

*Electronic Supplementary Information*

**Acid promoted cyclodehydration of amino  
alcohols with amide acetal**

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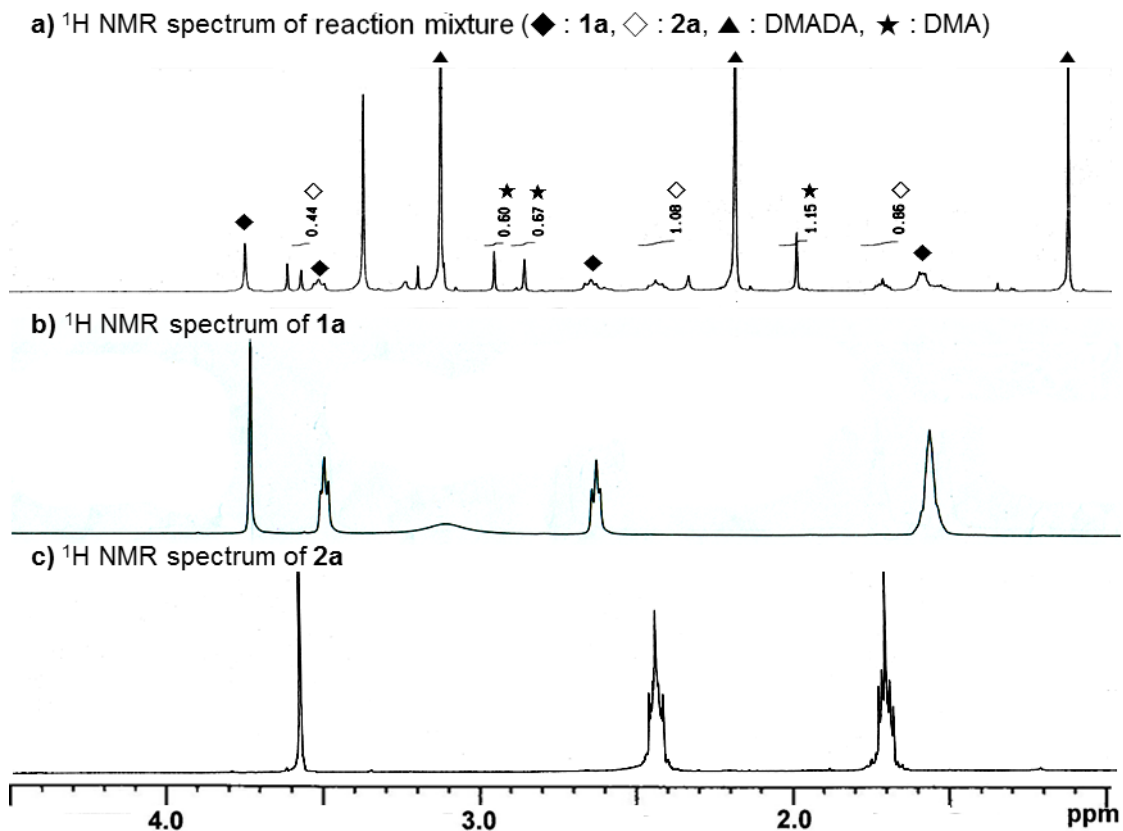
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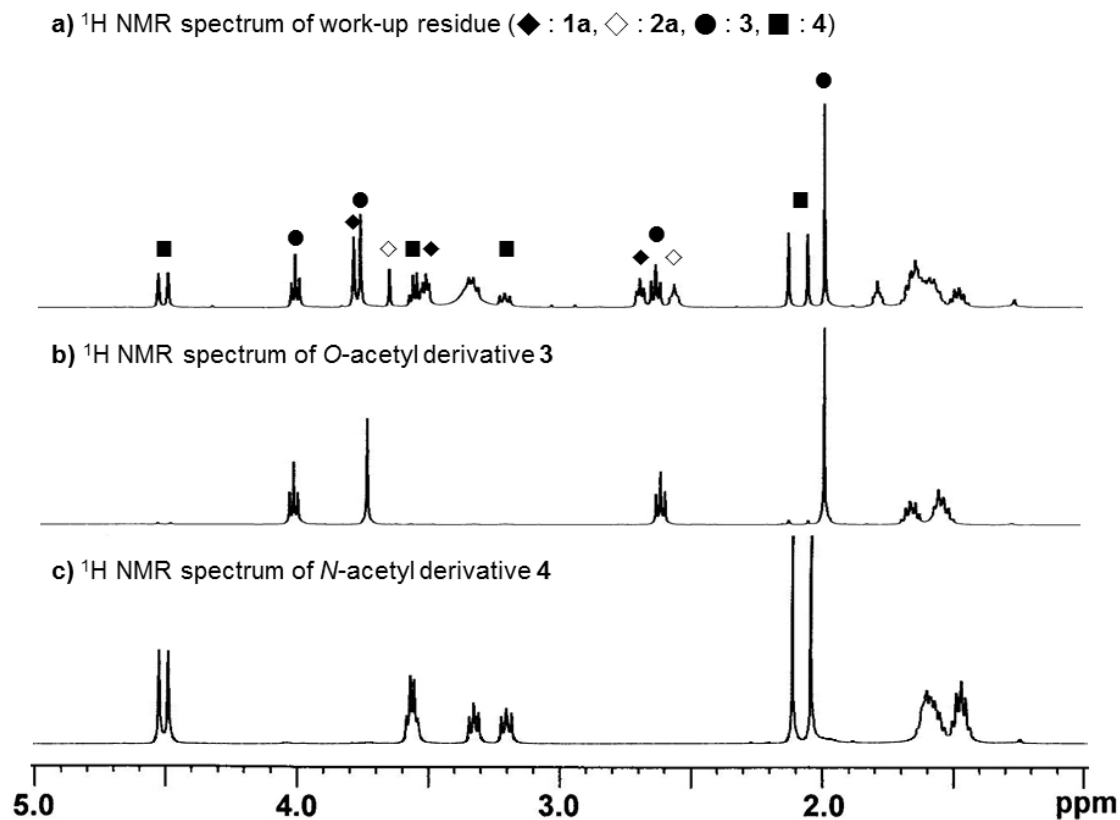
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## 1. $^1\text{H}$ NMR spectroscopy study



**Figure S1.** *In situ*  $^1\text{H}$  NMR spectra for the conversion of amino alcohol **1a** to cyclized product **2a**.

For a more sophisticated understanding of the reaction mechanism, we conducted an *in situ*  $^1\text{H}$  NMR spectroscopy analysis. DMADA (1.0 mmol) was added to a solution mixture of the amino alcohol **1a** (0.50 mmol) and  $\text{SnCl}_4$  (0.0050 mmol) in  $\text{CD}_2\text{Cl}_2$  (10 mL) at room temperature. We could observe the reaction mixture transformed into the cyclized product **2a** with a nearly stoichiometric amount of *N,N*-dimethylacetamide (DMA). No predominant intermediate was observed (Figure S1).



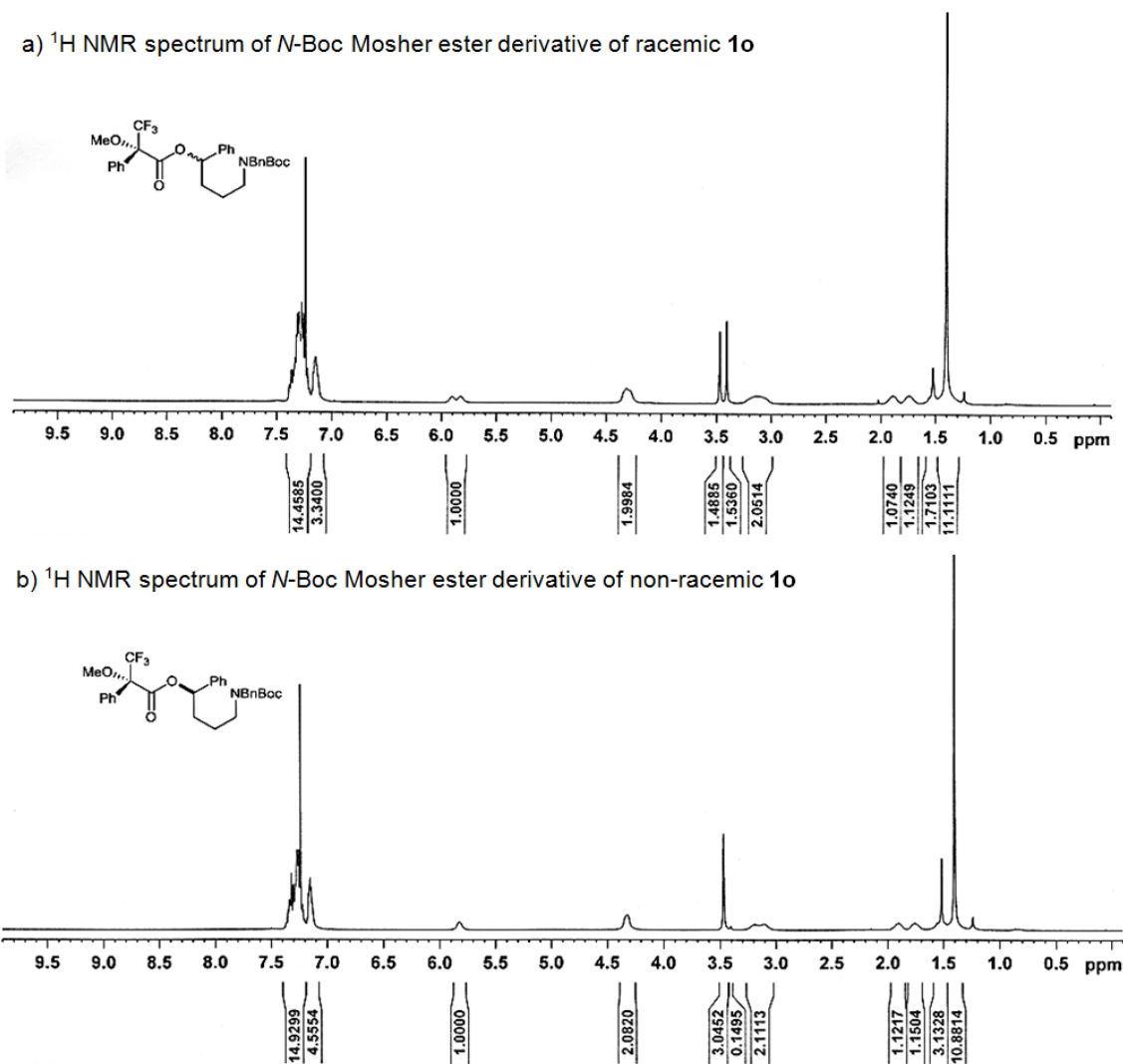
**Figure S2.**  $^1\text{H}$  NMR spectrum of work-up residue of the reaction mixture quenched with water.

As mentioned in the manuscript, by quenching the reaction mixture with water during the course of the reaction, we could detect the formation of the *O*-acetyl derivative **3** and *N*-acetyl derivative **4** that may have originated from envisaged intermediate (scheme 2) and column chromatography allowed for the isolation of **3** and **4** (Figure S2). As a result, the identification of *O*-acetyl derivative **3** and detection of DMA firmly supported the hypothesis that the reaction proceeded via the putative intermediate **I** (scheme 2) and intramolecular nucleophilic attack of the amine.

## 2. Stereochemical proofs for non-racemic compounds **1o** and **2o**

### 2.1 $^1\text{H}$ NMR analysis of *N*-Boc Mosher ester derivative of **1o**

The enantiomeric excess for non-racemic **1o** could not be determined because the enantiomers were not separable on a chiral HPLC column. The optical purity of **1o** was determined by  $^1\text{H}$  NMR spectroscopic analysis of its *N*-Boc Mosher ester derivative. The enantiomeric excess of non-racemic **1o** was 91%.

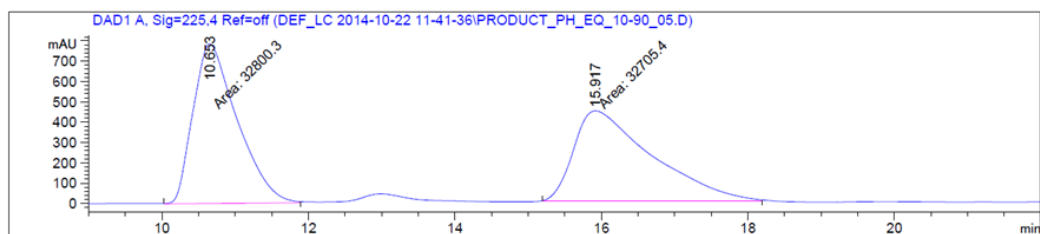


**Figure S3.**  $^1\text{H}$  NMR spectra of *N*-Boc Mosher ester derivative of **1o**.

## 2.2 Chiral HPLC Analysis of Non-racemic **2o**

To determine the enantiomeric excess, Agilent 1200 Series HPLC equipped with a DAD detector was used (Agilent Technologies, Palo Alto, CA, USA). The chiral column used was Chiralcel OJ (Daicel Chem. Ind., Ltd., 4.6 mm × 250 mm, 10 μm). The mobile phase used was hexane/isopropanol/dimethylamine (90/10/0.1) at a flow rate of 0.5 mL/min and the eluent was monitored using a DAD detector at 225 nm. Chiral HPLC results indicated the **2o** was obtained in 92% ee.

