Supporting information

Highly Active wormlike PtMo Nanowire in the Selective Synthesis of Dibenzylamines

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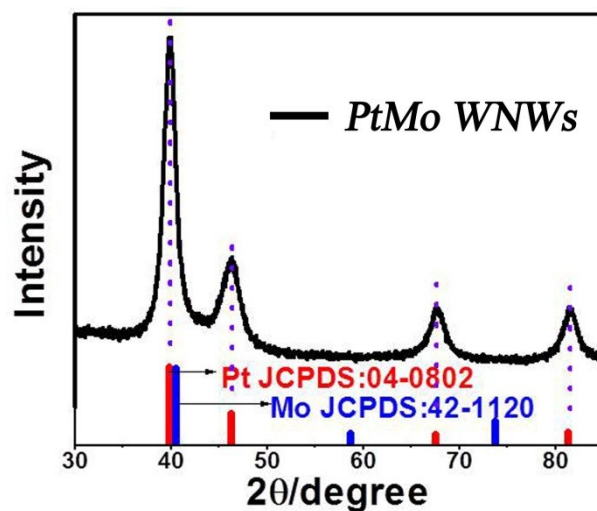Suzhou Nano Science and Technology, Soochow University, Suzhou 215123, P.R.

China

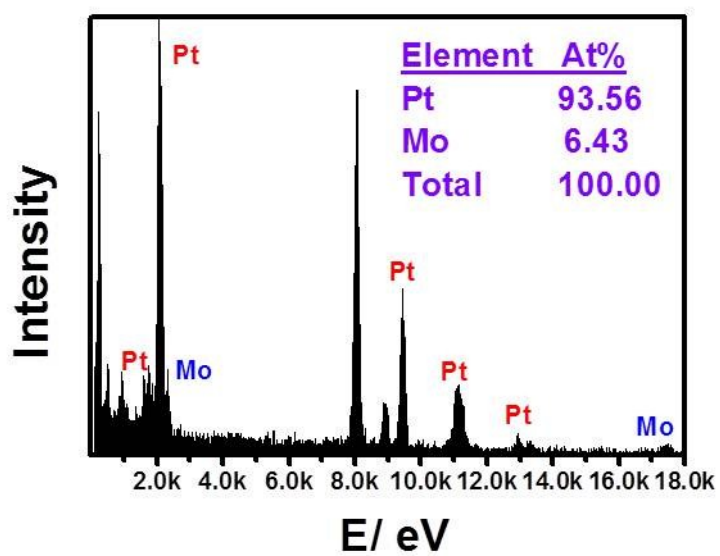**Figure S1. XRD spectra of the PtMo WNWs.**

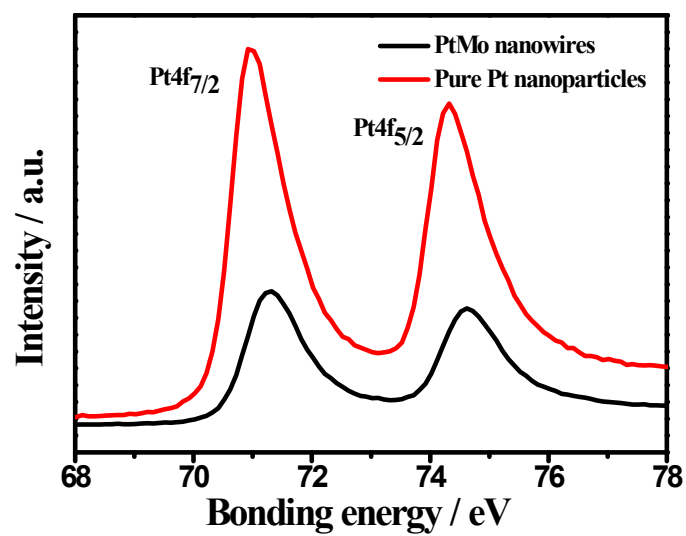**Figure S2. EDS spectra of the PtMo WNWs.**

