Supporting Information

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

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Table 1. Crystallographic data for POVCFs 1-3

	POVCFs **1**	POVCFs **2**	POVCFs **3**
Formula	$C_{24}H_{39}C_uN_8O_{11}V_4$	$C_{12}H_{20}C_uN_4O_6V_2$	$C_{48}H_{80}C_uN_{16}O_{28}V_{10}$
M_r	882.93	481.74	1902.22
Crystal system	triclinic	Monoclinic	orthorhombic
Space group	*P-1*	*P21/c*	*Pccn*
Temperature	298(2)	298(2) K	293(2)K
a (Å)	11.2508(8)	9.2616(7)	21.7725(7)
b (Å)	11.9199(9)	5.5433(4)	21.9575(9)
c (Å)	15.2277(14)	17.1092(11)	14.8458(6)
α (deg)	105.431(2)	90	90
β (deg)	94.1680(10)	93.4420(10)	90
γ (deg)	108.872(2)	90	90
V (Å^3)	1834.3(3)	876.80(11)	7097.3(5)
Z	2	2	4
$D_{calc.}$(g cm^{-3})	1.599	1.825	1.780
F(000)	896	486	3852
$R_1[I>2\sigma(I)]$	0.0611	0.0400	0.0650
$wR_2[I>2\sigma(I)]$	0.1762	0.1054	0.1738
R_1(all data)	0.0878	0.0561	0.0890
wR_2(all data)	0.1938	0.1136	0.1946
GOOF	1.049	1.043	1.040
CCDC No.	2009806	2009807	2009808