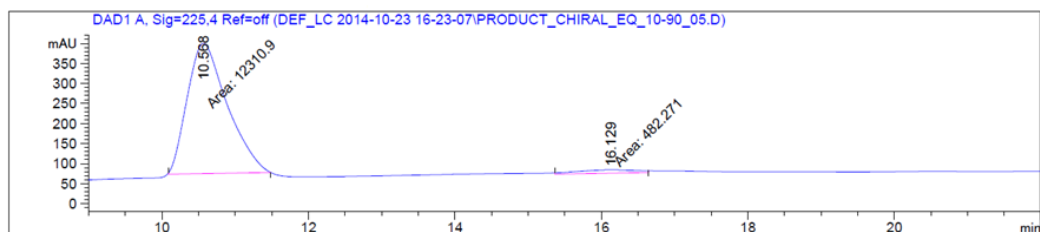
a) Chiral HPLC data of racemic **2o**



Signal 1: DAD1 A, Sig=225,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	10.653	MM	0.6963	3.28003e4	785.15222	50.0725
2	15.917	MM	1.2292	3.27054e4	443.45239	49.9275

b) Chiral HPLC data of non-racemic **2o**



Signal 1: DAD1 A, Sig=225,4 Ref=off

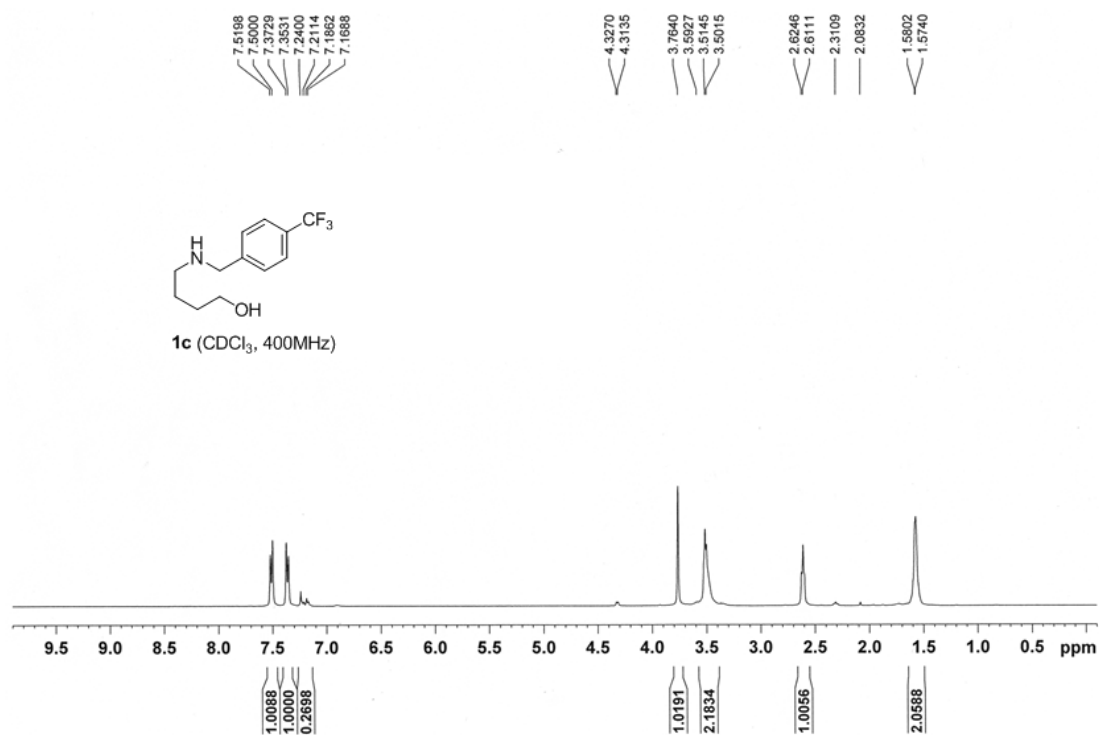
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	10.568	MM	0.6310	1.23109e4	325.19034	96.2303
2	16.129	MM	0.6904	482.27084	8.32048	3.7697

Figure S4. Chiral HPLC data of **2o** derived from racemic **1o** and non-racemic **1o**.

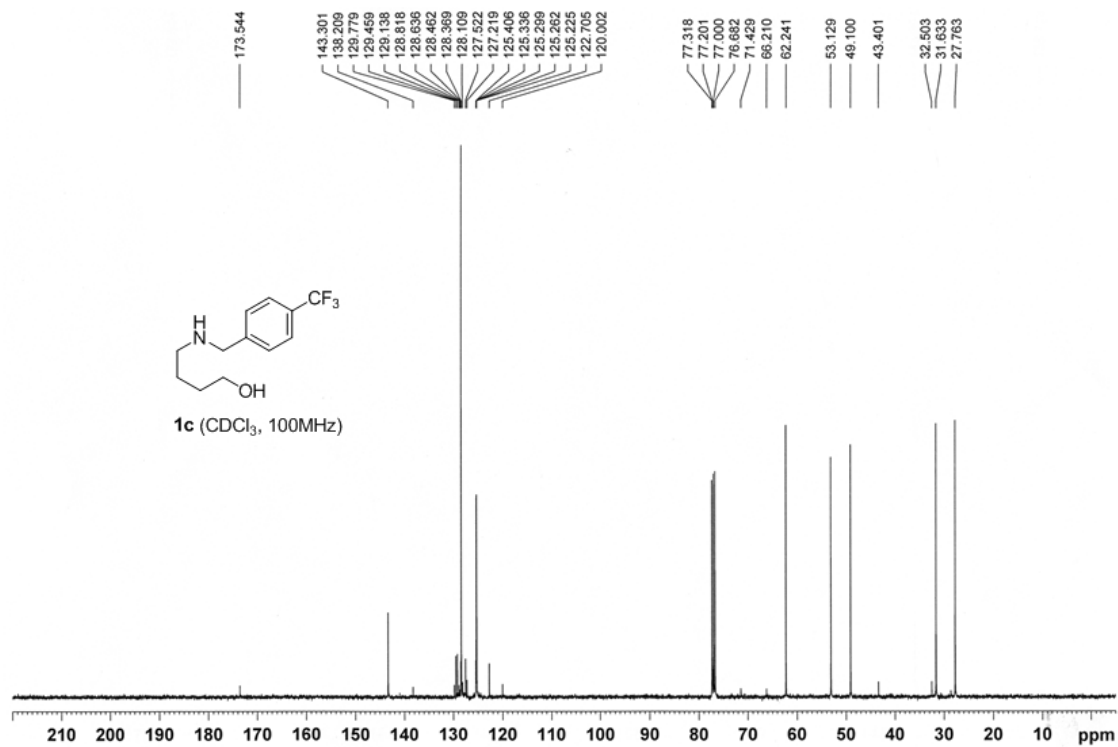
### **3. Copies of NMR spectra**

**(<sup>1</sup>H NMR & <sup>13</sup>C NMR)**

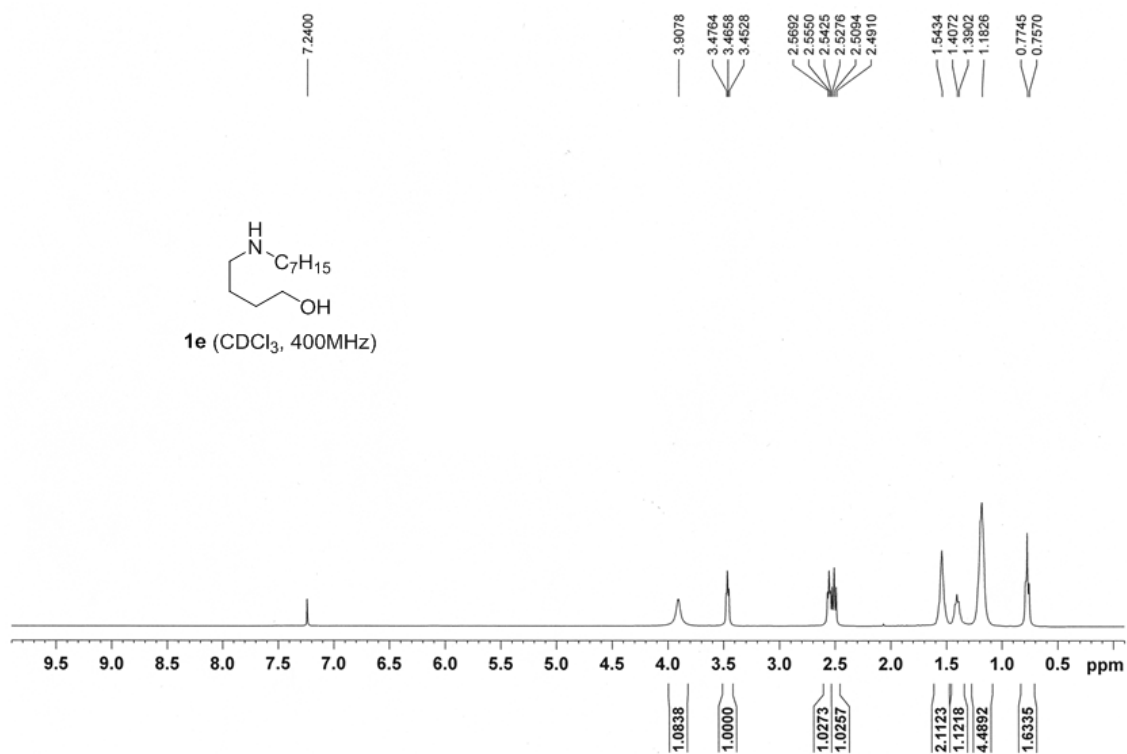
- <sup>1</sup>H NMR spectrum of compound **1c**



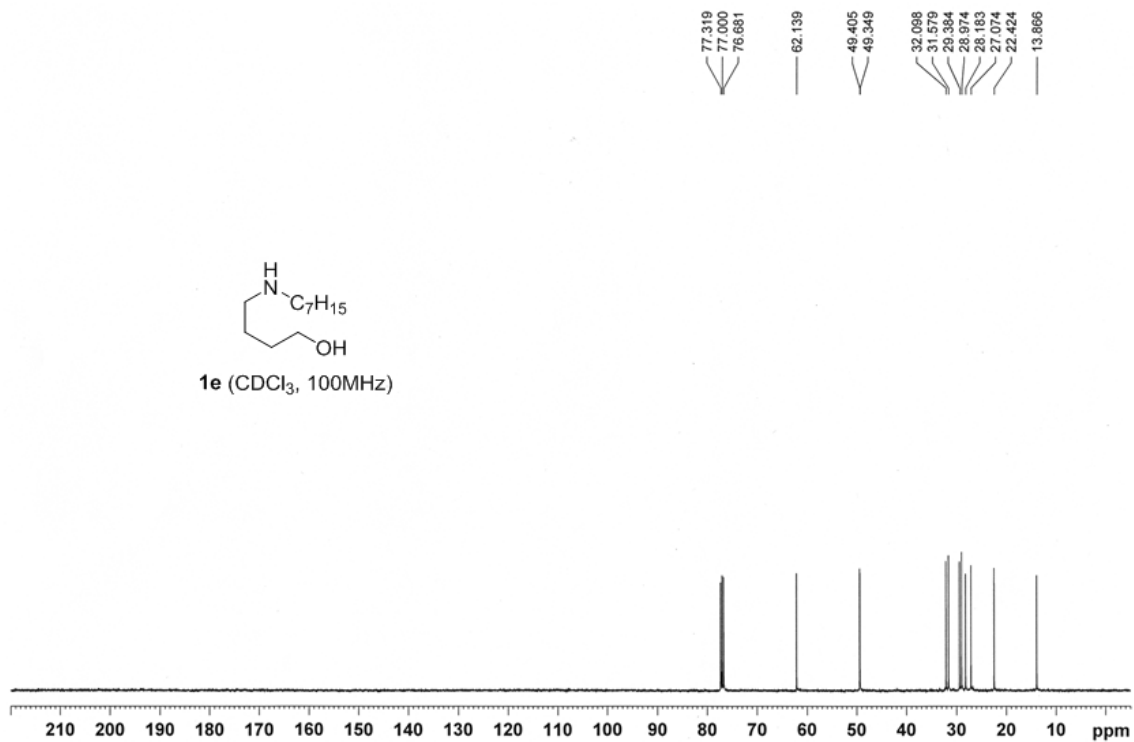
- <sup>13</sup>C NMR spectrum of compound **1c**



