

ESI for

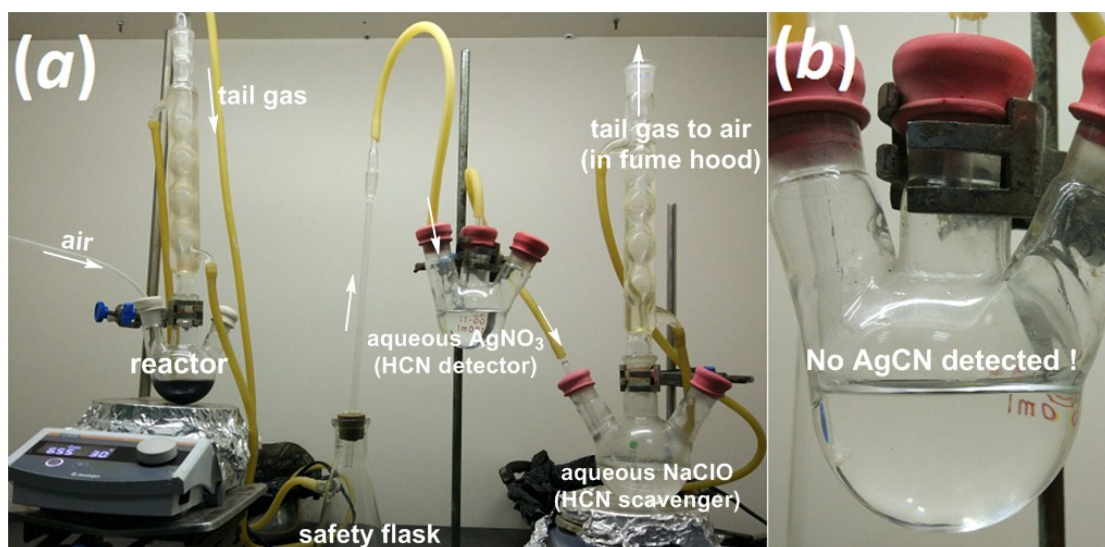
Ruthenium-catalyzed oxidative decyanative cross-coupling of acetonitriles with amines in air: A general access of primary to tertiary amides under mild conditions

Yuguang Wang, Zhongli Wu, Qin Li, Bingchun Zhu,*Lei Yu*

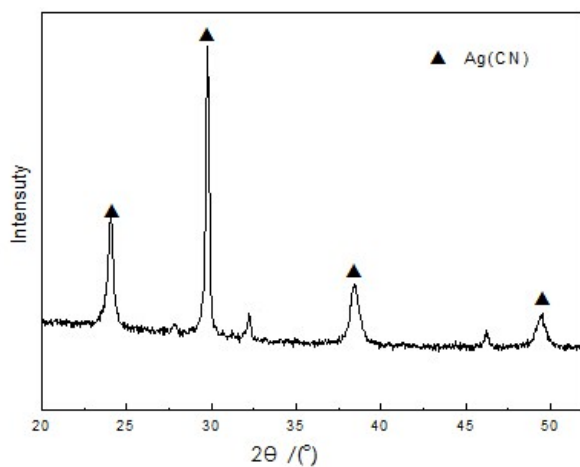
CONTENTS

1. Large pictures of Fig. 1 in text.....	S2
2. XRD of AgCN.....	S3
3. IR spectrum of AgCN	S3
4. IR spectrum of Ru/C isolated from a 5 h reaction.....	S4
5. Standard IR spectrum of RuO ₂ at SDBS website for comparison.....	S4
6. ¹ H NMR and ¹³ C NMR Spectra	S5

1. Large pictures of Fig. 1 in text

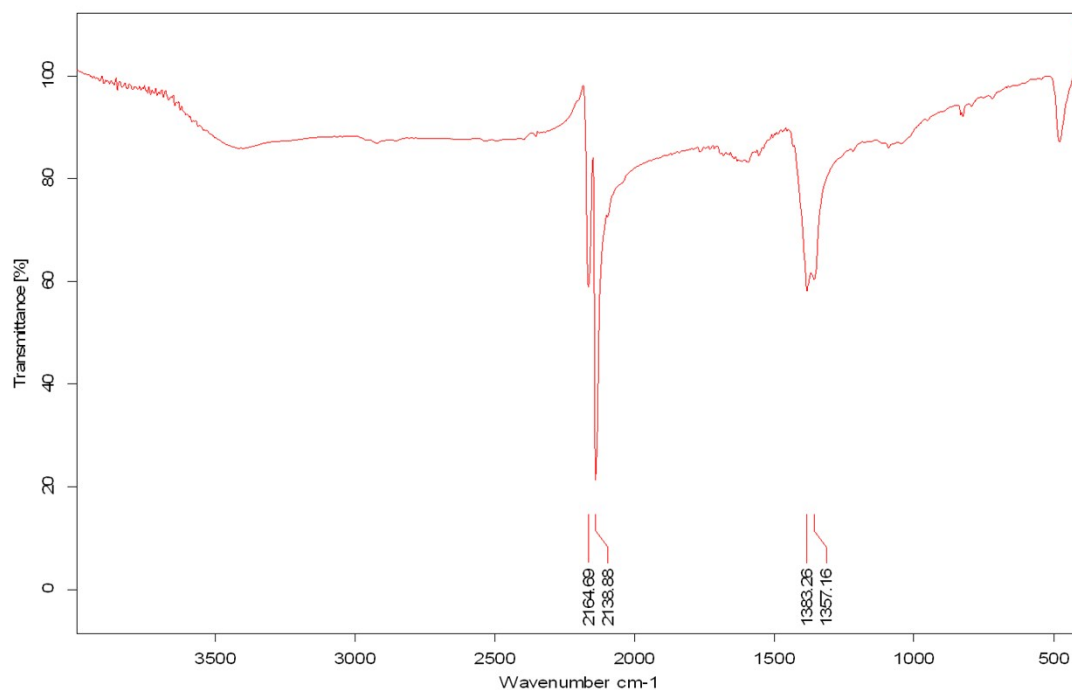


2. XRD of AgCN



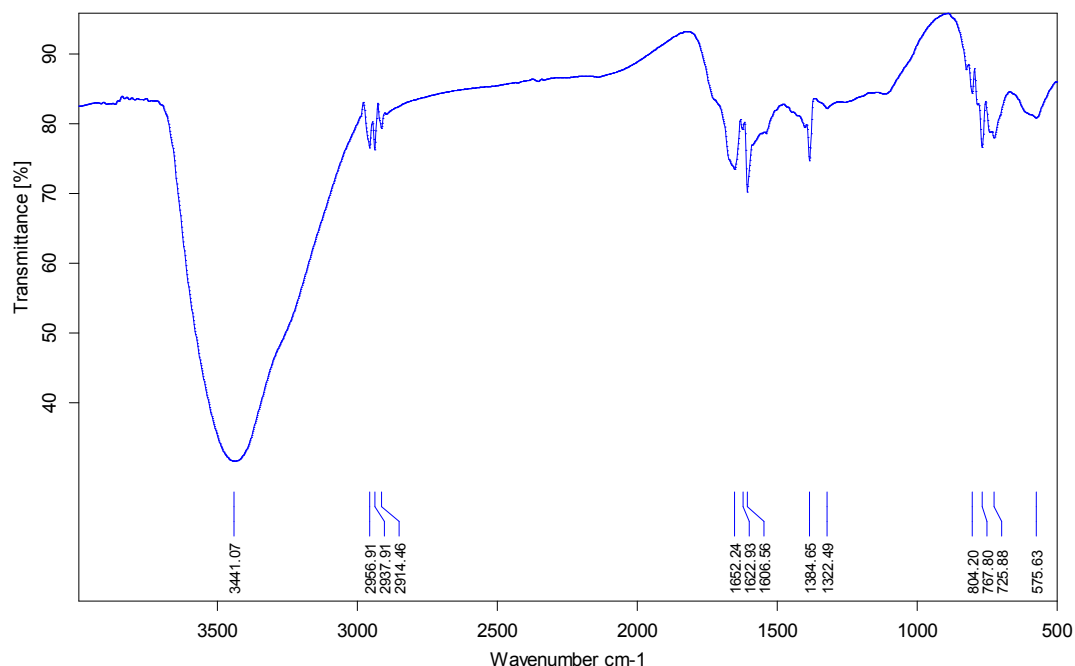
As shown in the above spectra, the peaks at 24.0736°, 29.7858°, 38.3882° and 49.6987° were in accordance with the lattice plane (ICSD 085783) of (101), (110), (012) and (211) of AgCN respectively.

3. IR spectrum of AgCN



The characteristic peaks: The characteristics of CN were the strong splitting peaks at 2139 and 2165 cm⁻¹, which were in accordance with reference (L. R. Guo, S. S. Bao, Y. Z. Li, L. M. Zheng, *Chem. Commun.* **2009**, 2893)

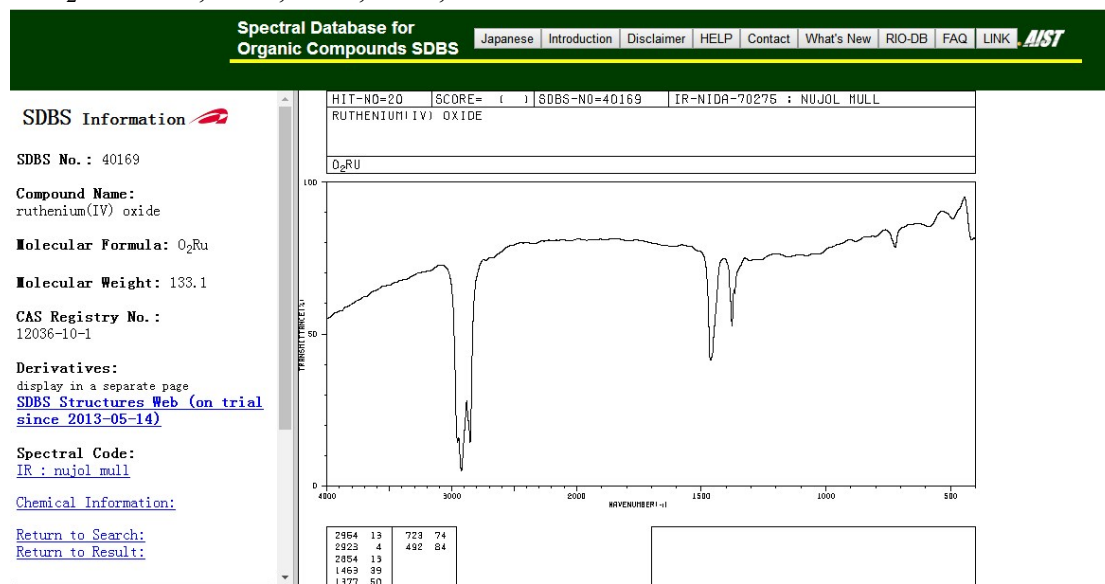
4. IR spectrum of Ru/C isolated from a 5 h reaction



5. Standard IR spectrum of RuO₂ at SDBS website for comparison

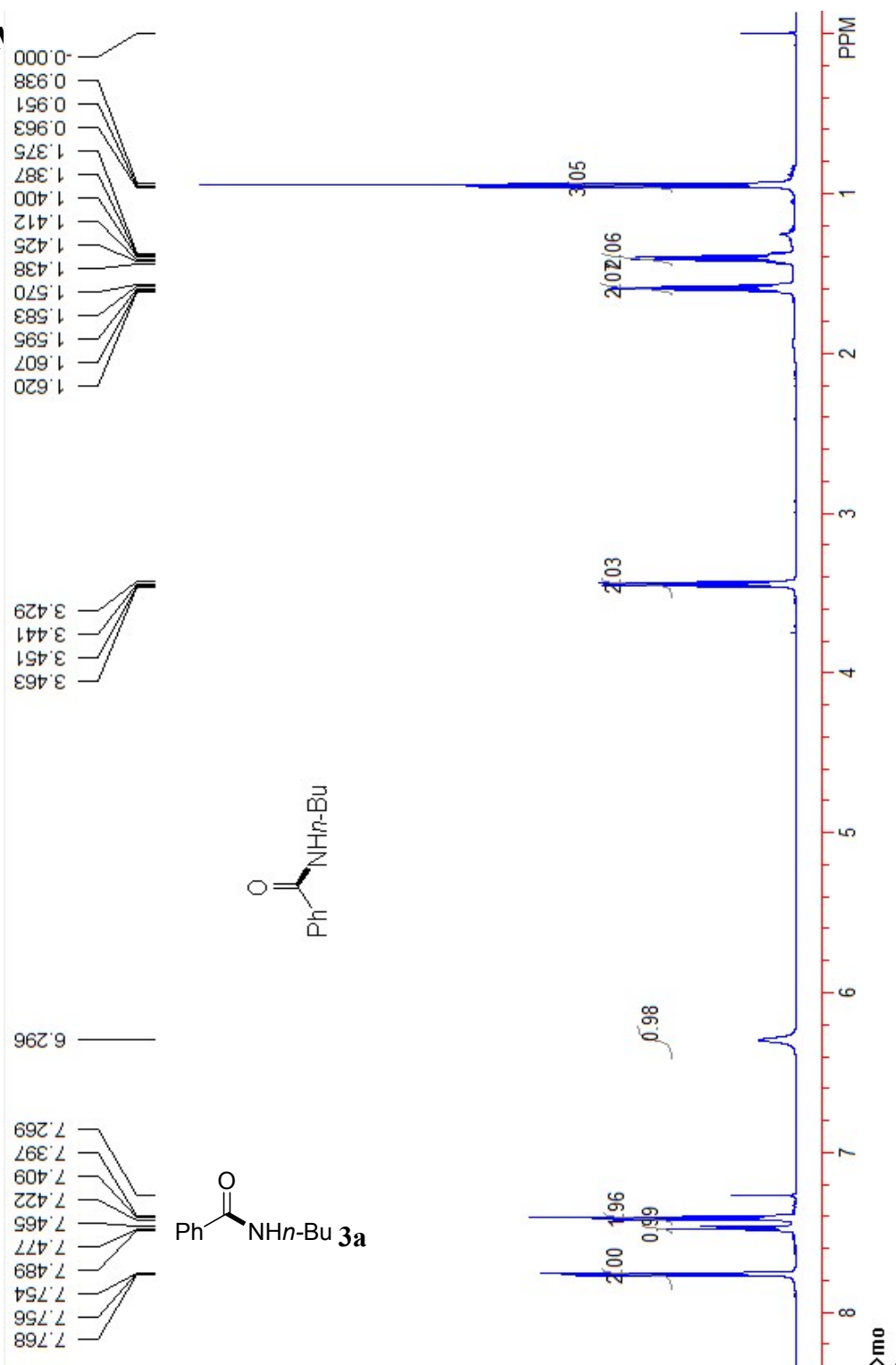
http://sdb.sdb.aist.go.jp/sdb/cgi-bin/direct_frame_top.cgi

RuO₂ IR: 2964, 2923, 2854, 1463, 1377 cm⁻¹

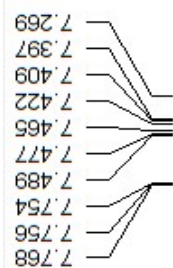


6. ^1H and ^{13}C NMR

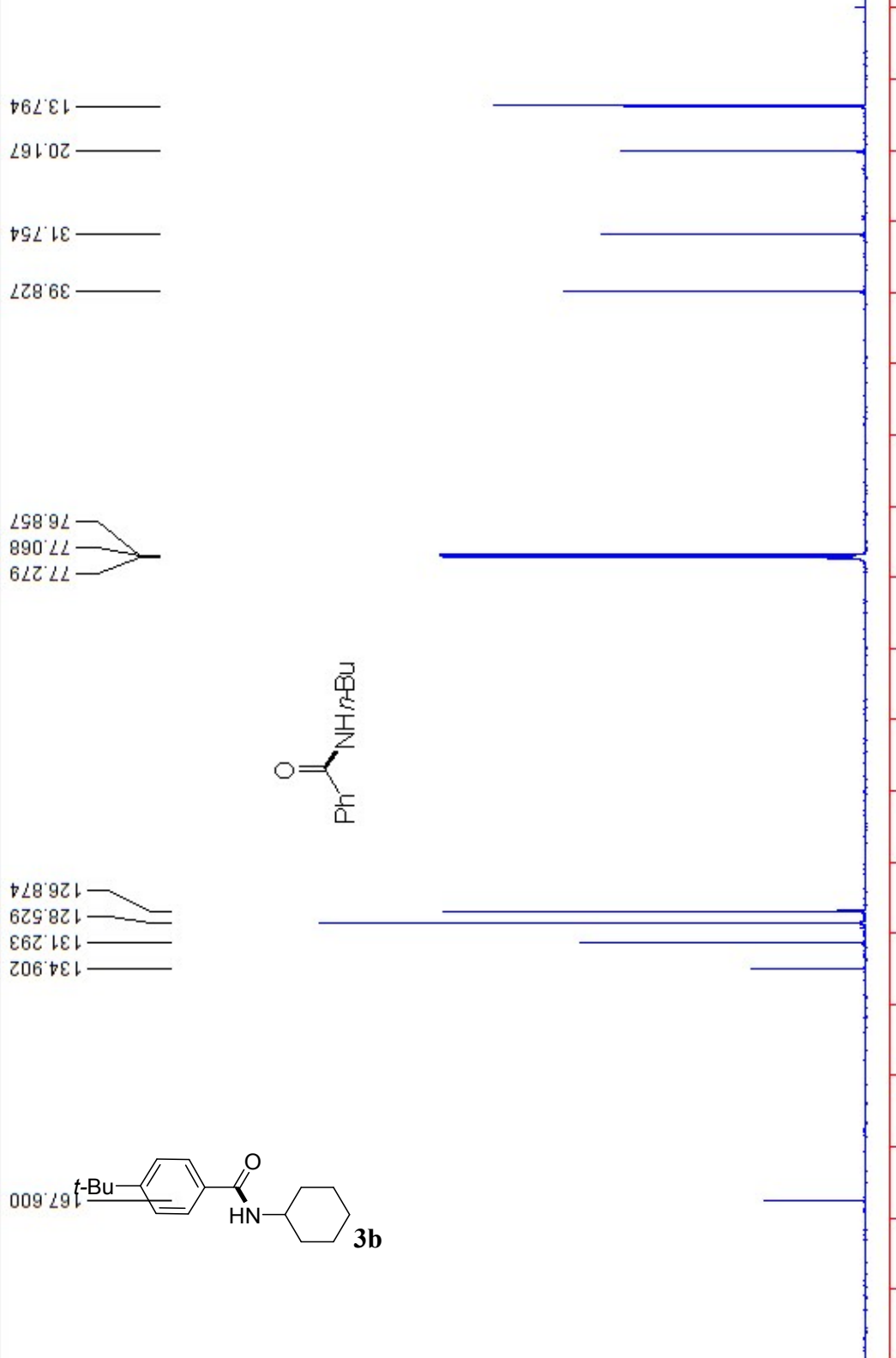
^1H NMR



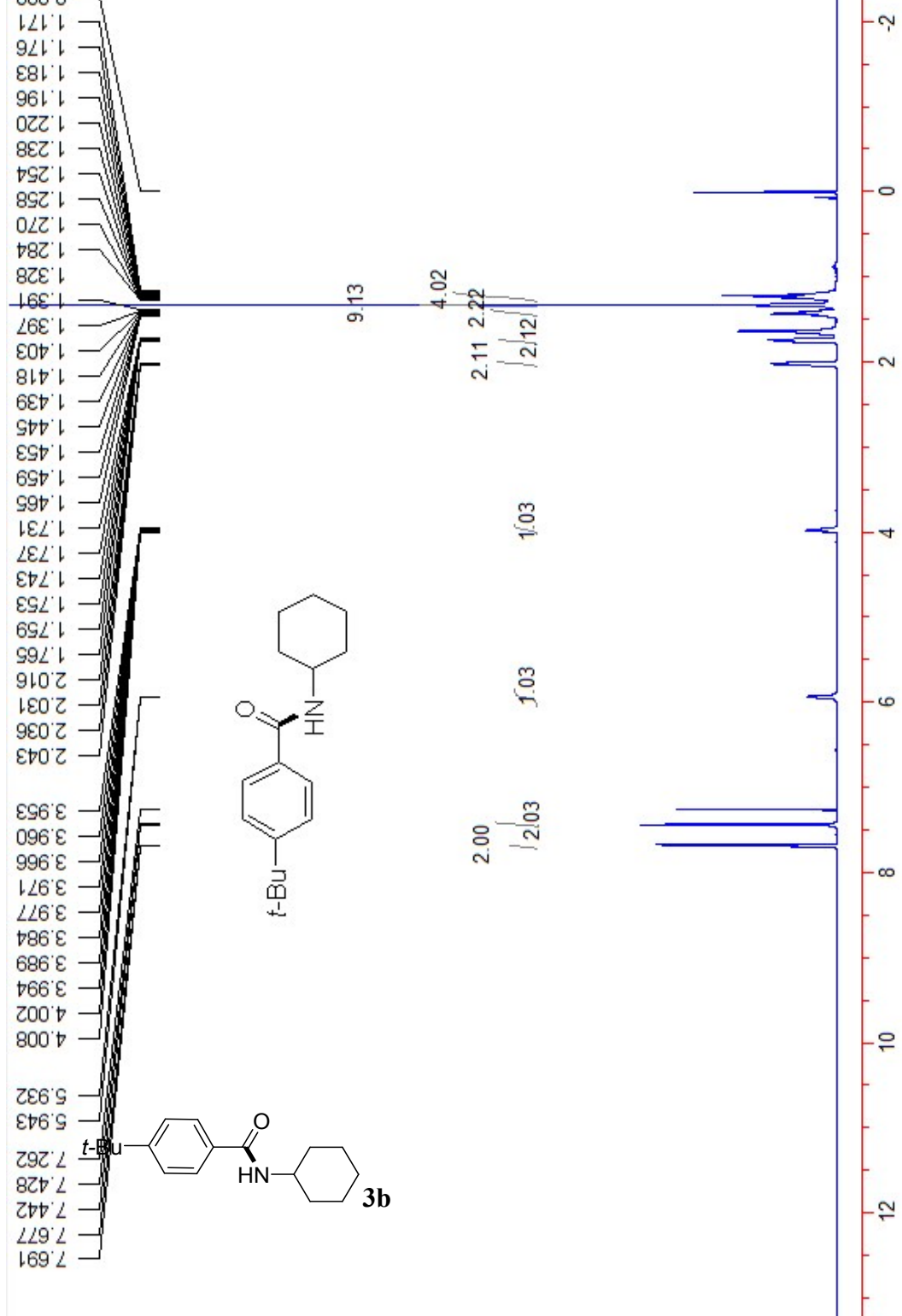
^{13}C NMR



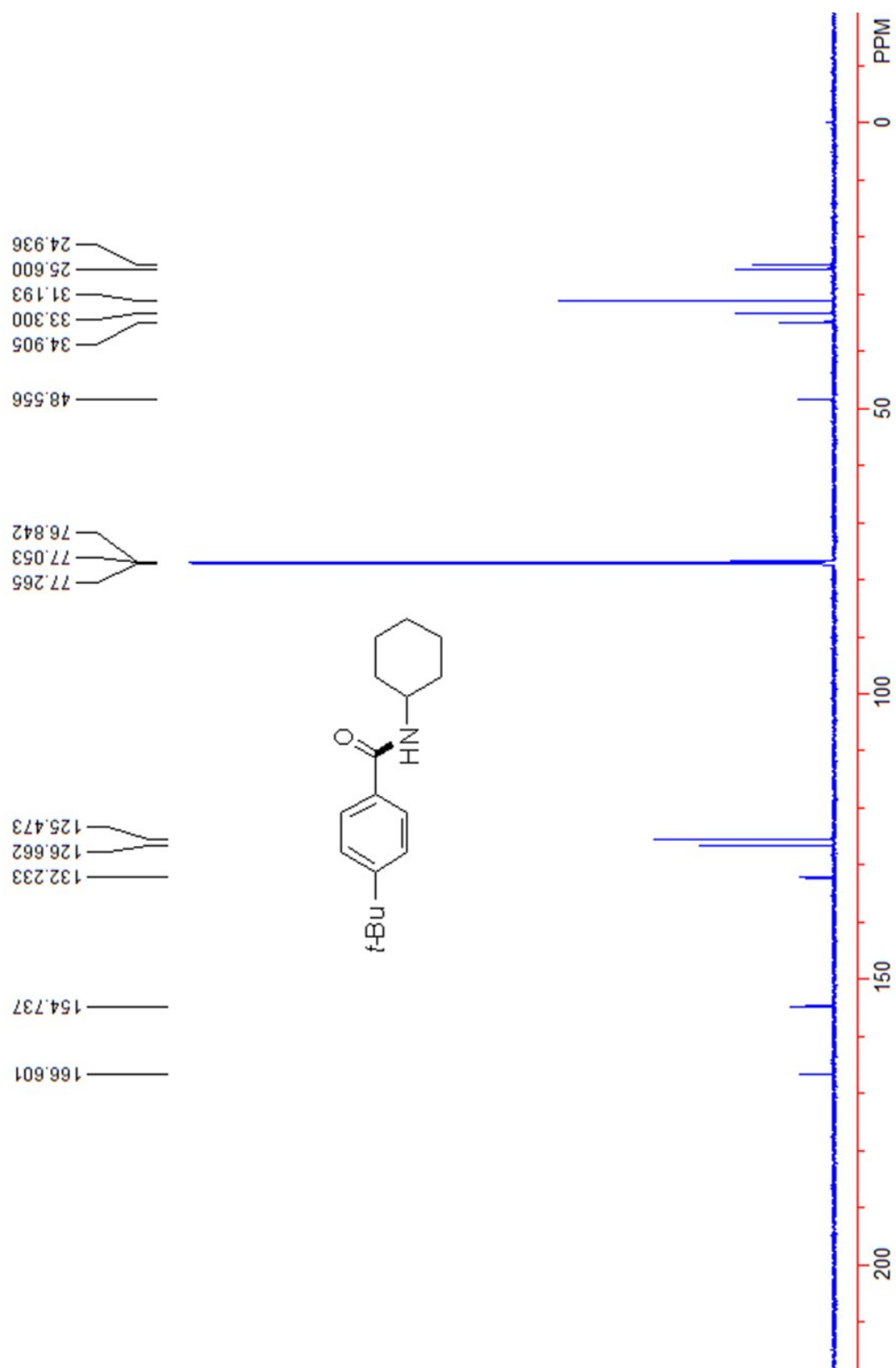
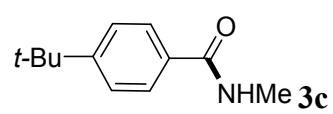
¹H NMR



