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# **A Facile Method for Oxidation of Primary Alcohols to Carboxylic Acids and Its Application in Glycosaminoglycan Syntheses**

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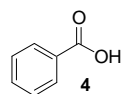
*Department of Chemistry, The University of Toledo, 2801 W. Bancroft Street, MS 602, Toledo, OH 43606, USA*

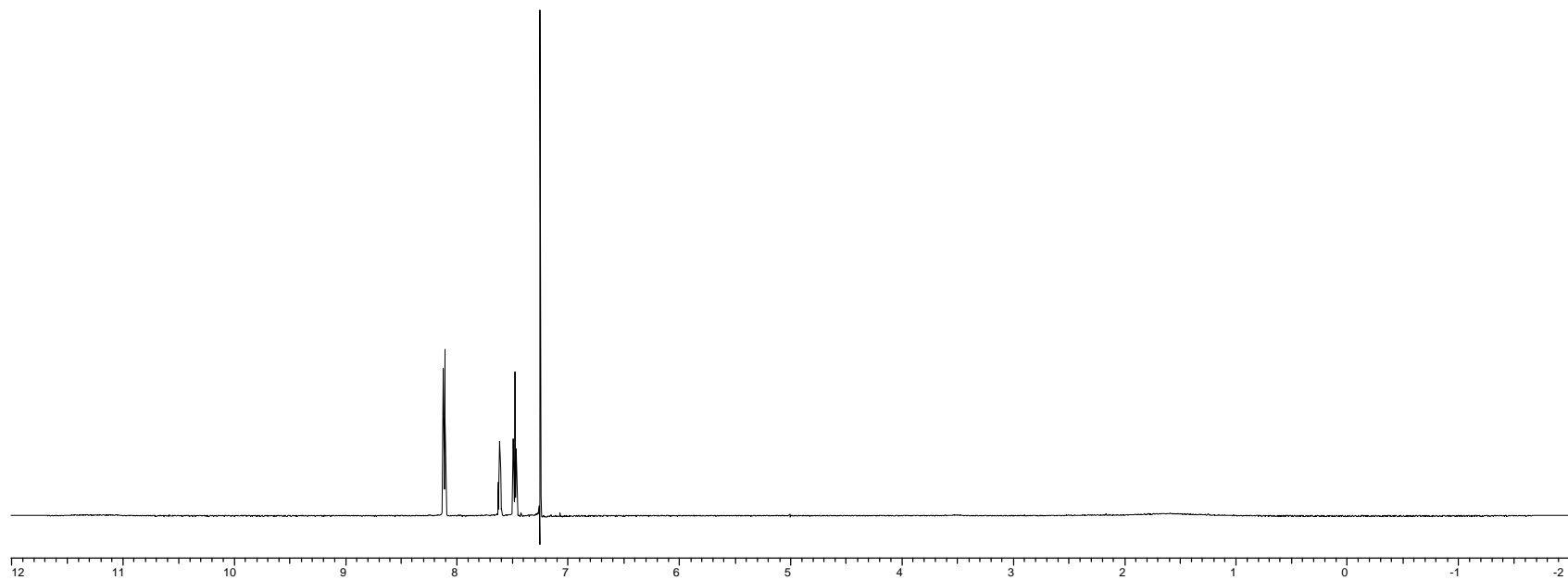
*Corresponding author: Tel: 1-419-530-1507; Fax: 1-419-530-4033;*

*Email: [xuefei.huang@utoledo.edu](mailto:xuefei.huang@utoledo.edu)*

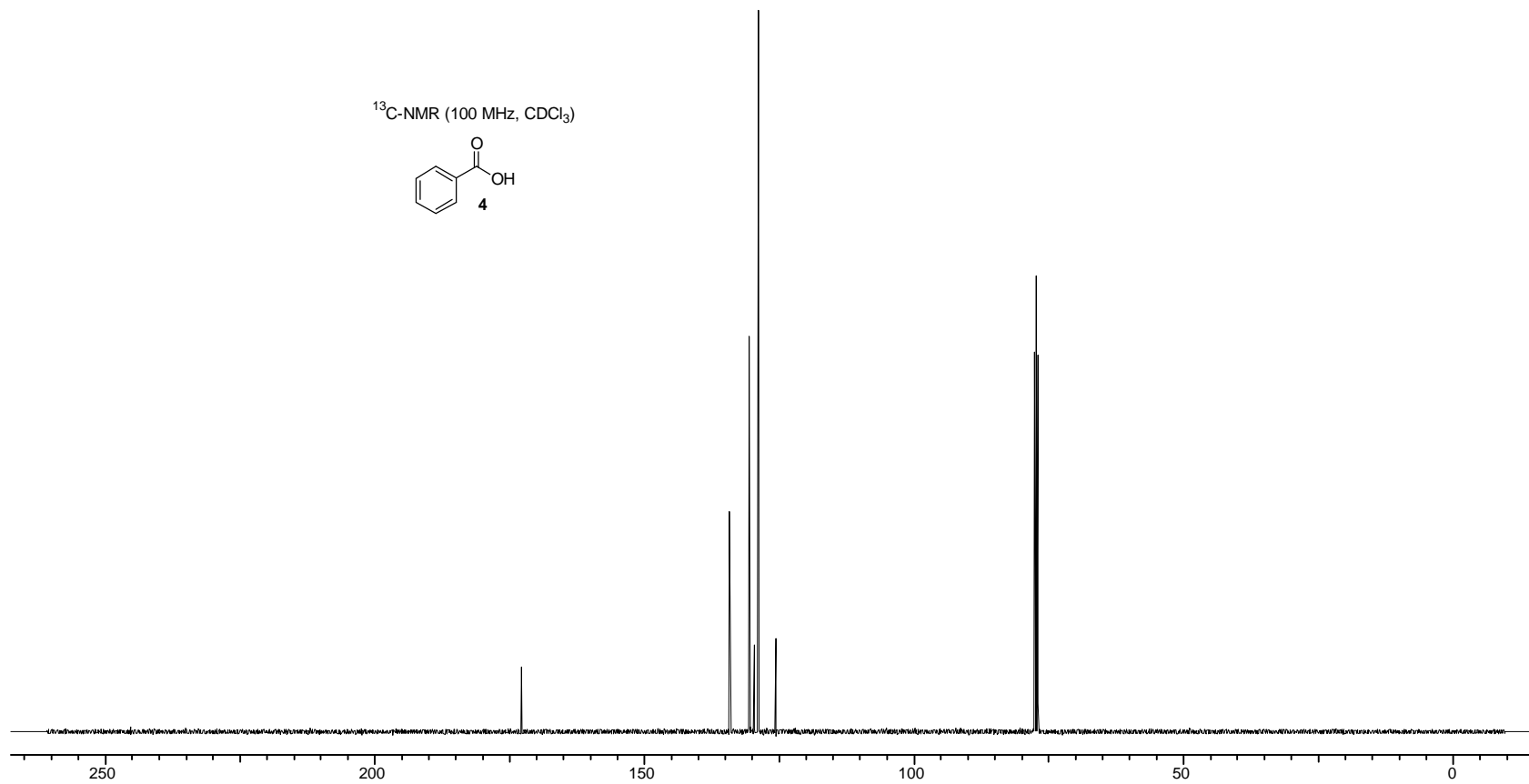
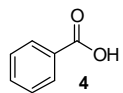
## $^1\text{H}$ - and $^{13}\text{C}$ - NMR Spectra

$^1\text{H}$ -NMR (600 MHz,  $\text{CDCl}_3$ )

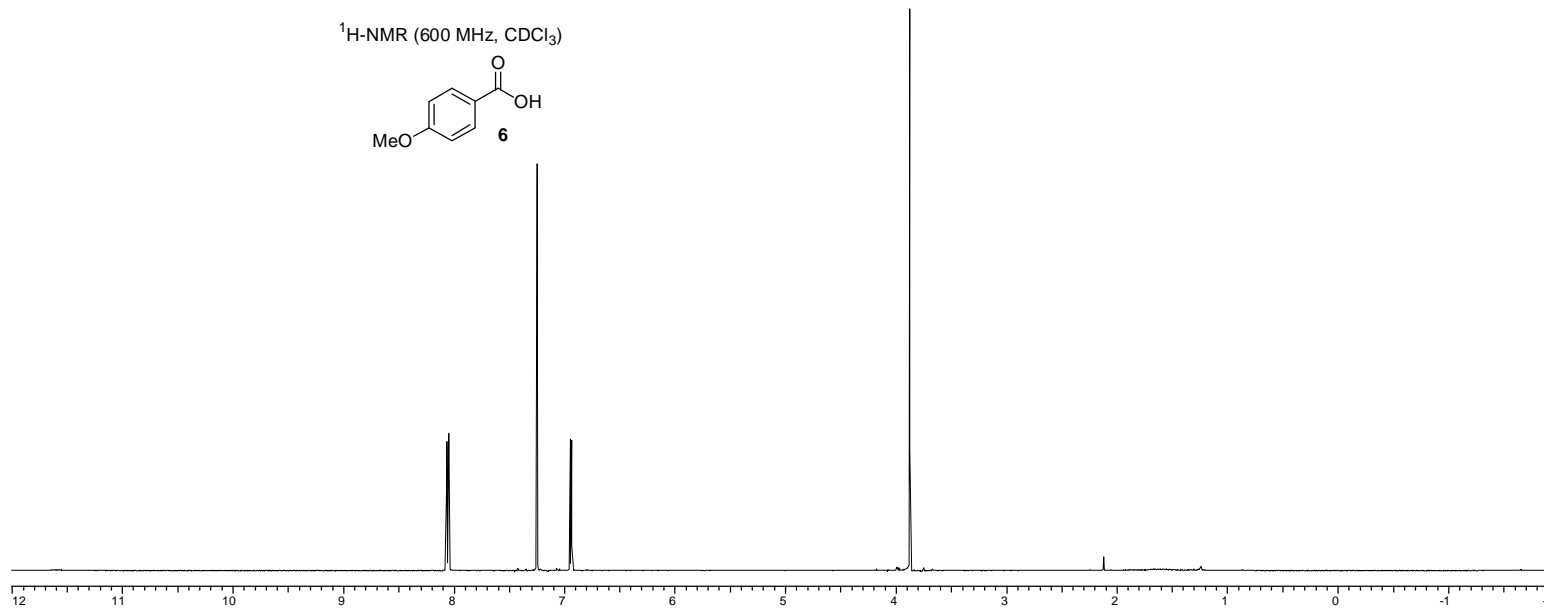
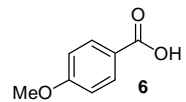




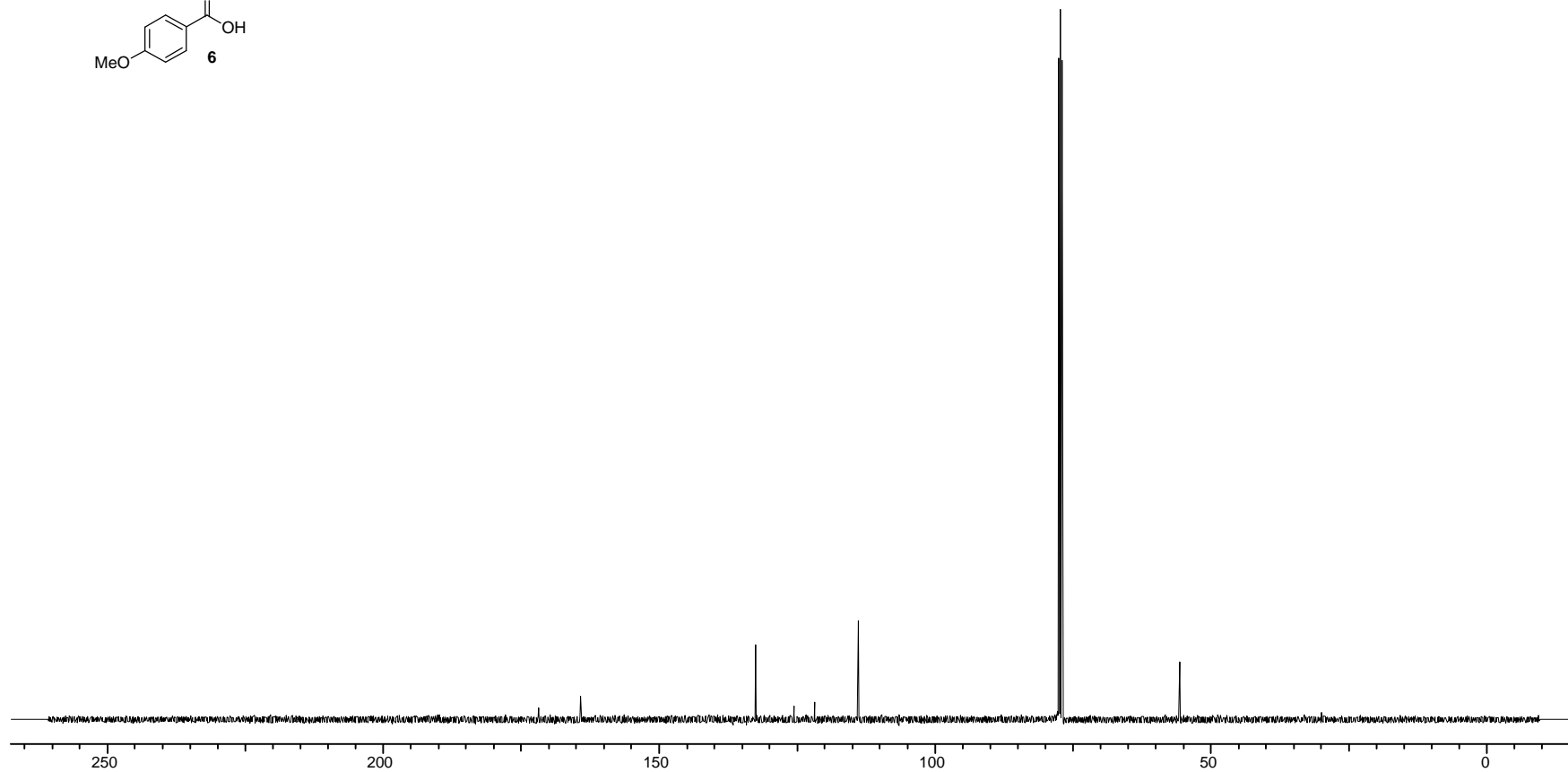
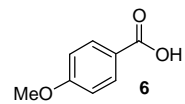
$^{13}\text{C}$ -NMR (100 MHz,  $\text{CDCl}_3$ )



