

**Electronic Supplementary Information**

for

**Electrochemical primary amination of imidazopyridines with  
azidotrimethylsilane under mild conditions**

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## 1 General information

All reagents were obtained from commercial suppliers and used without further purification. Reactions were monitored by thin layer chromatography. Column chromatography was performed using silica gel (300–400 mesh). The NMR spectra were recorded on a Bruker Avance 400 spectrometer at 400 MHz ( $^1\text{H}$ ) and 100 MHz ( $^{13}\text{C}$ ) in  $\text{DMSO-}d_6$  using tetramethylsilane as the internal standard. The following abbreviations were used to explain the multiplicities: s = singlet, d = doublet, t = triplet, m = multiplet, q = quartet. High-resolution mass spectra were obtained with an AB Triple 5600 mass spectrometer by ESI on a TOF mass analyzer. Melting points are uncorrected.

## 2 Experimental procedures

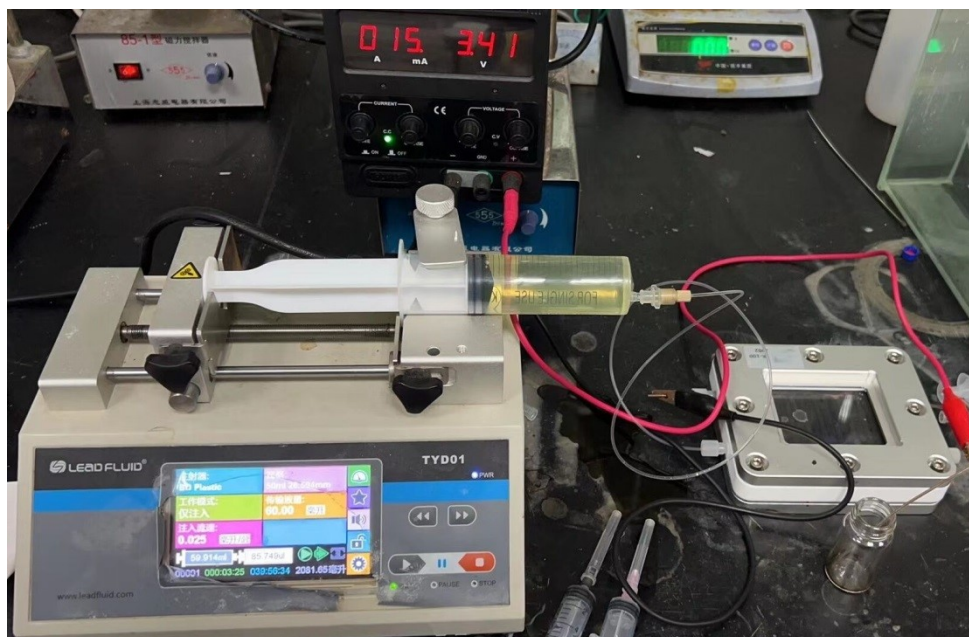
### 2.1 General procedure for the electrochemical reaction

An oven-dried undivided three-necked flask (25 mL) was charged with 2-phenylimidazo[1,2-*a*]pyridine (**1a**, 97.1 mg, 0.5 mmol),  $n\text{Bu}_4\text{NPF}_6$  (193.7 mg, 0.5 mmol). The flask was evacuated and backfilled with argon for 3 times. Then  $\text{CH}_3\text{CN}$  (10 mL) and  $\text{TMSN}_3$  (115.2 mg, 1.0 mmol, 131.5  $\mu\text{L}$ , 2.0 equiv.) were added. The flask was equipped with graphite felt electrode as the anode and platinum plate electrode (10 mm  $\times$  10 mm) as the cathode. The reaction mixture was stirred and electrolyzed at a constant current (10 mA) at room temperature for 4 h. After the reaction was completed, the mixture was diluted with water (30 mL) and then extracted with  $\text{CH}_2\text{Cl}_2$  (20 mL  $\times$  3). The combined organic phases were dried over anhydrous  $\text{Na}_2\text{SO}_4$ , filtered, concentrated in *vacuo*. The resulting residue was purified by silica gel chromatography using petroleum ether/ethyl acetate (2:1, v/v) as eluent to afford the desired product **2a**.

### 2.2 General procedure for the gram-scale experiment

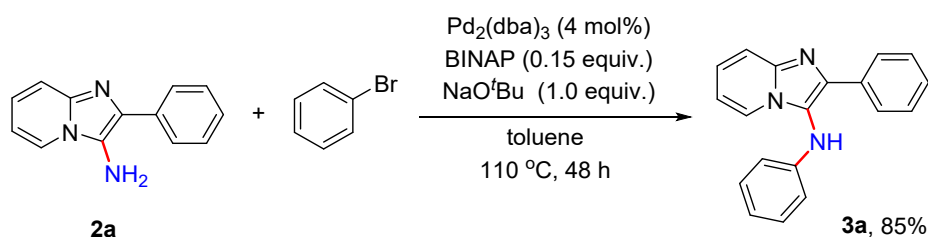
The electrolysis was carried out at a constant current of 15 mA using a flow electrolytic cell equipped with a carbon rod anode and a carbon rod cathode. The 2-phenylimidazo[1,2-*a*]pyridine (0.1 M in  $\text{CH}_3\text{CN}$ ),  $\text{TMSN}_3$  (0.2 M in  $\text{CH}_3\text{CN}$ ),  $n\text{Bu}_4\text{NPF}_6$  (0.1 M in  $\text{CH}_3\text{CN}$ ) were pushed via syringe pump into the flow electrolytic cell at a flow rate of 0.025 mL/min (Figure S1). After 66 h, 100 mL of the reaction solution was collected. It was concentrated under reduced pressure on rotary evaporator. The residue was diluted with water (80 mL) and then extracted with  $\text{CH}_2\text{Cl}_2$  (60 mL  $\times$  3). The combined organic phases were dried over anhydrous  $\text{Na}_2\text{SO}_4$ , filtered, concentrated

in *vacuo*. The resulting residue was purified by silica gel chromatography using petroleum ether/ethyl acetate (2:1, v/v) as eluent to afford the desired product **2a**. (1.47g, yield 70%).



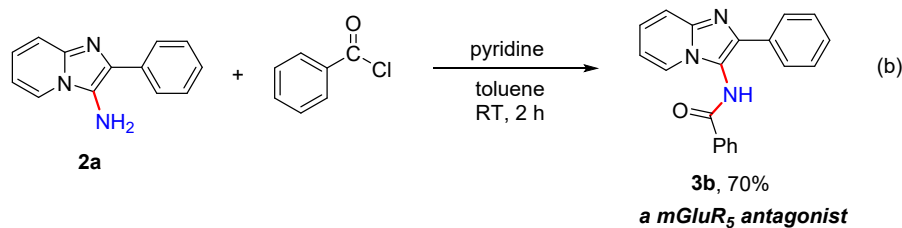
**Figure S1** Reaction setup for scale up experiment.

### 2.3 General procedure for the preparation of **3a**



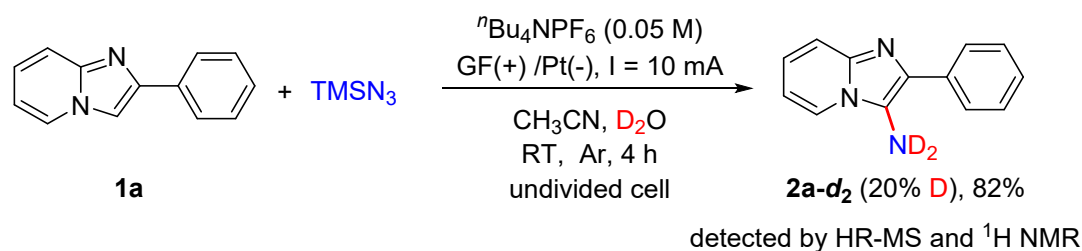
An oven-dried Schlenk tube (10 mL) was charged with 2-phenylimidazo[1,2-*a*]pyridin-3-amine (**2a**, 100.0 mg, 0.48 mmol), Pd<sub>2</sub>(dba)<sub>3</sub> (17.5 mg, 0.019 mmol, 4 mol%), BINAP (44.8 mg, 0.07 mmol, 0.15 equiv.), and sodium *tert*-butoxide (46.1 mg, 0.48 mmol, 1.0 equiv.). The flask was evacuated and backfilled with argon for 3 times. Then toluene (3 mL) and PhBr (150.7 mg, 0.96 mmol, 101.2 μL, 2.0 equiv.) were added. The reaction mixture was stirred under 110 °C for 48 hours. After the reaction was completed, the mixture was diluted with water (30 mL) and then extracted with CH<sub>2</sub>Cl<sub>2</sub> (20 mL × 3). The combined organic phases were dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>, filtered, concentrated in *vacuo*. The resulting residue was purified by silica gel chromatography using petroleum ether/ethyl acetate (2:1) as eluent to afford the desired product **3a**.

### 2.4 General procedure for the preparation of **3b**

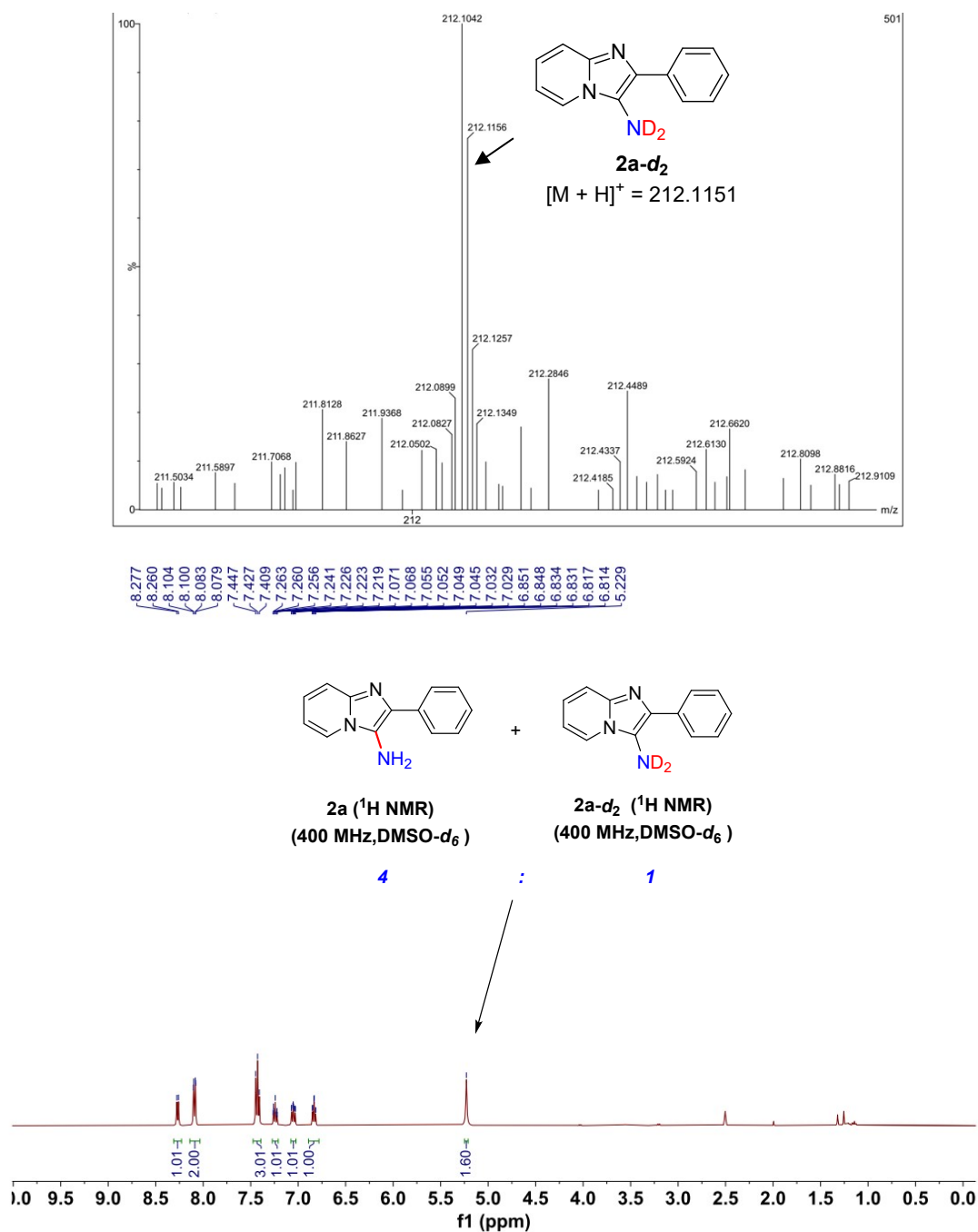


To a solution of 2-phenylimidazo[1,2-*a*]pyridin-3-amine (**2a**, 100.0 mg, 0.48 mmol) in toluene (4 mL) and pyridine (2 mL) in a Schlenk flask was added benzoyl chloride (105.5 mg, 87.9  $\mu\text{L}$ , 1.5 equiv.). The reaction mixture was stirred at room temperature for 2 hours. After the reaction was completed, water (3 mL) was added, and the solution was stirred for 15 min. The reaction mixture was cooled in an ice bath, and the precipitate was collected by vacuum filtration and then washed several times with ice water. The filtrate was diluted with water (30 mL) and then extracted with  $\text{CH}_2\text{Cl}_2$  (20 mL  $\times$  3), and the combined organic phases were dried over anhydrous  $\text{Na}_2\text{SO}_4$ , filtered, concentrated in *vacuo*. The resulting residue was purified by silica gel chromatography using petroleum ether/ethyl acetate (1:1, v/v) as eluent to afford the desired product **3b**.

### 3 Control experiments



An oven-dried undivided three-necked flask (25 mL) was charged with 2-phenylimidazo[1,2-*a*]pyridine (**1a**, 97.1 mg, 0.5 mmol),  $\text{tBu}_4\text{NPF}_6$  (193.7 mg, 0.5 mmol). The flask was evacuated and backfilled with argon for 3 times. Then dry  $\text{CH}_3\text{CN}$  (10 mL),  $\text{D}_2\text{O}$  (200.3 mg, 180.1  $\mu\text{L}$ , 20 equiv.) and  $\text{TMSN}_3$  (115.2 mg, 131.5  $\mu\text{L}$ , 1.0 mmol, 2.0 equiv.) were added. The flask was equipped with graphite felt electrode as the anode and platinum plate electrode (10 mm  $\times$  10 mm) as the cathode. The reaction mixture was stirred and electrolyzed at a constant current (10 mA) at room temperature for 4 h. After the reaction was completed, the mixture was diluted with water (30 mL) and then extracted with  $\text{CH}_2\text{Cl}_2$  (20 mL  $\times$  3). The combined organic phases were dried over anhydrous  $\text{Na}_2\text{SO}_4$ , filtered, concentrated in *vacuo*. The resulting residue was purified by silica gel chromatography using petroleum ether/ethyl acetate (2:1, v/v) as eluent to afford the desired product **2a-d<sub>2</sub>**.

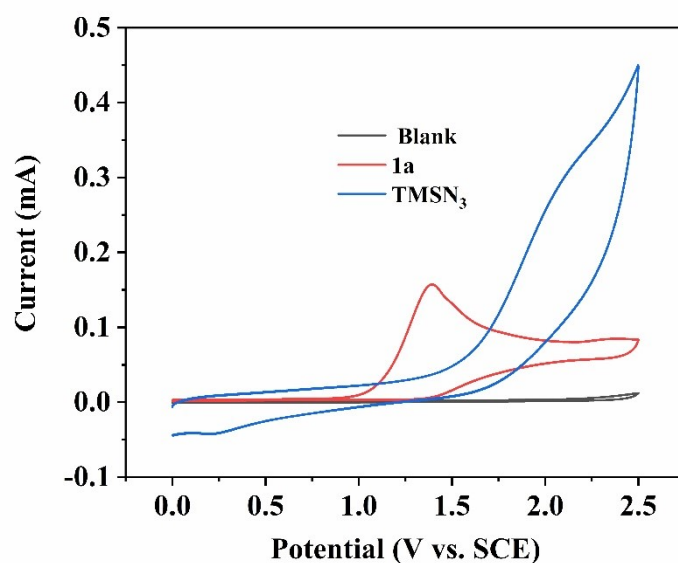


**Figure S2** HR-MS analysis and  $^1\text{H}$  NMR of the mixture of **2a** and **2a-d<sub>2</sub>**.

#### 4 Cyclic voltammetry analysis

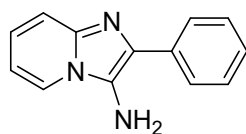
Cyclic voltammetry was performed in a three electrode cell in a three-necked flask. The working electrode was a Pt electrode, the counter electrode was Pt wire. The reference was saturated calomel electrode (SCE) submerged in saturated aqueous KCl solution. As shown in the Figure S2, 2-phenylimidazo[1,2-*a*]pyridine (**1a**) had lower oxidation potential (1.40 V vs SCE) than TMSN<sub>3</sub> (no distinct oxidation peak), indicating that the initial step maybe the oxidation of imidazopyridine

**1a.**

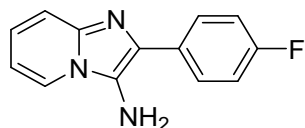


**Figure S3** CV scans (scan rate  $100 \text{ mv} \cdot \text{s}^{-1}$ ) of substrates. (a) Blank ( $n\text{Bu}_4\text{NPF}_6$  (0.02 M) in MeCN); (b)  $\text{TMSN}_3$  (0.01 M) in blank. (c) 2-Phenylimidazo[1,2-*a*]pyridine (**1a**, 0.01 M) in blank.

## 5 Experimental data for the products **2**, **3a** and **3b**.

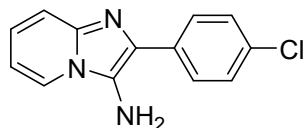


**2-Phenylimidazo[1,2-*a*]pyridin-3-amine (2a)**. The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (93.0 mg, 89% yield). m.p. 209–210 °C.  $^1\text{H}$  NMR (400 MHz,  $\text{DMSO}-d_6$ )  $\delta$  (ppm) 8.25–8.23 (m, 1H), 8.06–8.03 (m, 2H), 7.43–7.40 (m, 3H), 7.25–7.21 (m, 1H), 7.07–7.03 (m, 1H), 6.85–6.82 (m, 1H), 5.19 (s, 2H).  $^{13}\text{C}$  NMR (100 MHz, DMSO)  $\delta$  (ppm) 139.1, 135.3, 128.8, 127.2, 127.0, 126.6, 126.4, 123.1, 122.7, 116.8, 111.6. HRMS (ESI)  $m/z$ :  $[\text{M} + \text{H}]^+$  Calcd for  $\text{C}_{13}\text{H}_{12}\text{N}_3^+$  210.1026; Found 210.1027.

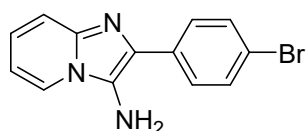


**2-(4-Fluorophenyl)imidazo[1,2-*a*]pyridin-3-amine (2b)**. The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (92.0 mg, 81% yield). m.p. 150–151 °C.  $^1\text{H}$  NMR (400 MHz,  $\text{DMSO}-d_6$ )  $\delta$  (ppm) 8.28 (d,  $J = 6.9 \text{ Hz}$ , 1H), 8.17–8.12 (m, 2H), 7.44 (d,  $J = 9.1 \text{ Hz}$ , 1H), 7.29–7.23 (m, 2H), 7.08–7.04 (m, 1H), 6.85–6.82 (m, 1H),

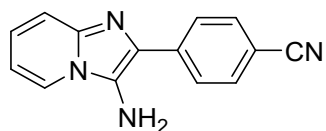
5.19 (s, 2H).  $^{13}\text{C}$  NMR (100 MHz, DMSO)  $\delta$  (ppm) 161.2 (d,  $J = 243.0$  Hz), 160.0, 139.4, 132.2 (d,  $J = 2.9$  Hz), 128.5 (d,  $J = 7.9$  Hz). 127.6, 126.5, 123.0, 122.6, 117.0, 115.5 (d,  $J = 21.1$  Hz), 111.4. HRMS (ESI)  $m/z$ :  $[\text{M} + \text{H}]^+$  Calcd for  $\text{C}_{13}\text{H}_{11}\text{FN}_3^+$  228.0932; Found 228.0936.