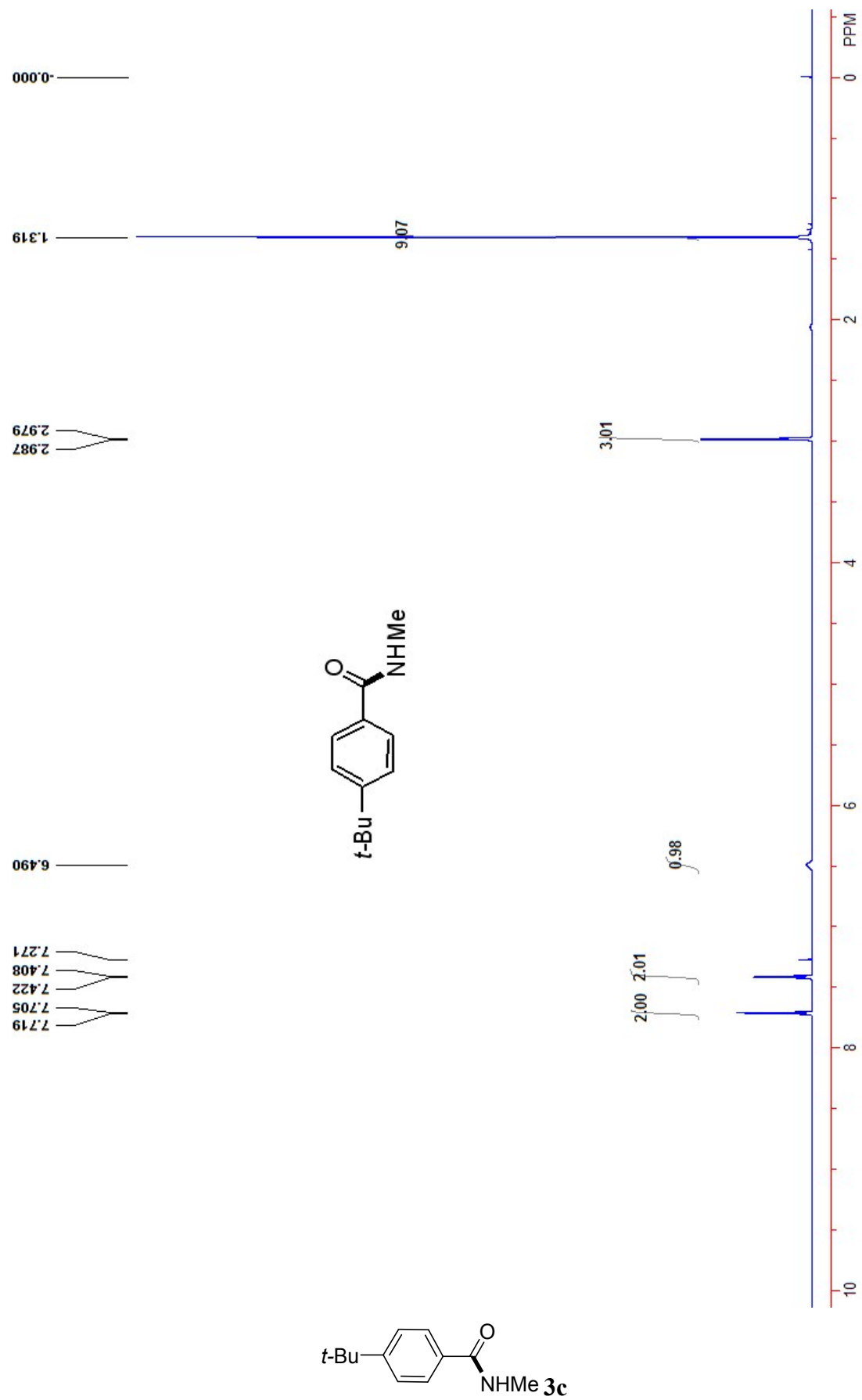
¹³C NMR

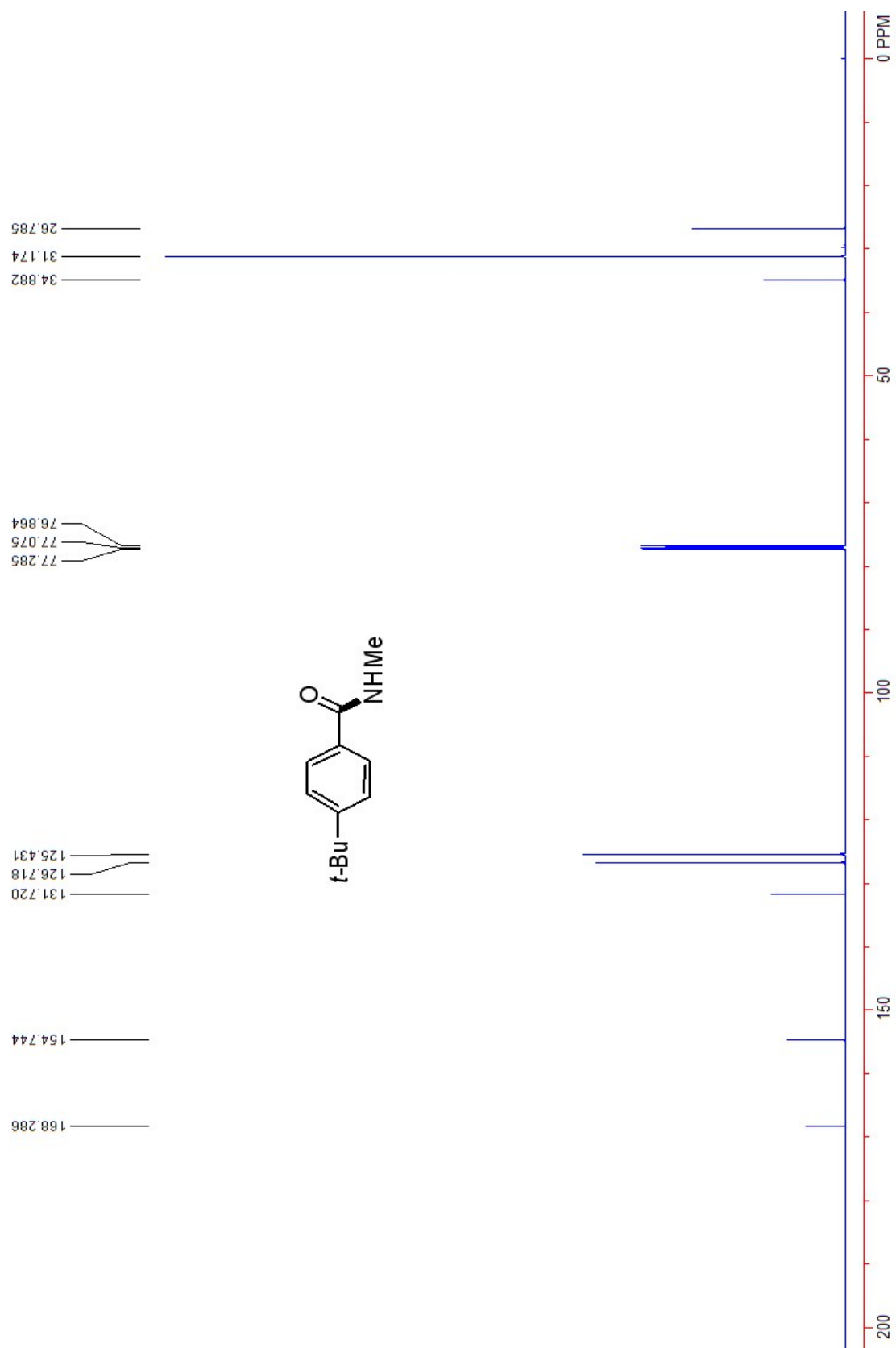


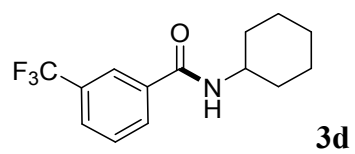
¹H NMR



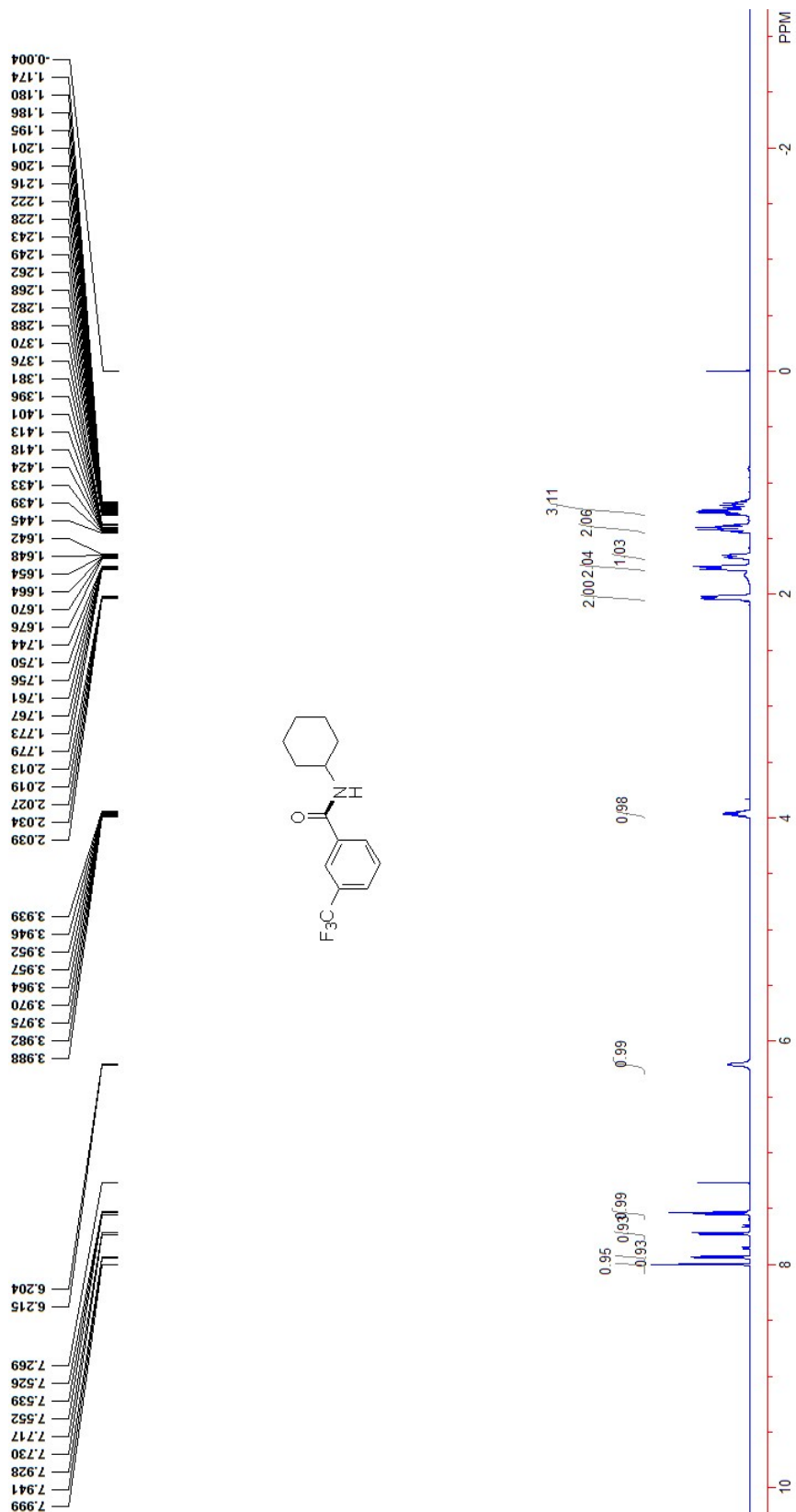
¹³C NMR

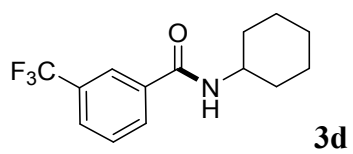




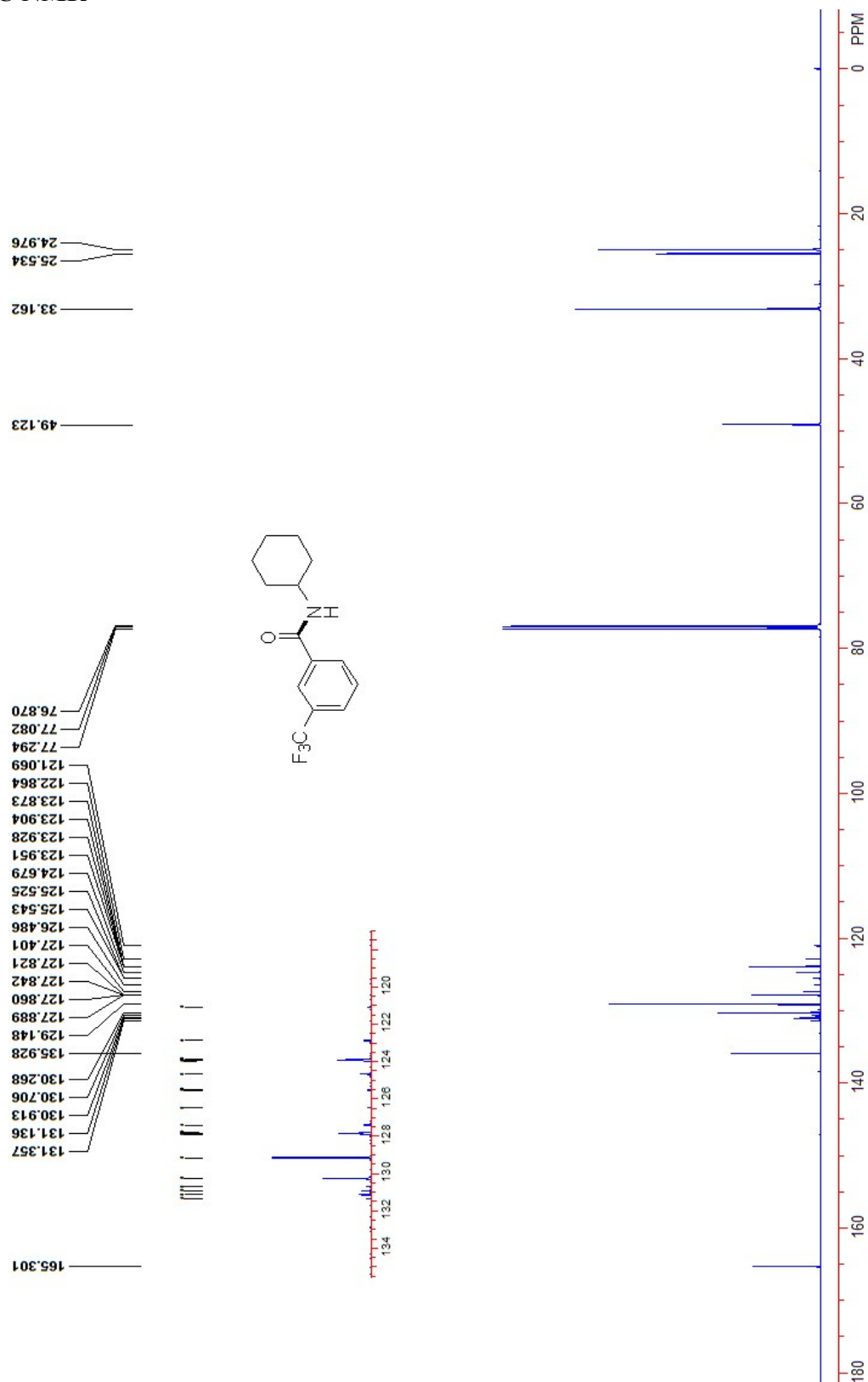


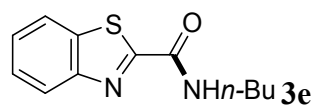
¹H NMR



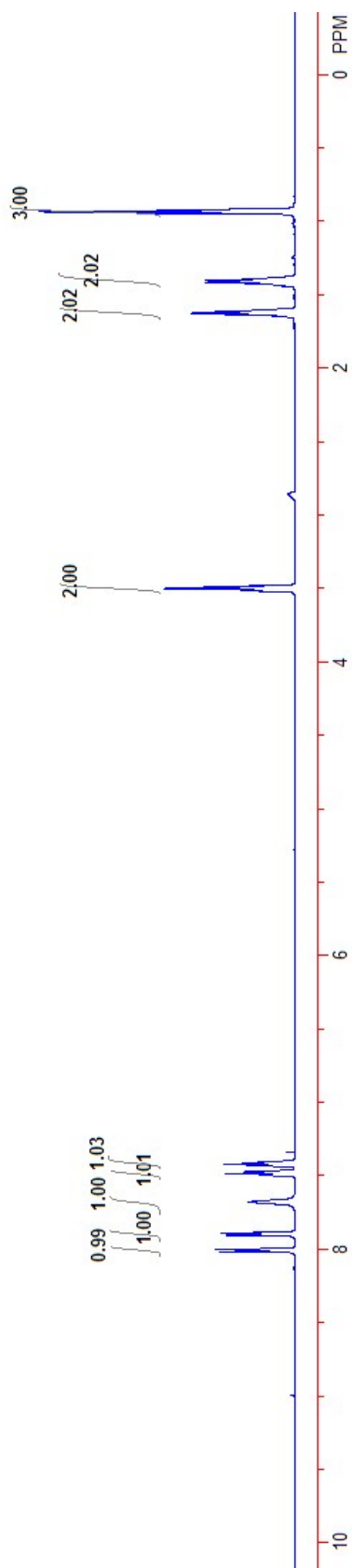
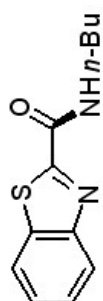
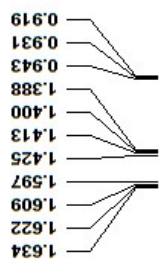


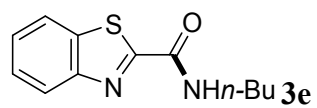
^{13}C NMR



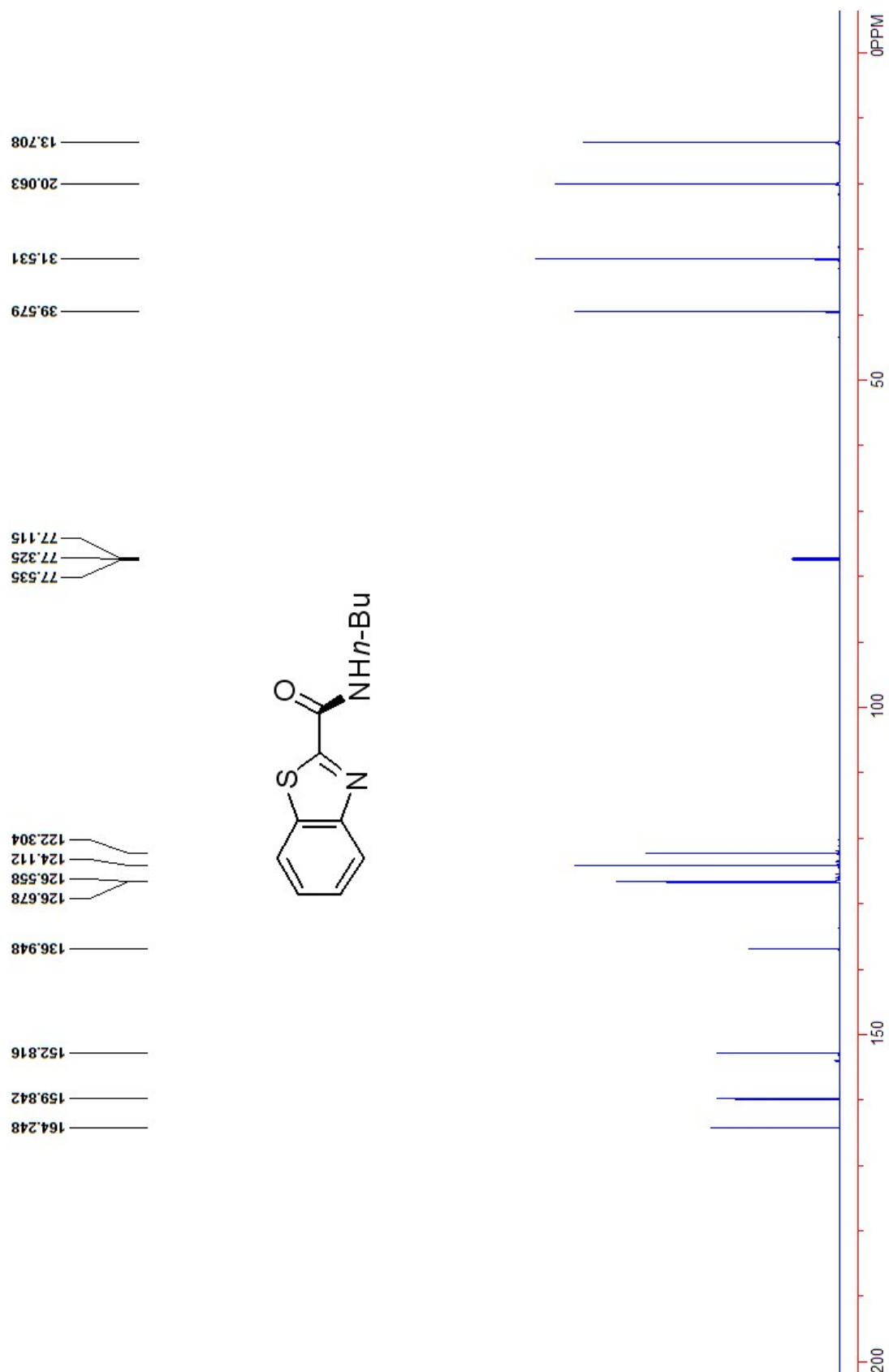


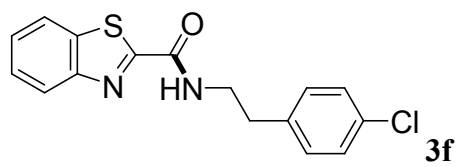
¹H NMR



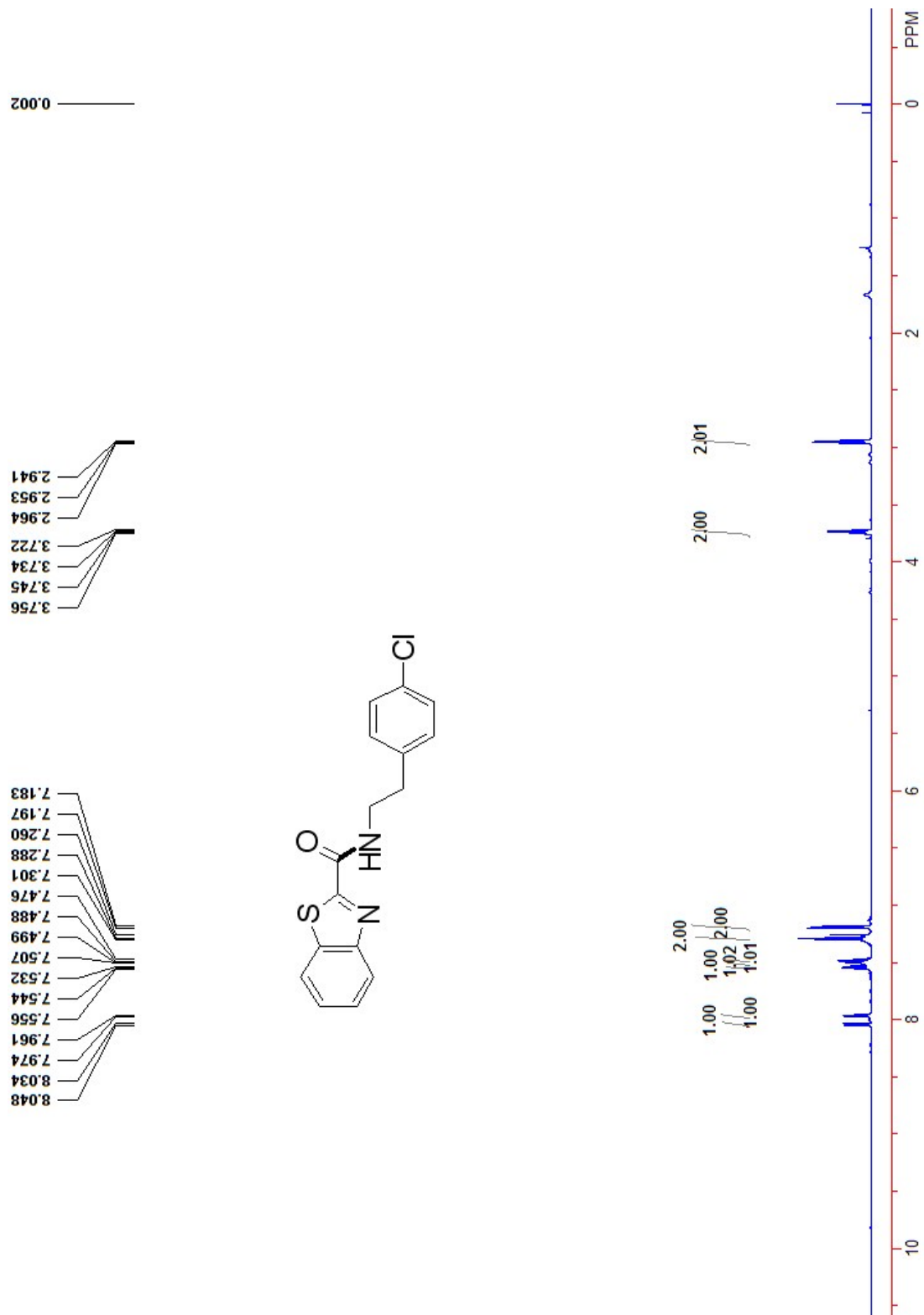


¹³C NMR

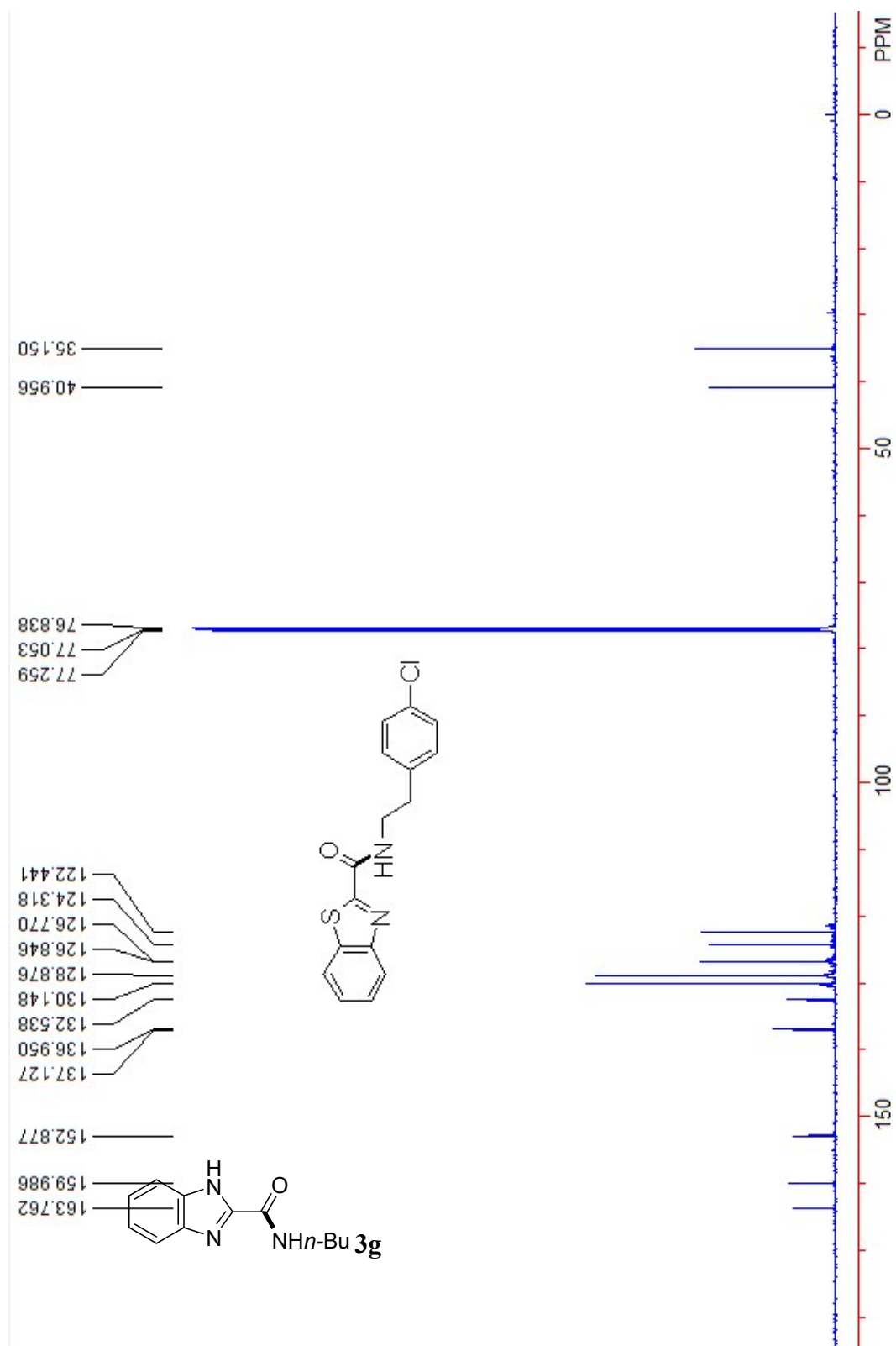




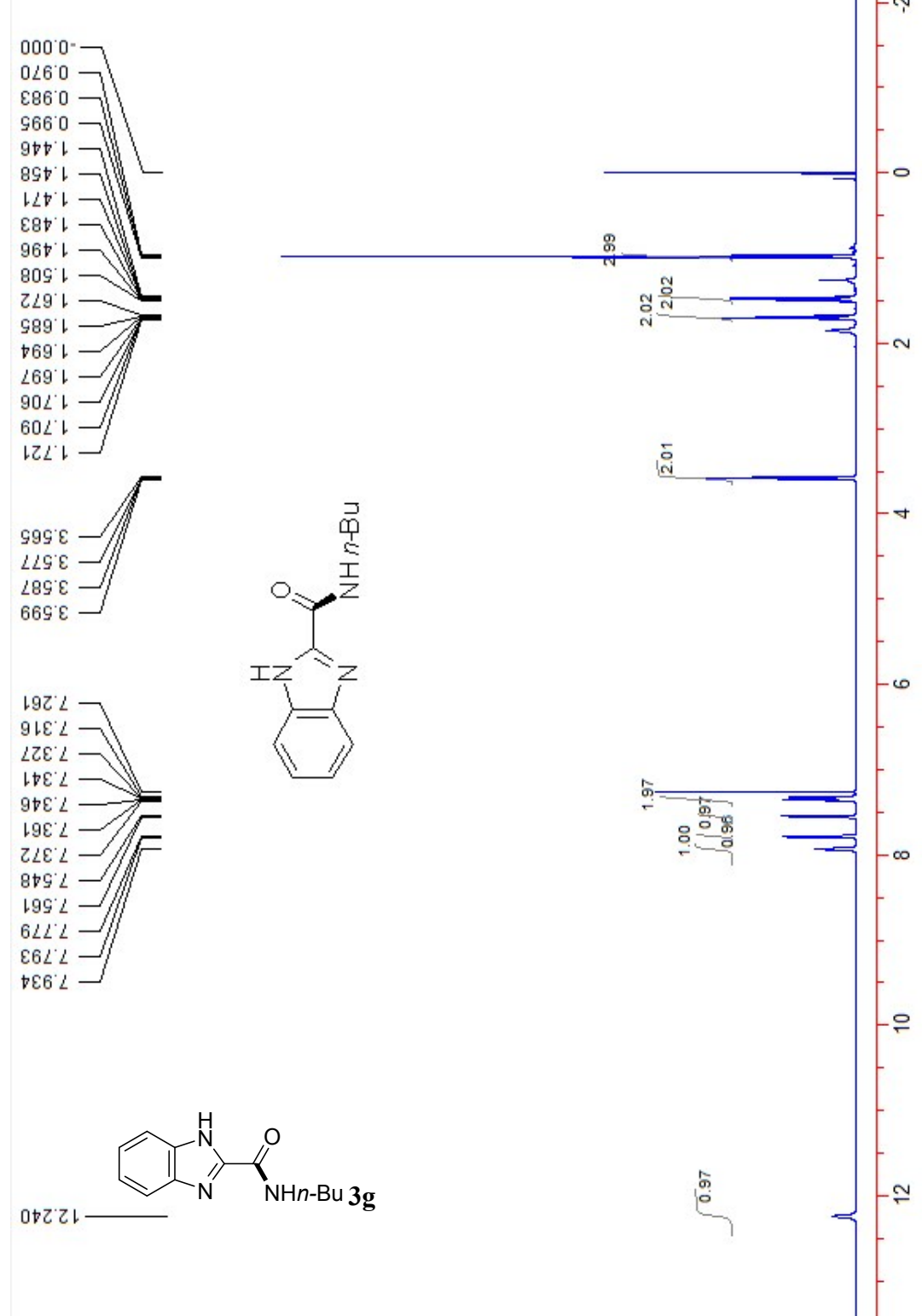
¹H NMR



¹³C NMR

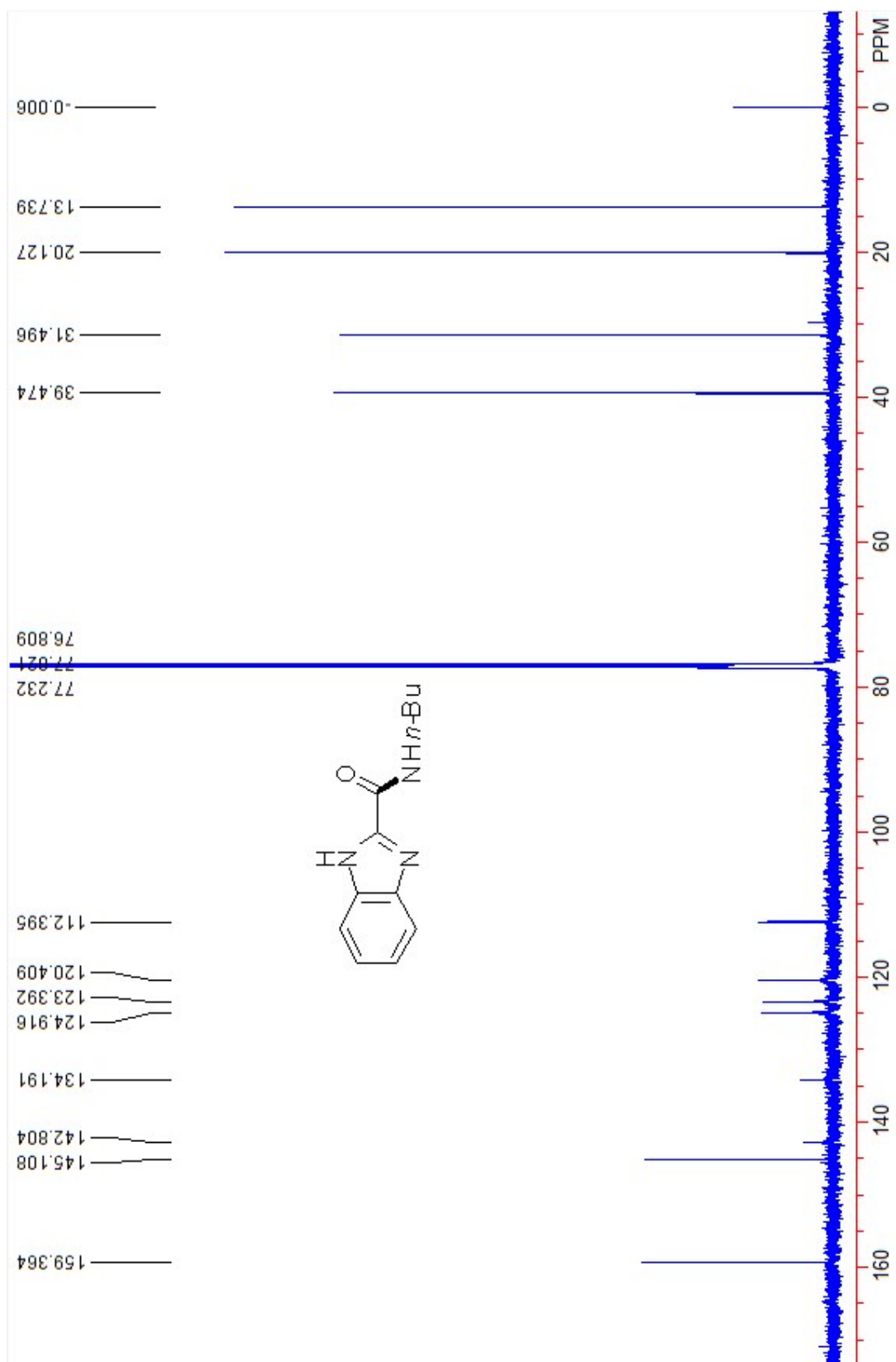
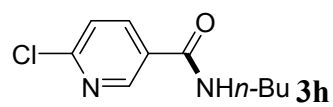


