

## Supporting Information

### Imidazole-Directed Fabrication of Three Polyoxovanadates-based Copper Frameworks as Efficient Catalysts for Constructing of C-N bonds

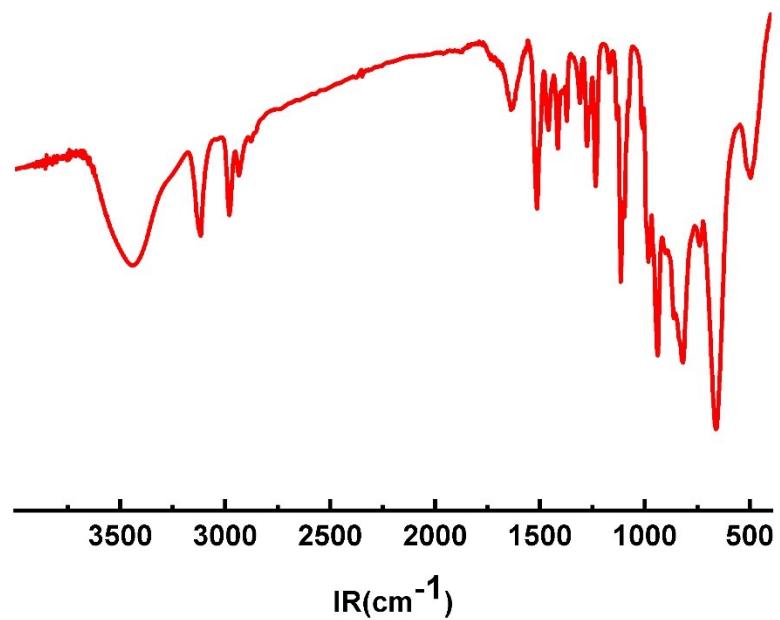
Xianqiang Huang,<sup>\*a</sup> Yuquan Qi,<sup>a</sup> Yuxiao Gu<sup>a</sup>, Shuwen Gong,<sup>\*a</sup> Guodong Shen,<sup>\*a</sup> Qiang Li,<sup>a</sup> Jikun Li<sup>\*b</sup>

#### Table of contents

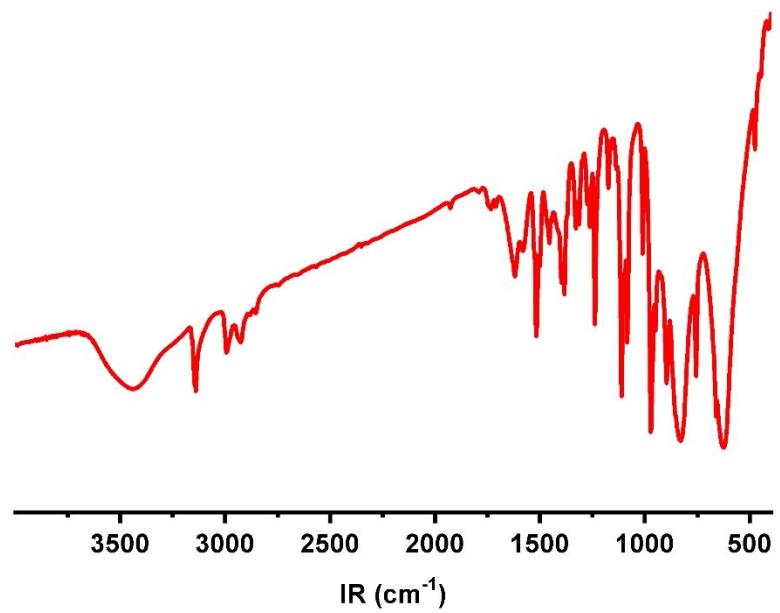
1. Table S1 Crystallographic data for POVCFs 1- 3.
2. Figures S1 The FT-IR spectrum for POVCFs 1
3. Figures S2 The FT-IR spectrum for POVCFs 2
4. Figures S3 The FT-IR spectrum for POVCFs 3
5. Figures S4 The PXRD spectrum for POVCFs 1
6. Figures S5 The PXRD spectrum for POVCFs 2
7. Figures S6 The PXRD spectrum for POVCFs 3
8. Figure S7 The PXRD of POVCFs 1 before and after three runs reaction
9. Figure S8-23 The NMR spectra of the products