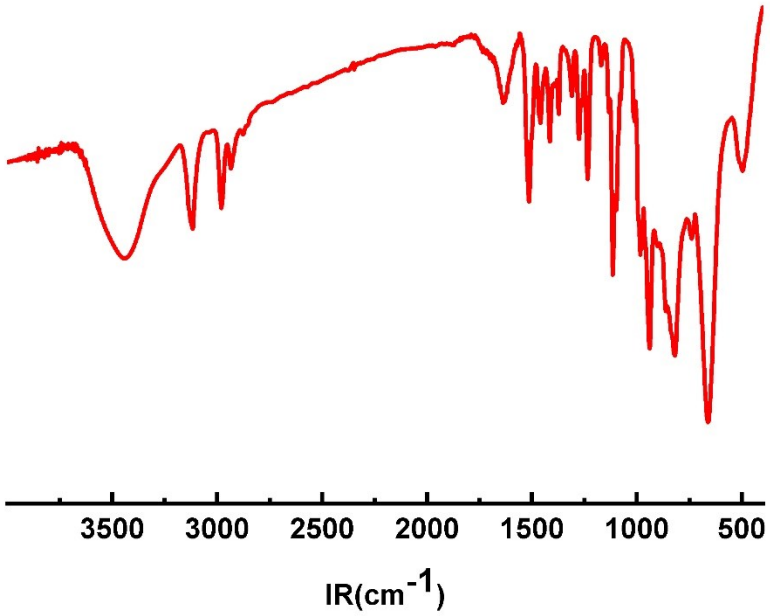

Figure S1. The IR spectrum of POVCFs 1

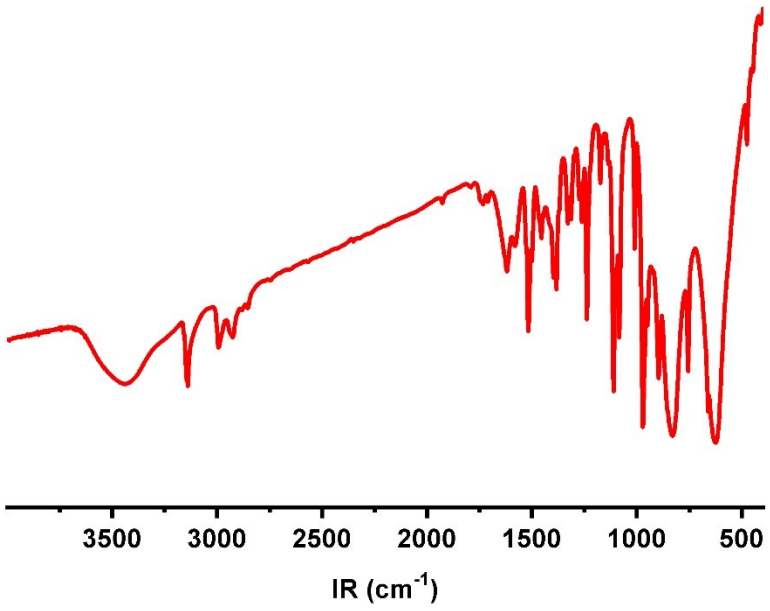

Figure S2. The IR spectrum of POVCFs 2

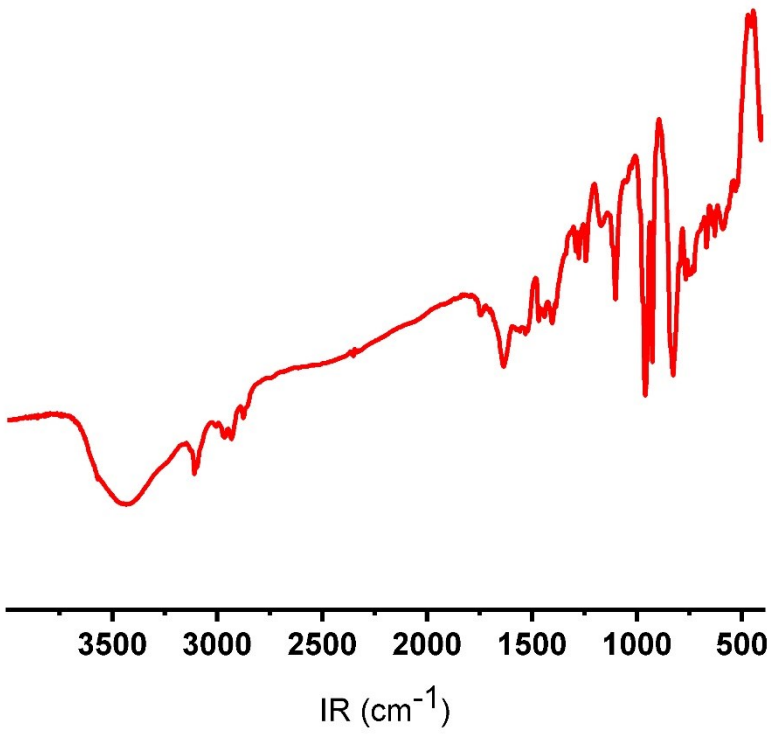

Figure S3. The IR spectrum of POVCFs 3

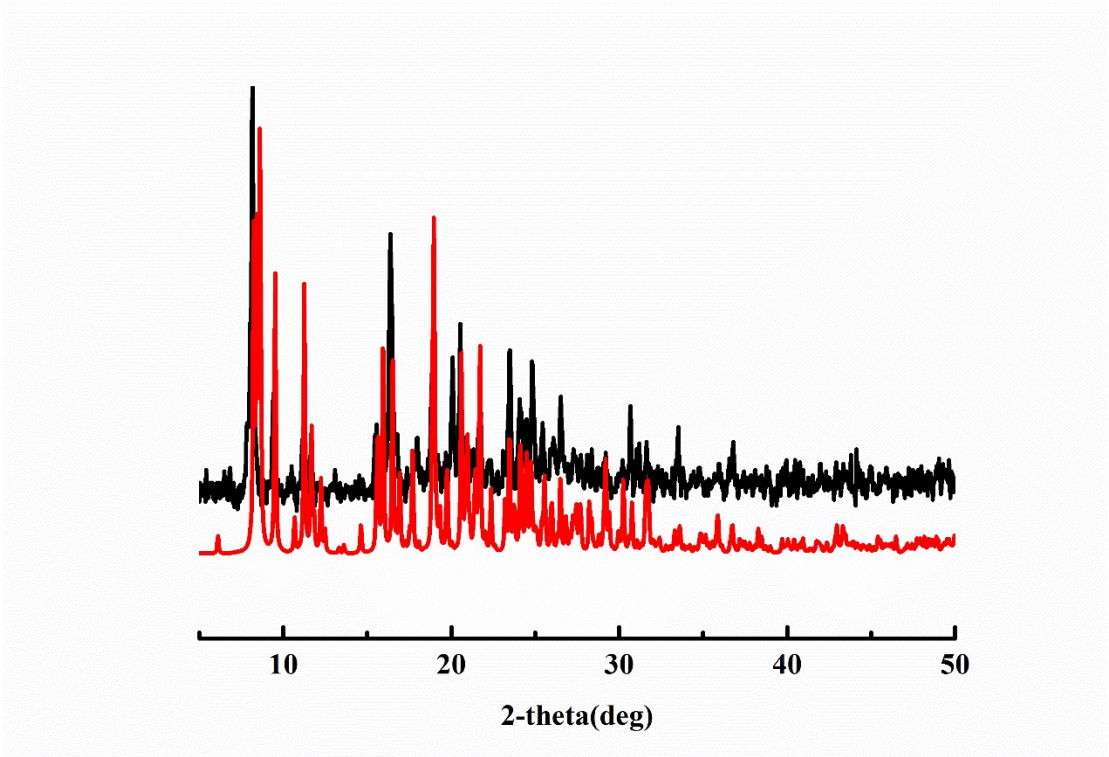

Figure S4. The PXRD spectrum of POVCFs 1

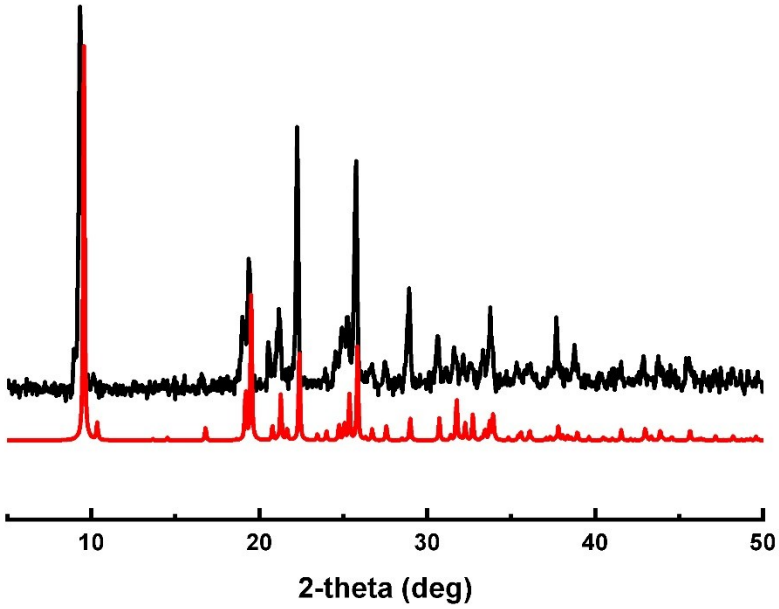

