

*Supporting information*

**One-Pot Synthesis of 3-Methyl-2-Arylimidazo[1,2-*a*]Pyridines  
through Calcium Carbide as an Alkyne Source**

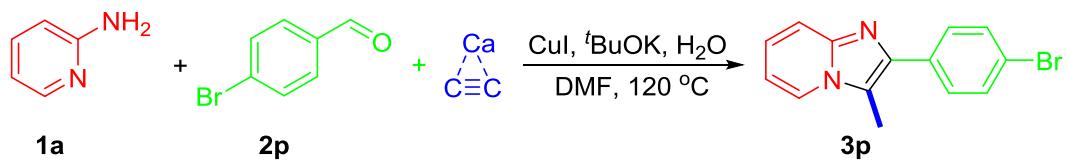
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Lanzhou, Gansu, 730070, P.R. China. E-mail: lizheng@nwnu.edu.cn

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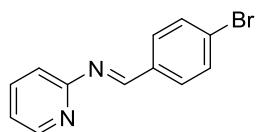
1. Reaction Intermediates Detection by HRMS (page 2)
2. The  $^1\text{H}$  NMR,  $^{13}\text{C}\{^1\text{H}\}$  NMR and  $^{19}\text{F}$  NMR Spectra for the Products **3a–3u**,  
**4a–4f**, **5a–5e** (page 4)

## 1. Reaction Intermediates Detection by HRMS



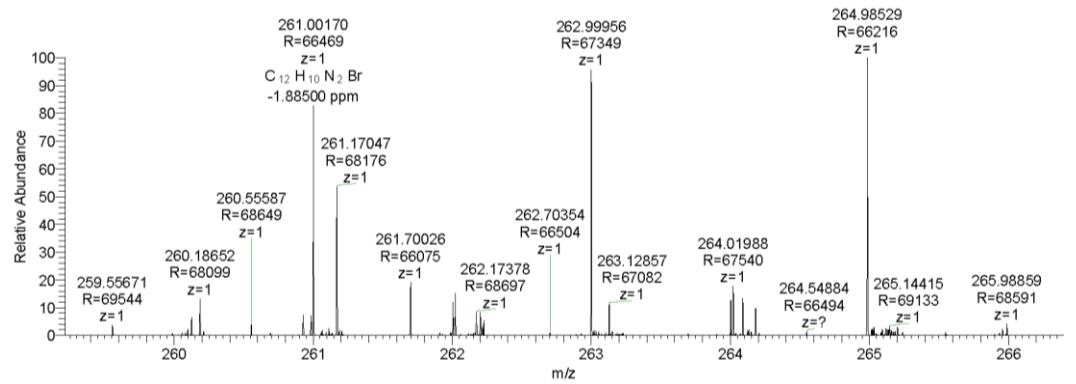
For the reaction of **1a**, **2p** and calcium carbide to synthesize **3p**, when the reaction is carried out under standard conditions for 5 h, the important intermediate and target product could be detected by HRMS analysis.

Intermediate A :

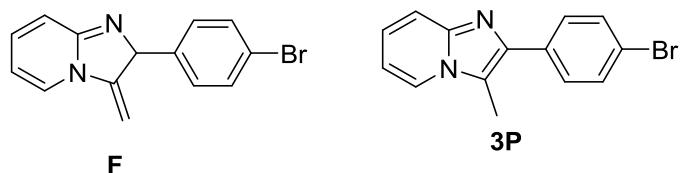


HRMS (ESI): *m/z* (M+H)<sup>+</sup> calcd for C<sub>12</sub>H<sub>10</sub>N<sub>2</sub>Br: 261.0022; Found: 261.0017.

The mass spectrum is as follow.

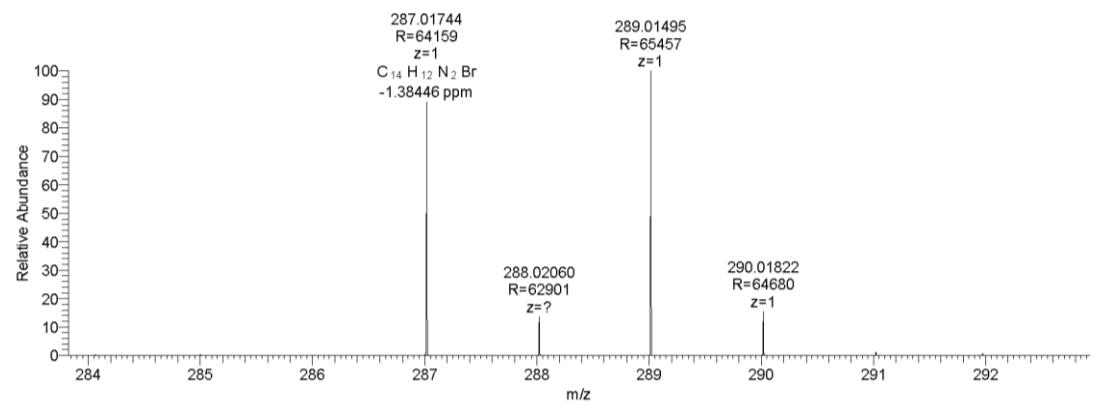


Intermediate F or Compound **3p** :



HRMS (ESI): *m/z* (M+H)<sup>+</sup> calcd for C<sub>14</sub>H<sub>11</sub>BrN<sub>2</sub>: 287.0178; Found: 287.0174.

The mass spectrum is as follow.



## 2. The $^1\text{H}$ NMR, $^{13}\text{C}\{^1\text{H}\}$ NMR and $^{19}\text{F}$ NMR Spectra for the Products

3a–3u, 4a–4f, 5a–5e

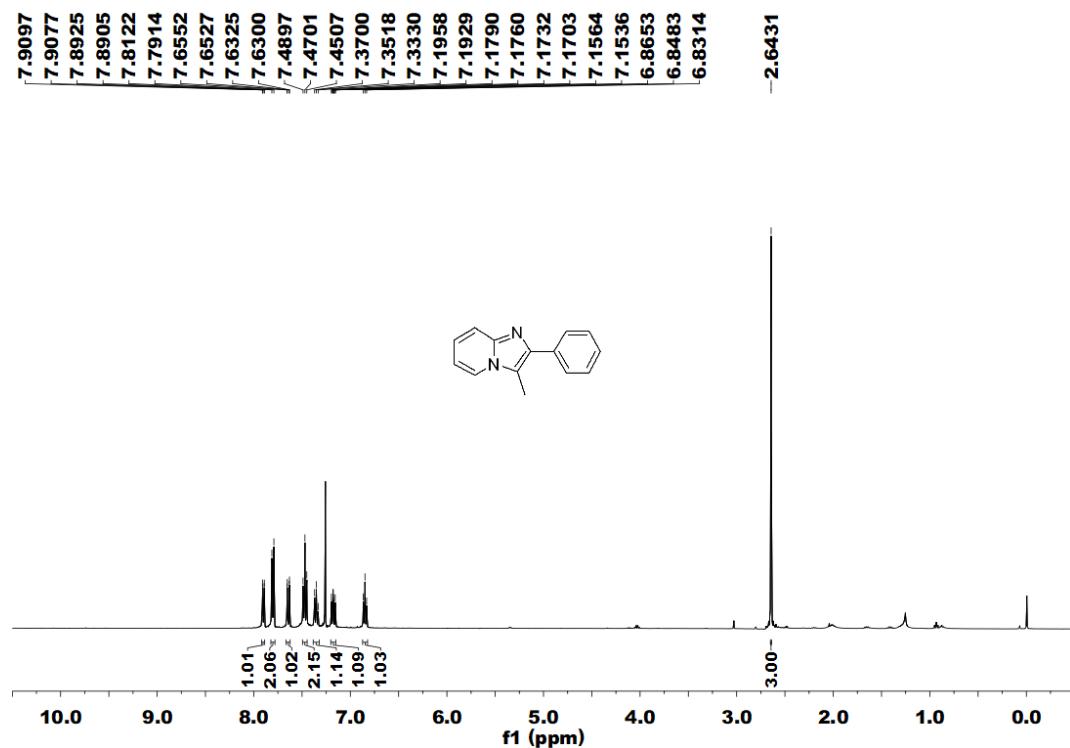


Fig. S1  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 3-methyl-2-phenylimidazo[1,2-a]pyridine (3a)

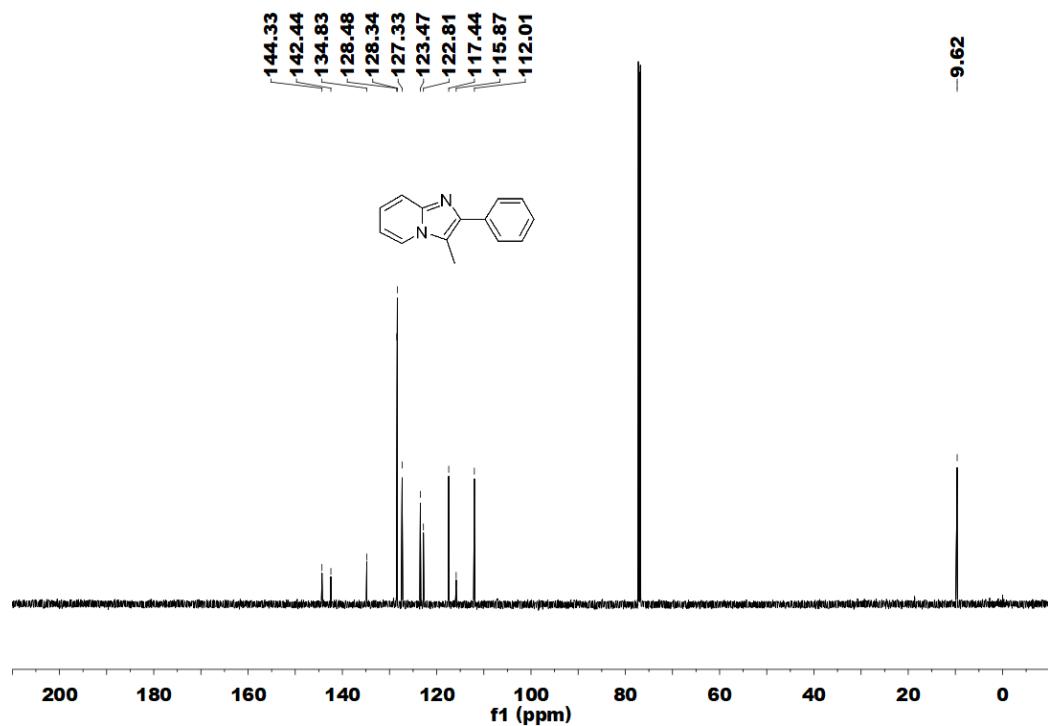
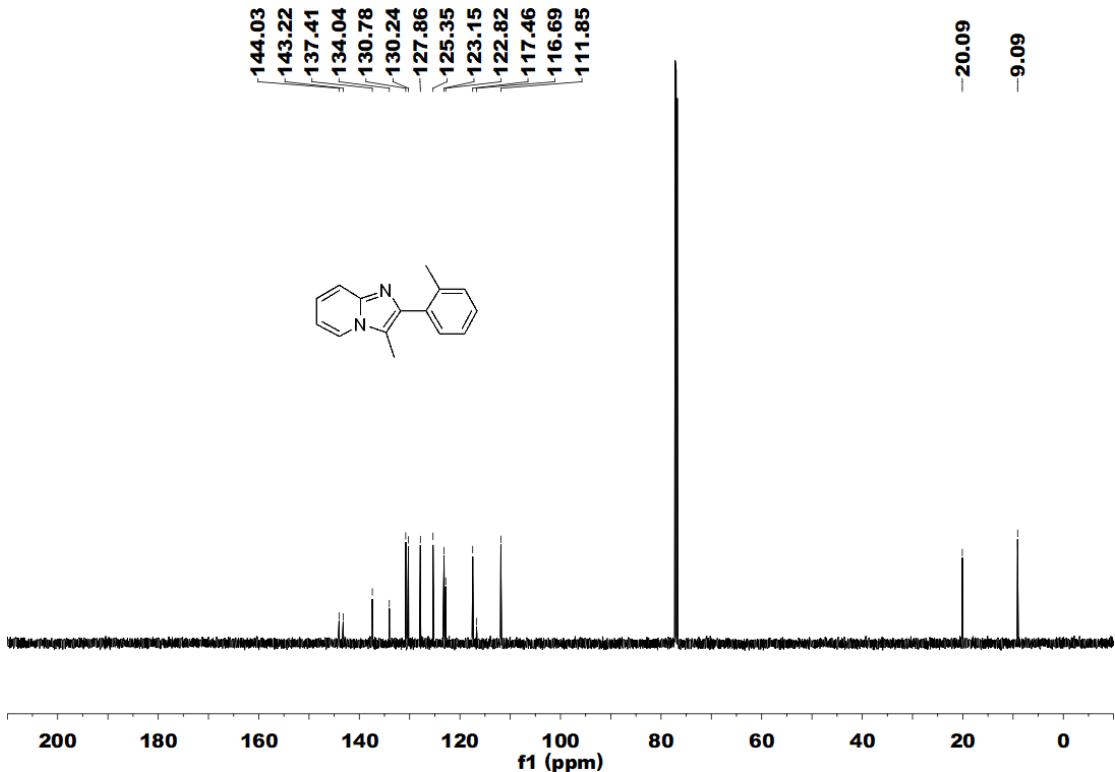
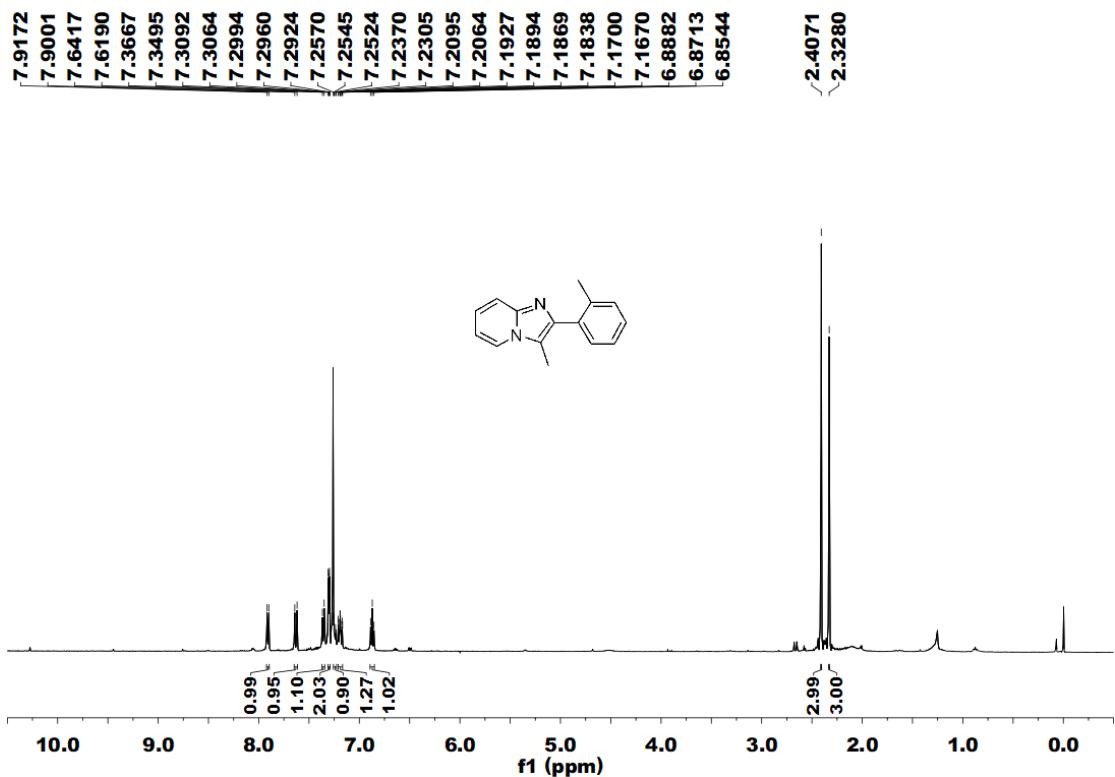
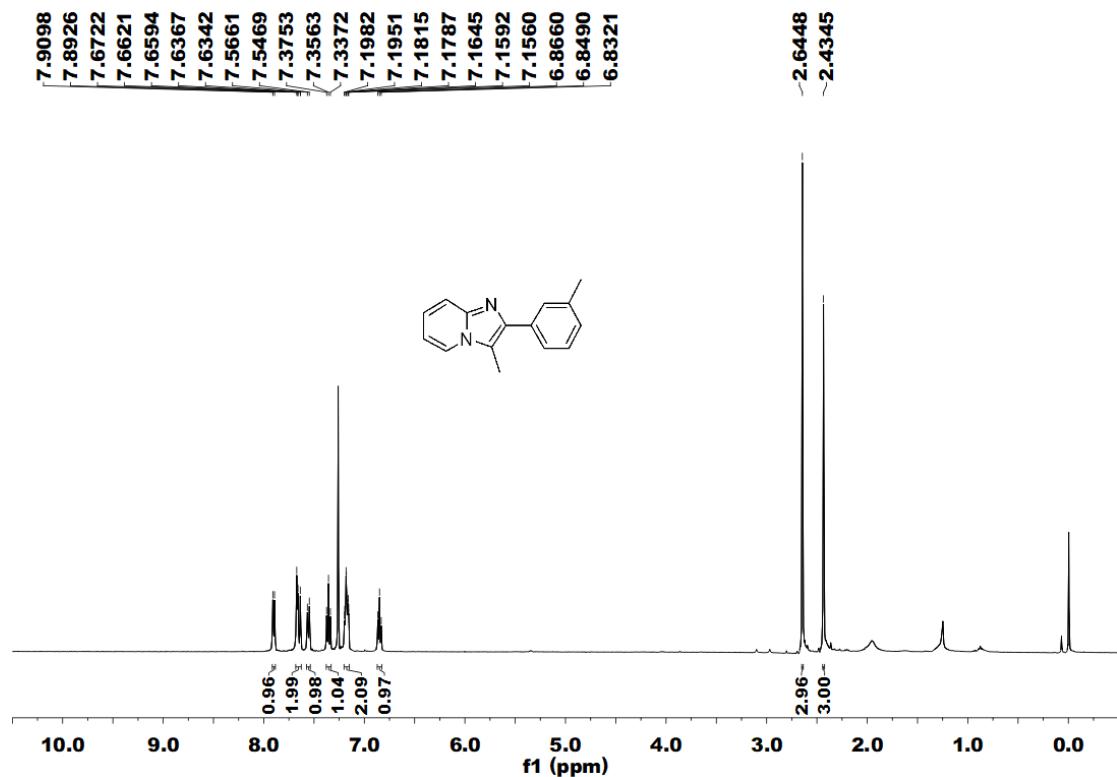
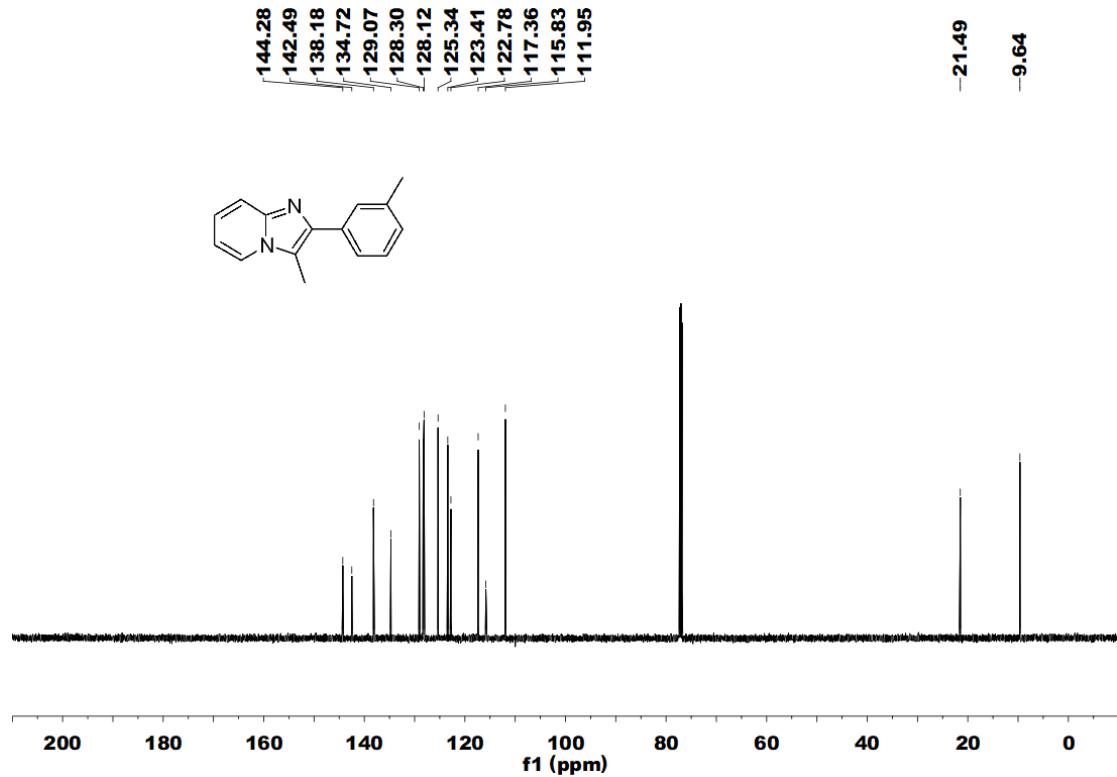


Fig. S2  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3-methyl-2-phenylimidazo[1,2-a]pyridine (3a)

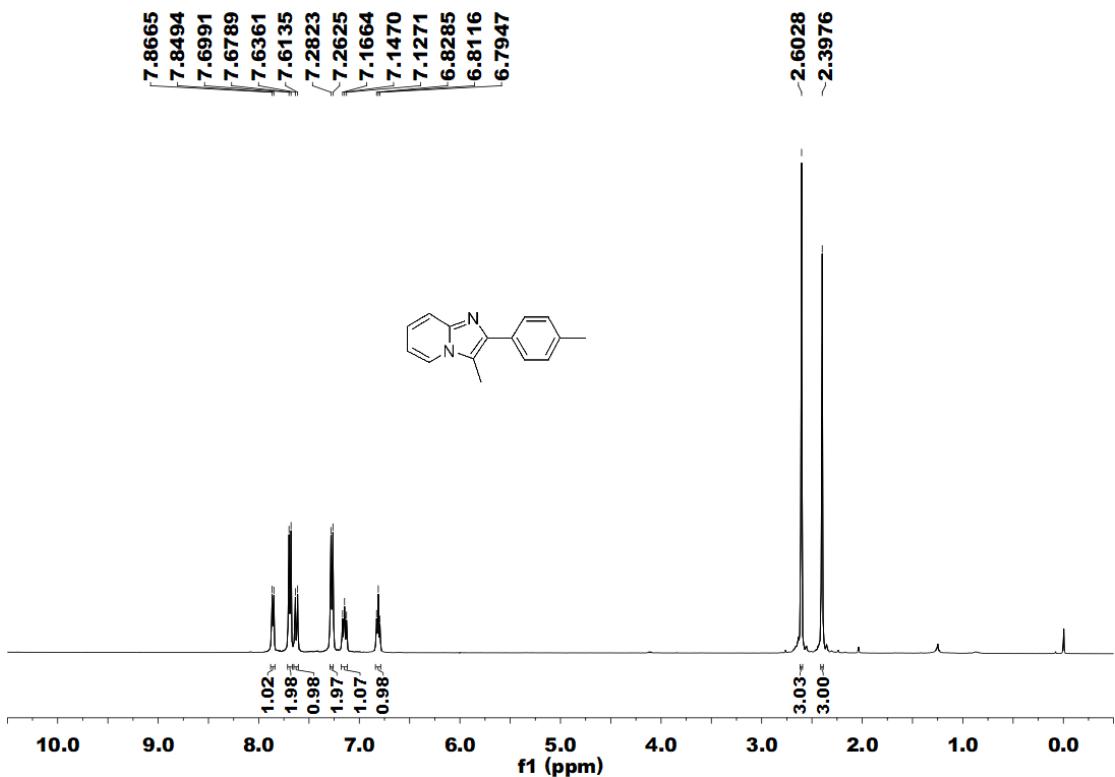




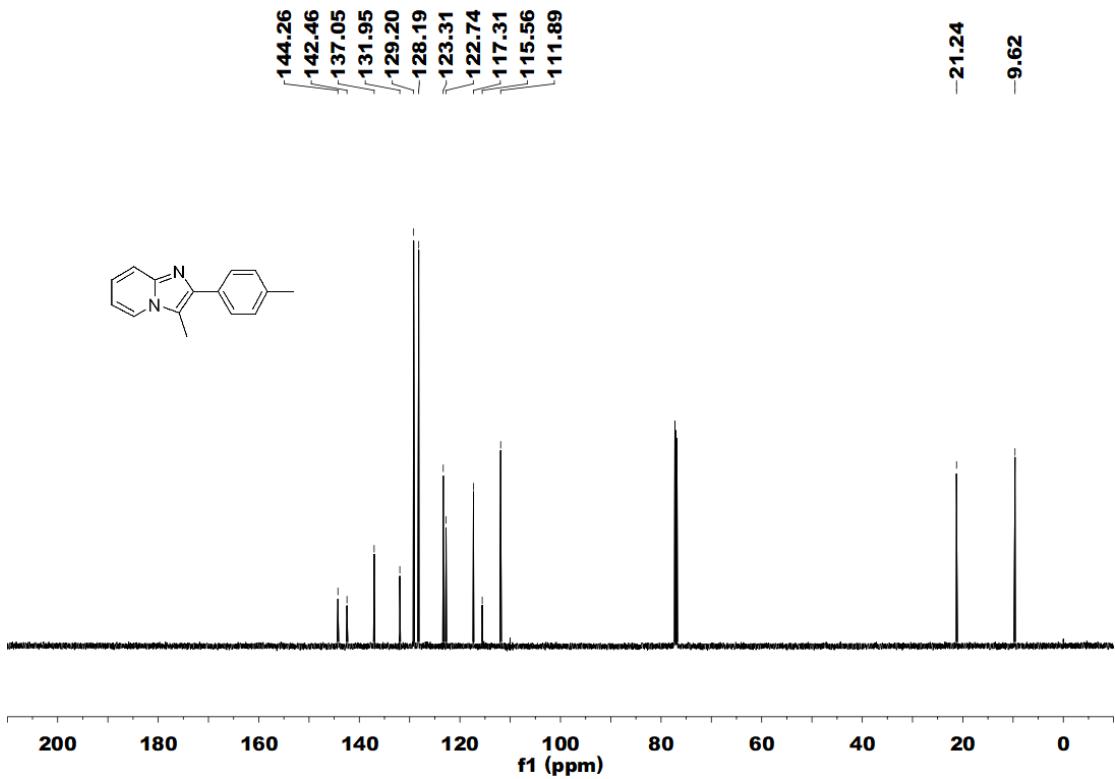
**Fig. S5**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 3-methyl-2-(*m*-tolyl)imidazo[1,2-*a*]pyridine (3c)



