

Supporting Information

A Relay Ring-Closing Metathesis/Diels-Alder Approach to Sugar-Derived

Pluramycin- Hybrids

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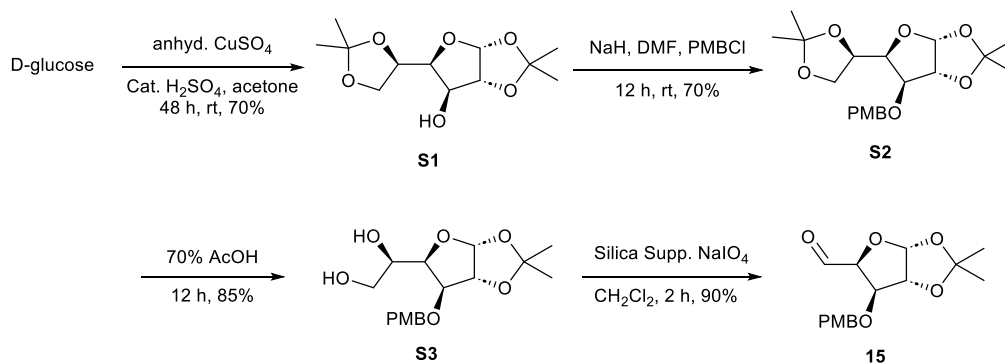
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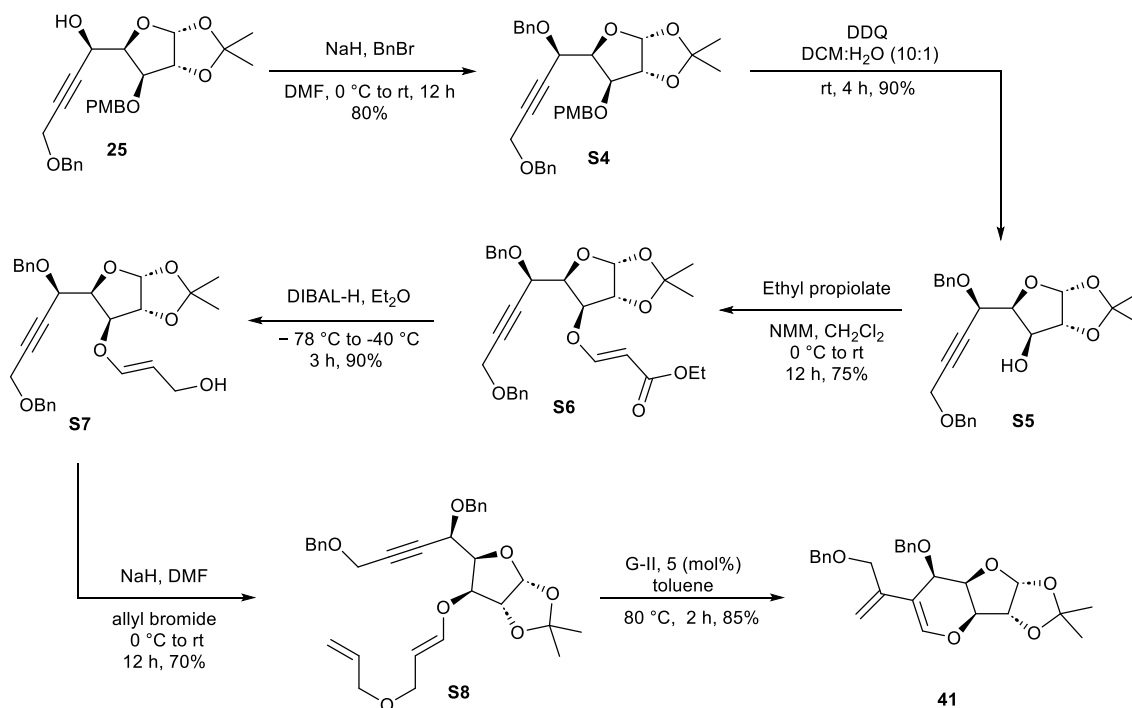
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1. Scheme S1: Preparation of known aldehyde **15** from D-glucose:



Following the literature procedure,¹ aldehyde **15** was prepared in 4-step sequences from commercially available D-glucose starting material.

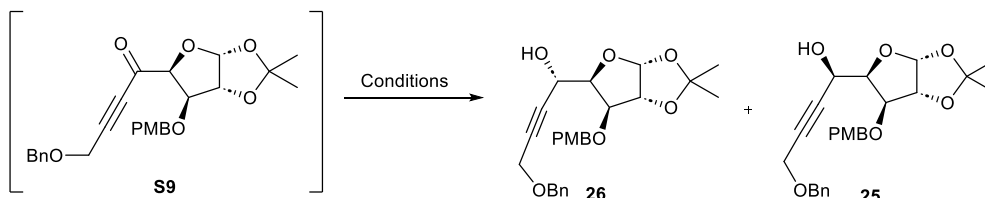
2. Scheme S2: Synthesis of diene **41** from alcohol **25**:



The β -isomer of diene (**41**) was synthesized in an overall 6 steps from the minor isomer of alkyne (**25**) in a similar synthetic procedure as employed for the α -isomer of **25**.

3. Table 1: Optimizing Conditions for Selective Reduction of Ketone **S9**:

The reduction of the crude product of alkynone **S9** was attempted under various conditions with the aim of obtaining a single isomer. It was discovered that all of the selective reduction outcomes occurred through a non-chelated Felkin-Anh transition state. Among the various options, diisobutylaluminium hydride (DIBAL-H), a sterically hindered electrophilic hydride donor, was found to produce predominantly a single isomer, as illustrated in (Table S1, Entry 4).



Entry	Reaction conditions	d.r. ^a	Yield ^b of 26
1.	LAH, THF, 0 °C to RT, 4 h	1.2:1	50%
2.	LAH, THF, -78 °C to RT, 6 h	3:1	60%
3.	LAH, CeCl ₃ , MeOH, THF, -78 °C to RT, 12 h	4:1	72%
4.	DIBAL-H, Et ₂ O, -78 °C to RT, 8 h	20:1	85%

^aratio were calculated with a crude mixture of ¹HNMR analysis. ^bIsolated yield of major isomer **26**

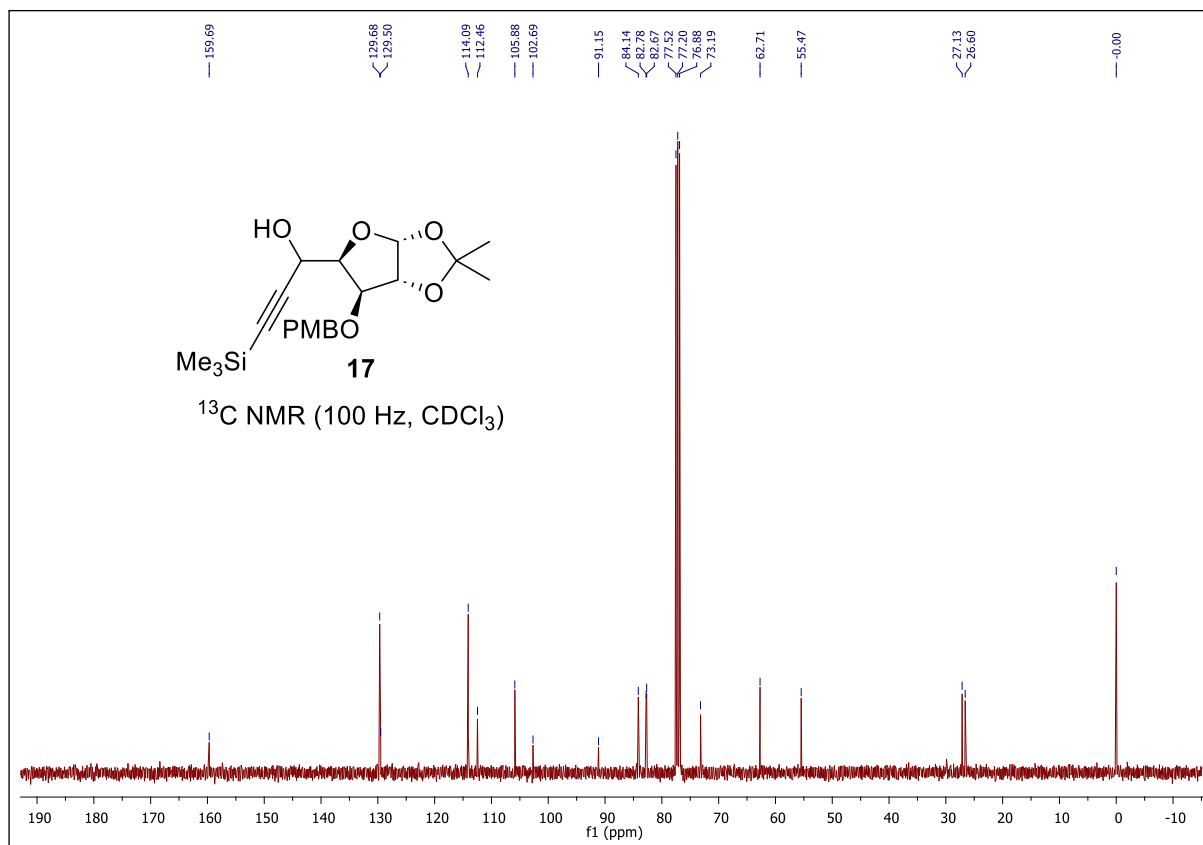
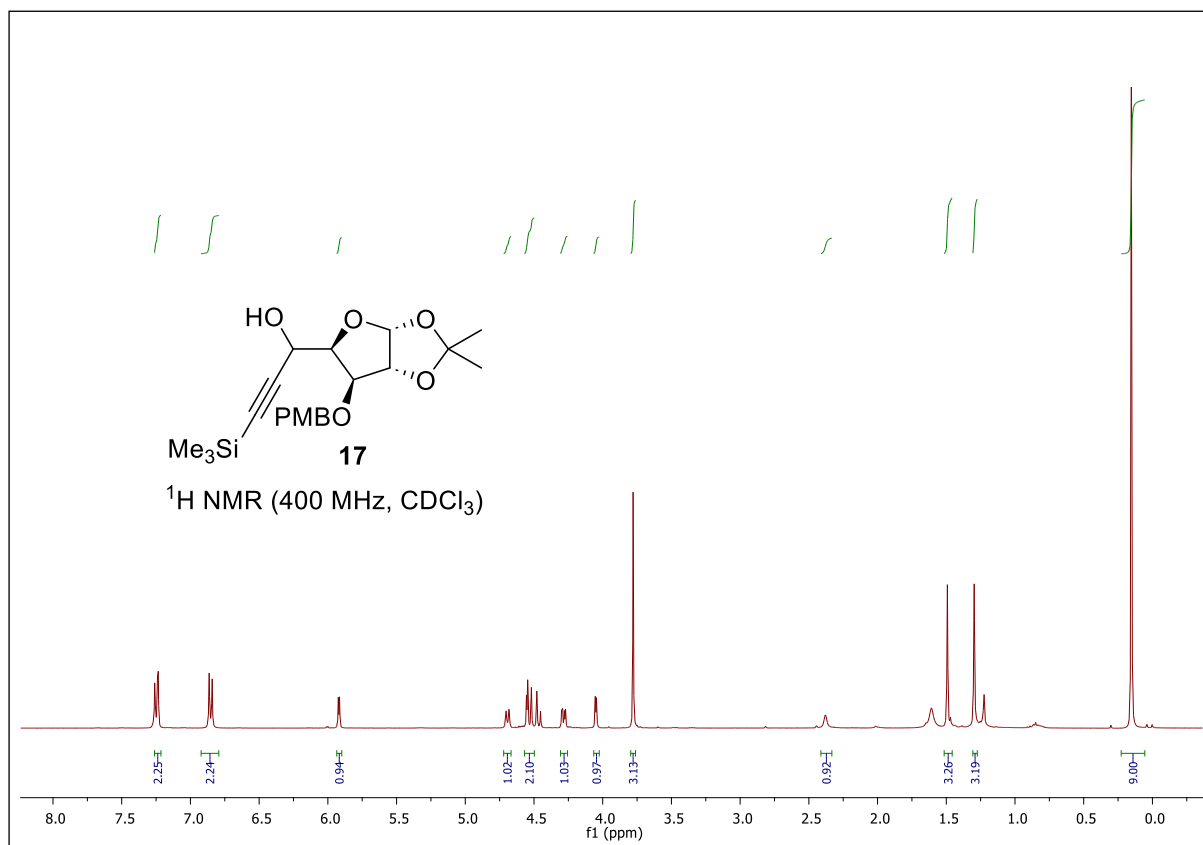
Experimental procedure:

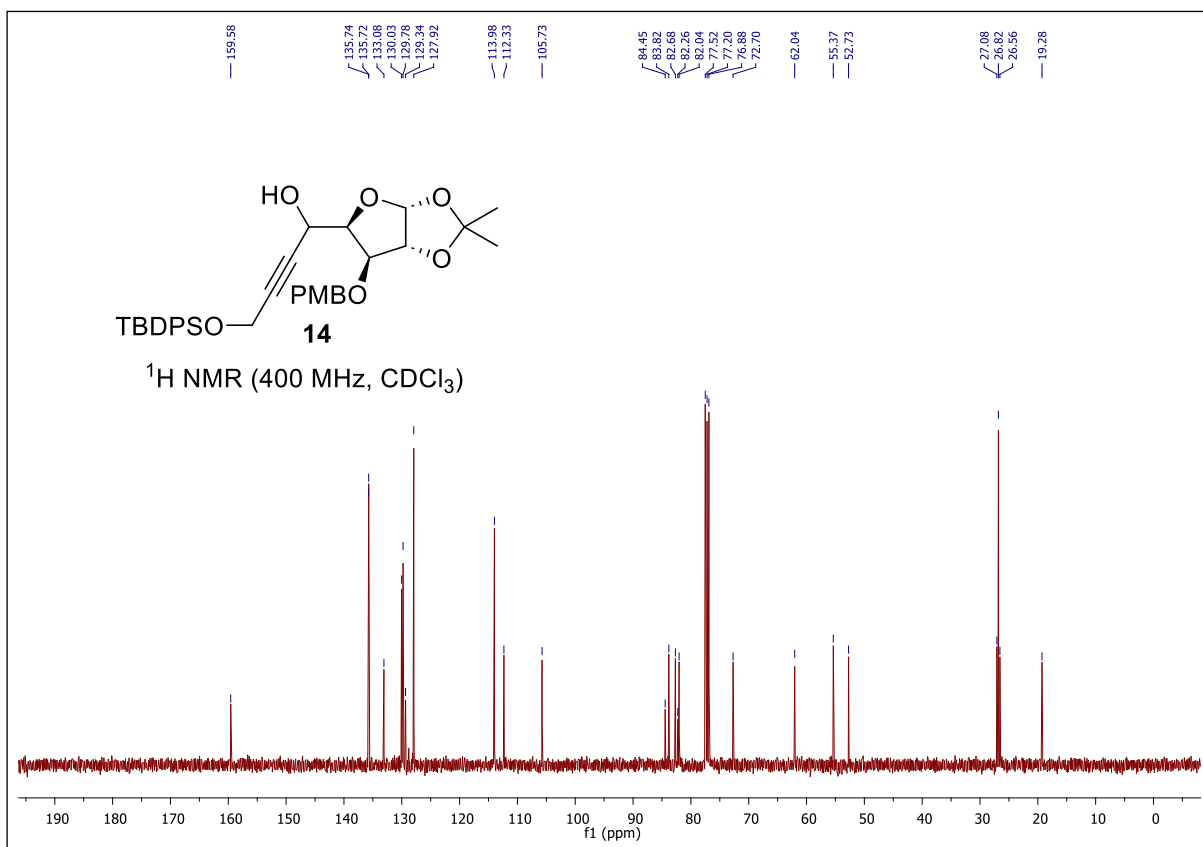
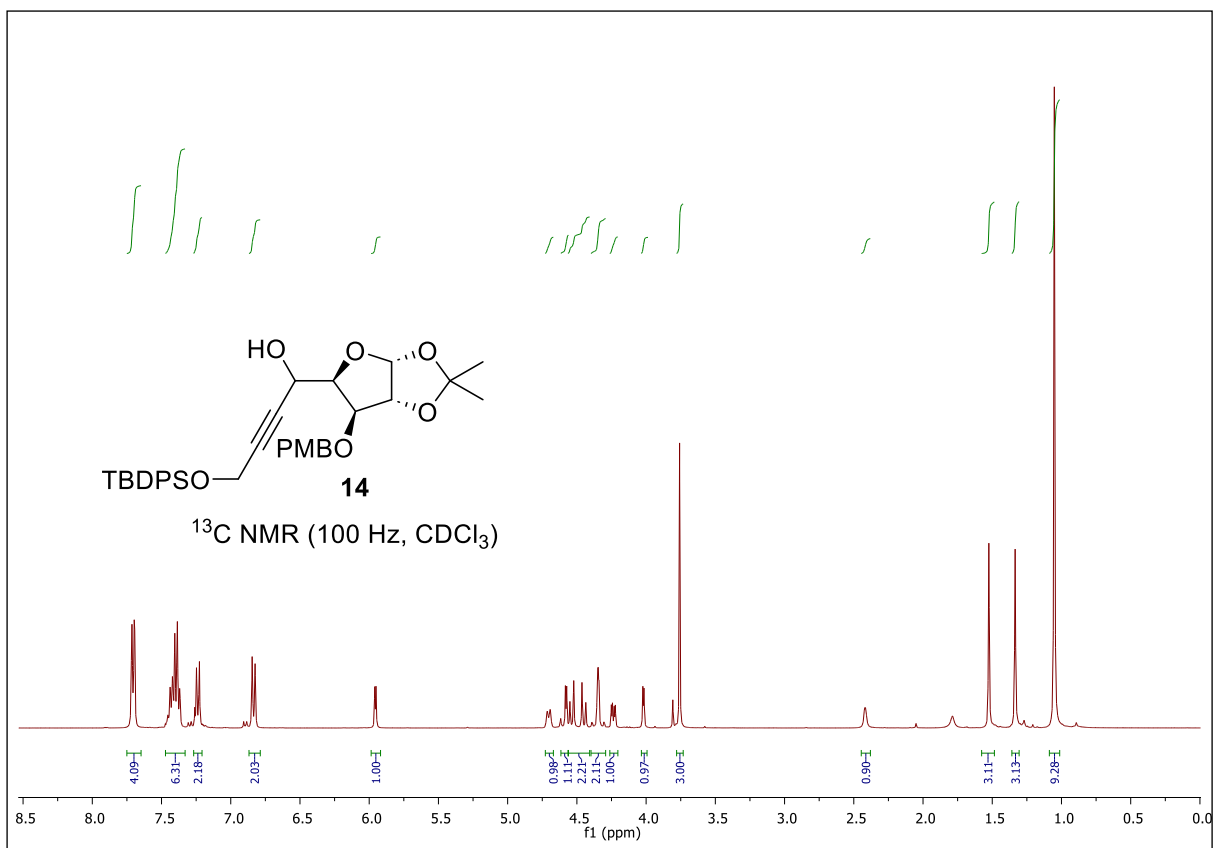
An oven-dried, two-neck round bottom flask was evacuated under vacuum and charged with a solution of ketone **S9** (100 mg, 0.22 mmol, 1.0 eq) in dry Et₂O (10 mL) under N₂ atmosphere. The reaction temperature was brought to -78 °C, and 1 M solution of DIBAL-H in toluene (0.33 mmol, 1.5 eq) was added slowly at the same temperature. The reaction mixture was stirred for 8 h. The reaction mixture was then extracted twice with ethyl acetate (2×10 mL). The combined organic layers were dried over Na₂SO₄ and concentrated in *vacuo*. The crude product was purified by column chromatography using silica gel (100-200 mesh) chromatography using hexane-ethyl acetate (4:1) as the solvent system to afford the corresponding alcohol **26** (86 mg, 85%) as a colourless liquid.

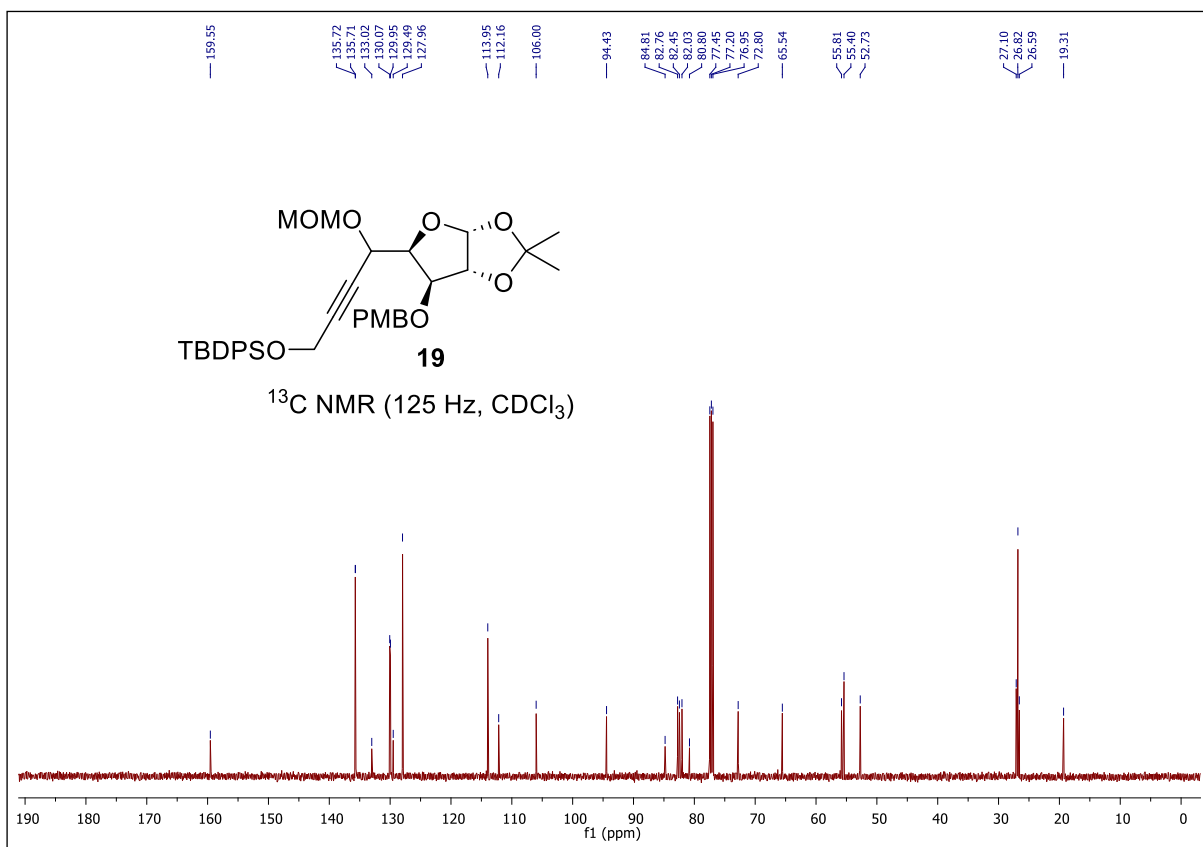
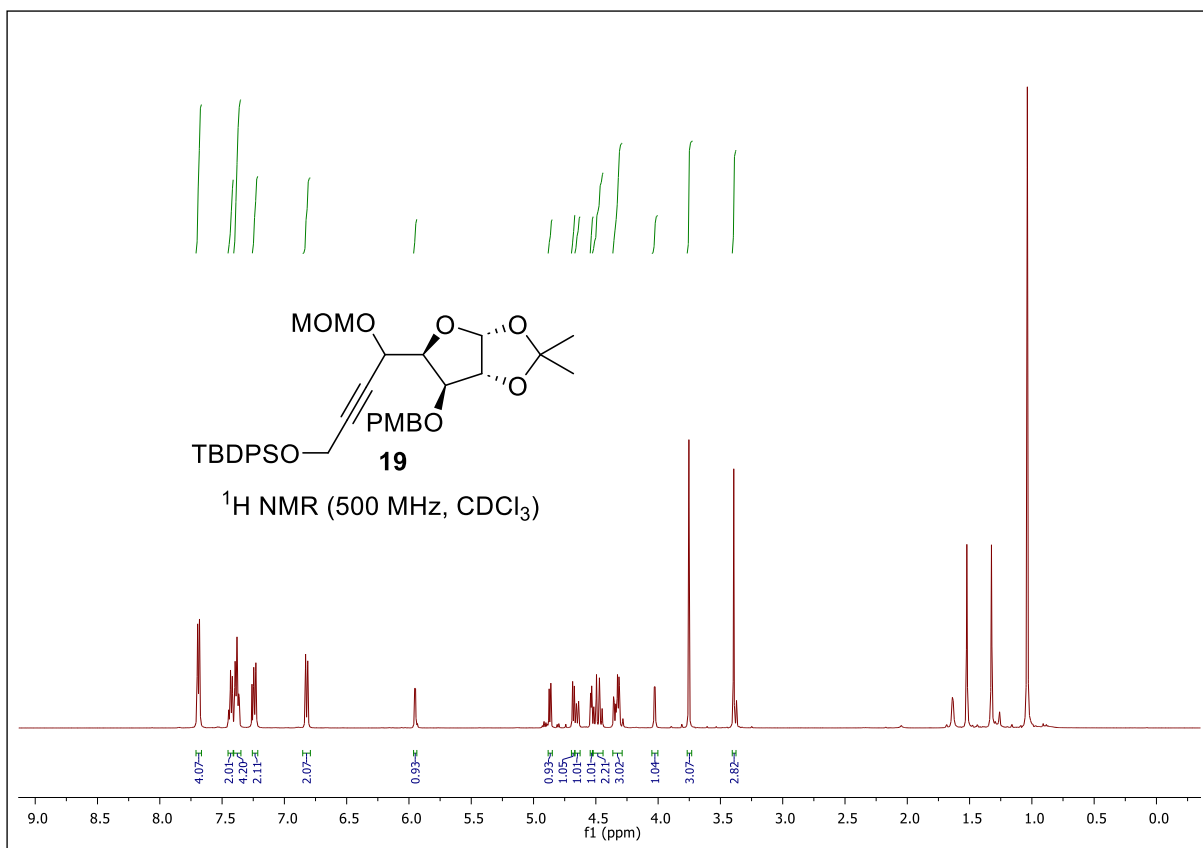
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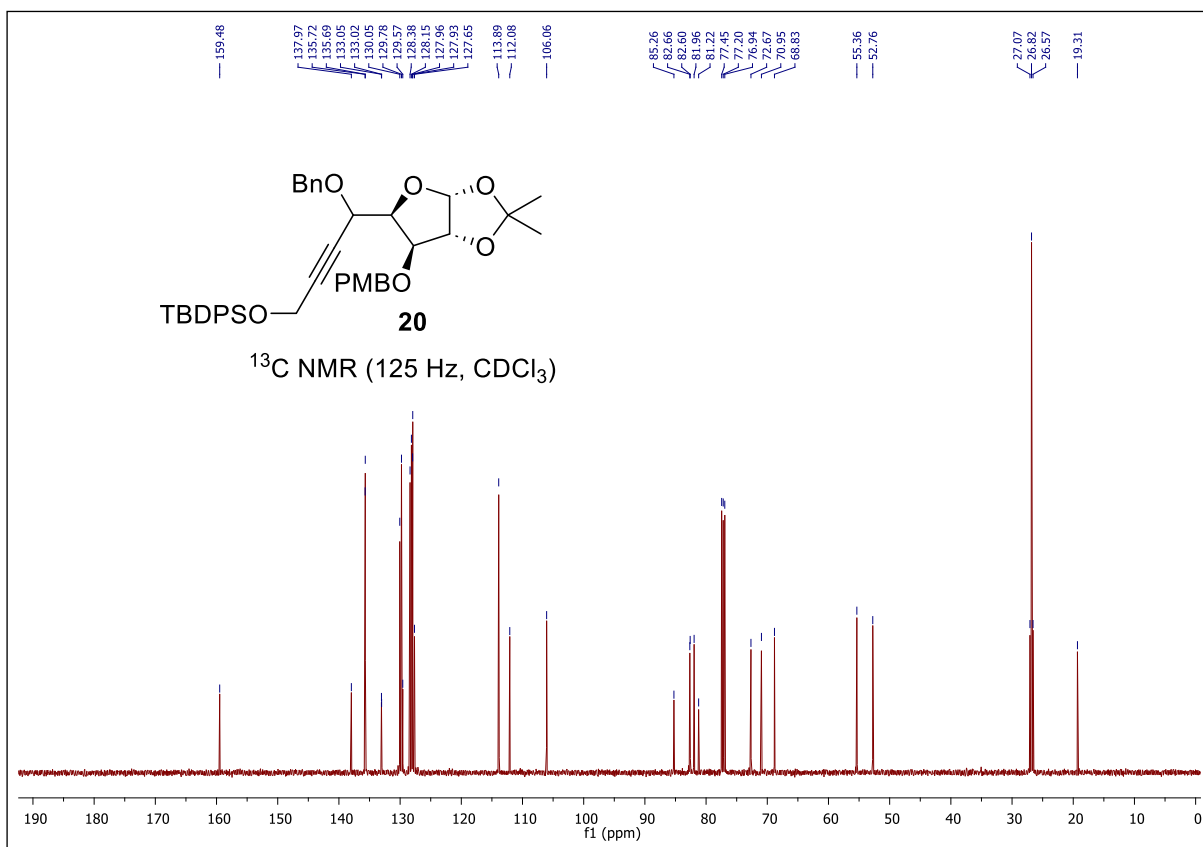
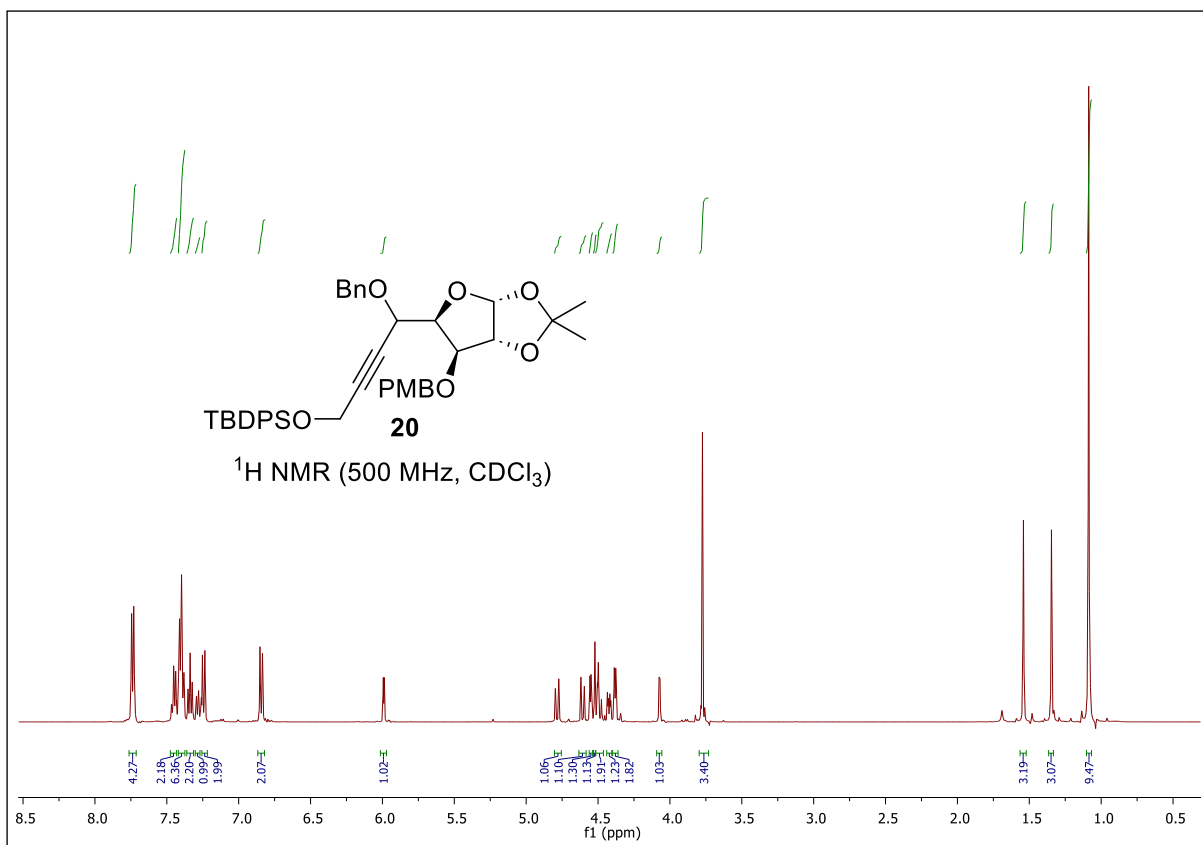
- 1) S. Ghosh, M. F. Hossain, C. K. Malik, S. Maity, *Tetrahedron*, 2010, **66**, 9159.