**Table 1. Crystallographic data for POVCFs 1-3**

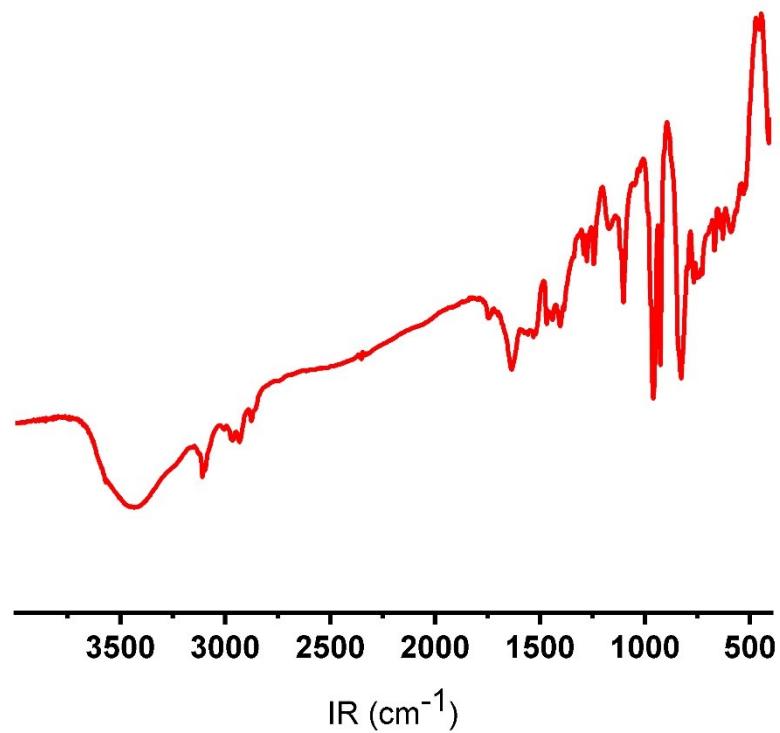
	<b>POVCFs 1</b>	<b>POVCFs 2</b>	<b>POVCFs 3</b>
Formula	C <sub>24</sub> H <sub>39</sub> C <sub>u</sub> N <sub>8</sub> O <sub>11</sub> V	C <sub>12</sub> H <sub>20</sub> C <sub>u</sub> N <sub>4</sub> O <sub>6</sub> V	C <sub>48</sub> H <sub>80</sub> C <sub>u</sub> N <sub>16</sub> O <sub>28</sub> V <sub>1</sub>
	4	2	0
M <sub>r</sub>	882.93	481.74	1902.22
Crystal system	triclinic	Monoclinic	orthorhombic
Space group	<i>P-1</i>	<i>P21/c</i>	<i>Pccn</i>
Temperature	298(2)	298(2) K	293(2)K
<i>a</i> (Å)	11.2508(8)	9.2616(7)	21.7725(7)
<i>b</i> (Å)	11.9199(9)	5.5433(4)	21.9575(9)
<i>c</i> (Å)	15.2277(14)	17.1092(11)	14.8458(6)
$\alpha$ (deg)	105.431(2)	90	90
$\beta$ (deg)	94.1680(10)	93.4420(10)	90
$\gamma$ (deg)	108.872(2)	90	90
<i>V</i> (Å <sup>3</sup> )	1834.3(3)	876.80(11)	7097.3(5)
<i>Z</i>	2	2	4
<i>D</i> <sub>calc.</sub> (g cm <sup>-3</sup> )	1.599	1.825	1.780
<i>F</i> (000)	896	486	3852
<i>R</i> <sub>1</sub> [ <i>I</i> >2σ( <i>I</i> )]	0.0611	0.0400	0.0650
<i>wR</i> <sub>2</sub> [ <i>I</i> >2σ( <i>I</i> )]	0.1762	0.1054	0.1738
<i>R</i> <sub>1</sub> (all data)	0.0878	0.0561	0.0890
<i>wR</i> <sub>2</sub> (all data)	0.1938	0.1136	0.1946
GOODF	1.049	1.043	1.040
CCDC No.	2009806	2009807	2009808



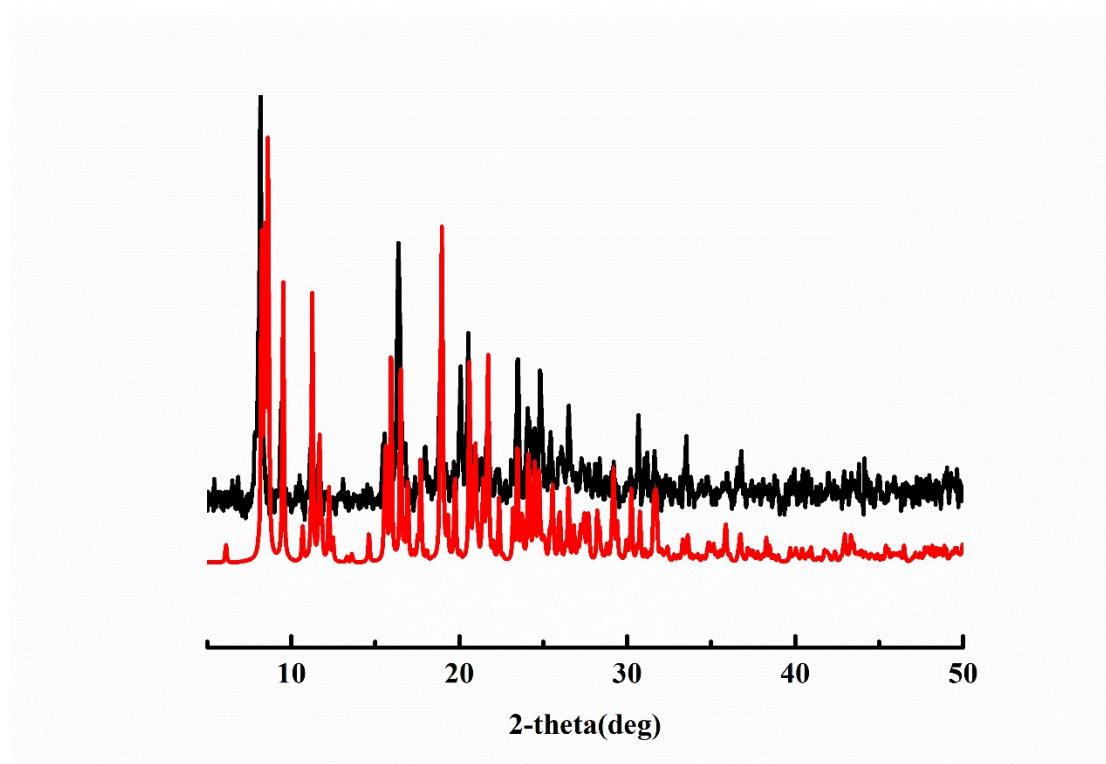
**Figure S1.** The IR spectrum of POVCFs 1



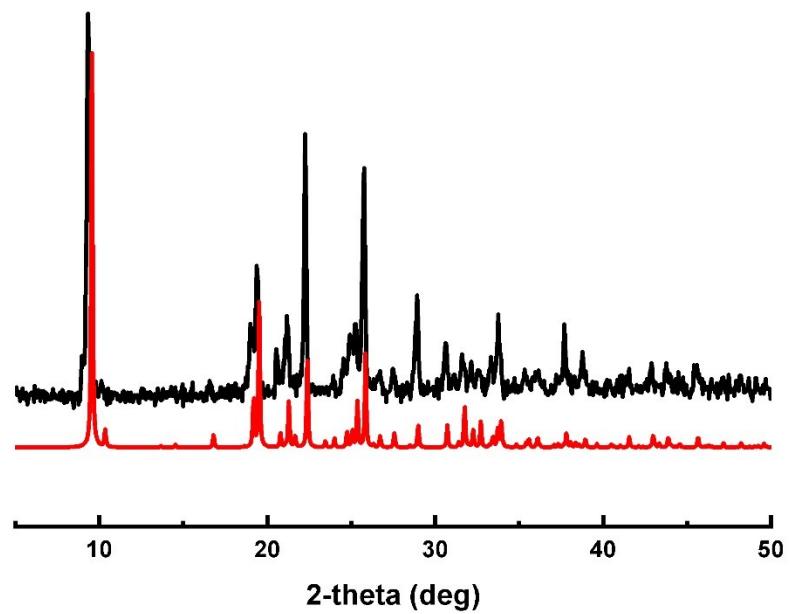
**Figure S2.** The IR spectrum of POVCFs 2