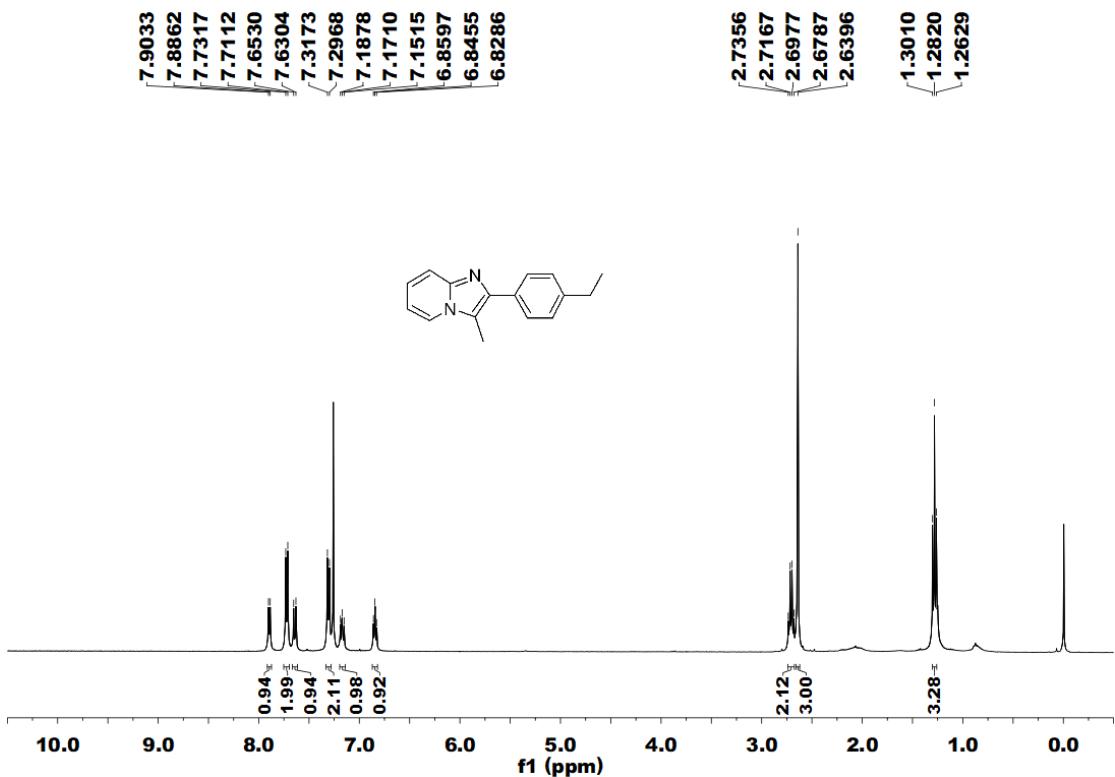
**Fig. S6**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3-methyl-2-(*m*-tolyl)imidazo[1,2-*a*]pyridine (3c)



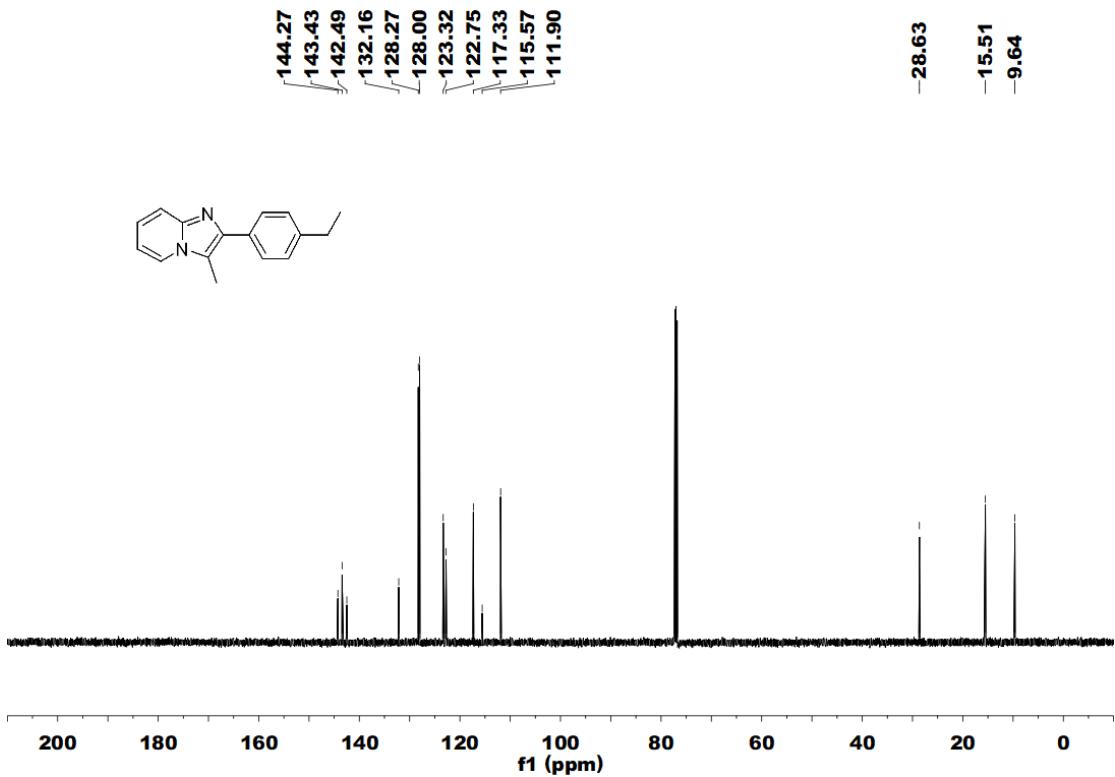
**Fig. S7**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 3-methyl-2-(*p*-tolyl)imidazo[1,2-*a*]pyridine (3d)



**Fig. S8**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3-methyl-2-(*p*-tolyl)imidazo[1,2-*a*]pyridine (3d)



**Fig. S9**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 2-(4-ethylphenyl)-3-methylimidazo[1,2-*a*]pyridine (3e)



**Fig. S10**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 2-(4-ethylphenyl)-3-methylimidazo[1,2-*a*]pyridine (3e)

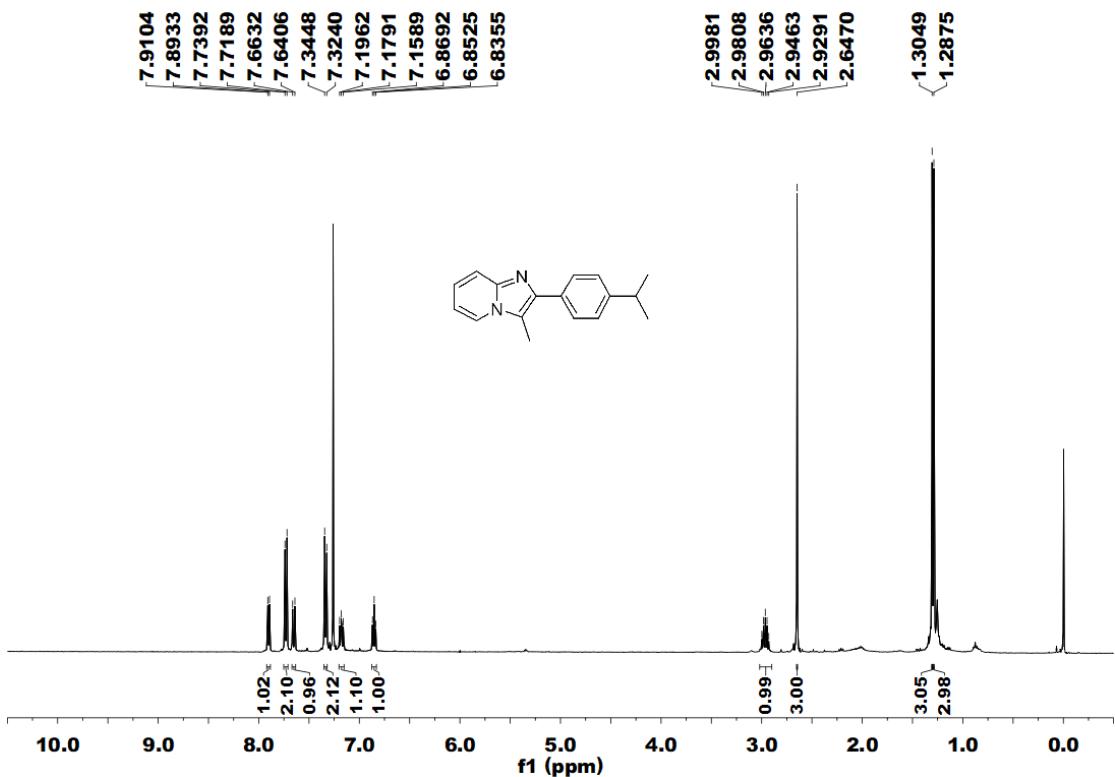


Fig. S11  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 2-(4-isopropylphenyl)-3-methylimidazo[1,2-*a*]pyridine (3f)

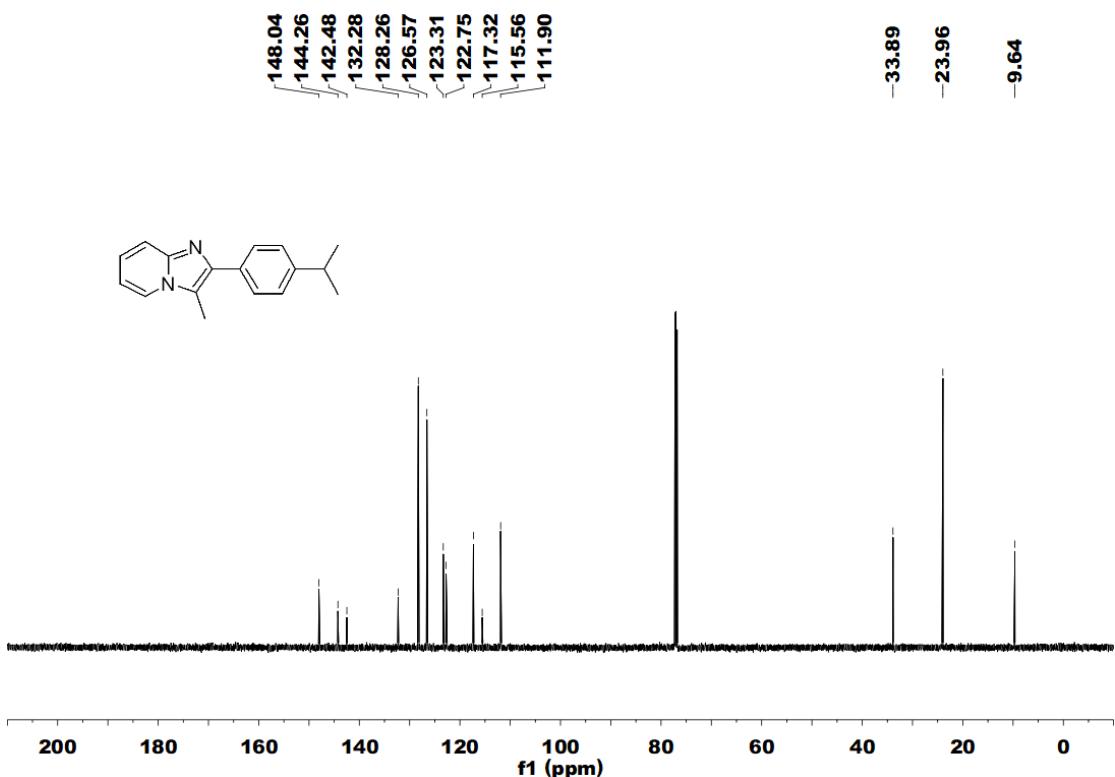


Fig. S12  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 2-(4-isopropylphenyl)-3-methylimidazo[1,2-*a*]pyridine (3f)

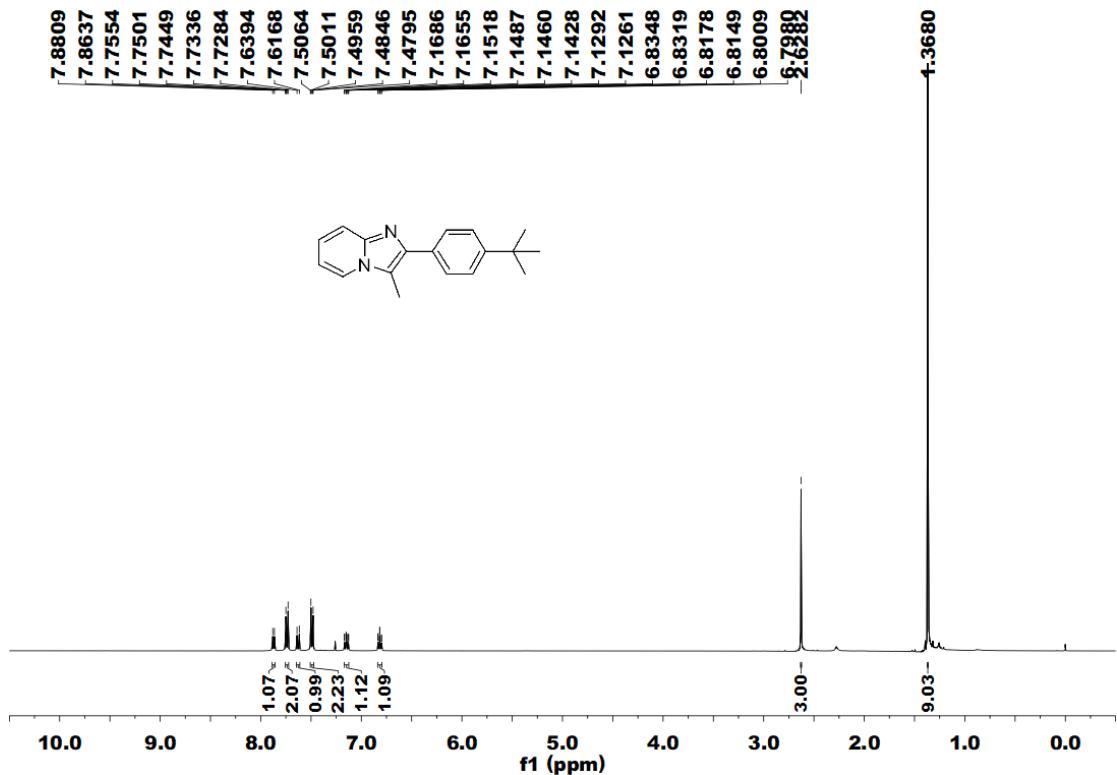


Fig. S13 <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) of 2-(4-(*tert*-butyl)phenyl)-3-methylimidazo[1,2-*a*]pyridine (3g)

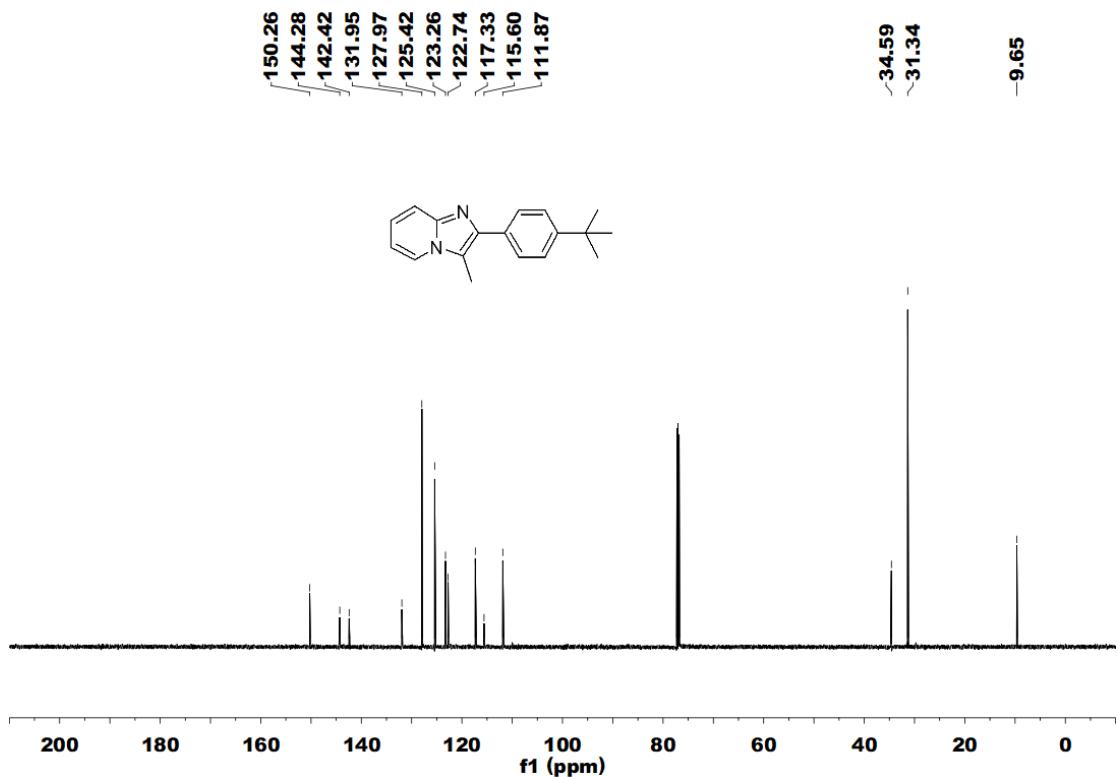
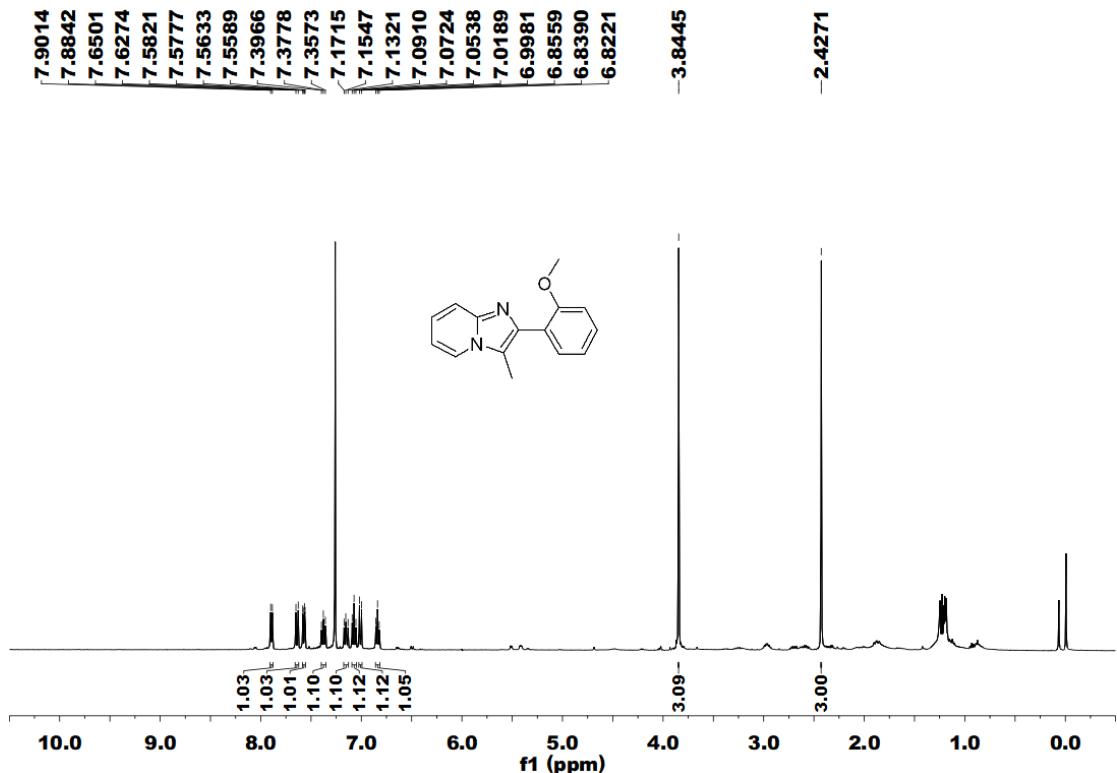
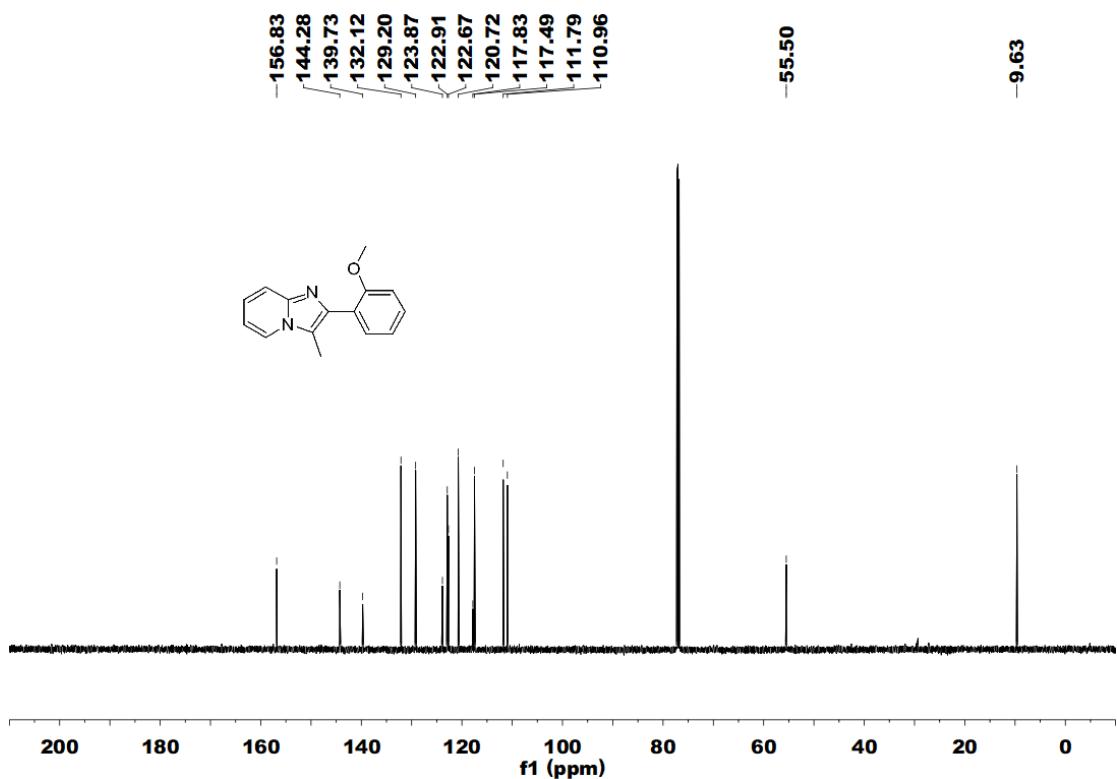