**2-(4-Chlorophenyl)imidazo[1,2-*a*]pyridin-3-amine (2c).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (104.5 mg, 86% yield). m.p. 151–152 °C.  $^1\text{H}$  NMR (400 MHz, DMSO- $d_6$ )  $\delta$  (ppm) 8.29–8.27 (m, 1H), 8.13–8.10 (m, 2H), 7.48–7.42 (m, 3H), 7.08–7.04 (m, 1H), 6.85–6.82 (m, 1H), 5.29 (s, 2H).  $^{13}\text{C}$  NMR (100 MHz, DMSO)  $\delta$  (ppm) 139.4, 134.5, 130.7, 128.7, 128.2, 127.3, 126.8, 123.1, 122.7, 117.1, 111.5. HRMS (ESI)  $m/z$ :  $[\text{M} + \text{H}]^+$  Calcd for  $\text{C}_{13}\text{H}_{11}\text{ClN}_3^+$  244.0636; Found 244.0644.

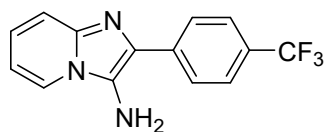


**2-(4-Bromophenyl)imidazo[1,2-*a*]pyridin-3-amine (2d).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (126.2 mg, 88% yield). m.p. 147–148 °C.  $^1\text{H}$  NMR (400 MHz, DMSO- $d_6$ )  $\delta$  (ppm) 8.30–8.28 (m, 1H), 8.09–8.06 (m, 2H), 7.62–7.58 (m, 2H), 7.46–7.43 (m, 1H), 7.08–7.04 (m, 1H), 6.85–6.81 (m, 1H), 5.32 (s, 2H).  $^{13}\text{C}$  NMR (100 MHz, DMSO)  $\delta$  (ppm) 139.4, 134.9, 131.6, 128.5, 127.4, 126.8, 123.1, 122.7, 119.3, 117.1, 111.5. HRMS (ESI)  $m/z$ :  $[\text{M} + \text{H}]^+$  Calcd for  $\text{C}_{13}\text{H}_{11}\text{BrN}_3^+$  288.0131; Found 288.0136.

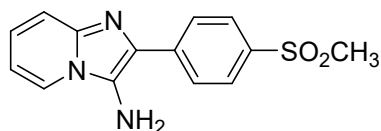


**4-(3-Aminoimidazo[1,2-*a*]pyridin-2-yl)benzonitrile (2e).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (97.1 mg, 83% yield). m.p. 184–185 °C.  $^1\text{H}$  NMR (400 MHz, DMSO- $d_6$ )  $\delta$  (ppm) 8.28 (d,  $J = 6.9$  Hz, 1H), 8.22–8.20 (m, 2H), 7.84–7.82 (m, 2H), 7.42 (d,  $J = 9.1$  Hz, 1H), 7.10–7.06 (m, 1H), 6.86–6.83 (m, 1H), 5.63 (s, 2H).  $^{13}\text{C}$  NMR (100 MHz, DMSO)  $\delta$  (ppm) 140.3, 139.5, 132.7, 129.5, 126.5, 124.7, 123.3, 123.2, 119.9, 117.4, 111.8, 107.8. HRMS (ESI)  $m/z$ :  $[\text{M} + \text{H}]^+$  Calcd for  $\text{C}_{14}\text{H}_{11}\text{N}_4^+$

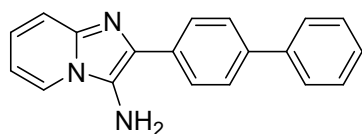
235.0978; Found 235.0985.



**2-(4-(Trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridin-3-amine (2f).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (121.9 mg, 88% yield). m.p. 189–190 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.30–8.25 (m, 3H), 7.74 (d, *J* = 8.3 Hz, 2H), 7.45–7.42 (m, 1H), 7.10–7.06 (m, 1H), 6.87–6.83 (m, 1H), 5.49 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.8, 139.4, 128.7, 126.6, 126.1 (q, *J* = 31.4 Hz), 125.6 (q, *J* = 3.9 Hz), 125.1 (q, *J* = 271.5 Hz), 125.5, 123.2, 123.0, 117.3, 111.6. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>11</sub>F<sub>3</sub>N<sub>3</sub><sup>+</sup> 278.0900; Found 278.0907.

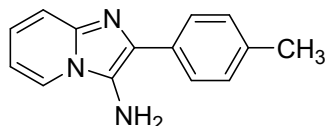


**2-(4-(Methylsulfonyl)phenyl)imidazo[1,2-*a*]pyridin-3-amine (2g).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (124.8 mg, 87% yield). m.p. 232–233 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.29 (d, *J* = 8.0 Hz, 3H), 7.94 (d, *J* = 8.1 Hz, 2H), 7.44 (d, *J* = 9.1 Hz, 1H), 7.10–7.06 (m, 1H), 6.87–6.84 (m, 1H), 5.60 (s, 2H), 3.25 (s, 3H). <sup>13</sup>C NMR ((100 MHz, DMSO) δ (ppm) 140.8, 139.5, 137.6, 129.3, 127.6, 126.5, 124.9, 123.2, 123.2, 117.4, 111.7, 44.2. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub>O<sub>2</sub>S<sup>+</sup> 288.0801; Found 288.0806.

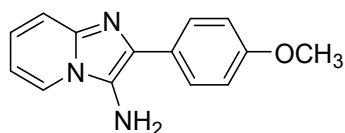


**2-([1,1'-Biphenyl]-4-yl)imidazo[1,2-*a*]pyridin-3-amine (2h).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (111.1 mg, 78% yield). m.p. 206–207 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.28 (d, *J* = 6.9 Hz, 1H), 8.18 (d, *J* = 8.1 Hz, 2H), 7.75–7.72 (m, 4H), 7.49–7.43 (m, 3H), 7.38–7.34 (m, 1H), 7.08–7.04 (m, 1H), 6.86–6.83 (m, 1H), 5.30 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 140.4, 139.3, 137.8, 134.9, 129.4, 127.7, 127.3, 127.1, 127.0, 126.8, 123.0, 122.5, 117.0, 111.4. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>19</sub>H<sub>16</sub>N<sub>3</sub><sup>+</sup> 286.1339; Found 286.1346.

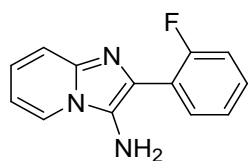




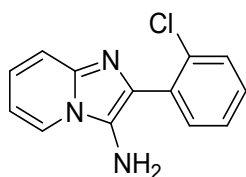
**2-(*p*-Tolyl)imidazo[1,2-*a*]pyridin-3-amine (2i).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (92.5 mg, 83% yield). m.p. 105–106 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.27–8.24 (m, 1H), 8.00–7.98 (m, 2H), 7.44–7.41 (m, 1H), 7.24 (d, *J* = 8.0 Hz, 2H), 7.06–7.02 (m, 1H), 6.85–6.81 (m, 1H), 5.15 (s, 2H), 2.33 (s, 3H). <sup>13</sup>C NMR (101 MHz, DMSO) δ (ppm) 139.2, 135.5, 132.8, 129.4, 128.2, 126.6, 126.4, 122.9, 122.2, 116.9, 111.3, 21.3. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub><sup>+</sup> 224.1182; Found 224.1182.



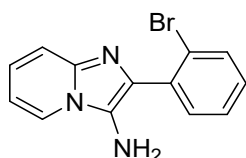
**2-(4-Methoxyphenyl)imidazo[1,2-*a*]pyridin-3-amine (2j).** The product was purified by silica gel column chromatography with ether/ethyl acetate (2:1, v/v). Yellow solid (100.4 mg, 84% yield). m.p. 152–153 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.25 (d, *J* = 6.9 Hz, 1H), 8.05 (d, *J* = 8.7 Hz, 2H), 7.43 (d, *J* = 9.0 Hz, 1H), 7.07–7.00 (m, 3H), 6.85–6.81 (m, 1H), 5.06 (s, 2H), 3.79 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 158.2, 139.3, 128.8, 128.2, 128.0, 125.6, 122.9, 122.2, 116.7, 114.2, 111.2, 55.5. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub>O<sup>+</sup> 240.1131; Found 240.1136.



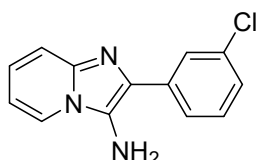
**2-(2-Fluorophenyl)imidazo[1,2-*a*]pyridin-3-amine (2k).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (85.1 mg, 75% yield). m.p. 232–233 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.18 (d, *J* = 6.9 Hz, 1H), 7.81–7.77 (m, 1H), 7.44 (d, *J* = 9.1 Hz, 1H), 7.38–7.26 (m, 3H), 7.08–7.04 (m, 1H), 6.86–6.83 (m, 1H), 5.10 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 159.4 (d, *J* = 245.8 Hz), 139.5, 131.6 (d, *J* = 4.6 Hz), 128.9 (d, *J* = 8.1 Hz), 128.5, 124.9 (d, *J* = 3.3 Hz), 123.2 (d, *J* = 14.5 Hz), 123.0, 122.2, 122.2, 117.1, 116.3 (d, *J* = 22.2 Hz), 111.4. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>FN<sub>3</sub><sup>+</sup> 228.0932; Found 228.0927.



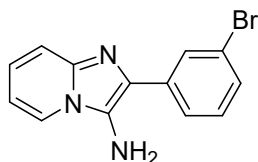
**2-(2-Chlorophenyl)imidazo[1,2-*a*]pyridin-3-amine (2l).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow oil (64.4 mg, 53% yield). <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.18–8.16 (m, 1H), 7.59–7.54 (m, 2H), 7.44–7.37 (m, 3H), 7.09–7.05 (m, 1H), 6.88–6.85 (m, 1H), 4.97 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 138.9, 134.3, 133.1, 132.9, 130.1, 129.3, 128.1, 127.3, 125.7, 123.0, 122.2, 117.1, 111.4. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>ClN<sub>3</sub><sup>+</sup> 244.0636; Found 244.0642.



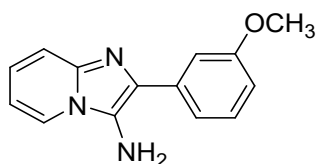
**2-(2-Bromophenyl)imidazo[1,2-*a*]pyridin-3-amine (2m).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (111.9 mg, 78% yield). m.p. 167–168 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.30–8.28 (m, 2H), 8.10–8.08 (m, 1H), 7.45–7.35 (m, 3H), 7.10–7.05 (m, 1H), 6.86–6.83 (m, 1H), 5.35 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.4, 138.1, 130.9, 128.9, 128.8, 127.7, 126.1, 125.2, 123.1, 123.0, 122.5, 117.2, 111.6. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>BrN<sub>3</sub><sup>+</sup> 288.0131; Found 288.0138.



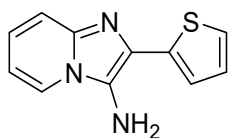
**2-(3-Chlorophenyl)imidazo[1,2-*a*]pyridin-3-amine (2n).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (70.5 mg, 58% yield). m.p. 172–173 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.30–8.27 (m, 1H), 8.13–8.12 (m, 1H), 8.06–8.03 (m, 1H), 7.45–7.41 (m, 2H), 7.29–7.26 (m, 1H), 7.09–7.05 (m, 1H), 6.86–6.83 (m, 1H), 5.35 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.4, 137.8, 133.7, 130.6, 127.7, 126.2, 126.0, 125.9, 124.8, 123.1, 122.9, 117.2, 111.6. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>ClN<sub>3</sub><sup>+</sup> 244.0636; Found 244.0644.



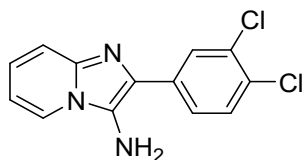
**2-(3-Bromophenyl)imidazo[1,2-*a*]pyridin-3-amine (2o).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (124.8 mg, 87% yield). m.p. 133–134 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.29 (d, *J* = 6.0 Hz, 2H), 8.10–8.08 (m, 1H), 7.45–7.35 (m, 3H), 7.09–7.05 (m, 1H), 6.86–6.83 (m, 1H), 5.34 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.4, 138.1, 130.9, 128.9, 128.8, 127.7, 126.2, 125.2, 123.1, 122.9, 122.5, 117.2, 111.6. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>BrN<sub>3</sub><sup>+</sup> 288.0131; Found 288.0141.



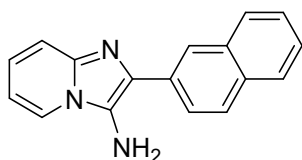
**2-(3-Methoxyphenyl)imidazo[1,2-*a*]pyridin-3-amine (2p).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow oil (62.1 mg, 52% yield). <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.27–8.24 (m, 1H), 7.65–7.61 (m, 2H), 7.44–7.41 (m, 1H), 7.35–7.30 (m, 1H), 7.09–7.04 (m, 1H), 6.86–6.79 (m, 2H), 5.20 (s, 2H), 3.83 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 159.8, 139.1, 136.9, 129.8, 127.4, 127.1, 123.0, 122.6, 119.0, 117.0, 112.3, 111.7, 111.5, 55.4. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub>O<sup>+</sup> 240.1131; Found 240.1140.



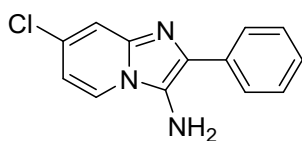
**2-(Thiophen-2-yl)imidazo[1,2-*a*]pyridin-3-amine (2q).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (91.4 mg, 85% yield). m.p. 170–171 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.23–8.21 (m, 1H), 7.57–7.56 (m, 1H), 7.42–7.38 (m, 2H), 7.13–7.11 (m, 1H), 7.08–7.03 (m, 1H), 6.86–6.83 (m, 1H), 5.33 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.0, 138.9, 128.3, 126.0, 124.1, 123.4, 122.9, 122.6, 122.4, 116.6, 111.6. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>11</sub>H<sub>10</sub>N<sub>3</sub>S<sup>+</sup> 216.0590; Found 216.0599.



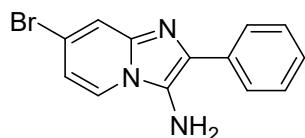
**2-(3,4-Dichlorophenyl)imidazo[1,2-*a*]pyridin-3-amine (2r).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (84.5 mg, 61% yield). m.p. 184–185 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.29–8.26 (m, 2H), 8.06–8.03 (m, 1H), 7.64 (d, *J* = 8.5 Hz, 1H), 7.43–7.40 (m, 1H), 7.10–7.06 (m, 1H), 6.87–6.83 (m, 1H), 5.40 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.5, 136.4, 131.6, 130.9, 128.2, 128.0, 127.7, 126.3, 125.2, 123.2, 117.2, 111.7. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>10</sub>Cl<sub>2</sub>N<sub>3</sub><sup>+</sup> 278.0246; Found 278.0255.



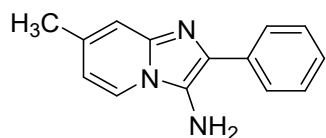
**2-(Naphthalen-2-yl)imidazo[1,2-*a*]pyridin-3-amine (2s).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (112.7 mg, 87% yield). m.p. 178–179 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.60 (d, *J* = 1.4 Hz, 1H), 8.39–8.33 (m, 2H), 8.00–7.88 (m, 3H), 7.53–7.44 (m, 3H), 7.10–7.06 (m, 1H), 6.88–6.85 (m, 1H), 5.48 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.4, 133.9, 133.3, 132.1, 128.4, 128.1, 128.0, 127.7, 127.4, 126.6, 125.8, 125.6, 124.5, 123.0, 122.5, 117.1, 111.5. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>17</sub>H<sub>14</sub>N<sub>3</sub><sup>+</sup> 260.1182; Found 260.1184.



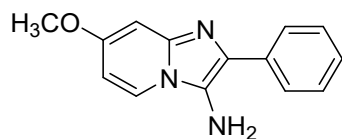
**7-Chloro-2-phenylimidazo[1,2-*a*]pyridin-3-amine (2t).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (98.4 mg, 81% yield). m.p. 220–221 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.28 (d, *J* = 7.4 Hz, 1H), 8.05–8.03 (m, 2H), 7.57 (d, *J* = 2.1 Hz, 1H), 7.44–7.40 (m, 2H), 7.27–7.22 (m, 1H), 6.93–6.91 (m, 1H), 5.36 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 138.6, 135.2, 128.8, 128.1, 127.6, 127.2, 126.6, 126.6, 123.9, 115.6, 112.5. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>ClN<sub>3</sub><sup>+</sup> 244.0636; Found 244.0634.



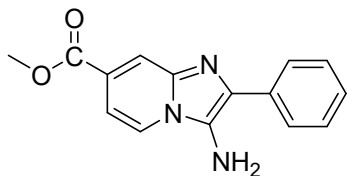
**7-Bromo-2-phenylimidazo[1,2-*a*]pyridin-3-amine (2u).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (123.4 mg, 86% yield). m.p. 238–239 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.22 (d, *J* = 7.3 Hz, 1H), 8.04–8.02 (m, 2H), 7.72 (d, *J* = 1.9 Hz, 1H), 7.44–7.40 (m, 2H), 7.27–7.23 (m, 1H), 7.01–6.99 (m, 1H), 5.36 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.1, 135.2, 128.8, 127.9, 127.7, 126.6, 126.6, 123.9, 118.8, 114.9, 114.7. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>BrN<sub>3</sub><sup>+</sup> 288.0131; Found 288.0135.



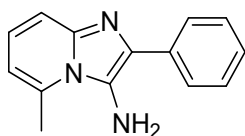
**7-Methyl-2-phenylimidazo[1,2-*a*]pyridin-3-amine (2v).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Red oil (78.0 mg, 70% yield). m.p. 201–202 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.16 (d, *J* = 7.1 Hz, 1H), 8.08–8.06 (m, 2H), 7.43–7.39 (m, 2H), 7.24–7.19 (m, 2H), 6.69–6.67 (m, 1H), 5.10 (s, 2H), 2.32 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.7, 135.8, 132.7, 128.7, 127.6, 126.5, 126.4, 126.2, 122.4, 115.2, 113.9, 21.2. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub><sup>+</sup> 224.1182; Found 224.1187.



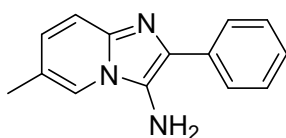
**7-Methoxy-2-phenylimidazo[1,2-*a*]pyridin-3-amine (2w).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (10:1, v/v). Yellow solid (87.2 mg, 73% yield). m.p. 161–162 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.14–8.12 (m, 1H), 8.05–8.03 (m, 2H), 7.41–7.36 (m, 2H), 7.22–7.17 (m, 1H), 6.81 (d, *J* = 2.5 Hz, 1H), 6.59–6.56 (m, 1H), 4.96 (s, 2H), 3.81 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 156.4, 140.6, 135.9, 128.7, 127.4, 126.3, 125.9, 125.7, 123.9, 106.1, 94.5, 55.8. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub>O<sup>+</sup> 240.1131; Found 240.1138.



