

Supplementary Material

Fast Ga(OTf)₃-catalyzed nucleophilic substitution of propargyl alcohols

Huili Liu, Yun Jin, and Shunji Zhang*

*College of Chemistry and Materials Science, Huaibei Normal University, Huaibei,
235000, P.R. China*

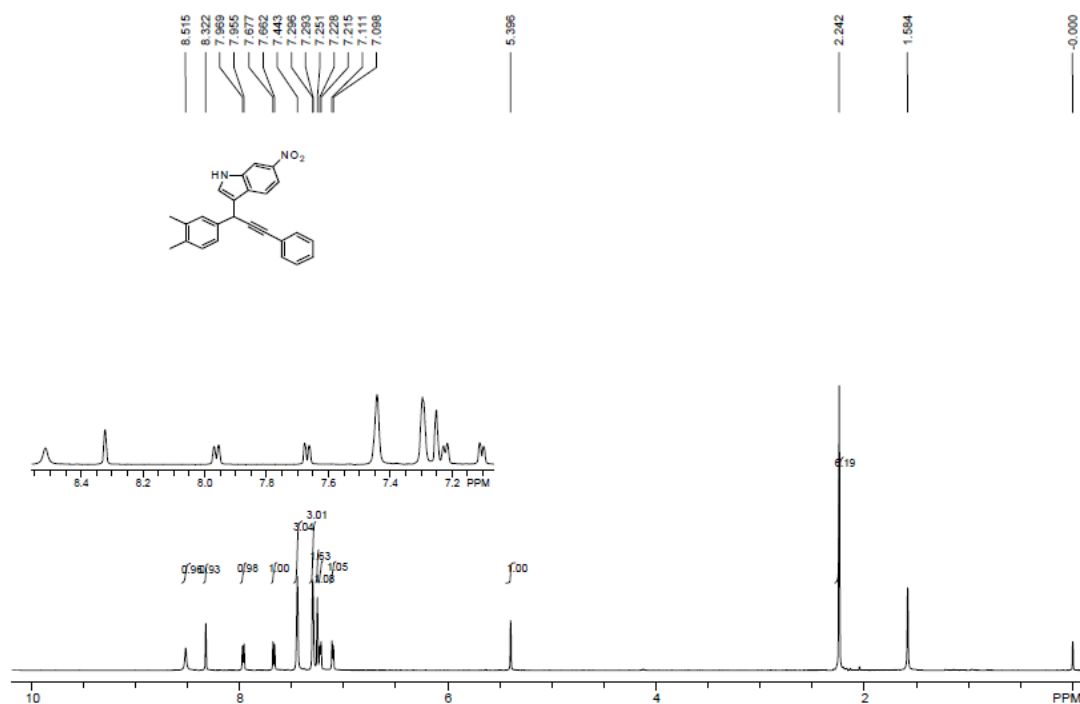
Email: sjzhang@chnu.edu.cn

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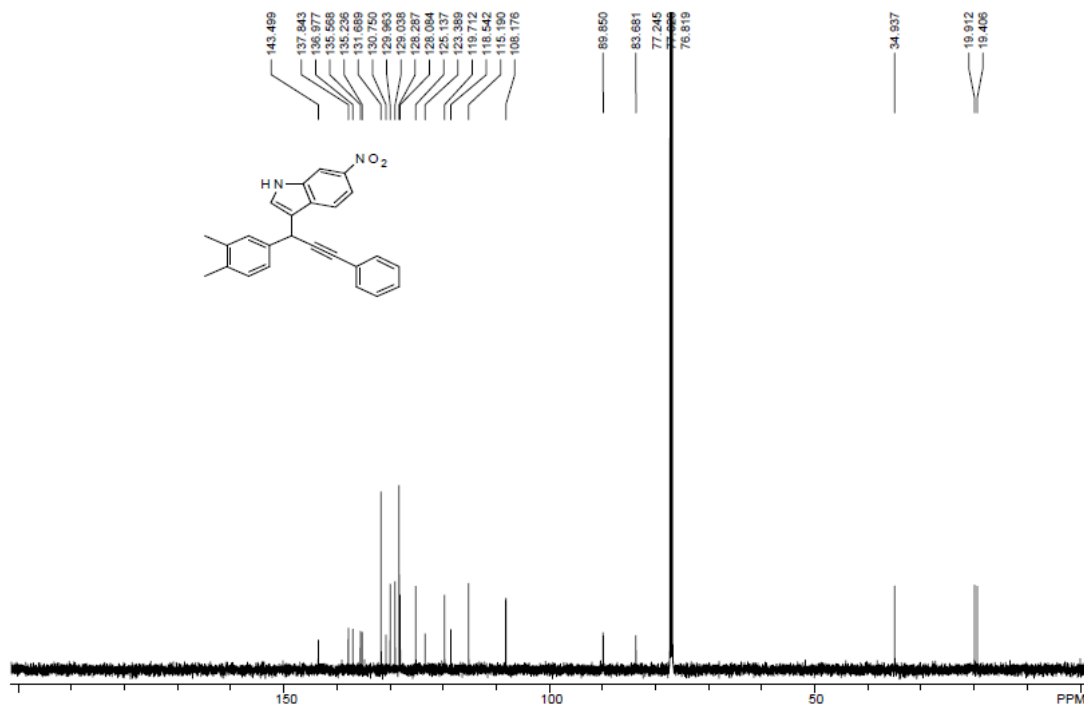
¹ H-NMR, ¹³ C-NMR and HRMS spectra	S2
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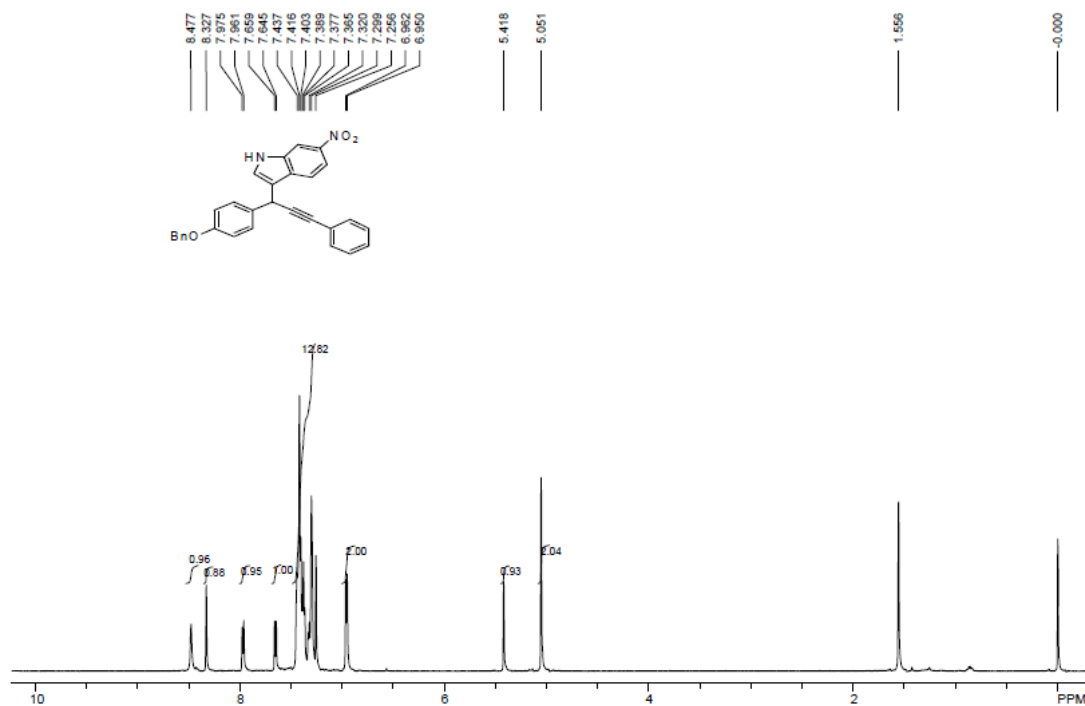
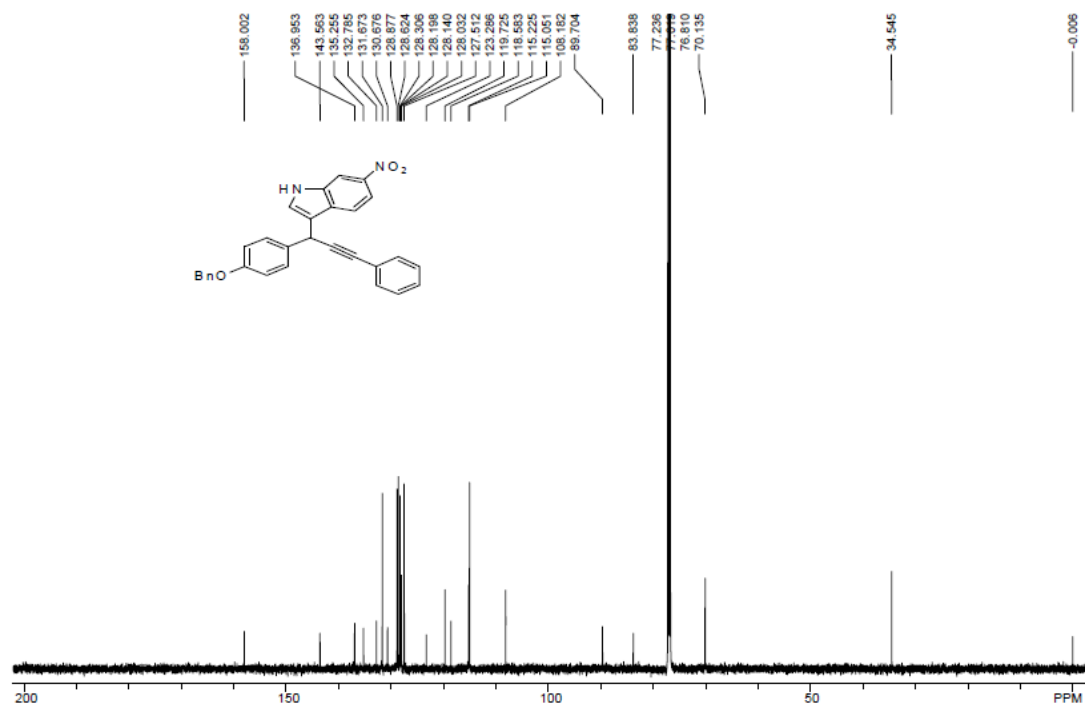
NMR Spectrum

^1H NMR Spectrum of 3-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)-6-nitro-1*H*-indole **2a**

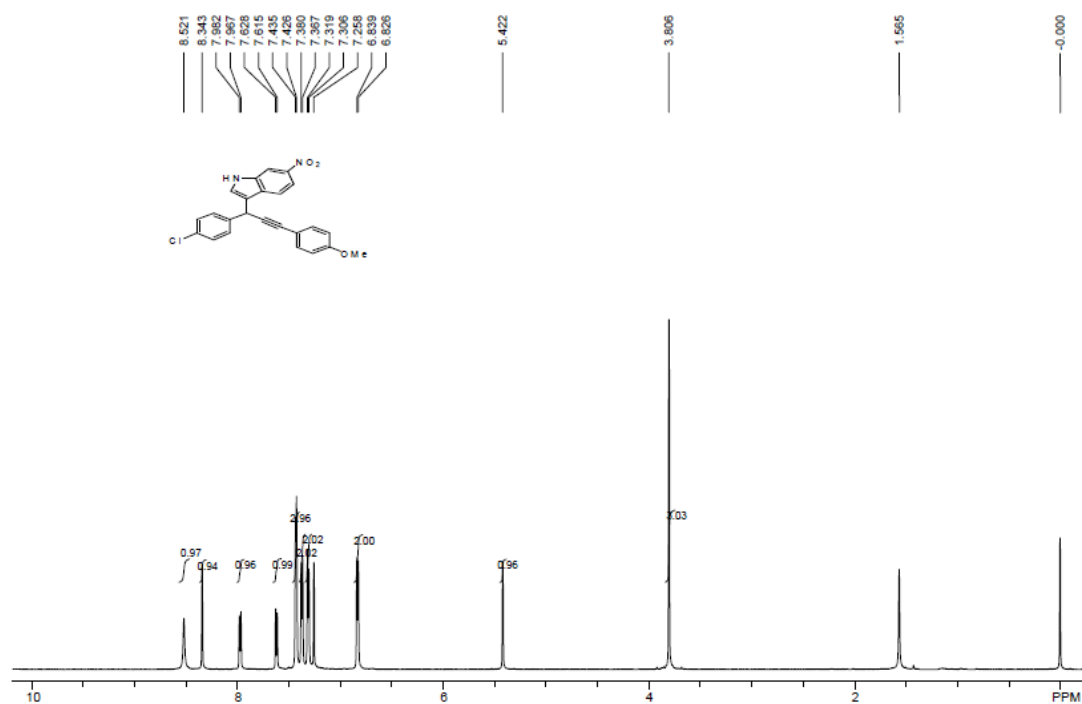


^{13}C NMR Spectrum of 3-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)-6-nitro-1*H*-indole **2a**