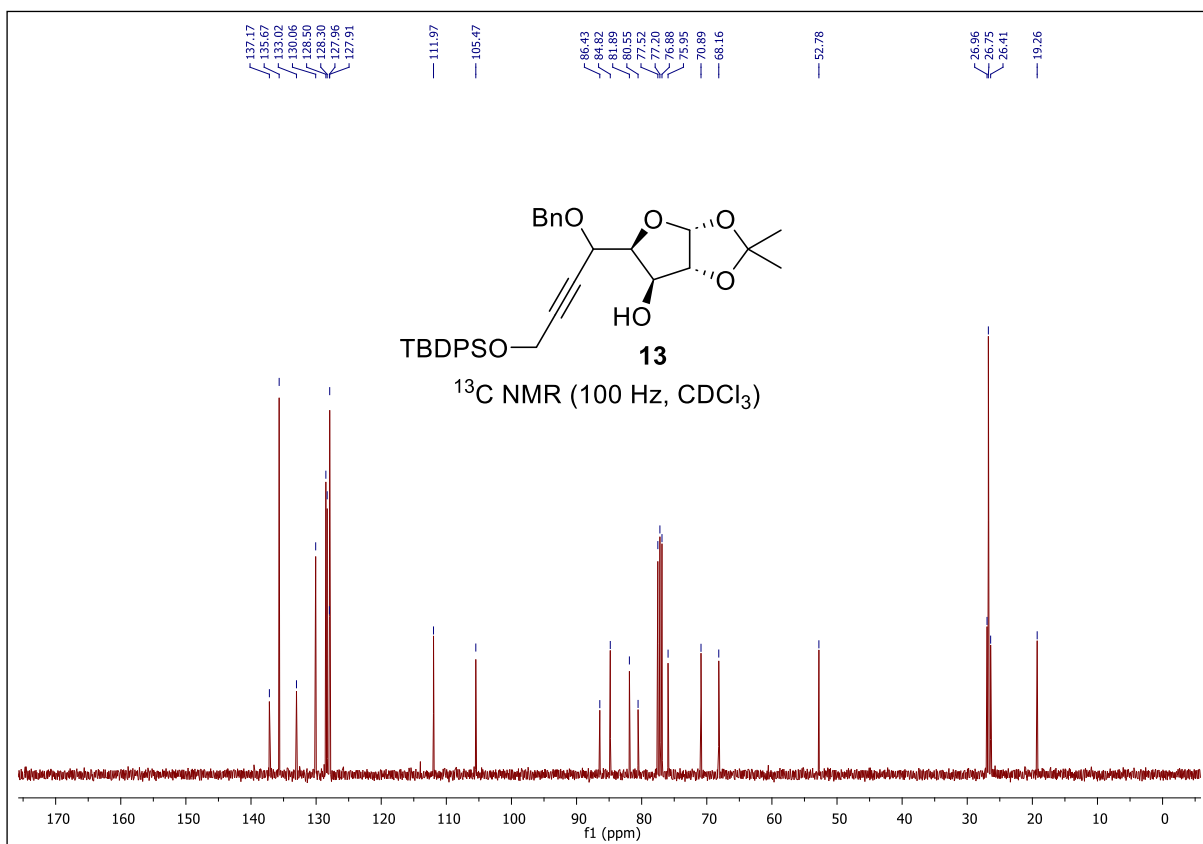
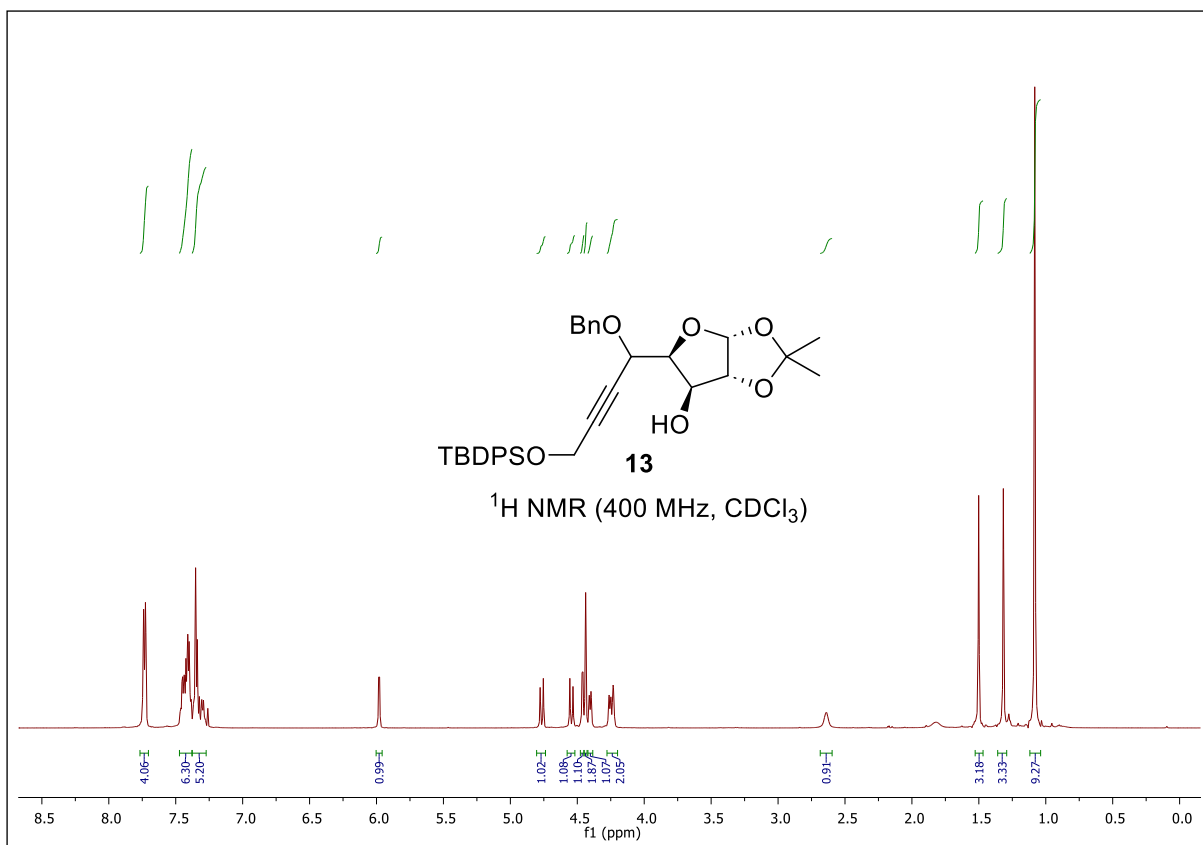
5. ^1H , ^{13}C and 2D NMR Spectral Data

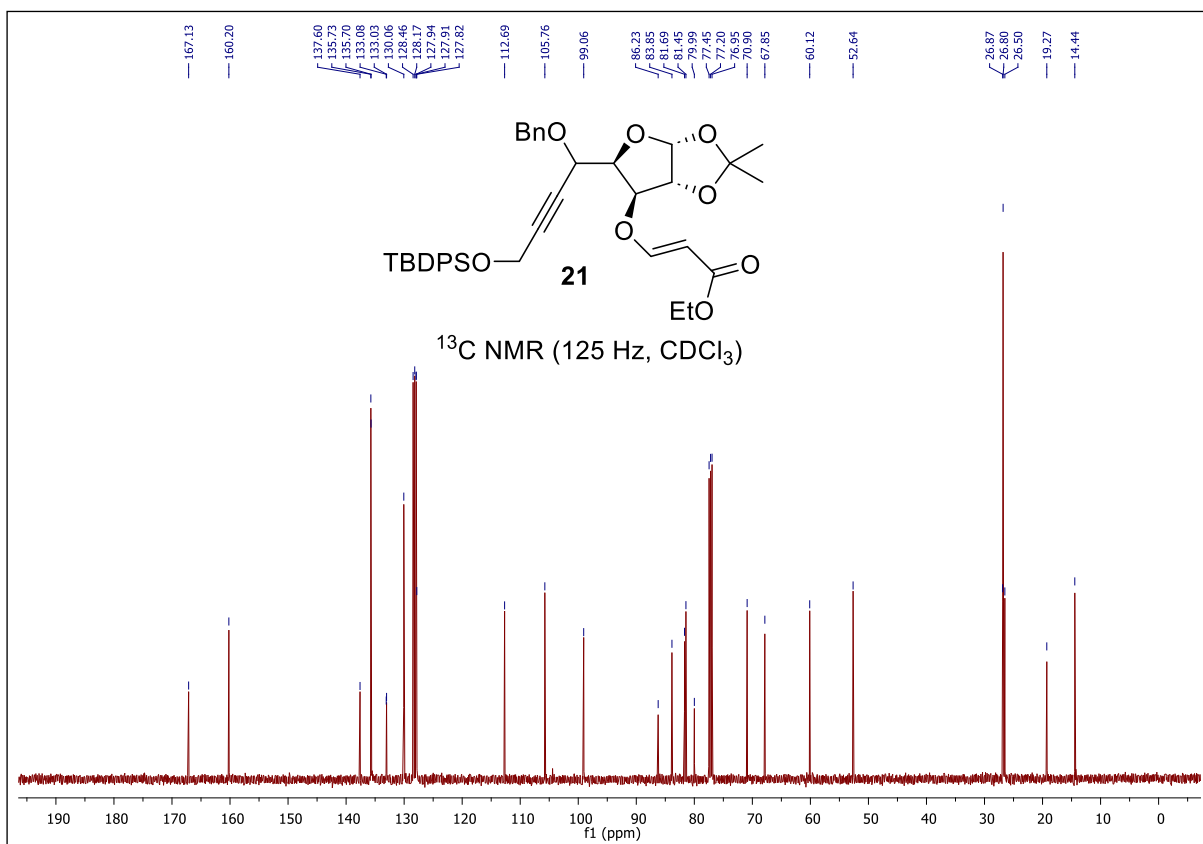
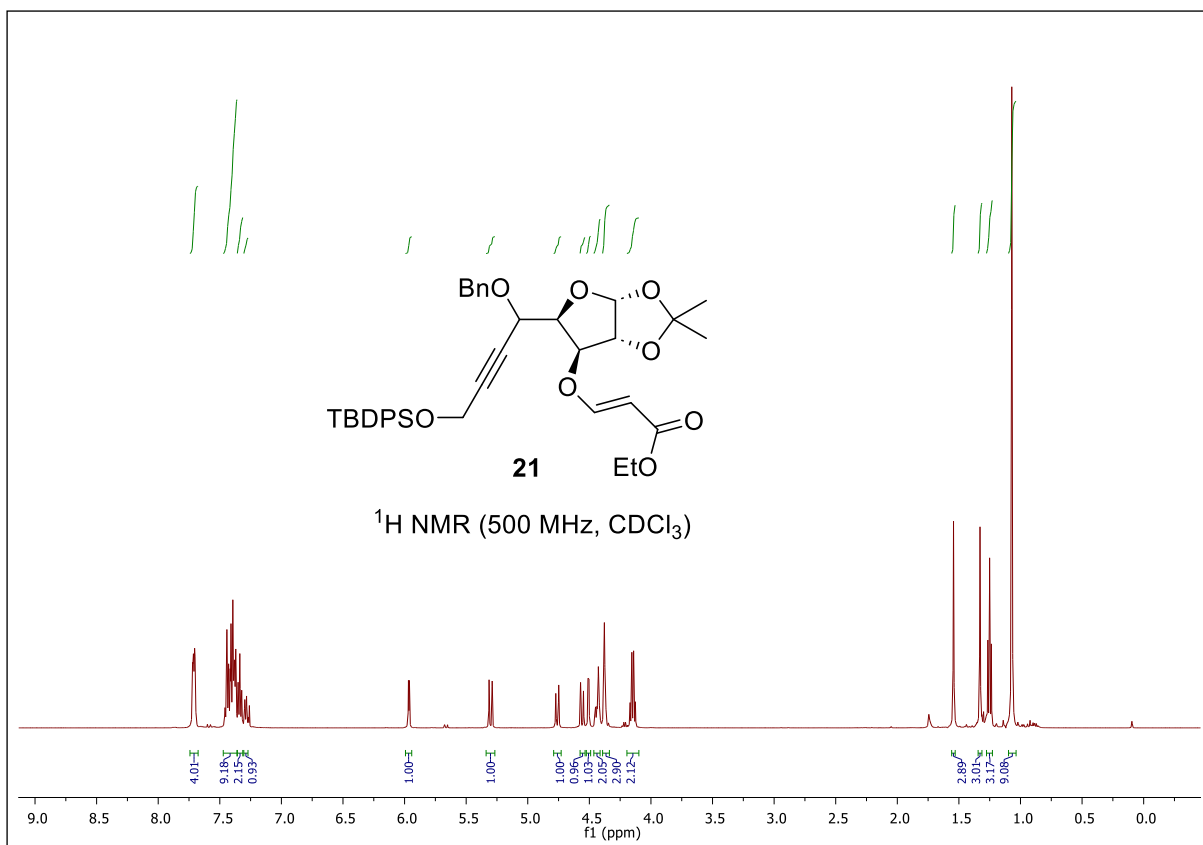


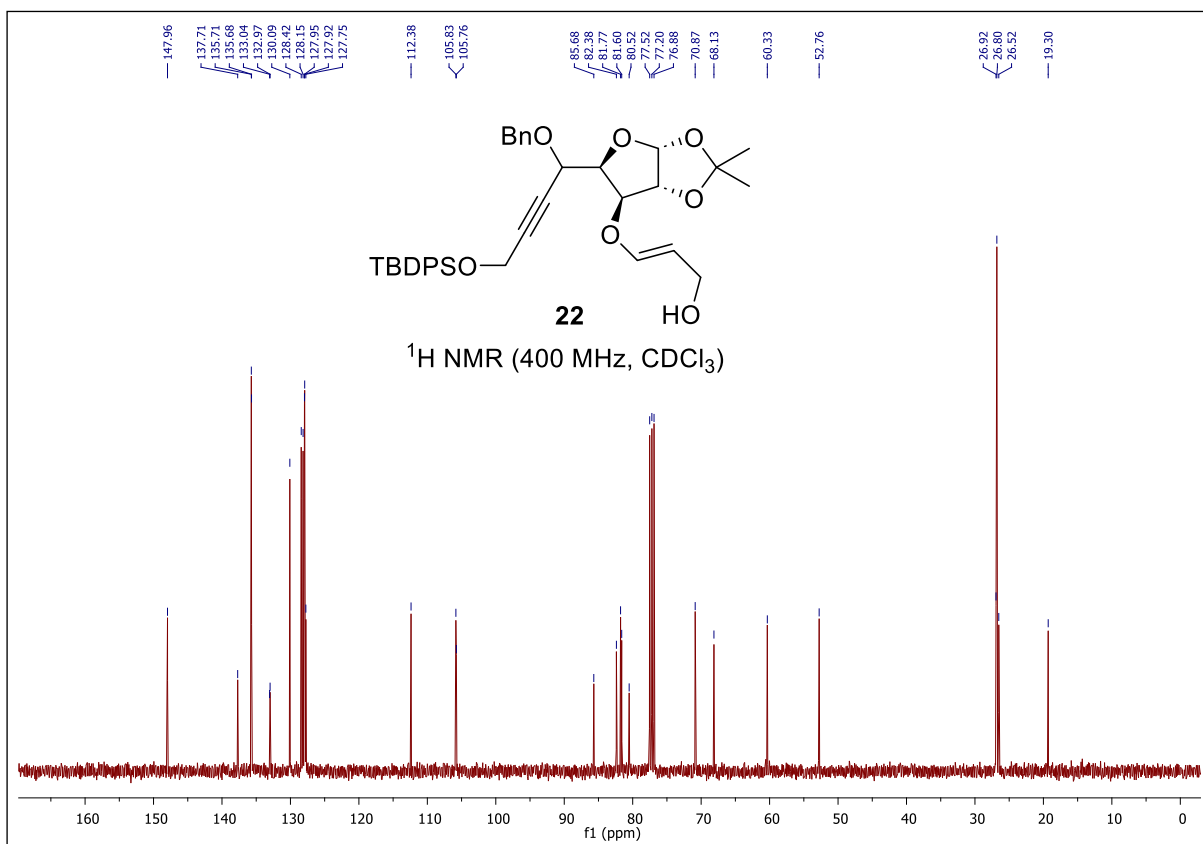
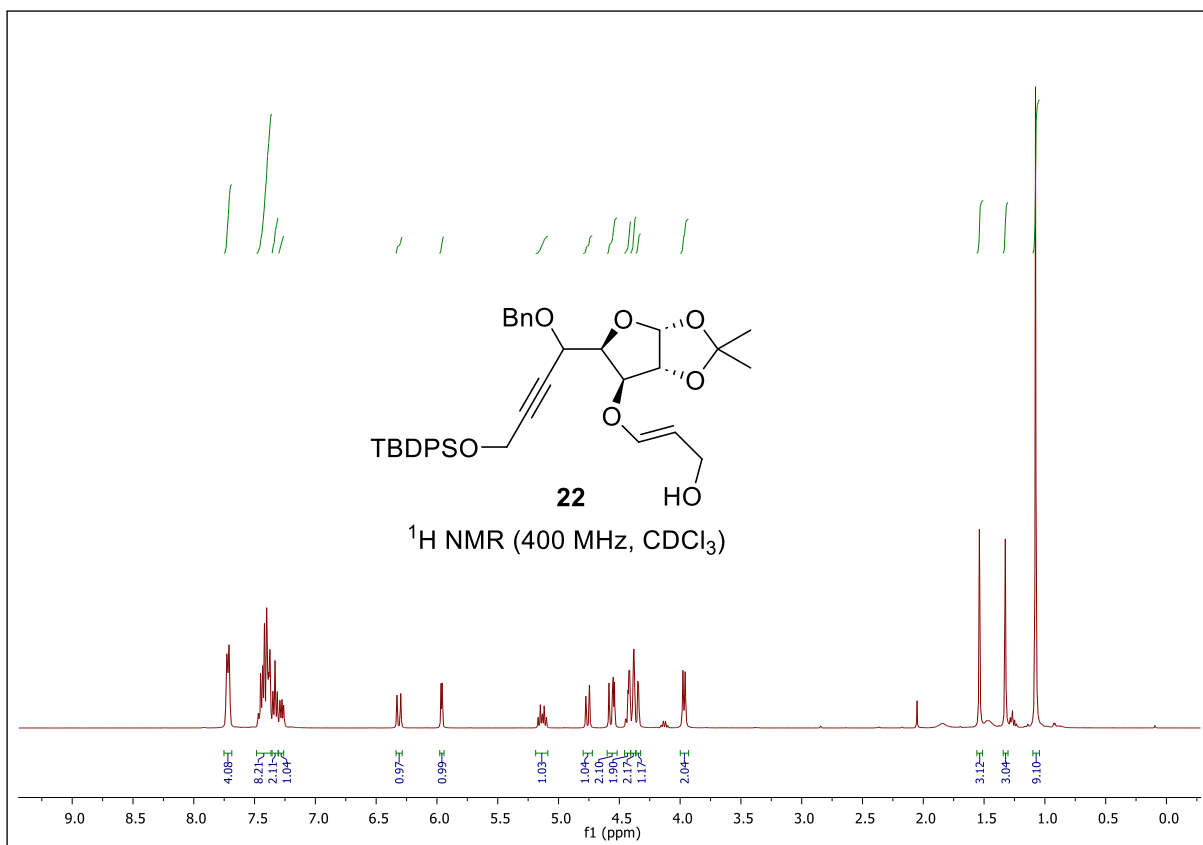