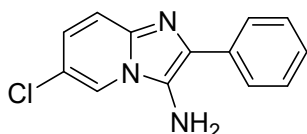
**Methyl 3-amino-2-phenylimidazo[1,2-*a*]pyridine-7-carboxylate (2x).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (104.1 mg, 78% yield). m.p. 207–208 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.30 (d, *J* = 7.3 Hz, 1H), 8.05–8.02 (m, 3H), 7.47–7.43 (m, 2H), 7.30–7.23 (m, 2H), 5.81 (s, 2H), 3.85 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 166.0, 137.4, 134.9, 130.0, 129.9, 128.9, 127.0, 126.8, 122.2, 121.2, 119.4, 110.1, 52.6. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>15</sub>H<sub>14</sub>N<sub>3</sub>O<sub>2</sub><sup>+</sup> 268.1081; Found 268.1077.



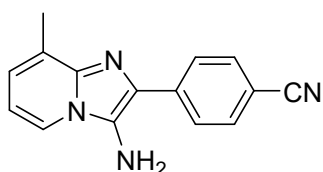
**5-Methyl-2-phenylimidazo[1,2-*a*]pyridin-3-amine (2y).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (40.1 mg, 36% yield). m.p. 78–79 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.11–8.08 (m, 2H), 7.45–7.40 (m, 2H), 7.29–7.25 (m, 2H), 6.97–6.93 (m, 1H), 6.47–6.44 (m, 1H), 4.55 (s, 2H), 2.99 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 141.8, 137.0, 135.6, 133.4, 128.7, 127.7, 127.4, 126.8, 123.7, 115.6, 112.7, 20.1. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub><sup>+</sup> 224.1182; Found 224.1192.



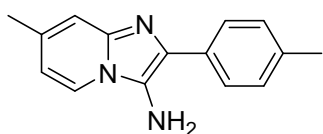
**6-Methyl-2-phenylimidazo[1,2-*a*]pyridin-3-amine (2z).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (55.8 mg, 50% yield). m.p. 197–198 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.08 (d, *J* = 9.3 Hz, 3H), 7.43–7.33 (m, 3H), 7.24–7.21 (m, 1H), 6.90 (d, *J* = 9.2 Hz, 1H), 5.15 (s, 2H), 2.27 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 138.5, 135.8, 128.7, 128.0, 126.7, 126.5, 126.2, 125.4, 120.3, 116.5, 18.4. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>14</sub>H<sub>14</sub>N<sub>3</sub><sup>+</sup> 224.1182; Found 224.1190.



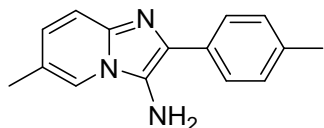
**6-Chloro-2-phenylimidazo[1,2-*a*]pyridin-3-amine (2aa).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Red oil (49.8 mg, 41% yield). m.p. 199–200 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.48 (d, *J* = 2.0 Hz, 1H), 8.03–8.01 (m, 2H), 7.48–7.40 (m, 3H), 7.27–7.23 (m, 1H), 7.07–7.05 (m, 1H), 5.42 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 137.3, 135.1, 128.9, 128.2, 128.0, 126.6, 126.6, 122.7, 120.7, 118.7, 117.9. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>13</sub>H<sub>11</sub>ClN<sub>3</sub><sup>+</sup> 244.0636; Found 244.0639.



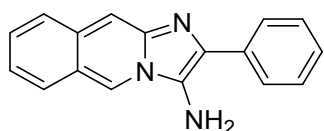
**4-(3-Amino-8-methylimidazo[1,2-*a*]pyridin-2-yl)benzonitrile (2ab).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow oil (45.9 mg, 37% yield). <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.24–8.21 (m, 2H), 8.14 (d, *J* = 7.0 Hz, 1H), 7.84–7.81 (m, 2H), 6.90–6.88 (m, 1H), 6.77–6.74 (m, 1H), 5.58 (s, 2H), 2.46 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 140.5, 140.0, 132.6, 129.9, 126.7, 126.5, 124.3, 121.8, 121.1, 120.0, 111.7, 107.6, 16.7. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>15</sub>H<sub>13</sub>N<sub>4</sub><sup>+</sup> 249.1135; Found 249.1139.



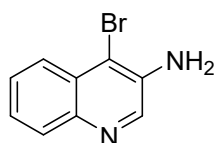
**7-Methyl-2-(*p*-tolyl)imidazo[1,2-*a*]pyridin-3-amine (2ac).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow oil (69.9 mg, 59% yield). <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.13 (d, *J* = 7.0 Hz, 1H), 7.96–7.94 (m, 2H), 7.22–7.17 (m, 3H), 6.68–6.66 (m, 1H), 4.98 (s, 2H), 2.33 (s, 3H), 2.32 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.7, 135.2, 133.0, 132.6, 129.3, 128.1, 126.5, 125.8, 122.3, 115.1, 113.7, 21.3, 21.2. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>15</sub>H<sub>16</sub>N<sub>3</sub><sup>+</sup> 238.1339; Found 238.1350.



**6-Methyl-2-(*p*-tolyl)imidazo[1,2-*a*]pyridin-3-amine (2ad).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (15:1, v/v). Yellow solid (53.3 mg, 45% yield). m.p. 208–209 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.06–8.05 (m, 1H), 7.93–7.91 (m, 2H), 7.34–7.32 (m, 1H), 7.22 (d, *J* = 8.0 Hz, 2H), 6.95–6.92 (m, 1H), 5.05 (s, 2H), 2.33 (s, 3H), 2.29 (s, 3H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 138.2, 135.4, 132.6, 129.4, 127.8, 126.5, 126.2, 125.6, 120.5, 120.4, 116.1, 21.3, 18.4. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>15</sub>H<sub>16</sub>N<sub>3</sub><sup>+</sup> 238.1339; Found 238.1347.

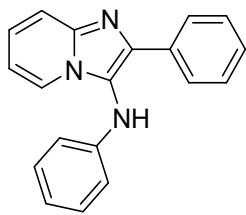


**2-Phenylimidazo[1,2-*b*]isoquinolin-3-amine (2ae).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (2:1, v/v). Yellow solid (93.2 mg, 72% yield). m.p. 119–120 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 9.37 (d, *J* = 8.6 Hz, 1H), 8.05 (d, *J* = 7.0 Hz, 2H), 7.88–7.85 (m, 1H), 7.64–7.59 (m, 1H), 7.50–7.42 (m, 5H), 7.31–7.28 (m, 1H), 5.17 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 139.0, 135.3, 134.8, 131.5, 130.9, 129.0, 128.9, 127.8, 127.2, 126.7, 125.0, 124.7, 124.6, 117.7, 117.4. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>17</sub>H<sub>14</sub>N<sub>3</sub><sup>+</sup> 260.1182; Found 260.1191.

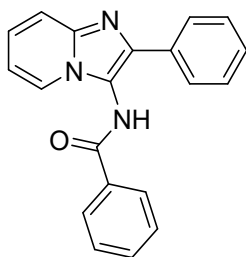


**4-Bromoquinolin-3-amine (2af).**<sup>1</sup> The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (5:1, v/v). Yellow solid (75.5 mg, 68% yield). m.p. 187–188 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.50 (s, 1H), 8.30 (d, *J* = 8.5 Hz, 1H), 7.80 (d, *J* = 8.4 Hz, 1H), 7.67–7.64 (m, 1H), 7.49–7.46 (m, 1H), 7.01 (s, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 151.5, 148.3, 147.5, 129.8, 129.4, 125.4, 123.0, 119.3, 98.6.





**N,2-diphenylimidazo[1,2-*a*]pyridin-3-amine (3a).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (3:1, v/v). Brown solid (121.1 mg, 85% yield). m.p. 235–236 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 8.28 (s, 1H), 8.08 (d, *J* = 7.7 Hz, 2H), 7.94 (d, *J* = 6.8 Hz, 1H), 7.64 (d, *J* = 9.0 Hz, 1H), 7.40–7.37 (m, 2H), 7.32–7.25 (m, 2H), 7.15–7.12 (m, 2H), 6.92–6.88 (m, 1H), 6.74–6.70 (m, 1H), 6.52 (d, *J* = 8.0 Hz, 2H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 146.0, 142.3, 137.9, 134.2, 130.0, 128.9, 128.0, 126.9, 125.6, 123.5, 119.4, 119.0, 117.6, 113.4, 112.7. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>19</sub>H<sub>16</sub>N<sub>3</sub><sup>+</sup> 286.1339; Found 286.1342.



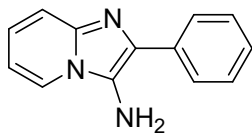
**N-(2-phenylimidazo[1,2-*a*]pyridin-3-yl)benzamide (3b).** The product was purified by silica gel column chromatography with petroleum ether/ethyl acetate (1:1, v/v). Brown solid (109.6 mg, 70% yield). m.p. 244–245 °C. <sup>1</sup>H NMR (400 MHz, DMSO-*d*<sub>6</sub>) δ (ppm) 10.75 (s, 1H), 8.16–8.12 (m, 3H), 8.03–8.00 (m, 2H), 7.72–7.60 (m, 4H), 7.47–7.43 (m, 2H), 7.37–7.31 (m, 2H), 6.98–6.95 (m, 1H). <sup>13</sup>C NMR (100 MHz, DMSO) δ (ppm) 167.2, 142.6, 138.3, 134.0, 133.4, 132.9, 129.2, 129.1, 128.5, 128.2, 127.1, 125.8, 124.3, 117.4, 115.9, 112.8. HRMS (ESI) *m/z*: [M + H]<sup>+</sup> Calcd for C<sub>20</sub>H<sub>16</sub>N<sub>3</sub>O<sup>+</sup> 314.1288; Found 314.1285.

## 6 References

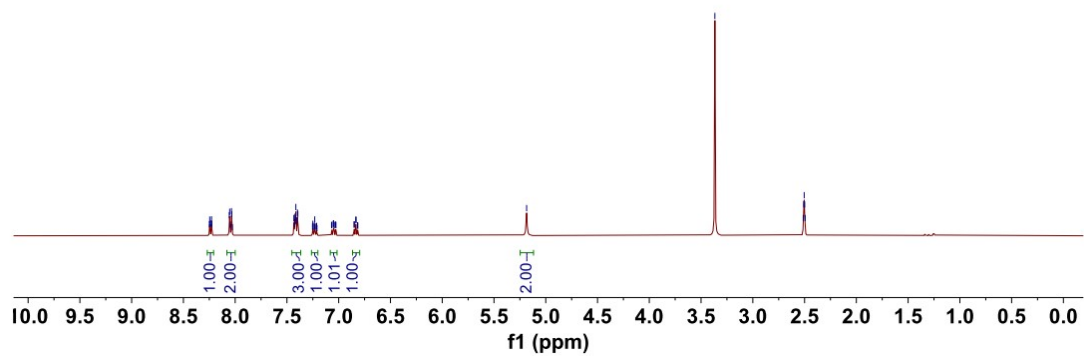
1 D. A. Scott, J. M. Hatcher, H. Liu, M. Fu, G. Du, L. Fontán, I. Us, G. Casalena, Q. Qiao, H. Wu, A. Melnick and N. S. Gray, *Bioorg. Med. Chem. Lett.*, 2019, **29**, 1694–1698.

## 7 <sup>1</sup>H and <sup>13</sup>C NMR spectra of the products

8.249  
8.246  
8.243  
8.232  
8.228  
8.225  
8.056  
8.053  
8.048  
8.036  
8.032  
8.028  
7.433  
7.428  
7.425  
7.422  
7.419  
7.414  
7.402  
7.399  
7.395  
7.253  
7.250  
7.247  
7.236  
7.232  
7.227  
7.217  
7.213  
7.210  
7.069  
7.066  
7.063  
7.050  
7.047  
7.044  
7.030  
7.027  
6.852  
6.849  
6.835  
6.832  
6.818  
6.815  
5.185  
3.367  
2.513  
2.508  
2.504  
2.499  
2.495

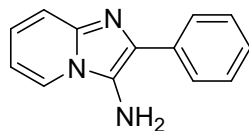


2a (<sup>1</sup>H NMR) (400 MHz, DMSO-*d*<sub>6</sub>)

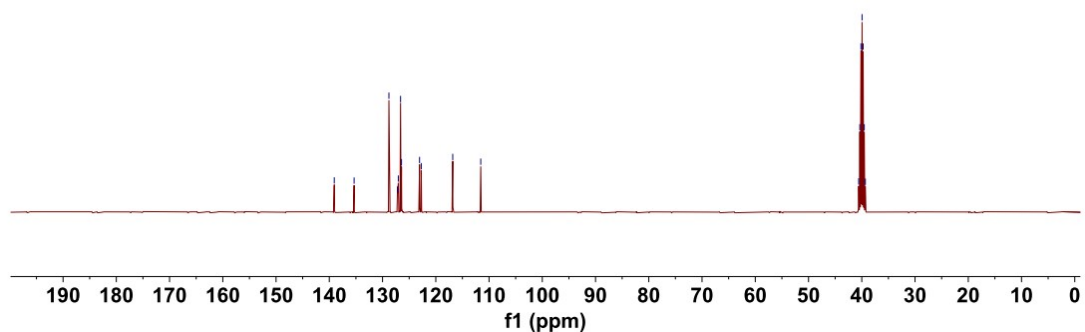


139.066  
135.340  
128.803  
127.212  
127.036  
126.616  
126.441  
123.052  
122.728  
116.821  
111.559

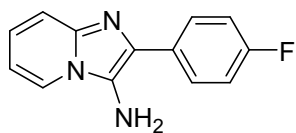
40.577  
40.368  
40.159  
39.950  
39.742  
39.532  
39.324



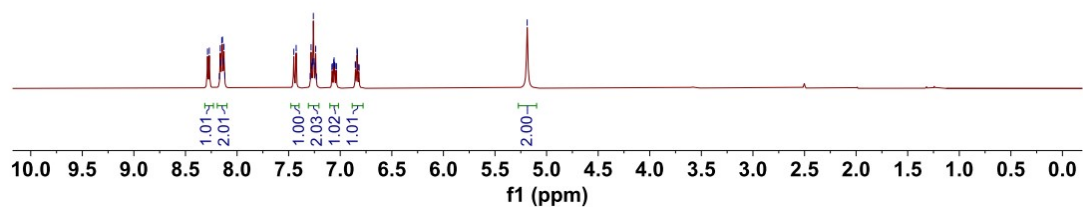
2a (<sup>13</sup>C{<sup>1</sup>H} NMR) (100 MHz, DMSO-*d*<sub>6</sub>)



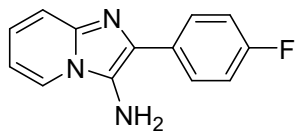
8.286  
8.269  
8.171  
8.163  
8.157  
8.148  
8.141  
8.132  
8.127  
8.119  
7.450  
7.427  
7.291  
7.283  
7.277  
7.267  
7.261  
7.254  
7.243  
7.238  
7.230  
7.080  
7.077  
7.063  
7.060  
7.055  
7.041  
7.038  
6.854  
6.851  
6.837  
6.834  
6.821  
6.818  
5.188



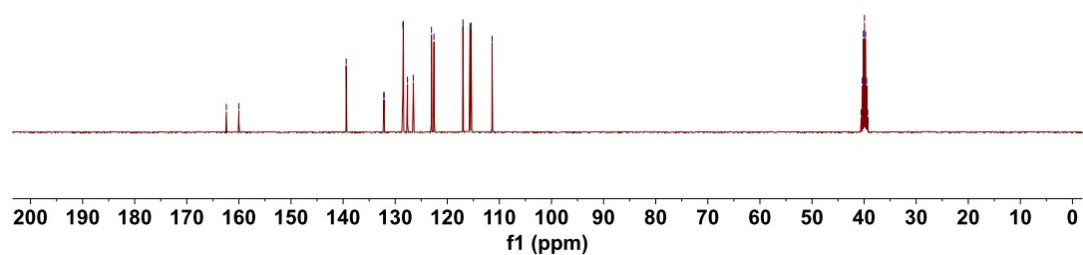
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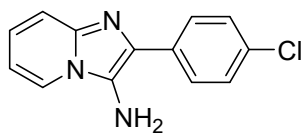
162.416  
160.000  
139.401  
132.172  
132.142  
128.525  
128.446  
127.642  
126.527  
123.043  
122.554  
116.994  
115.651  
115.441  
111.398  
40.551  
40.344  
40.136  
39.928  
39.718  
39.509  
39.301



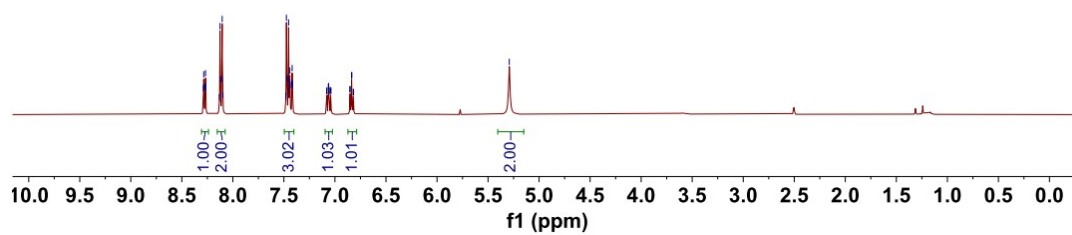
**2b ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )**



8.288  
8.285  
8.282  
8.271  
8.268  
8.265  
8.133  
8.126  
8.121  
8.109  
8.105  
8.098  
7.482  
7.475  
7.470  
7.459  
7.454  
7.447  
7.445  
7.442  
7.439  
7.422  
7.419  
7.416  
7.081  
7.078  
7.065  
7.062  
7.059  
7.056  
7.042  
7.039  
6.854  
6.851  
6.837  
6.834  
6.820  
6.817  
5.292

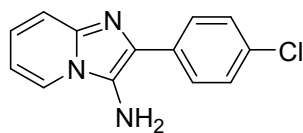


2c ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

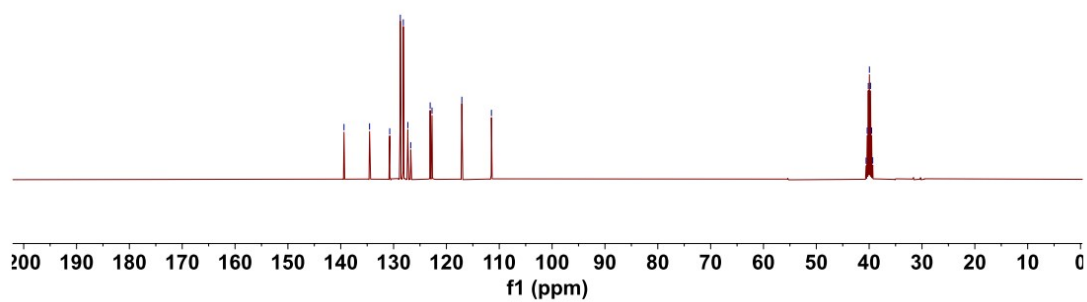


139.383  
134.548  
130.736  
128.723  
128.158  
127.300  
126.750  
123.075  
122.722  
117.081  
111.482

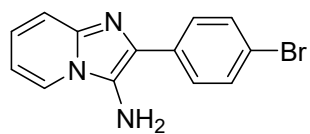
40.577  
40.368  
40.158  
39.950  
39.742  
39.533  
39.324



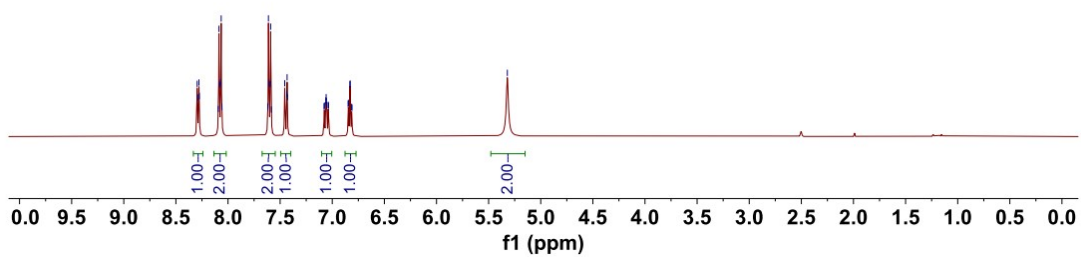
2c ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