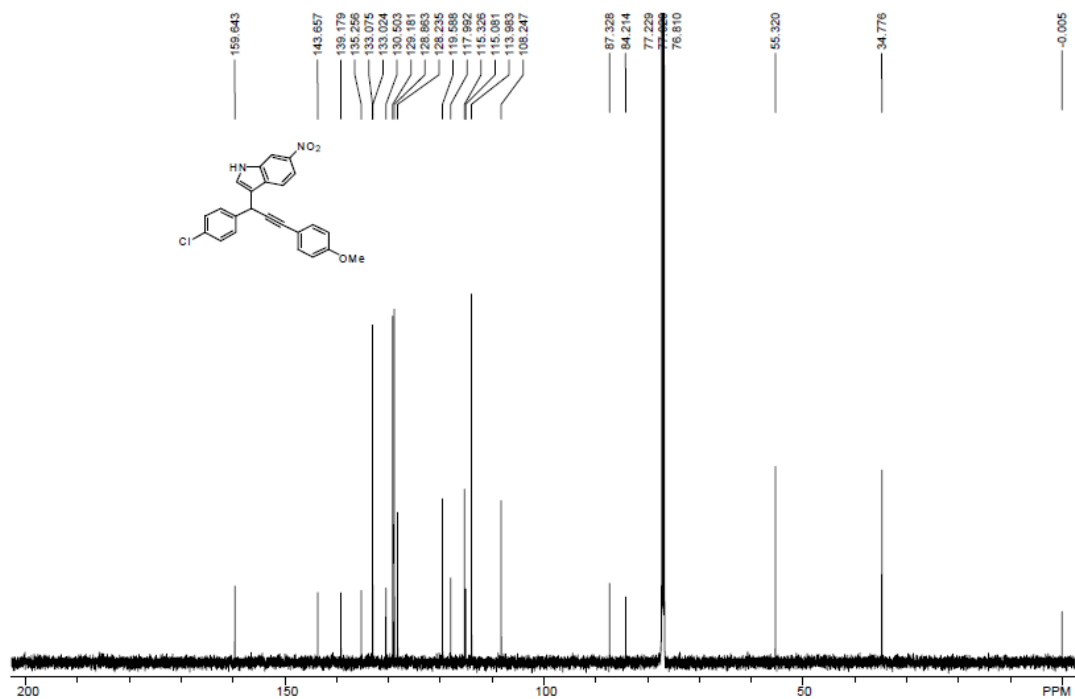


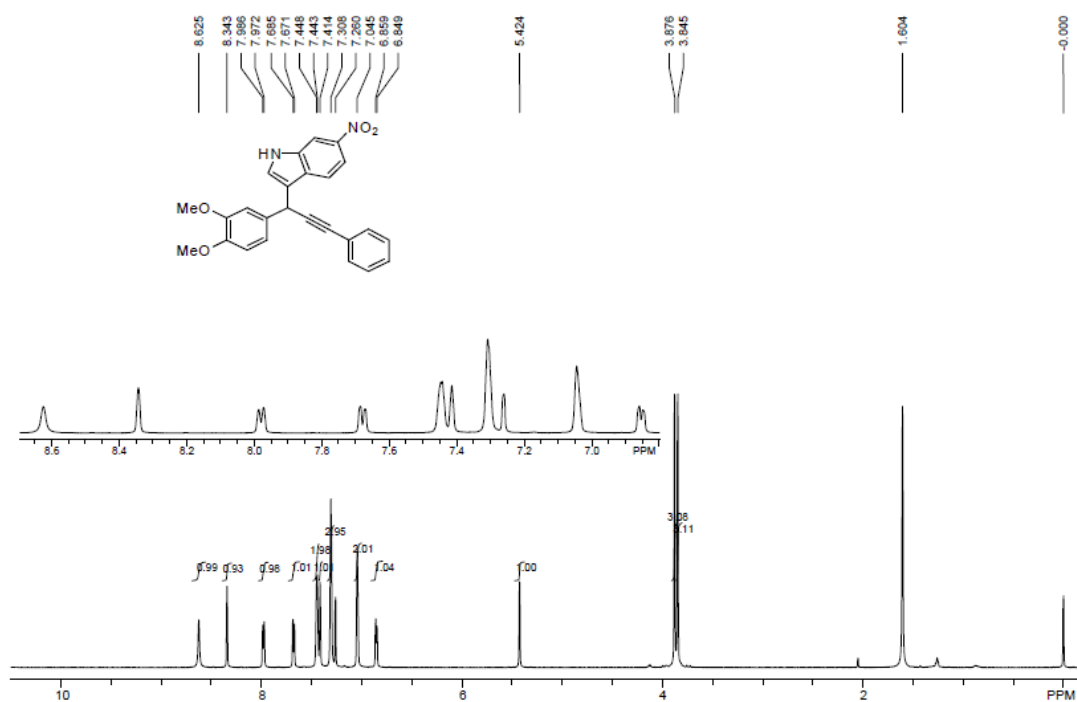
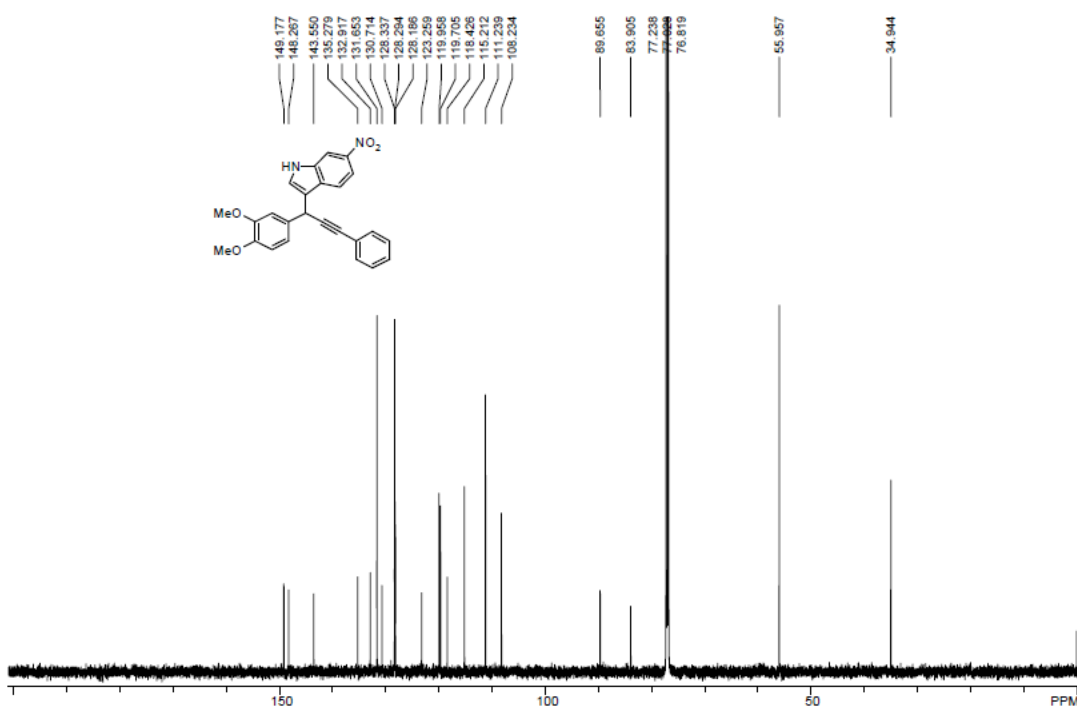
^1H NMR Spectrum of 3-(1-(4-(benzyloxy)phenyl)-3-phenylprop-2-yn-1-yl)-6-nitro-1*H*-indole **2b** ^{13}C NMR Spectrum of 3-(1-(4-(benzyloxy)phenyl)-3-phenylprop-2-yn-1-yl)-6-nitro-1*H*-indole **2b**

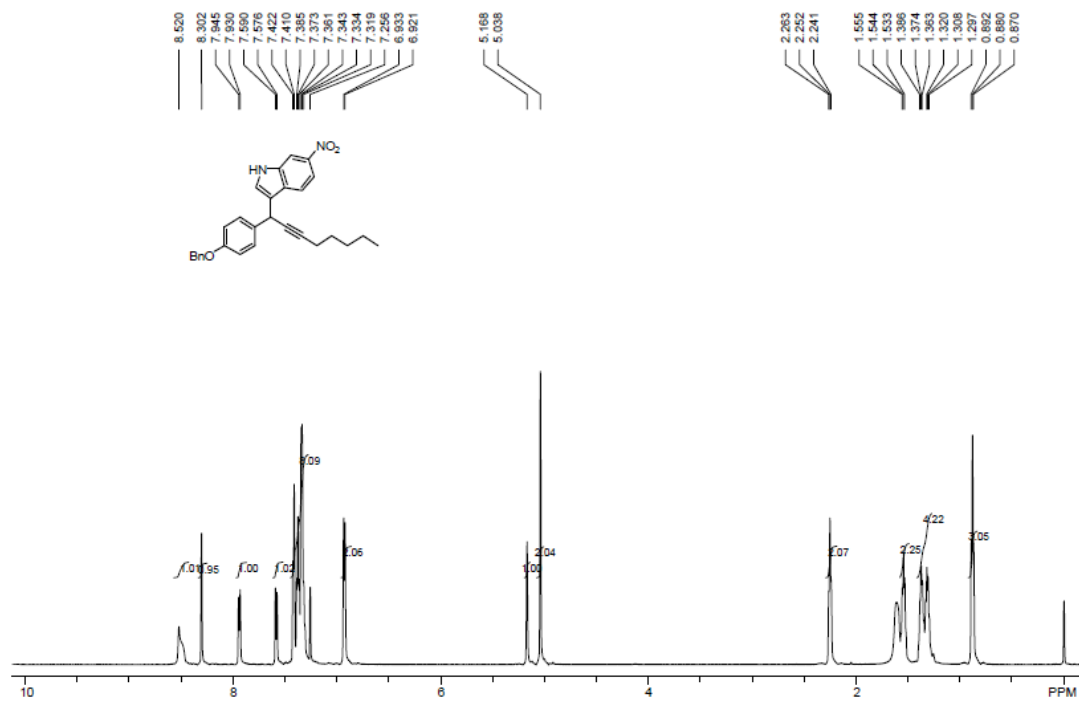
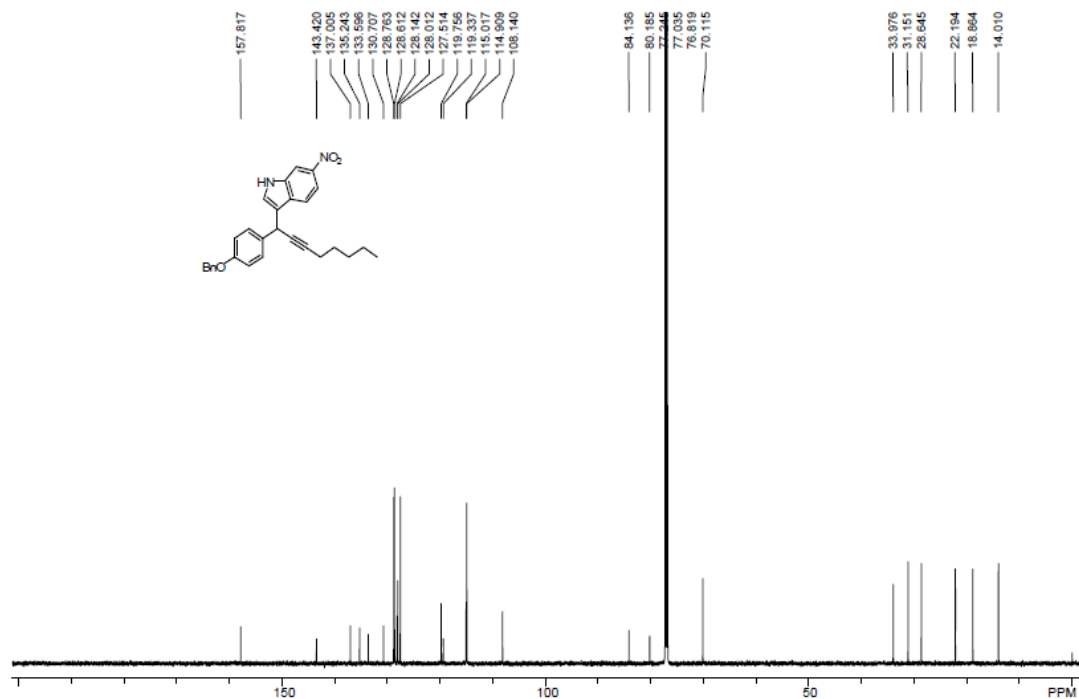
^1H NMR Spectrum of
3-(1-(4-chlorophenyl)-3-(4-methoxyphenyl)prop-2-yn-1-yl)-6-nitro-1*H*-indole **2c**

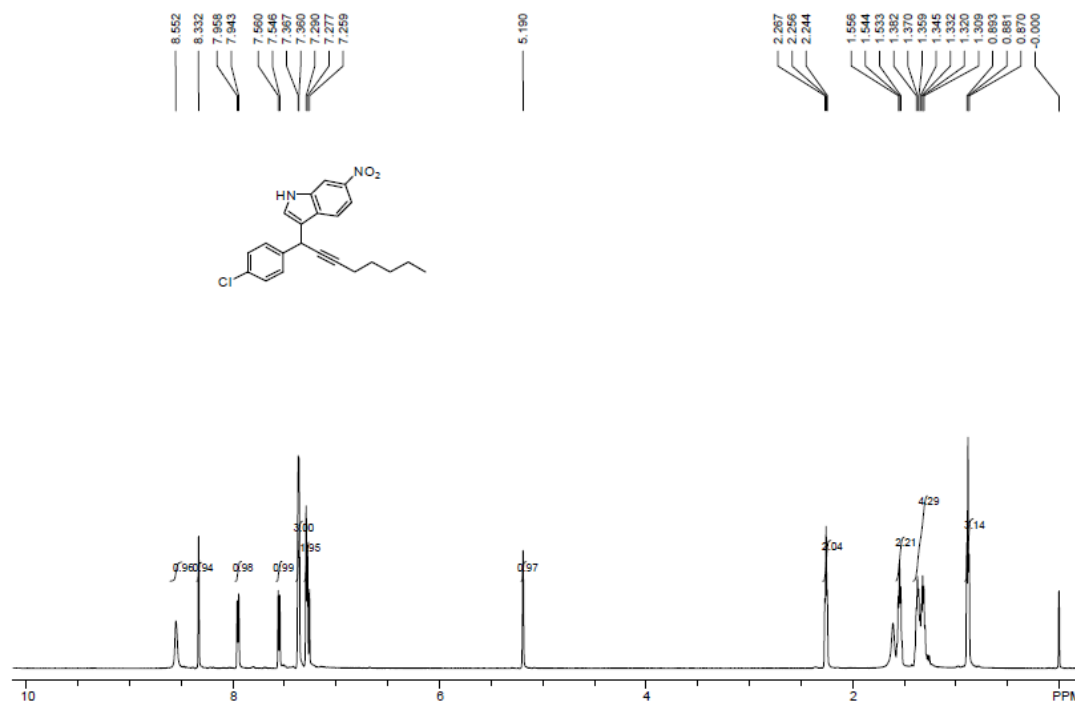
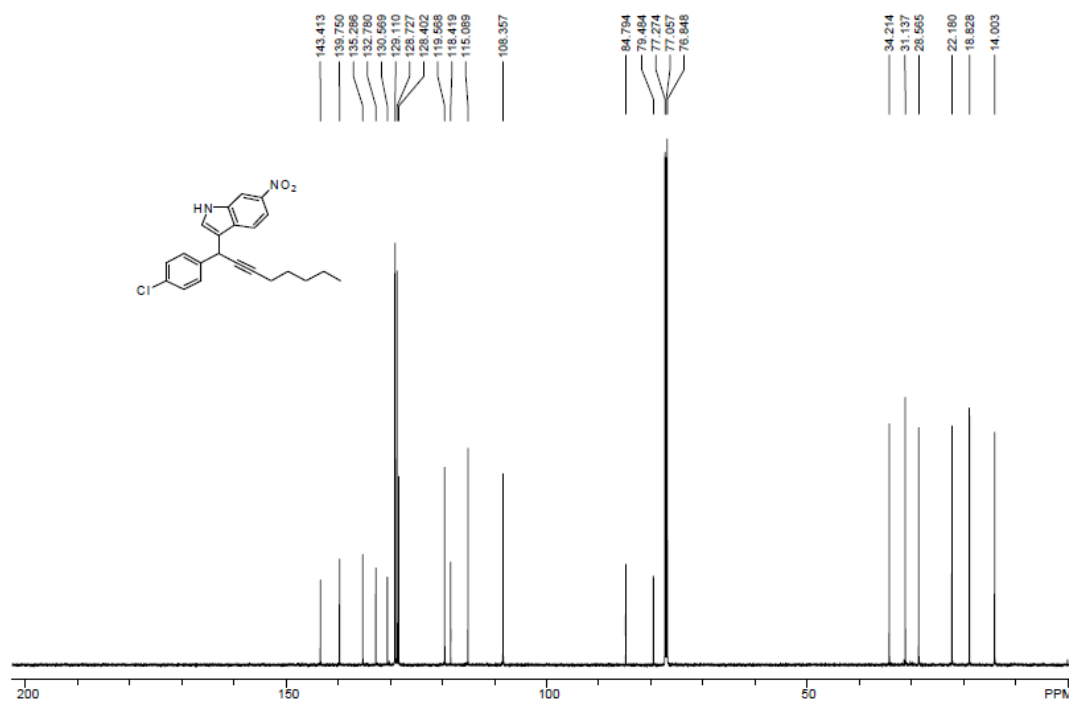