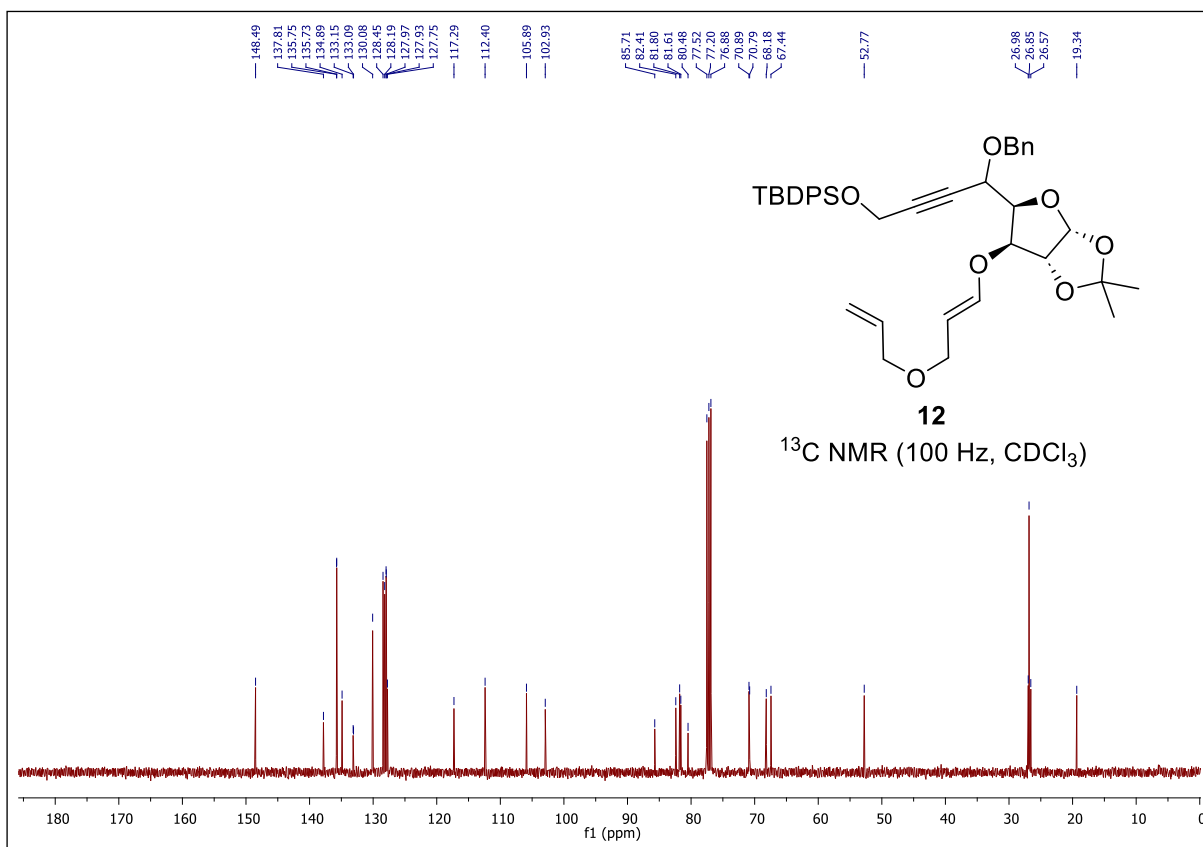
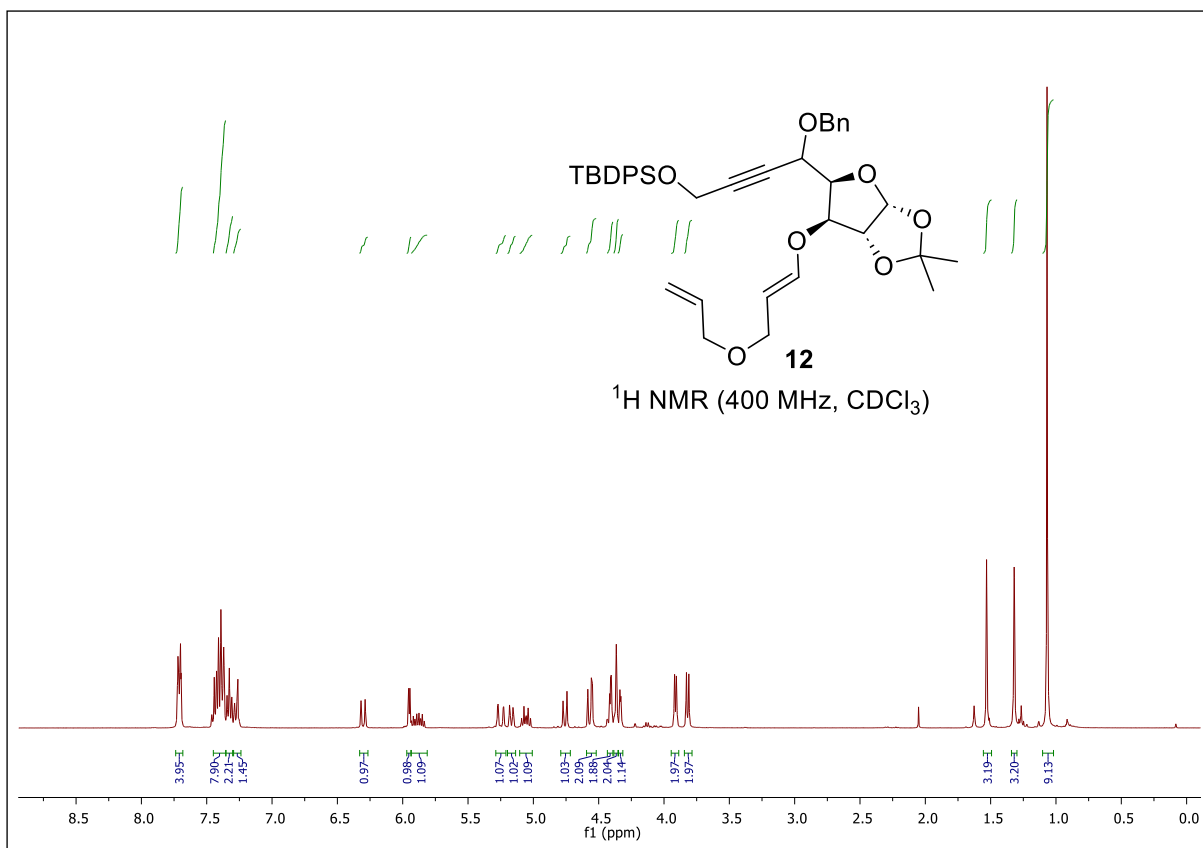


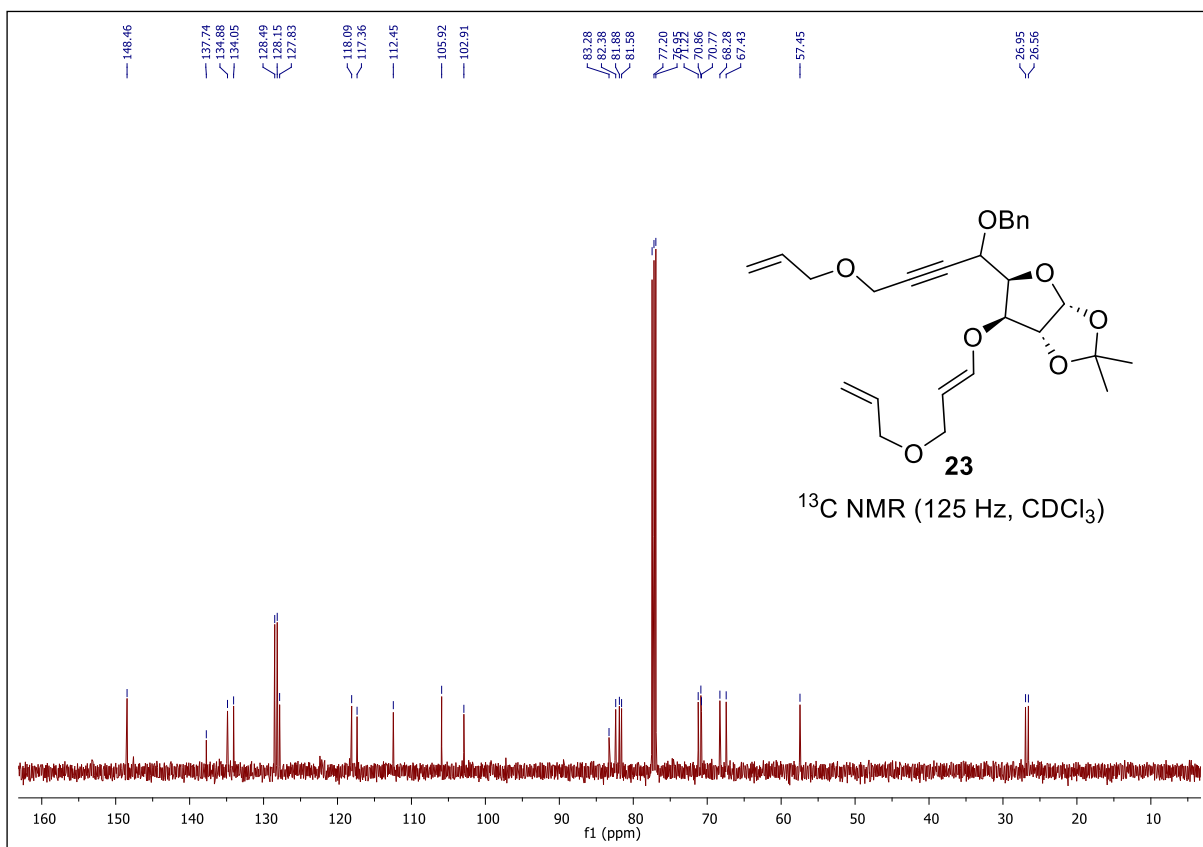
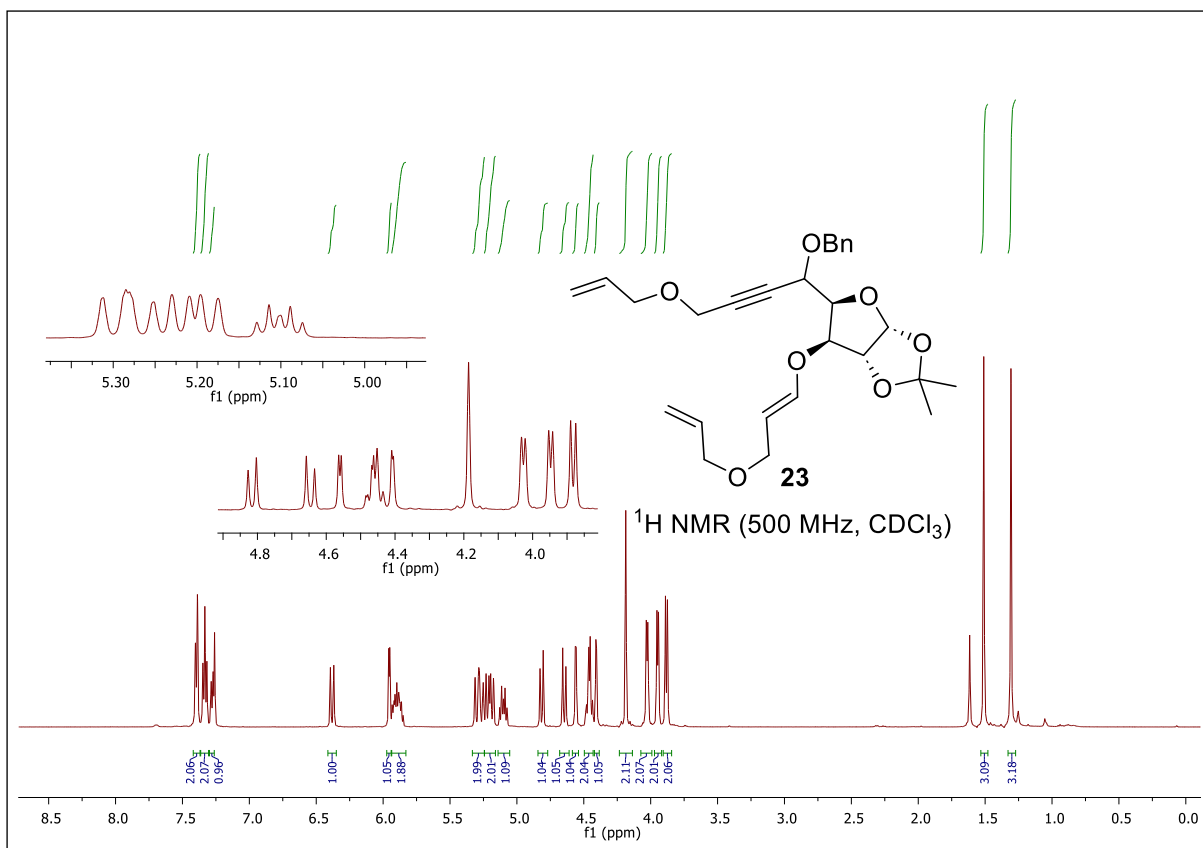


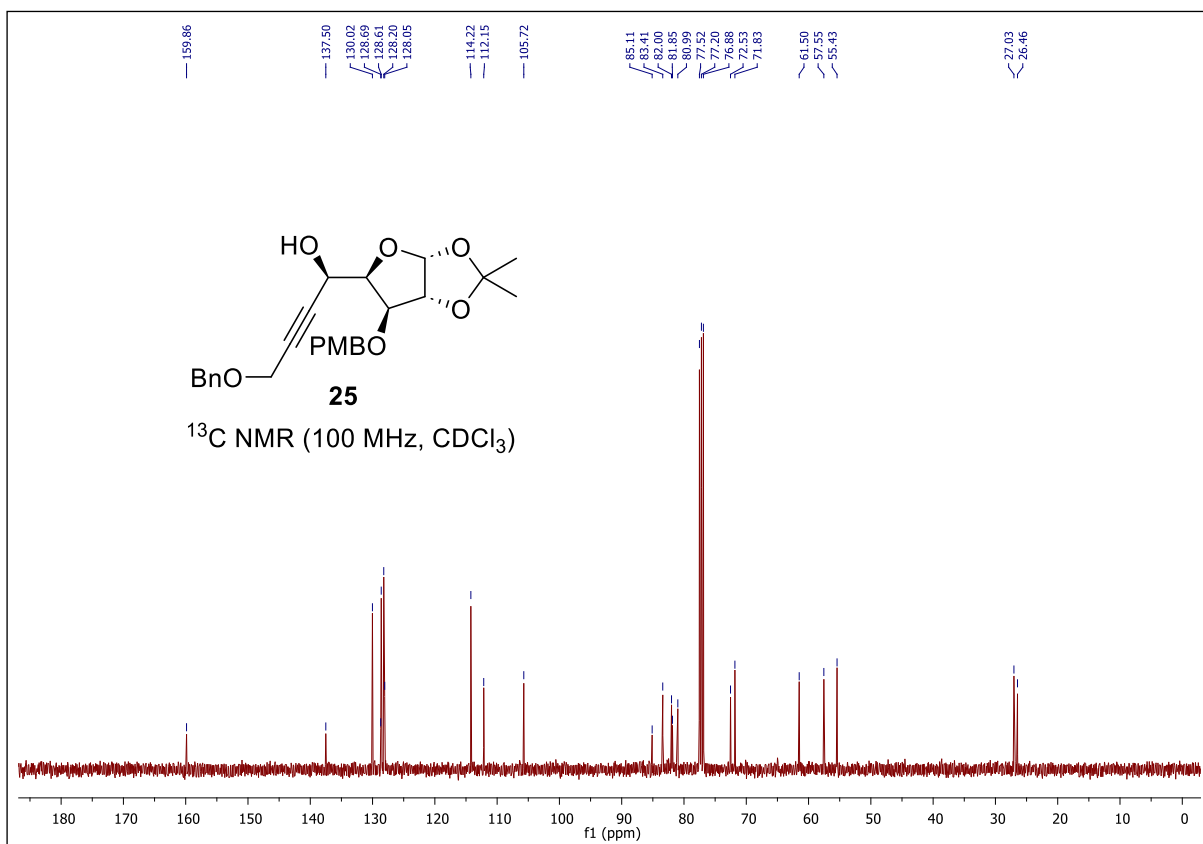
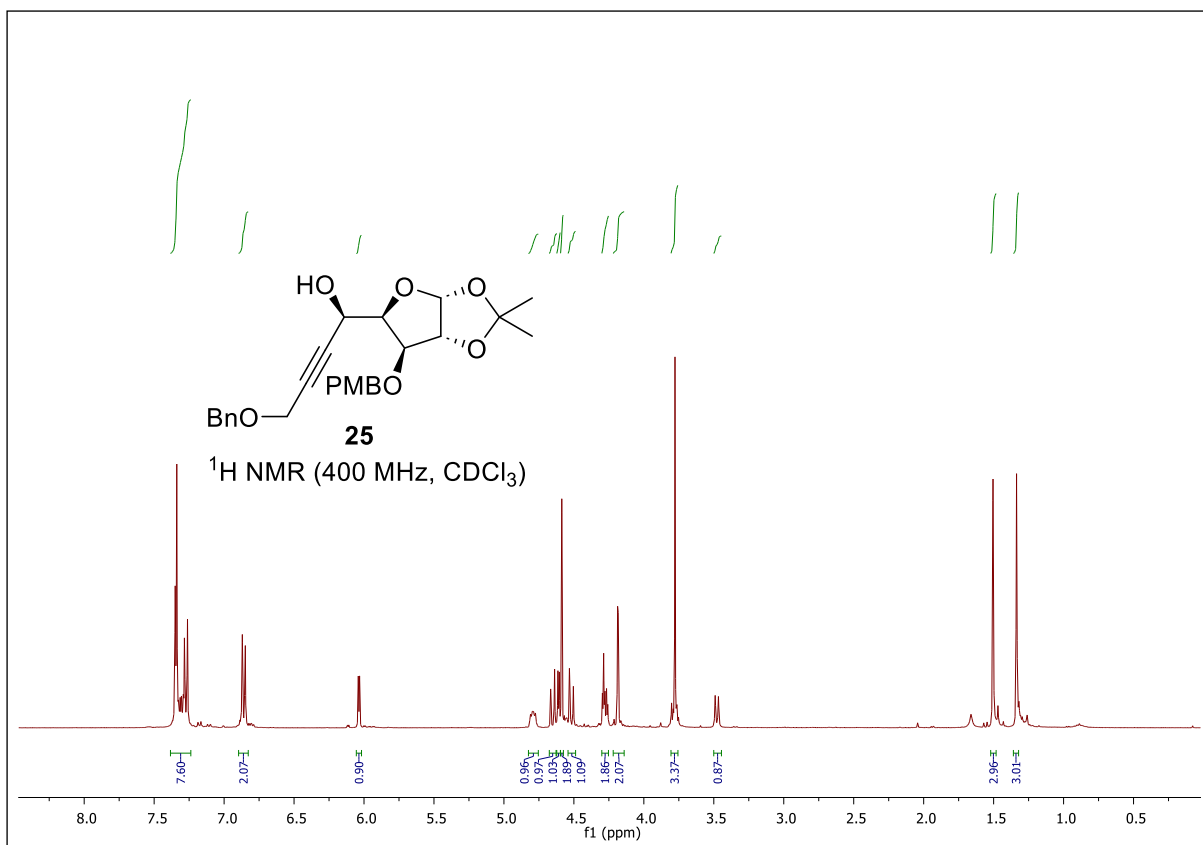


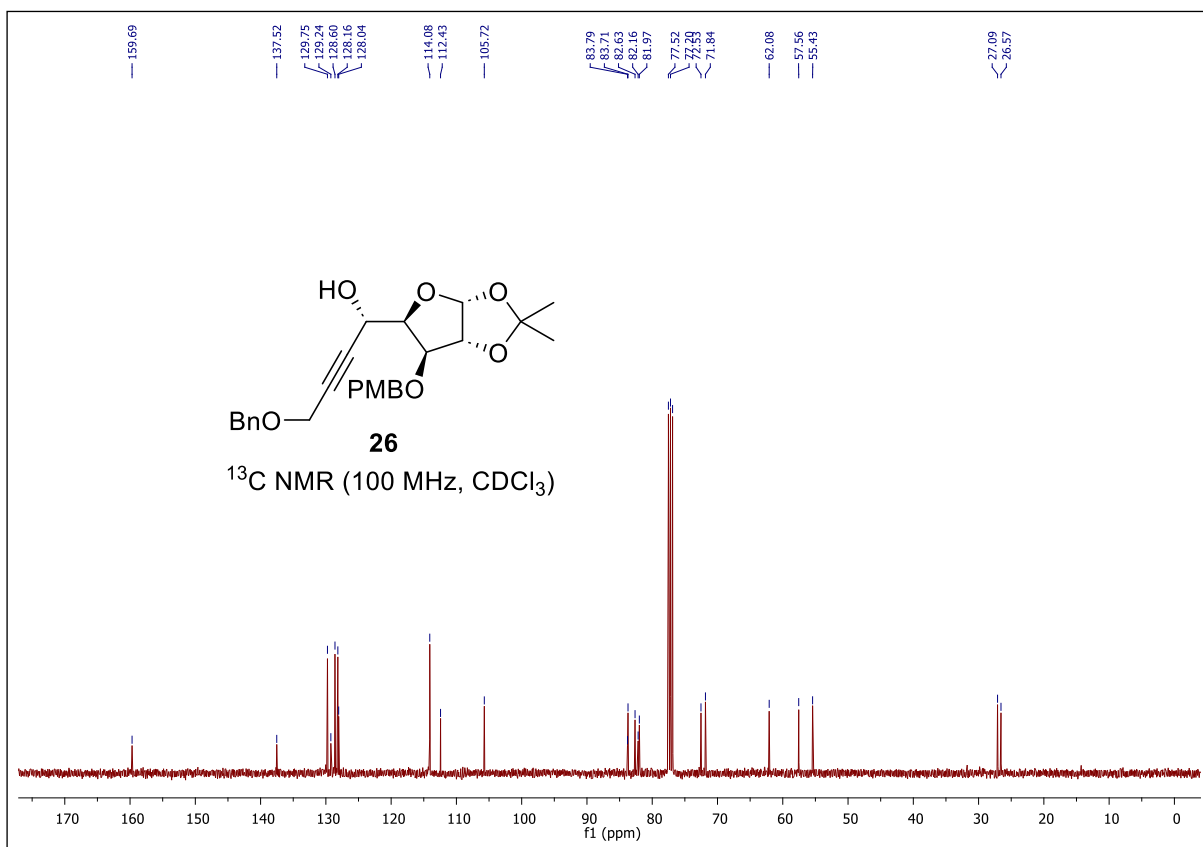
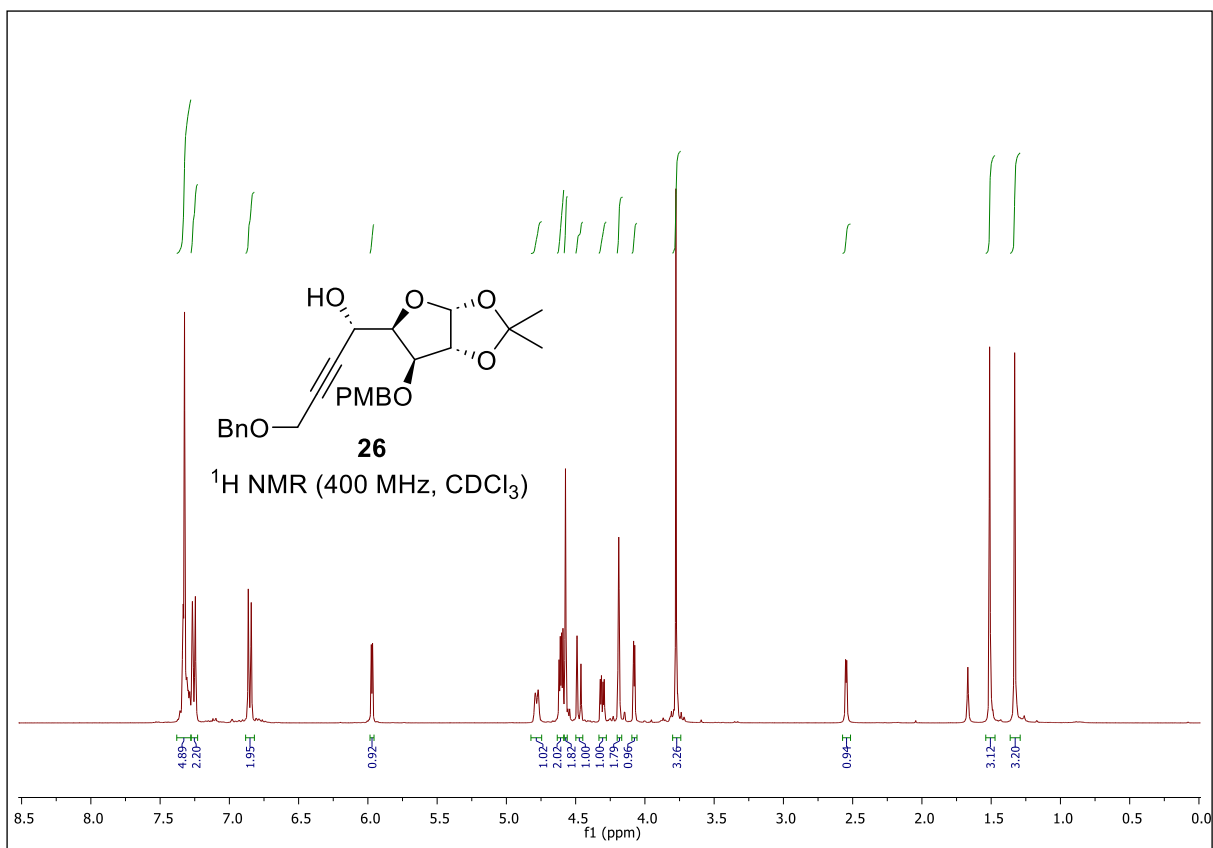


