

Supporting Information

Visible-light-catalyzed Cascade Radical Cyclization of *N*-propargylindoles with Acyl Chlorides for the Synthesis of 2-Acyl-9*H*-pyrrolo[1,2-*a*]indoles

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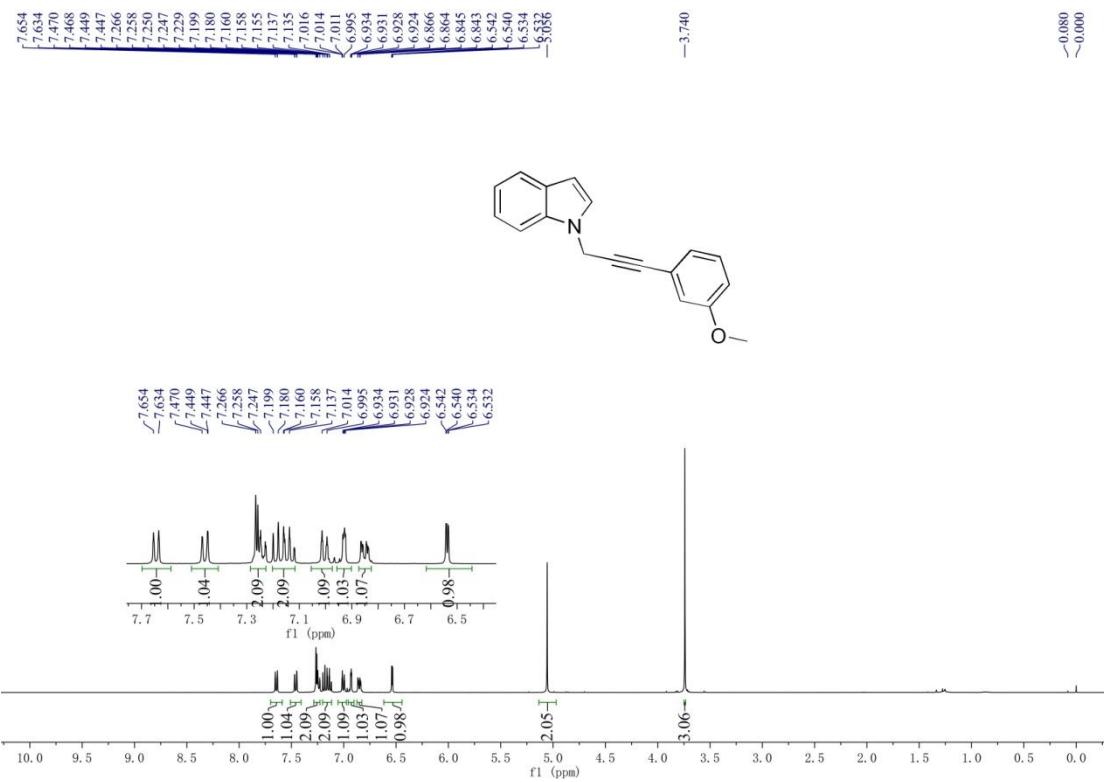
1. Typical Experimental Procedure for the Synthesis of 2-Acyl-9*H*-pyrrolo[1,2-*a*]indoles 3

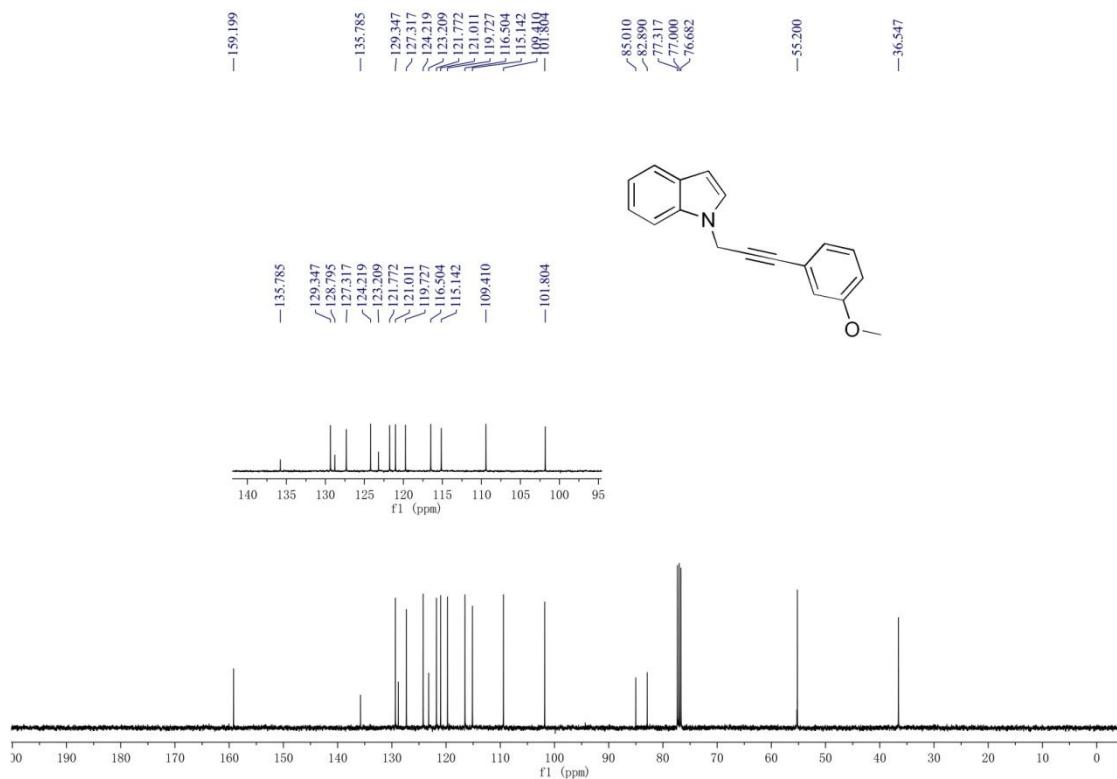
To a Schlenk tube were added *N*-propargylindoles **1** (0.2 mmol, 0.1 M), acyl chlorides **2** (0.6 mmol, 3 equiv), [Ir(ppy)₃] (1.3 mg, 0.002 mmol), Et₃N (60.6 mg, 0.6 mmol) and CH₃CN (2 mL). Then the tube was stirred at 100 °C (oil bath) in Ar atmosphere under 5 W blue LED light for the indicated time until complete consumption of starting material as monitored by TLC analysis. After the reaction was finished, the reaction mixture was washed with brine. The aqueous phase was re-extracted with EtOAc (3 × 10 mL). The combined organic extracts were dried over Na₂SO₄ and concentrated in vacuum. The residue was purified by silica gel flash column chromatography (hexane/ethyl acetate = 15 : 1) to afford the desired products **3**. An amplified experiment conducted in the presence of *N*-propargylindole **1a** (1155 mg, 5 mmol), 4-methylbenzoyl chloride **2a** (3 equiv, 15 mmol), [Ir(ppy)₃] (32.8 mg, 0.05 mmol), Et₃N (1515 mg, 15 mmol) and CH₃CN (50 mL) at 100 °C under argon atmosphere for 120 h could deliver the target product **3aa** in 51% yield (890.0 mg). The light source bought from Meinuoqi (https://detail.tmall.com/item.htm?id=528747286441&spm=a1z09.2.0.0.1c6e2e8dXwBVwm&_u=r35sh1qt9a14), 5 W blue LED light bulb (E27). The wavelength was about 460-470 nm and the wavelength of peak intensity was about 467.5 nm. The distance from the light source to the irradiation vessel for the light promoted reaction was 5 cm. The picture of the experimental facility was shown as follow:



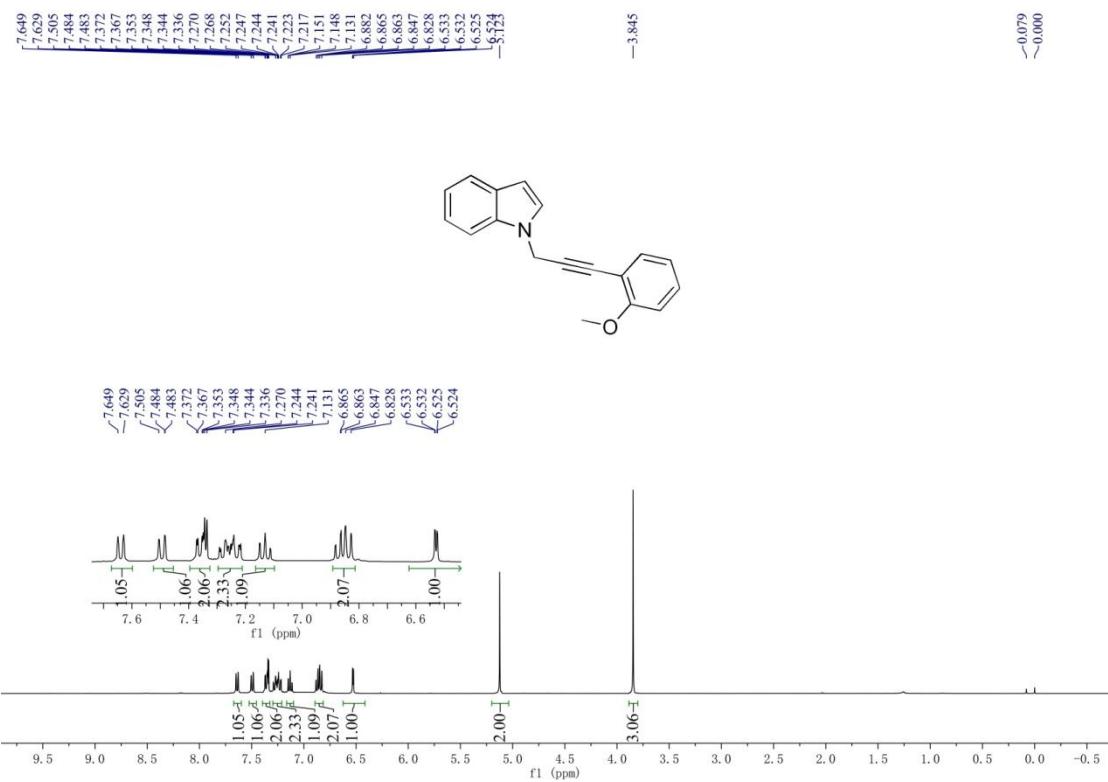
2. Spectra

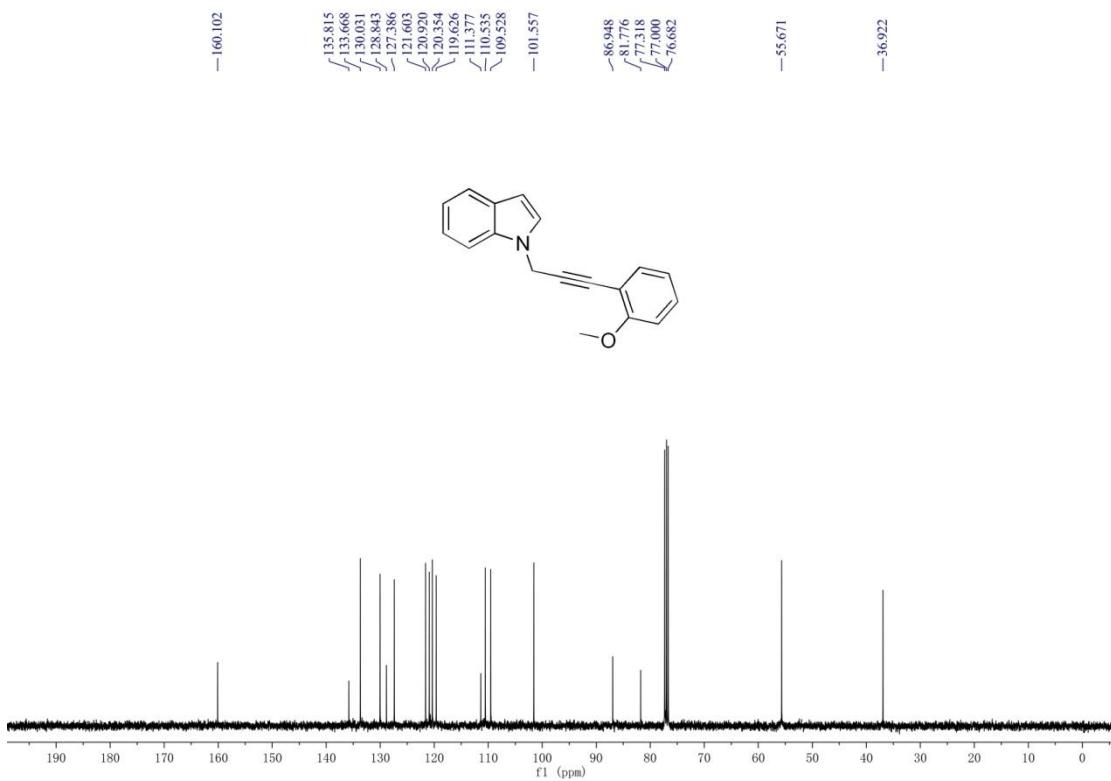
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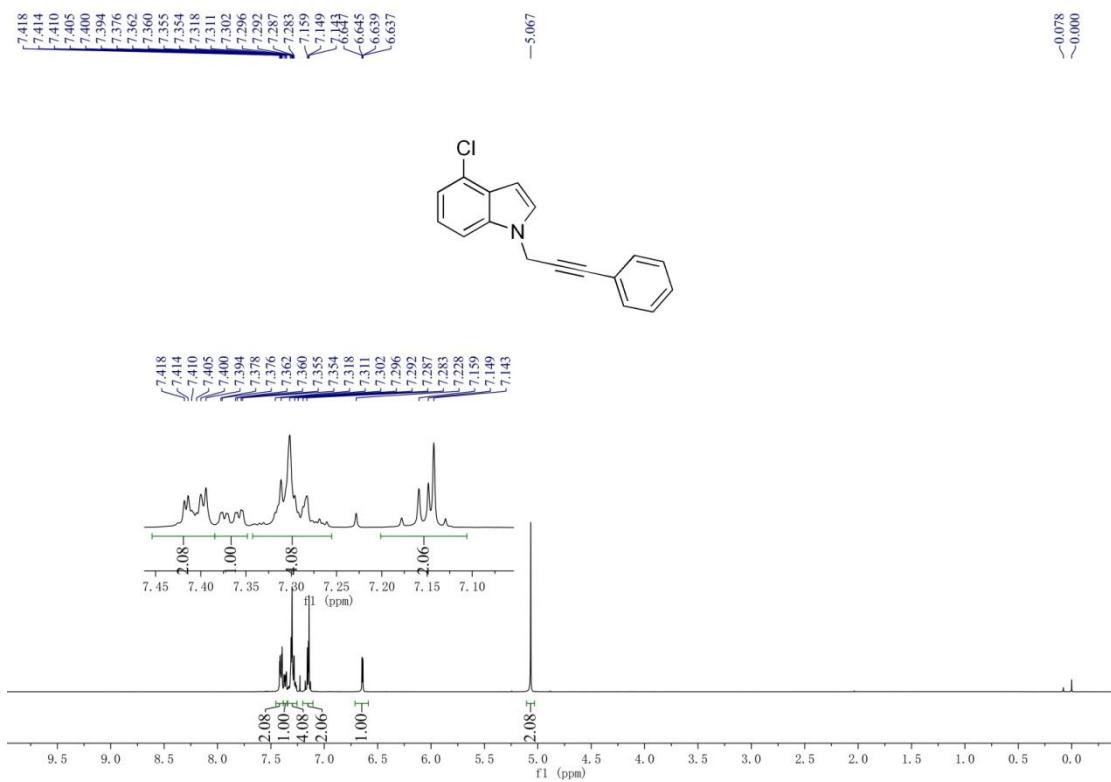


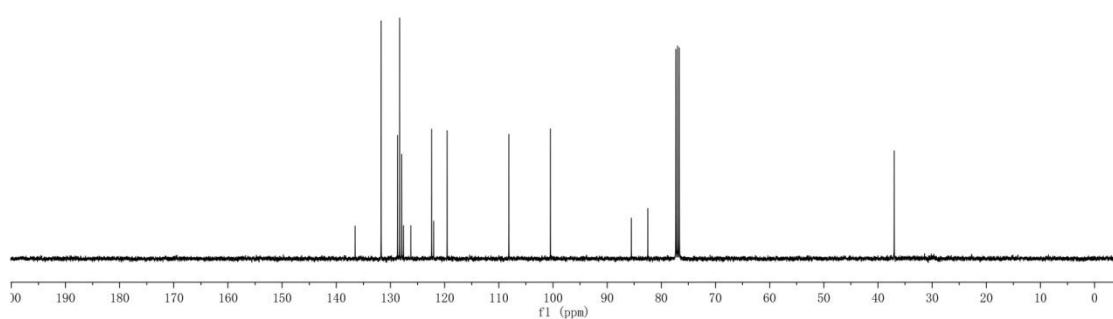
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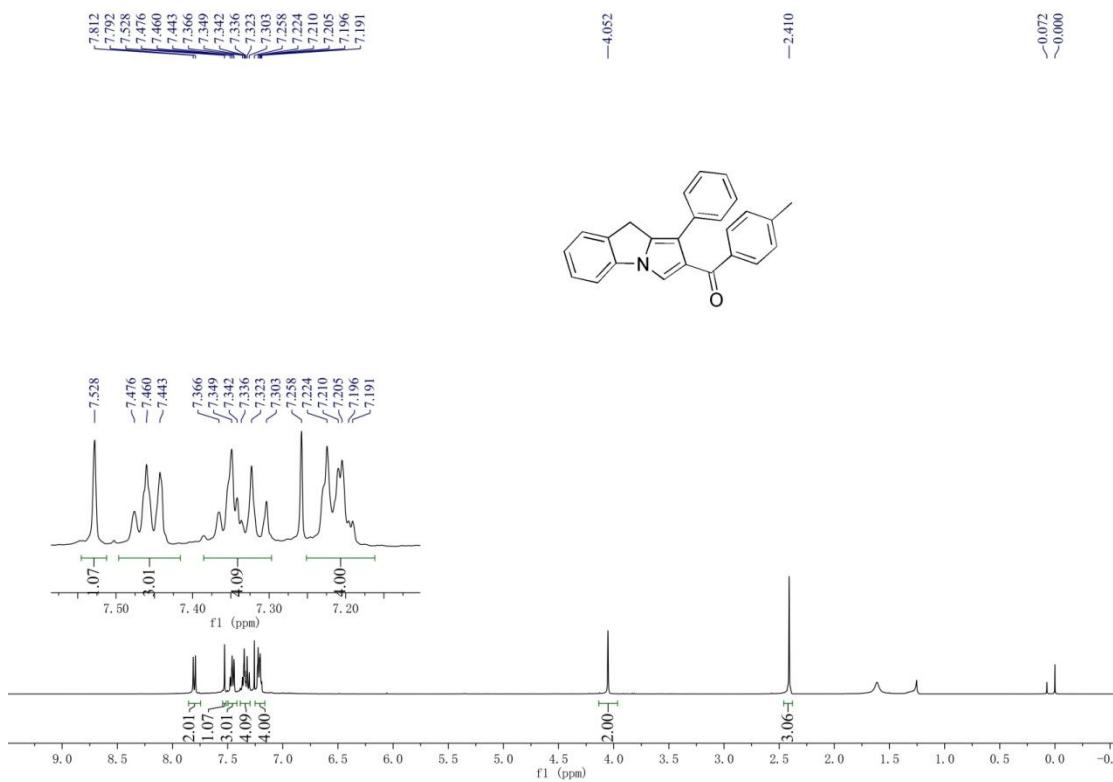


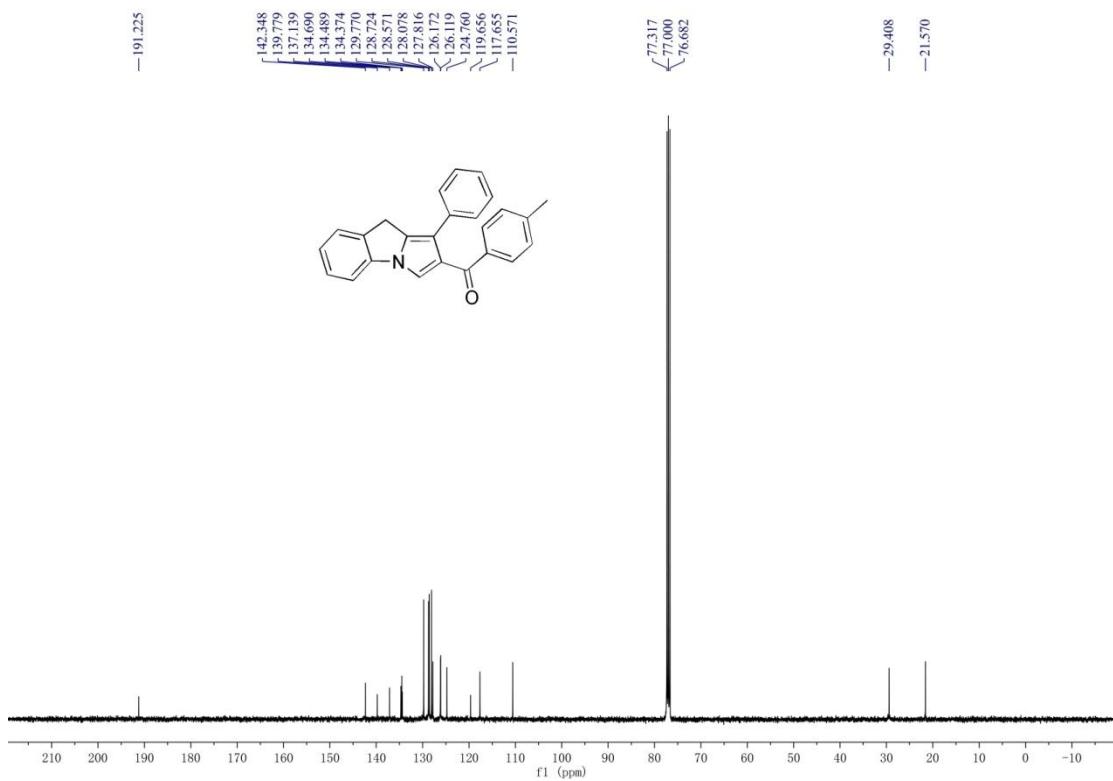
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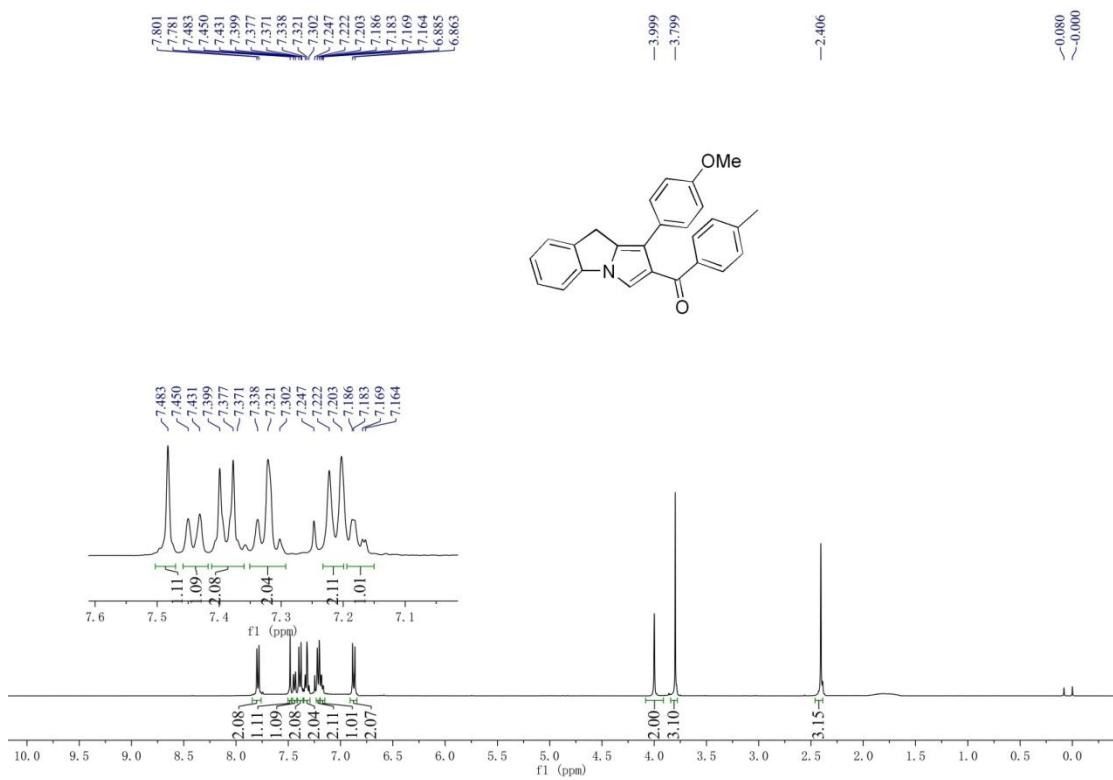


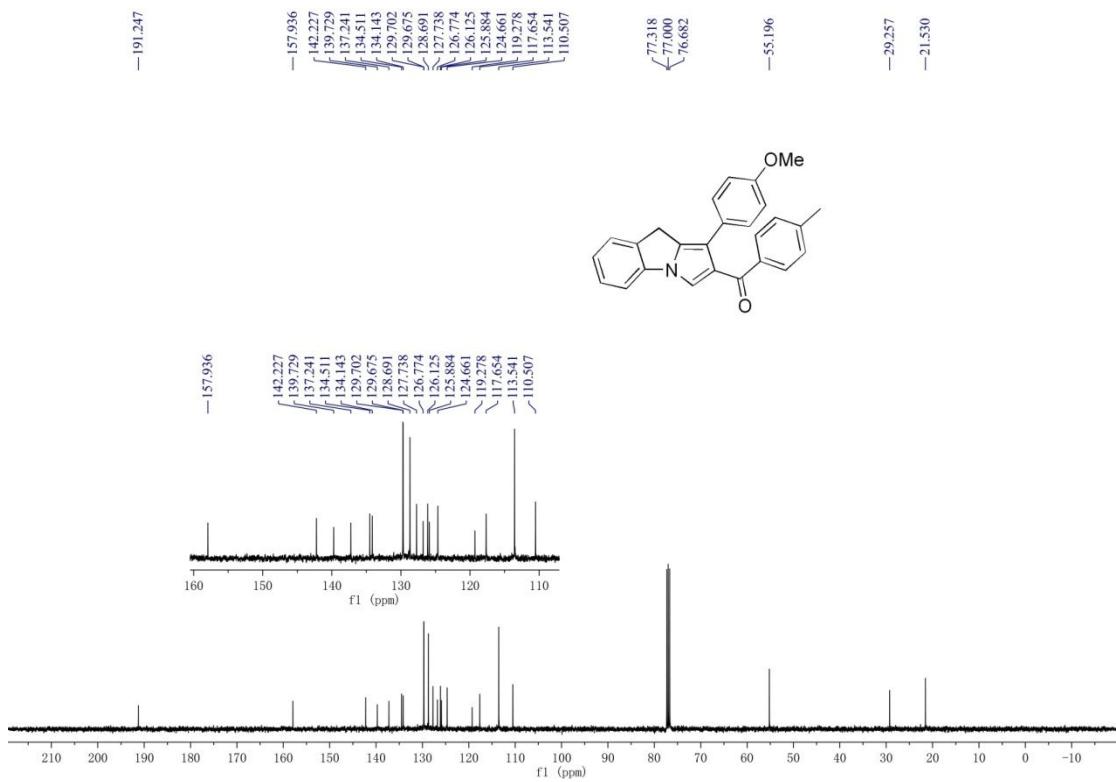
(1-Phenyl-9H-pyrrolo[1,2-a]indol-2-yl)(*p*-tolyl)methanone (3aa)