8.296  
8.293  
8.279  
8.276  
8.094  
8.087  
8.082  
8.071  
8.065  
8.059  
7.619  
7.612  
7.607  
7.596  
7.591  
7.584  
7.456  
7.436  
7.433  
7.430  
7.078  
7.075  
7.062  
7.059  
7.056  
7.053  
7.039  
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6.848  
6.845  
6.831  
6.828  
6.814  
6.811  
5.320

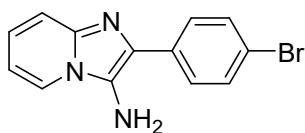


2d ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

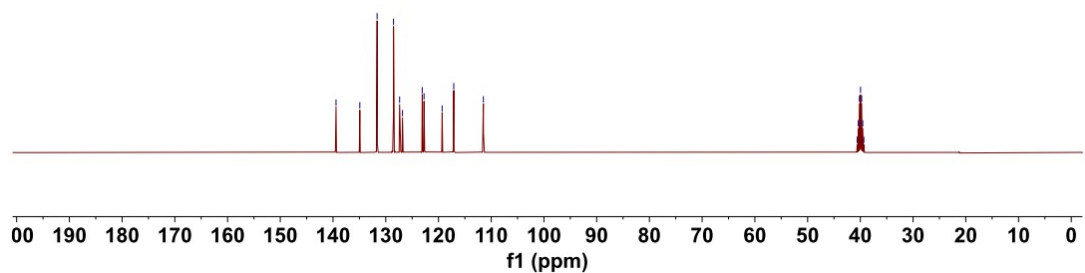


139.431  
134.920  
131.635  
128.532  
127.373  
126.822  
123.081  
122.740  
119.304  
117.104  
111.490

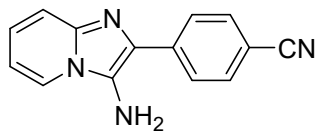
40.591  
40.383  
40.173  
39.965  
39.757  
39.549  
39.339



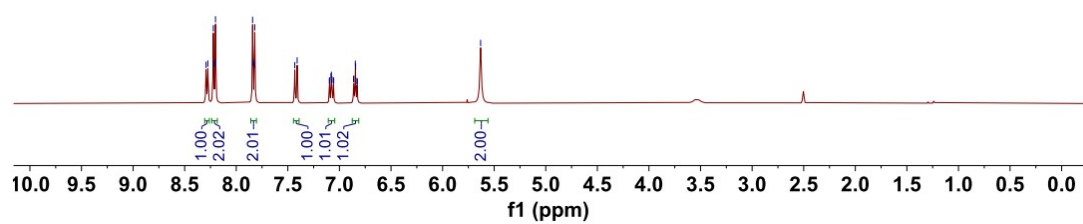
2d ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



8.293  
8.275  
8.222  
8.218  
8.206  
8.201  
7.842  
7.837  
7.825  
7.821  
7.433  
7.410  
7.098  
7.095  
7.081  
7.078  
7.072  
7.059  
7.055  
6.863  
6.860  
6.846  
6.843  
6.829  
6.827  
5.632

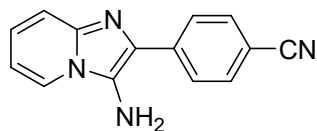


**2e ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )**

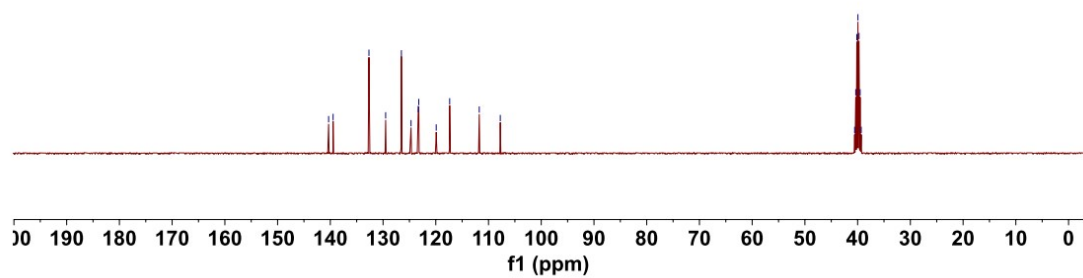


140.323  
139.473  
132.678  
129.508  
126.522  
124.694  
123.333  
123.225  
119.918  
117.368  
111.755  
107.768

40.570  
40.362  
40.153  
39.944  
39.735  
39.527  
39.319



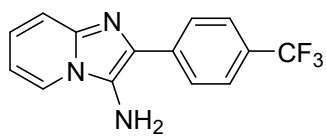
**2e ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )**



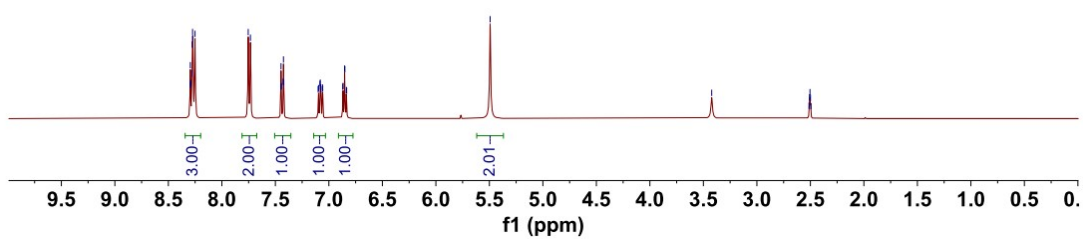
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8.280  
8.277  
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8.270  
8.251  
7.754  
7.733  
7.450  
7.447  
7.444  
7.427  
7.424  
7.421  
7.100  
7.097  
7.084  
7.080  
7.077  
7.074  
7.061  
7.058  
6.870  
6.867  
6.853  
6.850  
6.837  
6.834  
5.493

— 3.422

2.513  
2.508  
2.504  
2.499  
2.495

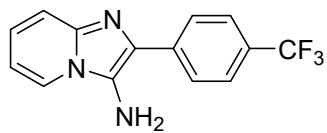


**2f ( $^1\text{H}$  NMR) (400 MHz,  $\text{DMSO-}d_6$ )**

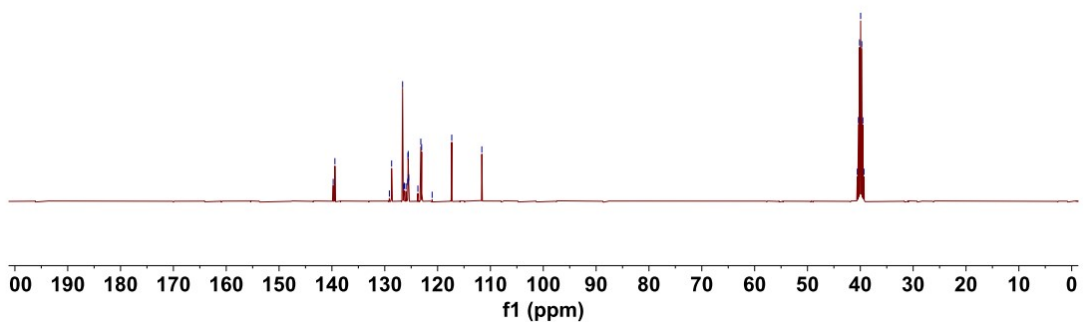


139.762  
139.434  
129.131  
128.704  
126.627  
126.432  
126.287  
125.973  
125.641  
125.603  
125.565  
125.526  
125.474  
123.733  
123.177  
123.020  
121.035  
117.323  
111.632

40.567  
40.360  
40.150  
39.943  
39.734  
39.524  
39.316



**2f ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz,  $\text{DMSO-}d_6$ )**

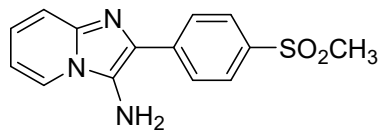


8.300  
8.280  
7.954  
7.934  
7.448  
7.426  
7.103  
7.086  
6.871  
6.854  
6.837

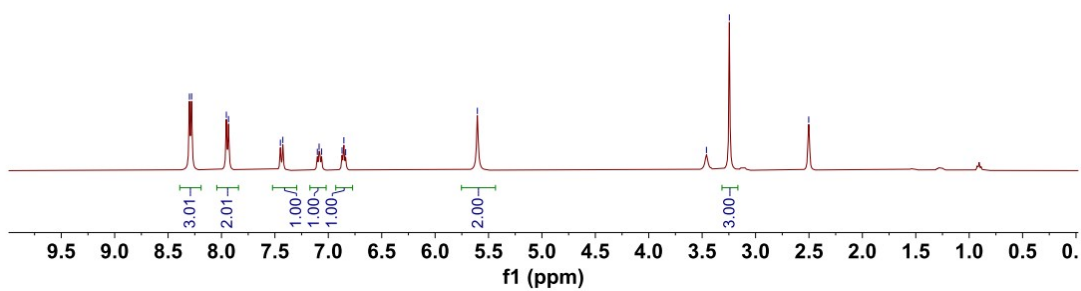
5.604

3.460  
3.245

2.502

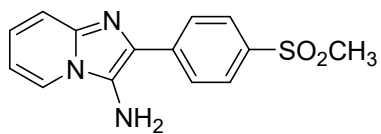


2g ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

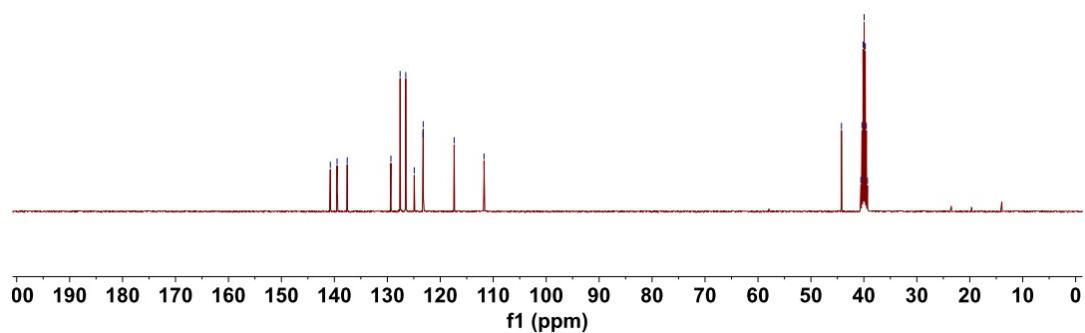


140.761  
139.486  
137.570  
129.322  
127.585  
126.516  
124.917  
123.243  
123.225  
117.377  
111.738

44.234  
40.574  
40.366  
40.158  
39.950  
39.740  
39.531  
39.323



2g ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )

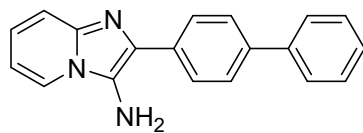




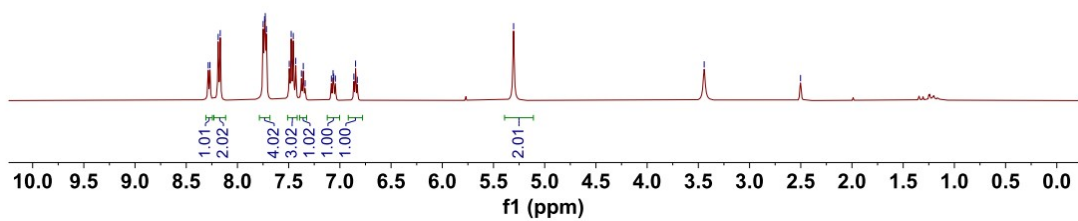
8.285  
8.268  
8.188  
8.168  
7.749  
7.735  
7.728  
7.717  
7.494  
7.475  
7.455  
7.431  
7.376  
7.357  
7.339  
7.083  
7.066  
7.060  
7.044  
6.863  
6.847  
6.830  
5.304

—3.443

—2.502

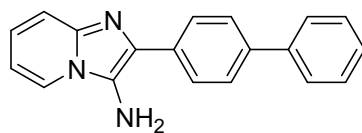


2h ( $^1\text{H}$  NMR) (400 MHz,  $\text{DMSO-}d_6$ )

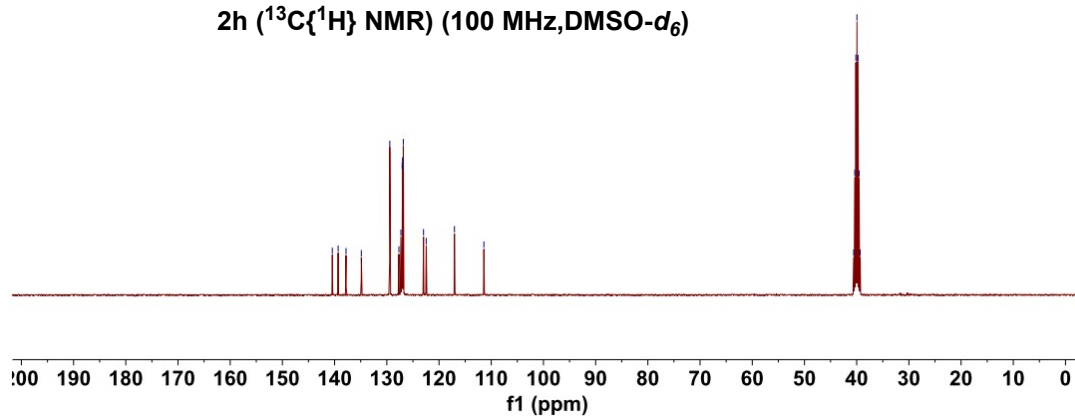


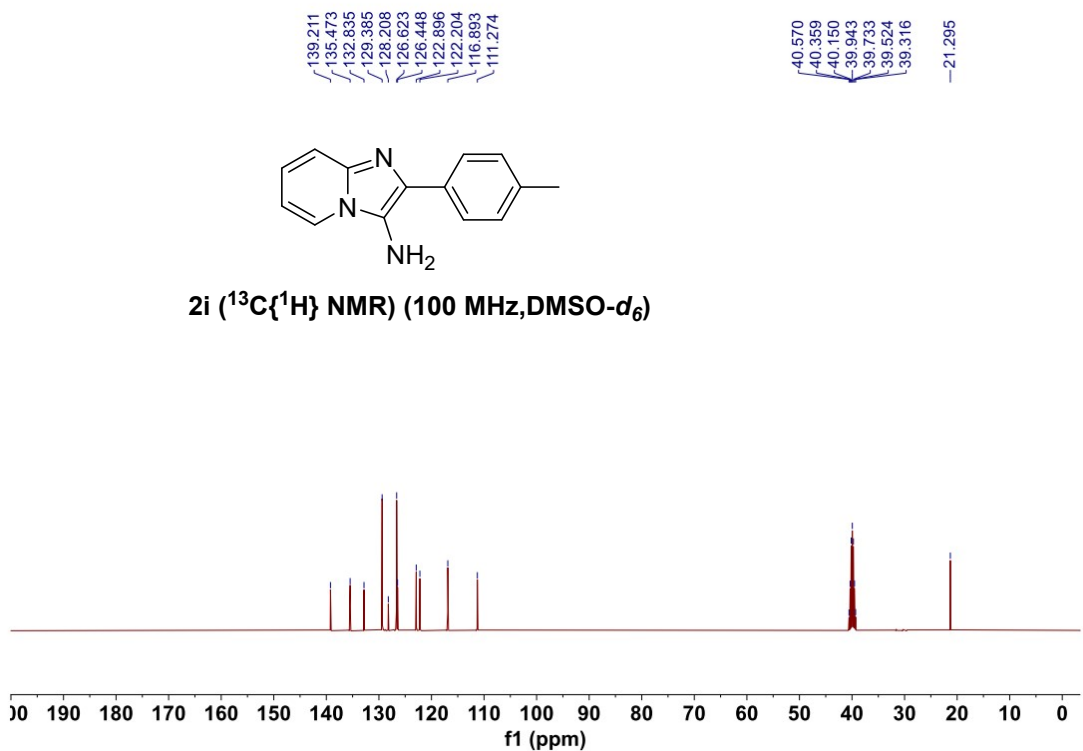
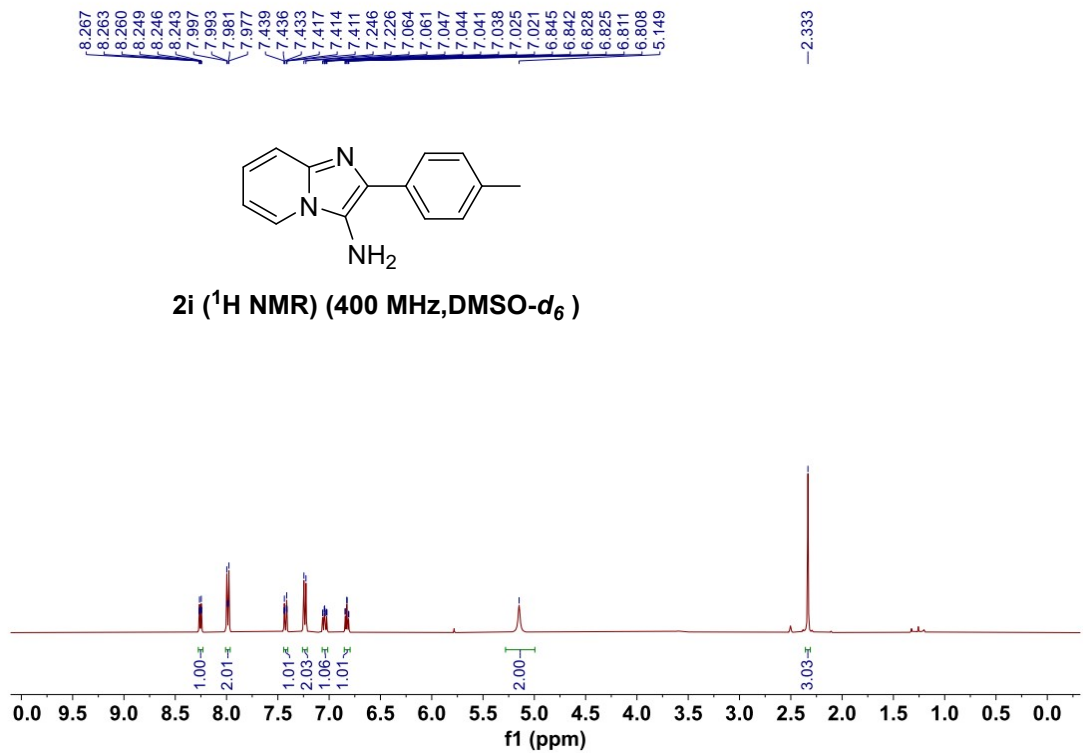
140.439  
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137.811  
134.882  
129.430  
127.683  
127.300  
127.062  
126.987  
126.841  
122.970  
122.450  
117.046  
111.405