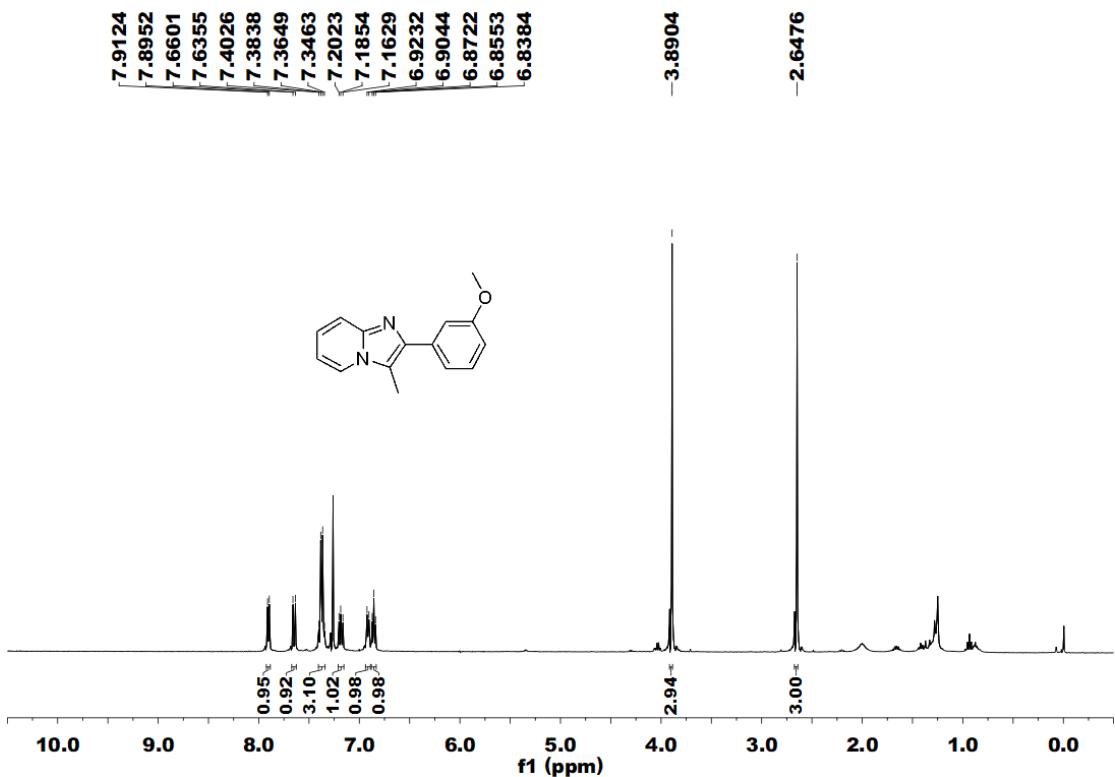
Fig. S14 <sup>13</sup>C{<sup>1</sup>H} NMR (150 MHz, CDCl<sub>3</sub>) of 2-(4-(*tert*-butyl)phenyl)-3-methylimidazo[1,2-*a*]pyridine (3g)



**Fig. S15**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 2-(2-methoxyphenyl)-3-methylimidazo[1,2-*a*]pyridine (3h)

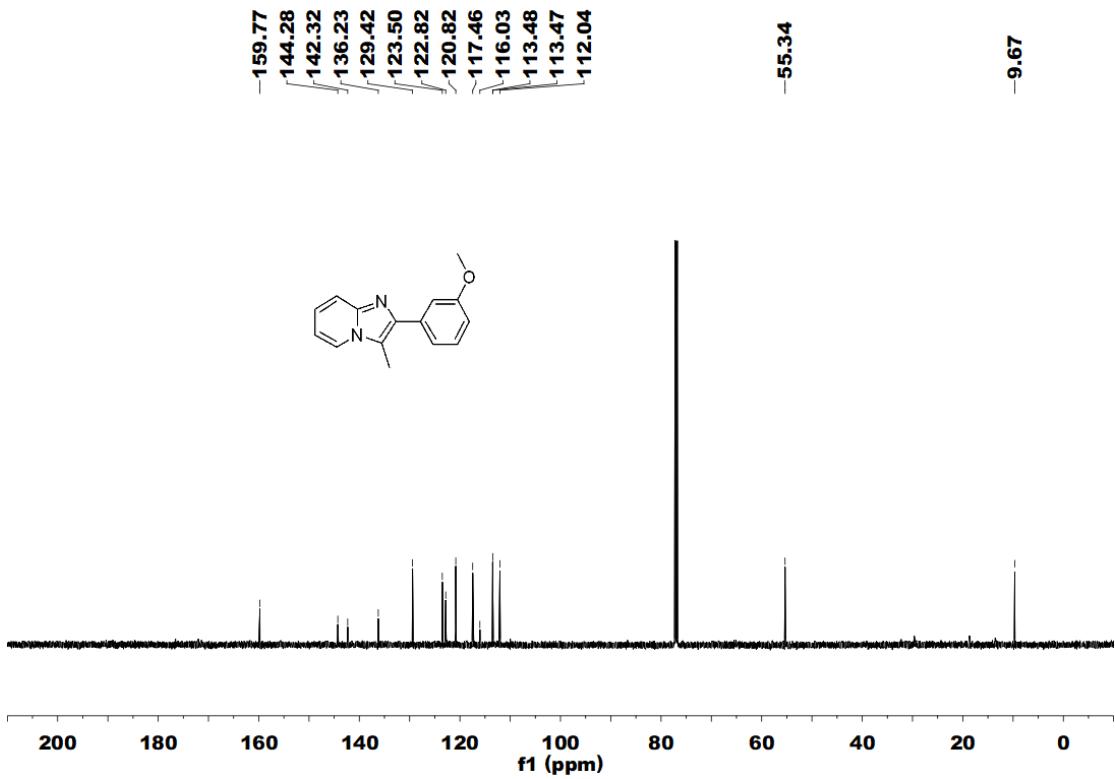


**Fig. S16**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 2-(2-methoxyphenyl)-3-methylimidazo[1,2-*a*]pyridine (3h)



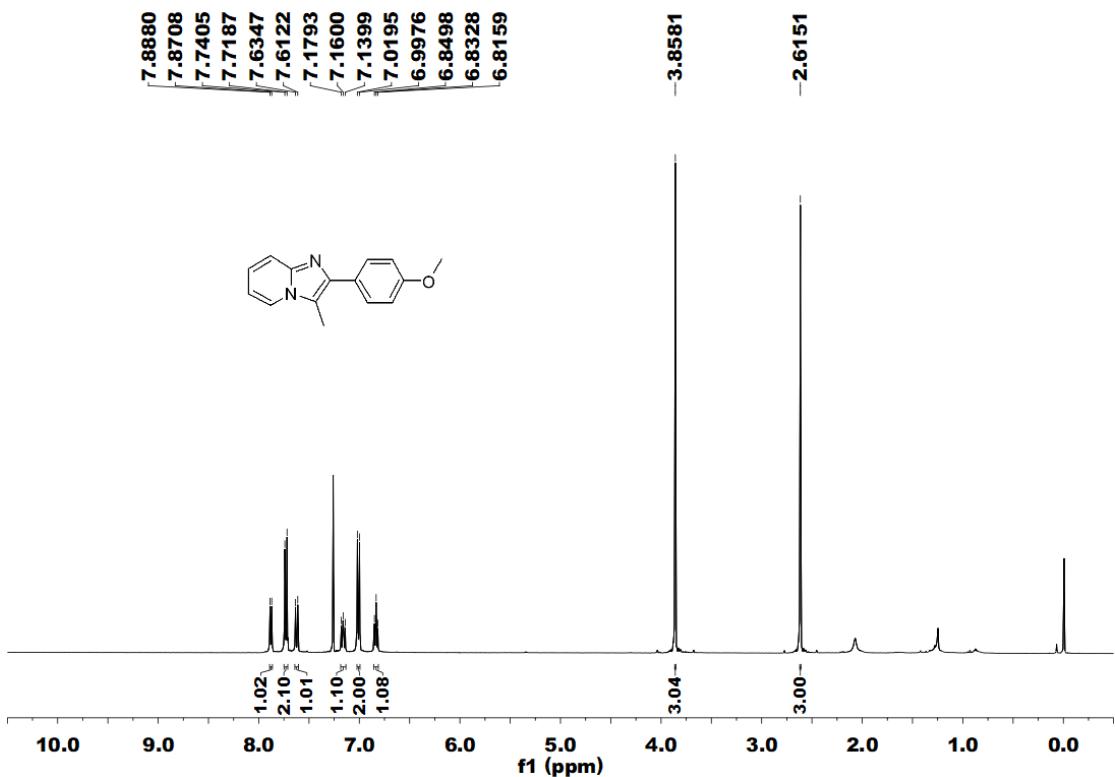
**Fig. S17**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 2-(3-methoxyphenyl)-3-methylimidazo[1,2-*a*]pyridine (3i)

pyridine (3i)

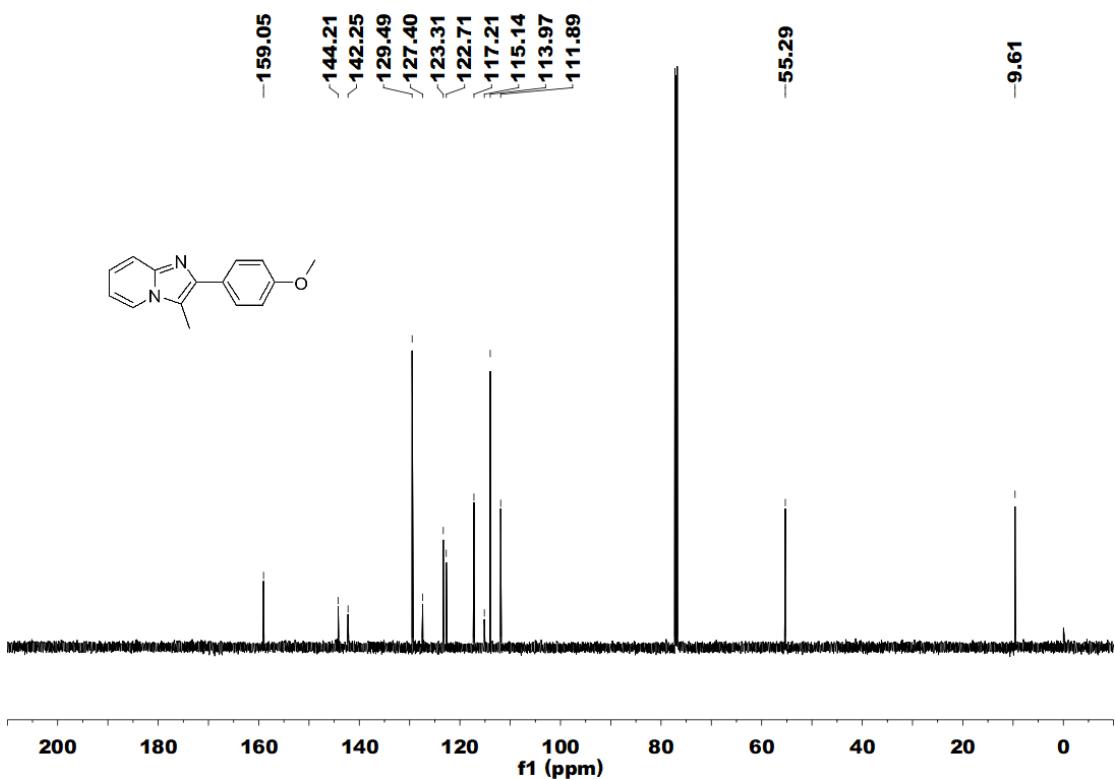


**Fig. S18**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 2-(3-methoxyphenyl)-3-methylimidazo[1,2-*a*]pyridine (3i)

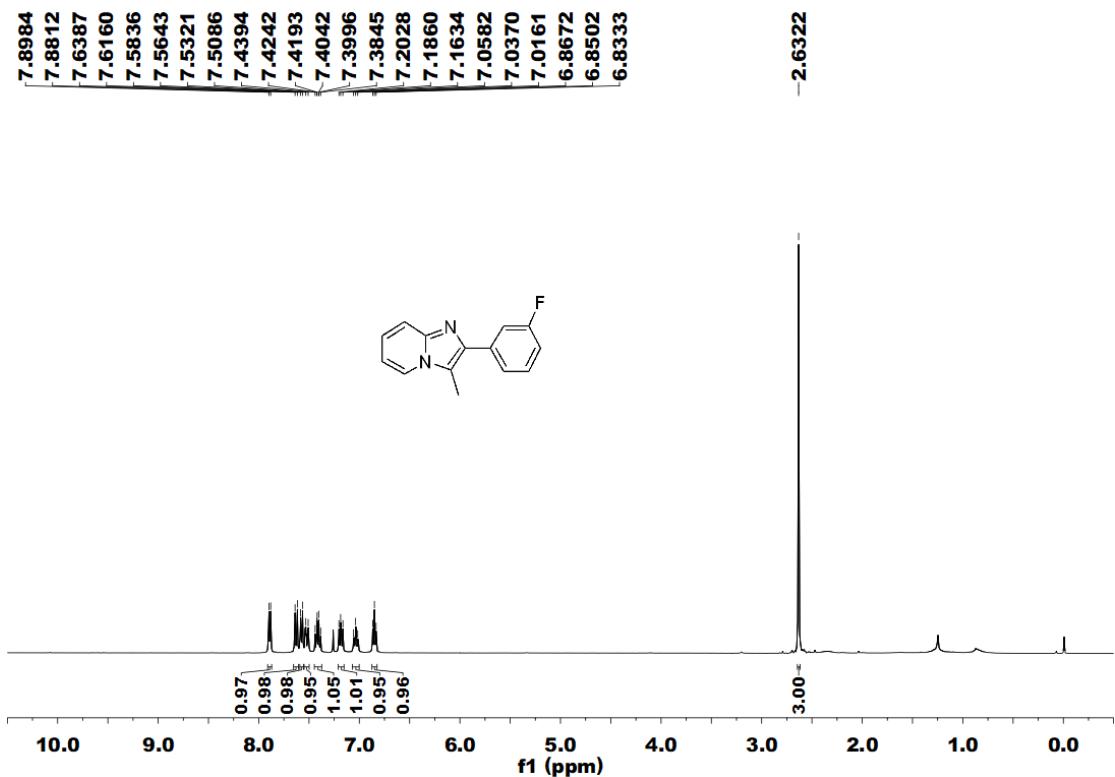
pyridine (3i)



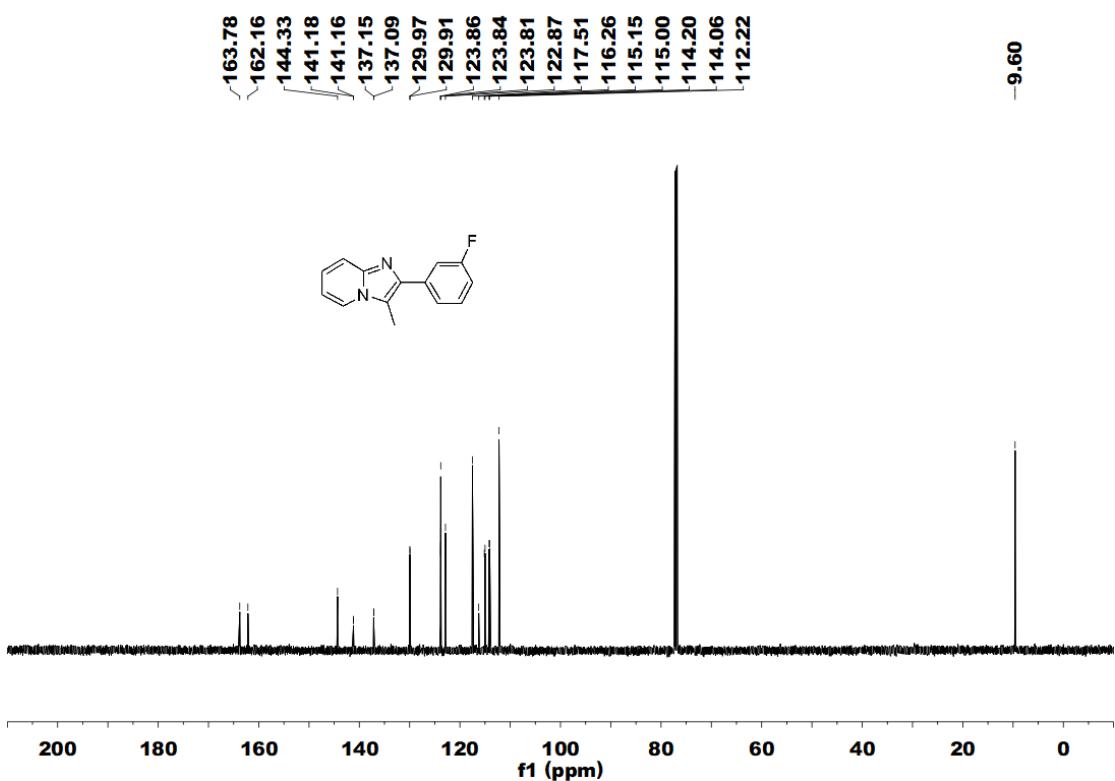
**Fig. S19**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 2-(4-methoxyphenyl)-3-methylimidazo[1,2-*a*]pyridine (3j)



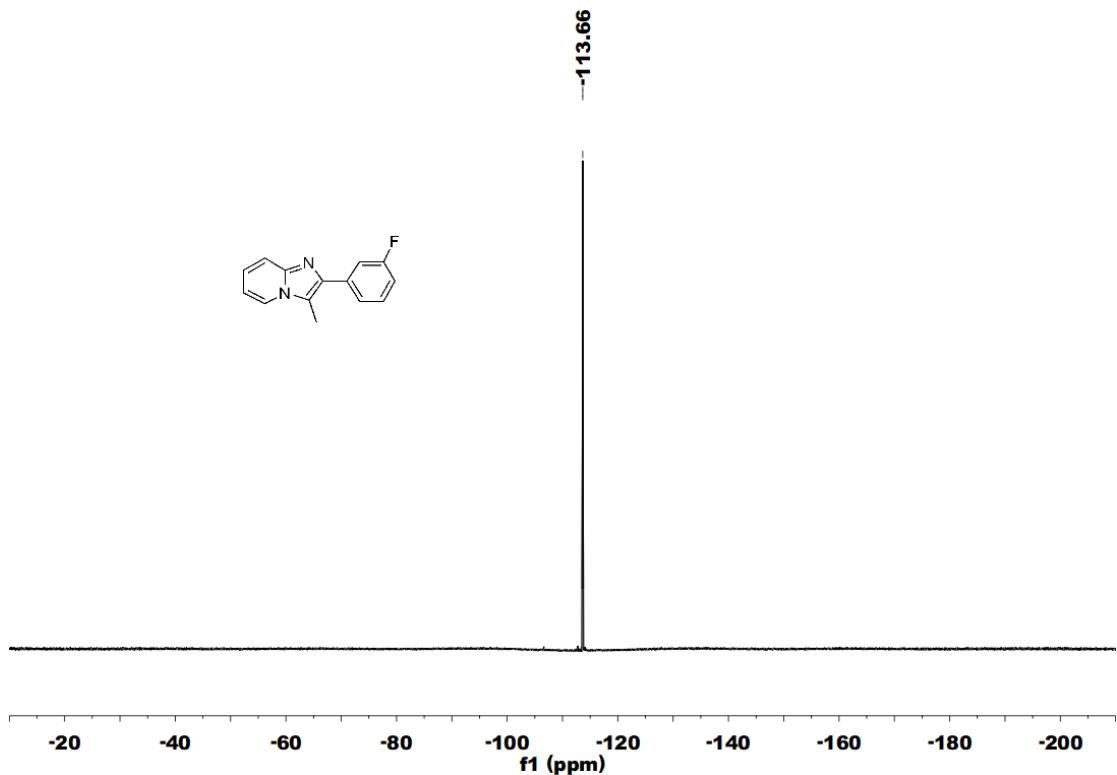
**Fig. S20**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 2-(4-methoxyphenyl)-3-methylimidazo[1,2-*a*]pyridine (3j)



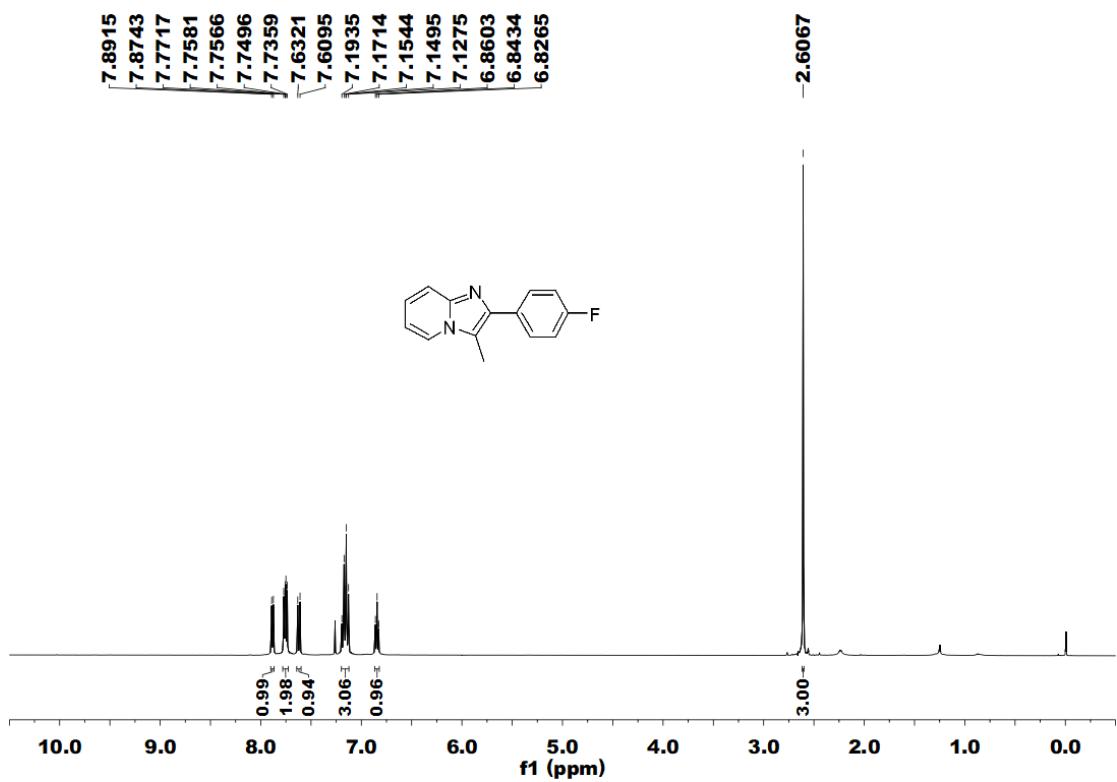
**Fig. S21**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 2-(3-fluorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3k)



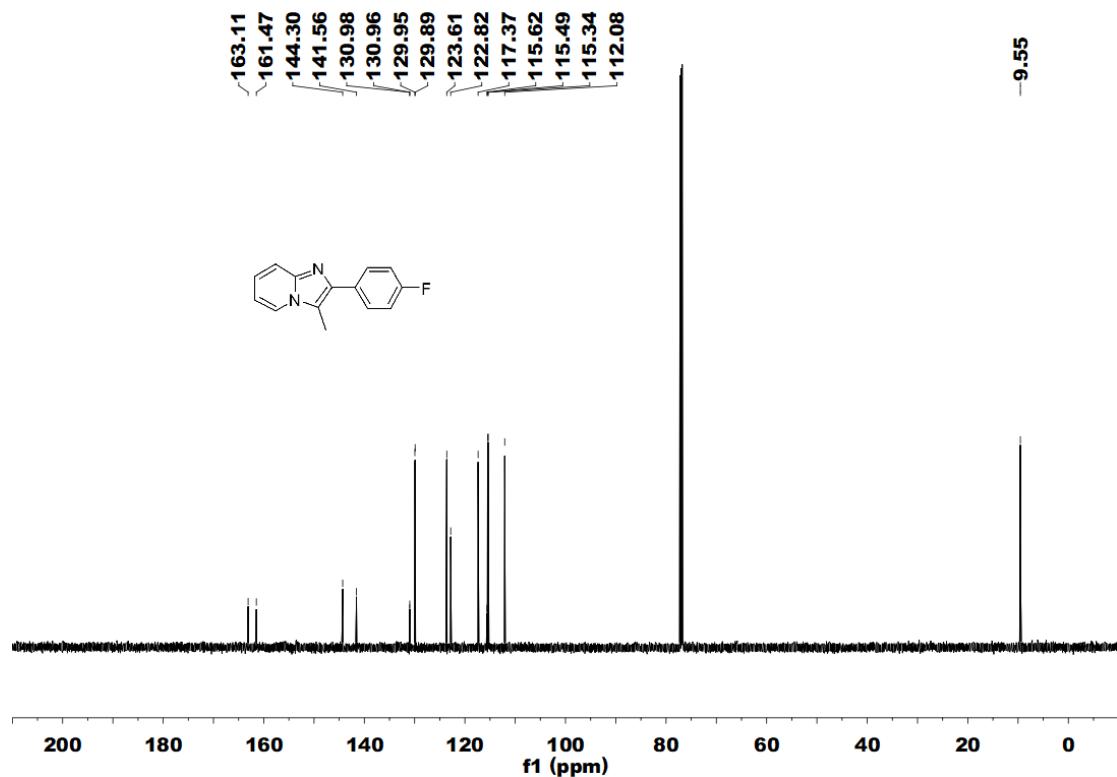
**Fig. S22**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 2-(3-fluorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3k)