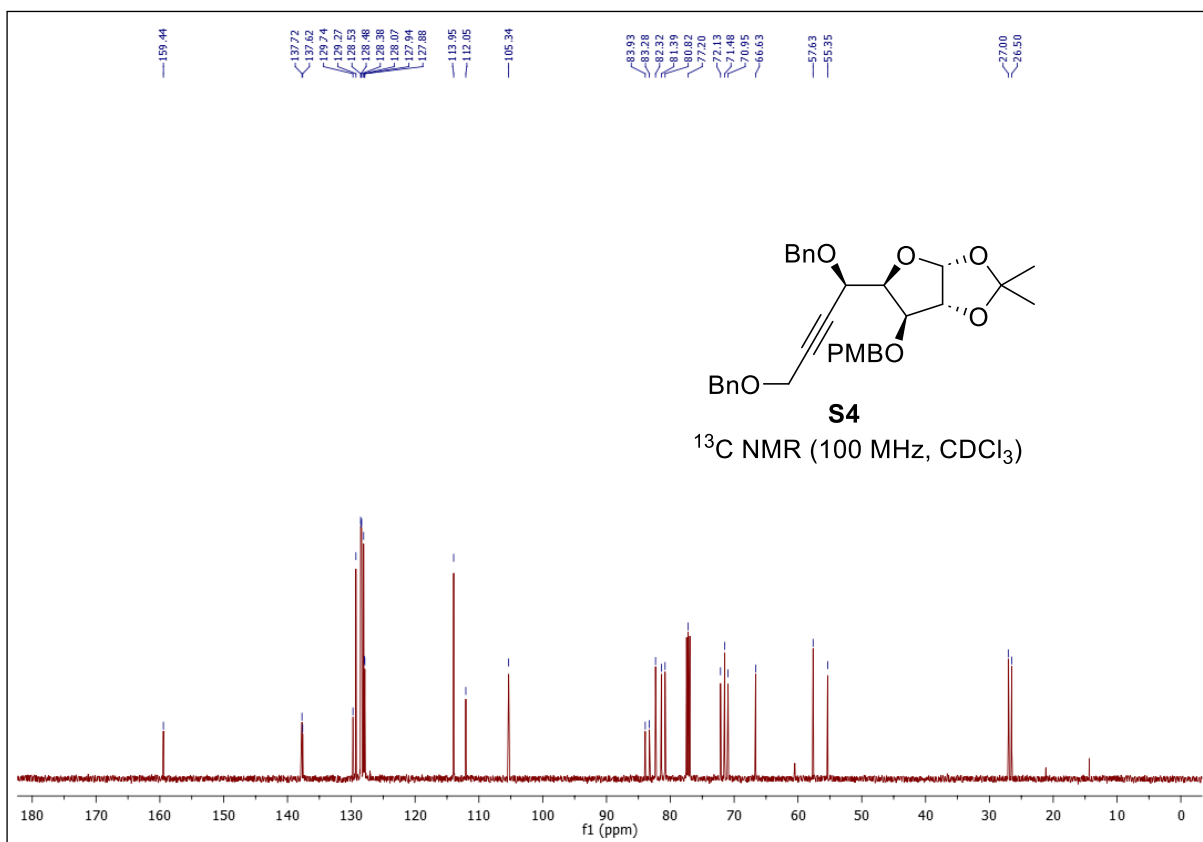
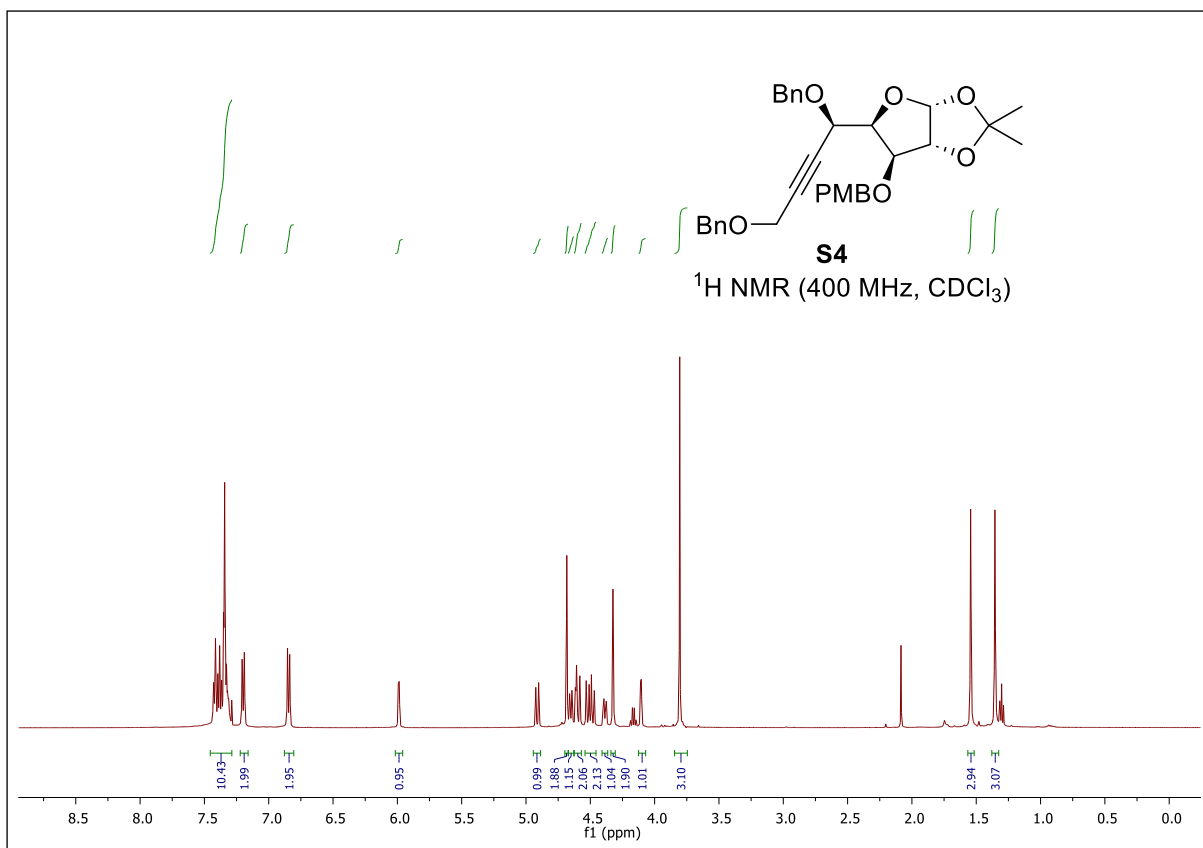


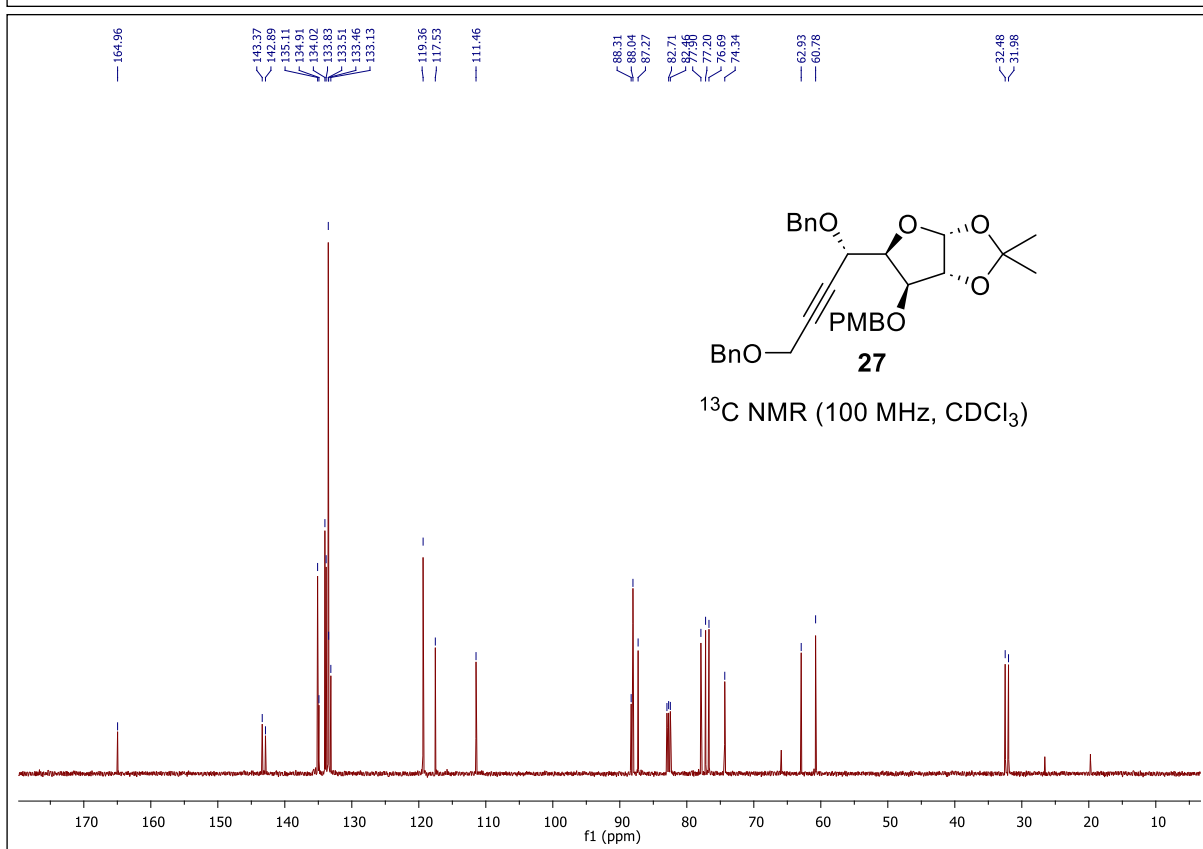
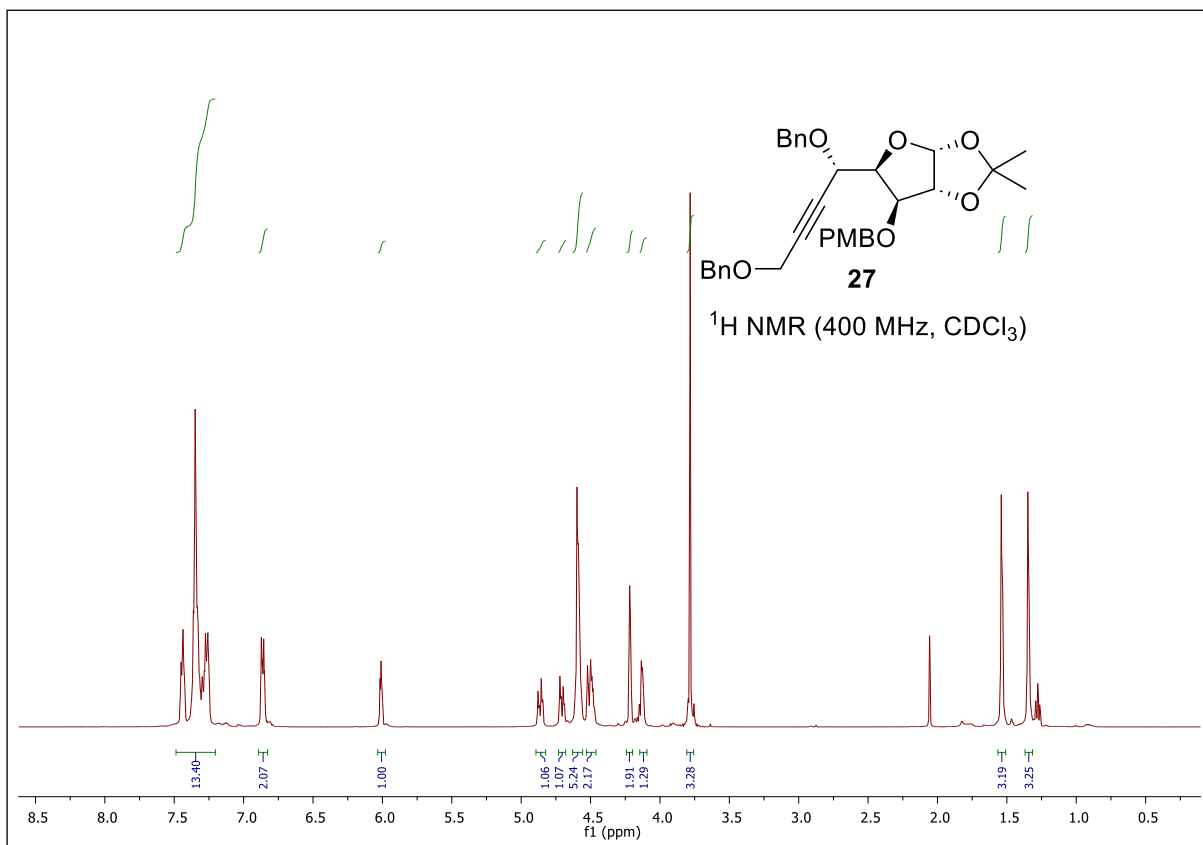


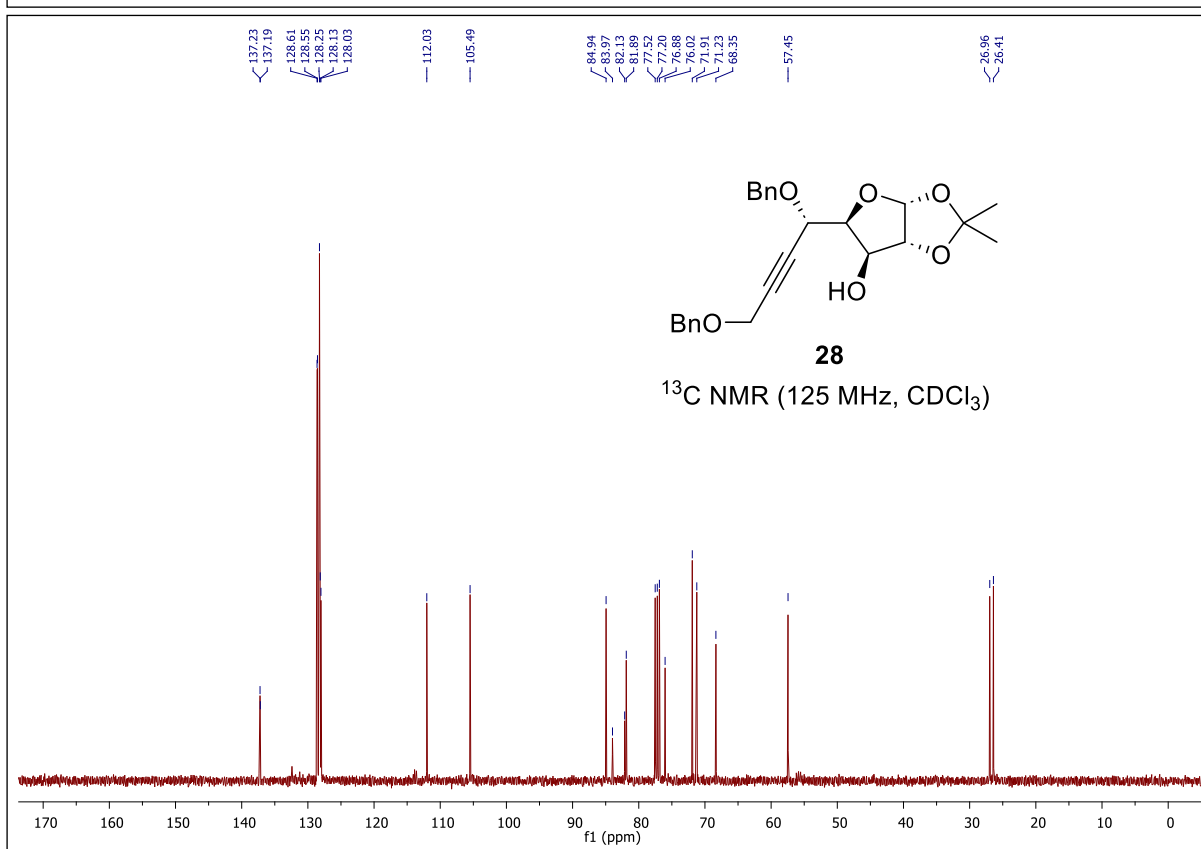
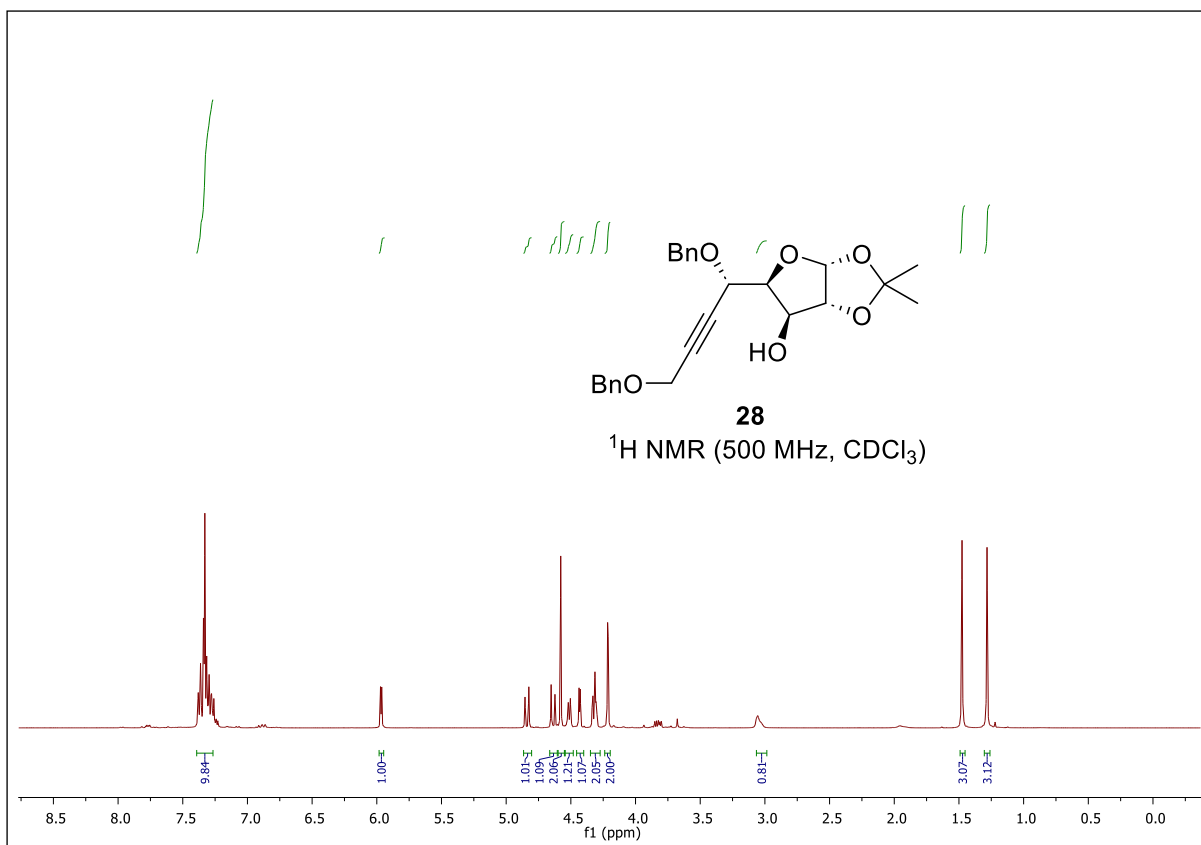


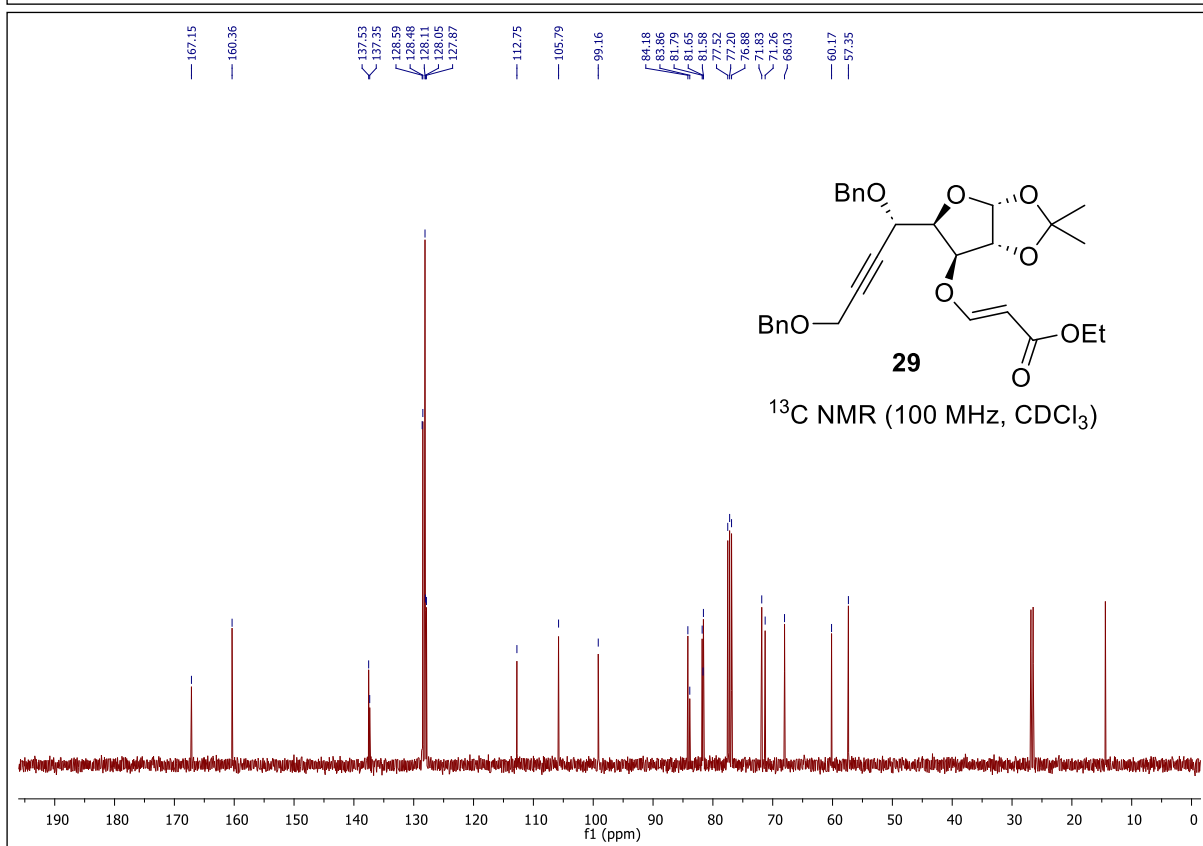
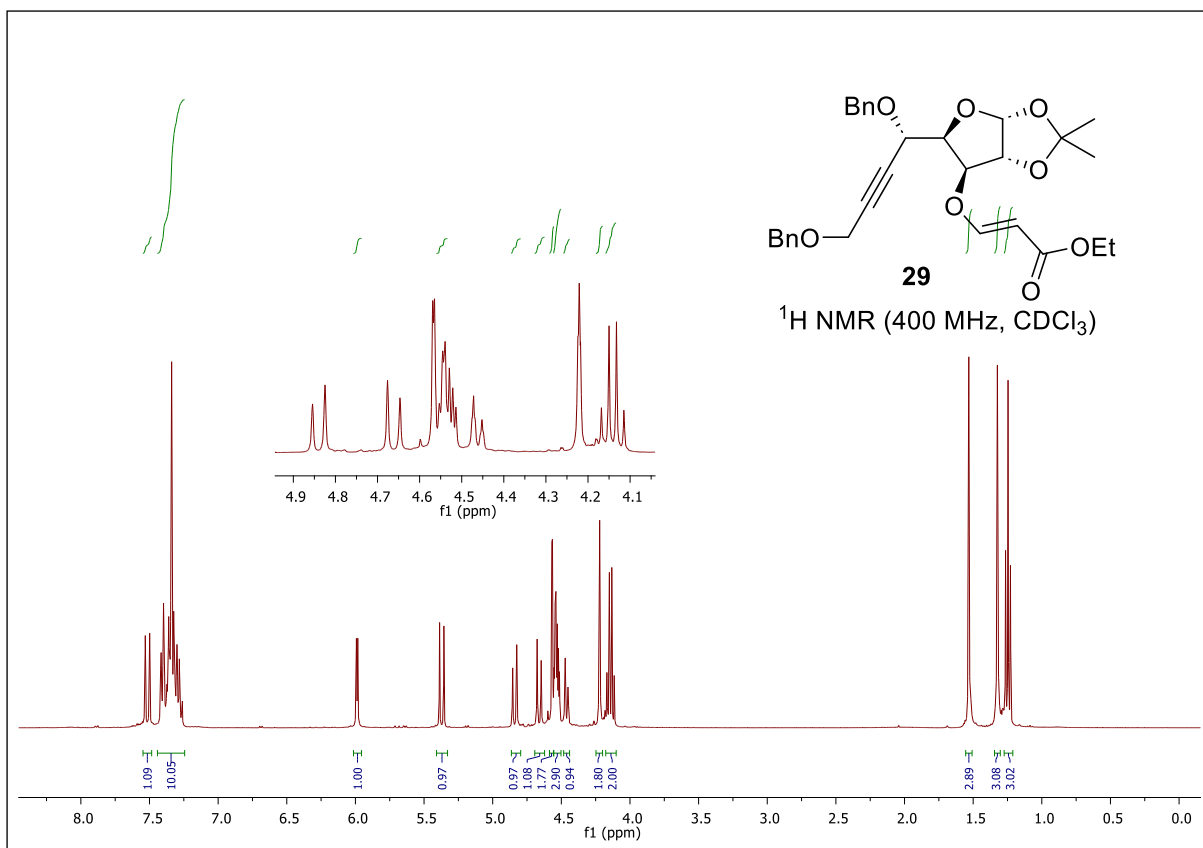