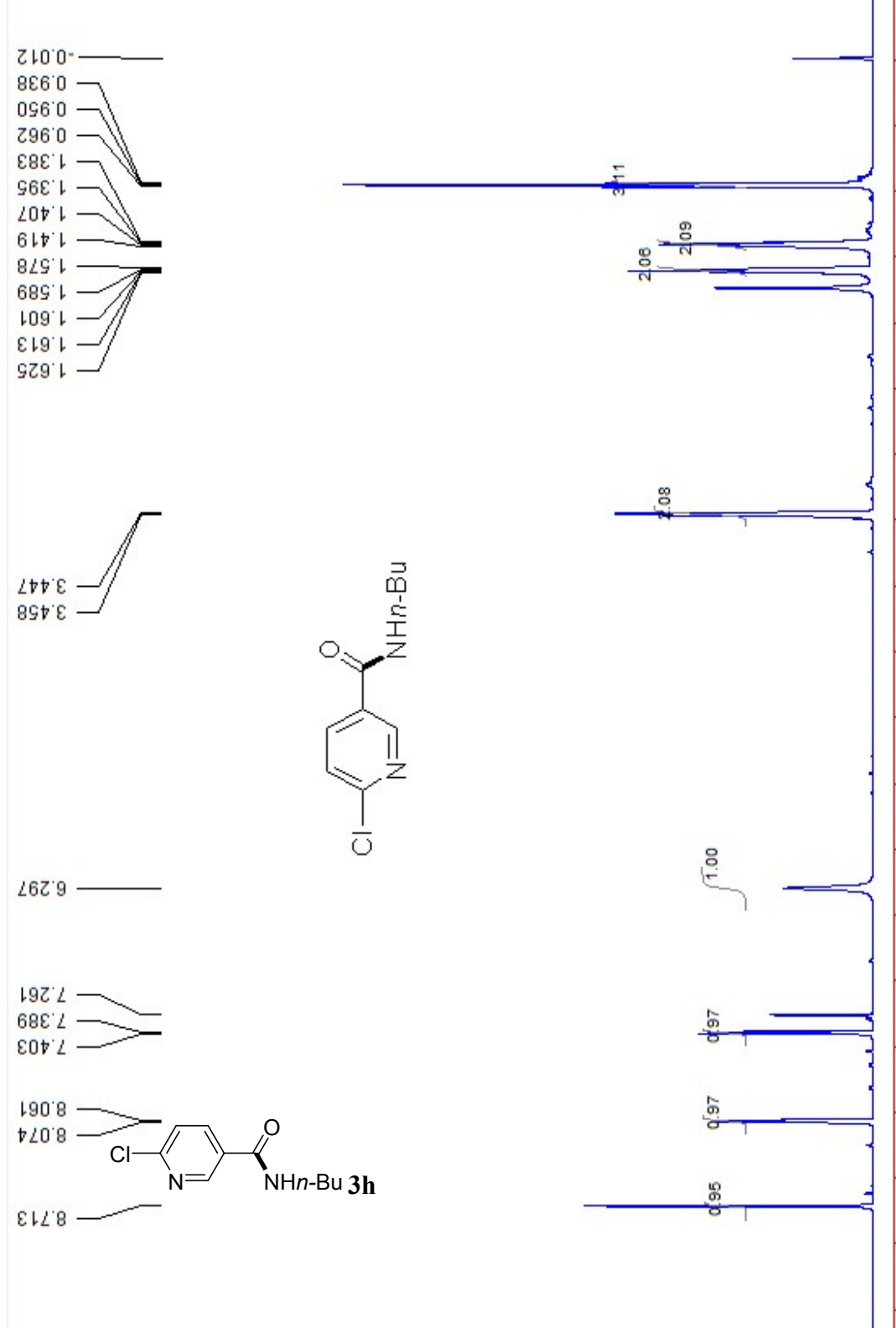
¹H NMR



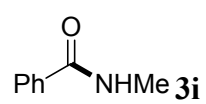
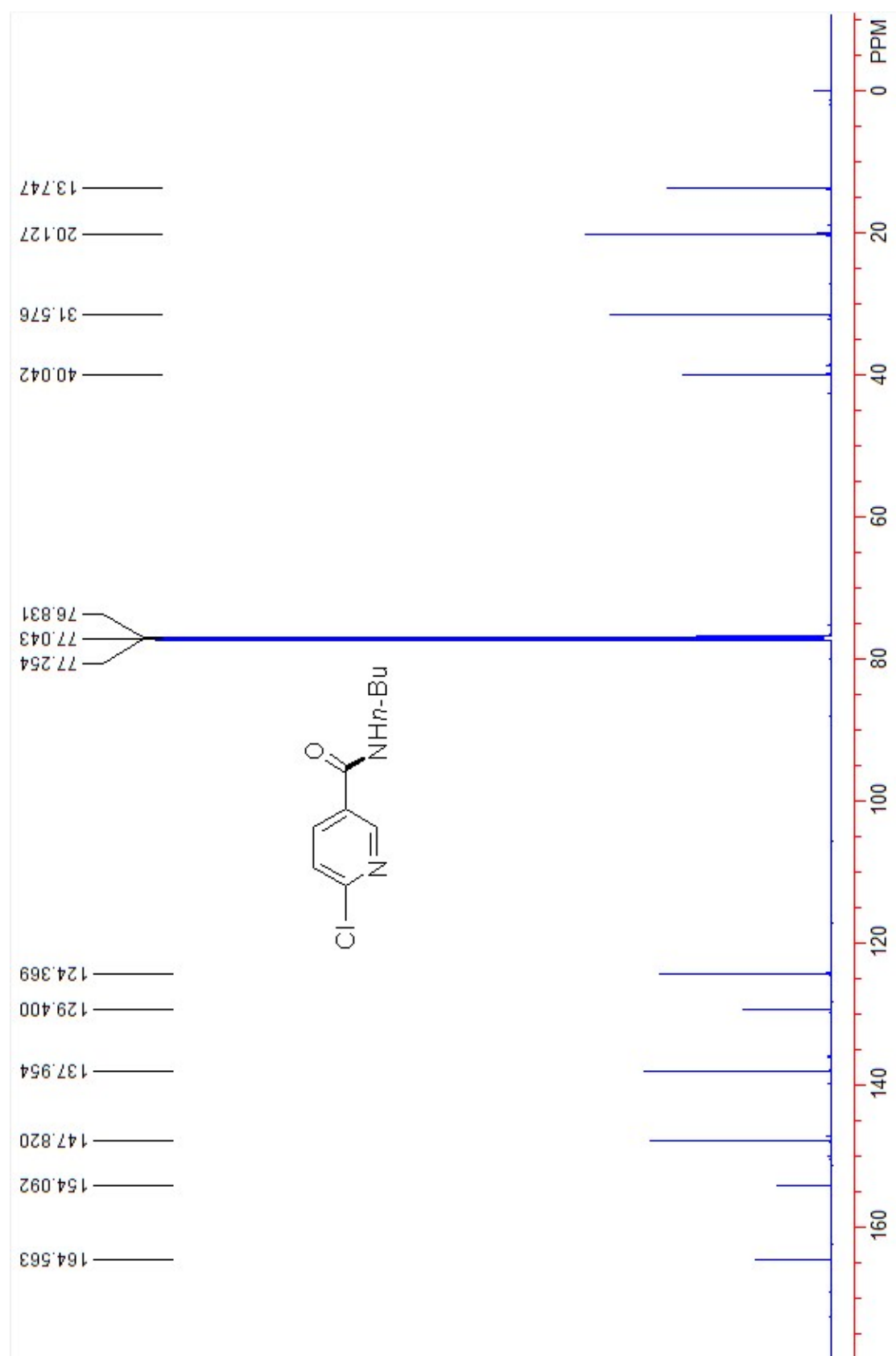
¹³C NMR

¹H NMR

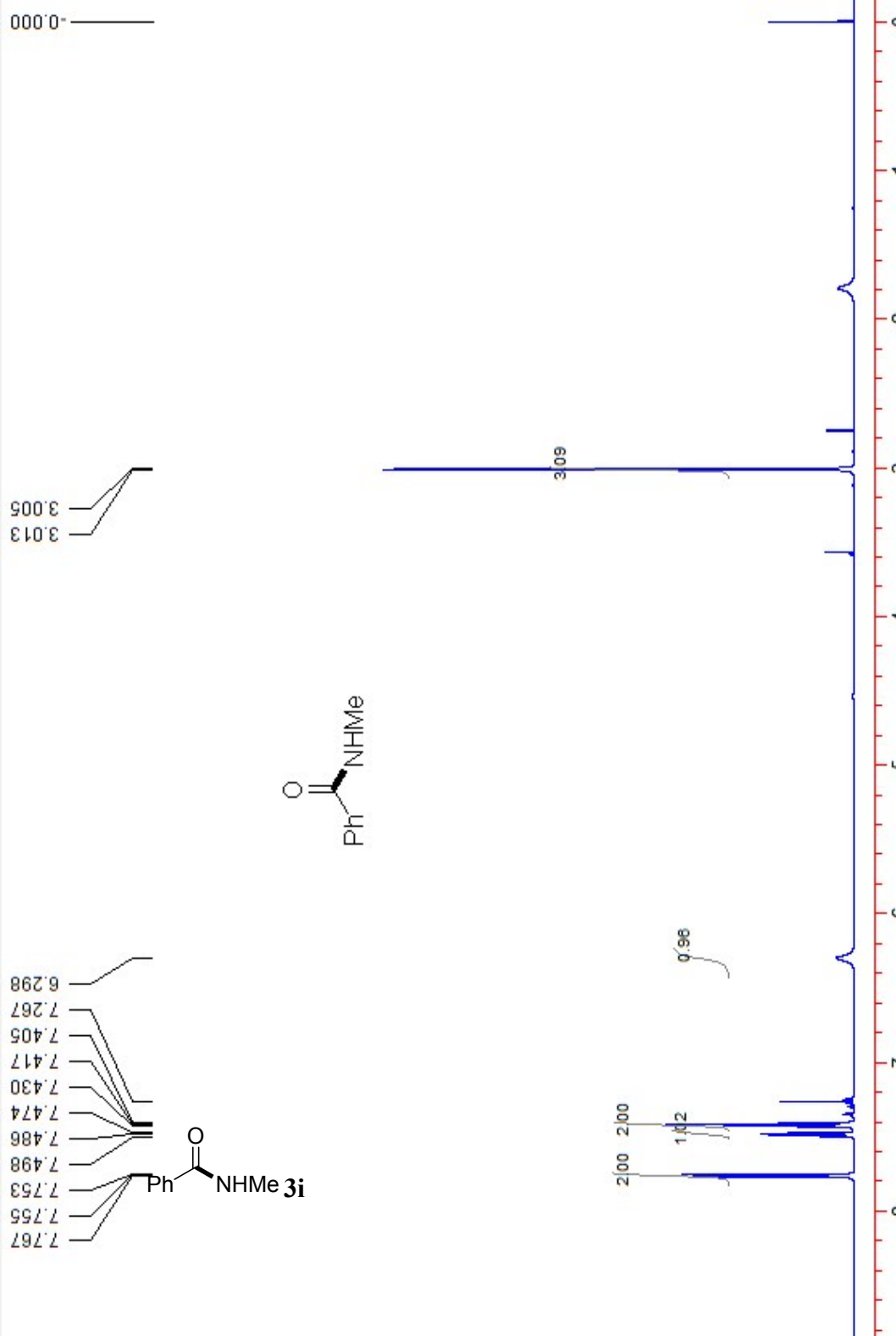




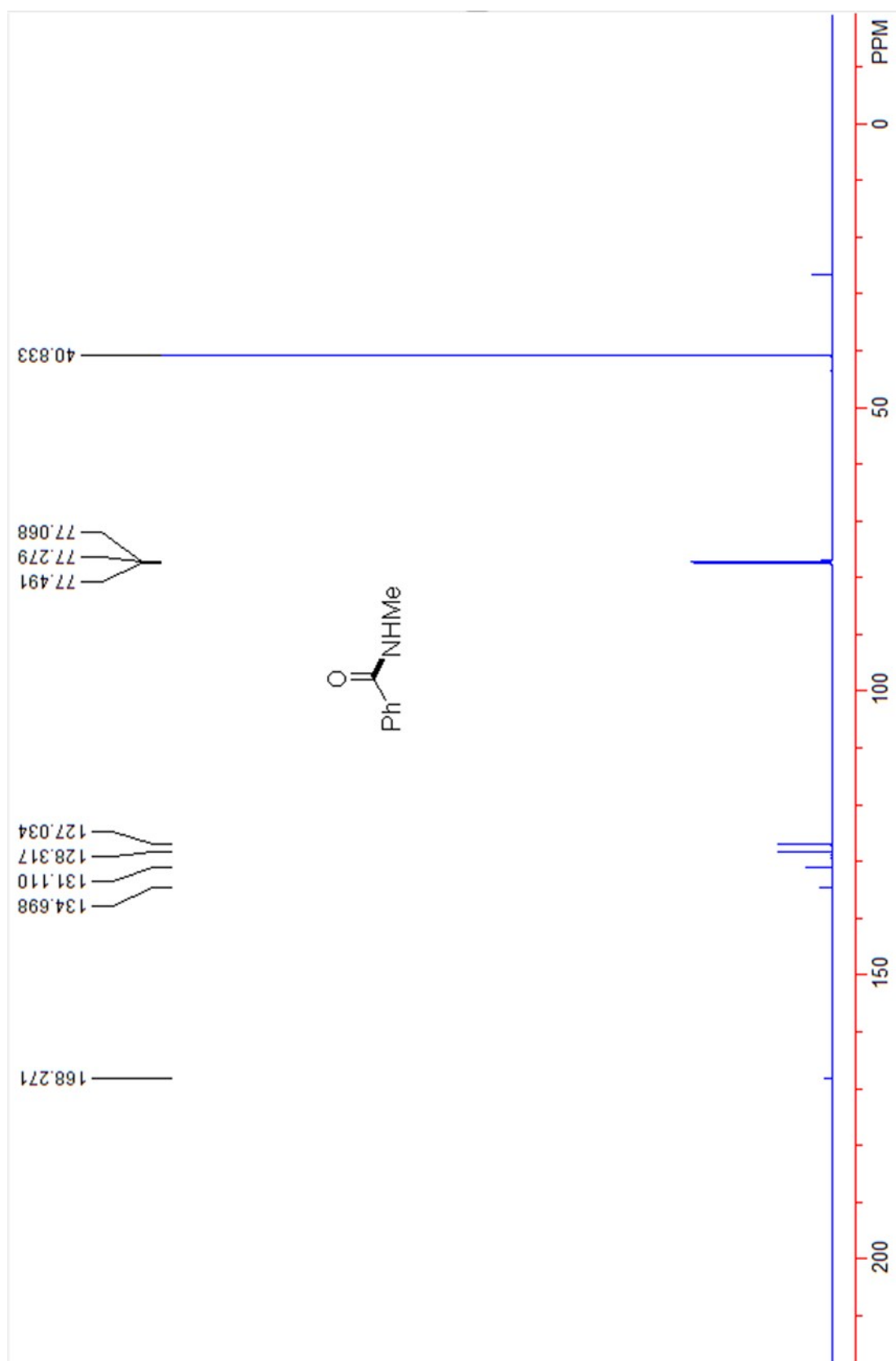
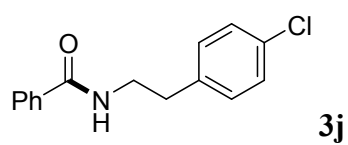
¹³C NMR

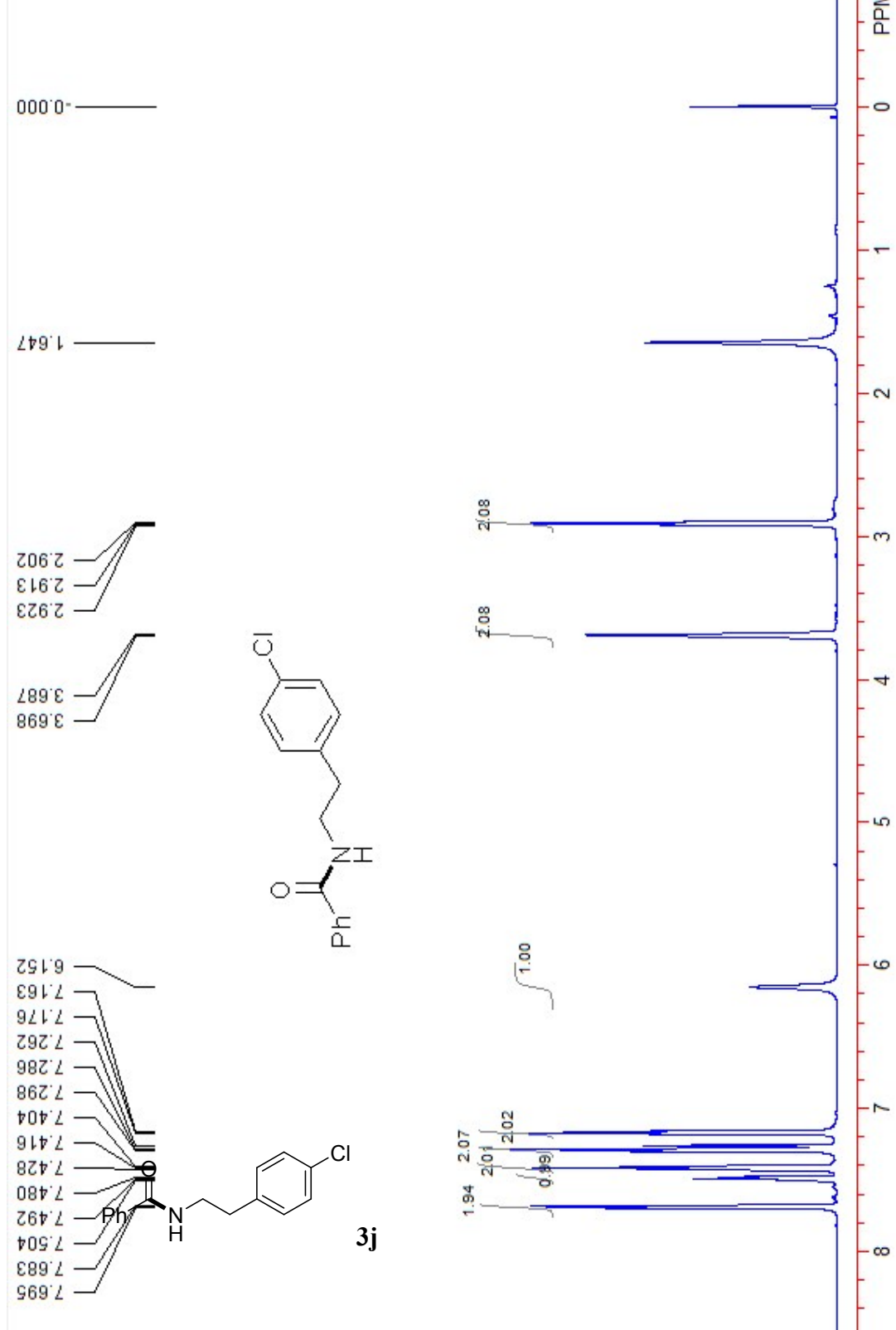


^1H NMR



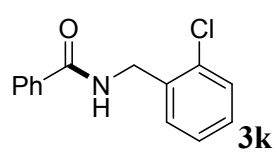
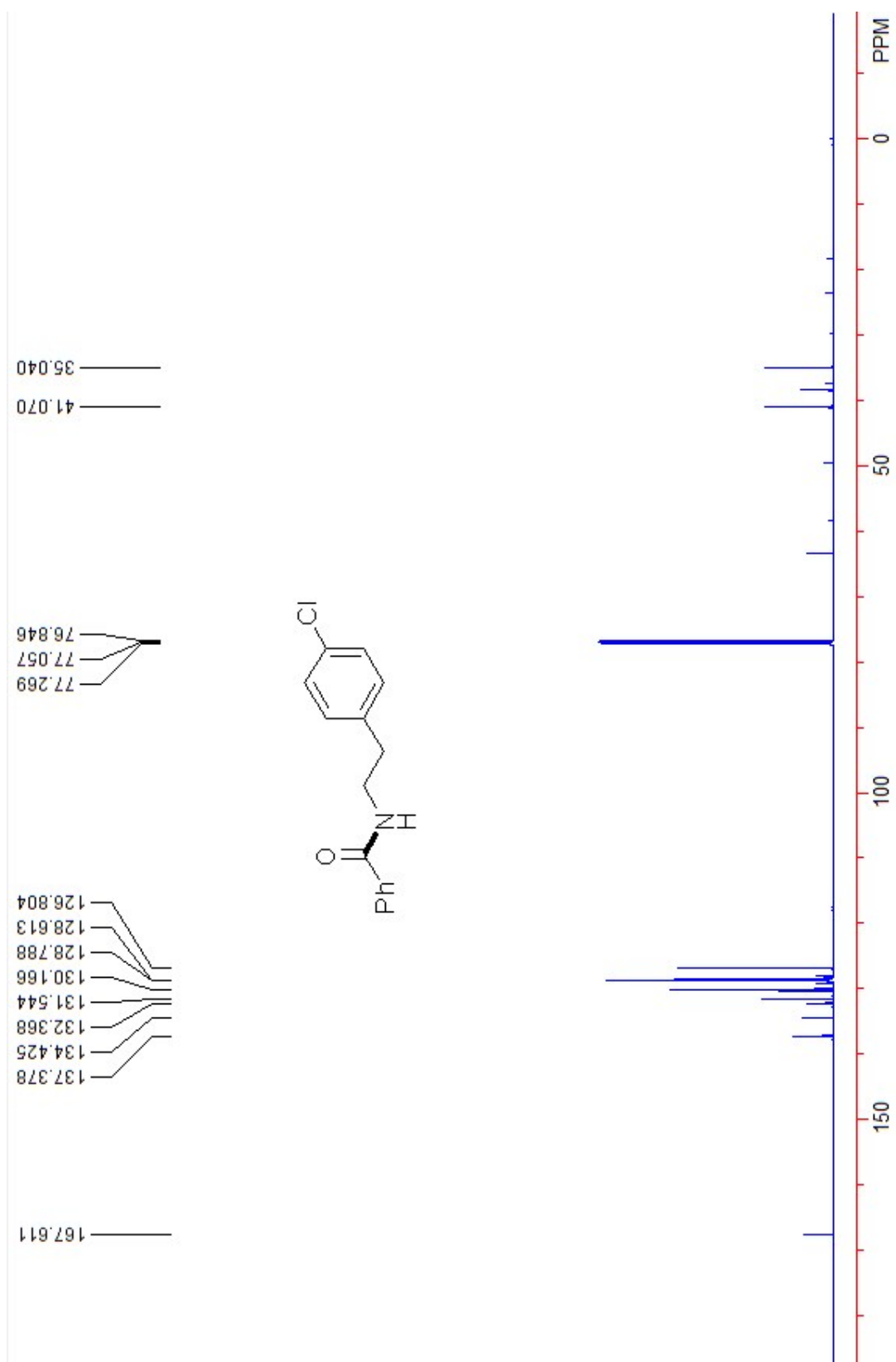
^{13}C NMR

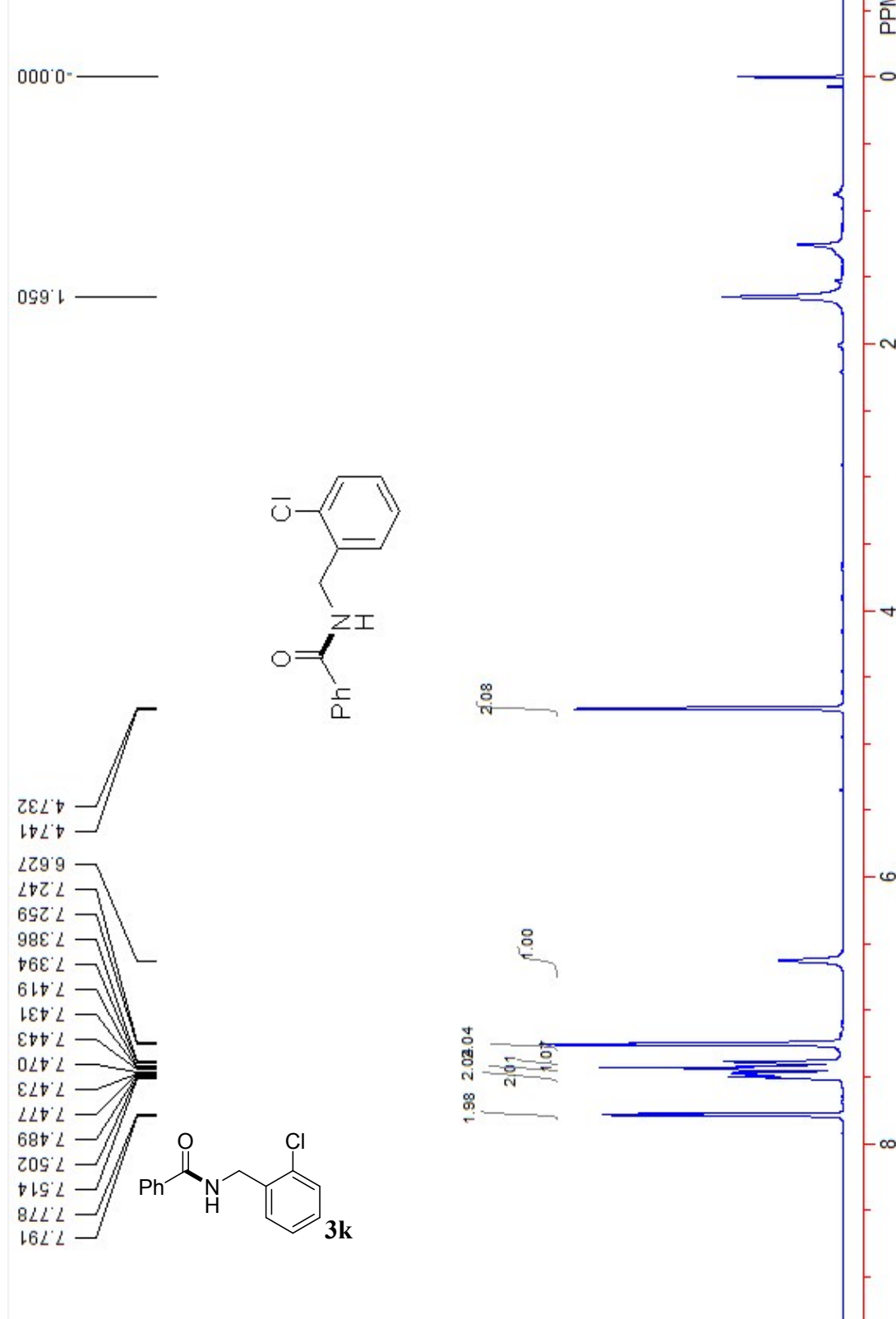




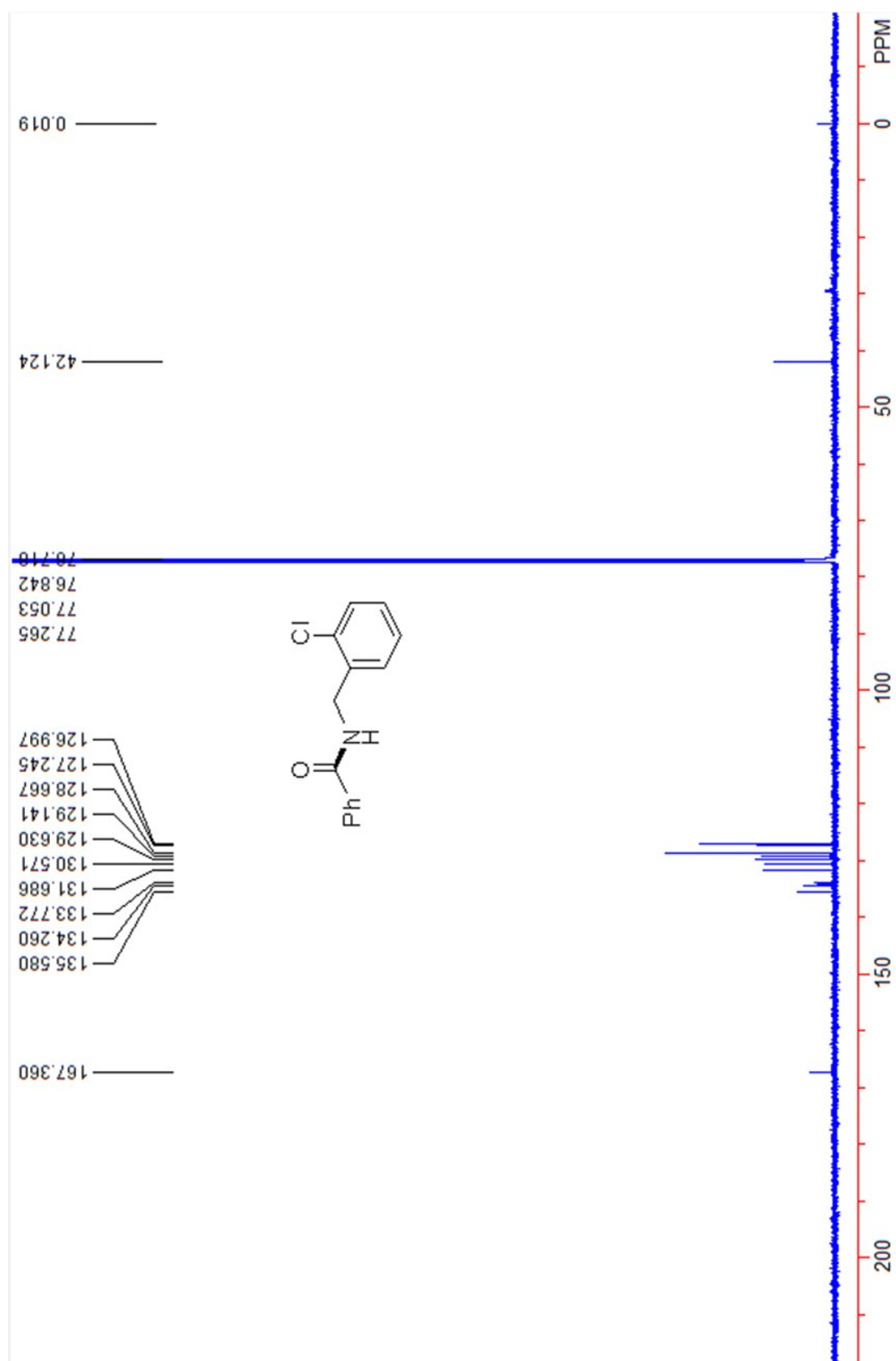
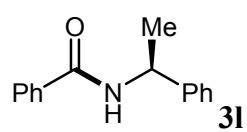
¹H NMR

¹H NMR

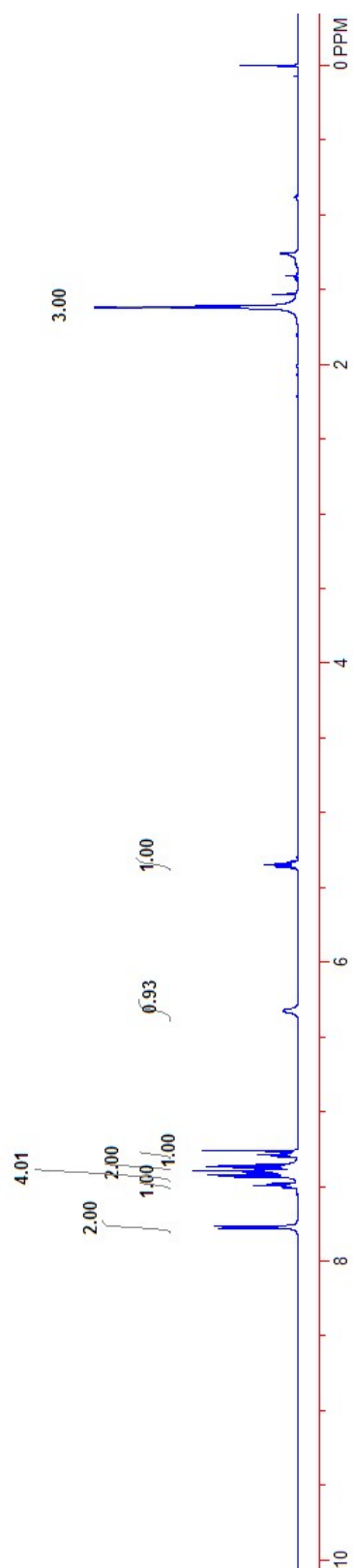
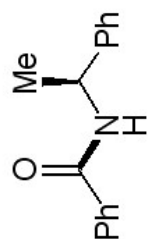
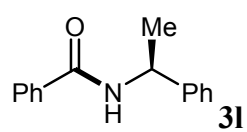




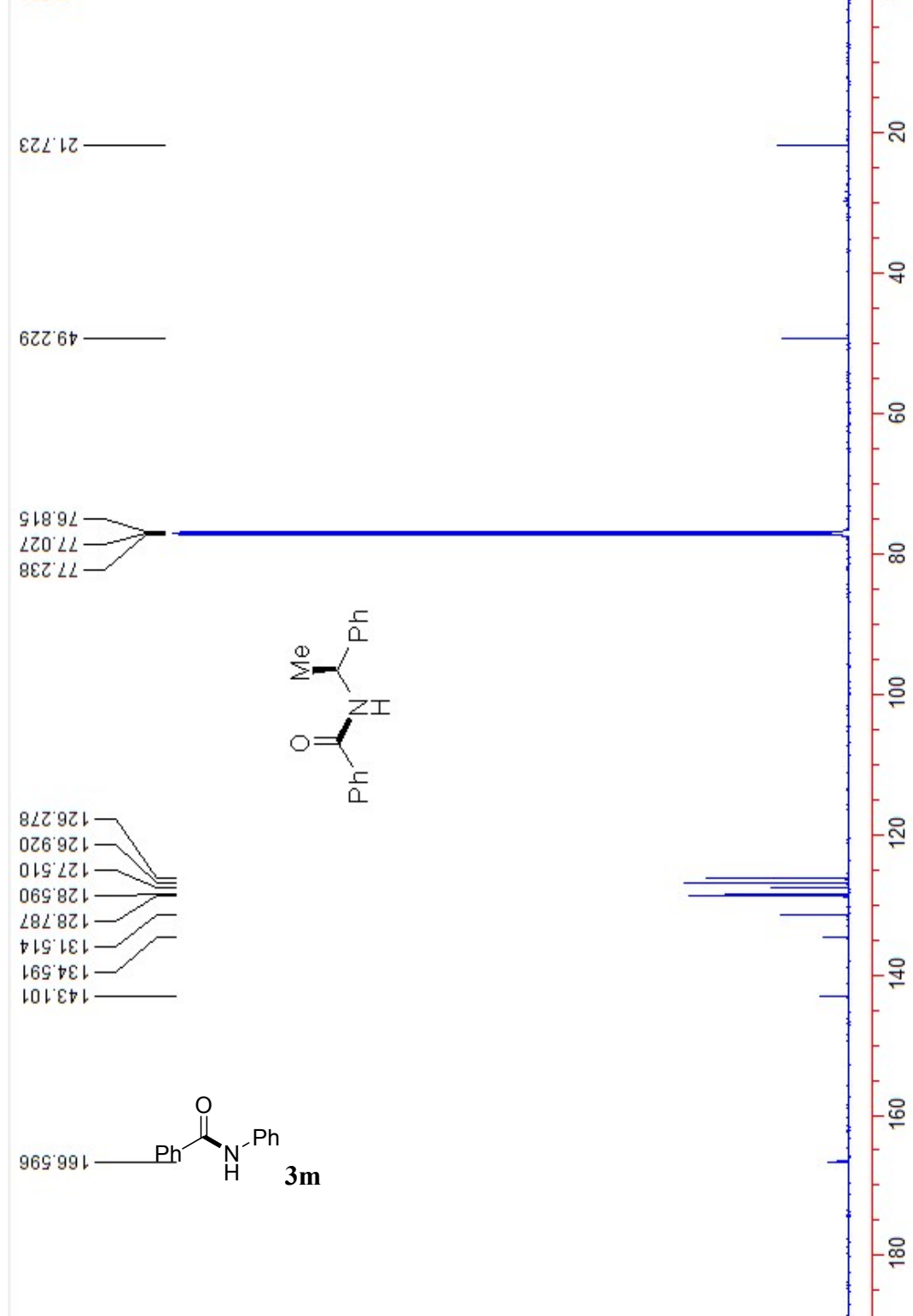
¹H NMR



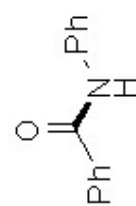
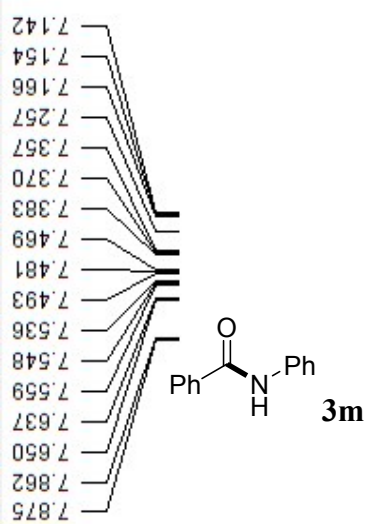
¹³C NMR