- $^1\text{H}$  NMR spectrum of compound **1e**

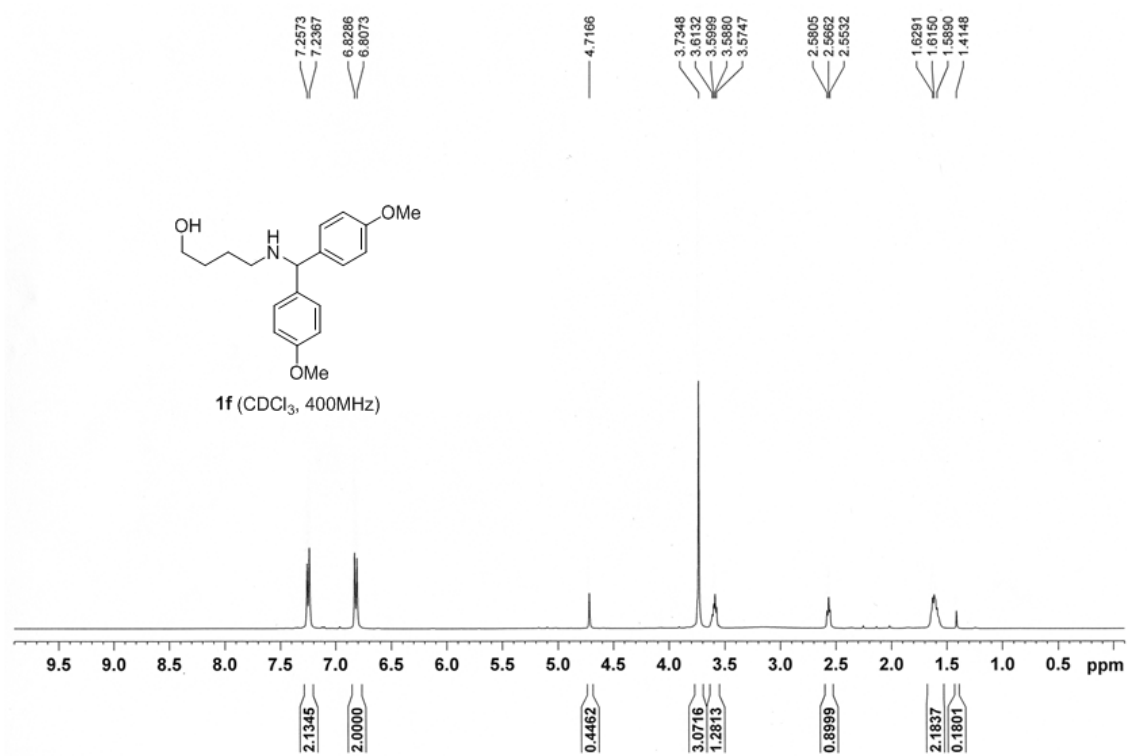


- $^{13}\text{C}$  NMR spectrum of compound **1e**

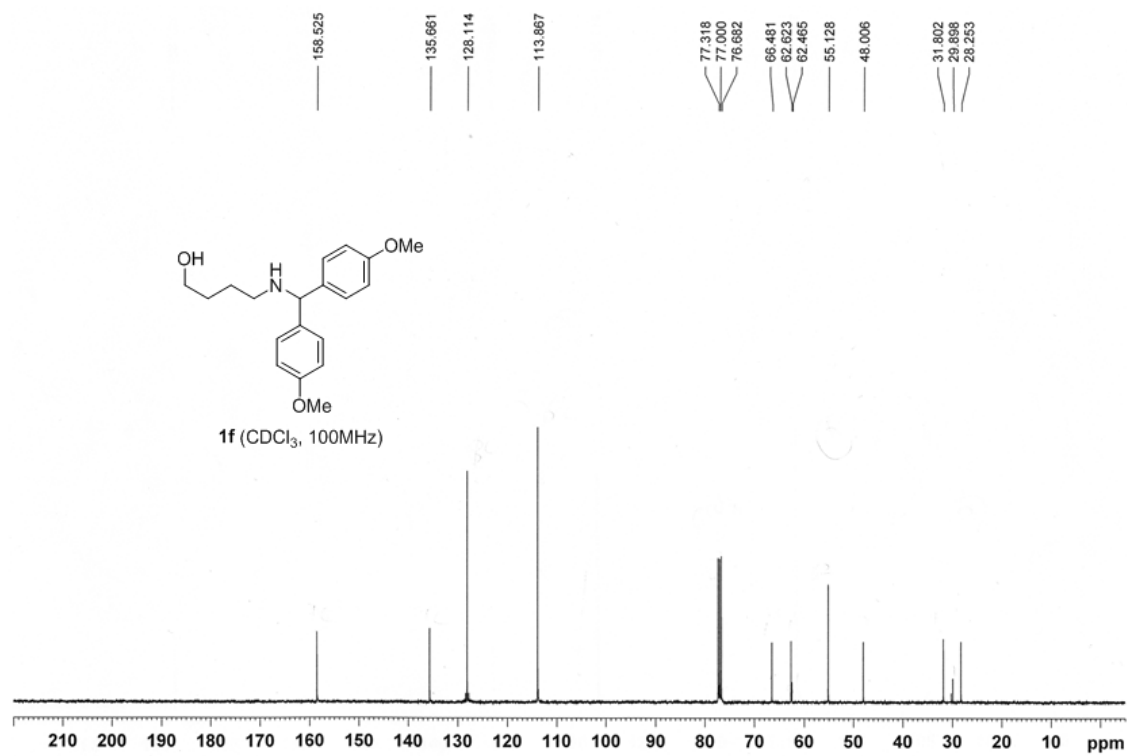




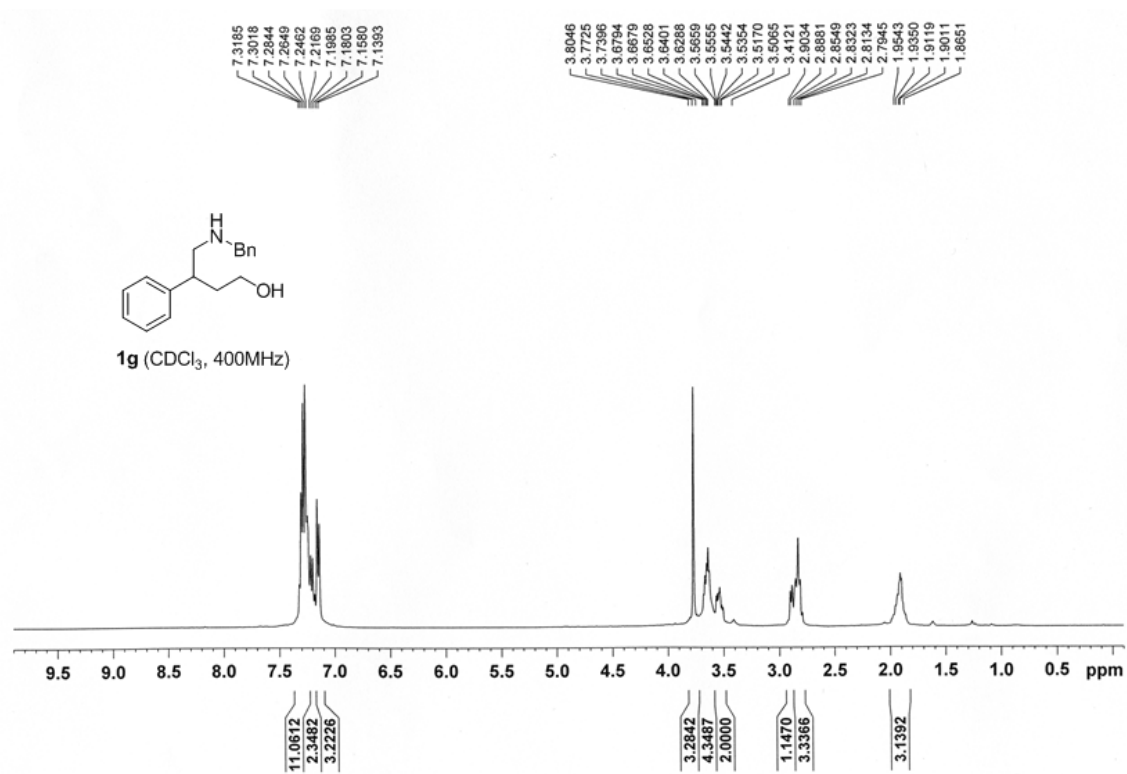
- $^1\text{H}$  NMR spectrum of compound **1f**



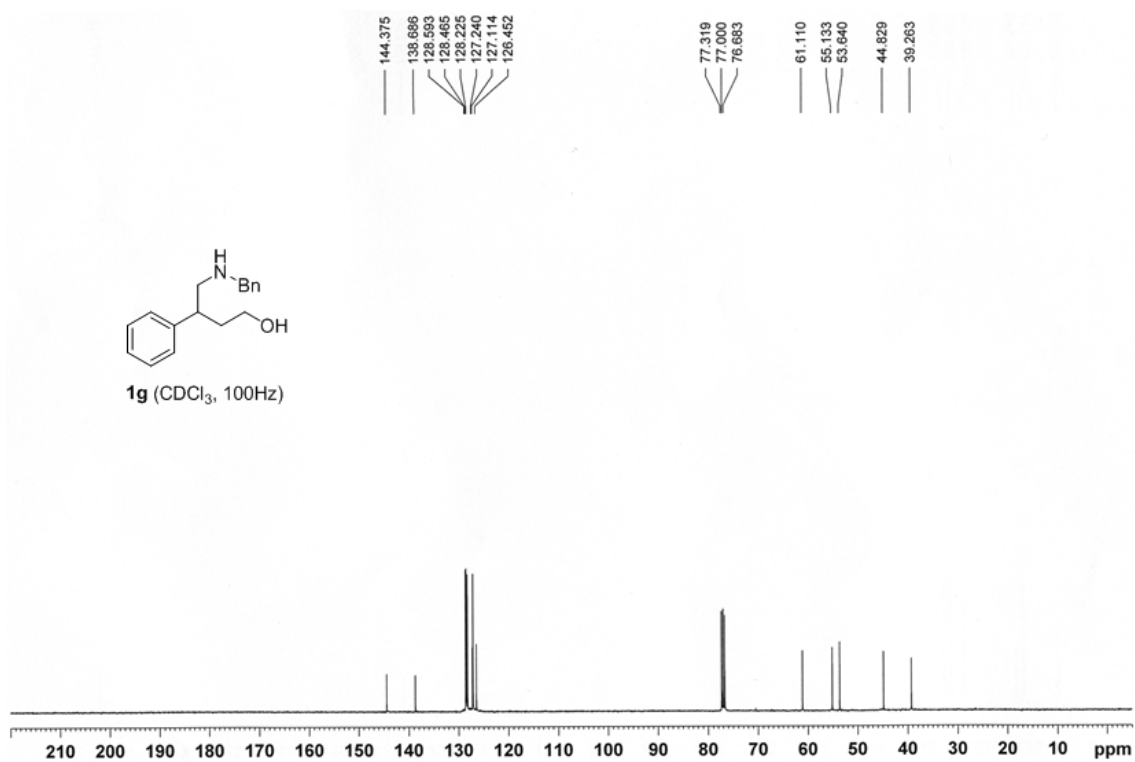
- $^{13}\text{C}$  NMR spectrum of compound **1f**