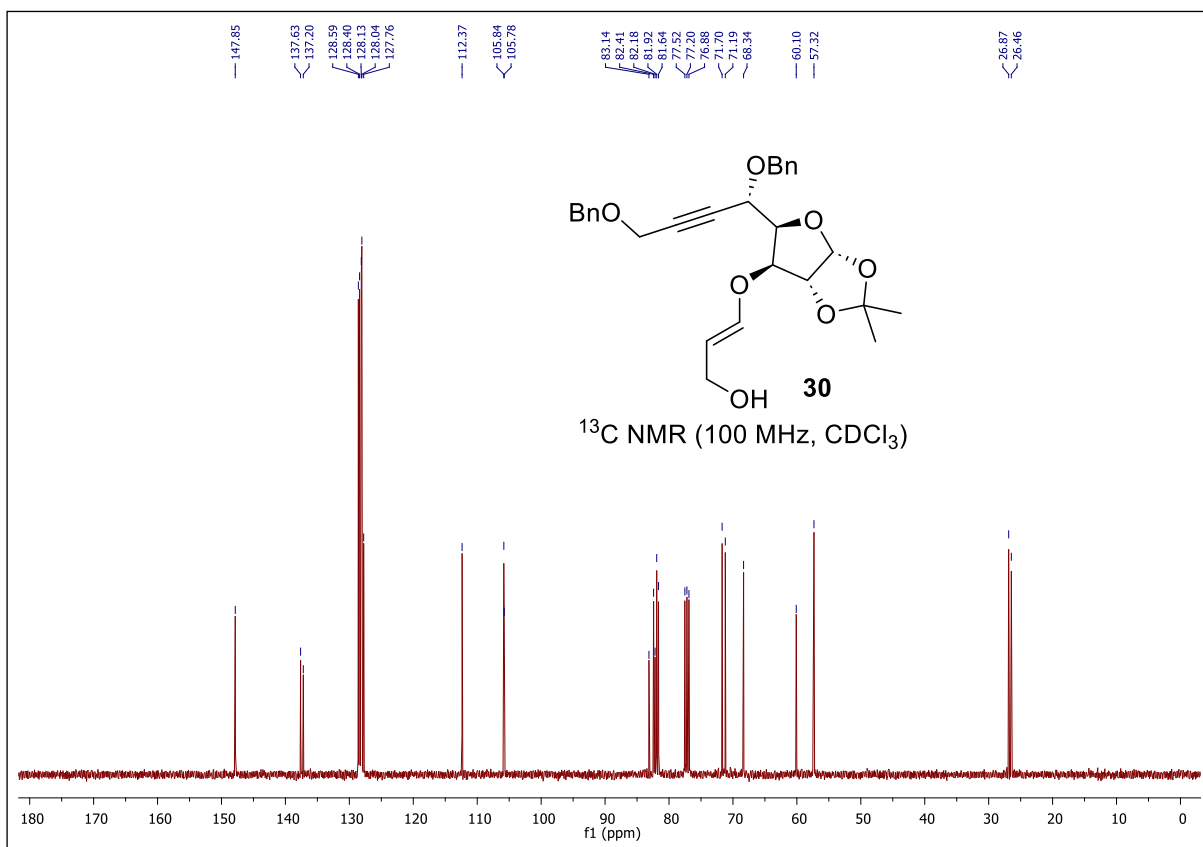
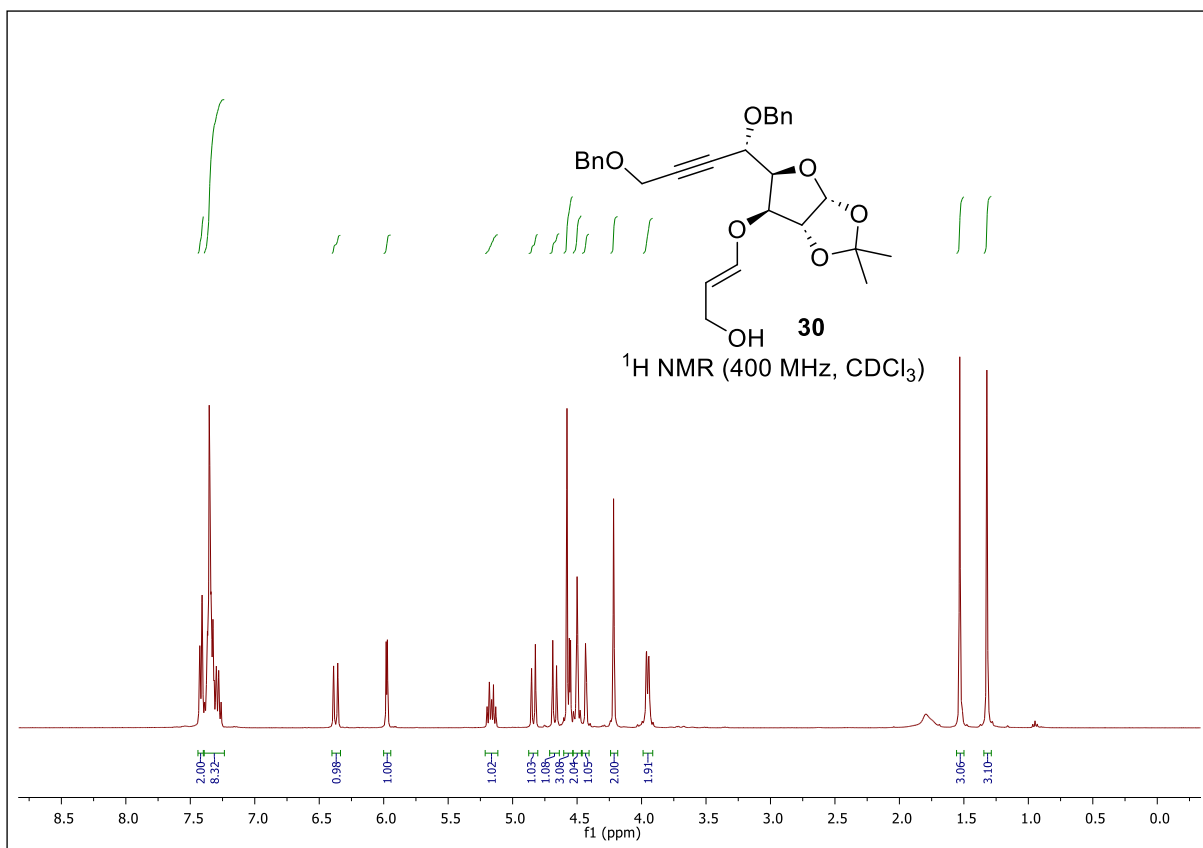


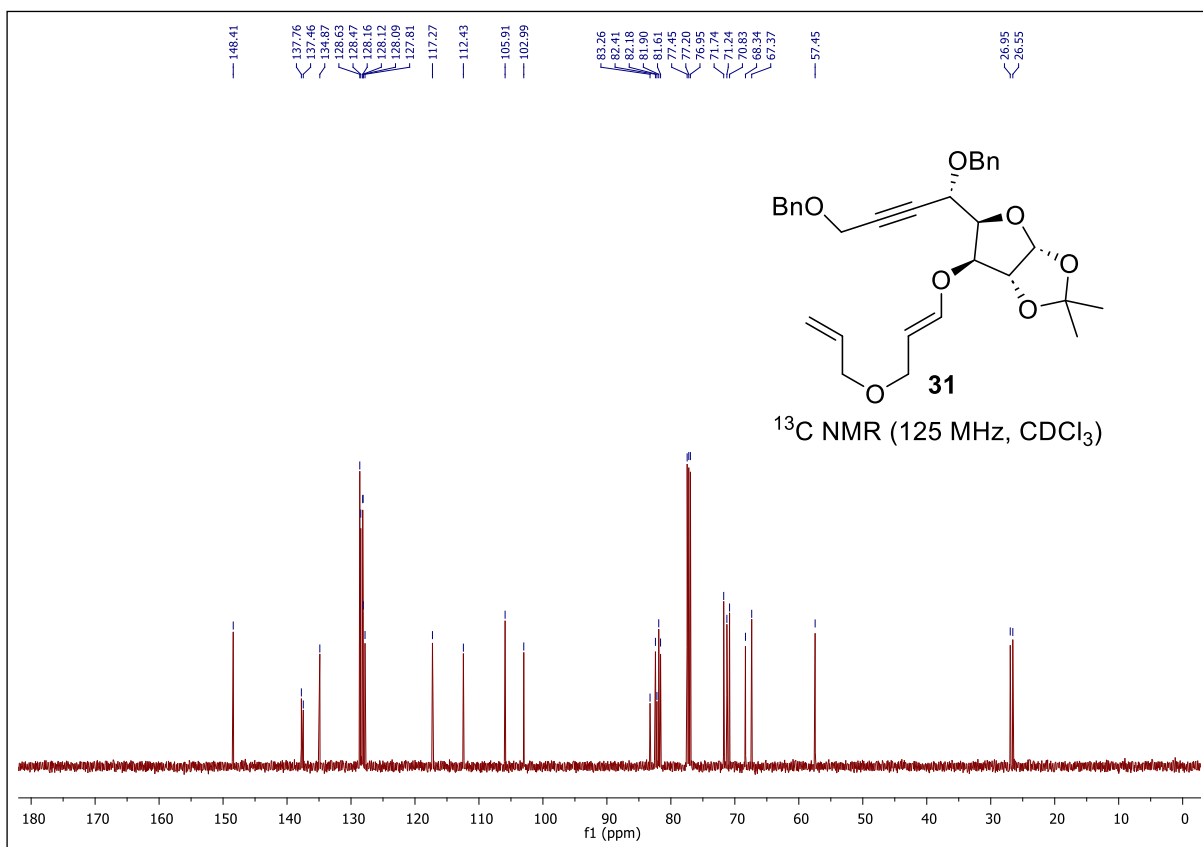
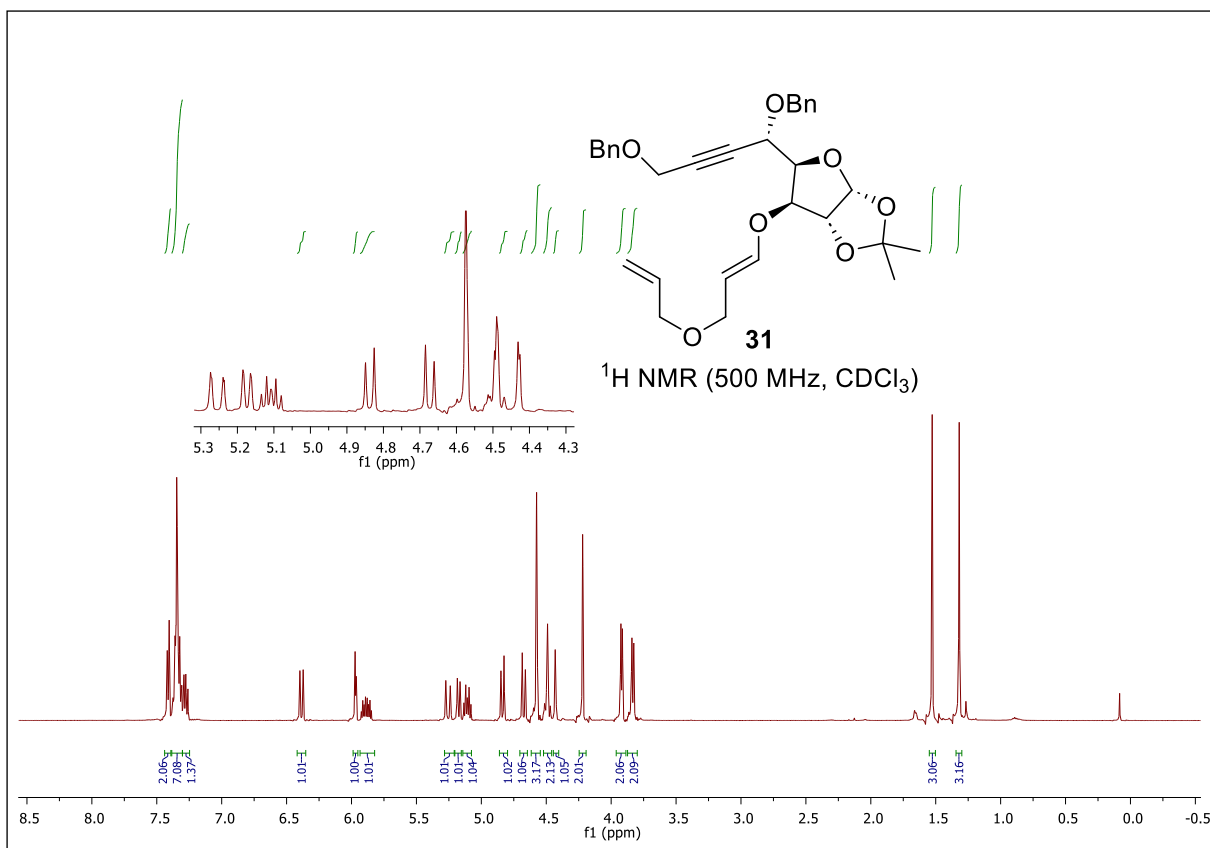


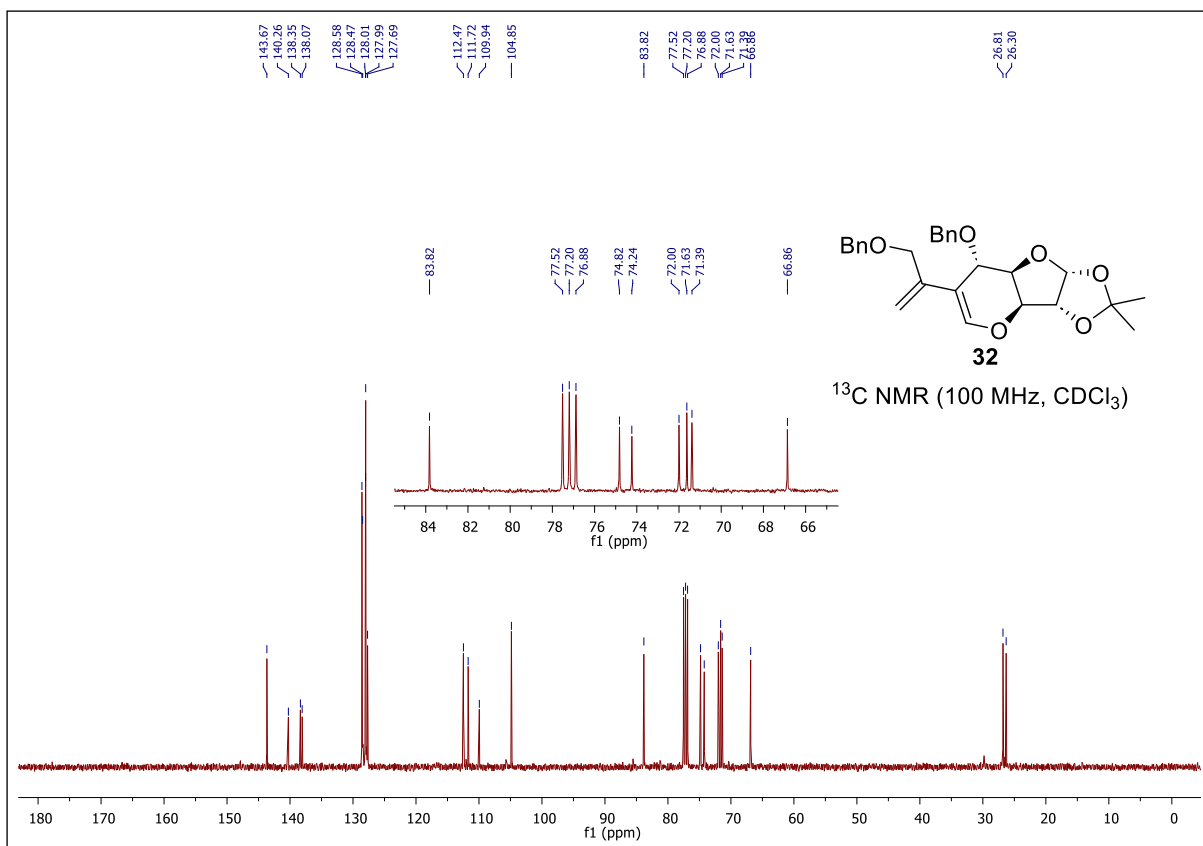
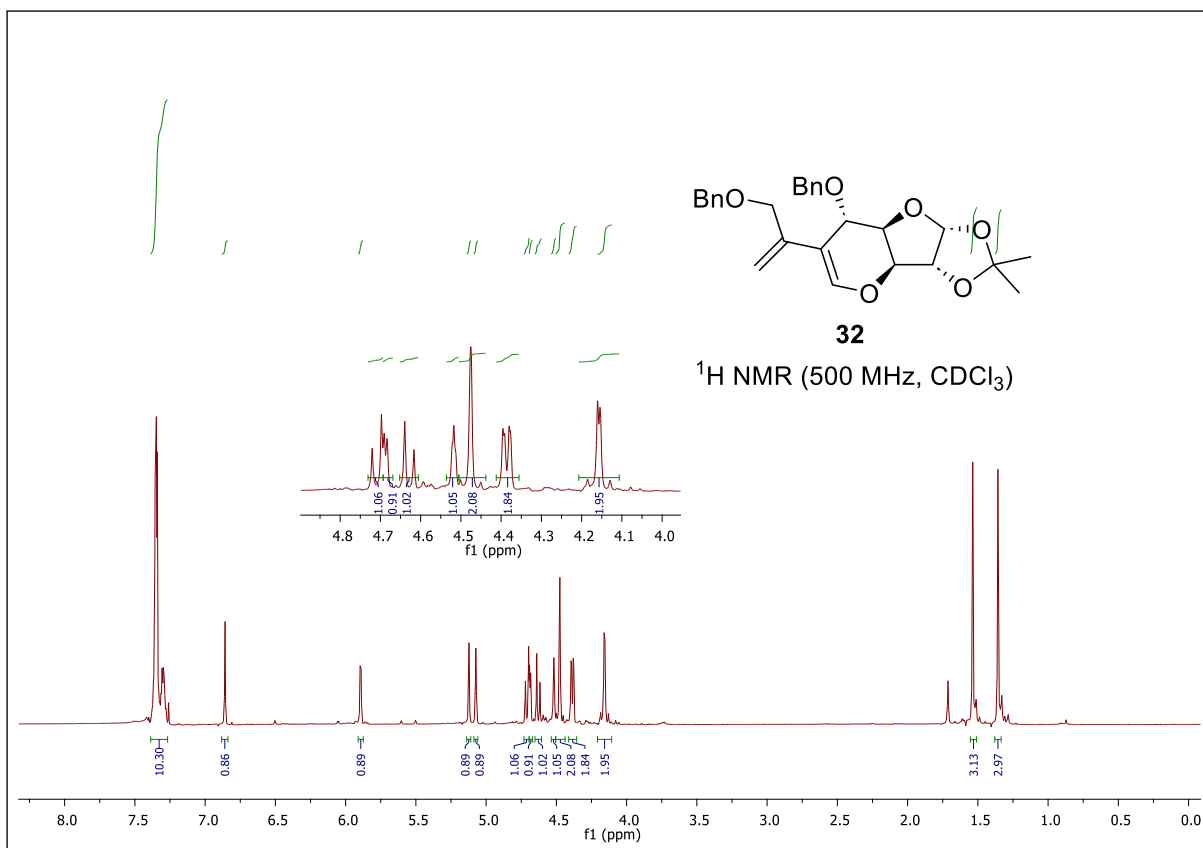


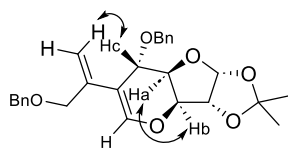




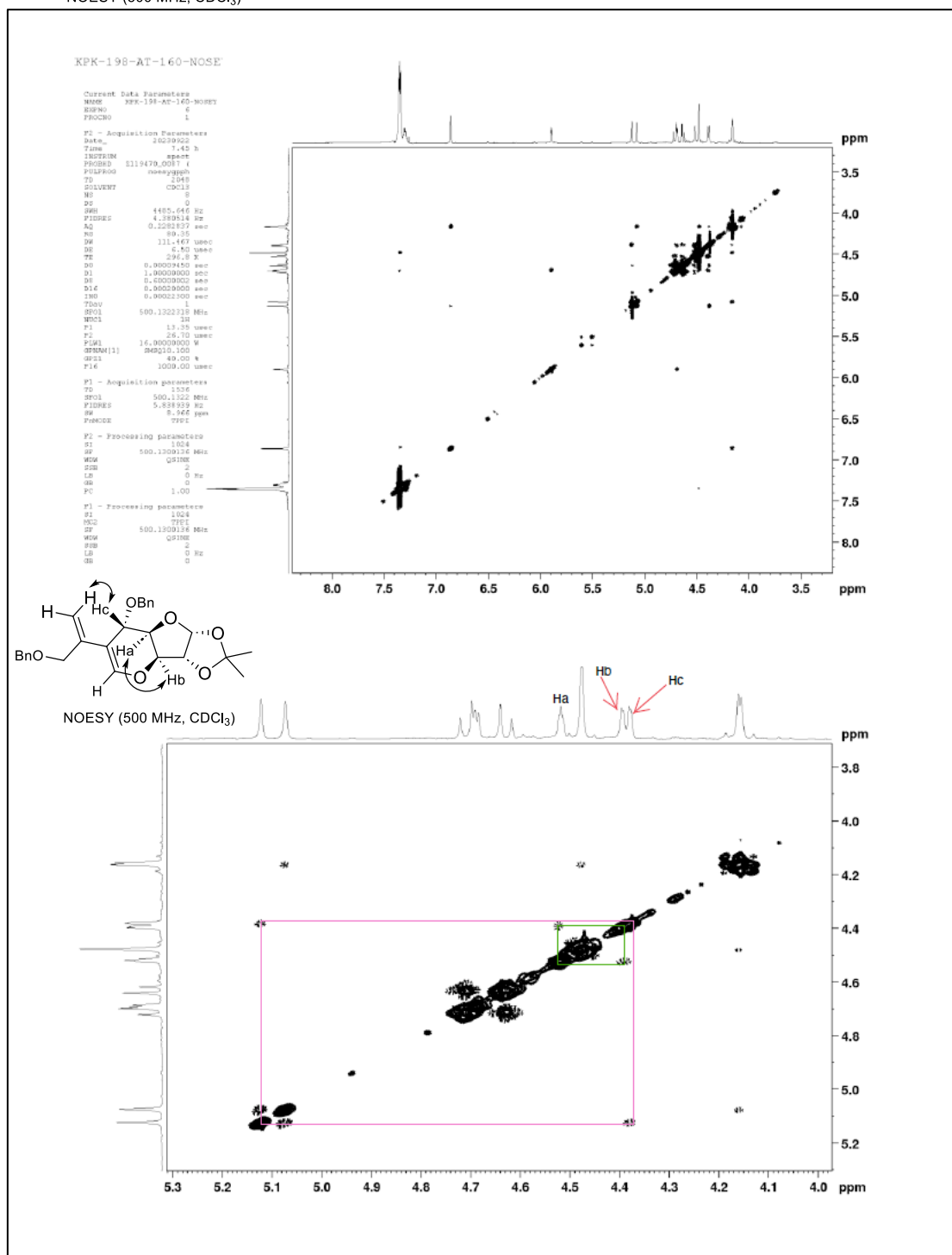


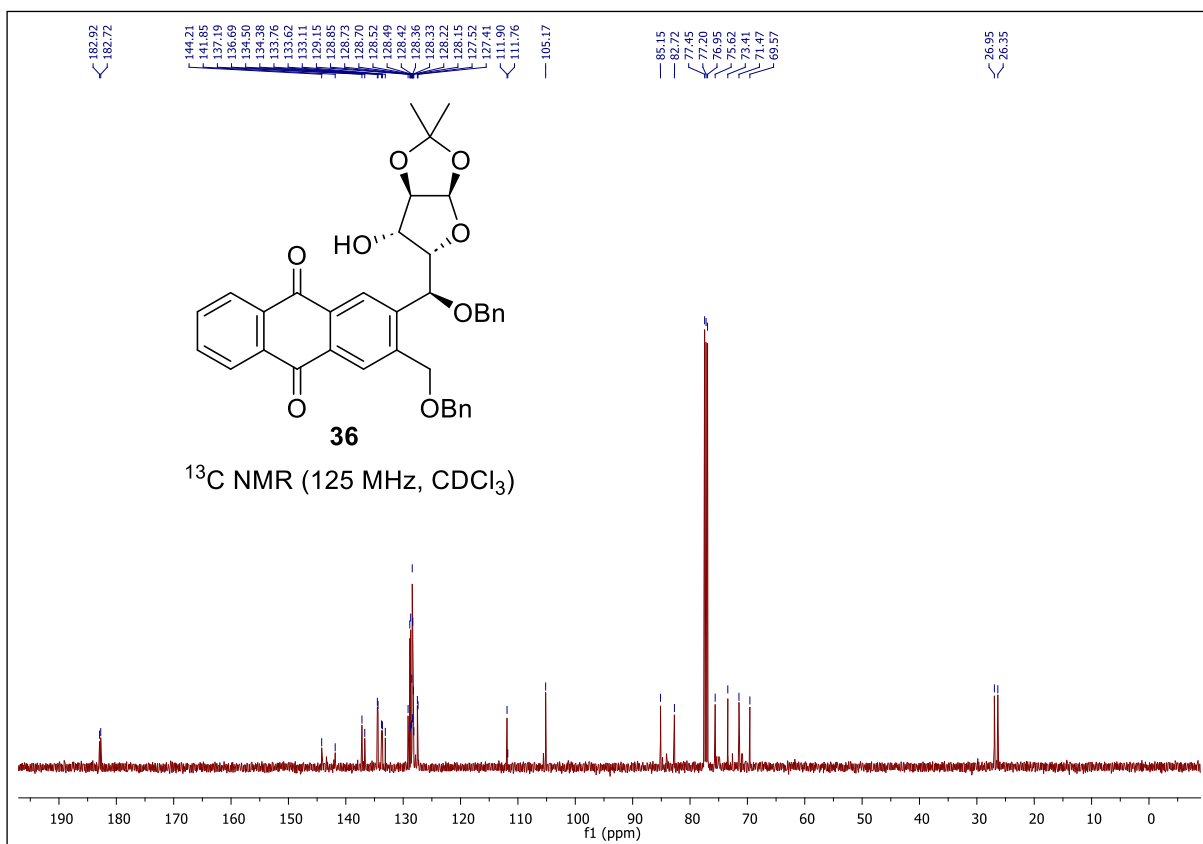
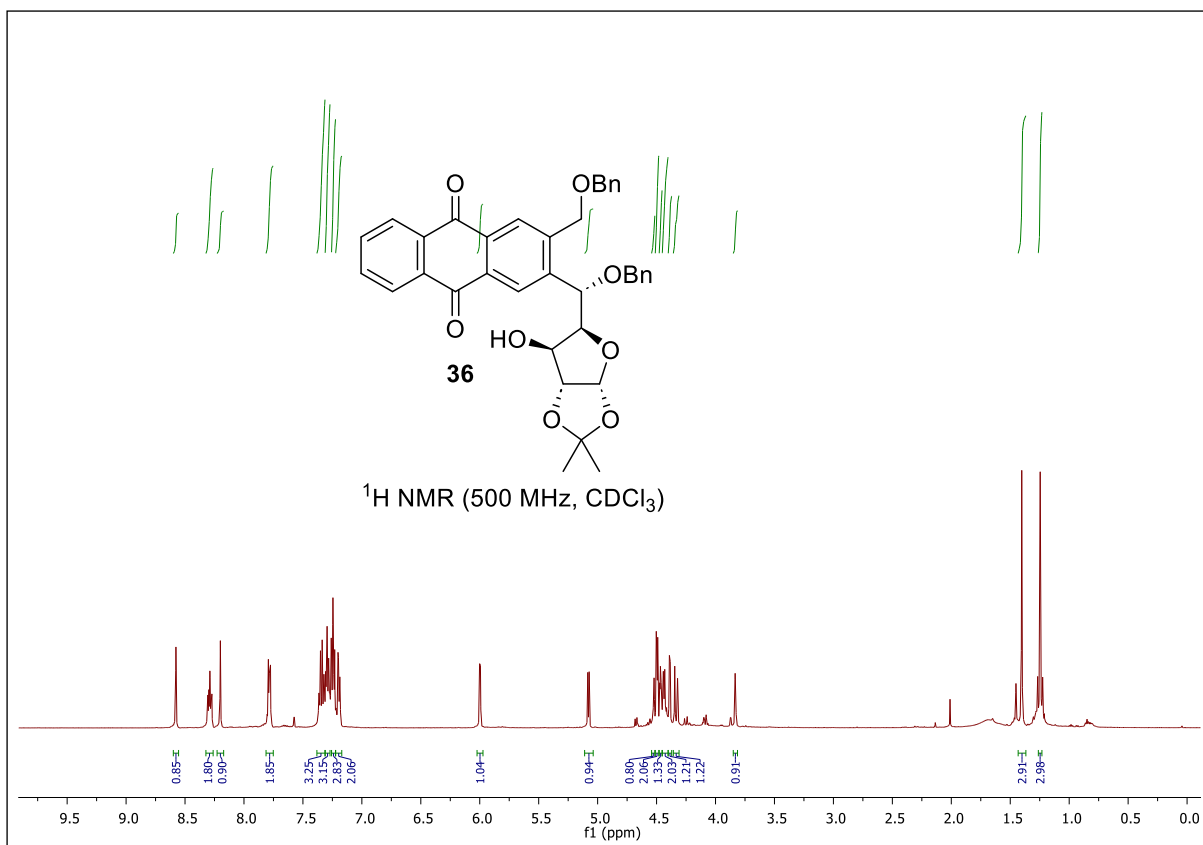