Figure S5. The PXRD spectrum of POVCFs 2

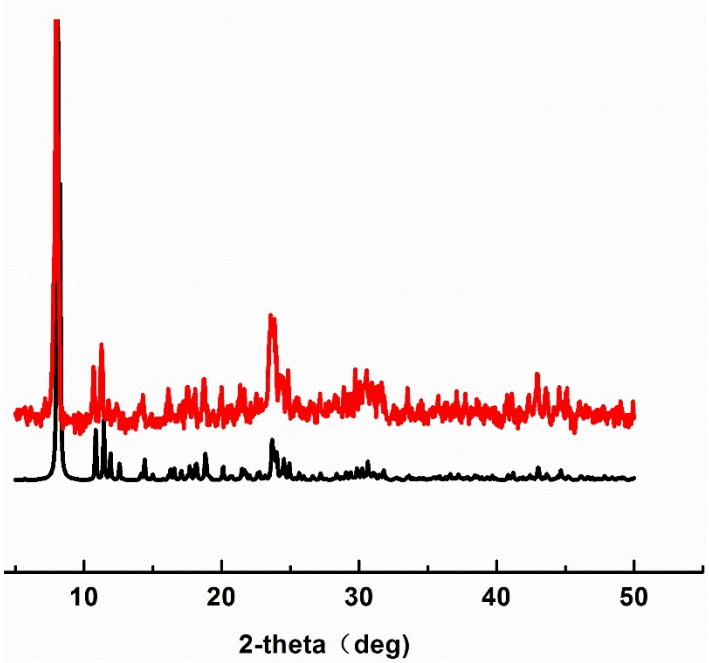

Figure S6. The PXRD spectrum of POVCFs 3

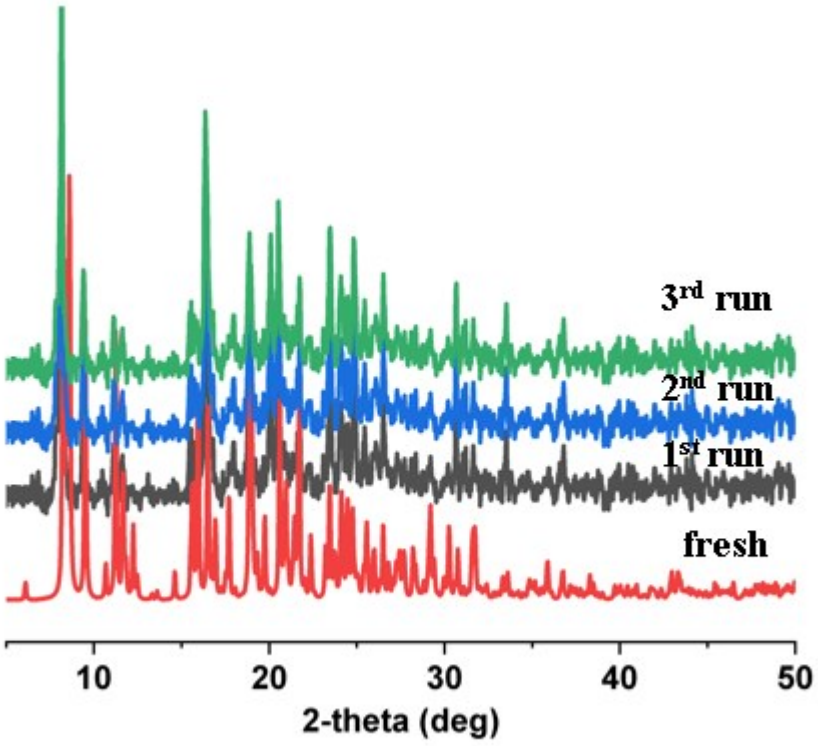

Figure S7. The powder XRD patterns of POVCFs 1 before and after three runs reaction

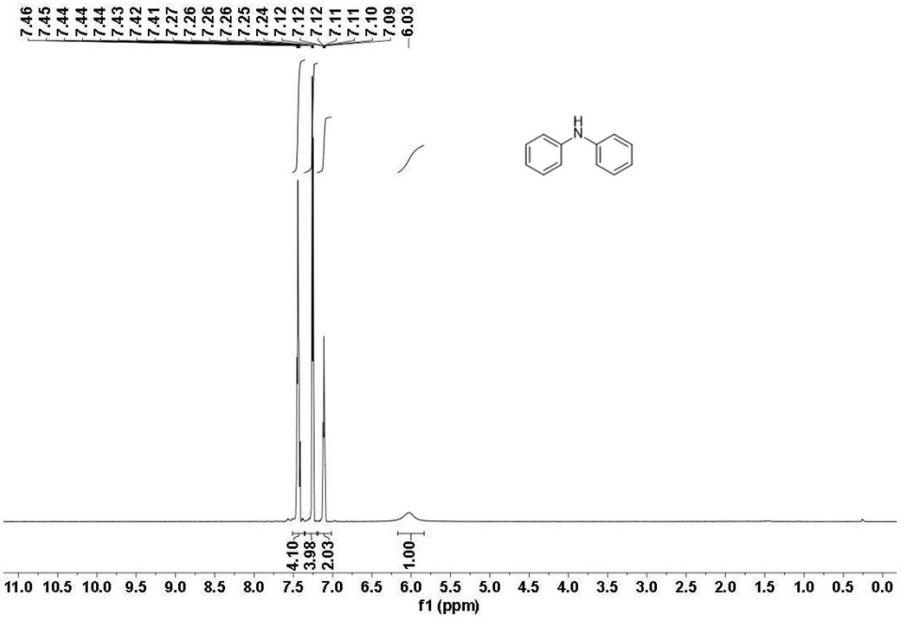

Figure S8 ^{1}H NMR spectrum of product 3a (entry 1) in $CDCl_3$.