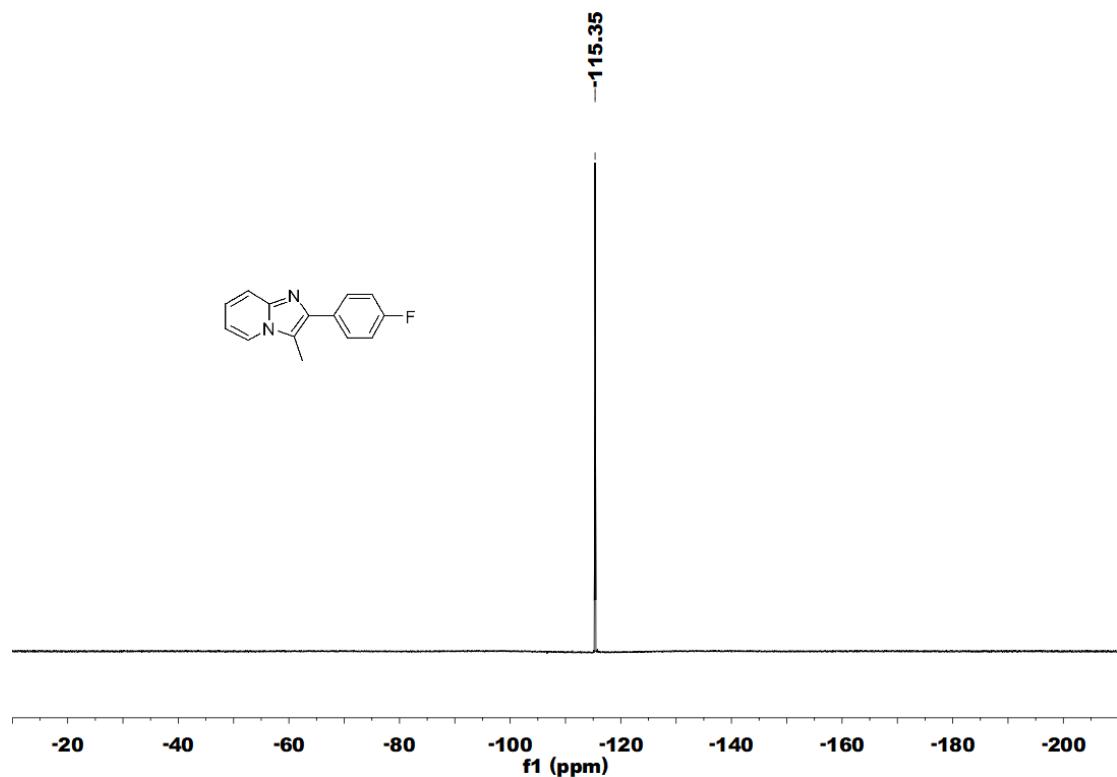
**Fig. S23**  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) of 2-(3-fluorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3k)



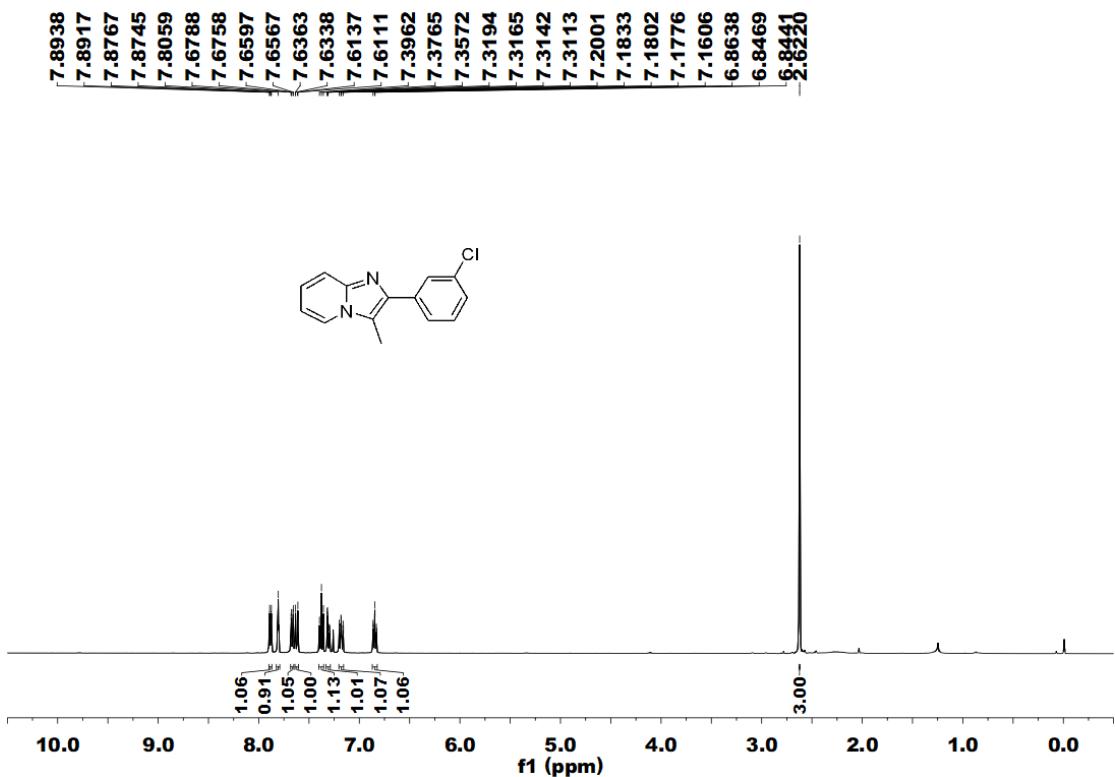
**Fig. S24**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 2-(4-fluorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3l)



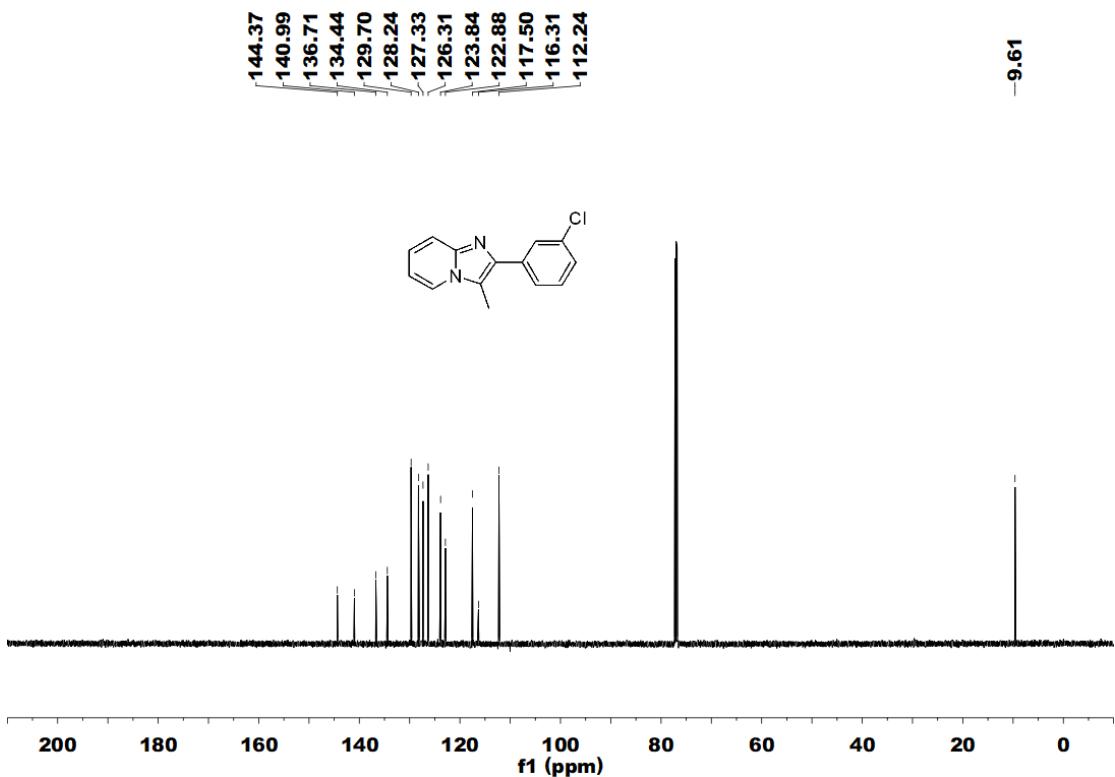
**Fig. S25**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 2-(4-fluorophenyl)-3-methylimidazo[1,2-*a*]pyridine (**3l**)



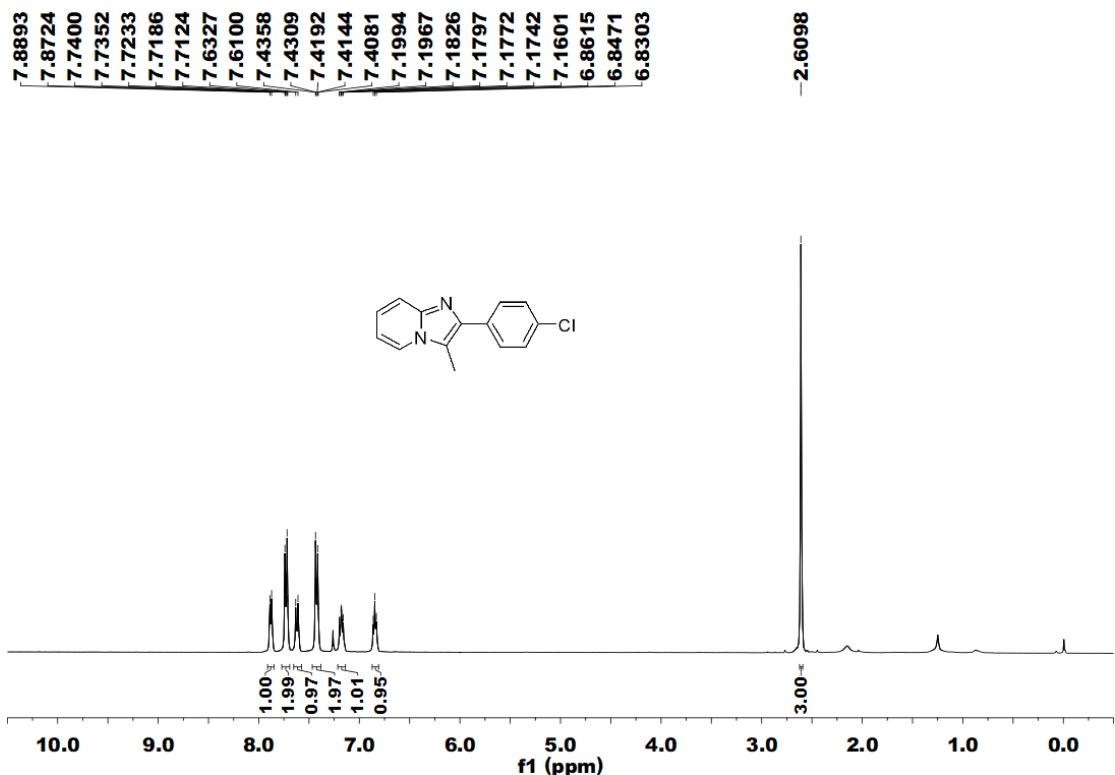
**Fig. S26**  $^{19}\text{F}$  NMR (376 MHz,  $\text{CDCl}_3$ ) of 2-(4-fluorophenyl)-3-methylimidazo[1,2-*a*]pyridine (**3l**)



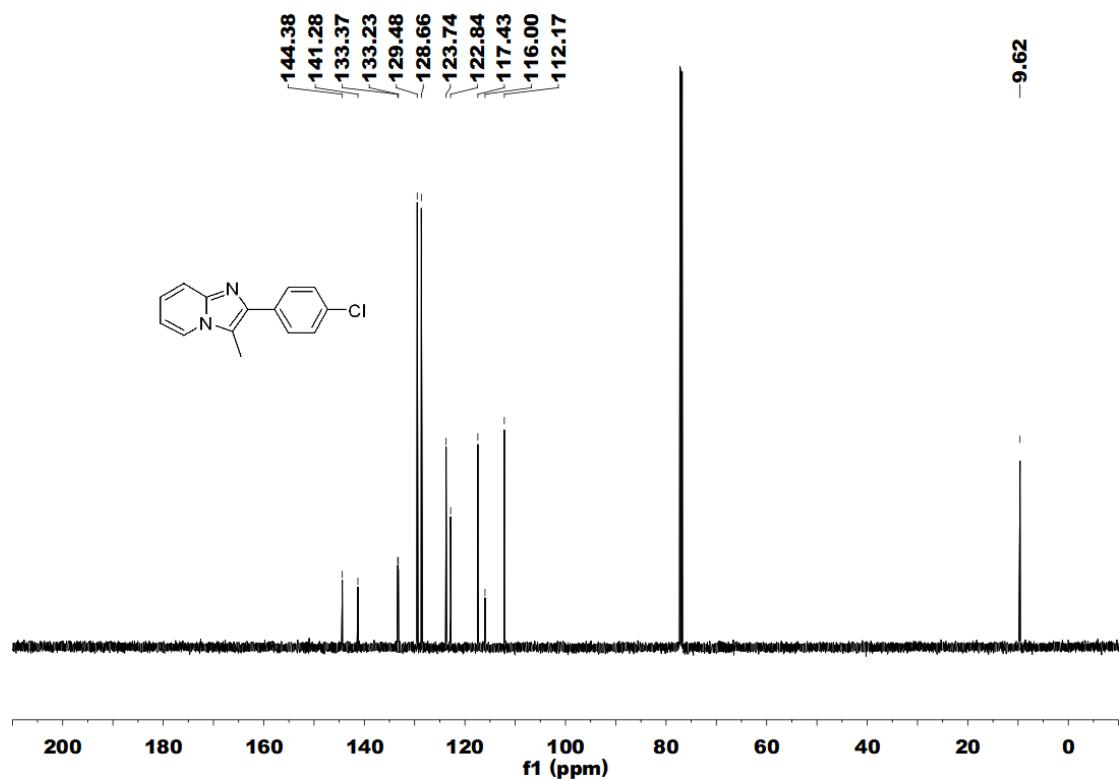
**Fig. S27**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 2-(3-chlorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3m)



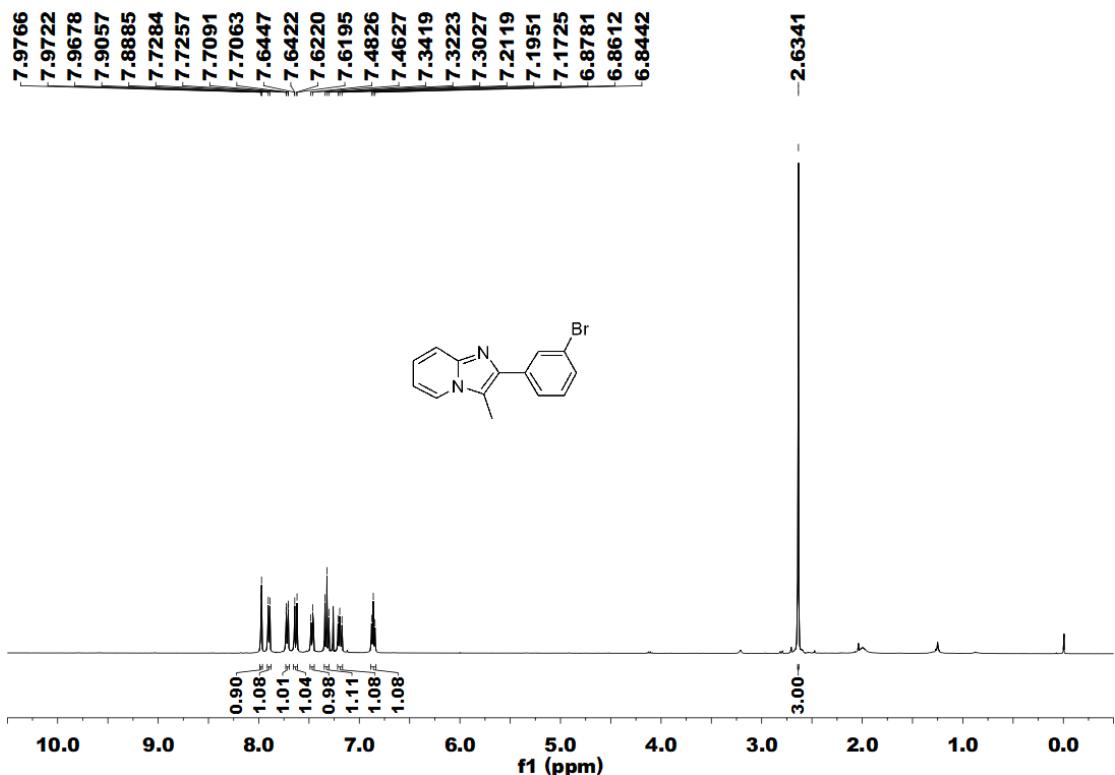
**Fig. S28**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 2-(3-chlorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3m)



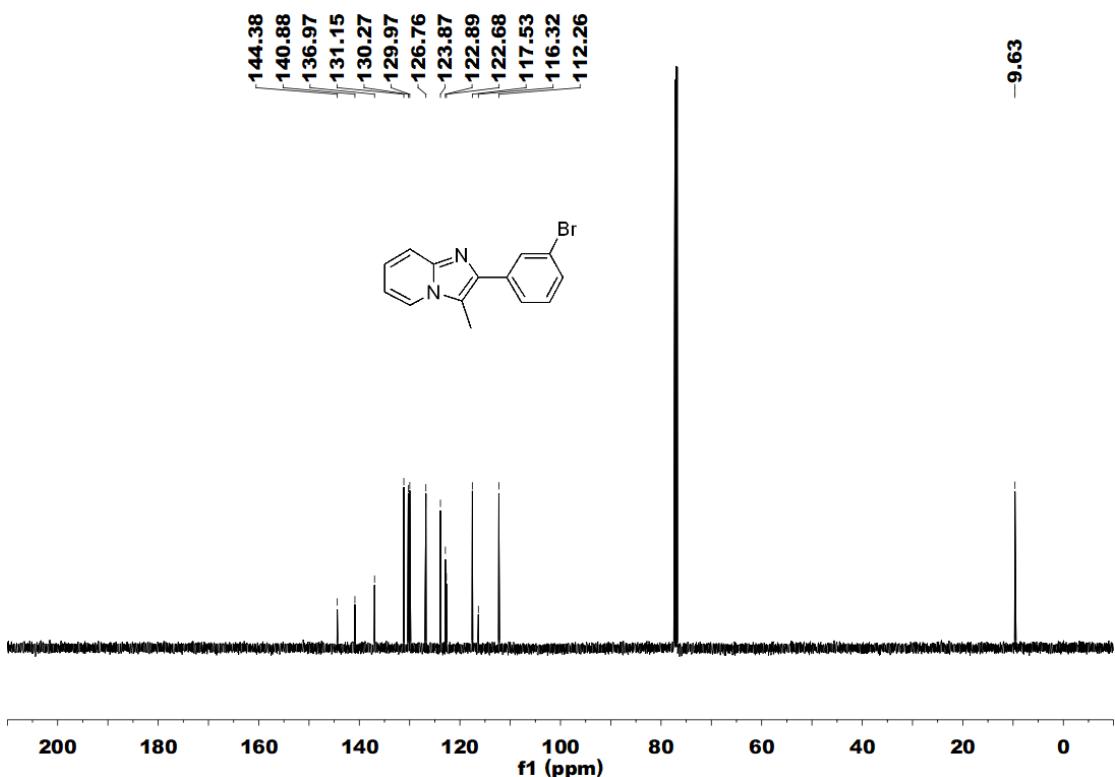
**Fig. S29** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) of 2-(4-chlorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3n)



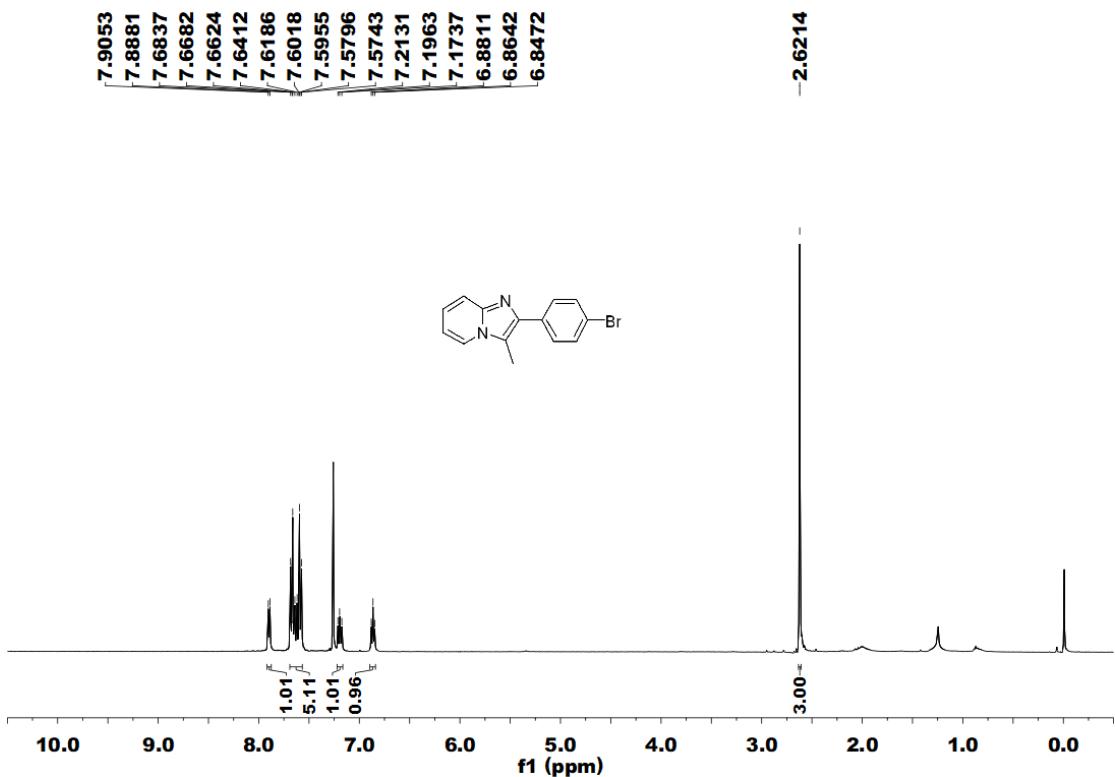
**Fig. S30** <sup>13</sup>C{<sup>1</sup>H} NMR (150 MHz, CDCl<sub>3</sub>) of 2-(4-chlorophenyl)-3-methylimidazo[1,2-*a*]pyridine (3n)