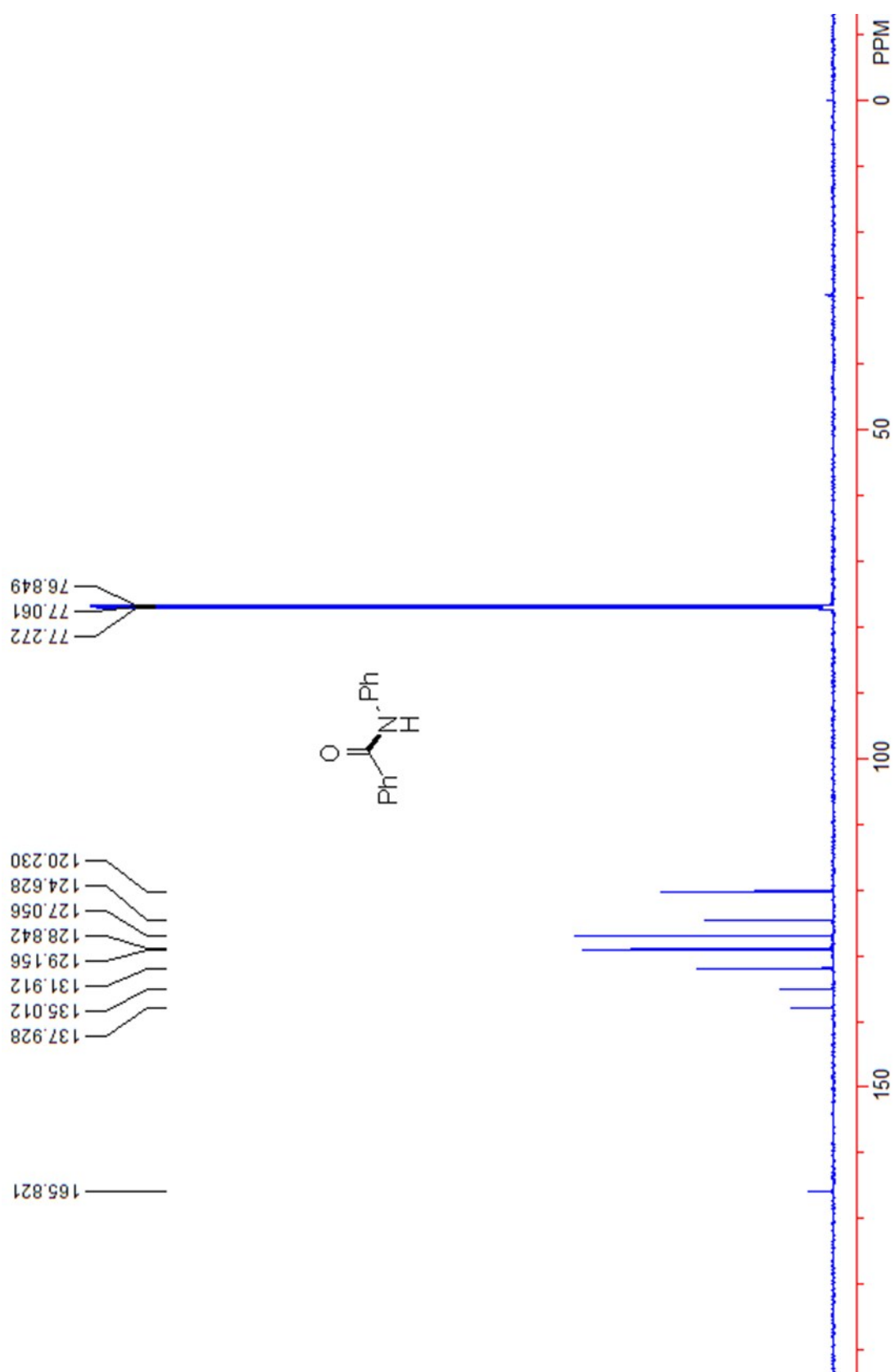


¹H NMR

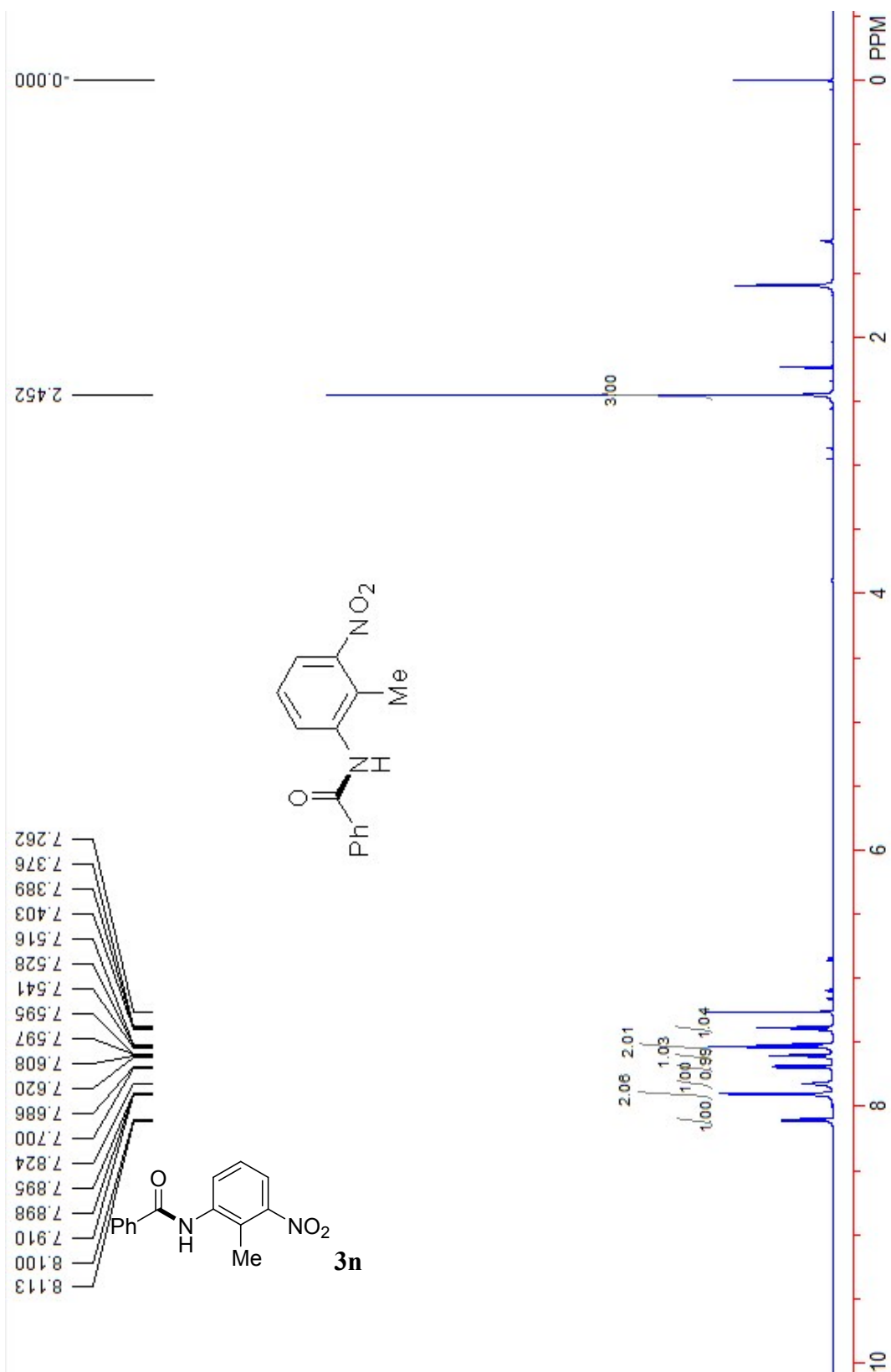


¹³C NMR



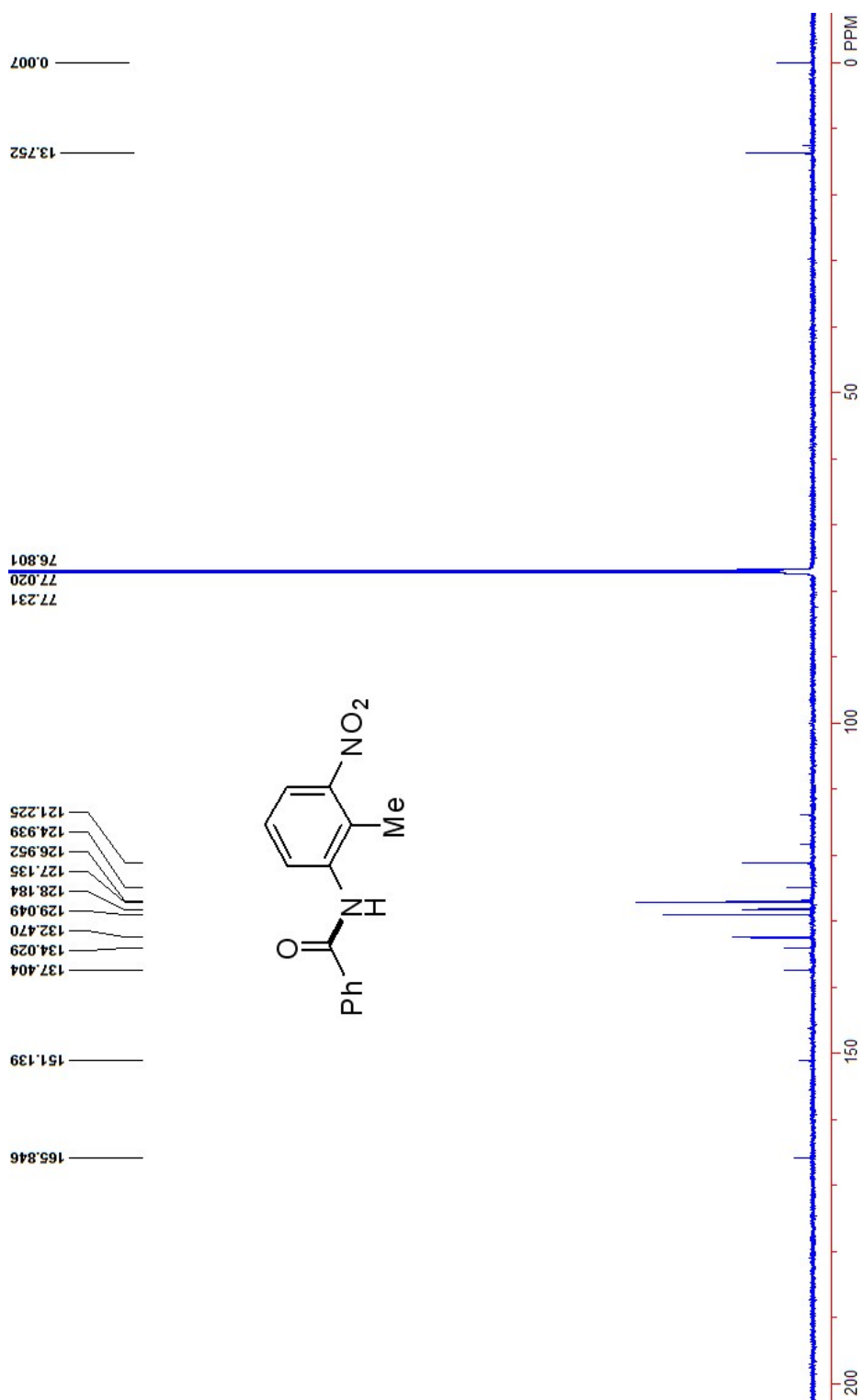
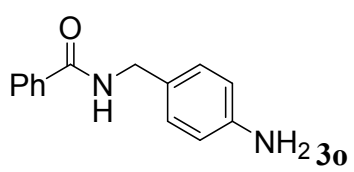


^1H NMR

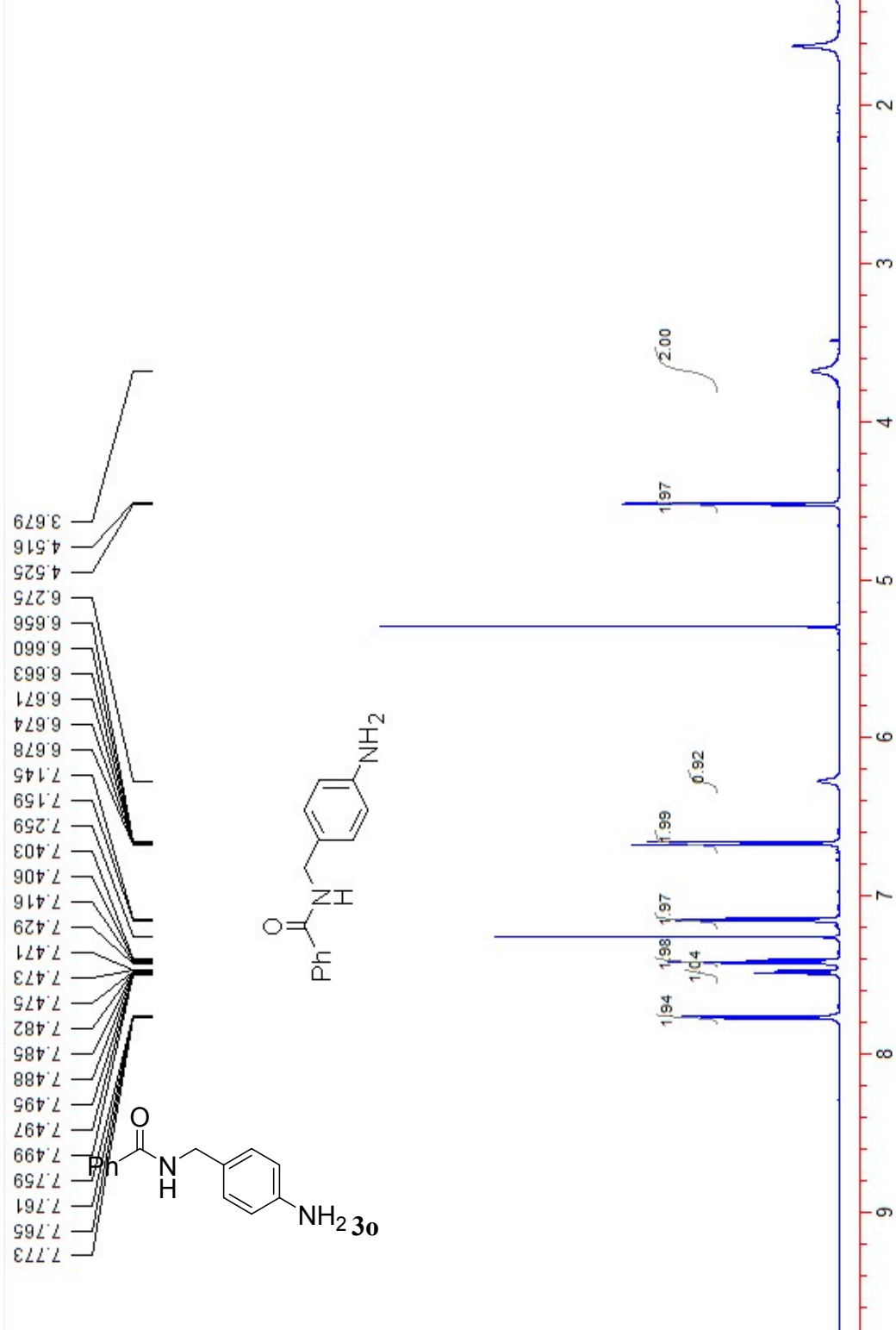


^{13}C NMR

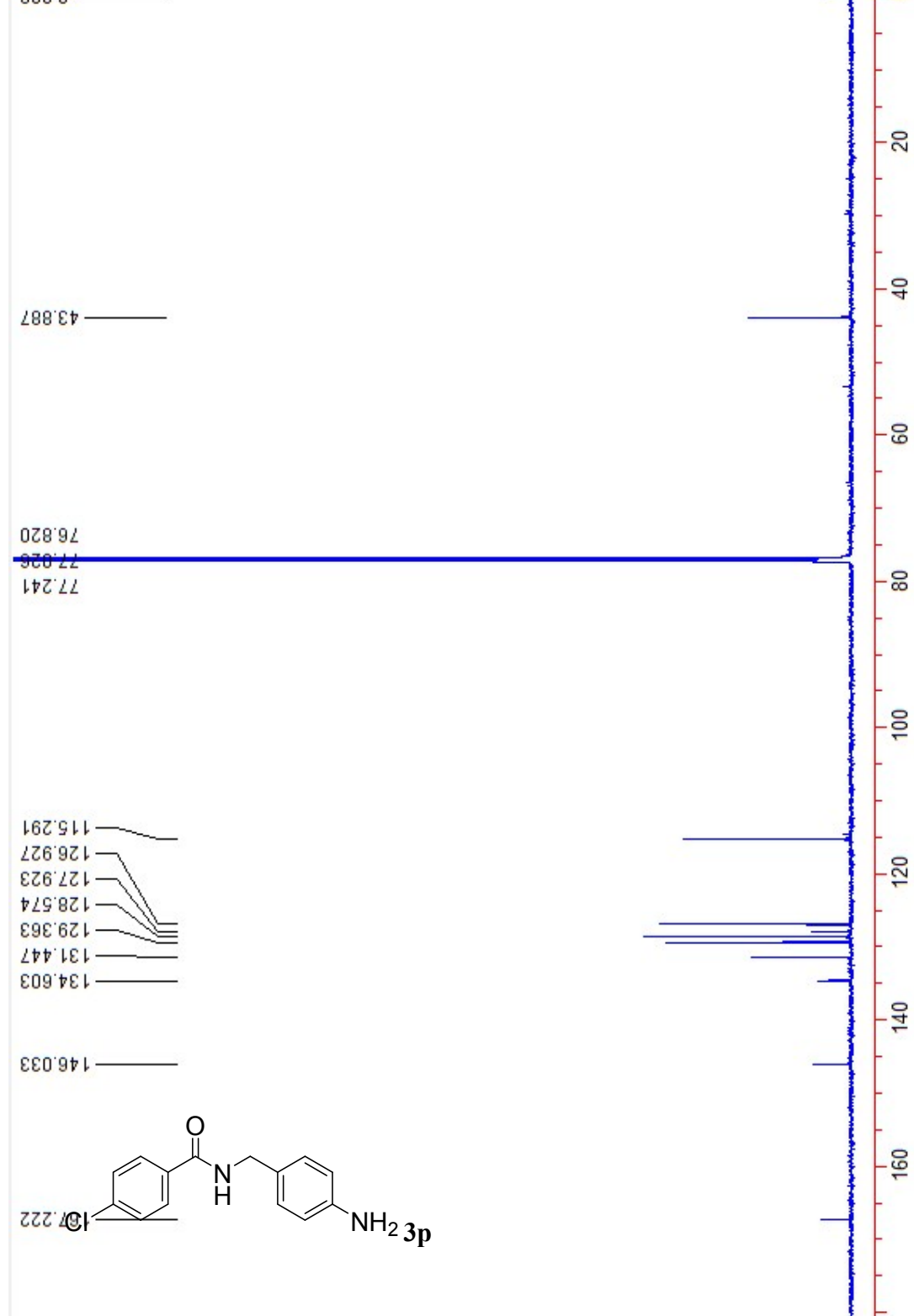
¹H NMR

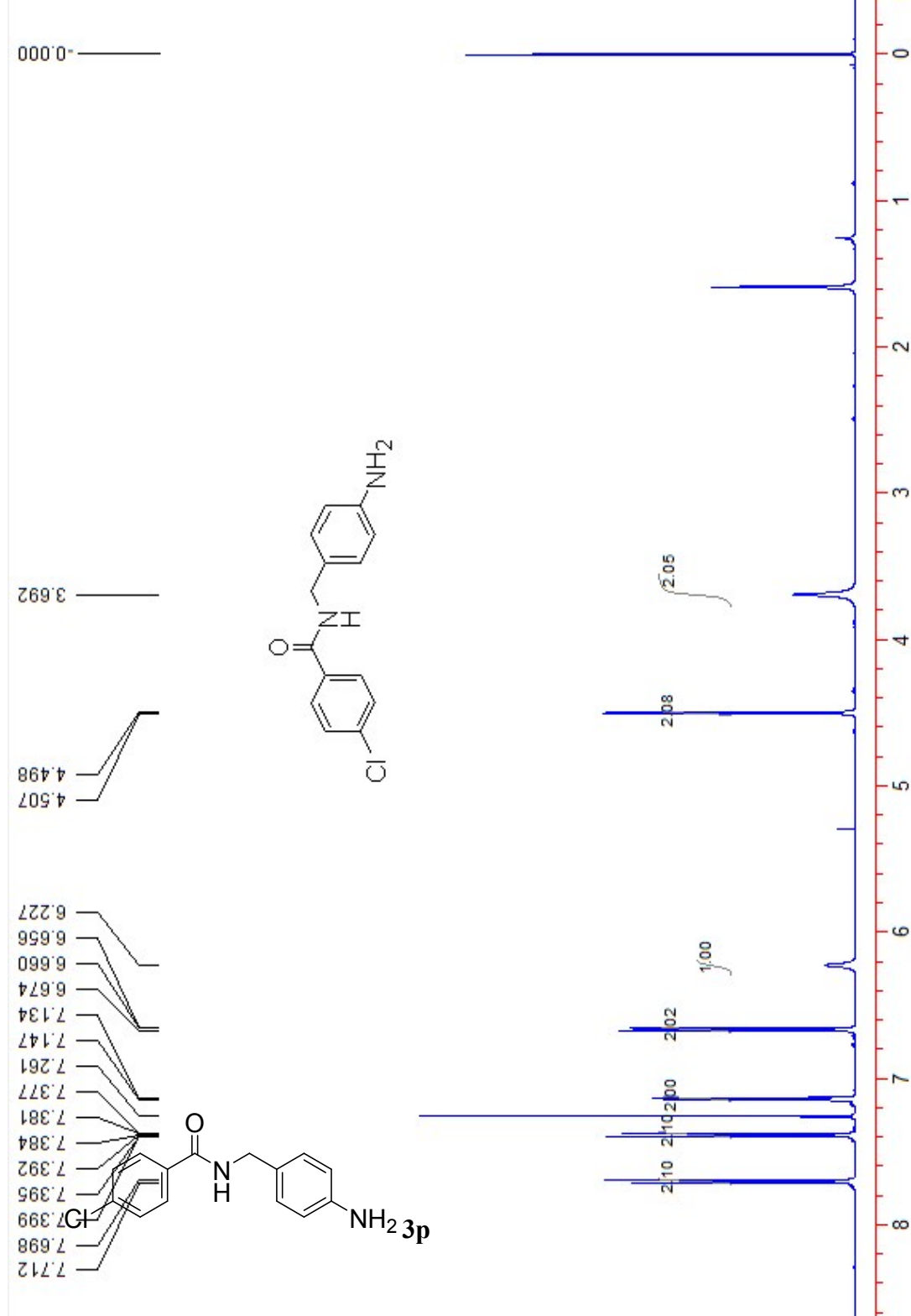


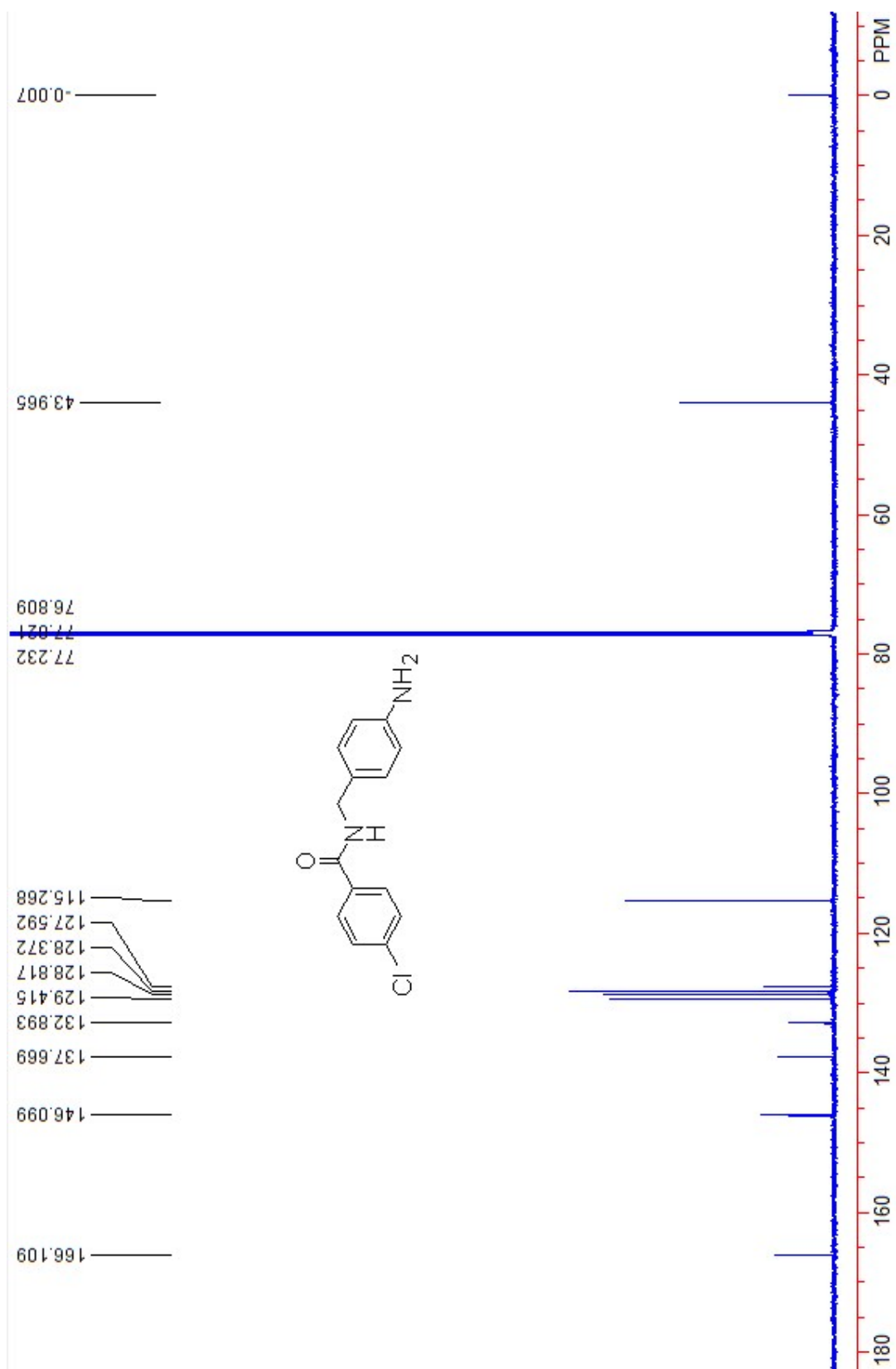
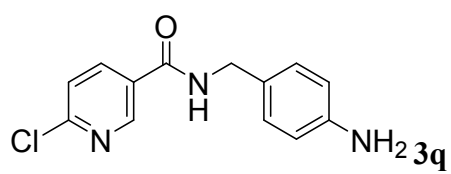
¹³C NMR



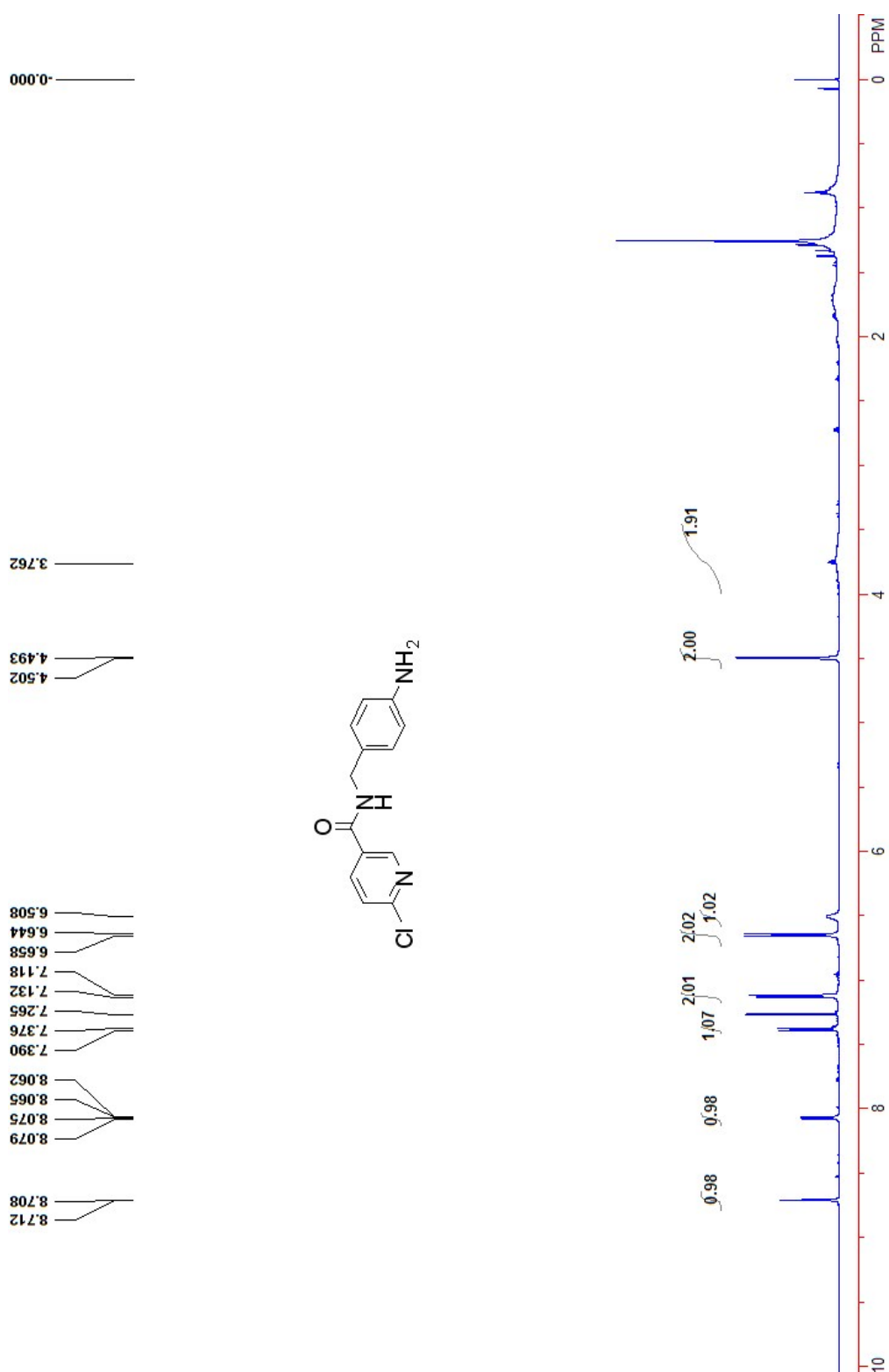
¹H NMR



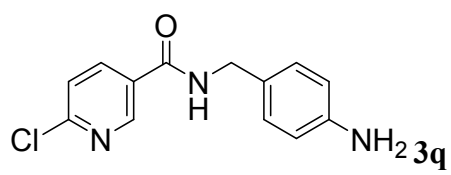


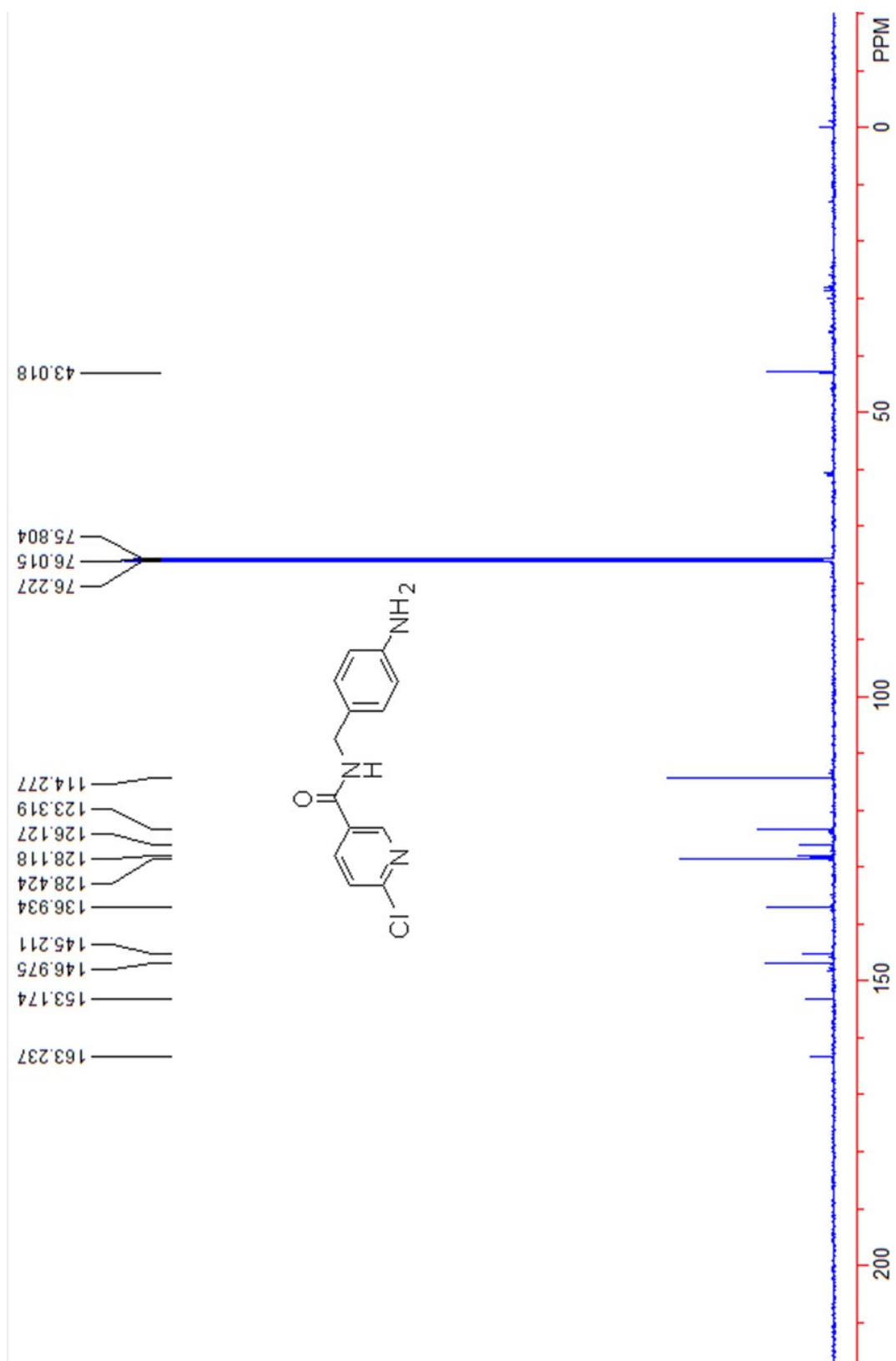
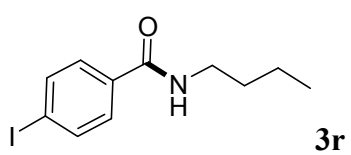