<sup>1</sup>H-NMR (600 MHz, CDCl<sub>3</sub>)



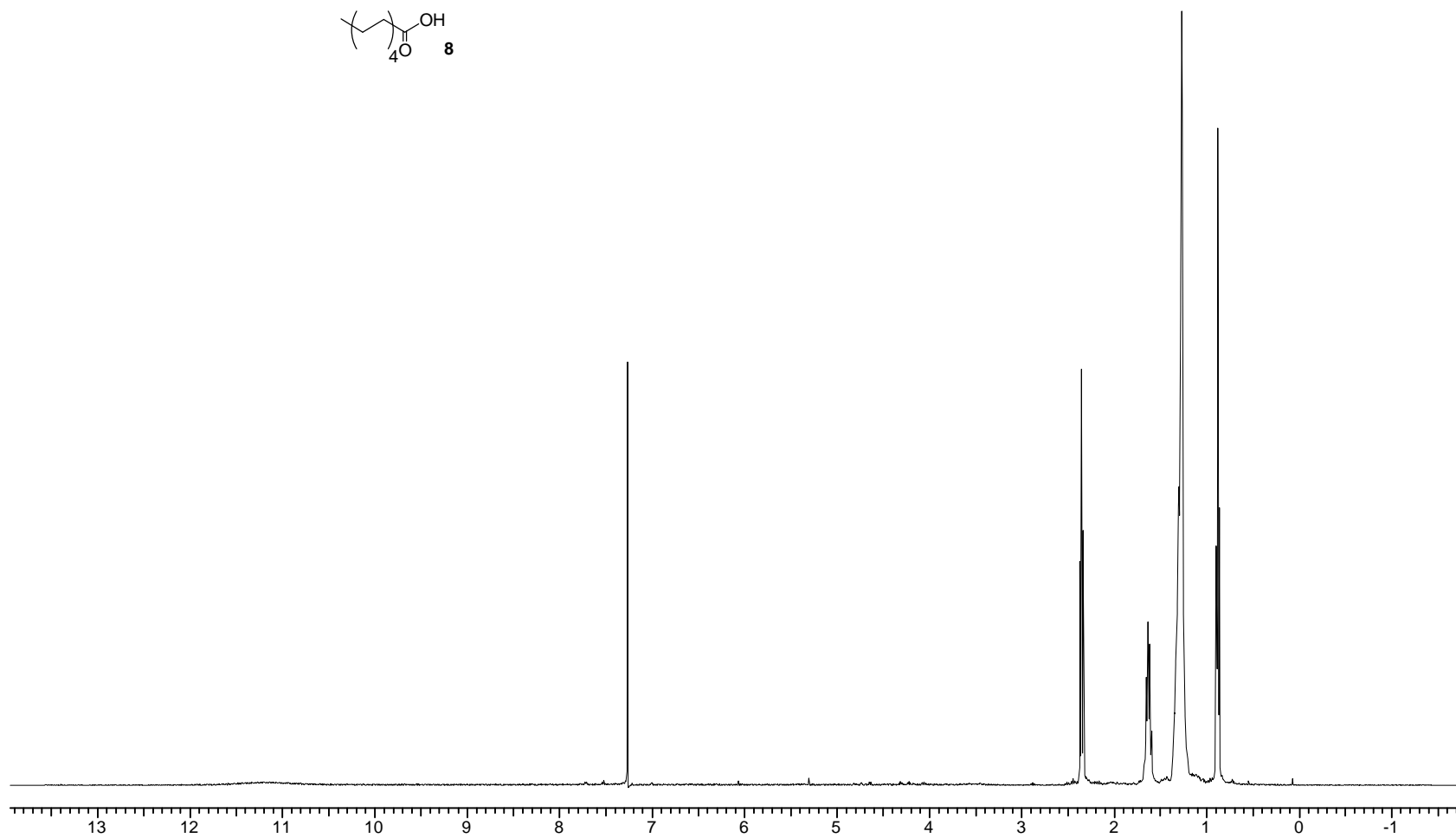
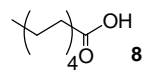
$^{13}\text{C-NMR}$  (100 MHz,  $\text{CDCl}_3$ )



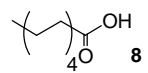


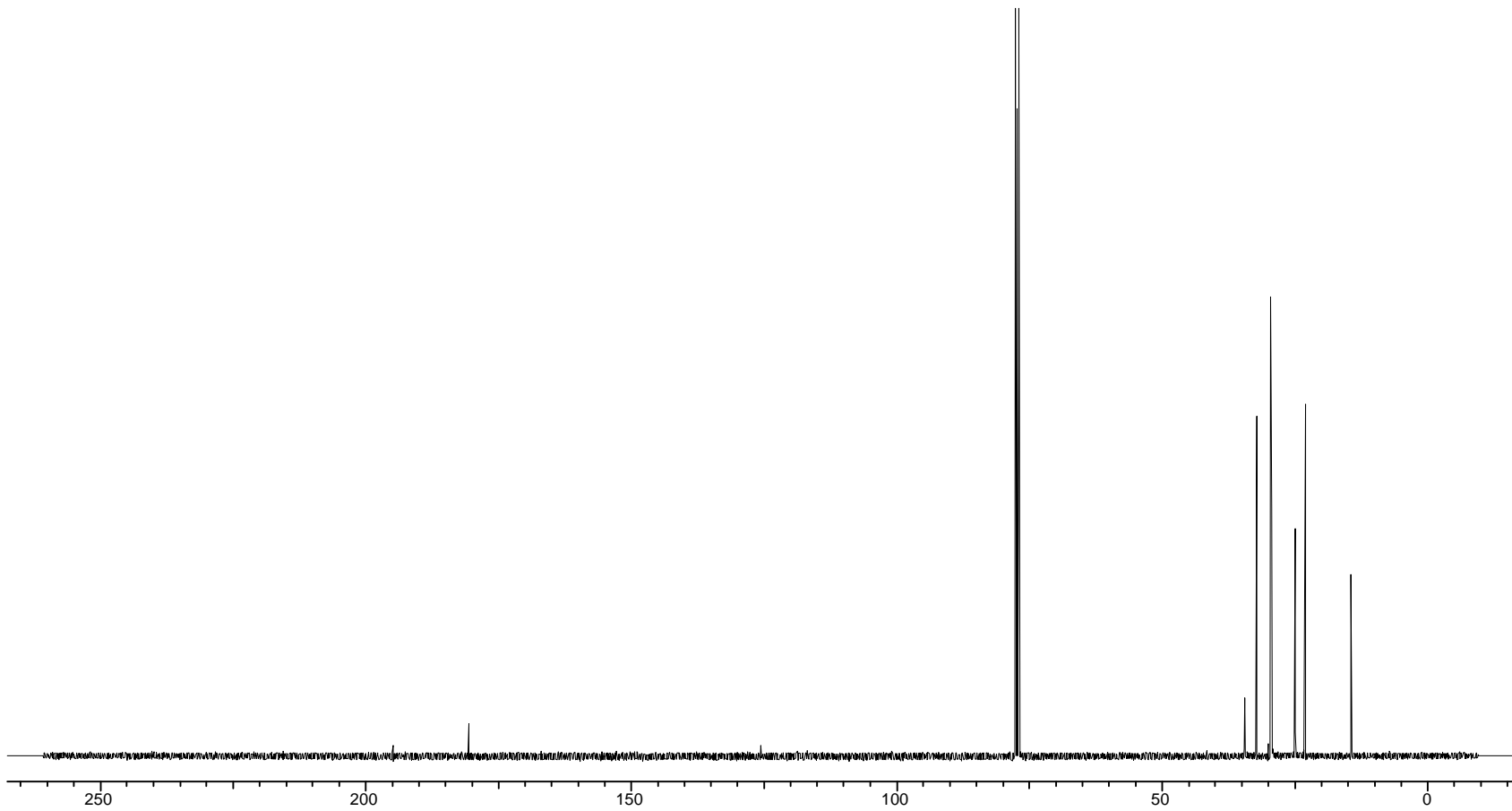


<sup>1</sup>H-NMR (400 MHz, CDCl<sub>3</sub>)

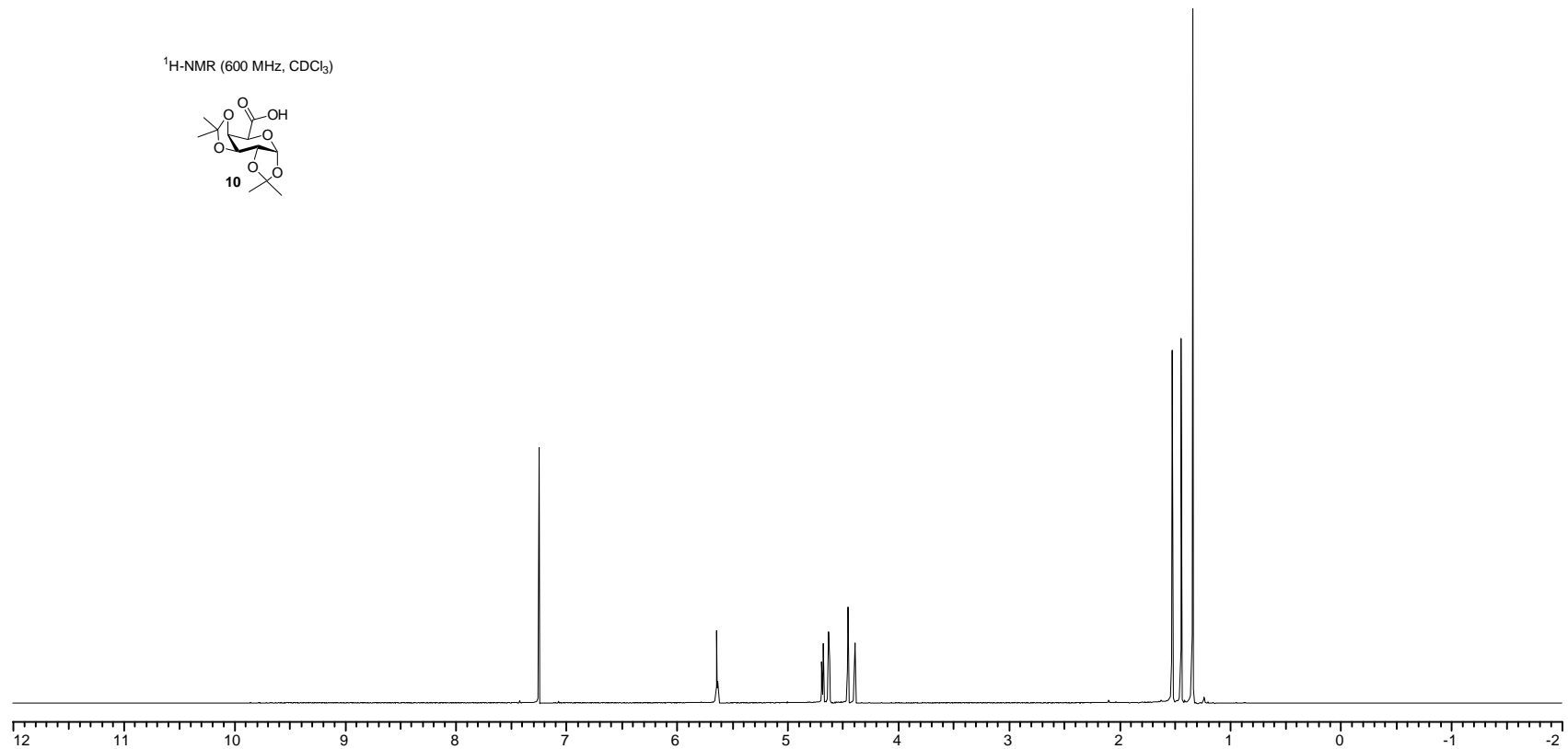
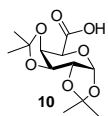


$^{13}\text{C}$ -NMR (100 MHz,  $\text{CDCl}_3$ )