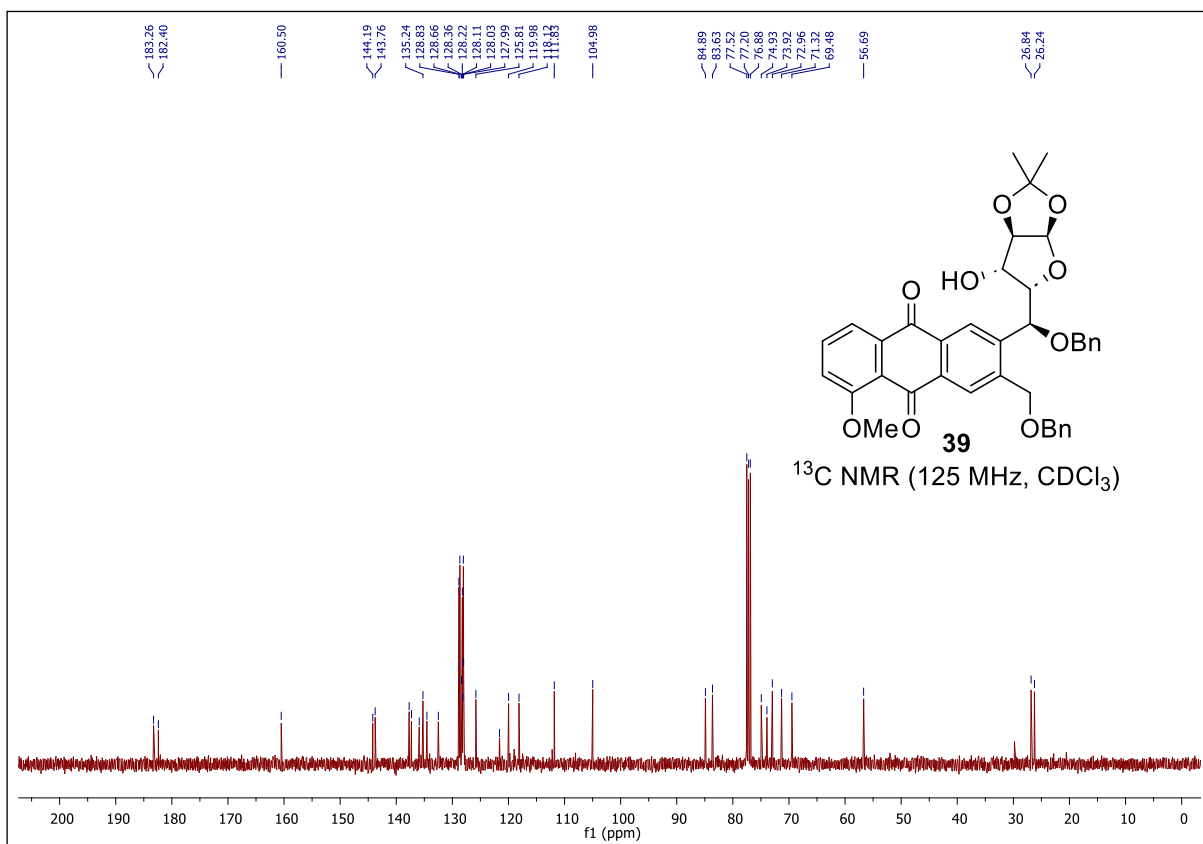
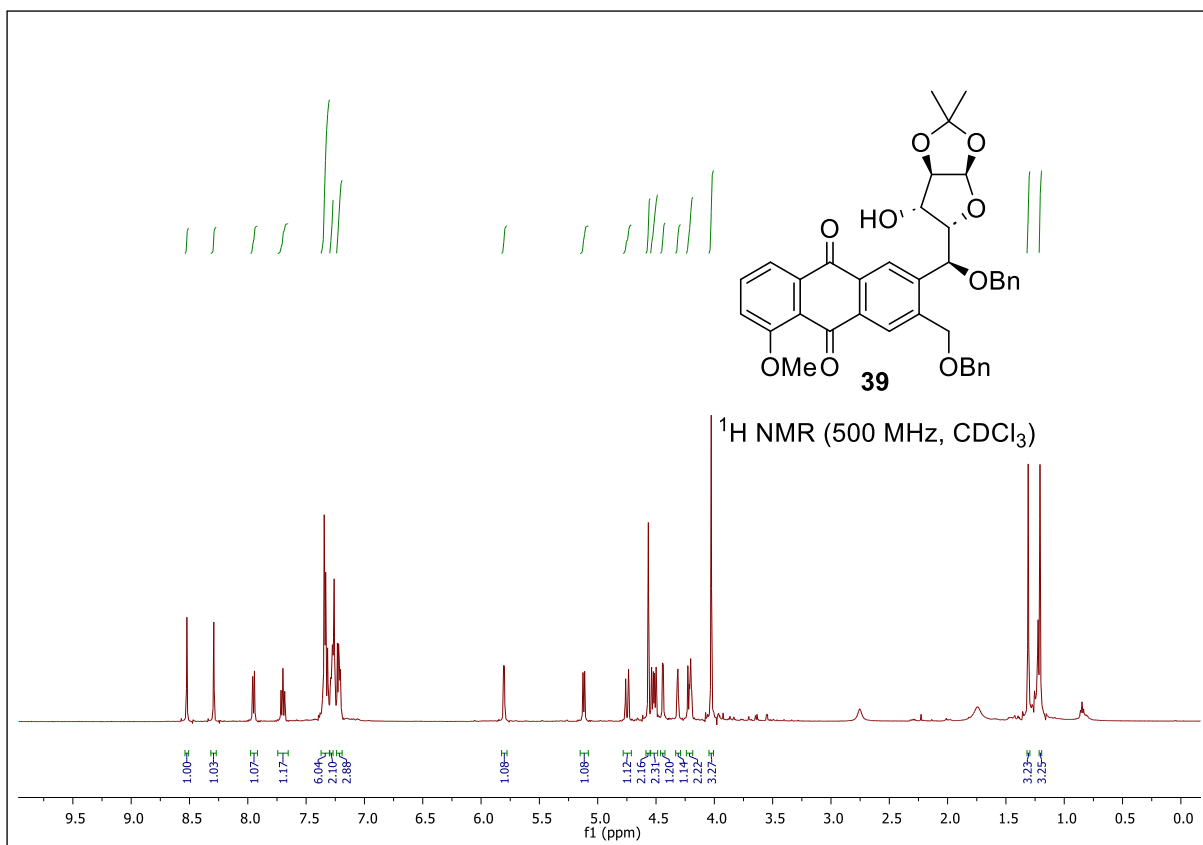




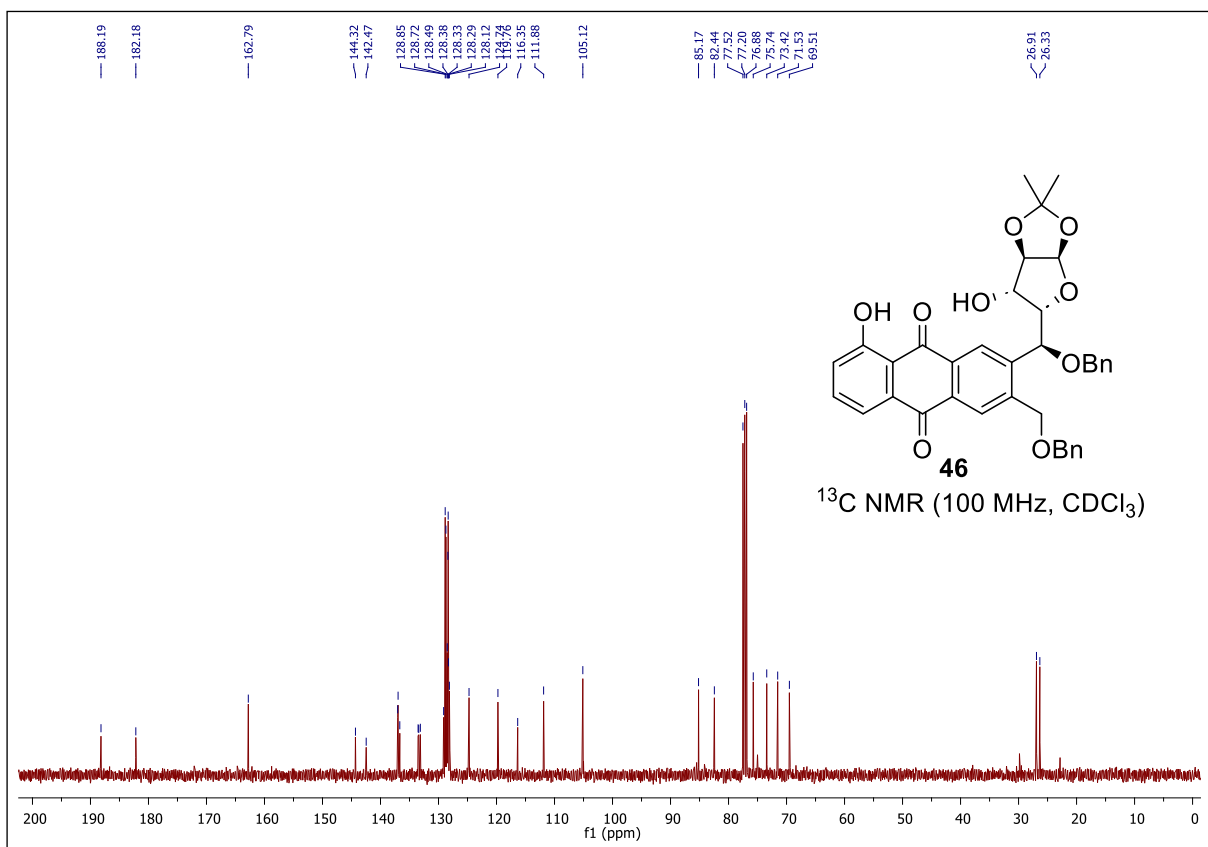
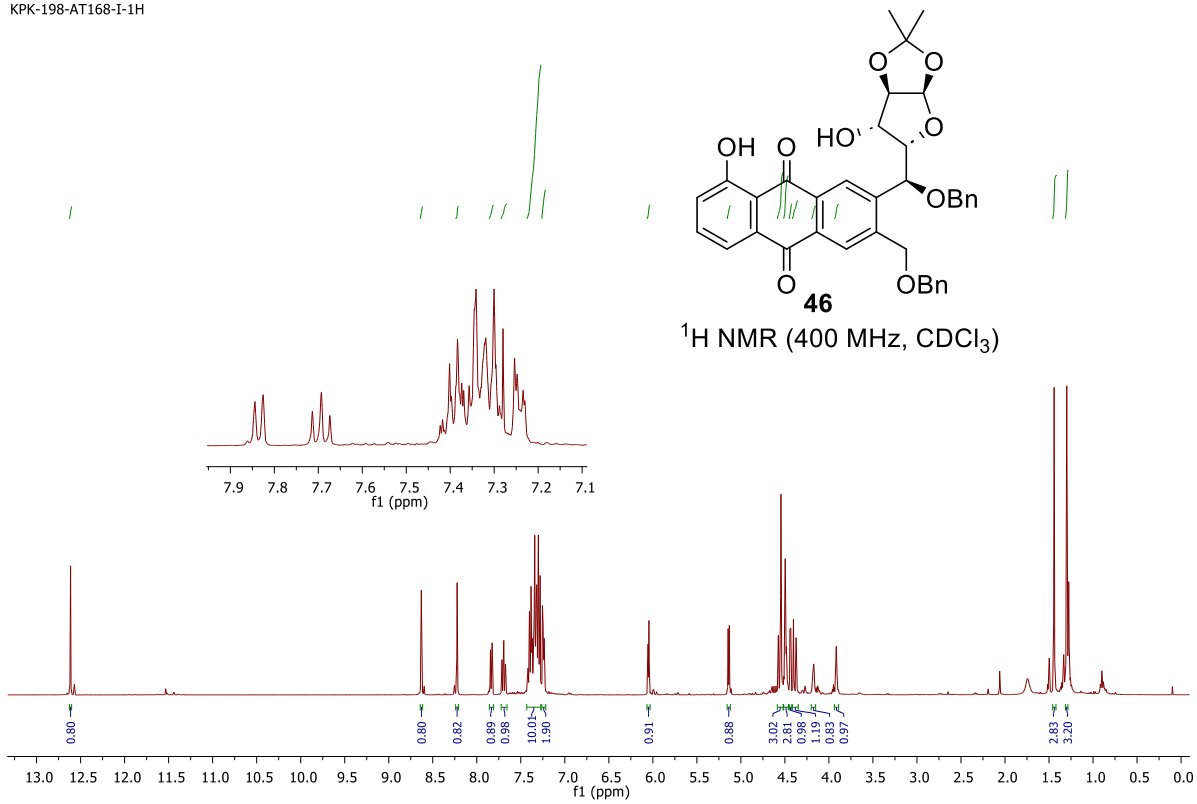
NOESY (500 MHz, CDCl₃)

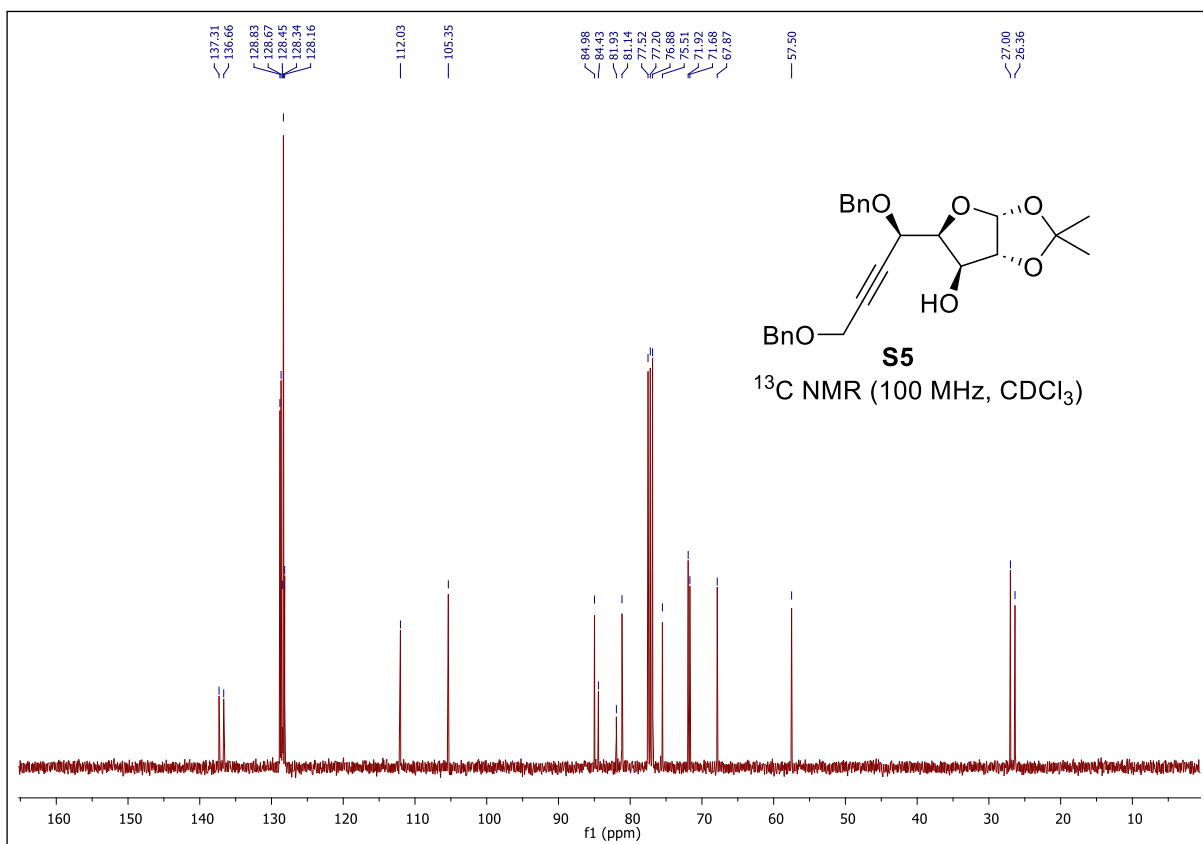
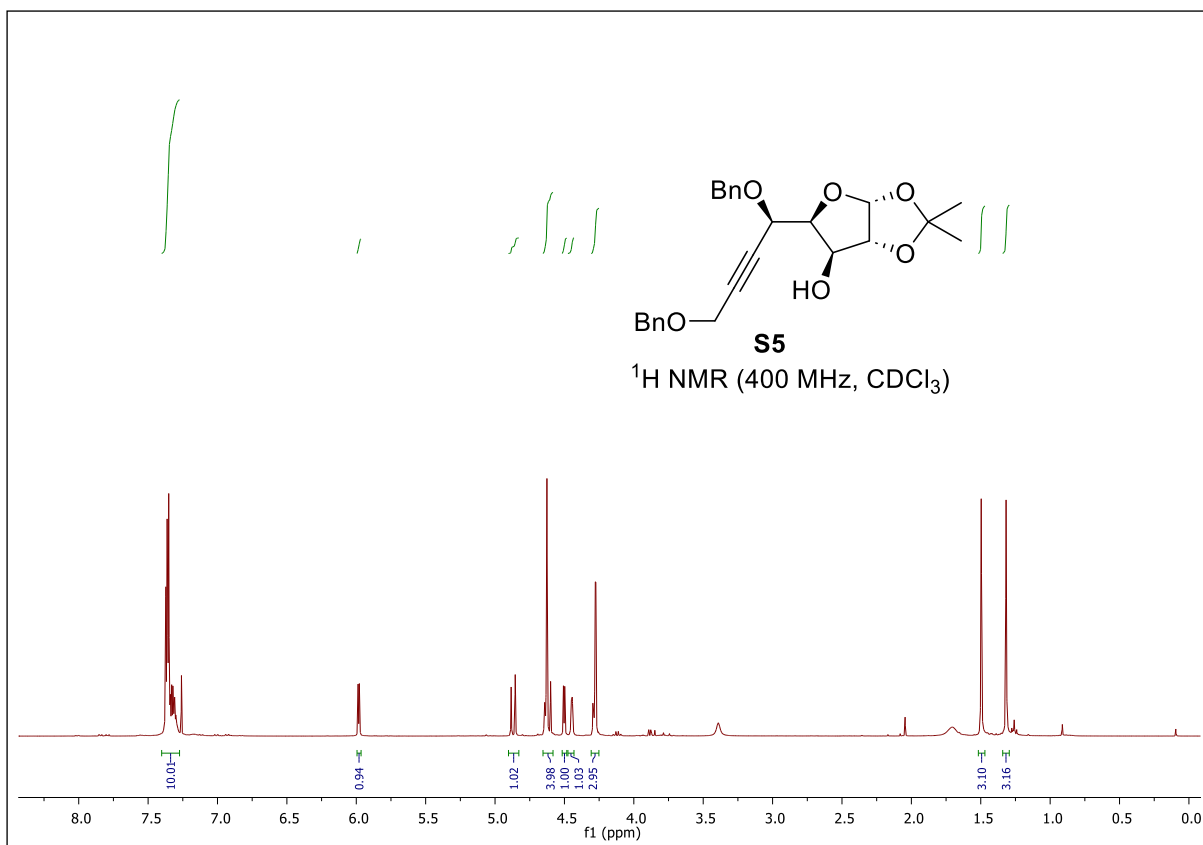


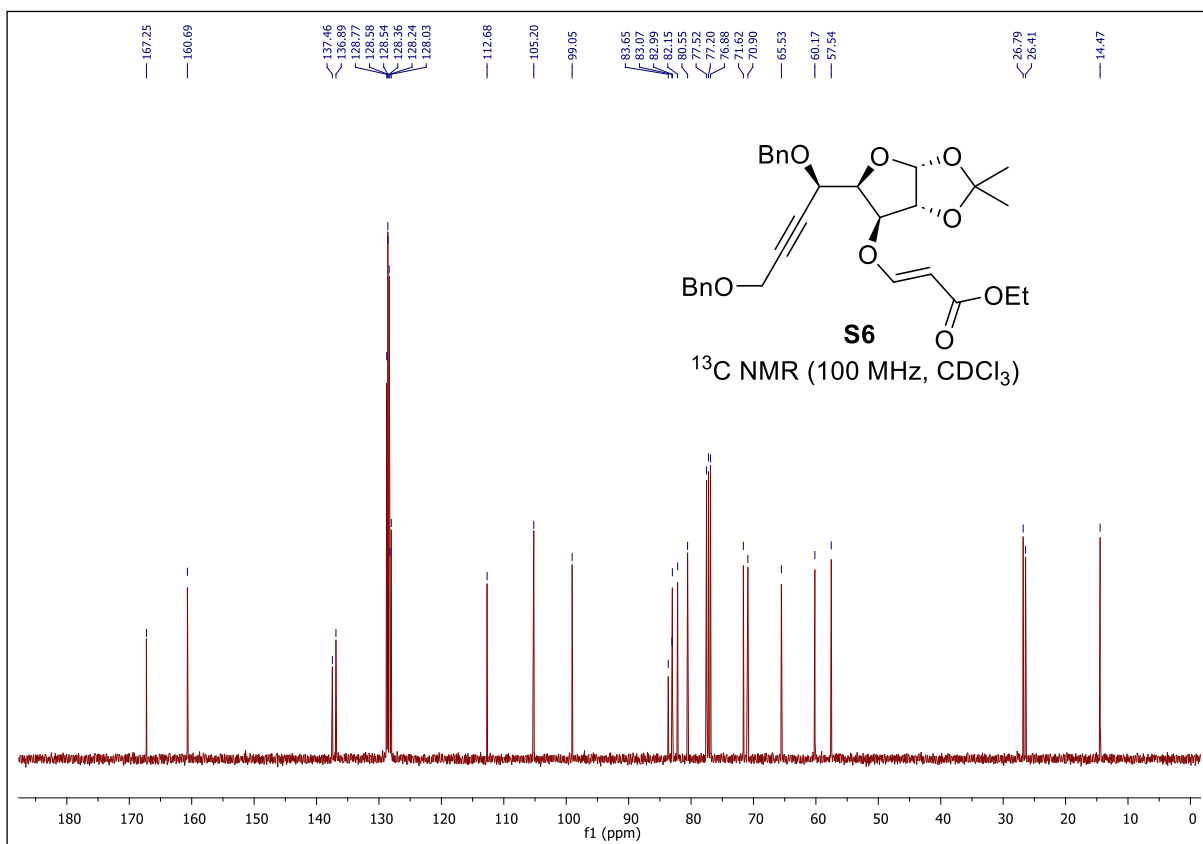
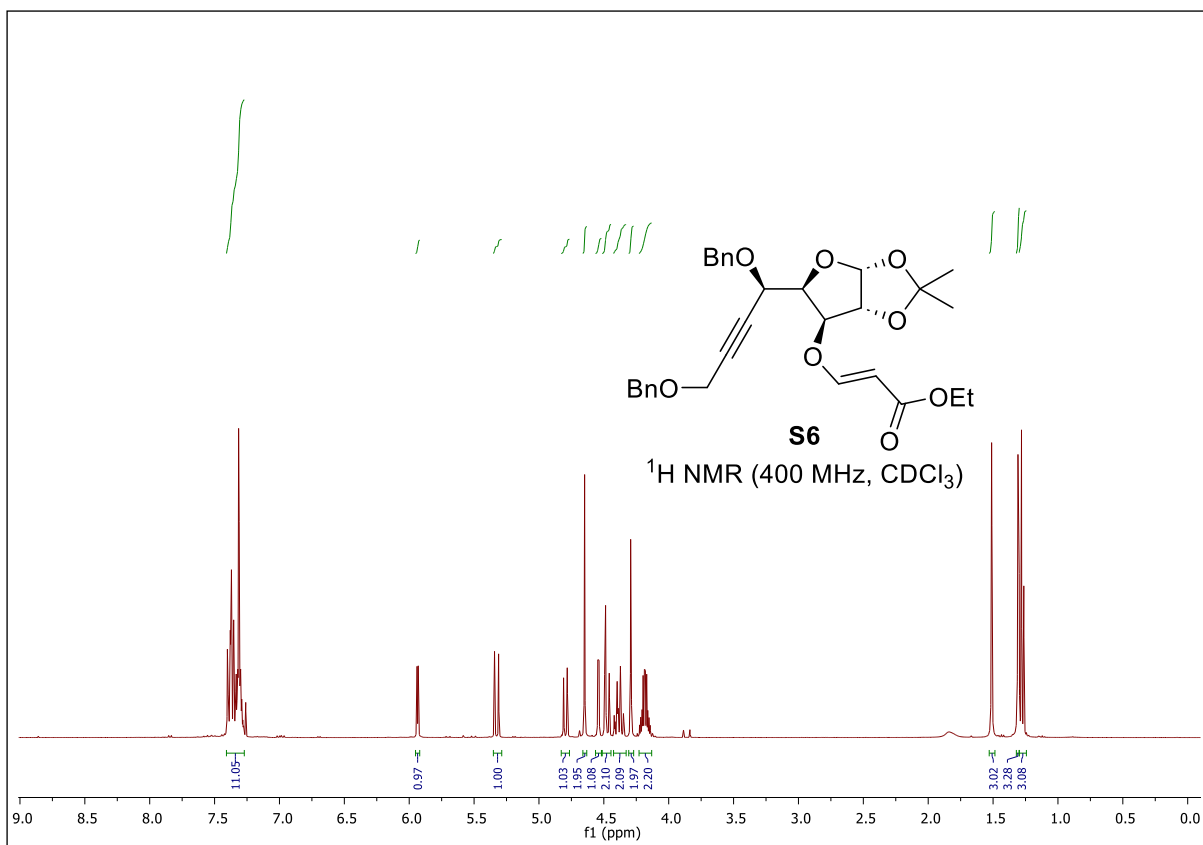


