Supporting Information

Synthesis of Enaminones via Copper-Catalyzed Decarboxylative Coupling Reaction under Redox-Neutral Conditions

Zhongzhi Zhu, Xiaodong Tang, Jianxiao Li, Xianwei Li, Wanqing Wu,

Guohua Deng,* Huanfeng Jiang*

Key Laboratory of Functional Molecular Engineering of Guangdong Province, *School of Chemistry and Chemical Engineering, South China University of Technology, Guangzhou 510640, P. R. China*

jianghf@scut.edu.cn; ghdeng@scut.edu.cn

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A: General information

Melting points were measured with a melting point instrument and were uncorrected. ^{1}H and ^{13}C NMR spectra were recorded using a 400 MHz NMR spectrometer. The chemical shifts are referenced to signals at 7.26 and 77.0 ppm, respectively, and chloroform is solvent with TMS as the internal standard. IR spectra were obtained either as potassium bromide pellets or as liquid films between two potassium bromide pellets with a spectrometer. GC-MS was obtained using electron ionization. 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. IR spectra were obtained either as potassium bromide pellets or as liquid films between two potassium bromide pellets with an infrared Fourier spectrometer High-resolution mass spectra (ESI) were obtained with a LCMS-IT-TOF mass spectrometer.

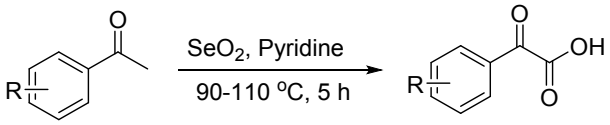
B: Typical procedure for preparation of oxime acetates

To a solution of aromatic ketones (2 mmol) in the mixture of C_2H_5OH/H_2O (v/v = 1:1) was added hydroxylamine hydrochloride (2.2 mmol), NaOAc (3 mmol) in one portion, and the reaction mixture was stirred at 100 ^{o}C (when the substrates are aromatic ketones) or at room temperature (when the substrates are aromatic aldehydes) for 6-8 h. Upon completion of the reaction as indicated by TLC, the reaction mixture was diluted with water, extracted with ethyl acetate, and dried over anhydrous Na_2SO_4. The solvent was removed and concentrated under reduced pressure to give oximes.

General procedure for aromatic ketoxime acetates: The mixture of aromatic ketoxime (2.0 mmol), anhydride (4.0 mmol, 2.0 equiv) was stirred at 100 ^{o}C for 3h. Upon completion of the reaction as indicated by TLC, the reaction mixture was diluted with EtOAc (25 mL), washed with H_2O (20 mL). Neutralization with $NaHCO_3$ and dried over anhydrous Na_2SO_4 and evaporated in vacuo. The crude residue was purified by column chromatography using silica gel with hexanes as the eluent to afford aromatic ketoxime acetates.

C: General procedure for α-oxocarboxylic acids [1].

The substituted arylglyoxylic acids **2** were prepared from oxidation of corresponding methyl ketones with SeO_2 (Scheme 1). Methyl ketones (5 mmol), SeO_2 (6 mmol), 20 mL of pyridine were added in a 50 mL round-bottom flask. The reaction mixture stirred at 110 ^{o}C for 1 h, then reduce the temperature to 90 ^{o}C for 4 h. the desired products (**2a**–**e**) were isolated by silica-gel column chromatography in excellent yield (65–90%).



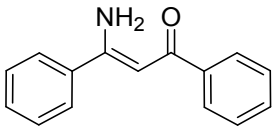
D: General procedure for the synthesis of enaminones.

Oximes acetates **1** (0.3 mmol), azidovinyl benzene **2** (0.36 mmol), $Fe(OAc)_2$ (2.6 mg, 0.015 mmol), and 2 mL of dry DCE (1,2-dichloroethane) were added in a 10 mL screw-capped tube. The reaction vessel was closed with the cap and the reaction mixture was stirred at 90 ^{o}C (oil bath) for 6 h. The desired products **2** were isolated by silica-gel column chromatography in moderate to

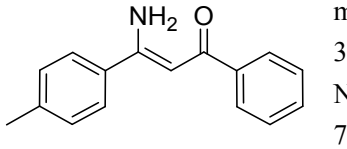
good yields.