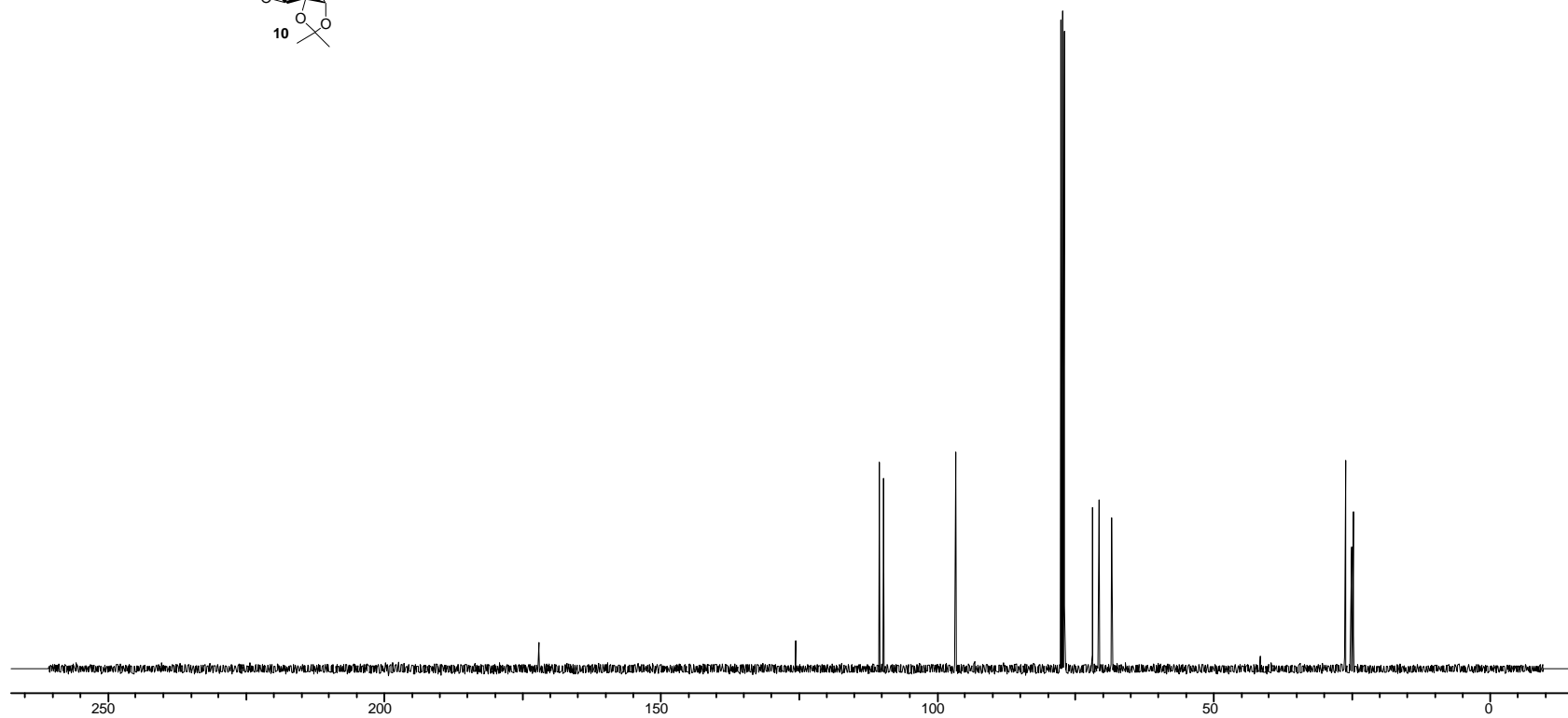
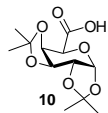


<sup>1</sup>H-NMR (600 MHz, CDCl<sub>3</sub>)

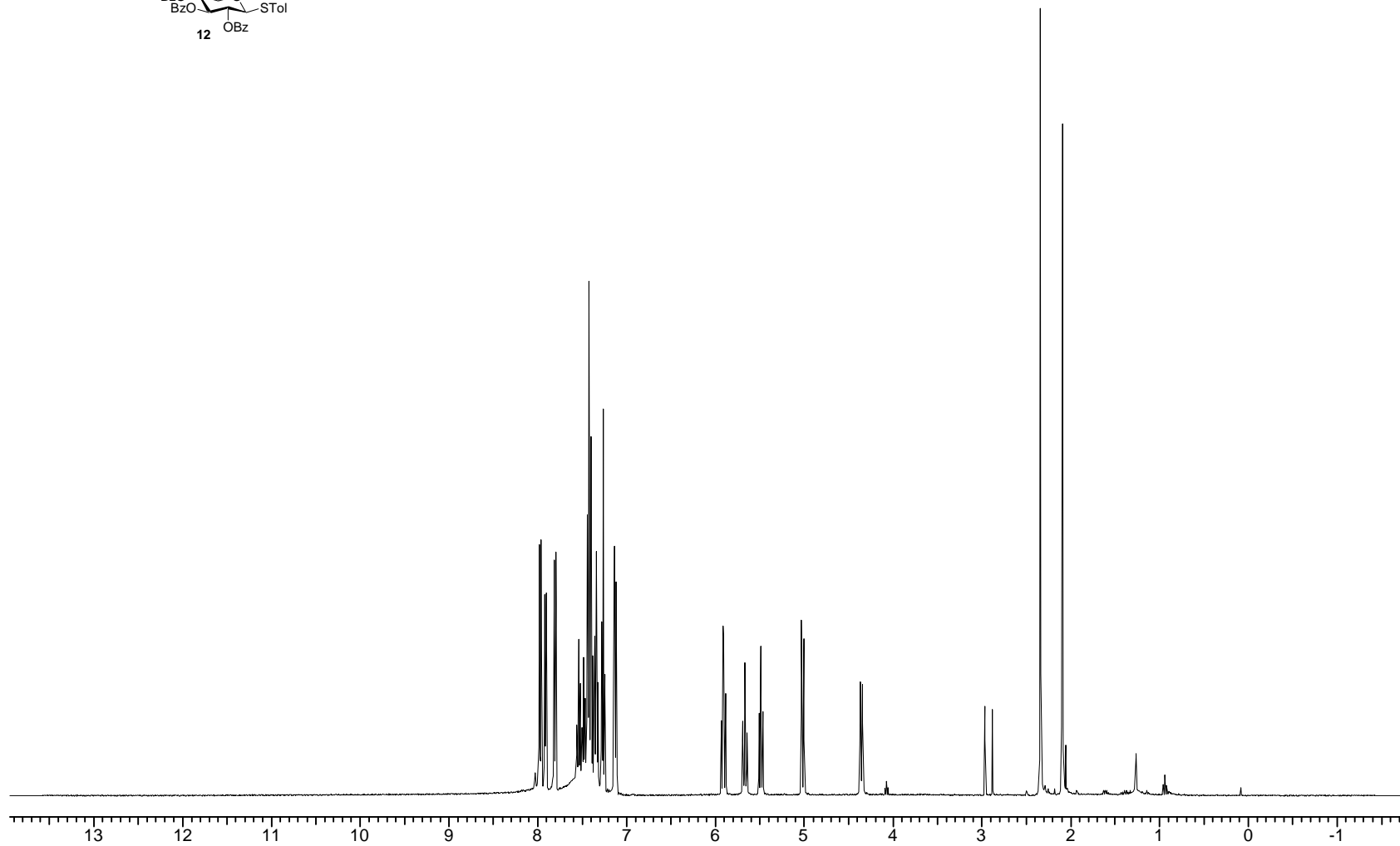
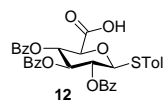




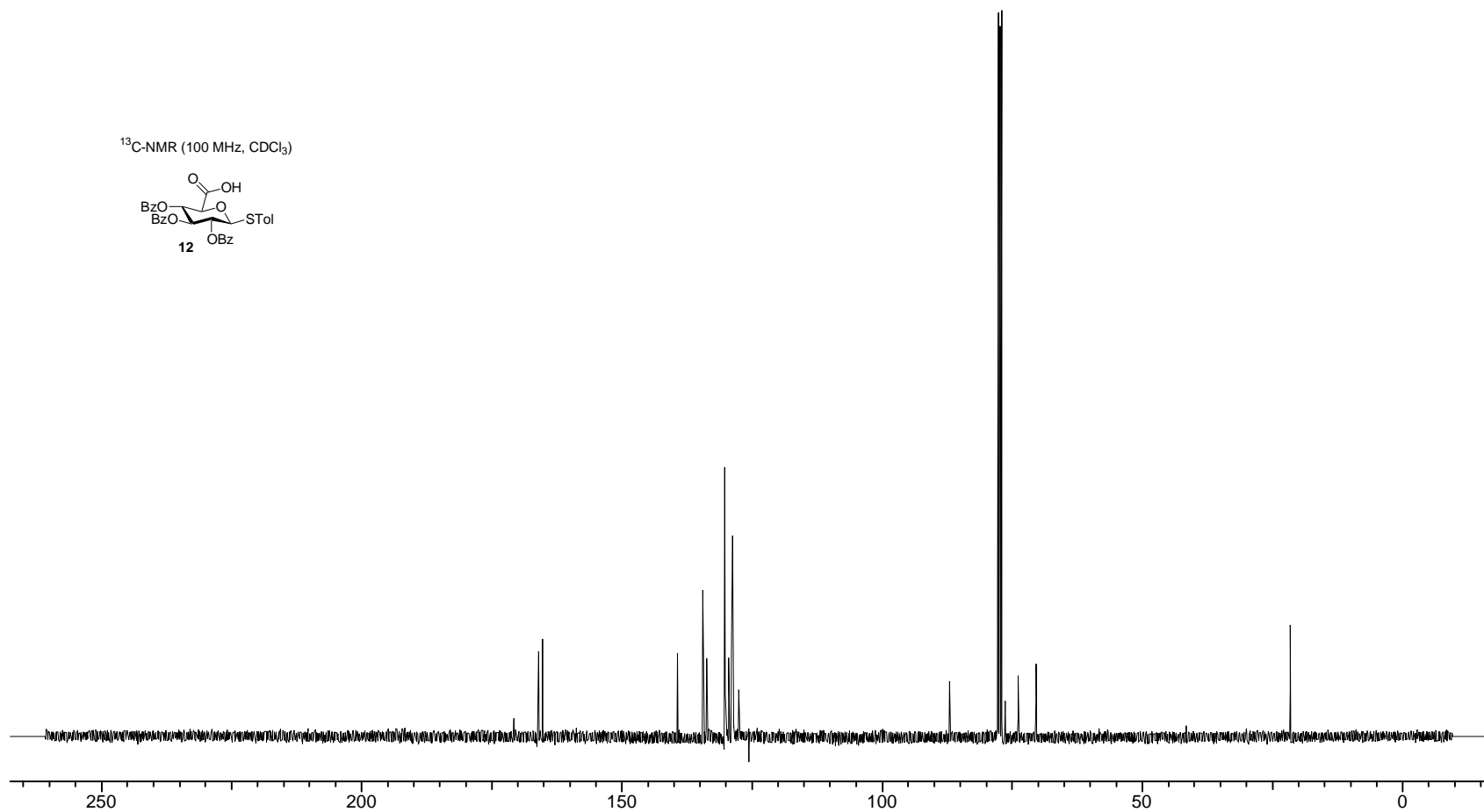
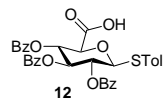
<sup>13</sup>C-NMR (100 MHz, CDCl<sub>3</sub>)



<sup>1</sup>H-NMR (400 MHz, CDCl<sub>3</sub>)

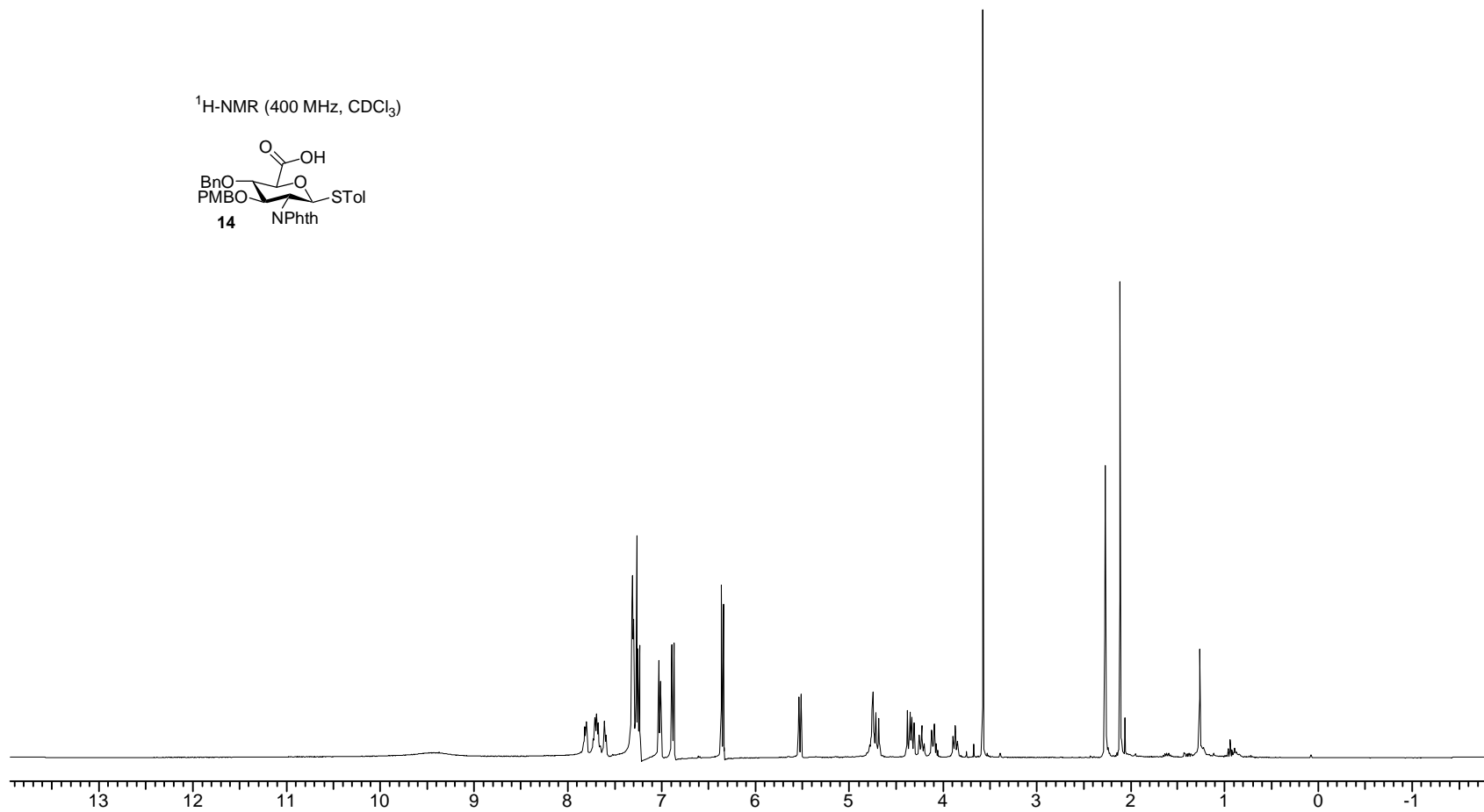
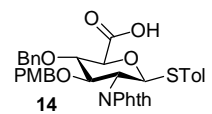