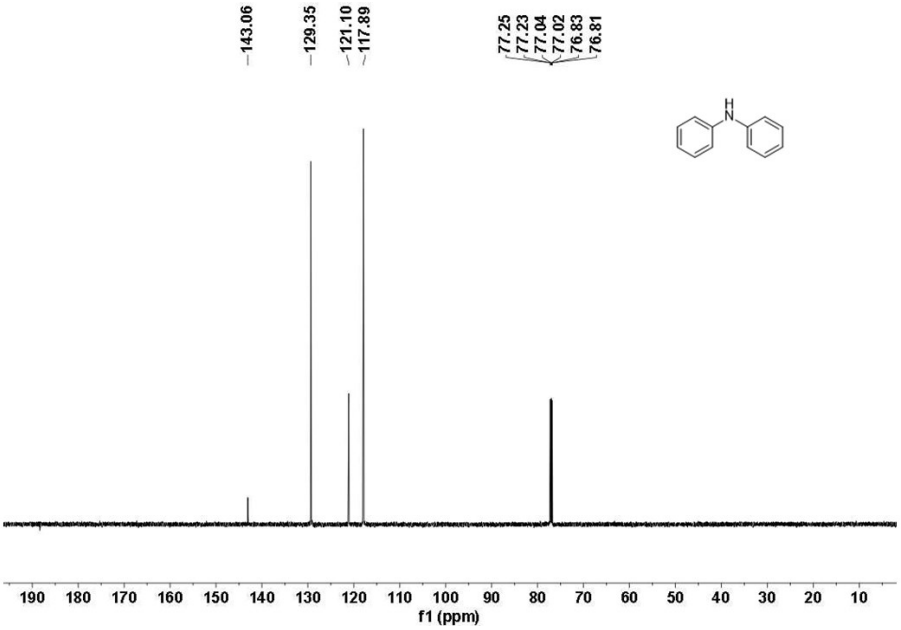

Figure S9 ^{13}C NMR spectrum of product 3a (entry 1) in $CDCl_3$.

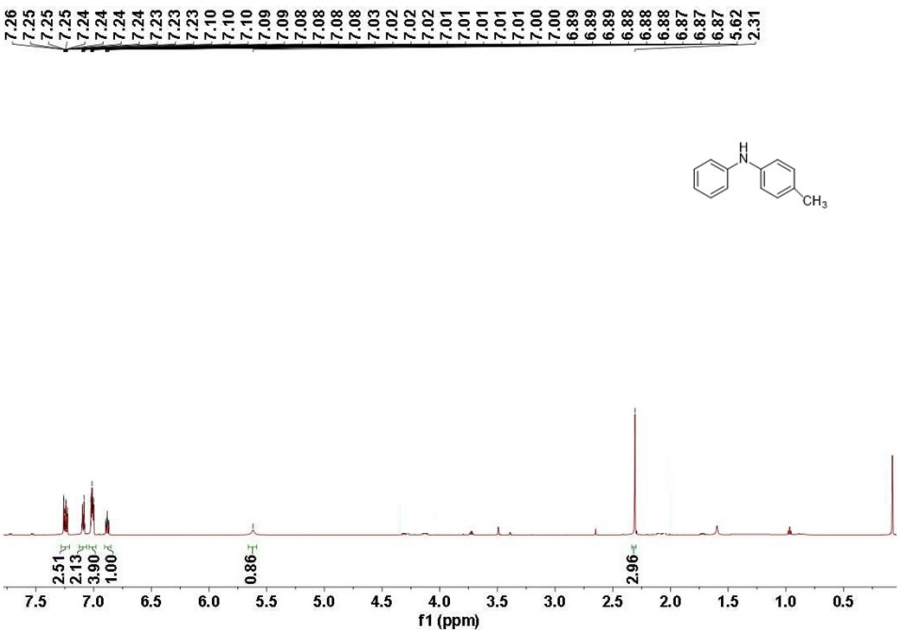

Figure S10 ^{1}H NMR spectrum of product 3b (entry 2) in $CDCl_3$.

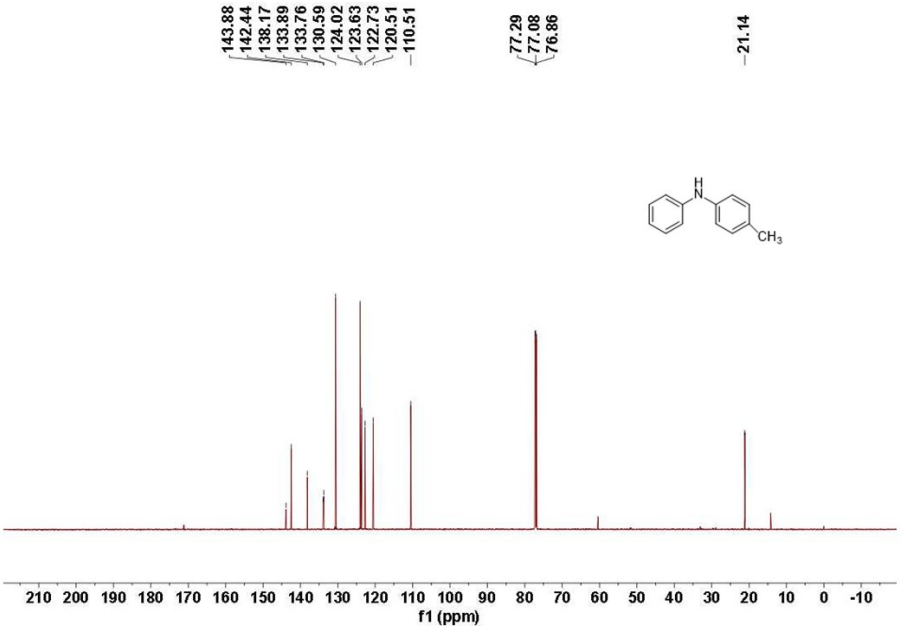

Figure S11 ^{13}C NMR spectrum of product 3b (entry 2) in $CDCl_3$.