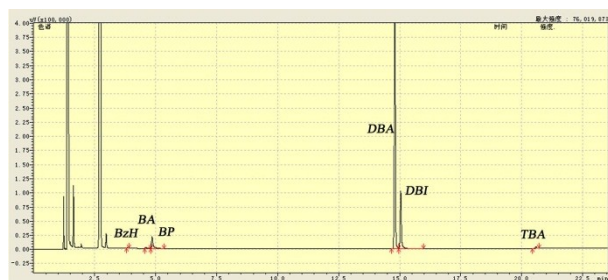**Figure S3. XPS spectra of the PtMo nanowires and Pt nanoparticles.**

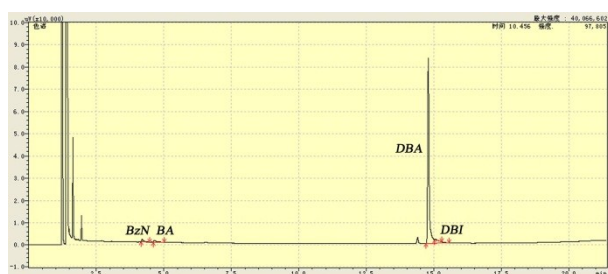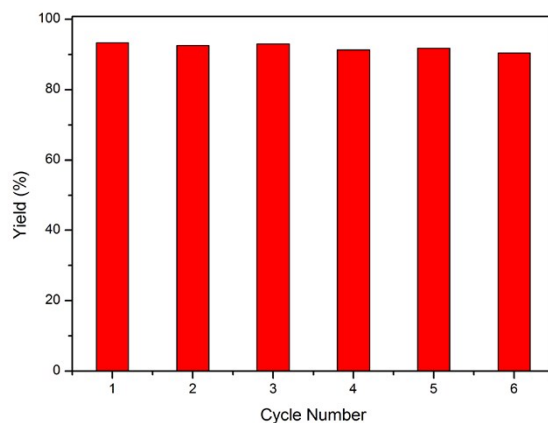**Figure S4. GC spectra of the reductive amination of BzH**

Figure S5. GC spectra of the reductive amination of BzN

Figure S6. Catalytic stability of Pt nanowires: BzH (1.0 mmol), 25% aqueous ammonia (2 equiv.), *m*-xylene (2 mL), 1 bar H$_2$, 100°C, 0.5 mol% PtMo WNWs for 24 h.

Table S1. Reductive amination for different molar ratios of BzH to ammonia [a]

Entry	Ammonia (equiv.)	Conv. (%)[b]	Yield. (%)[b]				
			BA	BP	DBI	DBA	TBA
1	0	99.0	--	99.0	--	--	--
2	0.5	79.9	--	3.8	9.6	62.4	4.1
3	1	100	1.4	--	2.6	94.6	1.5
4	2	100	0.7	0.5	0.8	96.1	0.8
5	5	100	--	18.1	1.2	56.9	23.8

[a] Reaction conditions: BzH (1.0 mmol), and *m*-xylene (2 mL) at 1 bar H$_2$, 100°C, with 0.5 mol% PtMo WNWs for 24 h. [b] GC yield.

Table S2. Control experiments dealing with the PtMo WNWs catalyzed system [a]

Entry	Catalyst	H_2 (bar)	Conv. (%)[b]	Yield. (%) [c]				
				BA	BP	DBI	DBA	TBA
1	--	1	0	--	--	--	--	--
2	PtMo WNWs	--	0	--	--	--	--	--
3	Pt/C	1	100	--	--	1.7	55.5	42.8
4[b]	Pt/C	1	96.8	--	--	10.1	24.3	52.8

[a] Reaction conditions: BzH (1.0 mmol), and *m*-xylene (2 mL) at 1 bar H_2, 100°C, with 0.5 mol% catalyst for 24 h. [b] BzN (1.0 mmol) and ethanol (2 mL) at 1 bar H_2, 80°C, with 0.5 mol% Pt/C WNWs for 24 h. [c] GC yield.