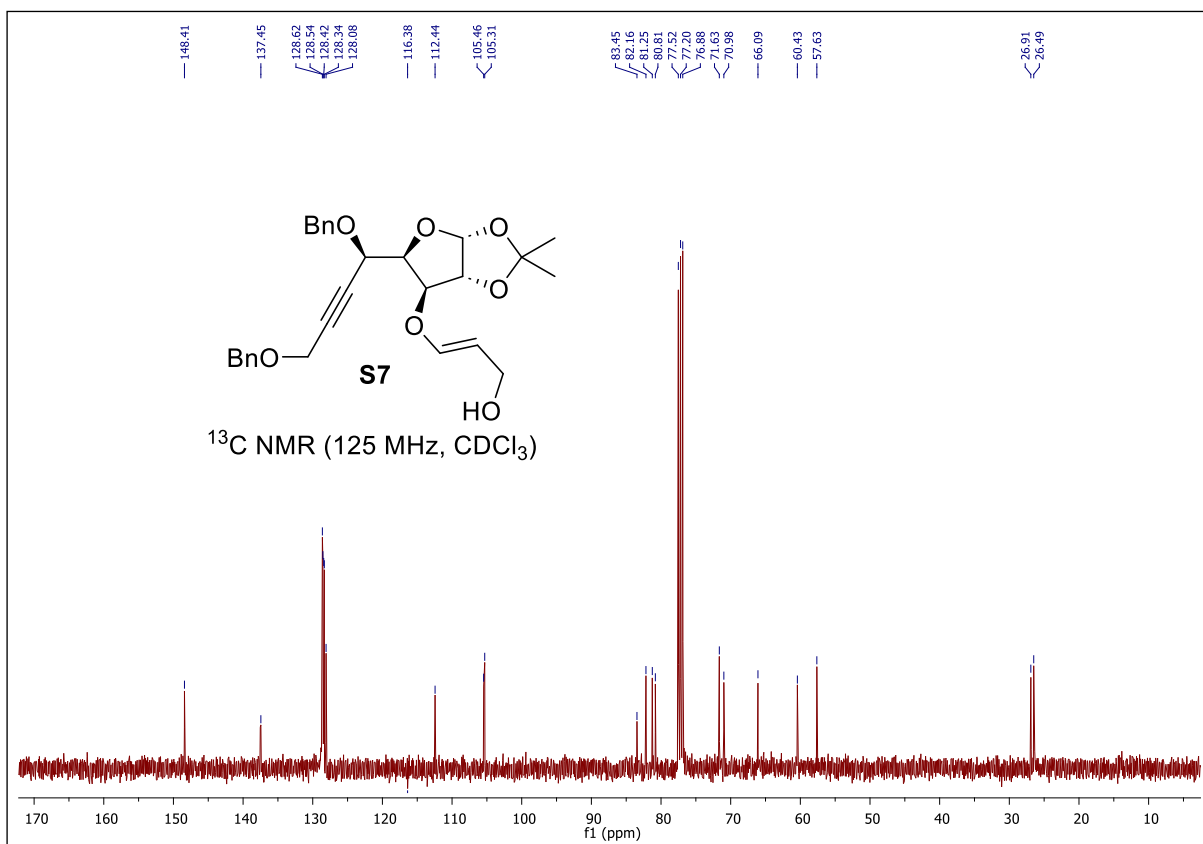
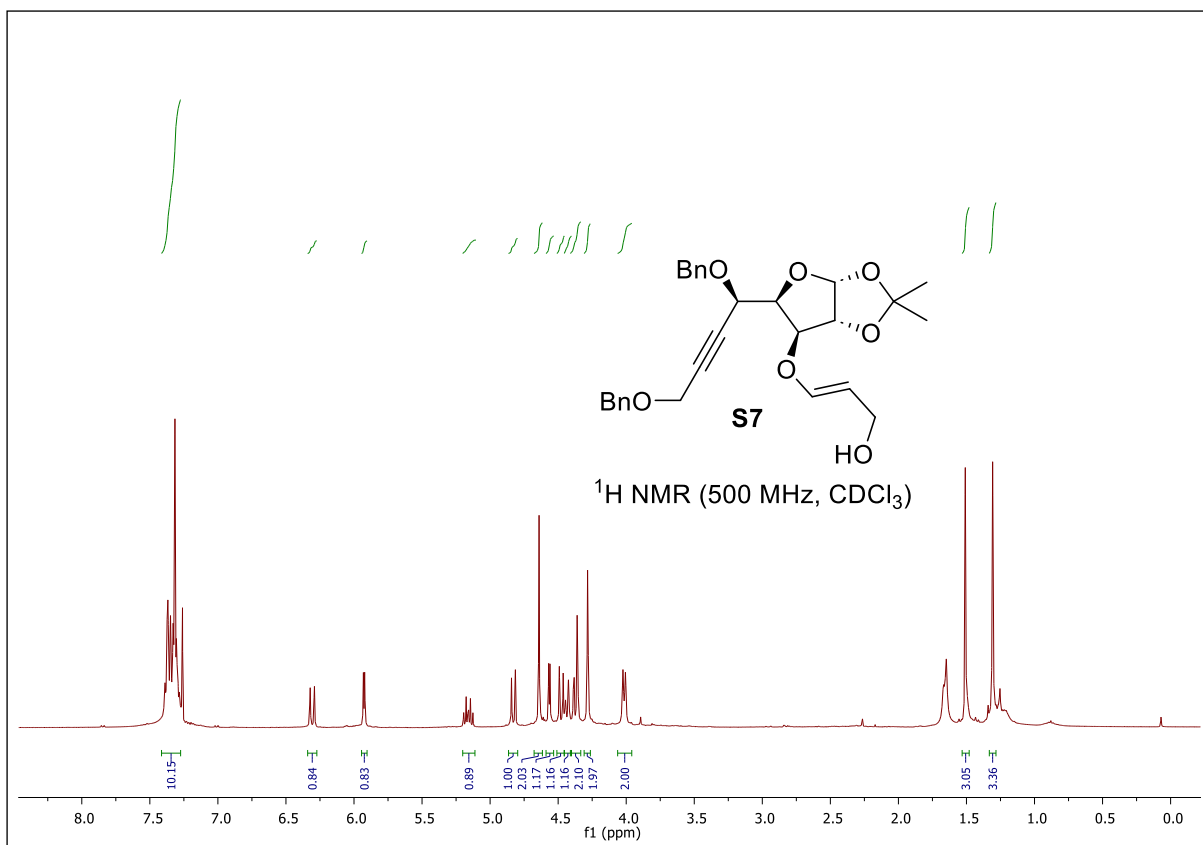


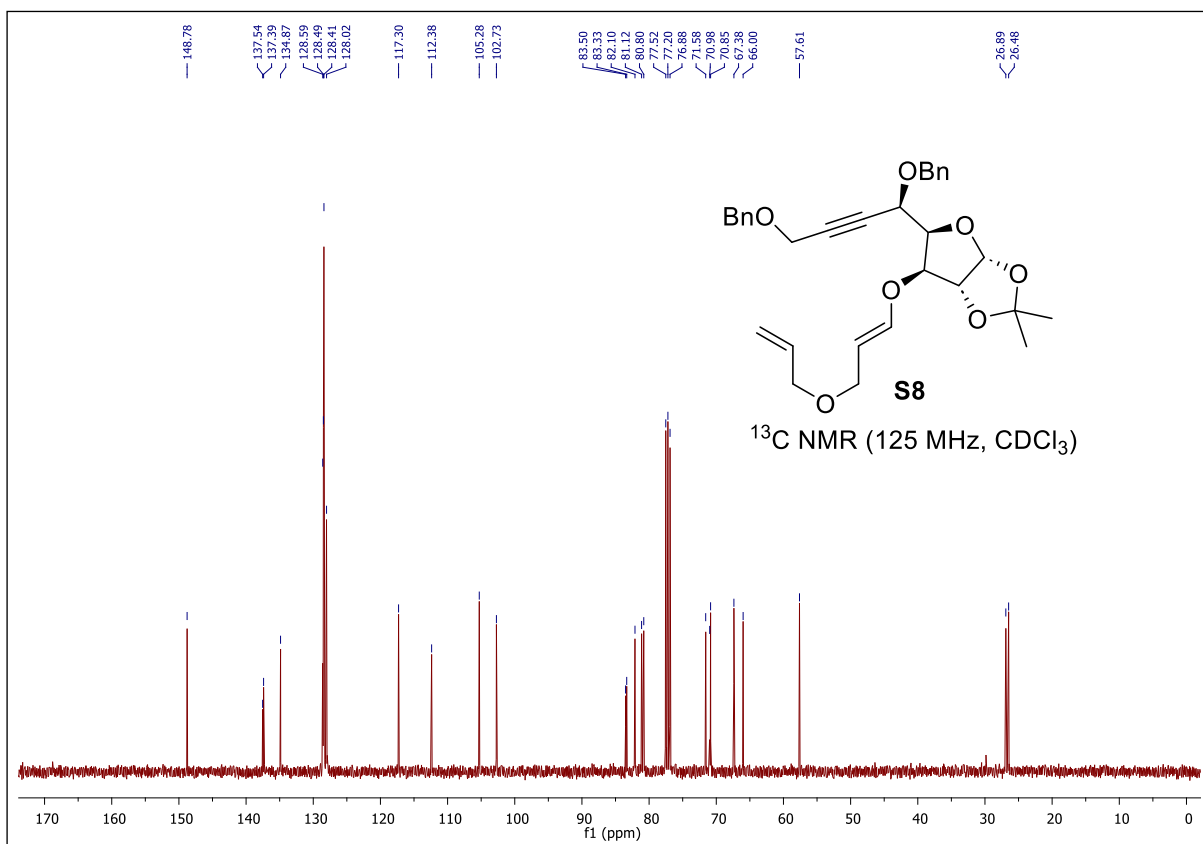
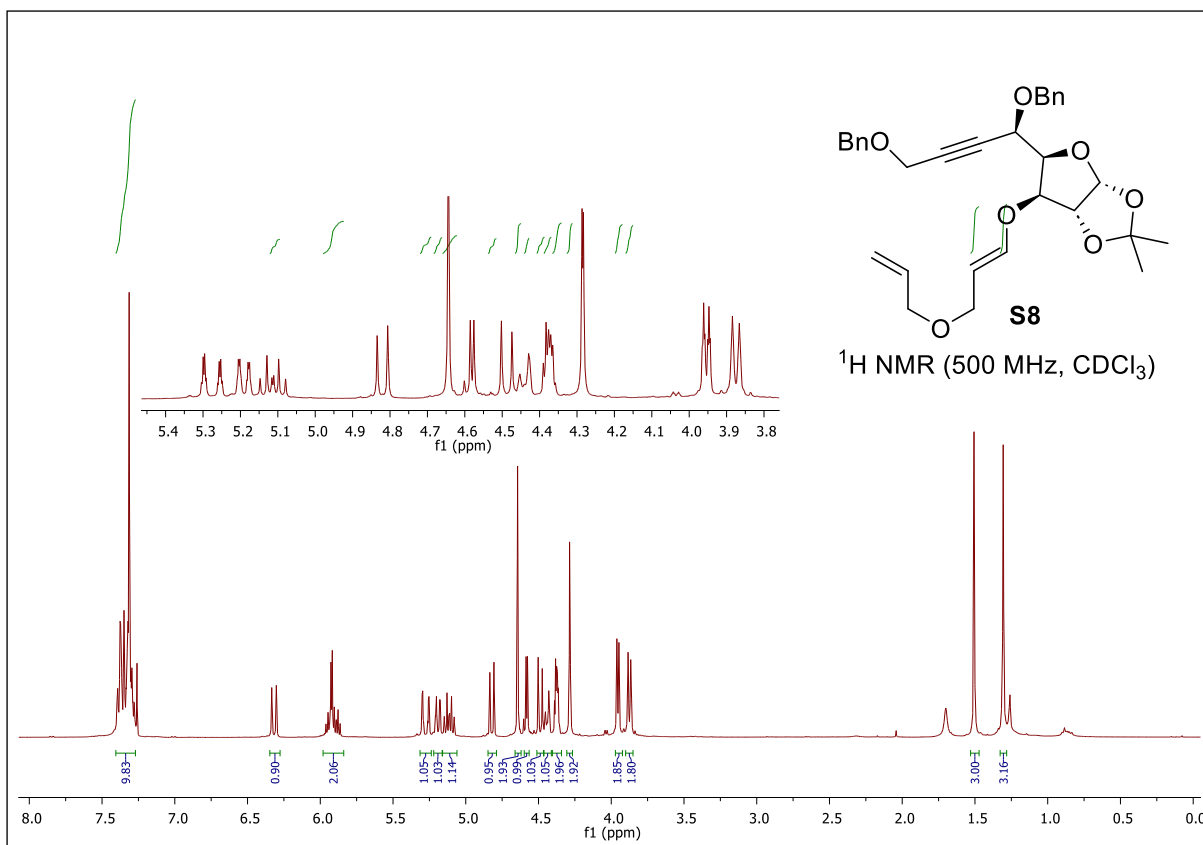
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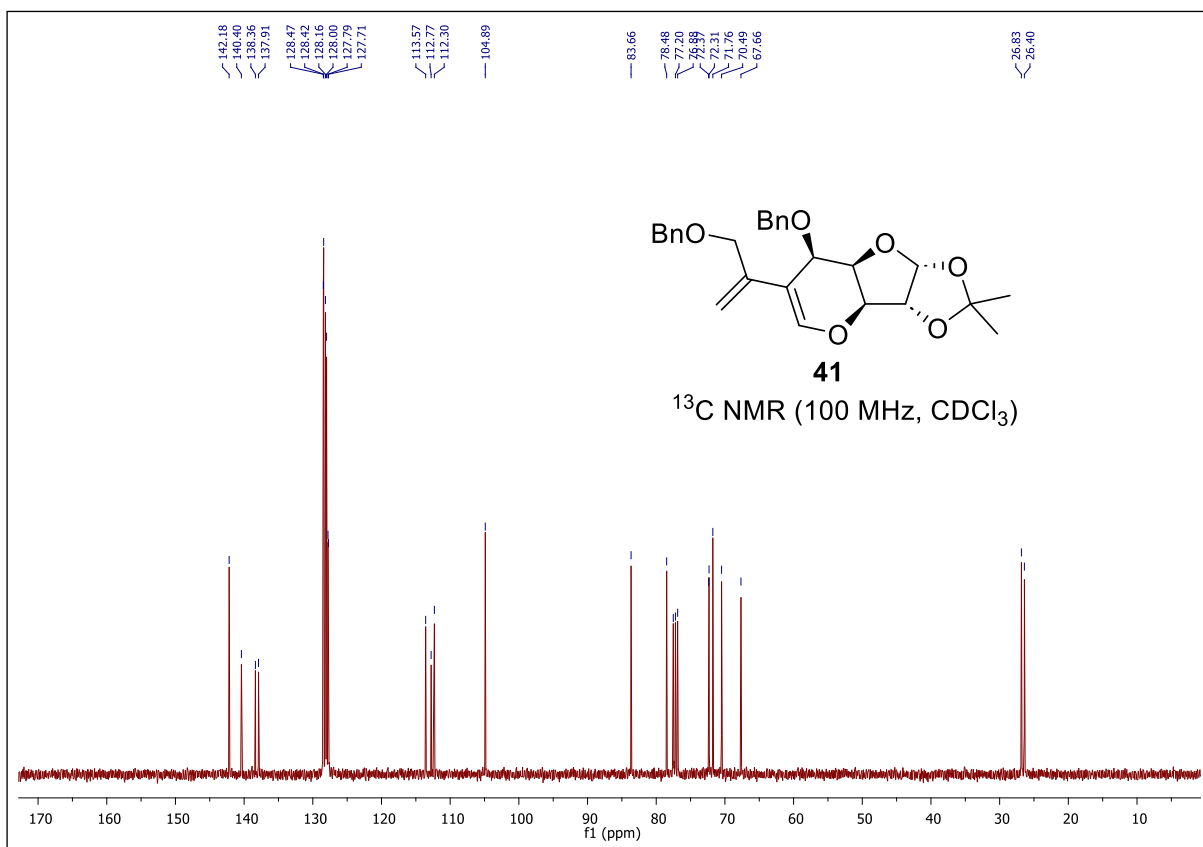
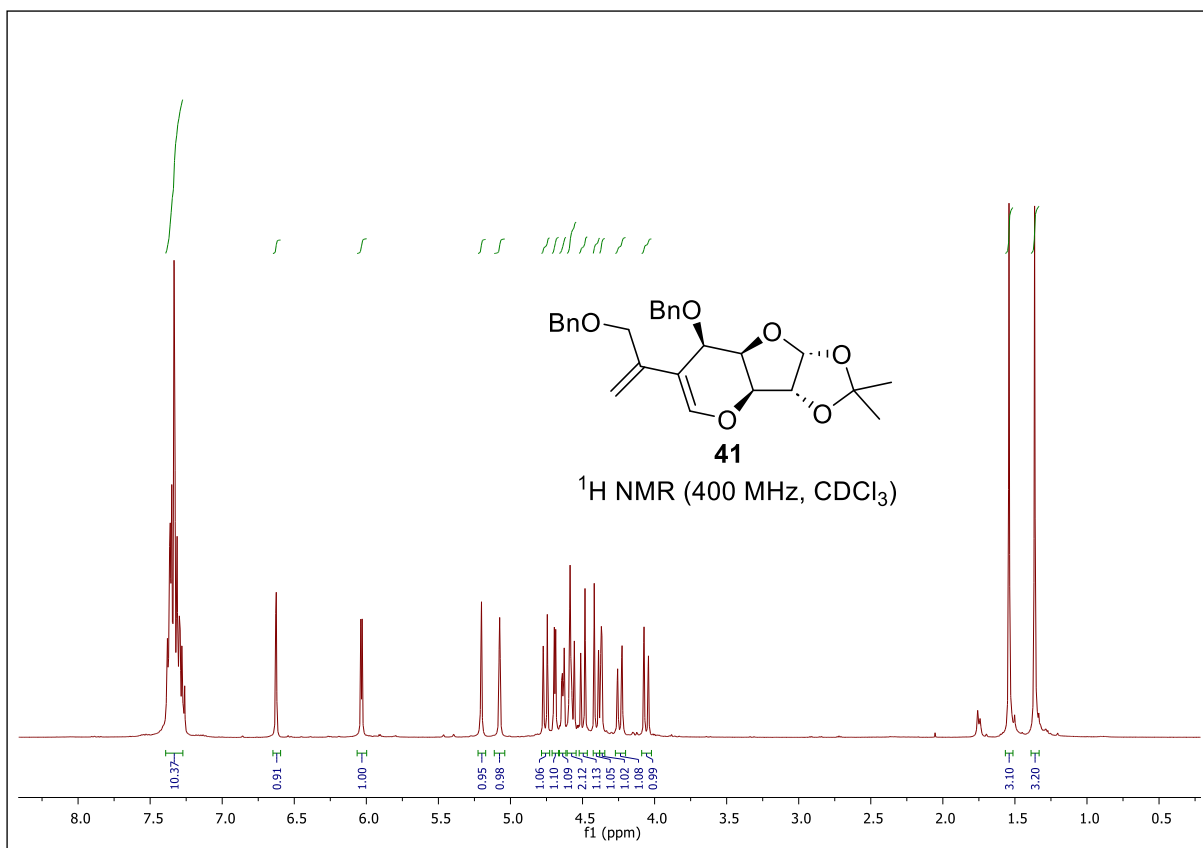




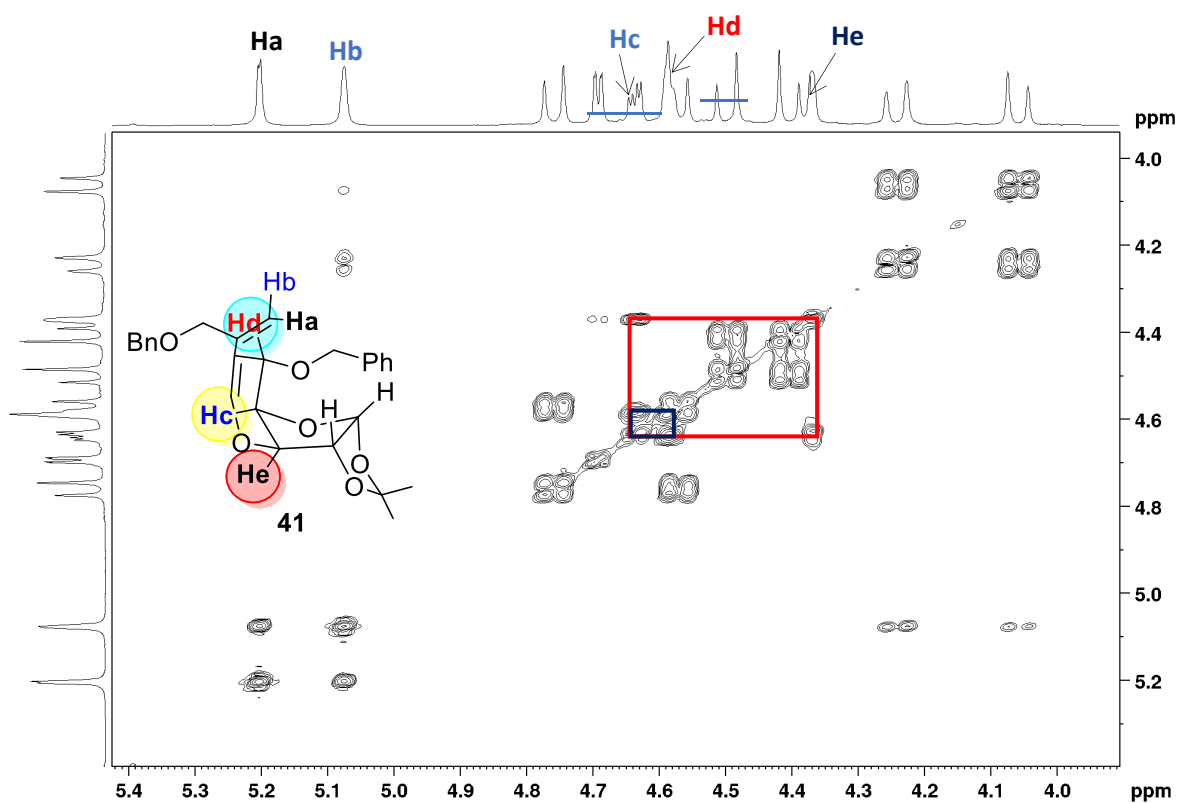
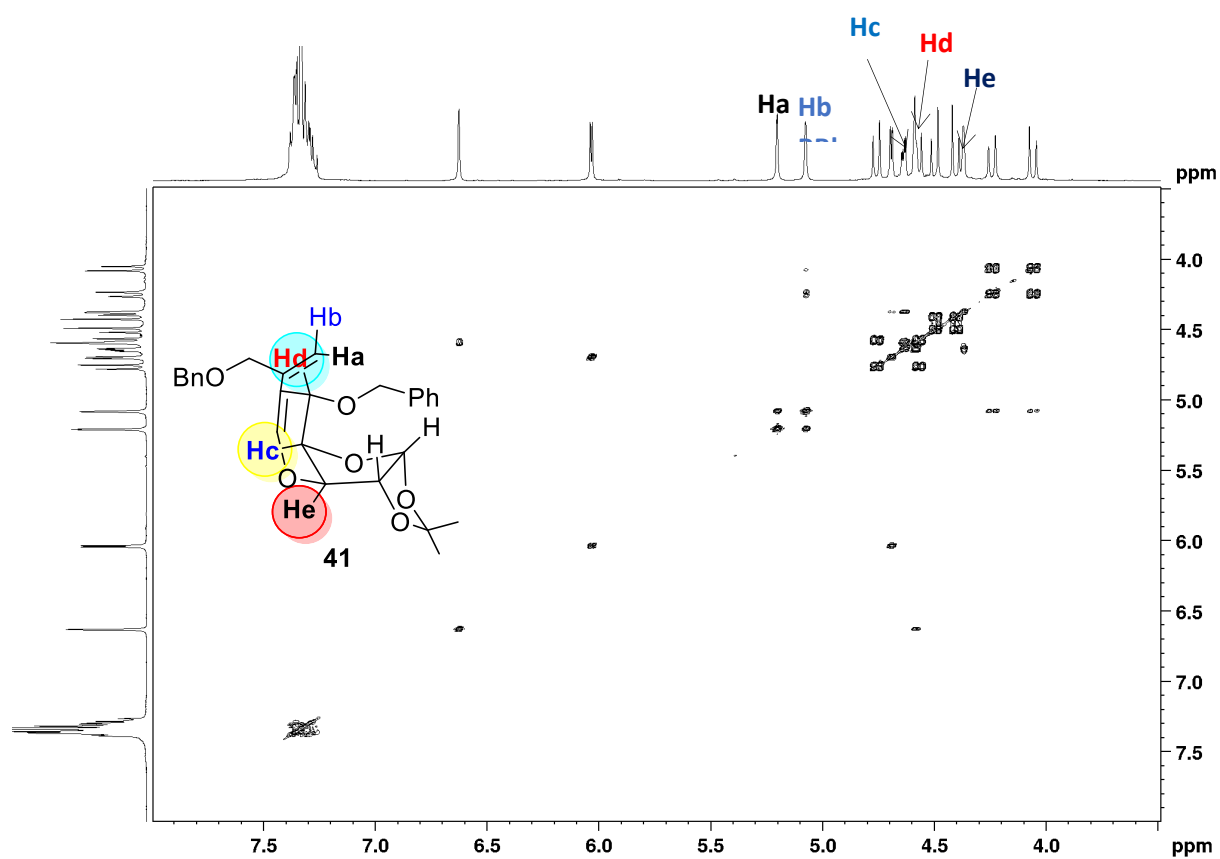