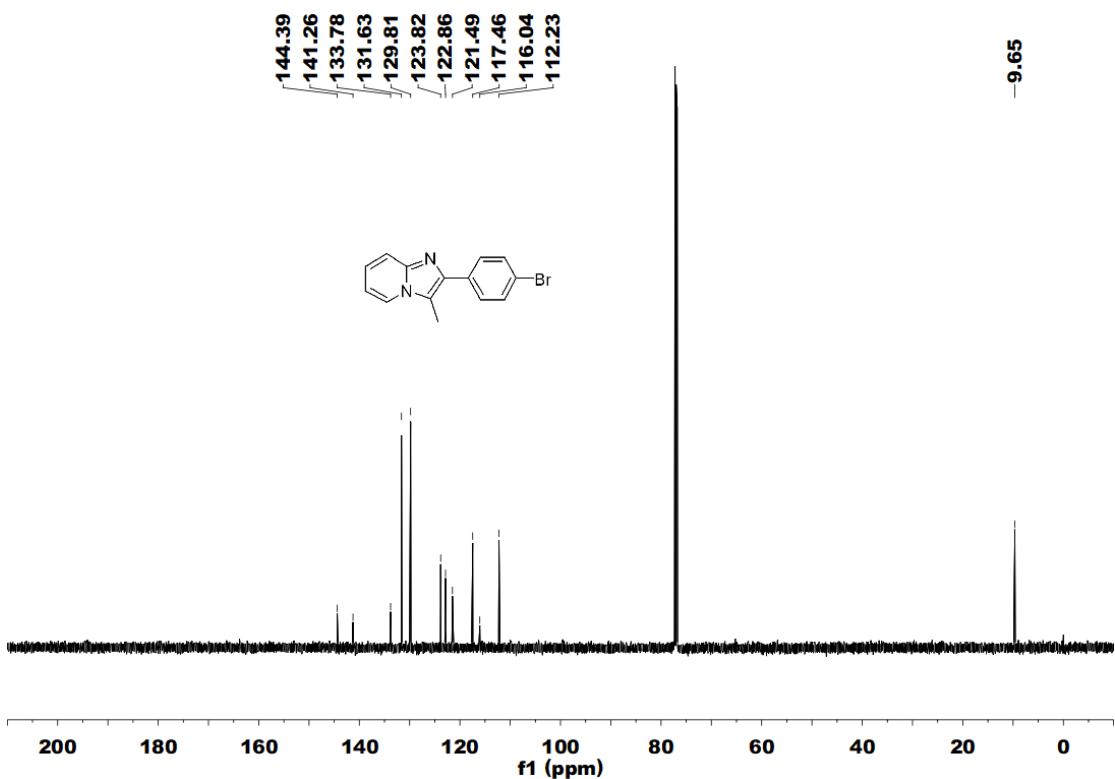
**Fig. S31**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 2-(3-bromophenyl)-3-methylimidazo[1,2-*a*]pyridine (3o)



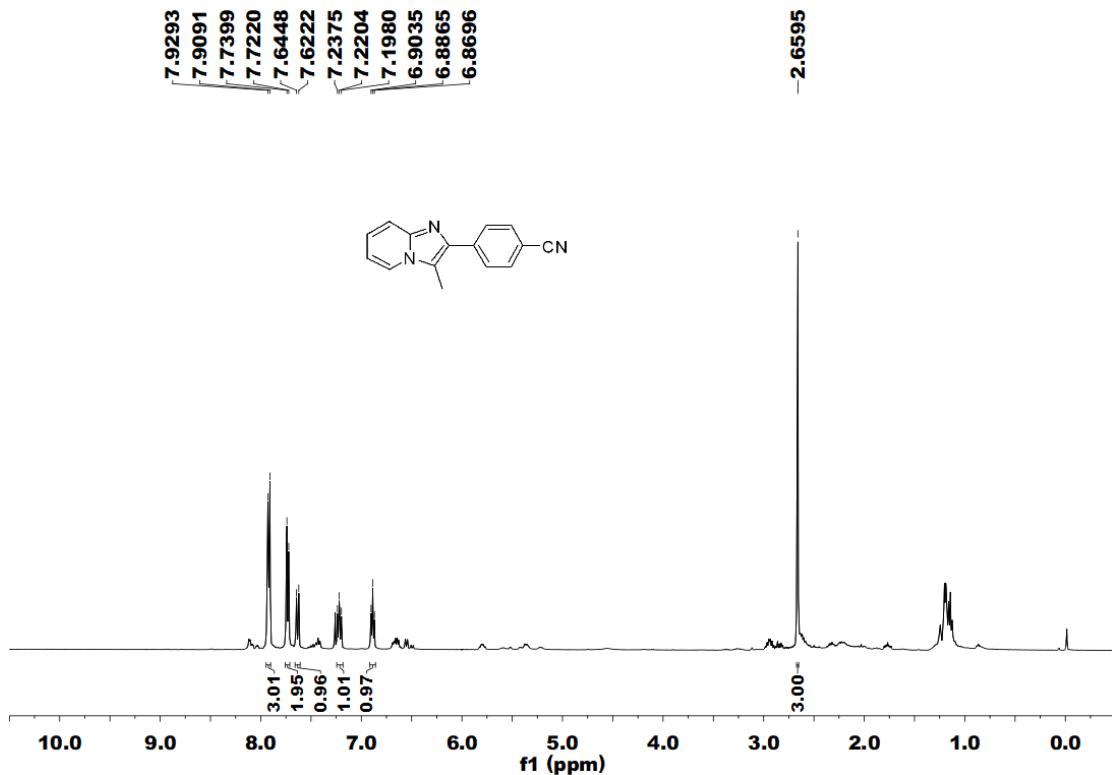
**Fig. S32**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 2-(3-bromophenyl)-3-methylimidazo[1,2-*a*]pyridine (3o)



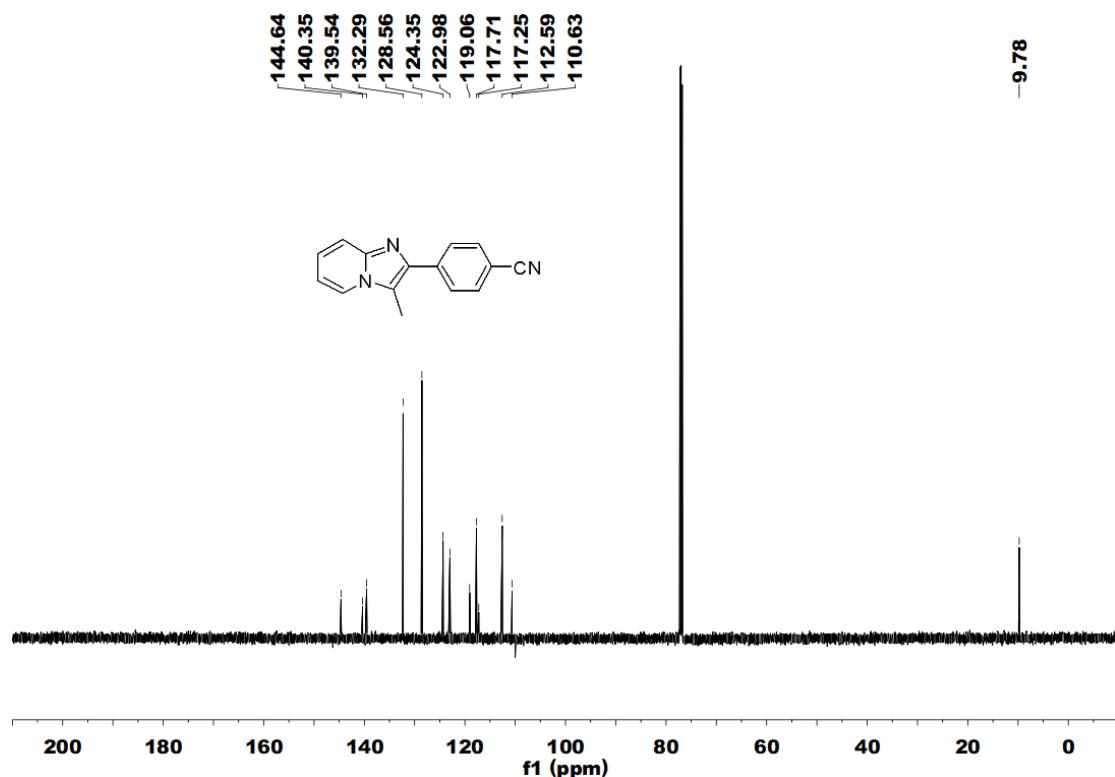
**Fig. S33** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) of 2-(4-bromophenyl)-3-methylimidazo[1,2-*a*]pyridine (3p)



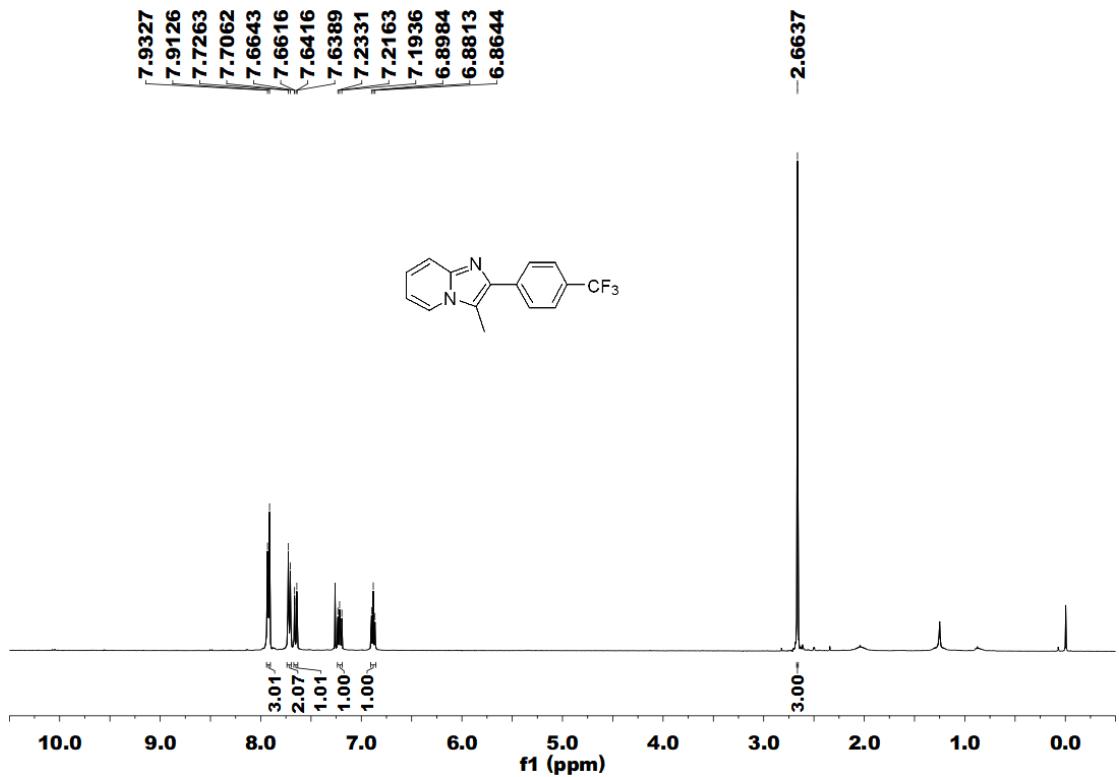
**Fig. S34** <sup>13</sup>C{<sup>1</sup>H} NMR (150 MHz, CDCl<sub>3</sub>) of 2-(4-bromophenyl)-3-methylimidazo[1,2-*a*]pyridine (3p)



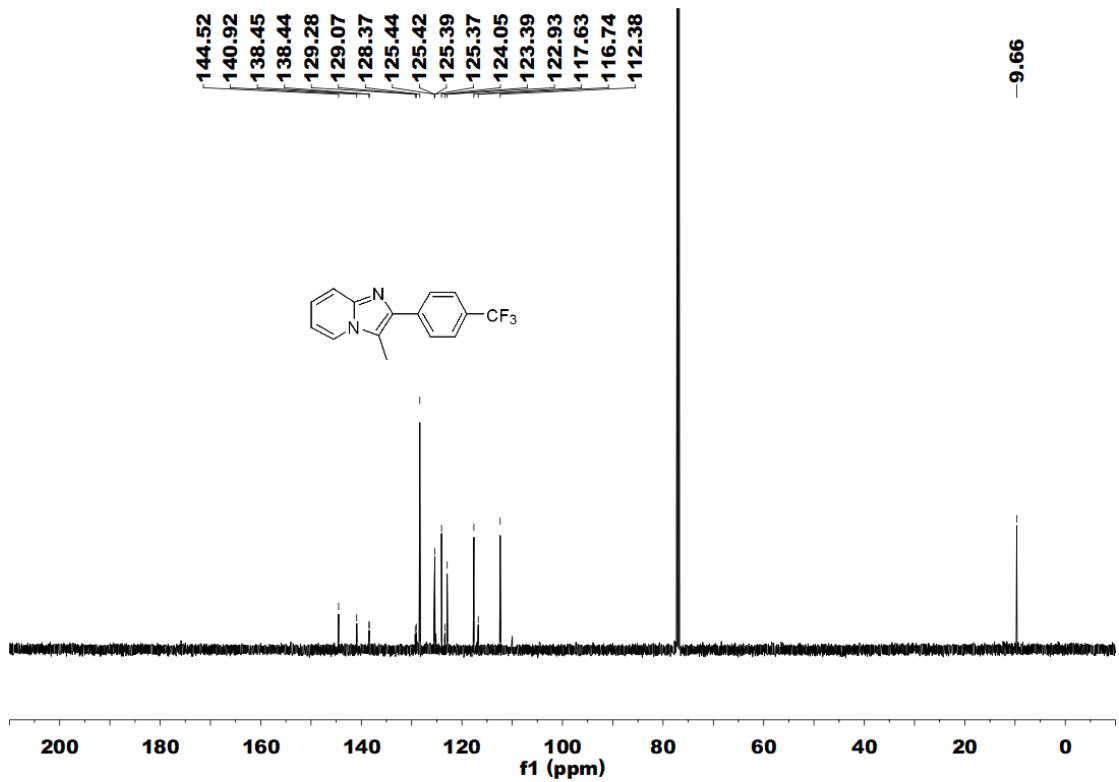
**Fig. S35**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 4-(3-methylimidazo[1,2-*a*]pyridin-2-yl)benzonitrile (3q)



**Fig. S36**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 4-(3-methylimidazo[1,2-*a*]pyridin-2-yl)benzonitrile (3q)



**Fig. S37** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) of 3-methyl-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridine (3r)



**Fig. S38** <sup>13</sup>C{<sup>1</sup>H} NMR (150 MHz, CDCl<sub>3</sub>) of 3-methyl-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridine (3r)

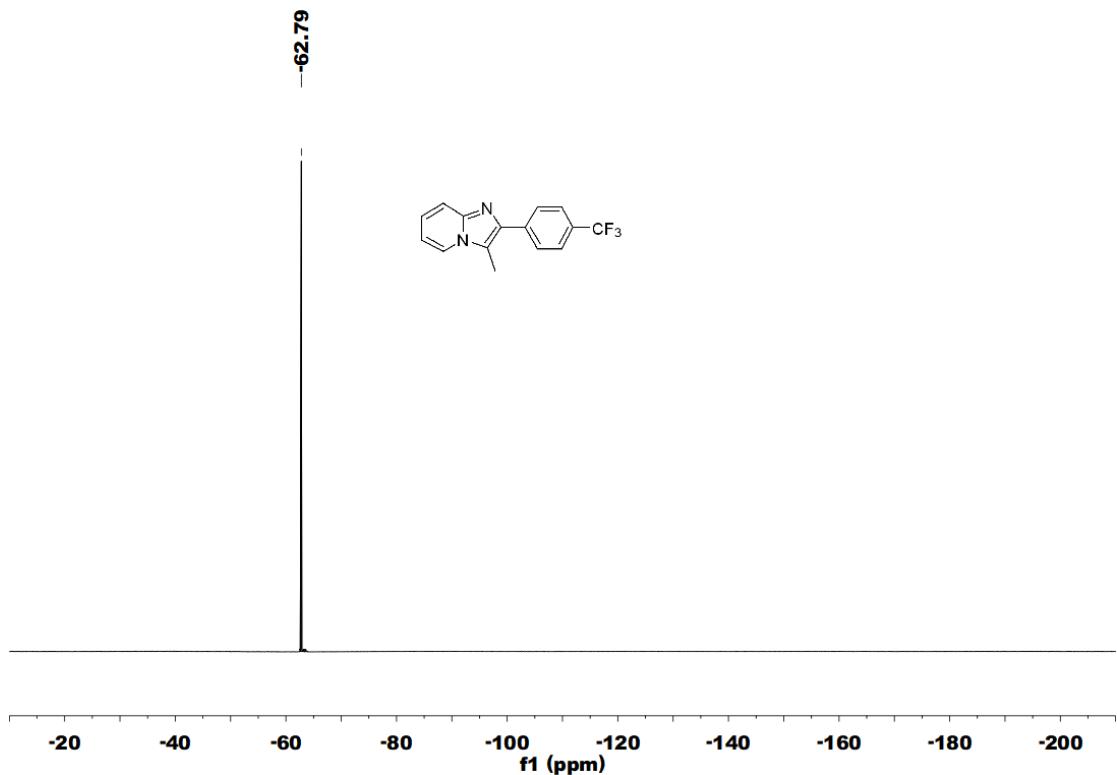


Fig. S39 <sup>19</sup>F NMR (376 MHz, CDCl<sub>3</sub>) of 3-methyl-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridine (3r)

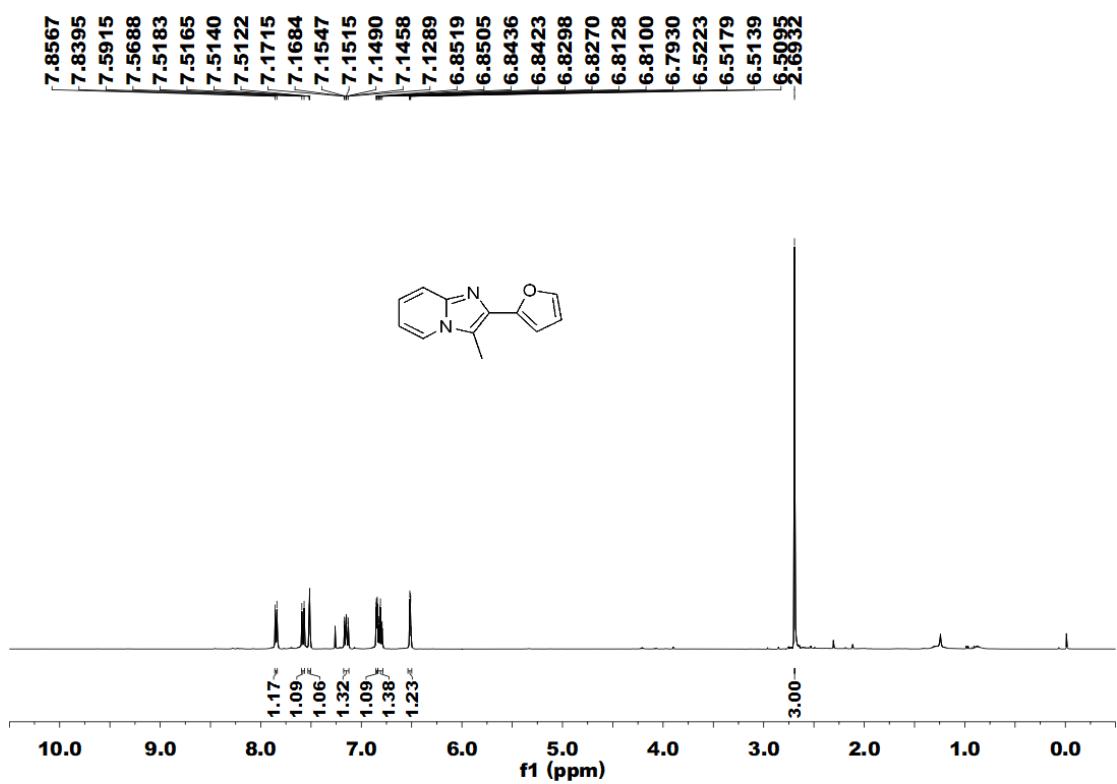
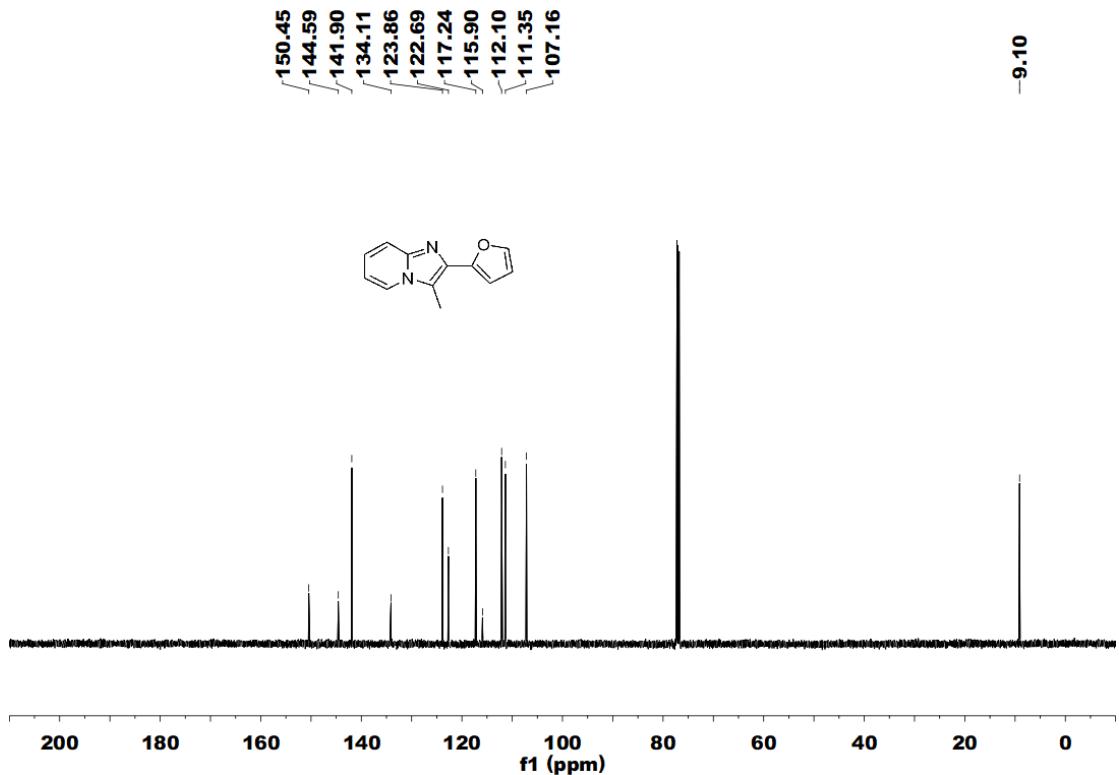
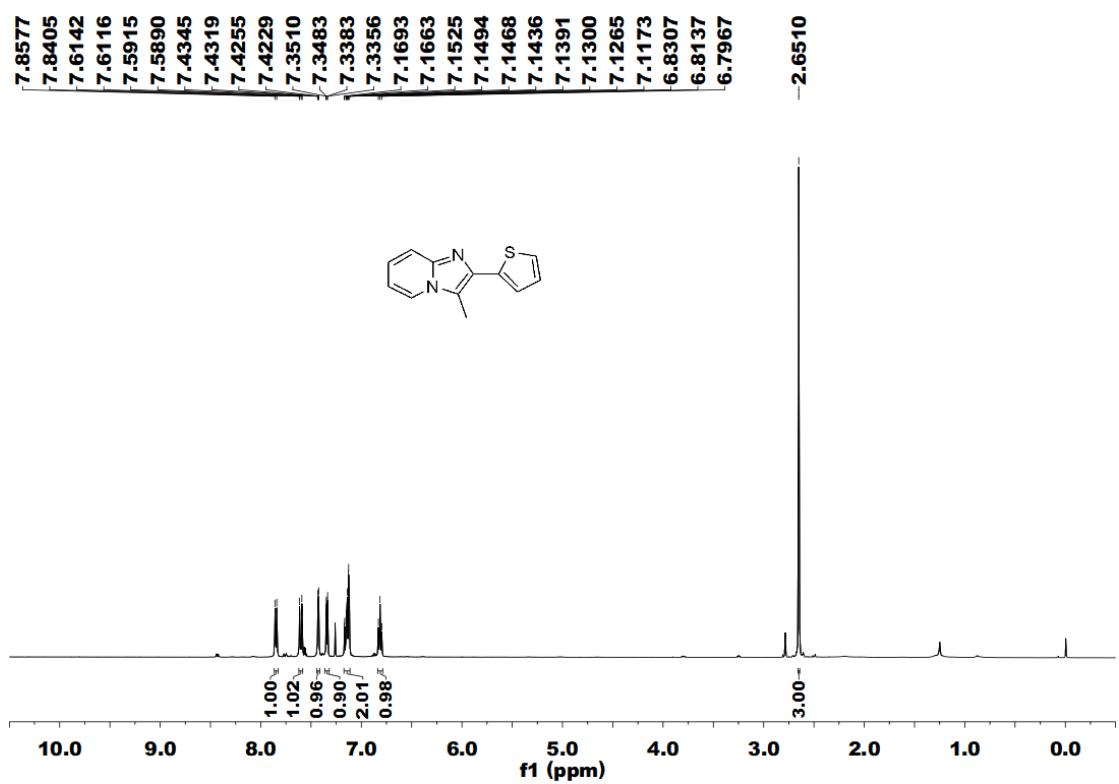


Fig. S40 <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) of 2-(furan-2-yl)-3-methylimidazo[1,2-*a*]pyridine (3s)