<sup>13</sup>C-NMR (100 MHz, CDCl<sub>3</sub>)



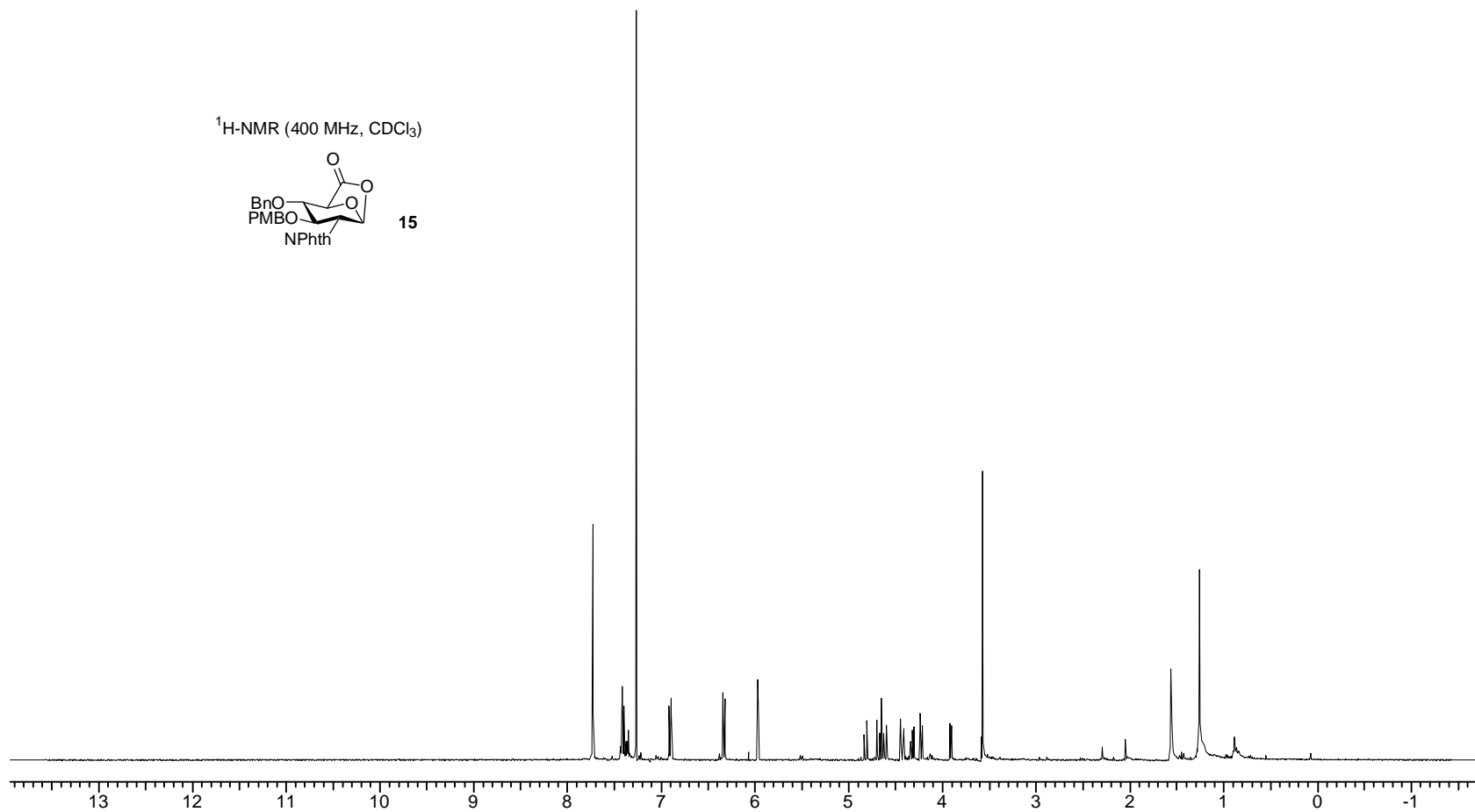
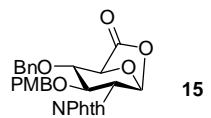


$^1\text{H-NMR}$  (400 MHz,  $\text{CDCl}_3$ )



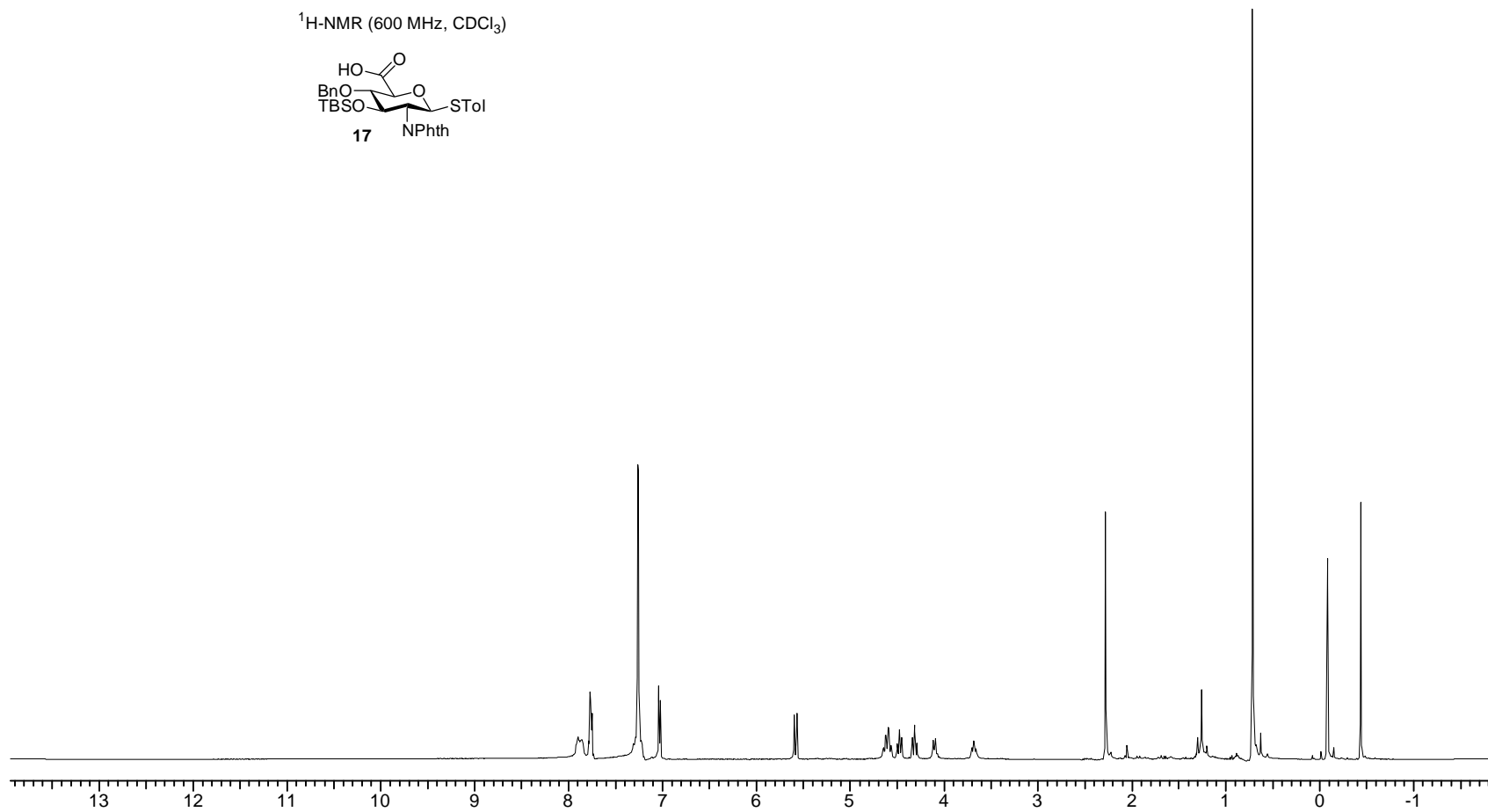
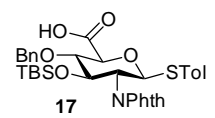


<sup>1</sup>H-NMR (400 MHz, CDCl<sub>3</sub>)

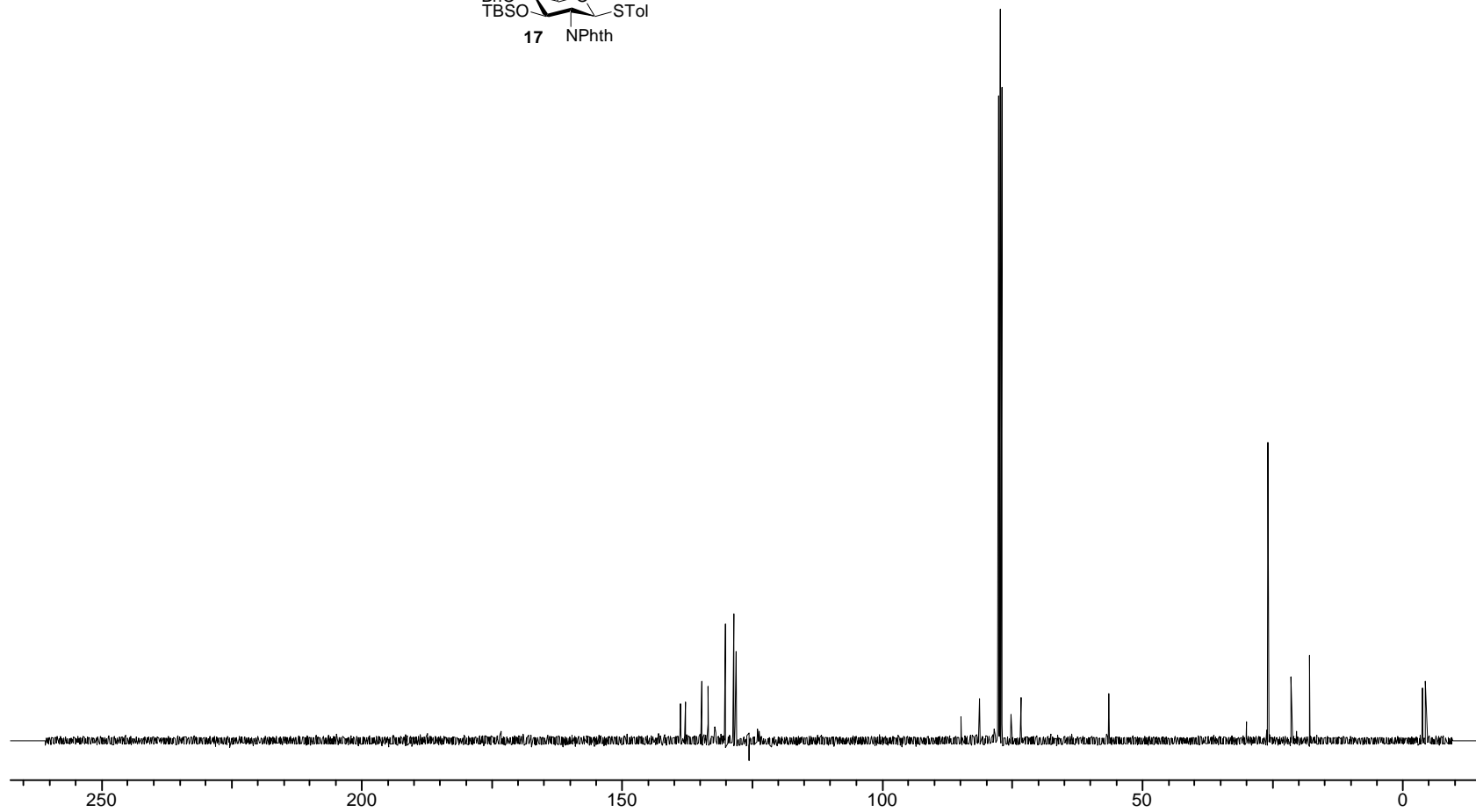
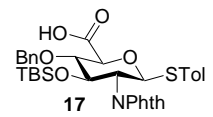


