Supporting Information

Fe-Catalyzed Enaminones Synthesis from Ketones and amines

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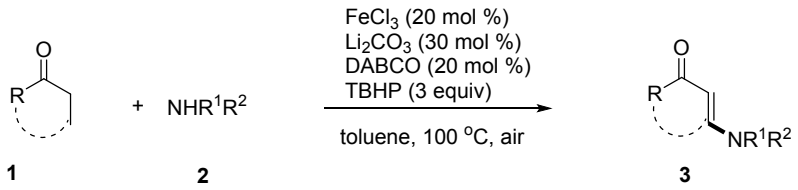
General Information

^{1}H and ^{13}C NMR spectra were recorded on BRUKER DRX-400 spectrometer. The chemical shifts are referenced to signals at 7.26 and 77.0 ppm, respectively, and $CDCl_3$ is solvent with TMS as the internal standard. HRMS was obtained with a LCMS-IT-TOF mass spectrometer. TLC was performed by using commercially prepared 100-400 mesh silica gel plates, and visualization was effected at 254 nm.

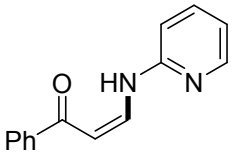
Experimental Procedure for Compounds 3



1 2 3

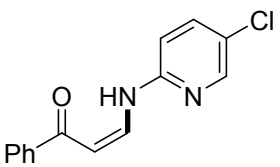
The mixture of ketones **1** (0.5 mmol), amines **2** (1.0 mmol), $FeCl_3$ (20 mol %), Li_2CO_3 (30 mol %), DABCO (20 mol %), TBHP (1.5 mmol) in toluene (2 mL) was stirred at 100 °C under air for 6 h. At ambient temperature, the reaction mixture was diluted with H_2O (15 mL) and extracted with EtOAc (3 × 15 mL). The organic extracts were dried over $MgSO_4$. After filtration and evaporation of the solvents under reduced pressure, the crude product was purified by column chromatography on silica gel to afford desired product.

Characterization Data for All Products 3



(*Z*)-1-Phenyl-3-(pyridin-2-ylamino)prop-2-en-1-one (3a)[1]

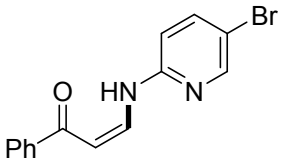
Yellow solid (78.4 mg, 70%); m.p.= 169-170 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.14 (br, 1H), 8.28 (ddd, *J* = 19.8, 8.2, 4.7 Hz, 2H), 7.99 – 7.92 (m, 2H), 7.62 (ddd, *J* = 8.1, 7.4, 1.9 Hz, 1H), 7.55 – 7.43 (m, 3H), 6.95 (ddd, *J* = 7.3, 4.9, 0.8 Hz, 1H), 6.84 (d, *J* = 8.2 Hz, 1H), 6.15 (d, *J* = 8.2 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 191.9, 151.7, 148.5, 142.9, 139.0, 138.4, 131.8, 128.5, 127.5, 118.5, 111.7, 95.3.



(*Z*)-3-((5-Chloropyridin-2-yl)amino)-1-phenylprop-2-en-1-one (3b)

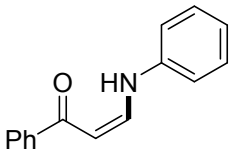
Yellow solid (86.4 mg, 67%); m.p.= 180-181 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.20 (br, 1H), 8.25 (d, *J* = 2.2 Hz, 1H), 8.16 (dd, *J* = 11.4, 8.3 Hz, 1H), 7.95 (d, *J* = 7.5 Hz, 2H), 7.62 – 7.43 (m, 4H), 6.80 (d, *J* = 8.6

Hz, 1H), 6.17 (d, J = 8.2 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 192.0, 150.2, 147.1, 142.6, 139.1, 138.1, 132.0, 128.5, 127.5, 125.6, 112.3, 95.8. HRMS (ESI) m/z: $[M + H]^+$ calcd for $C_{14}H_{12}ClN_2O^+$: 259.0633; found: 259.0637.



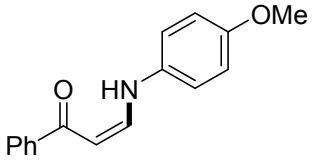
(*Z*)-3-((5-Bromopyridin-2-yl)amino)-1-phenylprop-2-en-1-one (3c)[1]

Yellow solid (89.4 mg, 59%); m.p.= 182-183 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.15 (br, 1H), 8.48-8.34 (m, 1H), 8.16 (dd, J = 11.4, 8.3 Hz, 1H), 7.95 (d, J = 7.4 Hz, 2H), 7.87-7.69 (m, 1H), 7.55-7.45 (m, 3H), 6.76-6.67 (m, 1H), 6.17 (d, J = 8.3 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 192.5, 154.4, 149.4, 146.2, 142.2, 140.8, 138.8, 132.0, 128.5, 127.5, 112.8, 95.9.



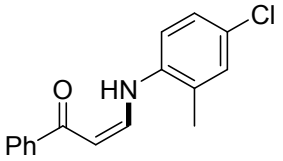
(*Z*)-1-Phenyl-3-(phenylamino)prop-2-en-1-one (3d)[1]

Yellow solid (82.5 mg, 74%); m.p.= 135-136 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.15 (s, brH), 7.94 (d, J = 7.0 Hz, 2H), 7.59 – 7.43 (m, 4H), 7.35 (t, J = 7.2 Hz, 2H), 7.10 (dd, J = 15.8, 7.8 Hz, 3H), 6.04 (dd, J = 7.9, 1.3 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 191.5, 144.9, 140.0, 139.2 131.6, 129.8, 128.4, 127.3, 123.7, 116.4, 93.7.



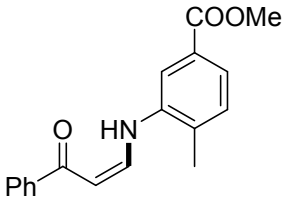
(*Z*)-3-((4-Methoxyphenyl)amino)-1-phenylprop-2-en-1-one (3e)[2]

Yellow solid (97. 4 mg, 77%); m.p.= 140-141 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.86 (br, 1H), 8.42 (d, J = 7.4 Hz, 2H), 7.68 – 7.43 (m, 7H), 6.93 (d, J = 9.0 Hz, 2H), 3.82 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 187.7, 158.9, 157.1, 134.6, 133.2, 131.5, 129.9, 128.5, 121.5, 114.4, 92.6, 55.5.



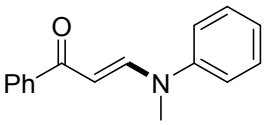
(*Z*)-3-((4-Chloro-2-methylphenyl)amino)-1-phenylprop-2-en-1-one (3f)

Yellow solid (84. 0 mg, 62%); m.p.= 158-159 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.30 (br, 1H), 7.95 (d, J = 7.0 Hz, 2H), 7.58 – 7.42 (m, 4H), 7.20 (d, J = 8.0 Hz, 2H), 7.10 (d, J = 8.3 Hz, 1H), 6.09 (d, J = 7.8 Hz, 1H), 2.42 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 191.3, 144.8, 139.1, 137.5, 131.7, 130.9, 128.5, 128.3, 128.1, 127.3, 127.1, 114.9, 94.5, 17.6. HRMS (ESI) m/z: $[M + H]^+$ calcd for $C_{16}H_{15}ClN_2O^+$: 272.0837; found: 272.0840.



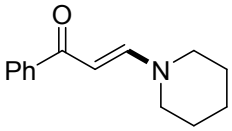
Methyl (*Z*)-4-methyl-3-((3-oxo-3-phenylprop-1-en-1-yl)amino)benzoate (3g)

Yellow solid (84.1 mg, 57%); m.p.= 153-154 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.35 (br, 1H), 7.98 – 7.94 (m, 2H), 7.87 (s, 1H), 7.71 – 7.63 (m, 2H), 7.52 – 7.45 (m, 3H), 7.29 (d, *J* = 7.8 Hz, 1H), 6.14 (d, *J* = 7.8 Hz, 1H), 3.93 (s, 3H), 2.50 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 191.5, 166.8, 144.7, 139.1, 139.0, 131.7, 131.5, 131.2, 129.3, 128.5, 127.4, 124.3, 114.5, 94.8, 52.2, 18.0. HRMS (ESI) m/z: $[M + H]^+$ calcd for $C_{18}H_{18}NO_3^+$: 296.1281; found: 296.1284.



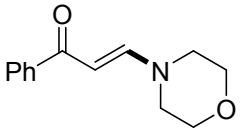
(*E*)-3-(Methyl(phenyl)amino)-1-phenylprop-2-en-1-one (3h)

Yellow solid (41.5 mg, 35%) m.p.= 110-112 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) *δ* 8.23 (d, *J* = 12.7 Hz, 1H), 7.96–7.93 (m, 2H), 7.51–7.42 (m, 3H), 7.40 – 7.36 (m, 2H),7.22–7.15 (m, 3H), 6.10 (d, *J* = 12.7 Hz, 1H), 3.39 (s, 3H); 13C NMR (100 MHz, $CDCl_3$) *δ*189.4, 149.9, 146.4, 140.0, 131.3, 129.5, 128.2, 127.6, 124.9, 120.4, 96.8, 37.2; HRMS (ESI) m/z: $[M+H]^+$ calcd for $C_{16}H_{16}NO^+$: 238.1232. Found: 238.1234.



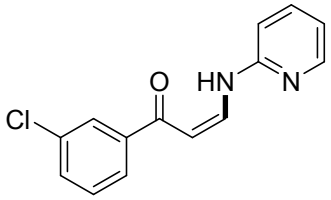
(*E*)-1-Phenyl-3-(piperidin-1-yl)prop-2-en-1-one (3i)[1]

Yellow liquid (61.3 mg, 57%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (d, *J* = 6.7 Hz, 2H), 7.77 (d, *J* = 12.5 Hz, 1H), 7.41 (tt, *J* = 14.0, 6.9 Hz, 3H), 5.81 (d, *J* = 12.5 Hz, 1H), 3.35 (s, 4H), 1.65 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 189.0, 153.1, 140.7, 130.7, 128.0, 127.4, 91.2,54.8, 24.0.



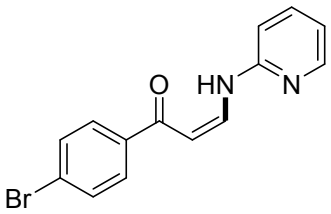
(*E*)-3-Morpholino-1-phenylprop-2-en-1-one (3j)[1]

Yellow solid (69.4 mg, 64%); m.p.= 93-94 ºC. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 – 7.87 (m, 2H), 7.70 (d, *J* = 12.6 Hz, 1H), 7.48 – 7.35 (m, 3H), 5.87 (d, *J* = 12.6 Hz, 1H), 3.73 – 3.65 (m, 4H), 3.37 – 3.27 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 188.6, 152.5, 139.9, 130.8, 127.9, 127.2, 92.0, 65.9.



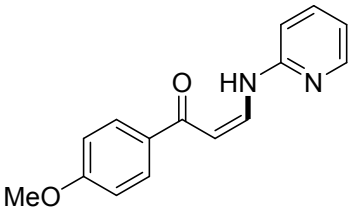
(*Z*)-1-(3-Chlorophenyl)-3-(pyridin-2-ylamino)prop-2-en-1-one (3k)

Yellow solid (78.7 mg, 61%); m.p.= 183-184 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.15 (br, 1H), 8.33 – 8.24 (m, 2H), 7.89 (d, *J* = 8.5 Hz, 2H), 7.66 – 7.59 (m, 1H), 7.43 (d, *J* = 8.5 Hz, 2H), 6.97 (dd, *J* = 7.2, 5.0 Hz, 1H), 6.84 (d, *J* = 8.2 Hz, 1H), 6.09 (d, *J* = 8.2 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.4, 151.6, 148.6, 143.4, 138.4, 138.1, 137.4, 128.9, 128.7, 118.7, 111.7, 94.9. HRMS (ESI) m/z: $[M + H]^+$ calcd for $C_{14}H_{12}ClN_2O^+$: 259.0633; found: 259.0637.



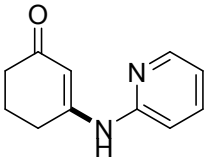
(*Z*)-1-(4-Bromophenyl)-3-(pyridin-2-ylamino)prop-2-en-1-one (3l)[3]

Yellow solid (89.4 mg, 59%); m.p.= 189-190 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.15 (br, H), 8.35 – 8.24 (m, 2H), 7.82 (d, *J* = 8.6 Hz, 2H), 7.68 – 7.58 (m, 3H), 6.97 (dd, *J* = 6.1, 4.5 Hz, 1H), 6.85 (d, *J* = 8.2 Hz, 1H), 6.08 (d, *J* = 8.2 Hz, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 190.8, 158.2, 155.4, 151.7, 148.6, 143.4, 138.4, 131.7, 129.1, 118.7, 111.8, 94.8.



(*Z*)-1-(4-Methoxyphenyl)-3-(pyridin-2-ylamino)prop-2-en-1-one (3m)[3]

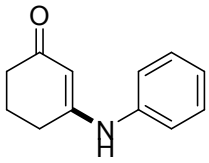
Yellow solid (92.7 mg, 73%); m.p.= 153-154 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.13 (br, 1H), 8.29 (s, 1H), 8.20 (ddd, *J* = 12.2, 8.3, 4.2 Hz, 1H), 7.94 (dd, *J* = 8.6, 2.3 Hz, 2H), 7.63 – 7.56 (m, 1H), 6.99 – 6.90 (m, 3H), 6.81 (dd, *J* = 8.0, 3.7 Hz, 1H), 6.10 (dd, *J* = 8.3, 3.6 Hz, 1H), 3.87 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.8, 162.7, 151.9, 148.4, 142.2, 138.3, 131.8, 129.5, 118.2, 113.7, 111.5, 95.0, 55.4.



3-(Pyridin-2-ylamino)cyclohex-2-en-1-one (3n)[4]

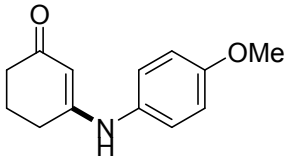
Yellow solid (67.7 mg, 72%); m.p.= 176-177 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.67 (br, 1H), 8.17 (d, *J* = 3.4 Hz, 1H), 7.49 (dd, *J* = 10.9, 4.6 Hz, 1H), 7.28 (d, *J* = 11.9 Hz, 1H), 7.00 (d, *J* = 8.3 Hz, 1H), 6.86 –

6.82 (m,1H), 6.65 (d, *J* = 4.5 Hz, 1H), 2.55 (t, *J* = 6.0 Hz, 2H), 2.31 (t, *J* = 6.3 Hz, 2H), 1.99 – 1.92 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 199.7, 159.8, 153.2, 147.7, 137.5, 118.0, 114.2, 103.9, 36.4, 29.4, 21.6.



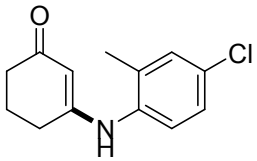
3-(Phenylamino)cyclohex-2-en-1-one (3o)[5]

Yellow solid (64.5 mg, 69%); m.p.= 161-162 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.34 (t, *J* = 7.8 Hz, 2H), 7.17 (t, *J* = 8.5 Hz, 3H), 6.02 (s, 1H), 5.59 (s, 1H), 2.50 (t, *J* = 6.2 Hz, 2H), 2.37 (t, *J* = 6.5 Hz, 2H), 2.11 – 2.02 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.3, 162.0, 129.4, 125.6, 123.9, 100.1, 36.5, 29.8, 21.8.



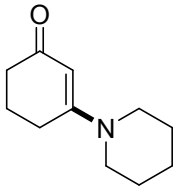
3-((4-Methoxyphenyl)amino)cyclohex-2-en-1-one (3p)[5]

Yellow solid (79.2 mg, 73%); m.p.= 173-174 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.78 (br, 1H), 6.99 (d, *J* = 8.8 Hz, 2H), 6.76 (d, *J* = 8.8 Hz, 2H), 5.30 (s, 1H), 3.73 (s, 3H), 2.44 (t, *J* = 6.1 Hz, 2H), 2.24 (t, *J* = 6.3 Hz, 2H), 1.91 (dd, *J* = 12.0, 6.0 Hz, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 197.9, 164.8, 157.4, 130.8, 126.0, 114.2, 98.0, 55.3, 36.2, 29.1, 21.7.



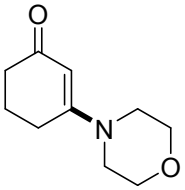
3-((4-Chloro-2-methylphenyl)amino)cyclohex-2-en-1-one (3q)

Yellow solid (68.2 mg, 58%); m.p.= 170-171 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ7.12 (s, 3H), 6.63 (s, 1H), 4.99 (d, *J* = 1.9 Hz, 1H), 2.49 (t, *J* = 5.4 Hz, 2H), 2.30 (dd, *J* = 9.1, 3.7 Hz, 2H), 2.14 (s, 3H), 2.05 – 1.97 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.0, 163.2, 137.3, 132.7, 132.0, 127.1, 126.7, 99.6, 36.4, 29.1, 21.9, 17.2. HRMS (ESI) m/z: $[M + H]^+$ calcd for $C_{13}H_{15}ClNO^+$: 236.0837; found: 236.0834.



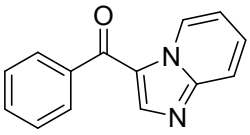
3-(Piperidin-1-yl)cyclohex-2-en-1-one (3r)[6]

Yellow liquid (48.3 mg, 54%). ^{1}H NMR (400 MHz, $CDCl_3$) δ5.29 (s, 1H), 3.42 – 3.30 (m, 4H), 2.40 (t, *J* = 6.3 Hz, 2H), 2.30 – 2.25 (m, 2H), 2.01 – 1.94 (m, 2H), 1.69 – 1.63 (m, 2H), 1.58 (dt, *J* = 11.0, 5.4 Hz, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 197.3, 164.7, 99.2, 47.5, 35.4, 27.0, 25.5, 24.3, 22.2.



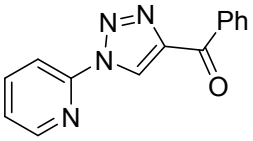
3-Morpholinocyclohex-2-en-1-one (3s)[7]

Yellow liquid (44.3 mg, 49%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 5.26 (s, 1H), 3.76 – 3.68 (m, 4H), 3.33 – 3.27 (m, 4H), 2.40 (t, *J* = 6.2 Hz, 2H), 2.31 – 2.26 (m, 2H), 2.06 – 1.95 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 197.6, 165.0, 100.5, 66.2, 46.2, 35.6, 26.7, 22.0.



Imidazo[1,2-a]pyridin-3-yl(phenyl)methanone (4a)[3]

Yellow solid (51.3 mg, 77%); m.p.= 120-121 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.71 (d, *J* = 6.9 Hz, 1H), 8.18 (s, 1H), 7.85 (dd, *J* = 15.4, 8.4 Hz, 2H), 7.77 (d, *J* = 9.0 Hz, 1H), 7.60 – 7.55 (m, 1H), 7.54 – 7.47 (m, 3H), 7.15 – 7.08 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.7, 145.6, 139.2, 131.9, 129.3, 128.8, 128.7, 128.5, 117.6, 115.0.



Phenyl(1-(pyridin-2-yl)-1H-1,2,3-triazol-4-yl)methanone (5a)[8]

White solid (60.0 mg, 80%); m.p.= 129-130 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.20 (s, 1H), 8.51 (ddd, *J* = 4.8, 1.6, 0.7 Hz, 1H), 8.41 (dt, *J* = 8.5, 1.7 Hz, 2H), 8.22 (d, *J* = 8.2 Hz, 1H), 7.96 – 7.90 (m, 1H), 7.63 – 7.59 (m, 1H), 7.55 – 7.48 (m, 2H), 7.38 (ddd, *J* = 7.5, 4.9, 0.9 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 185.4, 148.8, 148.4, 147.8, 139.2, 136.5, 133.3, 130.4, 128.4, 125.6, 124.2, 114.0.