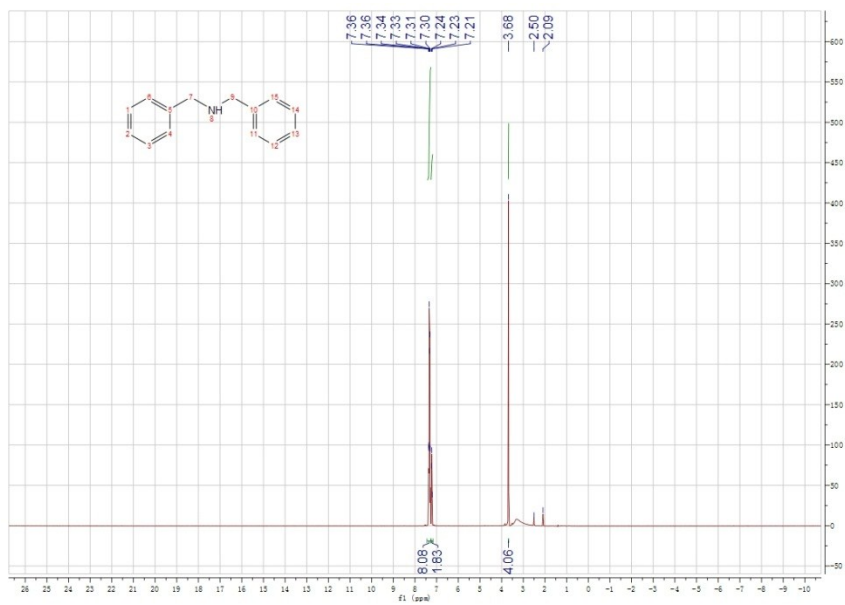**Table S3.** Comparison of the catalytic activities using Pt nanoparticles and Pt nanorods

Entry	Catalyst	Conv. (%)	Select. (%) [b]		
			BA	DBA	DBI
1	Pt NPs[1]	88.7	-	74.9	22.0
2	Pt NRs[2]	100	-	89.0	6.0

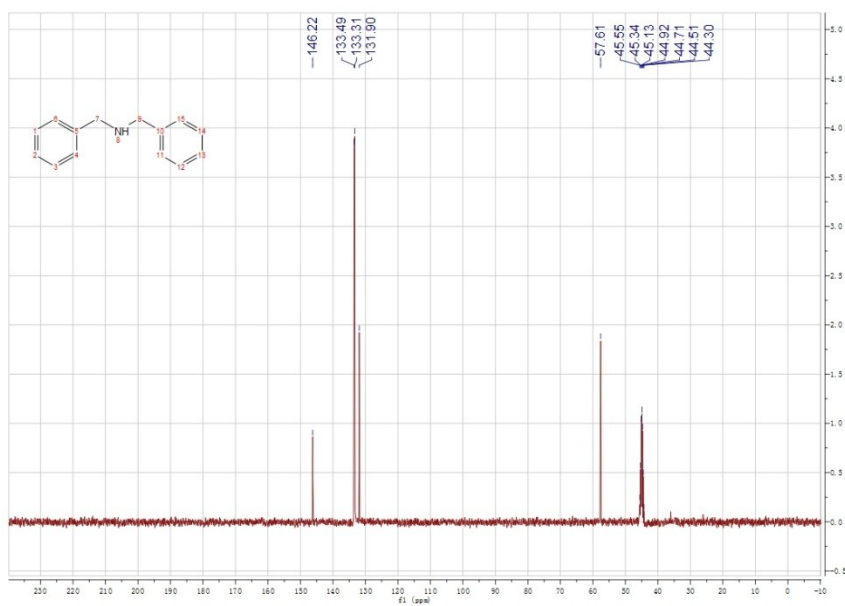[1]Wang, C.; Hou, Y. L.; Kim, J.; Sun, S. H. *Angew. Chem. Int. Ed.* **2007**, *46*, 6333.

