

Supporting Information

Diversity-Oriented Approach Towards the Syntheses of *Amaryllidaceae* Alkaloids *via* a Common Chiral Synthon

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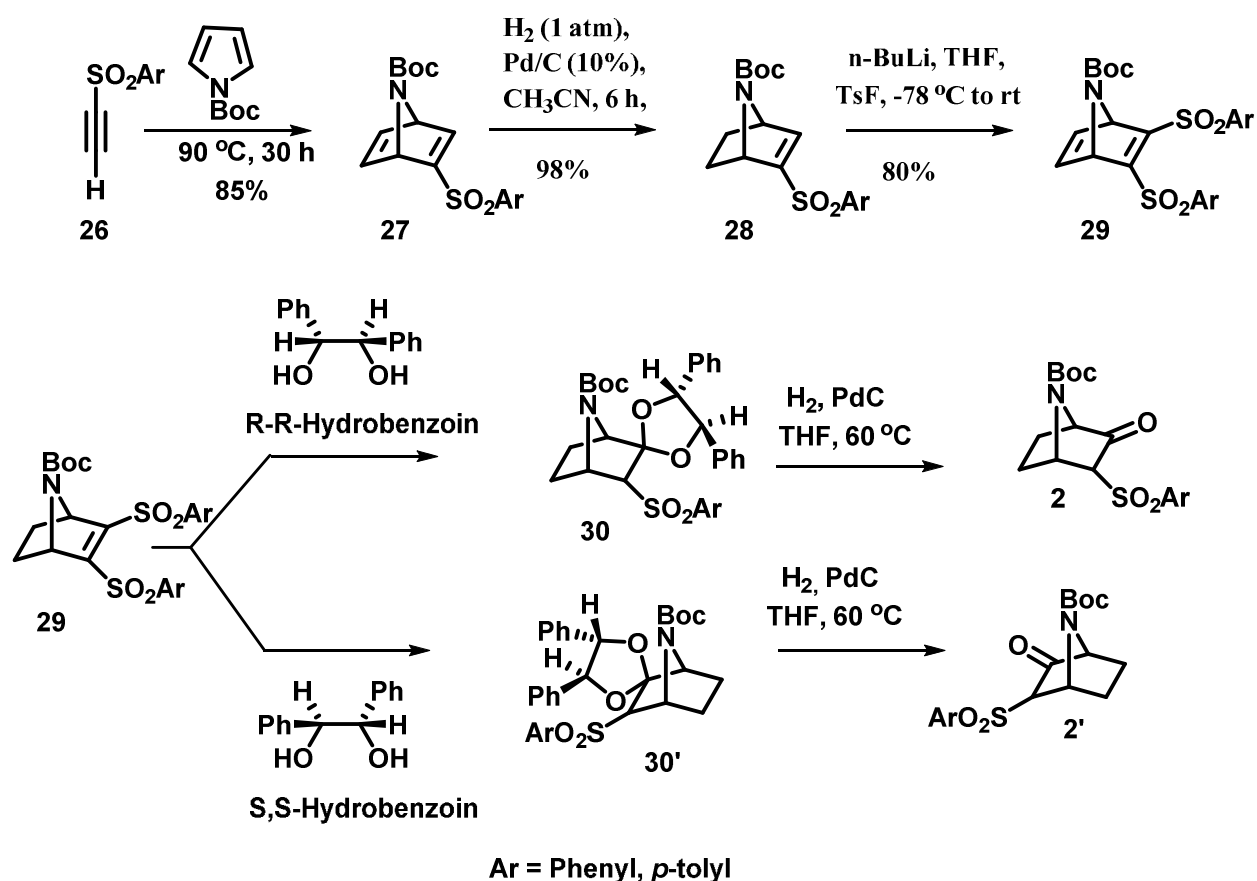
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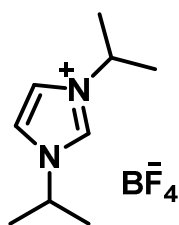
Preparation of chiral ketone scaffold *via* strategy of desymmetrization^{1,2}

The chiral ketone scaffold (**2**) was prepared by our previously reported desymmetrization protocol of the meso compound (**29**) using a chiral auxiliary, which in turn could be synthesized from a simple starting material, sulphonyl acetylene and Boc-pyrrole in five steps, upto a scale of 100 grams (Scheme 1). This efficient sterically congested 7-azabicyclo heptenesulfone scaffold led us to design a novel route to synthesize these structurally complex alkaloids in an enantiomerically pure form.

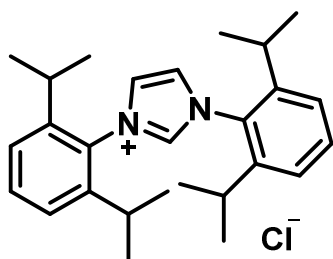


Scheme 1. Synthesis of chiral ketone scaffold (**2**).

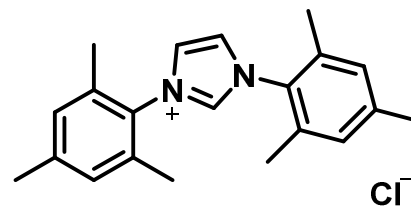
NHC Catalyst used to optimize reactions:



NHC-1



NHC-2

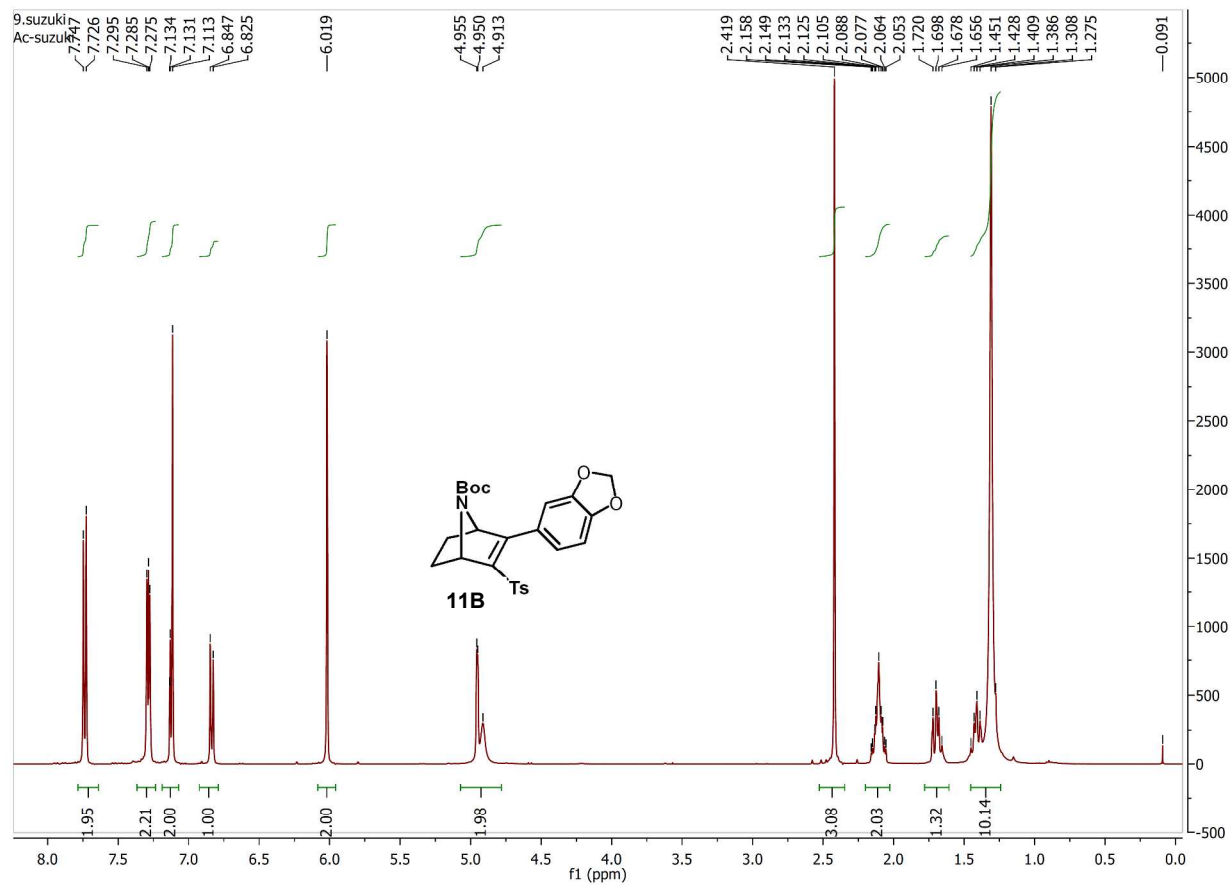


NHC-3

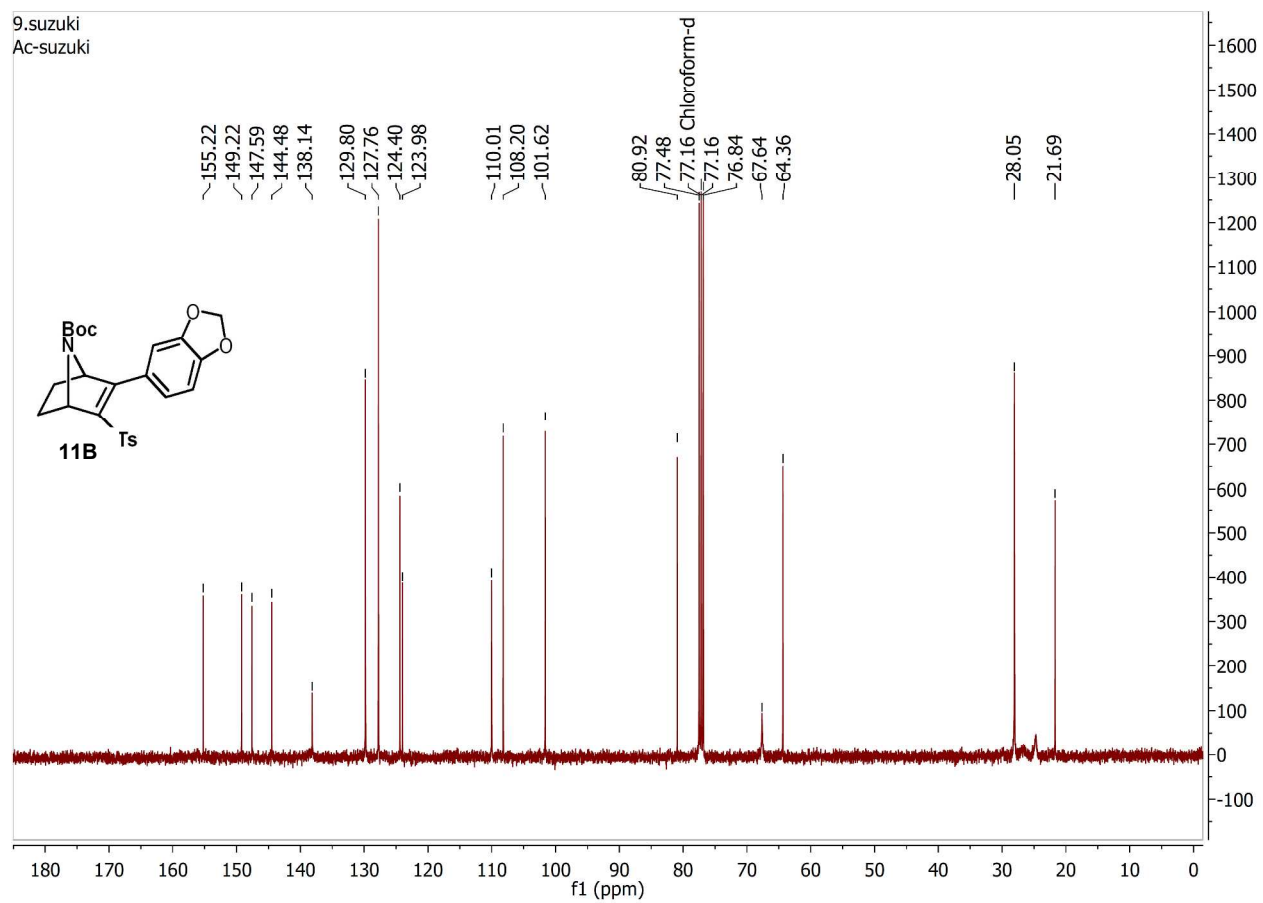
NHC-1 1,3-Diisopropylimidazolium tetrafluoroborate

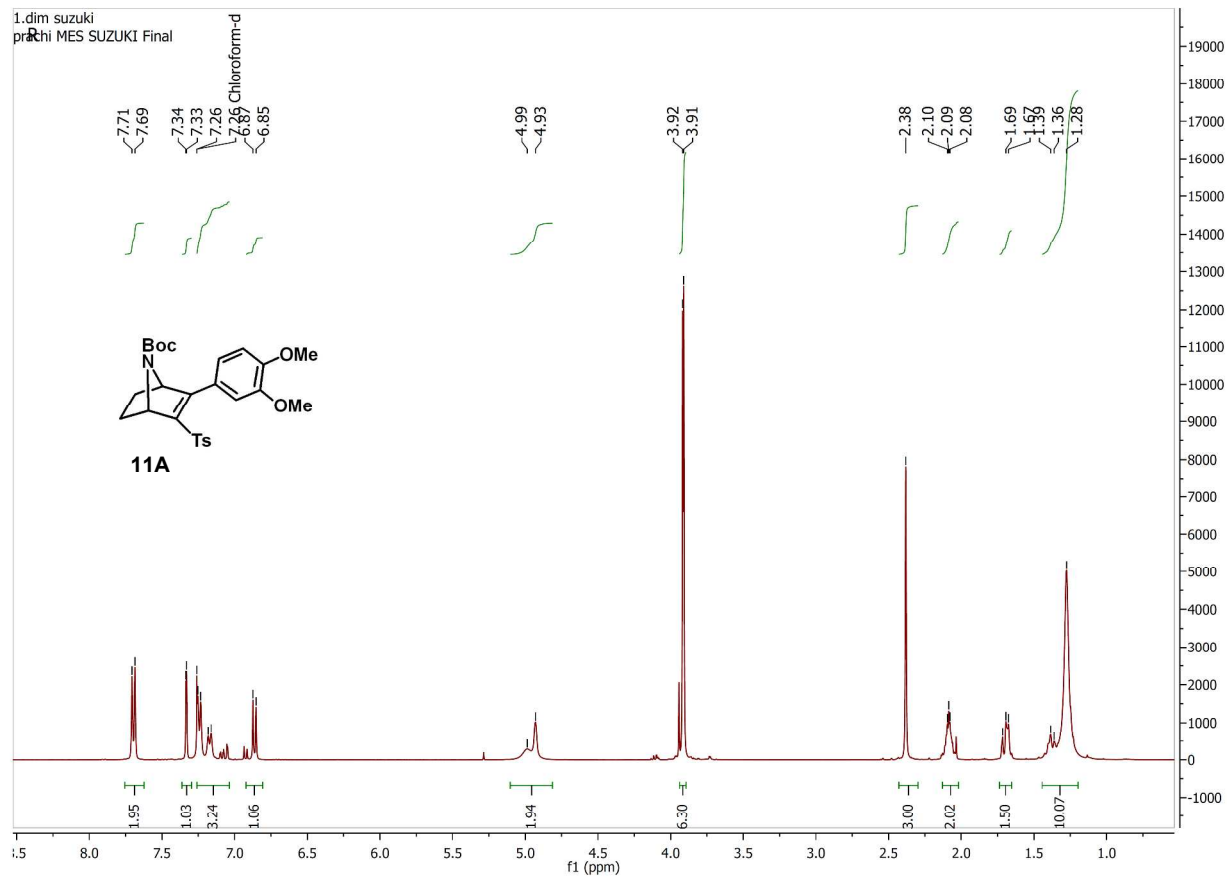
NHC-2 1,3-Bis(2,6-diisopropylphenyl)imidazolium chloride