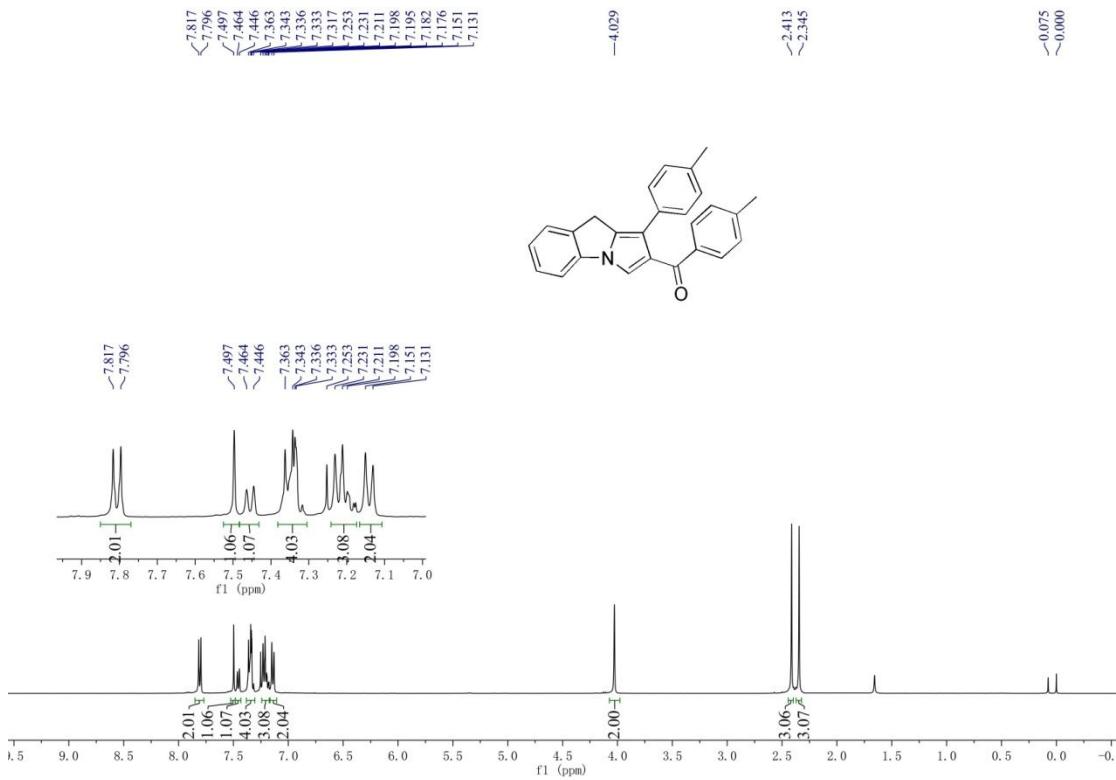


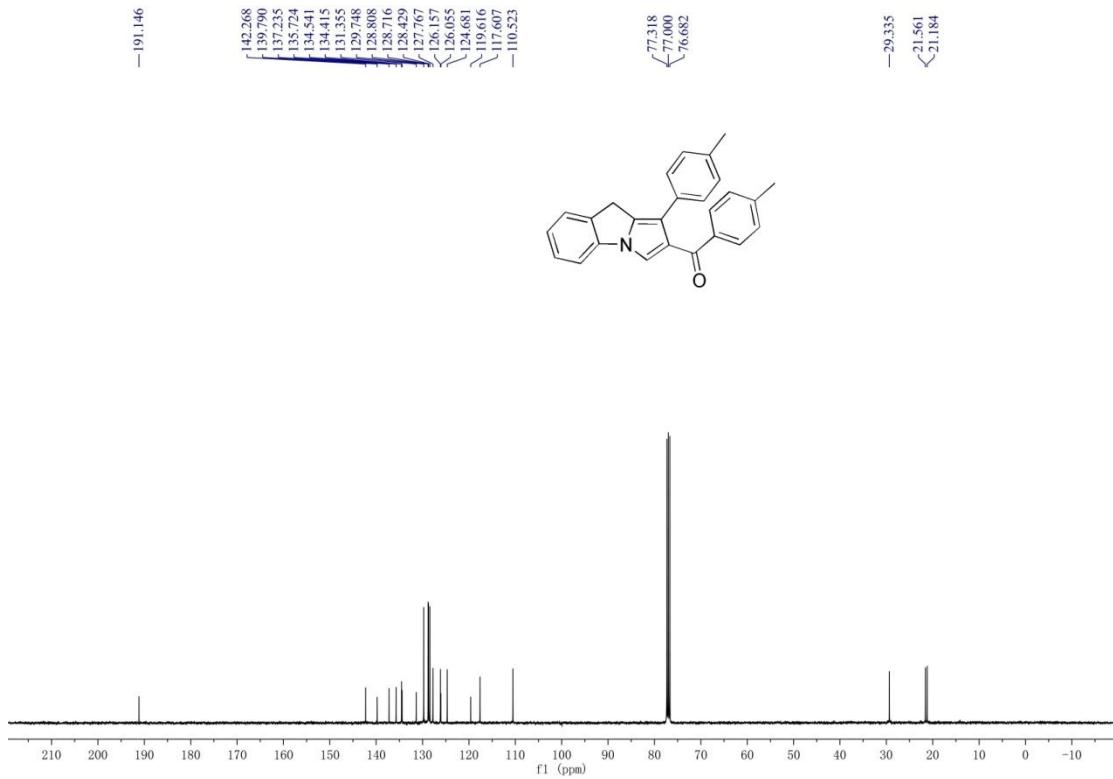
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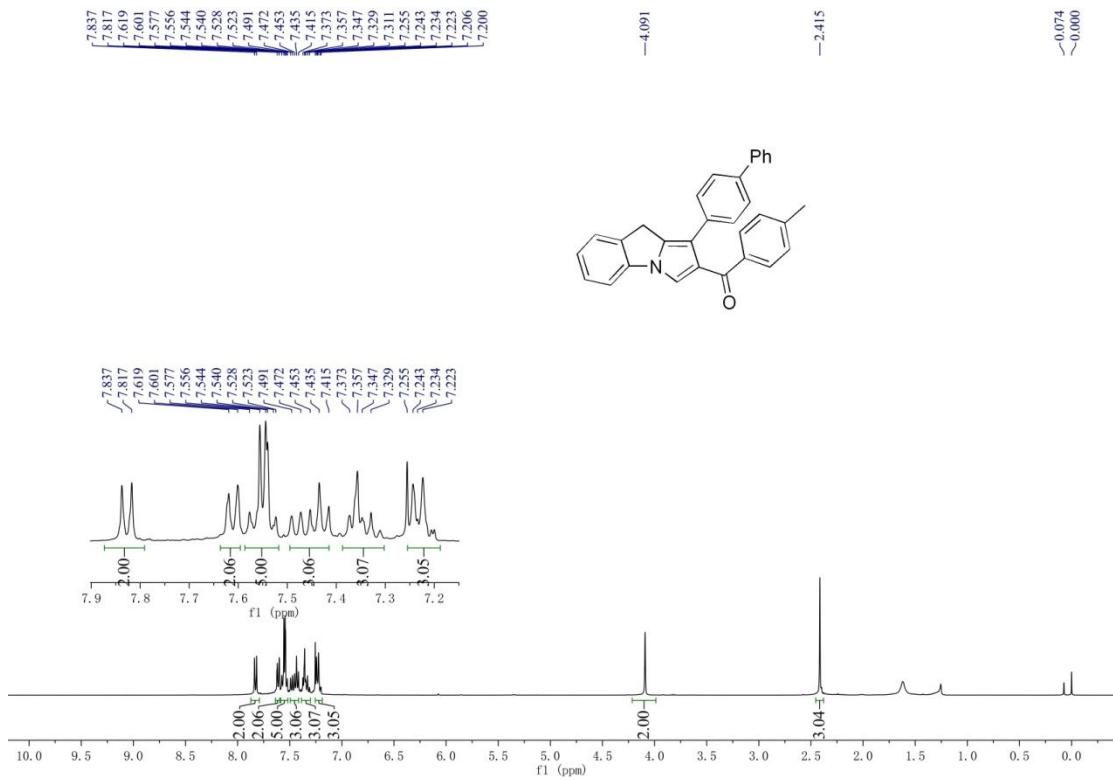


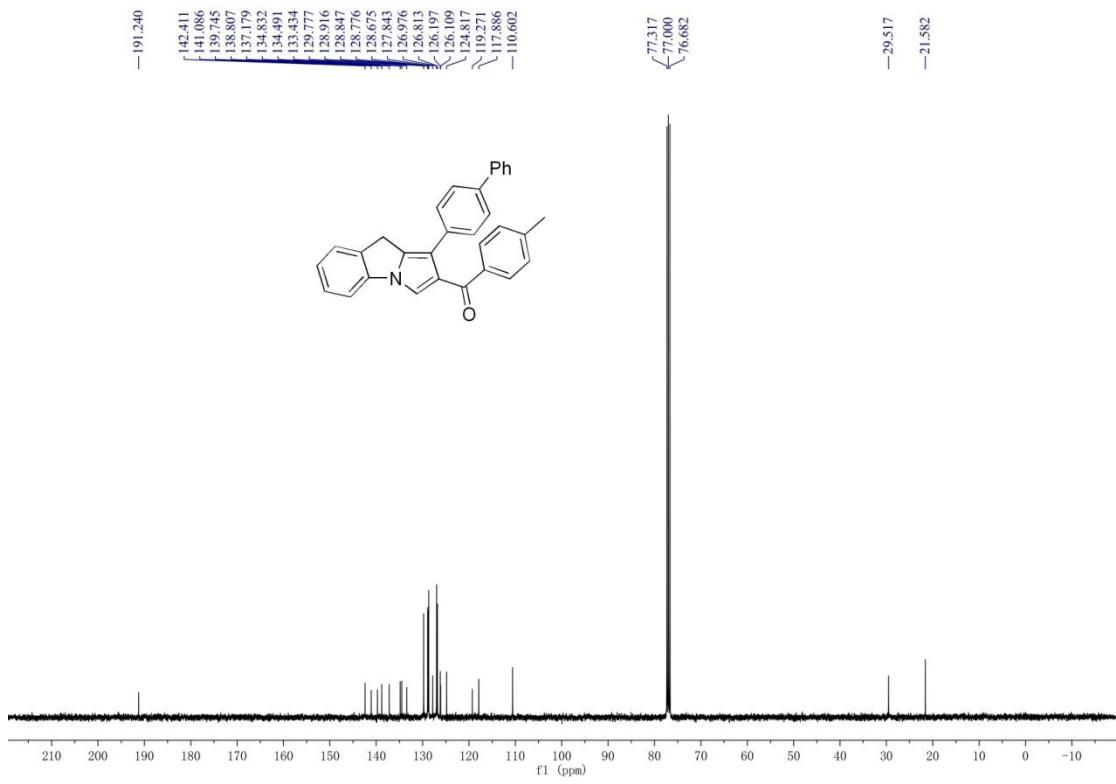
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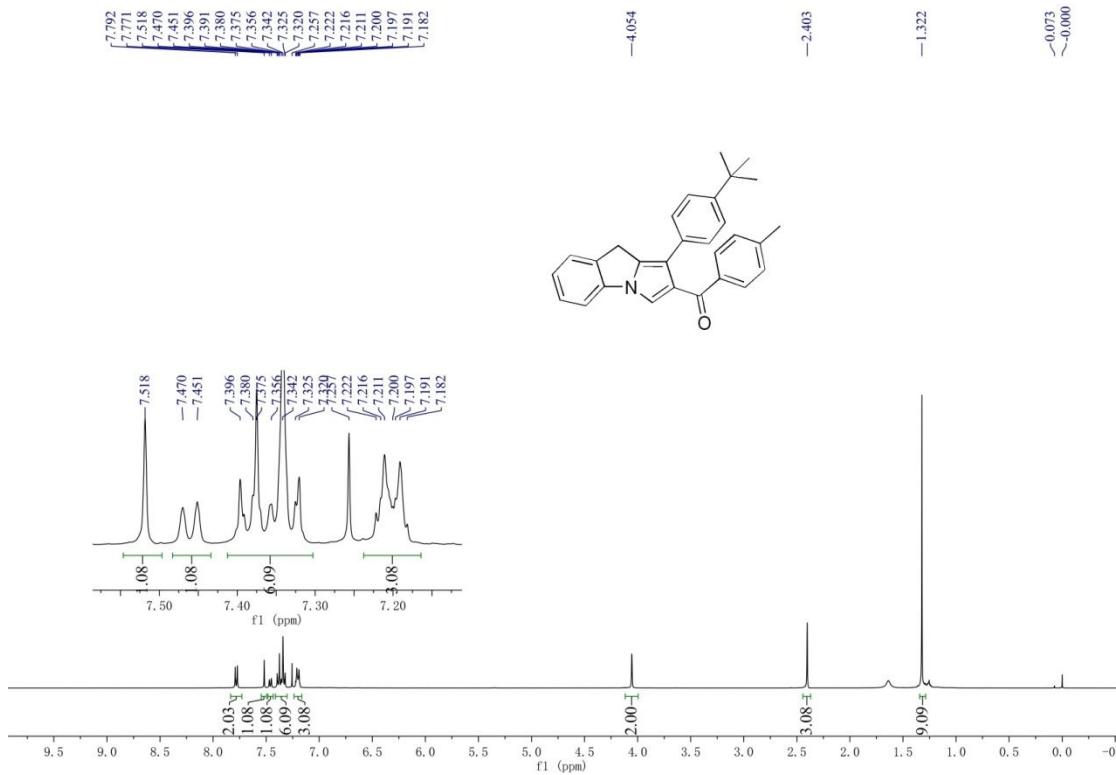


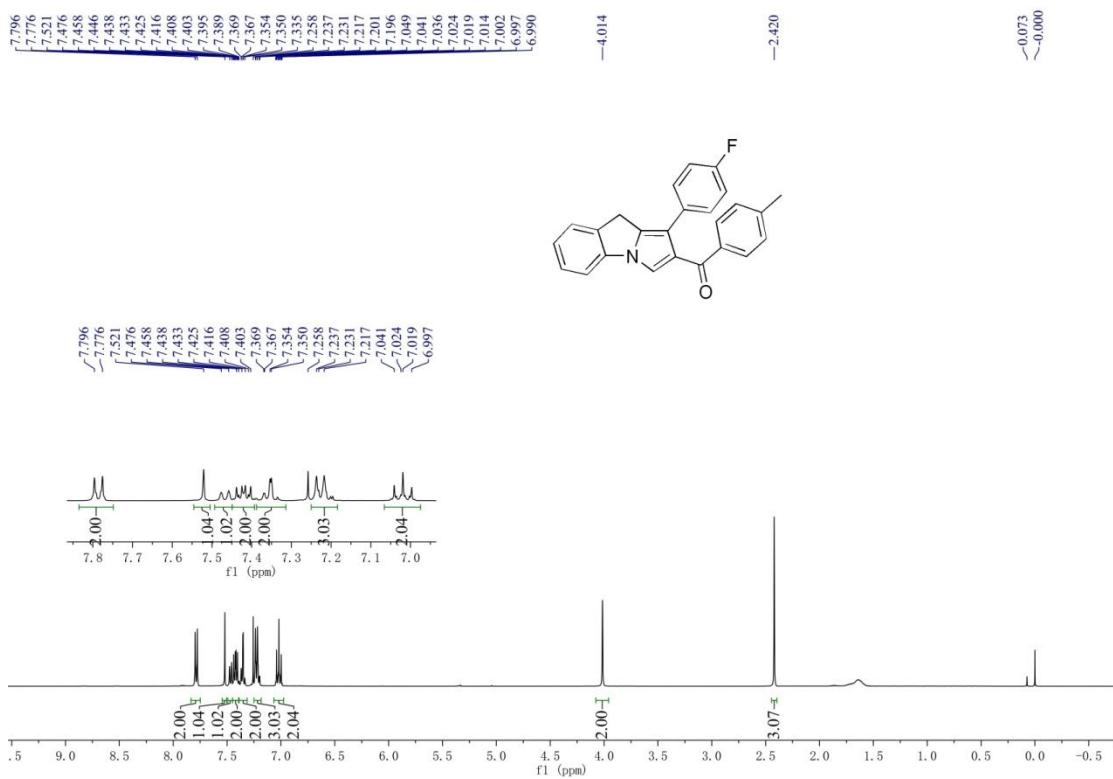
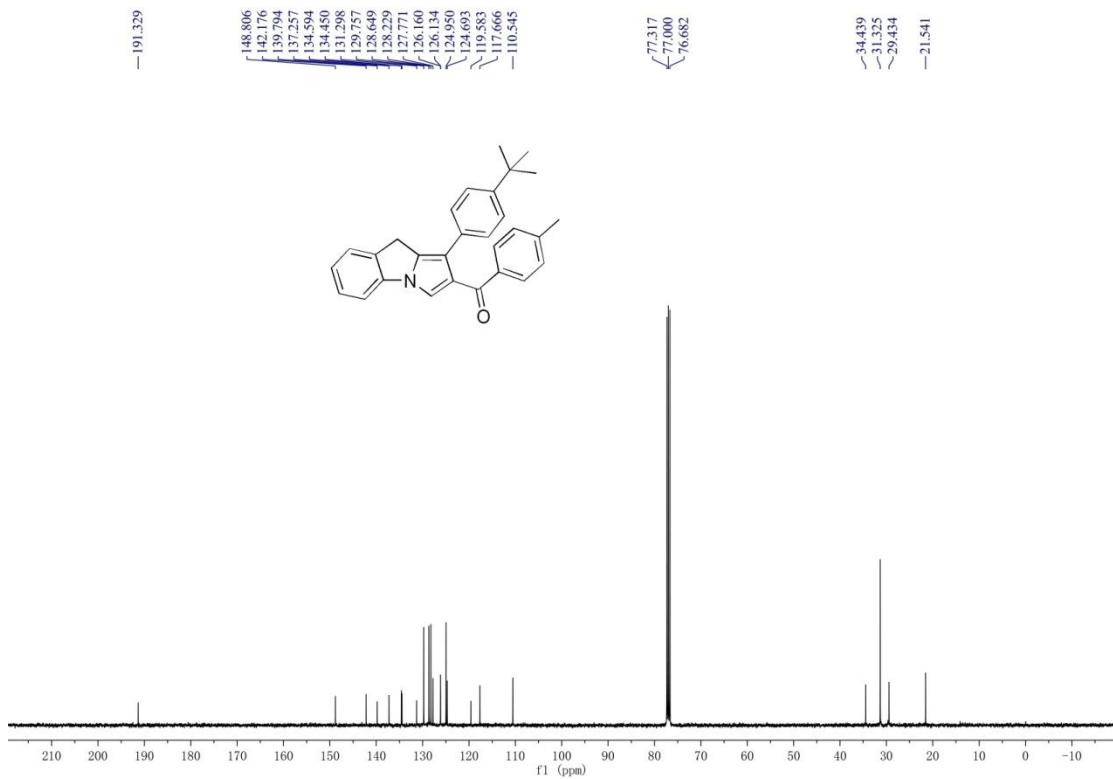
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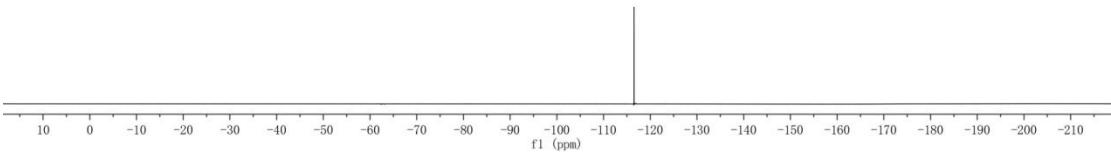
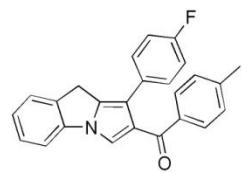
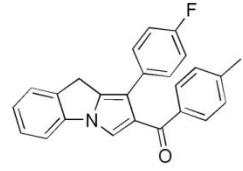
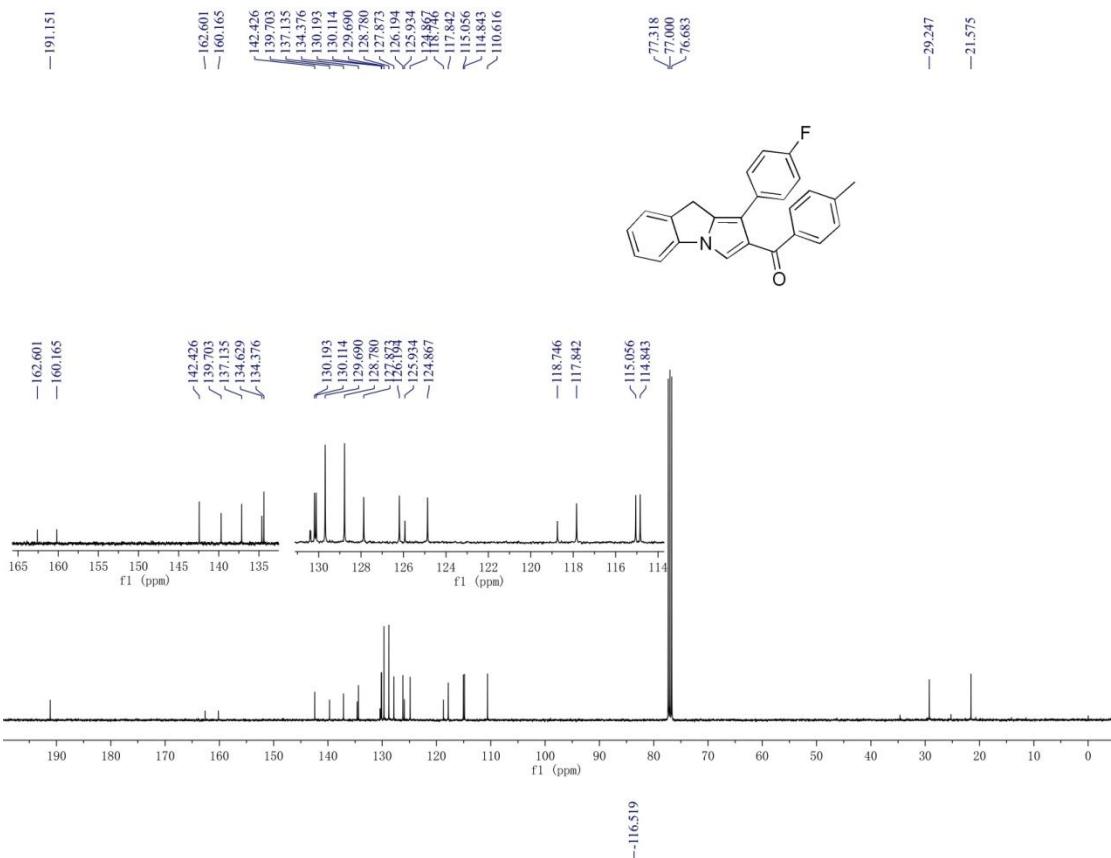




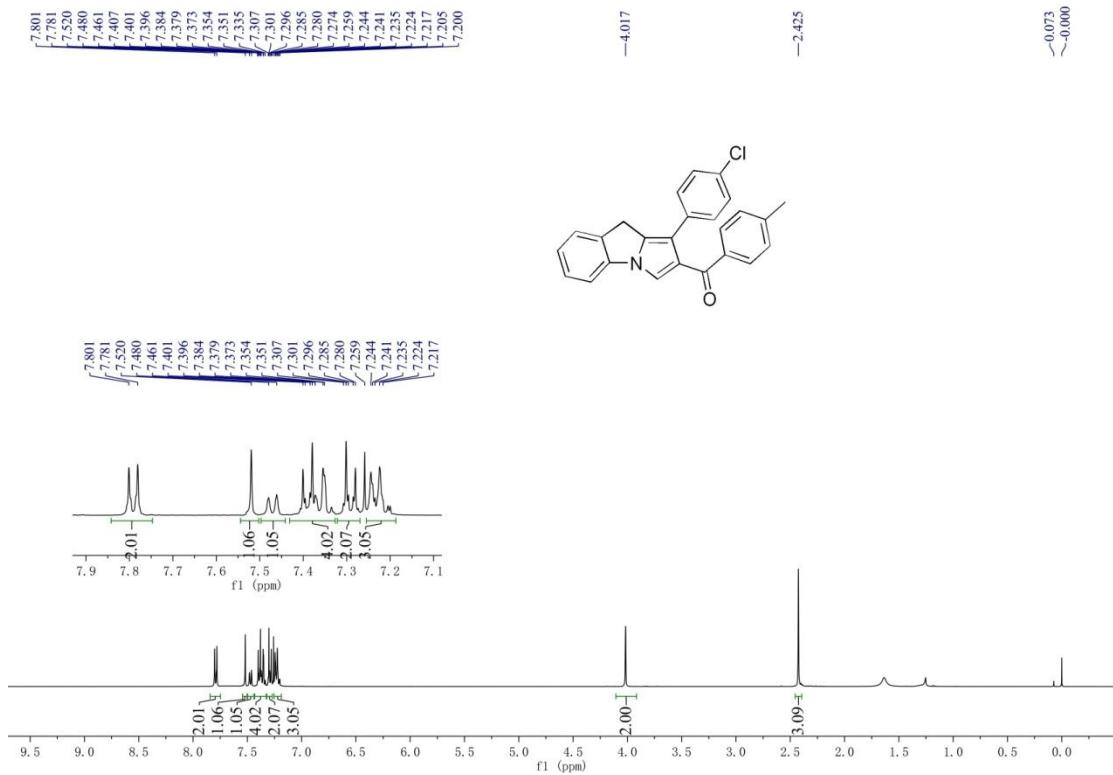
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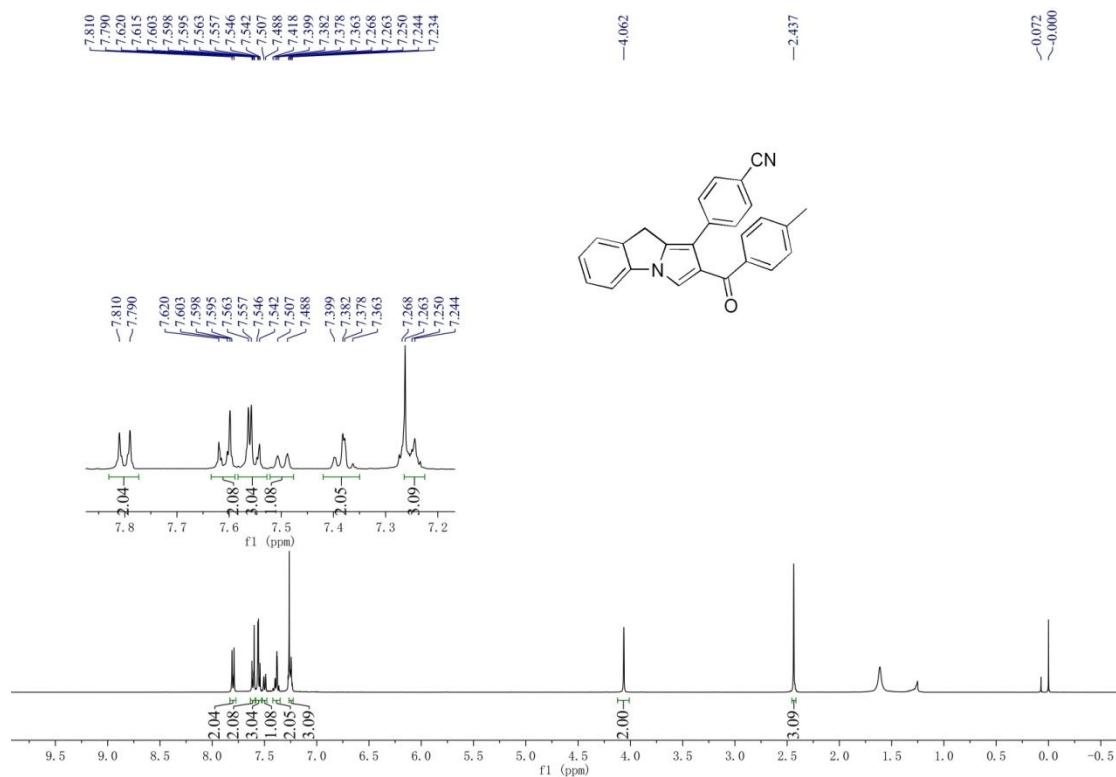
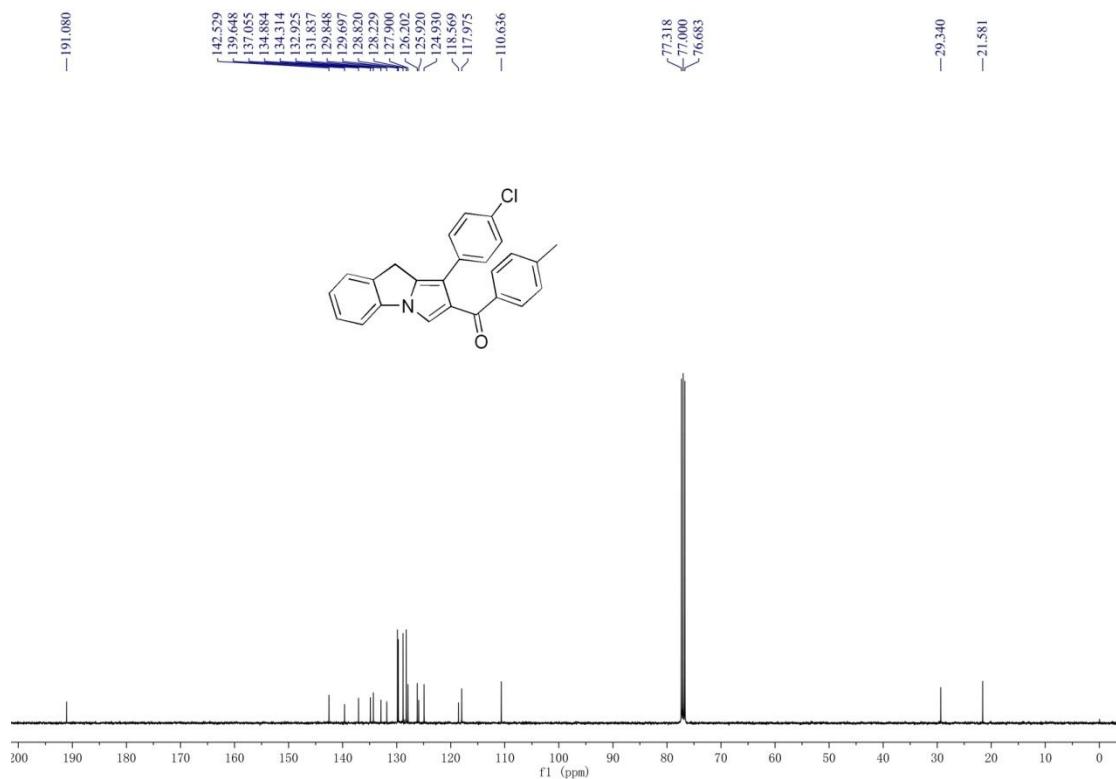