[2] Kim J.; Lee Y.; Sun S. H. *J. Am. Chem. Soc.*, **2010**, 132, 4996.
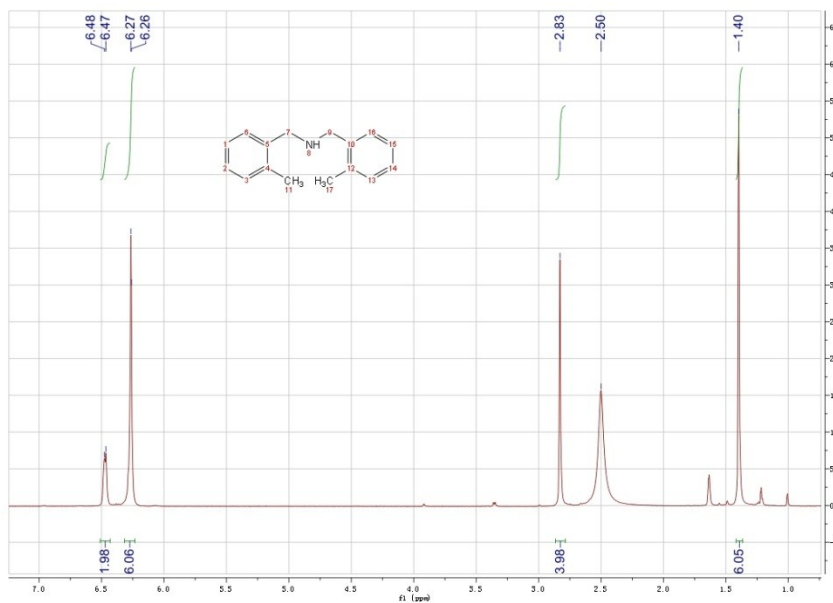
NMR analysis for the DBA products:
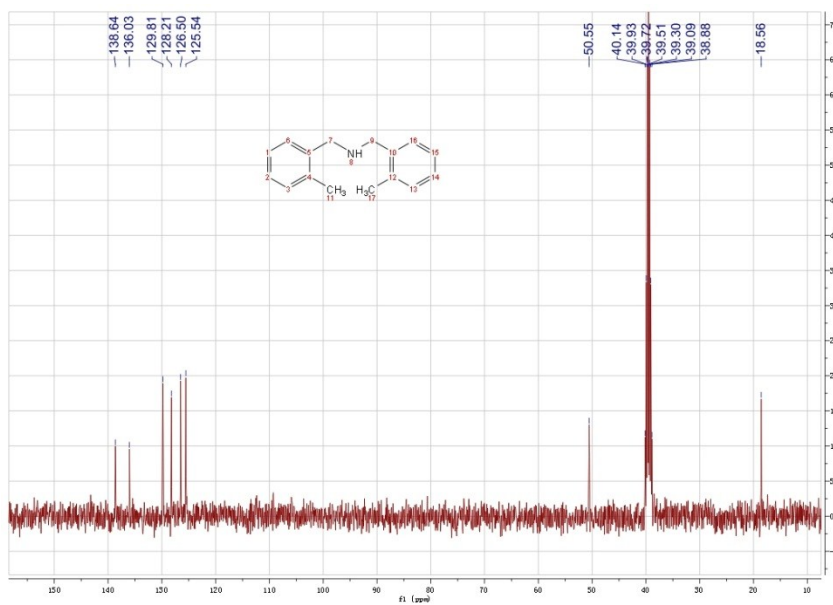
dibenzylamine: ^1H NMR
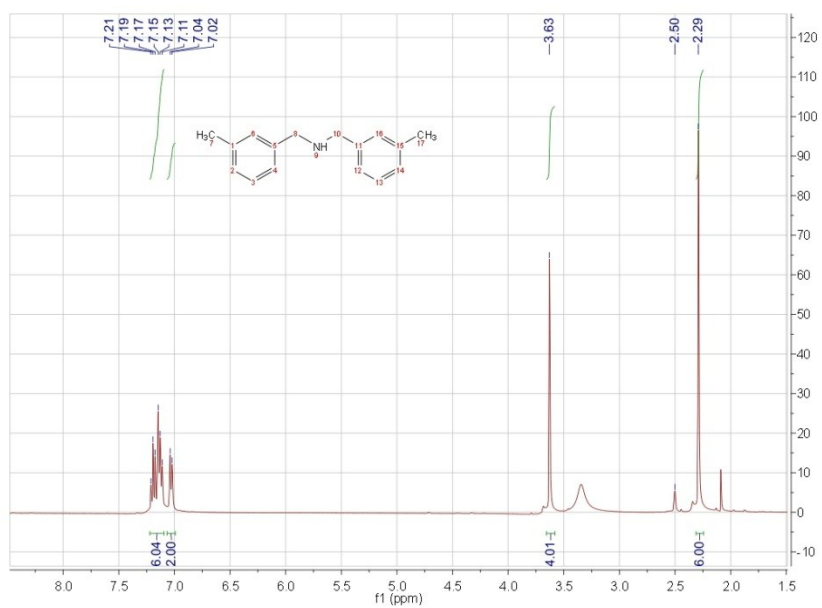