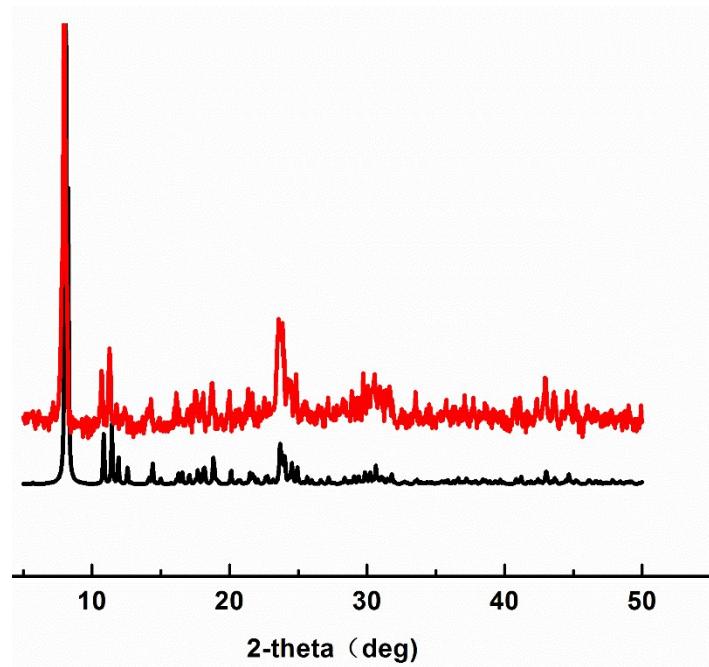
**Figure S3.** The IR spectrum of POVCFs 3



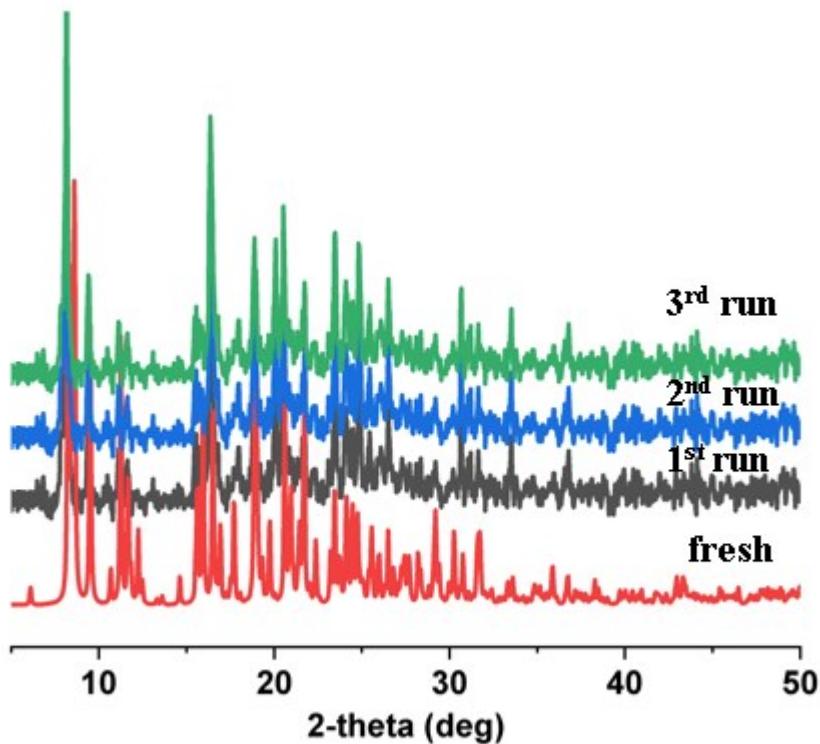
**Figure S4.** The PXRD spectrum of POVCFs 1