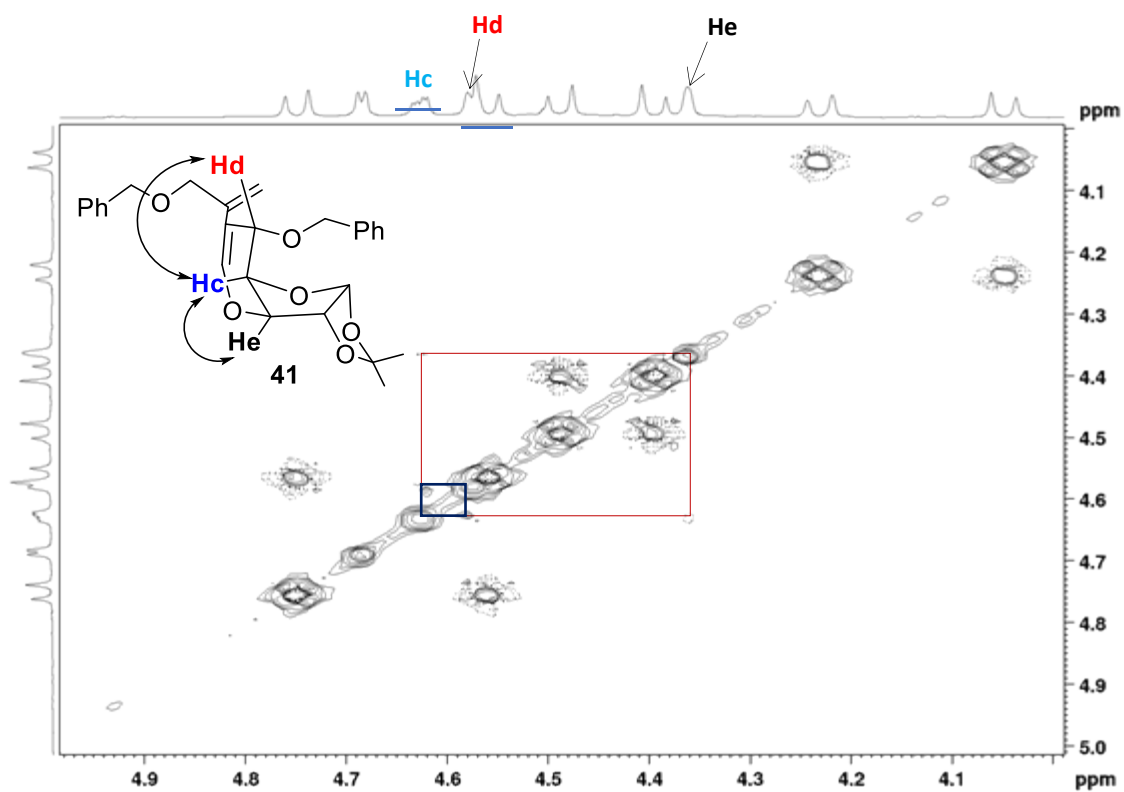
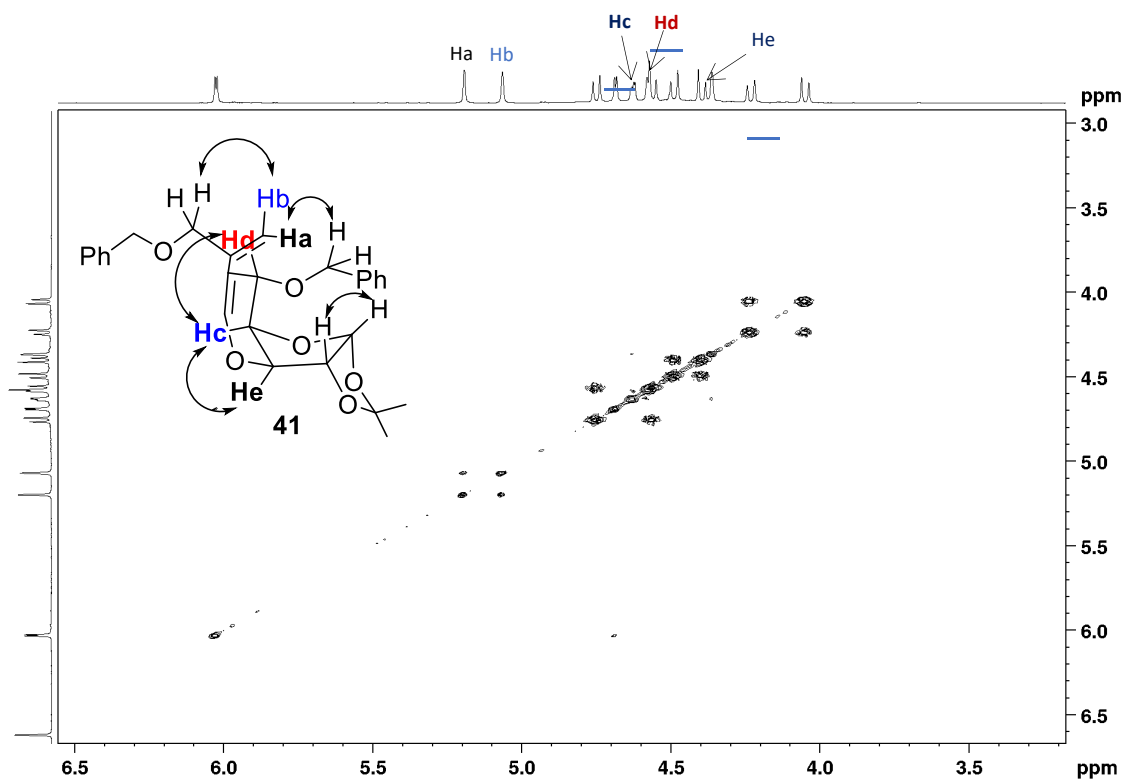


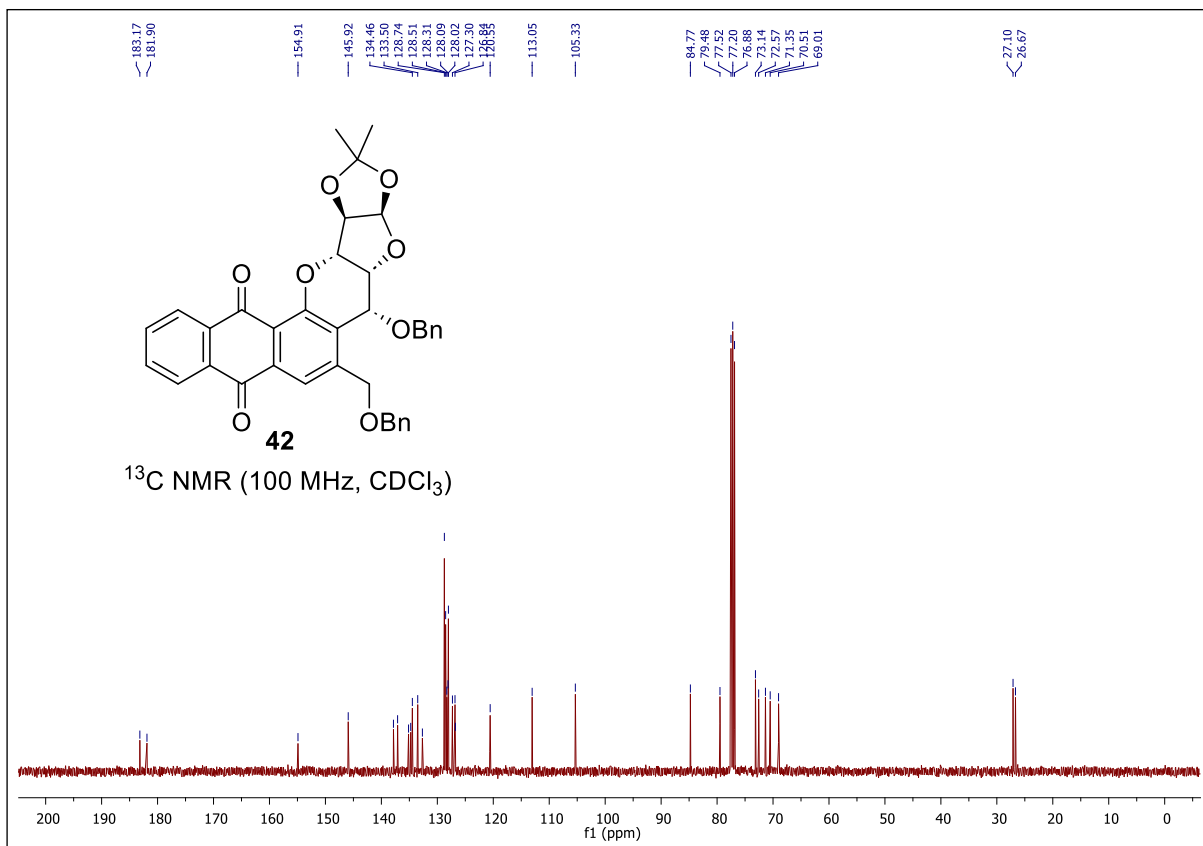
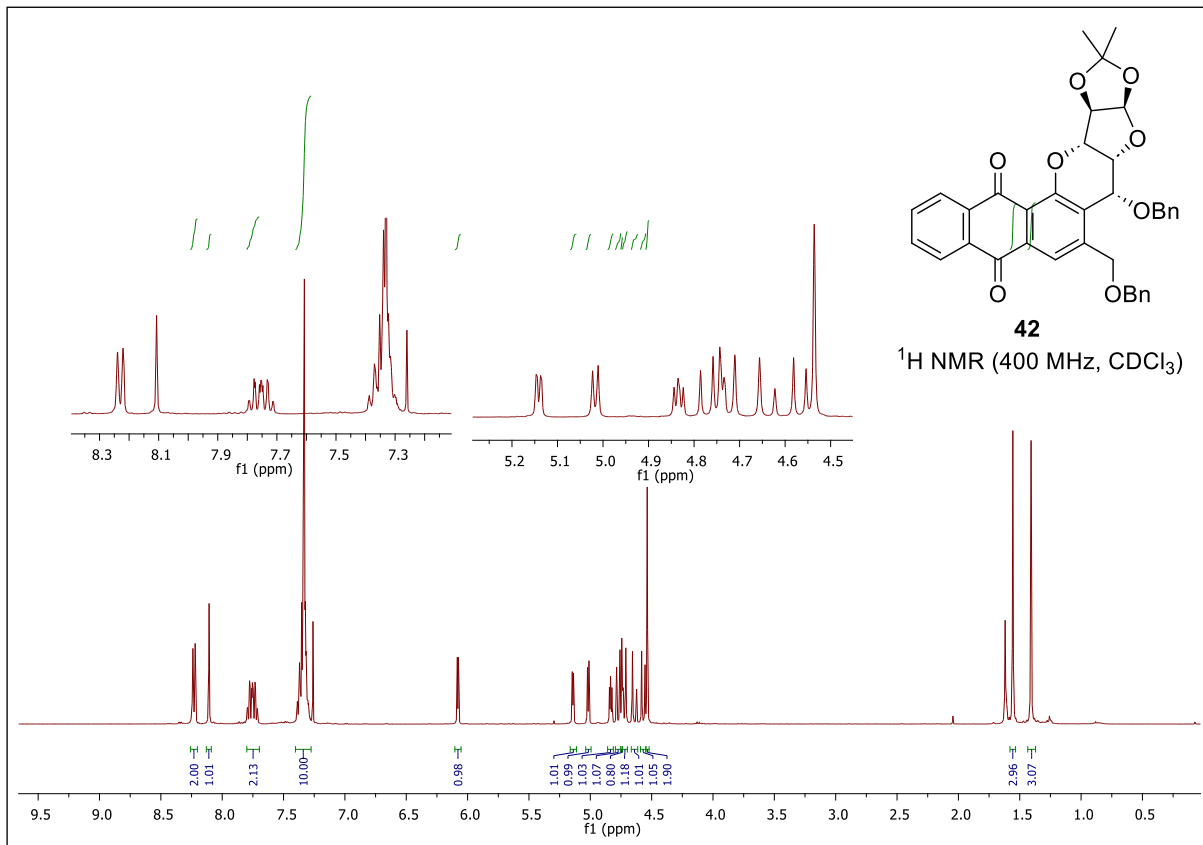


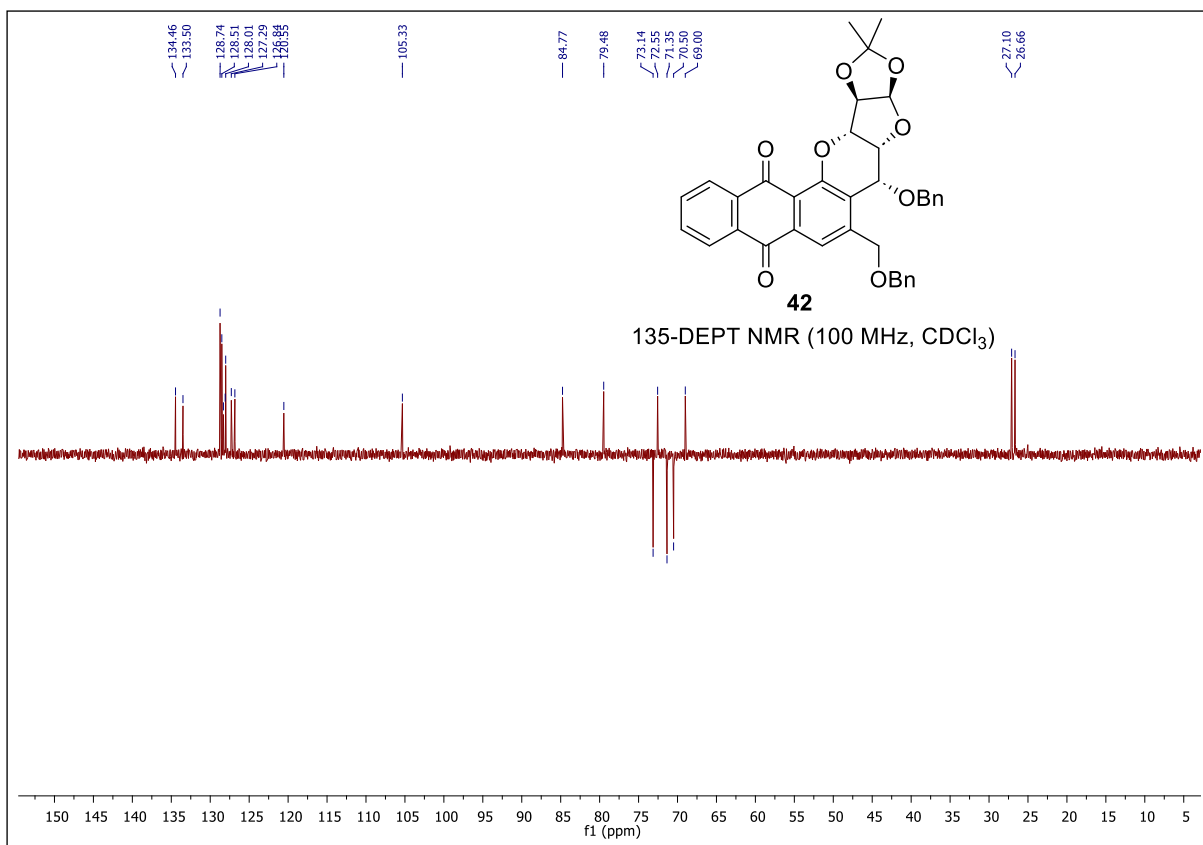
1H-1H COSY NMR of Minor Diastereomer 41 (500 MHz, CDCl₃)

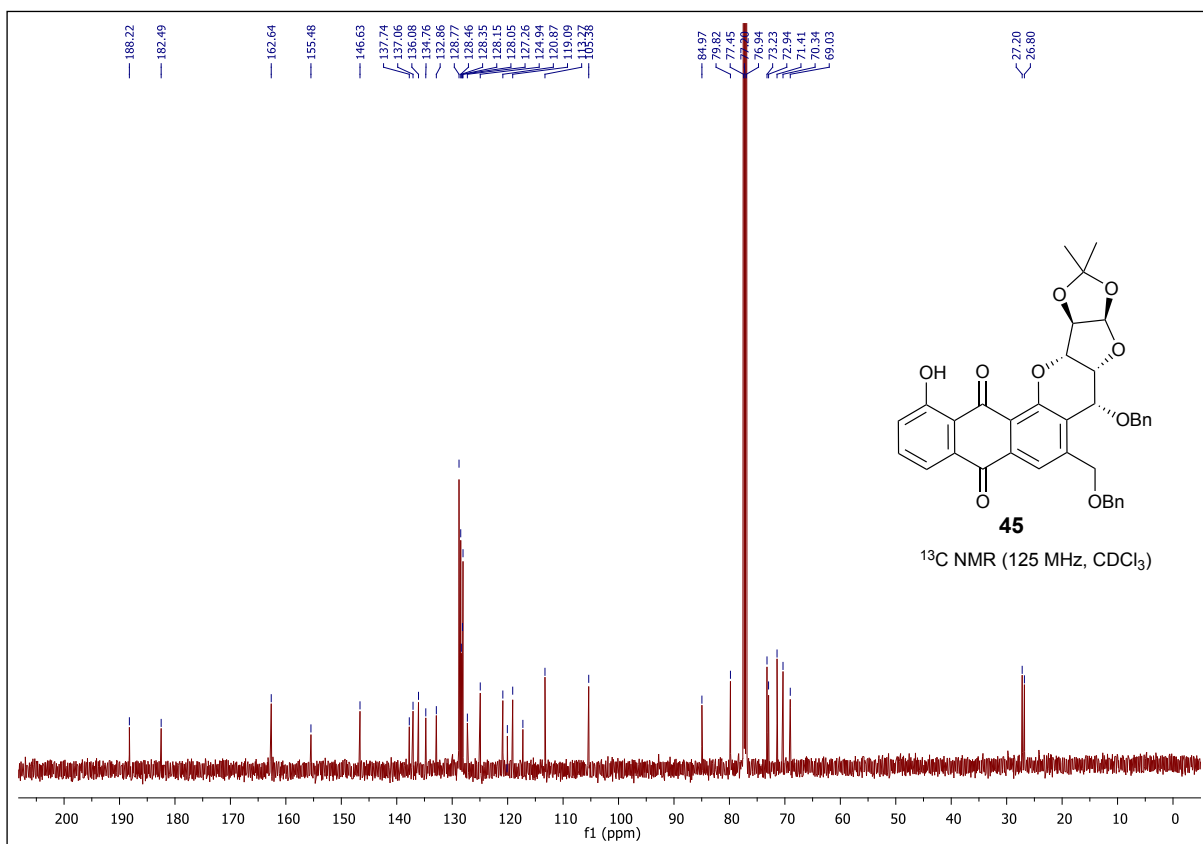
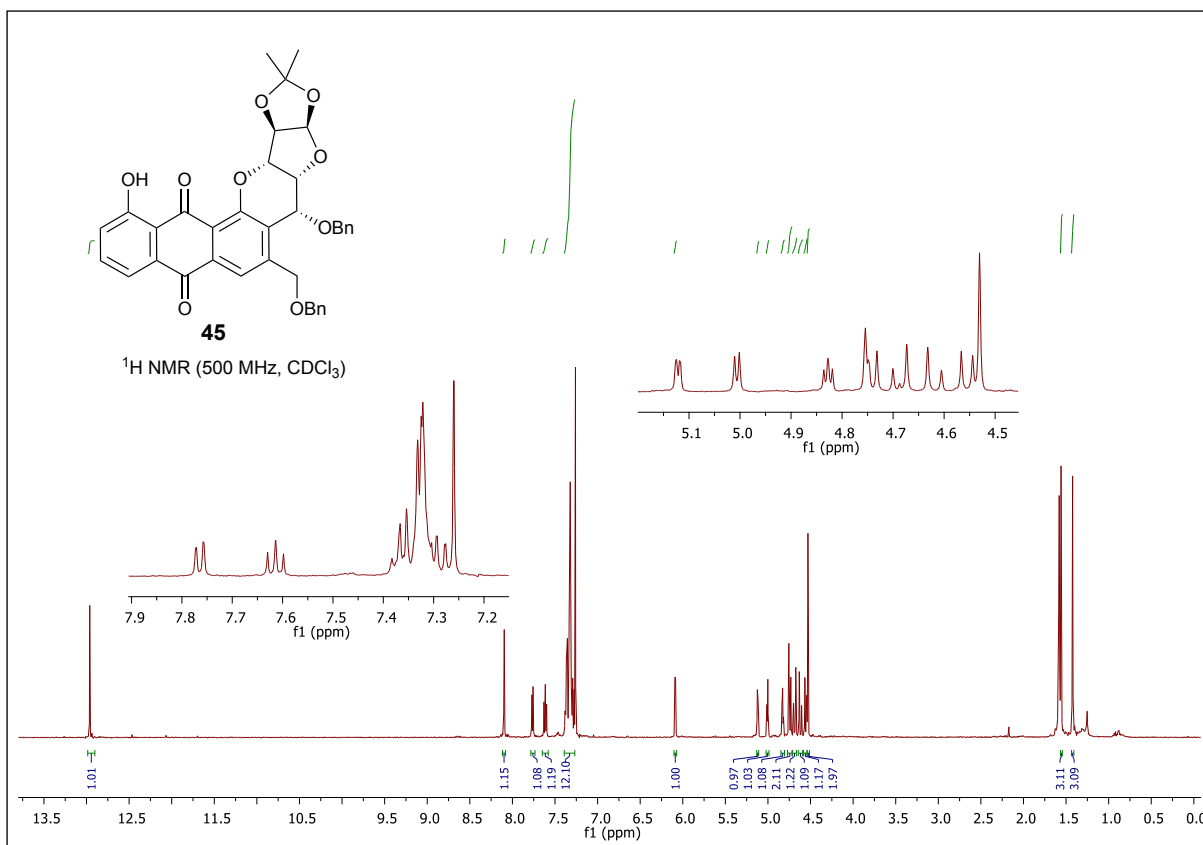


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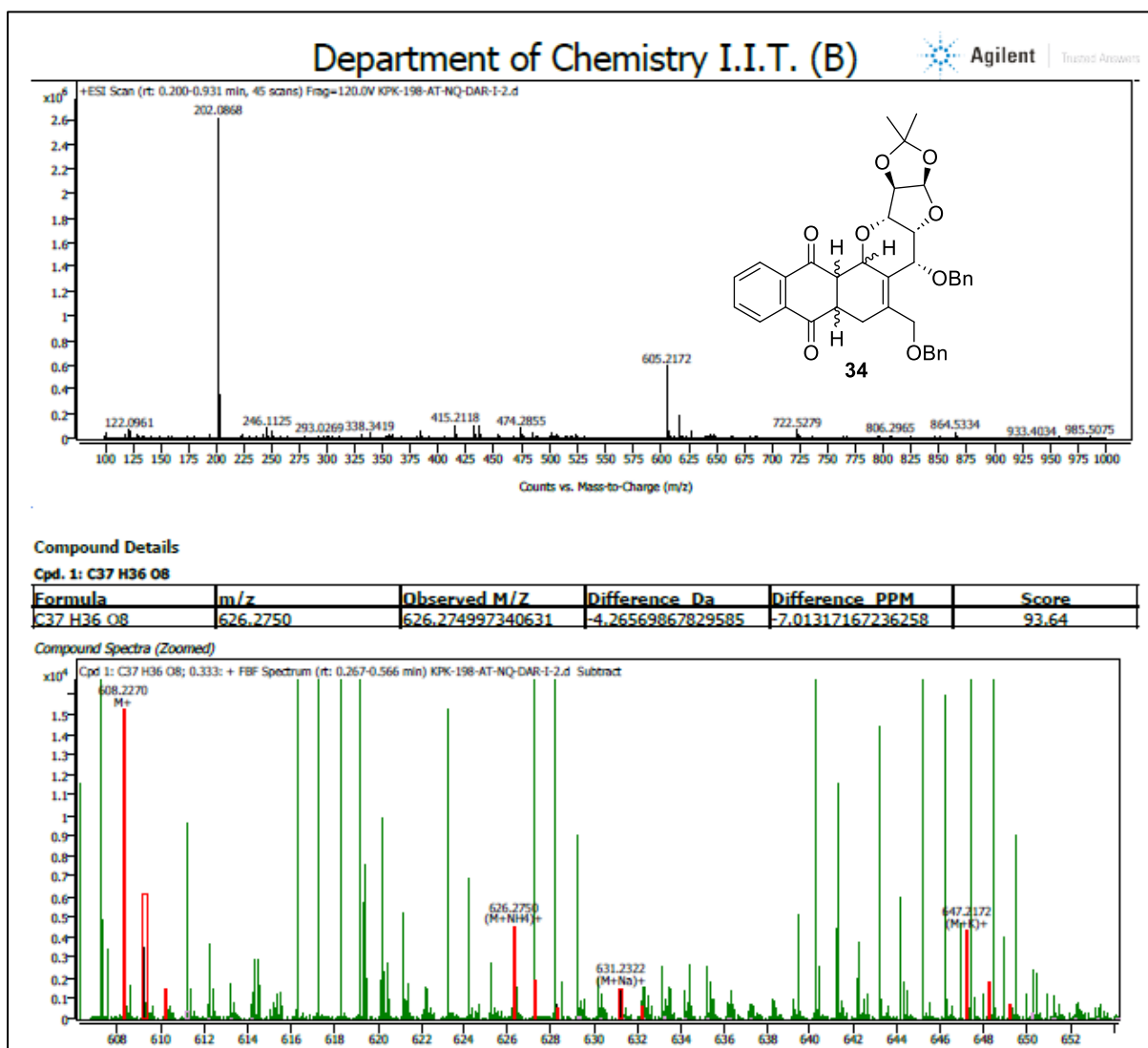








HRMS Mass Data for the crude Reaction Mixture of intermediate 34



HRMS Mass Data for the crude Reaction Mixture of intermediate 44