NHC-3 1,3-bis(2,4,6-trimethylphenyl)imidazolium chloride

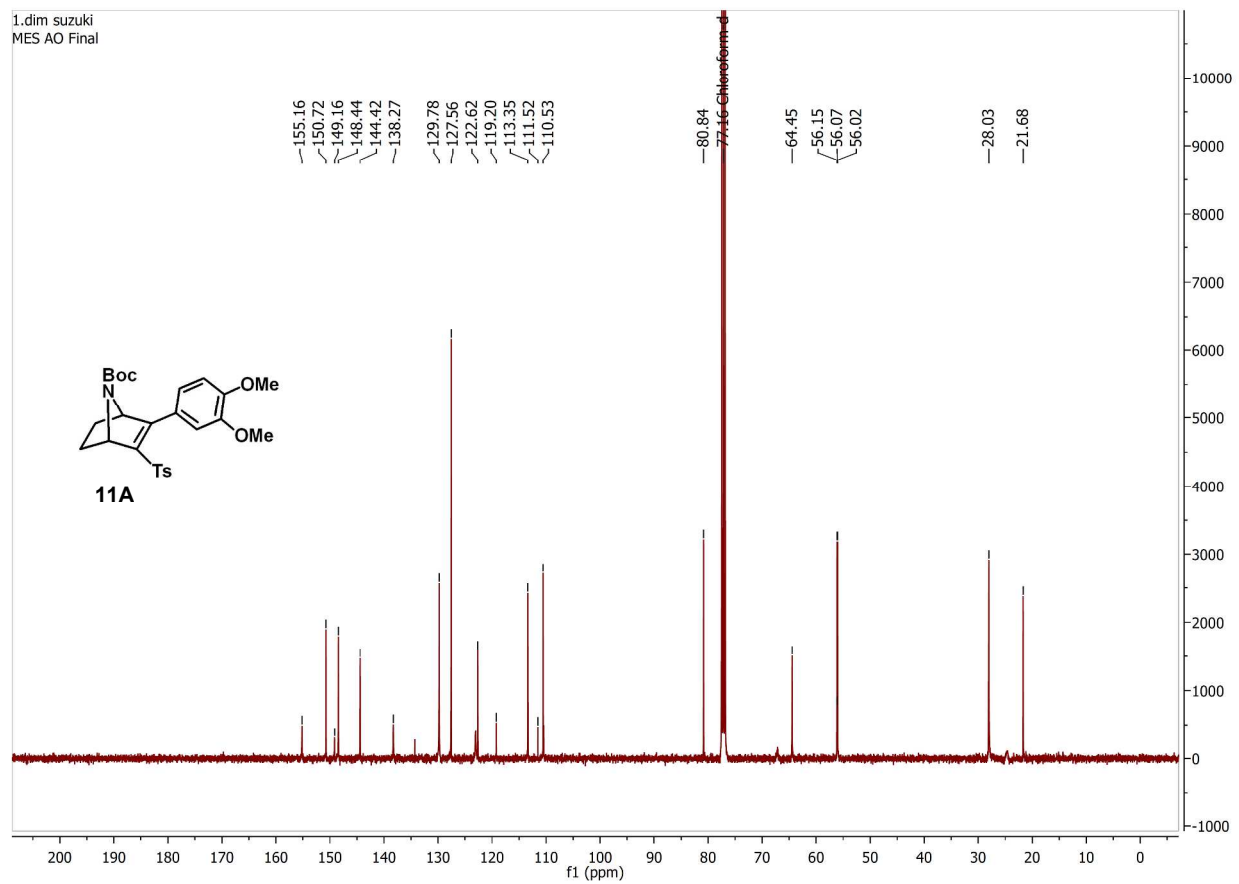


9.suzuki
Ac-suzuki

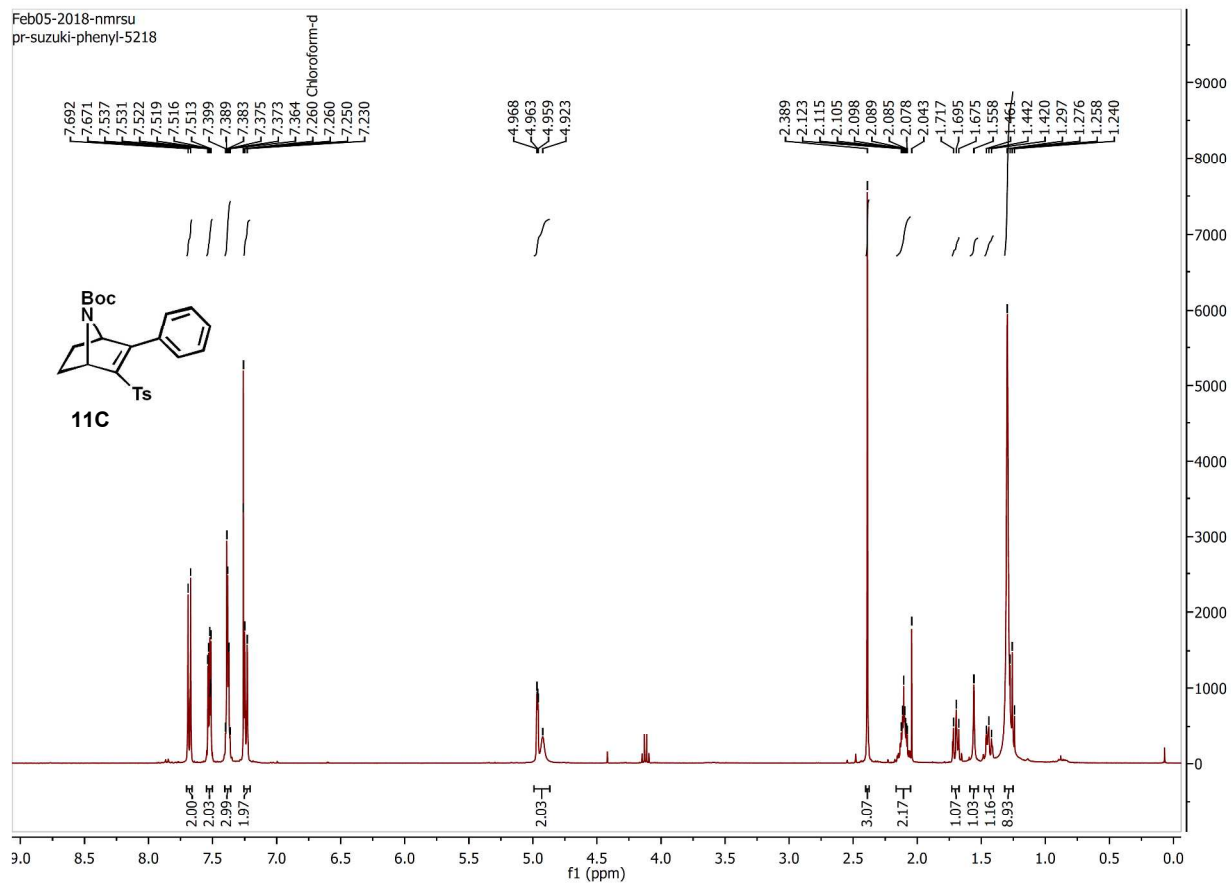




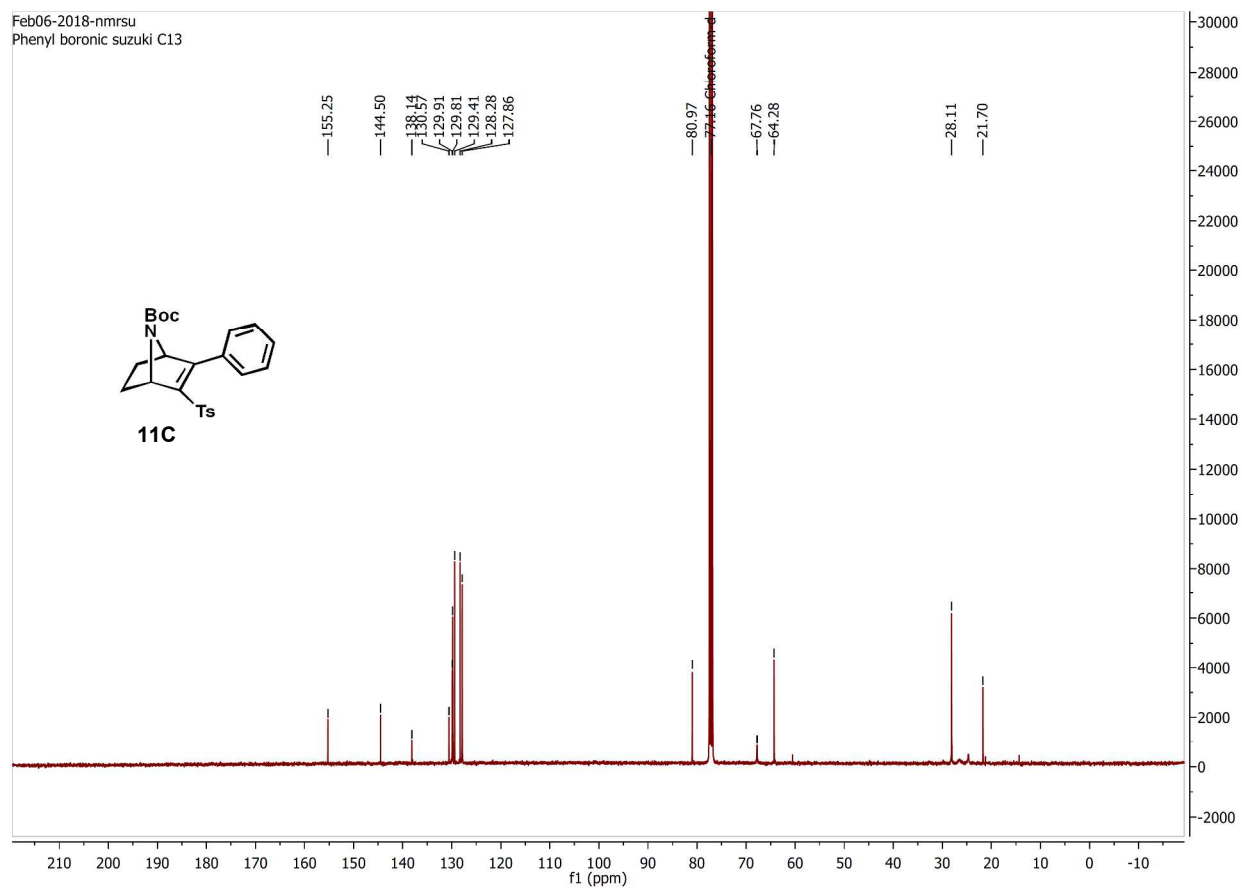
1.dim suzuki
MES AO Final



Feb05-2018-nmrsu
pr-suzuki-phenyl-5218



Feb06-2018-nmr
Phenyl boronic suzuki C13



May05-2018
pr-5518-1H-repeat

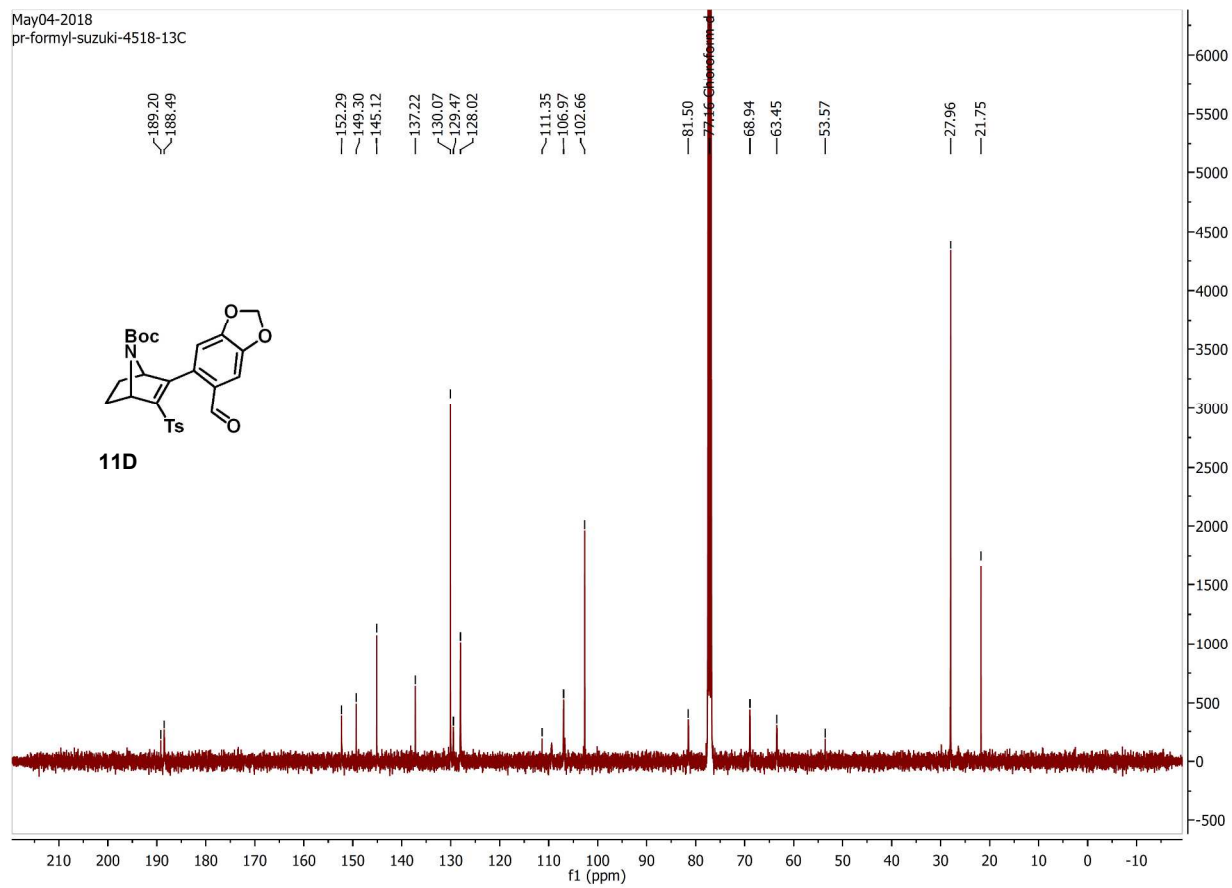
11D

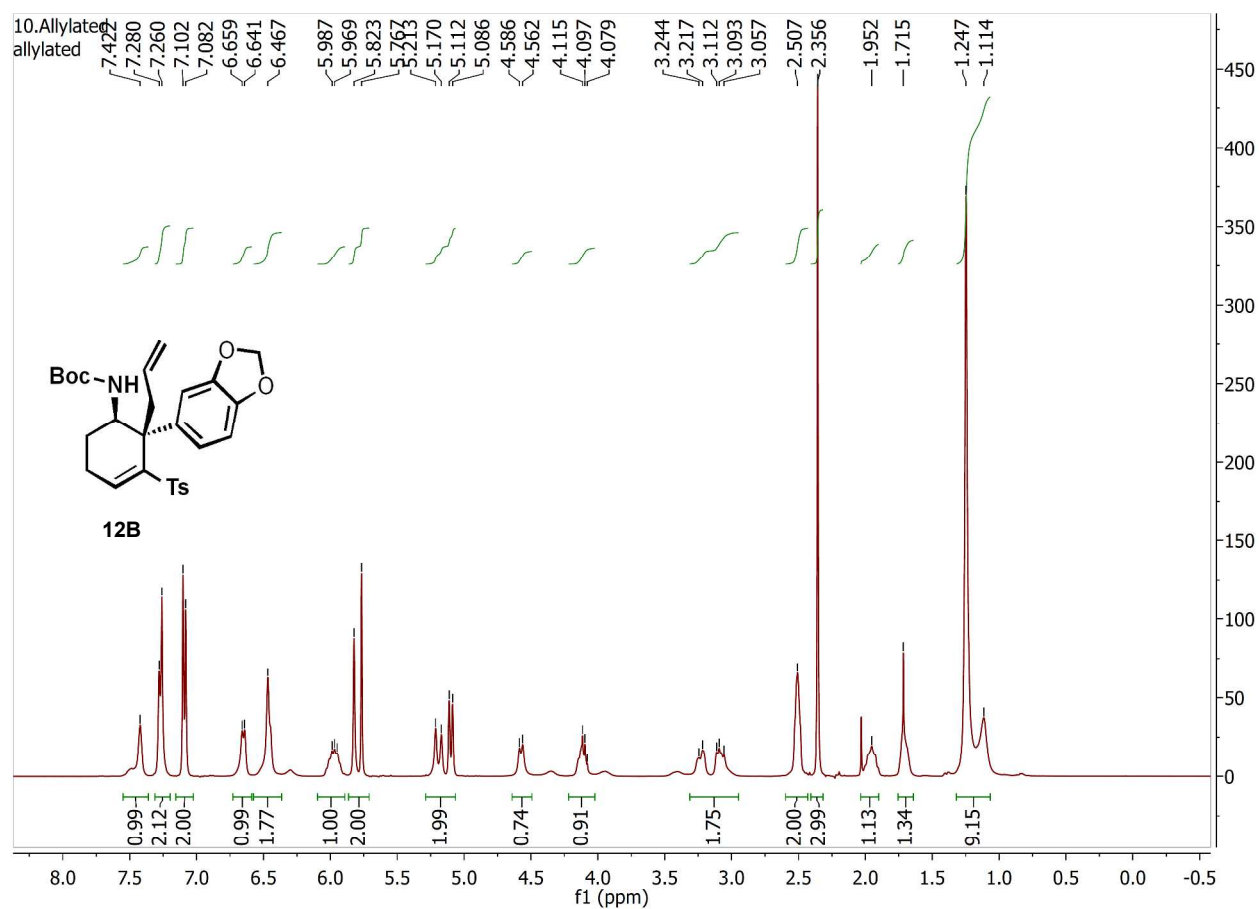
Chemical structure of 11D is shown. The structure is a bicyclic compound with a Boc group, a Ts group, and a furan ring.

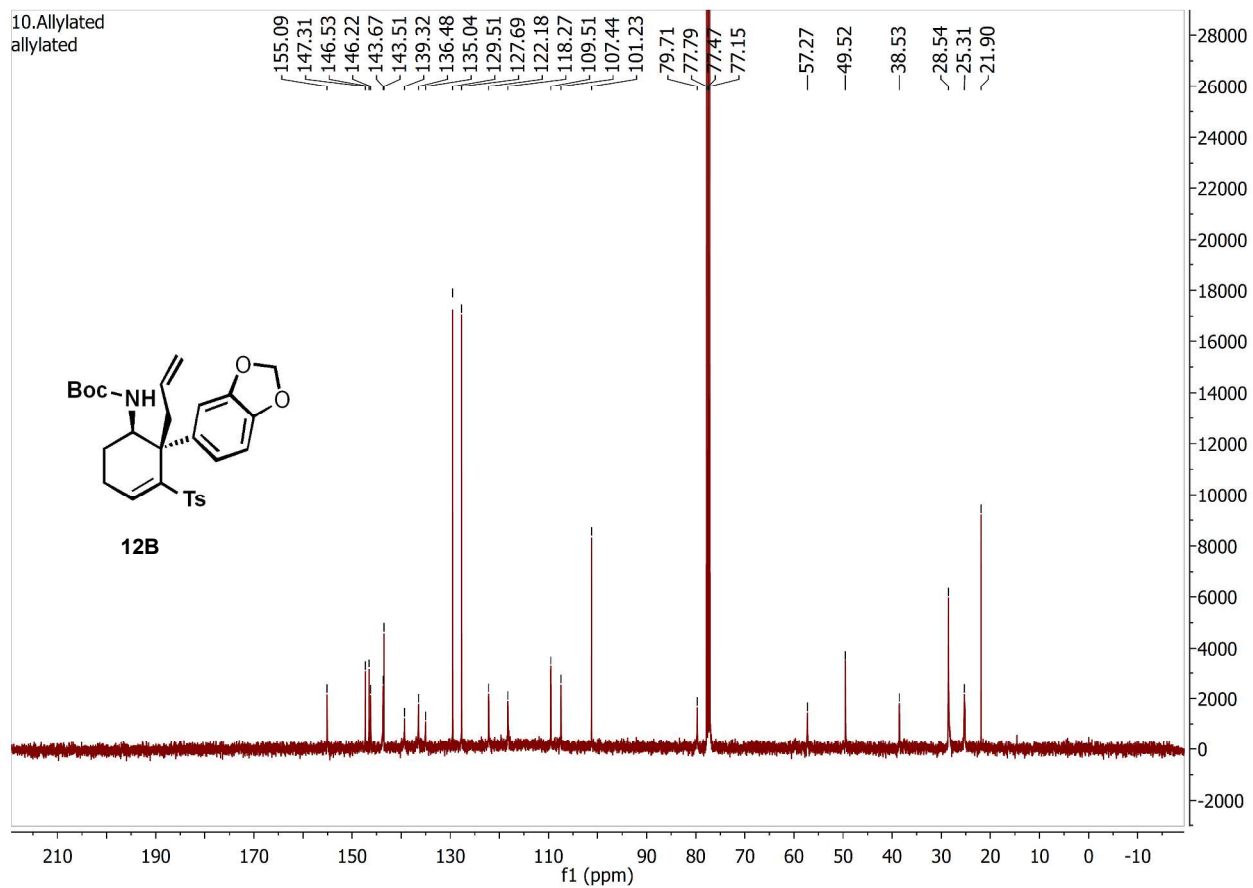
¹H NMR spectrum (CDCl₃) data:

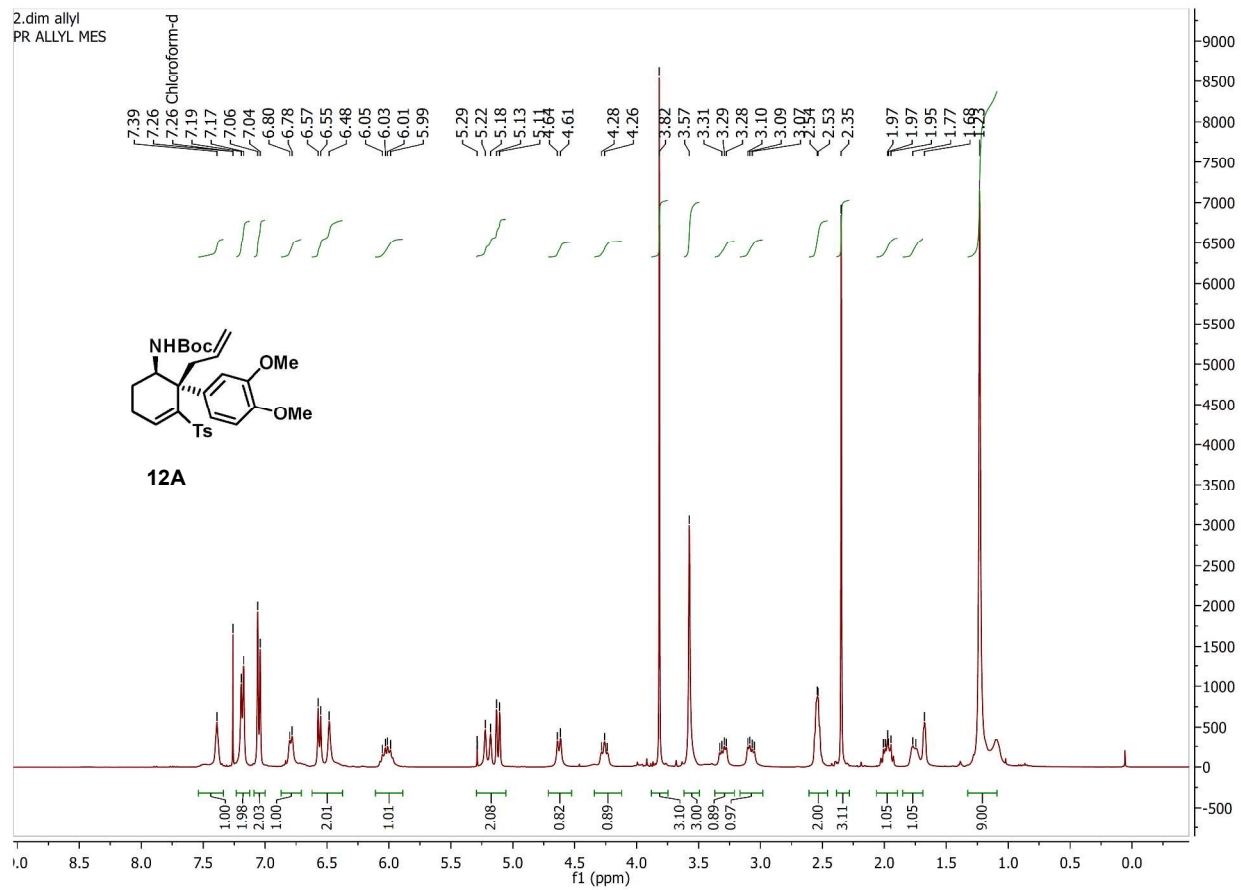
Chemical Shift (ppm)	Integration
9.745	1.01
7.600, 7.579, 7.384, 7.260, 7.240	2.09, 1.09, 2.32
6.664	1.06
6.087, 6.083	2.00
4.983, 4.747	1.05, 1.05
2.389, 2.198, 2.185, 2.175, 2.151, 2.127, 2.118, 2.108, 2.098, 2.089, 2.078, 2.066, 2.056, 1.752, 1.743, 1.729, 1.722, 1.715, 1.701, 1.694, 1.525, 1.518, 1.504, 1.496, 1.489, 1.475, 1.466, 1.270	3.03, 2.07, 1.06, 1.26, 9.04