**Figure S5.** The PXRD spectrum of POVCFs 2

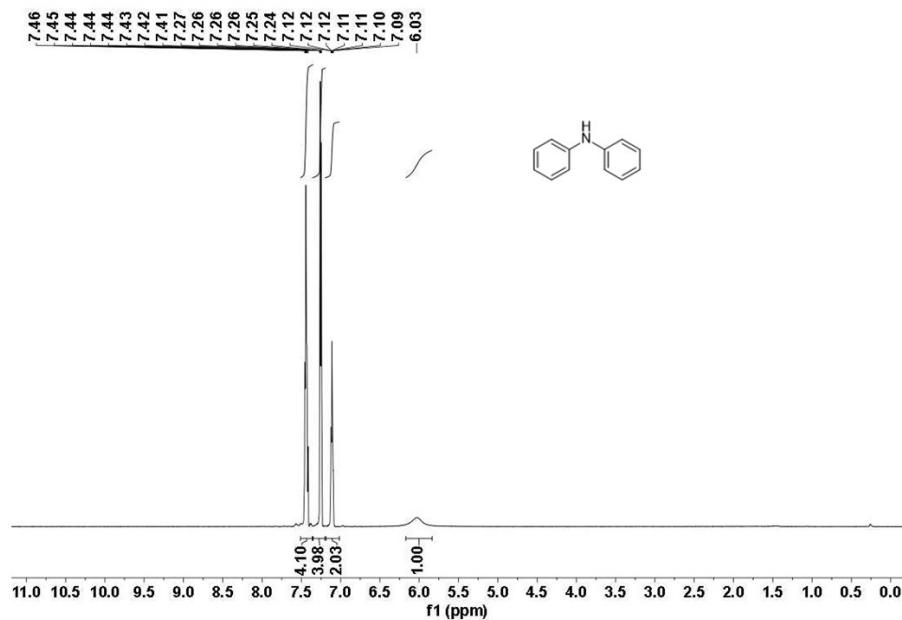


**Figure S6.** The PXRD spectrum of POVCFs 3

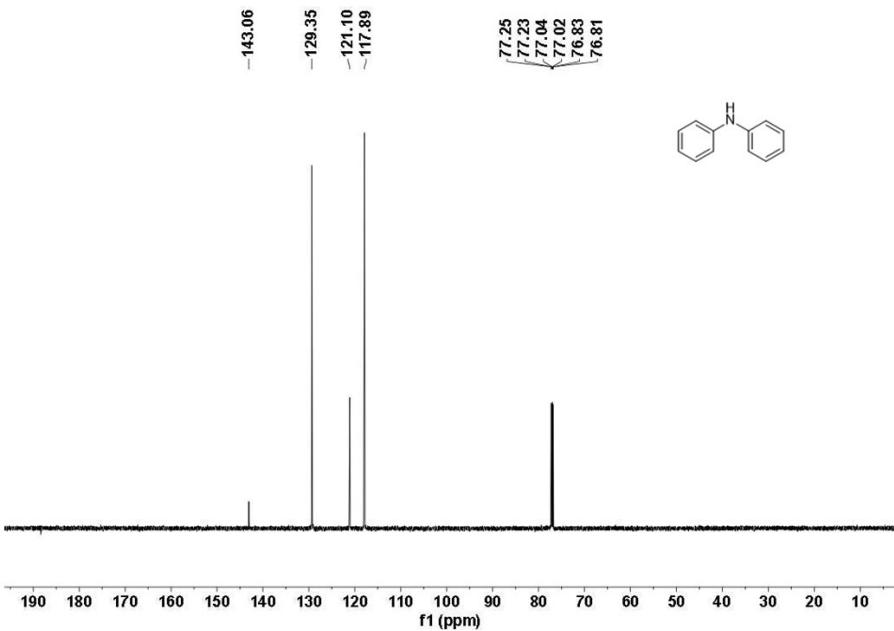


**Fig**

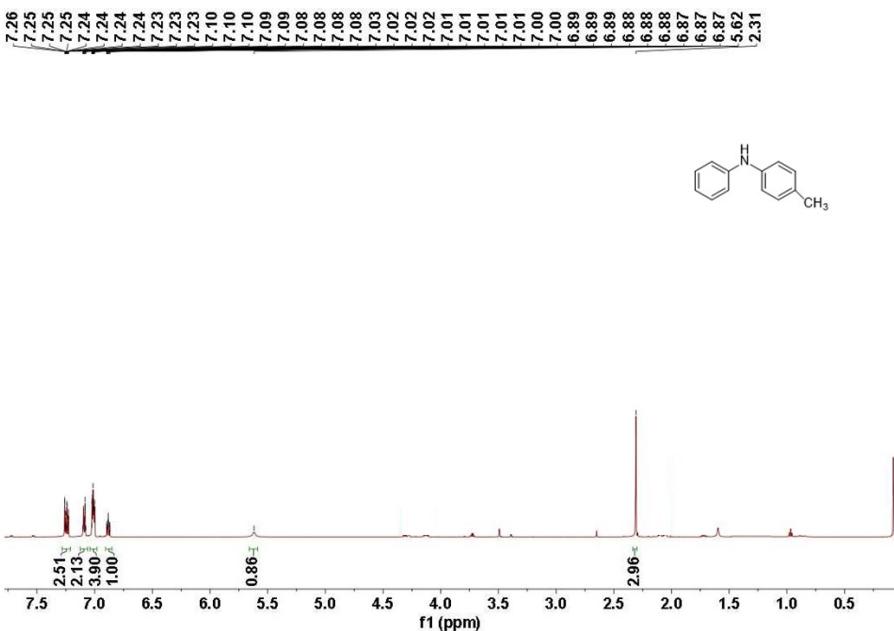
**ure S7.** The powder XRD patterns of POVCFs 1 before and after three runs reaction



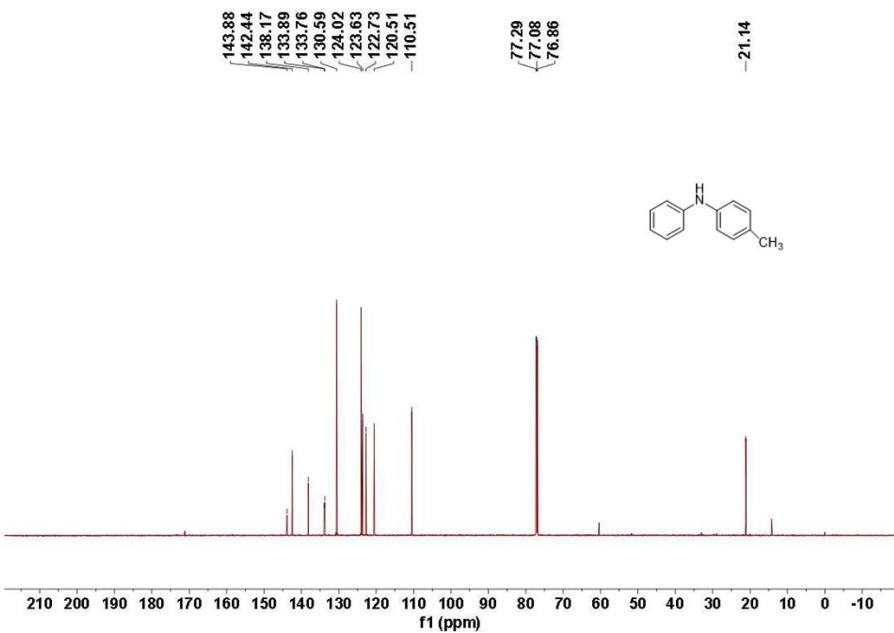
**Figure S8**  $^1\text{H}$  NMR spectrum of product 3a (entry 1) in  $\text{CDCl}_3$ .