E: Spectroscopic data for enaminones:

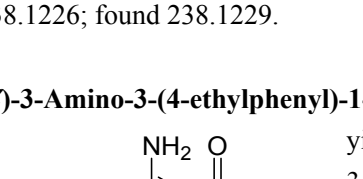
(*Z*)-3-Amino-1,3-diphenylprop-2-en-1-one (3aa): as a yellow oil (56.2 mg, 84% yield); R_f = 0.35 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3461, 3360, 1605, 1529, 1482, 1326, 1226, 743 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.42 (s, 1H), 7.95 (d, J = 7.4 Hz, 2H), 7.64 (d, J = 7.3 Hz, 2H), 7.48-7.42 (m, 6H), 6.15 (s, 1H), 5.57 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.0, 163.0, 141.1, 140.5, 134.6, 130.9, 129.7, 128.3, 127.2, 126.3, 91.5, 21.4； HRMS (ESI) m/z: calcd for $C_{15}H_{14}NO$ $[M+H]^+$, 224.1070; found 224.1074.



(*Z*)-3-Amino-1-phenyl-3-(*p*-tolyl)prop-2-en-1-one (3ab): as a white solid (57.6 mg, 81% yield); mp 93-94 °C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3352, 3159, 3035, 1602, 1542, 1495, 1327, 1225, 751 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.41 (s, 1H), 7.91 (d, J = 7.5 Hz, 2H), 7.50 (d, J = 7.7 Hz, 2H), 7.47-7.36 (m, 3H), 7.23 (d, J = 7.7 Hz, 2H), 6.11 (s, 1H), 5.54 (s, 1H), 2.37 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 163.8, 154.4, 140.1, 131.5, 131.1, 129.1, 128.4, 127.7, 127.0, 109.2, 27.0; HRMS (ESI) m/z: calcd for $C_{16}H_{15}NO$ $[M+H]^+$, 238.1226; found 238.1229.

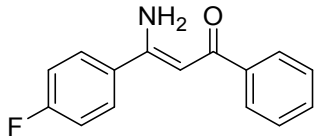


(*Z*)-3-Amino-3-(4-ethylphenyl)-1-phenylprop-2-en-1-one (3ac): as a yellow oil (61 mg, 76% yield); R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3354, 3162, 2966, 1602, 1541, 1496, 1326, 1227, 748 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.48 (s, 1H), 7.98 (d, J = 7.0 Hz, 2H), 7.59 (d, J = 7.9 Hz, 2H), 7.52-7.42 (m, 3H), 7.30 (d, J = 7.8 Hz, 2H), 6.18 (s, 1H), 5.73 (s, 1H), 2.72 (q, J = 7.5 Hz, 2H), 1.29 (t, J = 7.6 Hz, 3H); HRMS (ESI) m/z: calcd for $C_{17}H_{18}NO$ $[M+H]^+$, 252.1383; found 252.1384.



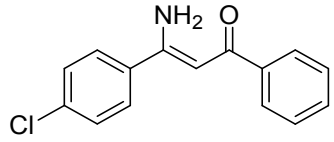
(*Z*)-3-Amino-3-(4-methoxyphenyl)-1-phenylprop-2-en-1-one (3ad): as a yellow oil (40.7 mg, 53% yield); R_f = 0.2 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3347, 2837, 1604, 1495, 1303, 1246, 1026, 755 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.48 (s, 1H), 7.94 (d, J = 6.2 Hz, 2H), 7.58 (d, J = 7.7 Hz, 2H), 7.43 (d, J = 6.4 Hz, 3H), 6.94 (d, J = 7.1 Hz, 2H), 6.12 (s, 1H), 5.69 (s, 1H), 3.82 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 189.8, 162.8, 161.7, 140.6, 130.9, 129.5, 128.3, 127.9, 127.2, 114.3, 91.1, 55.4; HRMS (ESI) m/z: calcd for $C_{16}H_{16}NO_2$ $[M+H]^+$, 254.1176; found 254.1182.

(*Z*)-3-Amino-3-(4-fluorophenyl)-1-phenylprop-2-en-1-one (3ae) as a white solid (47.1 mg, 65% yield); mp 97-98 °C; R_f = 0.25 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3368, 1609, 1495, 1327, 1226, 1165, 842, 755 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.40 (s, 1H), 7.93 (d, J = 7.6 Hz, 2H), 7.64-7.61 (m, 2H), 7.49-7.41 (m, 3H), 7.16-7.12 (m, 2H), 6.09 (s,

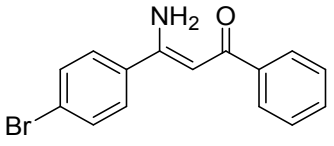


1H), 5.50 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.1, 165.4, 162.9(d, J = 95.5.0 Hz), 140.3, 133.7(d, J = 3.0 Hz), 131.1, 128.5(d, J = 8.5 Hz), 128.3, 127.2, 116.1 (d, J = 21.7.0 Hz), 91.8; HRMS (ESI) m/z: calcd for $C_{15}H_{13}FNO$ $[M+H]^+$, 242.0976; found 242.0974.