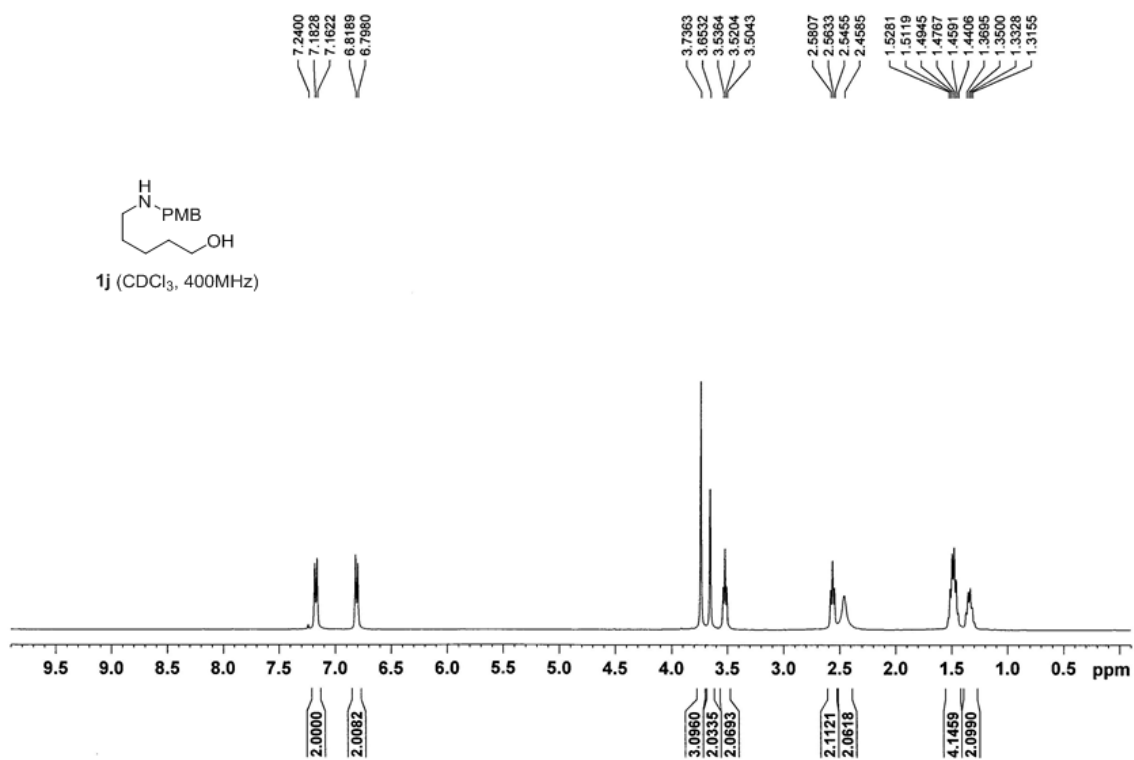
- $^1\text{H}$  NMR spectrum of compound **1g**



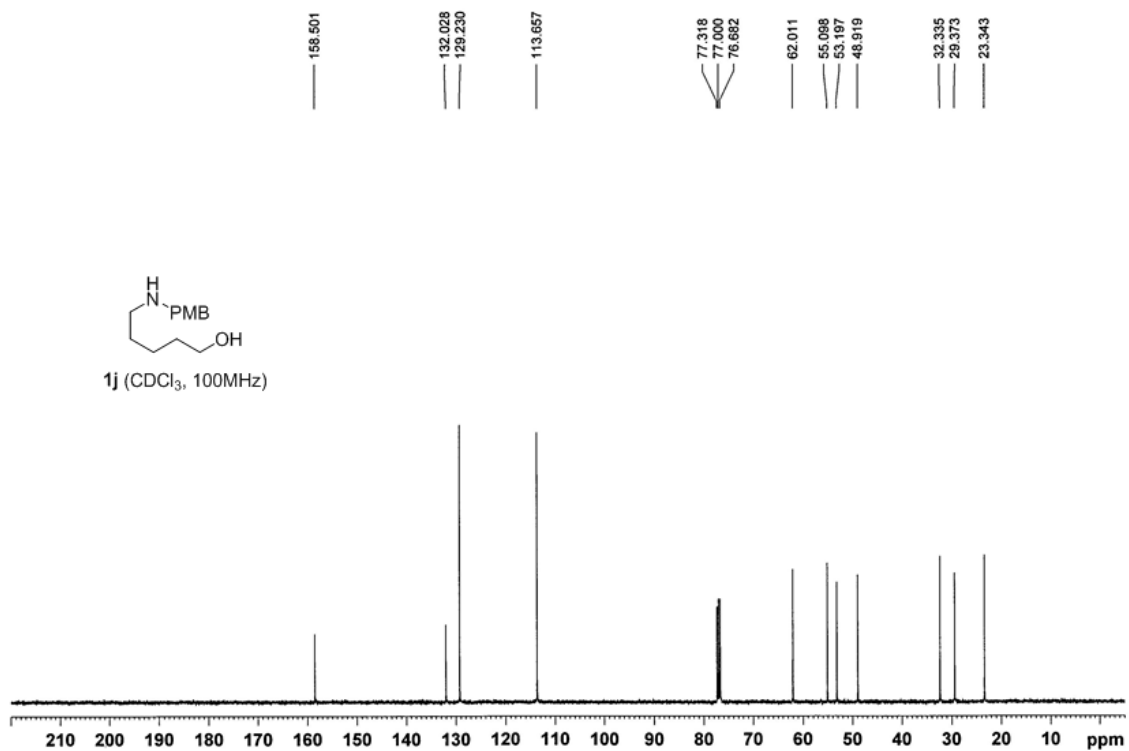
- $^{13}\text{C}$  NMR spectrum of compound **1g**



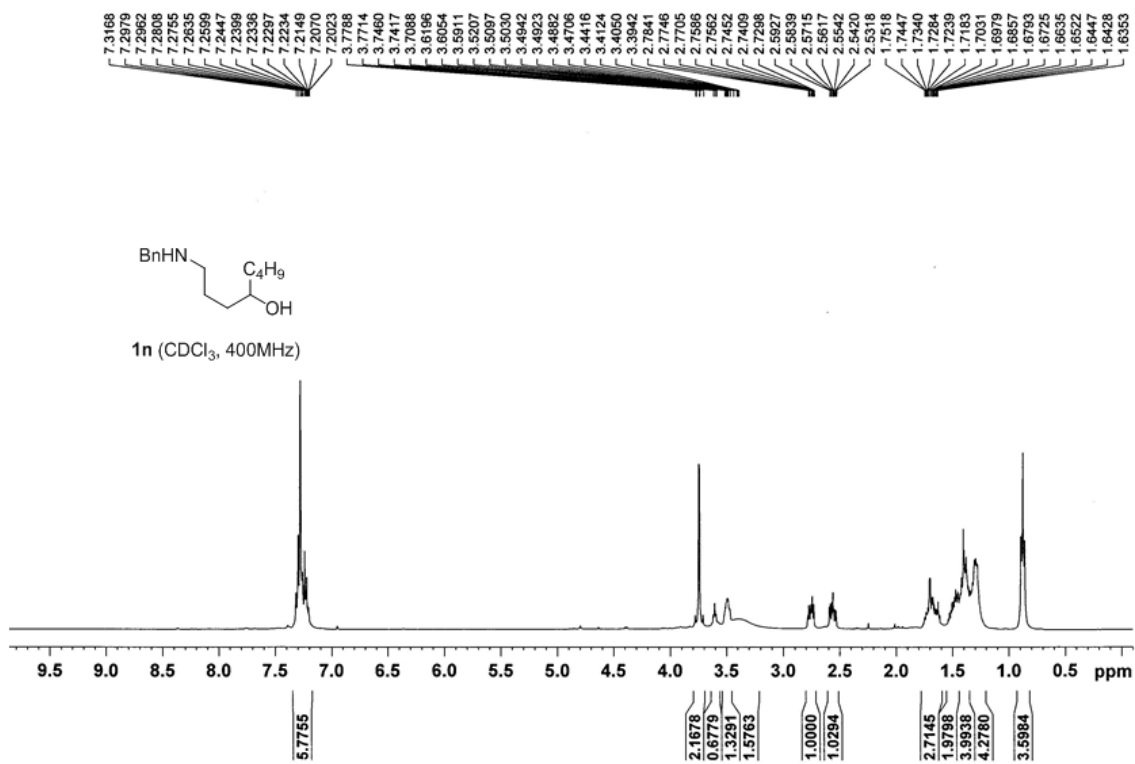
- $^1\text{H}$  NMR spectrum of compound **1j**



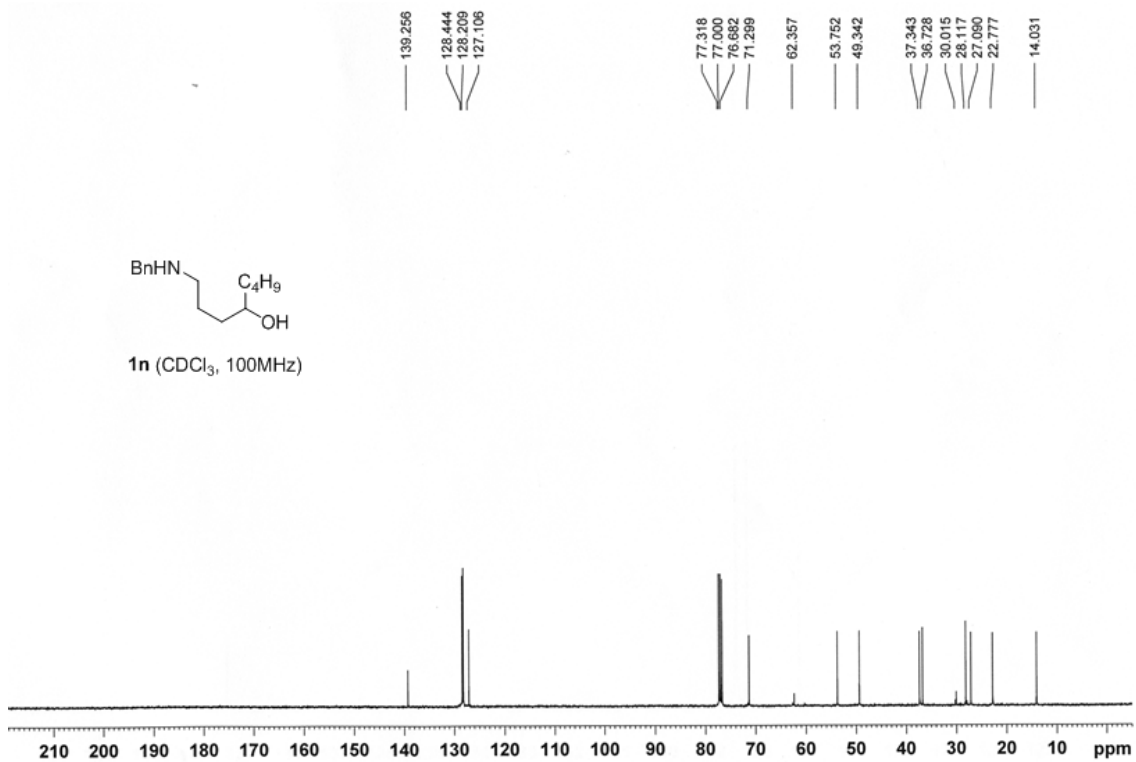
- $^{13}\text{C}$  NMR spectrum of compound **1j**



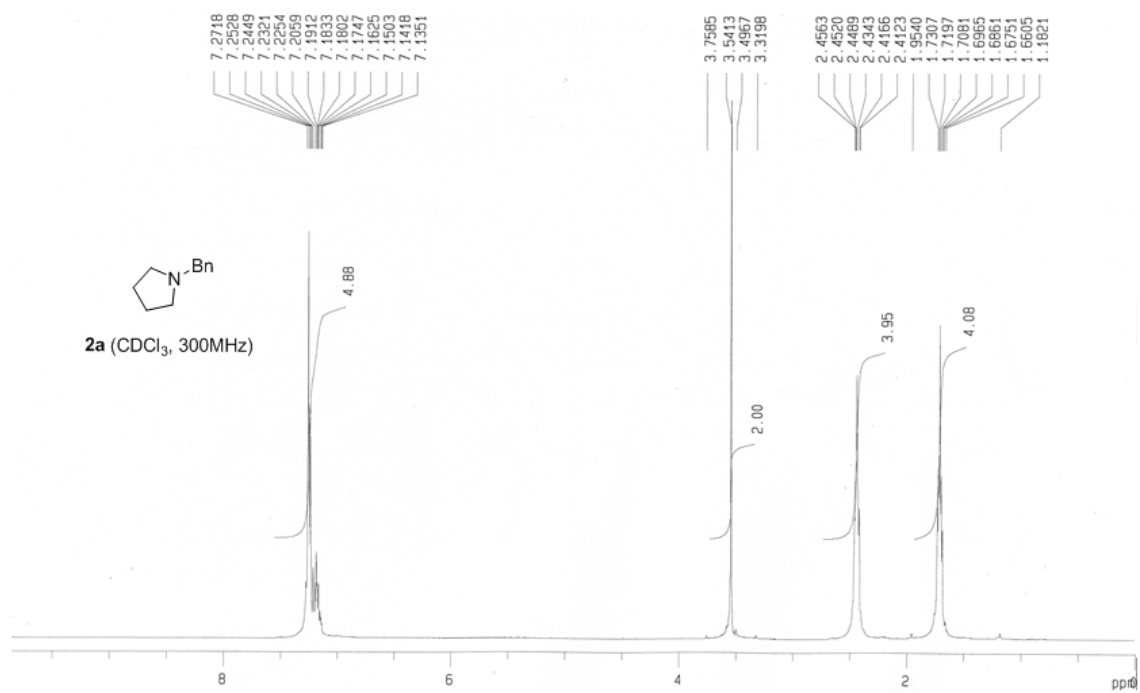
- <sup>1</sup>H NMR spectrum of compound **1n**