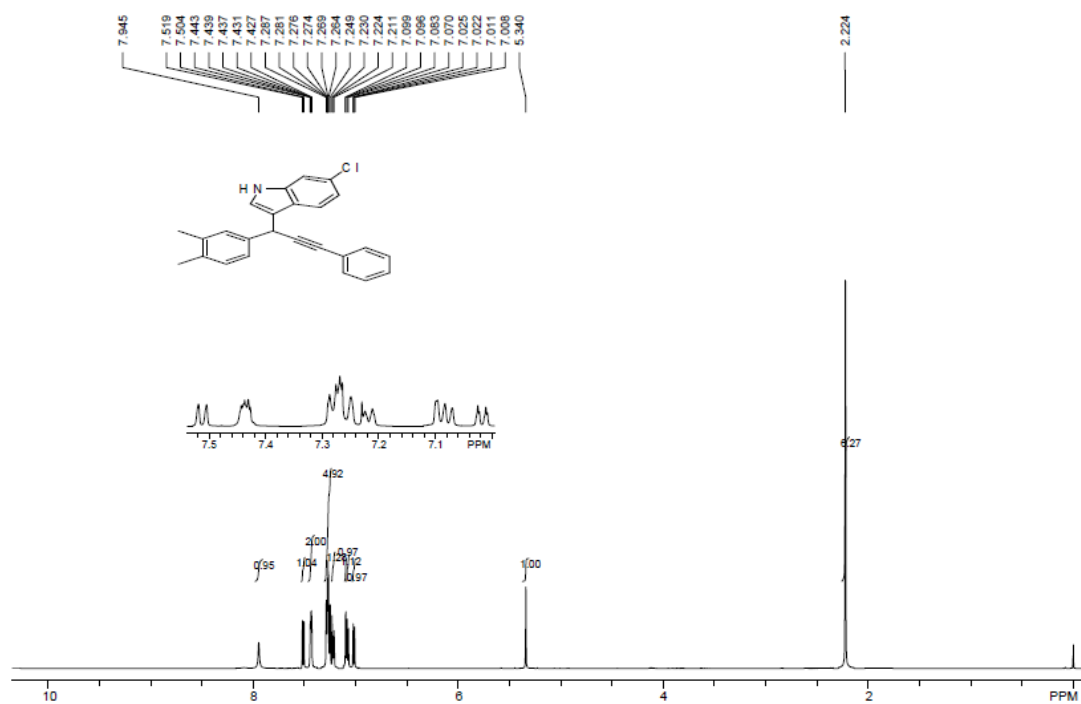
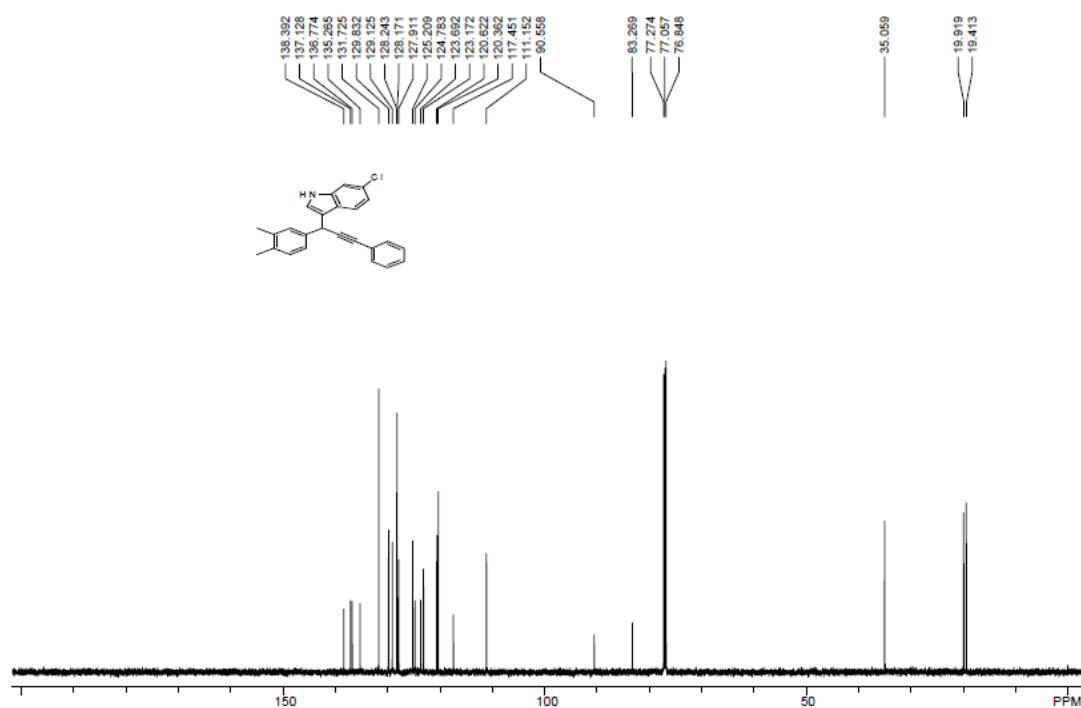
^{13}C NMR Spectrum of
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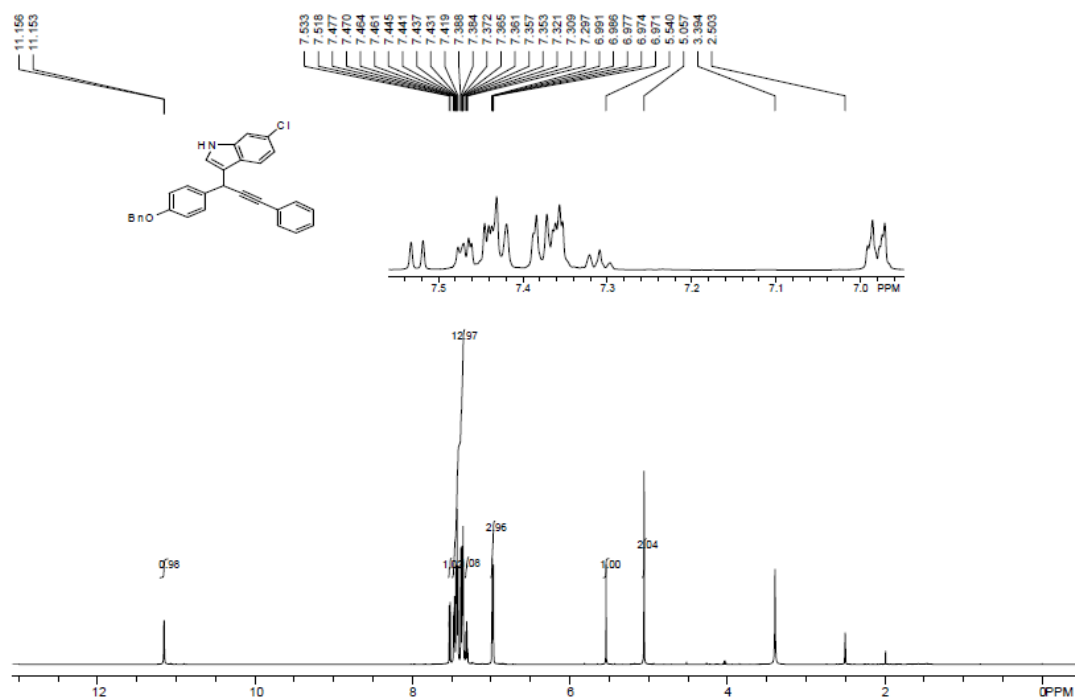
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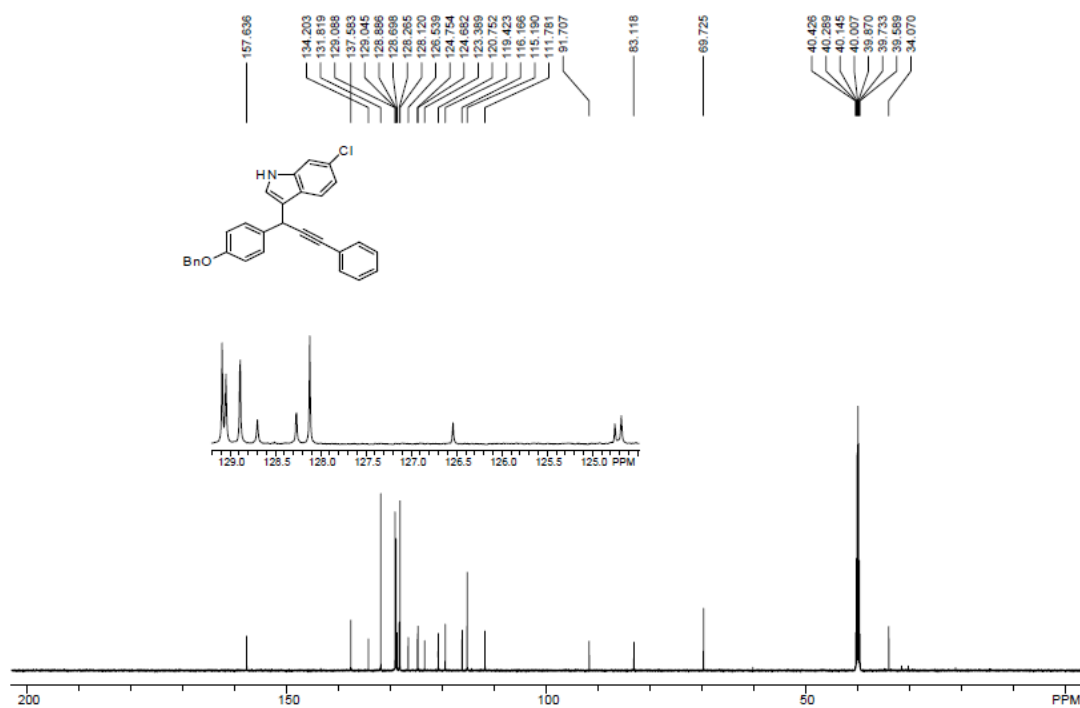
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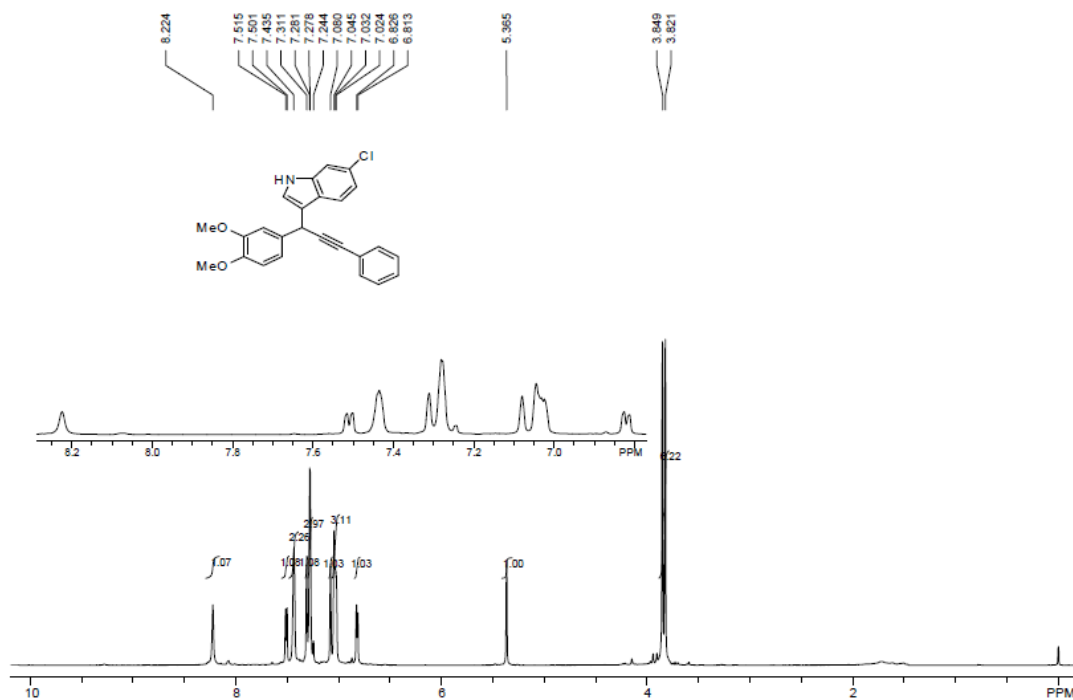
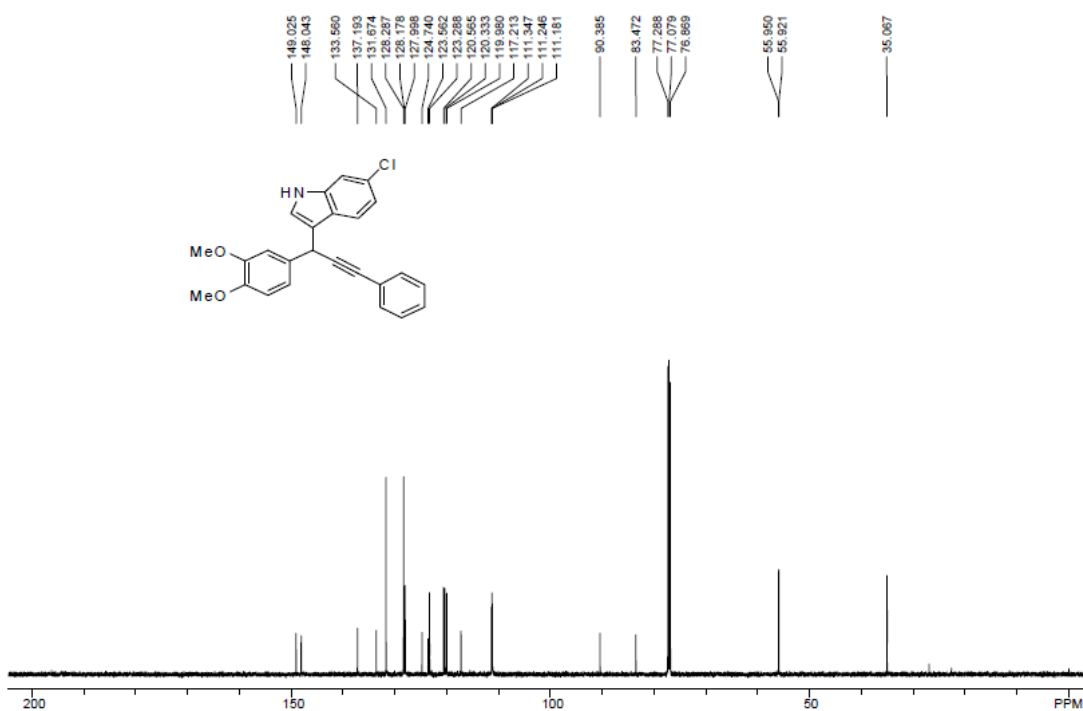
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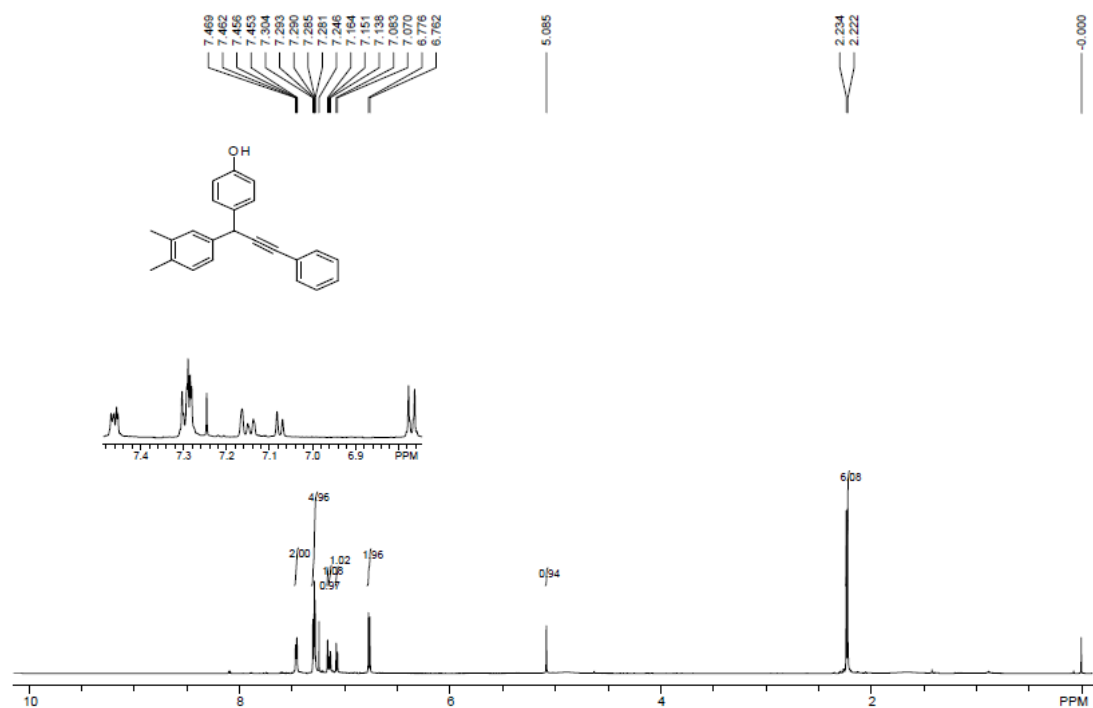
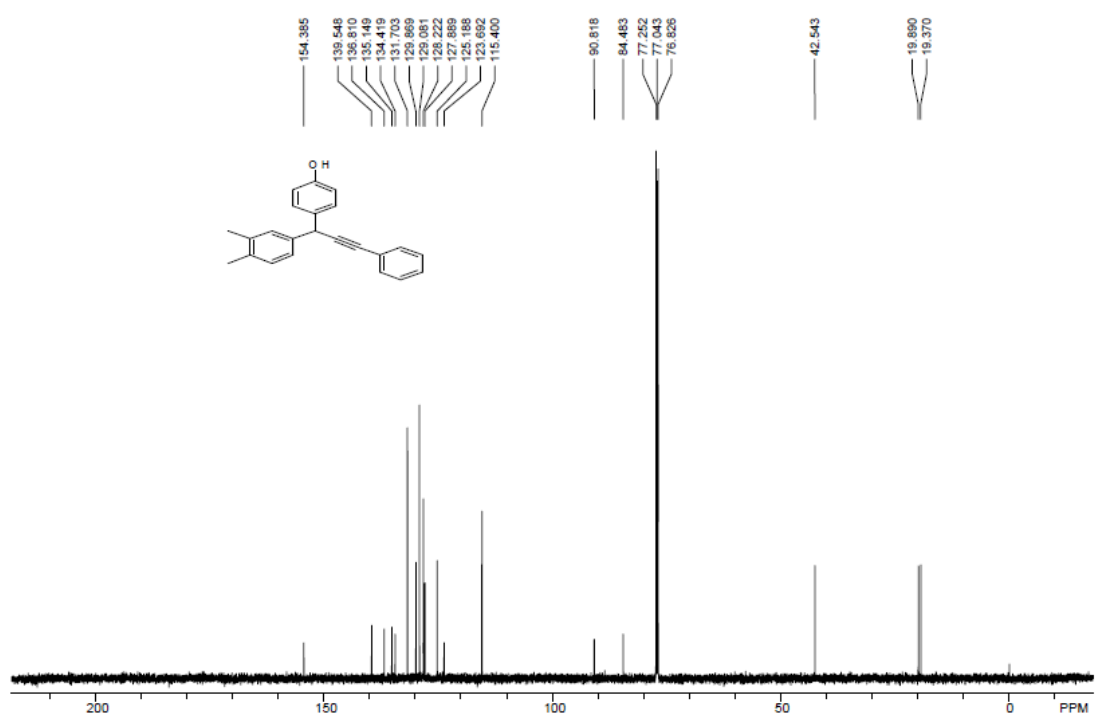