References

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3. J.-P. Wan, D. Hu, Y. Liu, L. Li, C. Wen, *Tetrahedron Lett*., 2016, **57**, 2880.
4. J. Liu, W. Wei, T. Zhao, X. Liu, J. Wu, W. Yu and J. Chang, *J. Org. Chem*., 2016, **81**, 9326.
5. S. G. Modha, A. Pöthig, A. Dreuw and T. Bach, *J. Org. Chem*., 2019, **84**, 1139.
6. M. A. Hussein, V. T. Huynh, R. Hommelsheim, R. M. Koenigs and T. V. Nguyen, *Chem. Commun*., 2018, **54**, 12970
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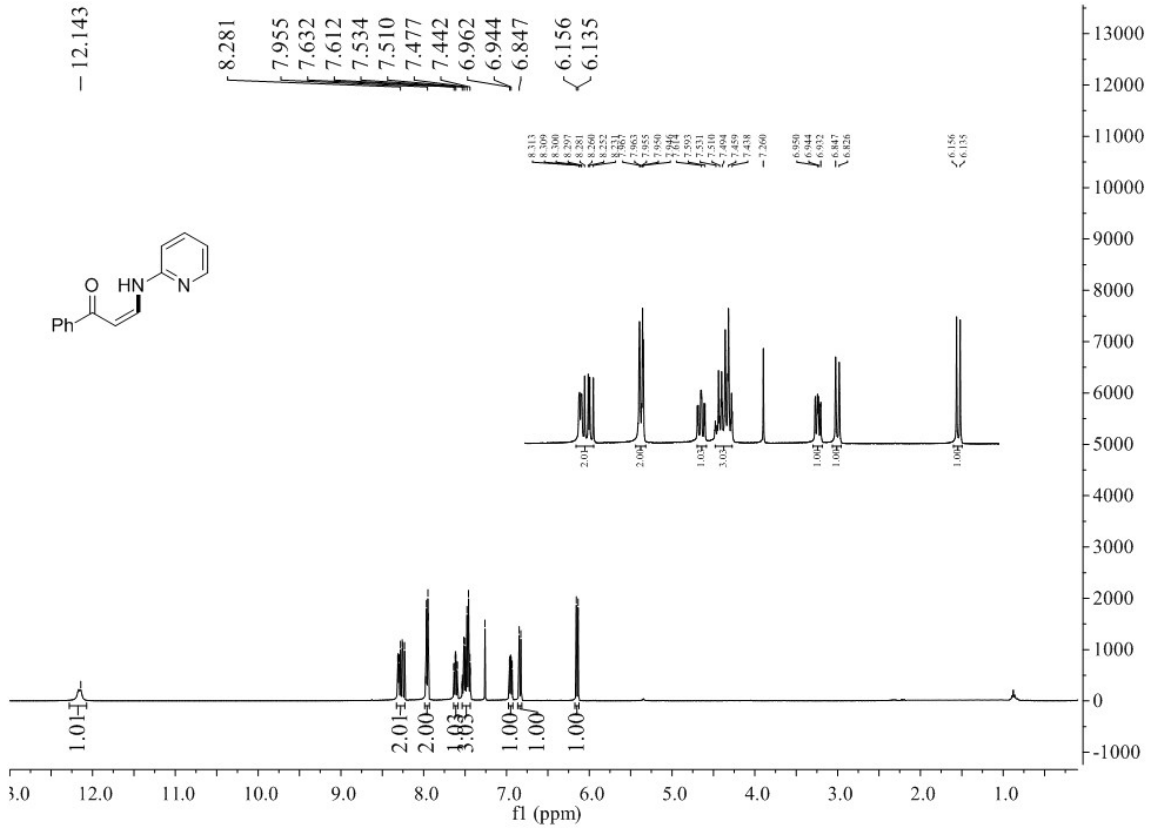
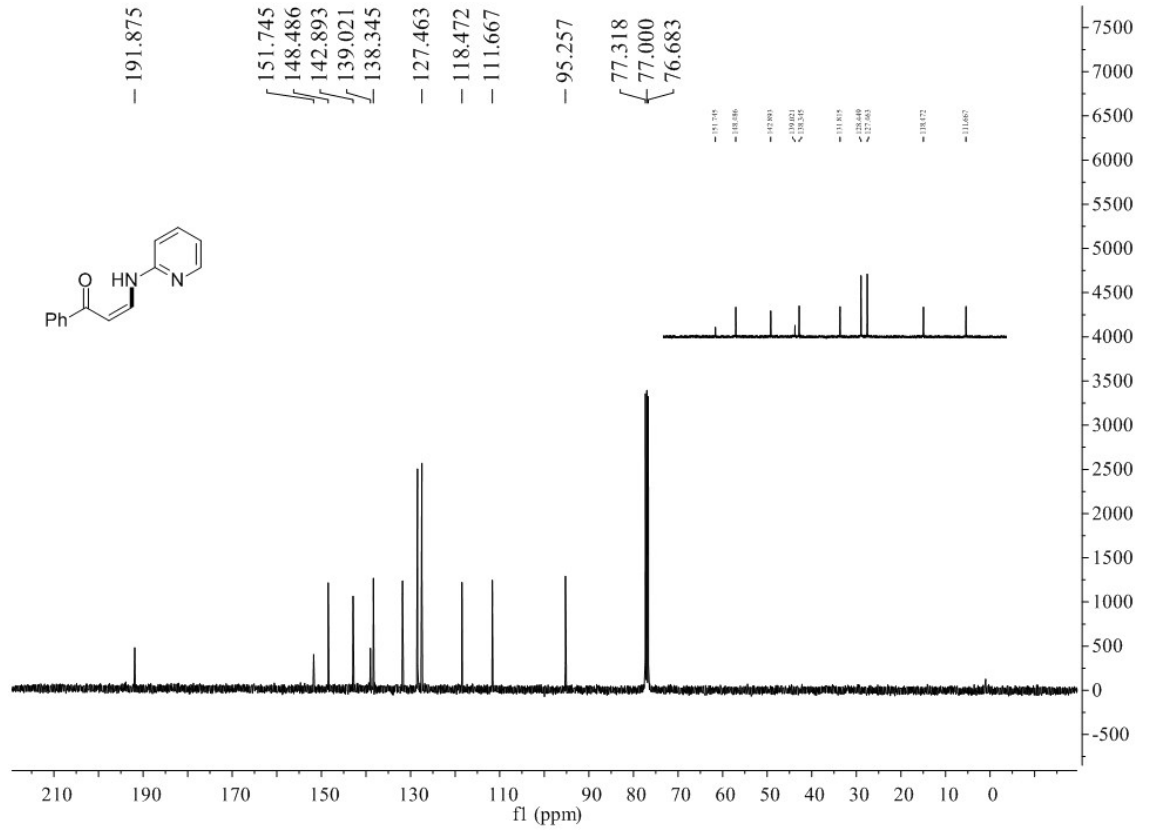
NMR Spectra for All Compounds 3

3a





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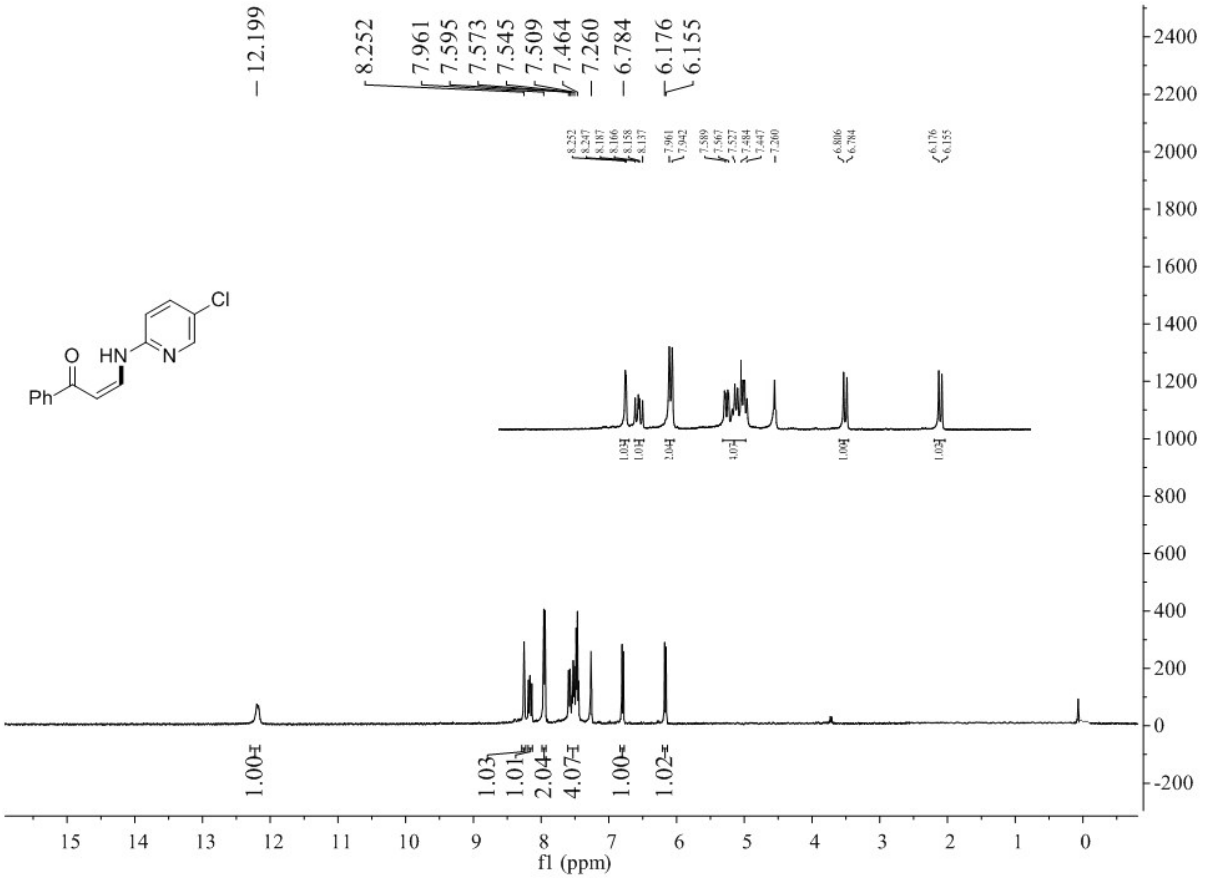
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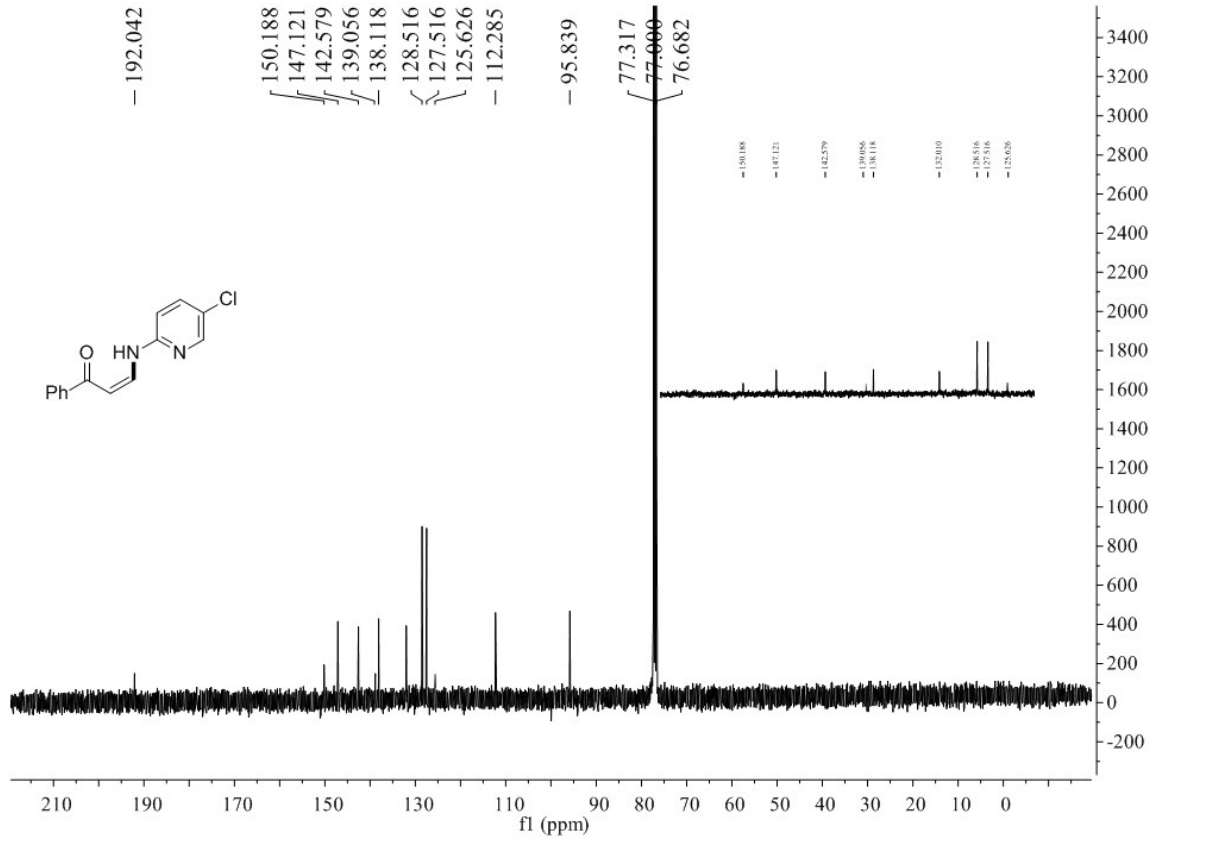
7.595
7.573
7.545
7.509
7.464
7.260
6.784
6.176
6.155
Cl
O
HN
N
Ph
1.00
1.03
1.01
2.04
4.07
1.00
1.02
fl (ppm)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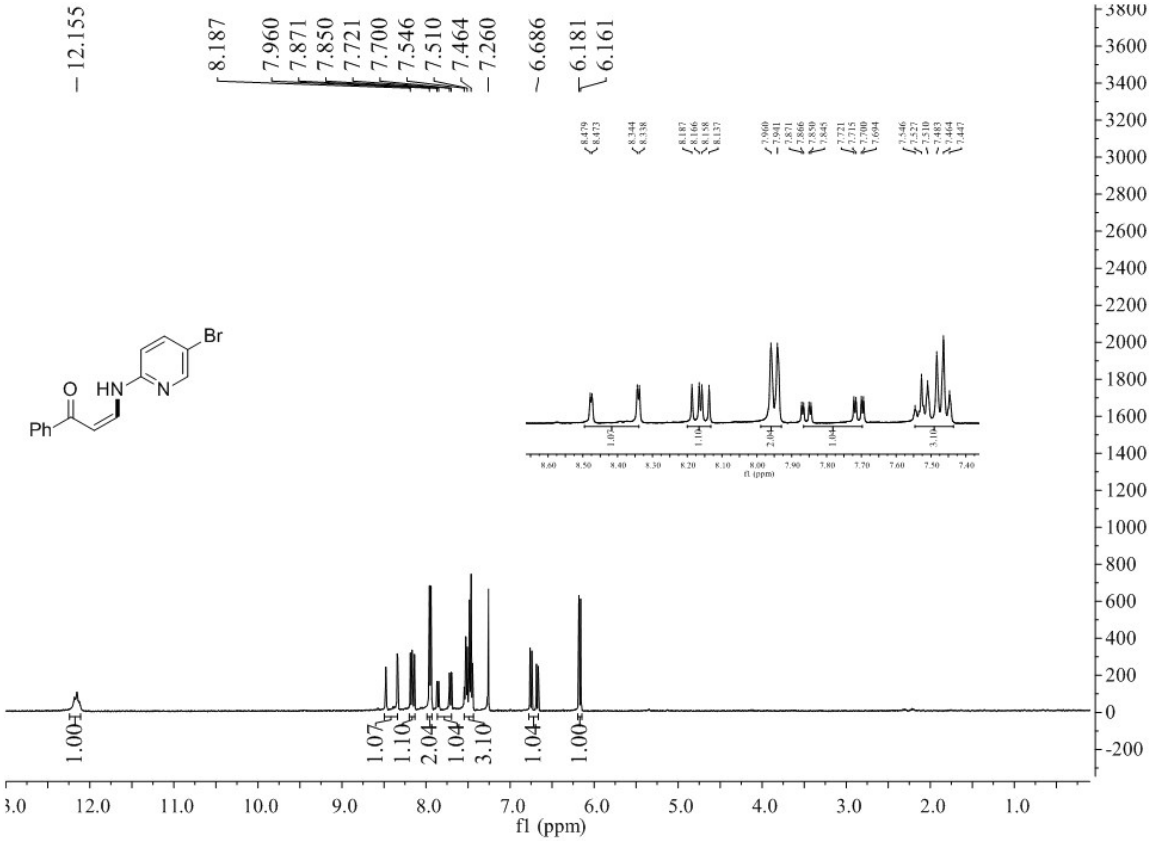
150.188
147.121
142.579
139.056
138.118
128.516
127.516
125.626
112.285
95.839
77.317
77.000
76.682
Cl
O
HN
N
Ph
fl (ppm)