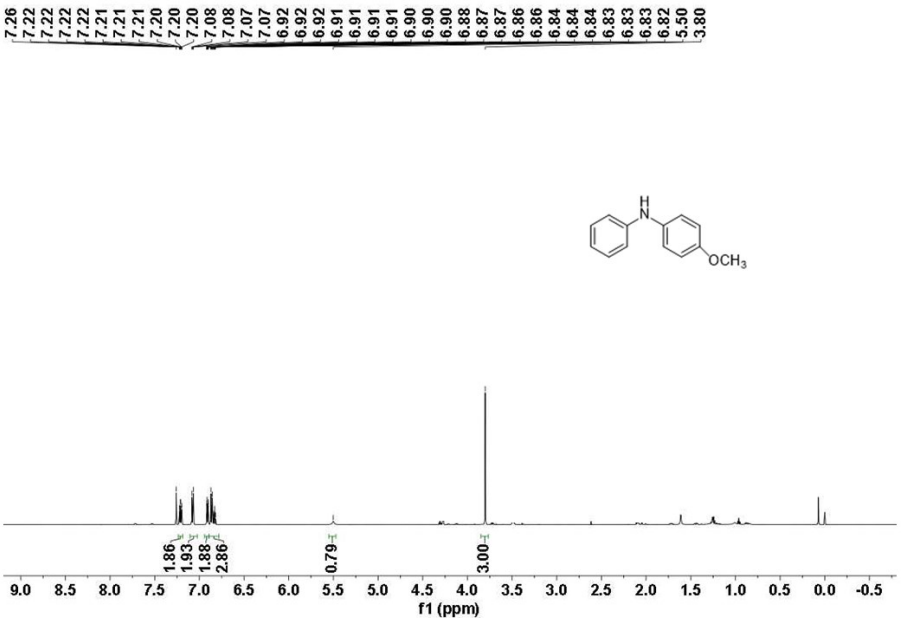

Figure S12 ^{1}H NMR spectrum of product 3c (entry 3) in $CDCl_3$.

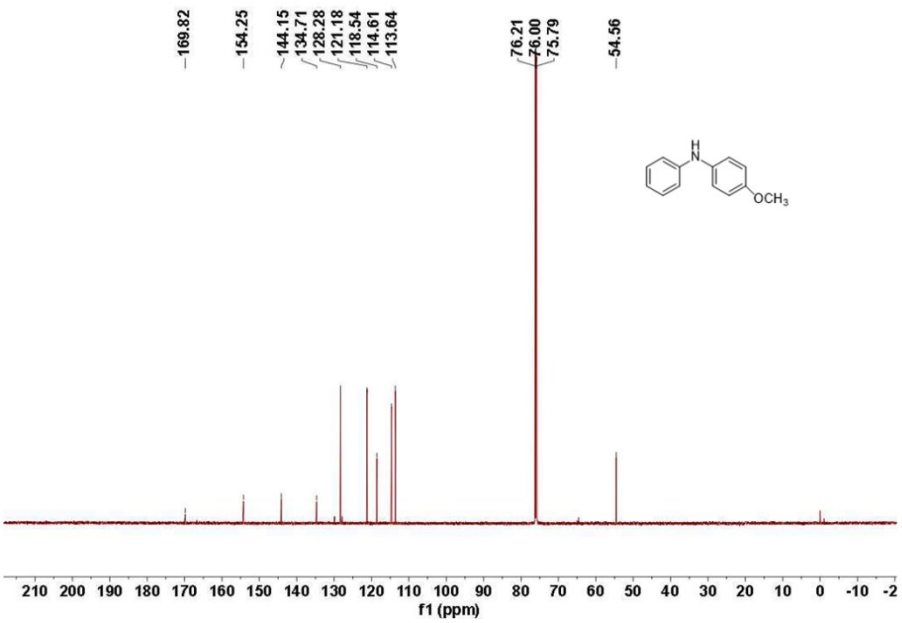

Figure S13 ^{13}C NMR spectrum of product 3c (entry 3) in $CDCl_3$.

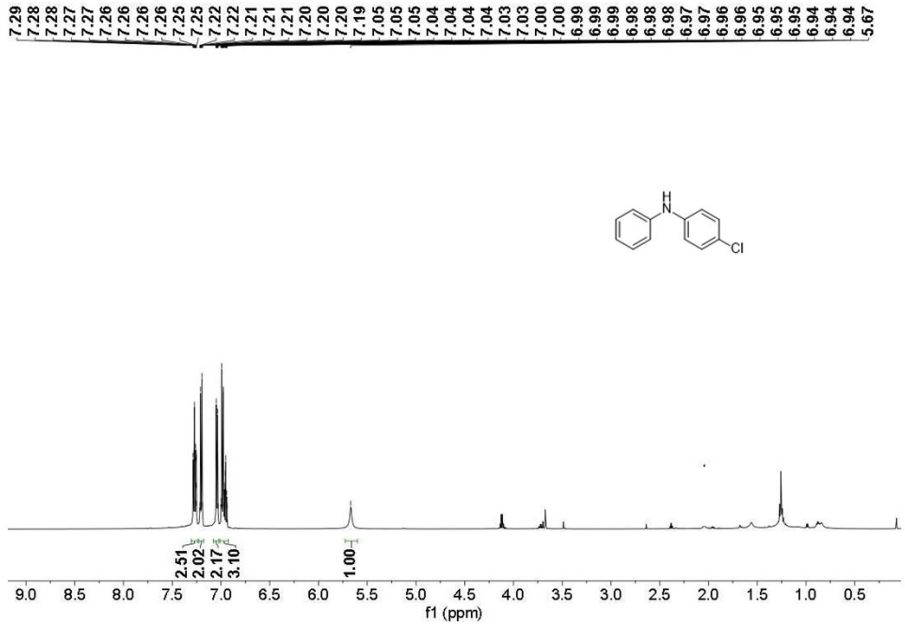

Figure S14 ^{1}H NMR spectrum of product 3d (entry 4) in $CDCl_3$.