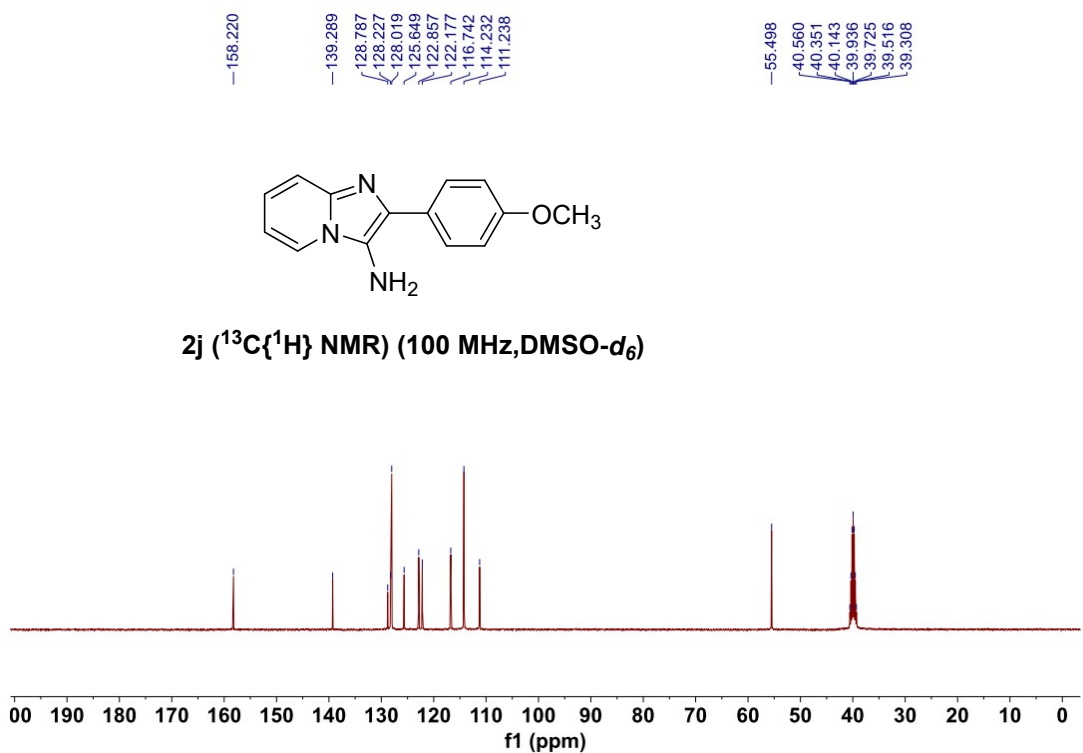
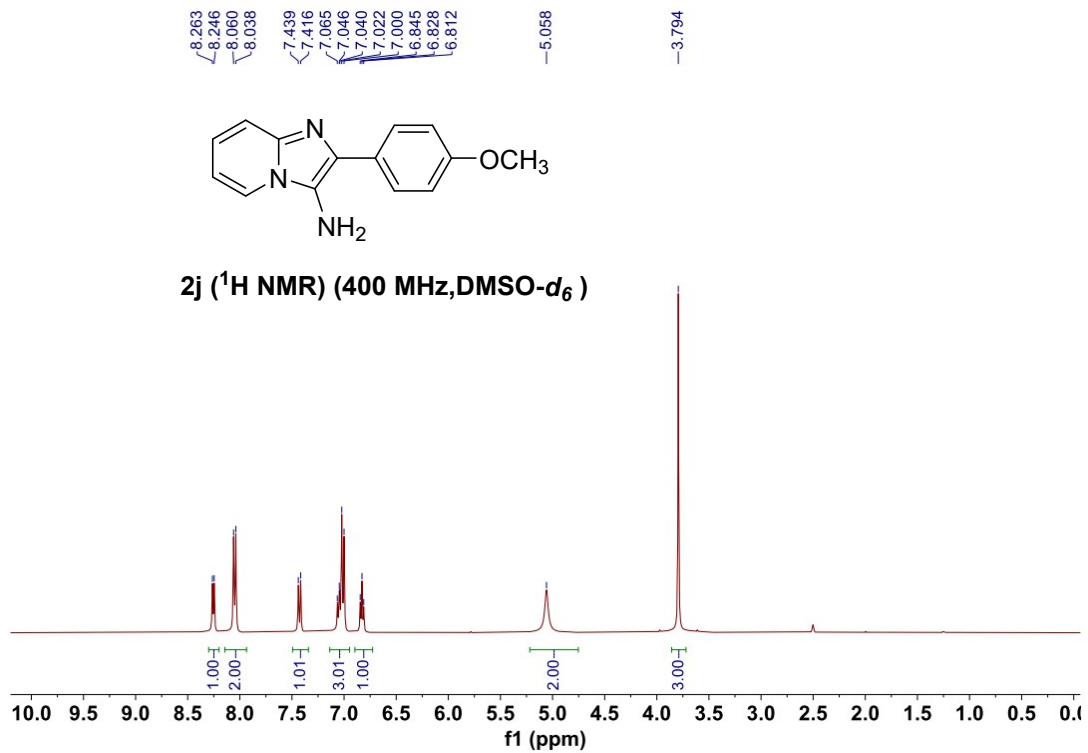
40.578  
40.369  
40.161  
39.951  
39.743  
39.534  
39.327



2h ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz,  $\text{DMSO-}d_6$ )



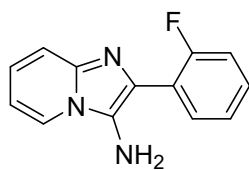




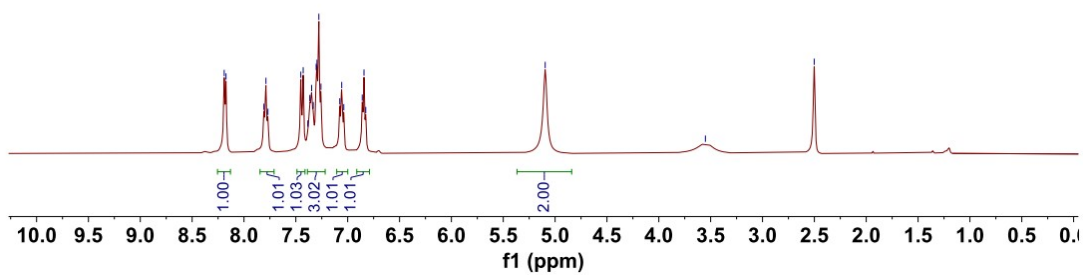
8.191  
8.173  
7.808  
7.788  
7.769  
7.452  
7.429  
7.384  
7.365  
7.348  
7.332  
7.304  
7.296  
7.278  
7.258  
7.077  
7.058  
6.860  
6.843  
6.826  
5.096

3.551

2.502



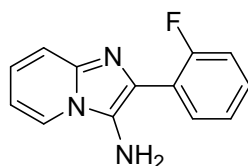
2k ( $^1\text{H}$  NMR) (400 MHz,  $\text{DMSO-}d_6$ )



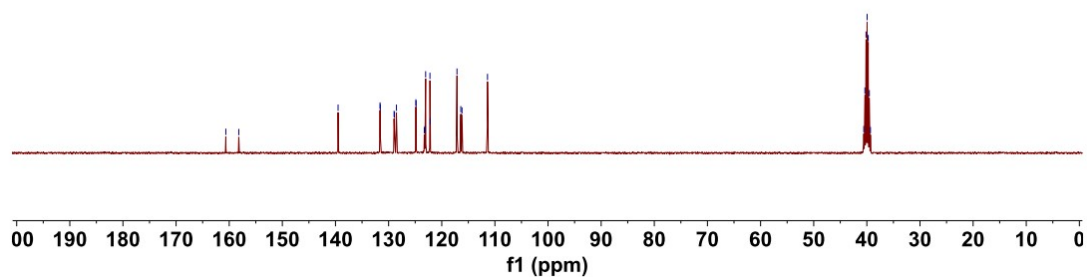
160.637  
158.194

139.510  
131.614  
131.568  
128.974  
128.893  
128.526  
124.869  
124.836  
123.284  
123.141  
123.034  
122.222  
122.172  
117.135  
116.415  
116.194  
111.390

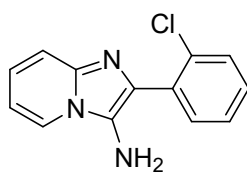
40.579  
40.369  
40.158  
39.950  
39.743  
39.533  
39.323



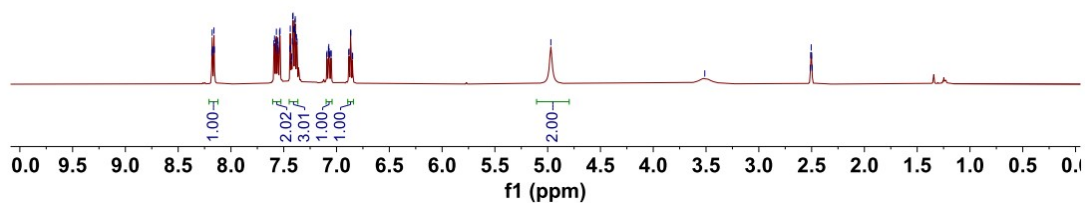
2k ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz,  $\text{DMSO-}d_6$ )



8.181  
8.178  
8.175  
8.164  
8.161  
8.158  
7.593  
7.587  
7.577  
7.574  
7.570  
7.558  
7.554  
7.552  
7.540  
7.535  
7.441  
7.438  
7.435  
7.429  
7.425  
7.418  
7.416  
7.411  
7.407  
7.398  
7.394  
7.391  
7.388  
7.379  
7.373  
7.093  
7.090  
7.076  
7.073  
7.070  
7.067  
7.054  
7.051  
6.884  
6.881  
6.867  
6.864  
6.850  
6.847  
4.970  
3.512  
2.513  
2.509  
2.504  
2.499  
2.495

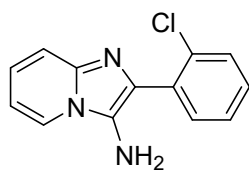


2I ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

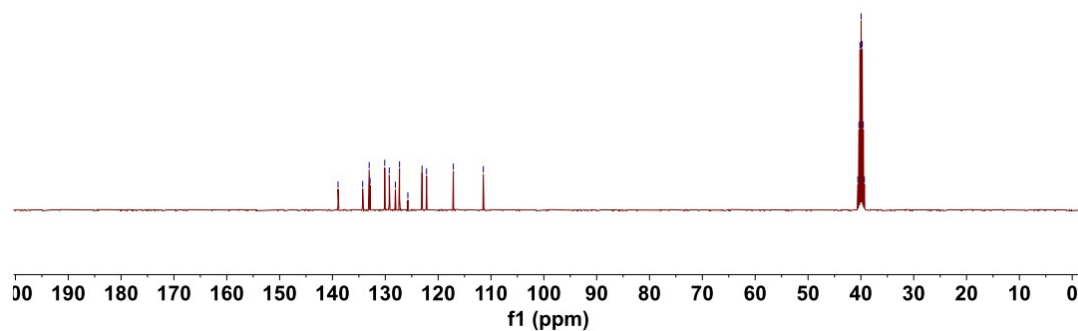


138.939  
134.282  
133.051  
132.886  
130.112  
128.251  
128.089  
127.311  
125.732  
123.047  
122.200  
117.125  
111.449

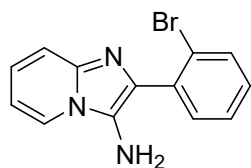
40.581  
40.372  
40.163  
39.954  
39.746  
39.538  
39.329



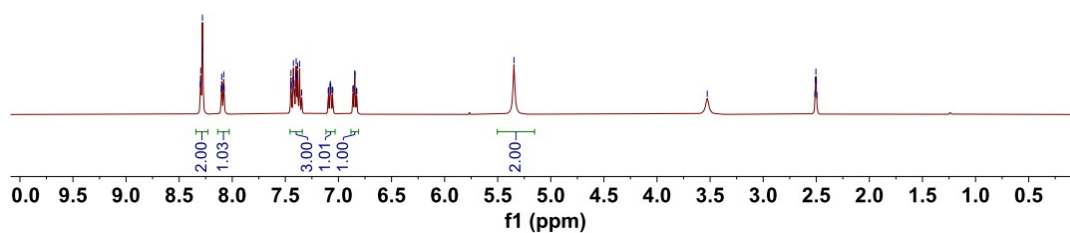
2I ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



8.300  
8.297  
8.294  
8.285  
8.281  
8.276  
8.103  
8.099  
8.095  
8.084  
8.080  
8.076  
7.450  
7.447  
7.444  
7.428  
7.424  
7.418  
7.413  
7.402  
7.398  
7.393  
7.385  
7.366  
7.346  
7.096  
7.092  
7.079  
7.076  
7.073  
7.070  
7.056  
7.053  
6.864  
6.861  
6.847  
6.844  
6.830  
6.827  
5.347  
5.327  
2.513  
2.509  
2.504  
2.499  
2.494

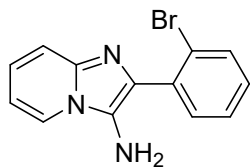


2m ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

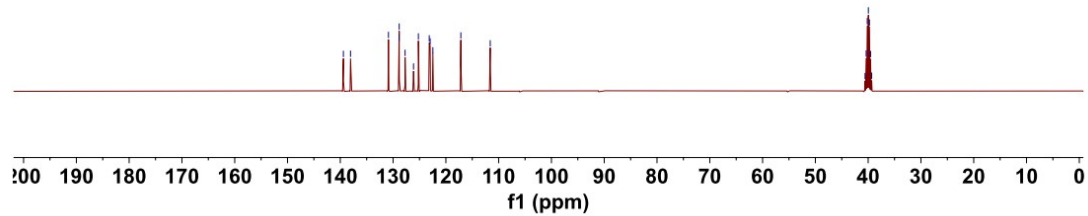


139.415  
138.063  
130.876  
128.865  
128.839  
127.723  
126.127  
125.205  
123.148  
122.977  
122.461  
117.161  
111.593

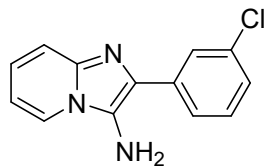
40.584  
40.376  
40.169  
39.961  
39.753  
39.542  
39.334



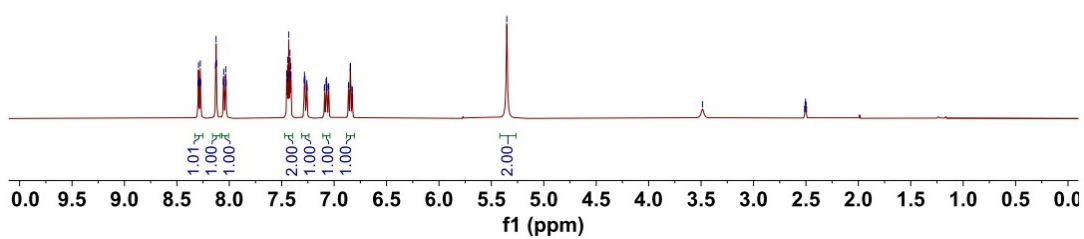
2m ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



8.294  
8.290  
8.279  
8.276  
8.273  
8.131  
8.126  
8.121  
8.056  
8.053  
8.037  
8.033  
8.030  
7.853  
7.447  
7.444  
7.441  
7.433  
7.424  
7.421  
7.418  
7.413  
7.285  
7.283  
7.278  
7.265  
7.260  
7.257  
7.093  
7.090  
7.076  
7.073  
7.070  
7.067  
7.054  
7.050  
6.864  
6.861  
6.847  
6.844  
6.830  
6.827  
6.827  
5.353  
3.486  
2.513  
2.508  
2.503  
2.499  
2.494

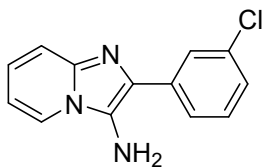


2n ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

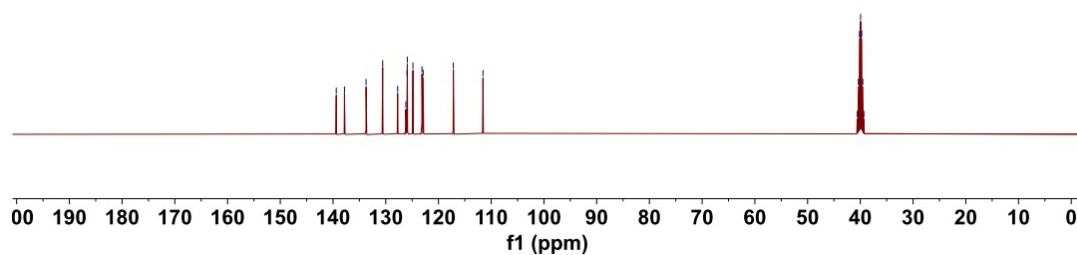


139.386  
137.830  
133.732  
130.582  
127.746  
126.192  
125.957  
125.912  
124.844  
123.133  
122.911  
117.187  
111.566

40.577  
40.368  
40.159  
39.951  
39.742  
39.534  
39.324



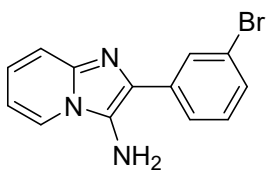
2n ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



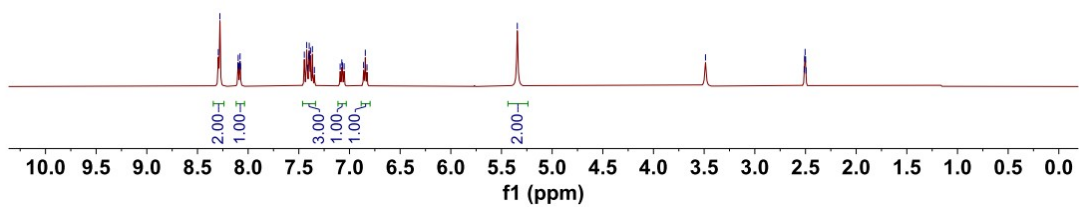
8.294  
8.279  
8.102  
8.098  
8.094  
8.083  
8.079  
8.075  
7.446  
7.422  
7.414  
7.402  
7.397  
7.393  
7.385  
7.366  
7.346  
7.092  
7.076  
7.069  
7.053  
6.861  
6.844  
6.827  
5.344

3.487

2.513  
2.509  
2.504  
2.499  
2.494

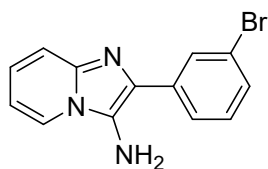


2o ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

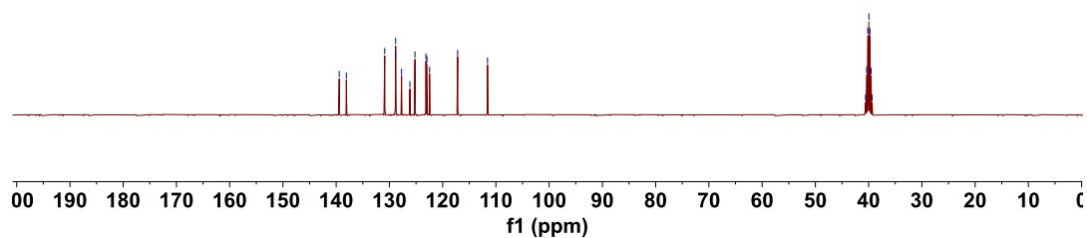


139.423  
138.090  
130.877  
128.858  
128.832  
127.721  
126.153  
125.200  
123.140  
122.944  
122.457  
117.183  
111.577

40.585  
40.377  
40.169  
39.961  
39.752  
39.543  
39.335

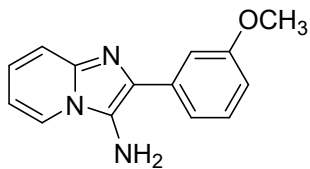


2o ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )

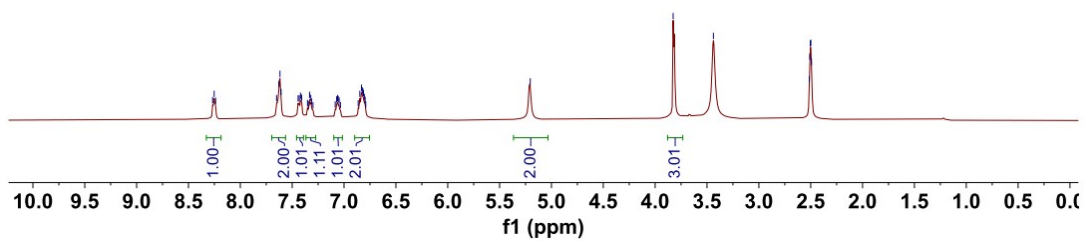




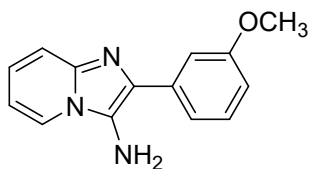
8.267  
8.252  
8.238  
7.650  
7.628  
7.618  
7.607  
7.443  
7.432  
7.420  
7.409  
7.352  
7.344  
7.332  
7.321  
7.312  
7.299  
7.085  
7.071  
7.063  
7.056  
7.047  
7.035  
6.863  
6.848  
6.832  
6.825  
6.819  
6.813  
6.804  
6.797  
6.790  
5.204  
-3.826  
-3.438  
2.514  
2.509  
2.504  
2.499  
2.493