3c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7.960
7.871
7.850
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7.546
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7.464
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6.686
6.181
6.161
Br
O
HN
N
Ph
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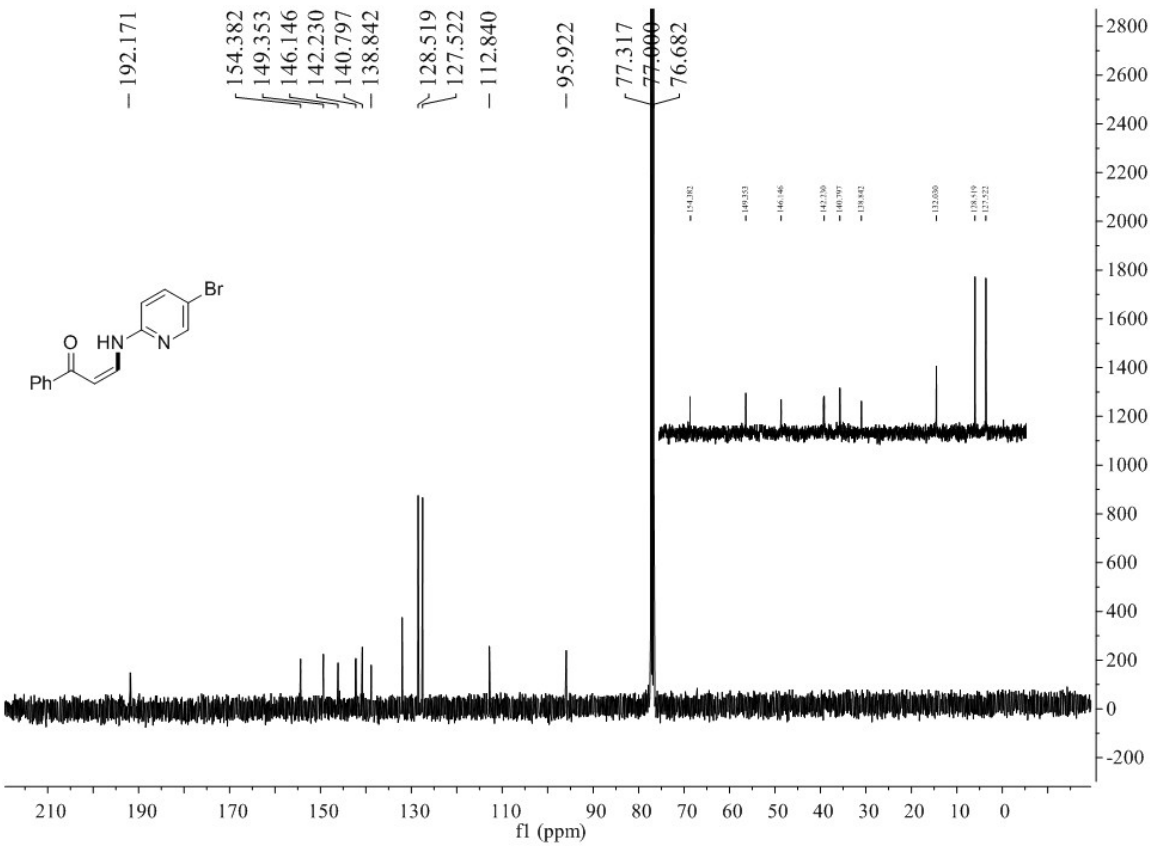
1.07
1.10
2.04
1.04
3.10
1.04
1.00
f1 (ppm)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149.353
146.146
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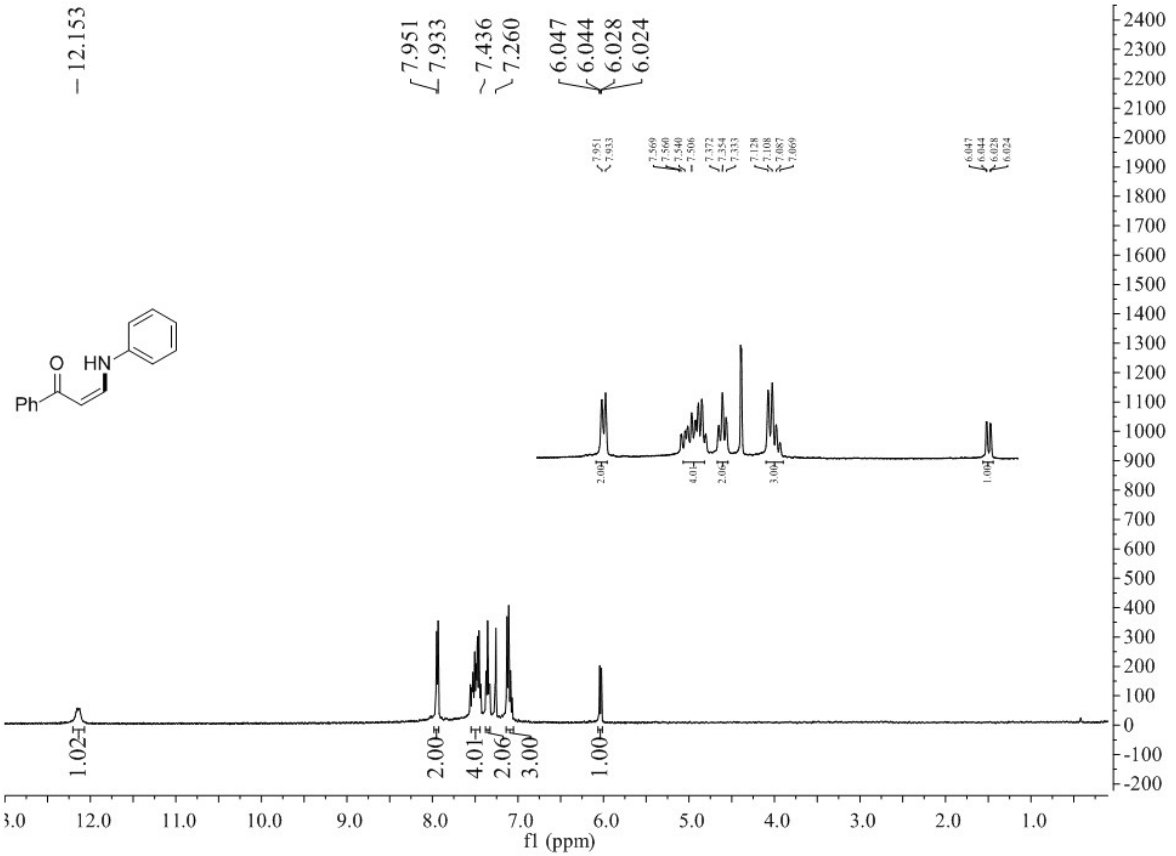
77.000
76.682
Br
O
HN
N
Ph
f1 (ppm)

3d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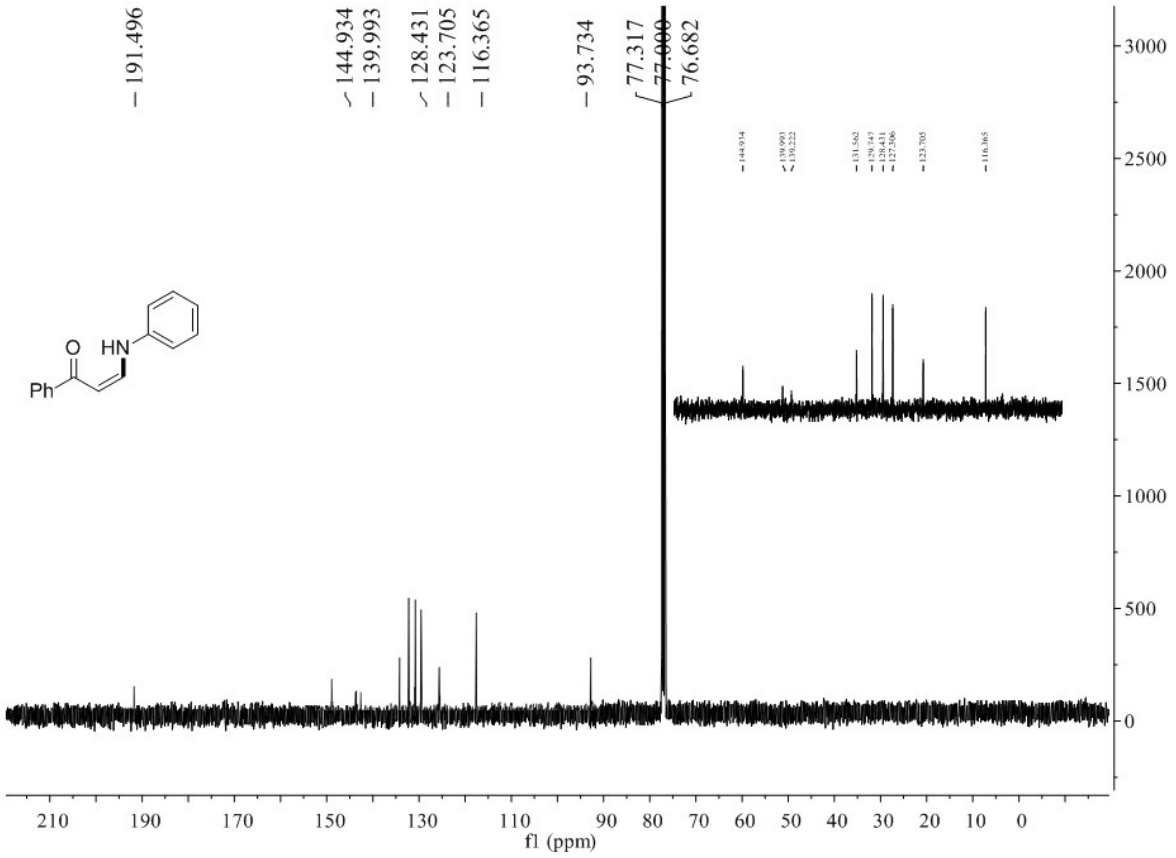
1.00
fl (ppm)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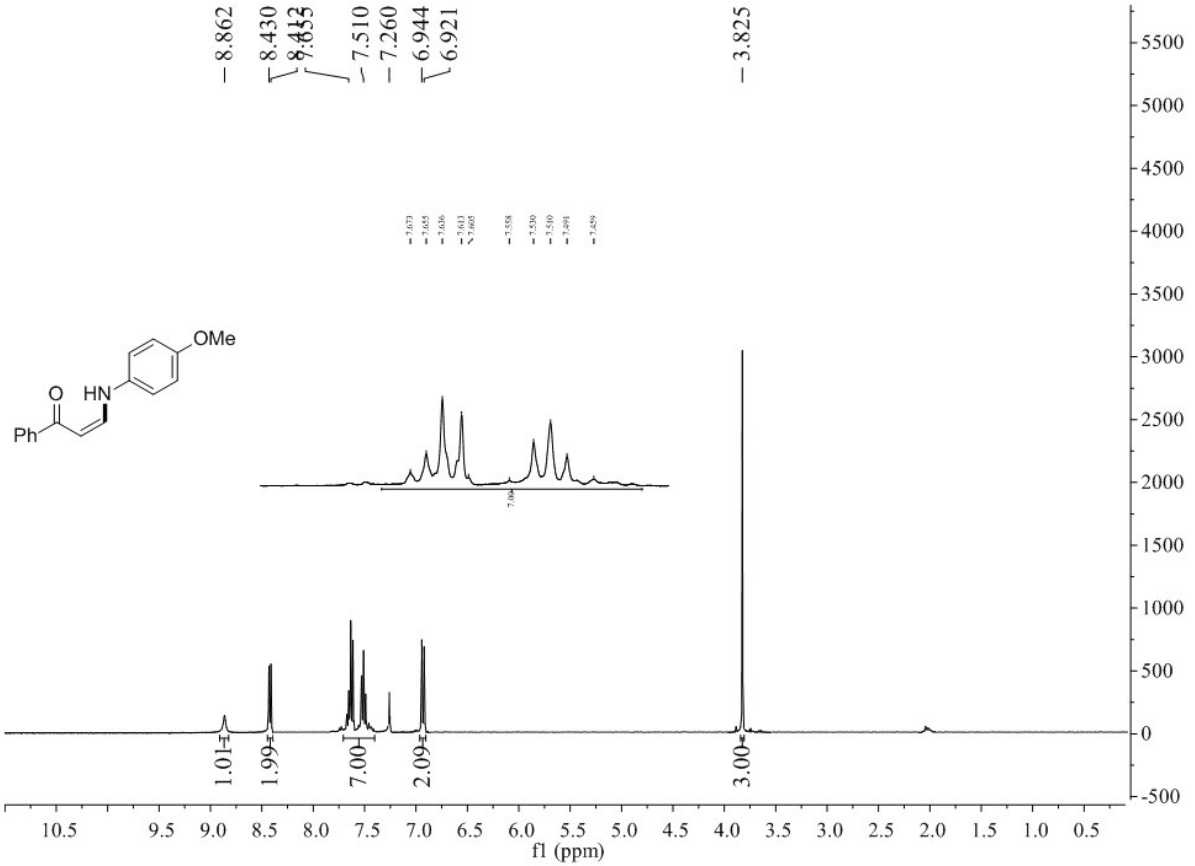
77.000
76.682
fl (ppm)

3e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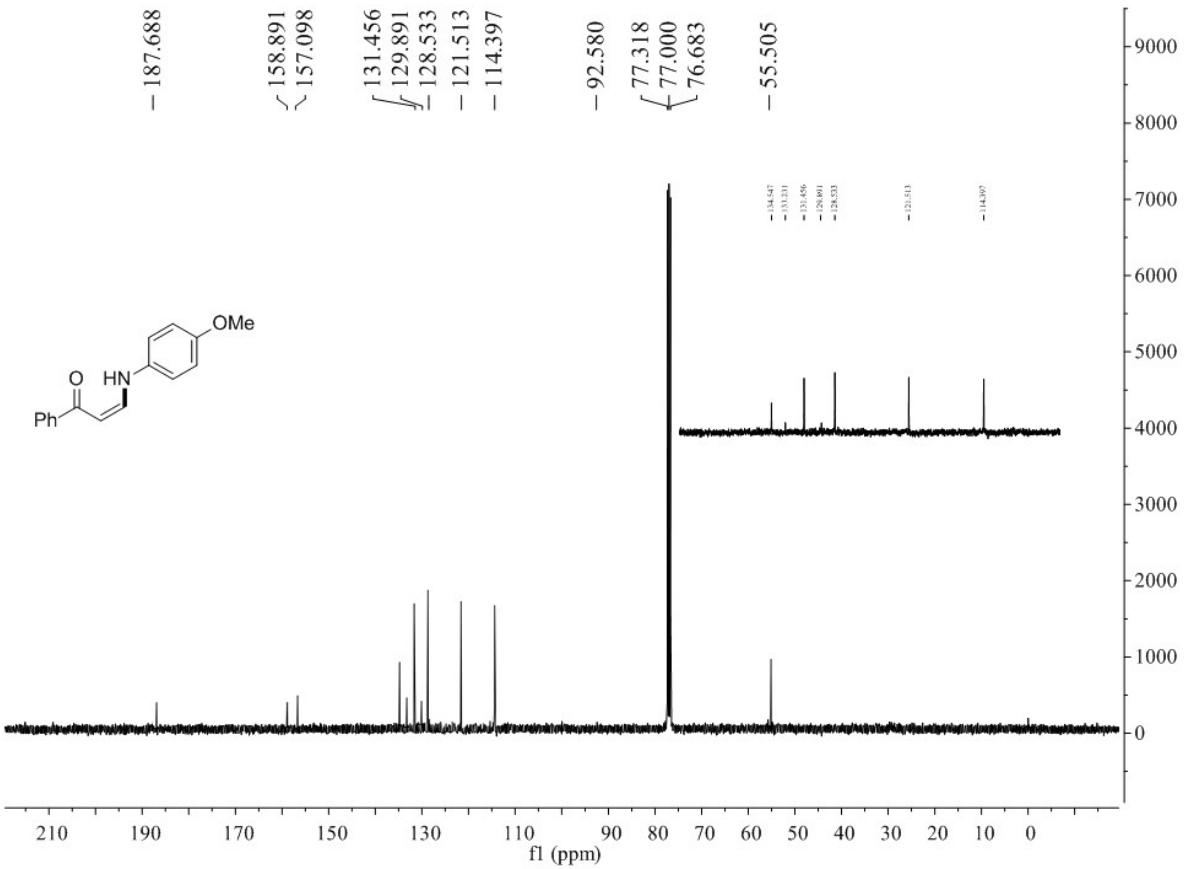
fl (ppm)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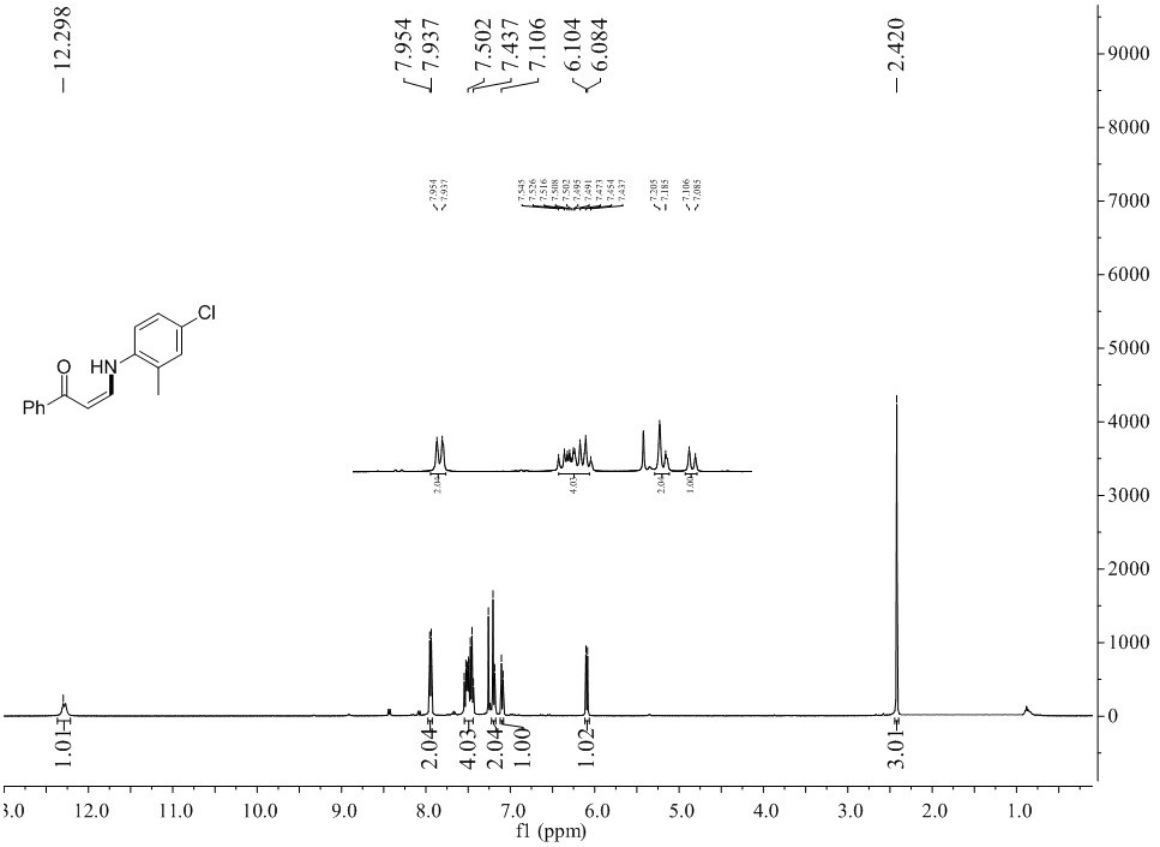
O
HN
Ph
fl (ppm)