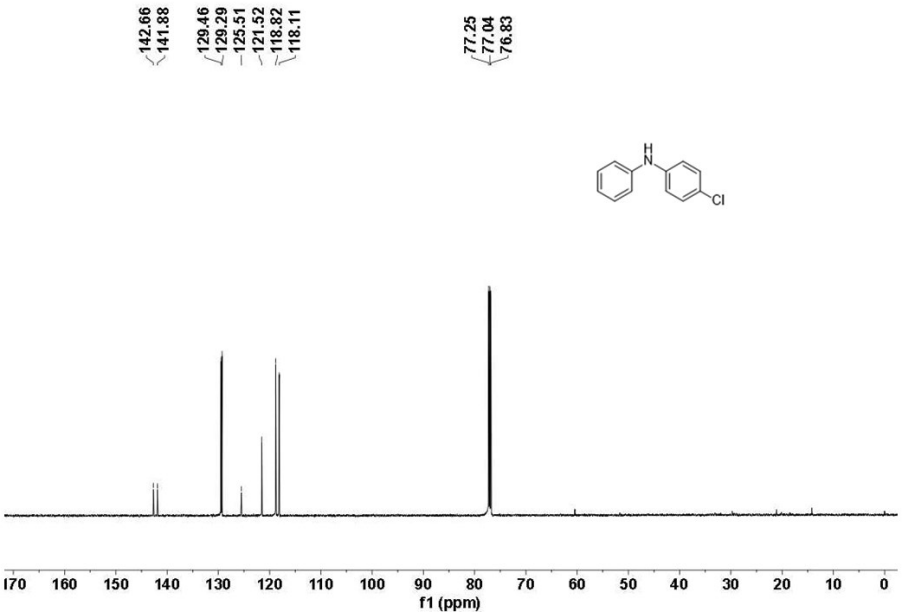

Figure S15 ^{13}C NMR spectrum of product 3d (entry 4) in $CDCl_3$.

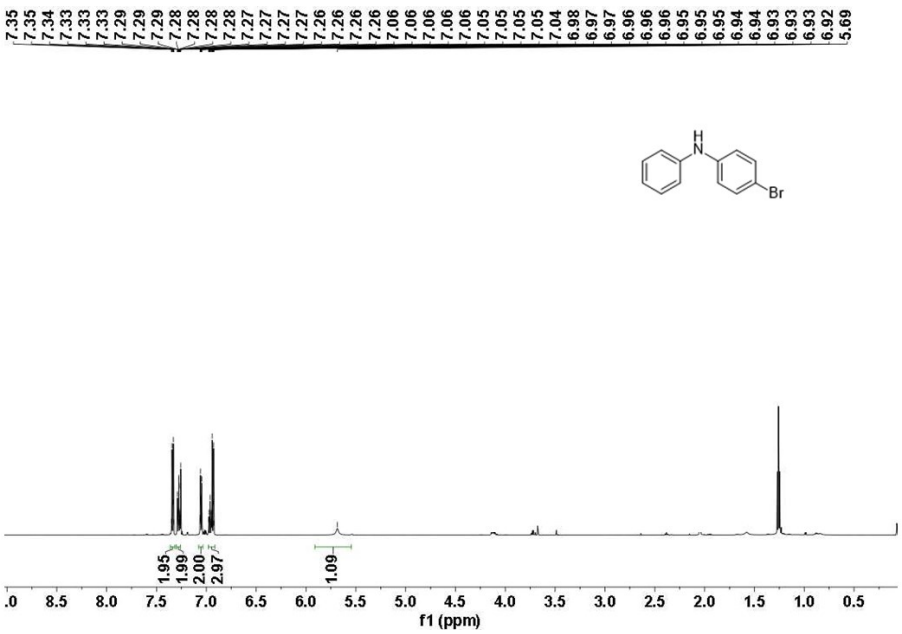

Figure S16 ^{1}H NMR spectrum of product 3e (entry 5) in $CDCl_3$.

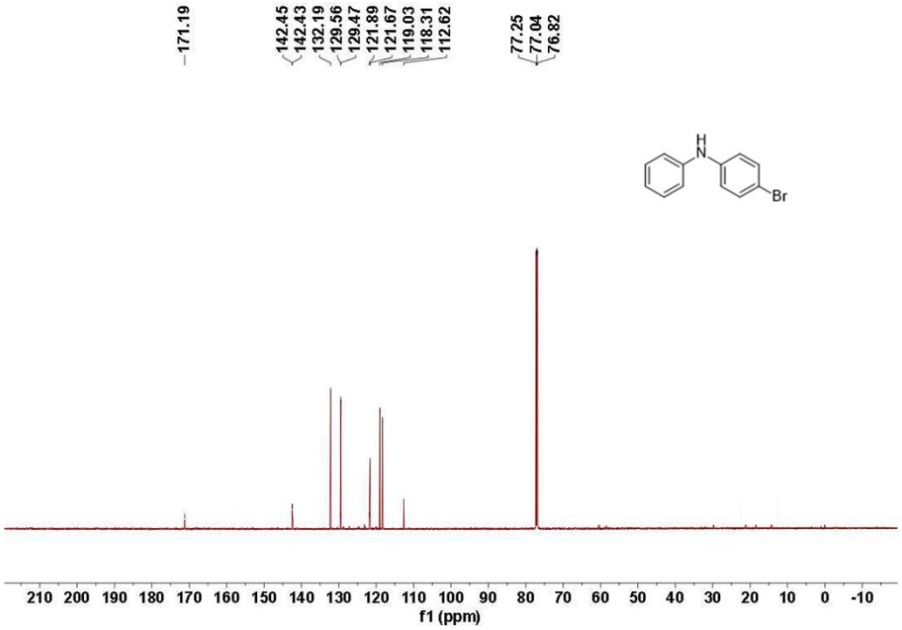

Figure S17 ^{13}C NMR spectrum of product 3e (entry 5) in $CDCl_3$.