¹H NMR

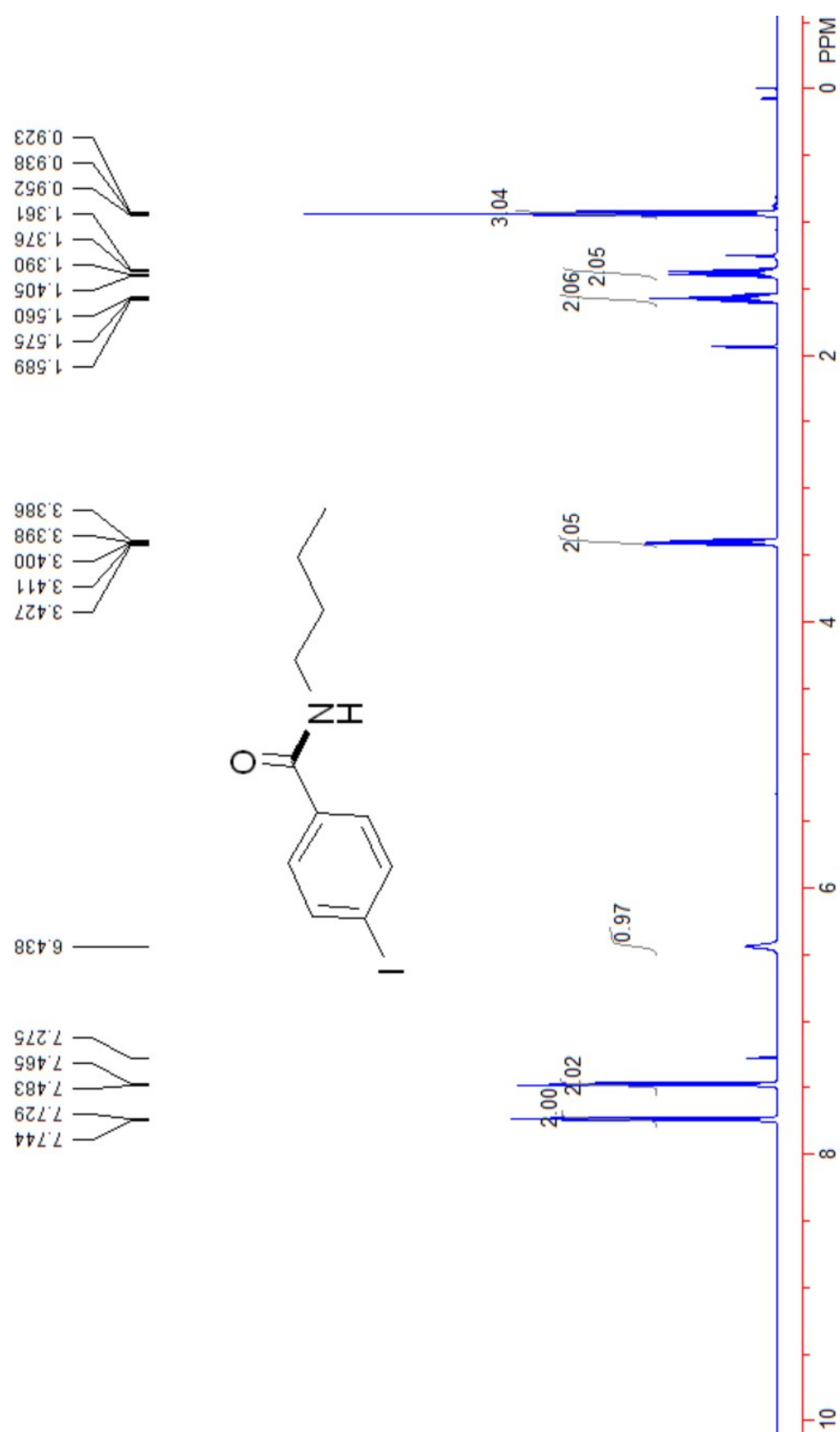


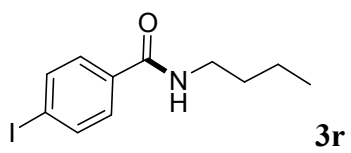
¹³C NMR



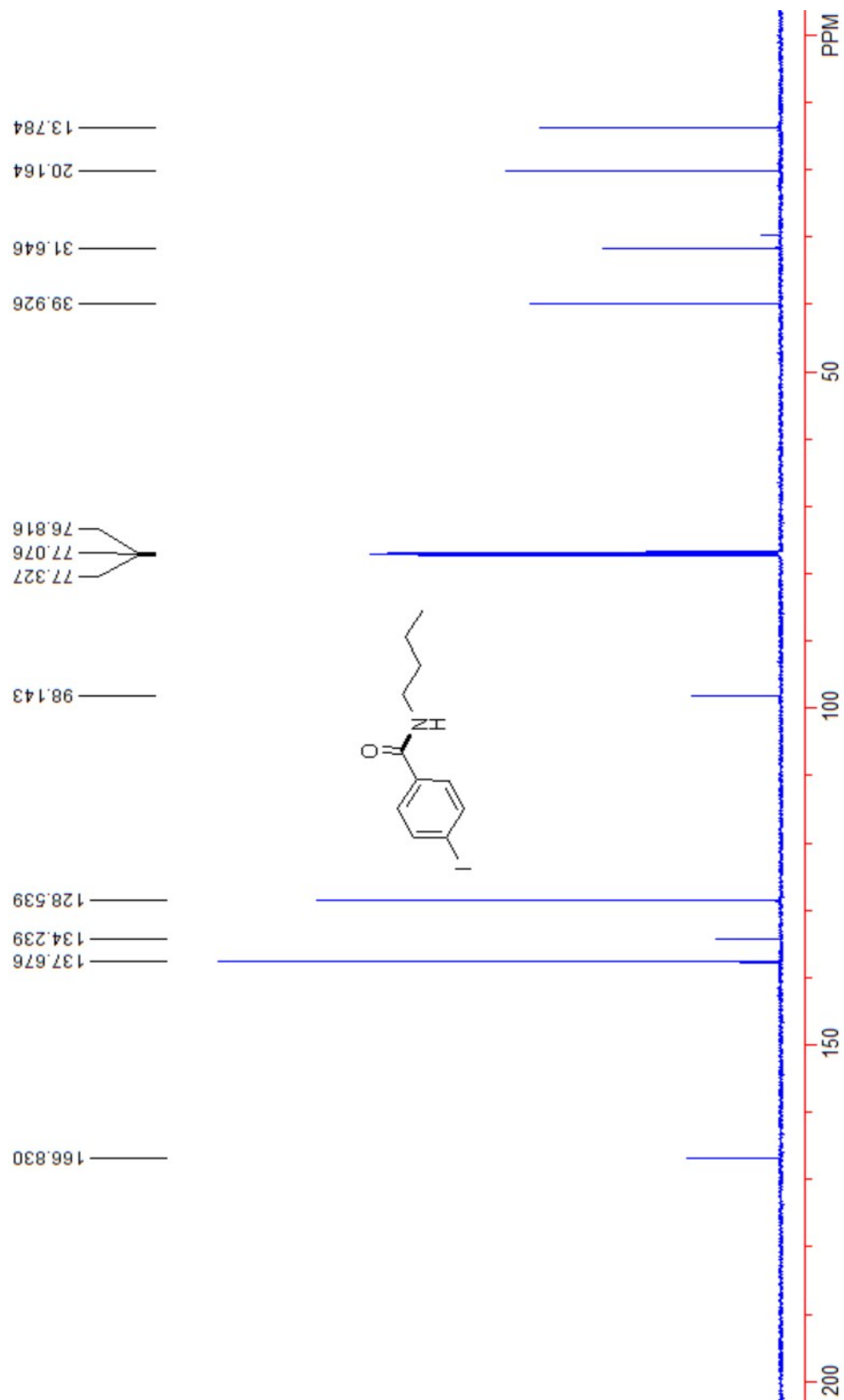


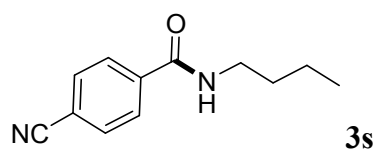
¹H NMR



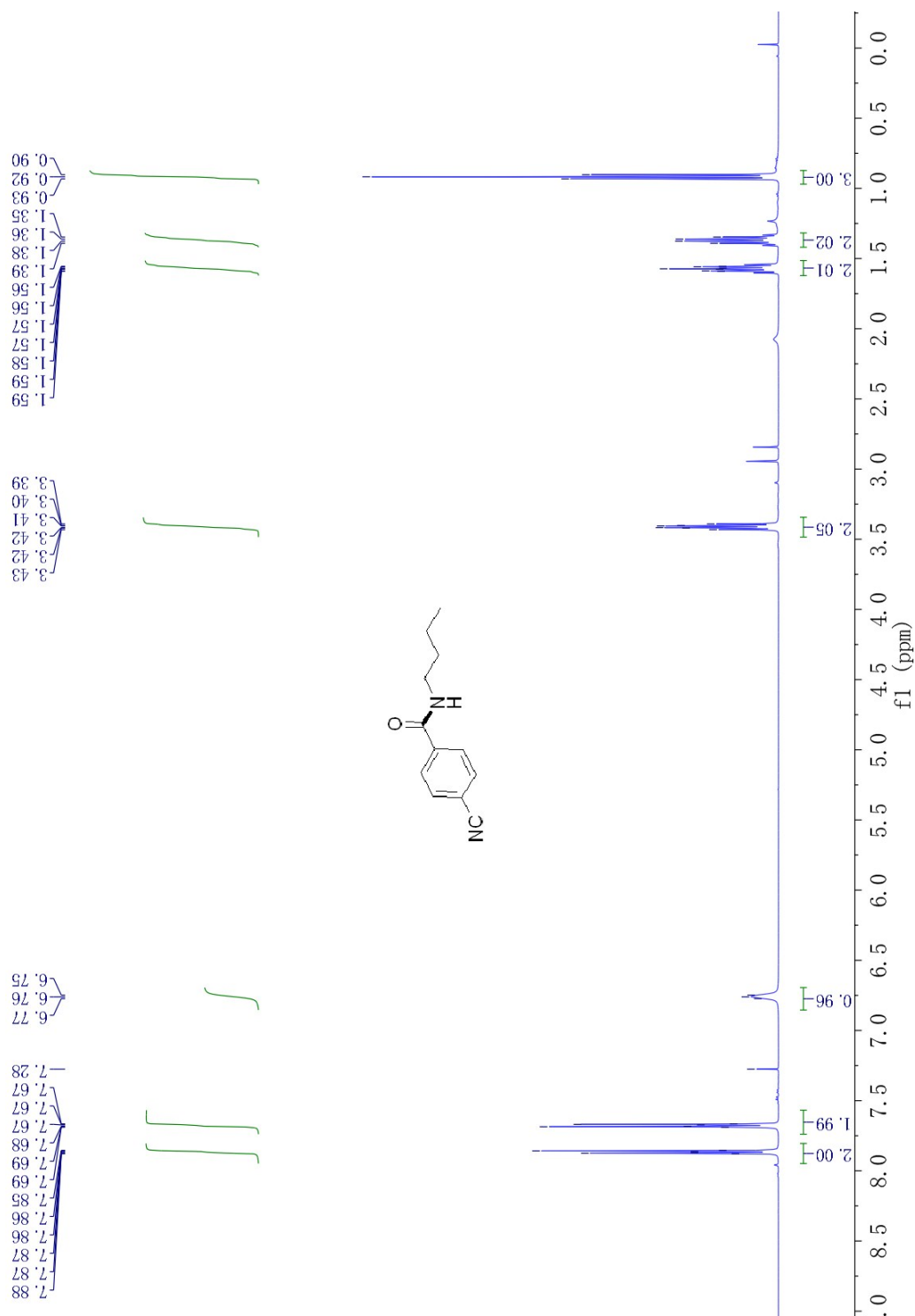


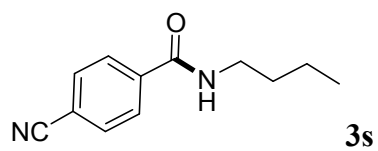
^{13}C NMR



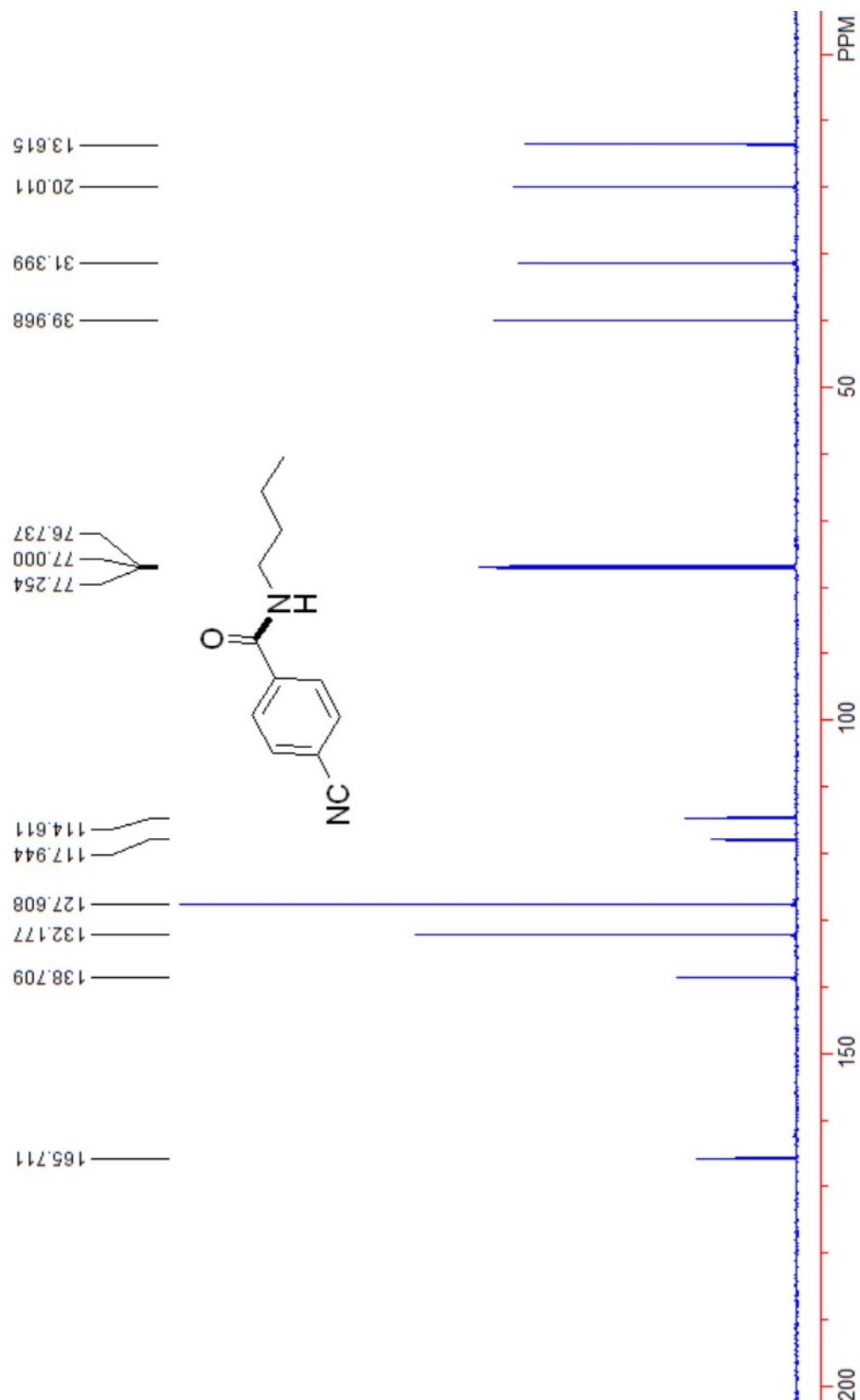


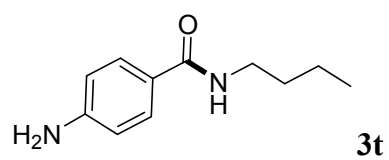
¹H NMR



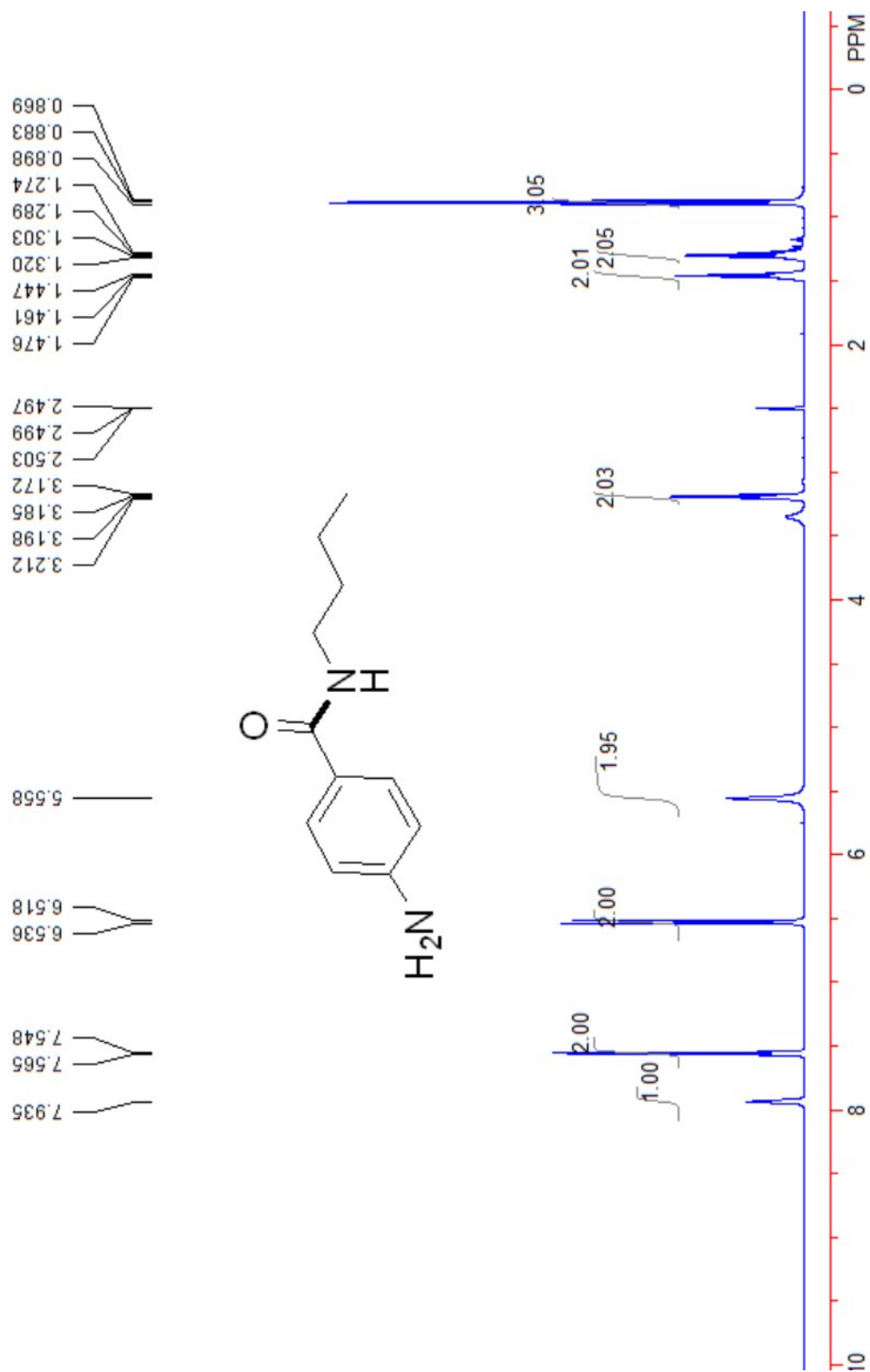


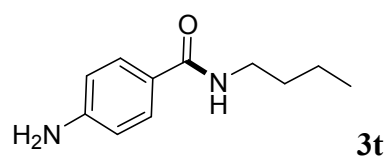
^{13}C NMR



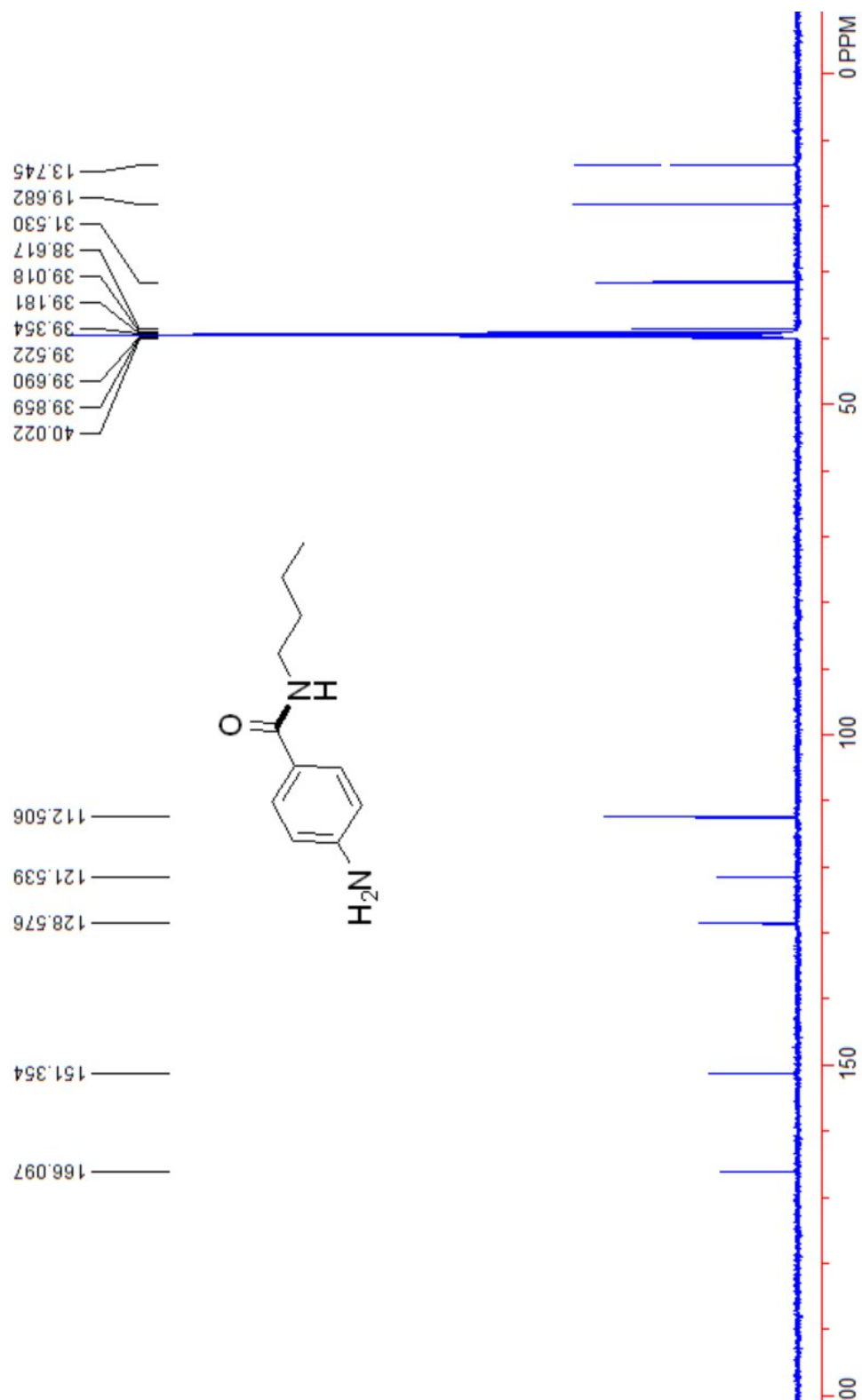


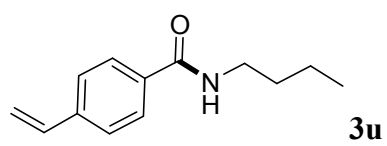
¹H NMR



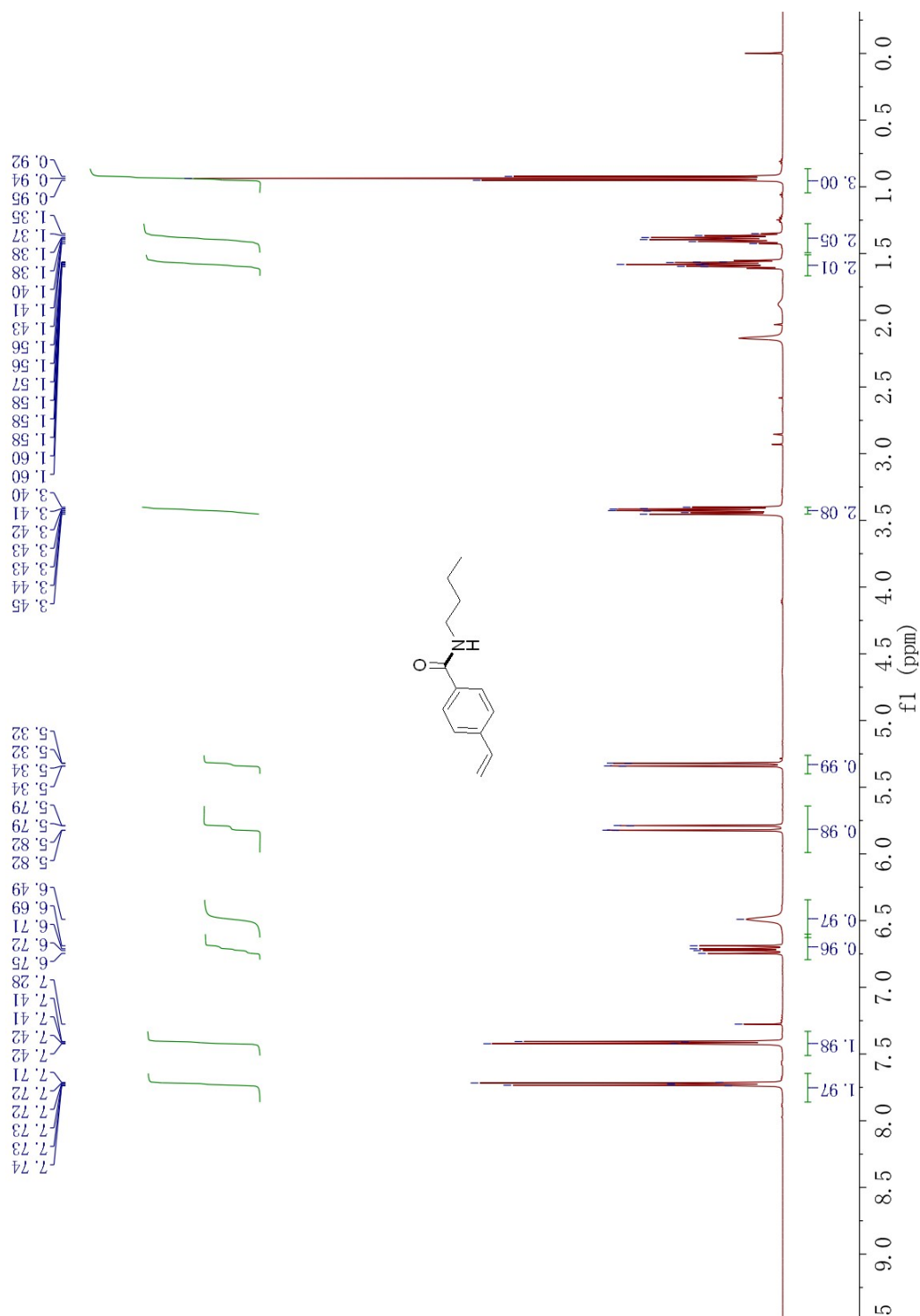


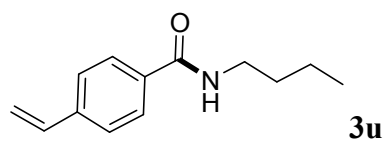
¹³C NMR



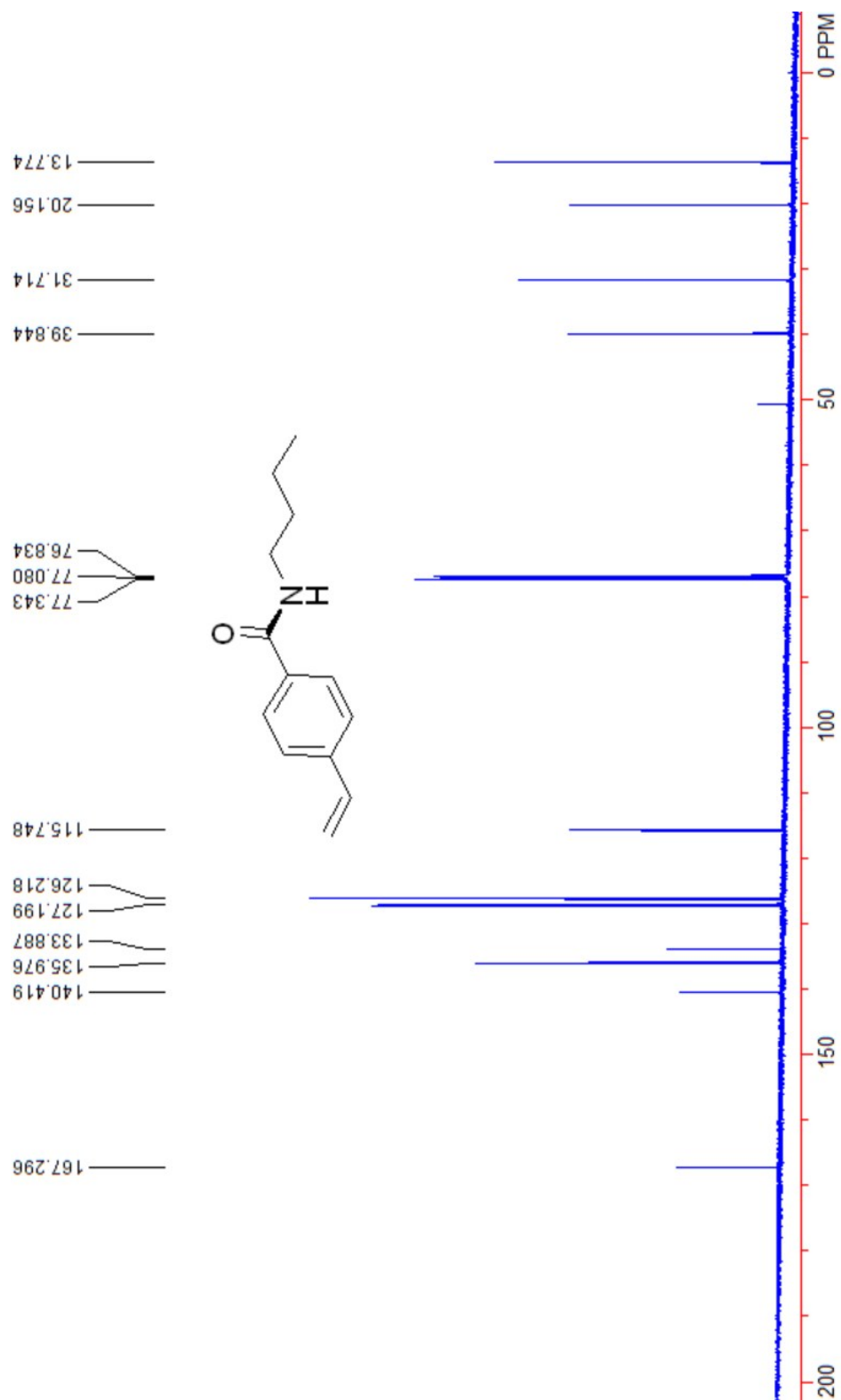


¹H NMR



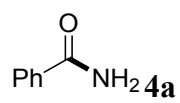
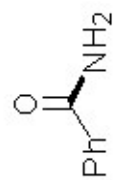