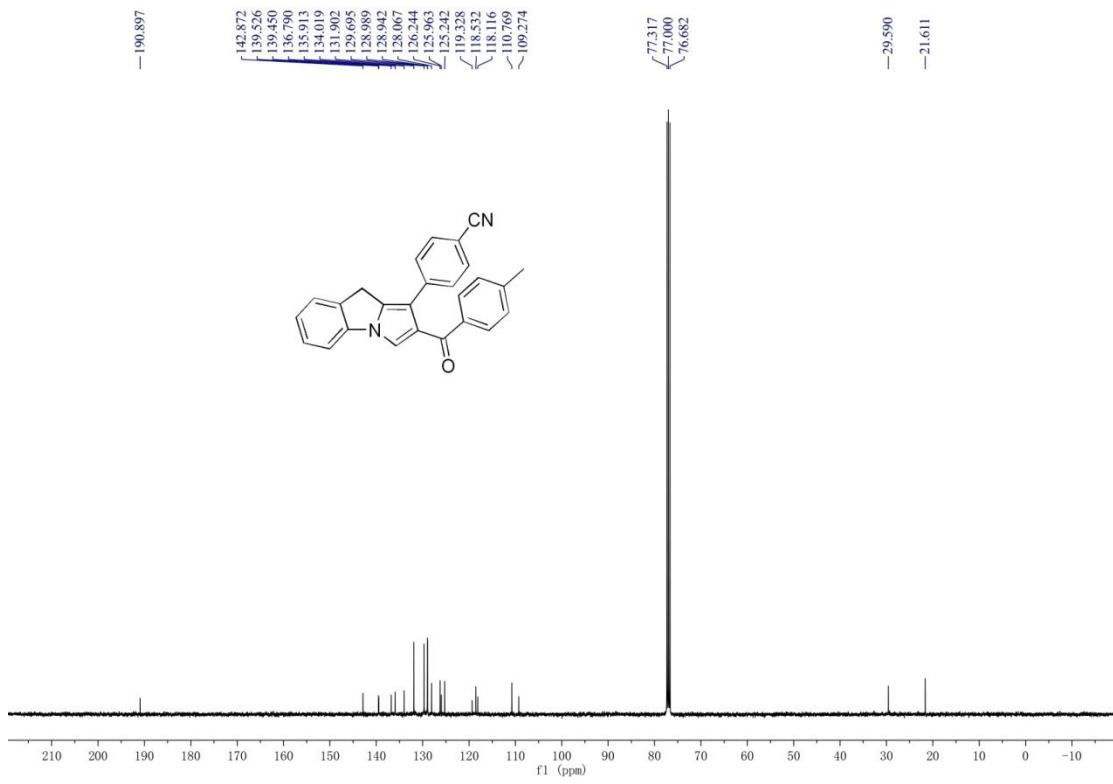




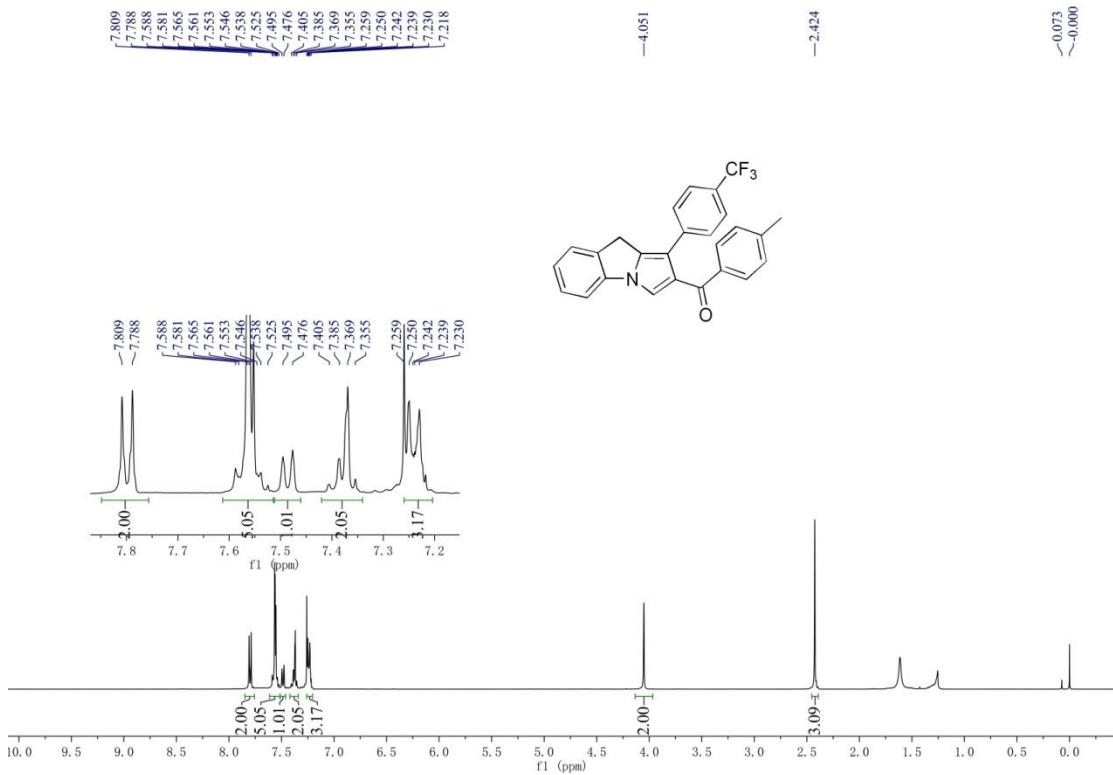
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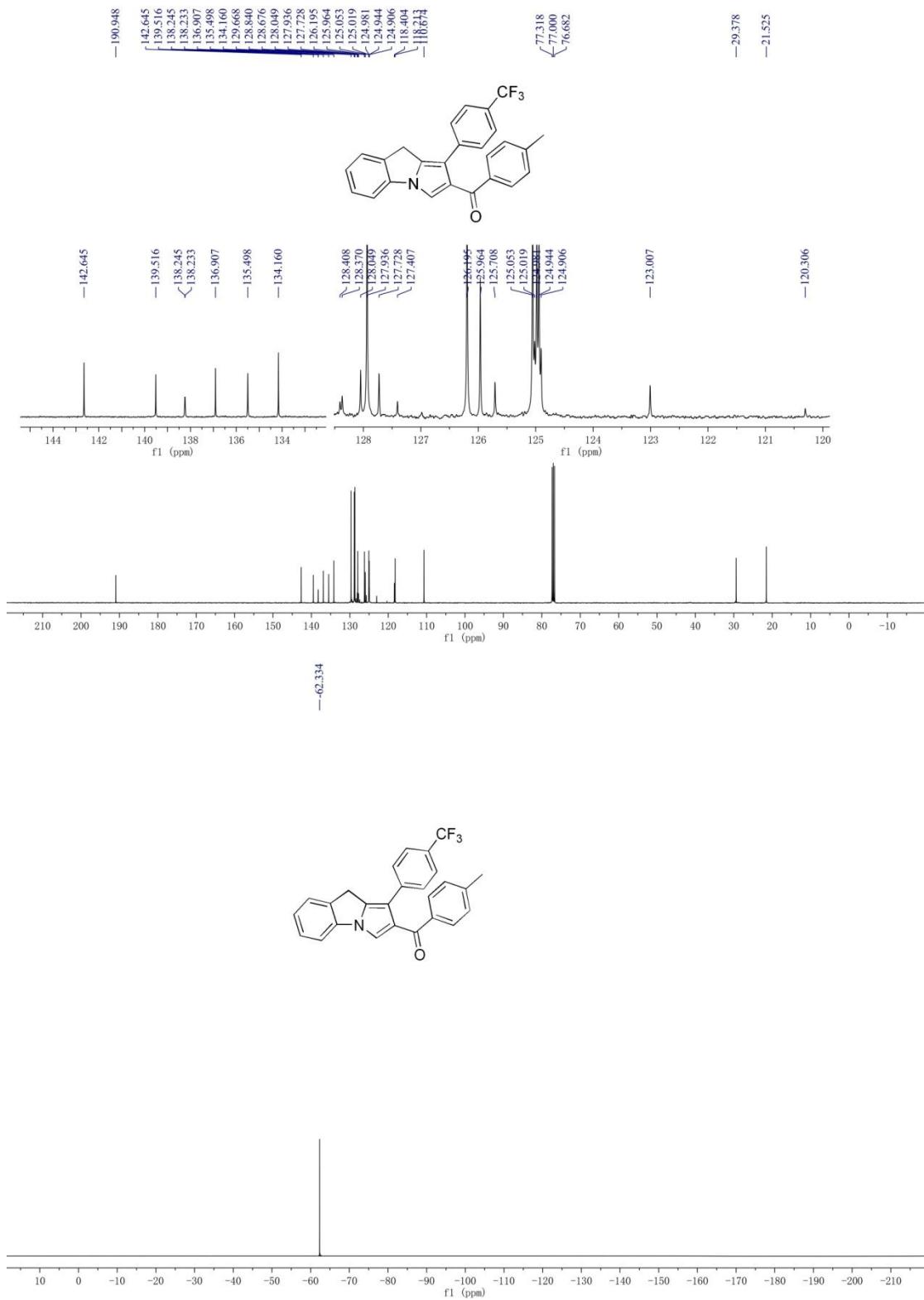




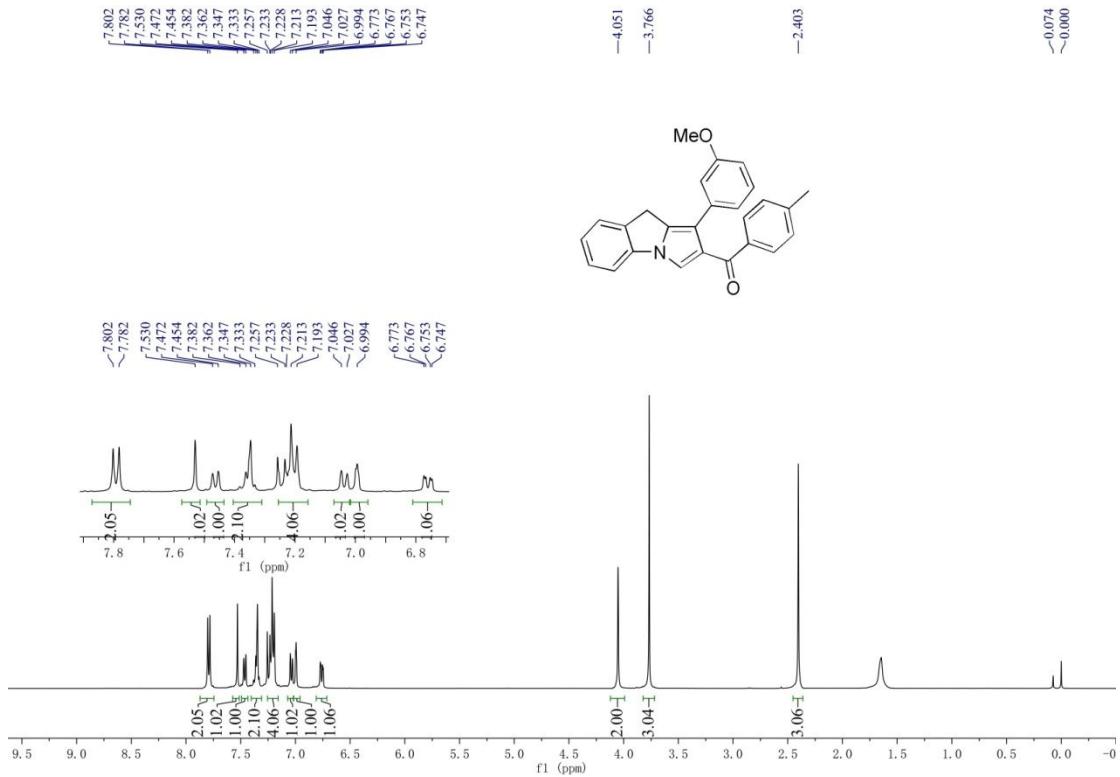


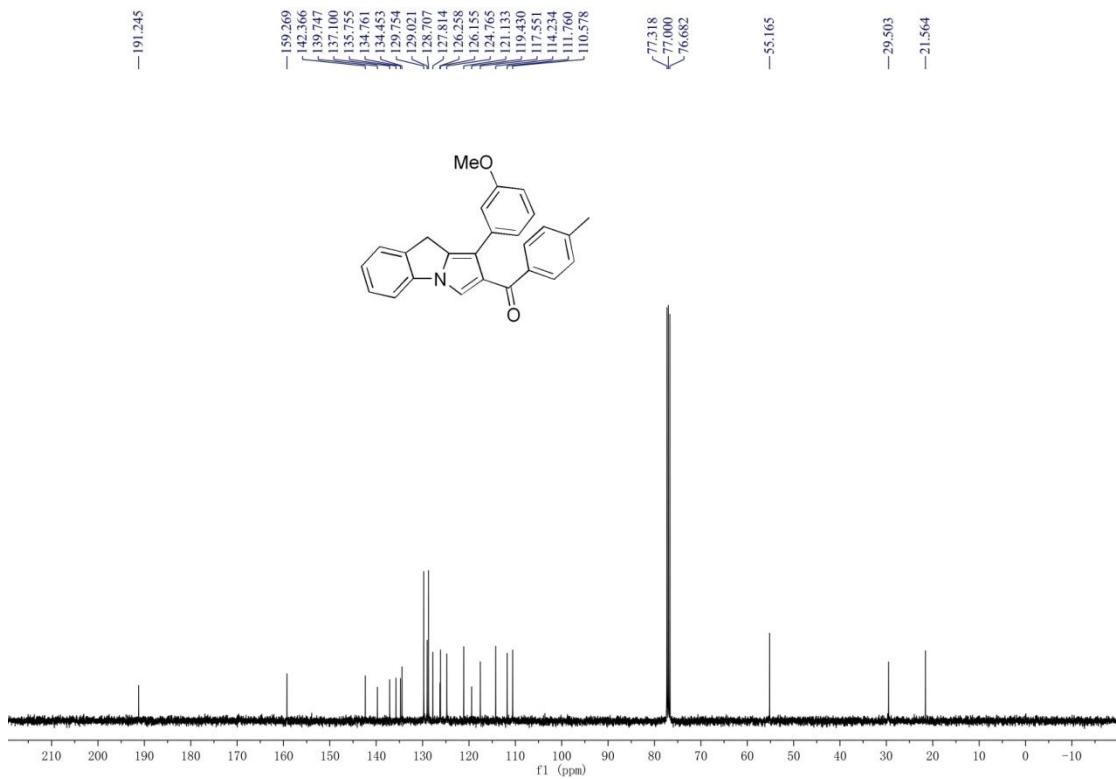
p-Tolyl(1-(4-(trifluoromethyl)phenyl)-9*H*-pyrrolo[1,2-*a*]indol-2-yl)methanone (**3ia**)



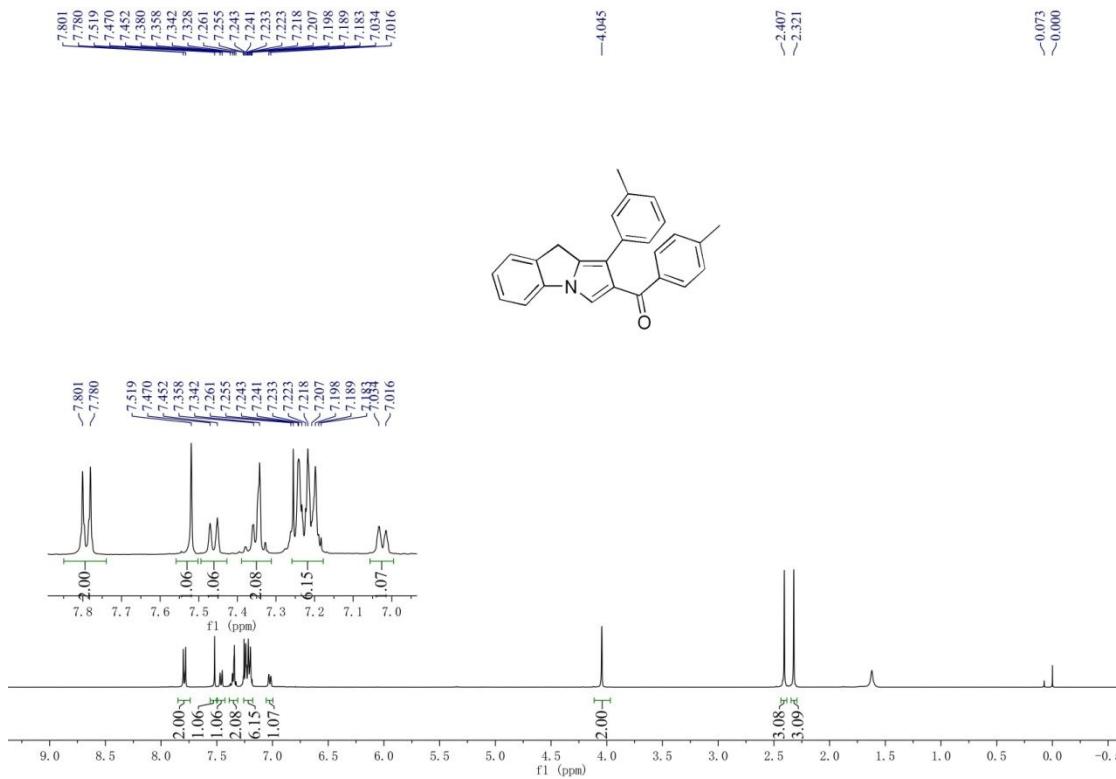


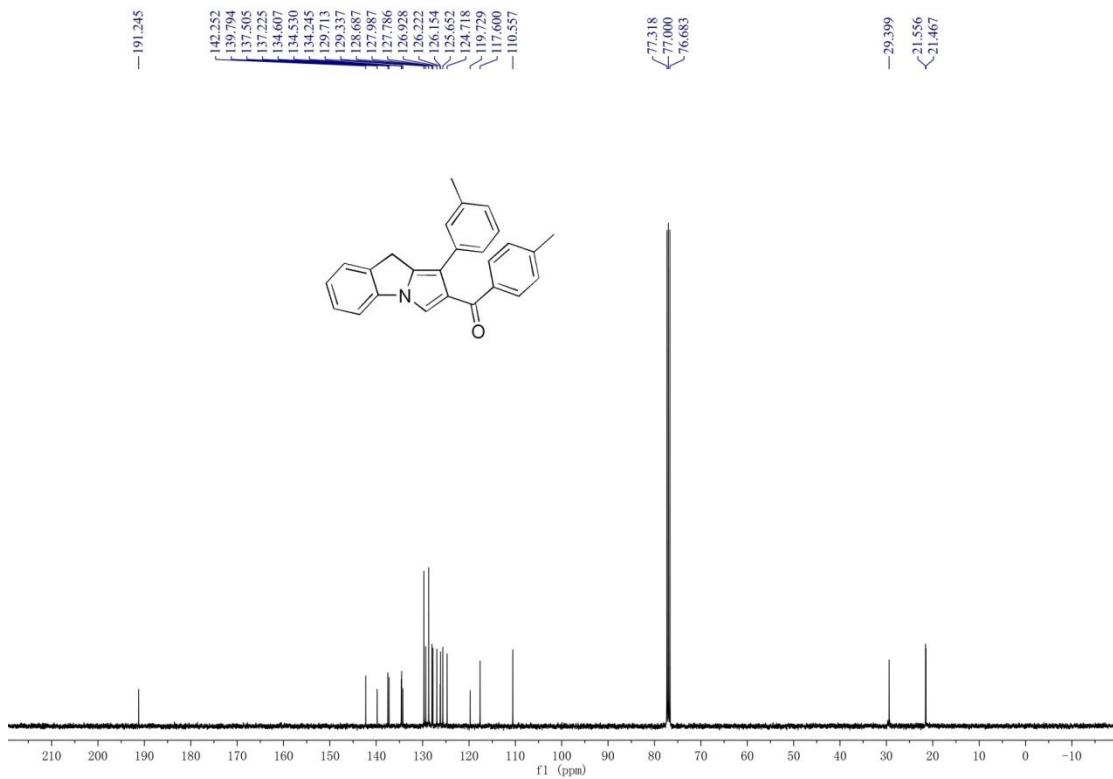
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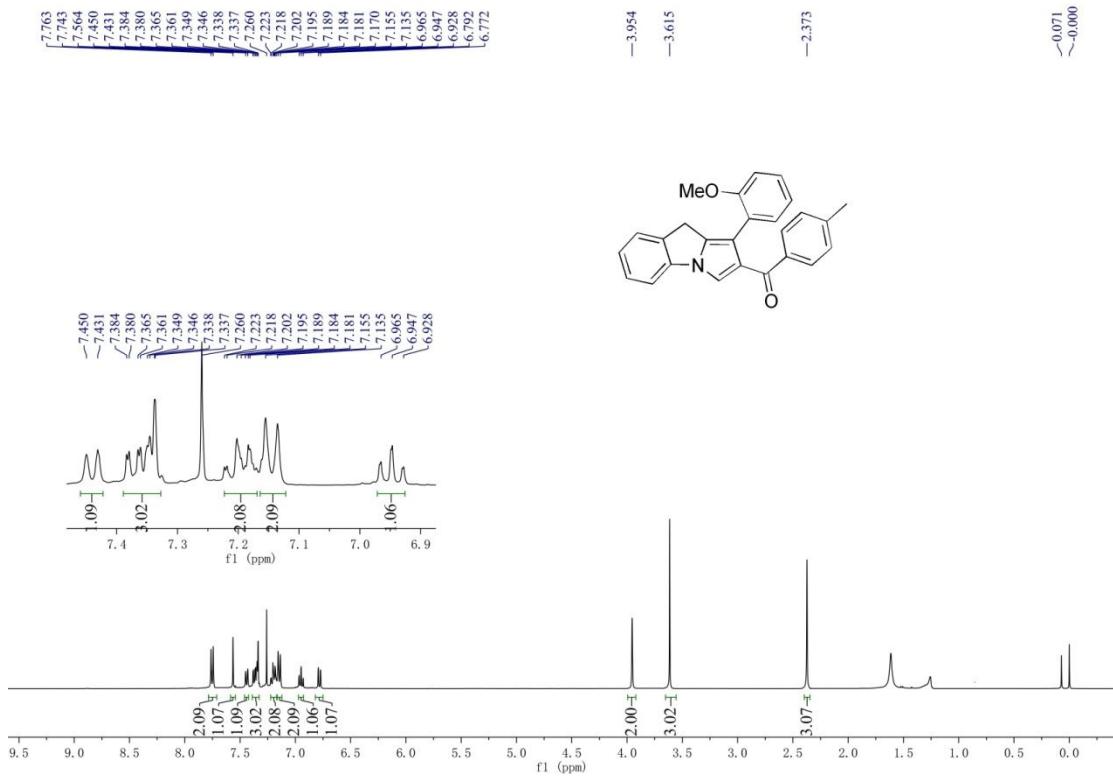


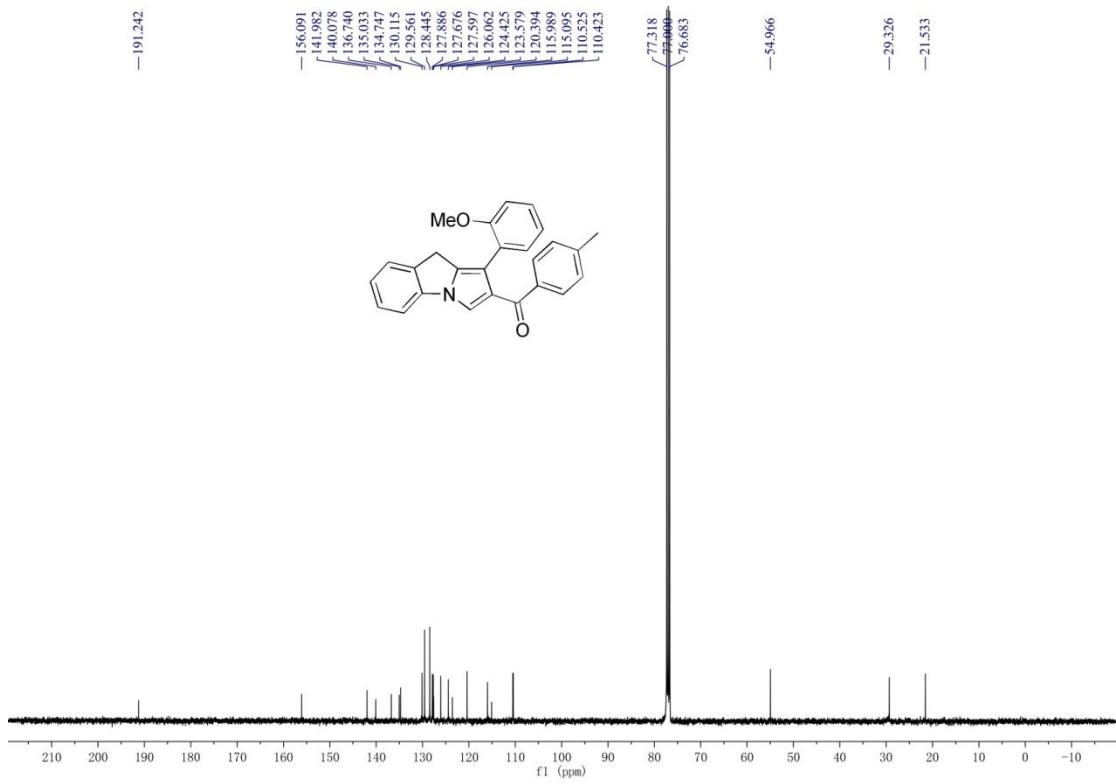
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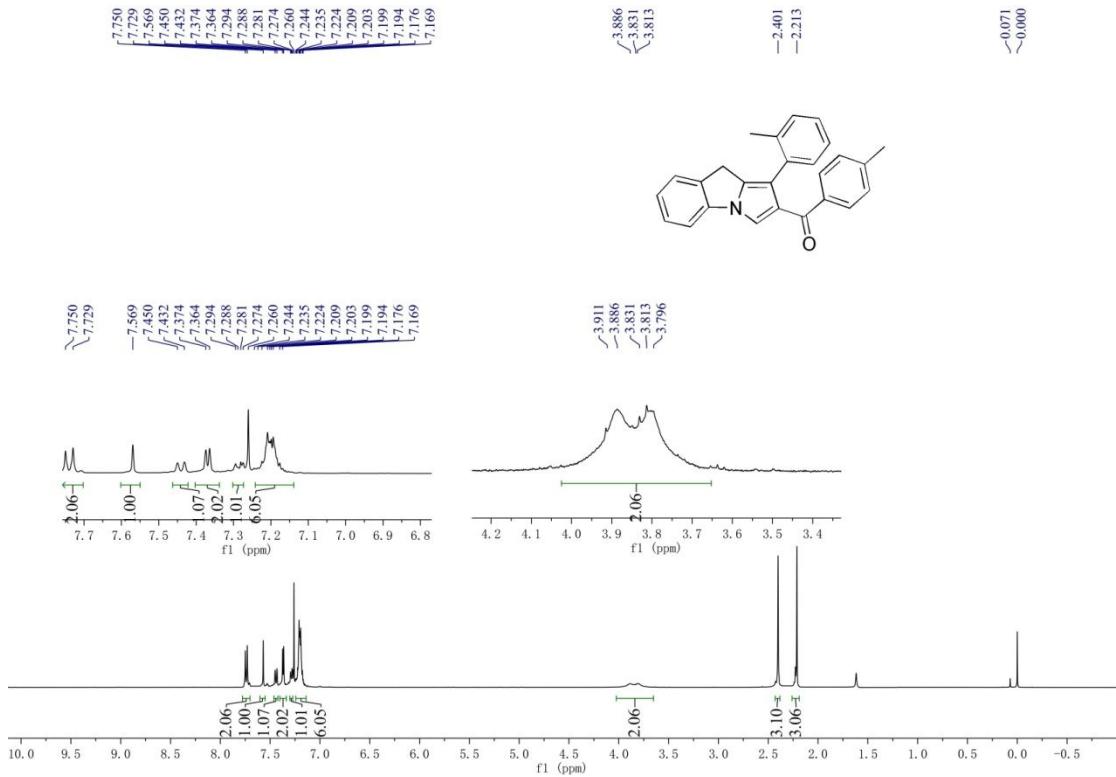


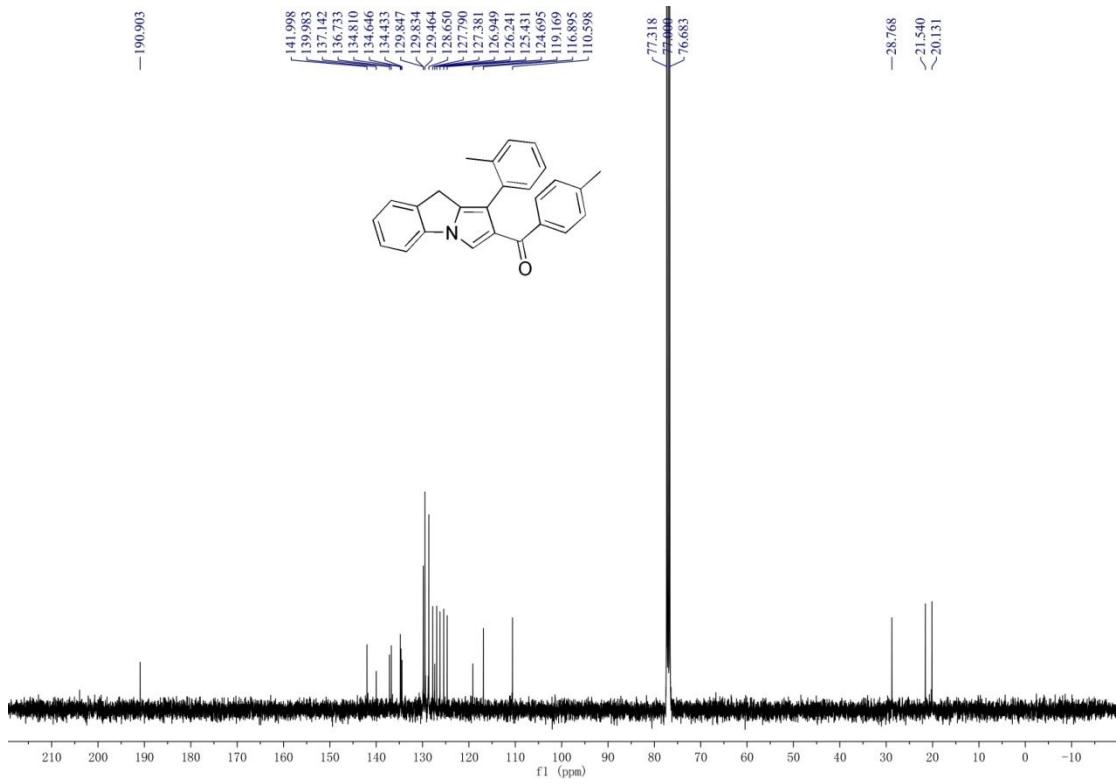
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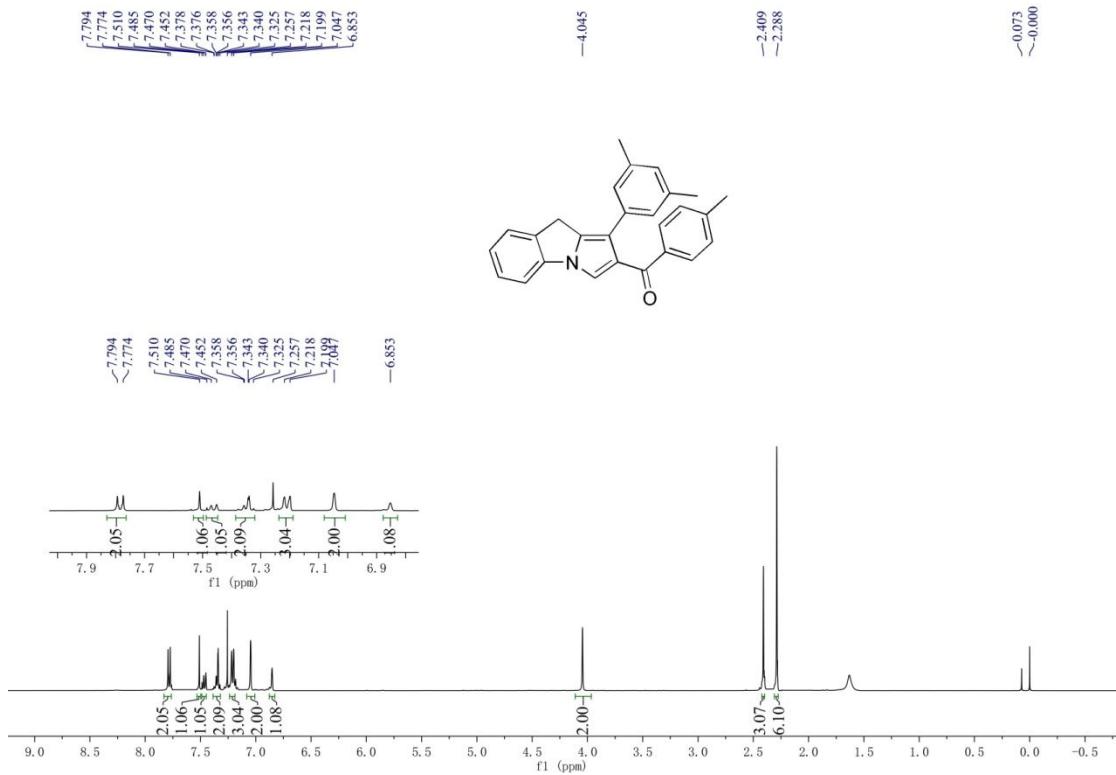