**Figure S9**  $^{13}\text{C}$  NMR spectrum of product 3a (entry 1) in  $\text{CDCl}_3$ .

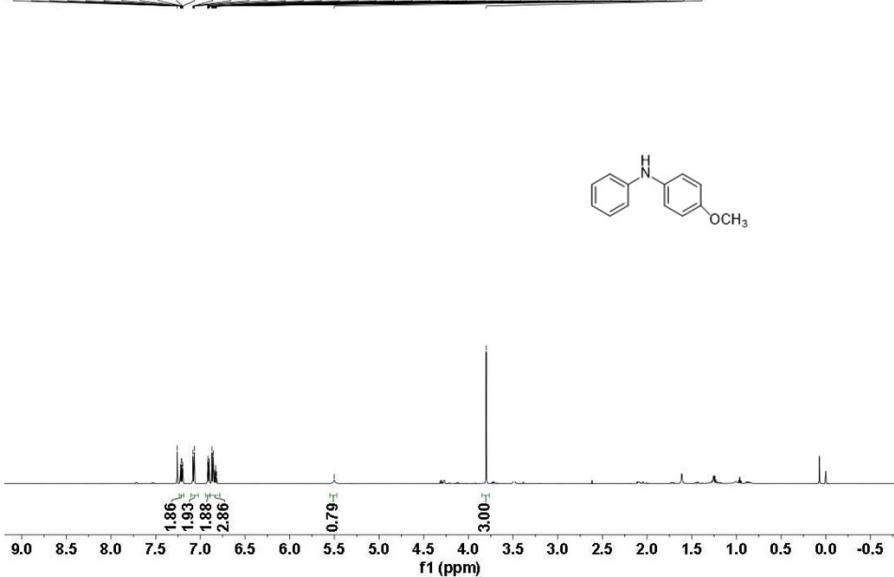


**Figure S10**  $^1\text{H}$  NMR spectrum of product 3b (entry 2) in  $\text{CDCl}_3$ .



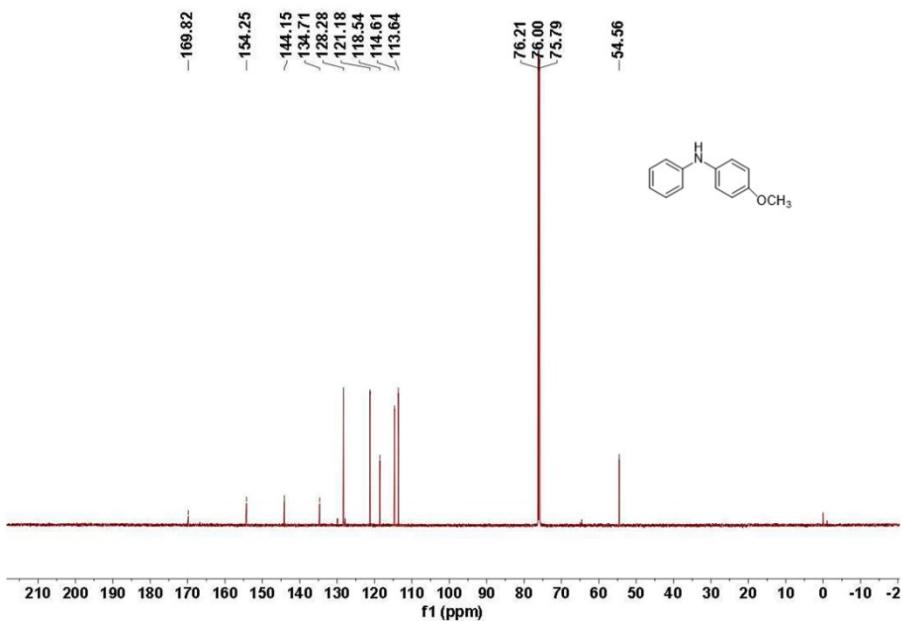
**Figure S11**  $^{13}\text{C}$  NMR spectrum of product 3b (entry 2) in  $\text{CDCl}_3$ .