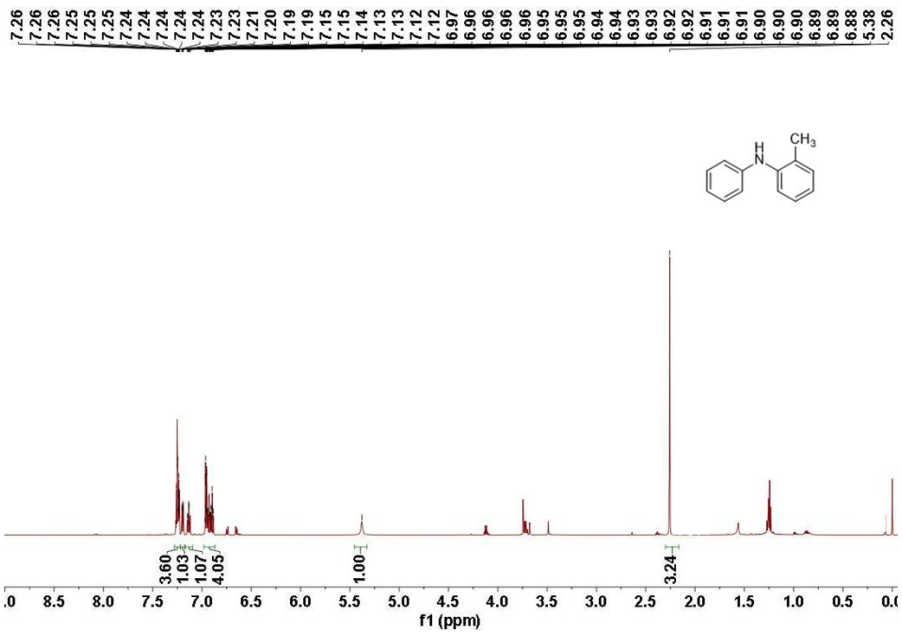

Figure S18 ^{1}H NMR spectrum of product 3f (entry 6) in $CDCl_3$.

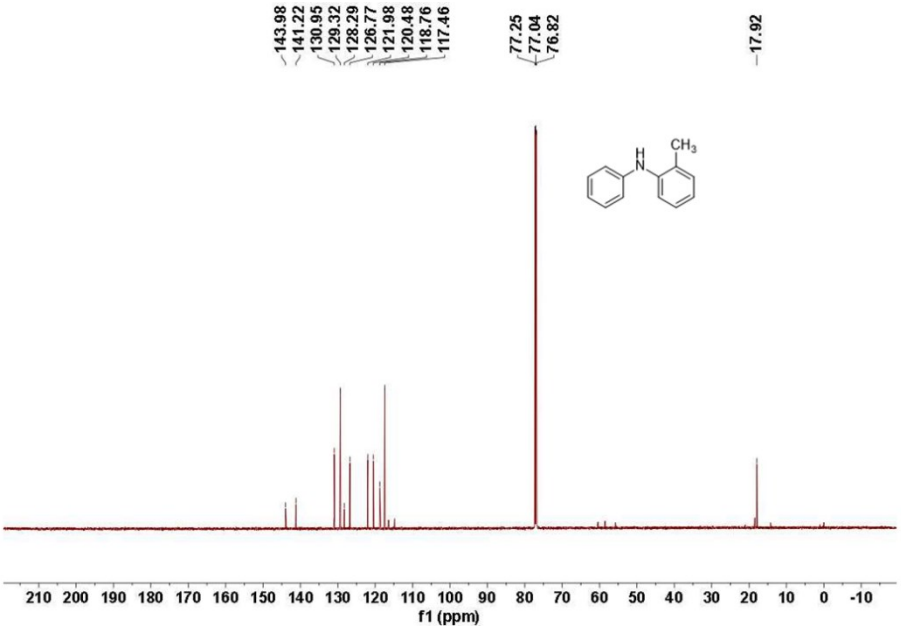

Figure S19 ^{13}C NMR spectrum of product 3f (entry 6) in $CDCl_3$.

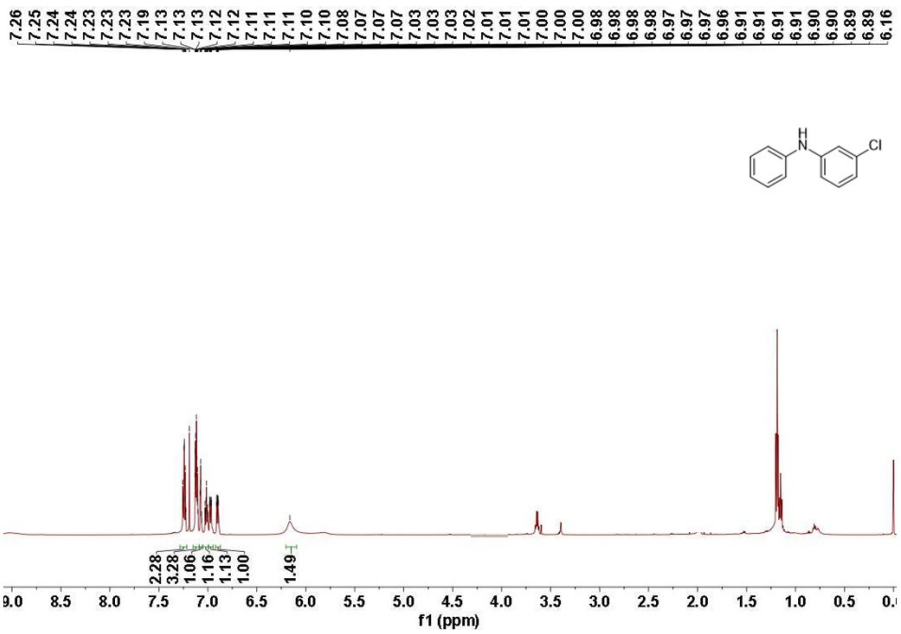

Figure S20 ^{1}H NMR spectrum of product 3g (entry 7) in $CDCl_3$.