**Fig. S41**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 2-(furan-2-yl)-3-methylimidazo[1,2-*a*]pyridine (3s)



**Fig. S42**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 3-methyl-2-(thiophen-2-yl)imidazo[1,2-*a*]pyridine (3t)

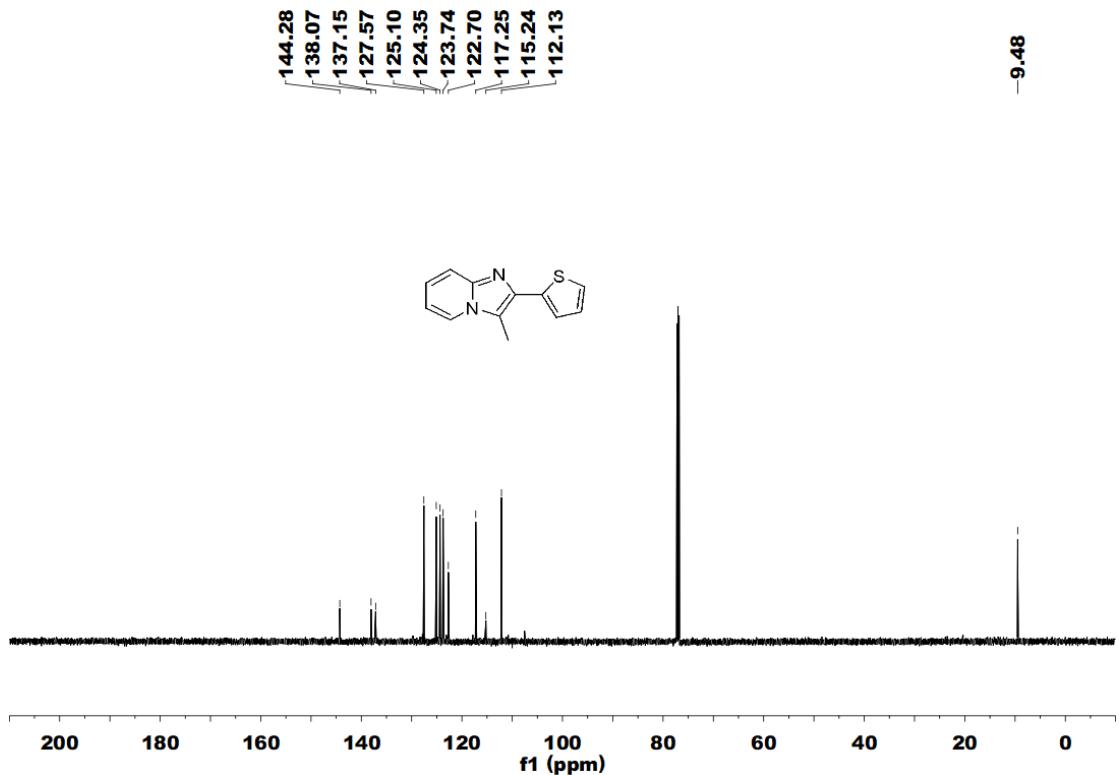


Fig. S43  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3-methyl-2-(thiophen-2-yl)imidazo[1,2-*a*]pyridine (3t)

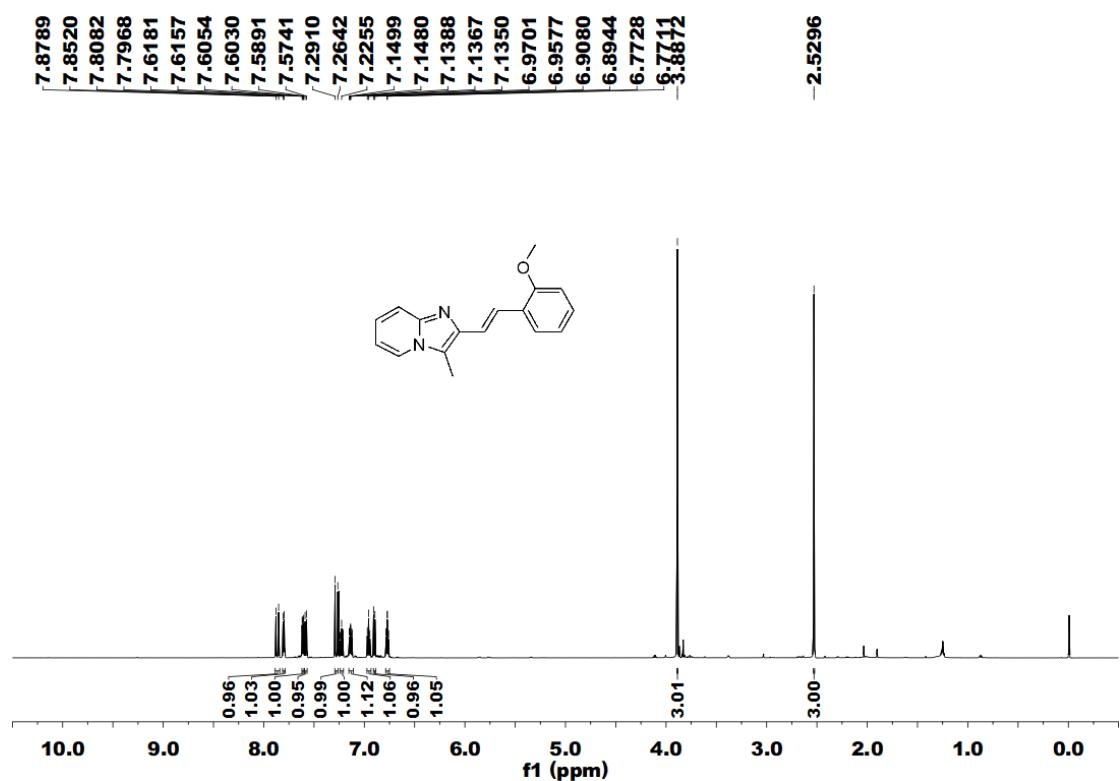
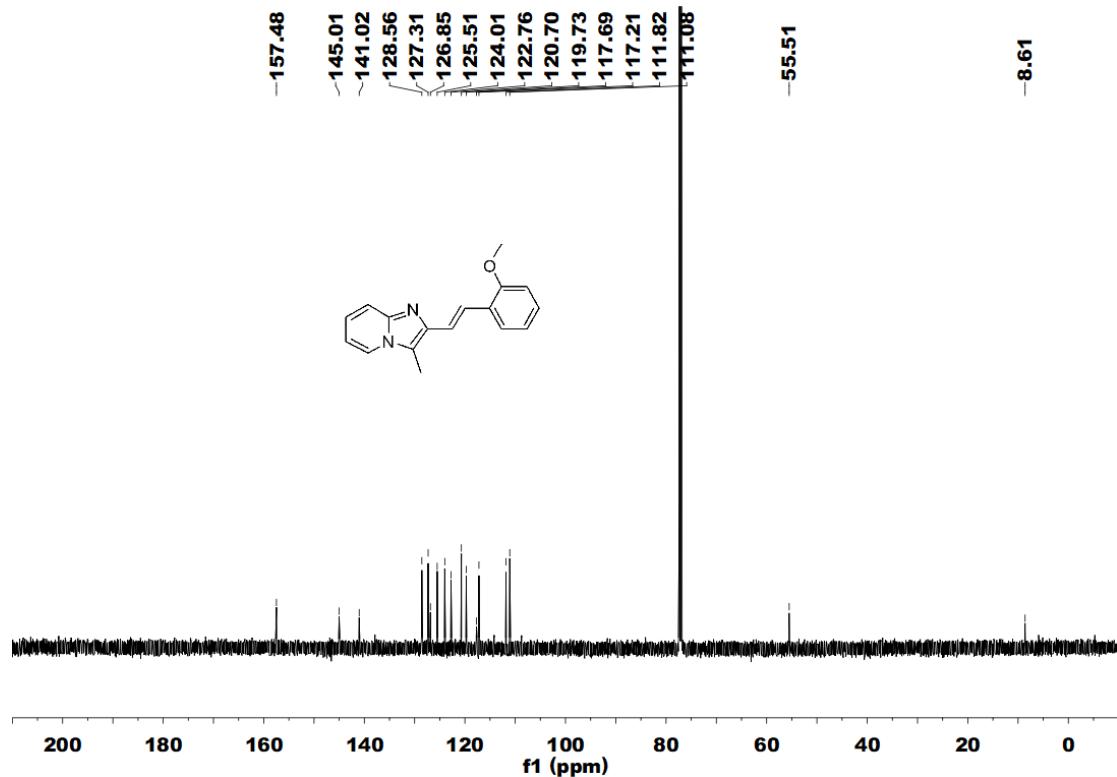
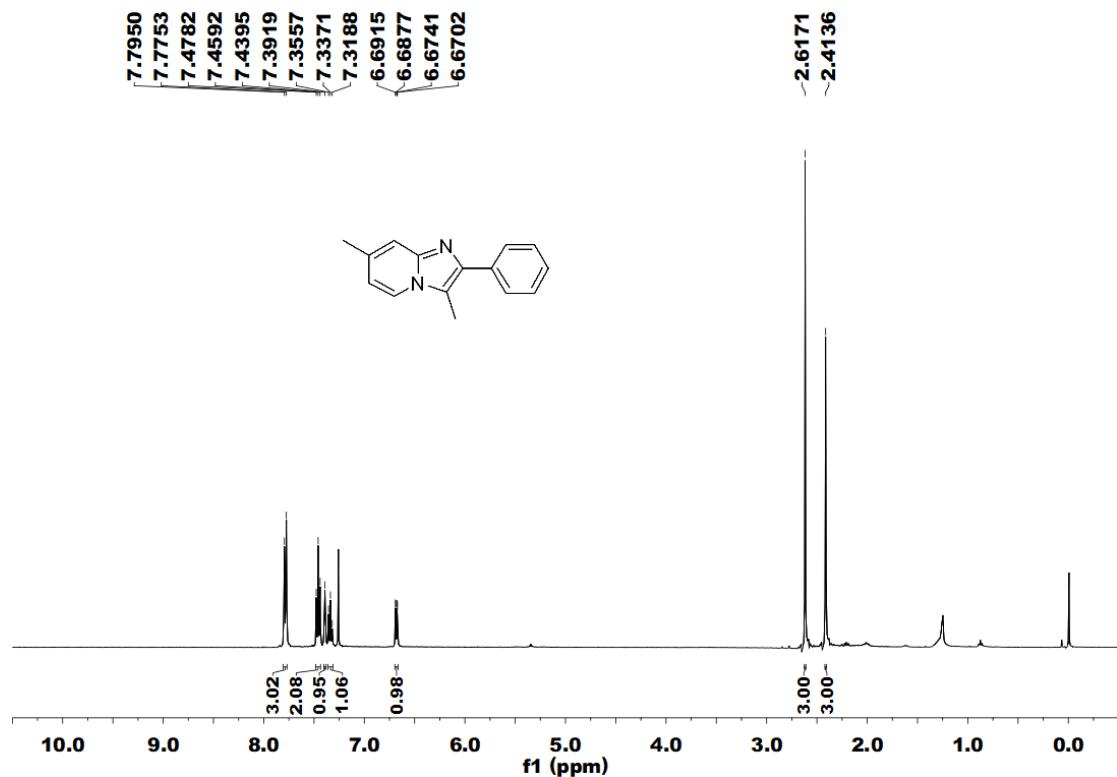


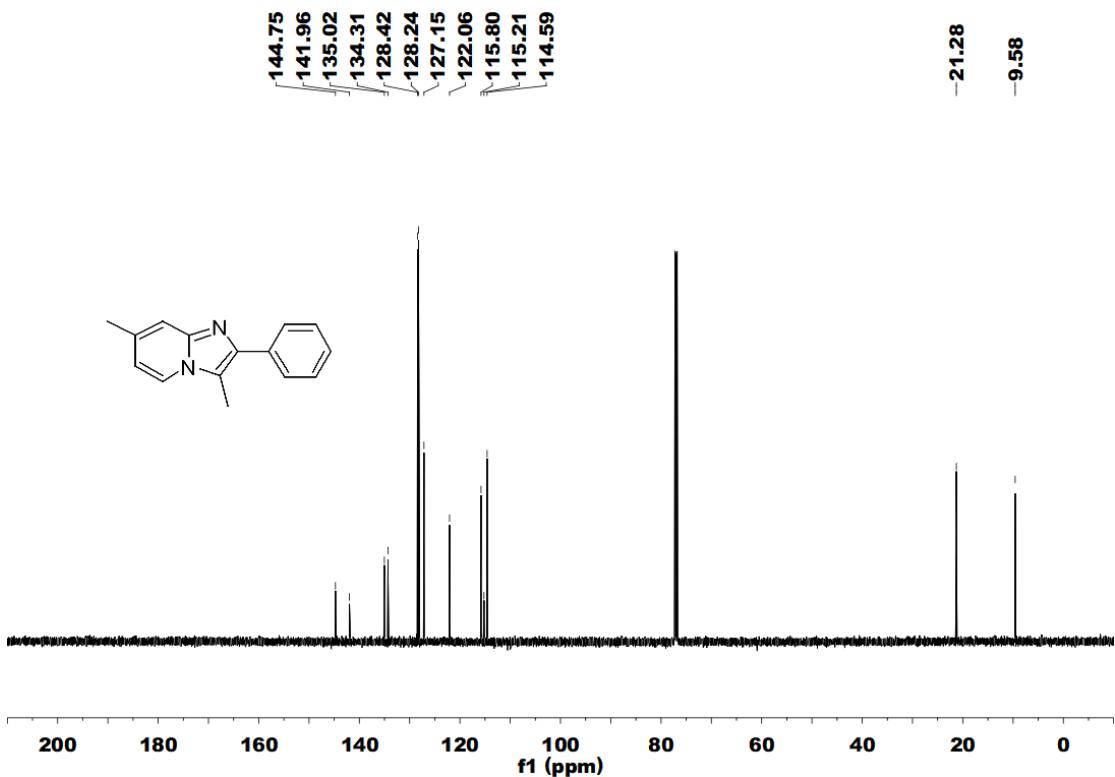
Fig. S44  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of (E)-2-(2-methoxystyryl)-3-methylimidazo[1,2-*a*]pyridine (3u)



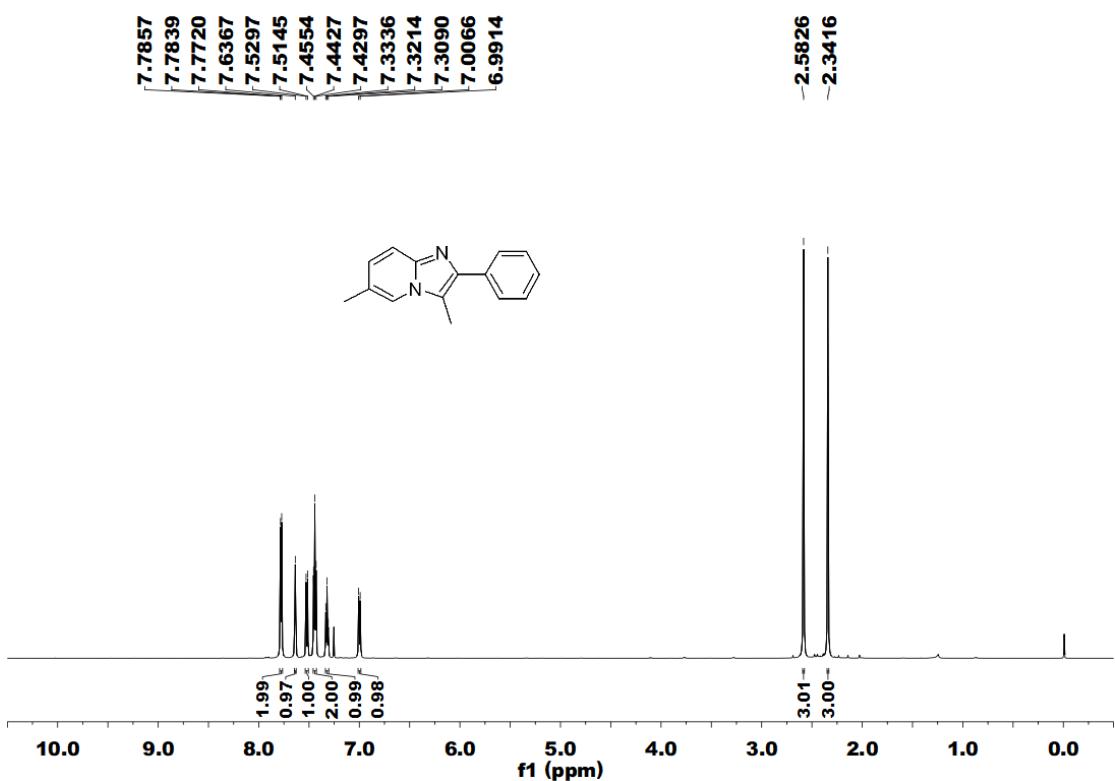
**Fig. S45**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of (*E*)-2-(2-methoxystyryl)-3-methylimidazo[1,2-*a*]pyridine (**3u**)



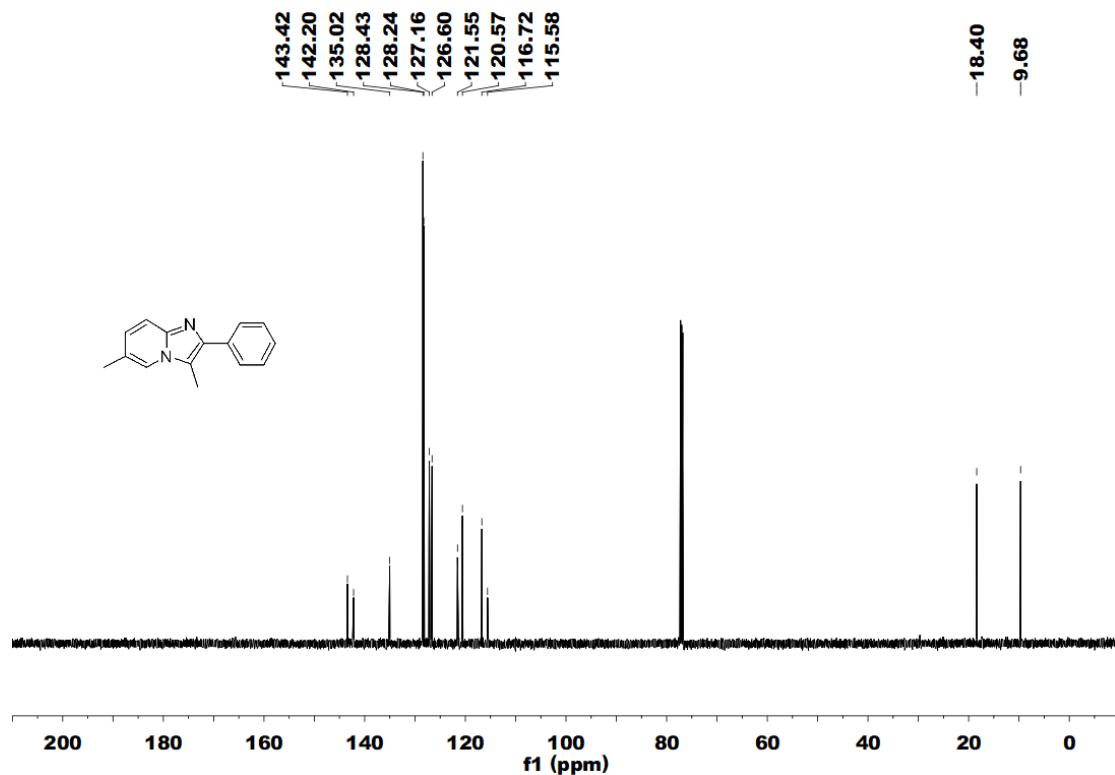
**Fig. S46**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 3,7-dimethyl-2-phenylimidazo[1,2-*a*]pyridine (**4a**)



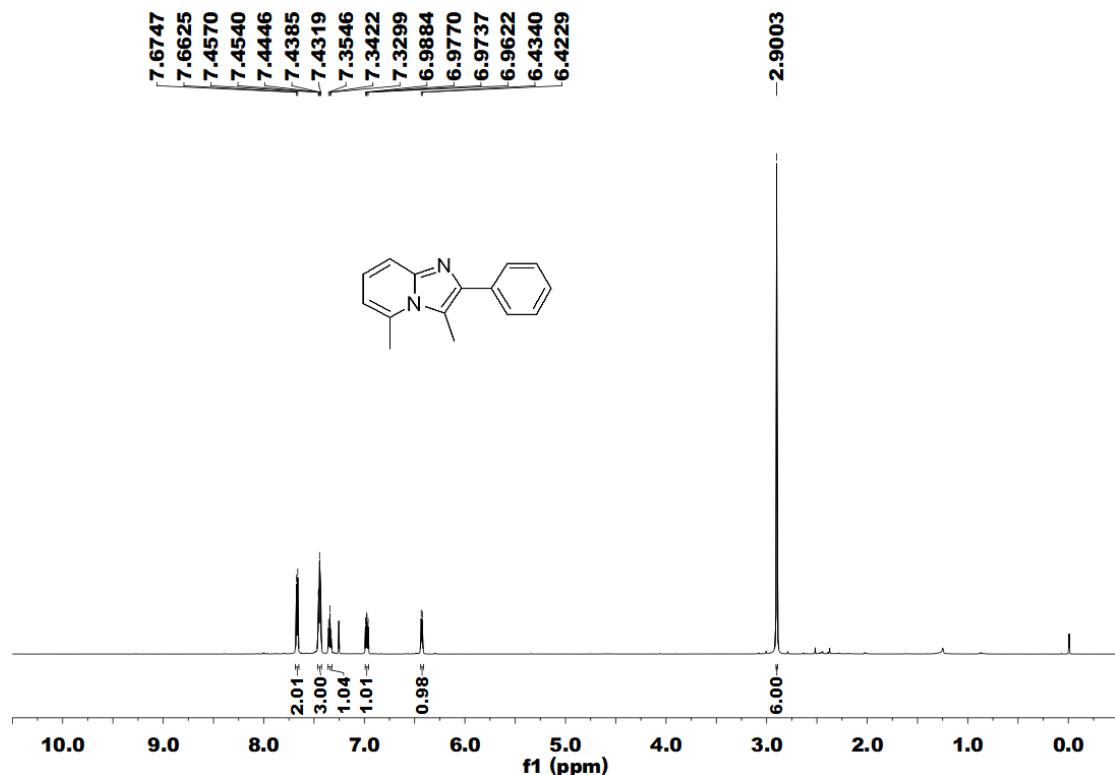
**Fig. S47**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3,7-dimethyl-2-phenylimidazo[1,2-*a*]pyridine  
(4a)



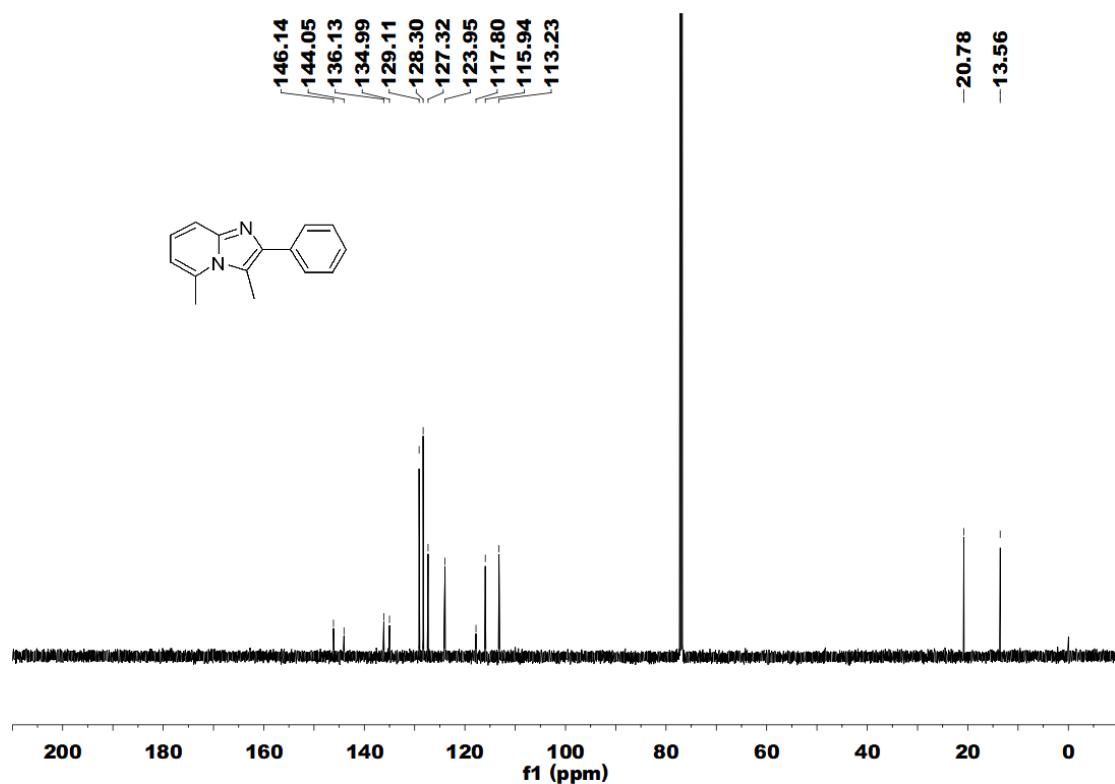
**Fig. S48**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 3,6-dimethyl-2-phenylimidazo[1,2-*a*]pyridine (4b)