dibenzylamine: ^{13}C NMR

di(2-methyl)benzylamine: ^1H NMR

di(2-methyl)benzylamine: ¹³C NMR
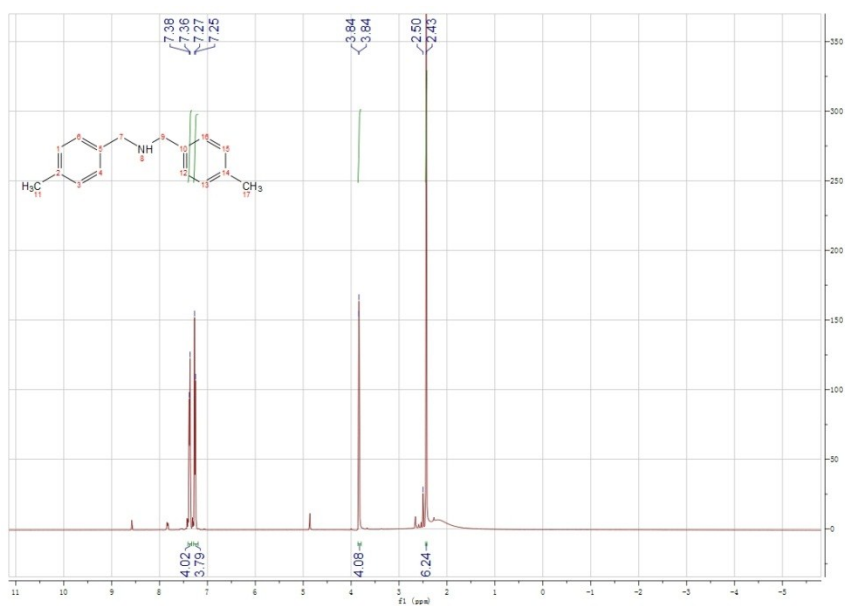

di(3-methyl)benzylamine: ¹H NMR
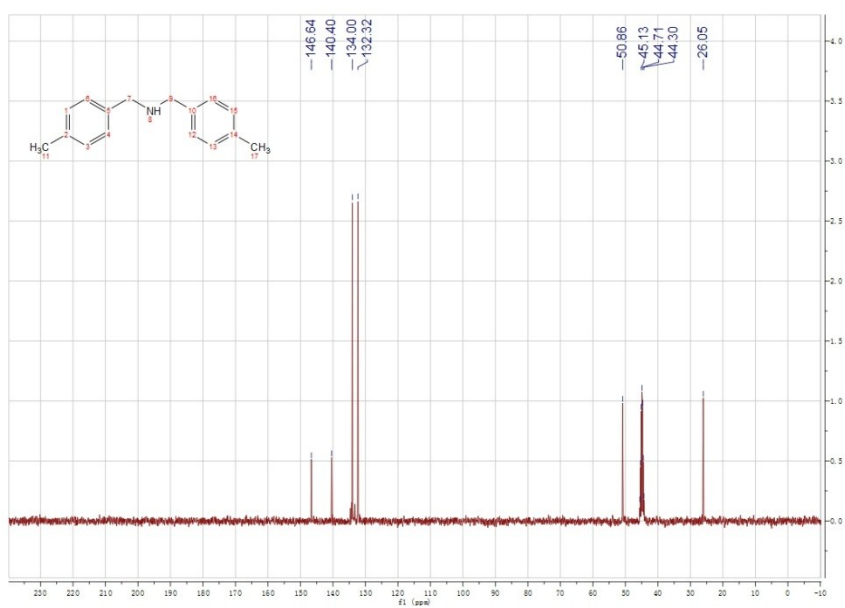