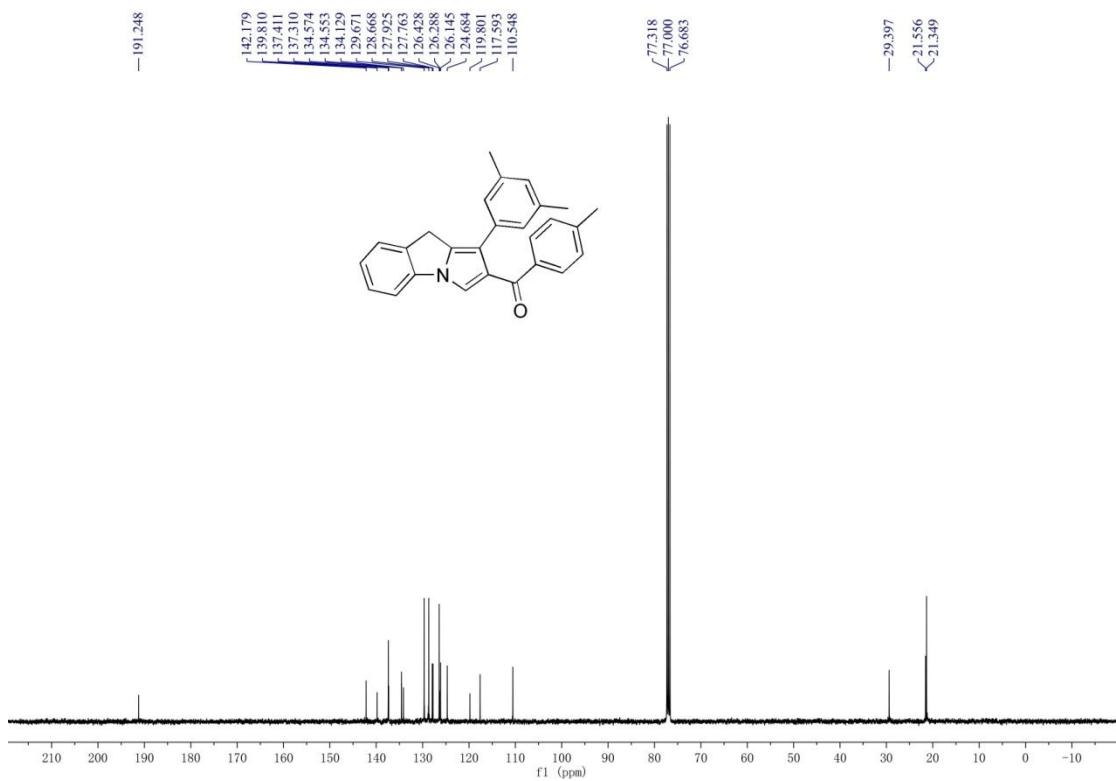
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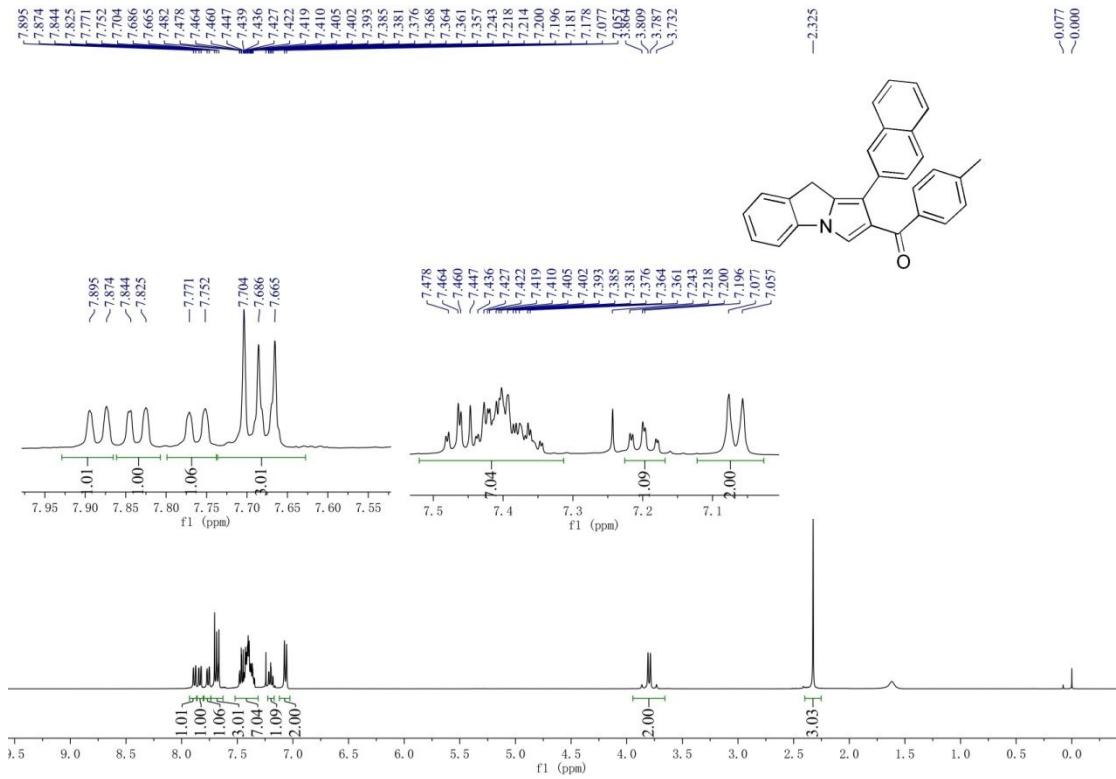


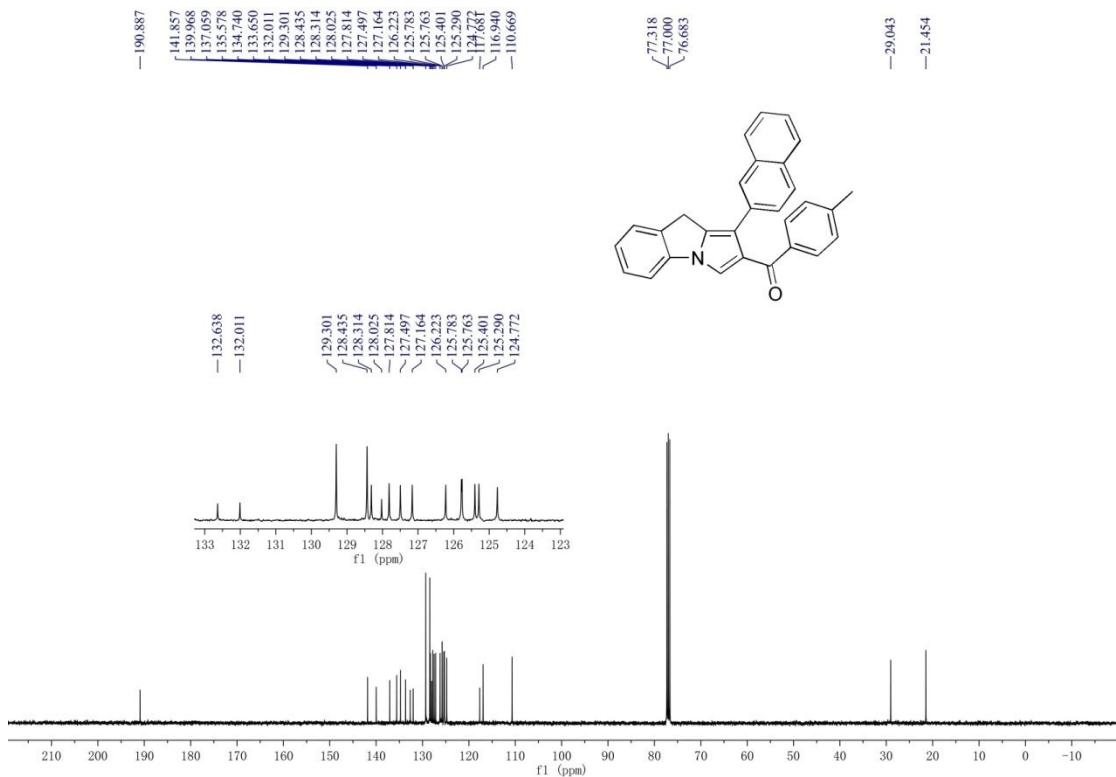
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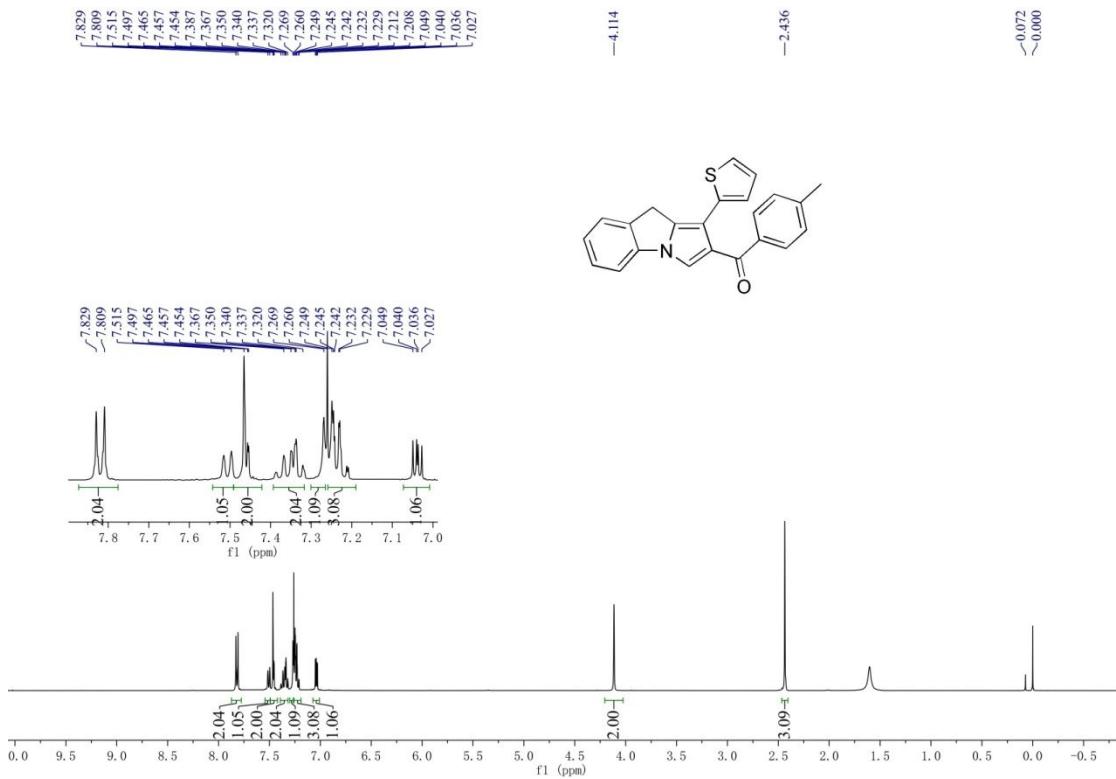


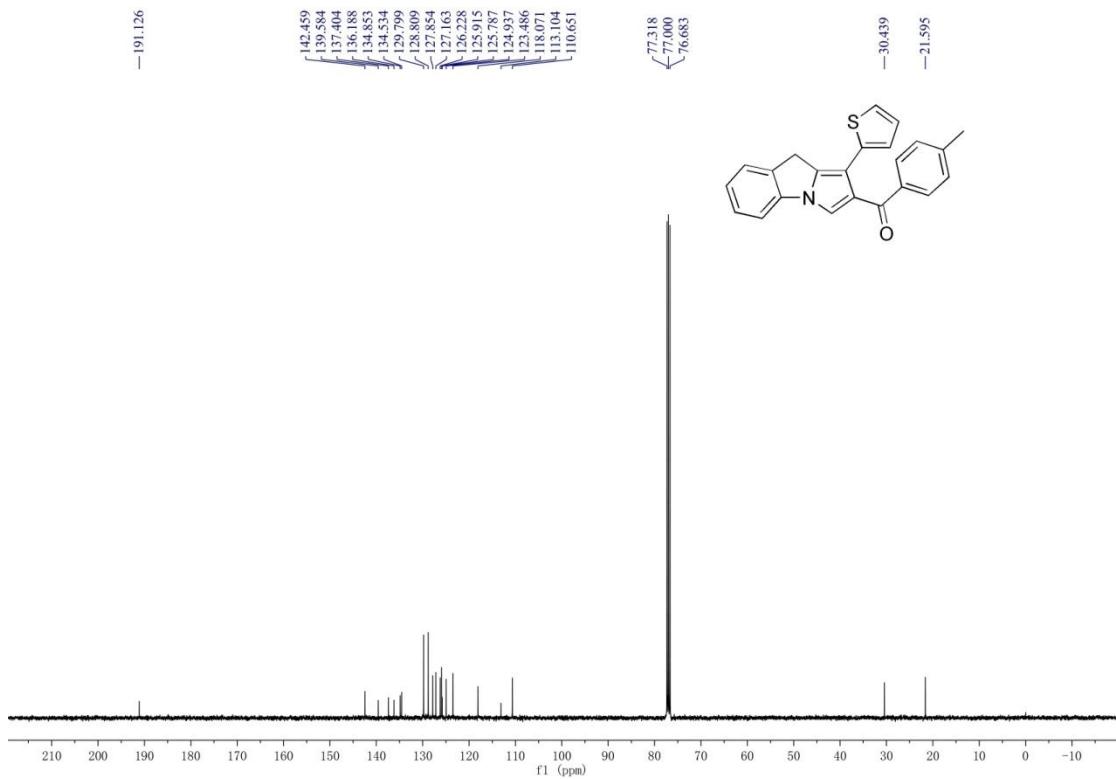
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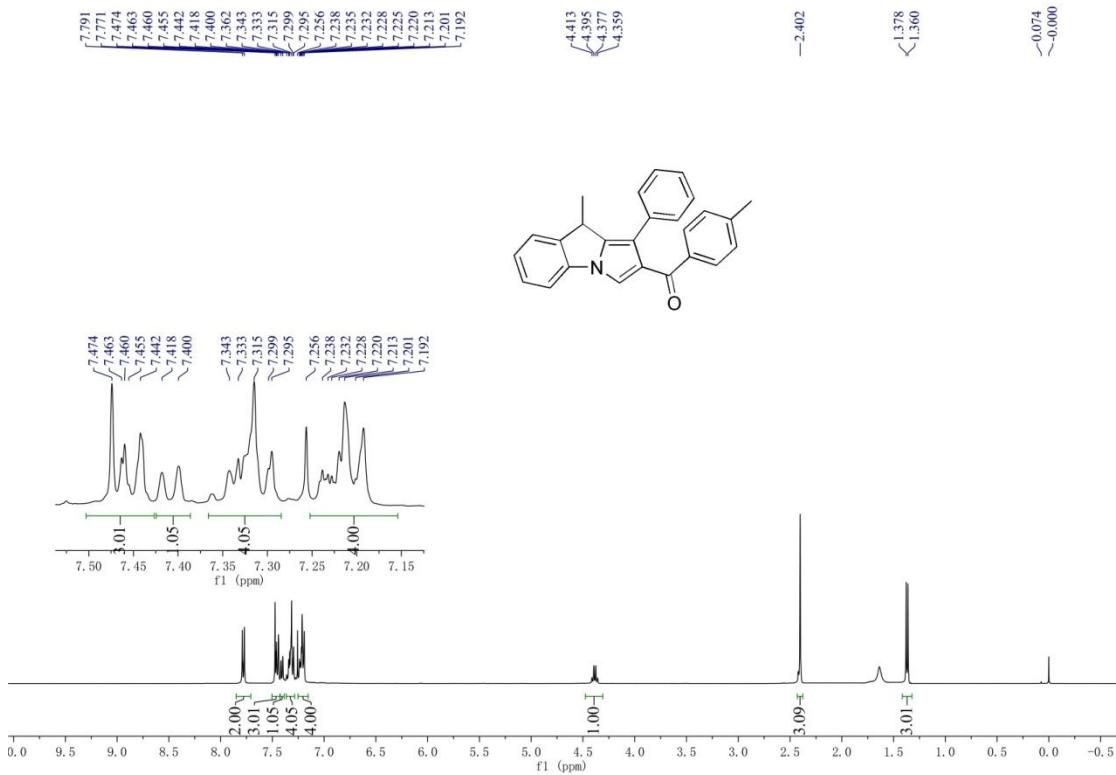


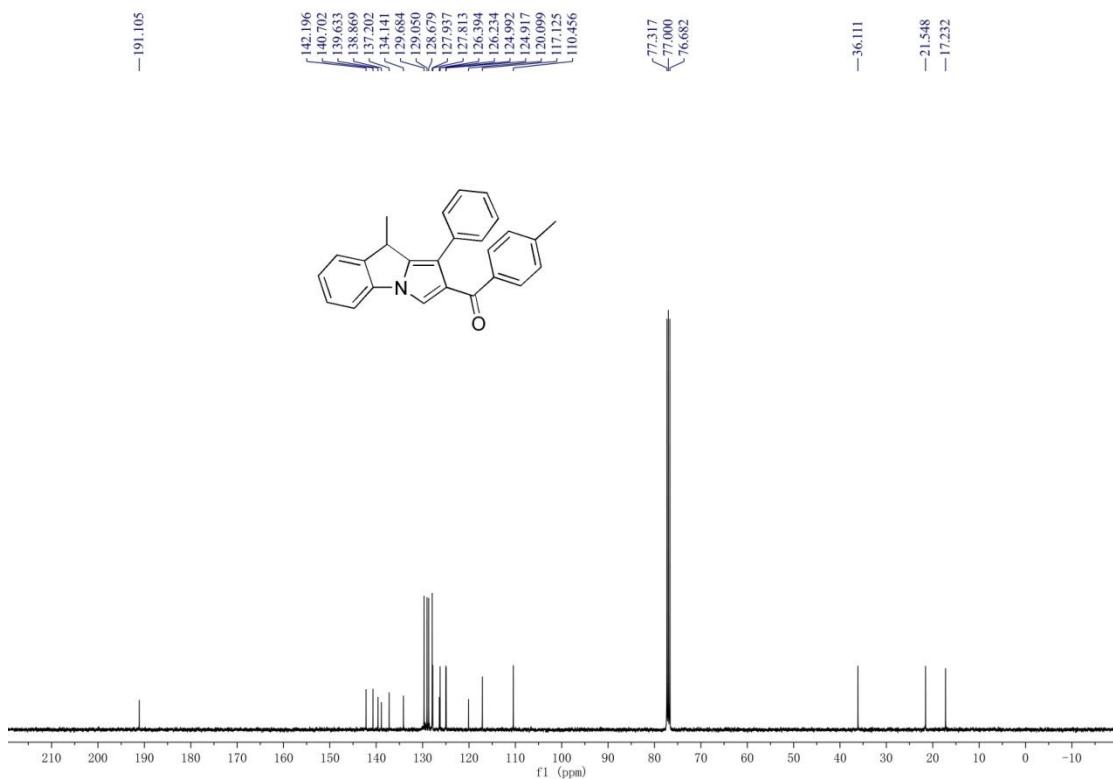
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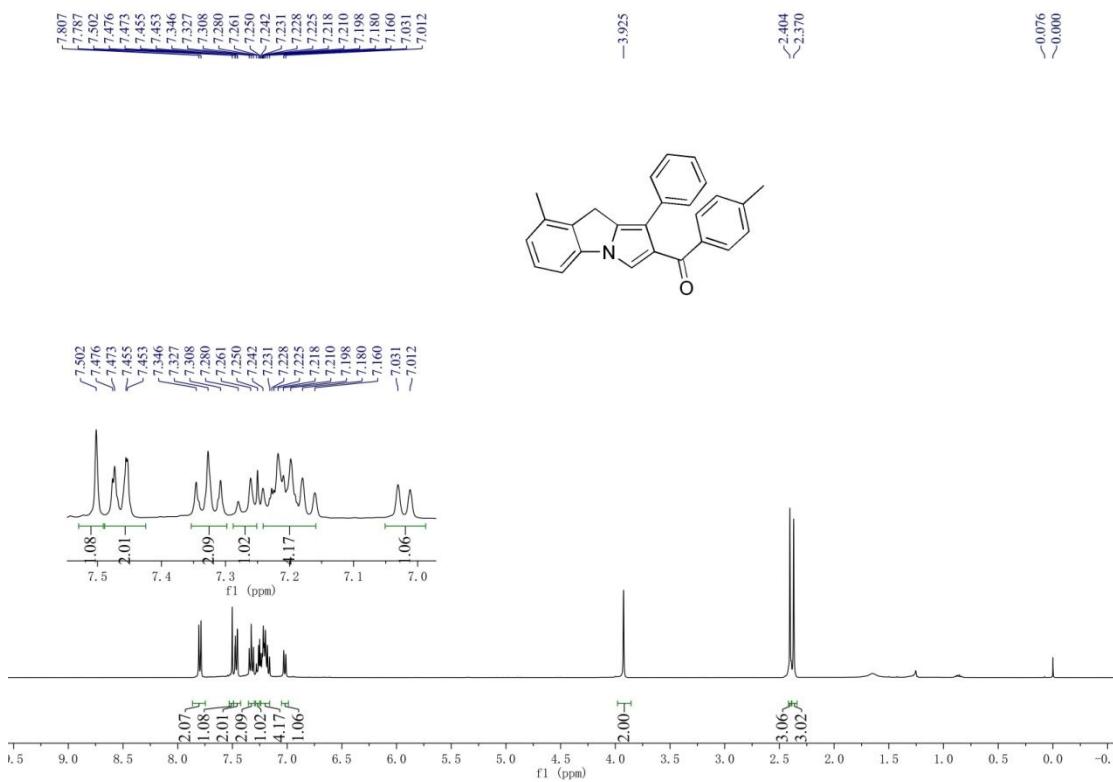


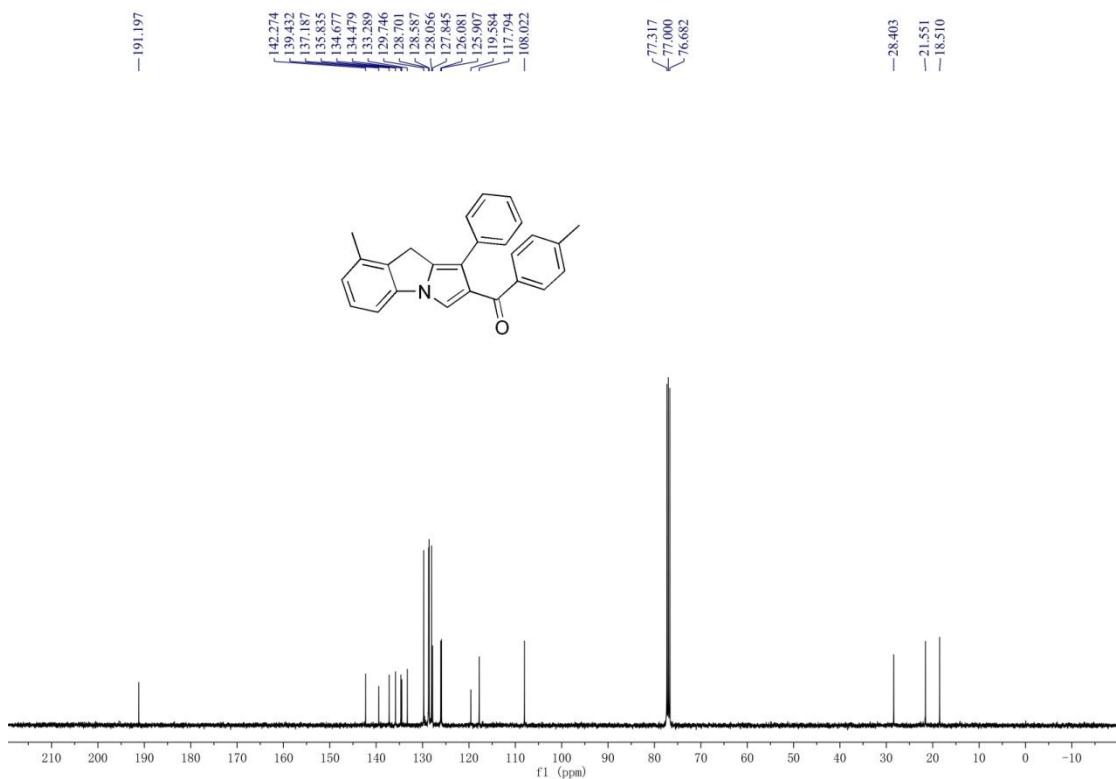
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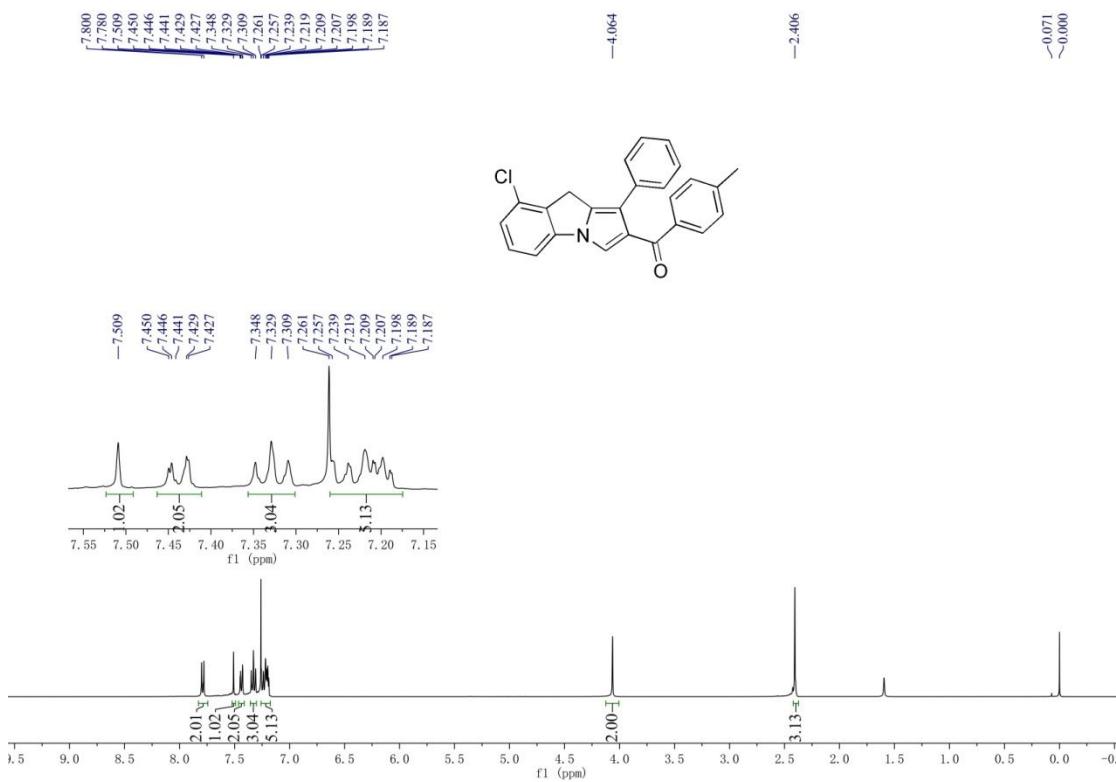