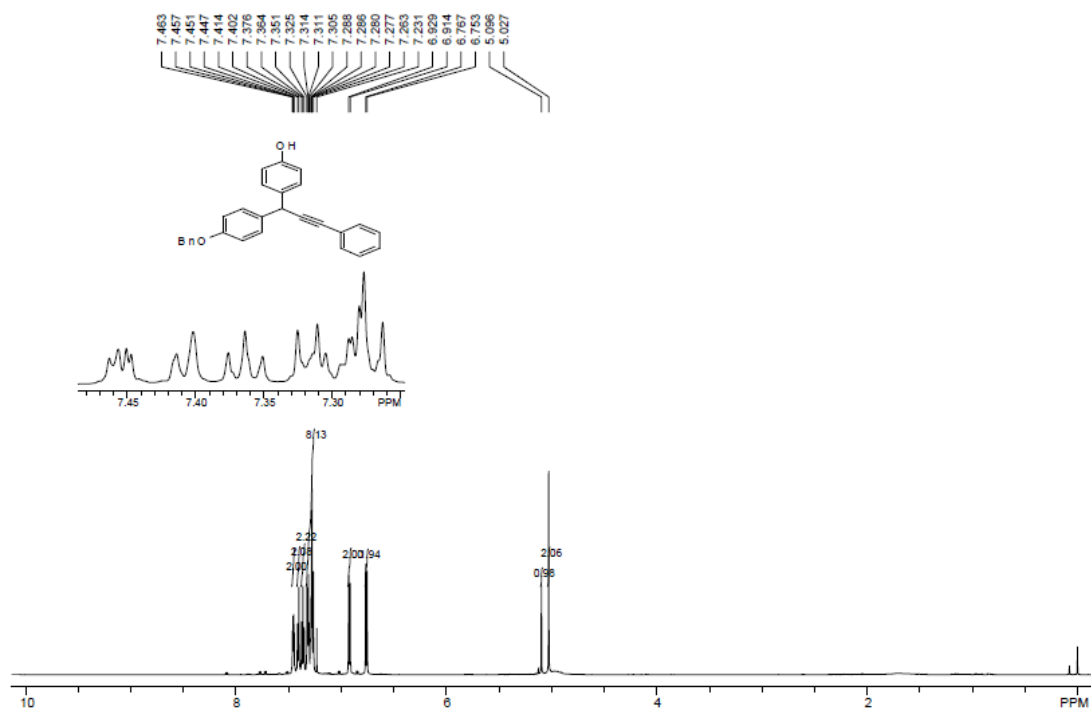
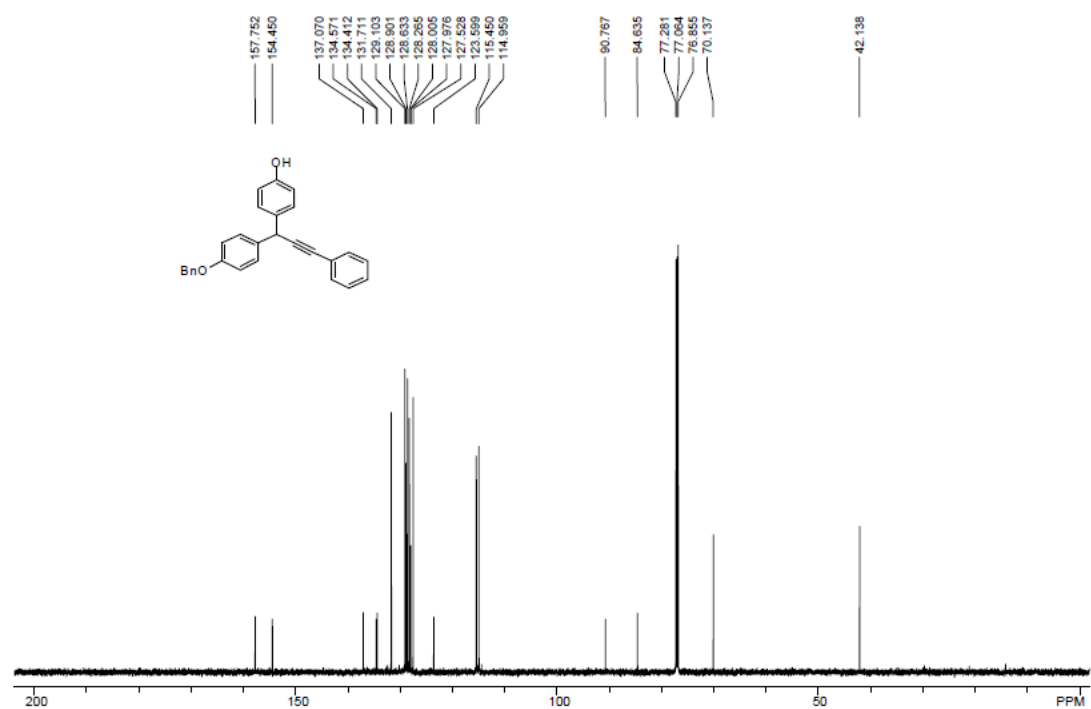
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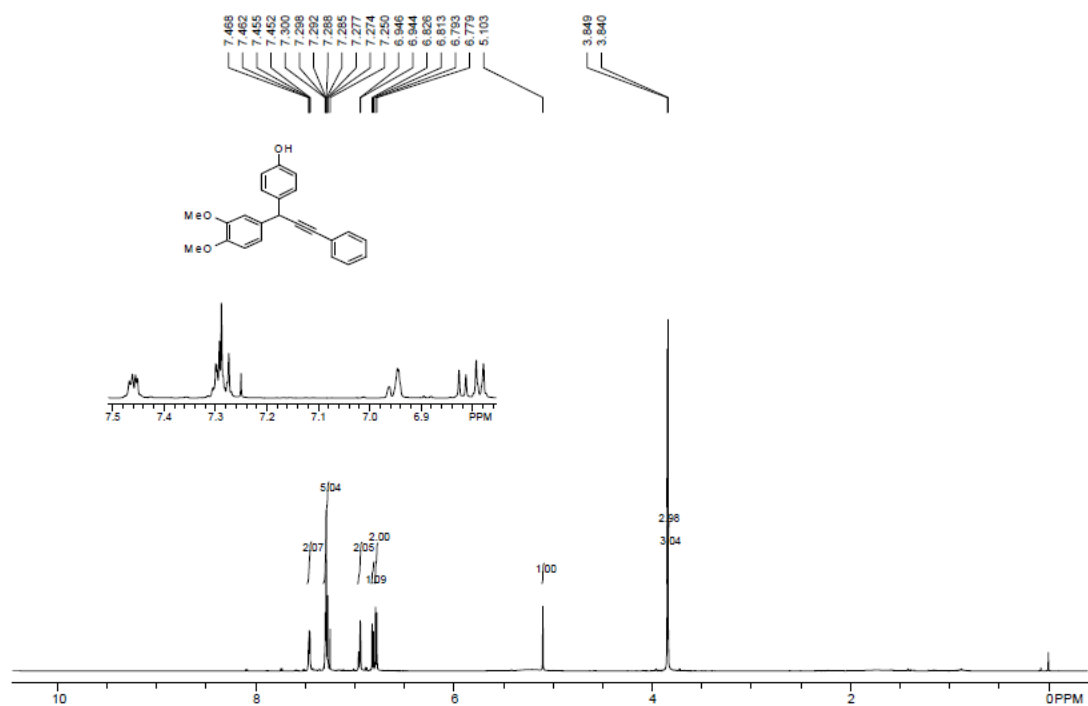
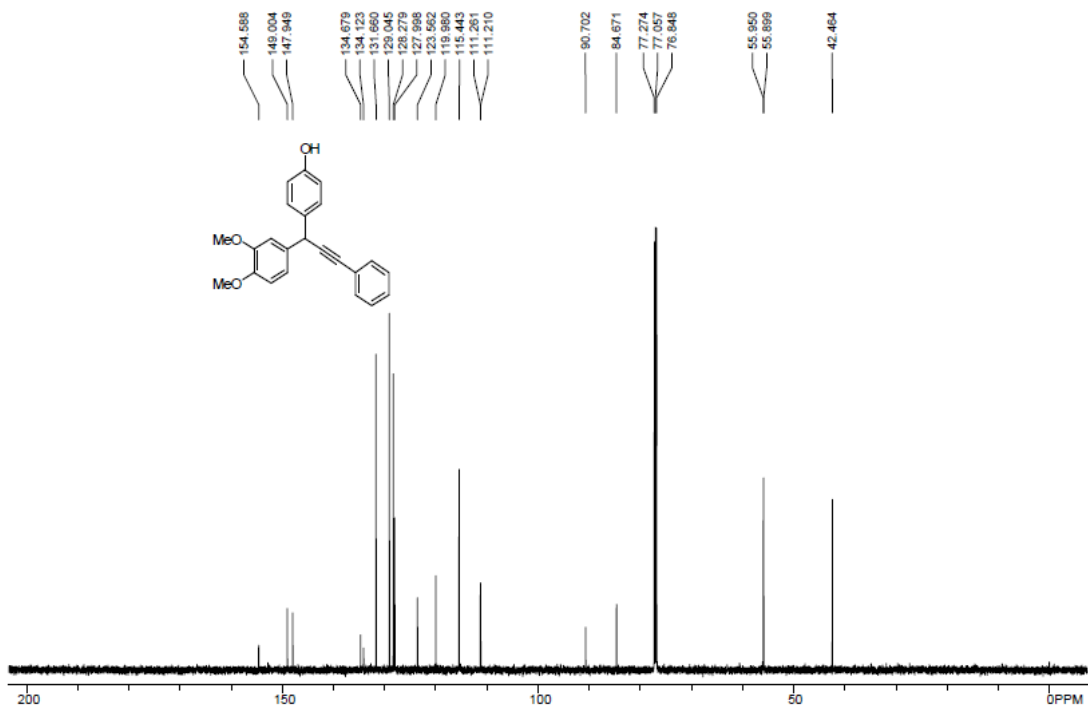
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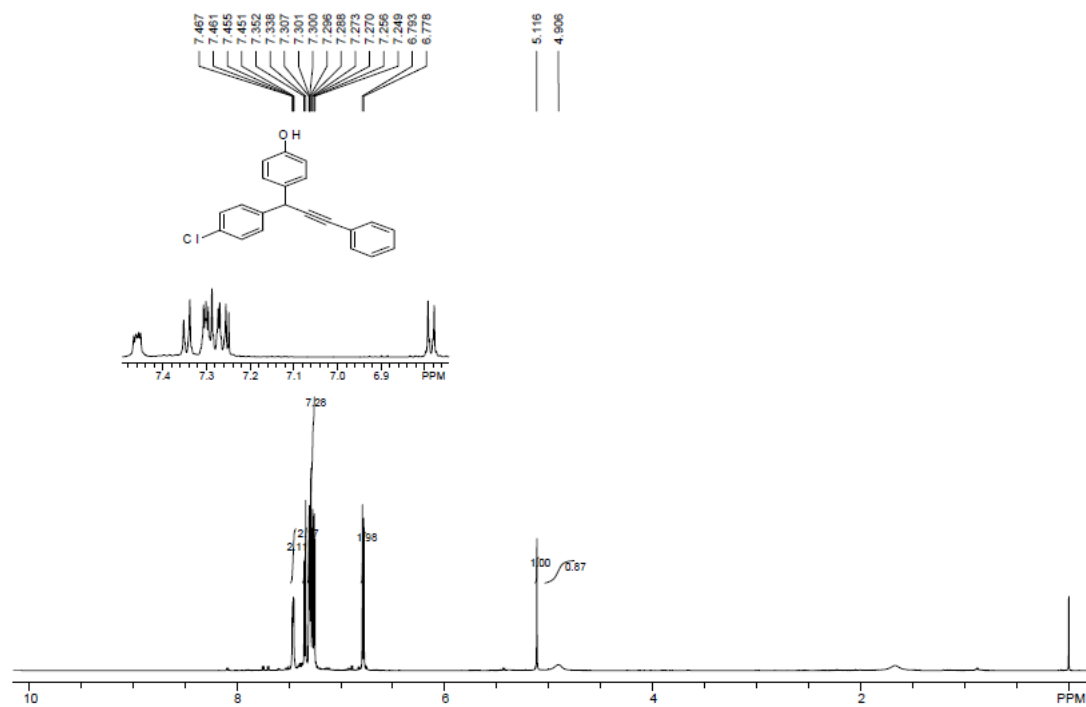
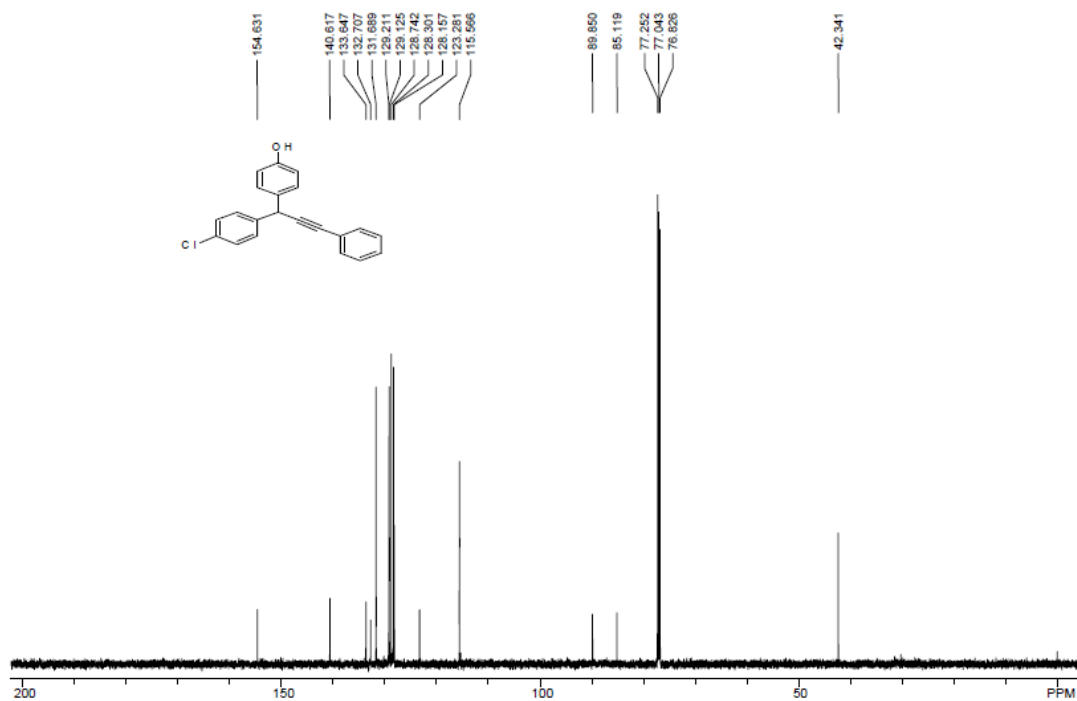