di(3-methyl)benzylamine: ^{13}C *NMR*
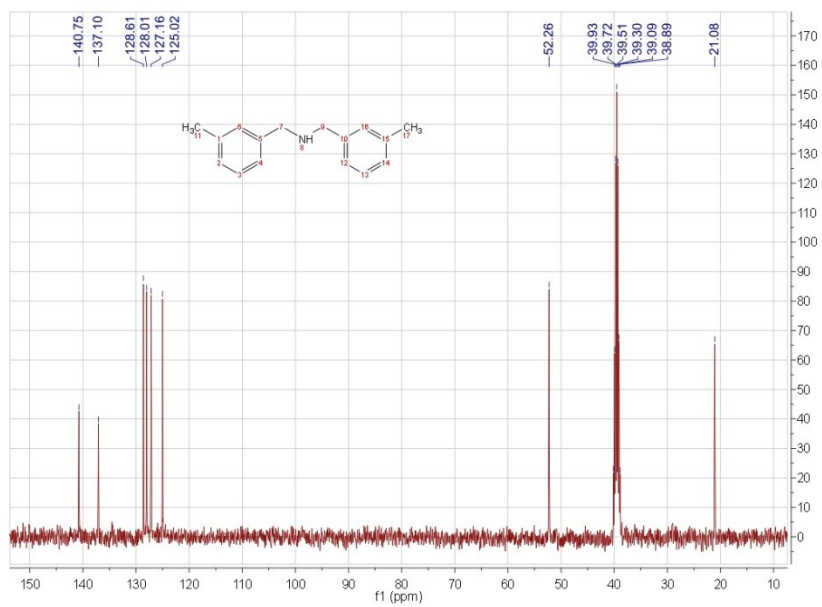
bis(4-methylbenzyl)amine: ^{1}H *NMR*
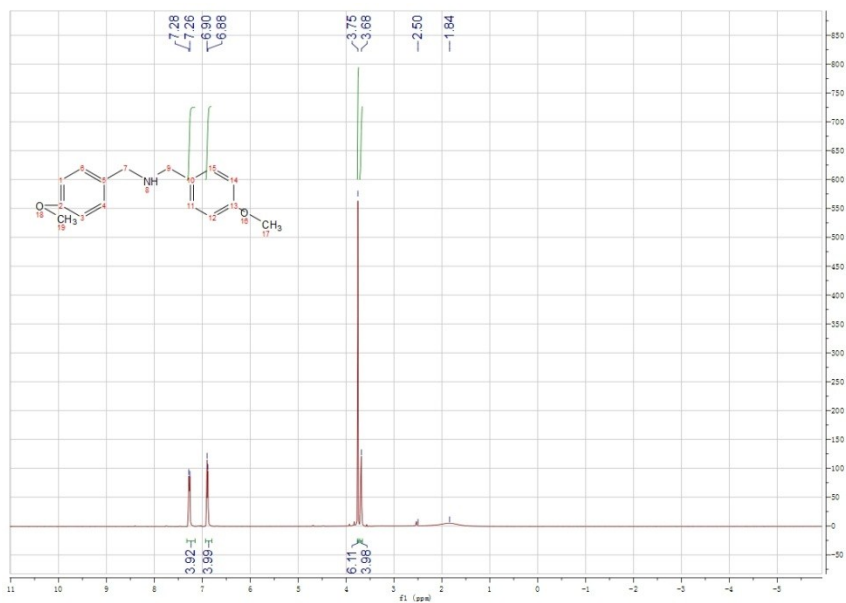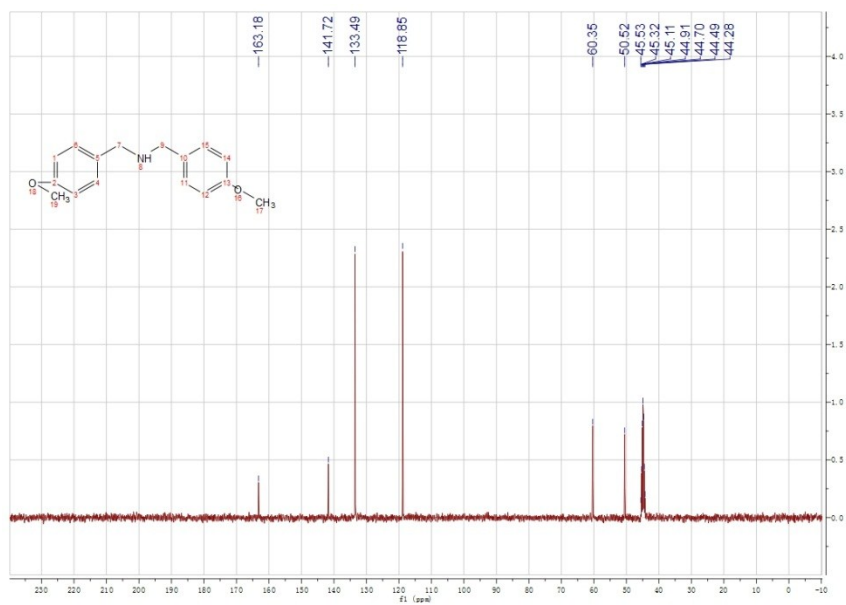