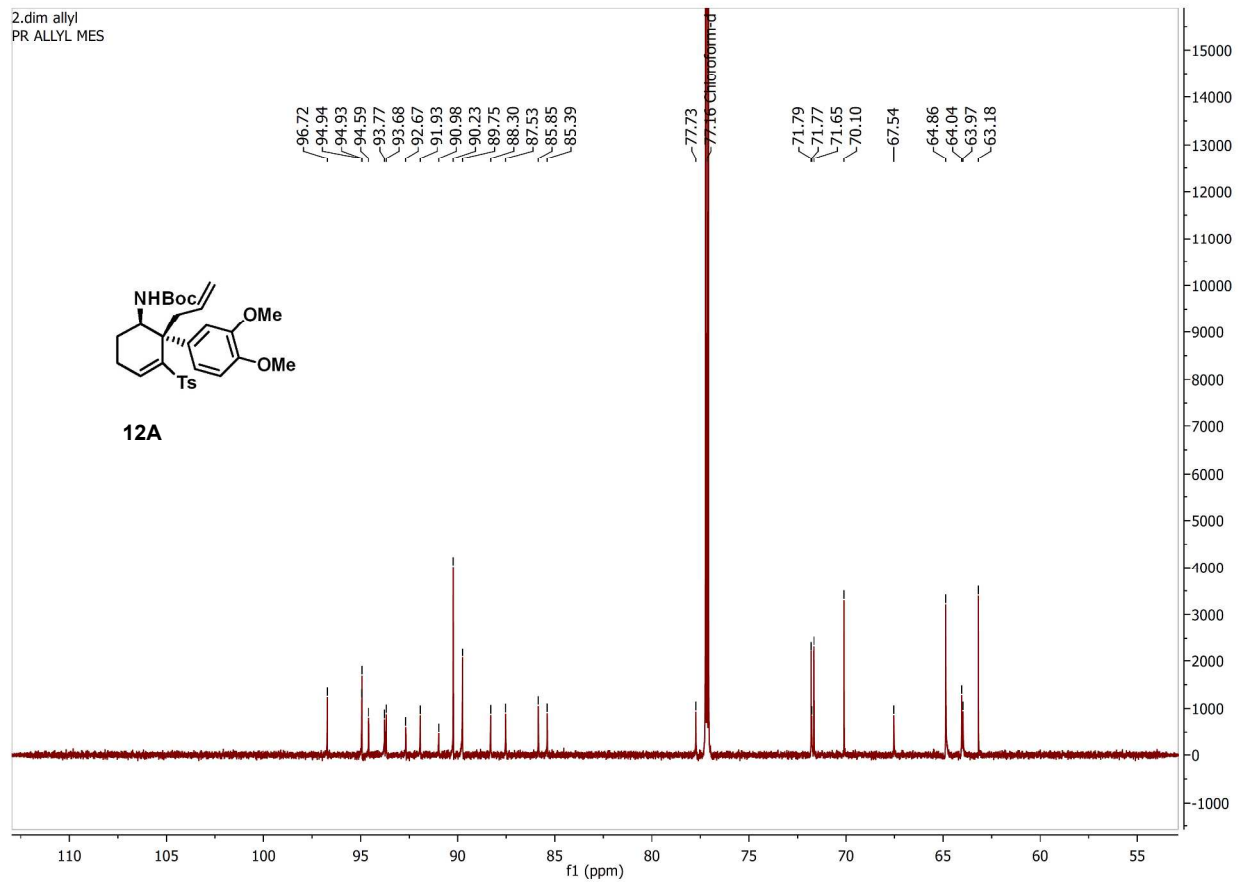
May04-2018
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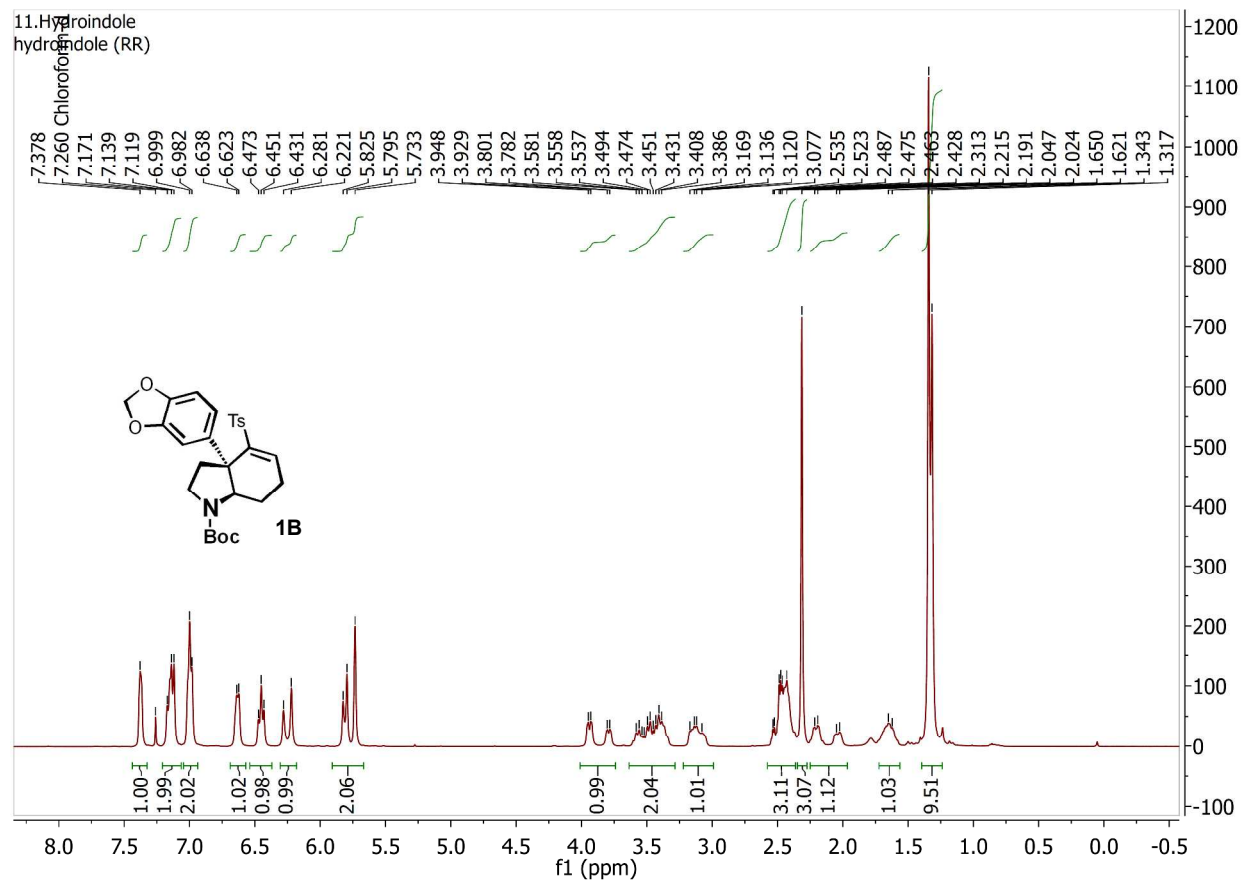