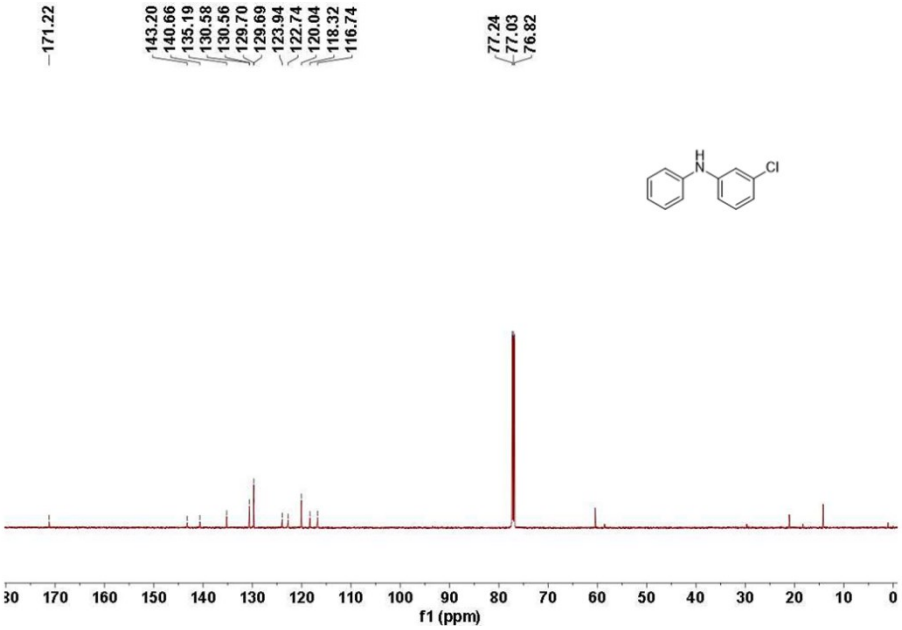

Figure S21 ^{13}C NMR spectrum of product 3g (entry 7) in $CDCl_3$.

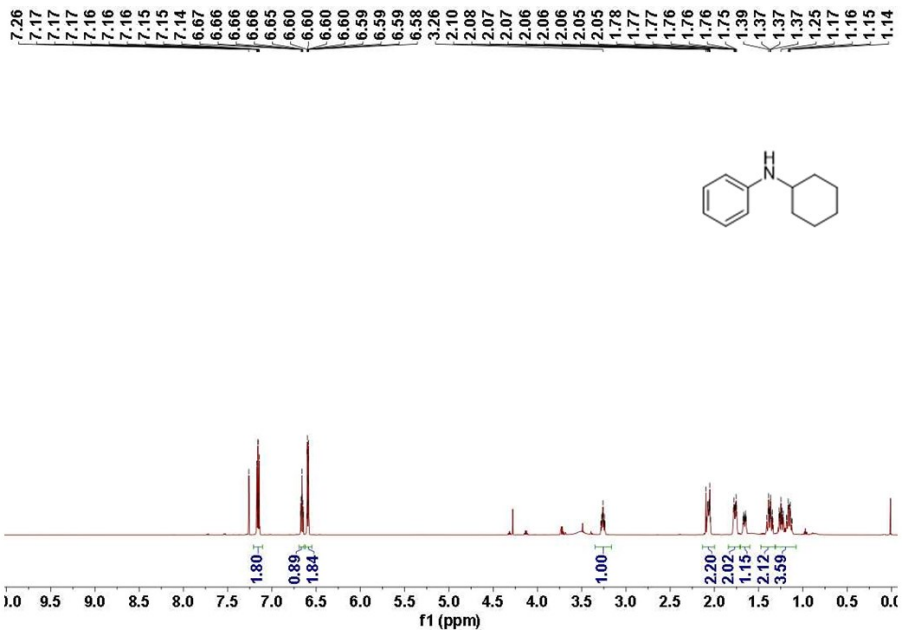

Figure S22 ^{1}H NMR spectrum of product 3h (entry 8) in $CDCl_3$.

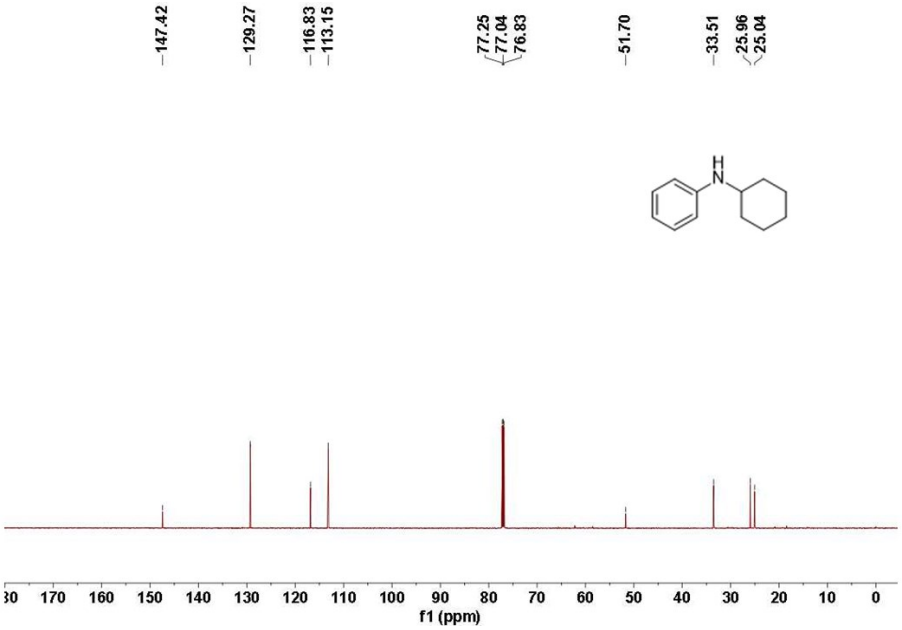

Figure S23 ^{13}C NMR spectrum of product 3h (entry 8) in $CDCl_3$.