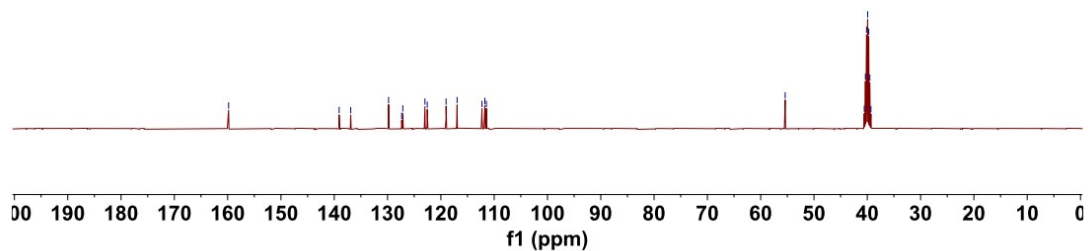
2p ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )



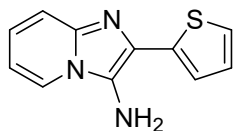
159.818  
139.083  
136.911  
129.804  
127.357  
127.144  
122.988  
122.554  
119.024  
116.958  
112.288  
111.749  
111.456  
55.400  
40.564  
40.355  
40.147  
39.937  
39.729  
39.520  
39.311



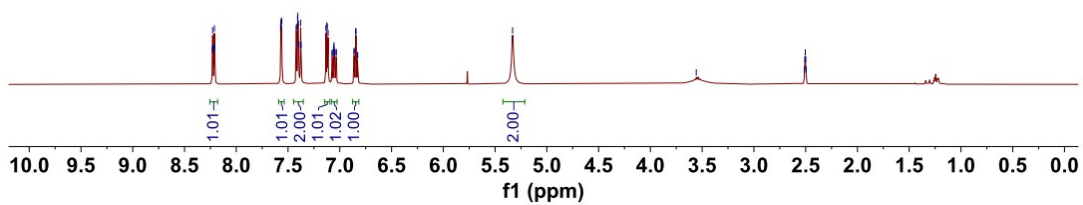
2p ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



8.231  
8.228  
8.225  
8.214  
8.211  
8.208  
7.572  
7.569  
7.563  
7.560  
7.421  
7.418  
7.408  
7.406  
7.400  
7.397  
7.381  
7.378  
7.375  
7.134  
7.125  
7.122  
7.113  
7.076  
7.073  
7.059  
7.056  
7.053  
7.050  
7.037  
7.033  
6.864  
6.861  
6.847  
6.844  
6.830  
6.827  
5.331  
3.557  
2.513  
2.508  
2.504  
2.499  
2.494

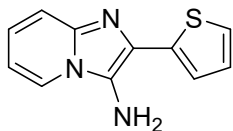


2q ( $^1\text{H}$  NMR) (400 MHz,  $\text{DMSO-}d_6$ )

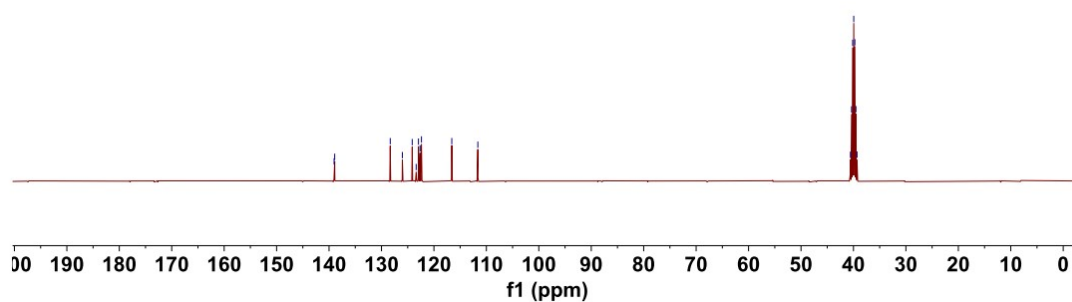


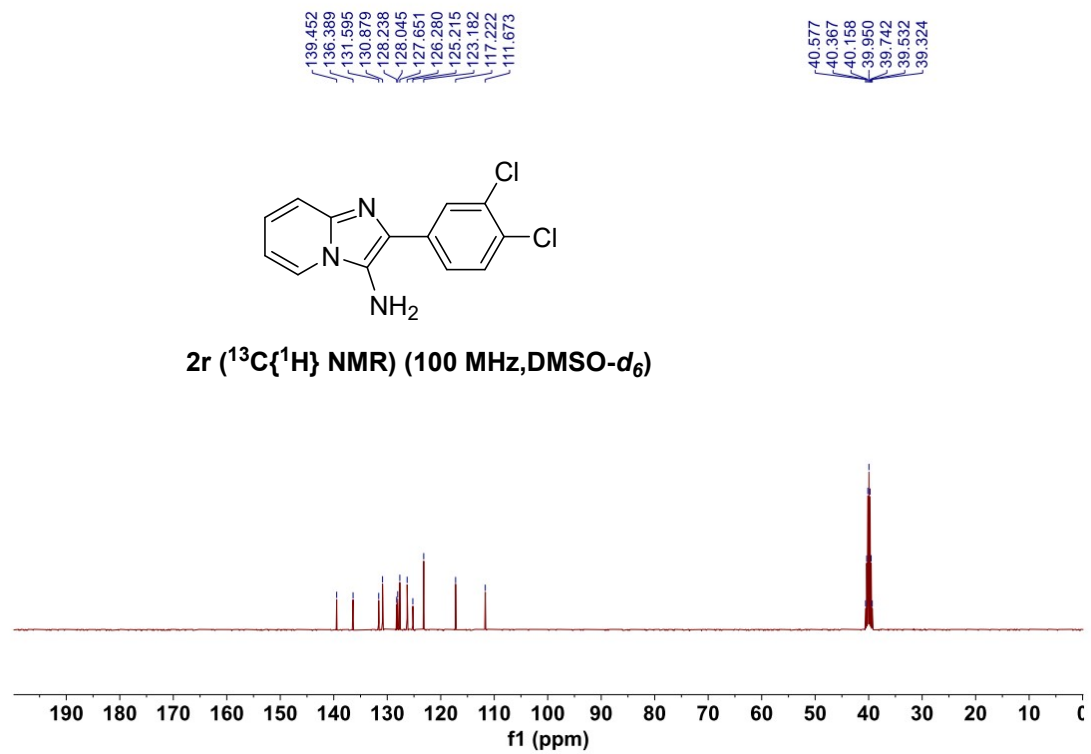
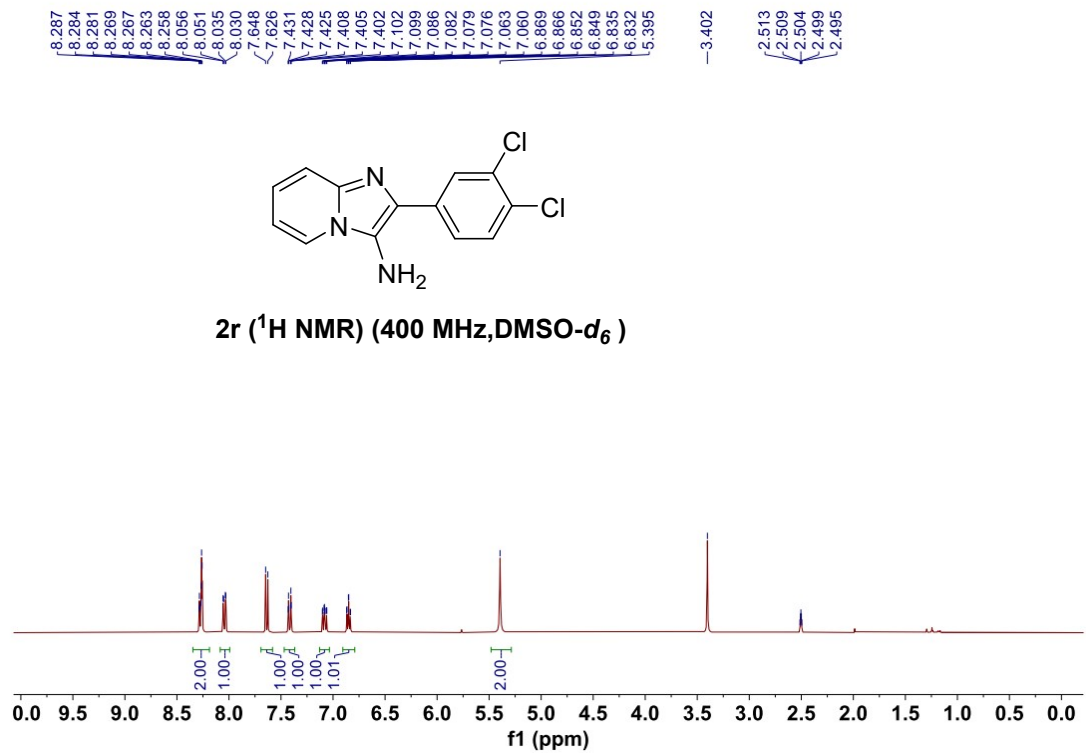
139.036  
138.923  
128.331  
126.017  
124.140  
123.385  
122.948  
122.634  
122.382  
116.595  
111.628

40.573  
40.366  
40.156  
39.947  
39.739  
39.531  
39.323

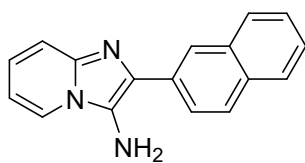


2q ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz,  $\text{DMSO-}d_6$ )

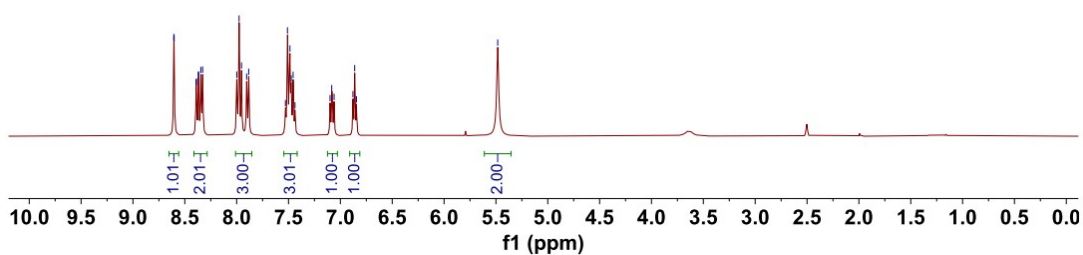




8.606  
8.603  
8.392  
8.387  
8.370  
8.366  
8.345  
8.328  
7.999  
7.977  
7.953  
7.904  
7.884  
7.530  
7.510  
7.486  
7.474  
7.456  
7.438  
7.099  
7.083  
7.061  
6.879  
6.862  
6.845  
5.483

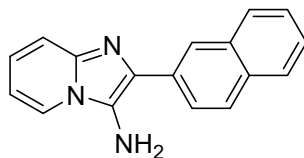


2s ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

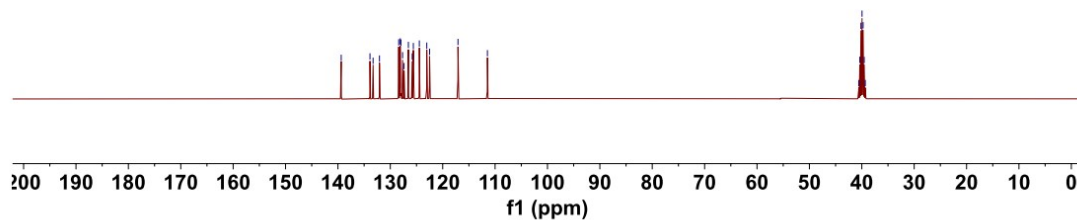


139.373  
133.881  
133.288  
132.071  
128.398  
128.107  
127.979  
127.658  
127.377  
126.550  
125.813  
125.604  
124.459  
123.041  
122.503  
117.082  
111.462

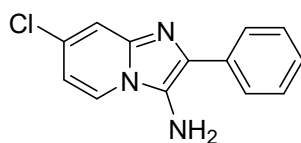
40.561  
40.373  
40.164  
39.954  
39.746  
39.538  
39.330



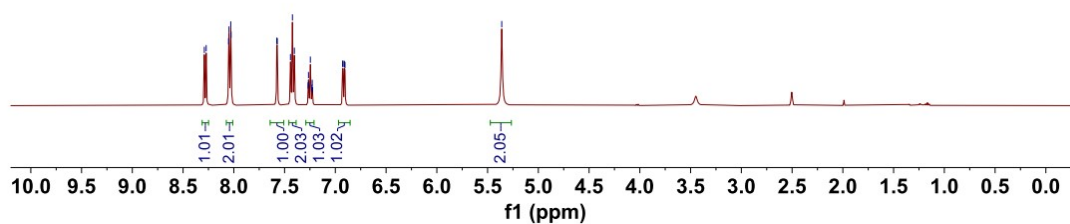
2s ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



8.290  
8.272  
8.051  
8.048  
8.030  
8.027  
7.577  
7.572  
7.442  
7.422  
7.403  
7.268  
7.264  
7.261  
7.246  
7.231  
7.227  
7.224  
6.928  
6.923  
6.910  
6.905  
5.361

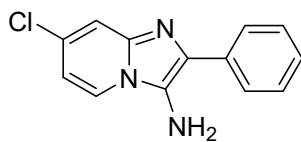


2t ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

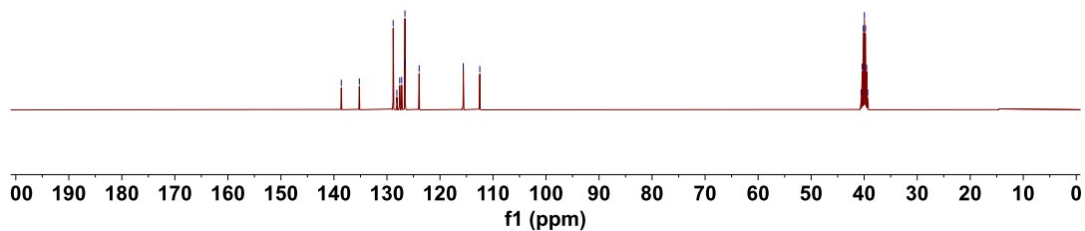


138.610  
135.212  
128.825  
128.133  
127.592  
127.224  
126.601  
126.576  
123.929  
115.603  
112.492

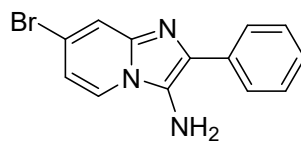
40.581  
40.373  
40.164  
39.955  
39.745  
39.539  
39.329



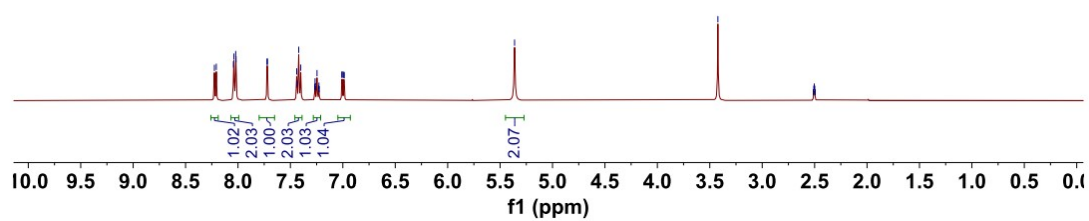
2t ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )



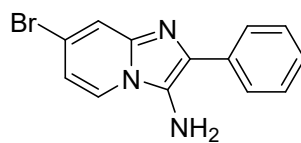
8.225  
8.207  
8.043  
8.039  
8.022  
8.018  
7.724  
7.719  
7.440  
7.435  
7.421  
7.401  
7.268  
7.265  
7.262  
7.246  
7.231  
7.228  
7.225  
7.010  
7.005  
6.992  
6.987  
— 5.362  
— 3.423  
2.513  
2.508  
2.503  
2.499  
2.494



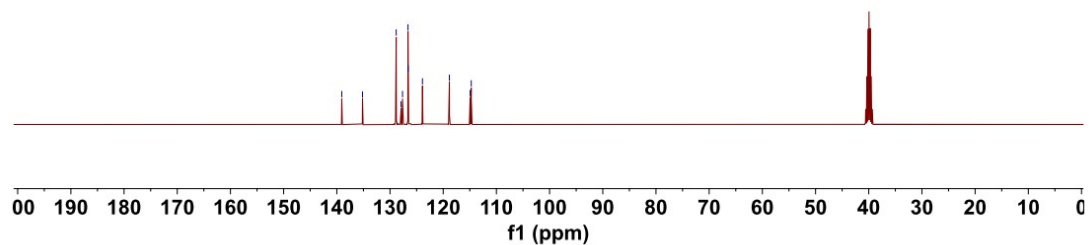
**2u ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )**



139.065  
135.171  
128.839  
127.919  
127.652  
126.618  
126.600  
123.900  
118.839  
114.928  
114.731



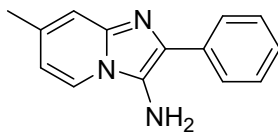
**2u ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )**



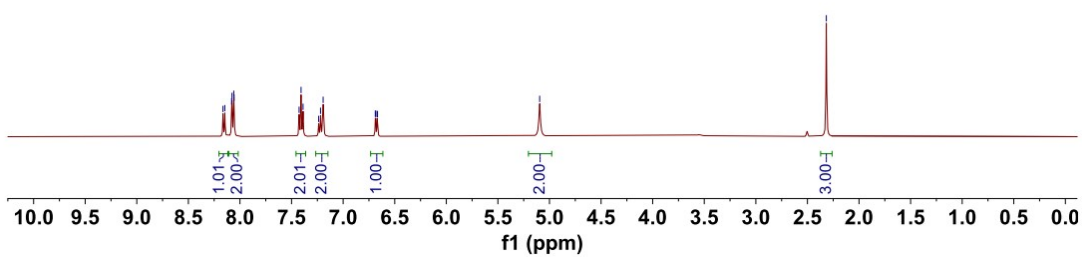
8.165  
8.147  
8.081  
8.077  
8.060  
8.057  
7.427  
7.408  
7.389  
7.237  
7.219  
7.194  
6.688  
6.671  
6.667

5.095

2.317

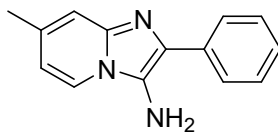


2v ( $^1\text{H}$  NMR) (400 MHz,  $\text{DMSO-}d_6$ )