¹³C NMR



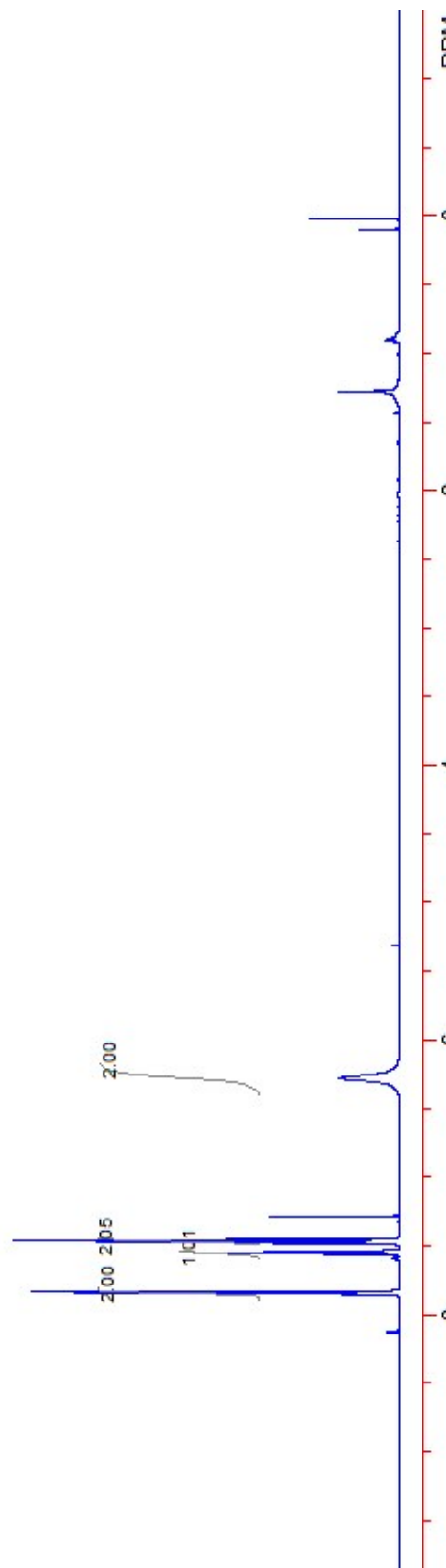
^1H NMR

0.021

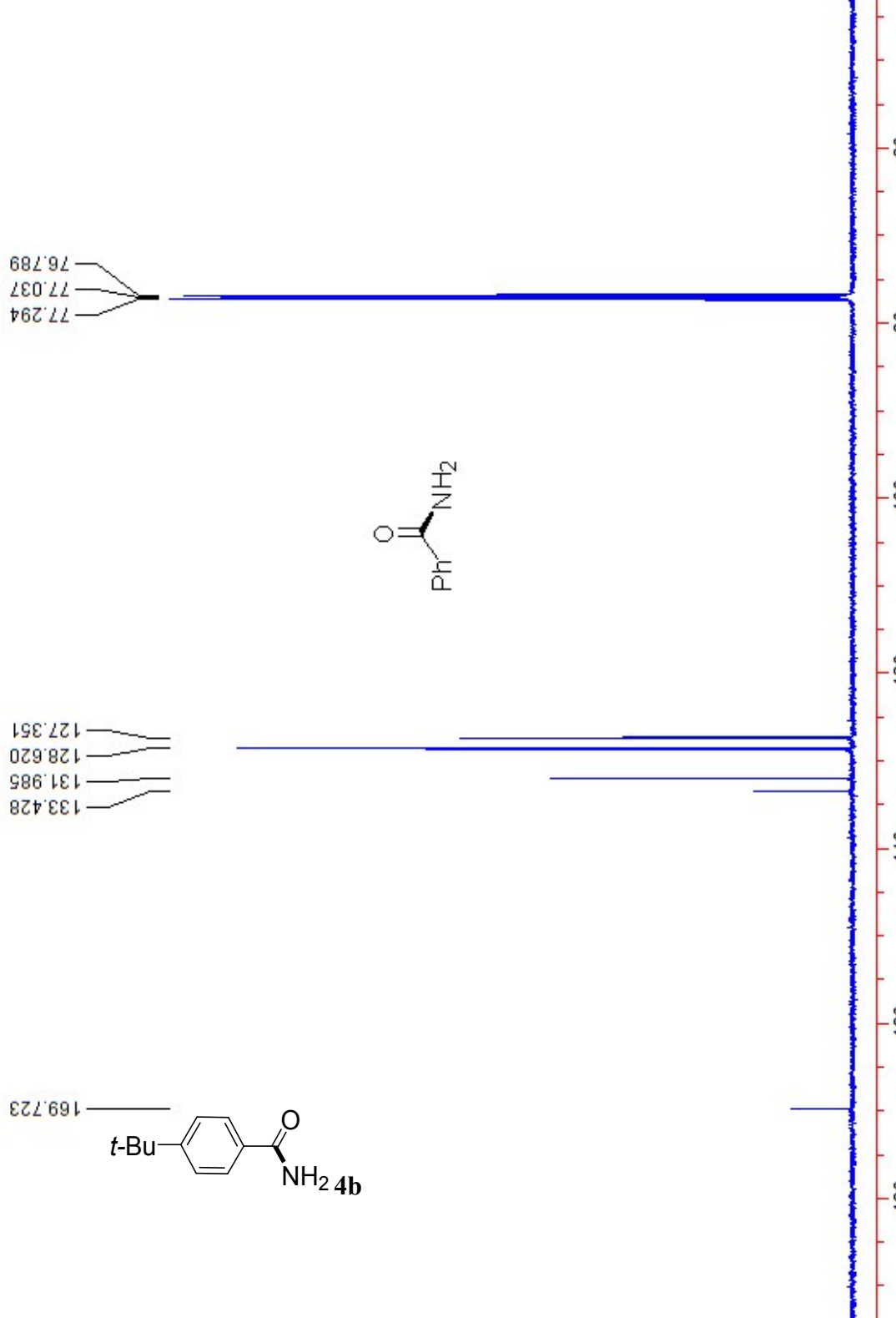


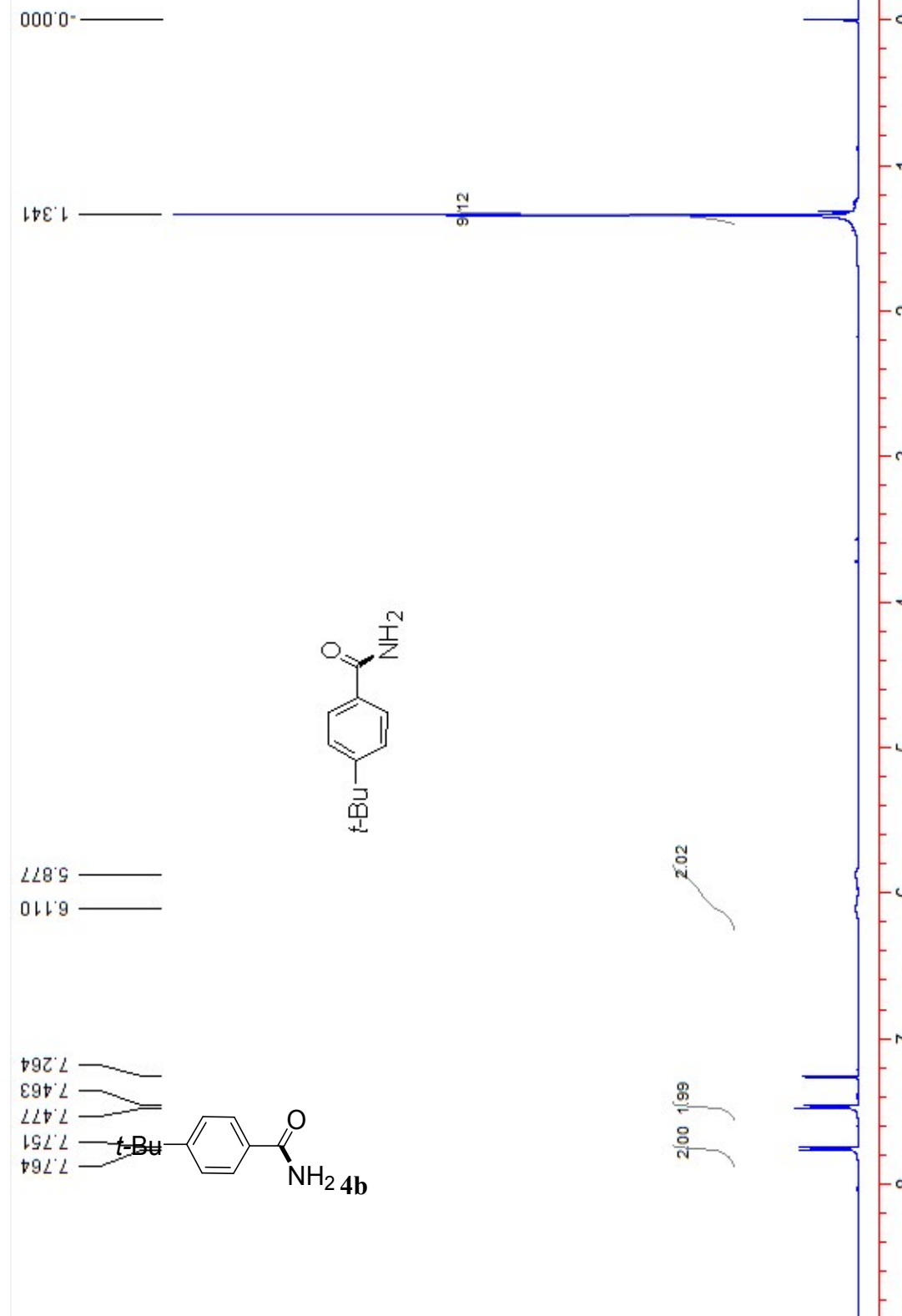
7.850
7.848
7.839
7.836
7.834
7.565
7.563
7.561
7.561
7.540
7.538
7.536
7.480
7.467
7.467
7.454
7.286
6.279

^{13}C NMR

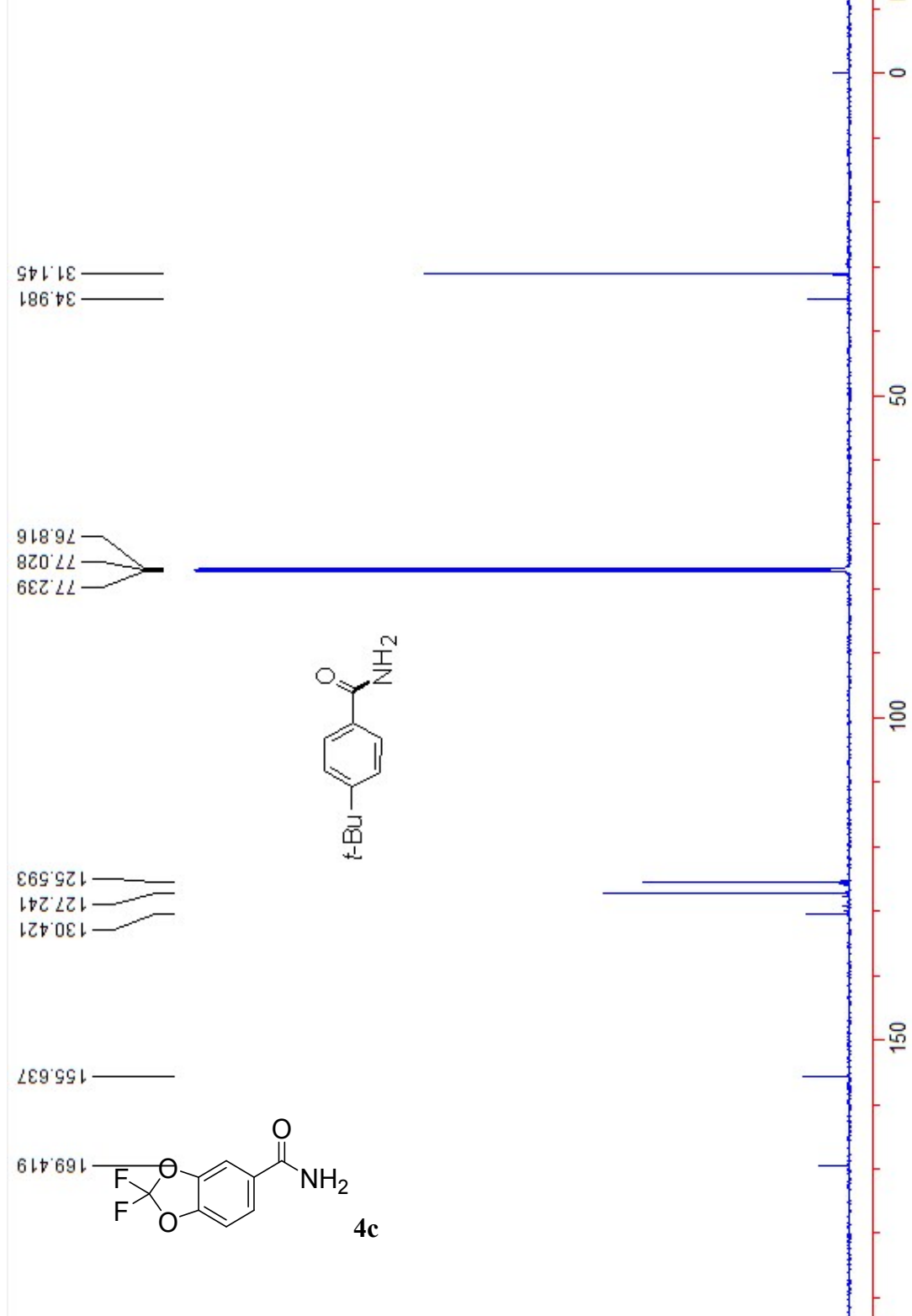


¹H NMR

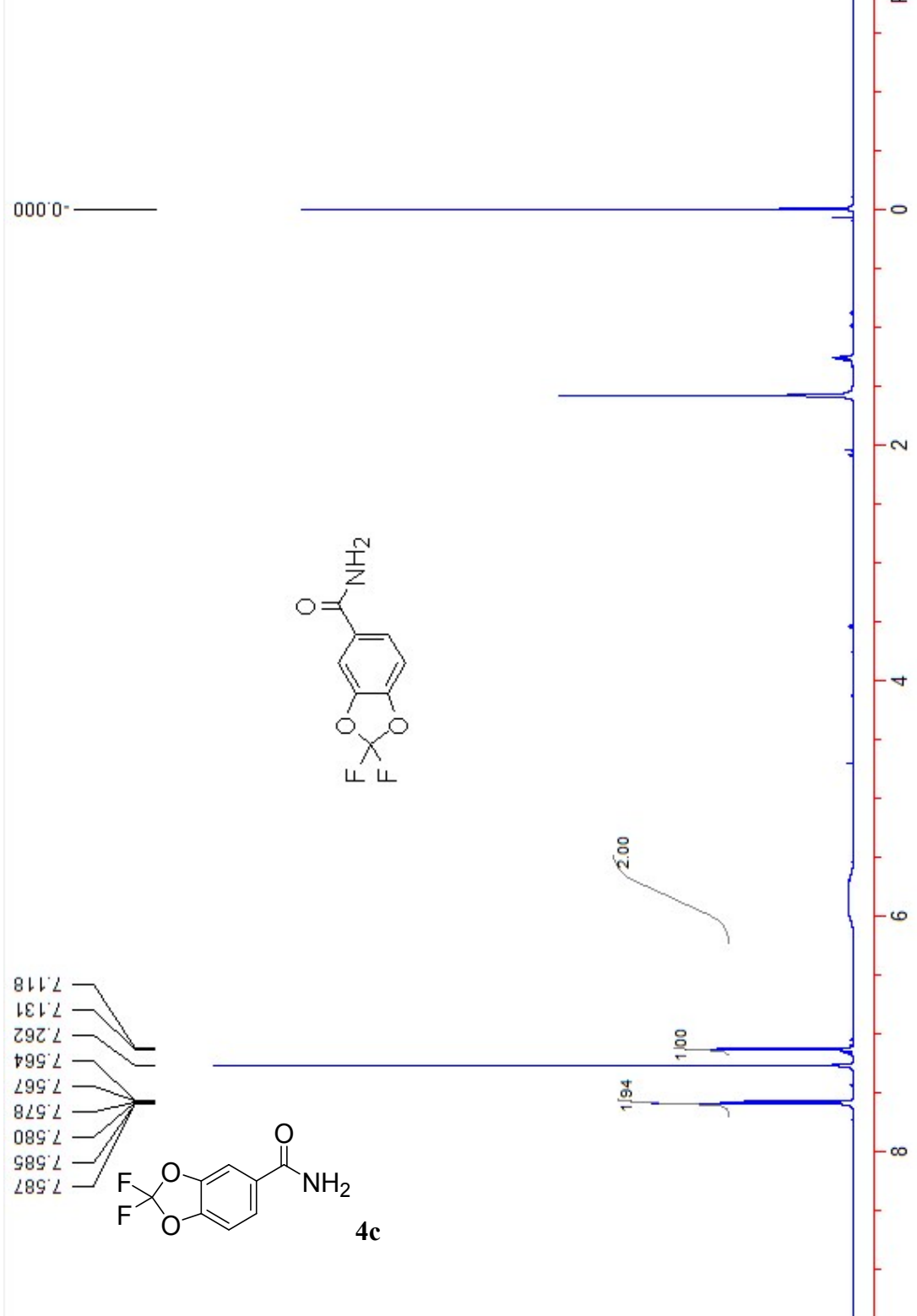




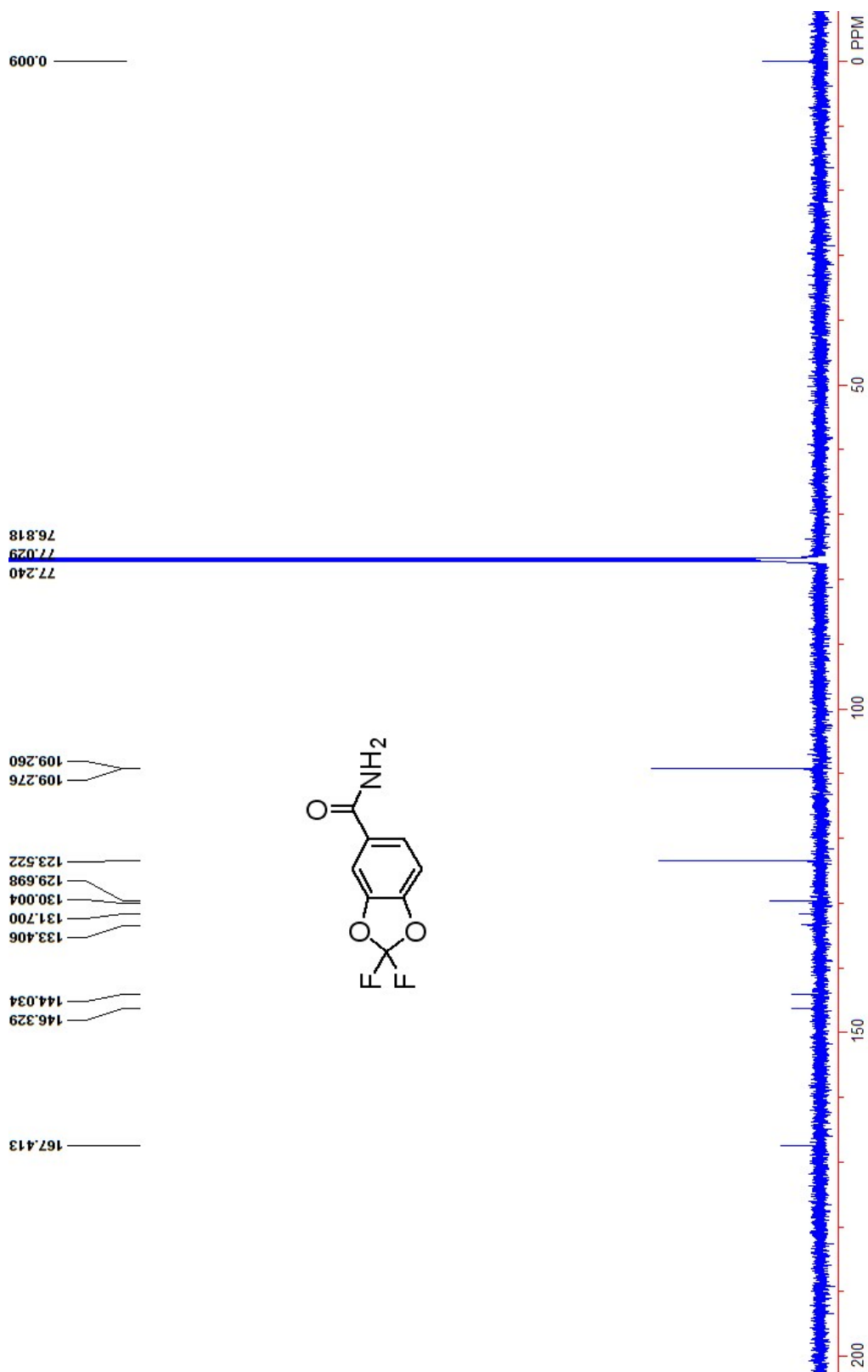
¹H NMR



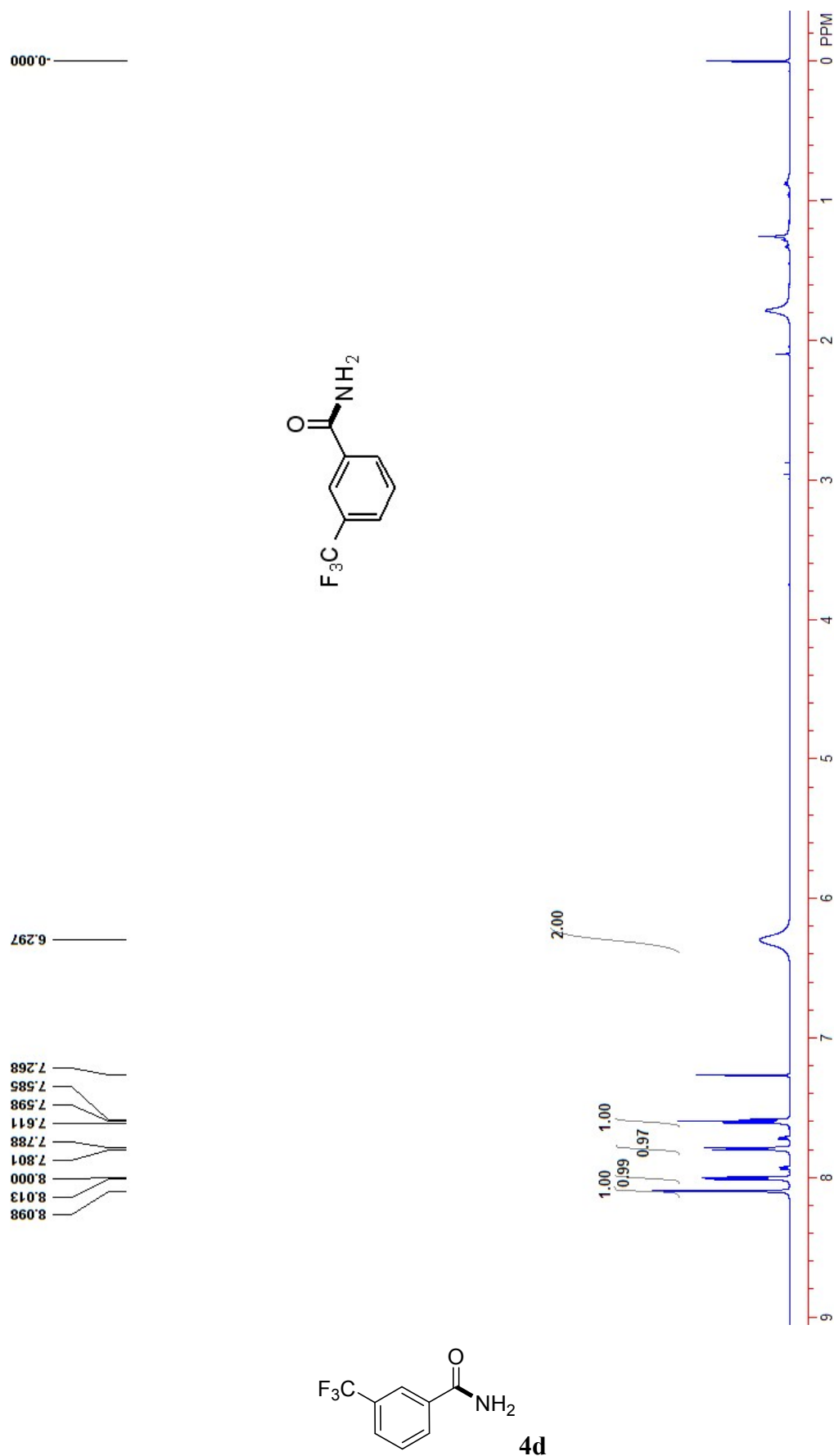
¹³C NMR



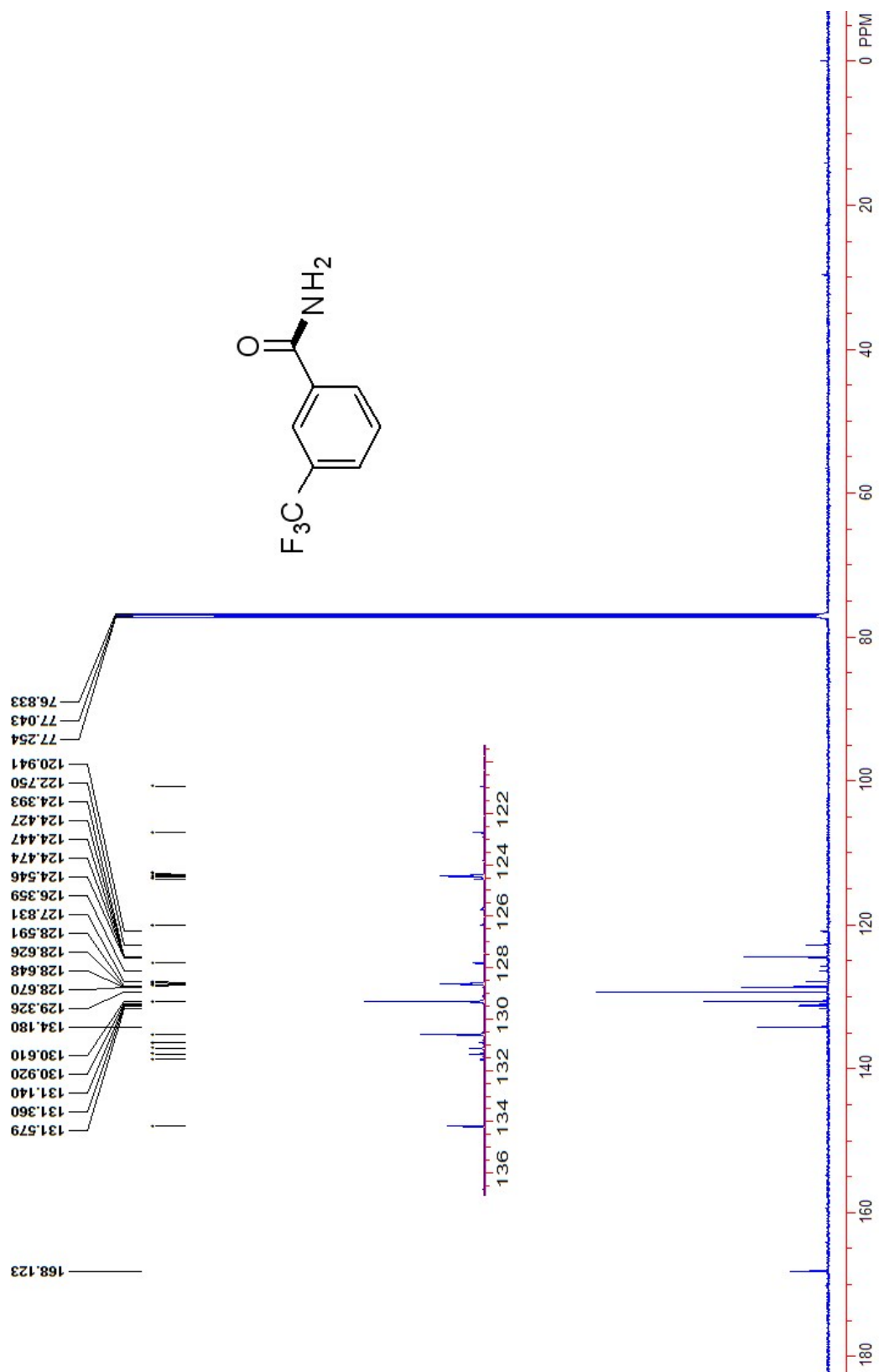
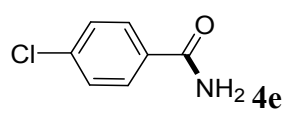
¹H NMR

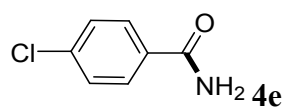
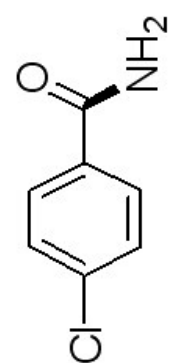
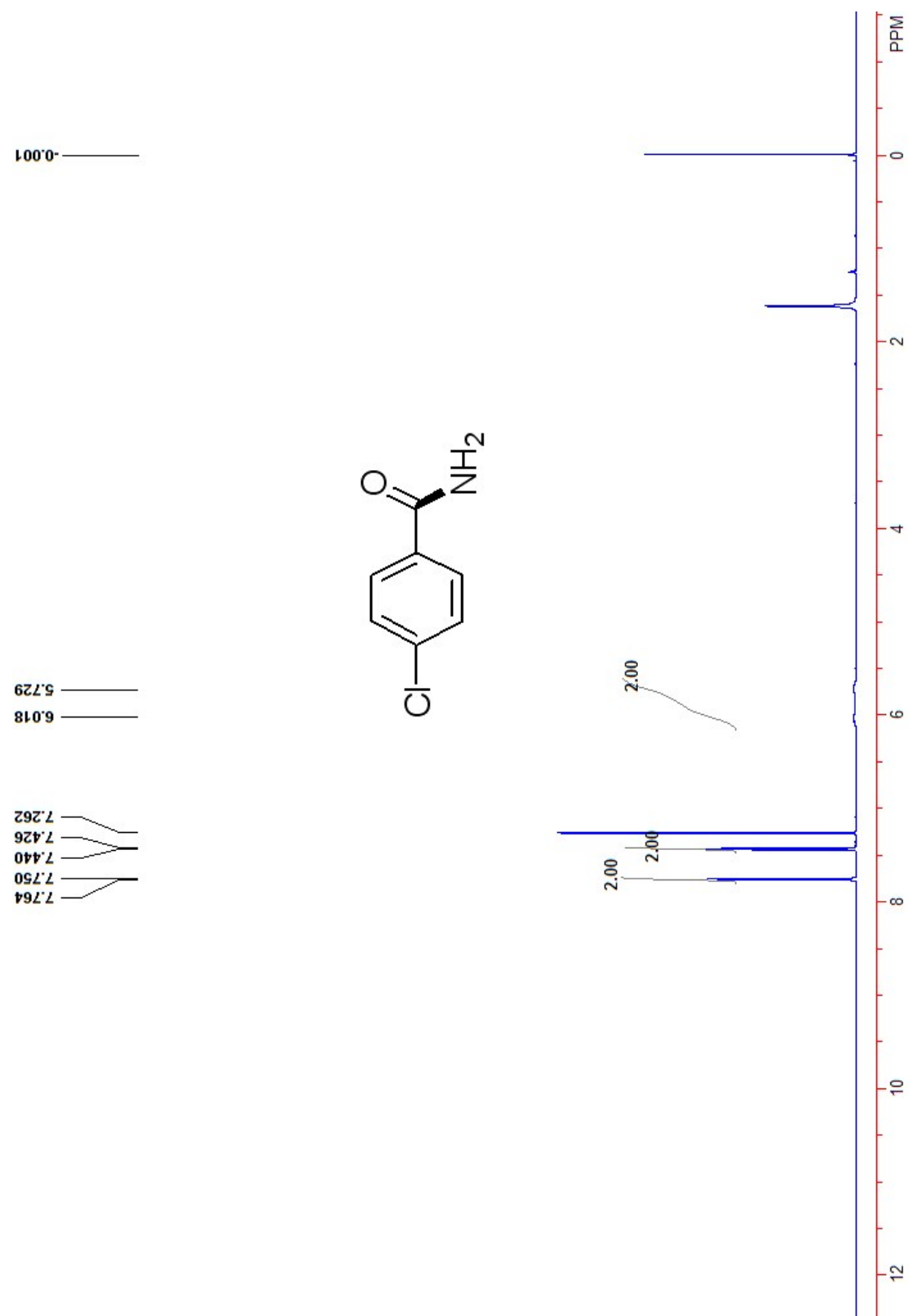