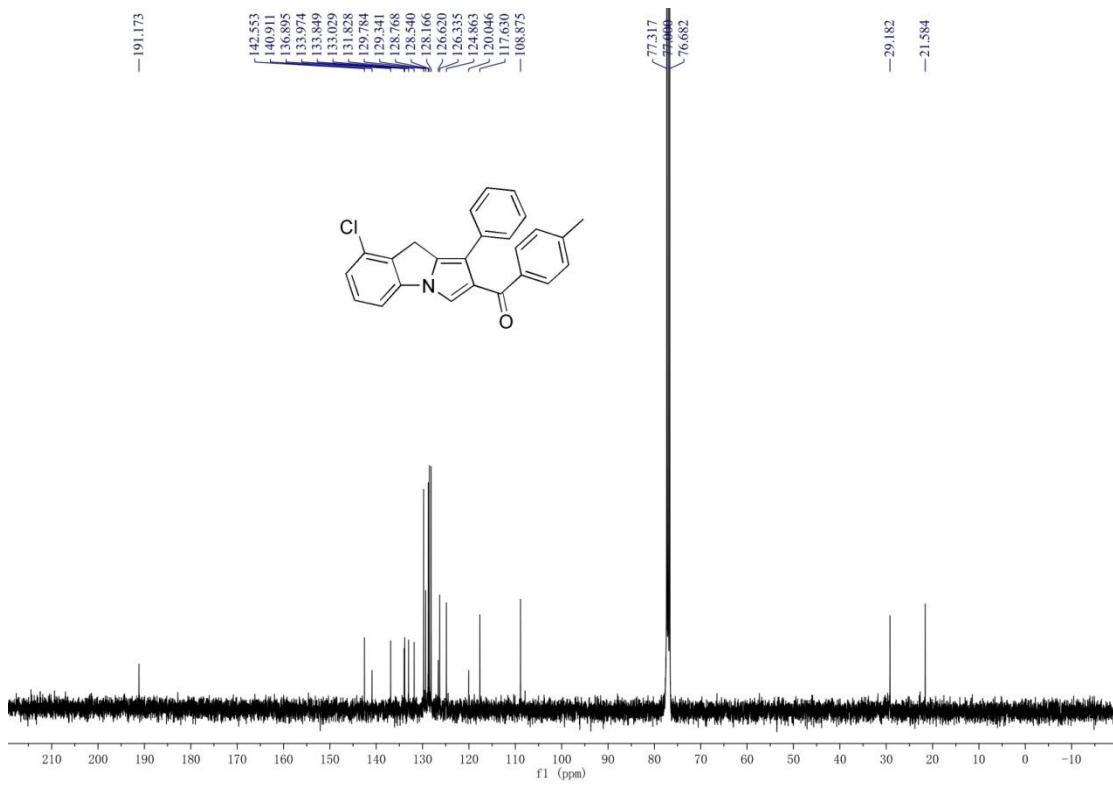
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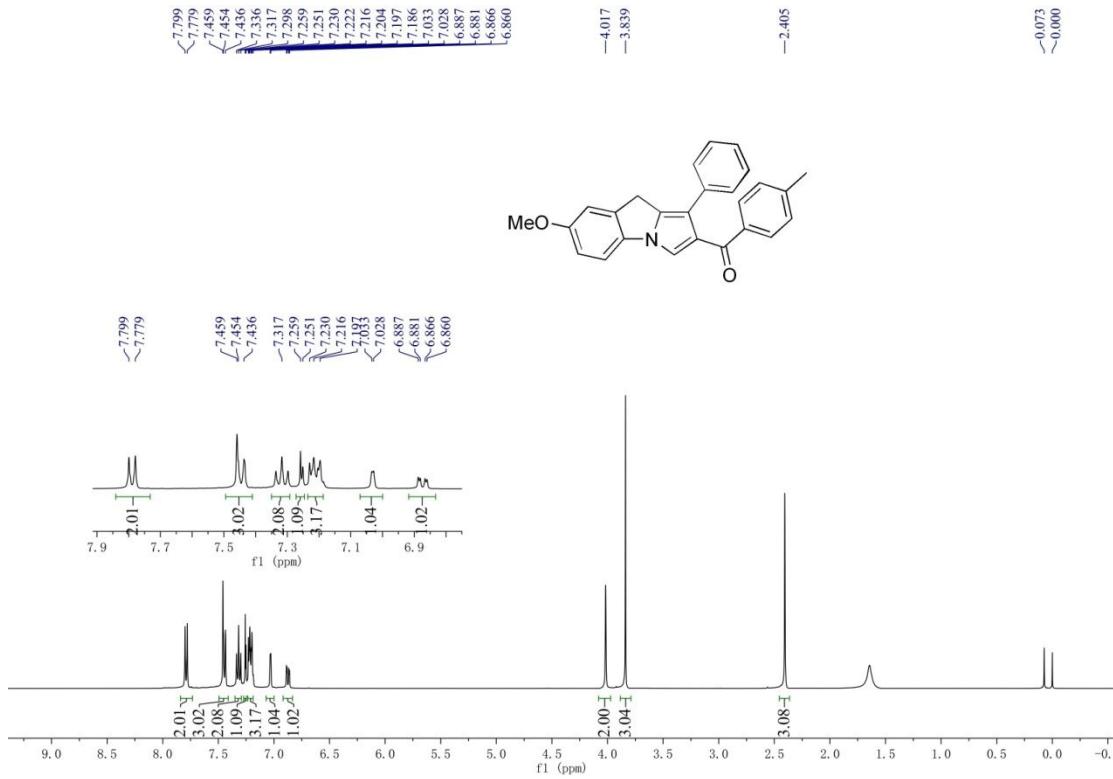


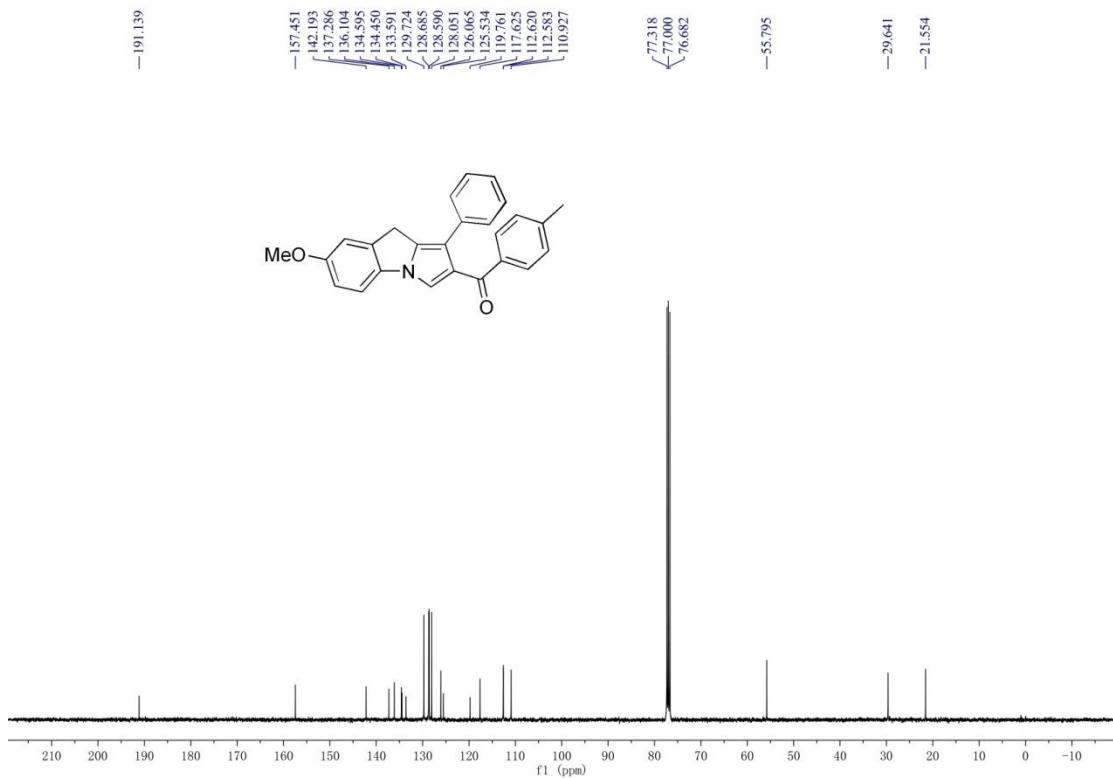
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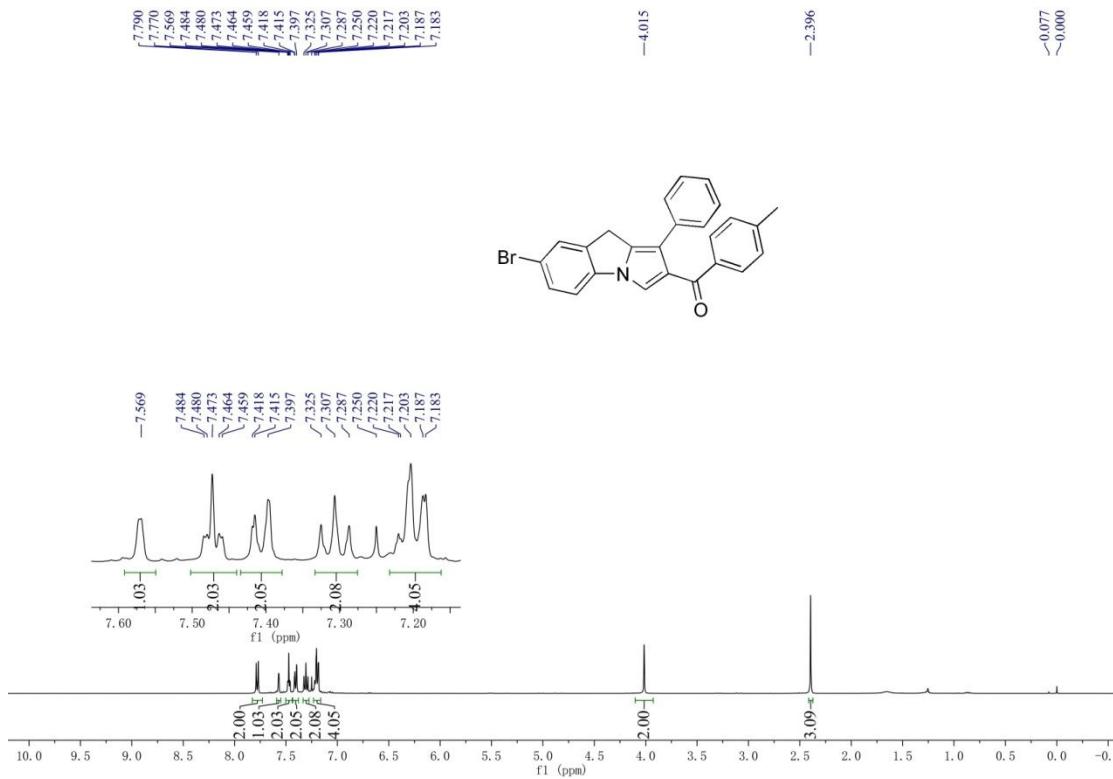


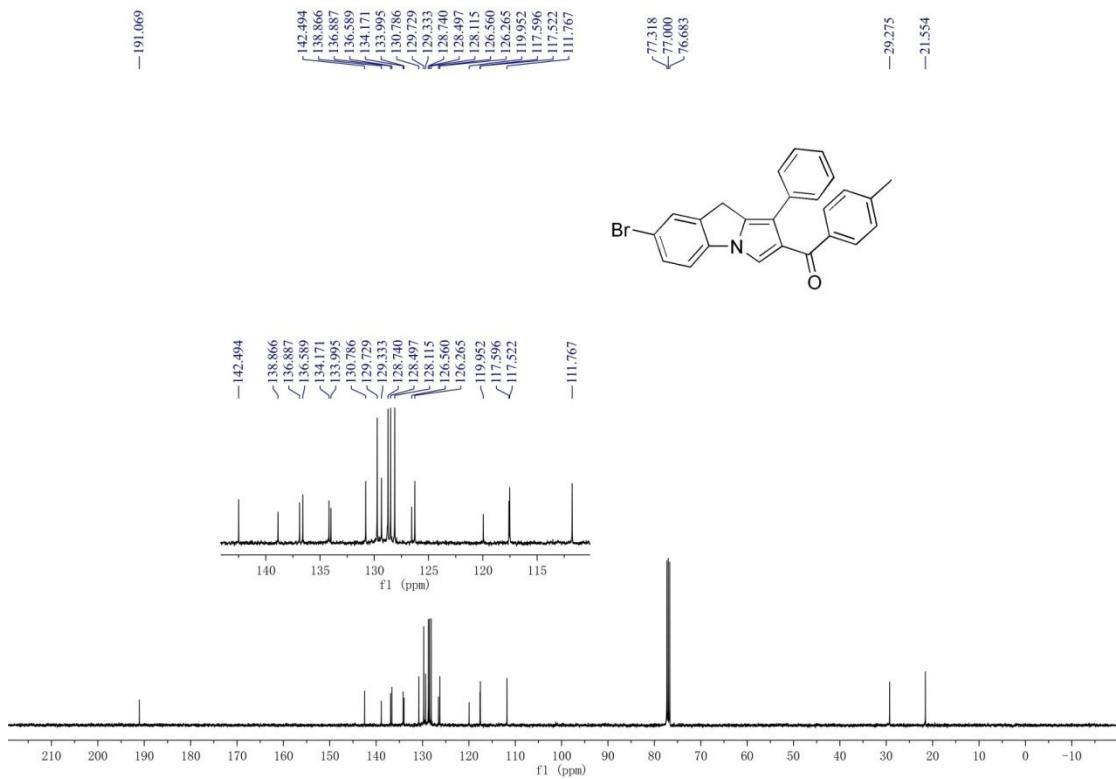
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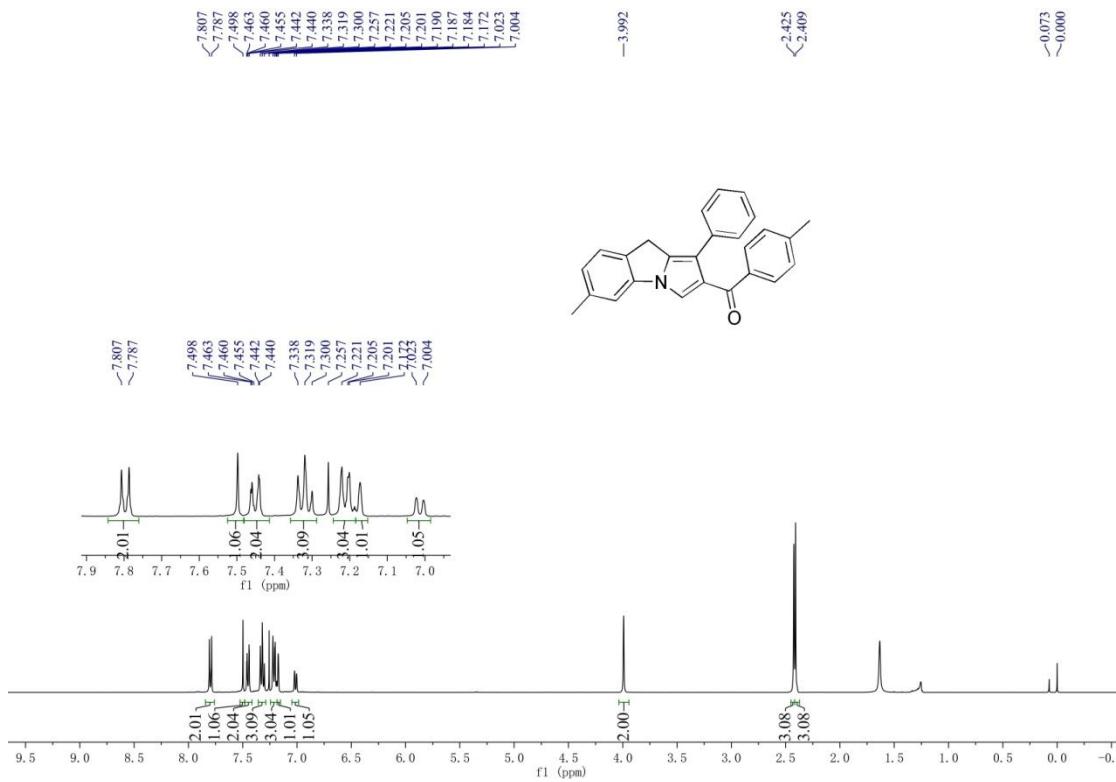


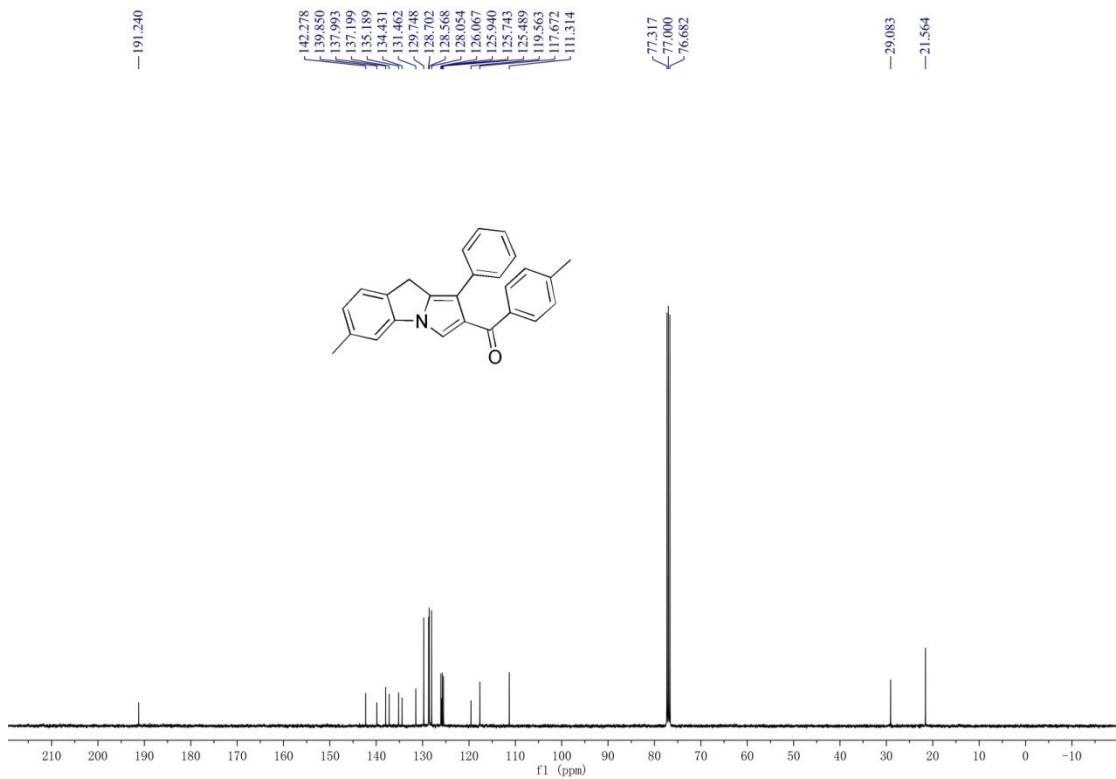
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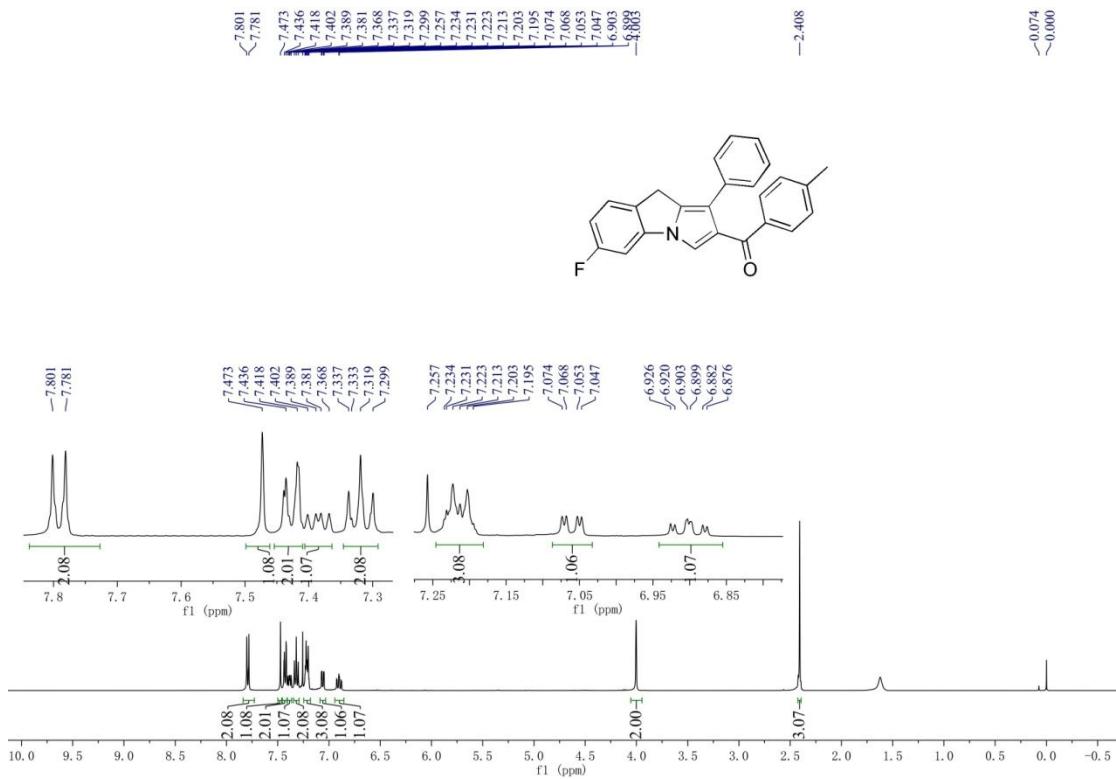


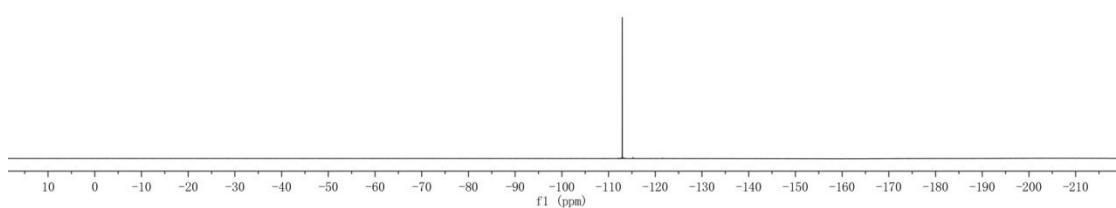
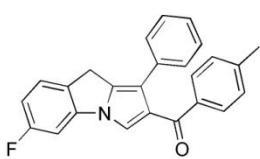
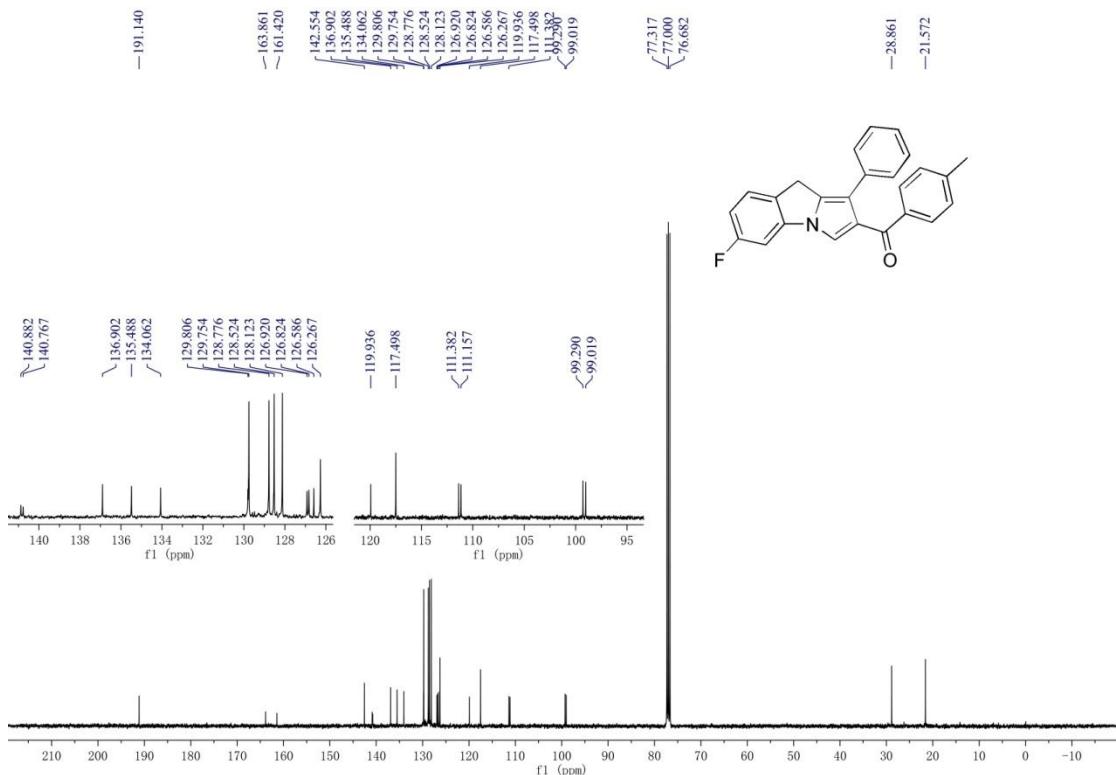
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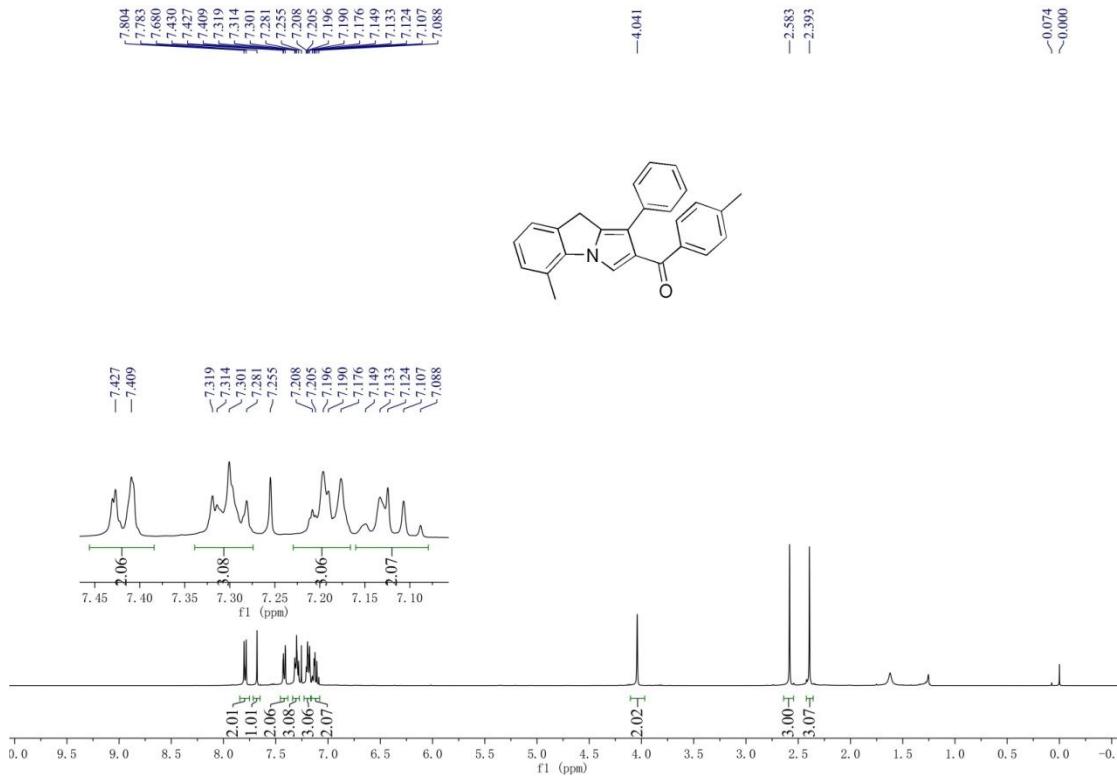


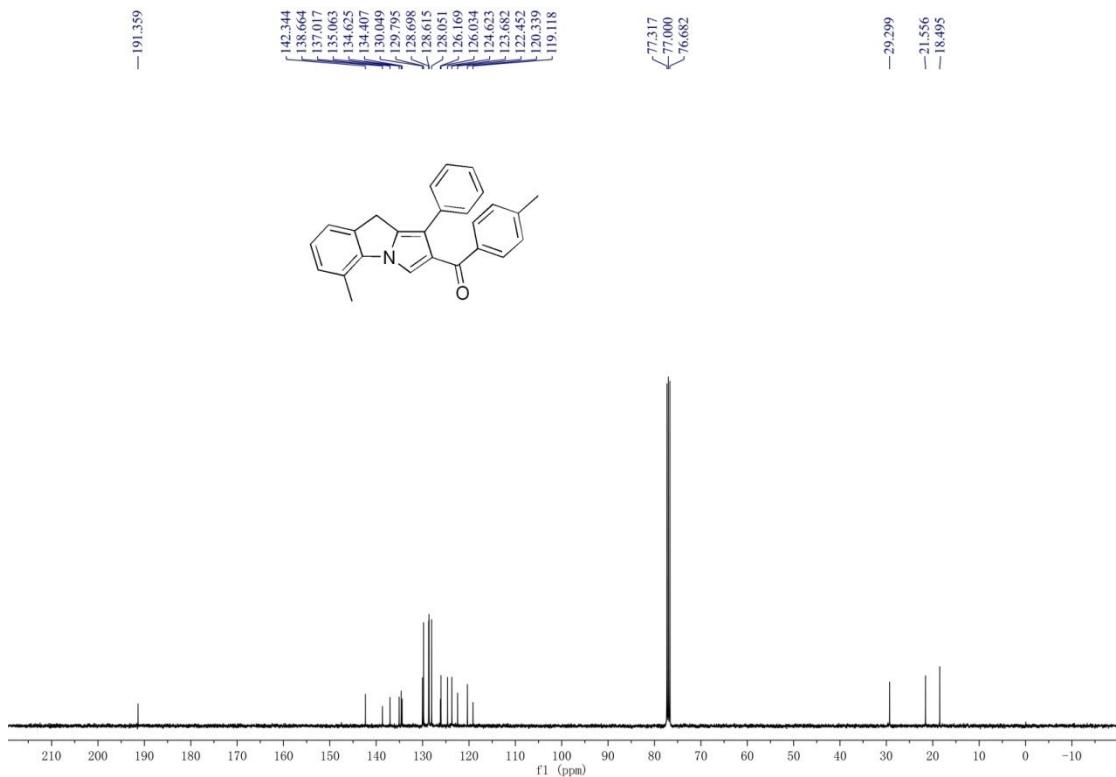
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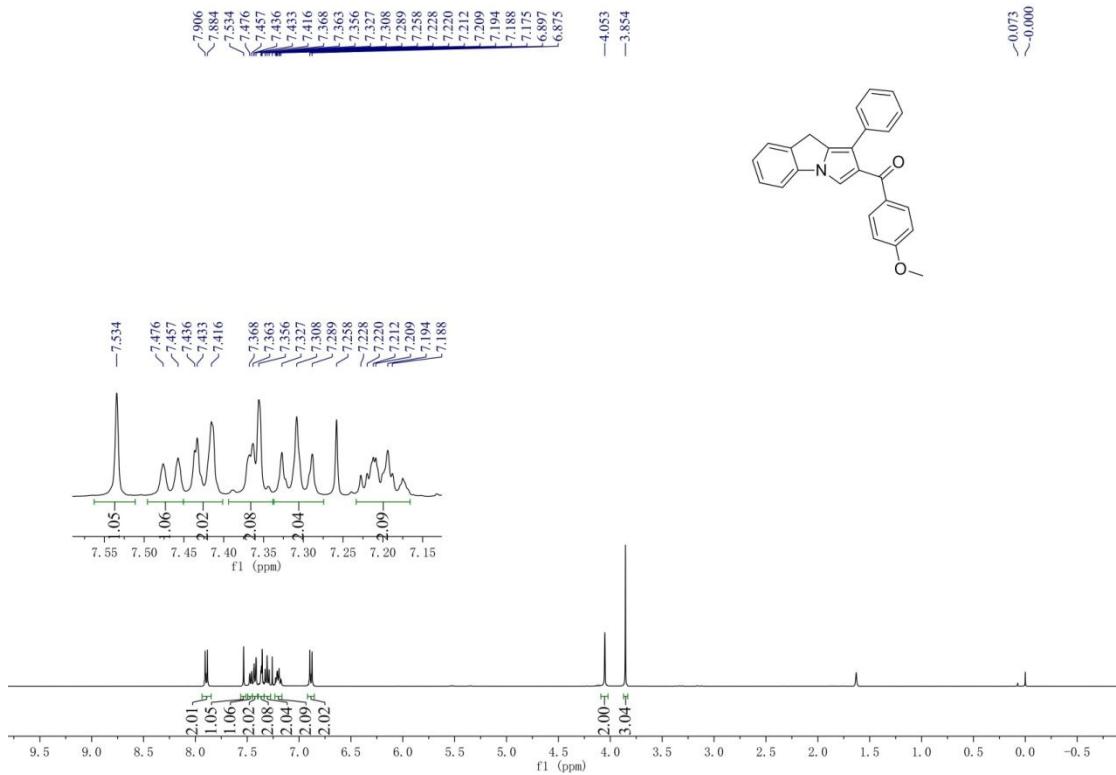