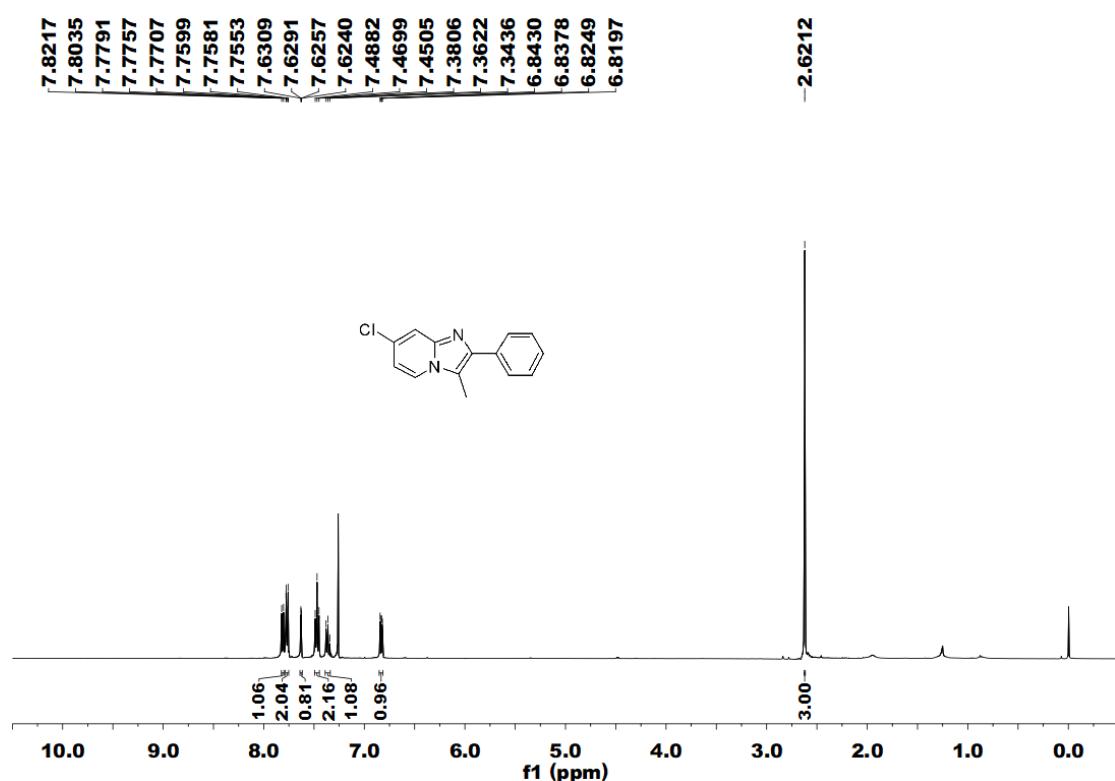
**Fig. S49**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3,6-dimethyl-2-phenylimidazo[1,2-*a*]pyridine (4b)



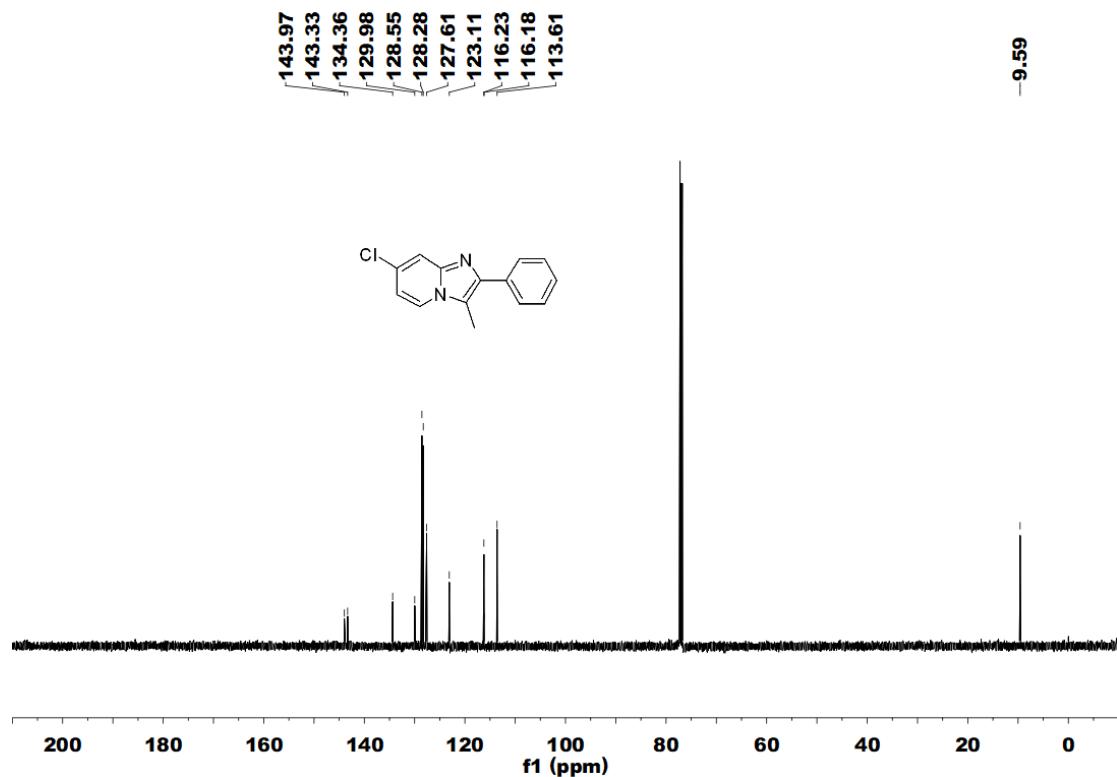
**Fig. S50**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 3,5-dimethyl-2-phenylimidazo[1,2-*a*]pyridine (4c)



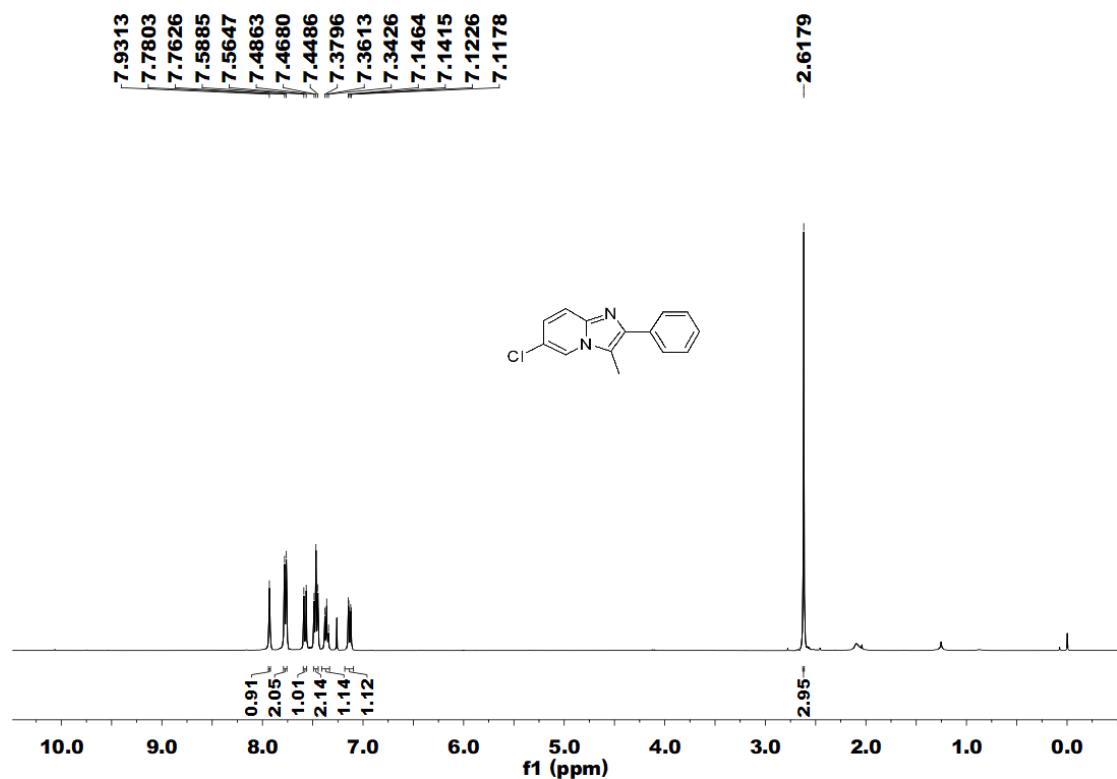
**Fig. S51**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3,5-dimethyl-2-phenylimidazo[1,2-*a*]pyridine (4c)



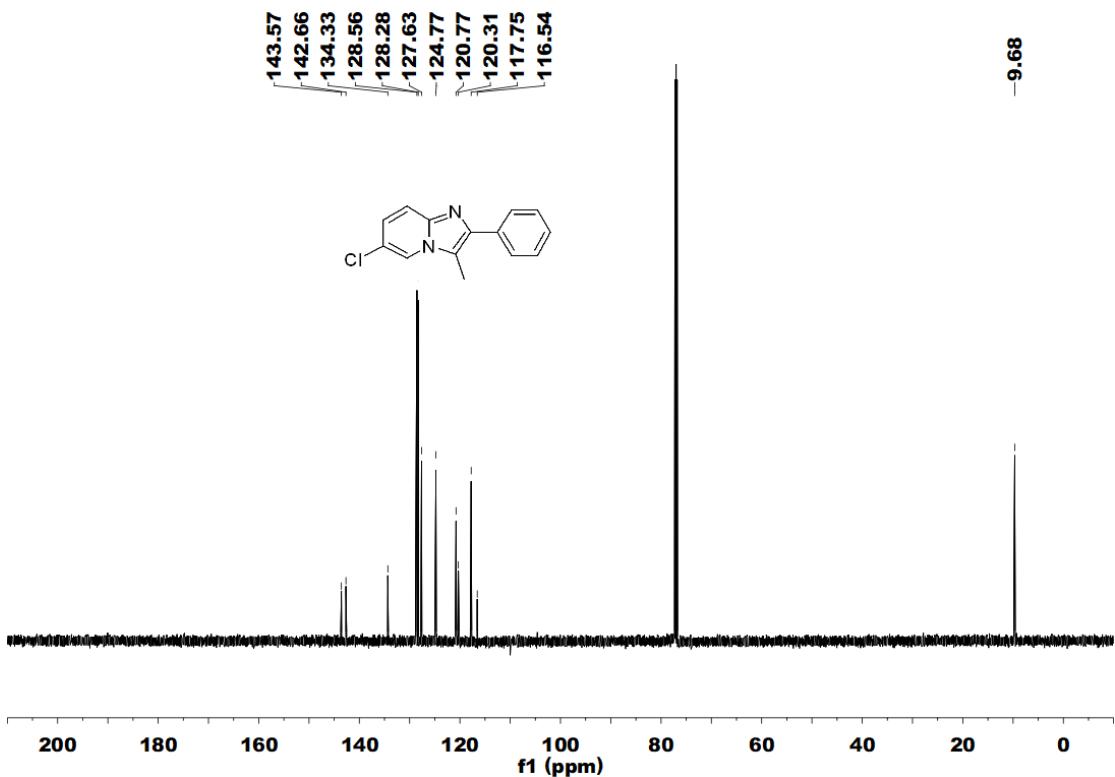
**Fig. S52**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 7-chloro-3-methyl-2-phenylimidazo[1,2-*a*]pyridine (4d)



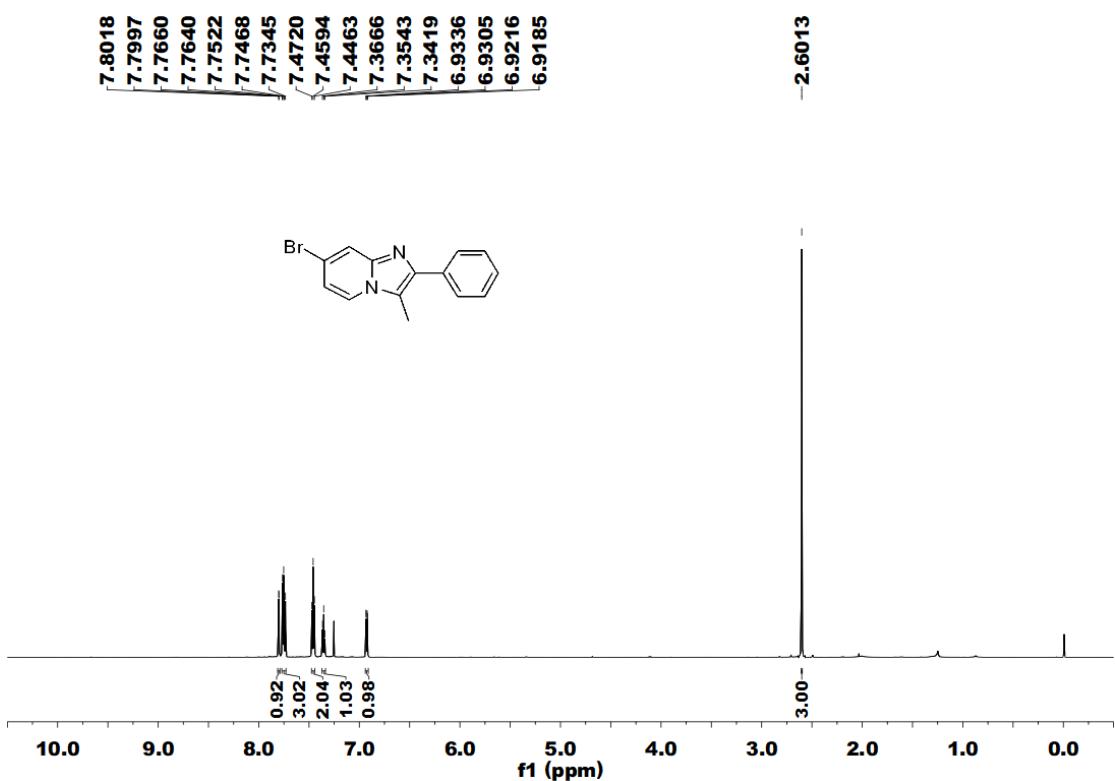
**Fig. S53  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 7-chloro-3-methyl-2-phenylimidazo[1,2-*a*]pyridine (4d)**



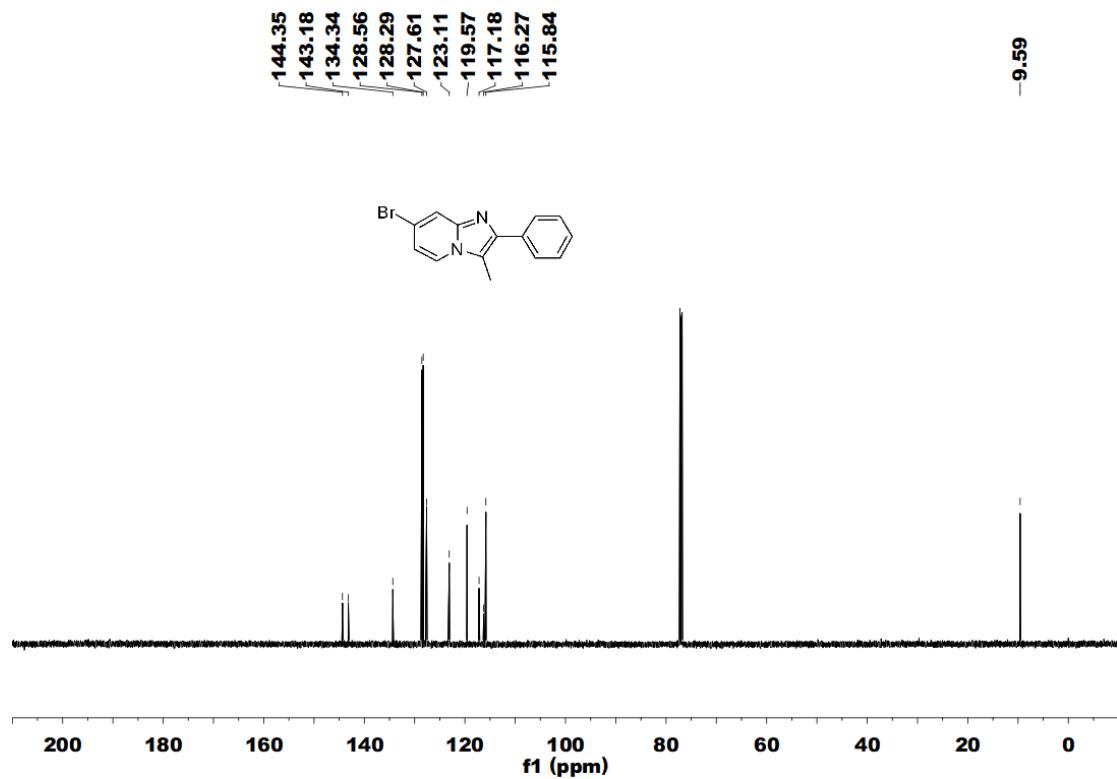
**Fig. S54  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 6-chloro-3-methyl-2-phenylimidazo[1,2-*a*]pyridine (4e)**



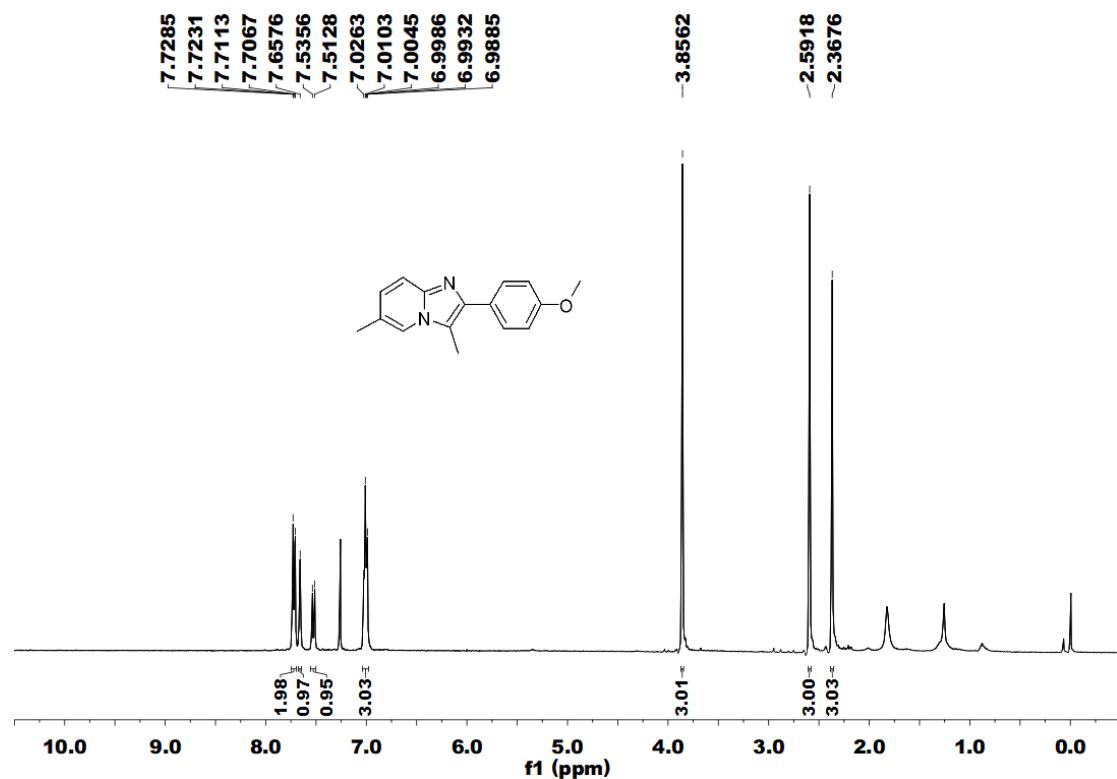
**Fig. S55**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150MHz,  $\text{CDCl}_3$ ) of 6-chloro-3-methyl-2-phenylimidazo[1,2-*a*]pyridine (**4e**)



**Fig. S56**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 7-bromo-3-methyl-2-phenylimidazo[1,2-*a*]pyridine (**4f**)



**Fig. S57**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 7-bromo-3-methyl-2-phenylimidazo[1,2-*a*]pyridine (4f)



**Fig. S58**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 2-(4-methoxyphenyl)-3,6-dimethylimidazo[1,2-*a*]pyridine (5a)

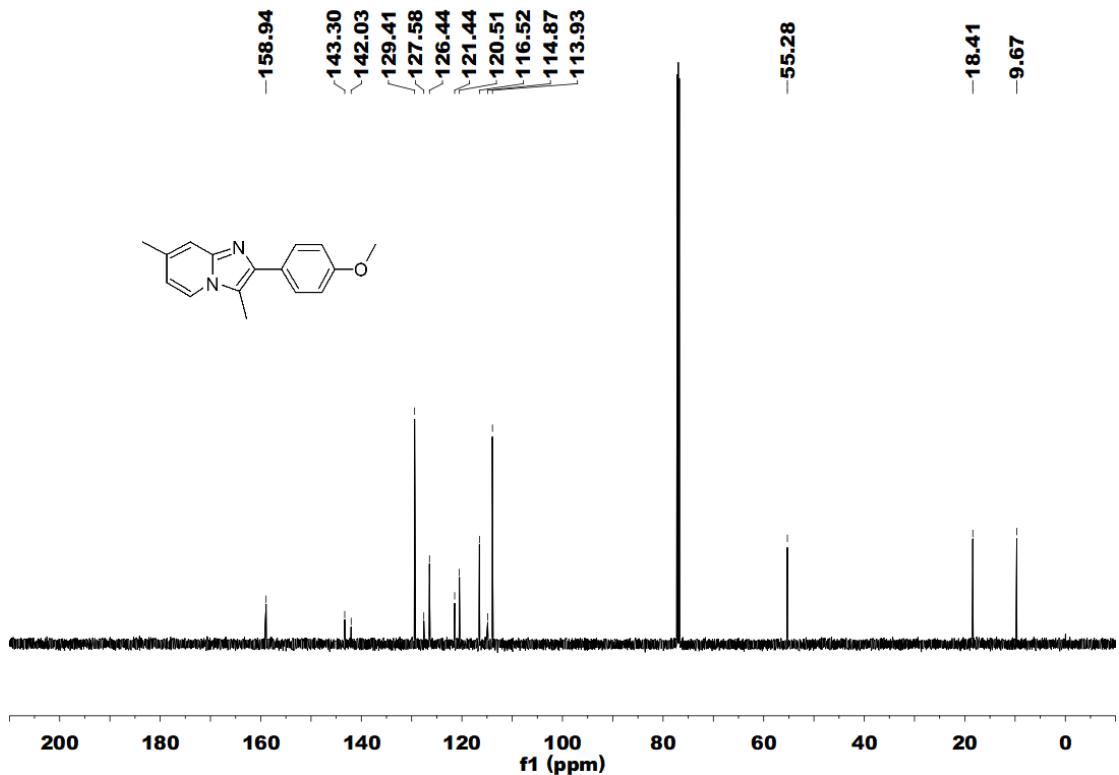


Fig. S59  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 2-(4-methoxyphenyl)-3,6-dimethylimidazo[1,2-*a*]pyridine (5a)