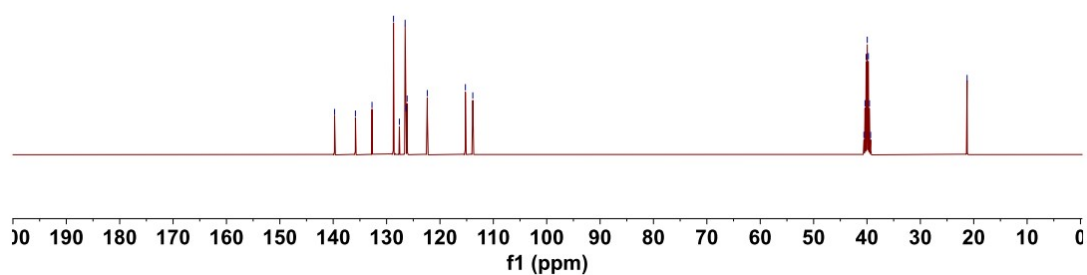


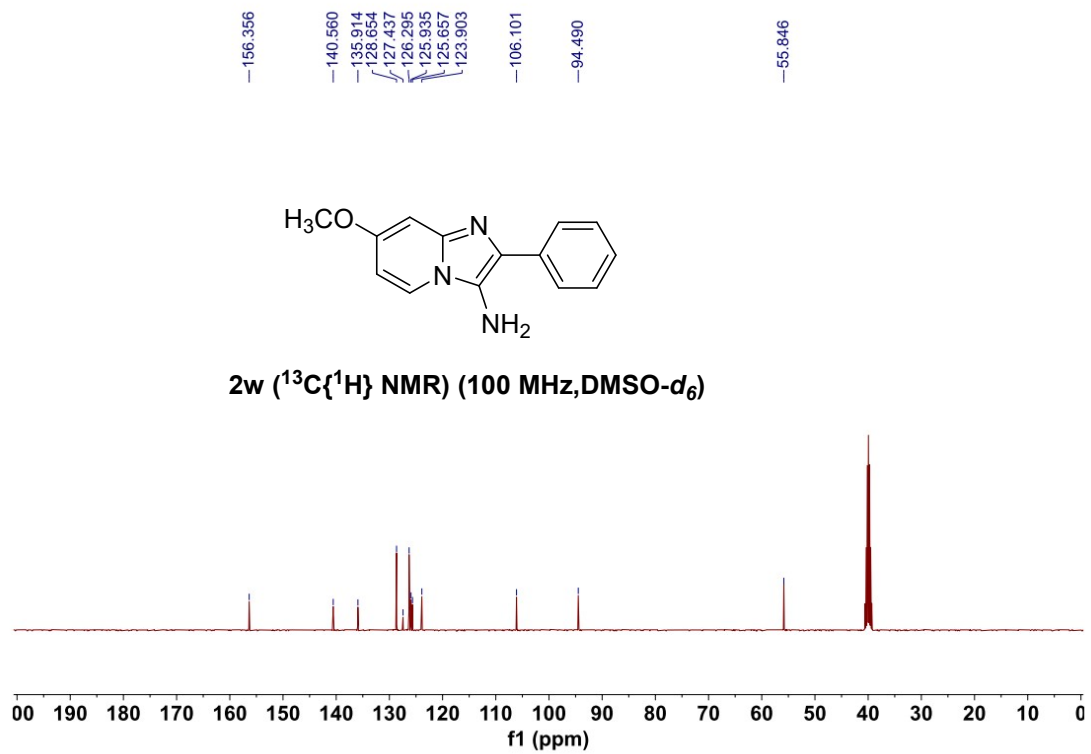
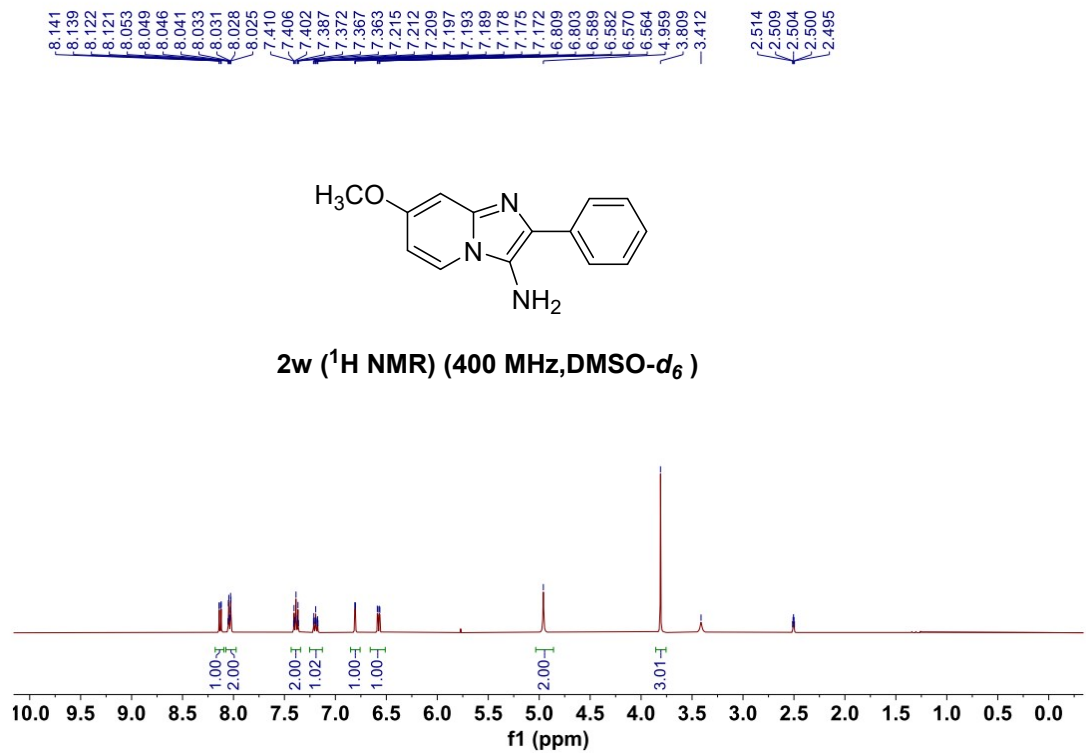
138.739  
135.837  
132.728  
128.704  
127.607  
126.526  
126.364  
126.152  
122.375  
115.237  
113.852

40.577  
40.369  
40.160  
39.950  
39.742  
39.534  
39.324  
21.246



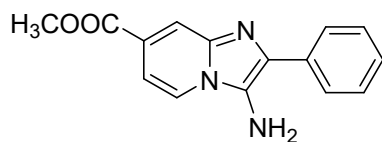
2v ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz,  $\text{DMSO-}d_6$ )



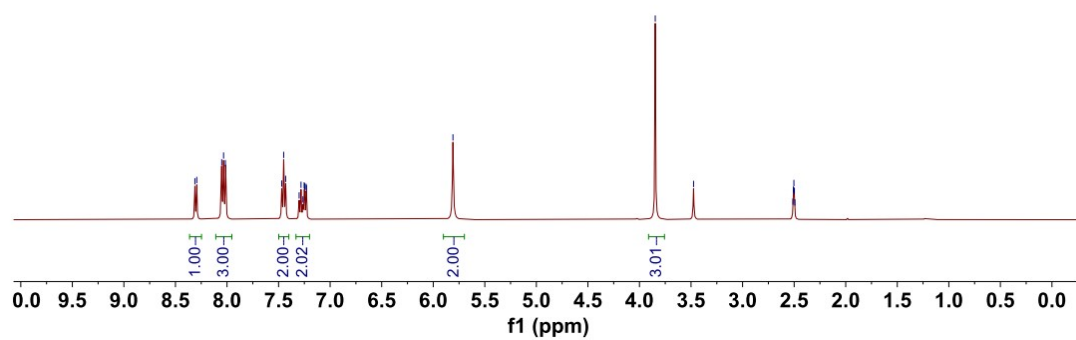




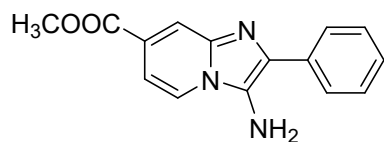
8.311  
8.293  
8.051  
8.033  
8.016  
7.470  
7.450  
7.431  
7.301  
7.282  
7.264  
7.252  
7.247  
7.234  
7.229  
-5.809  
-3.847  
-3.476  
2.512  
2.507  
2.502  
2.498  
2.493



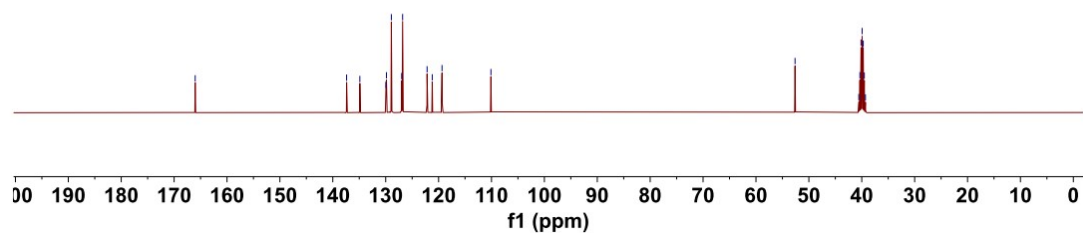
2x (<sup>1</sup>H NMR) (400 MHz, DMSO-d<sub>6</sub>)



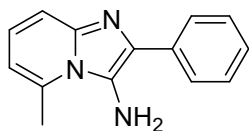
-166.014  
137.390  
134.887  
129.959  
129.856  
128.930  
126.976  
126.802  
122.175  
121.201  
119.351  
110.105  
52.611  
40.659  
40.351  
40.140  
39.932  
39.725  
39.516  
39.306



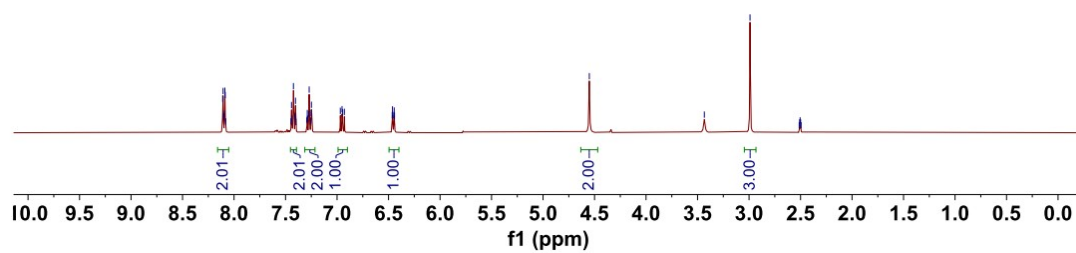
2x (<sup>13</sup>C{<sup>1</sup>H} NMR) (100 MHz, DMSO-d<sub>6</sub>)



8.110  
8.106  
8.101  
8.093  
8.089  
8.086  
8.081  
7.446  
7.442  
7.437  
7.423  
7.408  
7.404  
7.399  
7.292  
7.289  
7.286  
7.275  
7.271  
7.256  
7.252  
7.249  
6.968  
6.952  
6.946  
6.929  
6.465  
6.461  
6.459  
6.448  
6.445  
6.442  
4.551  
3.434  
2.991  
2.513  
2.509  
2.504  
2.499  
2.495

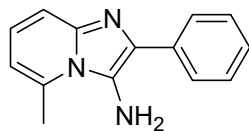


2y ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

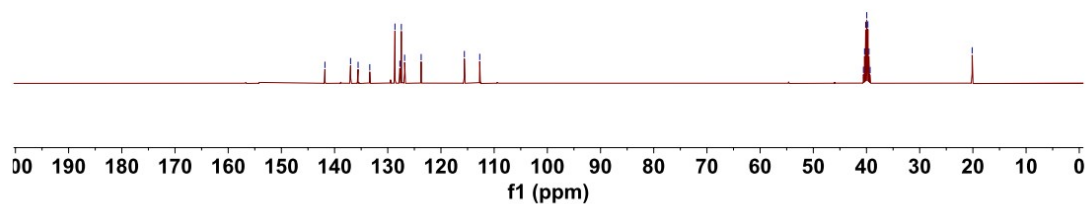


141.817  
136.998  
135.581  
133.386  
128.650  
127.730  
126.827  
123.722  
115.602  
112.714

40.573  
40.366  
40.158  
39.947  
39.739  
39.531  
39.321  
-20.136



2y ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )

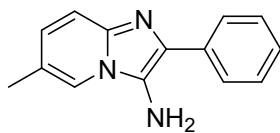


8.093  
8.070  
7.433  
7.414  
7.395  
7.354  
7.331  
7.243  
7.225  
7.206  
6.910  
6.887

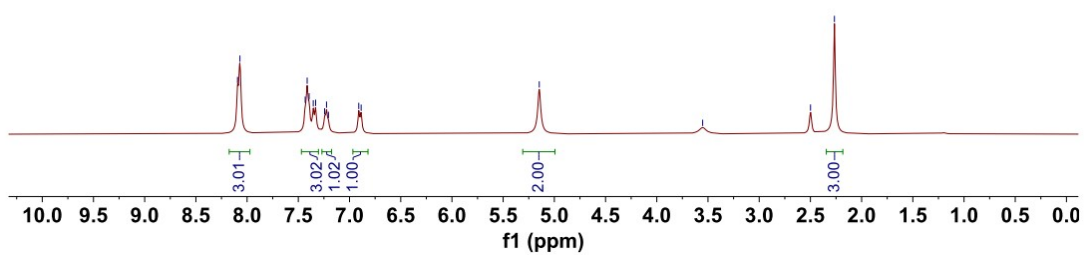
5.147

3.552

2.499  
2.266



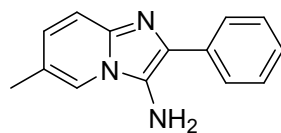
2z (<sup>1</sup>H NMR) (400 MHz, DMSO-d<sub>6</sub>)



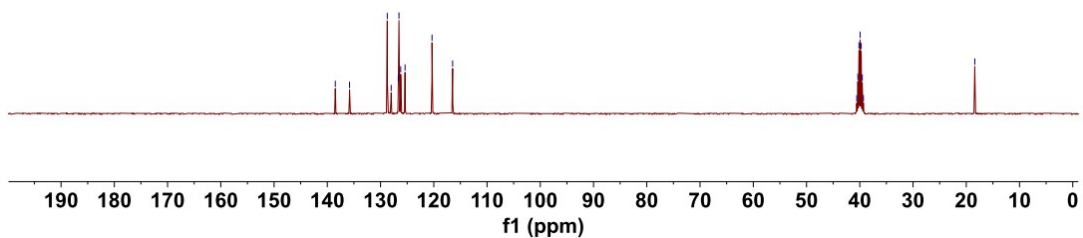
138.497  
135.825  
128.737  
128.001  
126.663  
126.540  
126.214  
125.398  
120.334  
116.469

40.570  
40.361  
40.151  
39.943  
39.734  
39.525  
39.316

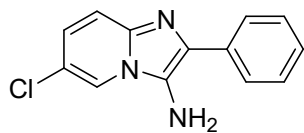
18.397



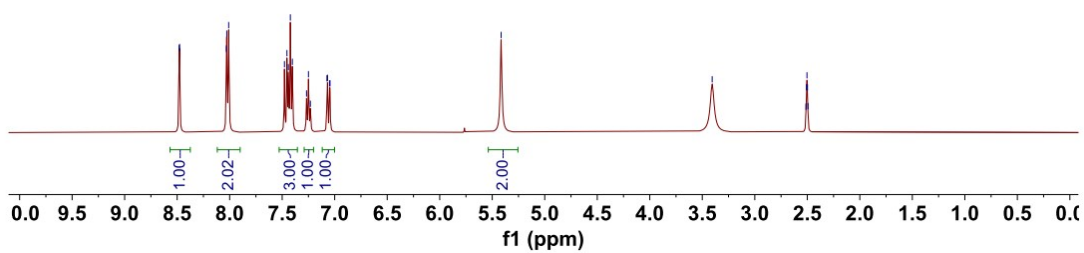
2z (<sup>13</sup>C{<sup>1</sup>H} NMR) (100 MHz, DMSO-d<sub>6</sub>)



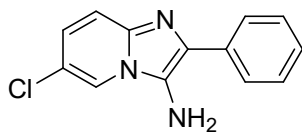
8.482  
8.477  
8.031  
8.028  
8.009  
7.478  
7.455  
7.441  
7.422  
7.403  
7.268  
7.250  
7.232  
7.073  
7.068  
7.050  
7.045  
-5.415  
-3.406  
2.513  
2.508  
2.503  
2.498  
2.494



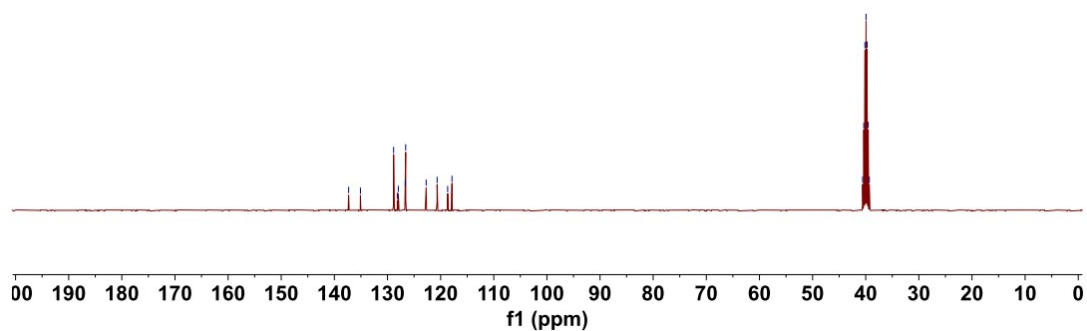
2aa ( $^1\text{H}$  NMR) (400 MHz,  $\text{DMSO-}d_6$ )

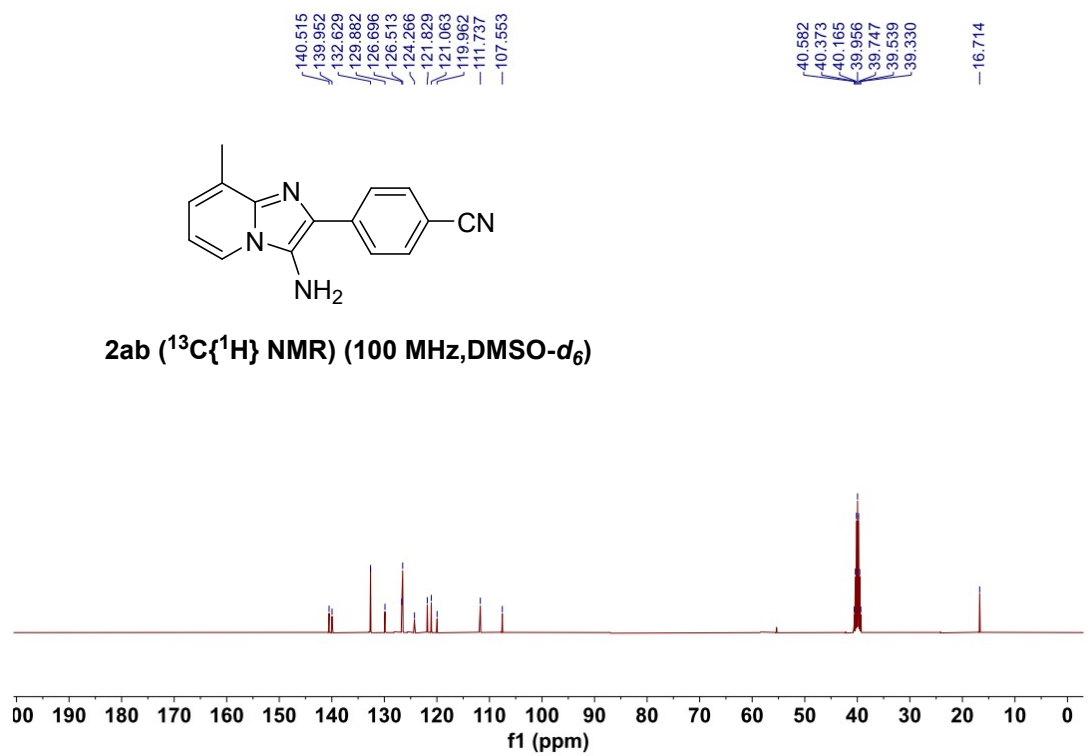
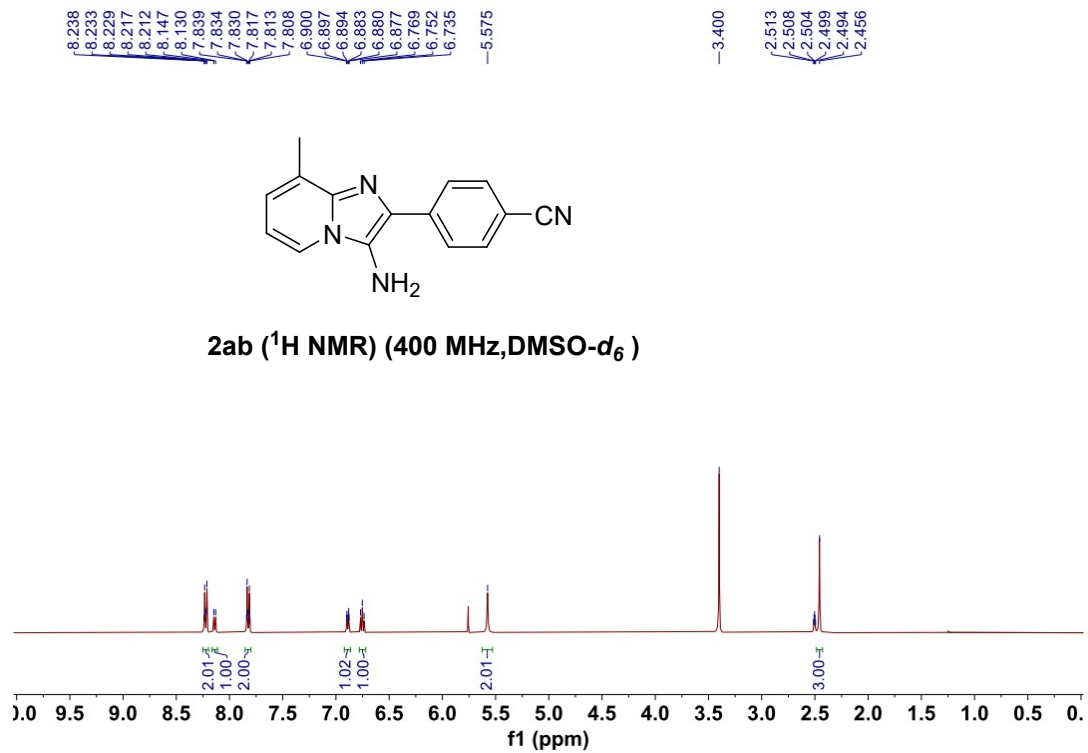