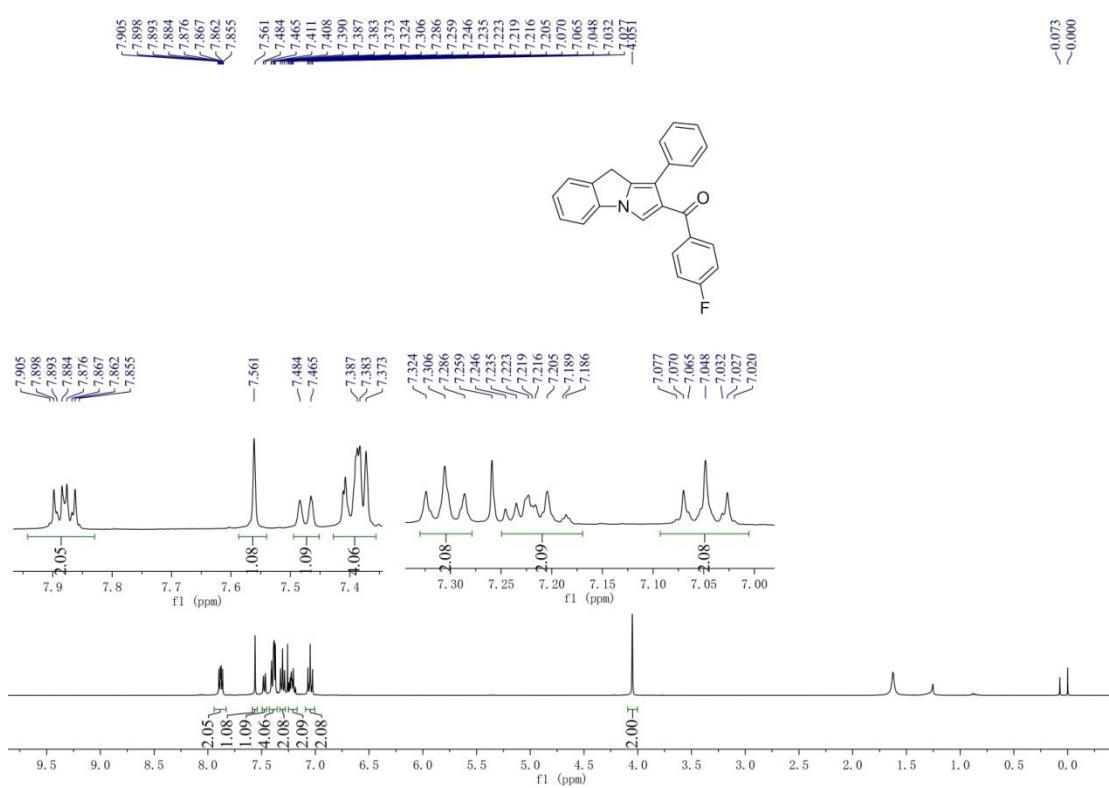
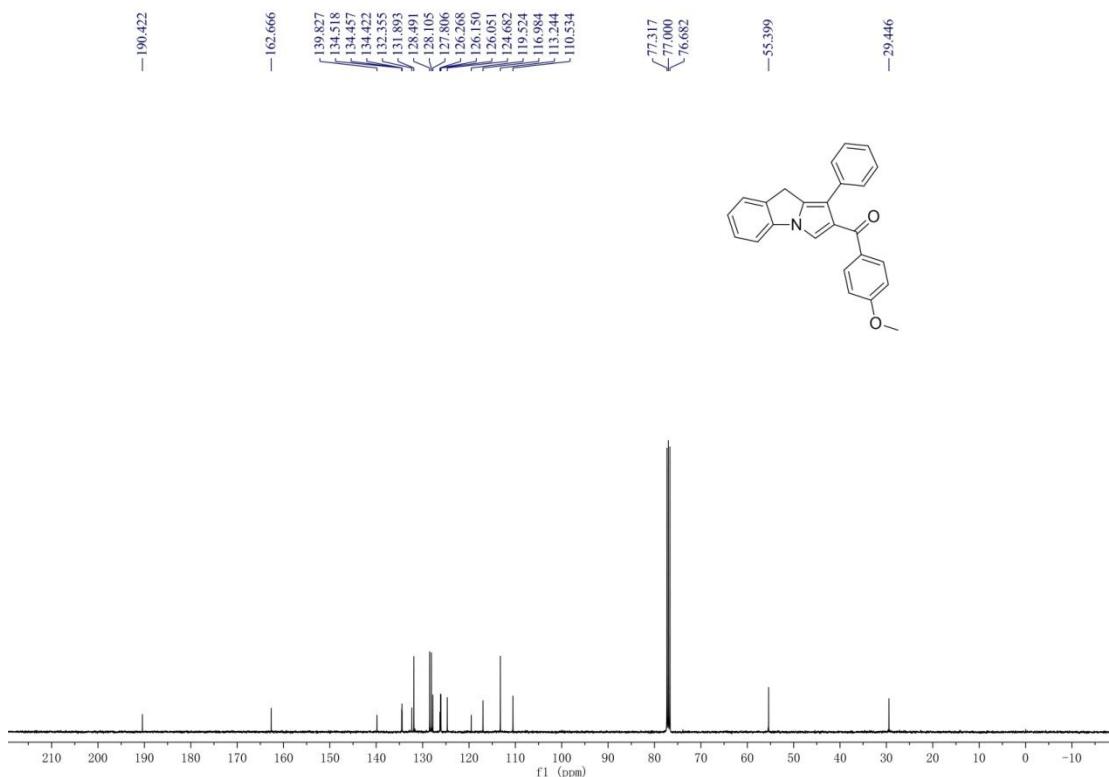
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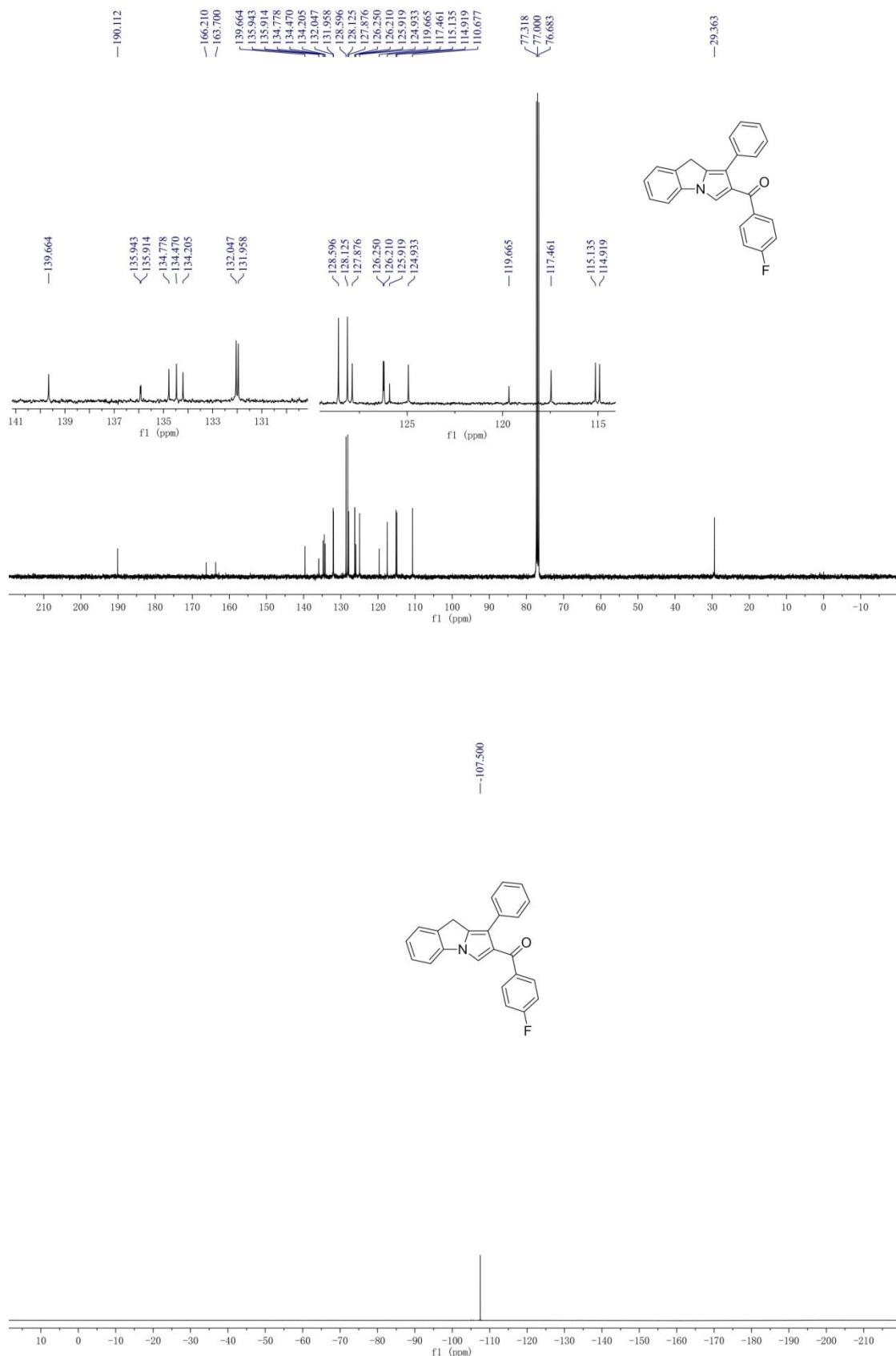




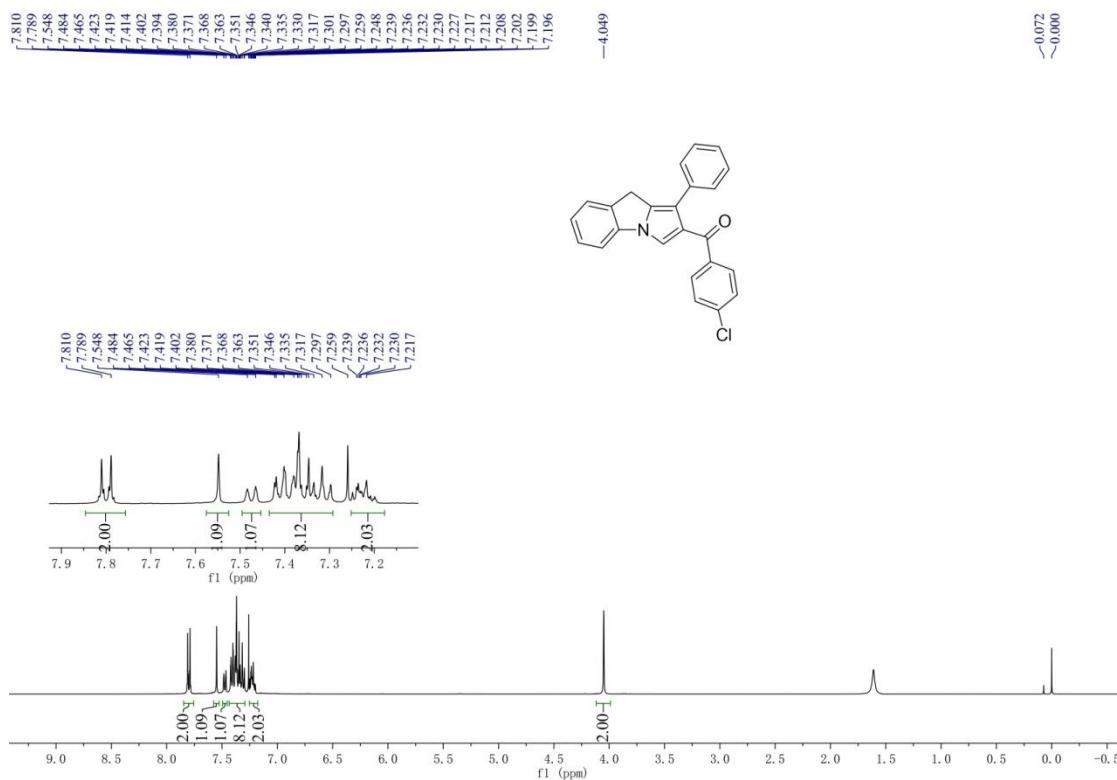
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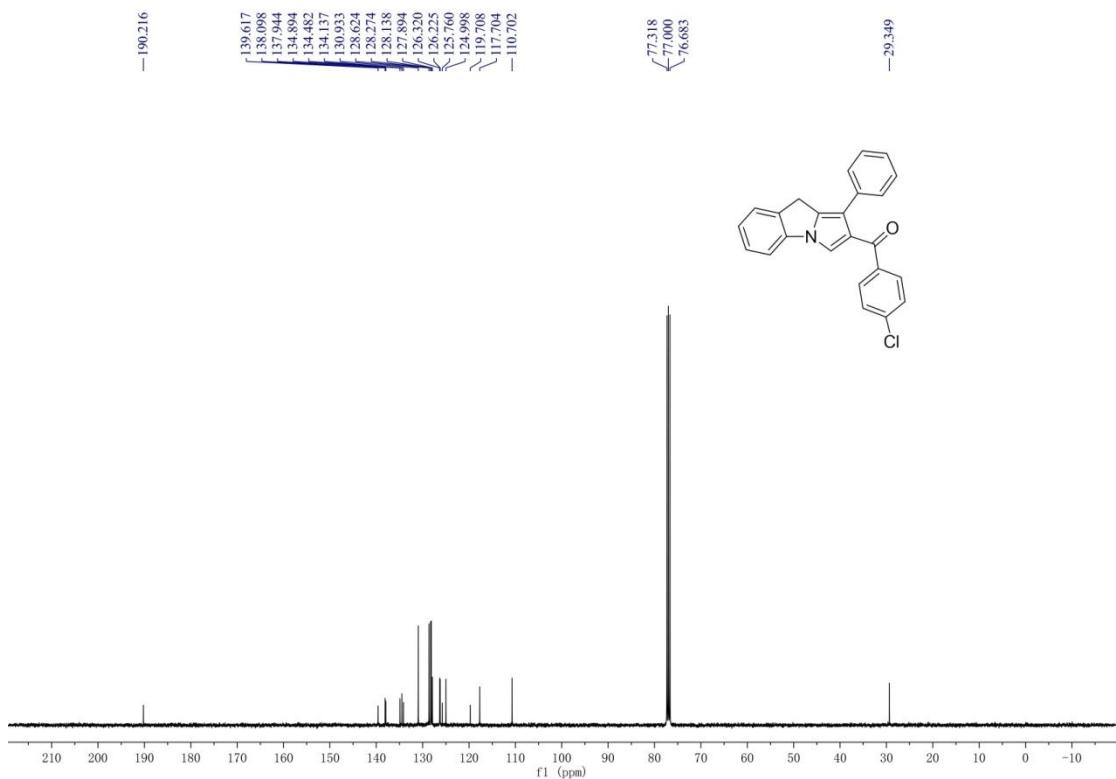




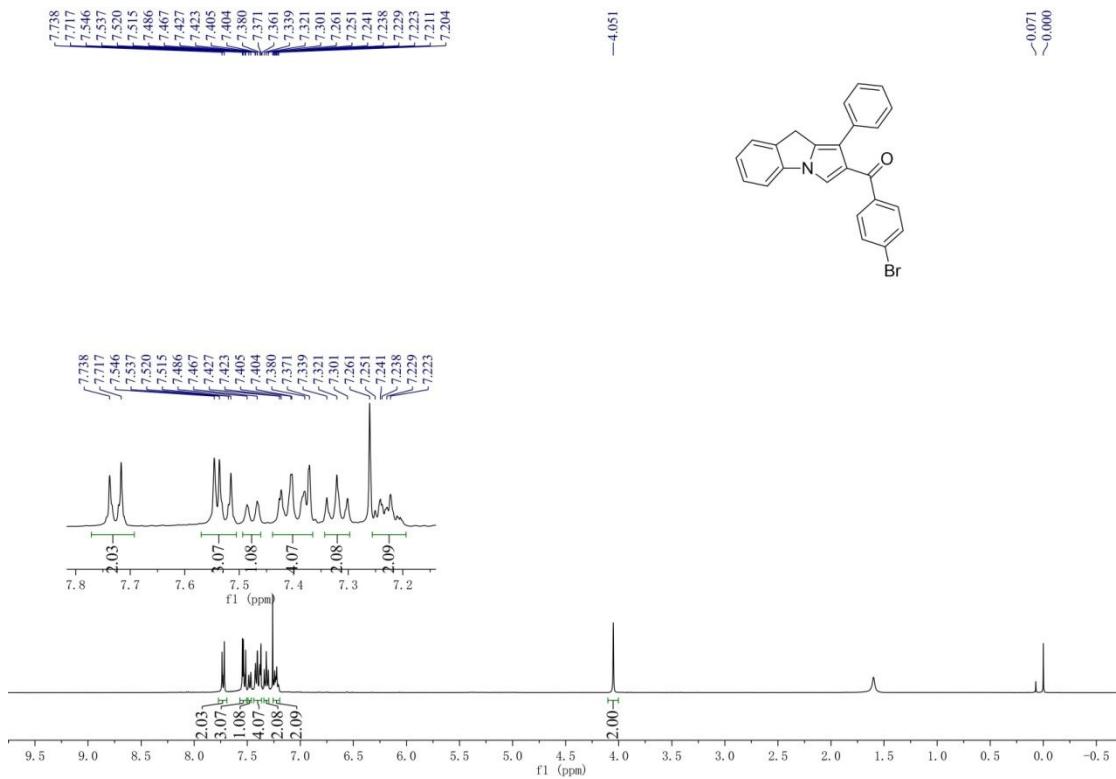


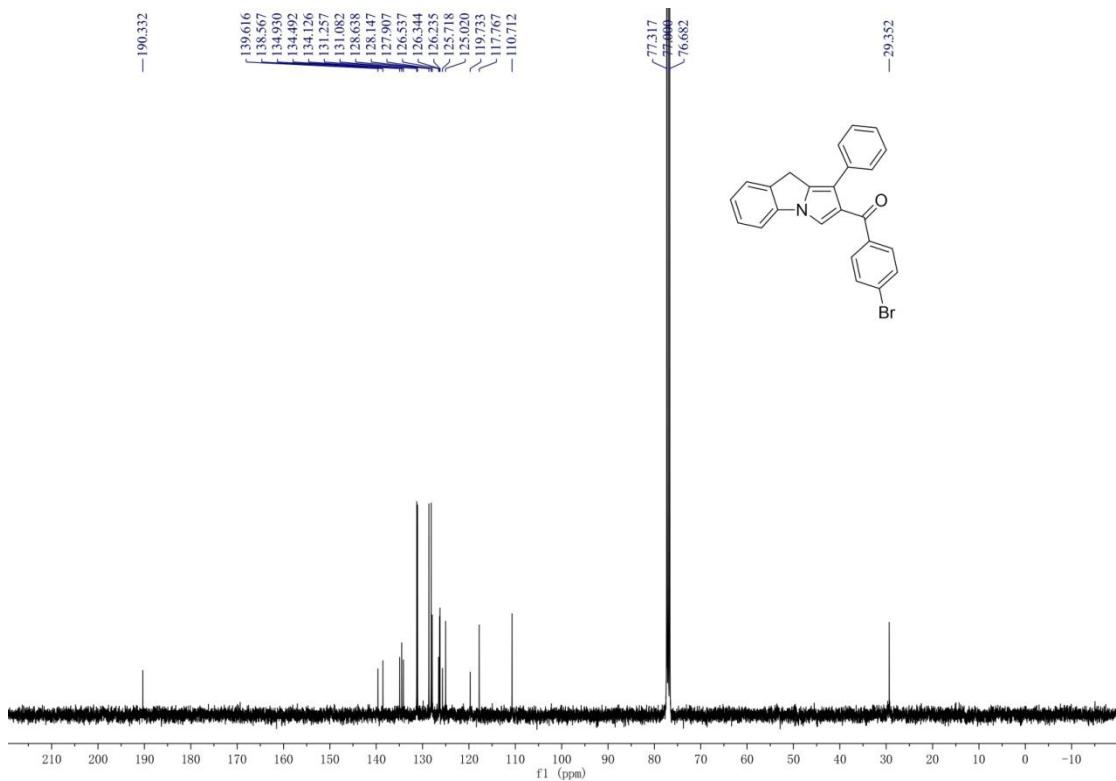
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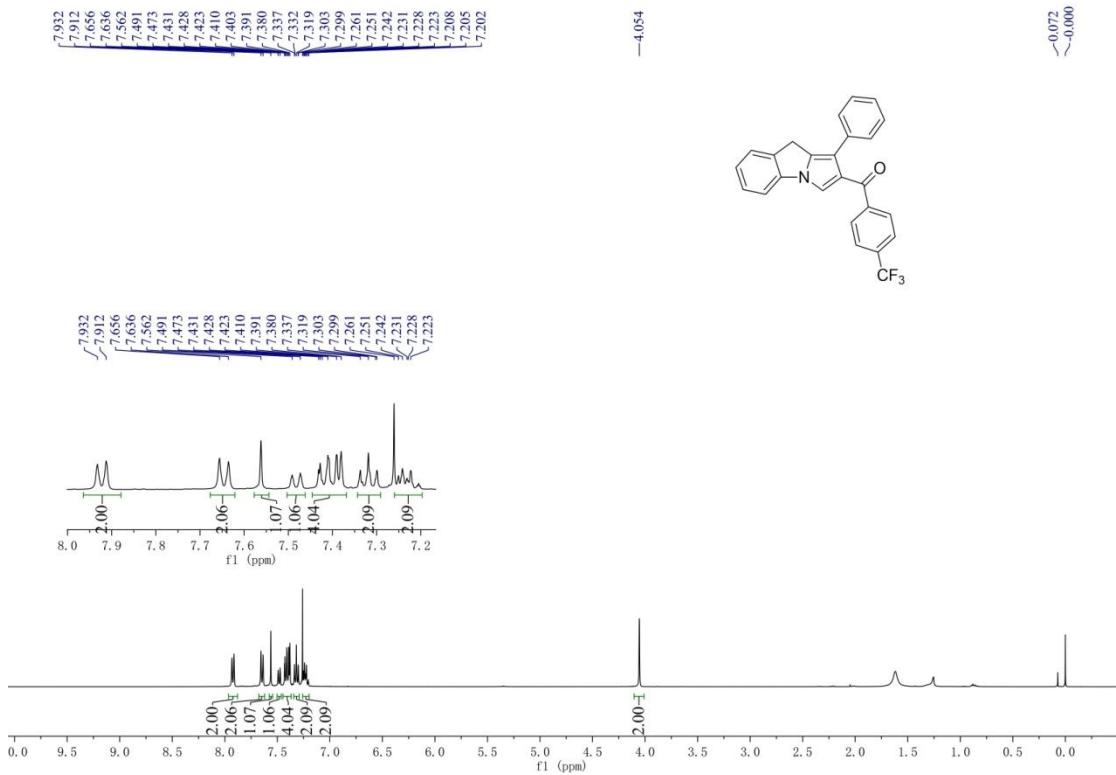


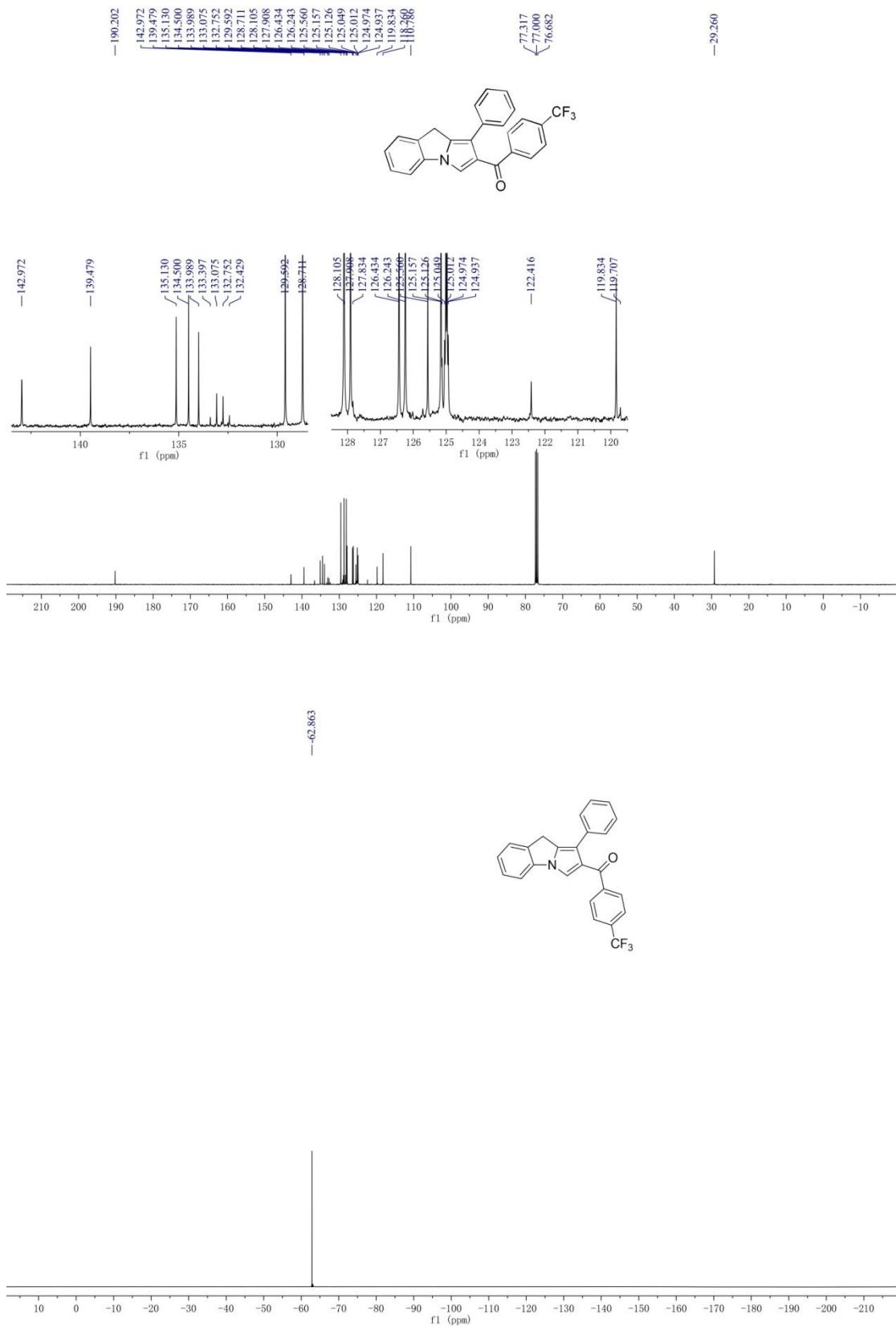
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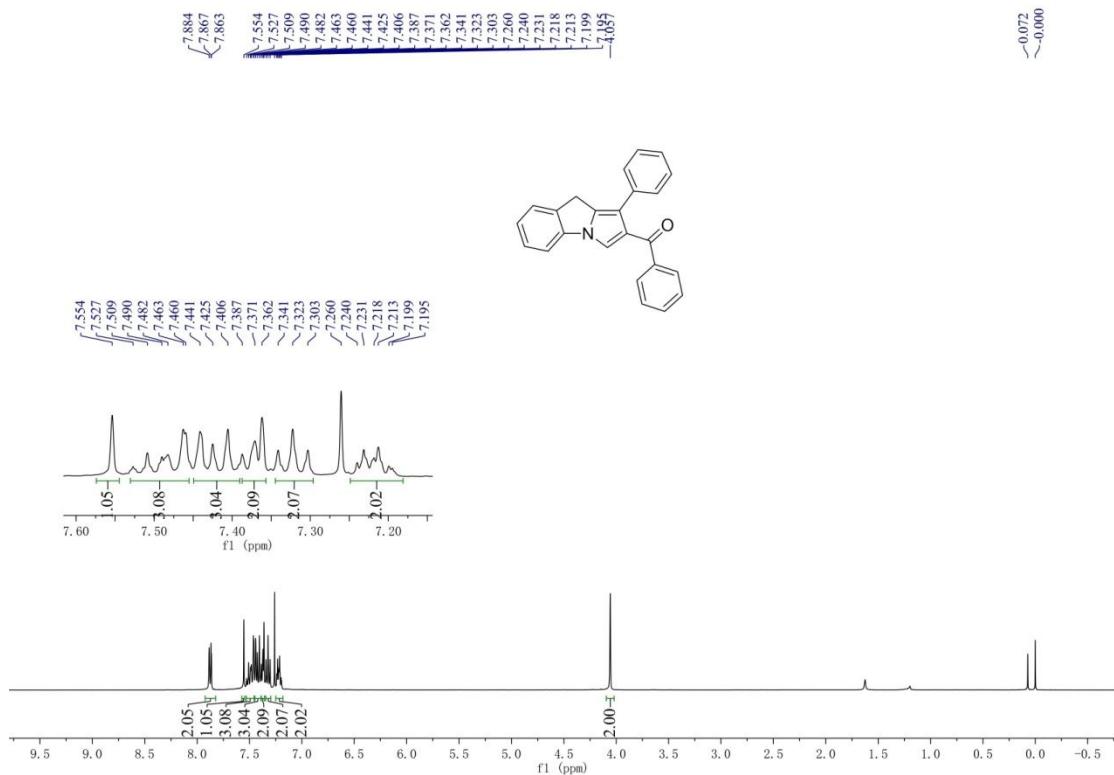