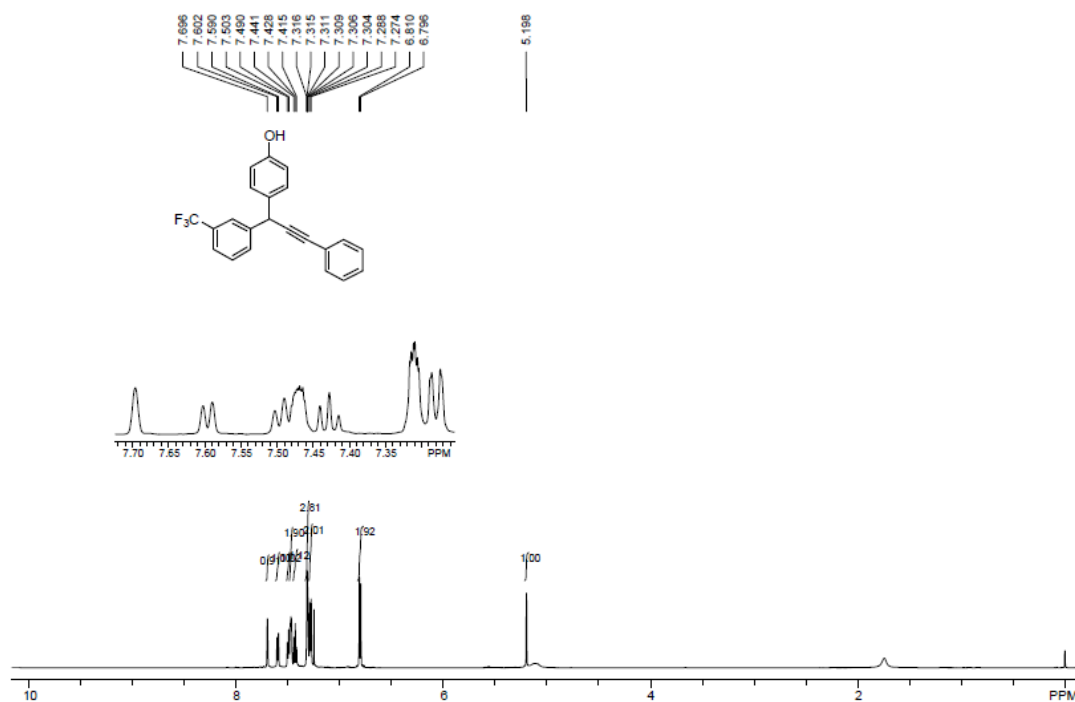
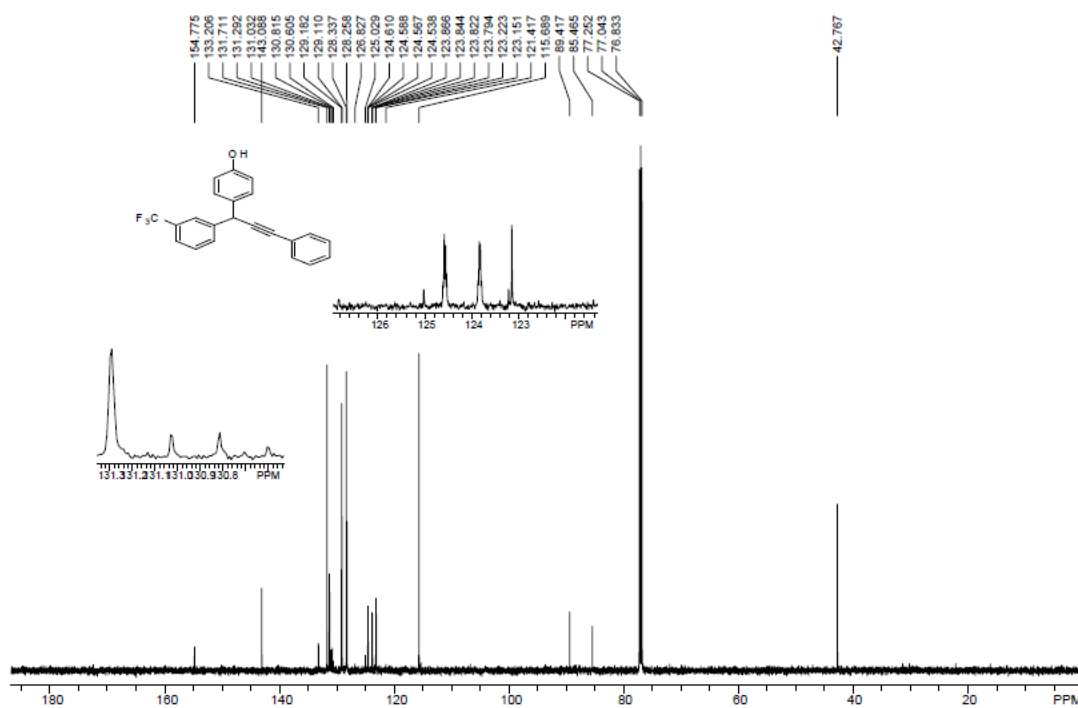
^1H NMR Spectrum of 6-chloro-3-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)-1*H*-indole **2i** ^{13}C NMR Spectrum of 6-chloro-3-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)-1*H*-indole**2i**

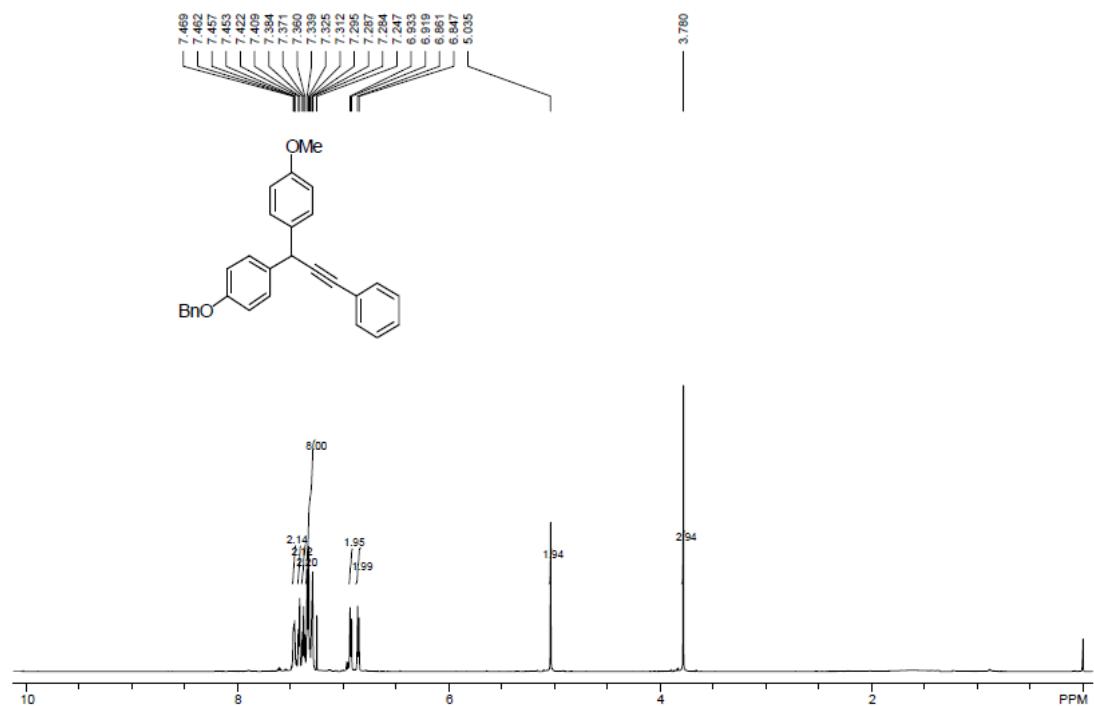
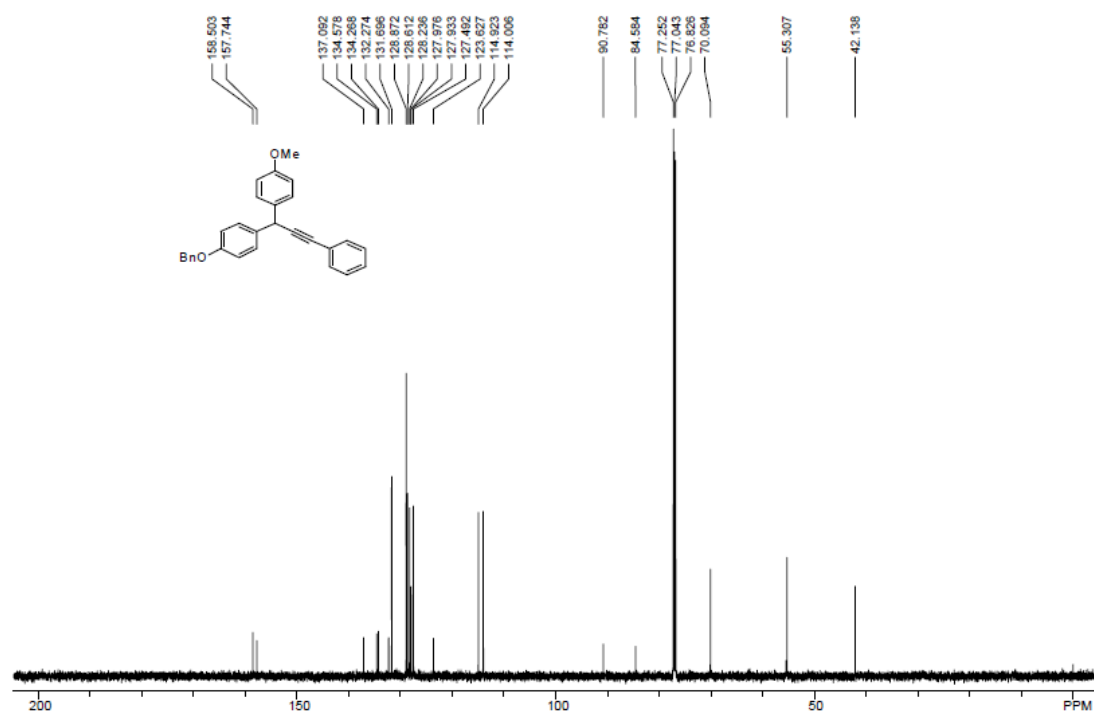
¹H NMR Spectrum of 4-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)phenol **2j**¹³C NMR Spectrum of 4-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)phenol **2j**

¹H NMR Spectrum of 4-(1-(4-(benzyloxy)phenyl)-3-phenylprop-2-yn-1-yl)phenol **2k**¹³C NMR Spectrum of 4-(1-(4-(benzyloxy)phenyl)-3-phenylprop-2-yn-1-yl)phenol **2k**

¹H NMR Spectrum of 4-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)phenol **21**¹³C NMR Spectrum of 4-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)phenol **21**