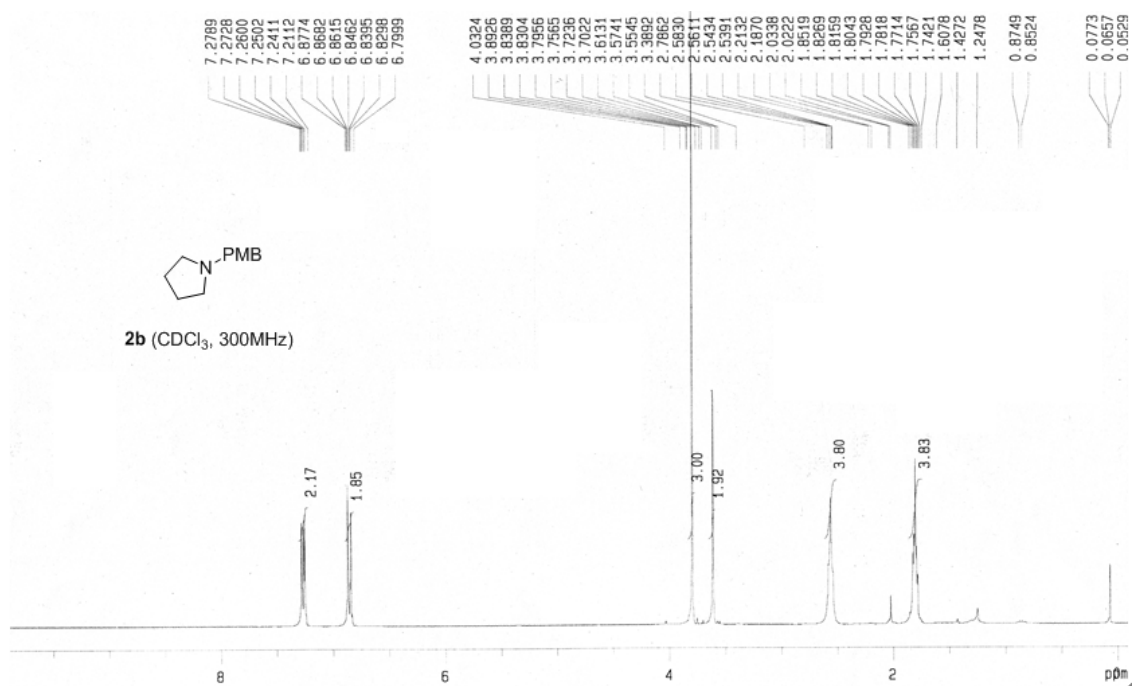
- <sup>13</sup>C NMR spectrum of compound **1n**



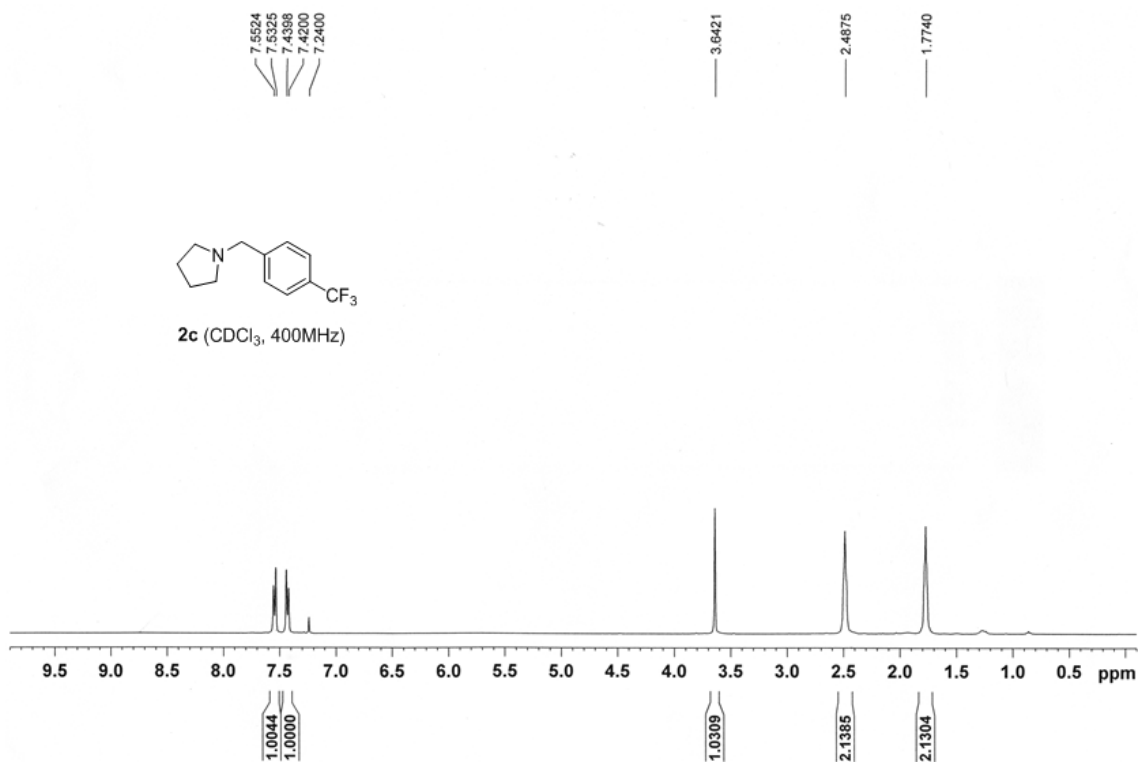
- $^1\text{H}$  NMR spectrum of compound **2a**



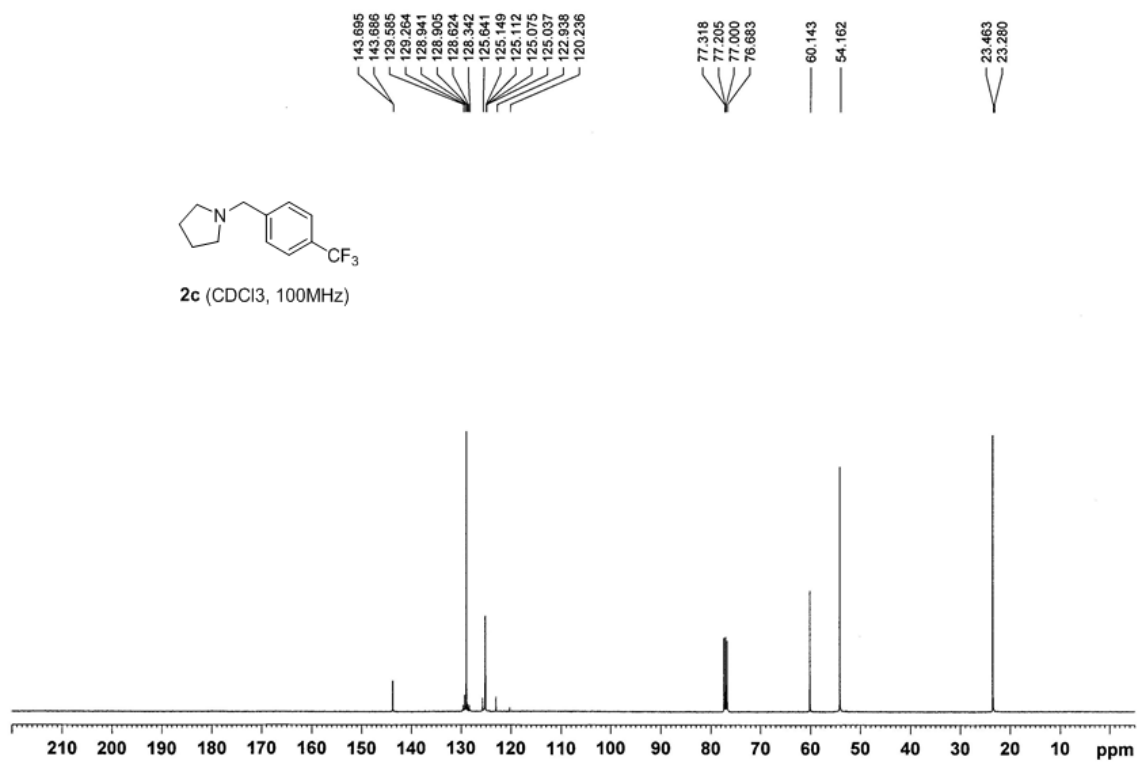
- $^1\text{H}$  NMR spectrum of compound **2b**



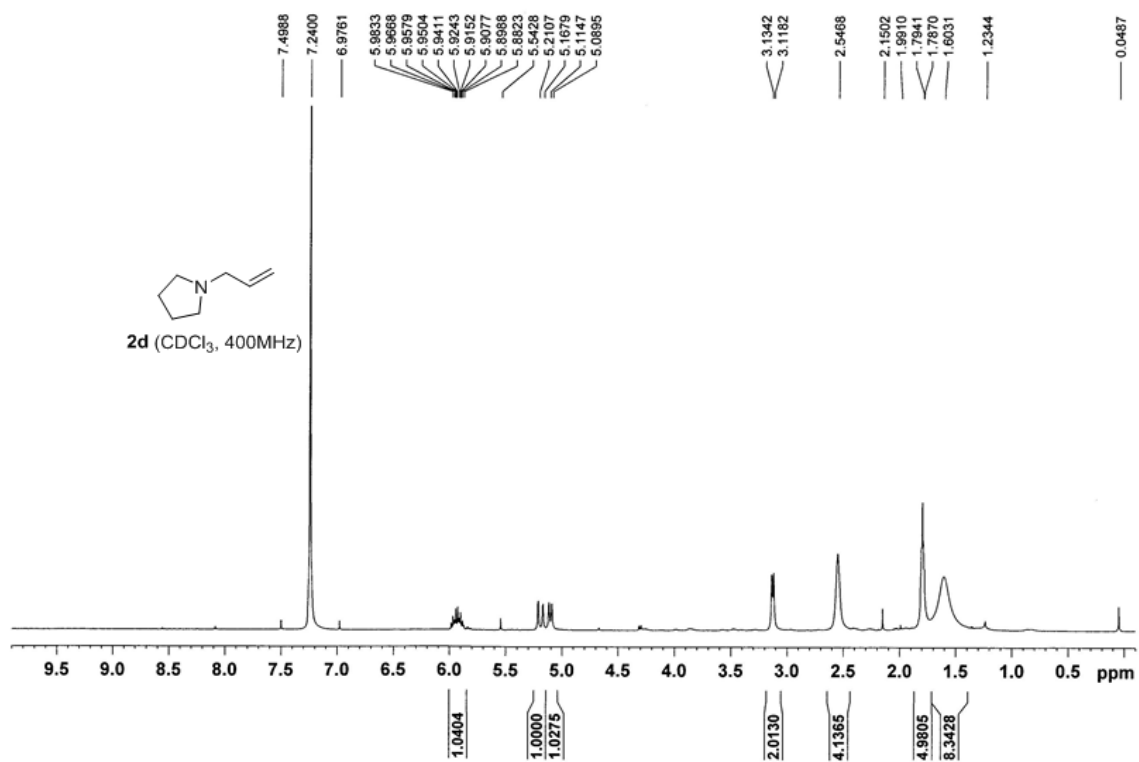
- <sup>1</sup>H NMR spectrum of compound **2c**