3f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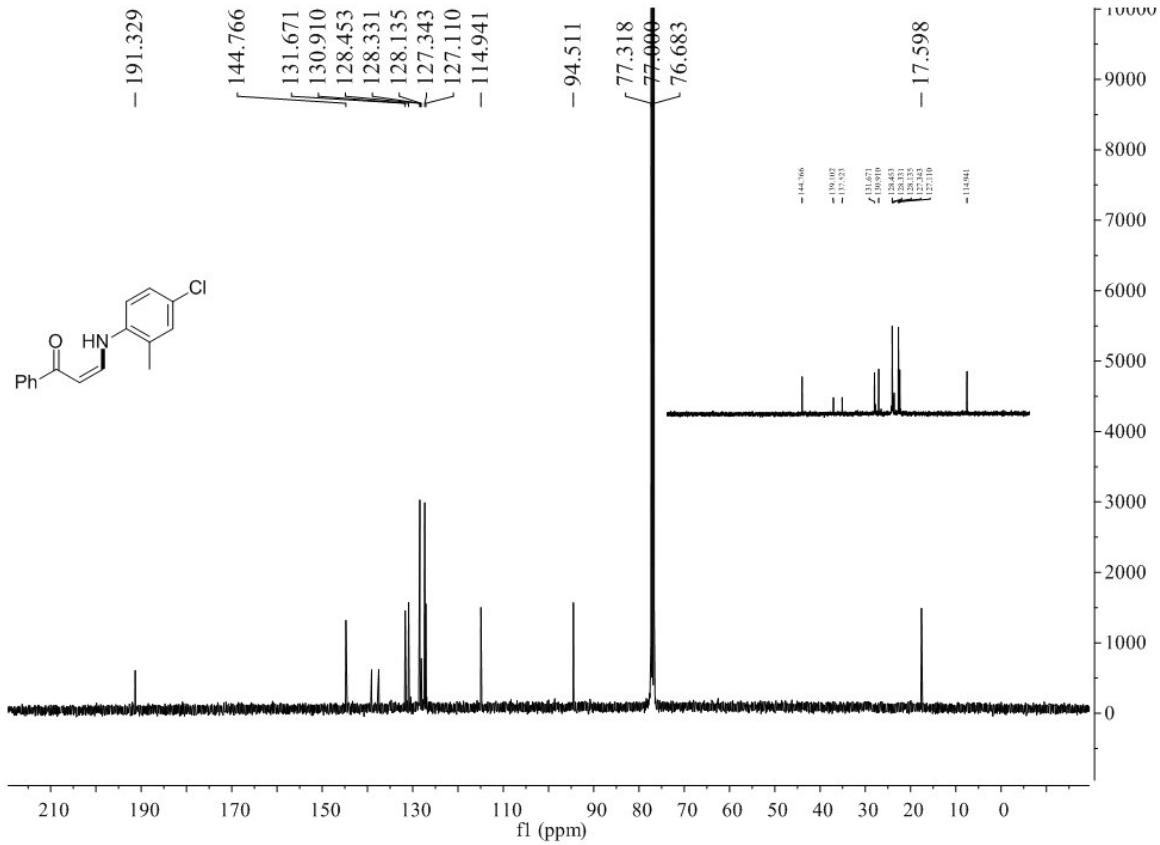
1.00
1.02
3.01
fl (ppm)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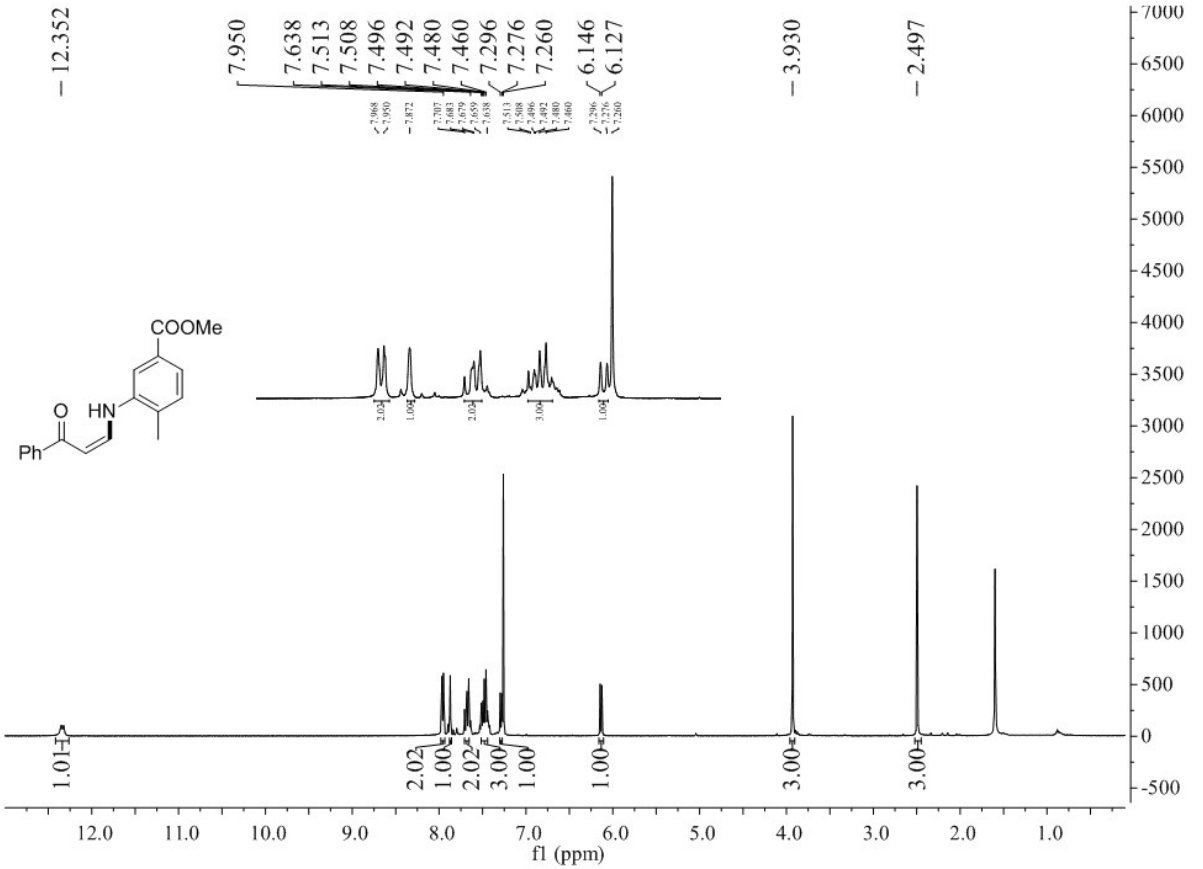
Cl
HN
O
Ph
fl (ppm)

3g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3.00
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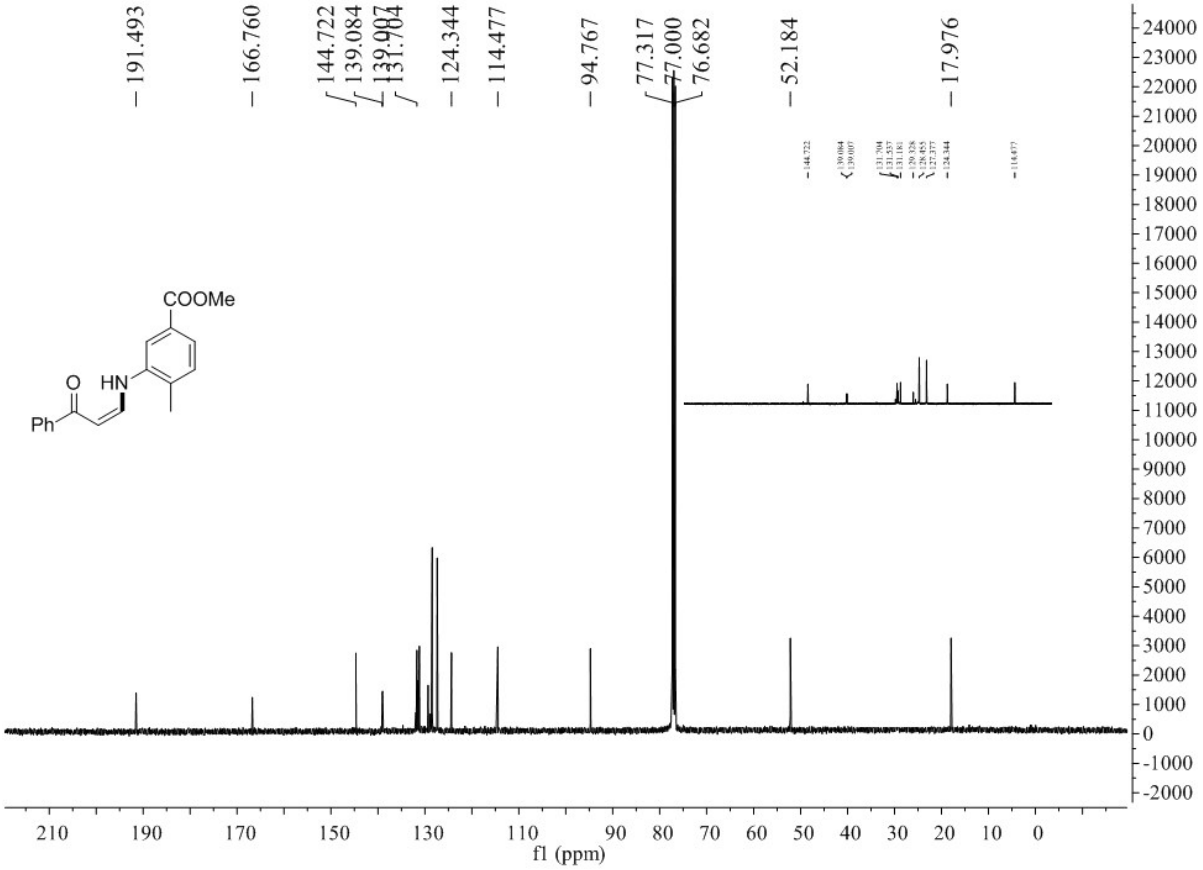
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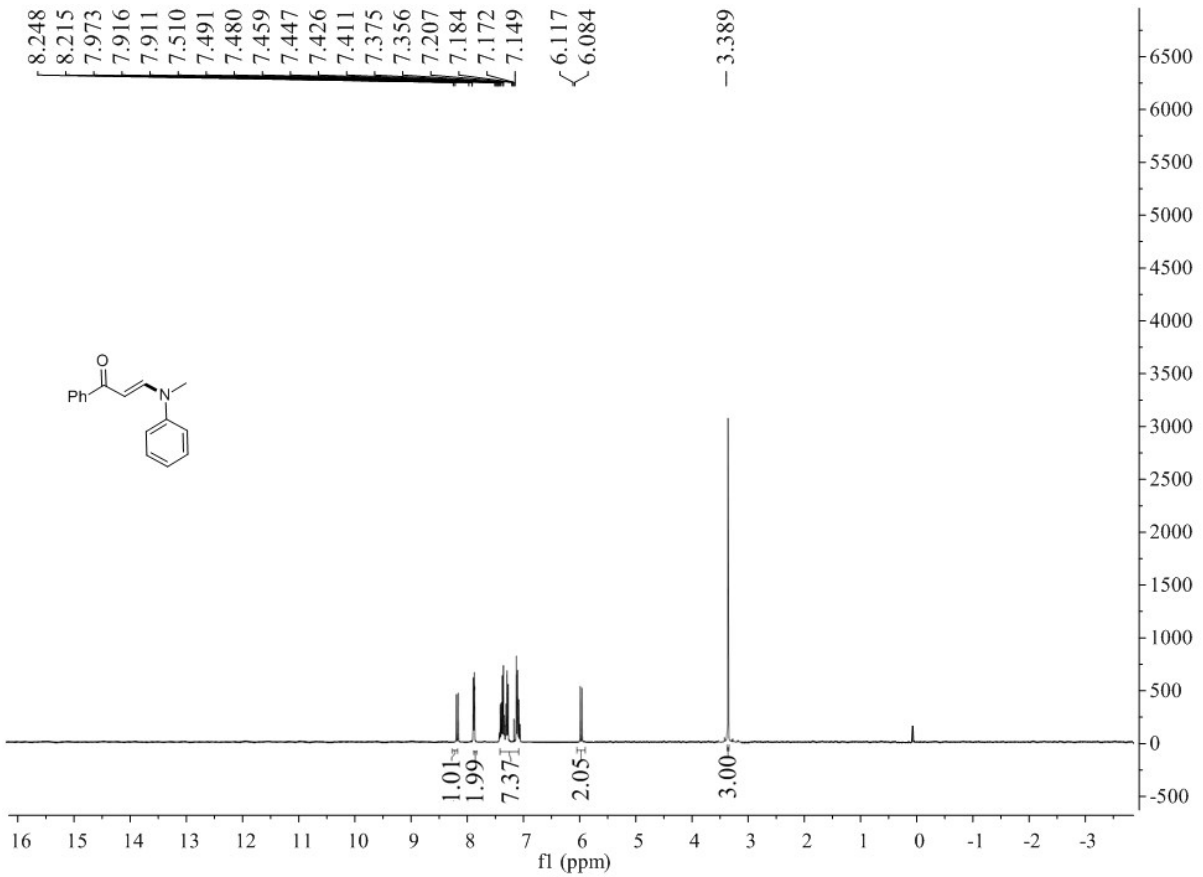
3h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7.356
7.207
7.184
7.172
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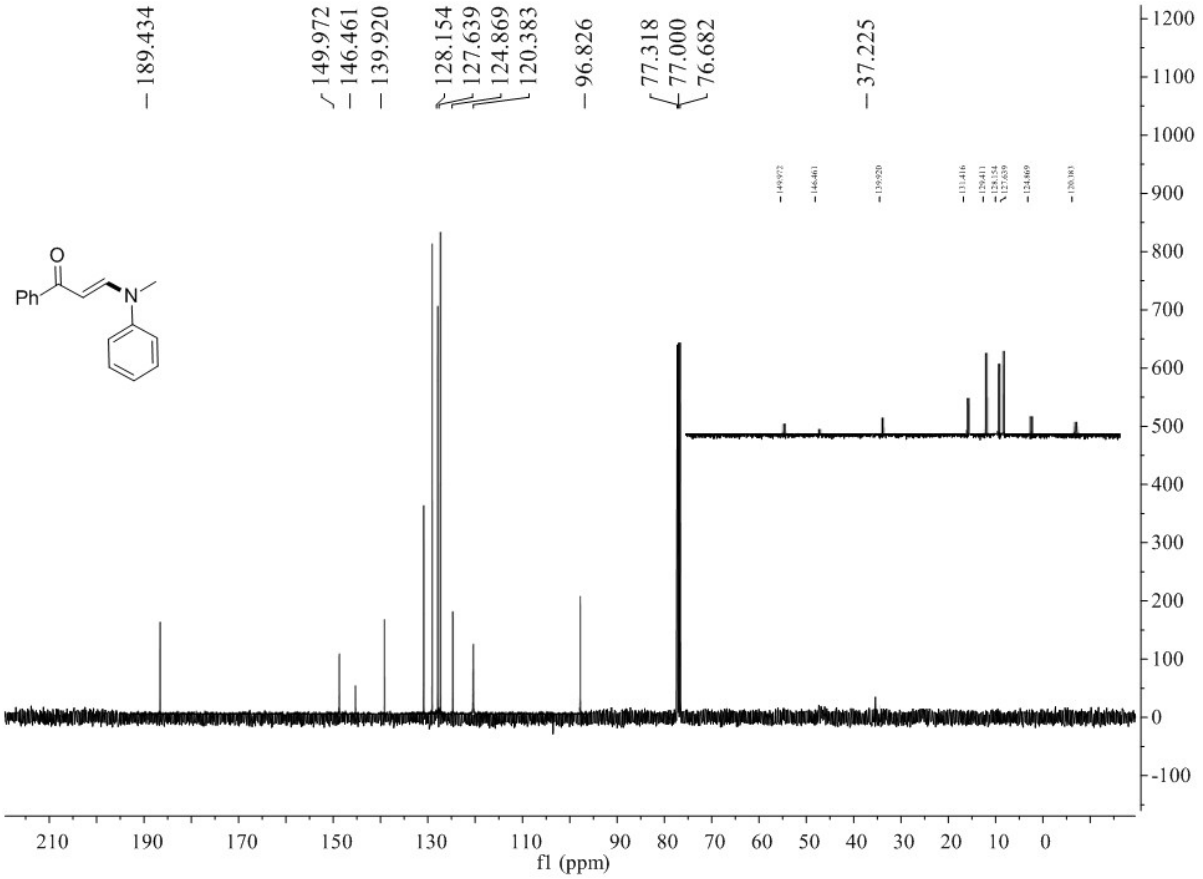
fl (ppm)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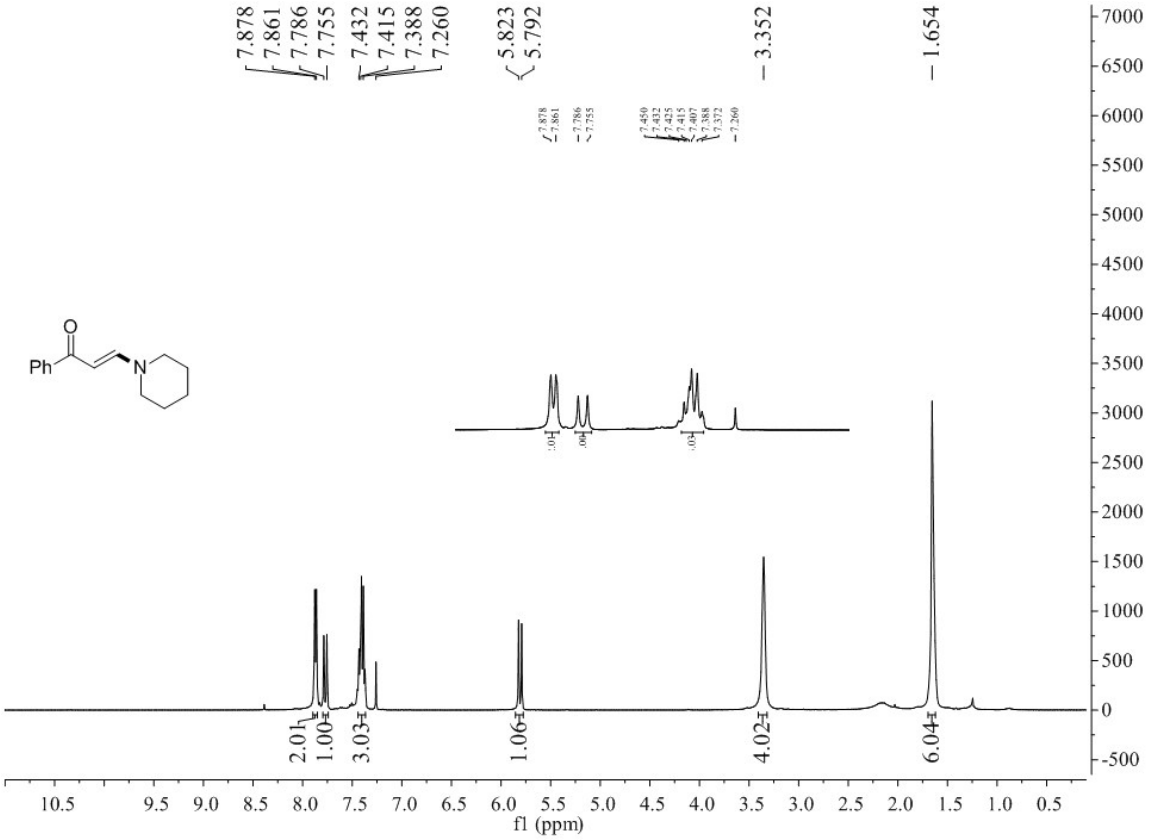
37.225
Ph
O
N
fl (ppm)

3i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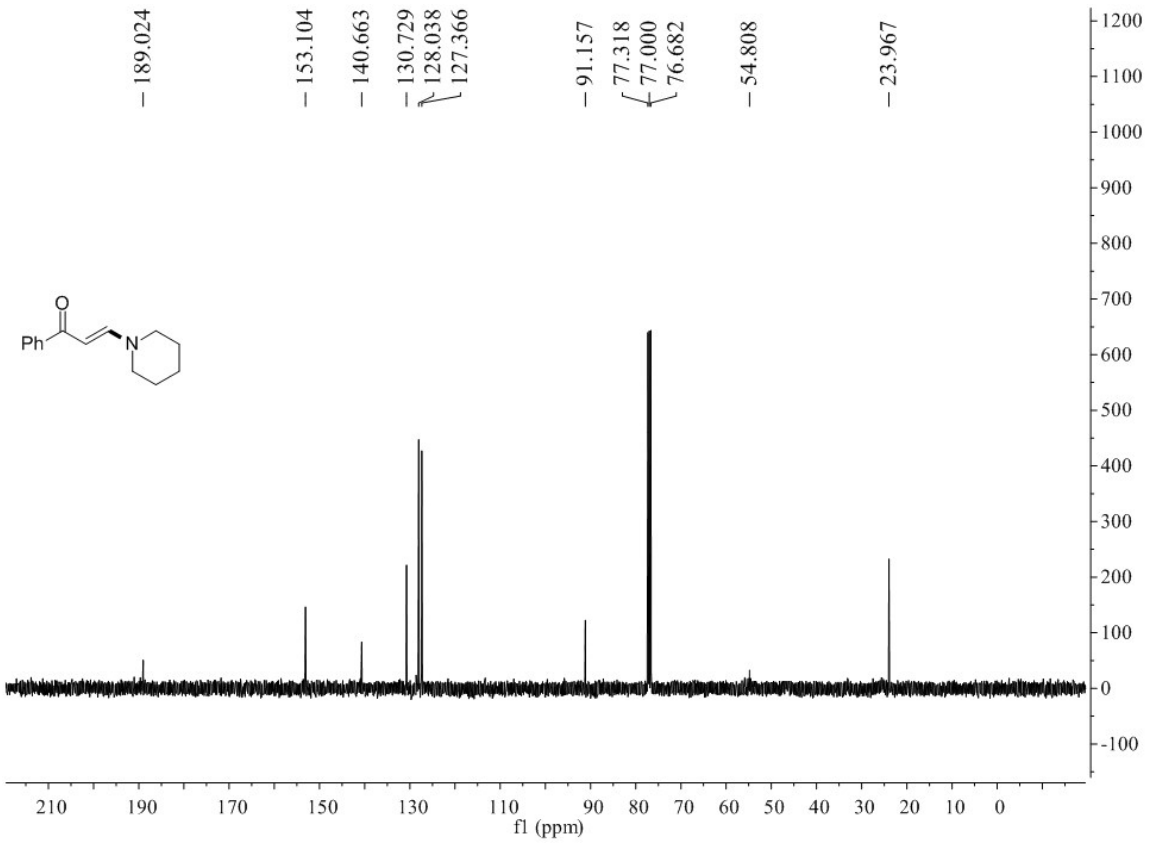
fl (ppm)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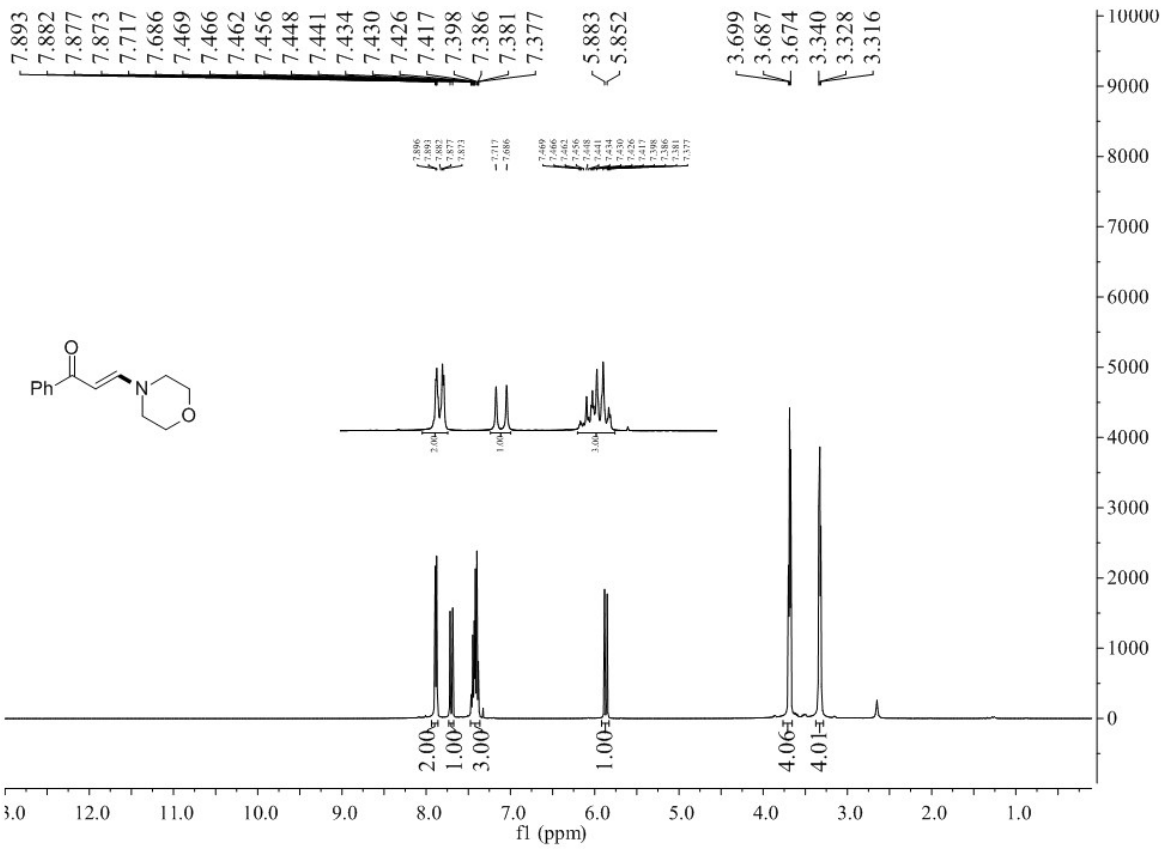
fl (ppm)