¹³C NMR



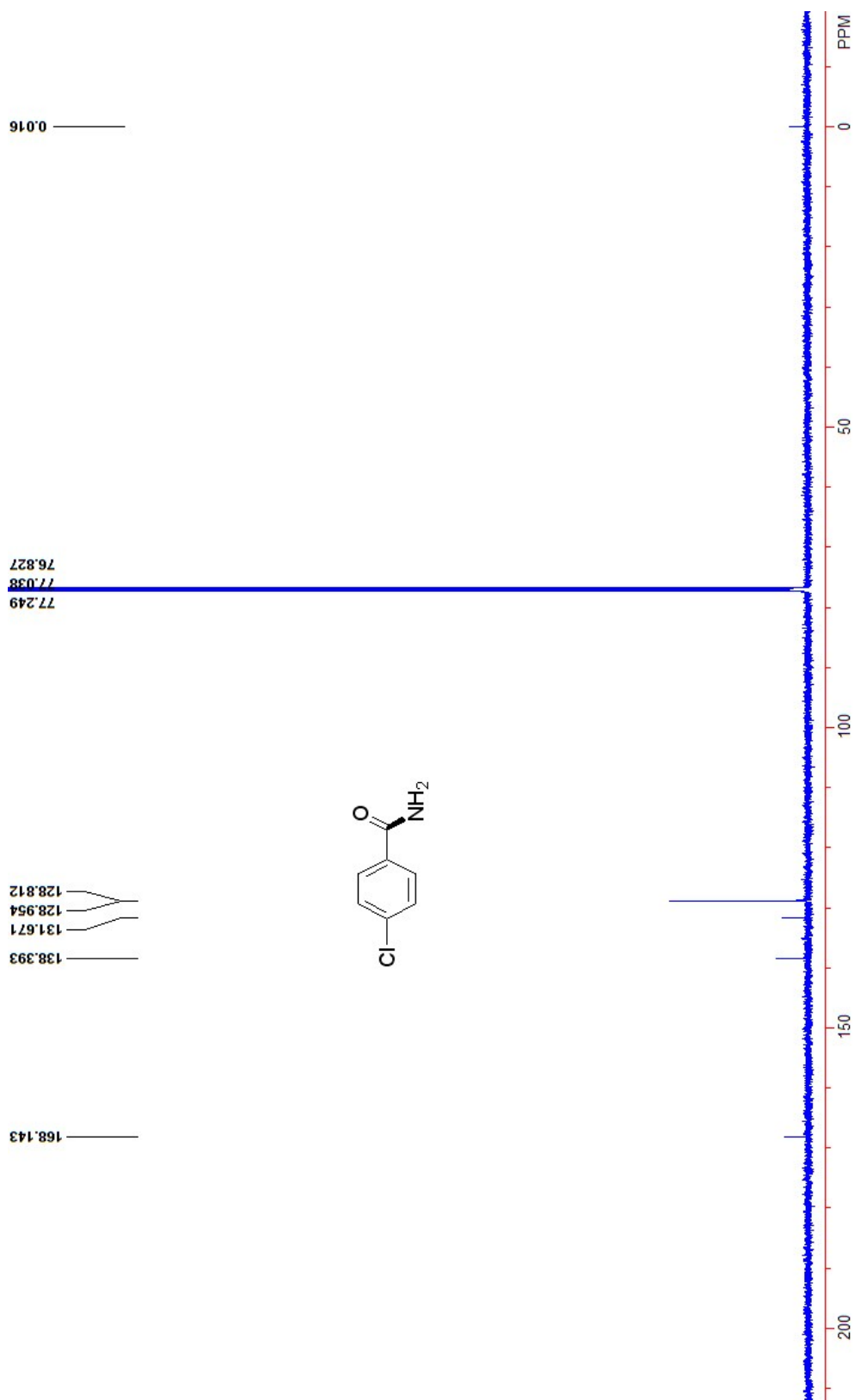
¹H NMR

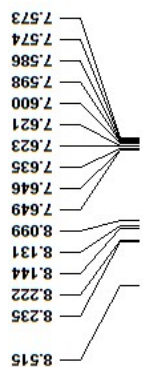
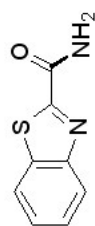




¹³C NMR

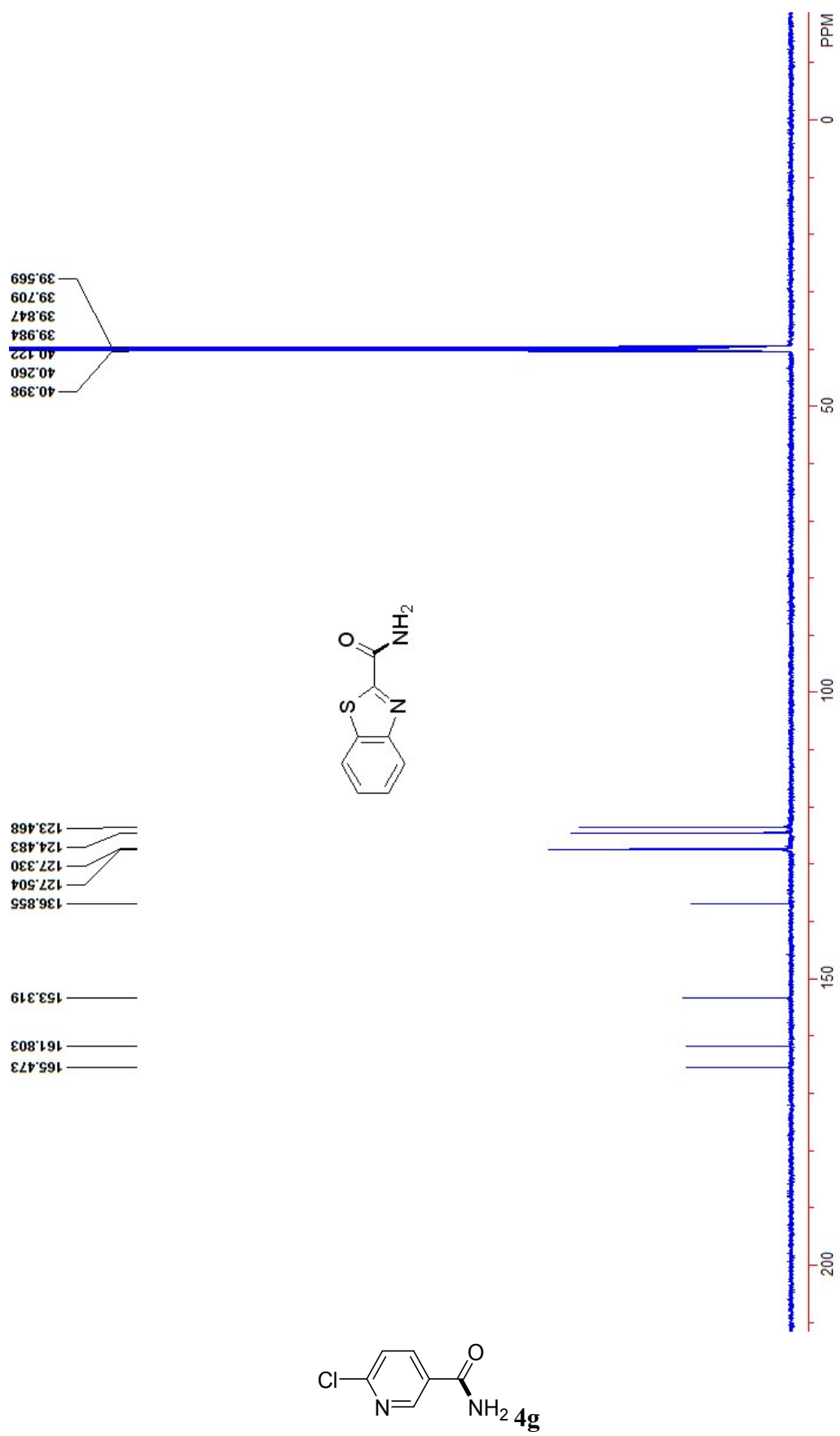
¹H NMR



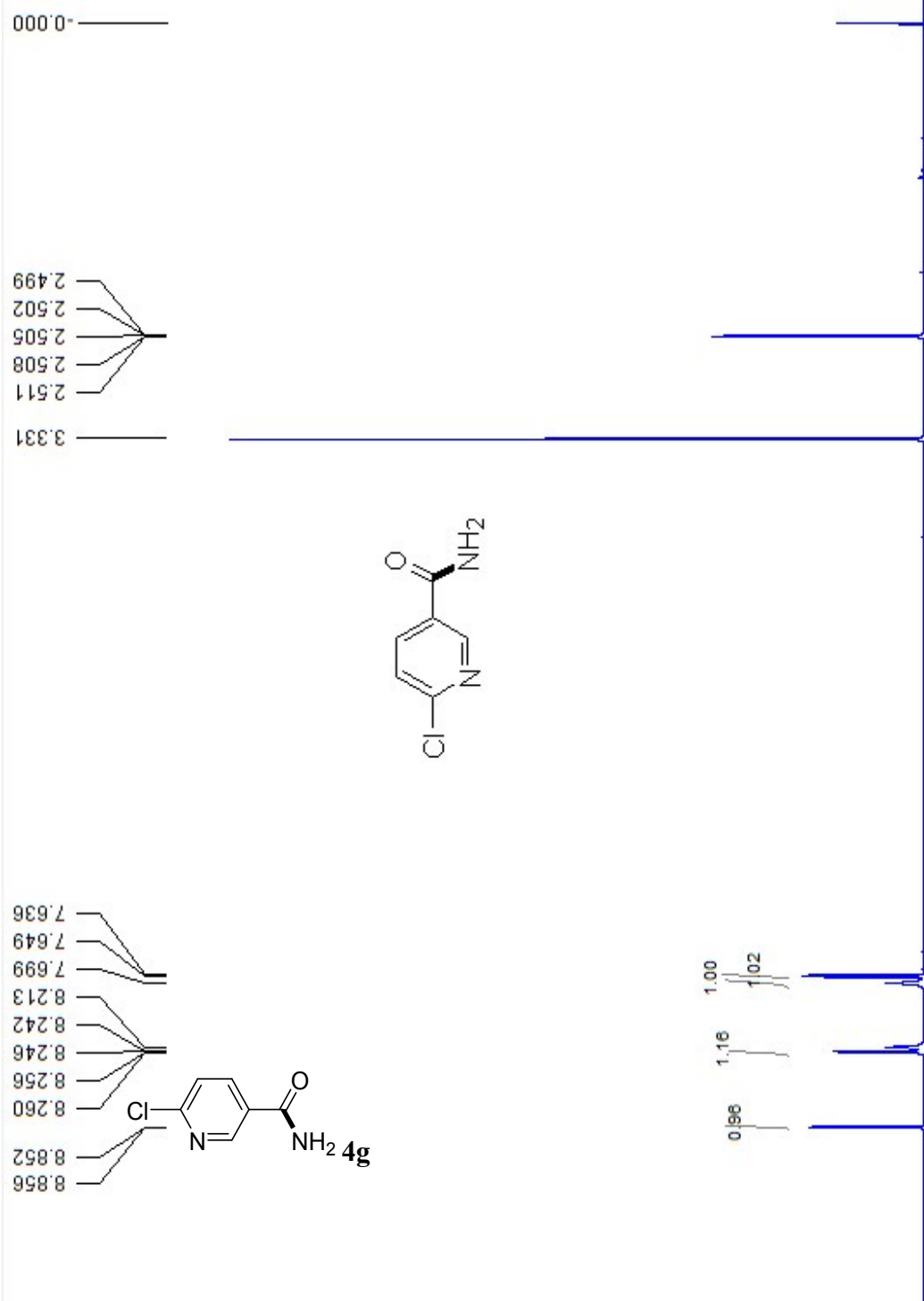


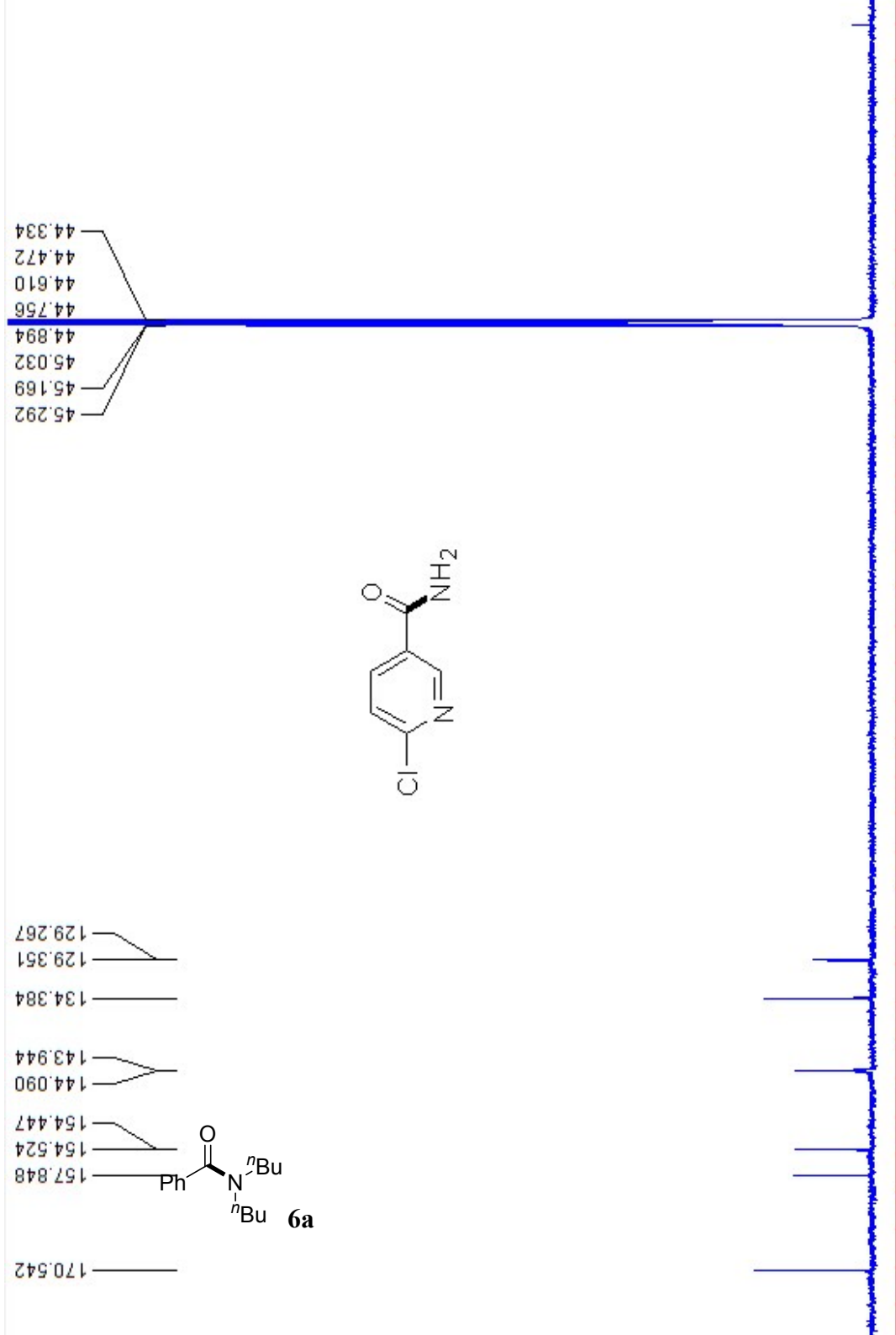
S57

¹H NMR

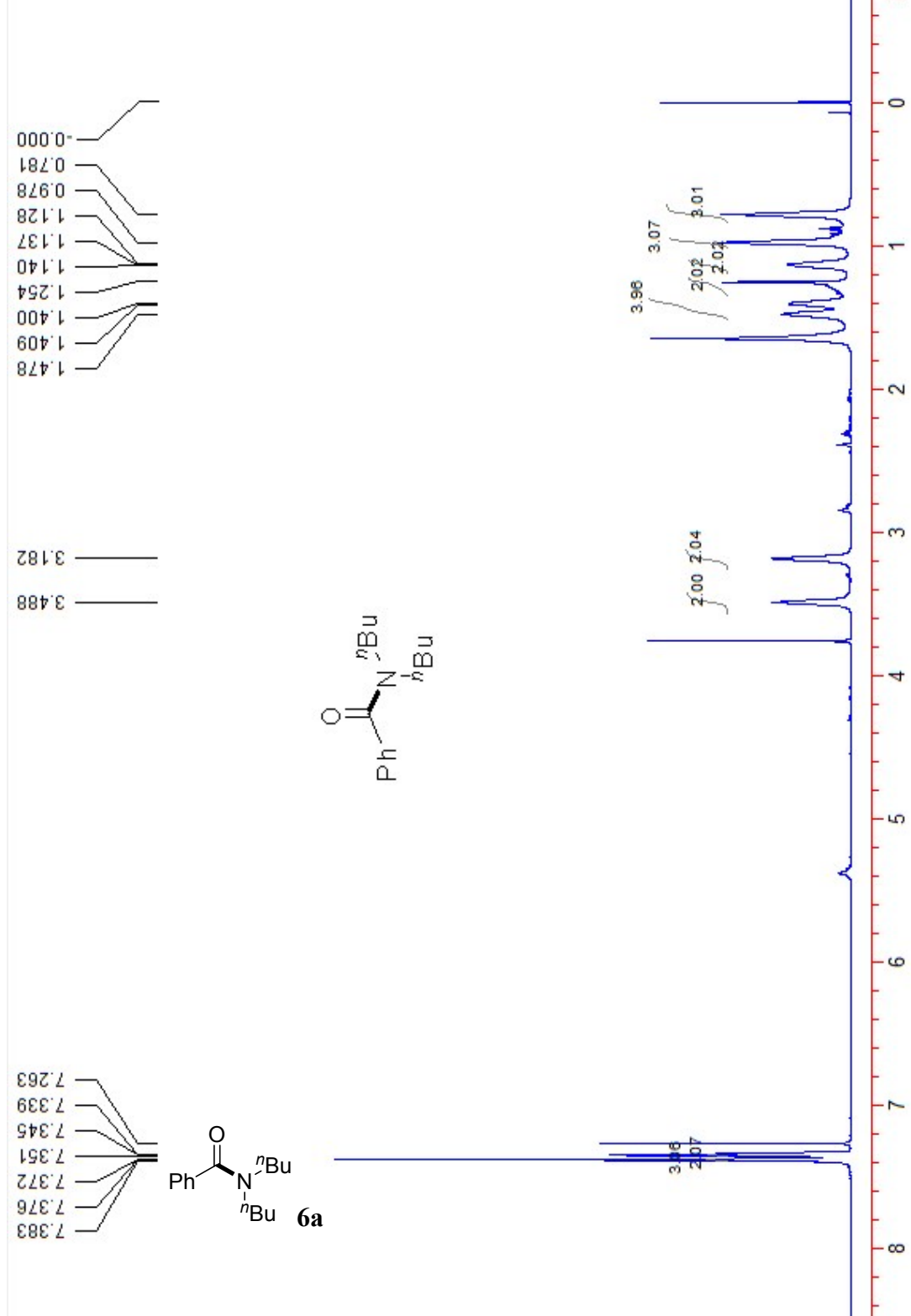


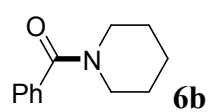
¹³C NMR



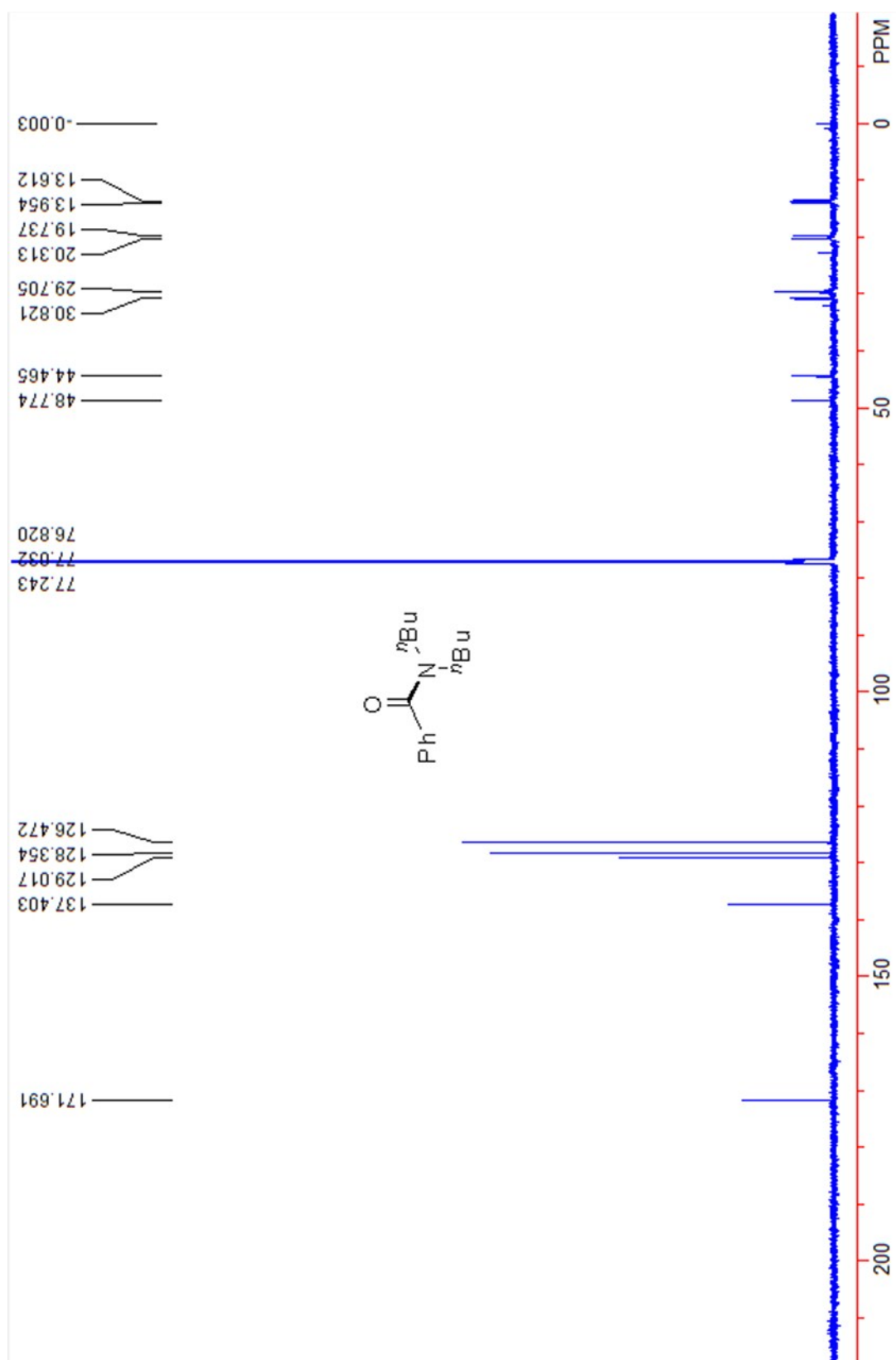


¹³C NMR

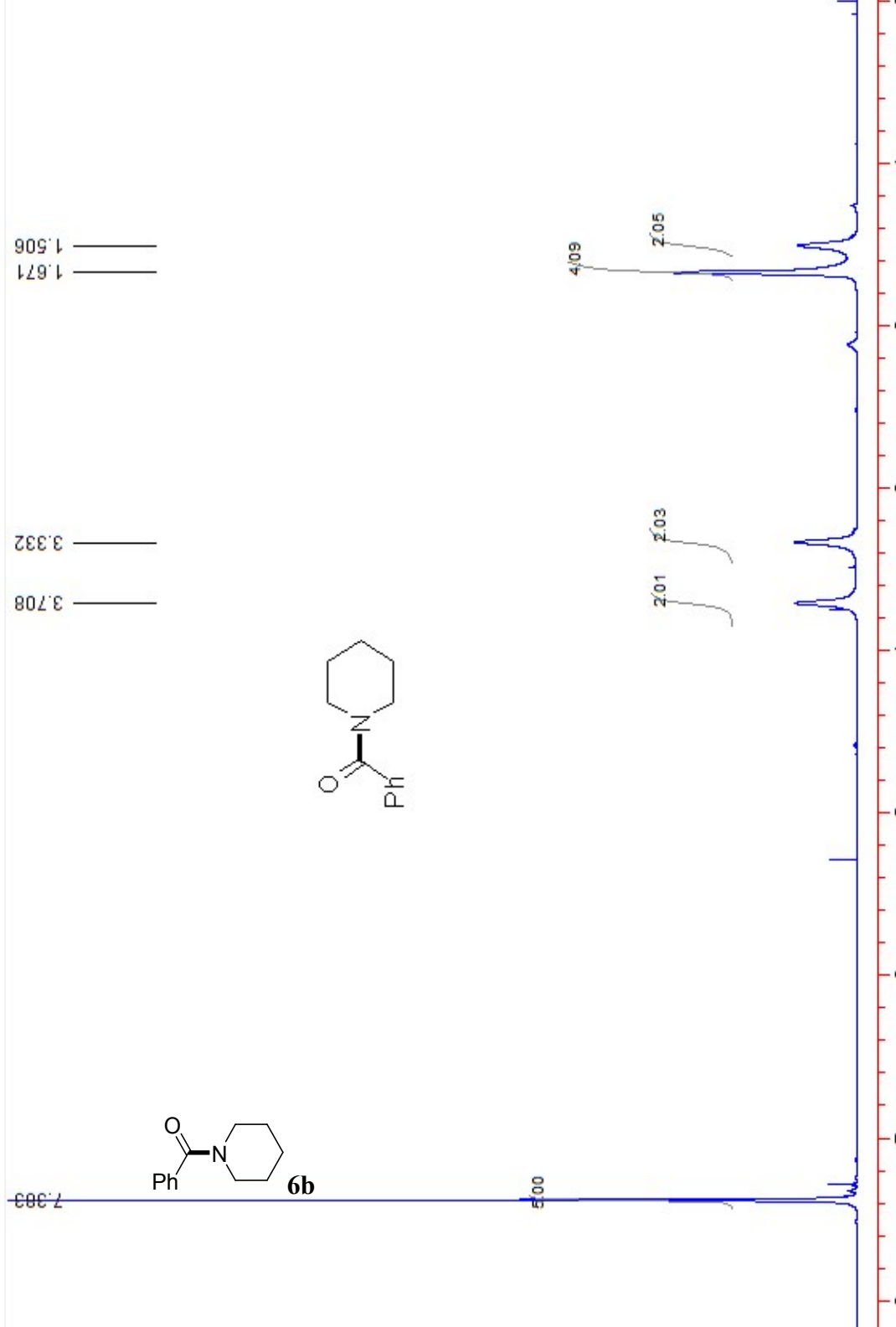


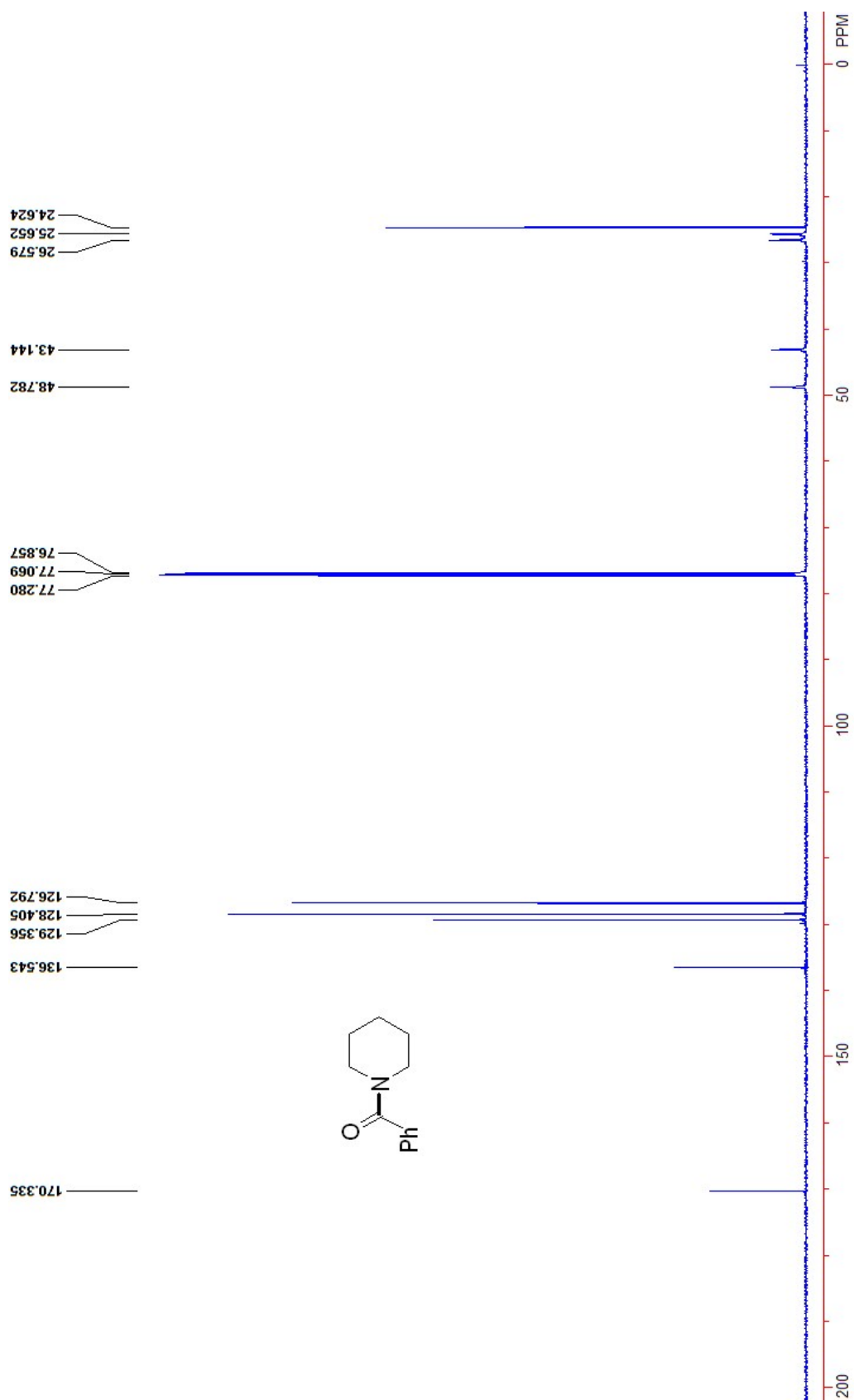


¹H NMR



¹³C NMR



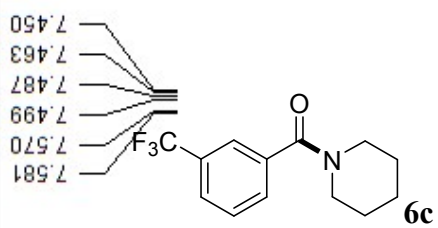
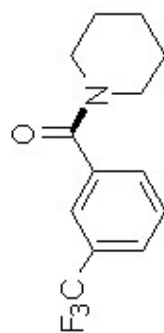