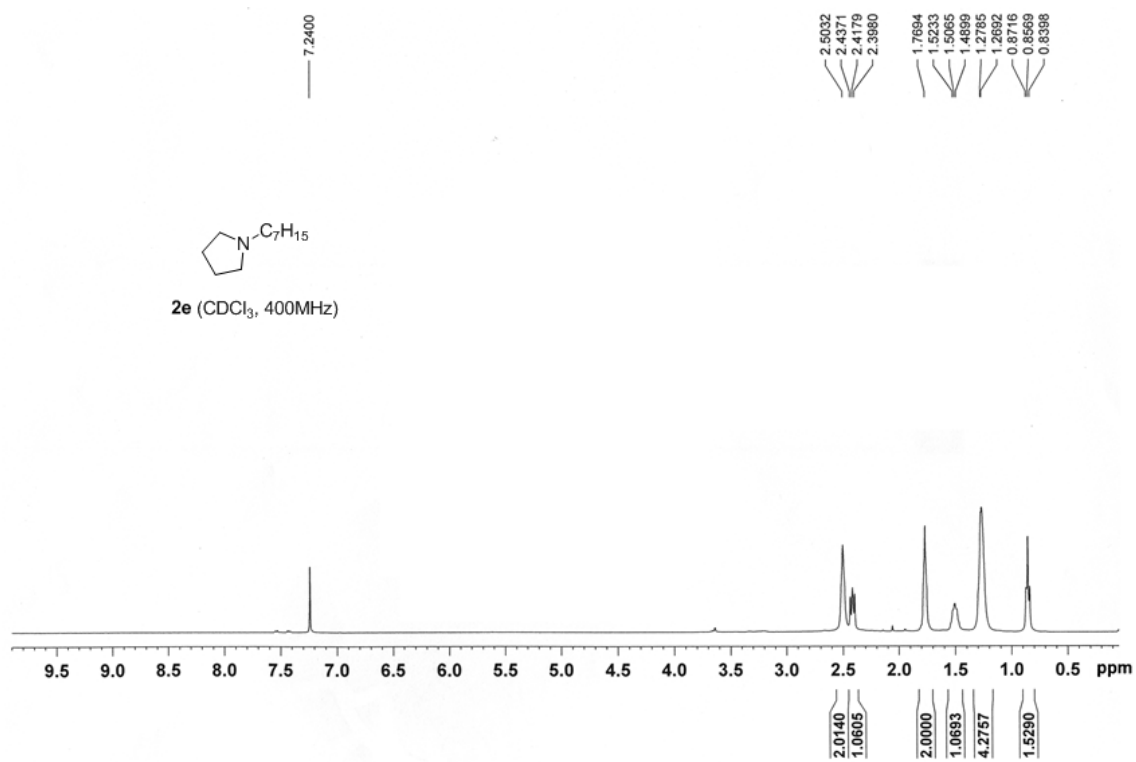
- <sup>13</sup>C NMR spectrum of compound **2c**



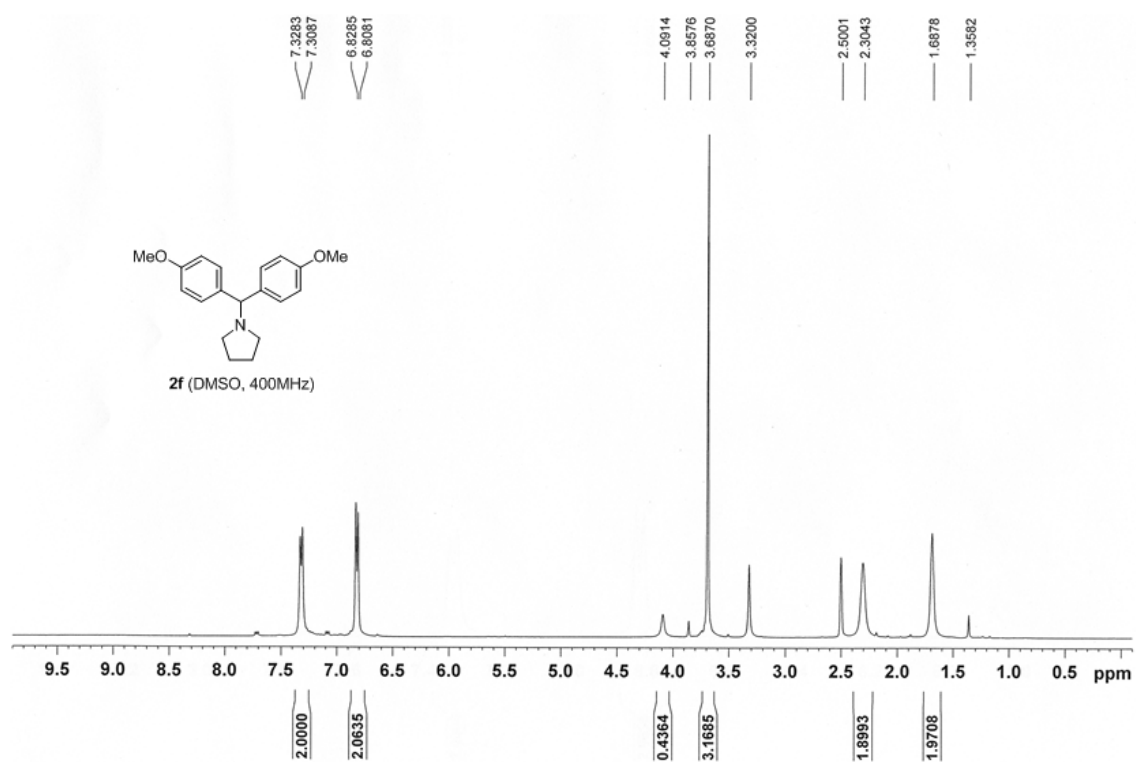
- $^1\text{H}$  NMR spectrum of compound **2d**



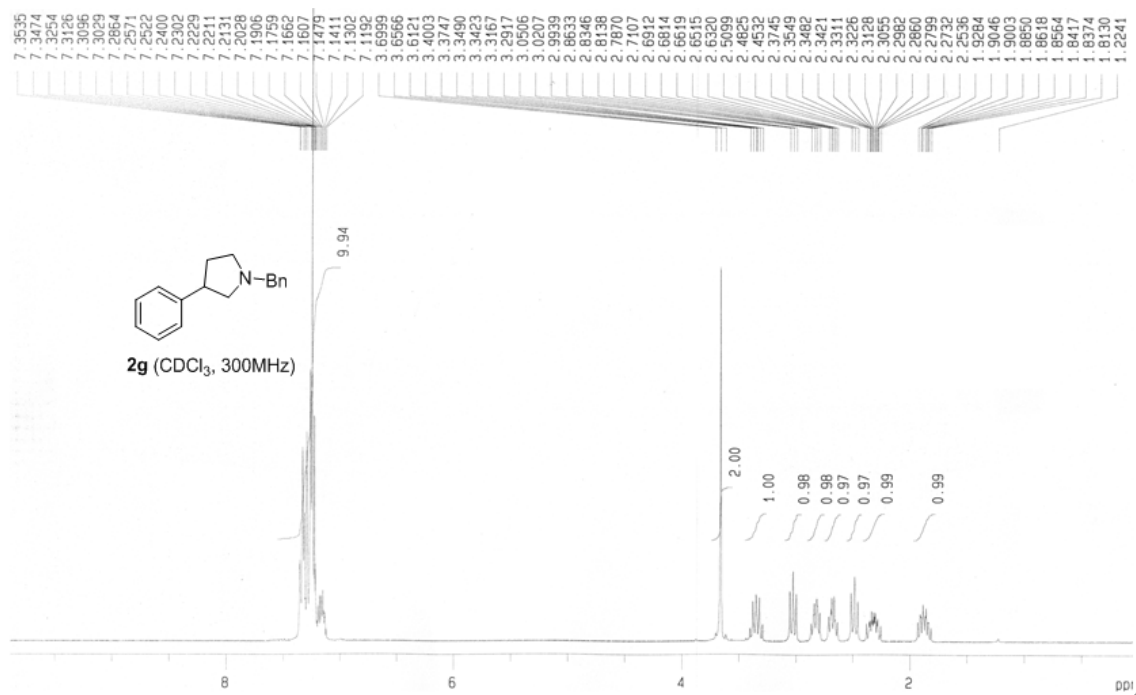
- $^1\text{H}$  NMR spectrum of compound **2e**