3j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7.426
7.417
7.398
7.386
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5.883
5.852
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3.687
3.674
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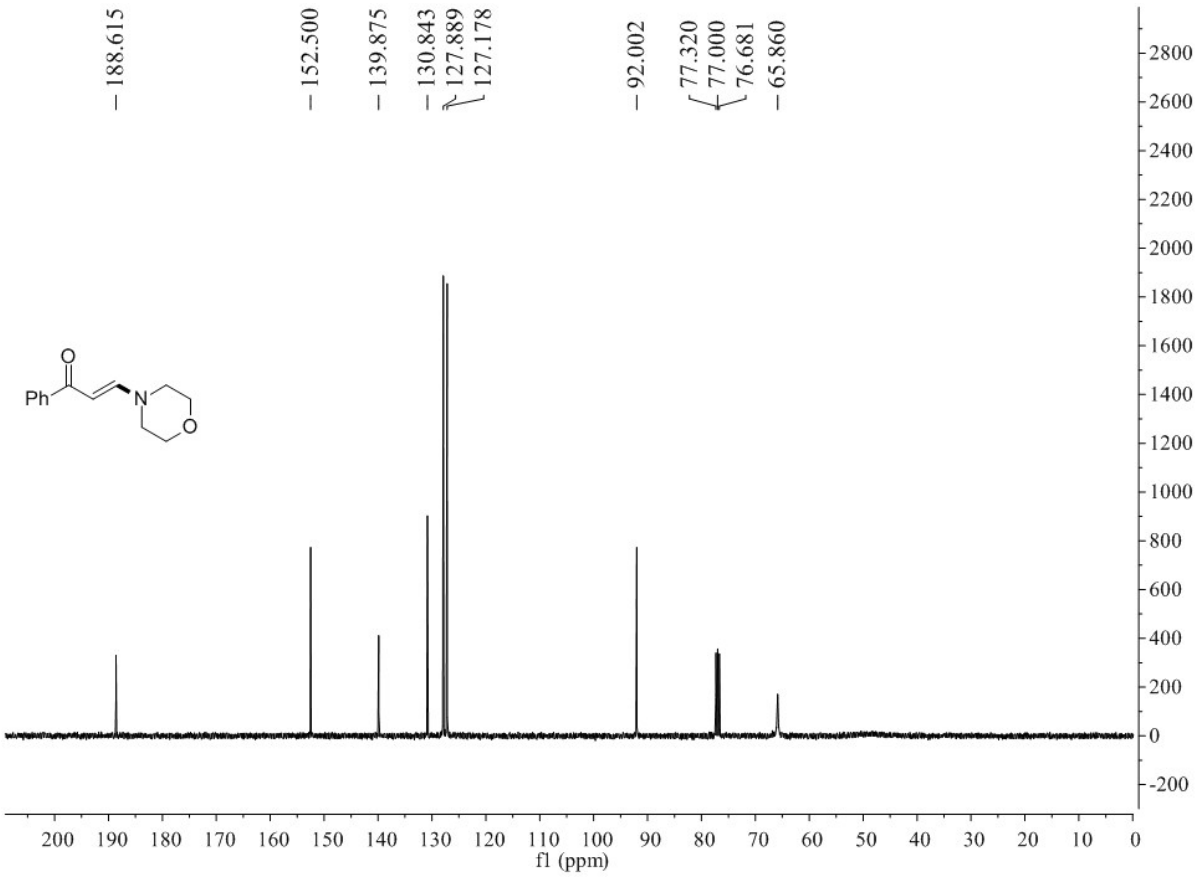
fl (ppm)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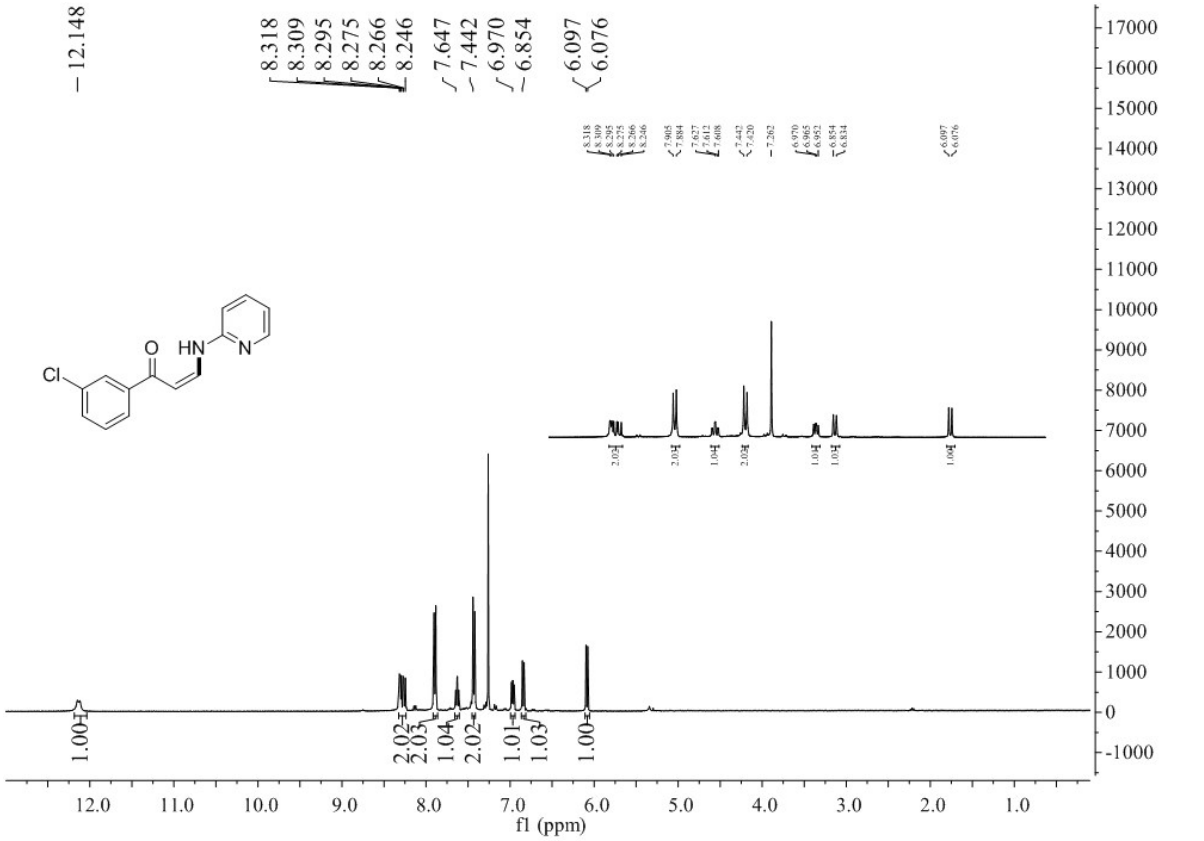
O
fl (ppm)

3k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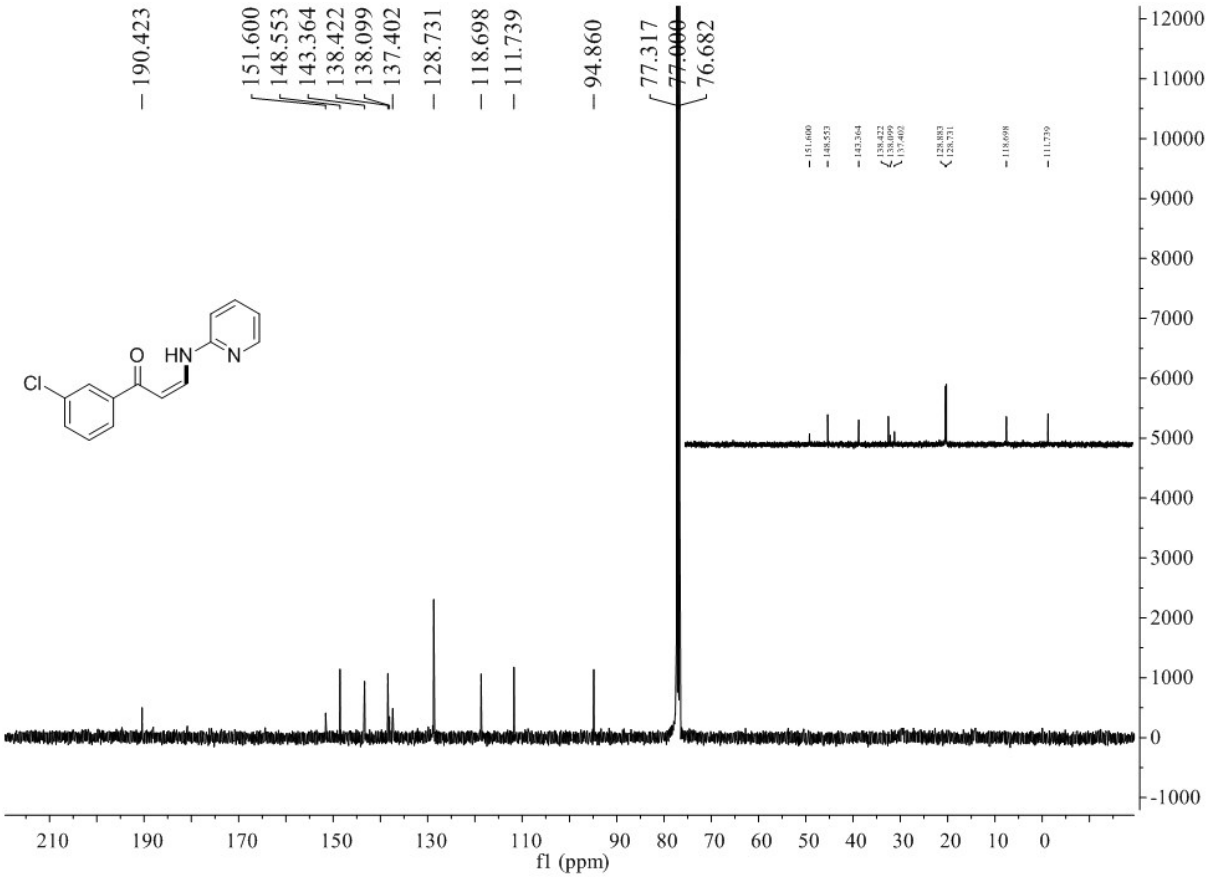
fl (ppm)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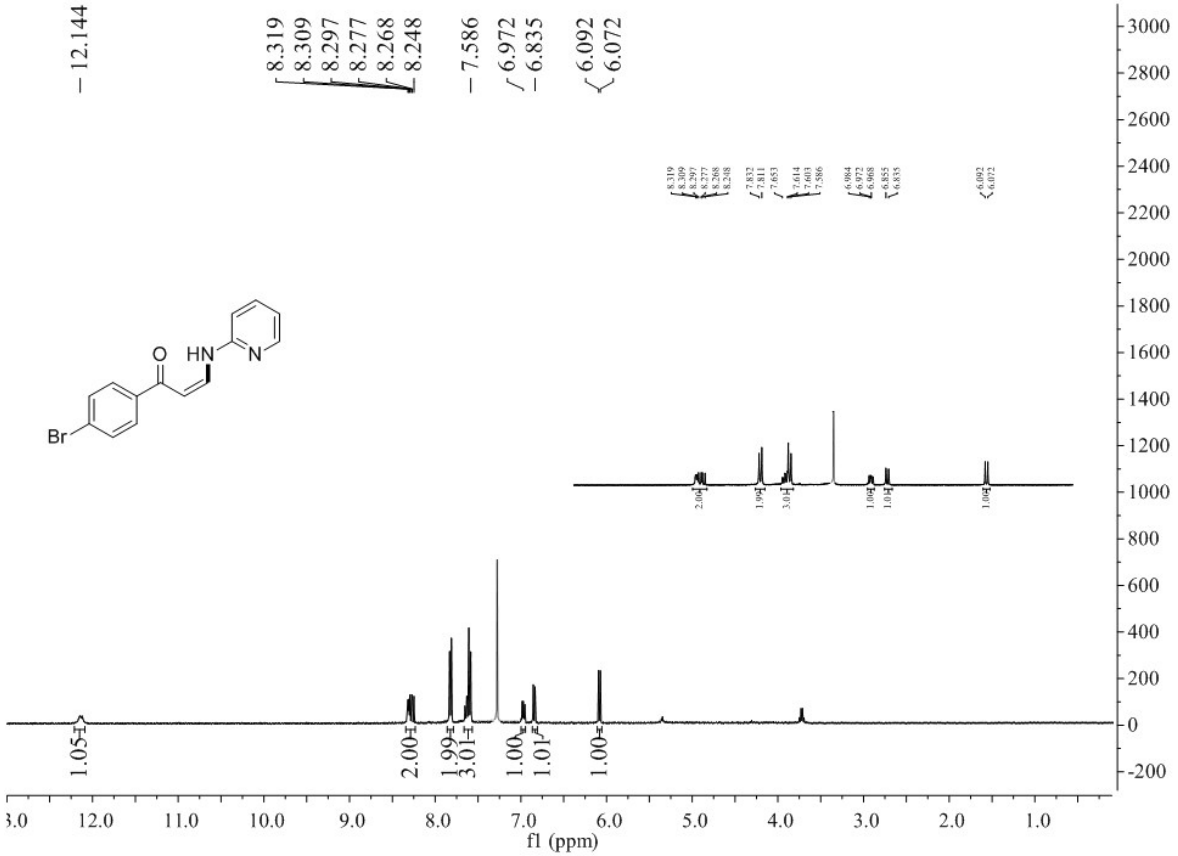
N
fl (ppm)

3l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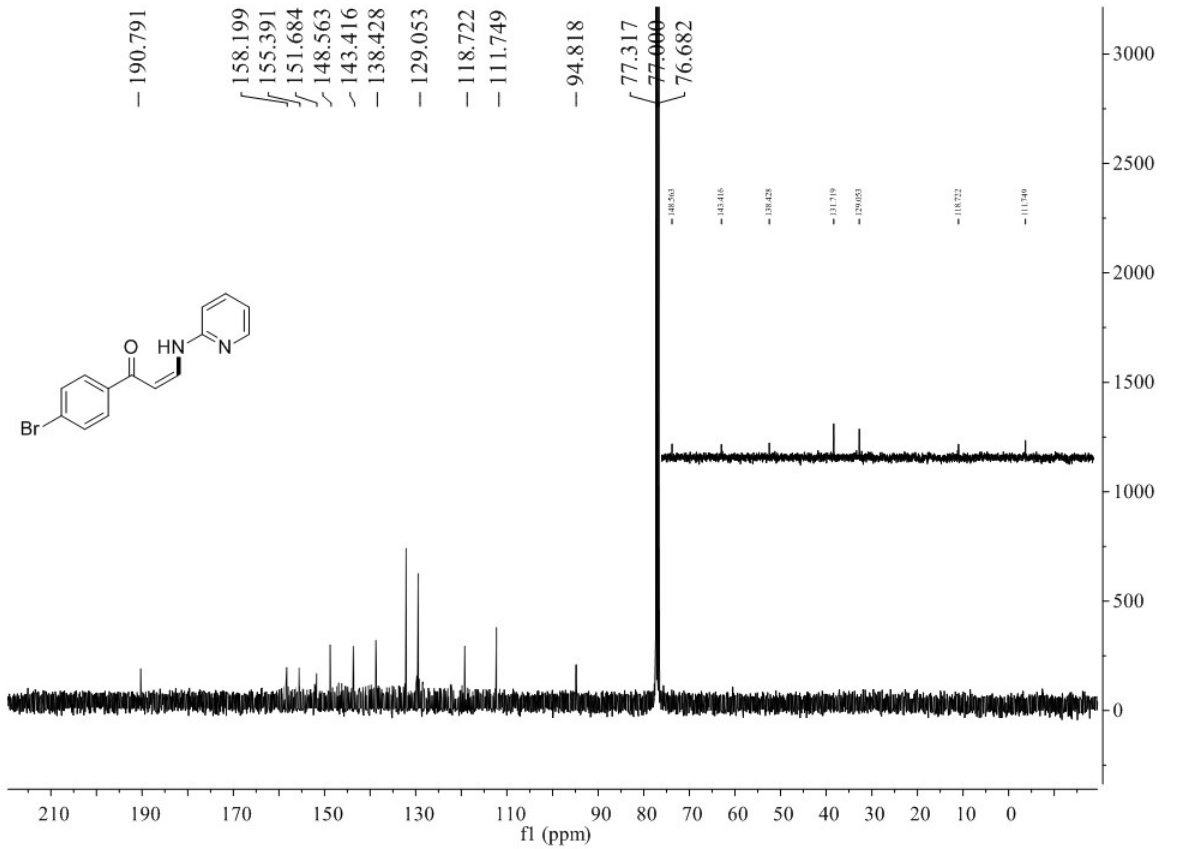
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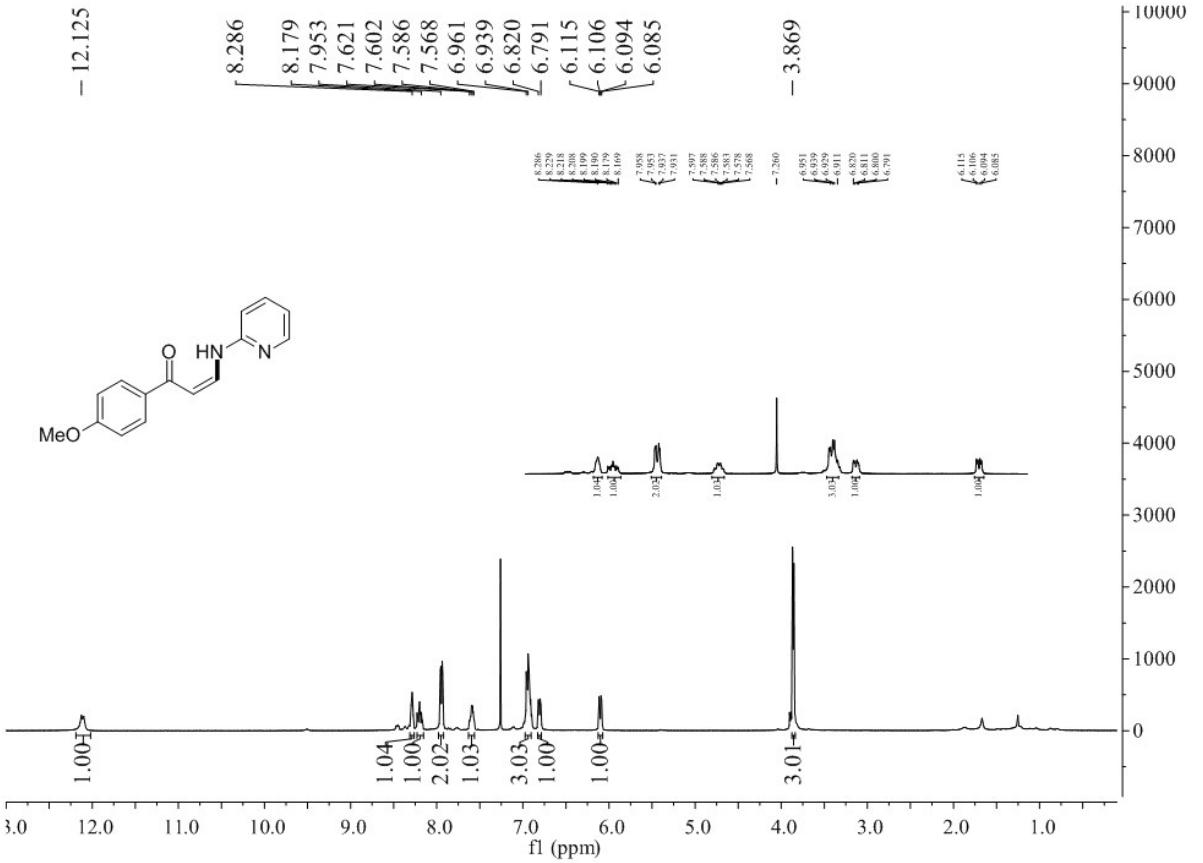
Br
fl (ppm)