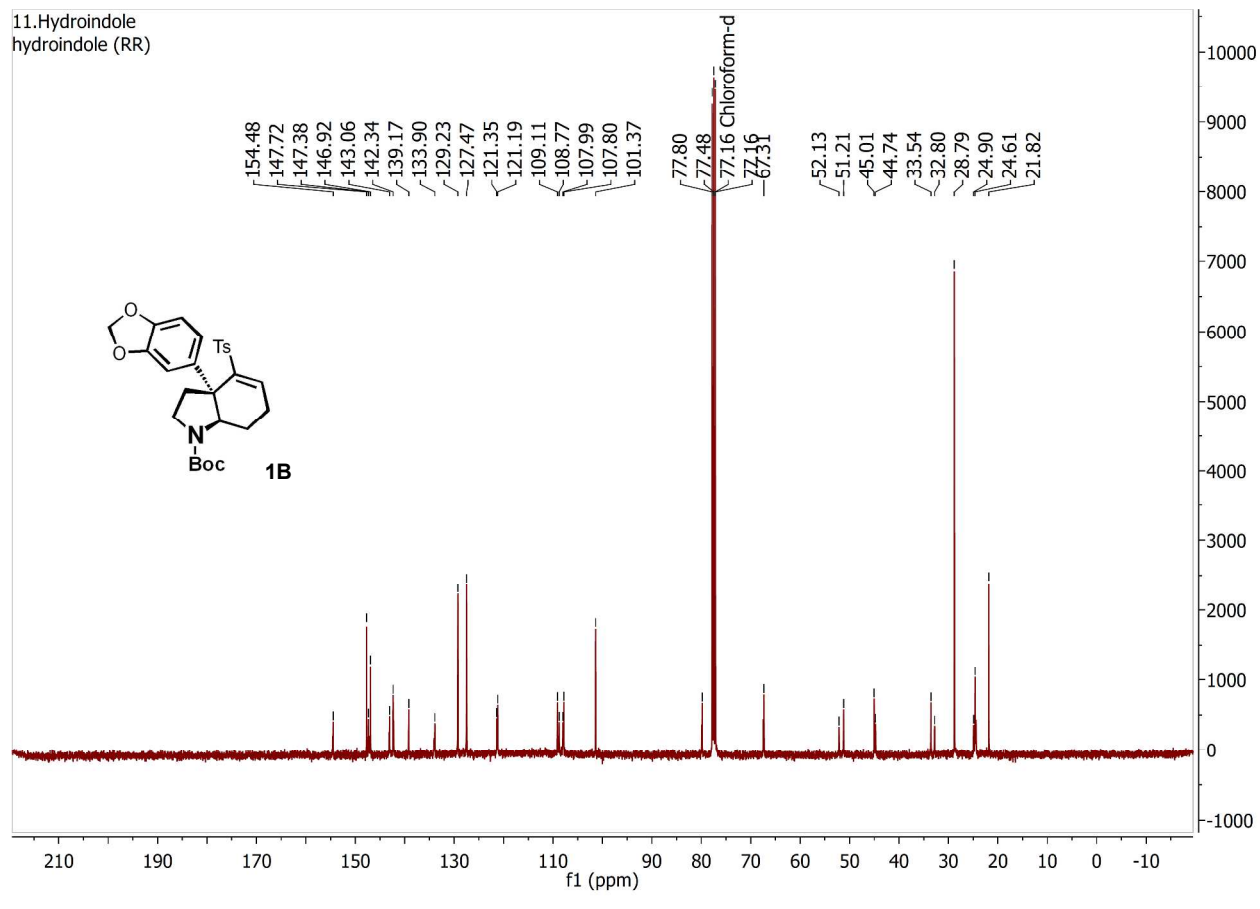


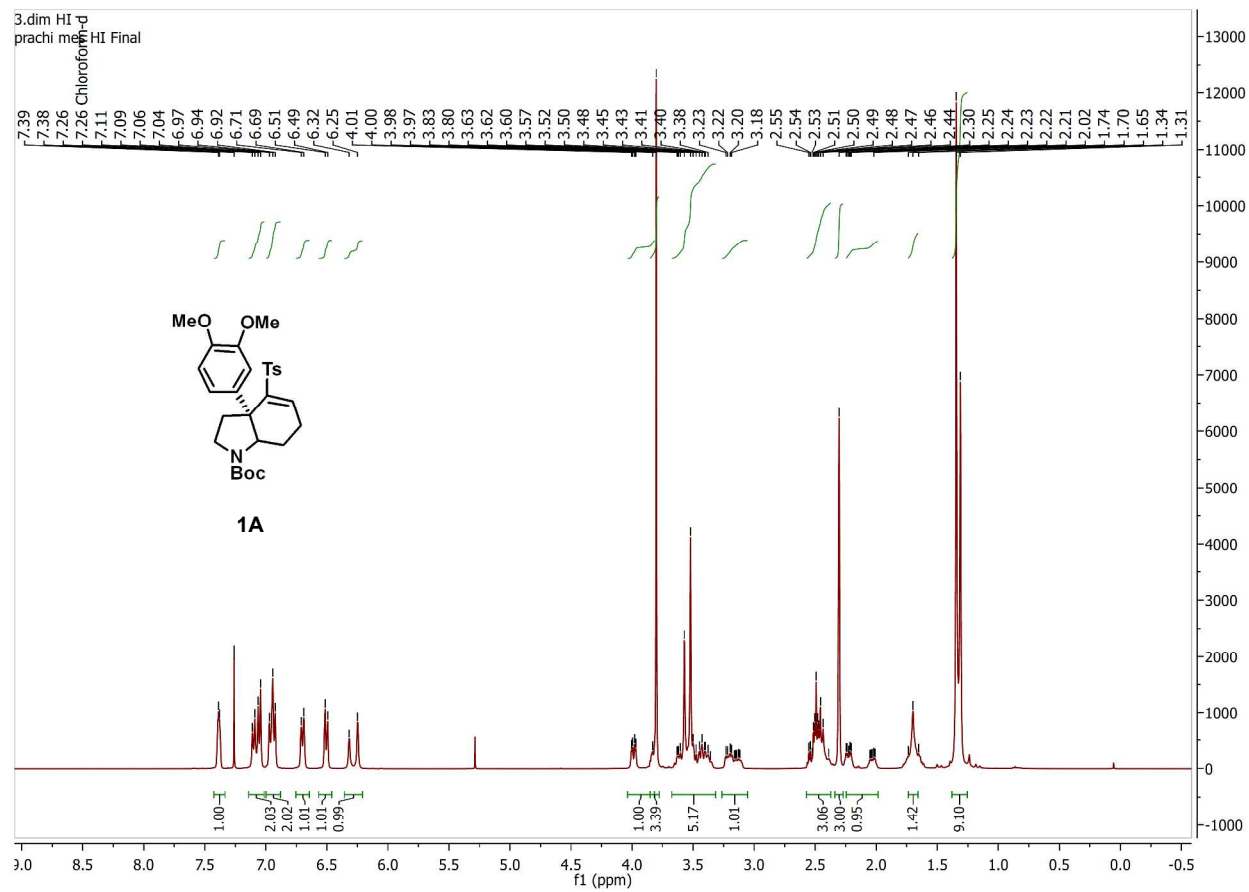


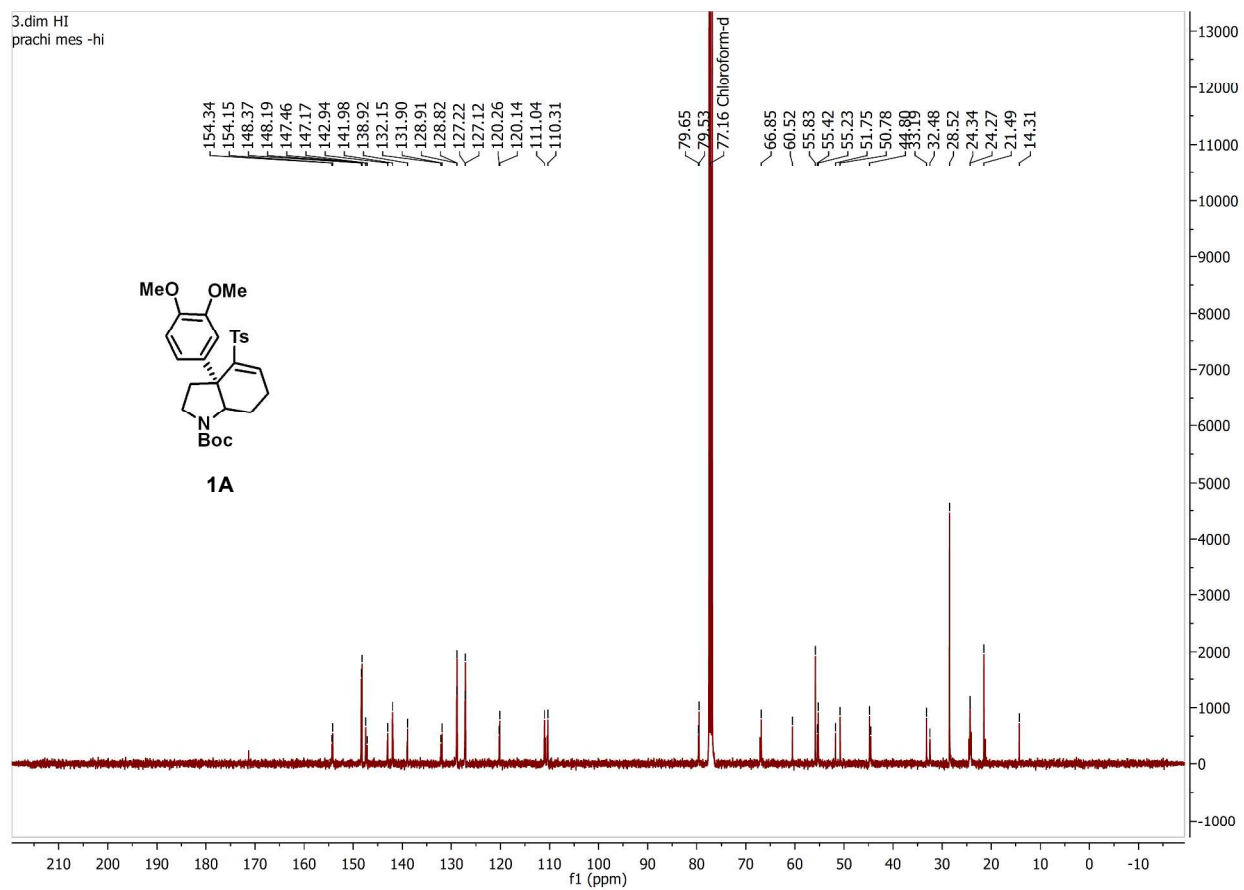


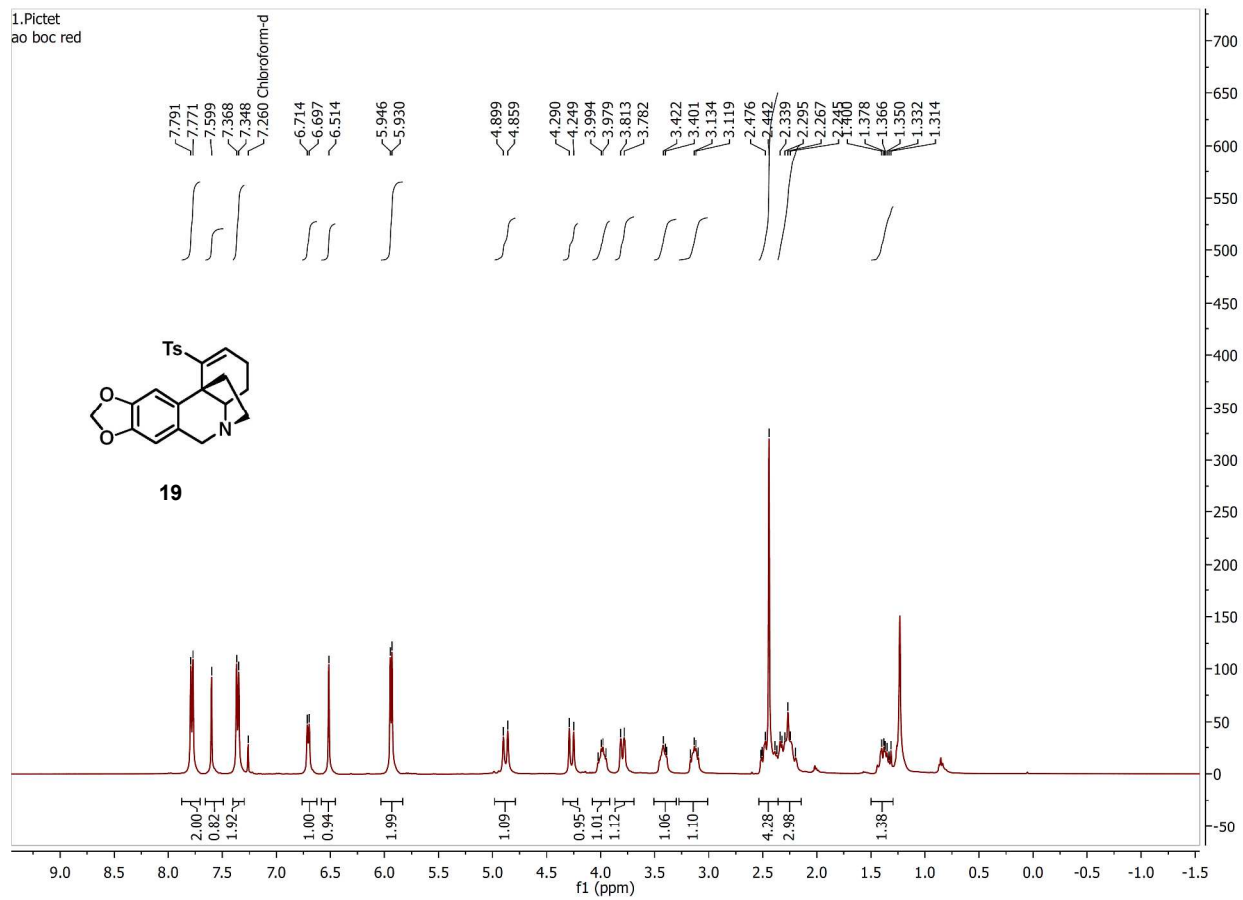


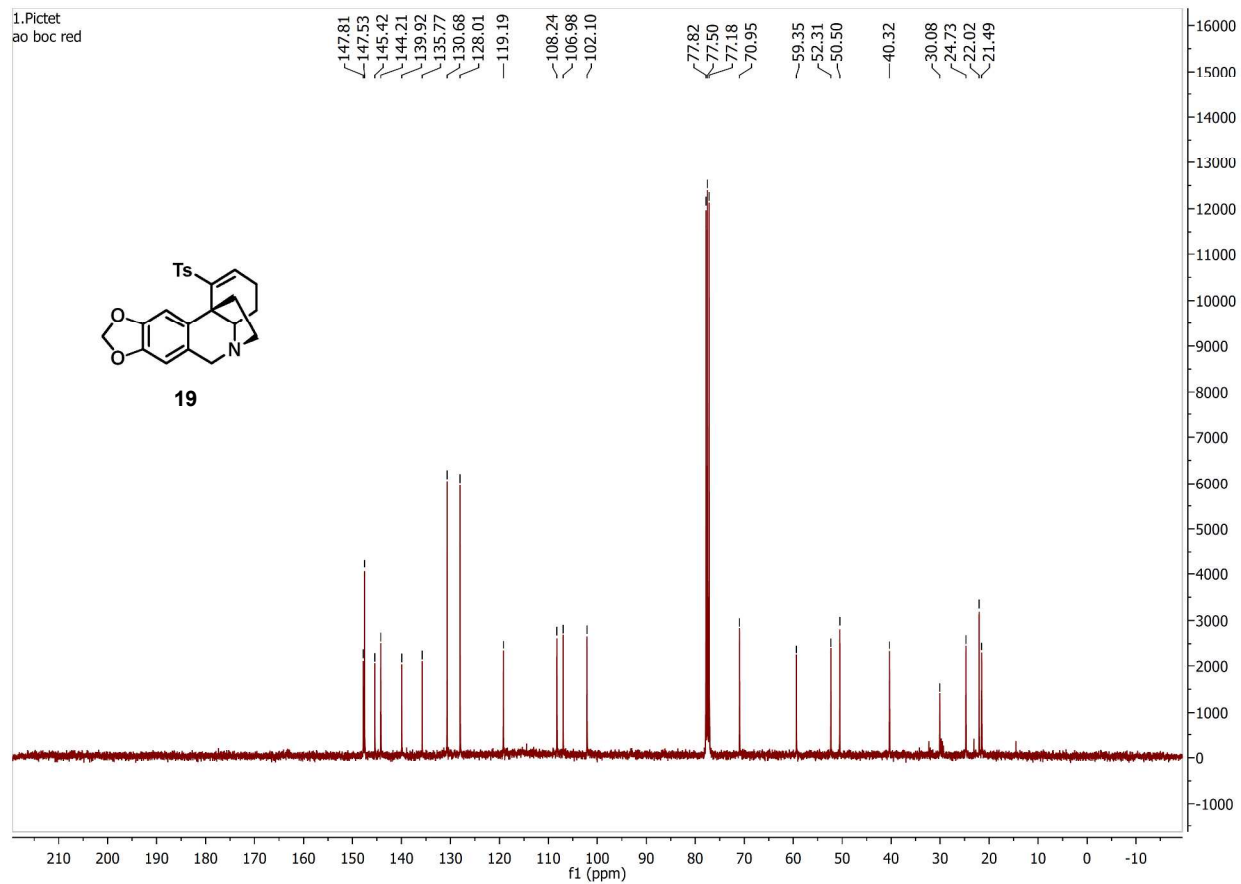


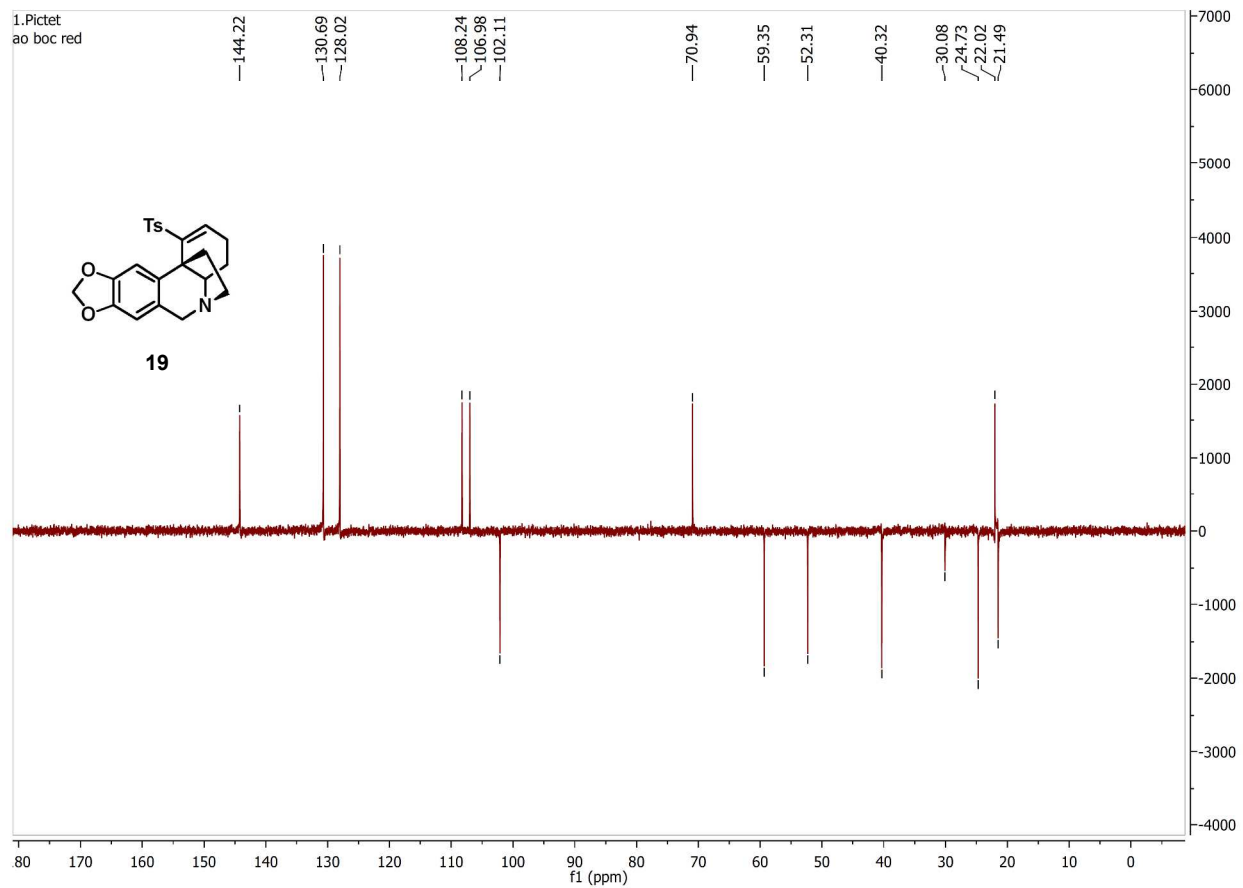


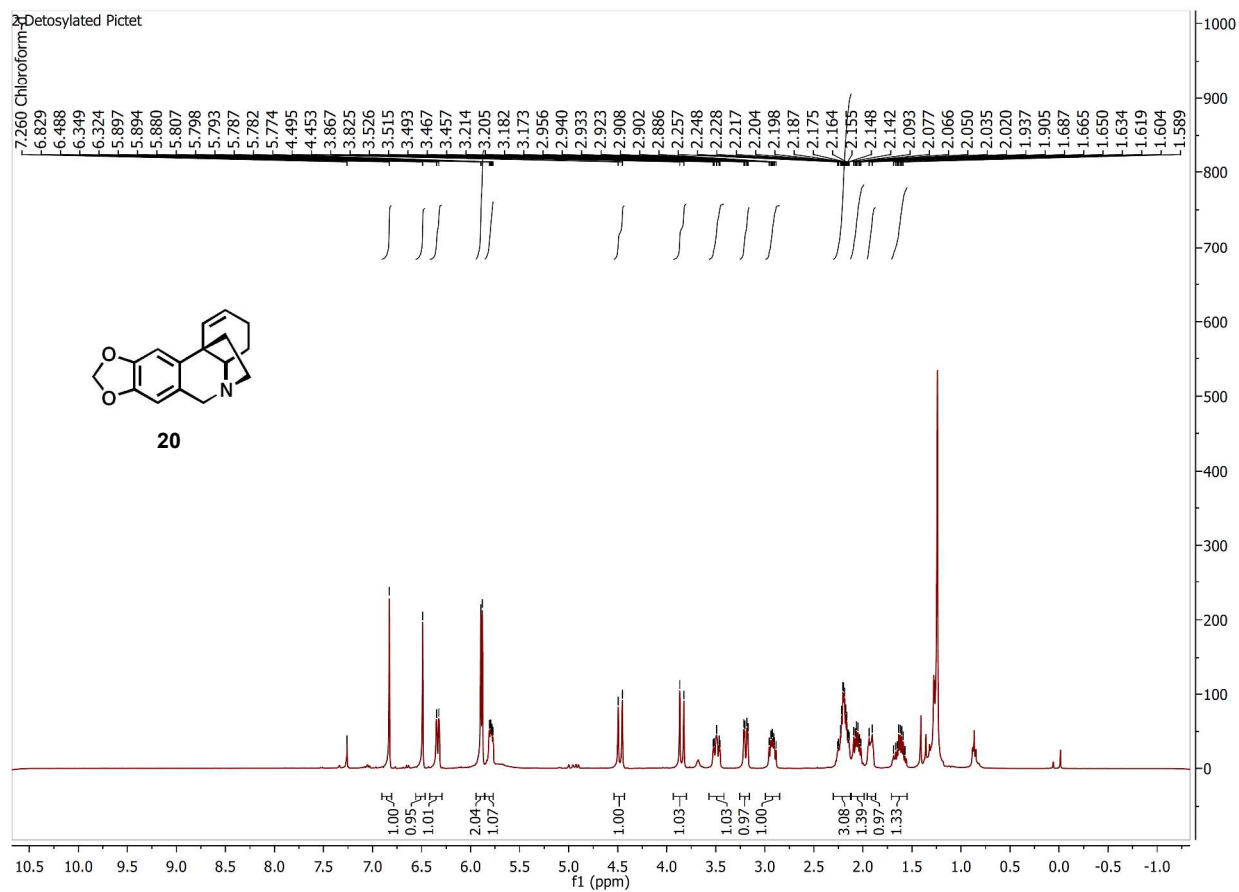


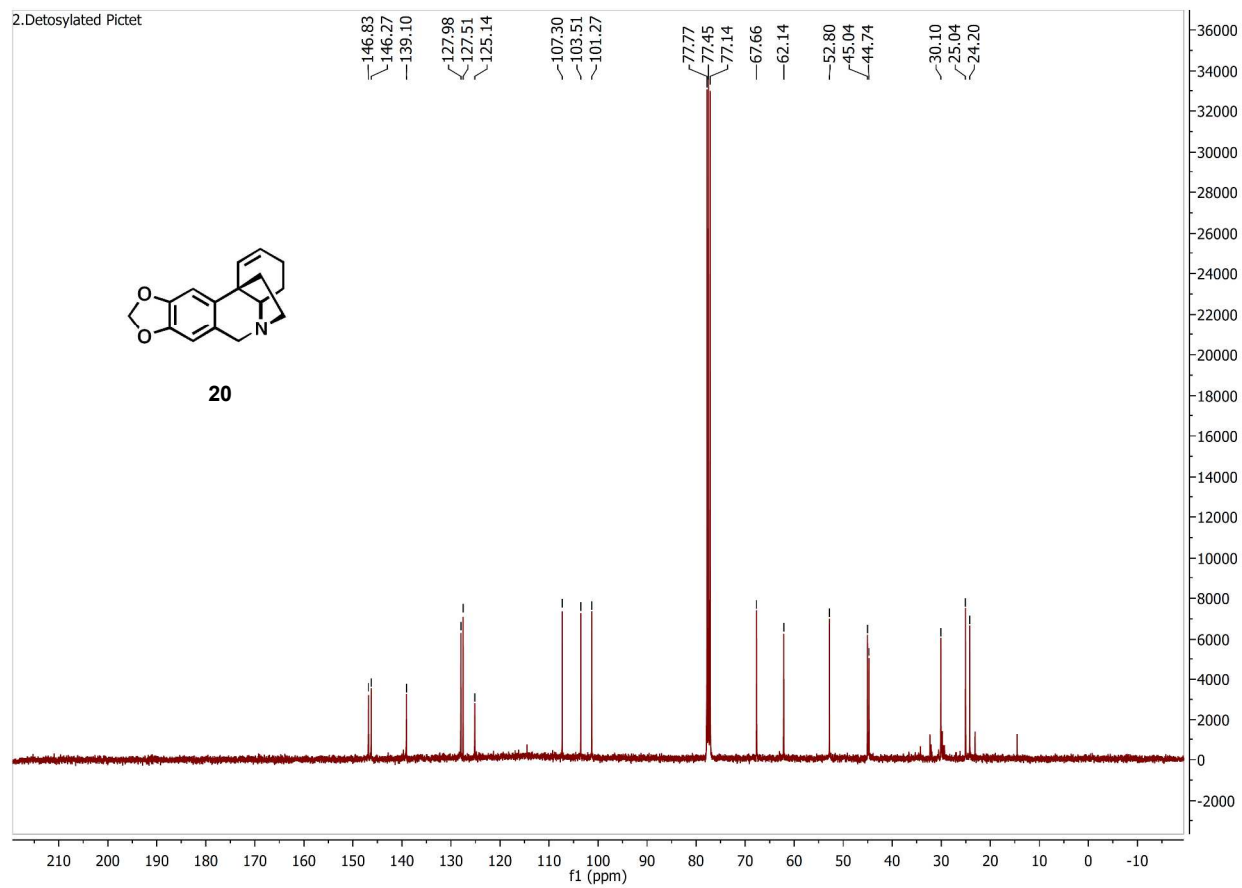


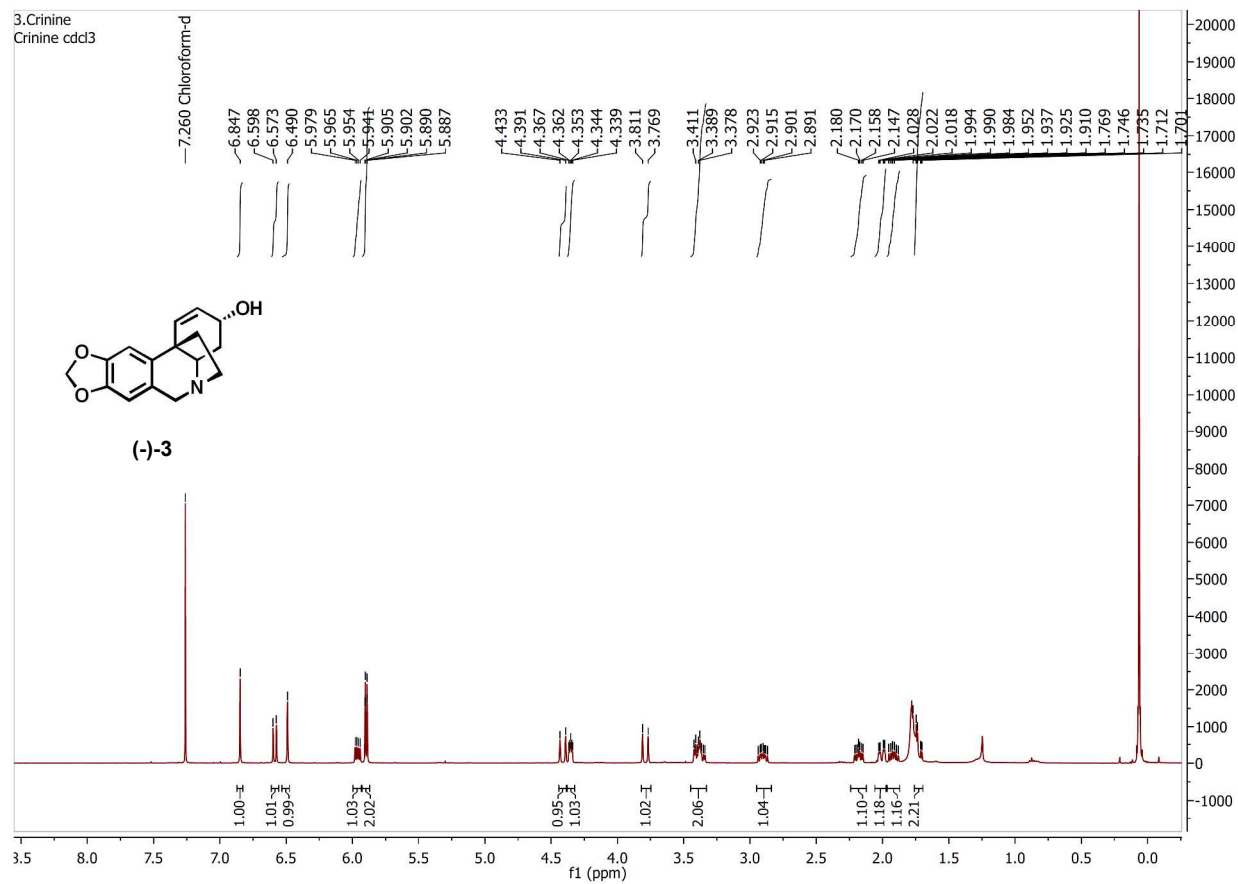


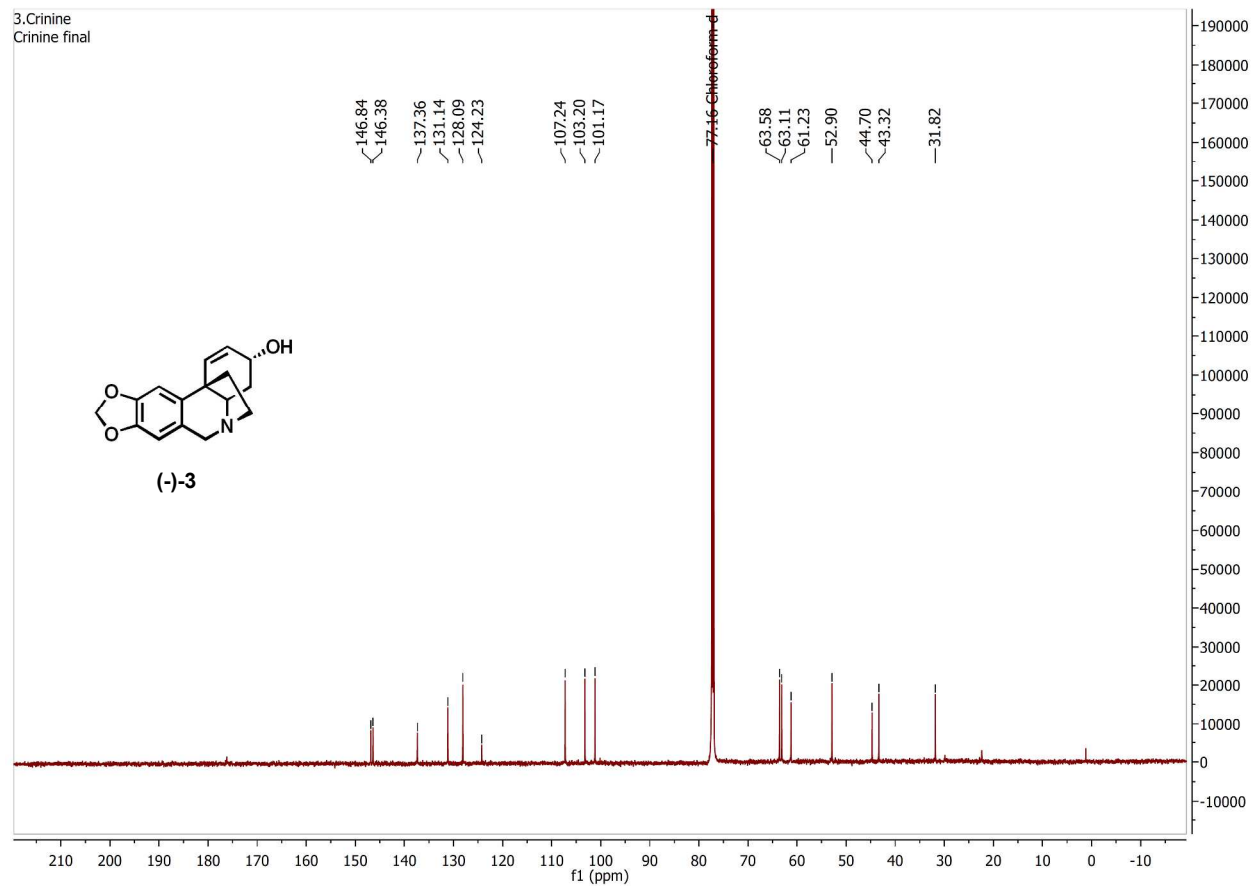


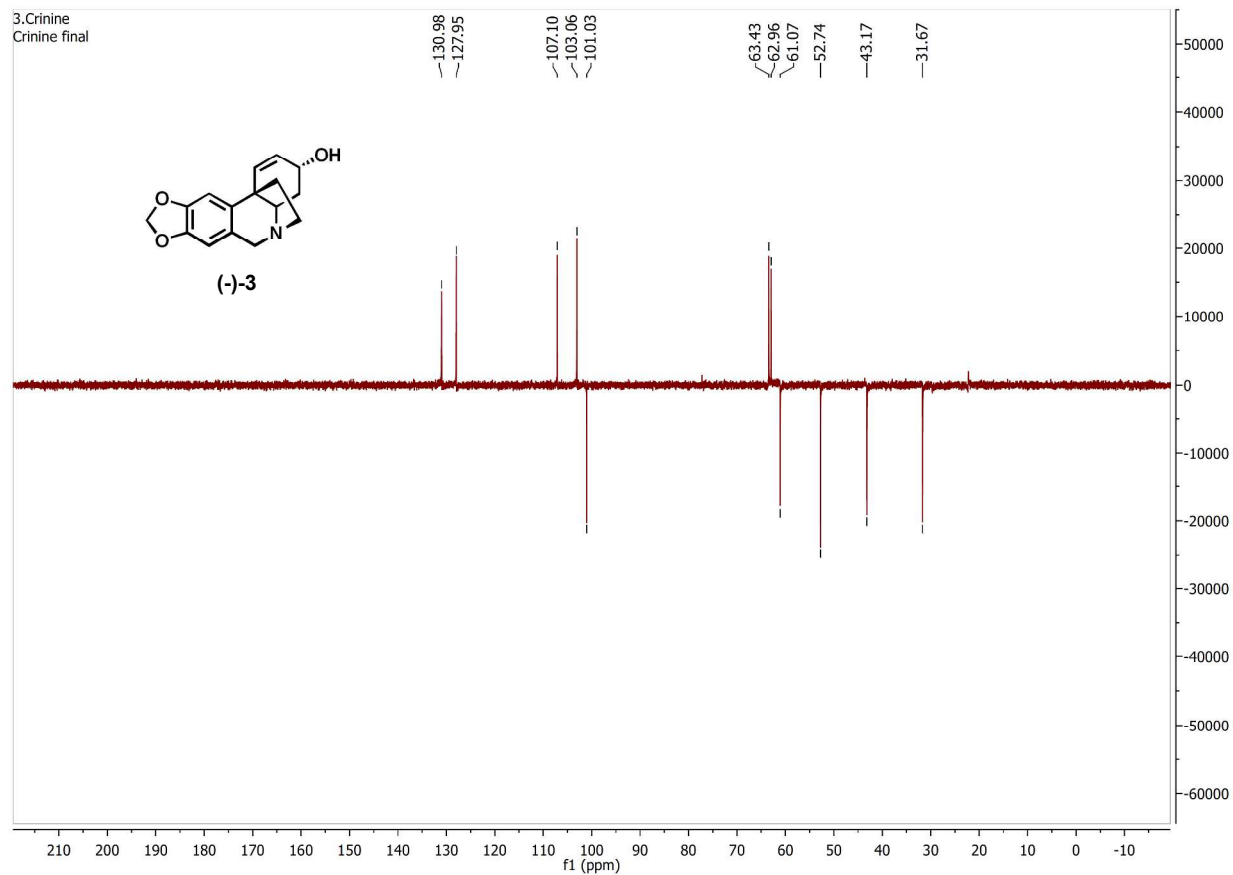


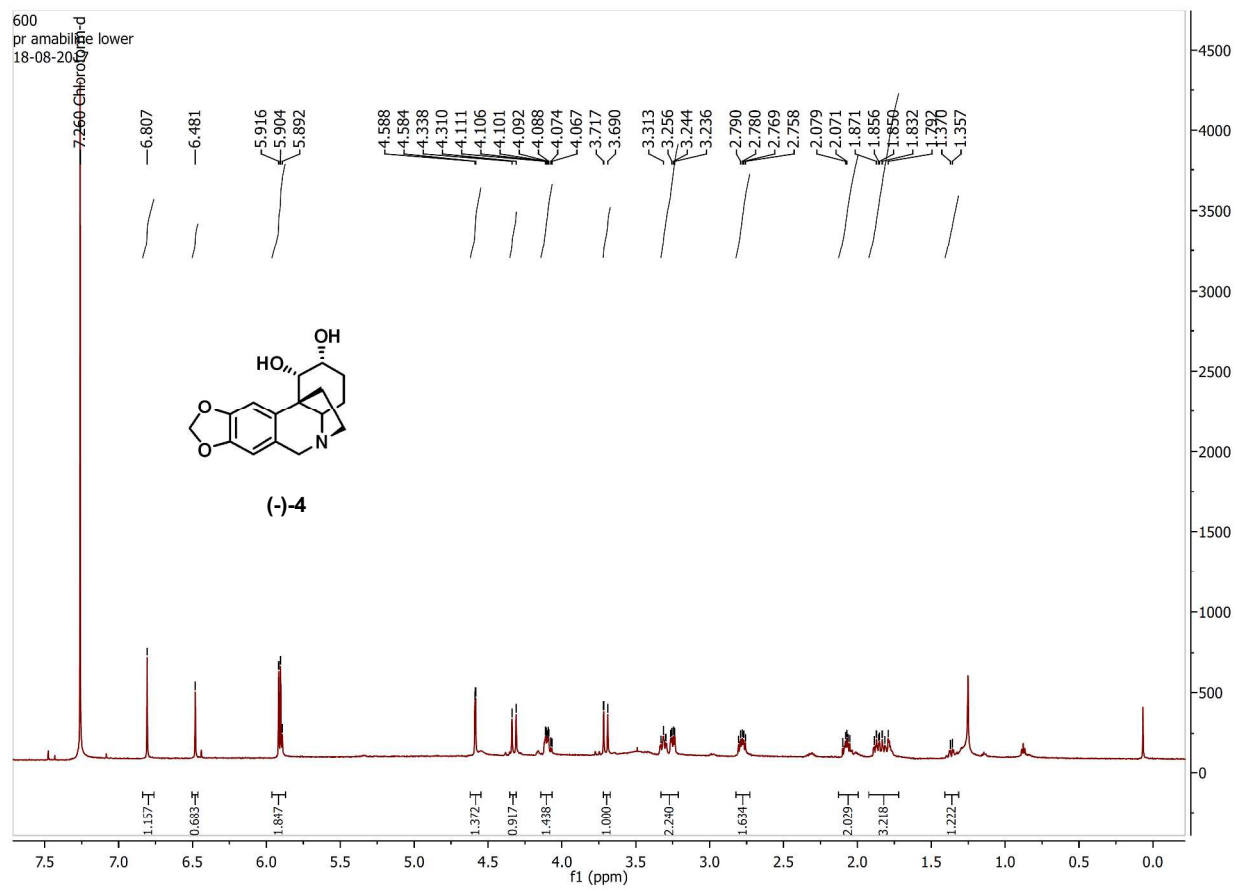




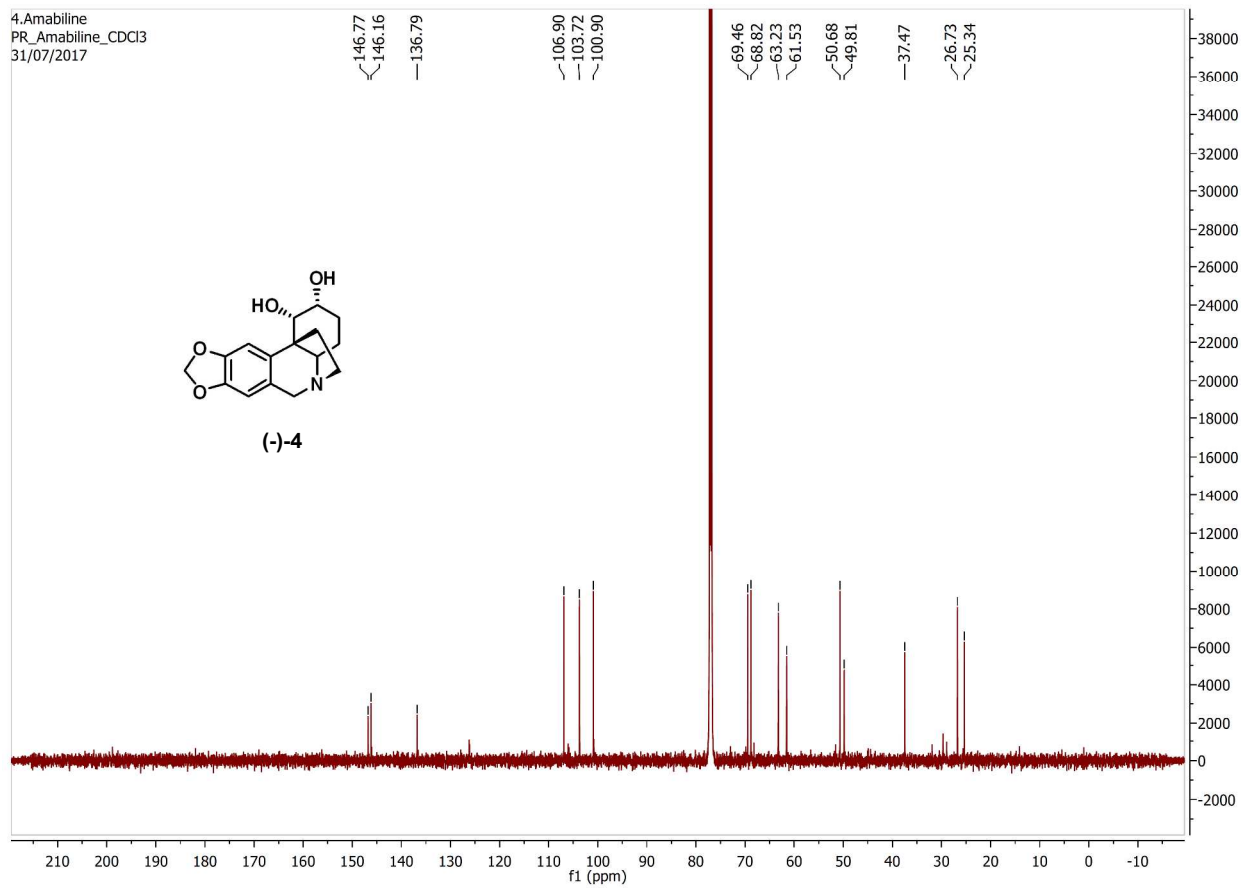