- <sup>1</sup>H NMR spectrum of compound **2f**

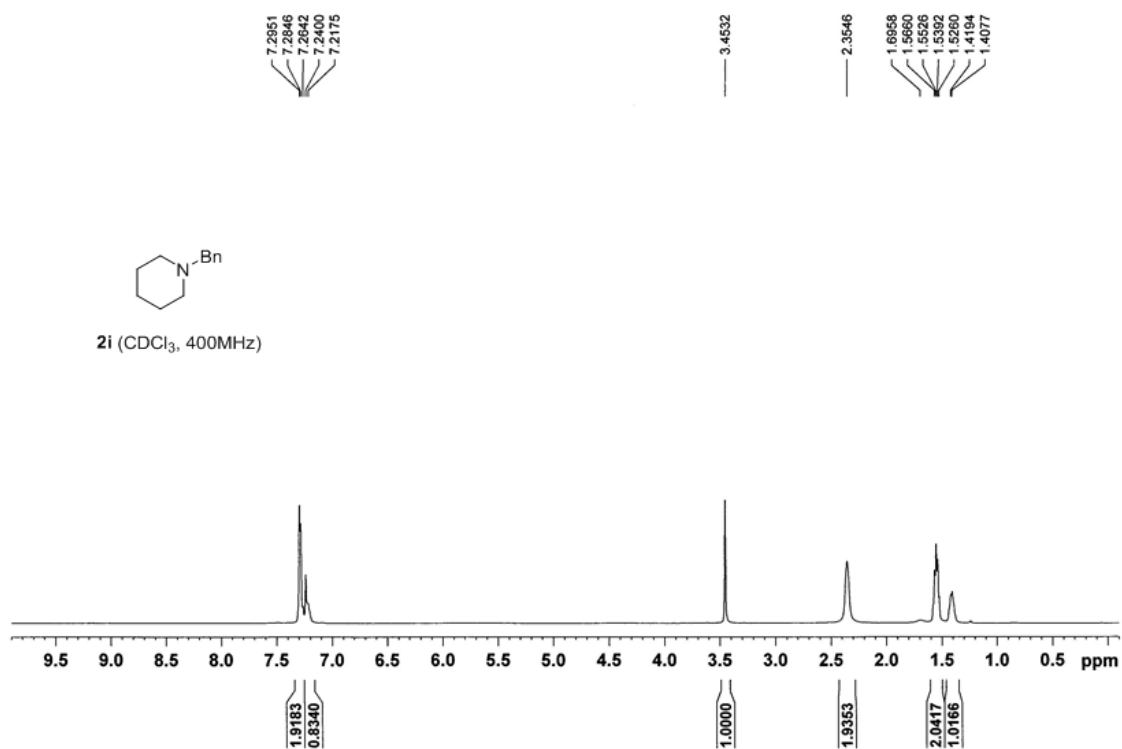


- <sup>1</sup>H NMR spectrum of compound **2g**

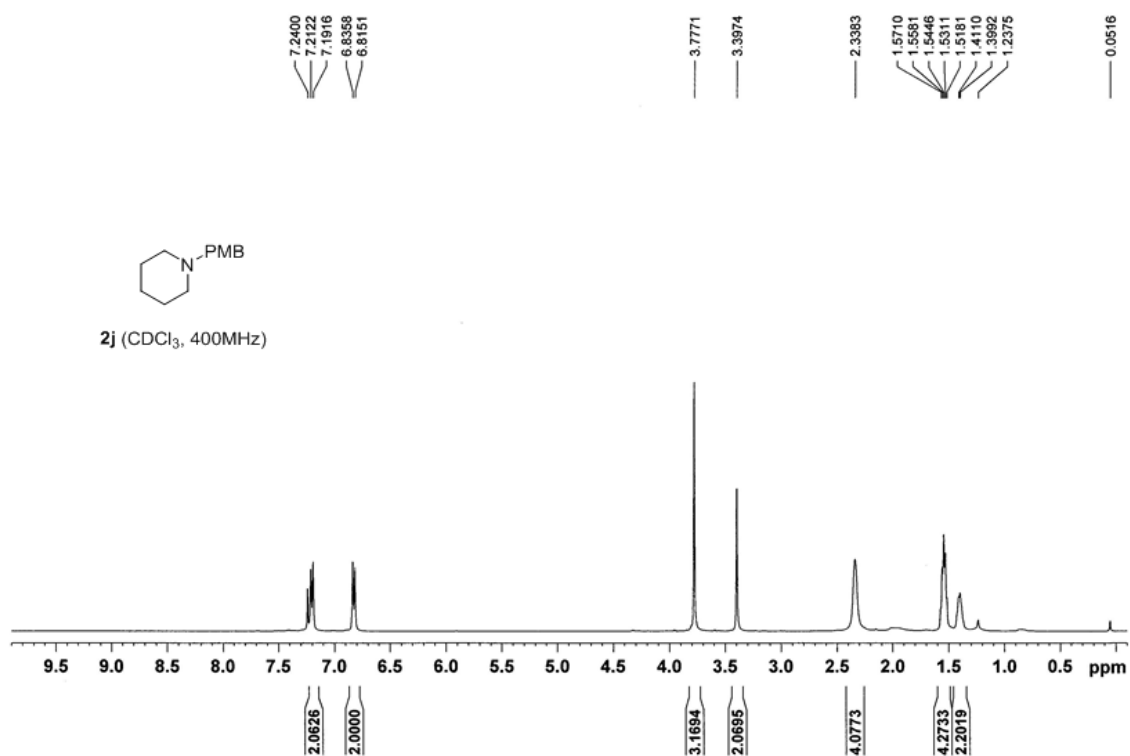




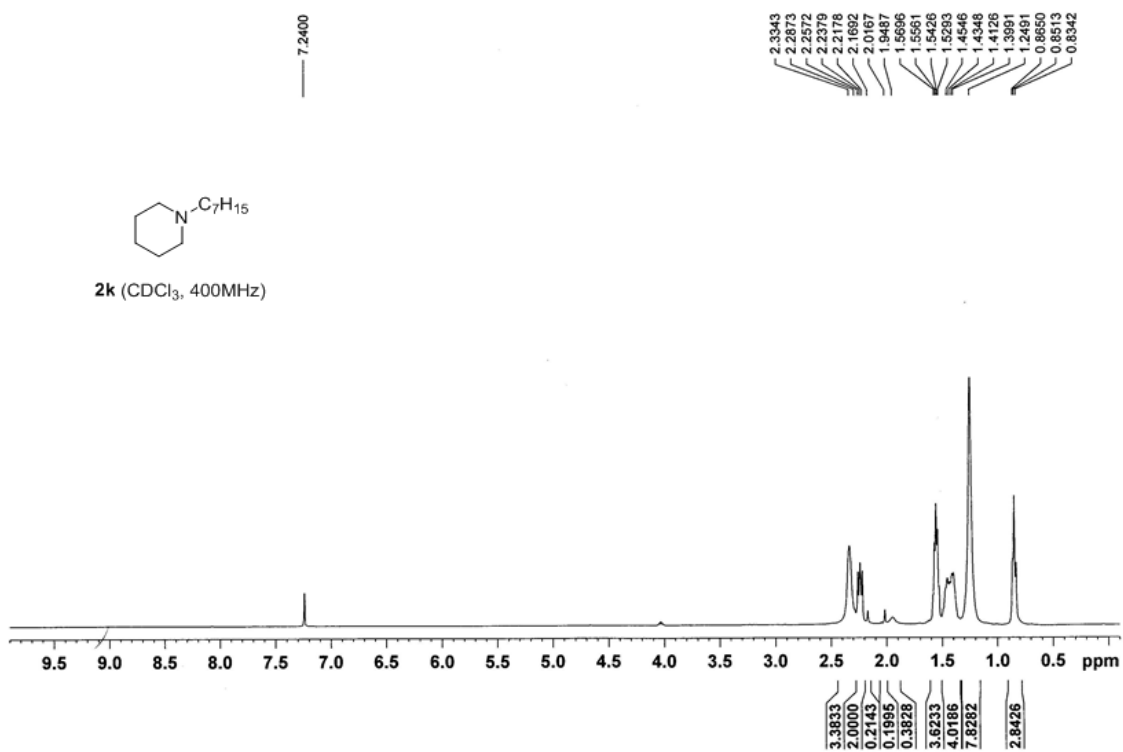
- $^1\text{H}$  NMR spectrum of compound **2i**



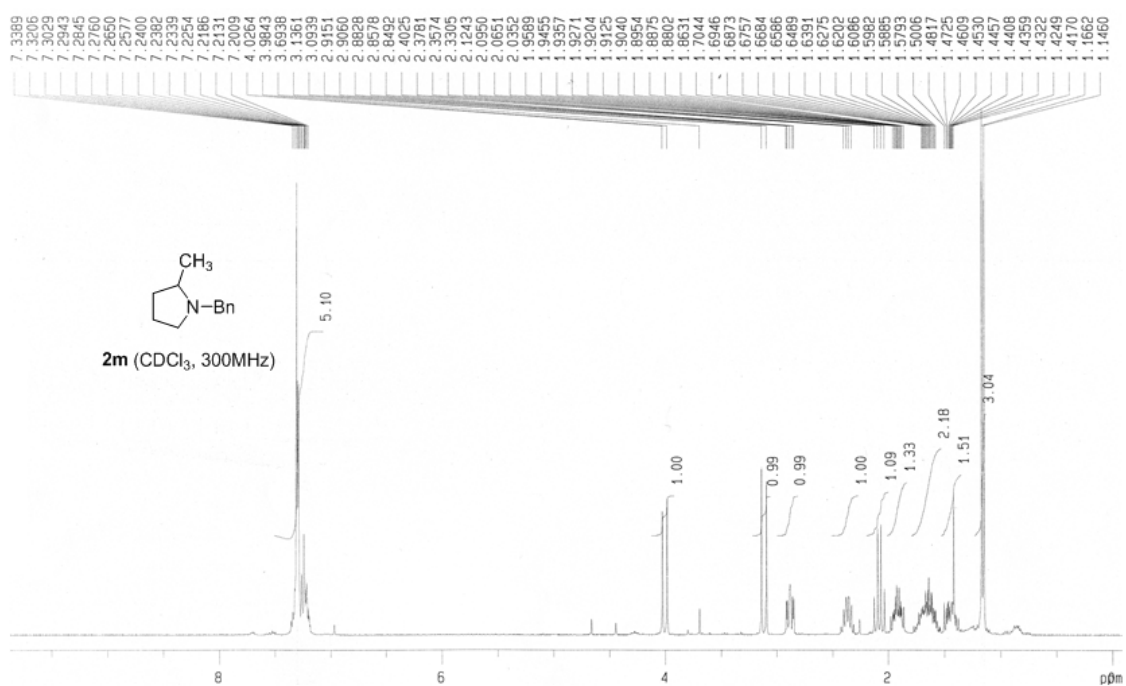
- $^1\text{H}$  NMR spectrum of compound **2j**



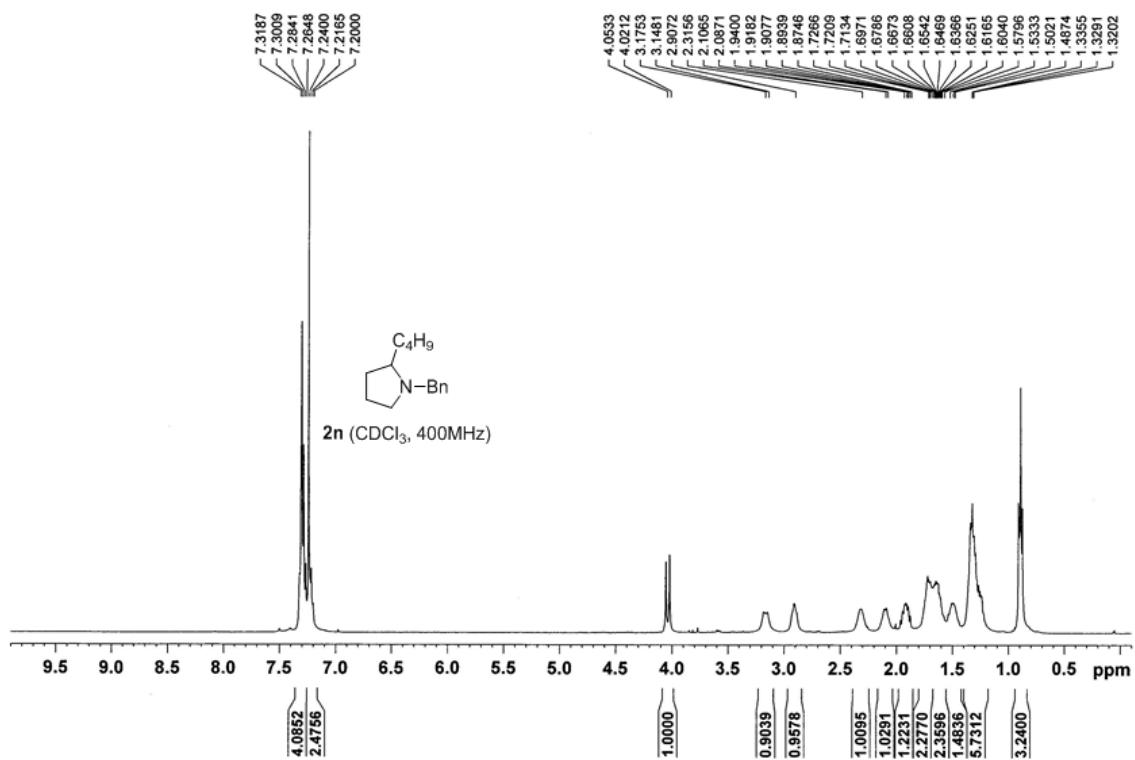
- <sup>1</sup>H NMR spectrum of compound **2k**



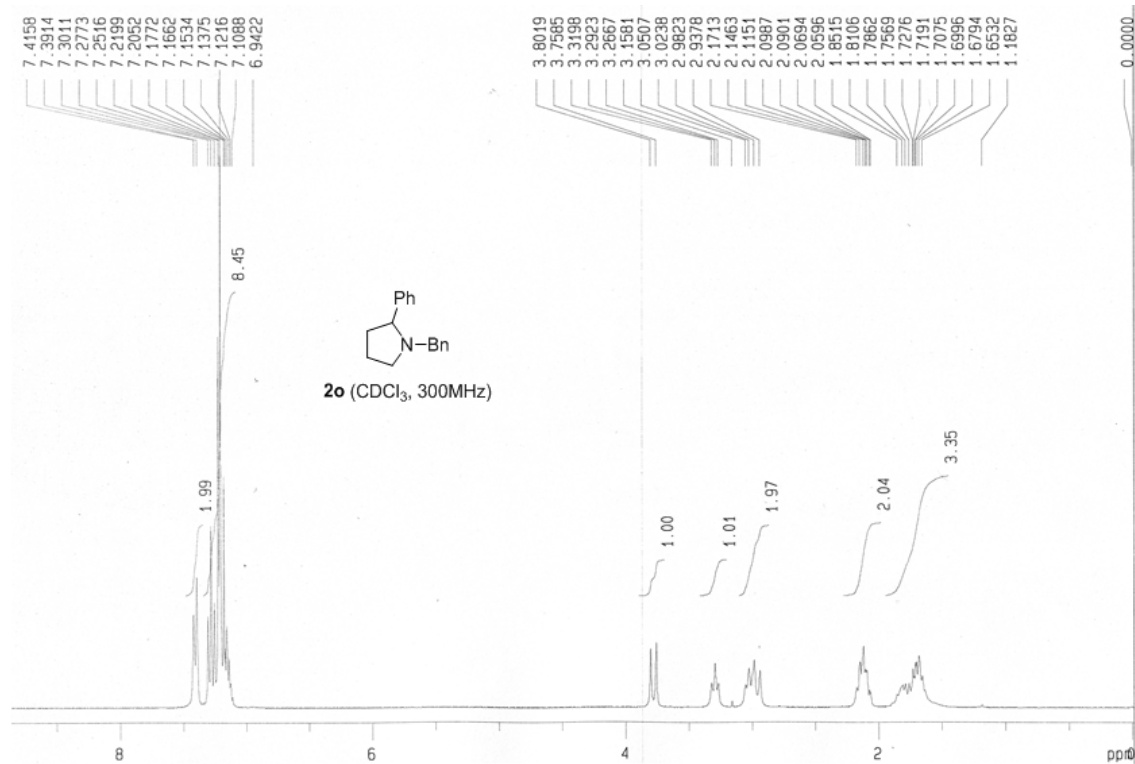
- <sup>1</sup>H NMR spectrum of compound **2m**



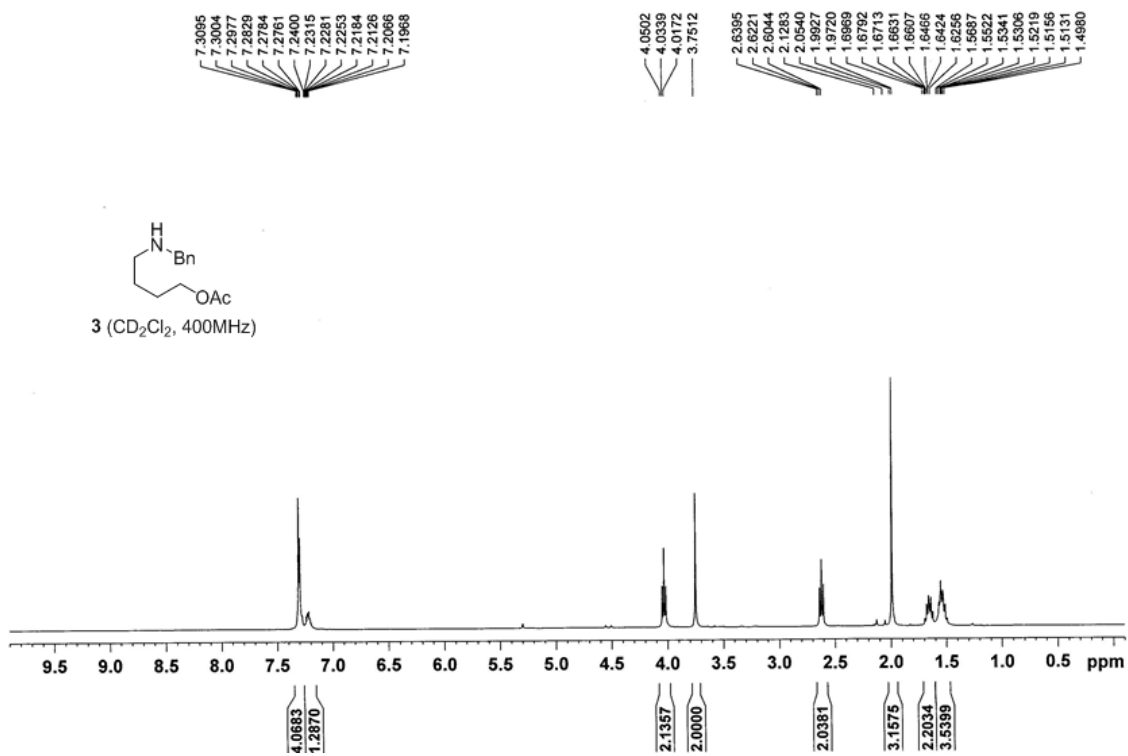
- <sup>1</sup>H NMR spectrum of compound **2n**