3m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6.791
6.115
6.106
6.094
6.085
3.869
O
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1.04
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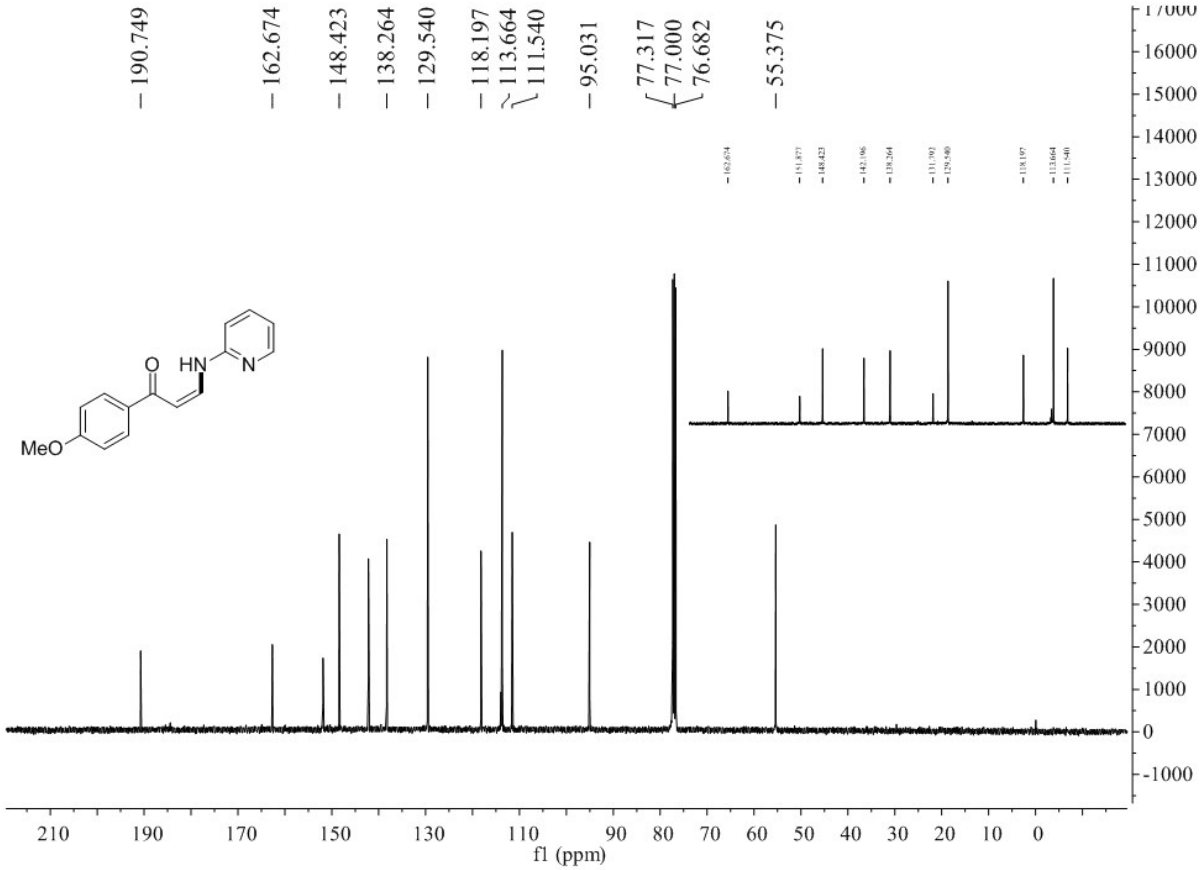
1.00
3.01
f1 (ppm)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O
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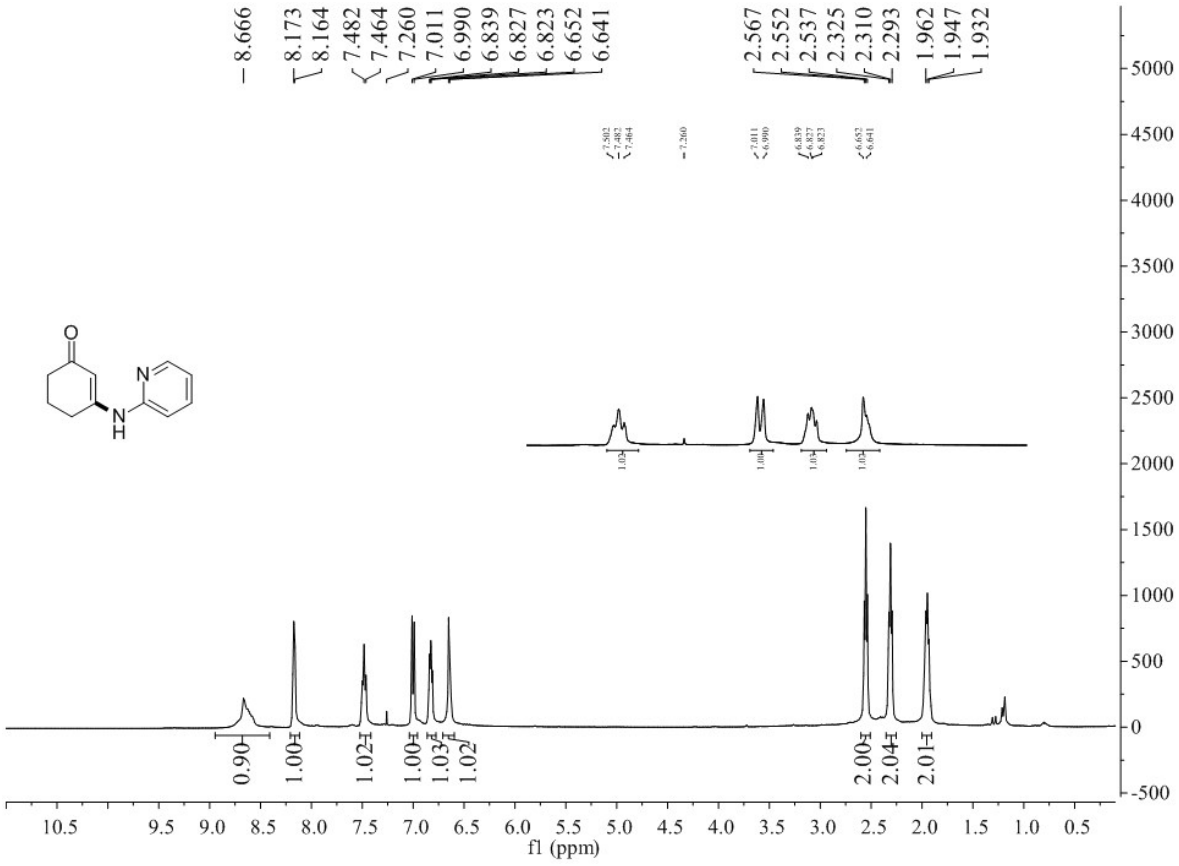
N
MeO
f1 (ppm)