137.312  
135.095  
128.852  
128.153  
127.964  
126.648  
126.579  
122.722  
120.666  
118.676  
117.867  
40.573  
40.366  
40.156  
39.948  
39.739  
39.531  
39.323



2aa ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz,  $\text{DMSO-}d_6$ )



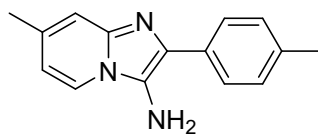


8.138  
8.120  
7.959  
7.954  
7.944  
7.939  
7.222  
7.203  
7.172  
7.168  
7.165  
6.681  
6.677  
6.663  
6.659

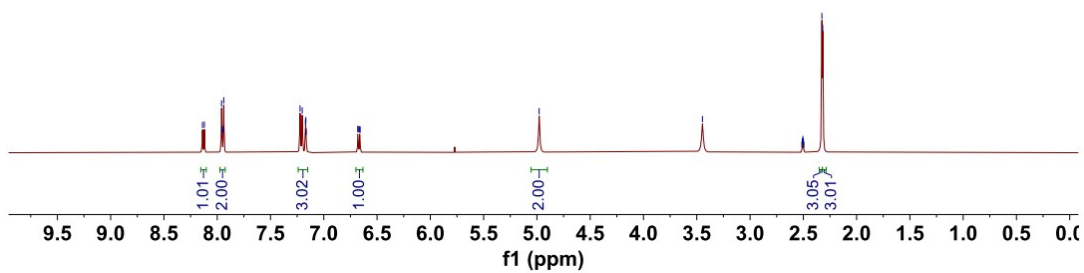
—4.979

—3.447

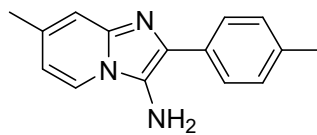
2.513  
2.509  
2.504  
2.500  
2.495  
2.326  
2.318



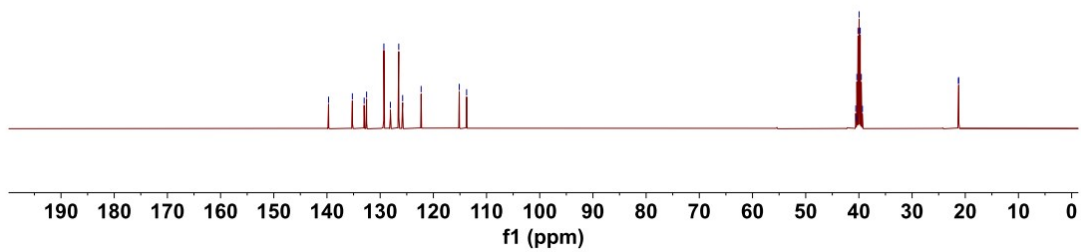
**2ac ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )**



139.699  
135.223  
133.006  
132.551  
129.300  
128.078  
126.506  
125.773  
122.299  
115.137  
113.748



**2ac ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )**

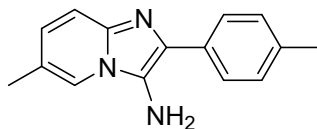


8.063  
8.059  
8.056  
8.052  
7.934  
7.929  
7.918  
7.913  
7.340  
7.338  
7.318  
7.315  
7.228  
7.208  
6.947  
6.943  
6.924  
6.920

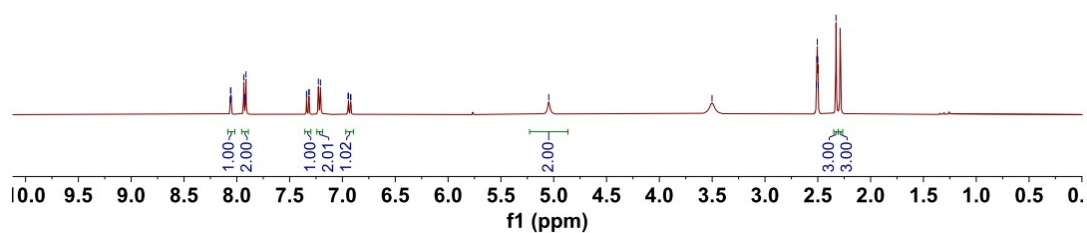
-5.047

-3.501

2.514  
2.509  
2.505  
2.500  
2.495  
2.327  
2.289

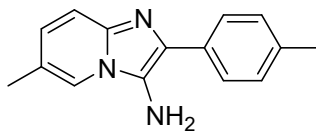


2ad ( $^1\text{H}$  NMR) (400 MHz,  $\text{DMSO}-d_6$ )

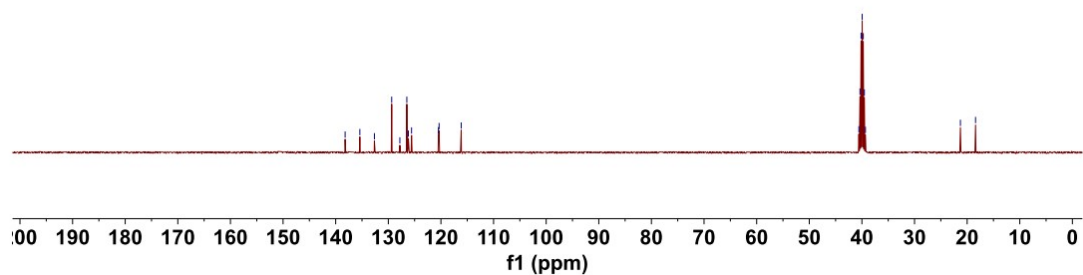


138.205  
135.409  
132.641  
129.359  
127.808  
126.481  
126.185  
125.584  
120.476  
120.352  
116.149

40.577  
40.369  
40.161  
39.951  
39.742  
39.534  
39.327  
-21.279  
-18.404



2ad ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz,  $\text{DMSO}-d_6$ )

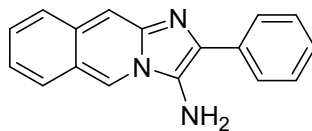


9.380  
9.359

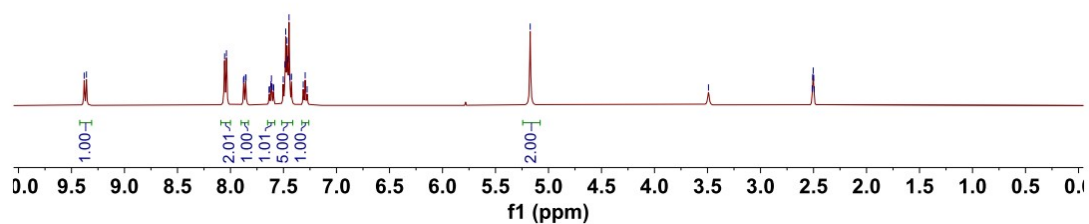
8.055  
8.038  
7.877  
7.873  
7.857  
7.853  
7.636  
7.632  
7.618  
7.614  
7.610  
7.596  
7.592  
7.503  
7.486  
7.479  
7.467  
7.459  
7.448  
7.440  
7.424  
7.314  
7.295  
7.277  
5.173

3.491

2.513  
2.508  
2.503  
2.498  
2.493

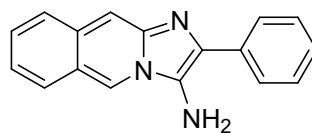


2ae ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

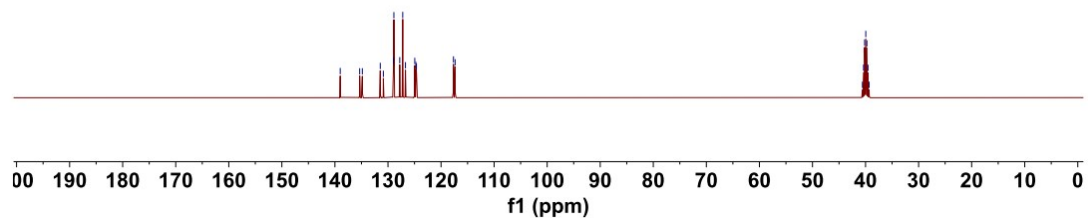


139.000  
135.333  
134.836  
131.453  
130.872  
128.957  
128.887  
127.784  
127.220  
126.707  
124.950  
124.742  
124.639  
117.660  
117.351

40.585  
40.376  
40.168  
39.959  
39.752  
39.542  
39.334



2ae ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )

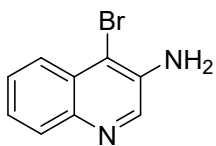




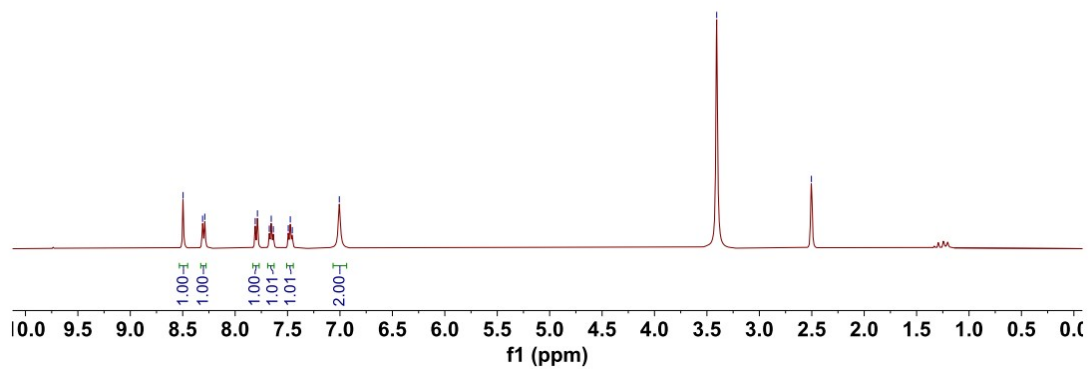
8.496  
8.310  
8.289  
7.808  
7.787  
7.674  
7.656  
7.493  
7.474  
7.455  
-7.006

-3.407

-2.504



2af ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

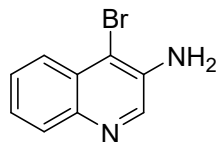


151.529  
148.337  
147.469

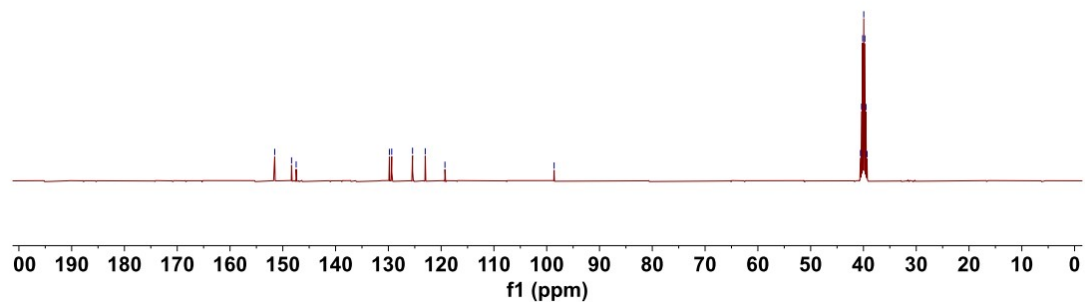
129.810  
129.369  
125.420  
123.018  
119.285

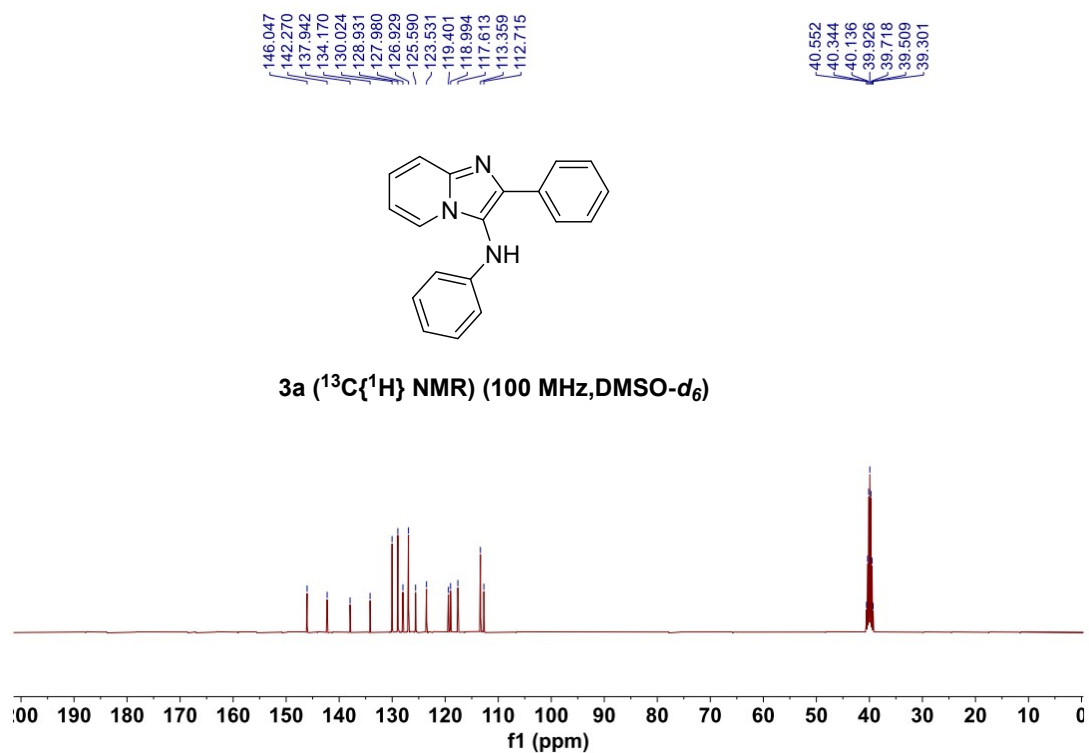
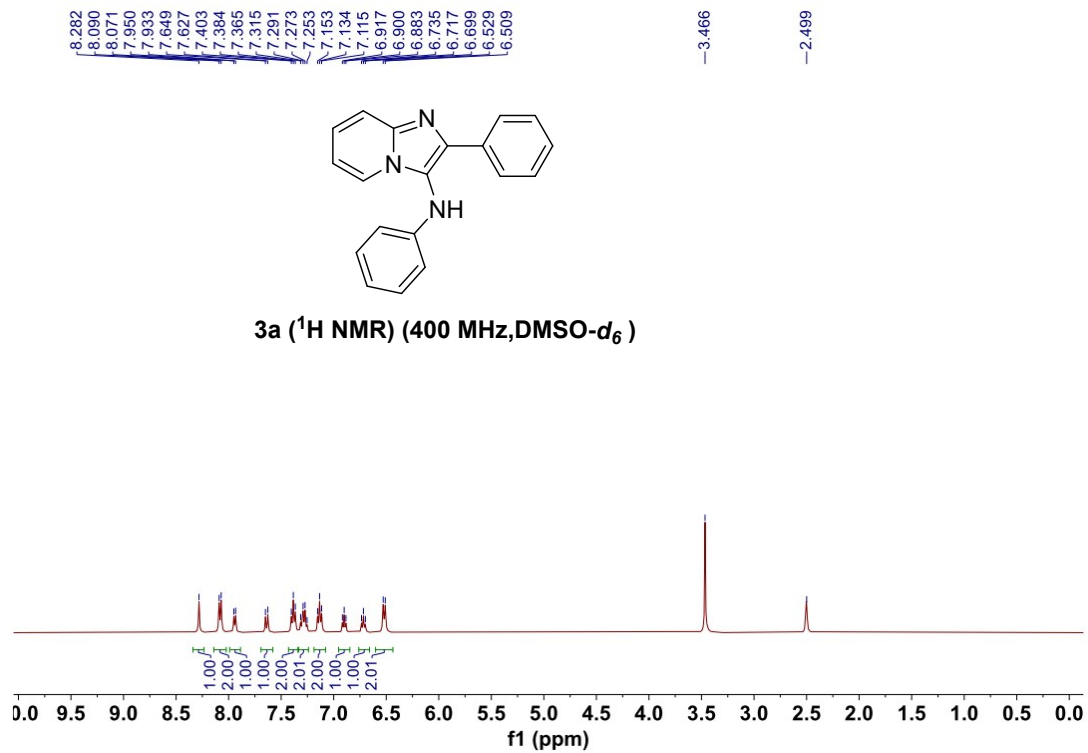
-98.601

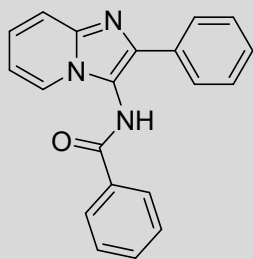
40.566  
40.358  
40.150  
39.940  
39.731  
39.523  
39.314



2af ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )

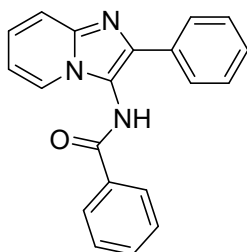






3b ( $^1\text{H}$  NMR) (400 MHz, DMSO- $d_6$ )

167.225  
142.584  
138.307  
134.028  
133.418  
132.897  
129.190  
129.072  
128.497  
128.216  
127.124  
125.759  
124.266  
117.399  
115.902  
112.776  
40.561  
40.352  
40.194  
40.143  
39.937  
39.726  
39.517  
39.308



3b ( $^{13}\text{C}\{^1\text{H}\}$  NMR) (100 MHz, DMSO- $d_6$ )