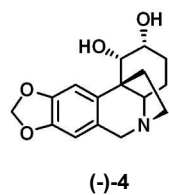




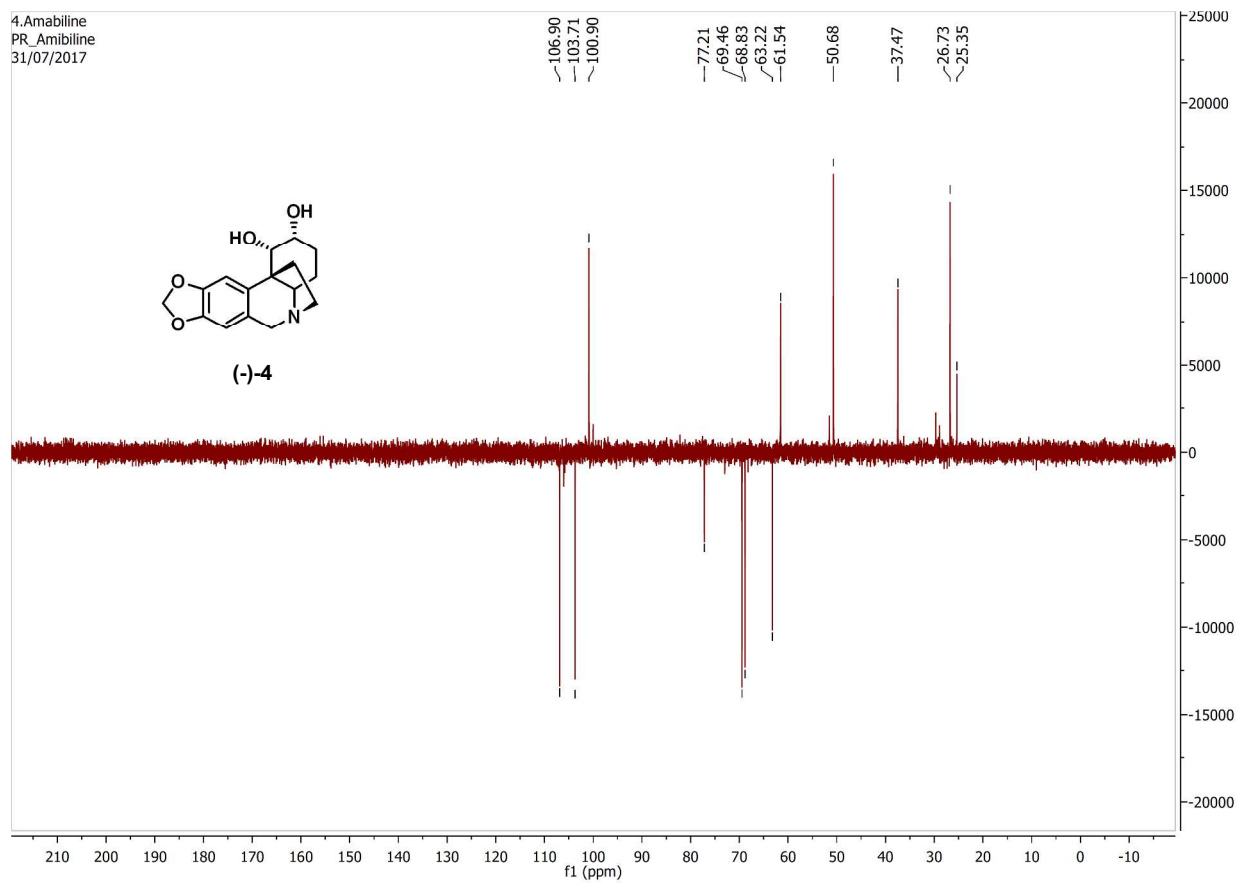




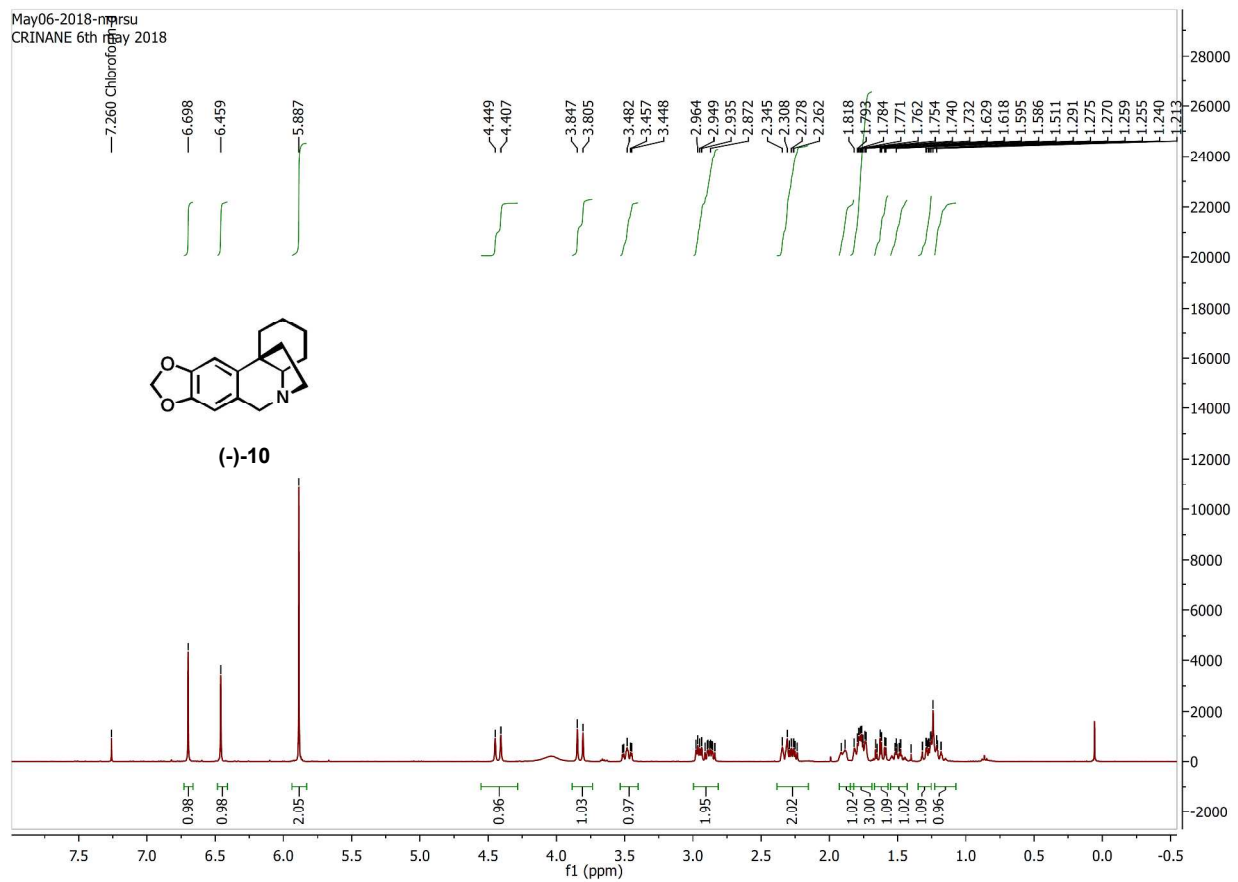
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PR_Amabiline_CDCl3
31/07/2017



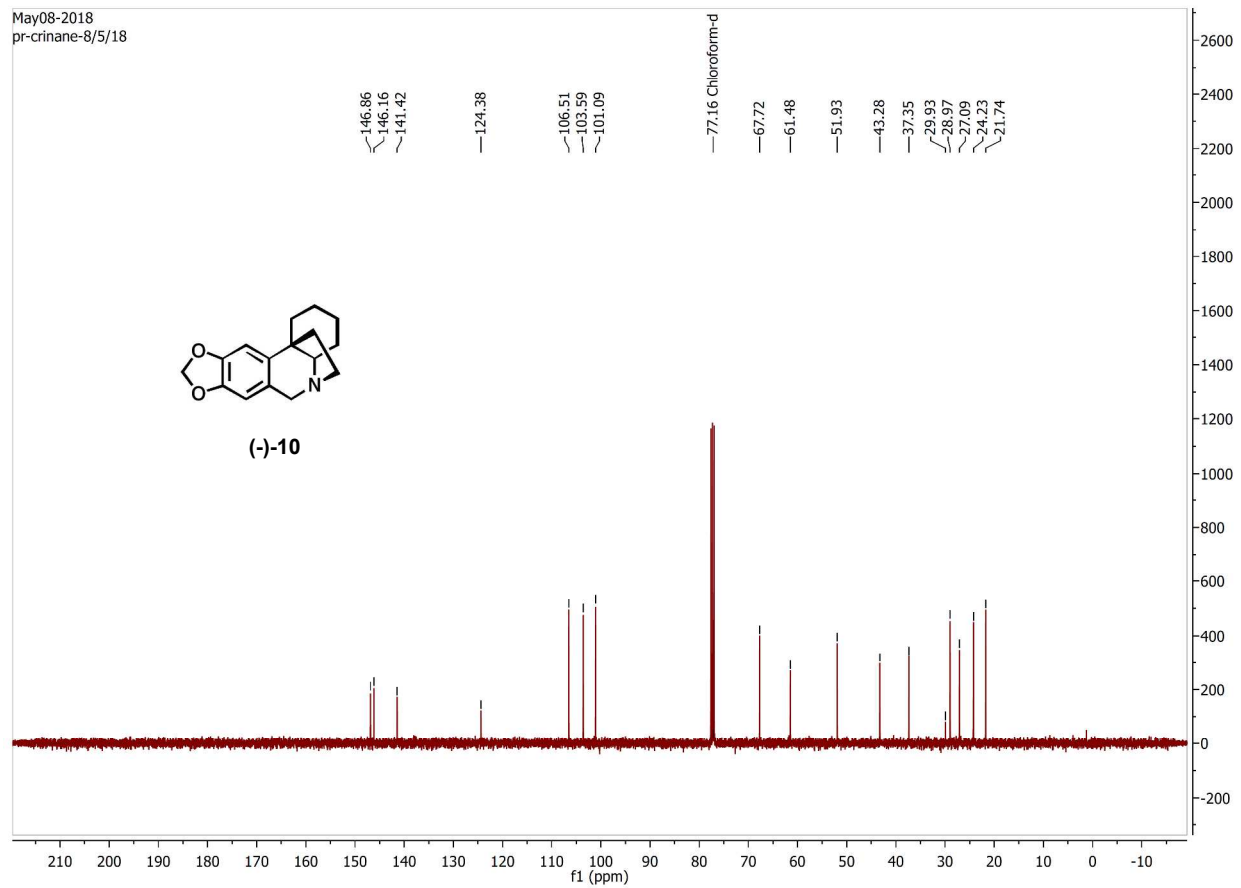
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PR_Amabiline
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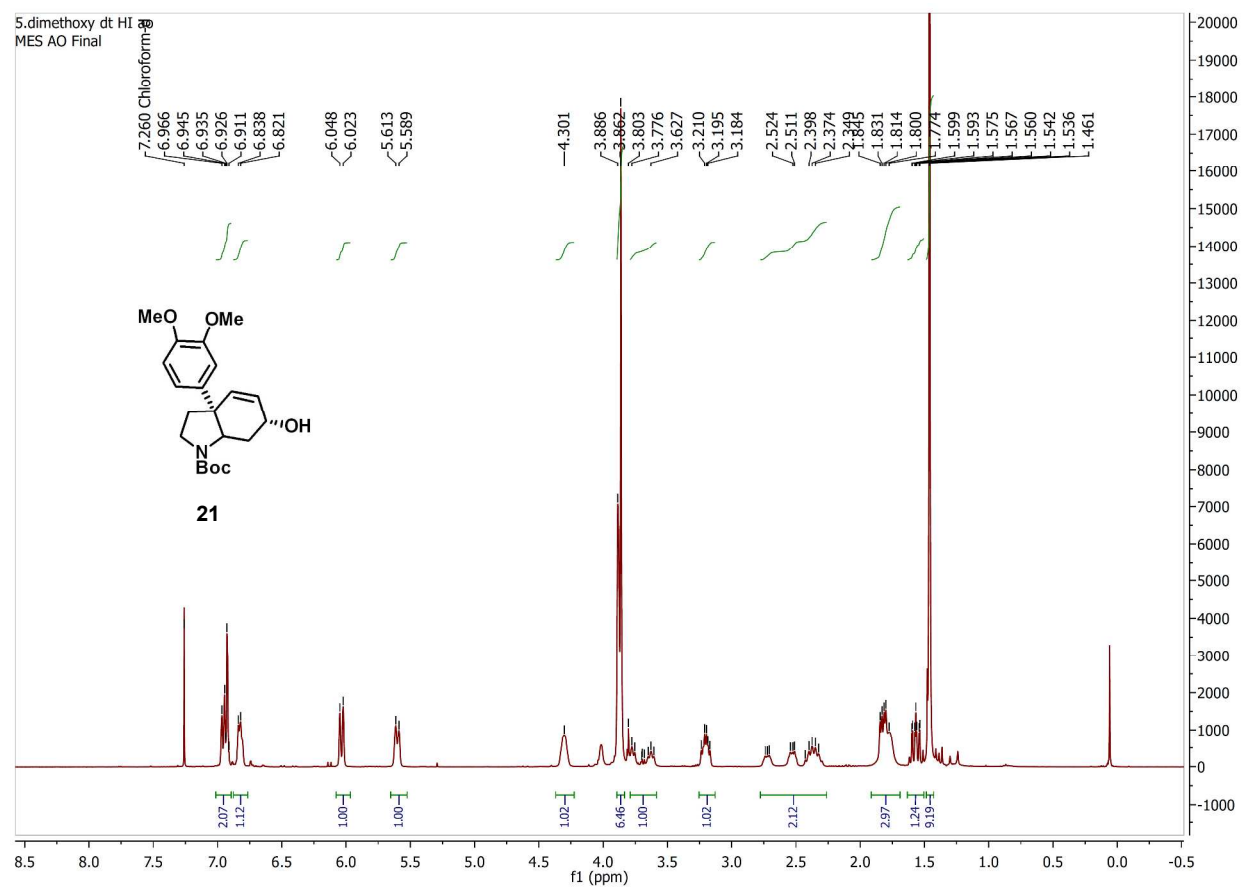


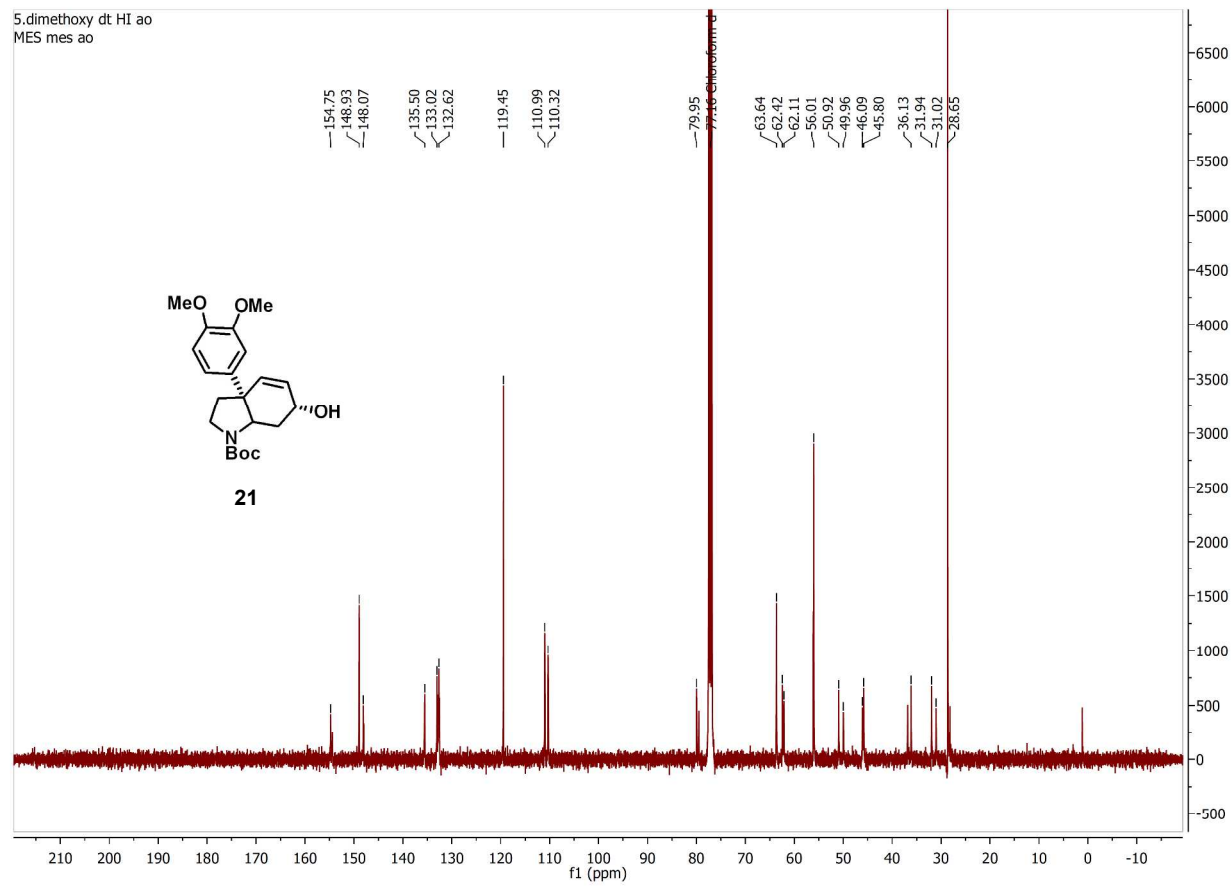
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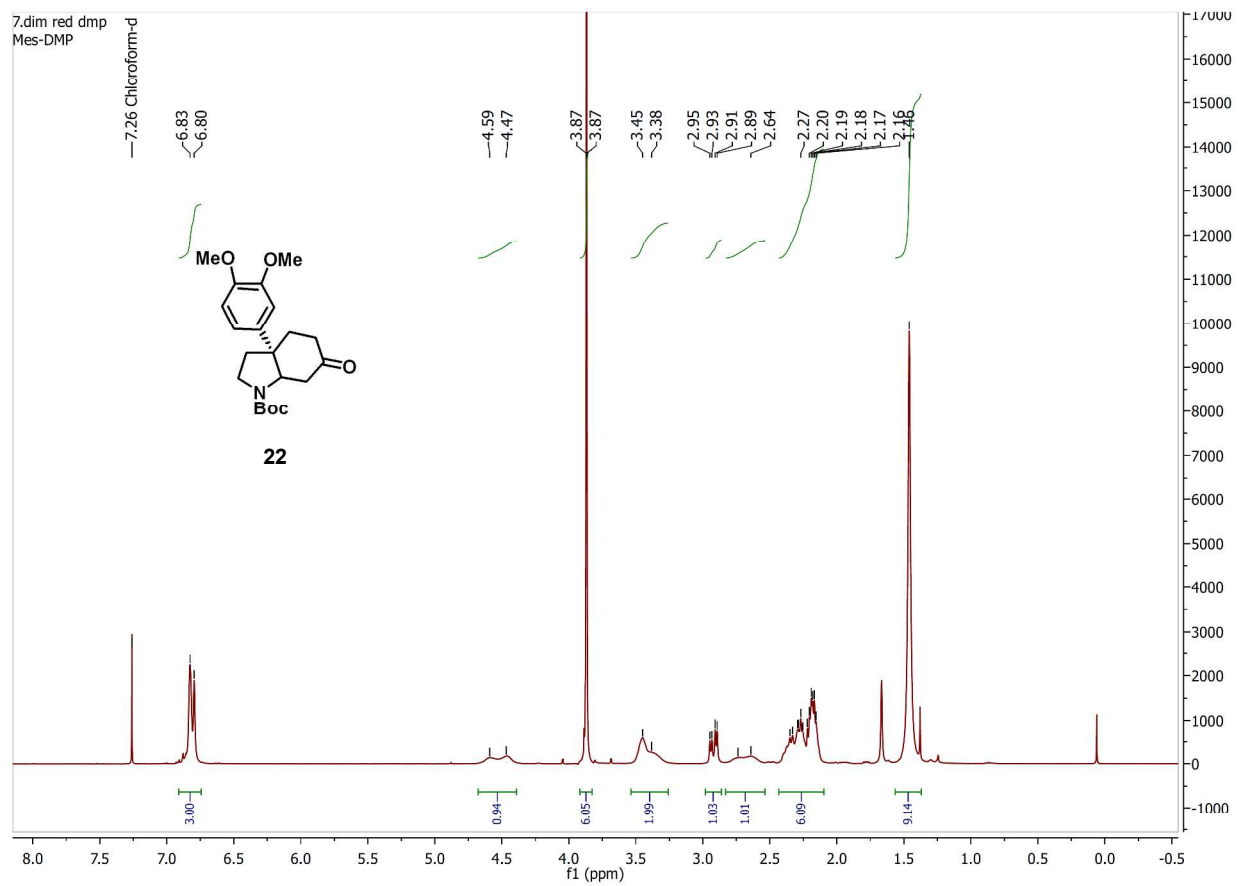