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6.82  
5.50  
3.80

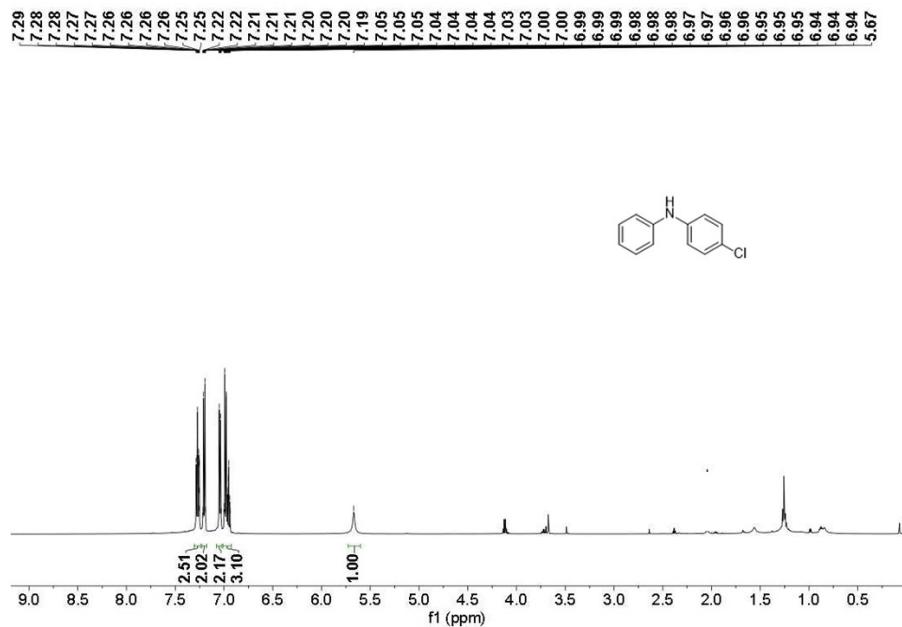


**Figure S12**  $^1\text{H}$  NMR spectrum of product 3c (entry 3) in  $\text{CDCl}_3$ .

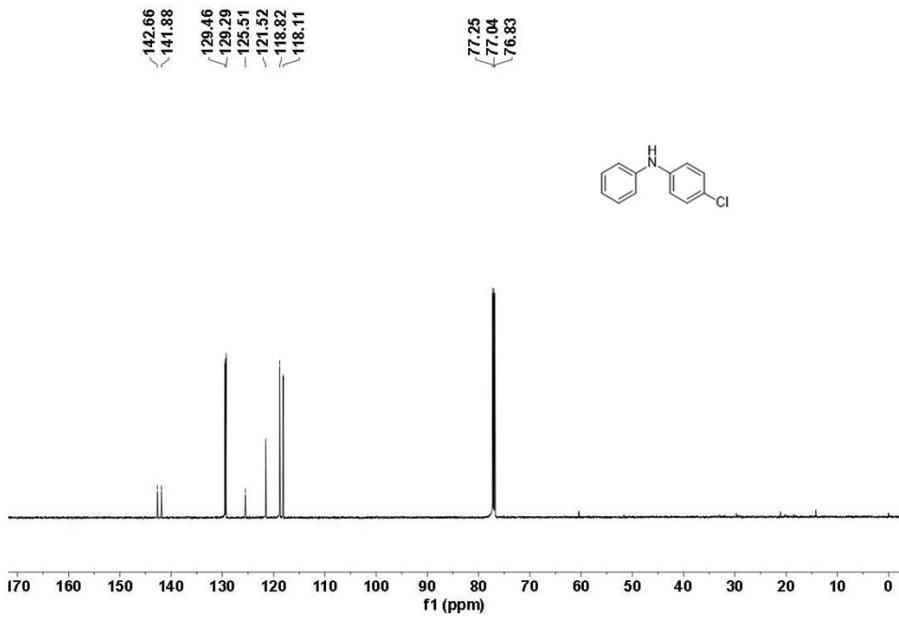
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3.80



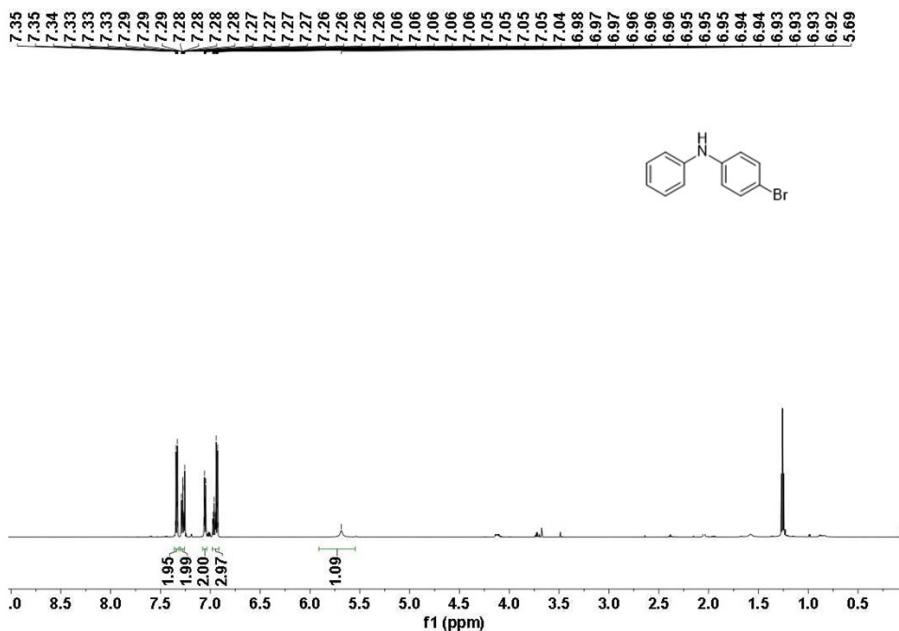
**Figure S13**  $^{13}\text{C}$  NMR spectrum of product **3c** (entry 3) in  $\text{CDCl}_3$ .



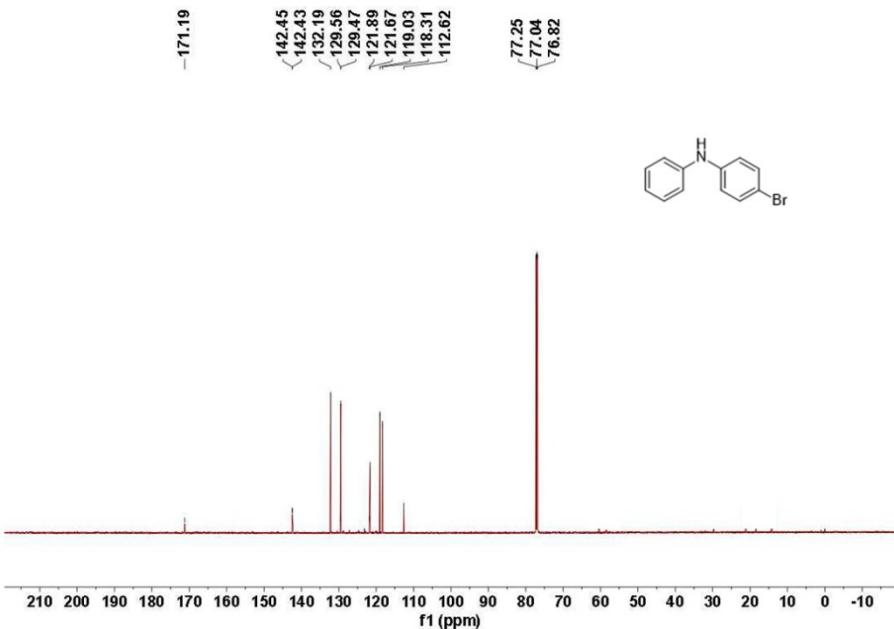
**Figure S14**  $^1\text{H}$  NMR spectrum of product **3d** (entry 4) in  $\text{CDCl}_3$ .