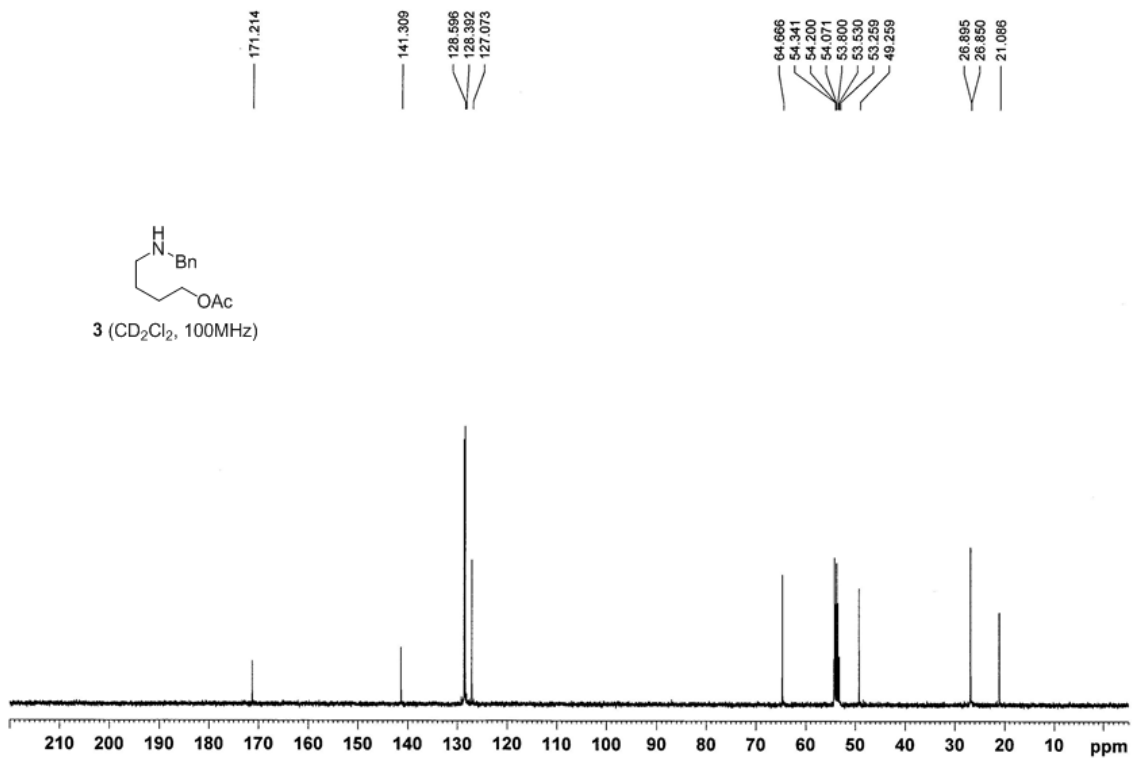
- <sup>1</sup>H NMR spectrum of compound **2o**



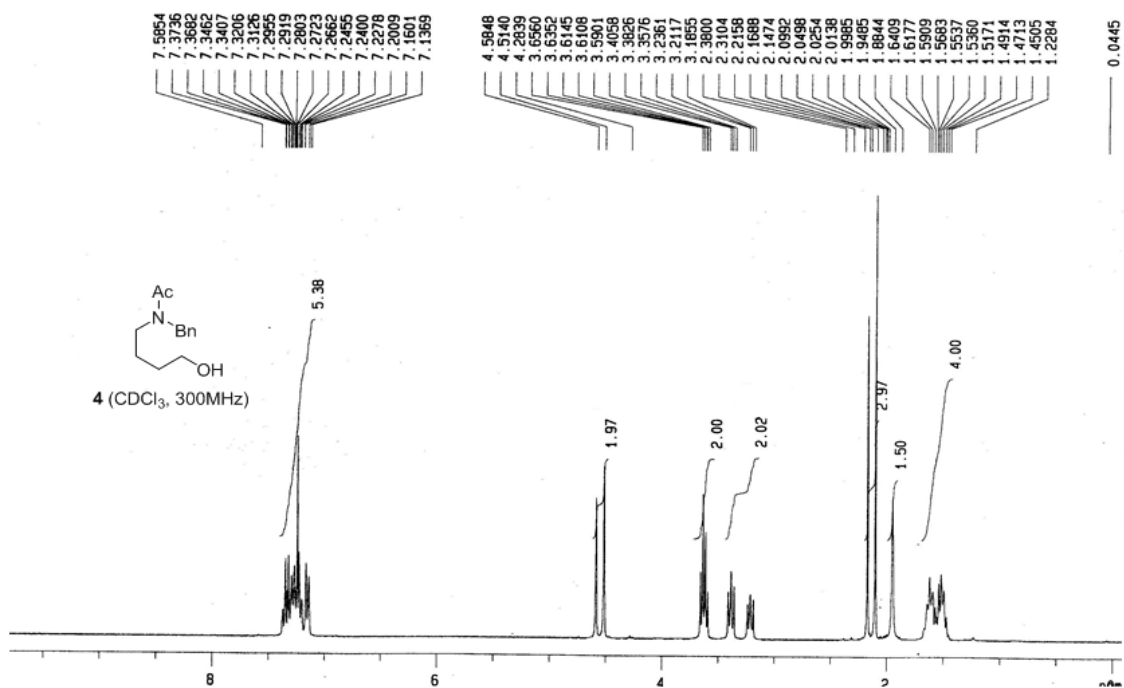
- $^1\text{H}$  NMR spectrum of compound **3**



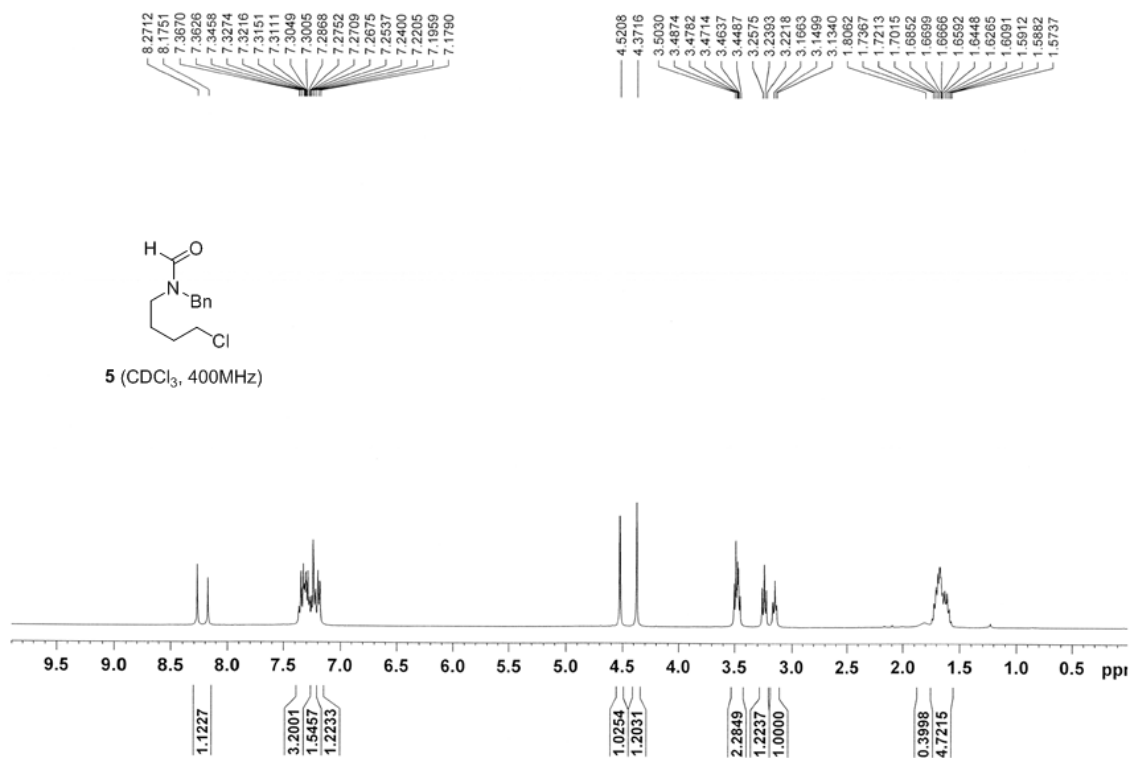
- $^{13}\text{C}$  NMR spectrum of compound **3**



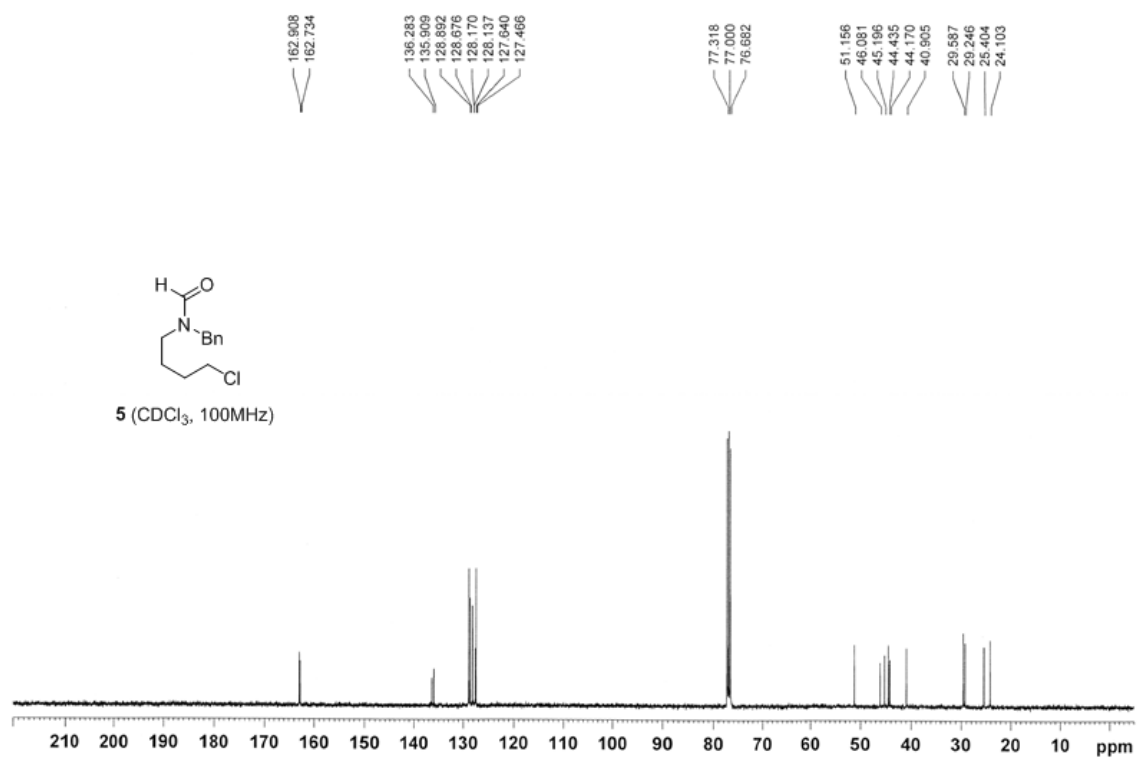
- $^1\text{H}$  NMR spectrum of compound 4



- $^1\text{H}$  NMR spectrum of compound 5



- $^{13}\text{C}$  NMR spectrum of compound **5**



- $^1\text{H}$  NMR spectrum of compound **7**