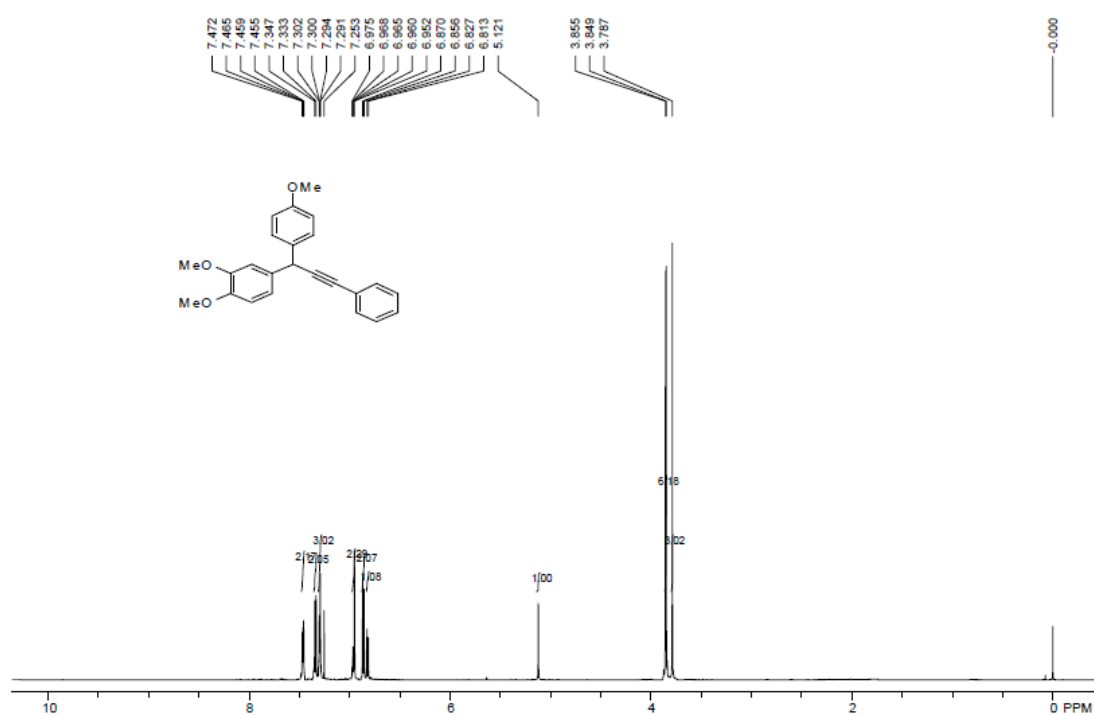
¹H NMR Spectrum of 4-(1-(4-chlorophenyl)-3-phenylprop-2-yn-1-yl)phenol **2m**¹³C NMR Spectrum of 4-(1-(4-chlorophenyl)-3-phenylprop-2-yn-1-yl)phenol **2m**

¹H NMR Spectrum of 4-(3-phenyl-1-(3-(trifluoromethyl)phenyl)prop-2-yn-1-yl)phenol **2n**¹³C NMR Spectrum of 4-(3-phenyl-1-(3-(trifluoromethyl)phenyl)prop-2-yn-1-yl)phenol **2n**

¹H NMR Spectrum of 1-(benzyloxy)-4-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)benzene **2o**¹³C NMR Spectrum of 1-(benzyloxy)-4-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)benzene **2o**

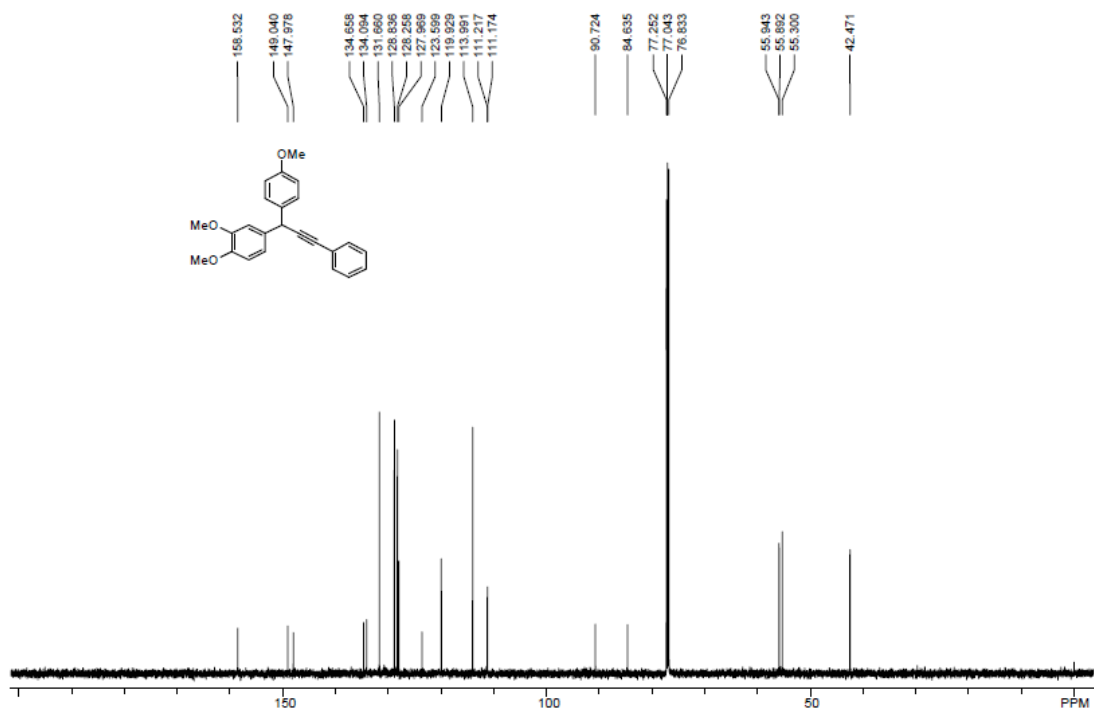
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2p



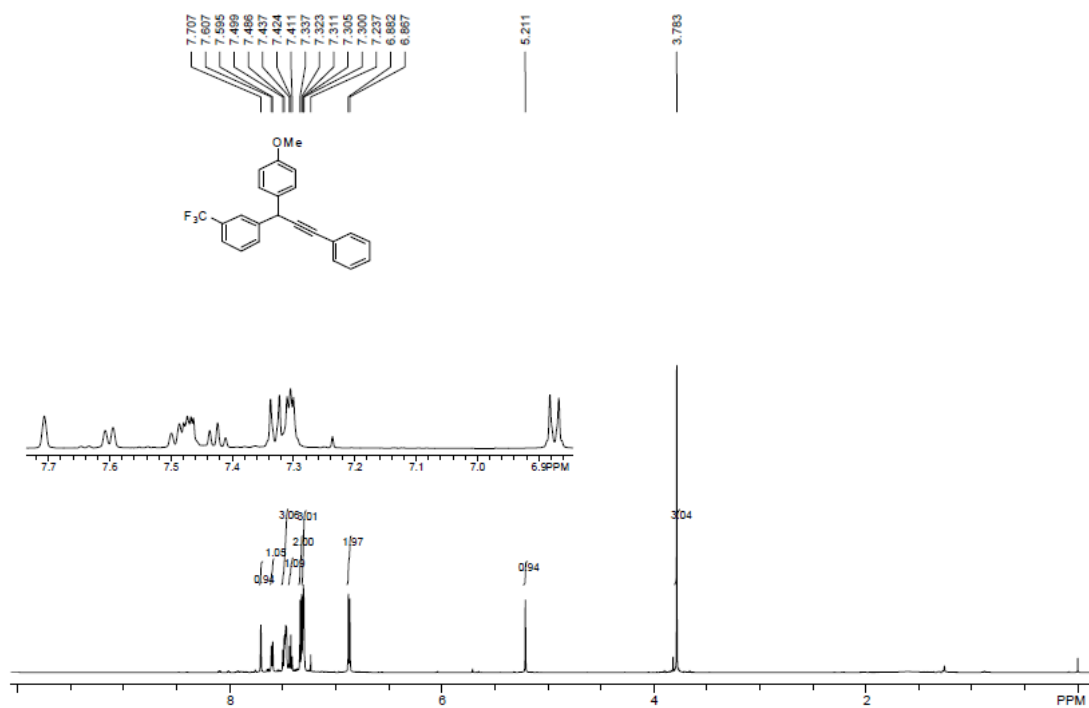
¹³C NMR Spectrum of 1,2-dimethoxy-4-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)benzene

2p



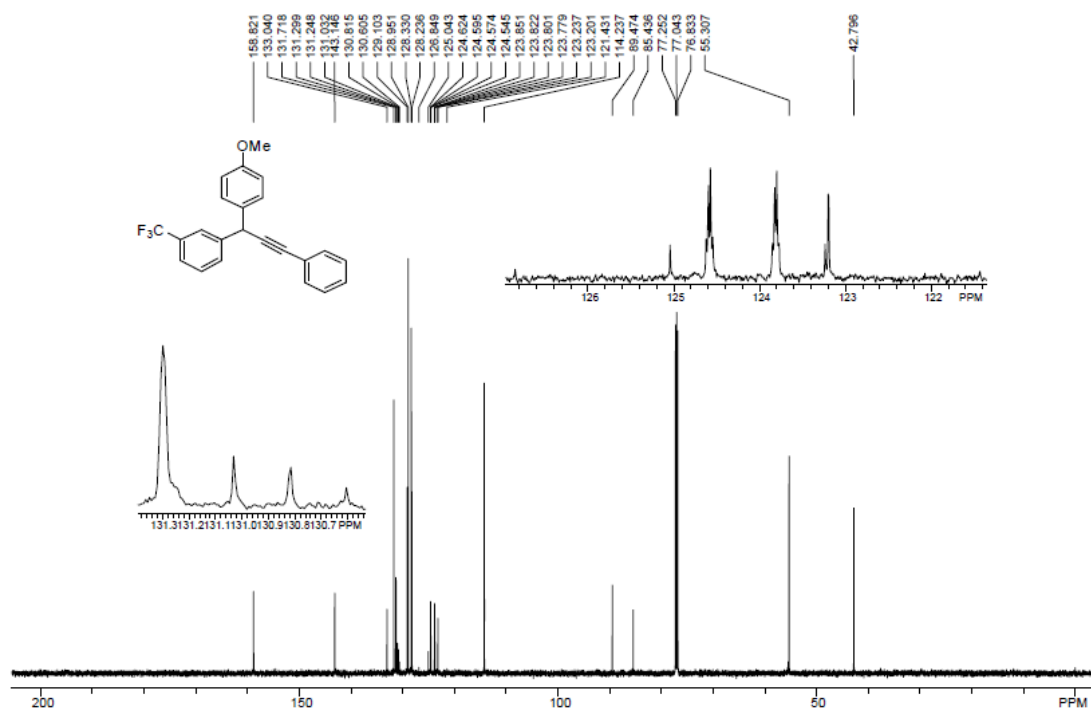
^1H NMR Spectrum of

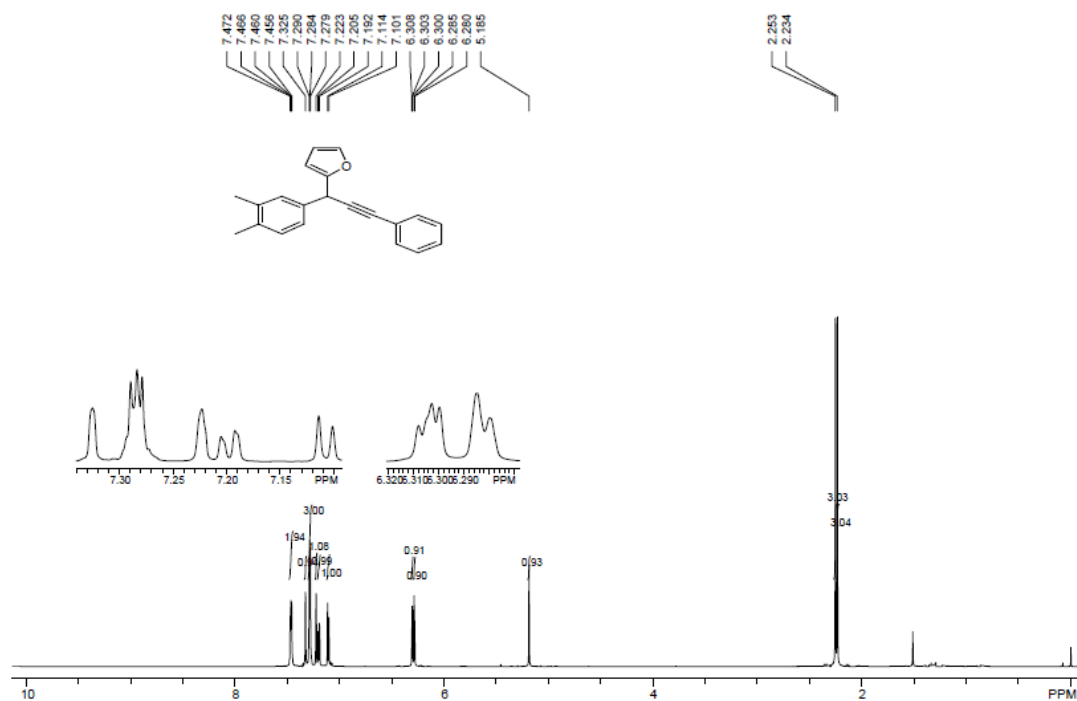
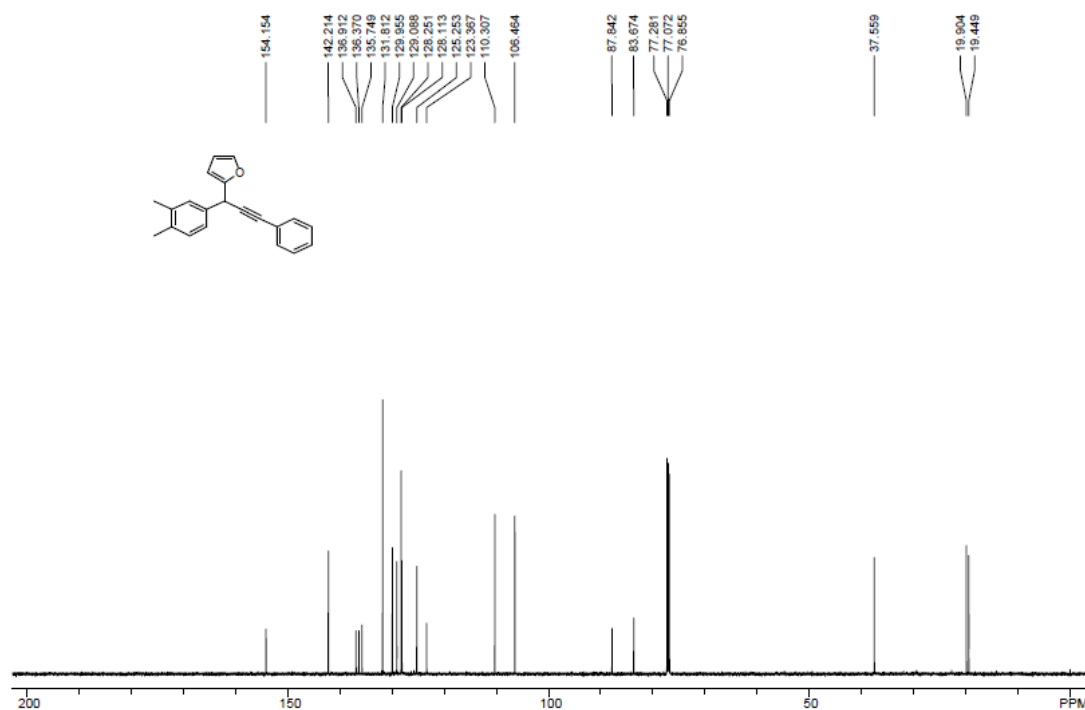
1-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)-3-(trifluoromethyl)benzene **2q**