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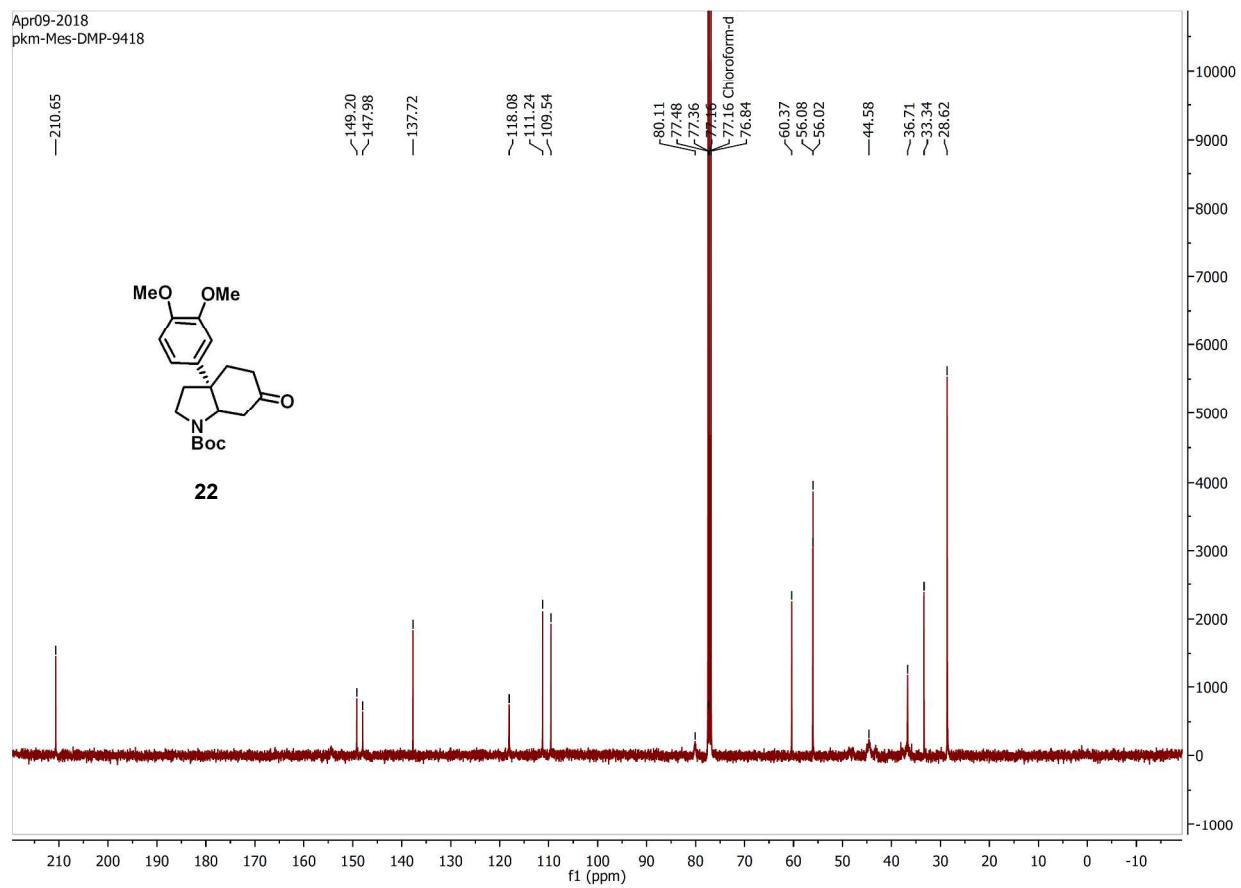


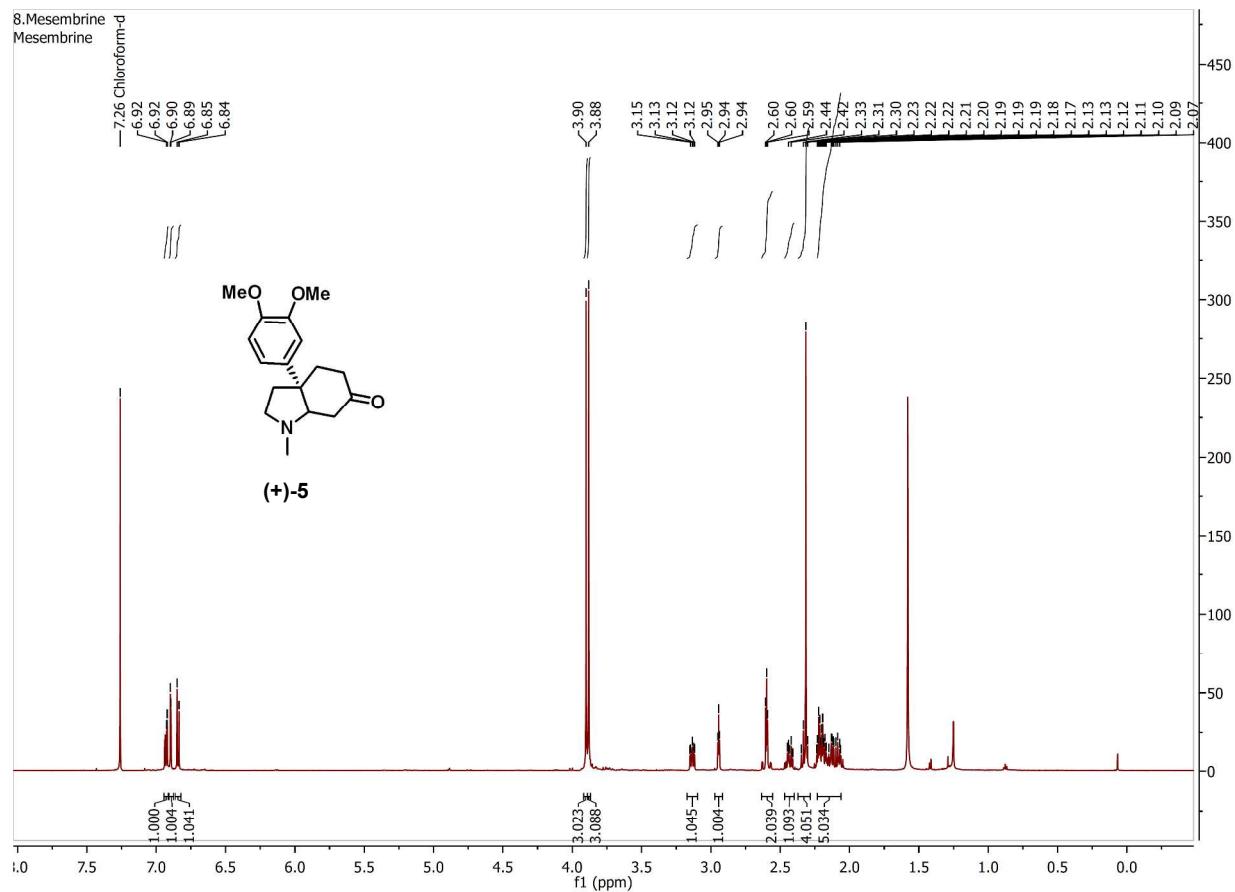


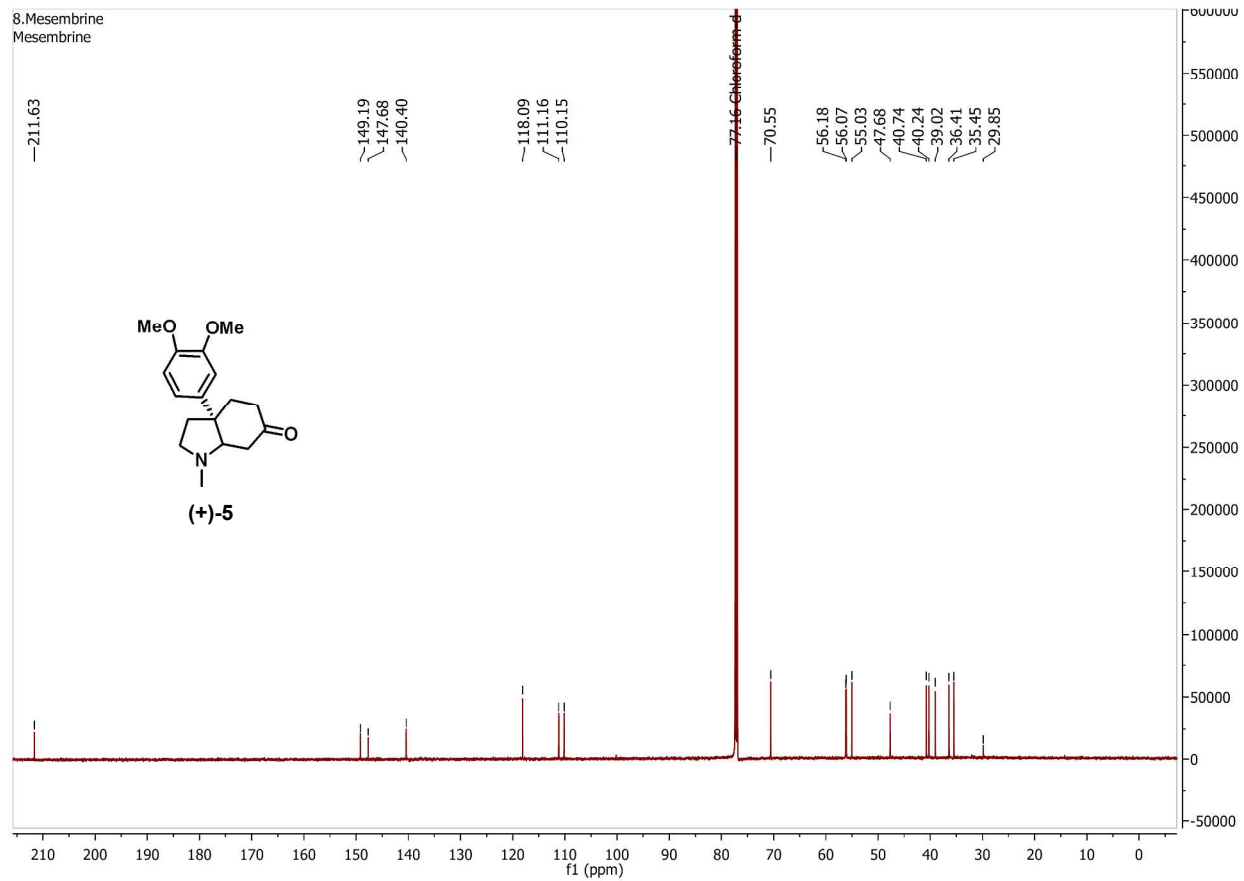


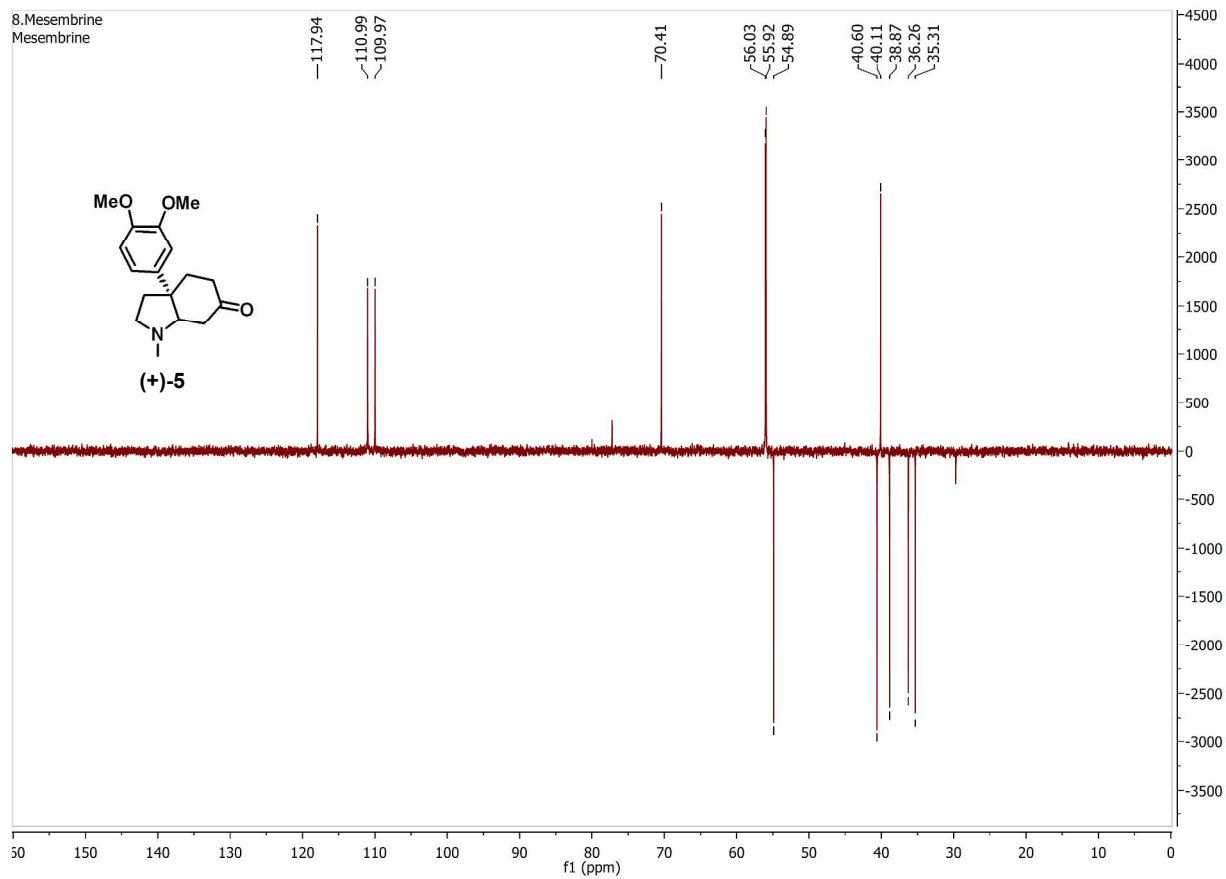


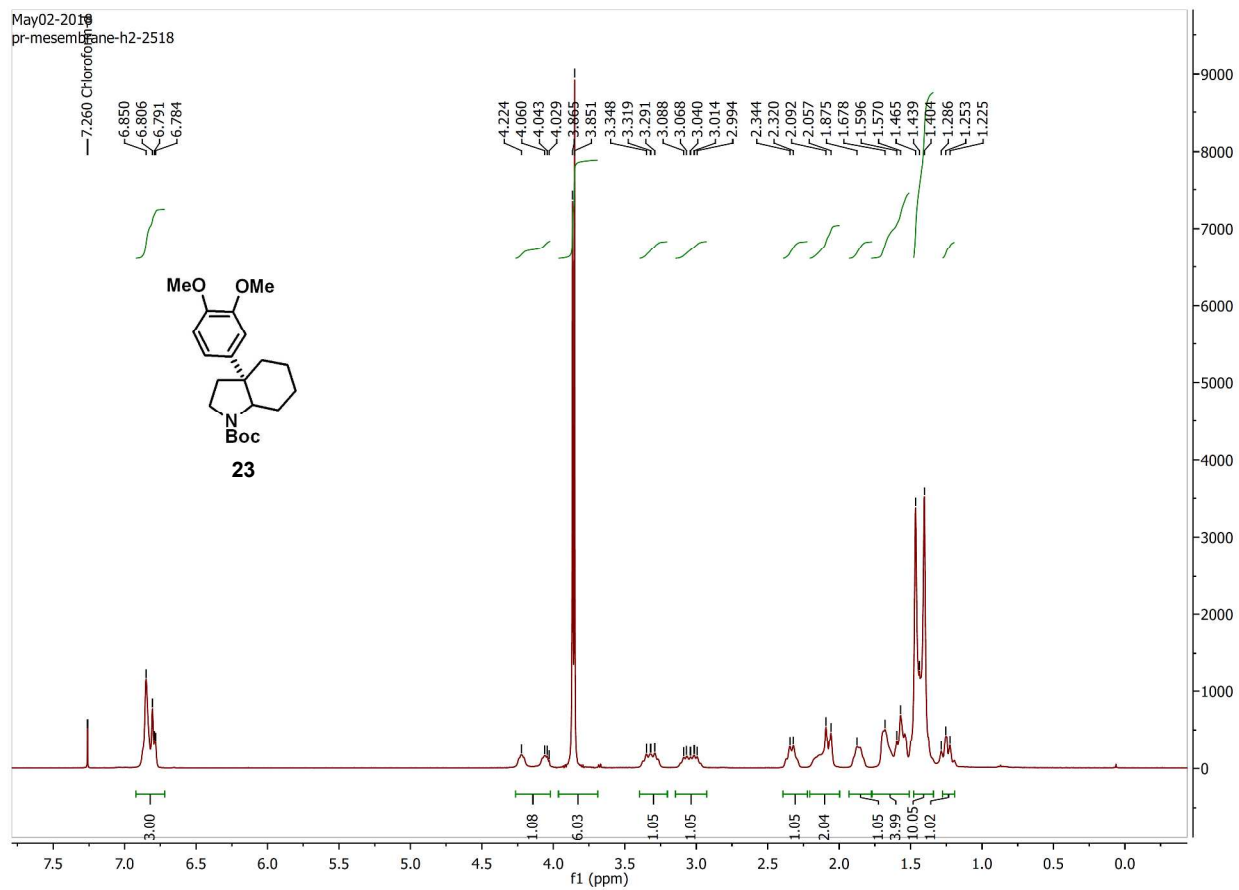
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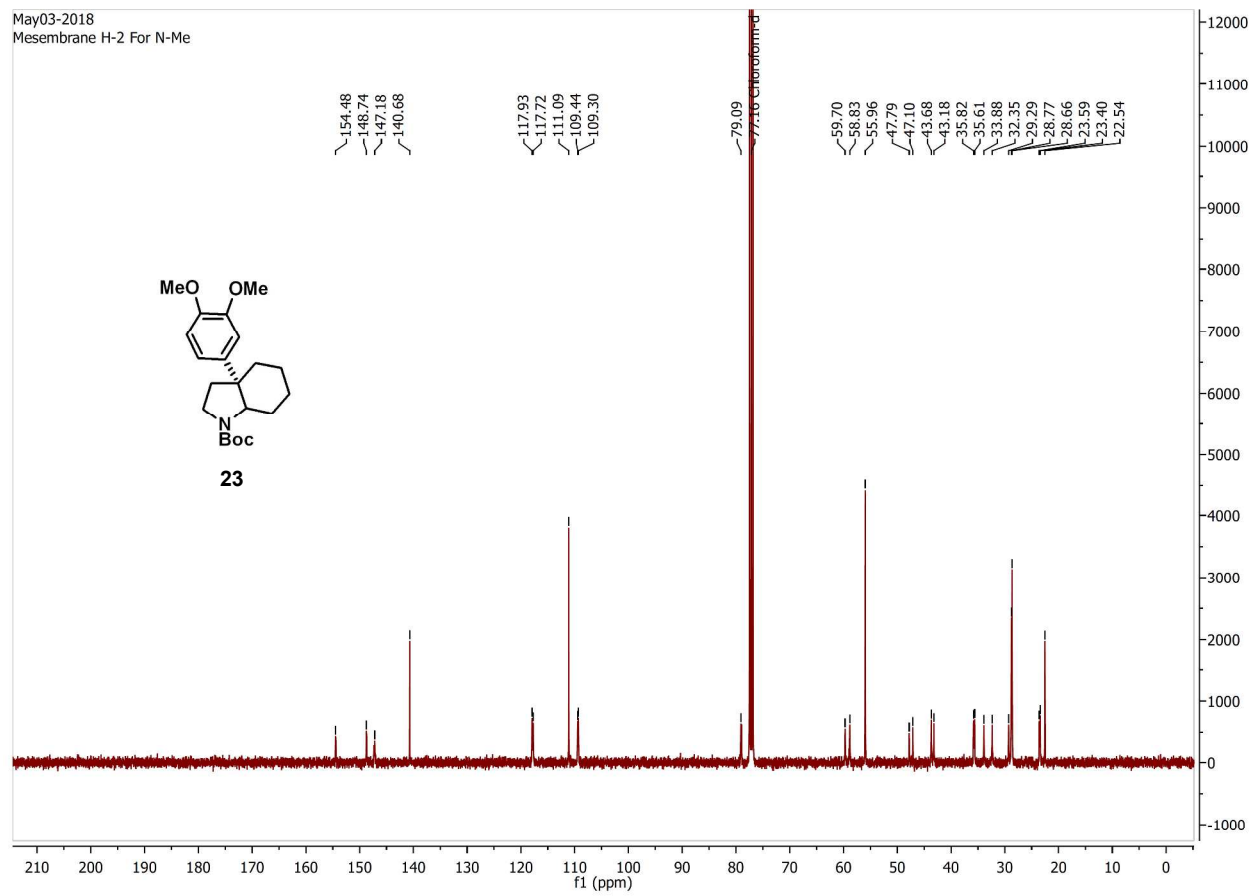