3n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1.02
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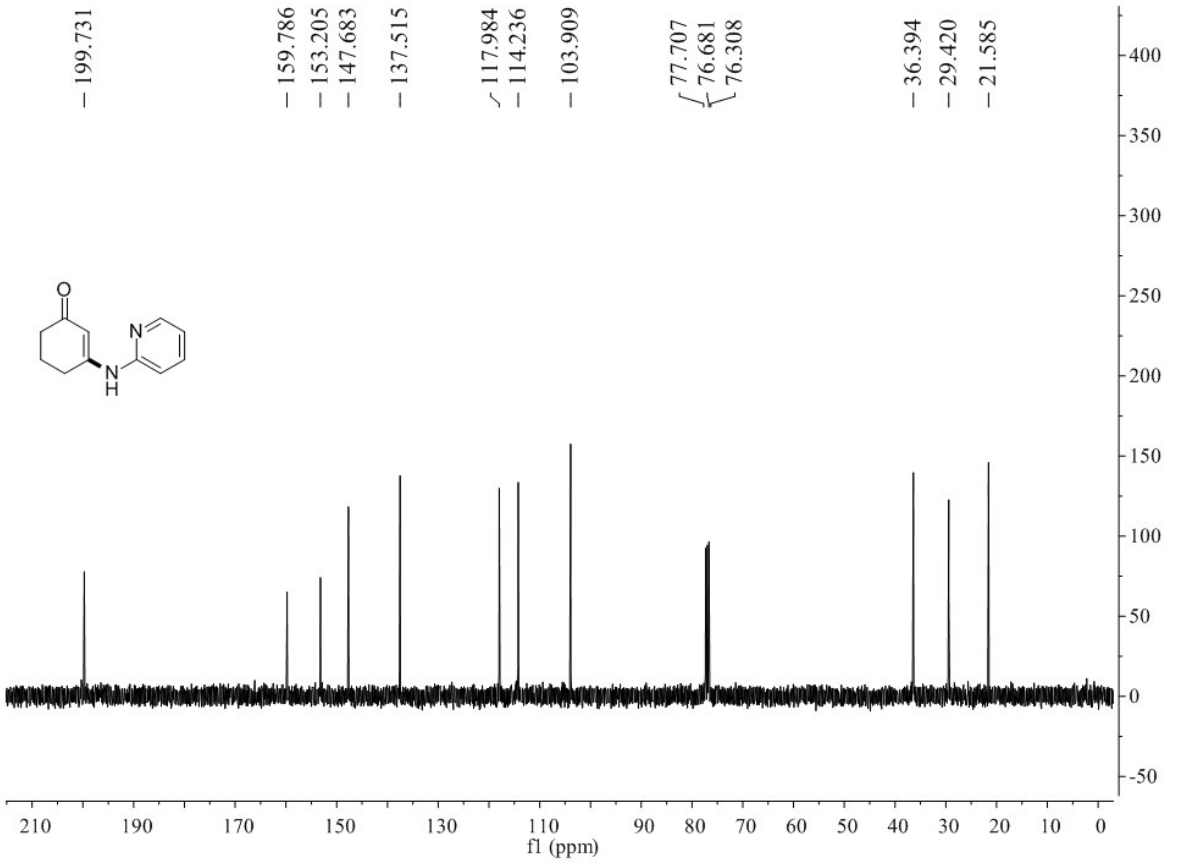
2.04
2.01
fl (ppm)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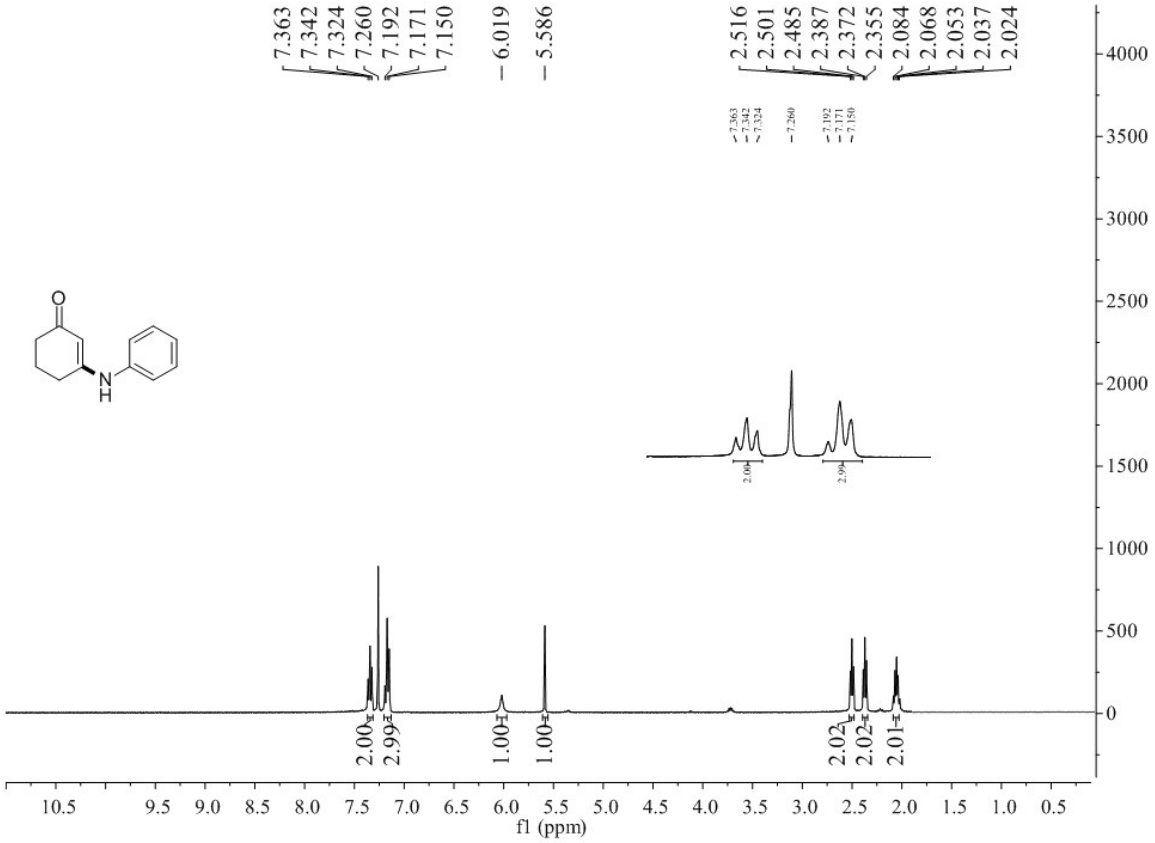
3o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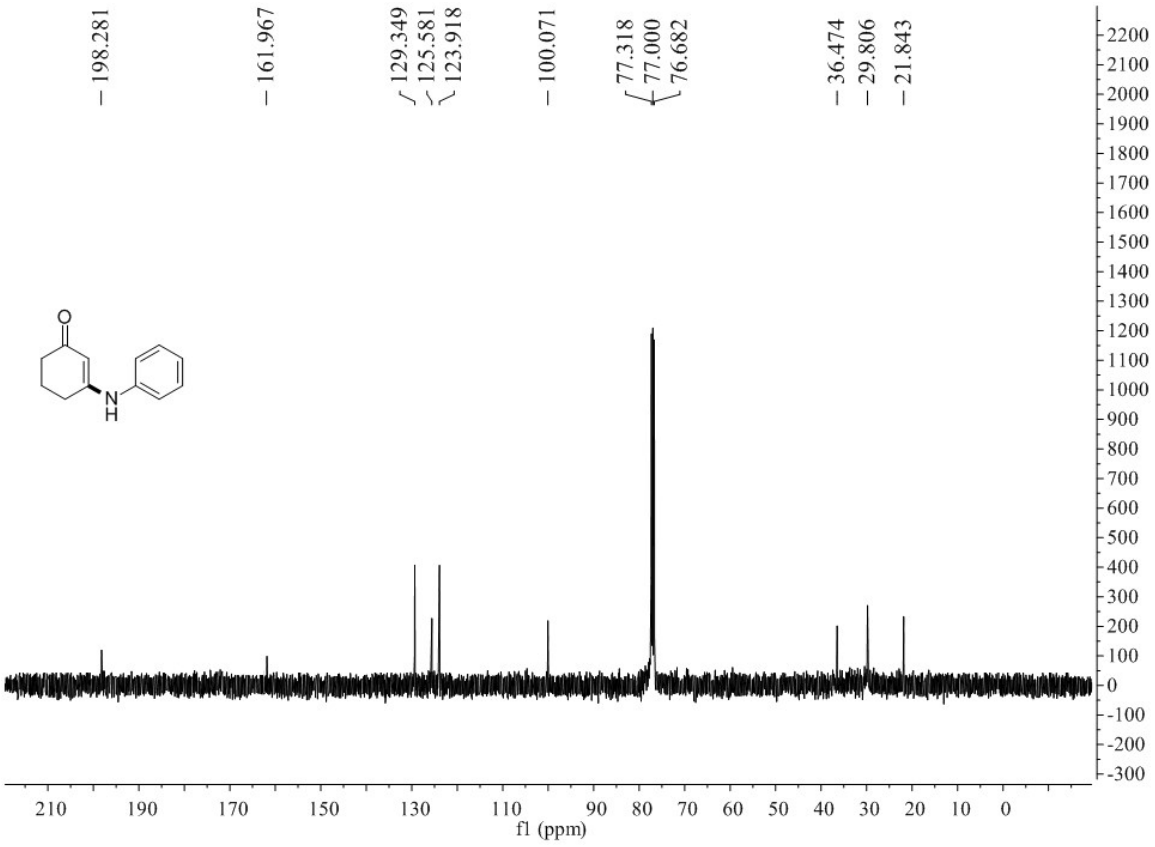
f1 (ppm)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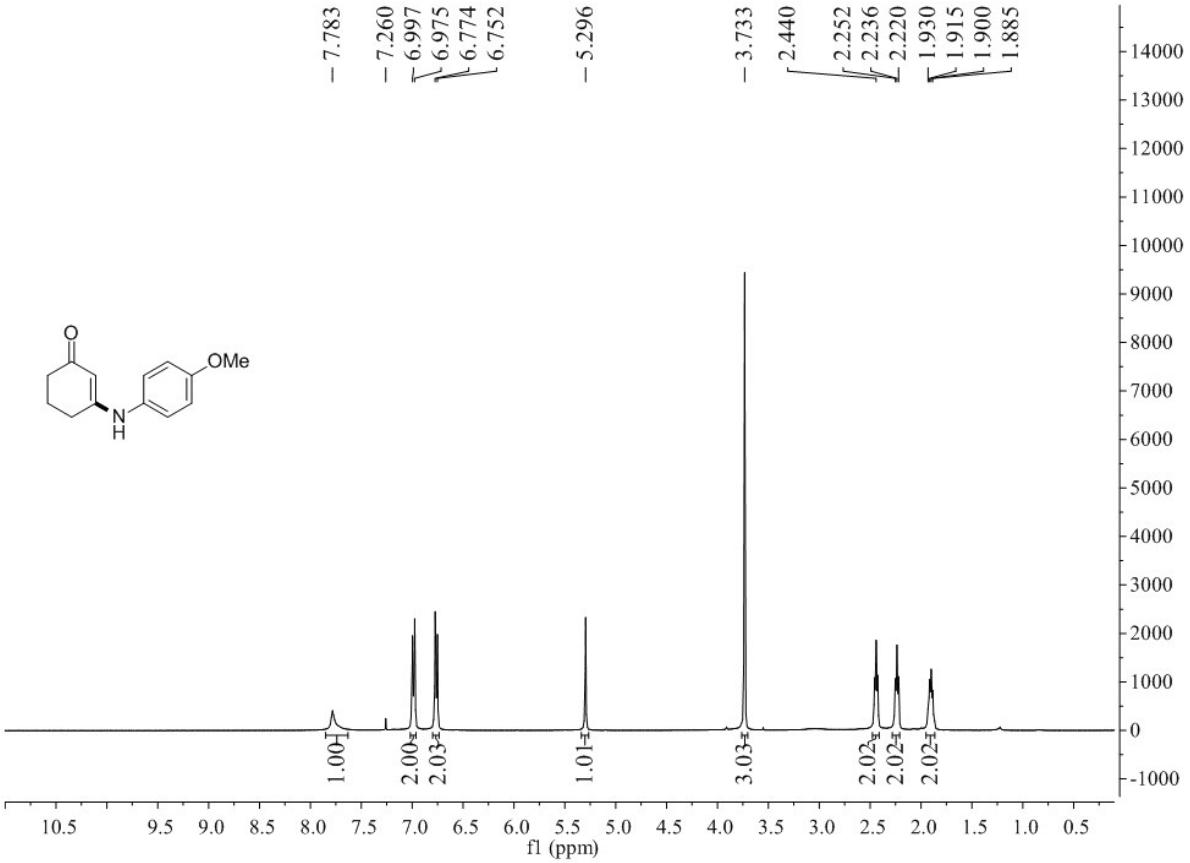
3p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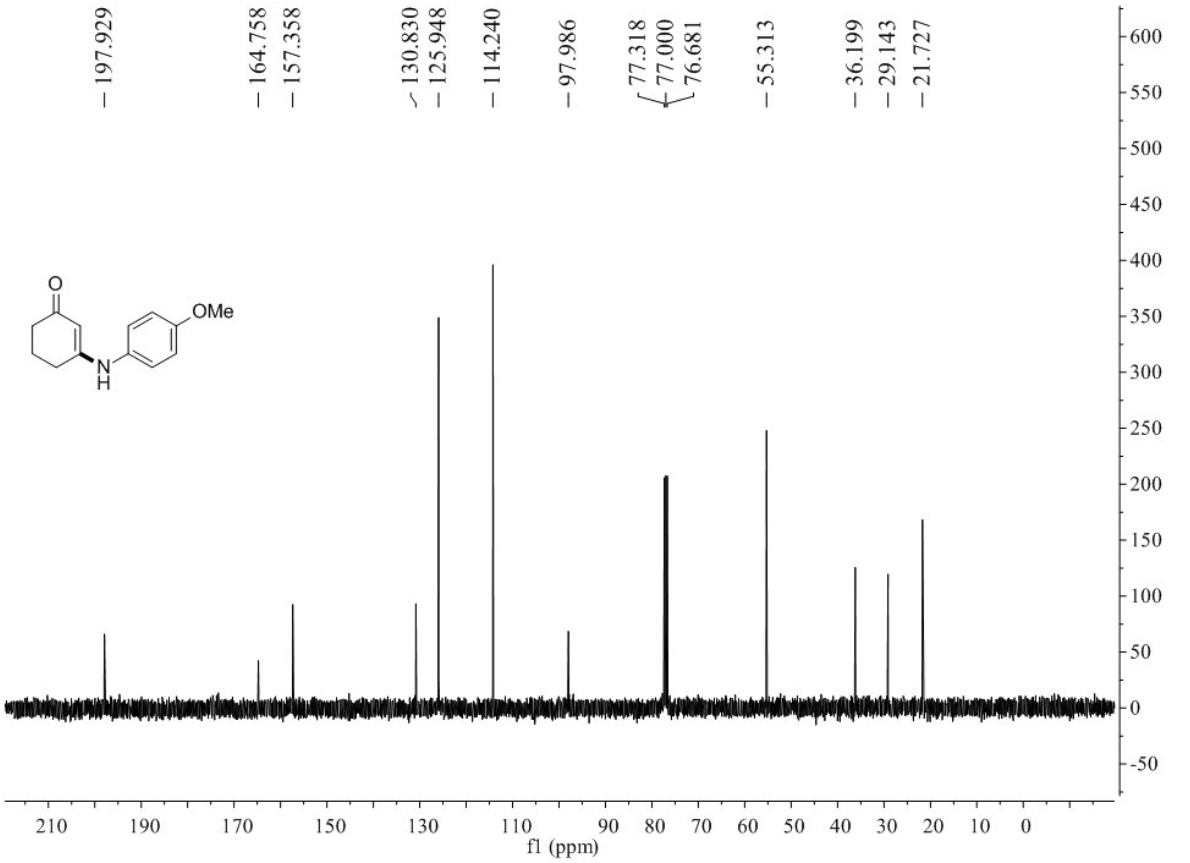
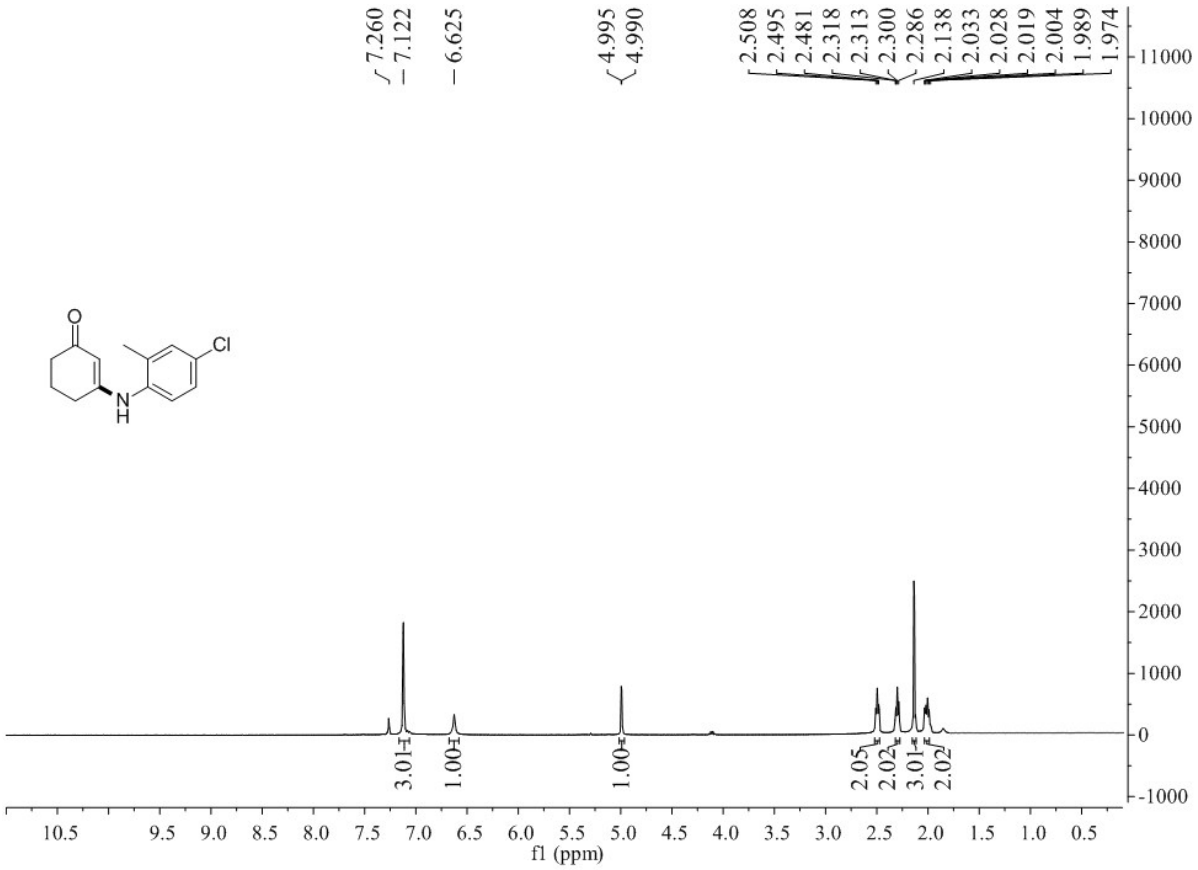
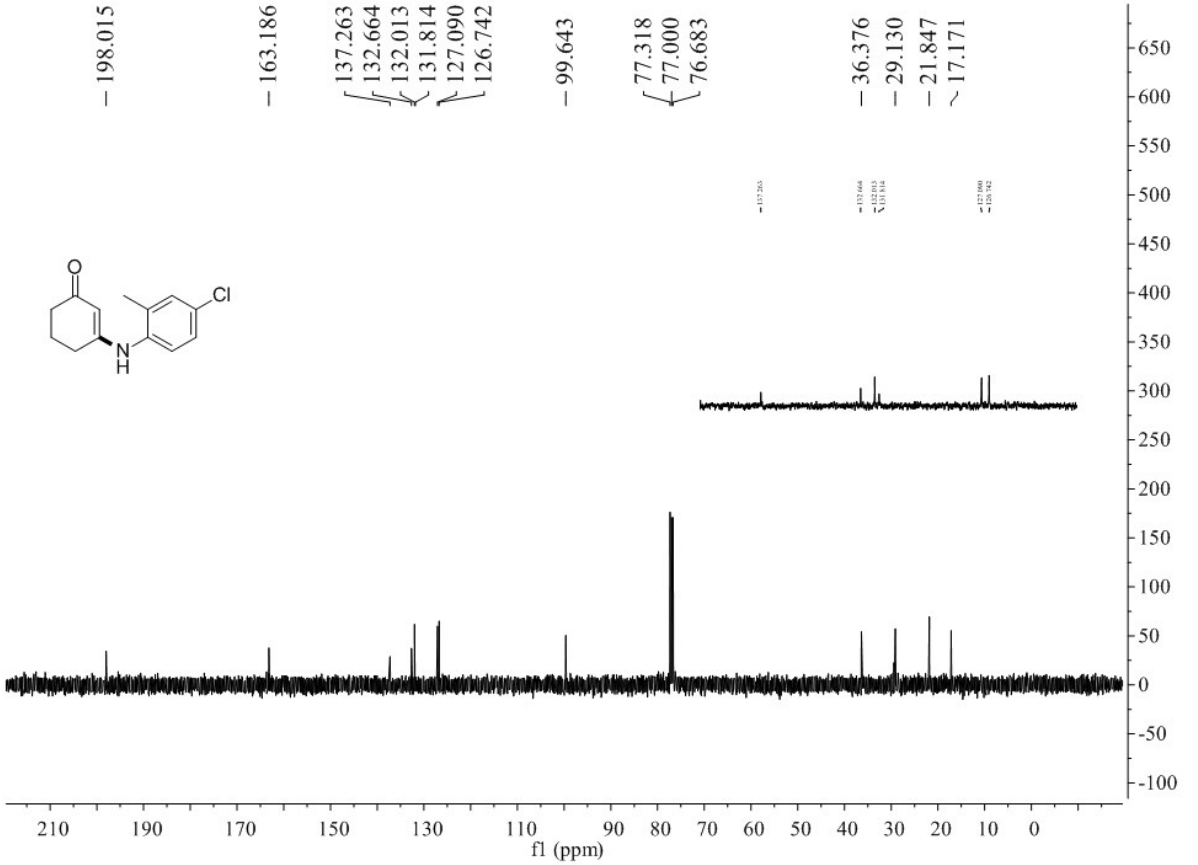
3.03
2.02
2.02
2.02
OMe
N
H
O
fl (ppm)

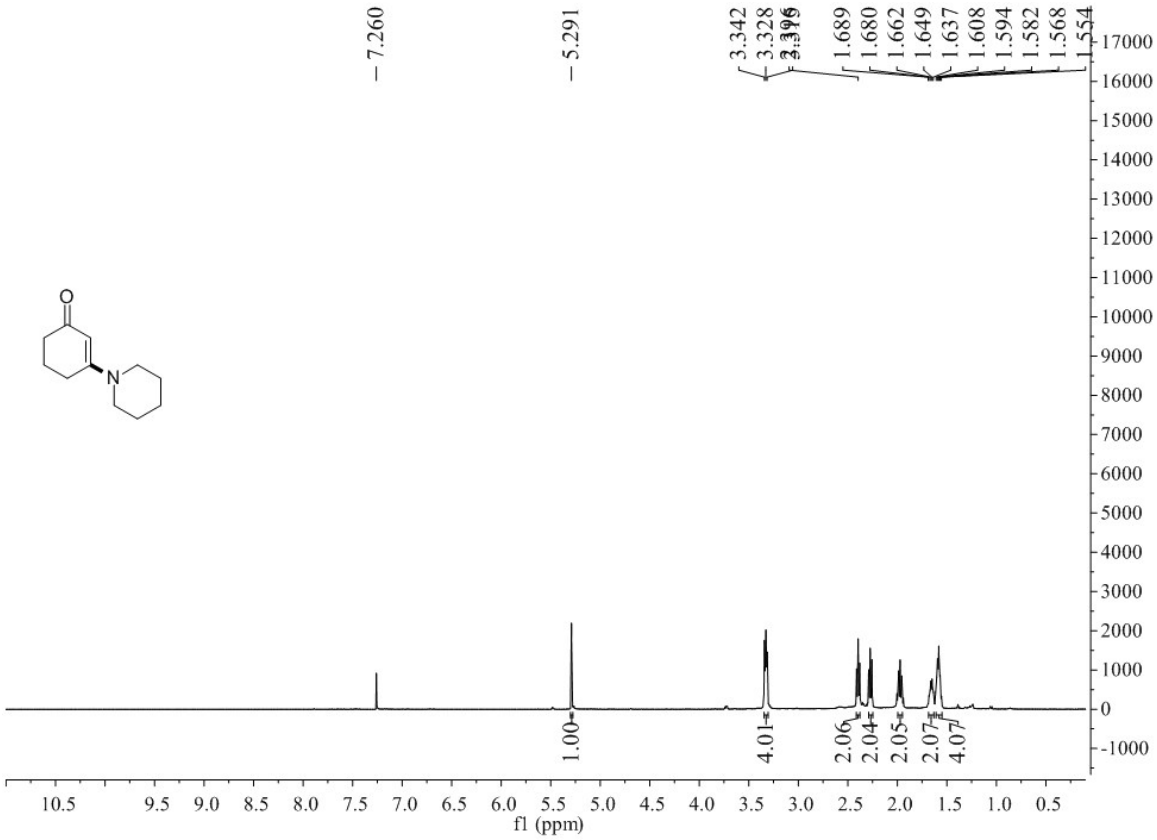

197.929
164.758
157.358
130.830
125.948
114.240
97.986
77.318
77.000
76.681
55.313
36.199
29.143
21.727
OMe
N
H
O
fl (ppm)

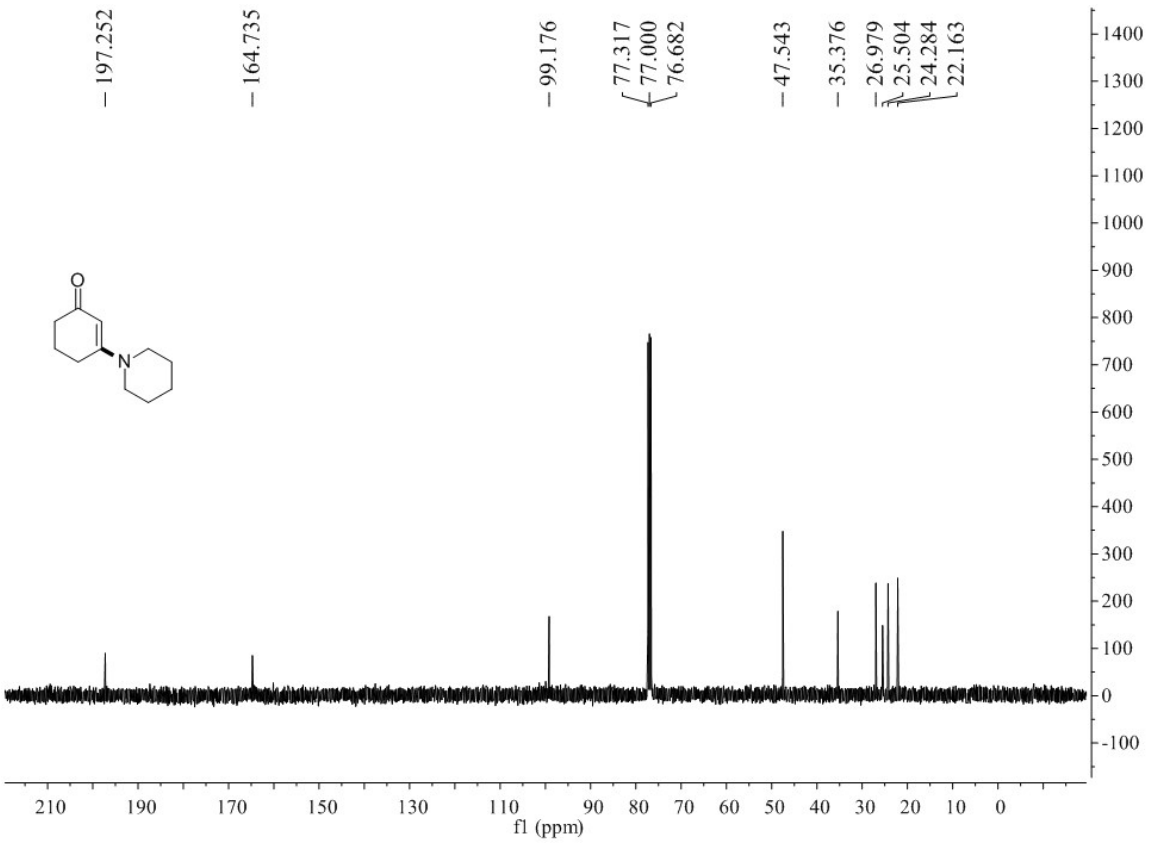
3q


7.260
7.122
6.625
4.995
4.990
2.508
2.495
2.481
2.318
2.313
2.300
2.286
2.138
2.033
2.028
2.019
2.004
1.989
1.974
3.01
1.00
1.00
2.05
2.02
3.01
2.02
fl (ppm)