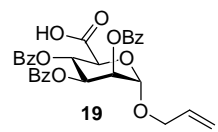


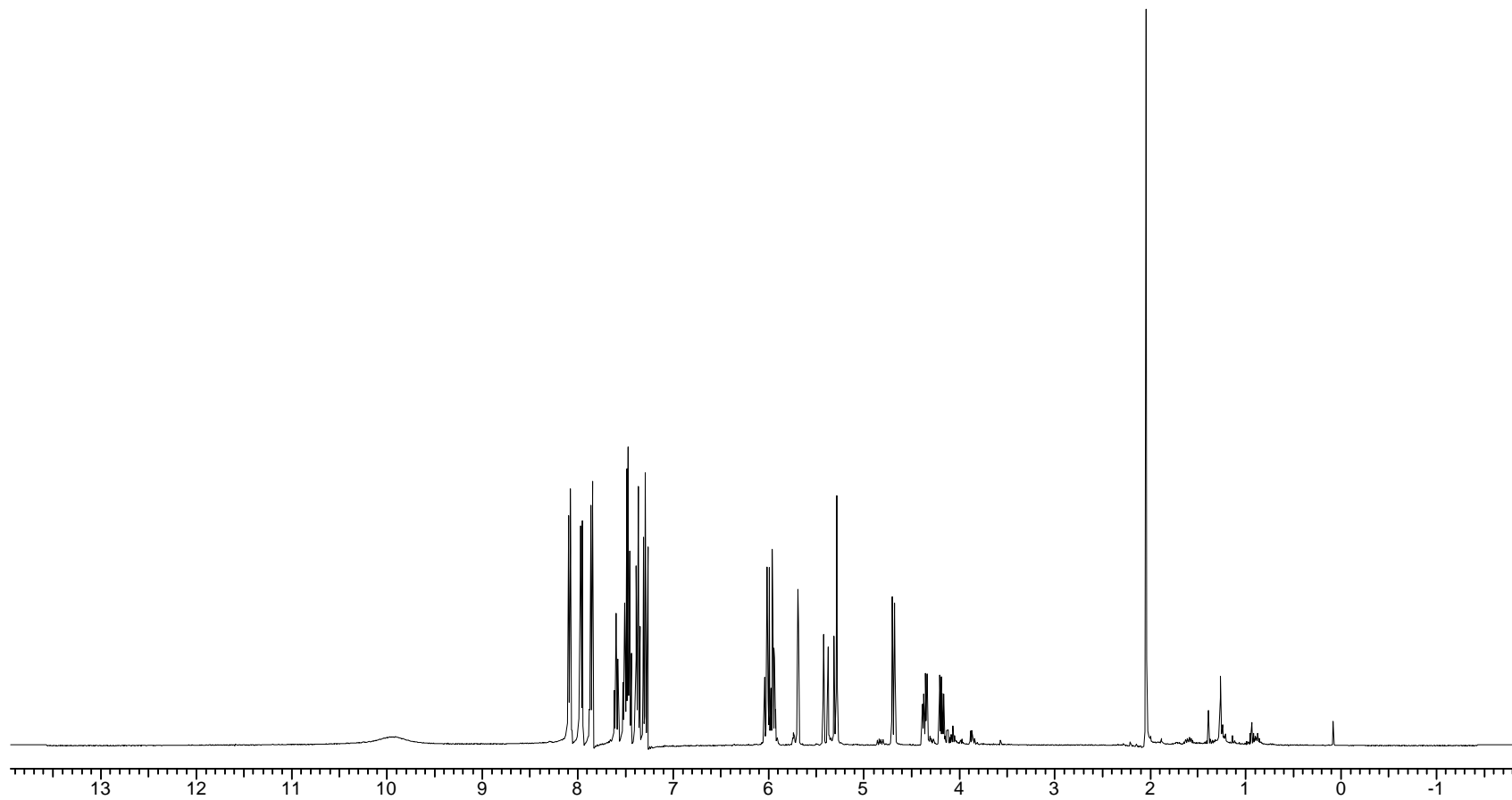
<sup>1</sup>H-NMR (600 MHz, CDCl<sub>3</sub>)



<sup>13</sup>C-NMR (150 MHz, CDCl<sub>3</sub>)

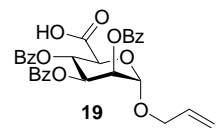


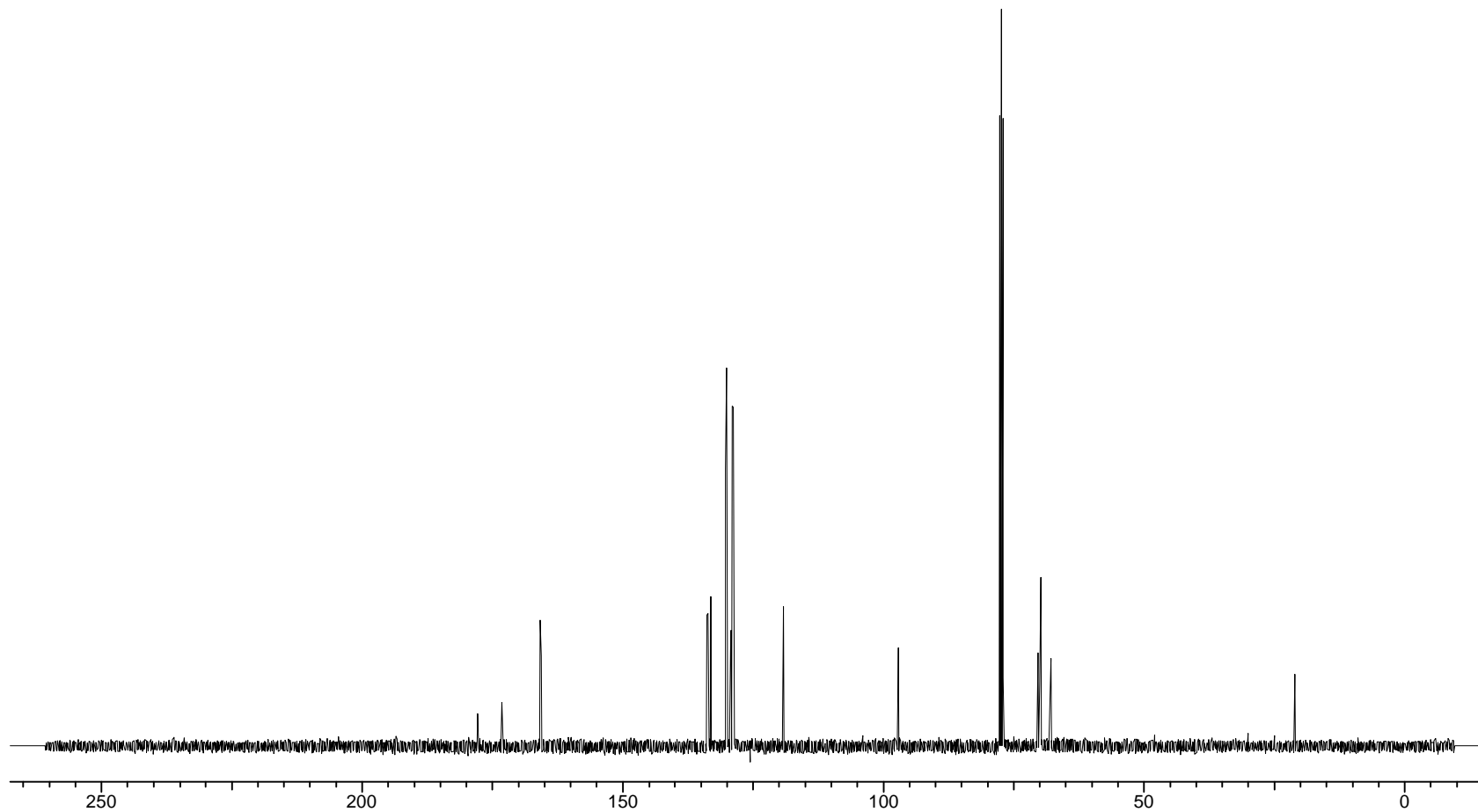




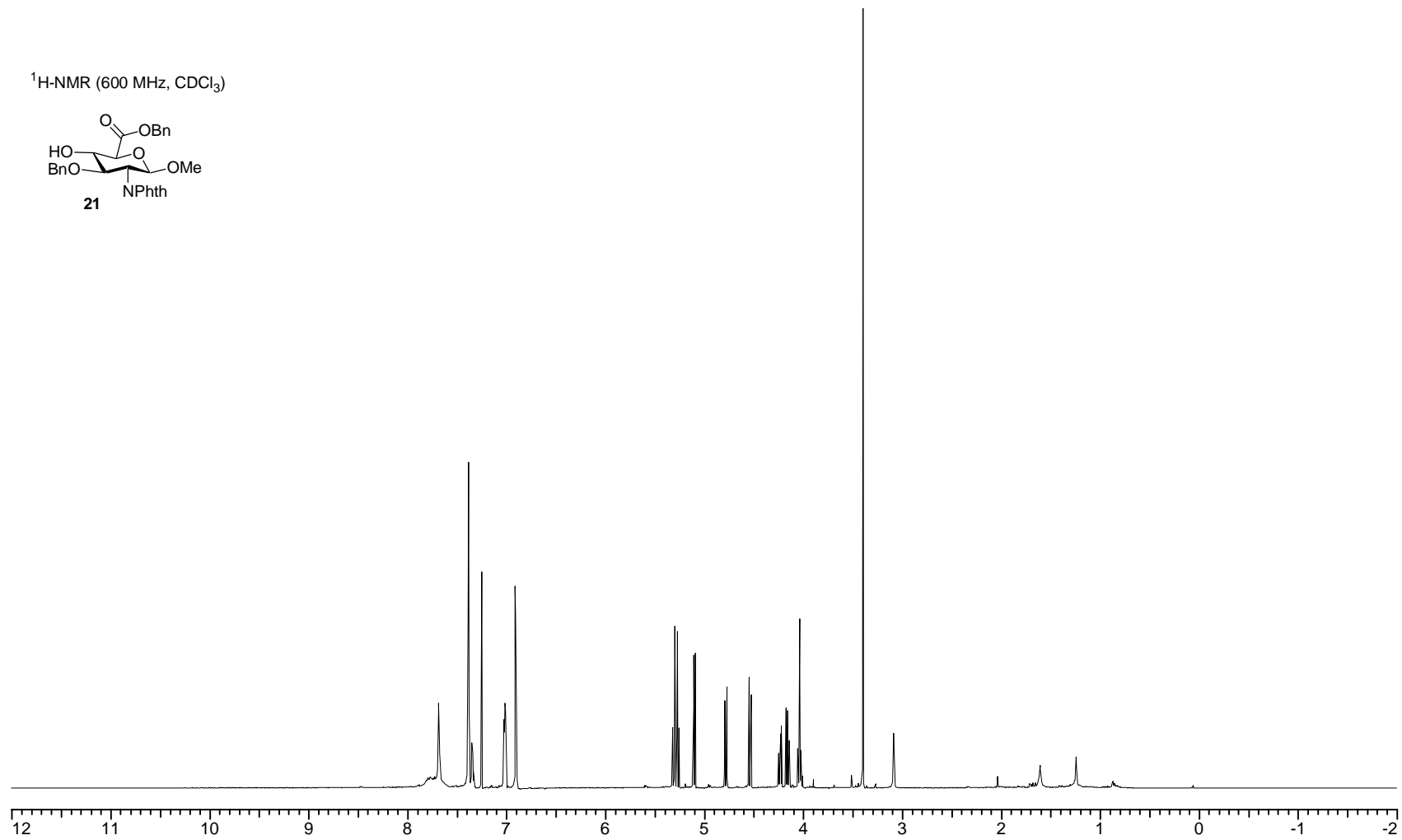
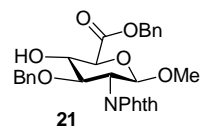


$^{13}\text{C}$ -NMR (100 MHz,  $\text{CDCl}_3$ )

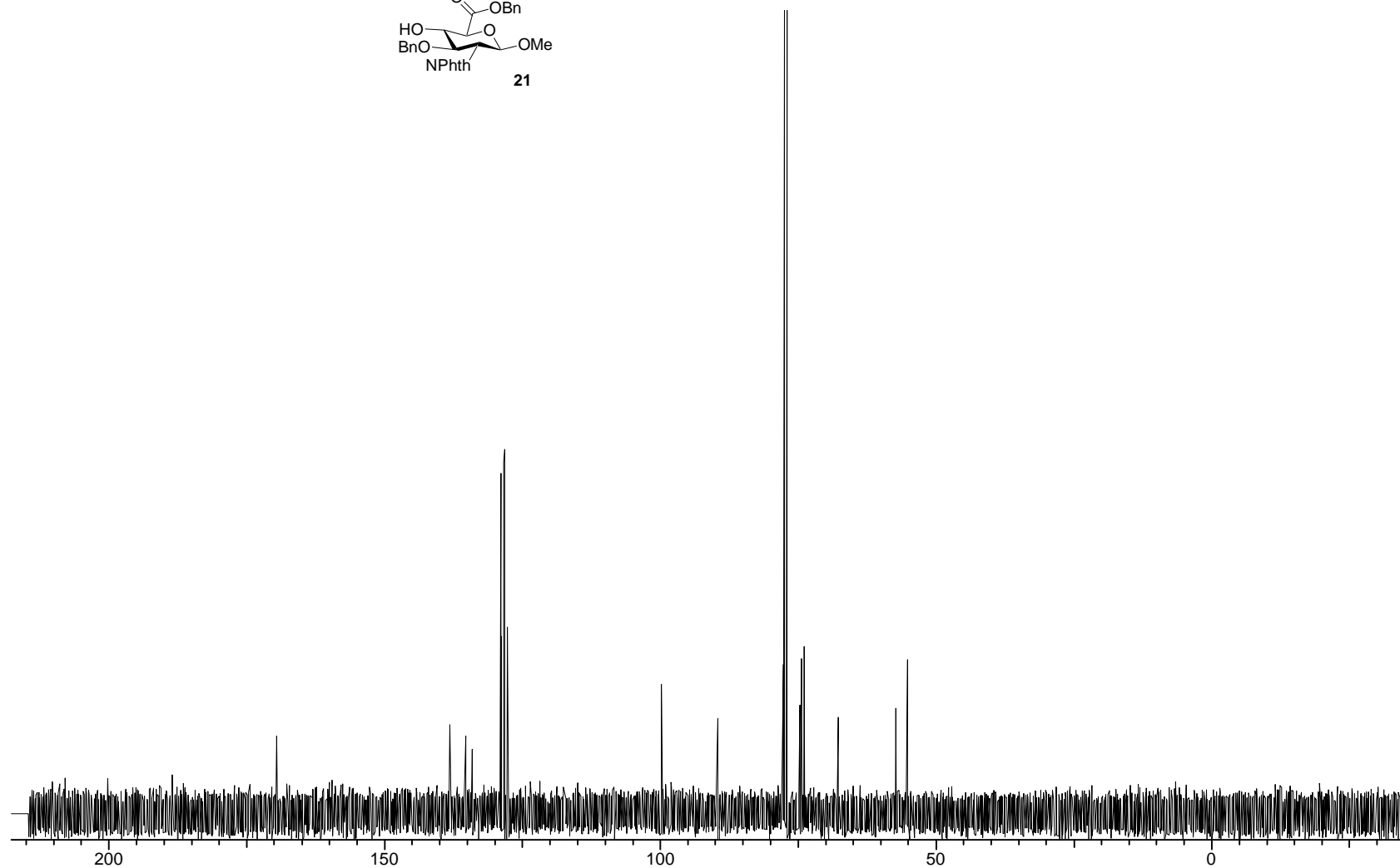
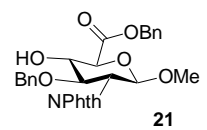