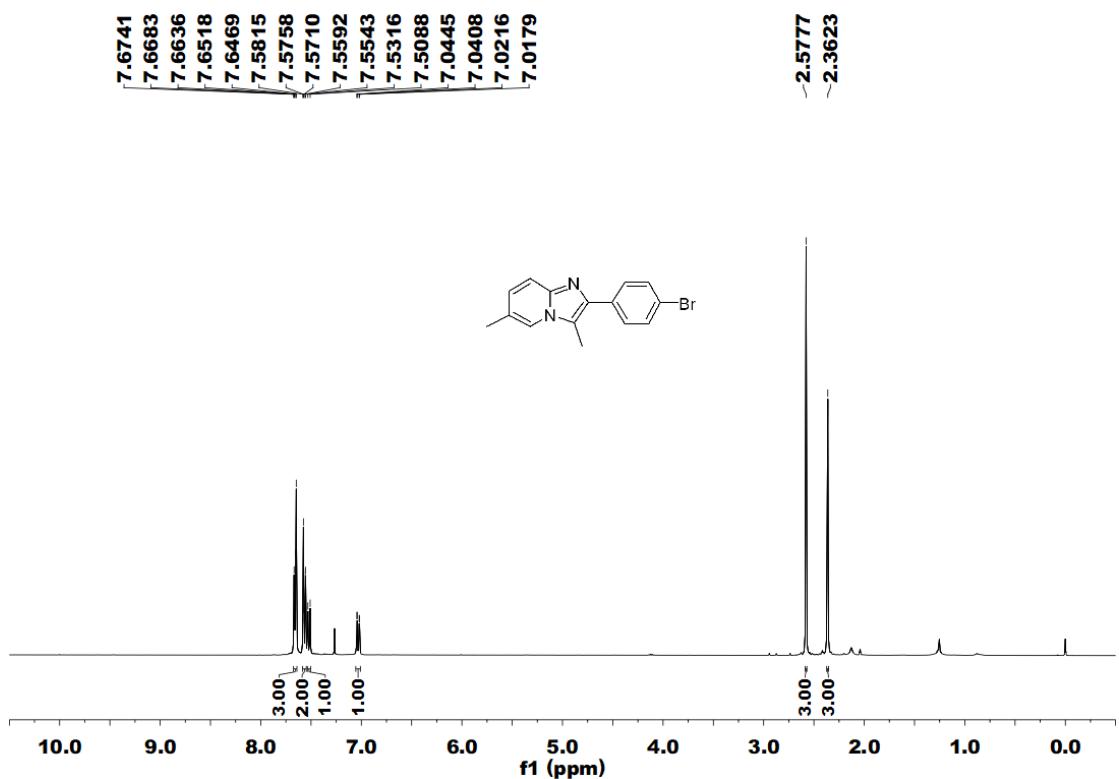
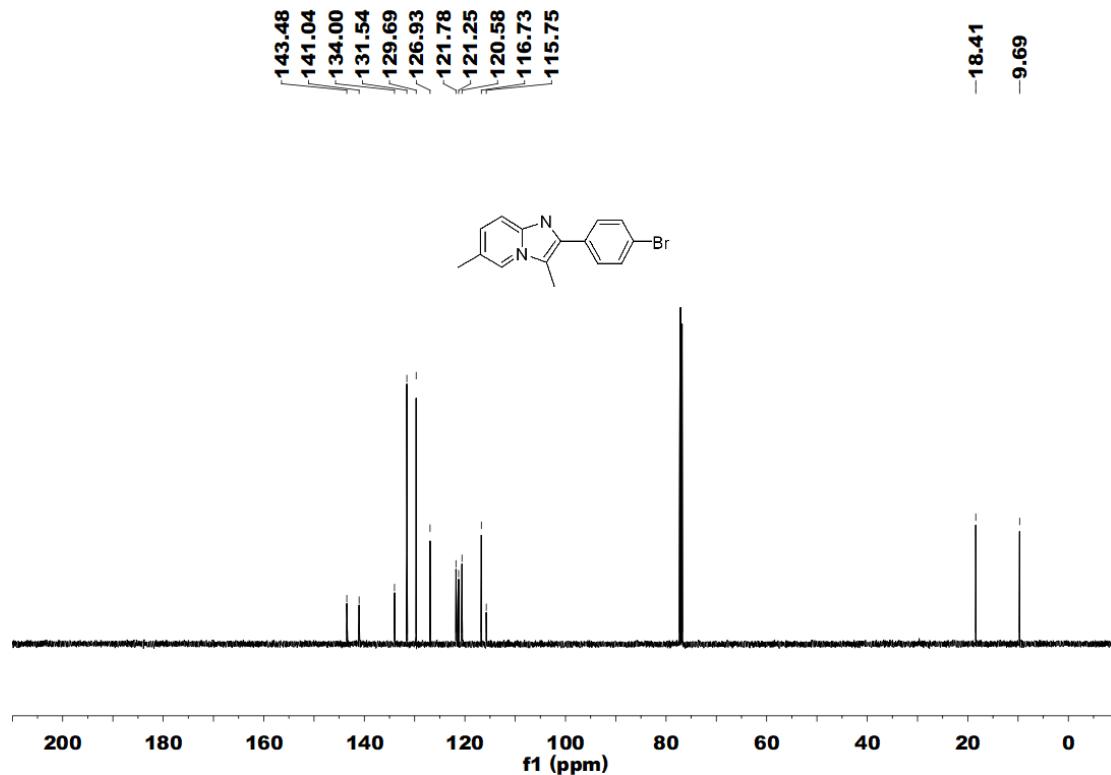
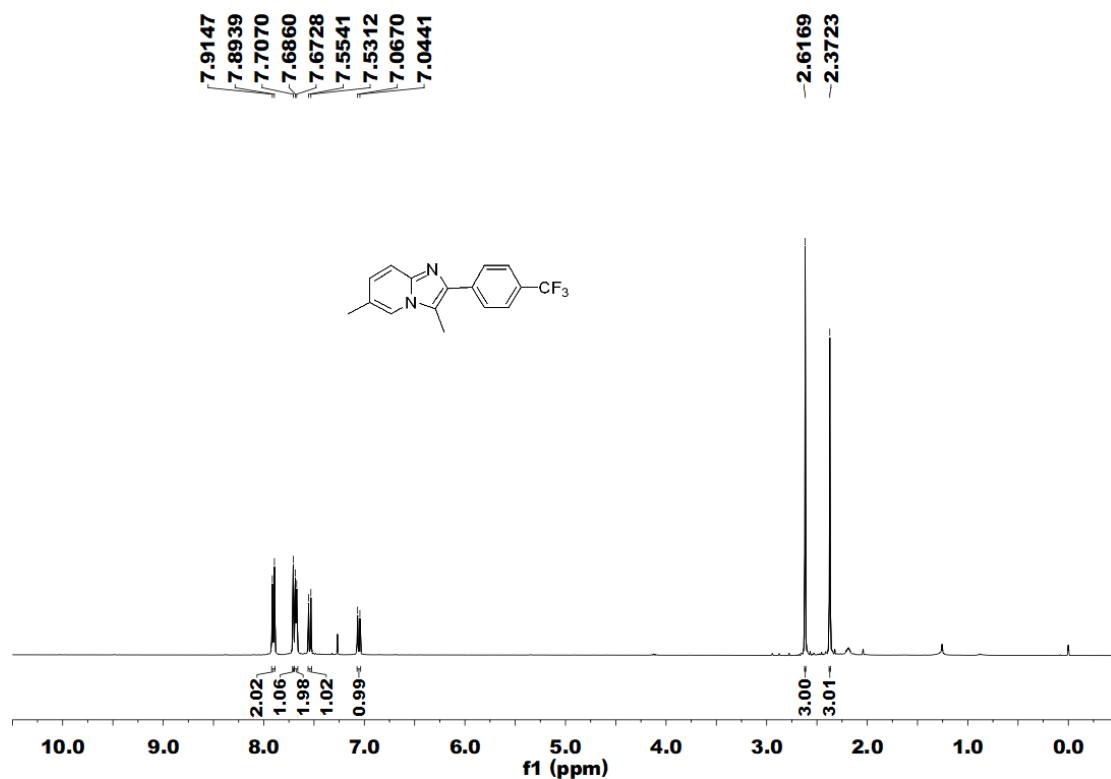


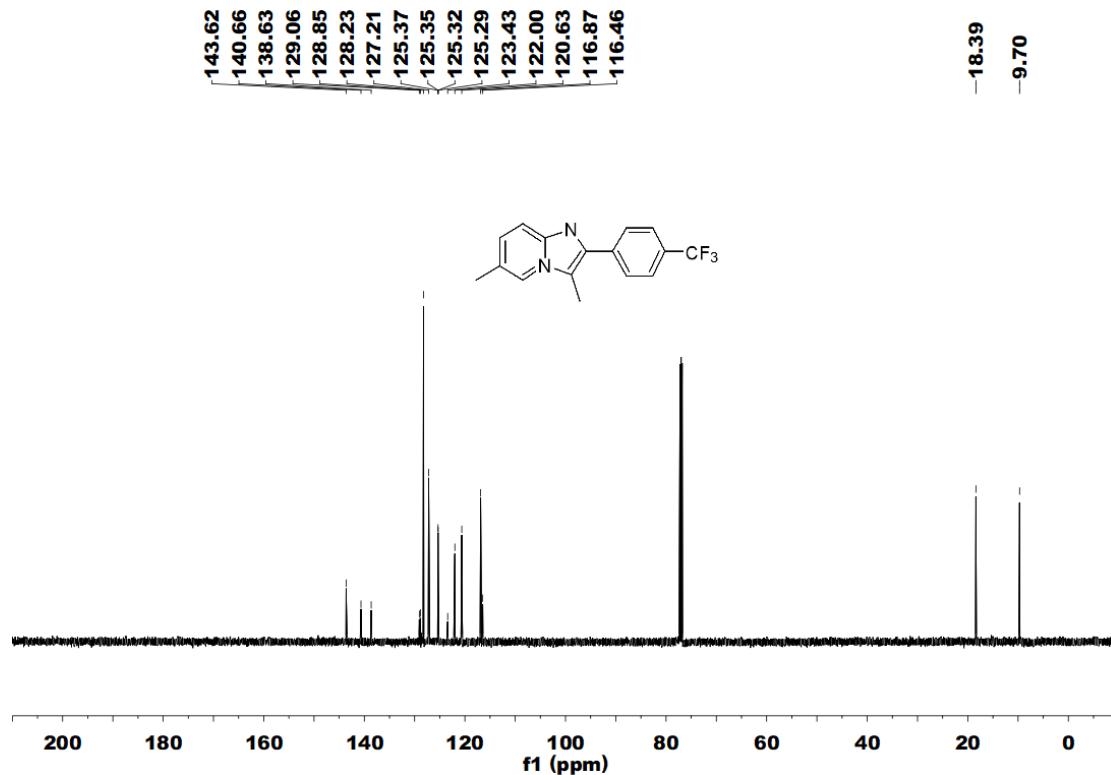
Fig. S60  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 2-(4-bromophenyl)-3,6-dimethylimidazo[1,2-*a*]pyridine (5b)



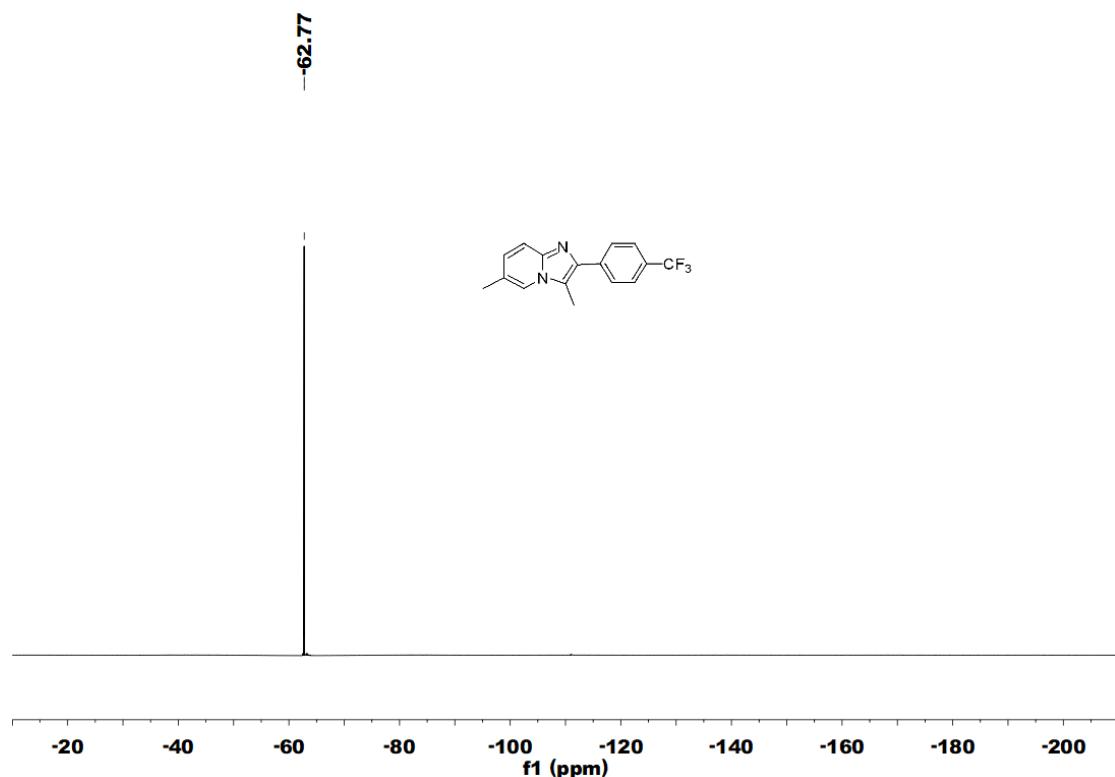
**Fig. S61**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 2-(4-bromophenyl)-3,6-dimethylimidazo[1,2-*a*]pyridine (**5b**)



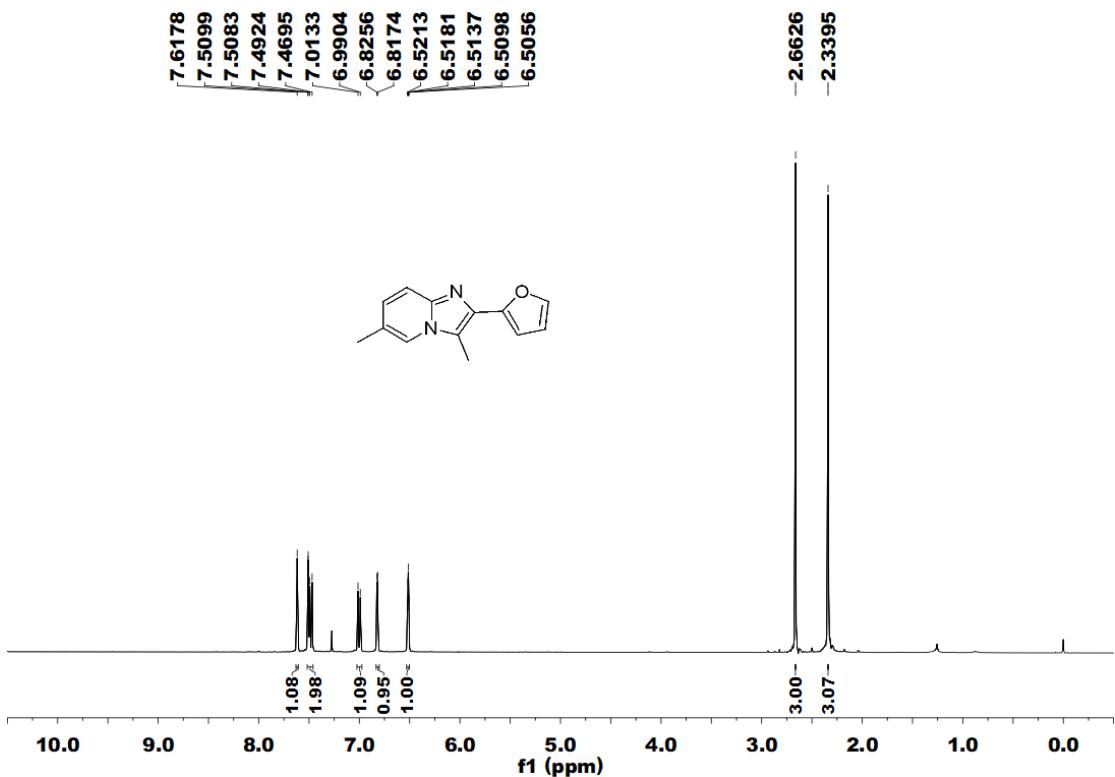
**Fig. S62**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) of 3,6-dimethyl-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridine (**5c**)



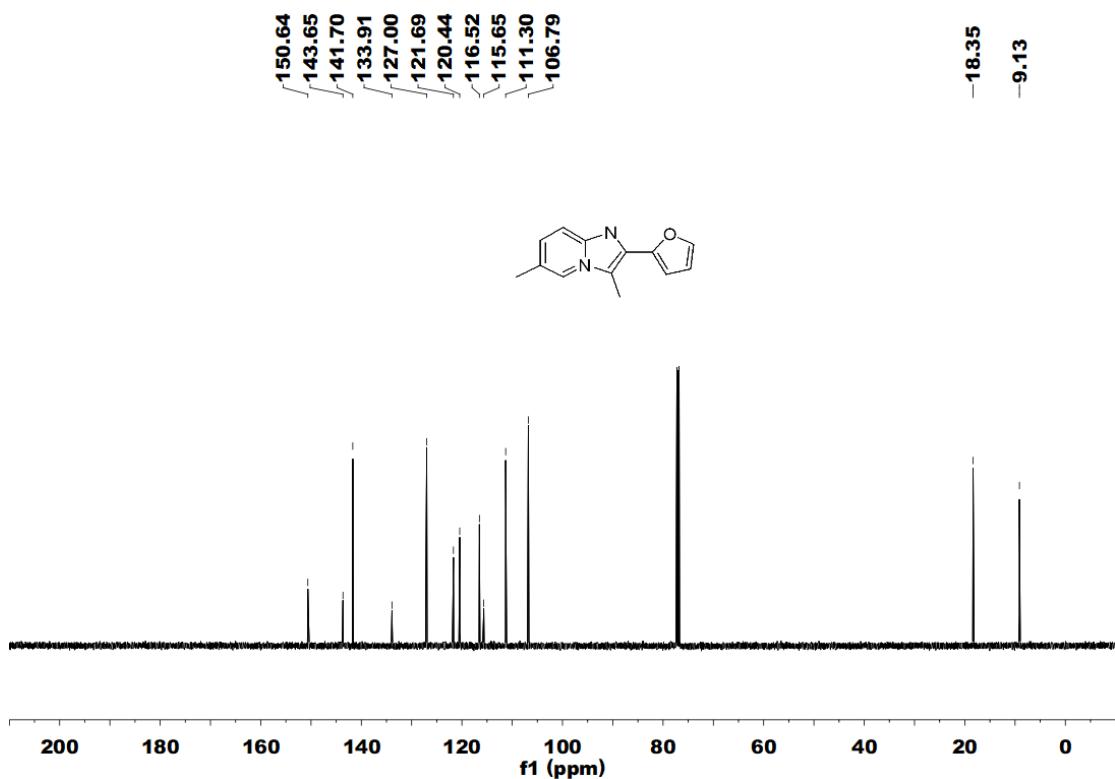
**Fig. S63**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) of 3,6-dimethyl-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridine (**5c**)



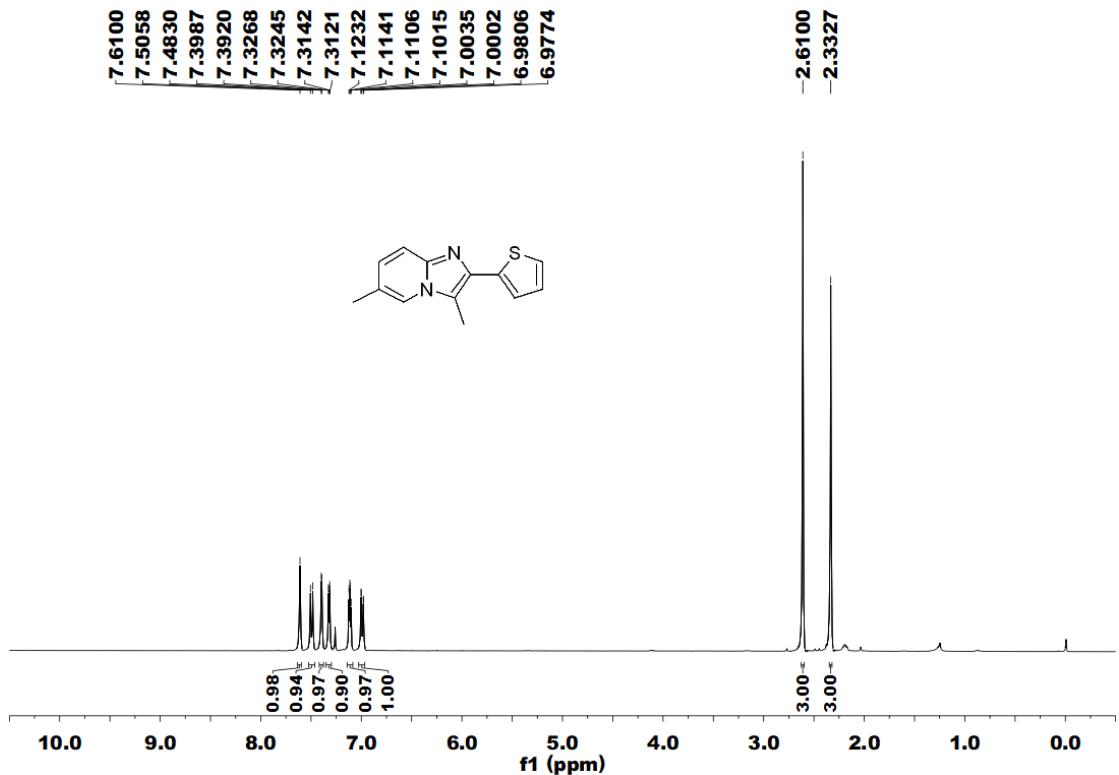
**Fig. S64**  $^{19}\text{F}$  (376 MHz,  $\text{CDCl}_3$ ) NMR of 3,6-dimethyl-2-(4-(trifluoromethyl)phenyl)imidazo[1,2-*a*]pyridine (**5c**)



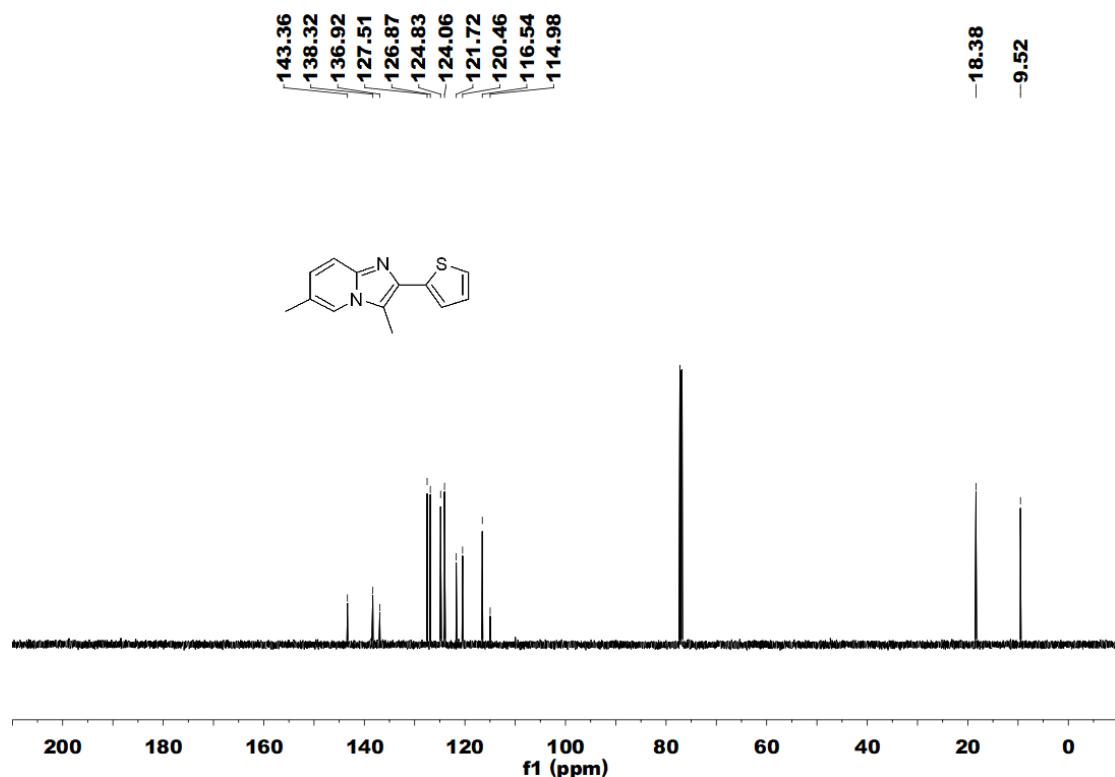
**Fig. S65**  $^1\text{H}$  NMR (400 MHz, CDCl<sub>3</sub>) of 2-(furan-2-yl)-3,6-dimethylimidazo[1,2-*a*]pyridine (5d)



**Fig. S66**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz, CDCl<sub>3</sub>) of 2-(furan-2-yl)-3,6-dimethylimidazo[1,2-*a*]pyridine (5d)



**Fig. S67**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ) 3,6-dimethyl-2-(thiophen-2-yl)imidazo[1,2-*a*]pyridine  
(5e)



**Fig. S68**  $^{13}\text{C}\{^1\text{H}\}$  NMR (150 MHz,  $\text{CDCl}_3$ ) 3,6-dimethyl-2-(thiophen-2-yl)imidazo[1,2-*a*]pyridine (5e)