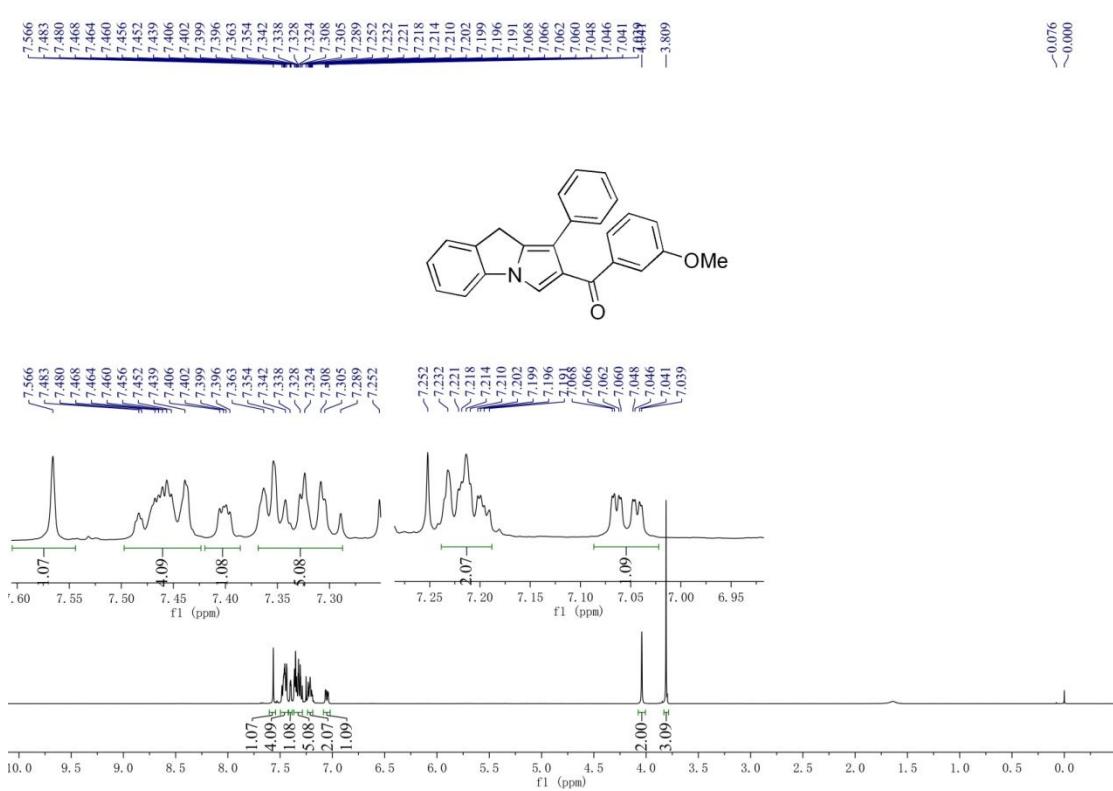
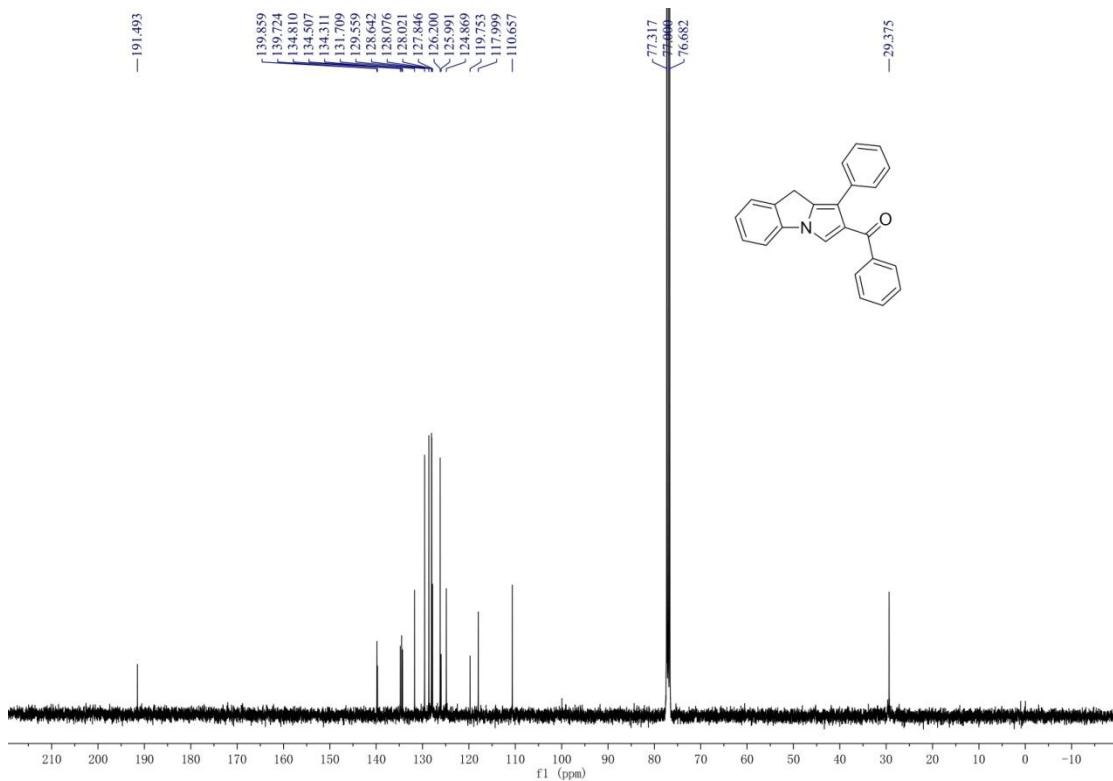
(1-Phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)(4-(trifluoromethyl)phenyl)methanone (3ag)

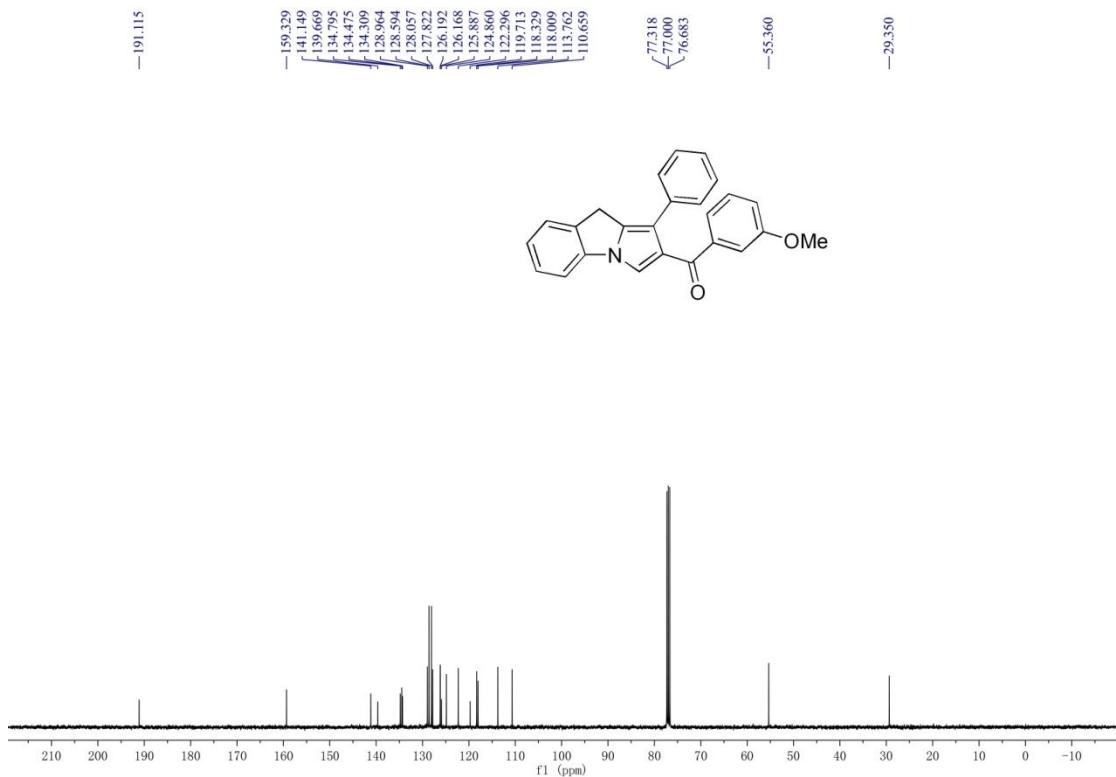




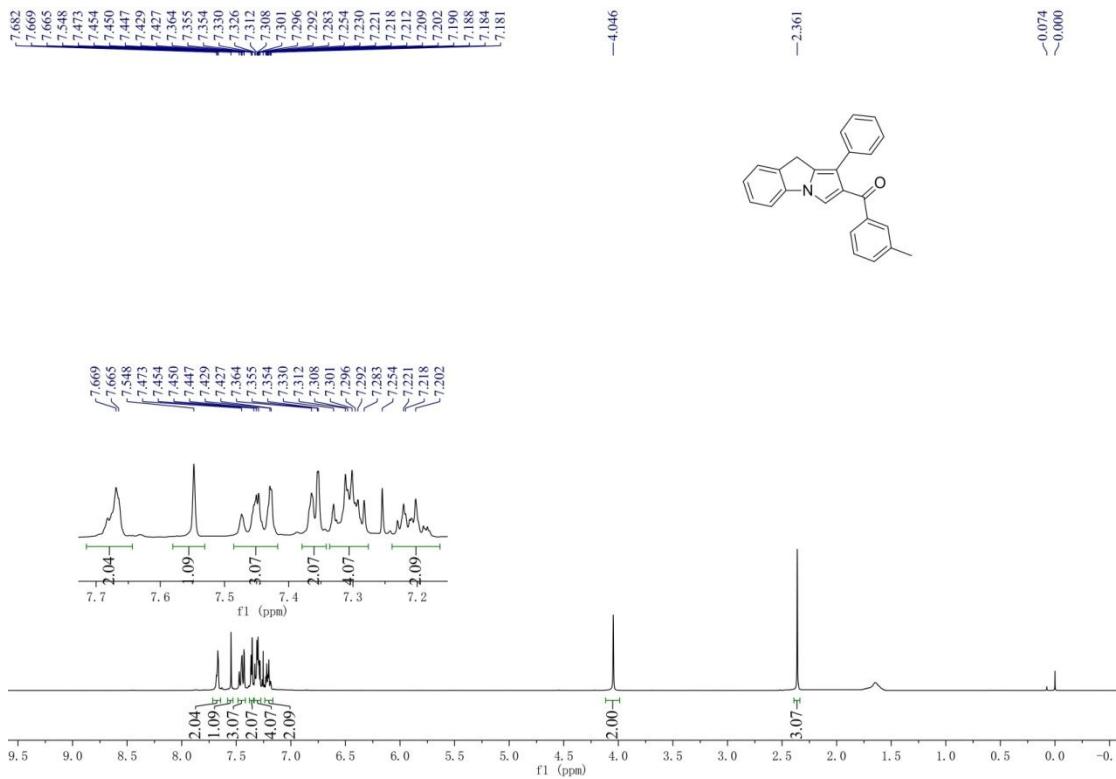
Phenyl(1-phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)methanone (3ah)

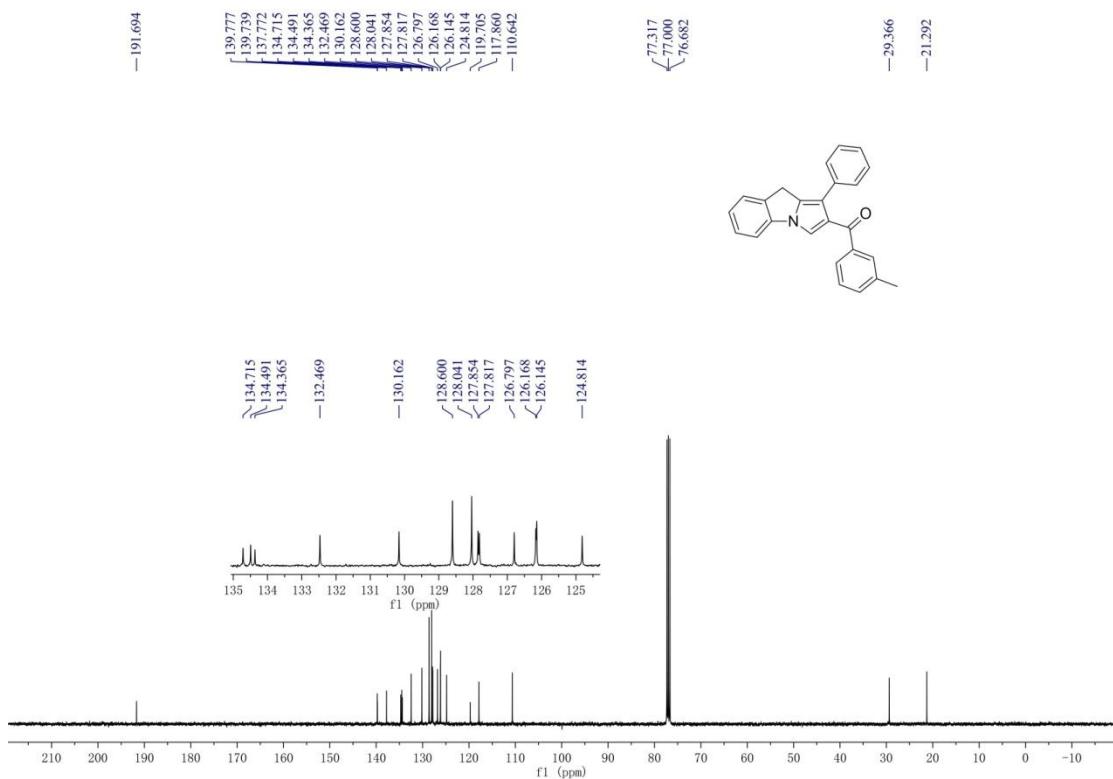




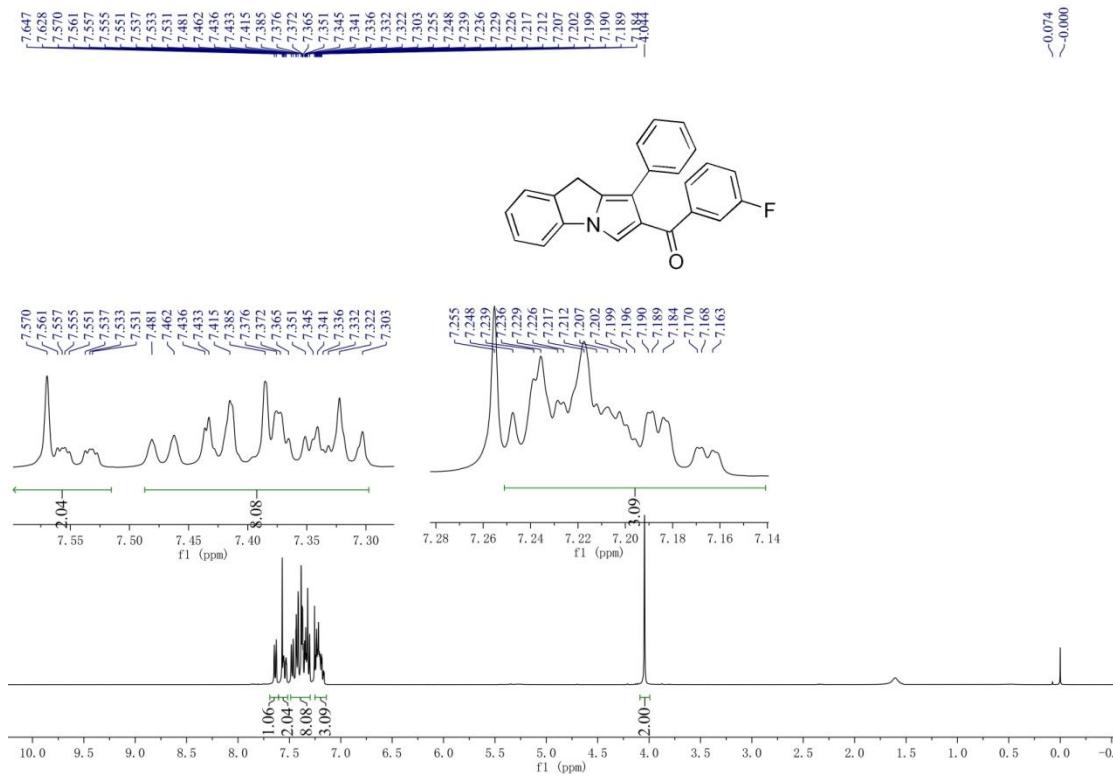


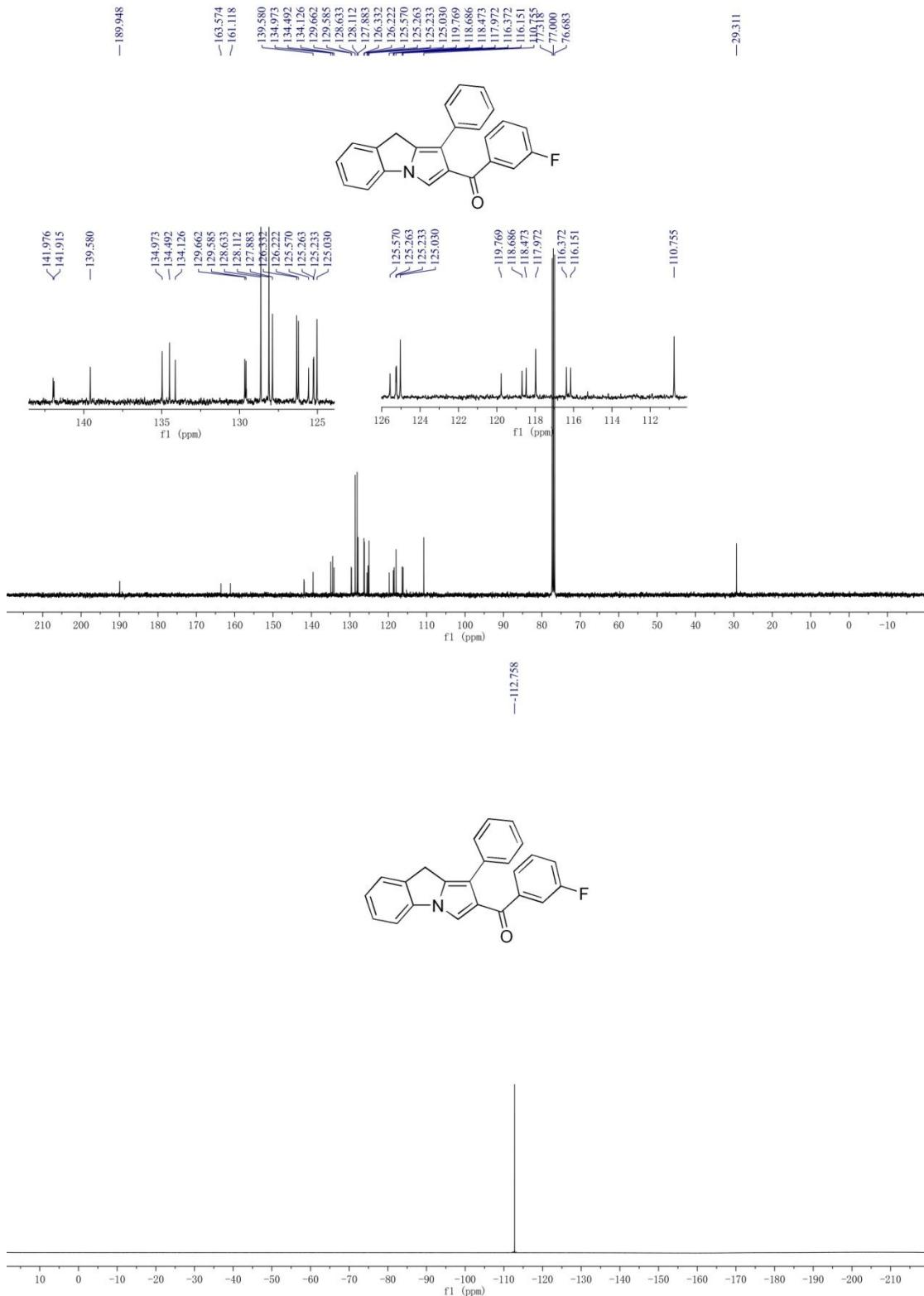
(1-Phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)(*m*-tolyl)methanone (3aj)



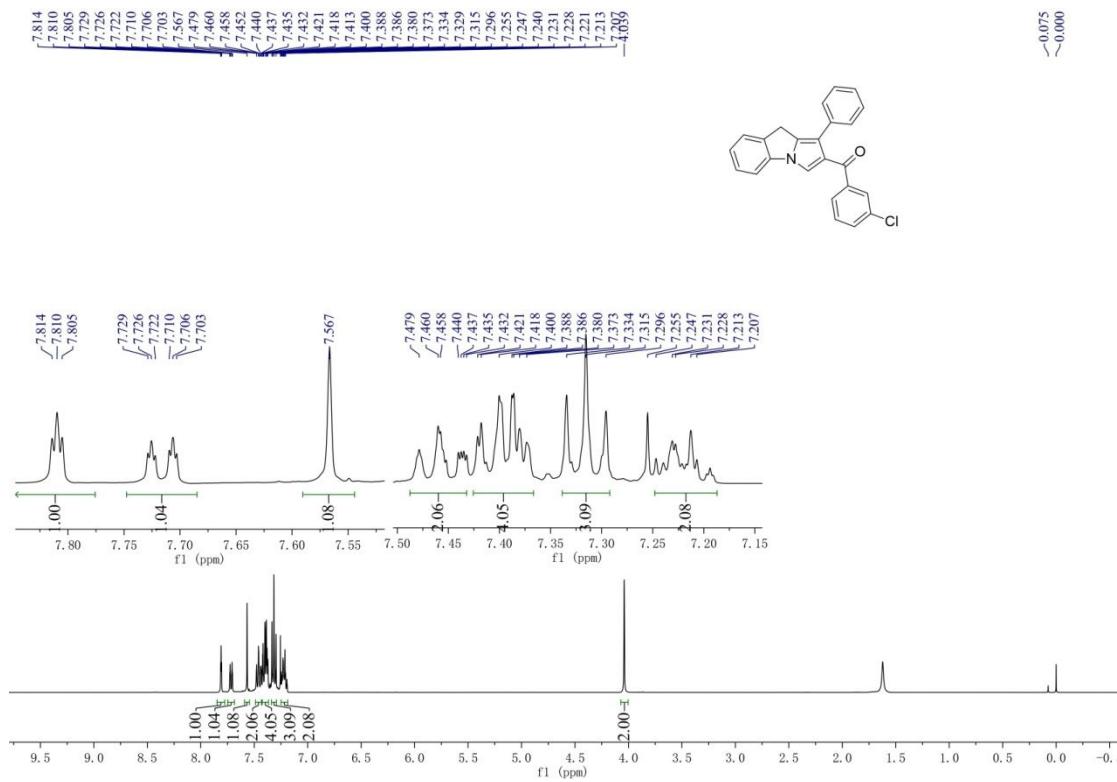


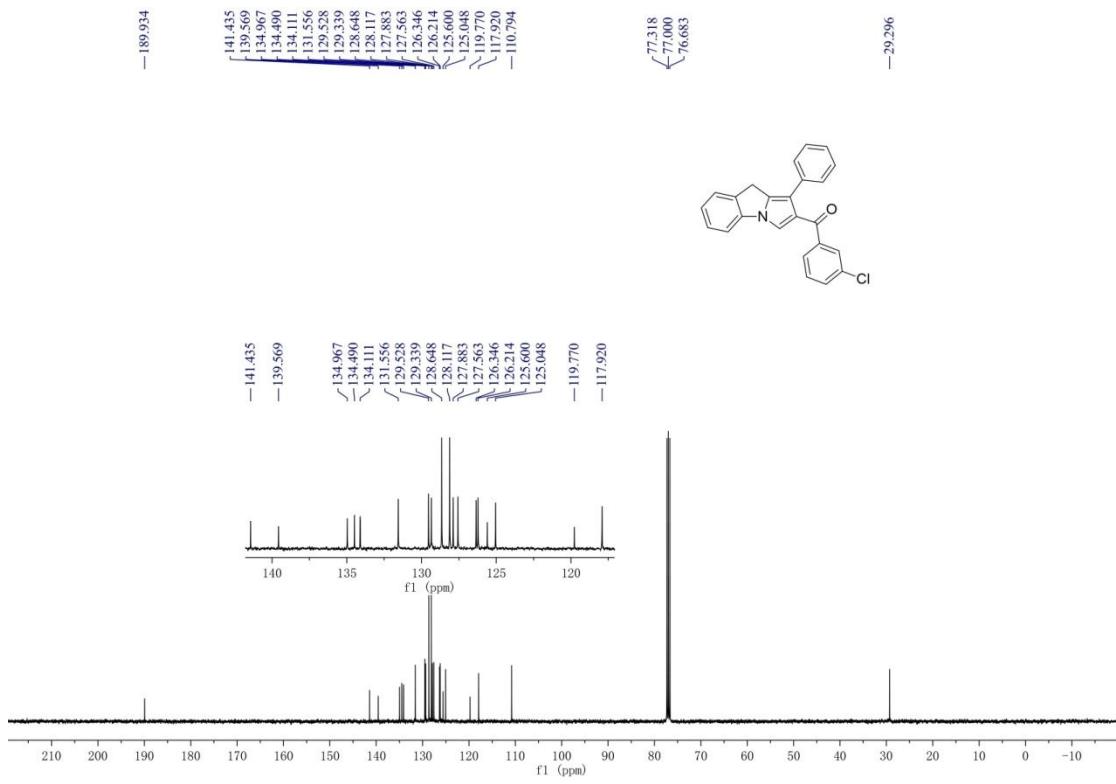
(3-fluorophenyl)(1-phenyl-9H-pyrrolo[1,2-a]indol-2-yl)methanone (3ak)



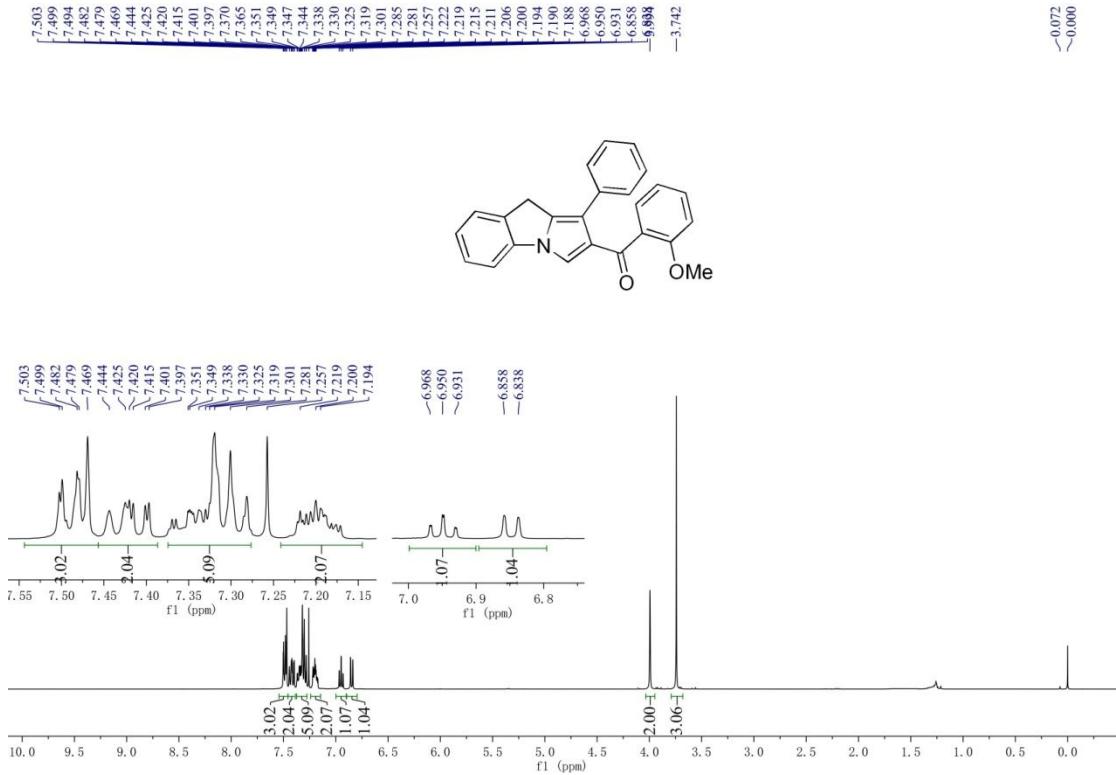


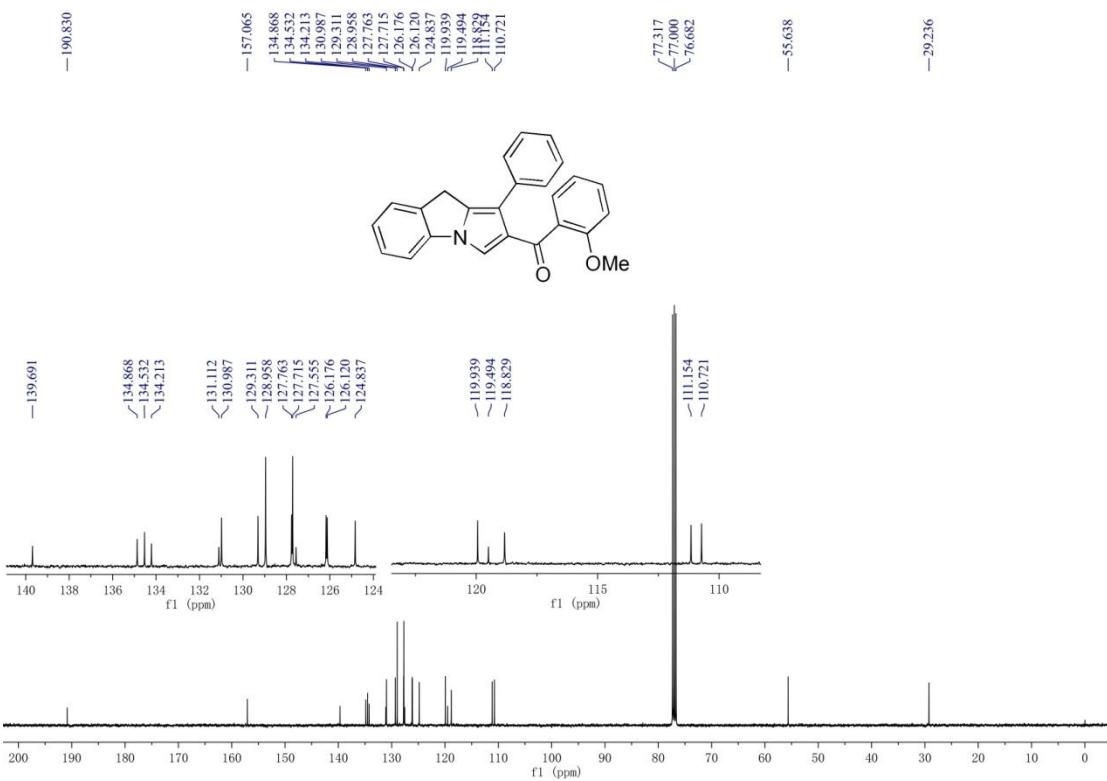
(3-Chlorophenyl)(1-phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)methanone (3al)