bis(4-methylbenzyl)amine: ^{13}C NMR
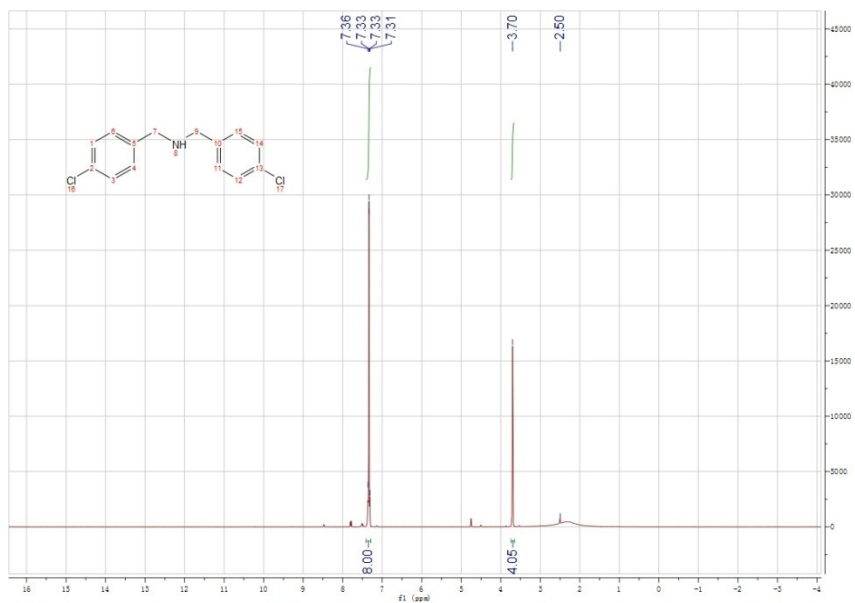

bis(4-methoxybenzyl)amine: ^{1}H NMR

bis(4-methoxybenzyl)amine: ^{13}C NMR

bis(4-chlorobenzyl)amine: ^{1}H NMR

bis(4-chlorobenzyl)amine: ^{13}C NMR