<sup>1</sup>H-NMR (600 MHz, CDCl<sub>3</sub>)

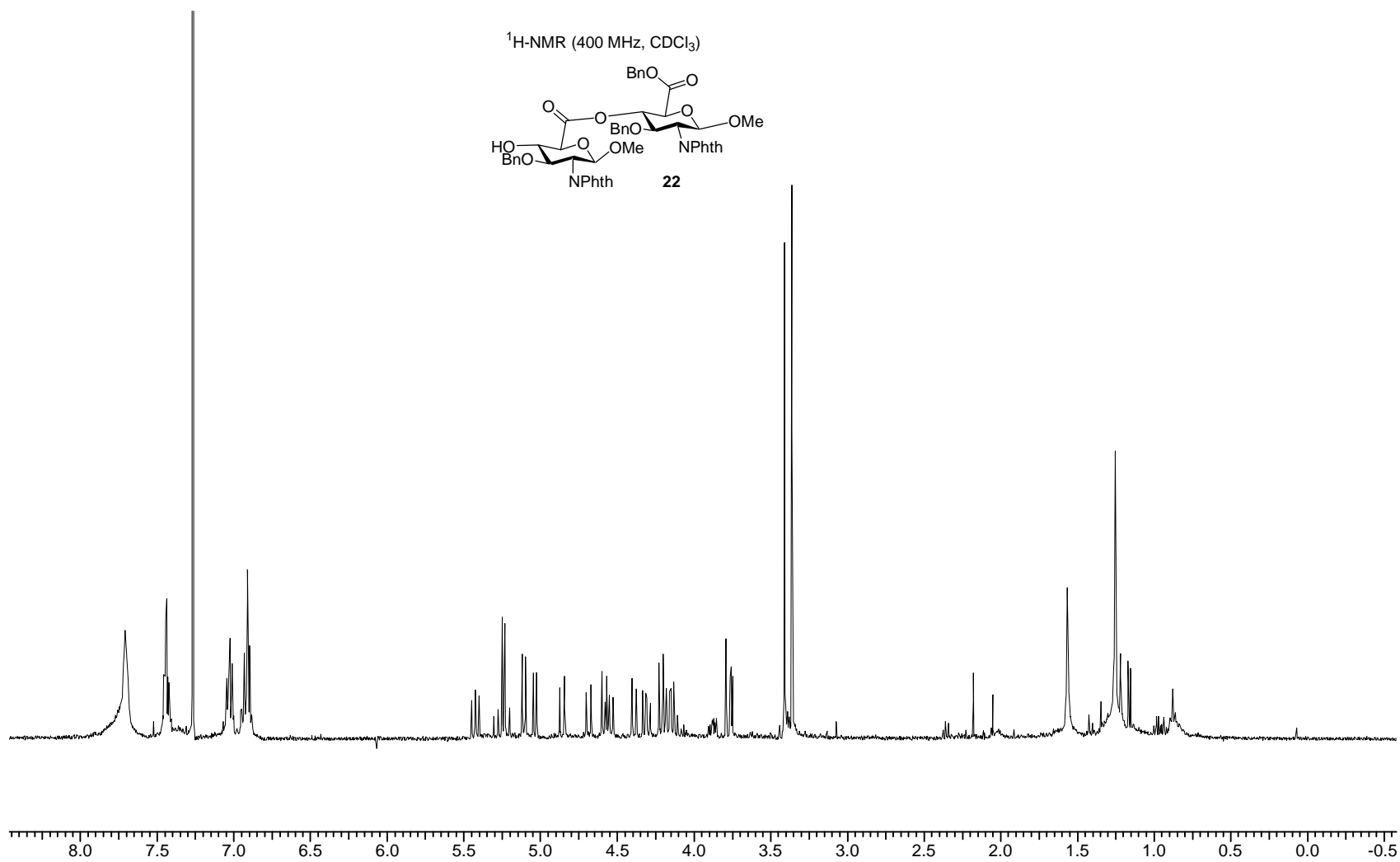
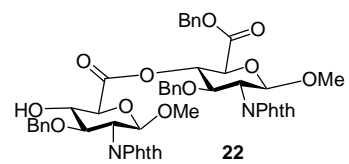


<sup>13</sup>C-NMR (150 MHz, CDCl<sub>3</sub>)

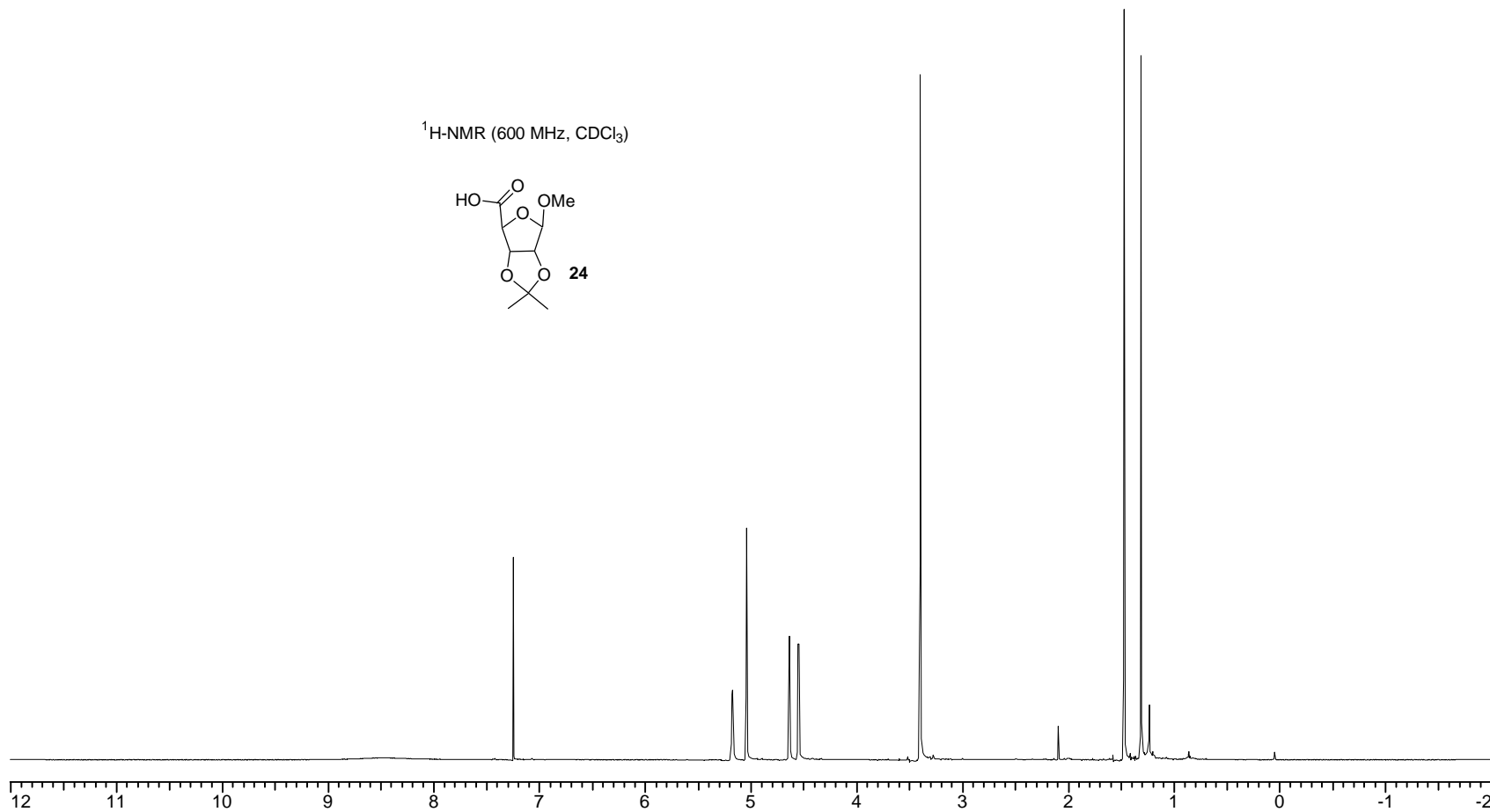
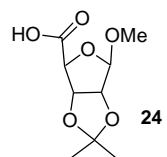




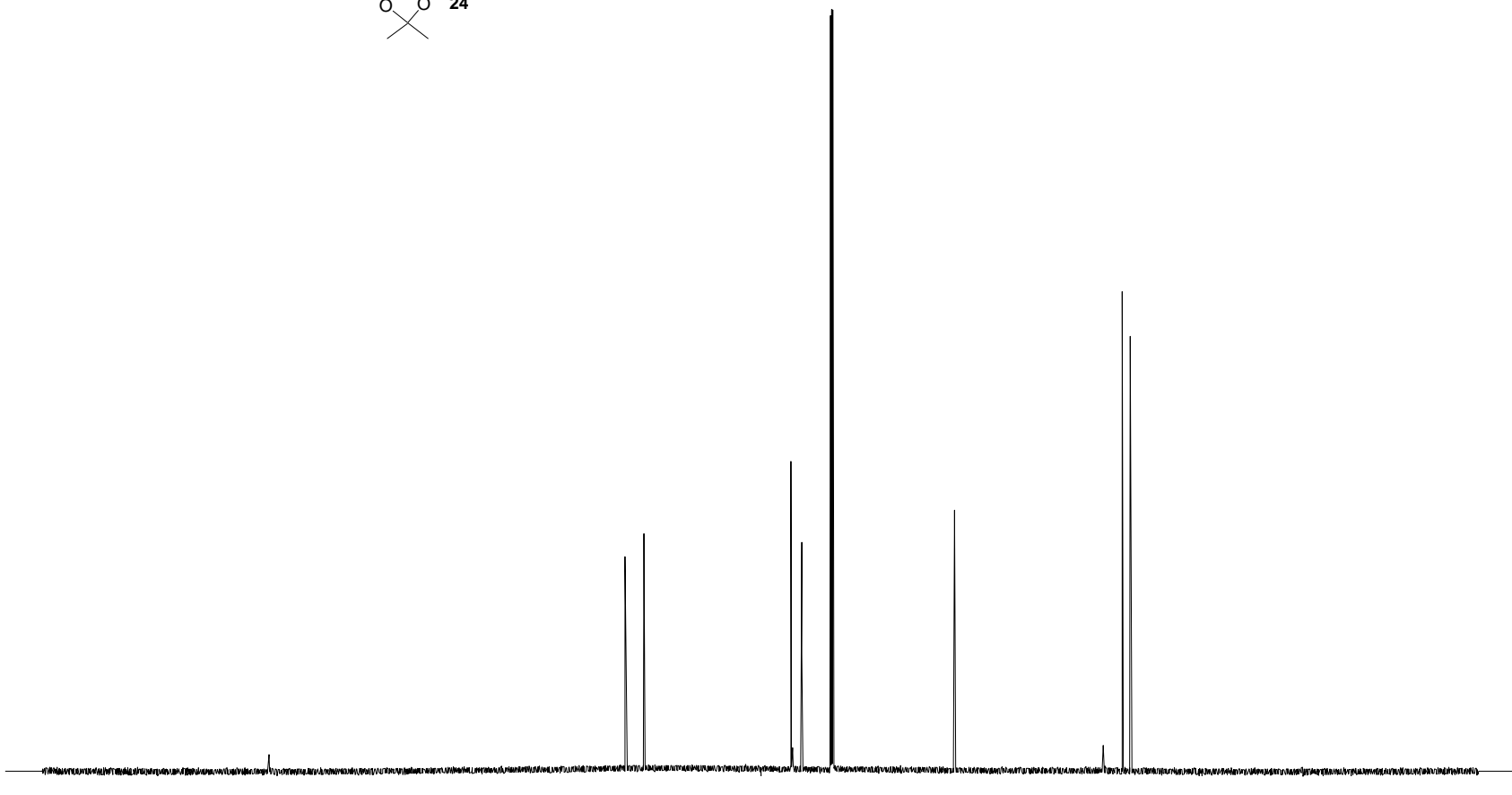
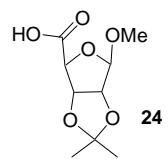
<sup>1</sup>H-NMR (400 MHz, CDCl<sub>3</sub>)