^1H NMR

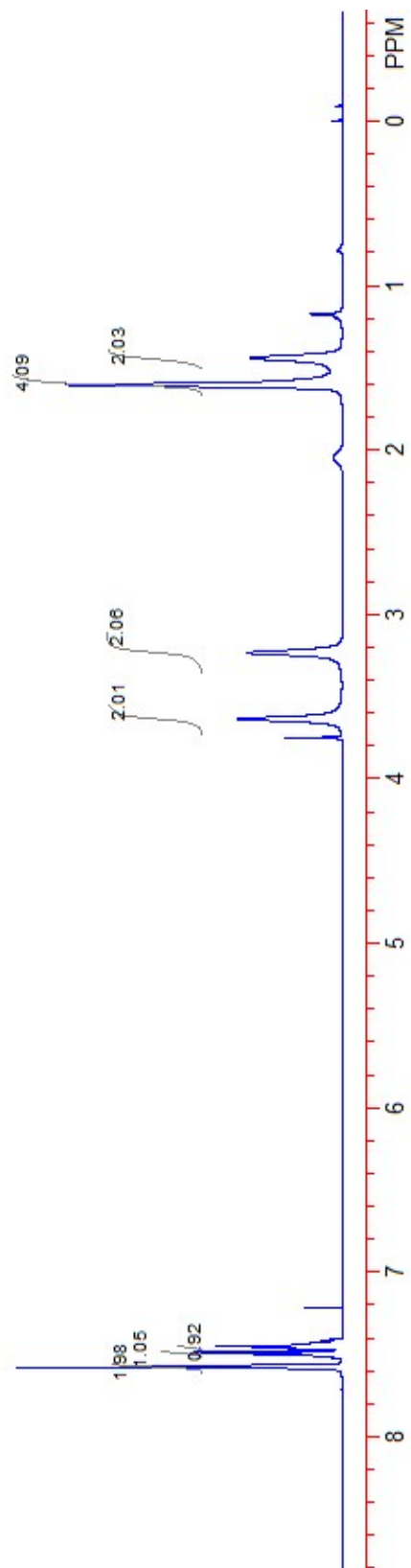
1.605
1.442

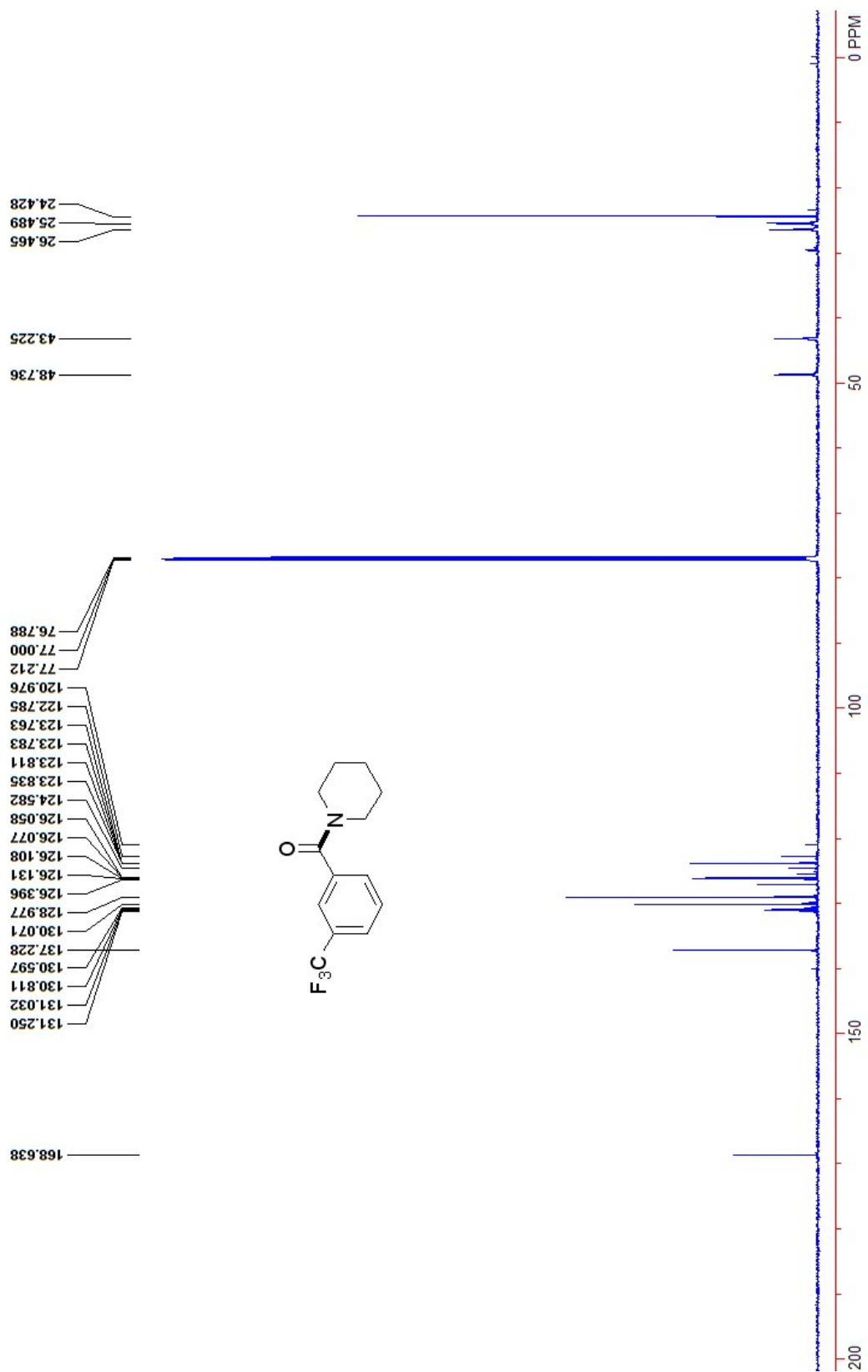
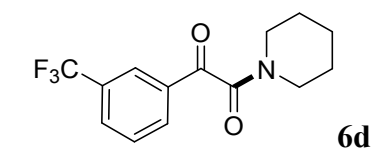
3.233

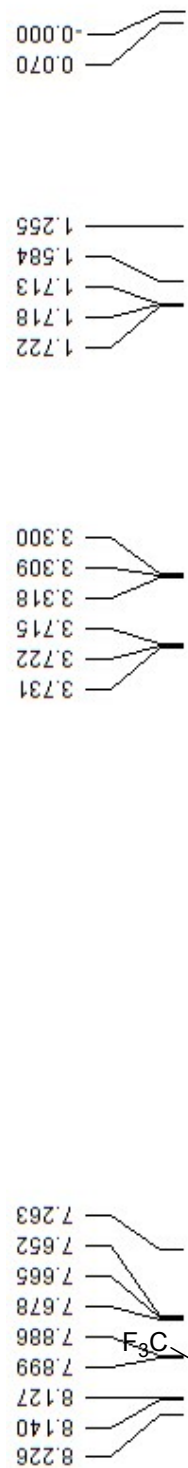
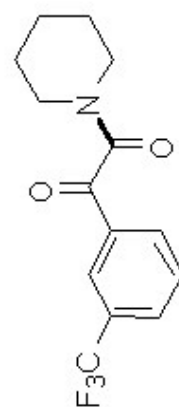
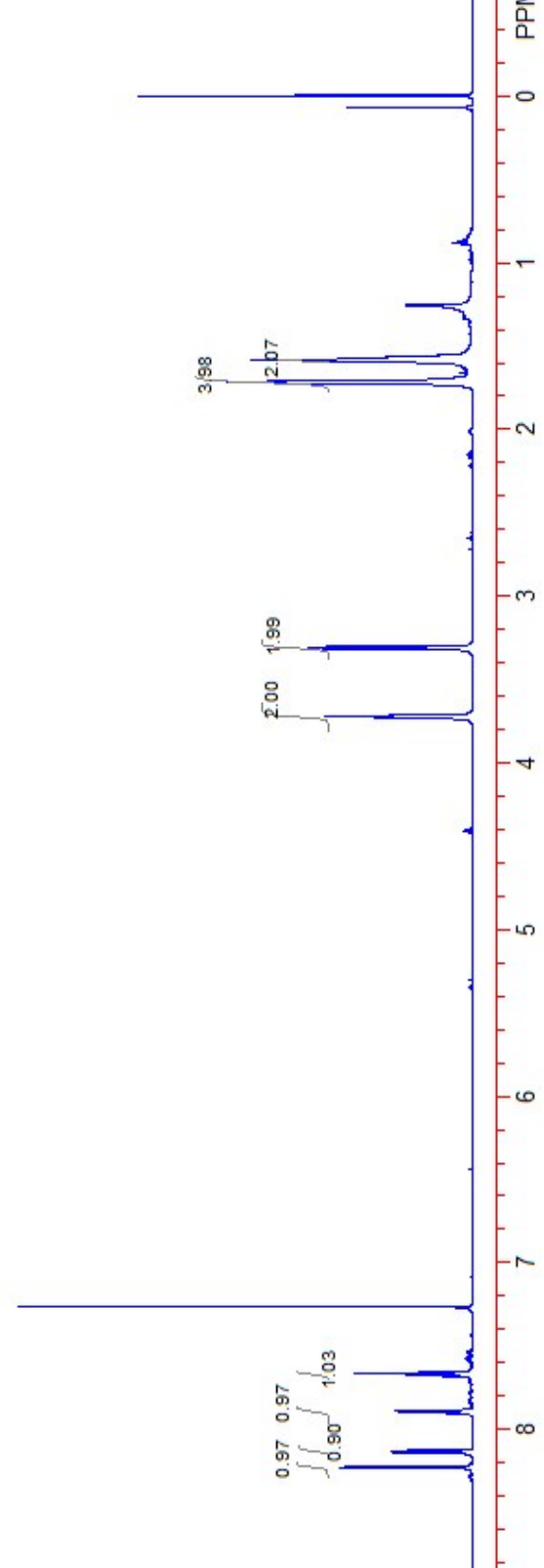
3.636



^{13}C NMR



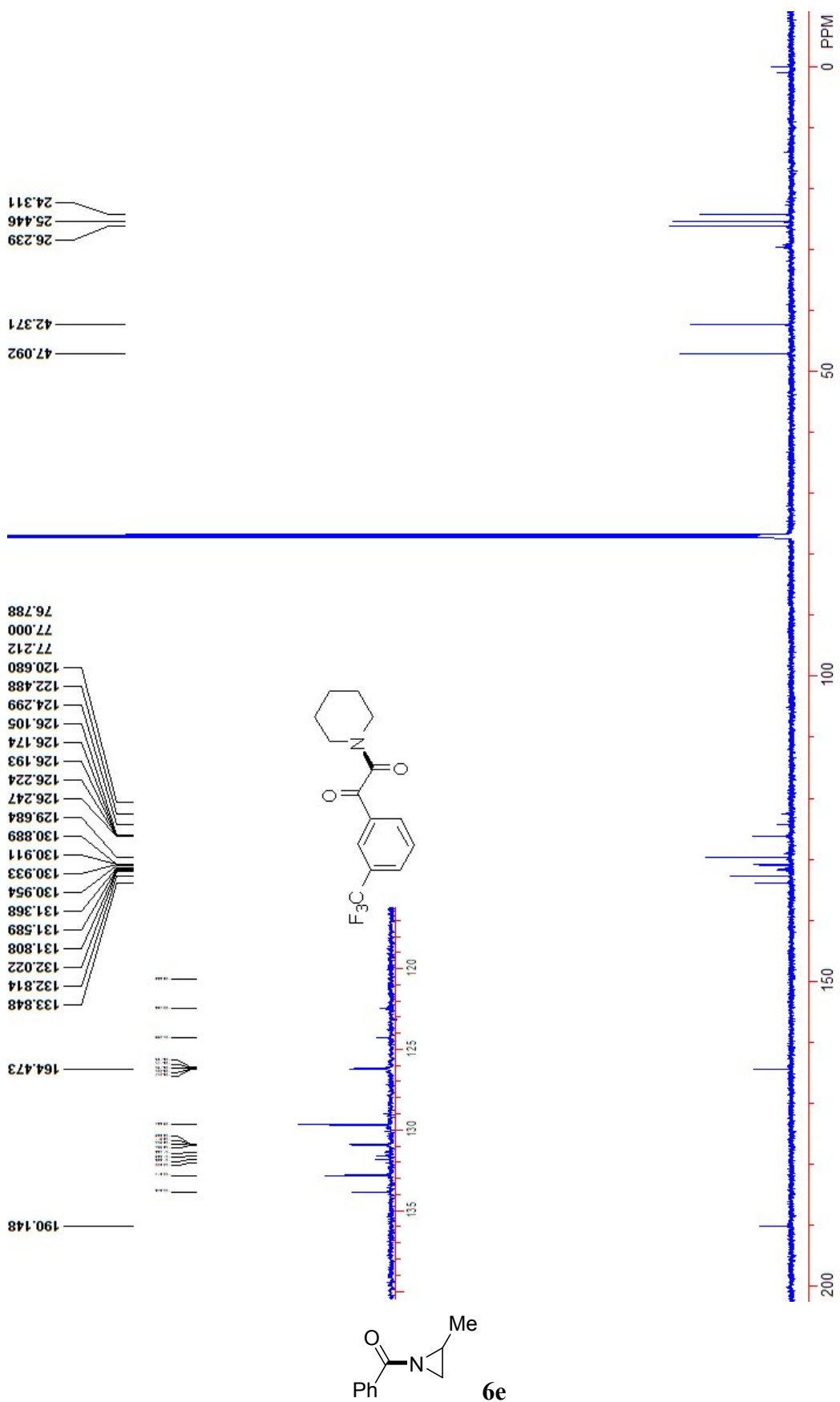




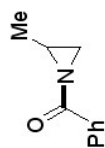
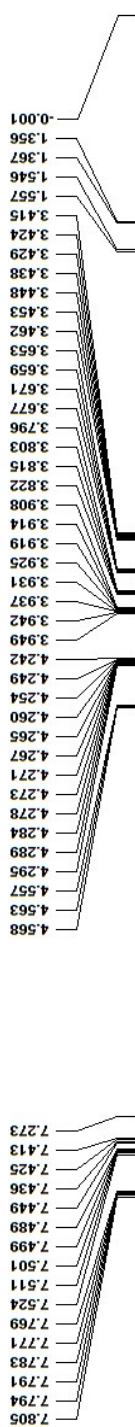
¹H NMR

¹³C NMR

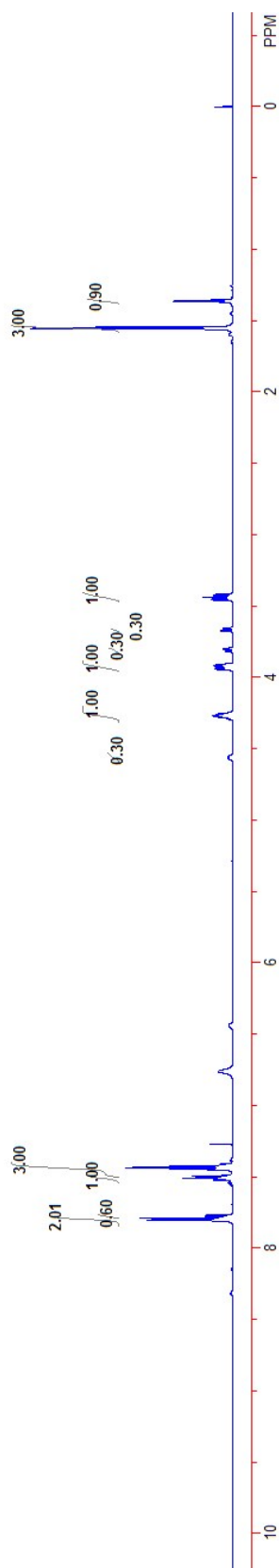
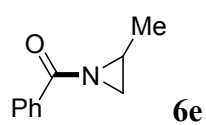
¹H NMR



¹³C NMR

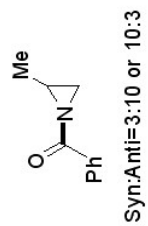


Syn:Anti=3:10 or 10:3

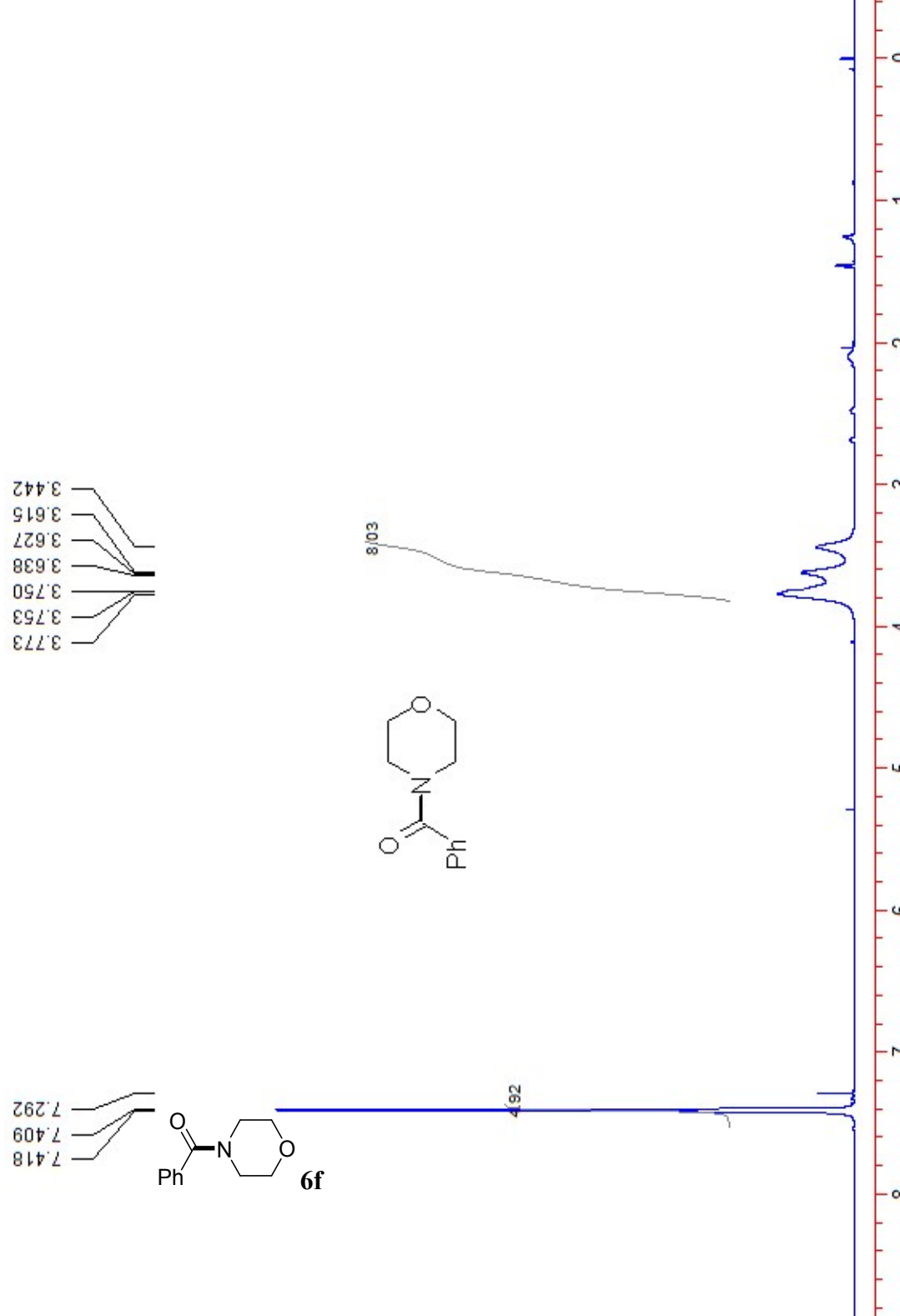


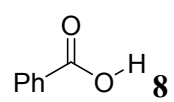
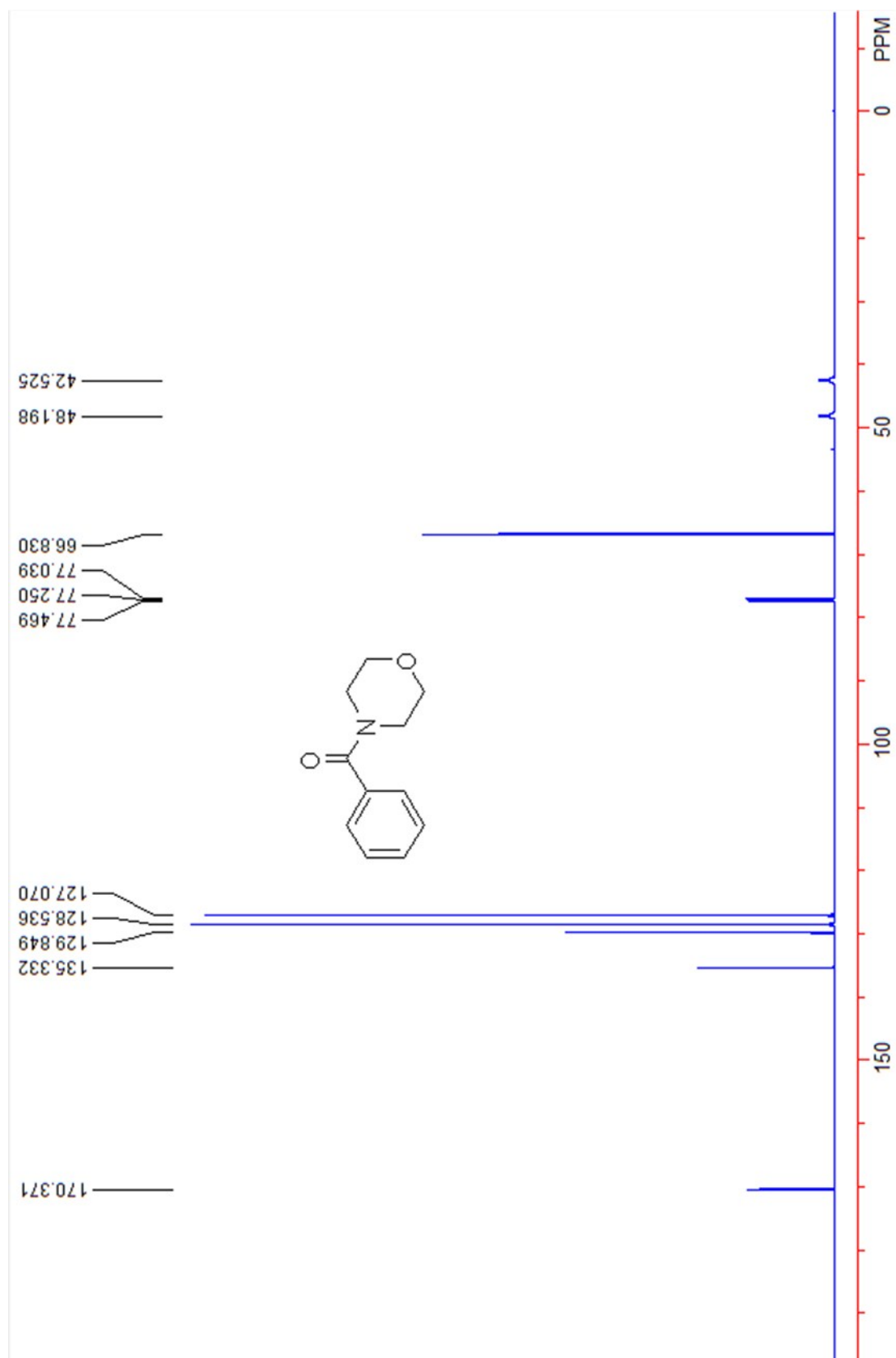


¹H NMR

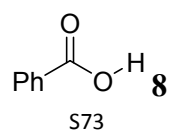
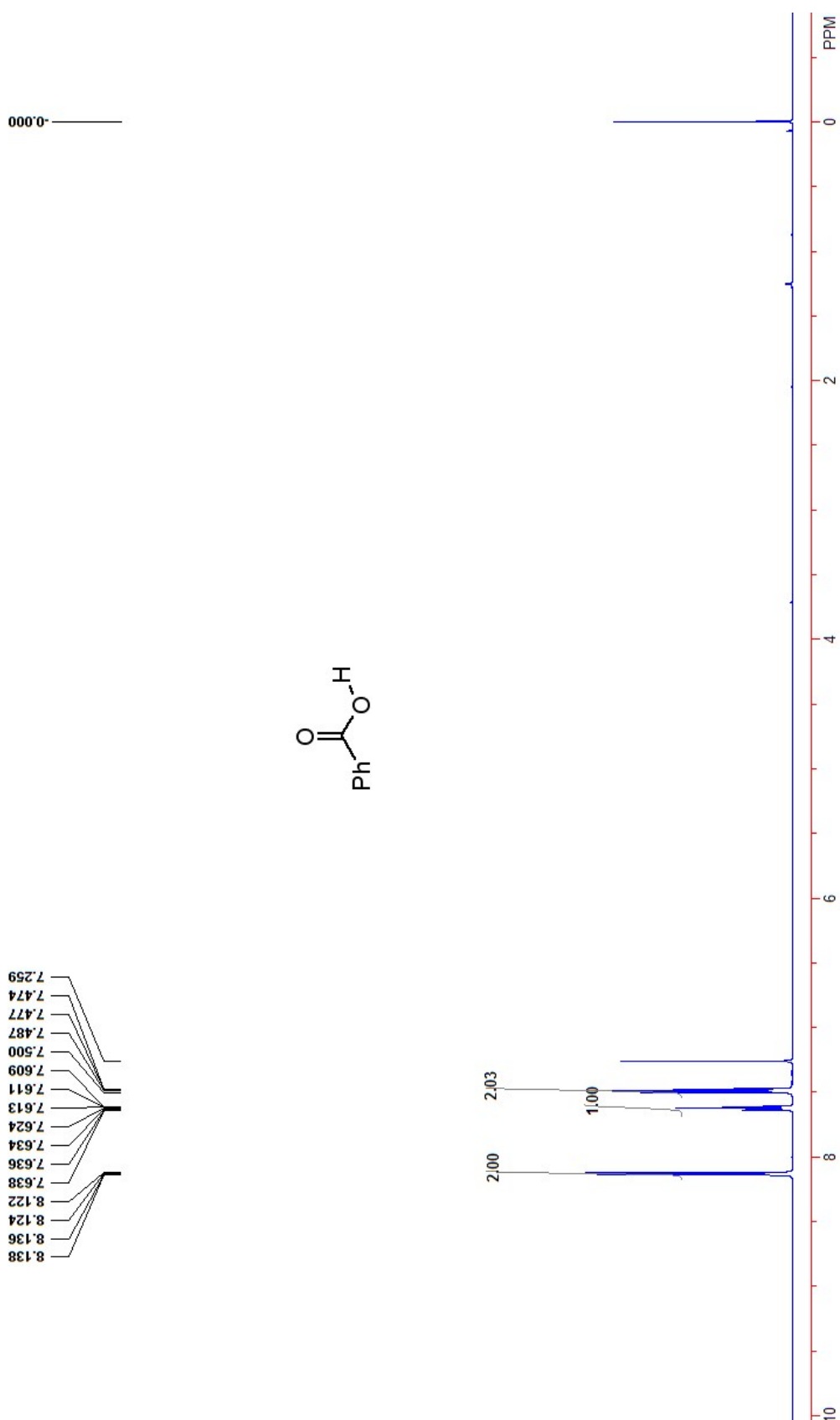


¹³C NMR

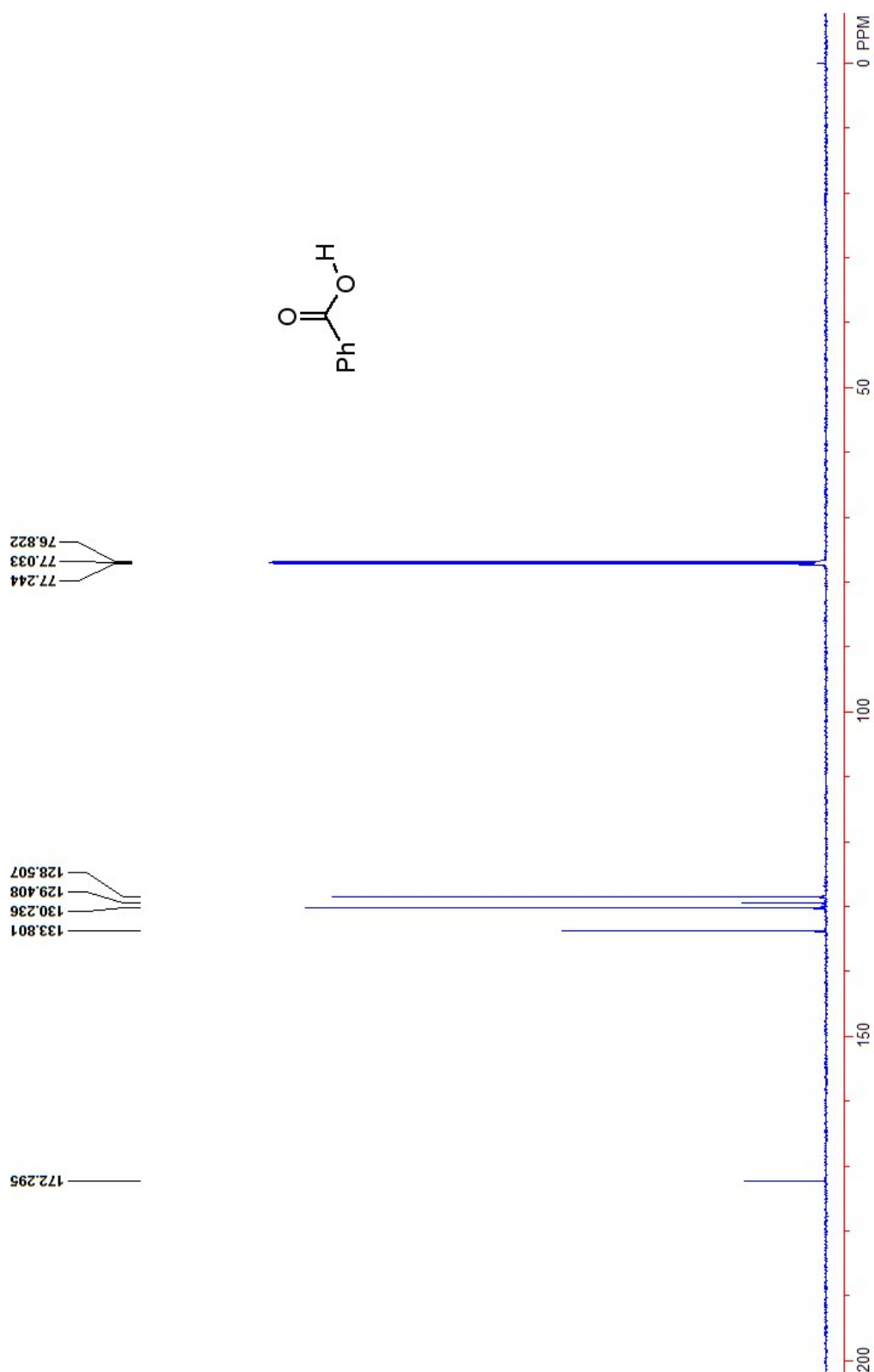




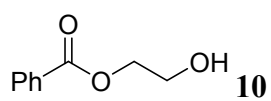
¹H NMR

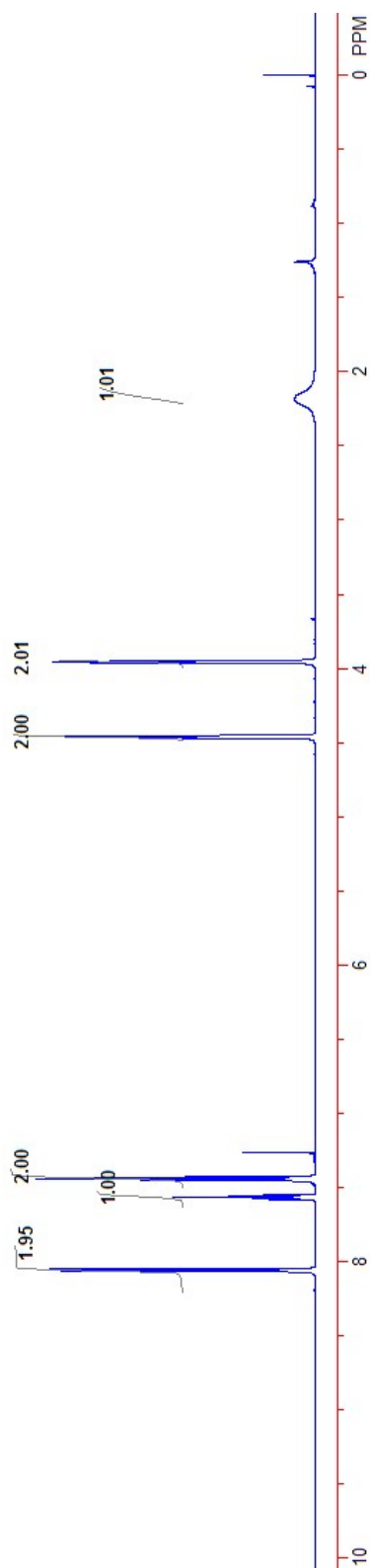
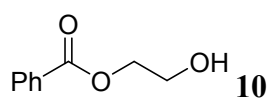


¹³C NMR



¹H NMR





^{13}C NMR