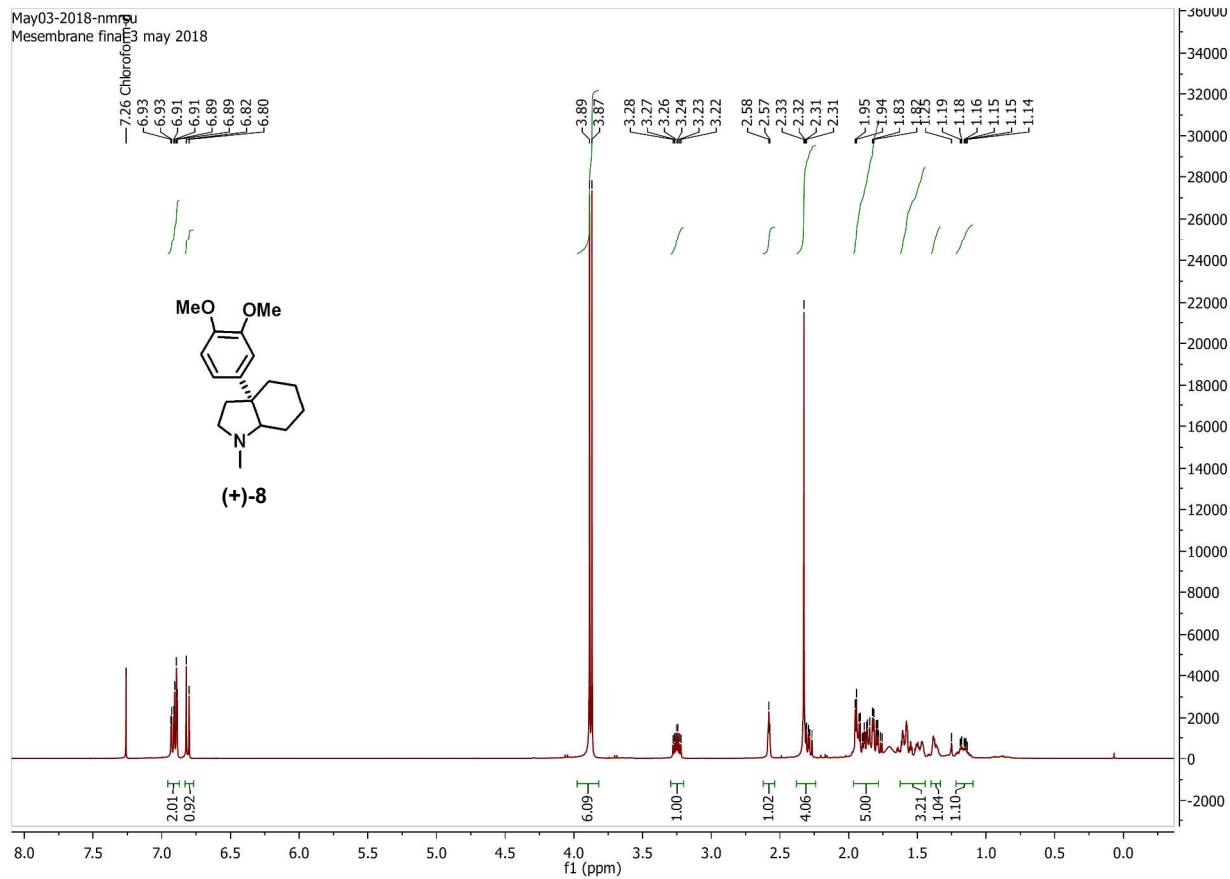




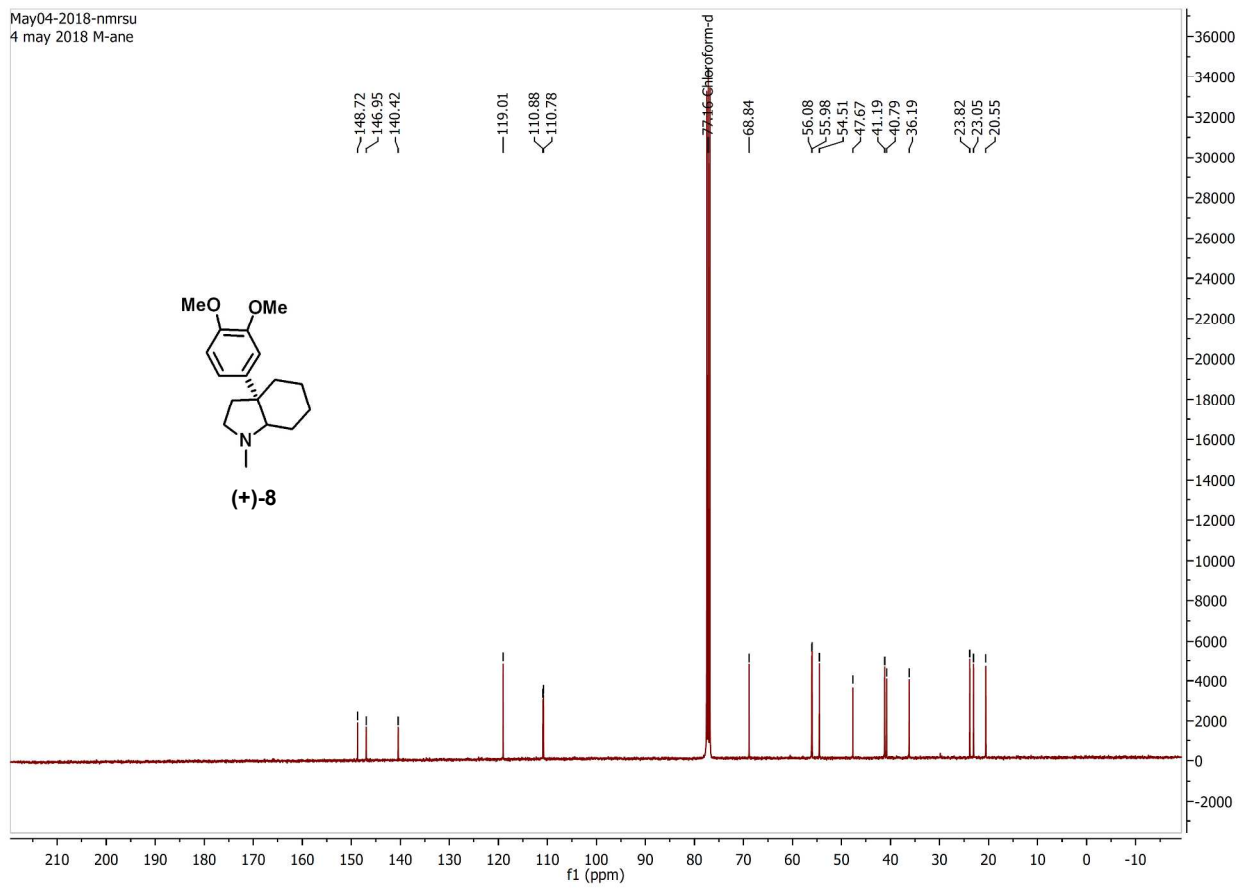


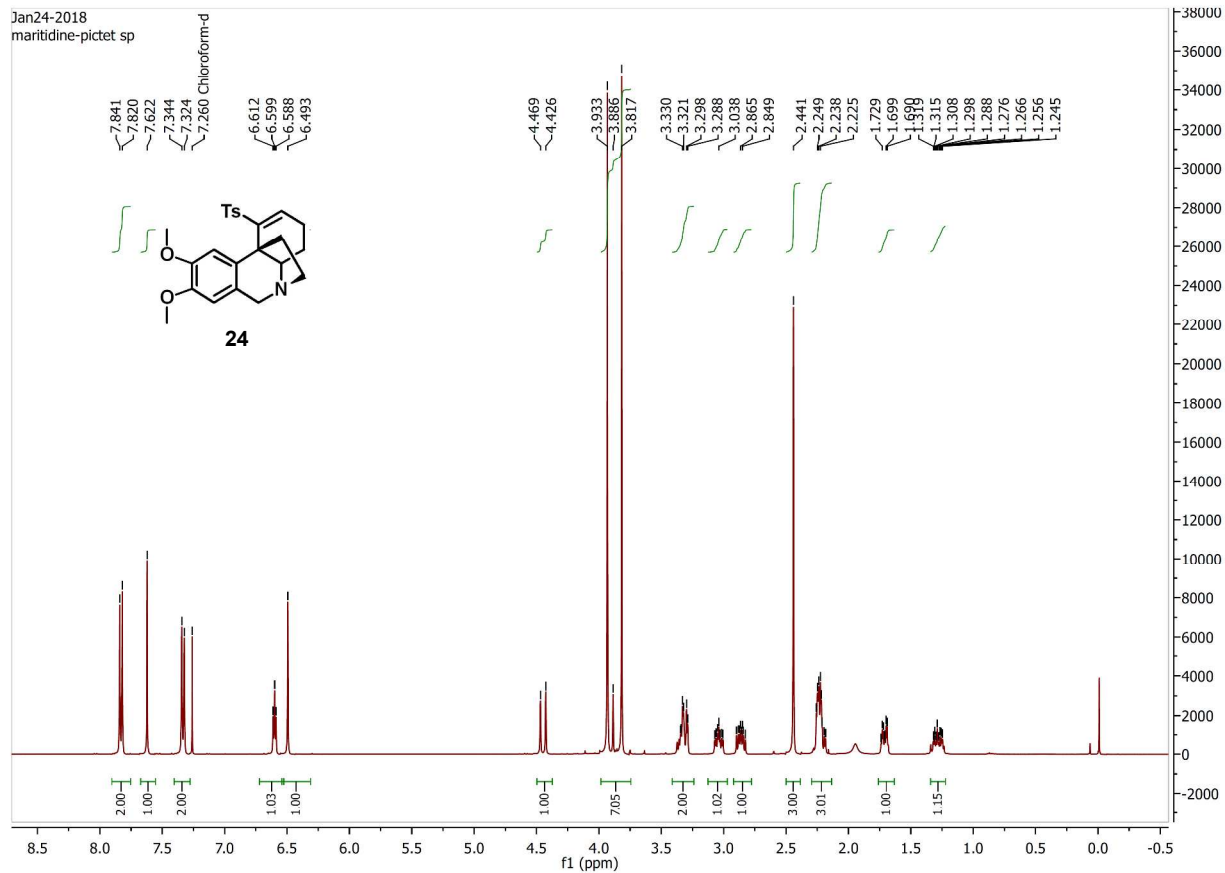
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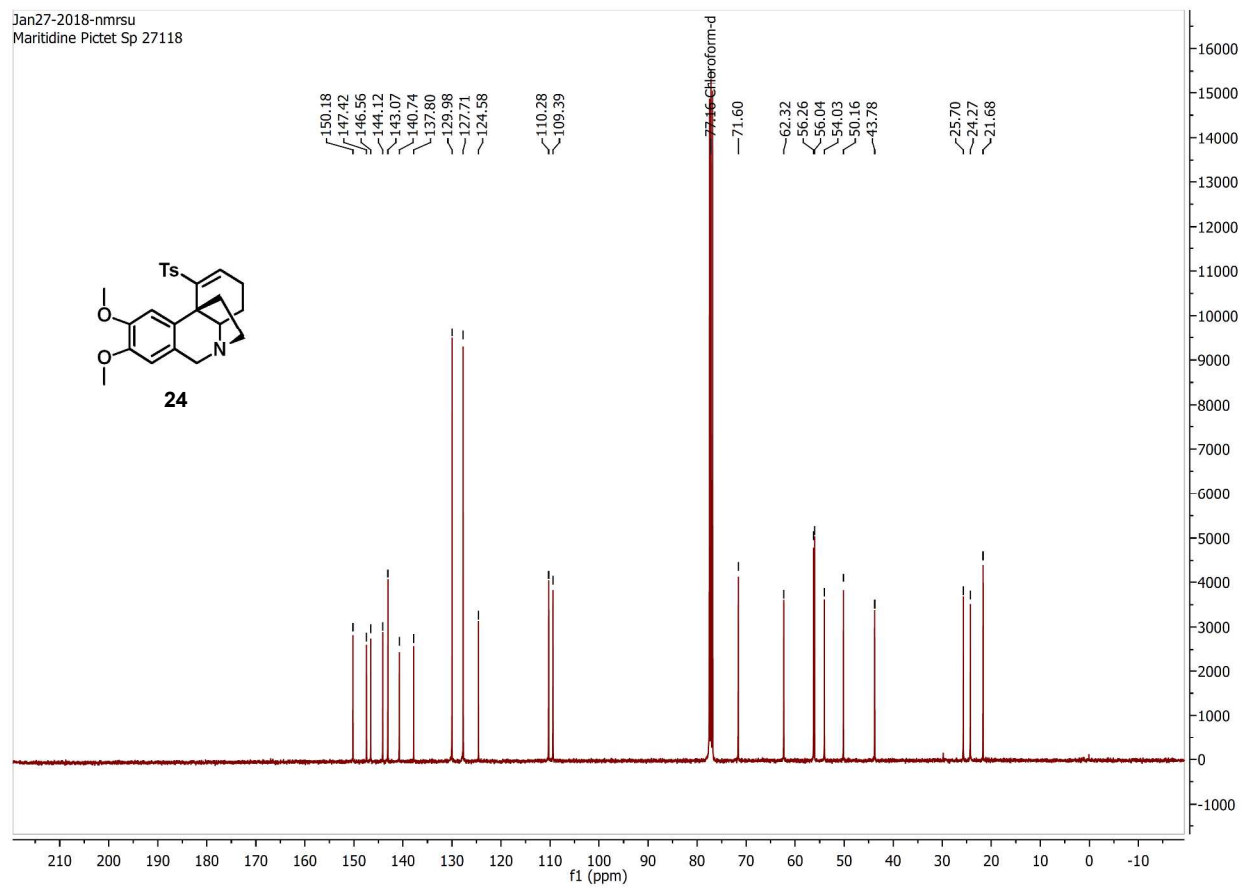


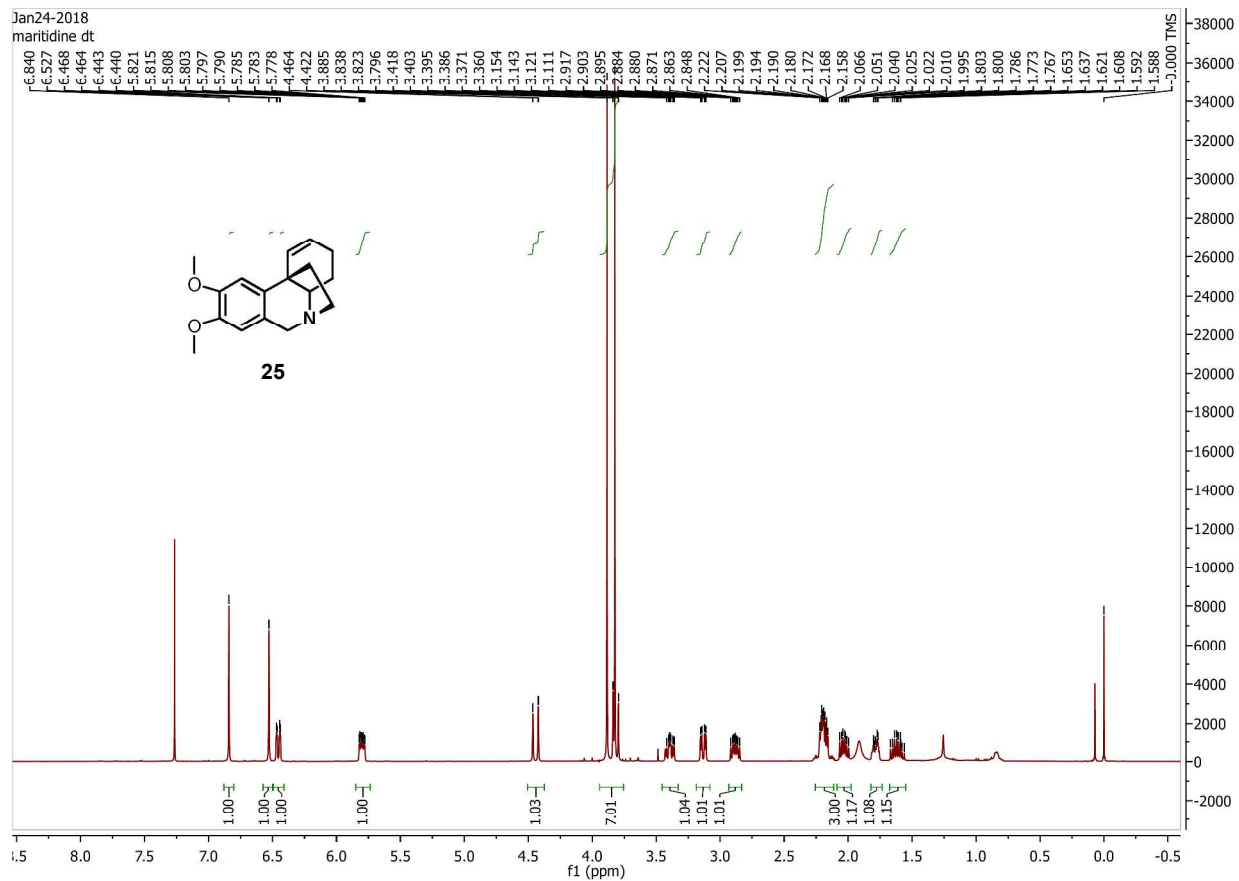
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4 may 2018 M-ane