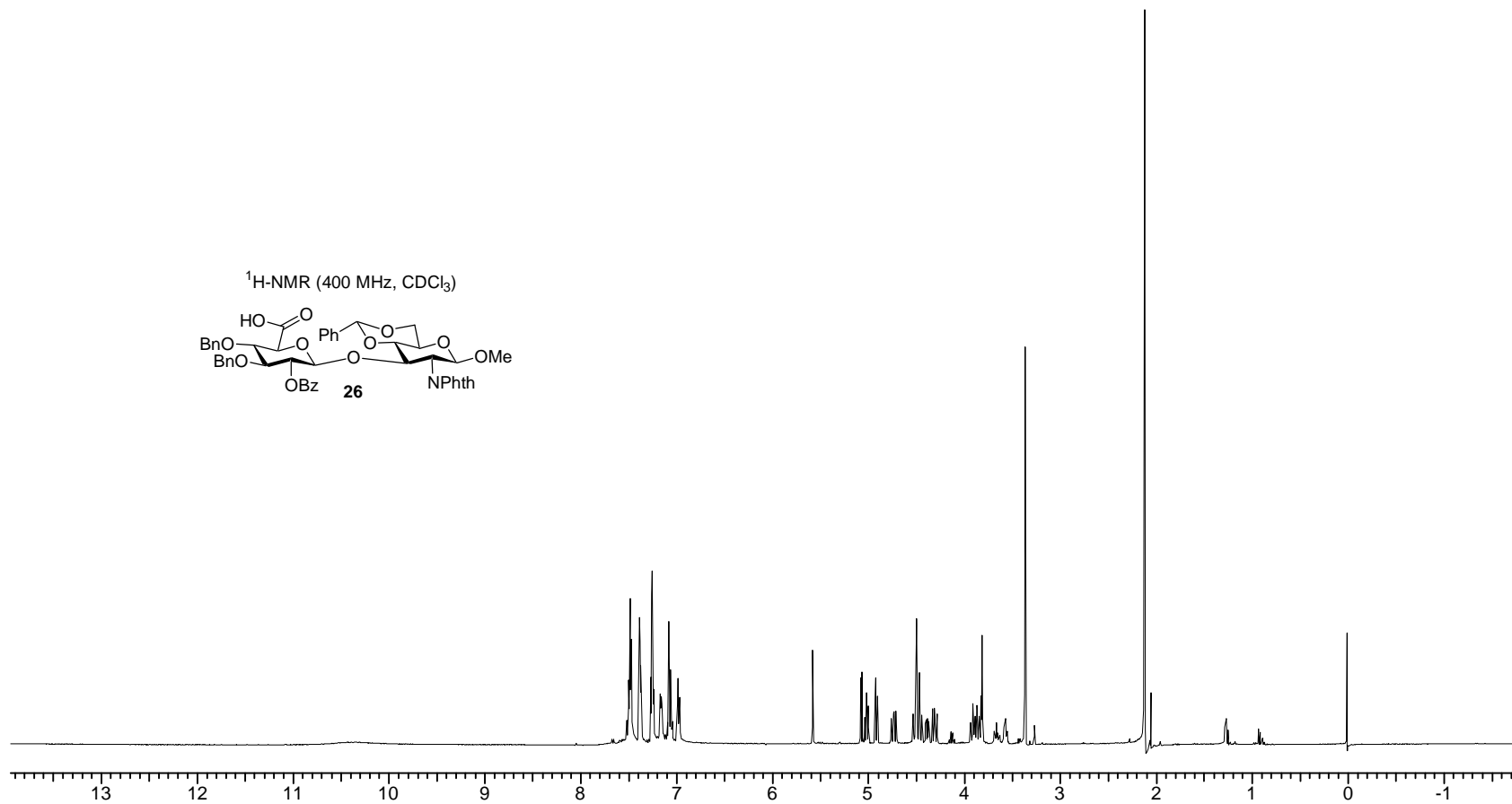
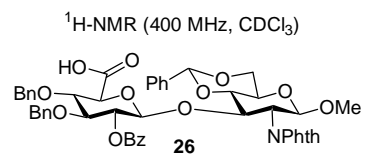
<sup>1</sup>H-NMR (600 MHz, CDCl<sub>3</sub>)



$^{13}\text{C}$ -NMR (150 MHz,  $\text{CDCl}_3$ )

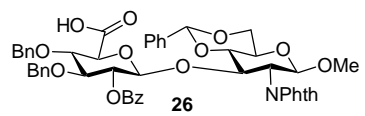


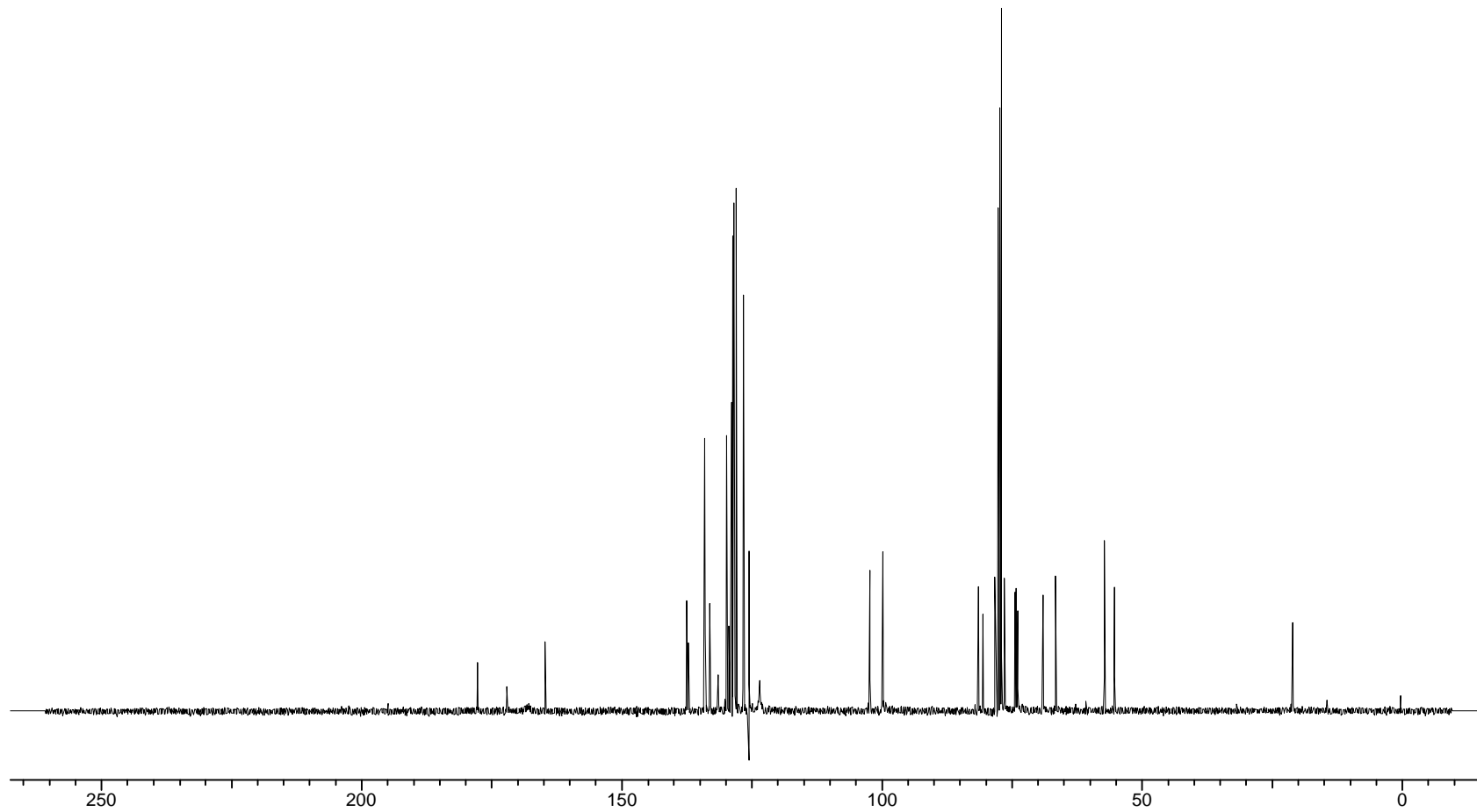


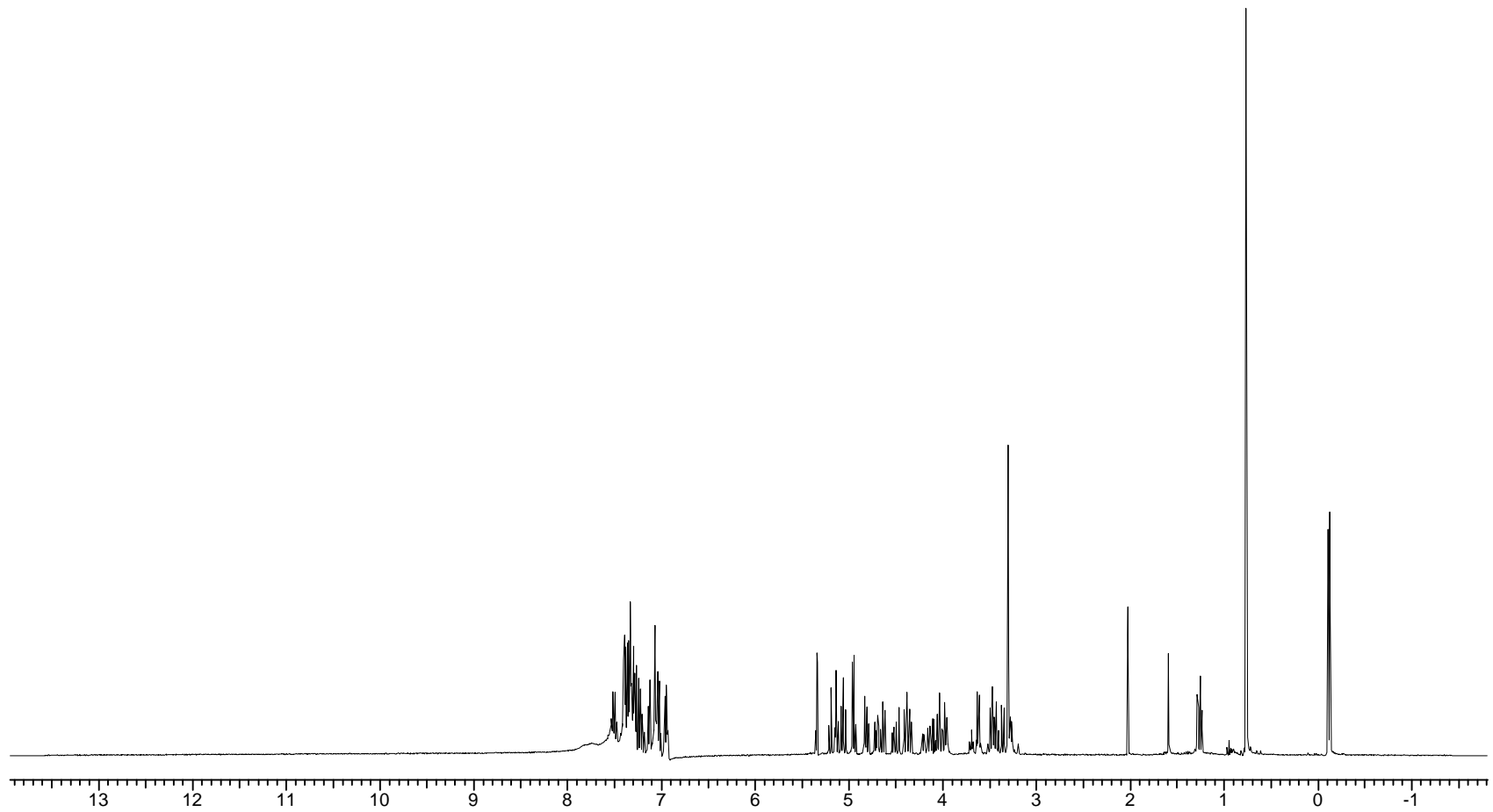




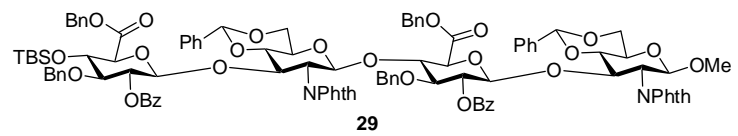
$^{13}\text{C}$ -NMR (100 MHz,  $\text{CDCl}_3$ )



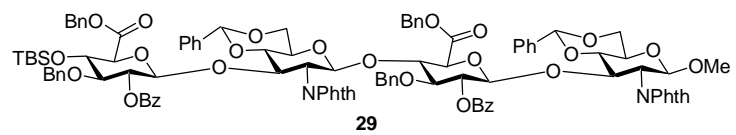


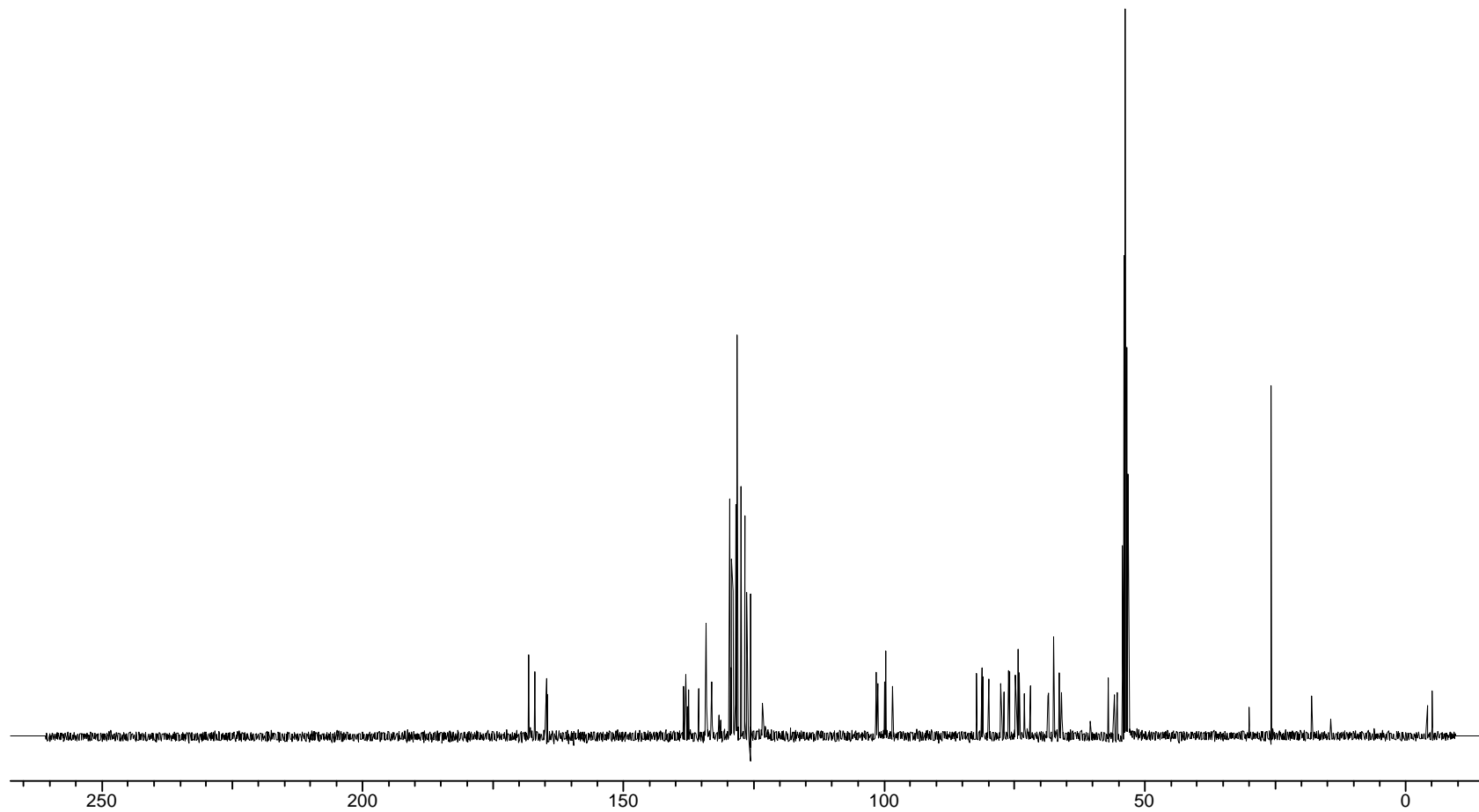


$^1\text{H-NMR}$  (600 MHz,  $\text{CD}_2\text{Cl}_2$ )