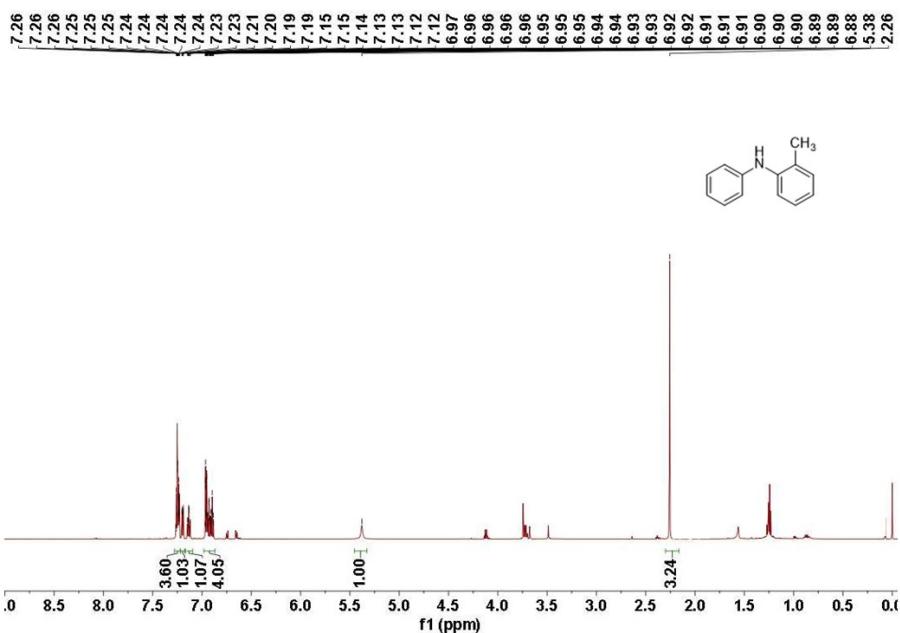
**Figure S15**  $^{13}\text{C}$  NMR spectrum of product 3d (entry 4) in  $\text{CDCl}_3$ .



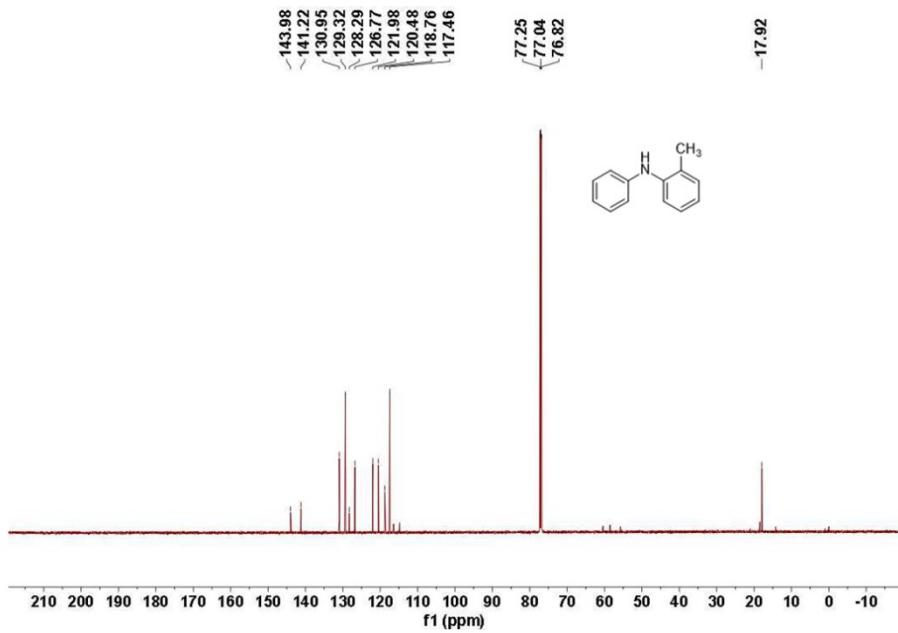
**Figure S16**  $^1\text{H}$  NMR spectrum of product 3e (entry 5) in  $\text{CDCl}_3$ .



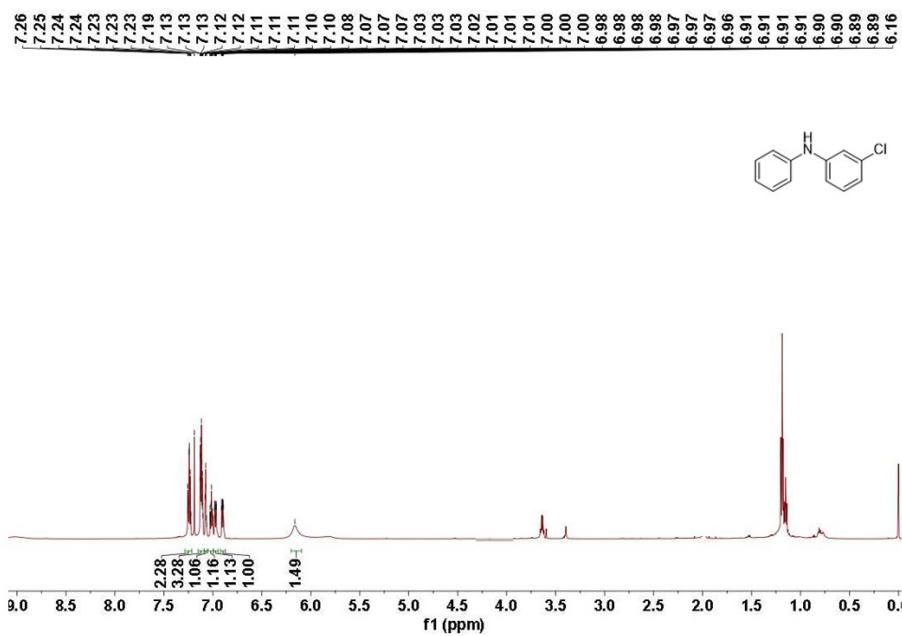
**Figure S17**  $^{13}\text{C}$  NMR spectrum of product 3e (entry 5) in  $\text{CDCl}_3$ .