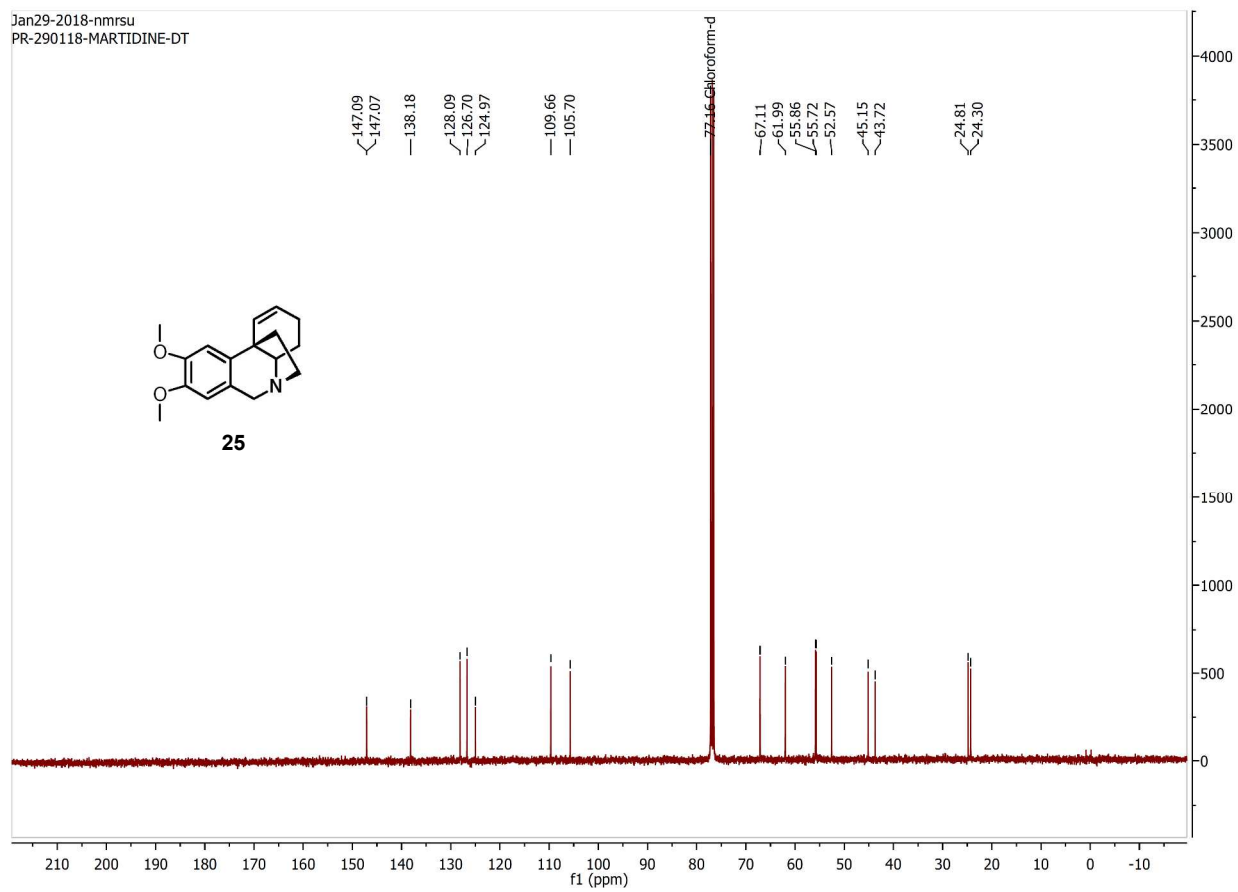


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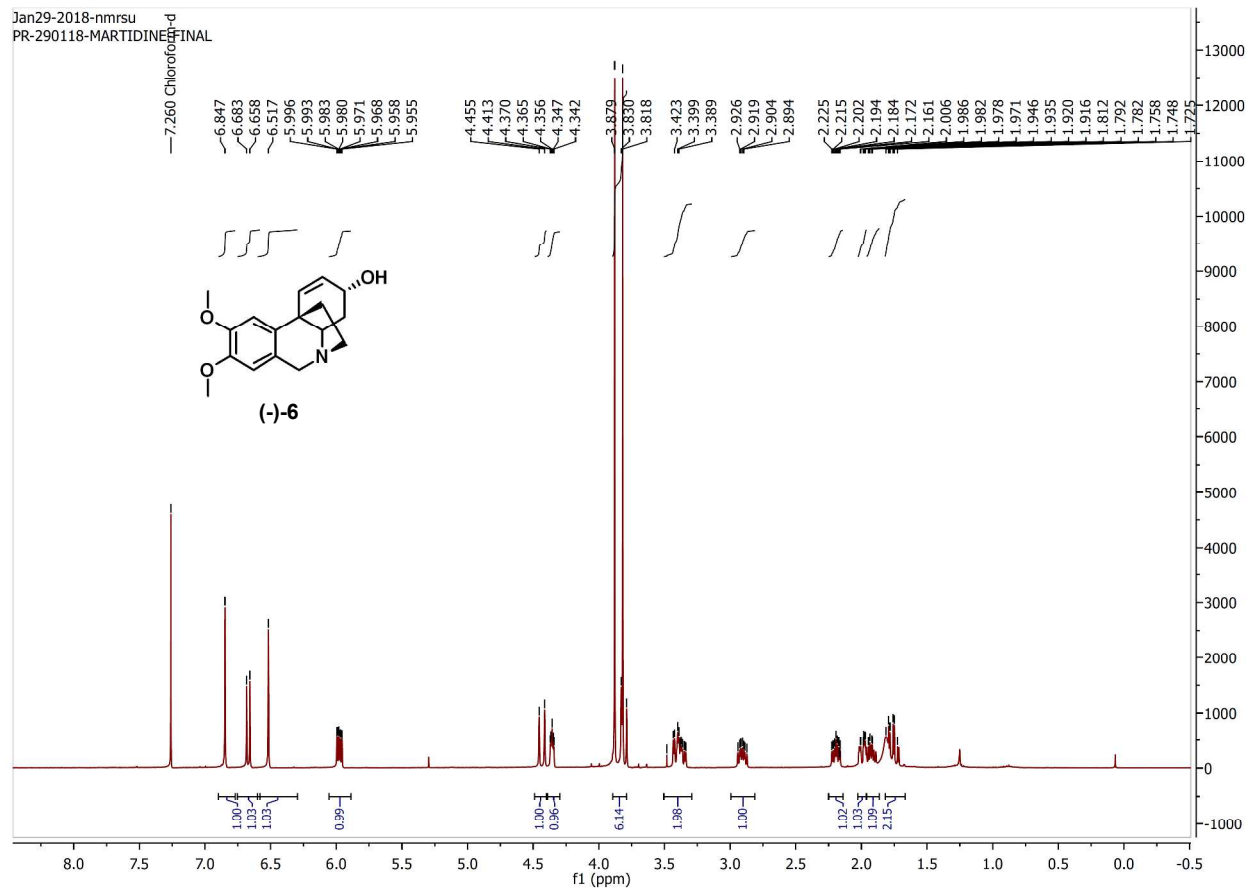




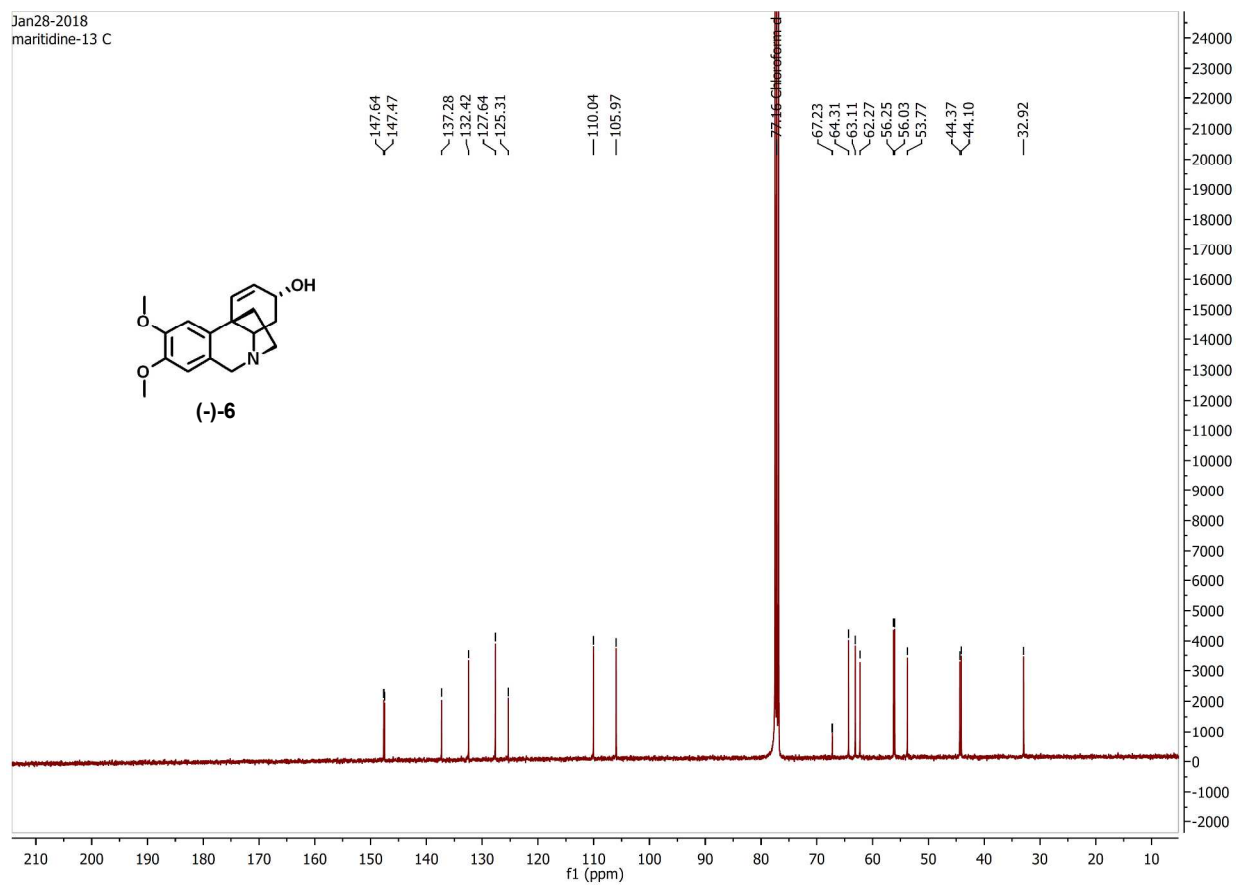
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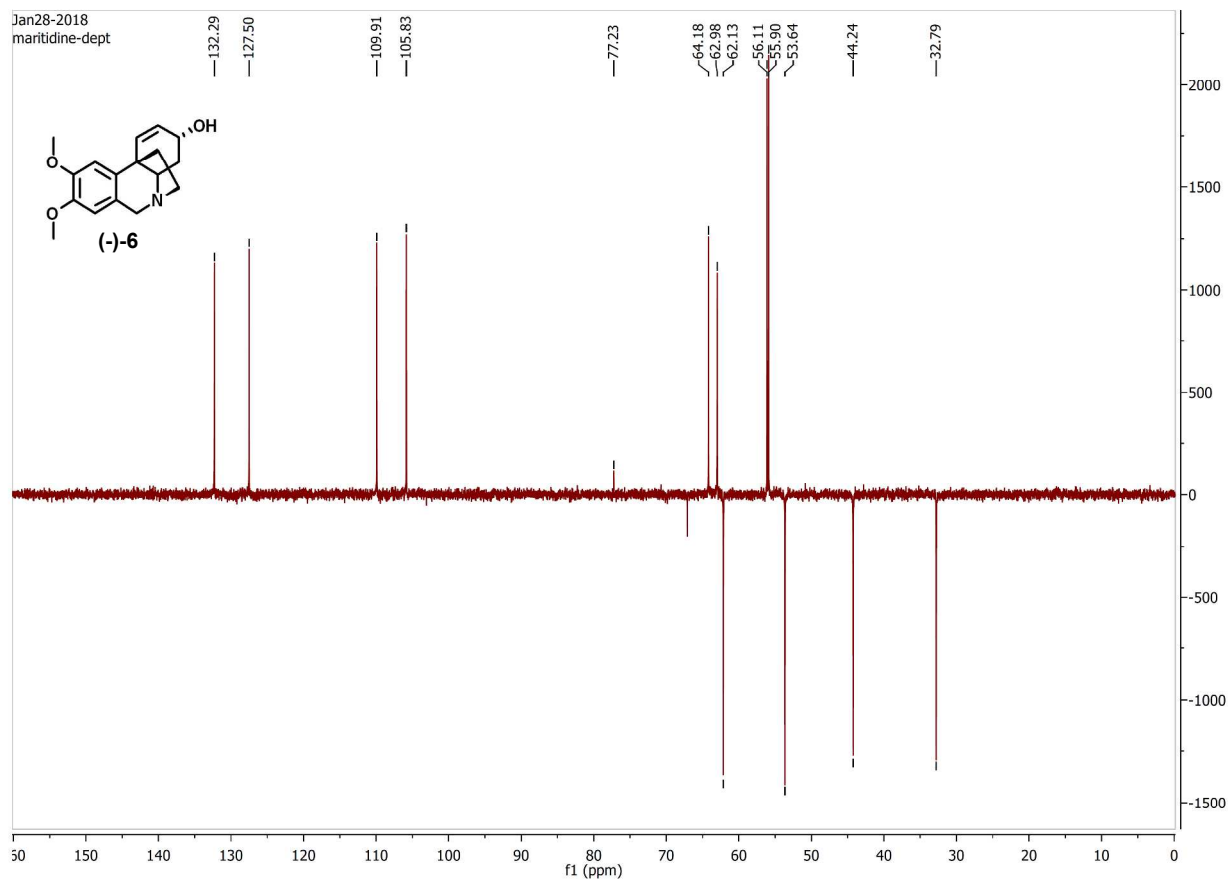


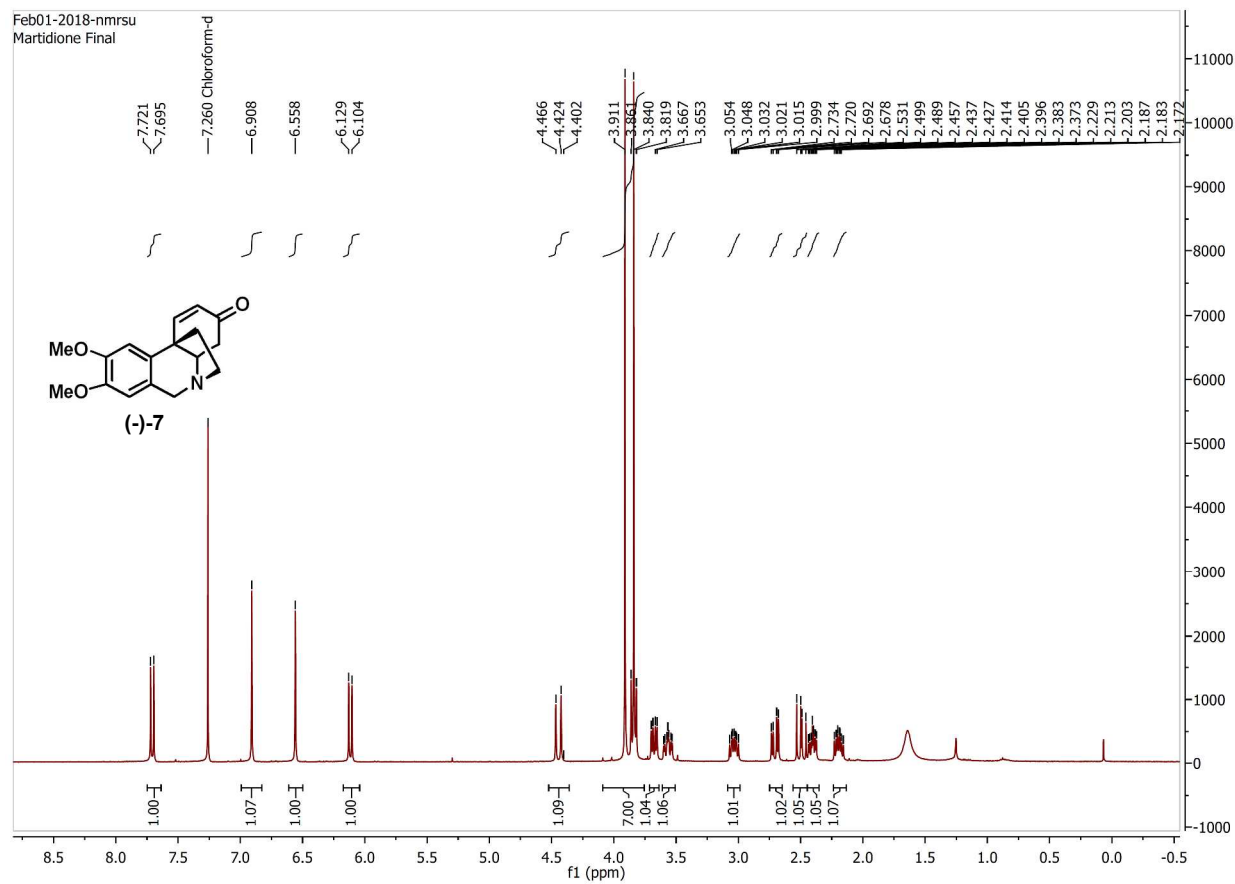
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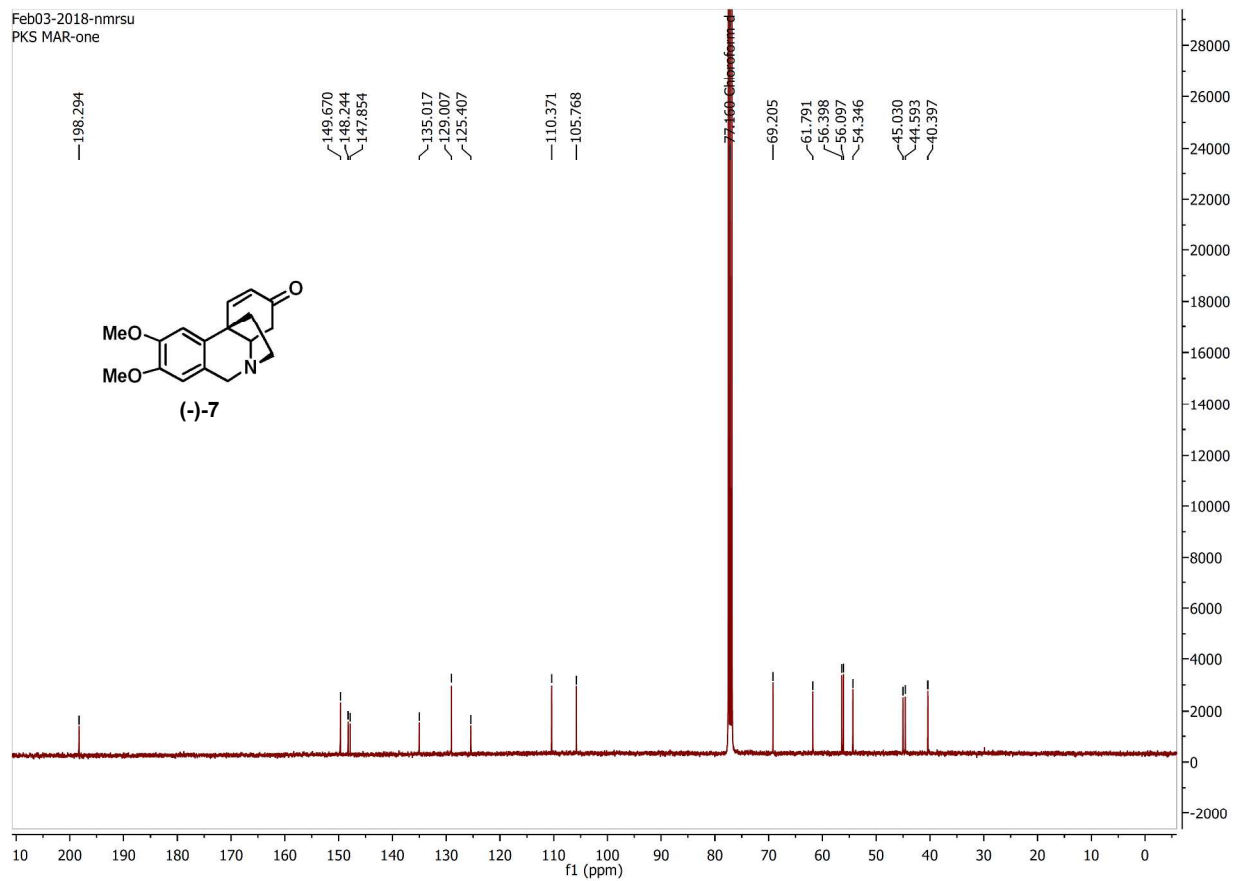


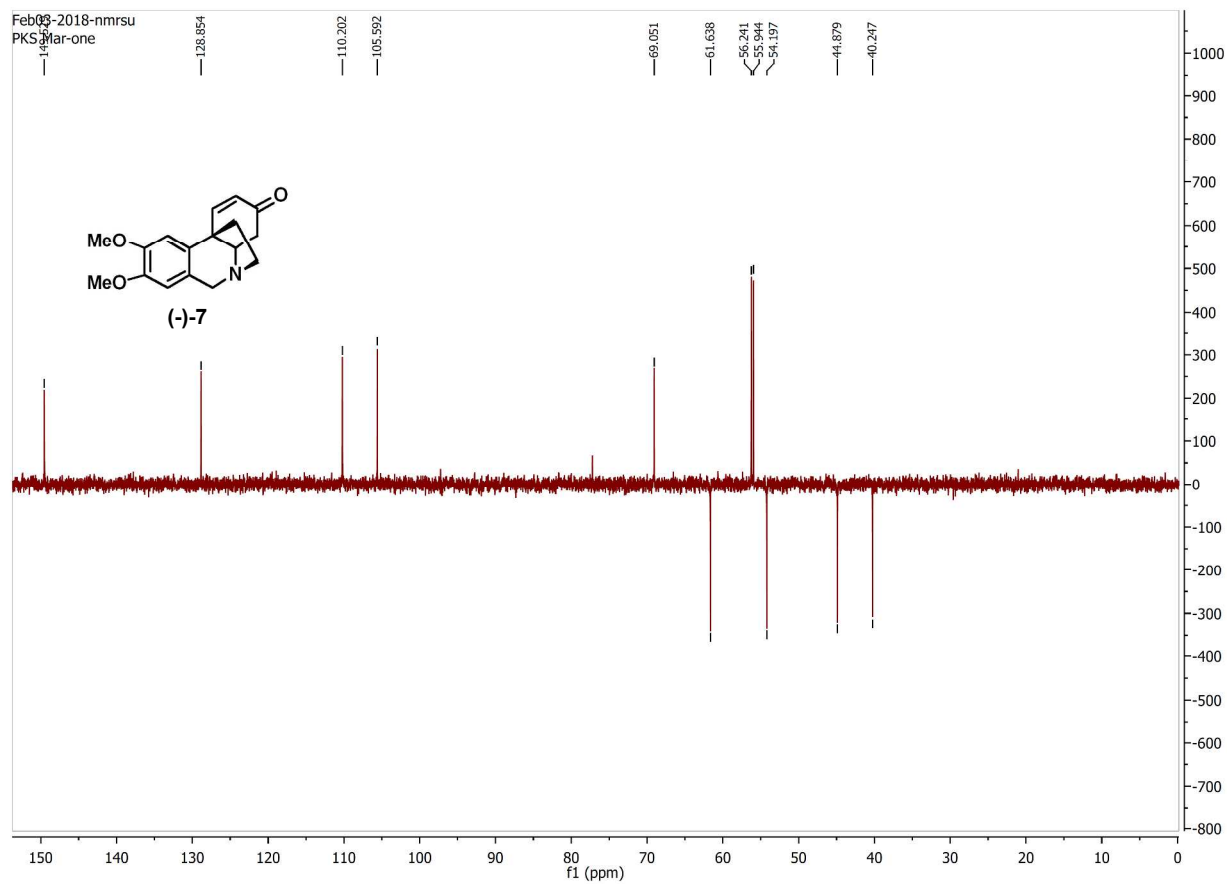
Jan28-2018
maritidine-13 C











References

- 1) a) Pandey, G.; Tiwari, S. K.; Singh, R. S.; Mali, R. S. A Short and Efficient Synthesis of Enantiopure (+)-*N*-Boc-7-azabicyclo[2.2.1]heptan-2-one Utilizing an Asymmetric Desymmetrization Protocol: Formal Total Synthesis of (-)-Epibatidine. *Tetrahedron Lett.*, **2001**, 42, 3947–3949; b) Pandey, G.; Rajender, S. A Temperature-Guided Diastereoselectivity Switch During the Desymmetrization of *meso*-7-Azabicyclo[2.2.1]heptadiene: New Strategy towards the Synthesis of Aminocyclitols. *Chem. Eur. J.*, **2011**, 17, 6304; c) Pandey, G.; Tiwari, K. N.; Puranik, V. G. Use of Enantiomerically Pure 7-Azabicyclo[2.2.1]heptan-2-ol as a Chiral Template for the Synthesis of Aminocyclitols. *Org. Lett.*, **2008**, 10, 3611–3614.
- 2) Chandra, A.; Verma, P.; Nigel, A.; Pandey, G. Asymmetric Total Synthesis of (-)-Gracilamine Using a Bioinspired Approach. *Eur. J. Org. Chem.*, **2017**, 6788–6792.