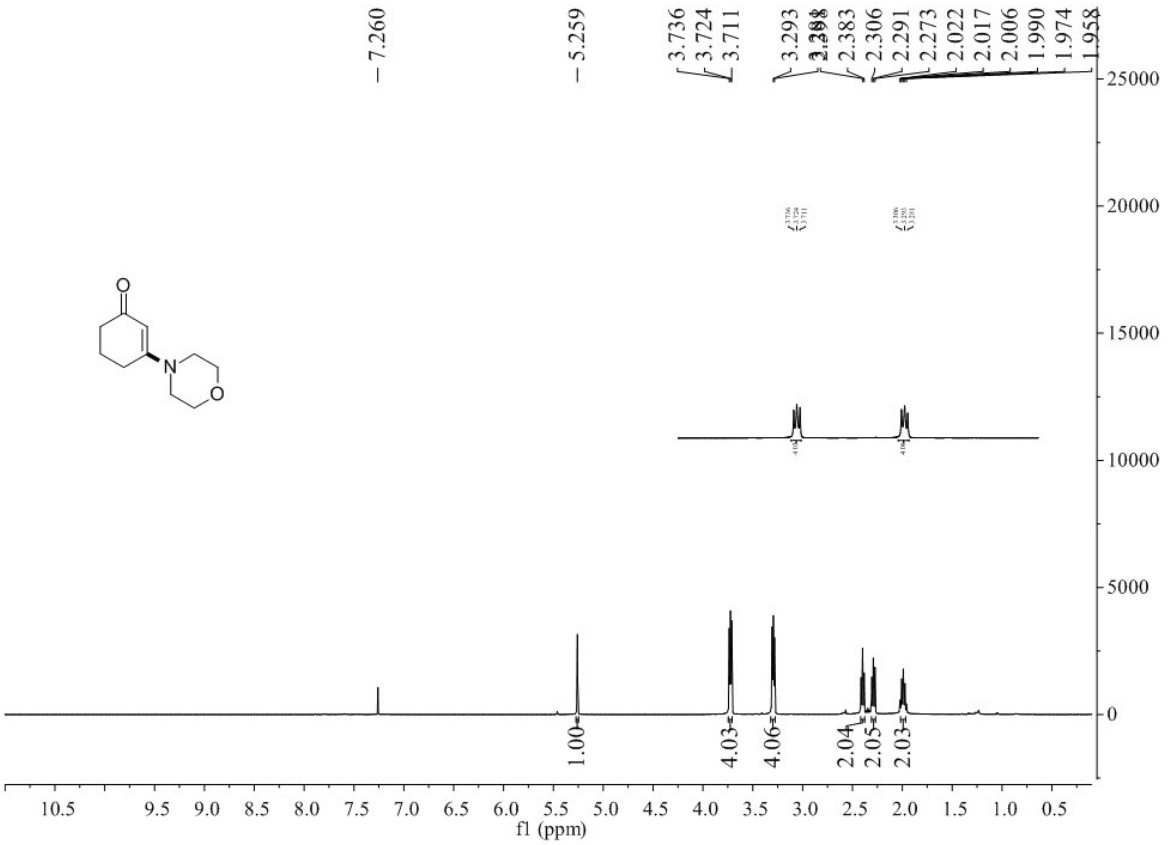

198.015
163.186
137.263
132.664
132.013
131.814
127.090
126.742
99.643
77.318
77.000
76.683
36.376
29.130
21.847
17.171
fl (ppm)

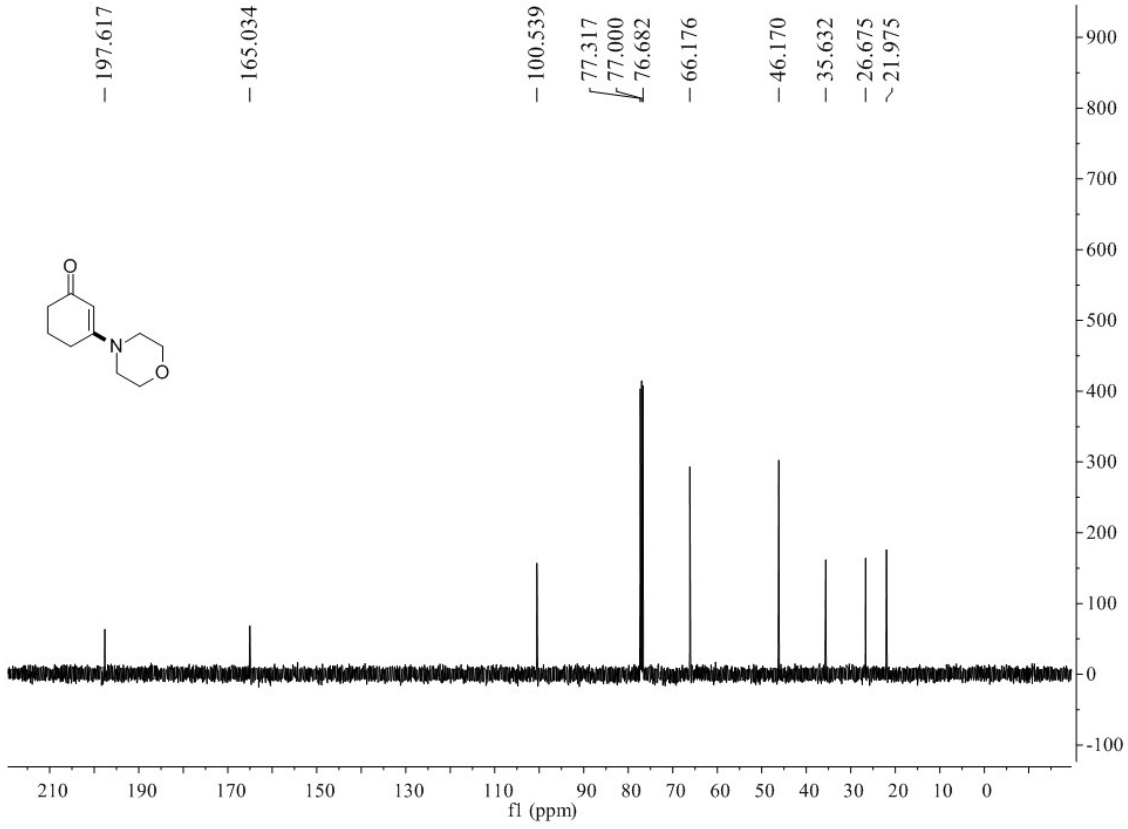
3r


7.260
5.291
3.342
3.328
1.689
1.680
1.662
1.649
1.637
1.608
1.594
1.582
1.568
1.554
1.00
4.01
2.06
2.04
2.05
2.07
4.07
f1 (ppm)

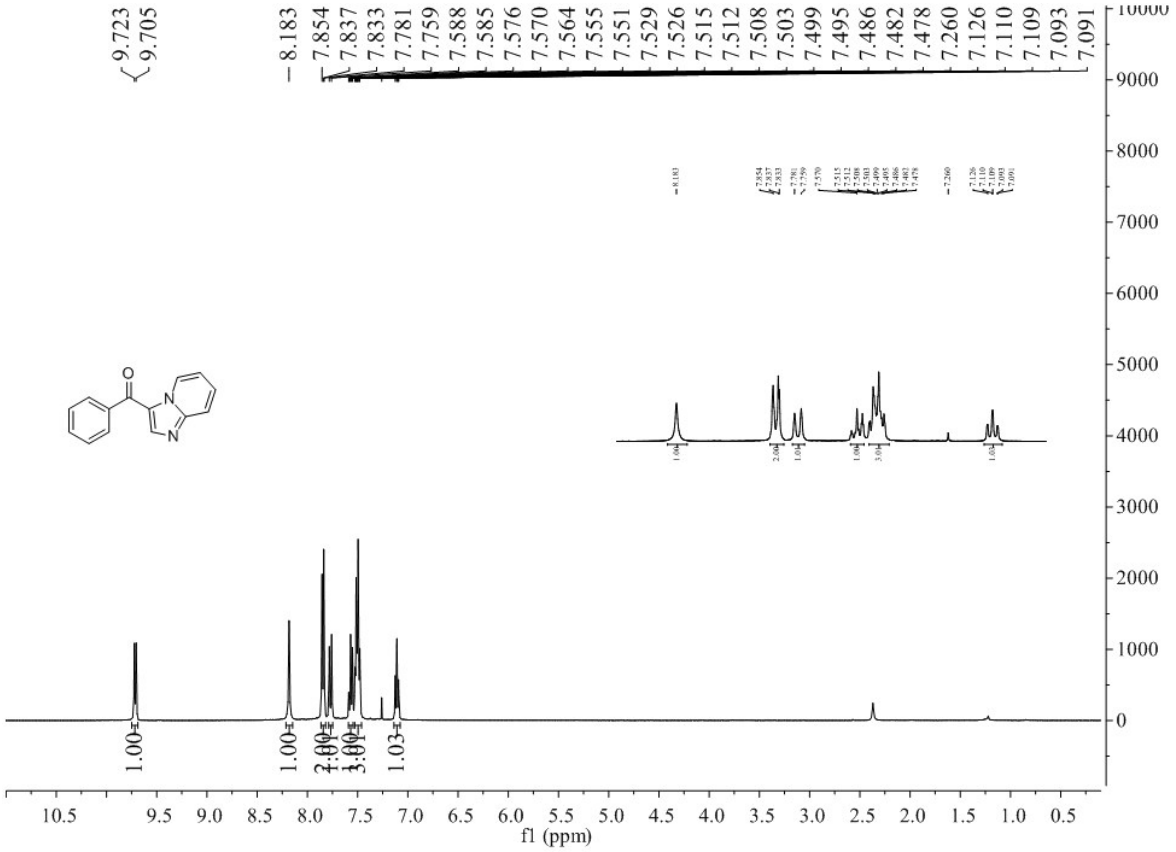

197.252
164.735
99.176
77.317
77.000
76.682
47.543
35.376
26.979
25.504
24.284
22.163
f1 (ppm)

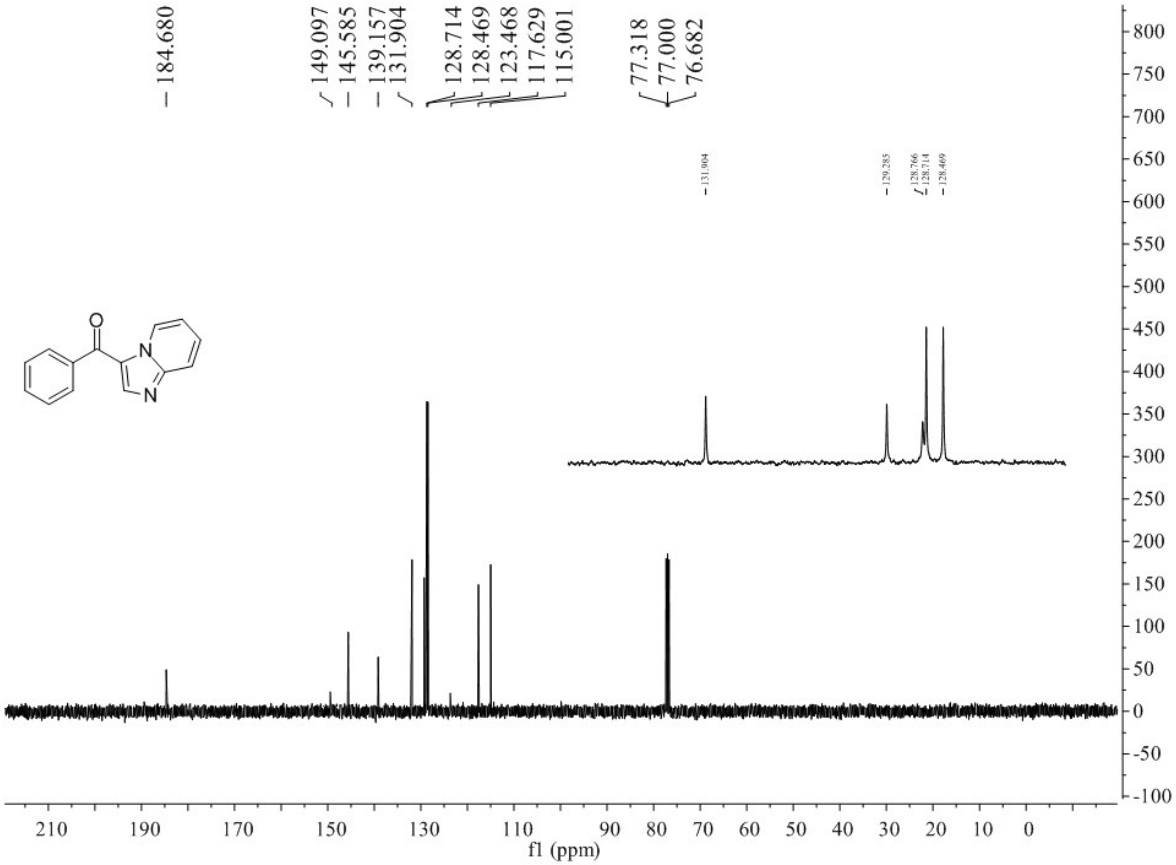
3s


7.260
5.259
3.736
3.724
3.711
3.293
2.383
2.306
2.291
2.273
2.022
2.017
2.006
1.990
1.974
1.958
1.00
4.03
4.06
2.04
2.05
2.03
f1 (ppm)

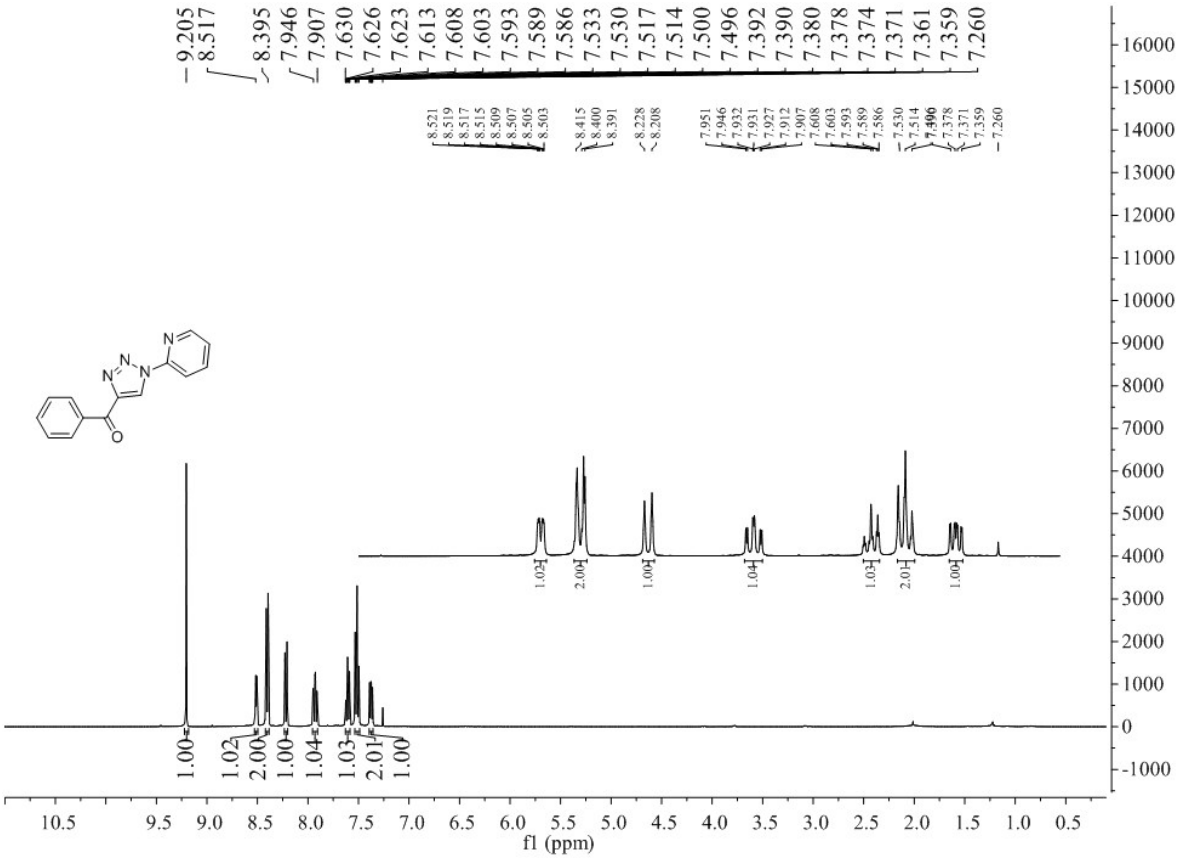

197.617
165.034
100.539
77.317
77.000
76.682
66.176
46.170
35.632
26.675
21.975
f1 (ppm)

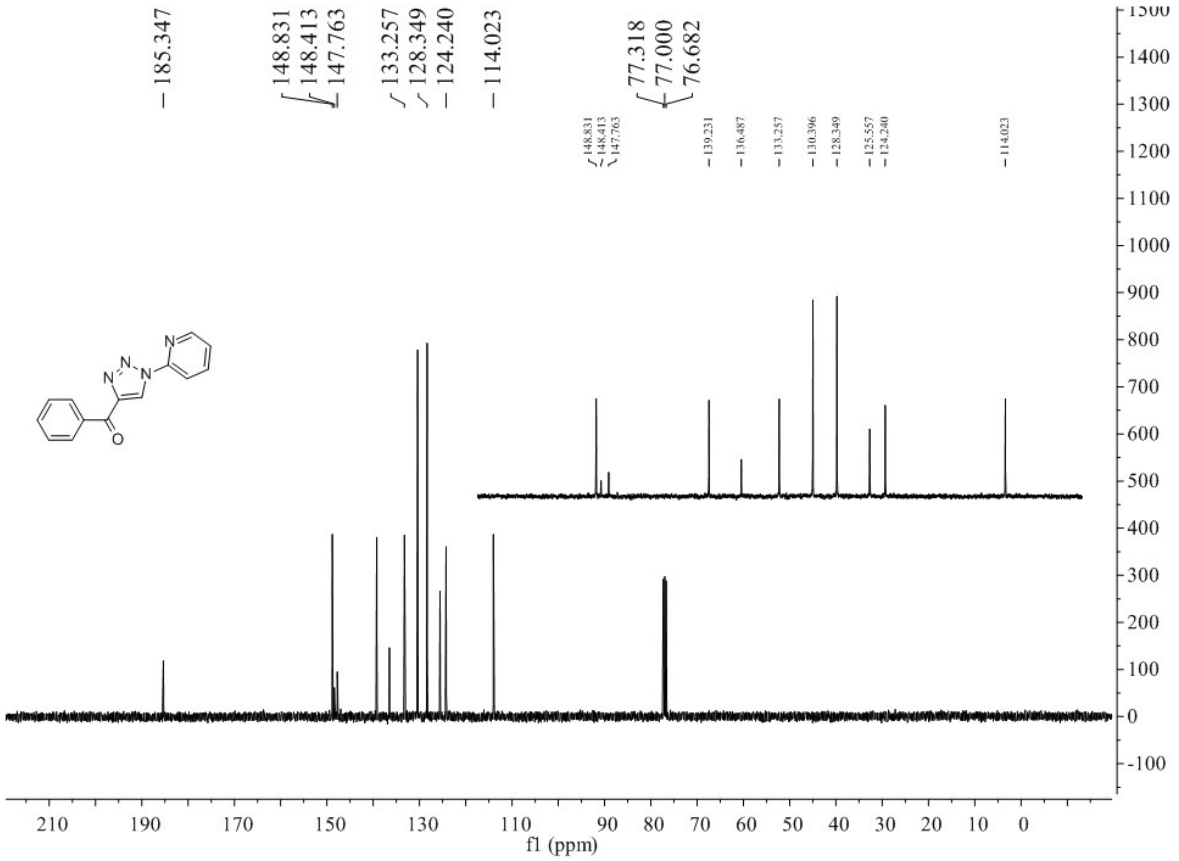
4a


9.723
9.705
8.183
7.854
7.837
7.833
7.781
7.759
7.588
7.585
7.576
7.570
7.564
7.555
7.551
7.529
7.526
7.515
7.512
7.508
7.503
7.499
7.495
7.486
7.482
7.478
7.260
7.126
7.110
7.109
7.093
7.091
1.00
1.00
2.00
3.01
1.03
fl (ppm)


184.680
149.097
145.585
139.157
131.904
128.714
128.469
123.468
117.629
115.001
77.318
77.000
76.682
fl (ppm)

5a


9.205
8.517
8.395
7.946
7.907
7.630
7.626
7.623
7.613
7.608
7.603
7.593
7.589
7.586
7.533
7.530
7.517
7.514
7.500
7.496
7.392
7.390
7.380
7.378
7.374
7.371
7.361
7.359
7.260
1.00
1.02
2.00
1.00
1.04
1.03
2.01
1.00
f1 (ppm)


185.347
148.831
148.413
147.763
133.257
128.349
124.240
114.023
77.318
77.000
76.682
139.231
136.487
133.257
130.396
128.349
125.557
124.240
114.023
f1 (ppm)