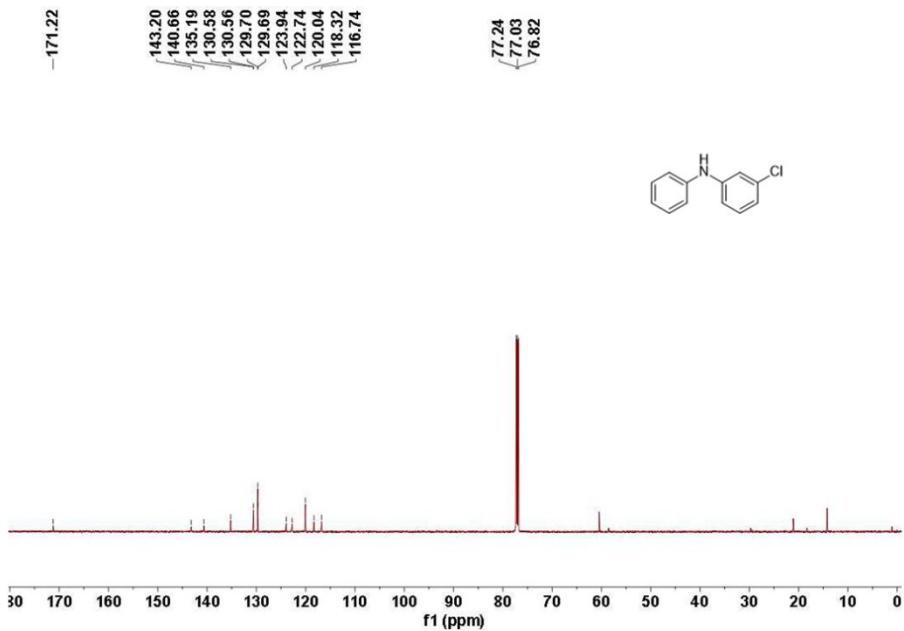
**Figure S18**  $^1\text{H}$  NMR spectrum of product 3f (entry 6) in  $\text{CDCl}_3$ .



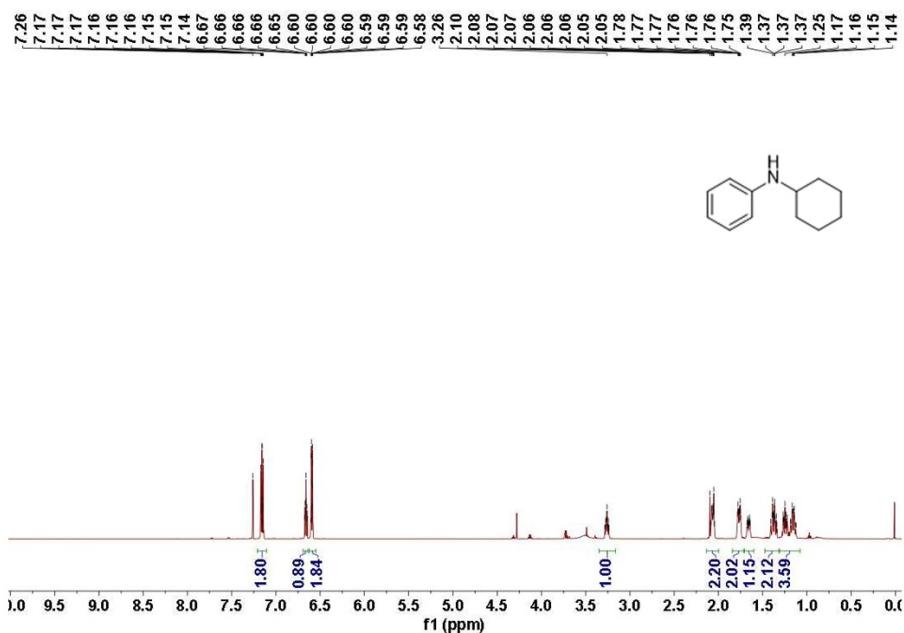
**Figure S19**  $^{13}\text{C}$  NMR spectrum of product 3f (entry 6) in  $\text{CDCl}_3$ .



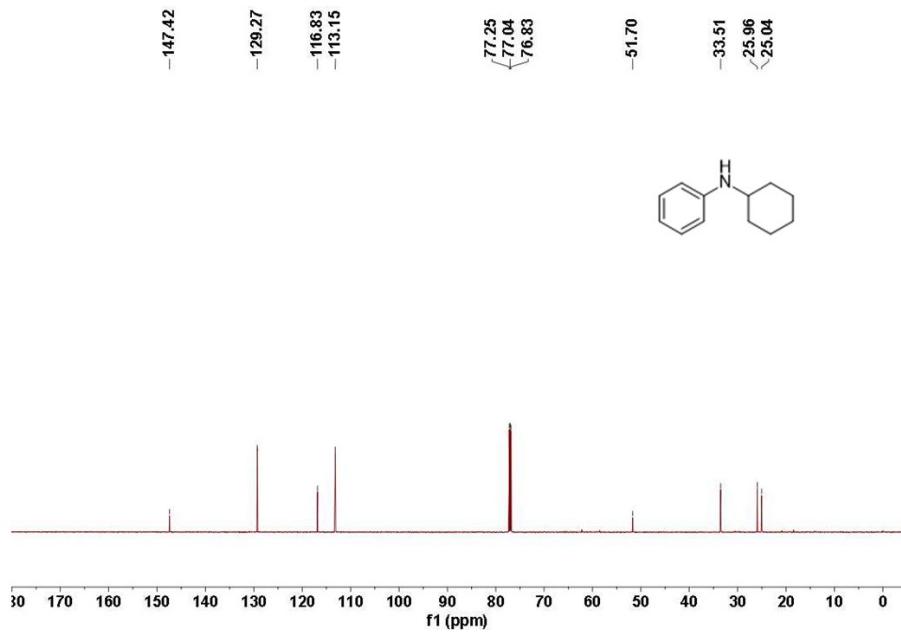
**Figure S20**  $^1\text{H}$  NMR spectrum of product 3g (entry 7) in  $\text{CDCl}_3$ .



**Figure S21**  $^{13}\text{C}$  NMR spectrum of product 3g (entry 7) in  $\text{CDCl}_3$ .



**Figure S22**  $^1\text{H}$  NMR spectrum of product 3h (entry 8) in  $\text{CDCl}_3$ .



**Figure S23**  $^{13}\text{C}$  NMR spectrum of product **3h** (entry 8) in  $\text{CDCl}_3$ .