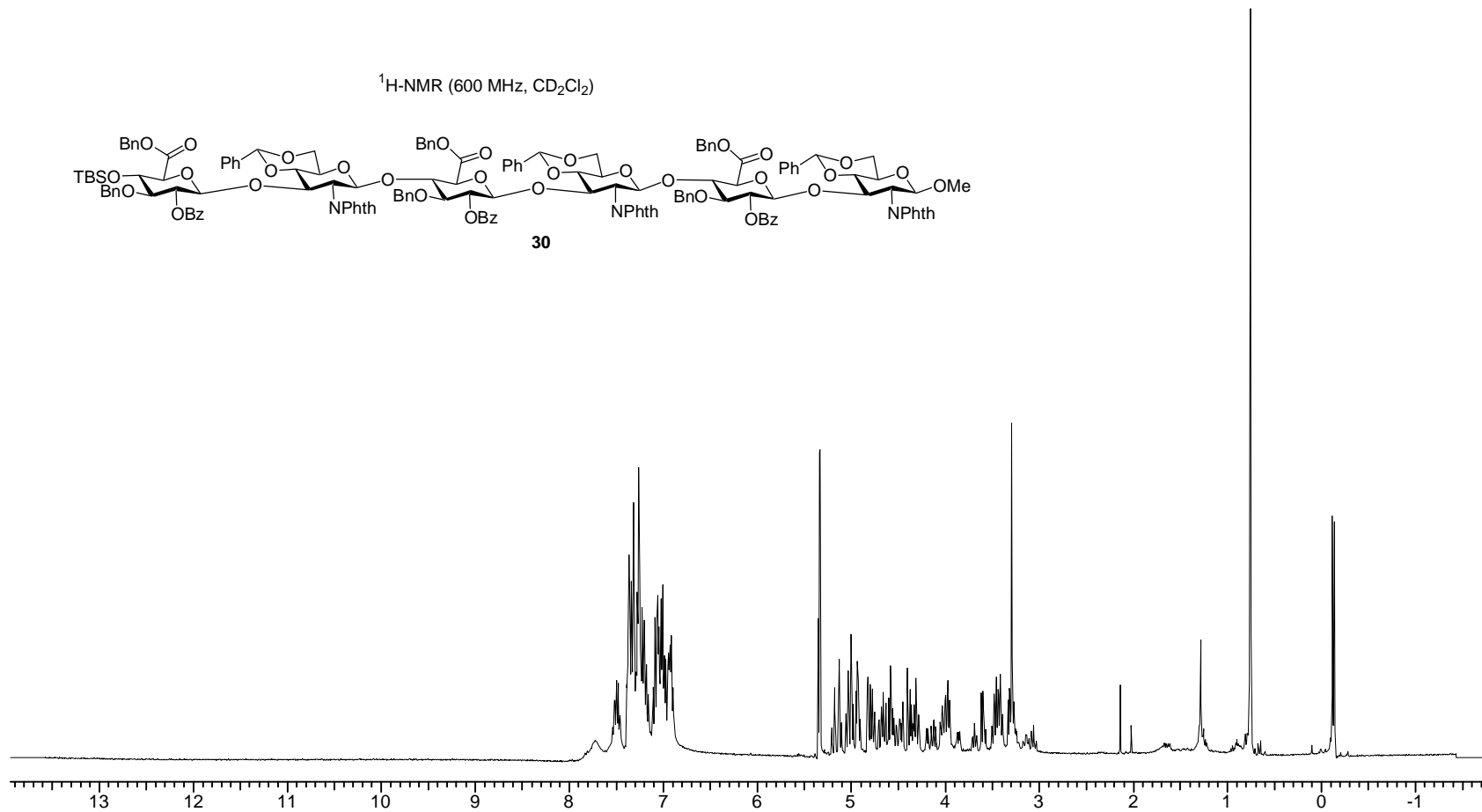
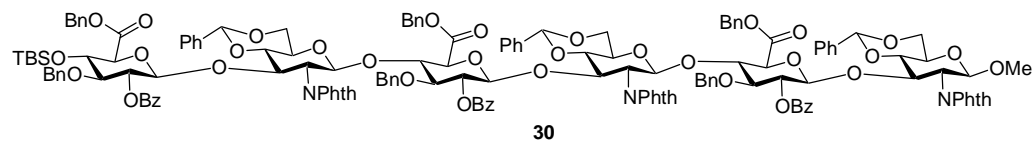
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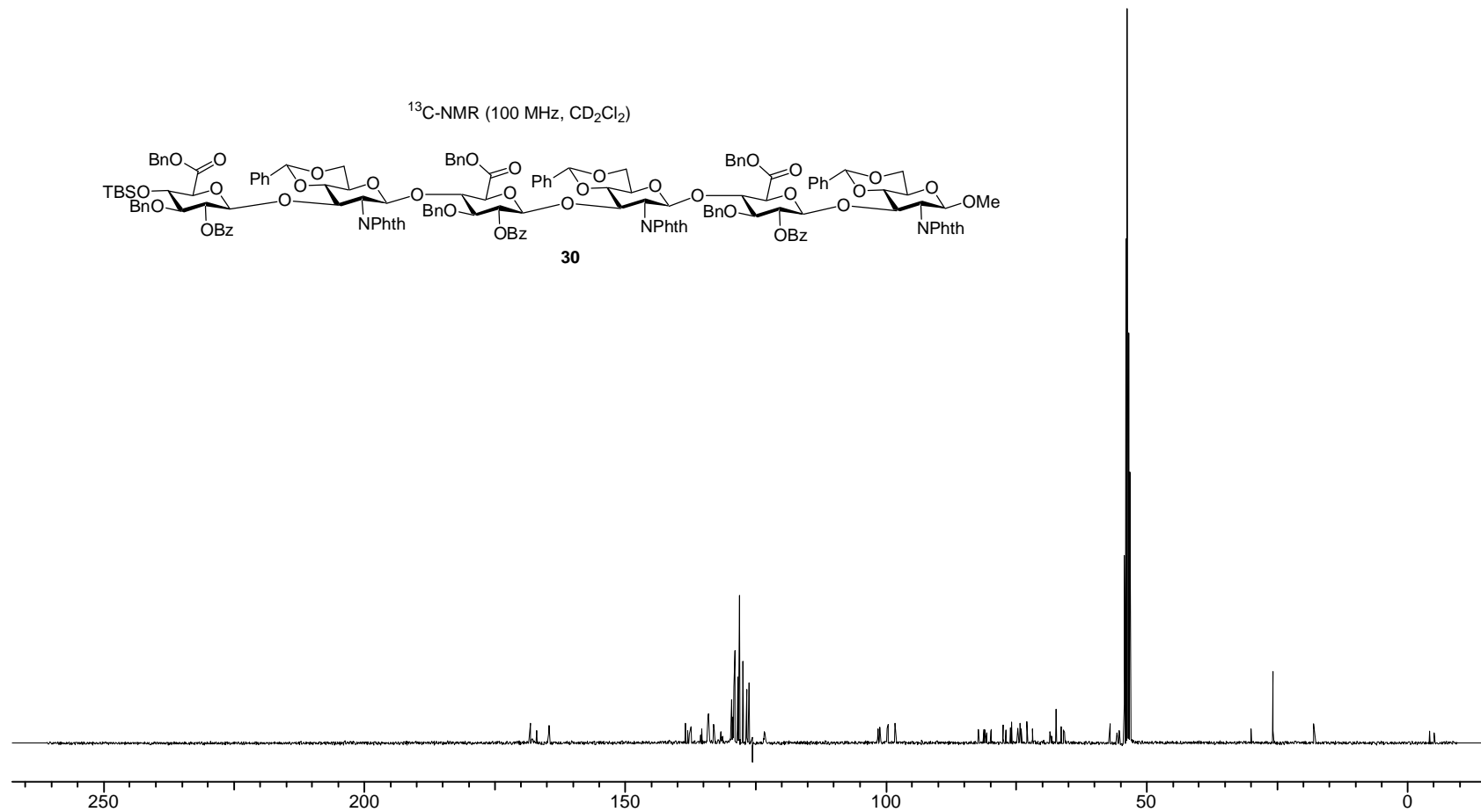






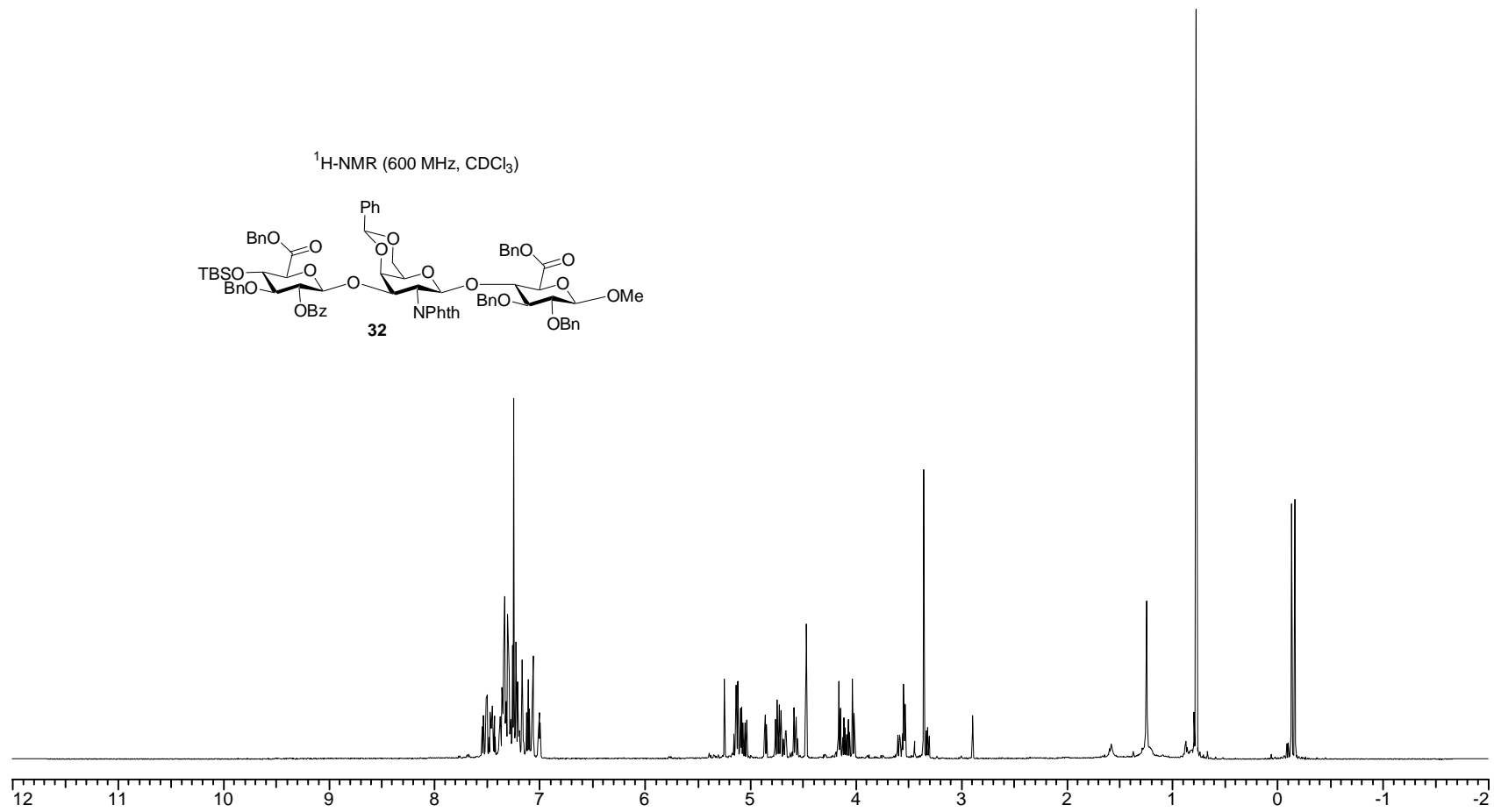
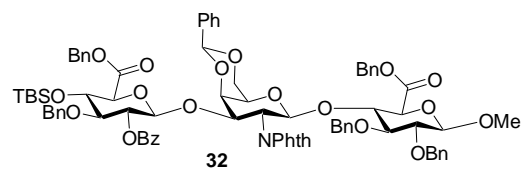
<sup>1</sup>H-NMR (600 MHz, CD<sub>2</sub>Cl<sub>2</sub>)







<sup>1</sup>H-NMR (600 MHz, CDCl<sub>3</sub>)





$^{13}\text{C}$ -NMR (150 MHz,  $\text{CDCl}_3$ )