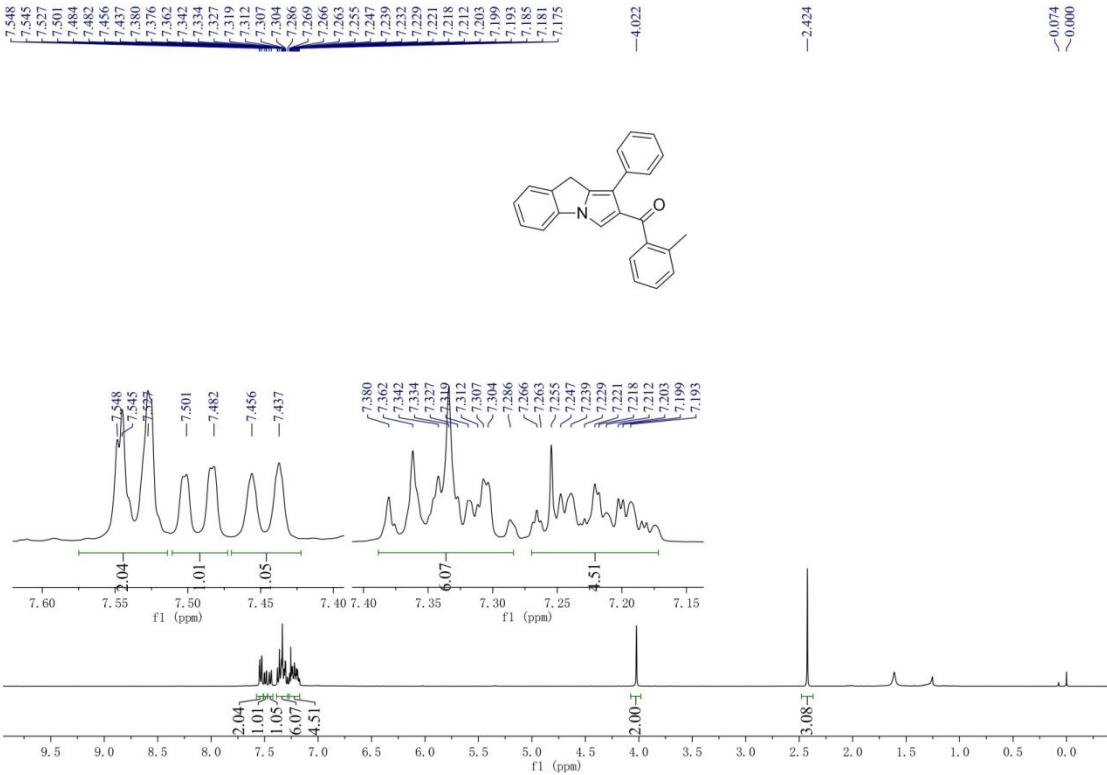


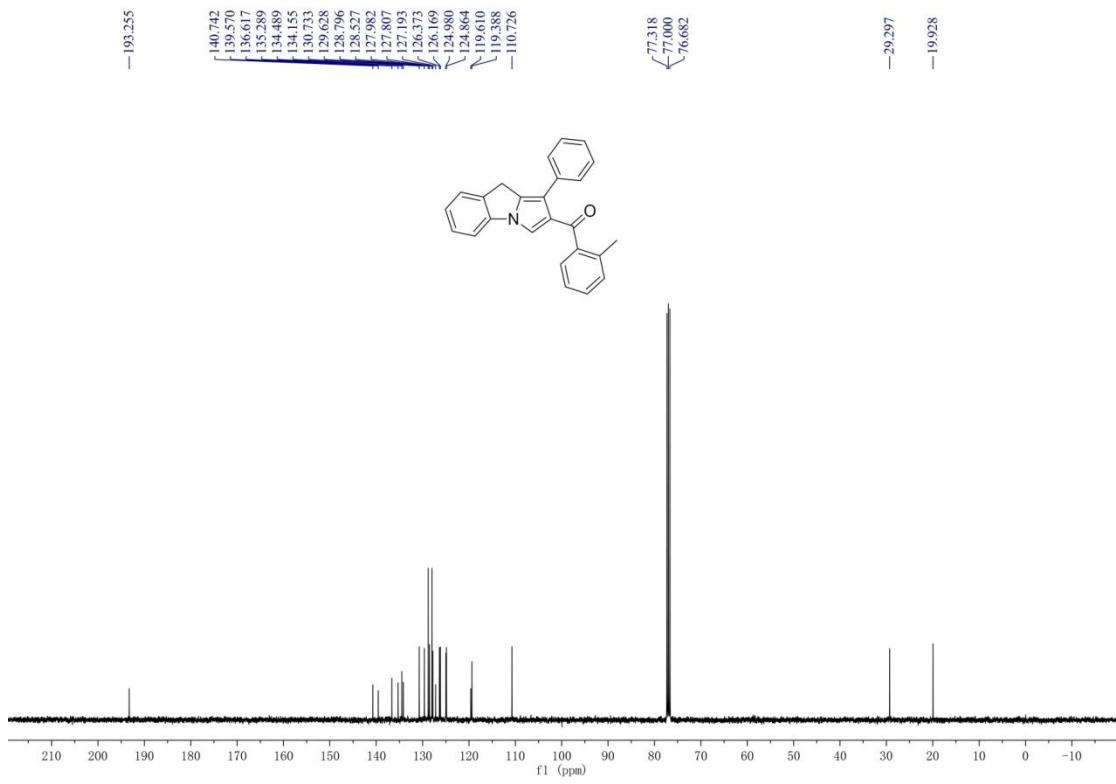
(2-methoxyphenyl)(1-phenyl-9H-pyrrolo[1,2-a]indol-2-yl)methanone (3am)



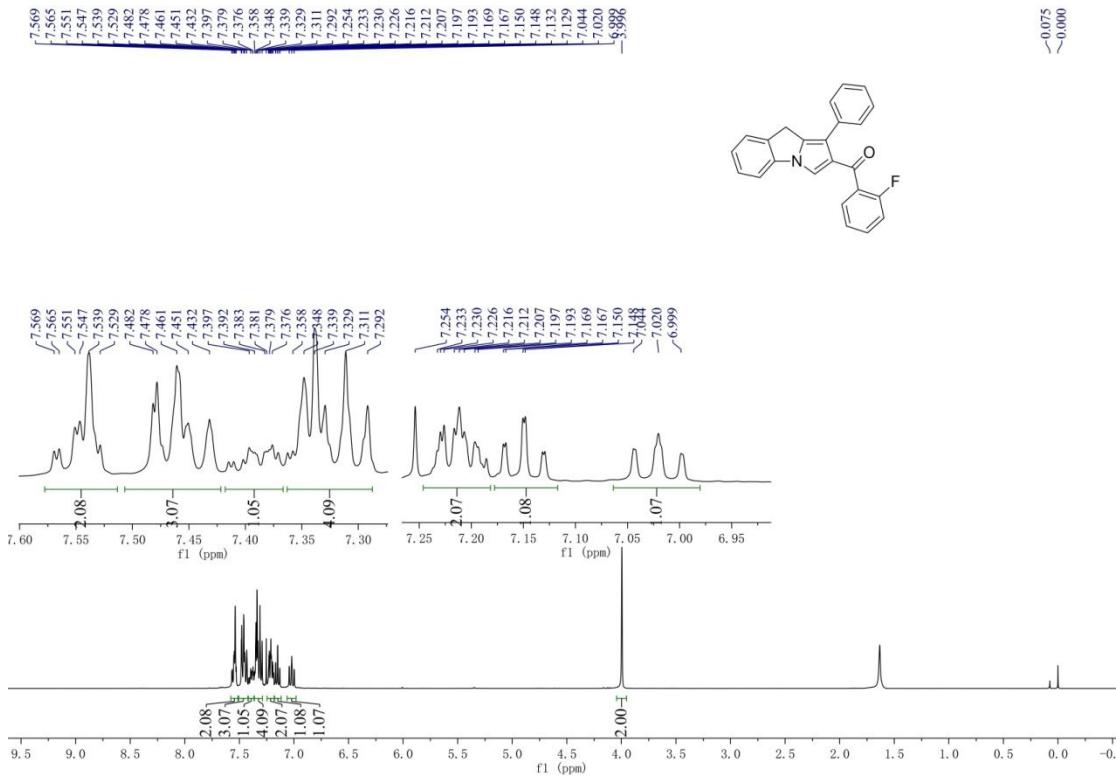


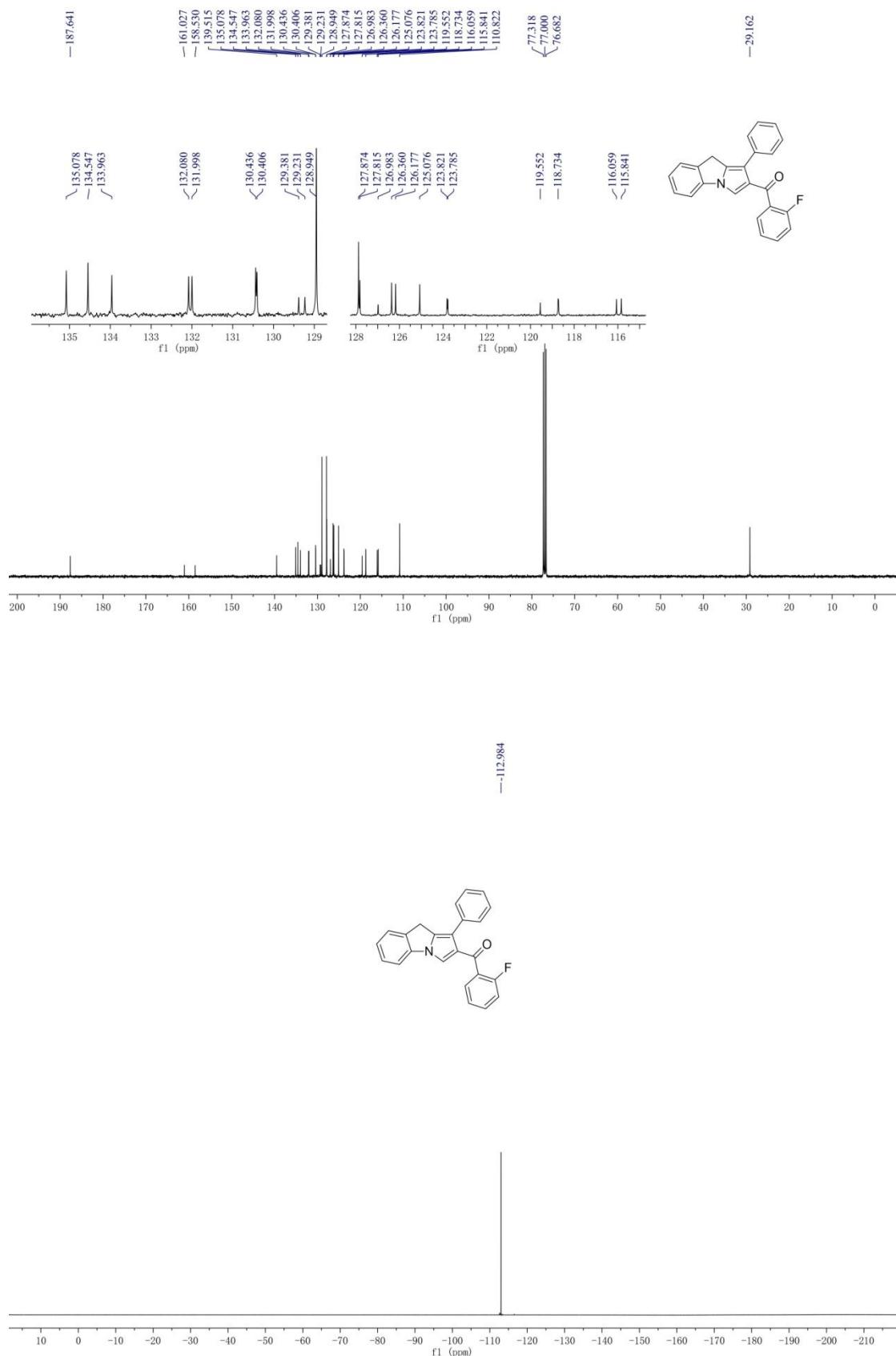
(1-Phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)(*o*-tolyl)methanone (3an)



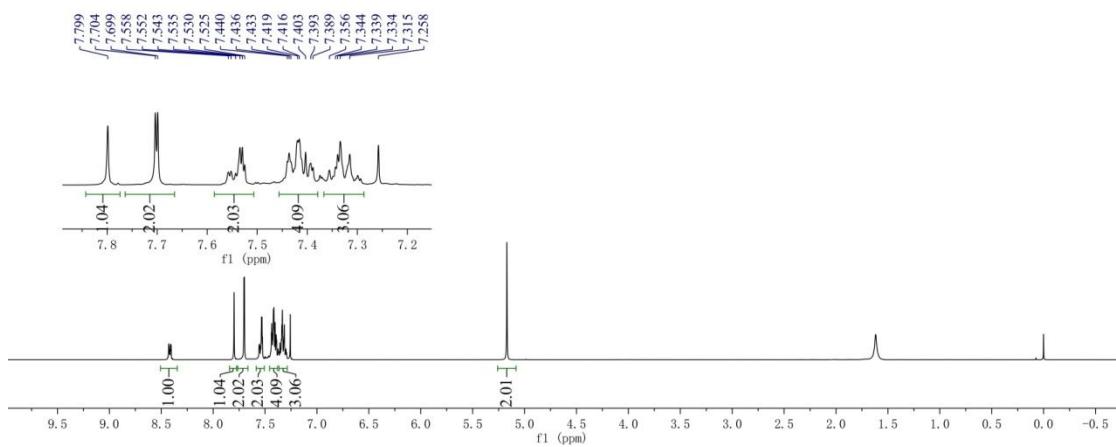
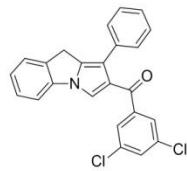


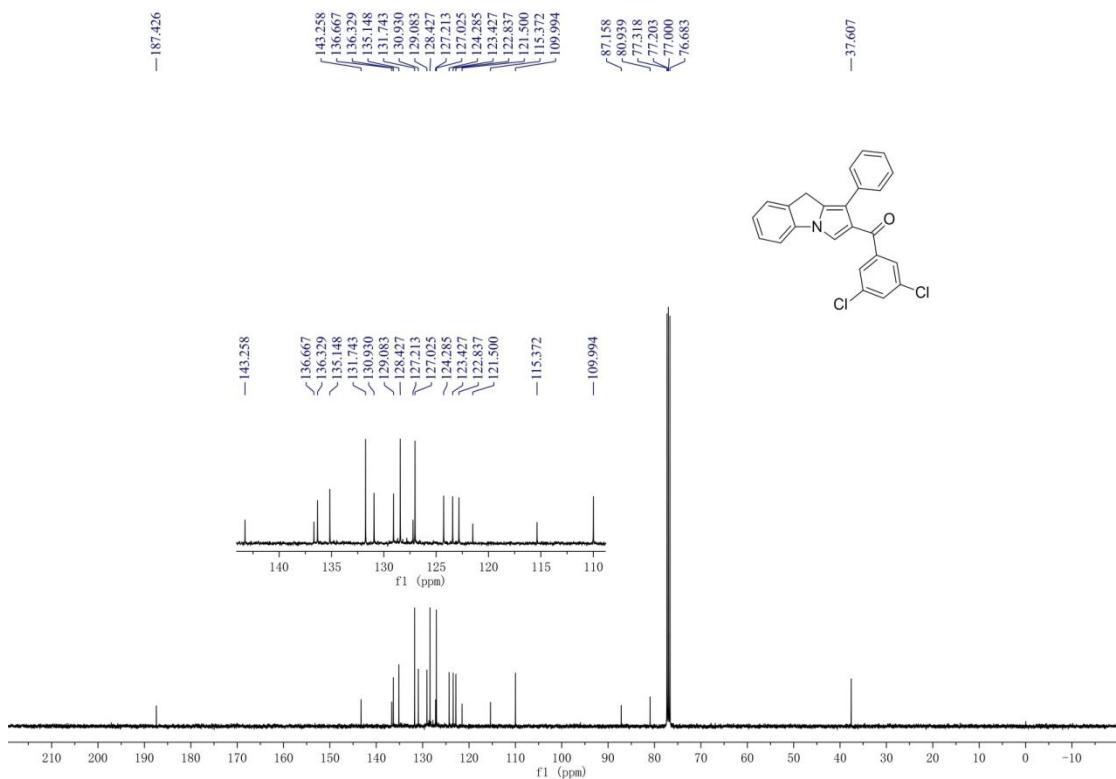
(2-Fluorophenyl)(1-phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)methanone (3ao)



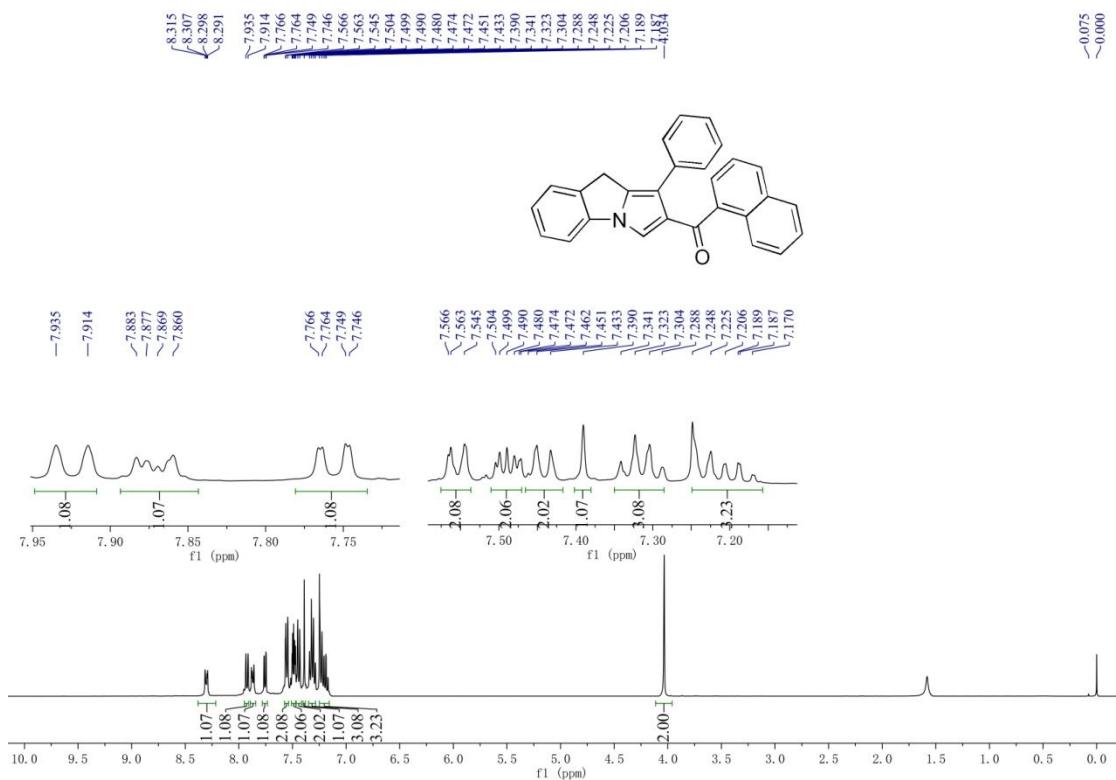


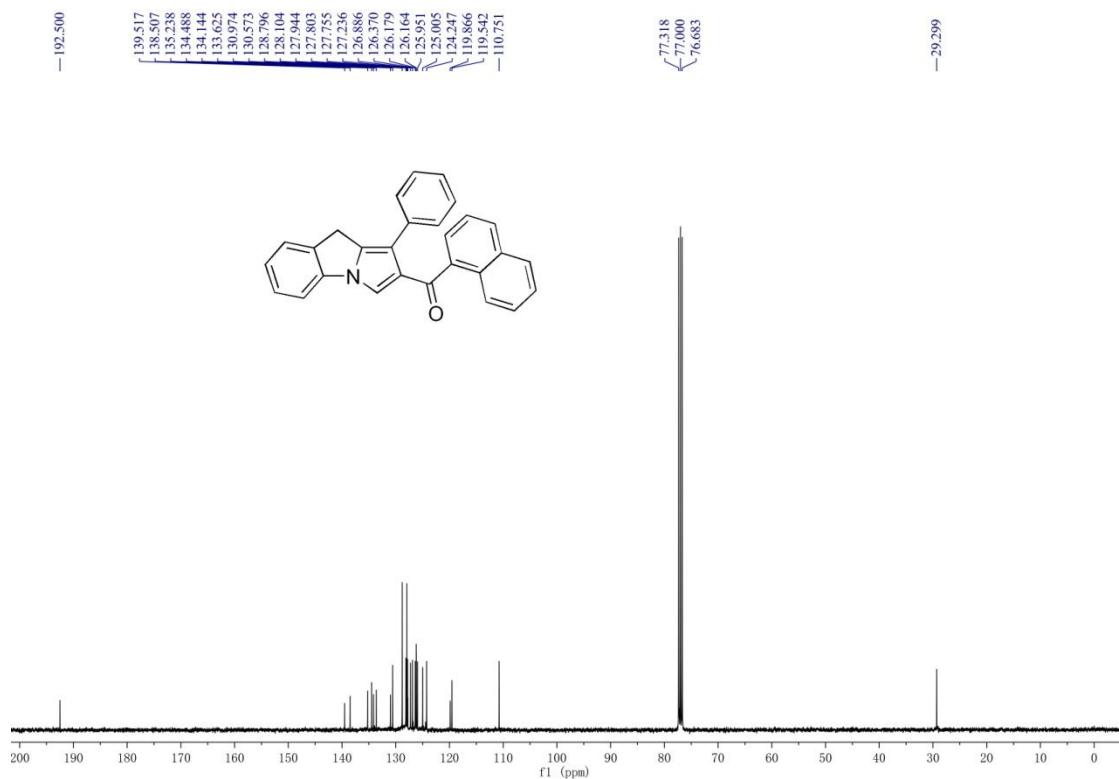
(3,5-Dichlorophenyl)(1-phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)methanone (3ap)



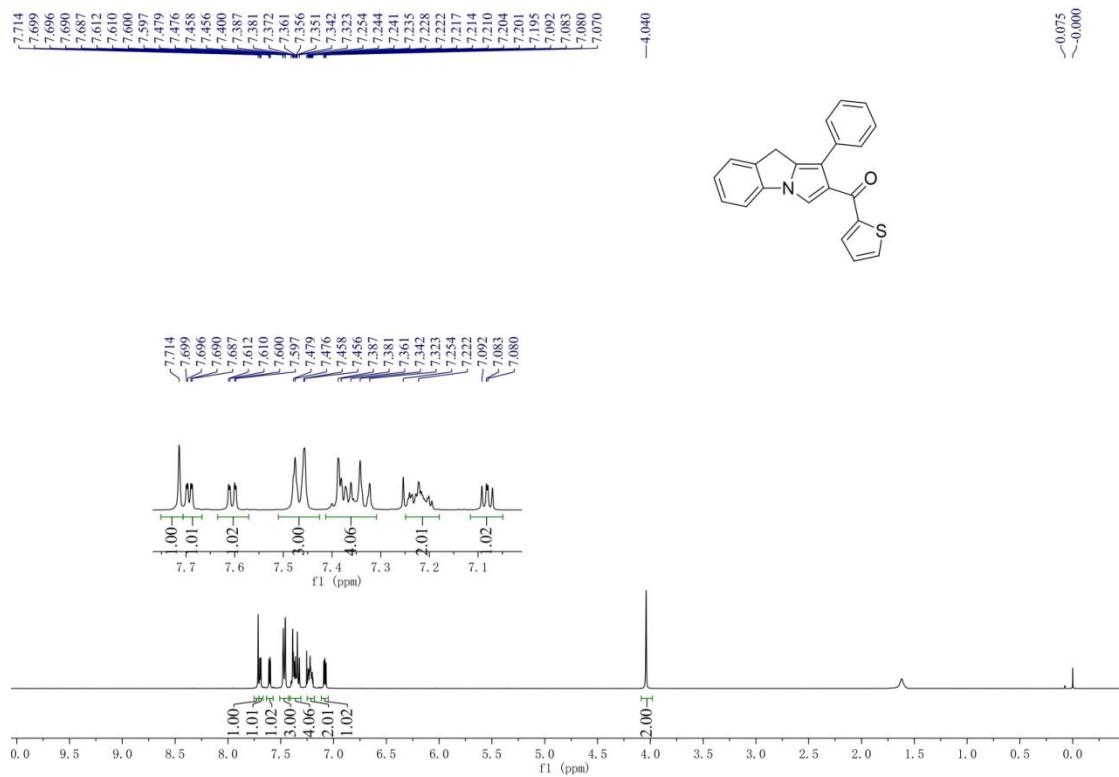


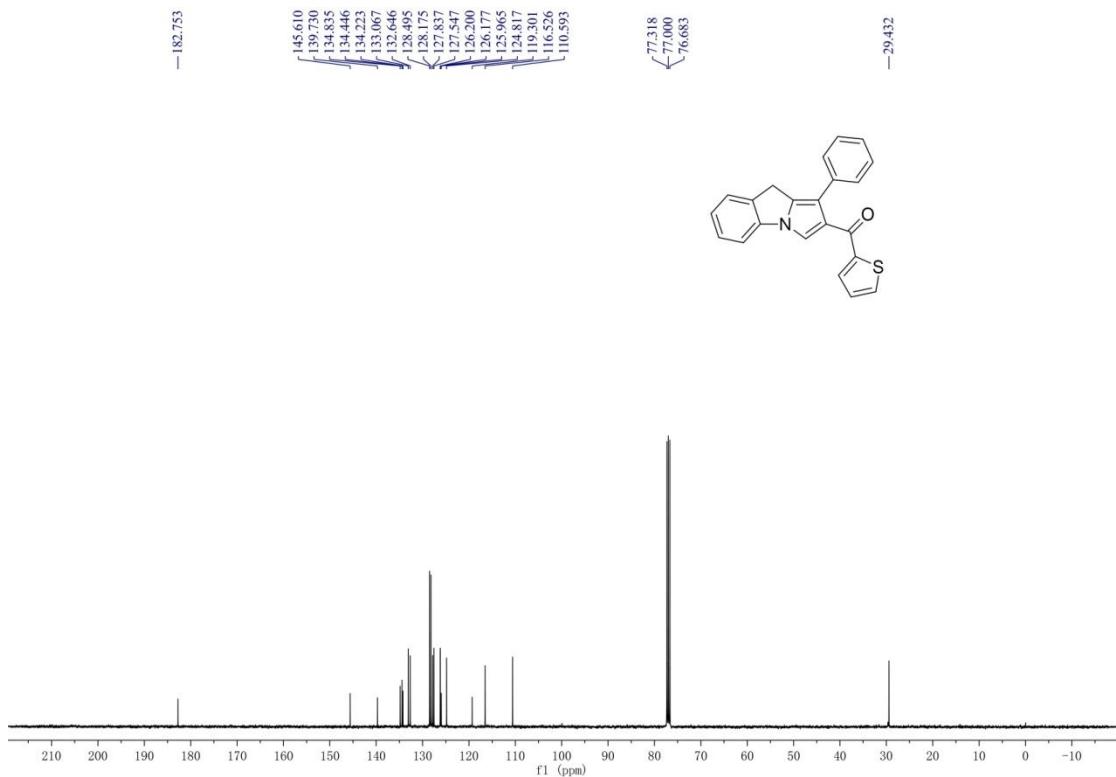
naphthalen-1-yl(1-phenyl-9H-pyrrolo[1,2-a]indol-2-yl)methanone (3aq)





(1-Phenyl-9*H*-pyrrolo[1,2-a]indol-2-yl)(thiophen-2-yl)methanone (3ar)





1-(4-Methoxyphenyl)-3,3-diphenylprop-2-en-1-one 4