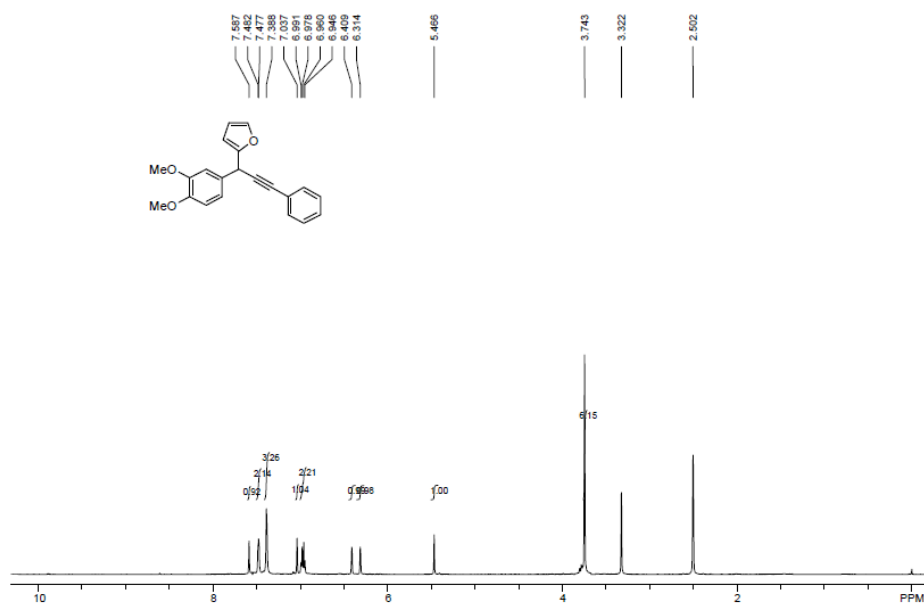
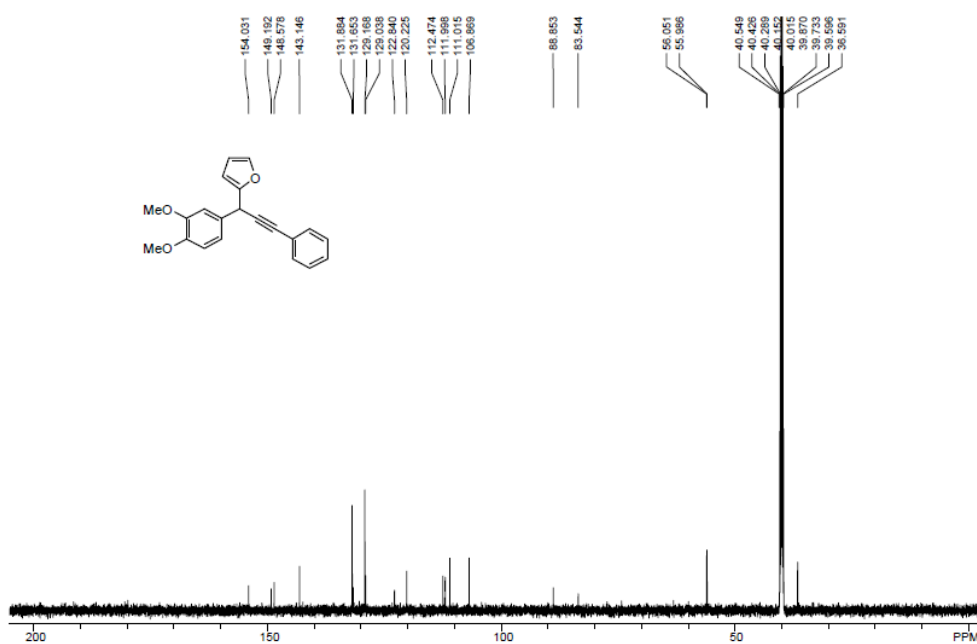


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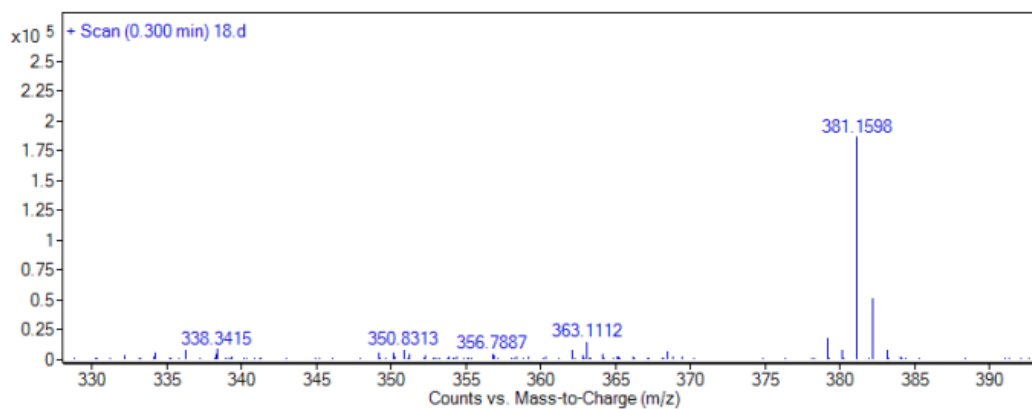
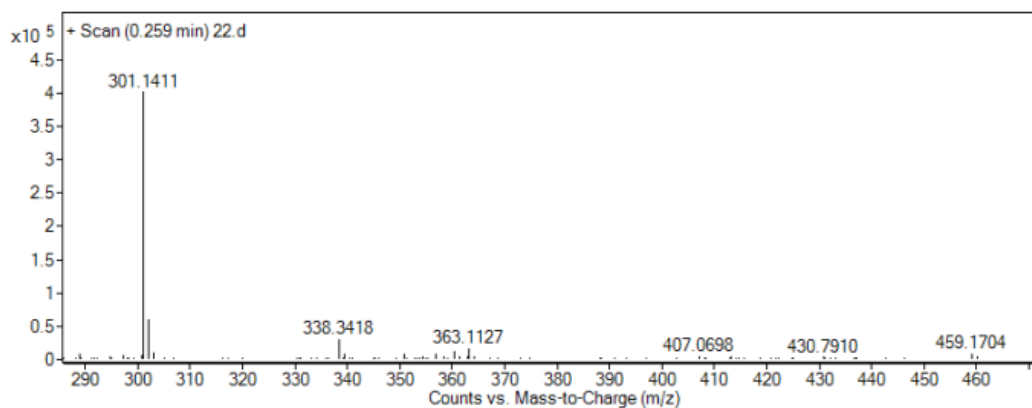
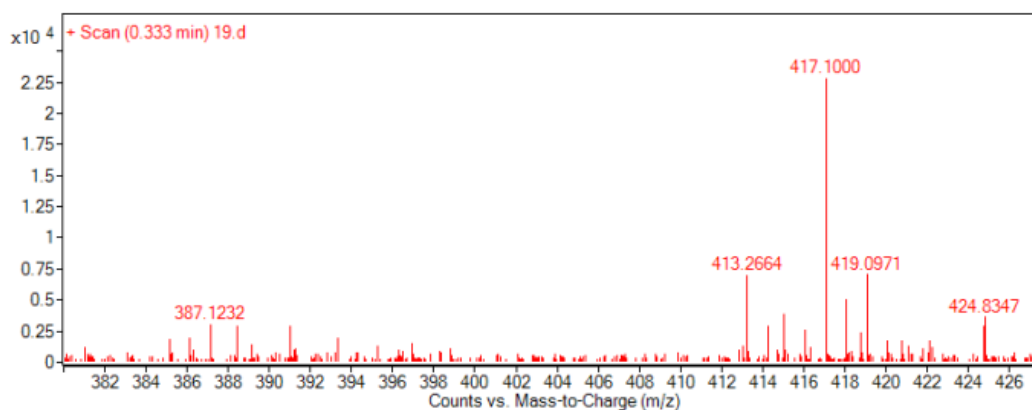
1-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)-3-(trifluoromethyl)benzene **2q**

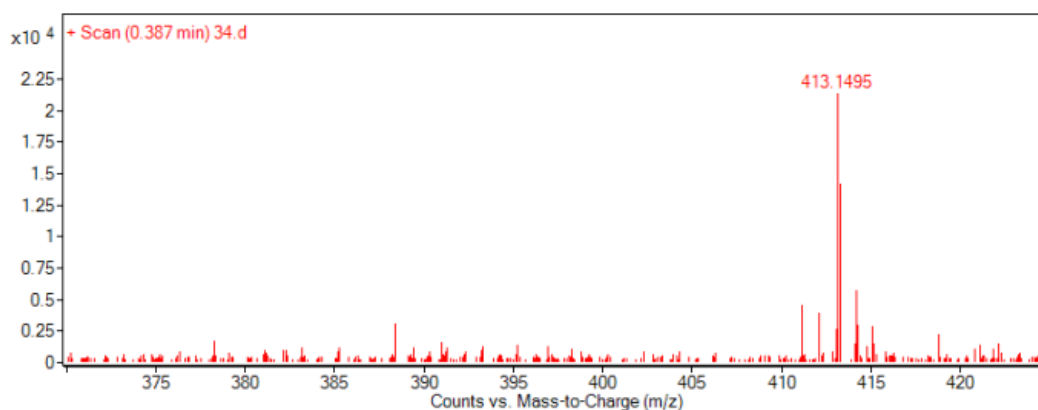
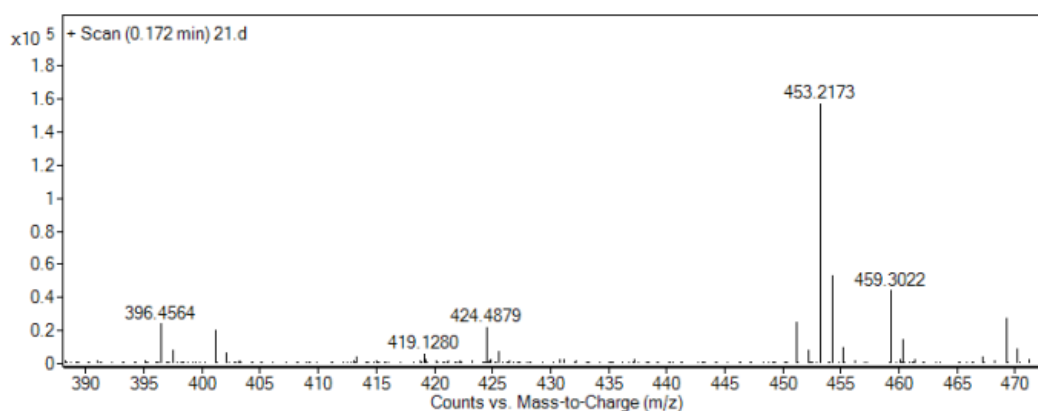
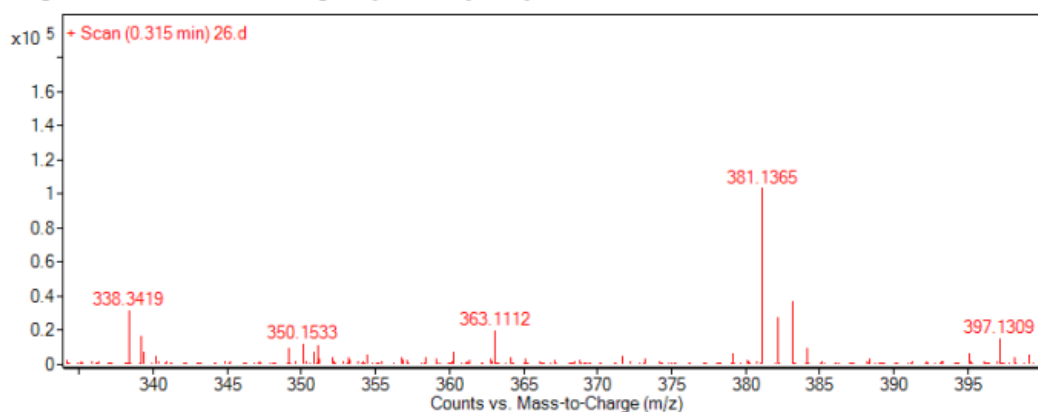


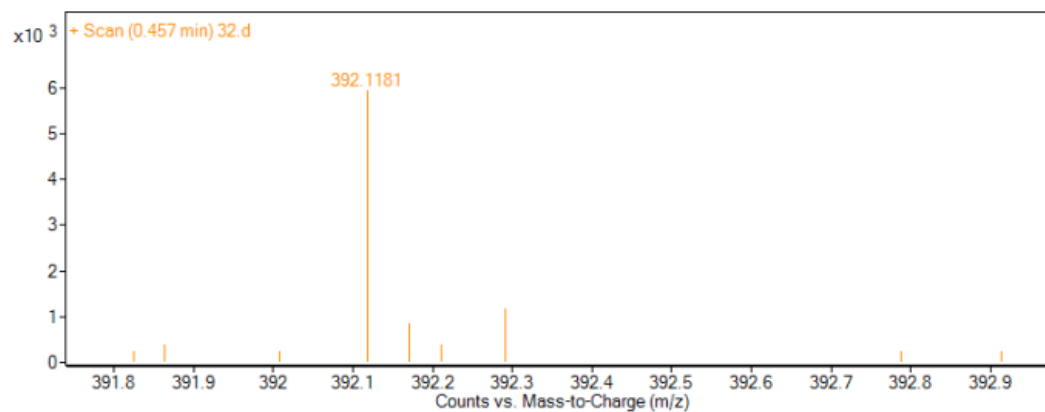
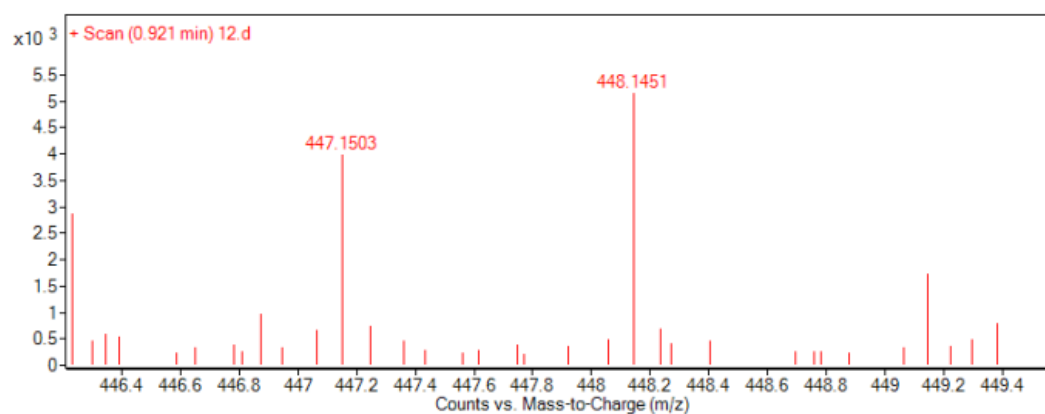
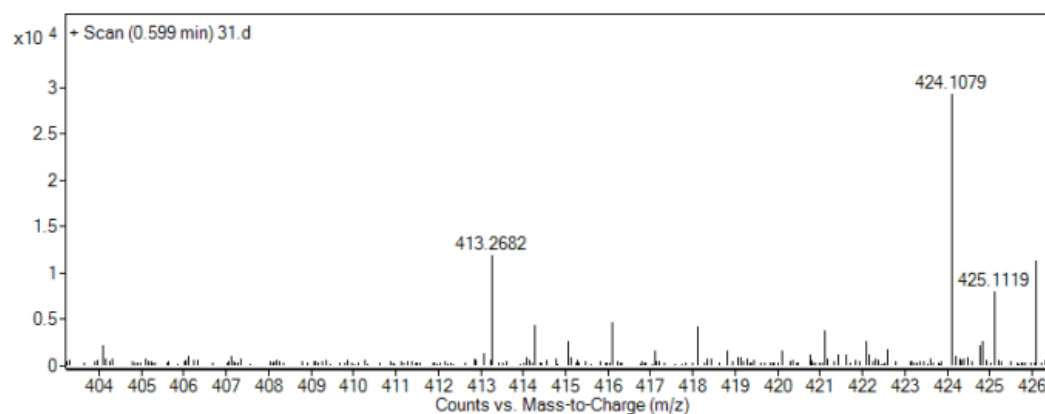
¹H NMR Spectrum of 2-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)furan **2r**¹³C NMR Spectrum of 2-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)furan **2r**

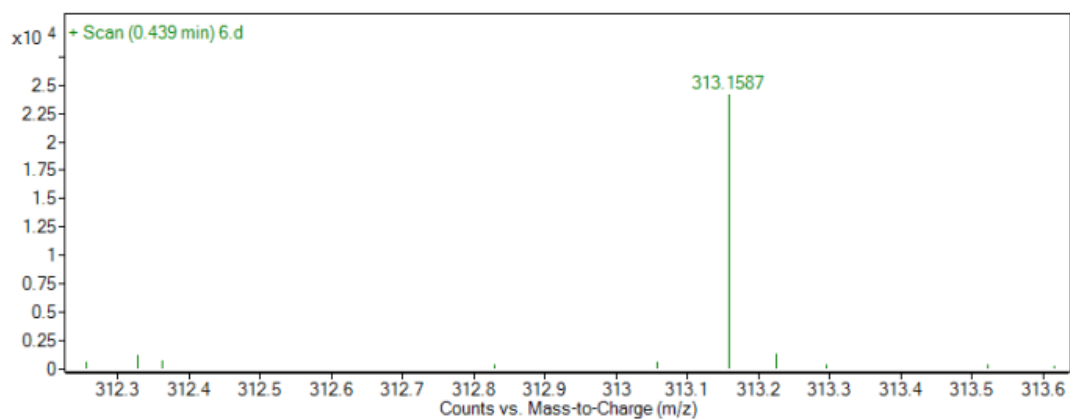
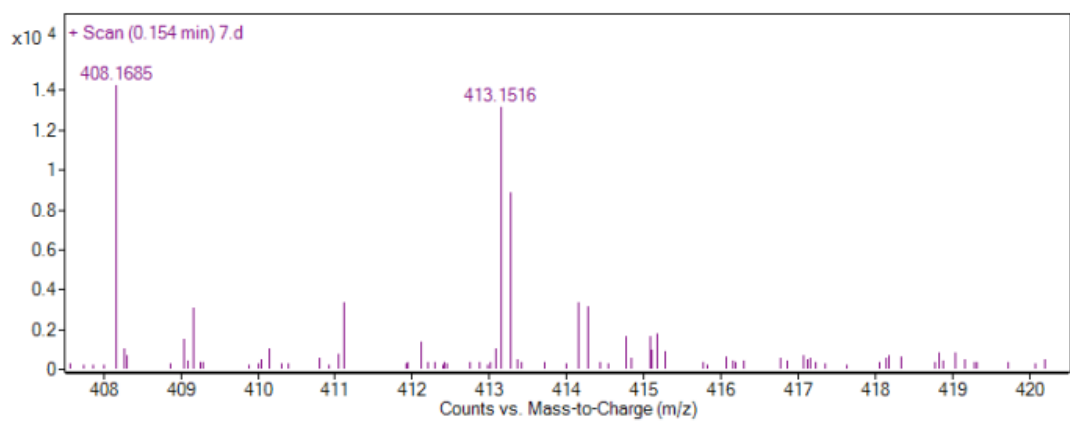
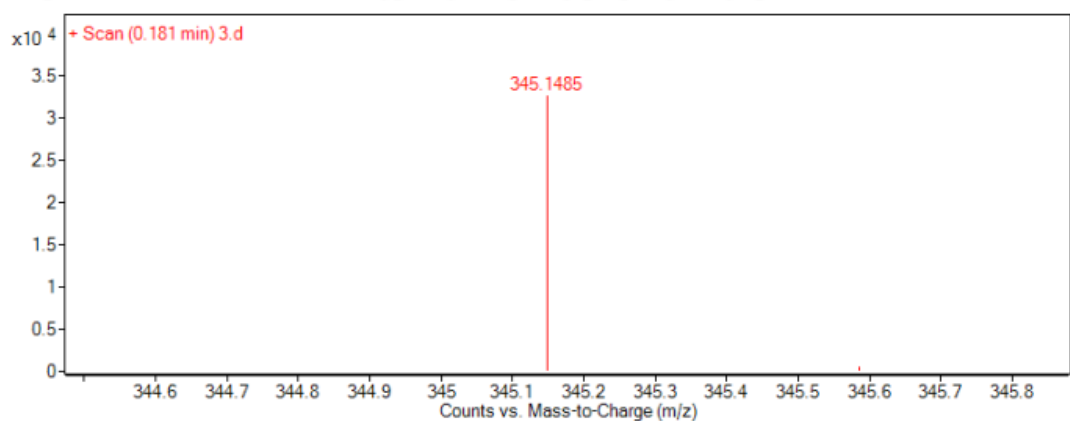
^1H NMR Spectrum of 2-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)furan 2s ^{13}C NMR Spectrum of 2-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)furan 2s

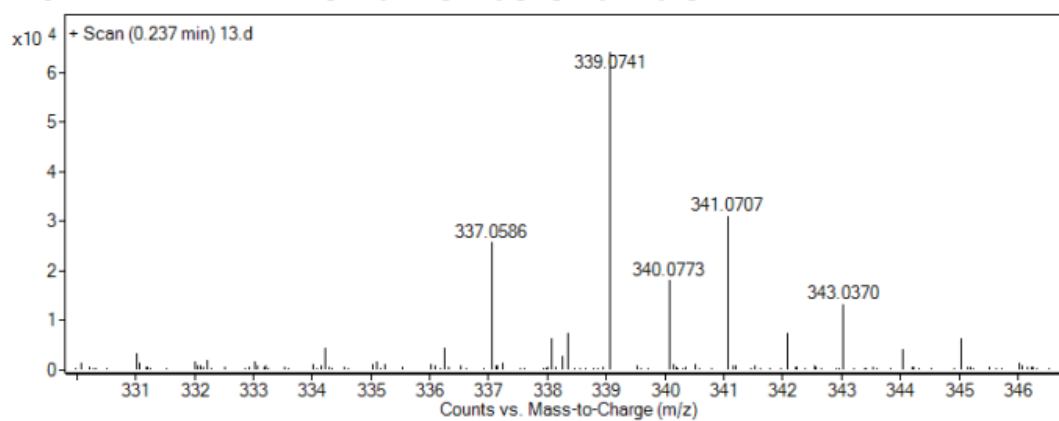
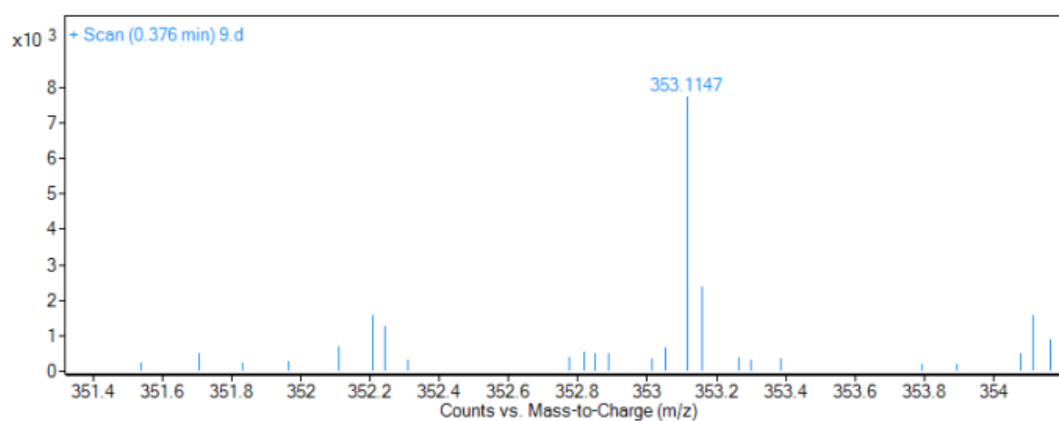
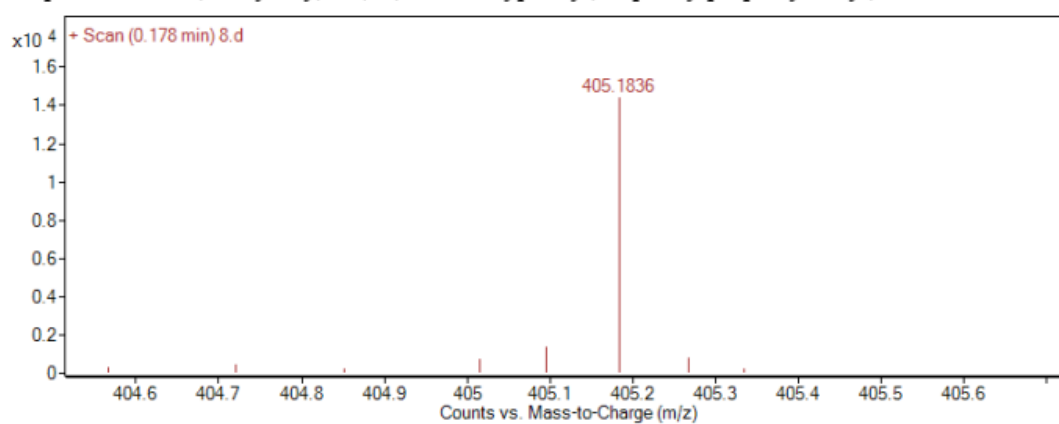
HRMS SPECTRUM

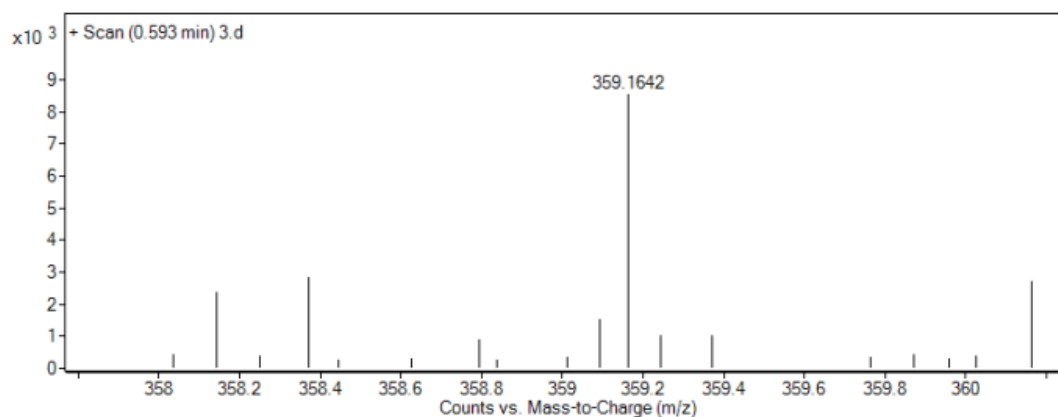
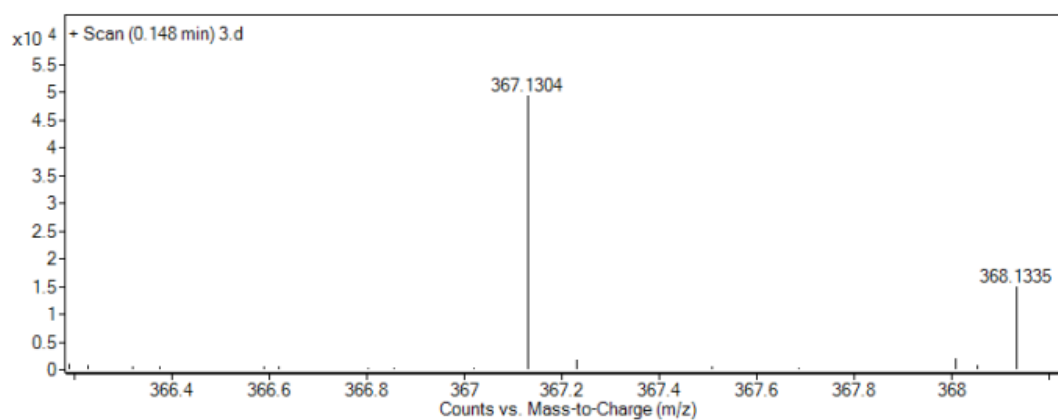
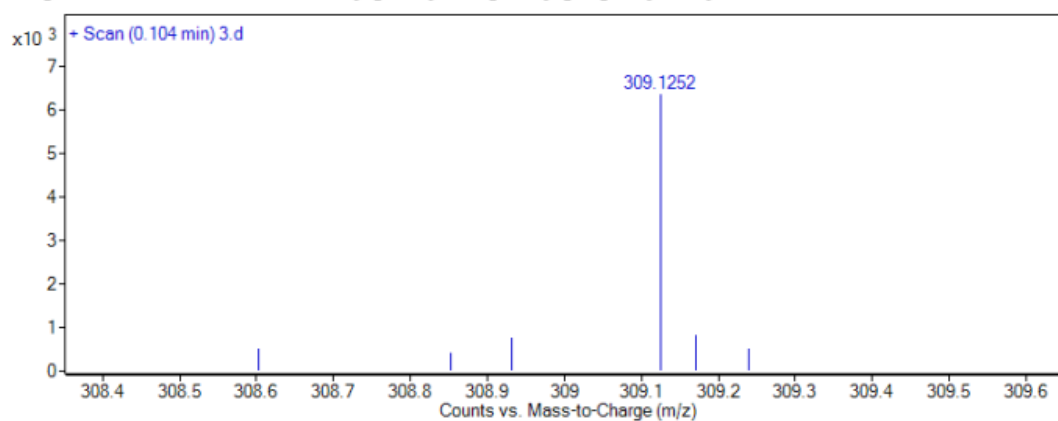
MS Spectrum of 3-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)-6-nitro-1*H*-indole **2a**MS Spectrum of 3-(1-(4-(benzyloxy)phenyl)-3-phenylprop-2-yn-1-yl)-6-nitro-1*H*-indole **2b**MS Spectrum of 3-(1-(4-chlorophenyl)-3-(4-methoxyphenyl)prop-2-yn-1-yl)-6-nitro-1*H*-indole **2c**

MS Spectrum of 3-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)-6-nitro-1*H*-indole **2d**MS Spectrum of 3-(1-(4-(benzyloxy)phenyl)oct-2-yn-1-yl)-6-nitro-1*H*-indole **2e**MS Spectrum of 3-(1-(4-chlorophenyl)oct-2-yn-1-yl)-6-nitro-1*H*-indole **2f**

MS Spectrum of 6-chloro-3-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)-1*H*-indole **2g**MS Spectrum of 3-(1-(4-(benzyloxy)phenyl)-3-phenylprop-2-yn-1-yl)-6-chloro-1*H*-indole **2h**MS Spectrum of 6-chloro-3-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)-1*H*-indole **2i**

MS Spectrum of 4-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)phenol **2j**MS Spectrum of 4-(1-(4-(benzyloxy)phenyl)-3-phenylprop-2-yn-1-yl)phenol **2k**MS Spectrum of 4-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)phenol **2l**

MS Spectrum of 4-(1-(4-chlorophenyl)-3-phenylprop-2-yn-1-yl)phenol **2m**MS Spectrum of 4-(3-phenyl-1-(3-(trifluoromethyl)phenyl)prop-2-yn-1-yl)phenol **2n**MS Spectrum of 1-(benzyloxy)-4-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)benzene **2o**

MS Spectrum of 1,2-dimethoxy-4-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)benzene **2p**MS Spectrum of 1-(1-(4-methoxyphenyl)-3-phenylprop-2-yn-1-yl)-3-(trifluoromethyl)benzene **2q**MS Spectrum of 2-(1-(3,4-dimethylphenyl)-3-phenylprop-2-yn-1-yl)furan **2r**

MS Spectrum of 2-(1-(3,4-dimethoxyphenyl)-3-phenylprop-2-yn-1-yl)furan 2s