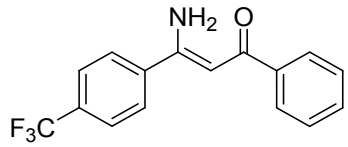
(*Z*)-3-Amino-3-(4-chlorophenyl)-1-phenylprop-2-en-1-one (3af) as a white solid (47.4mg, 66% yield); mp 93-94 °C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3340, 3159, 2925, 1601, 1530, 1479, 1324, 1226, 1014, 751 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.21 (s, 1H), 7.77 (d, J = 7.6 Hz, 2H), 7.41 (d, J = 8.2 Hz, 2H), 7.34-7.26 (m, 4H), 5.94 (s, 1H), 5.33 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.3, 161.7, 140.2, 136.7, 136.0, 131.2, 129.3, 128.4, 127.8, 127.2, 92.0; HHRMS (ESI) m/z: calcd for $C_{15}H_{13}ClNO$ $[M+H]^+$, 258.0680; found 258.0676.



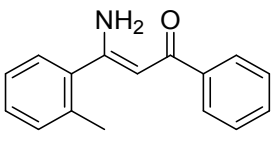
(*Z*)-3-Amino-3-(4-bromophenyl)-1-phenylprop-2-en-1-one (3ag) as a white solid (51.5 mg, 58% yield); mp 73-74 °C; R_f = 0.35 (petroleum ether: EtOAc = 5: 1); IR(KBr): 3363, 3164, 1601, 1524, 1326, 1226, 1012, 752 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.33 (s, 1H), 7.92 (d, J = 7.6 Hz, 2H), 7.58 (d, J = 8.5 Hz, 2H), 7.52-7.36 (m, 5H), 6.08 (s, 1H), 5.53 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.3, 161.6, 140.2, 136.5, 132.2, 131.2, 128.4, 128.0, 127.2, 125.0, 92.0; HRMS (ESI) m/z: calcd for $C_{15}H_{13}BrNO$ $[M+H]^+$, 302.0175; found 302.0182.



(*Z*)-3-Amino-1-phenyl-3-(4-(trifluoromethyl)phenyl)prop-2-en-1-one (3ah) as a white solid (55.3 mg, 64% yield); mp 74-75 °C; R_f = 0.35 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3186, 3058, 1605, 1566, 1507, 1229, 1114, 736 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.33 (s, 1H), 7.92 (d, J = 7.4 Hz, 2H), 7.80-7.61 (m, 4H), 7.50-7.43 (m, 3H), 6.12 (s, 1H), 5.72 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.5, 161.3, 141.1, 140.0, 132.4 (q, J = 32 Hz), 131.4, 128.4, 127.2, 127.0, 126.0 (q, J = 4 Hz), 123.6 (q, J = 271.0 Hz) 92.5; HRMS (ESI) m/z: calcd for $C_{16}H_{12}F_3NNaO$ $[M+H]^+$, 314.0763; found 314.0766.



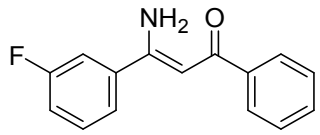
(*Z*)-3-Amino-1-phenyl-3-(*o*-tolyl)prop-2-en-1-one (3ai) as a white solid (51.0 mg, 72% yield); mp 121-122 °C; R_f = 0.4 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3345, 3159, 1595, 1531, 1480, 1324, 1224, 1017, 753 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.37 (s, 1H), 7.93 (d, J = 7.7 Hz, 2H), 7.50-7.42 (m, 3H), 7.37 (t, J = 8.0 Hz, 2H), 7.31-7.28 (m, 2H), 5.87 (s, 1H), 5.58 (s, 1H), 2.48 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 189.9, 164.2, 140.2, 138.0, 135.1, 131.1, 130.8, 129.4, 128.3, 127.9, 127.3, 126.0, 93.7, 19.7; HRMS (ESI) m/z: calcd for $C_{16}H_{16}NO$ $[M+H]^+$, 238.1226; found 238.1227.



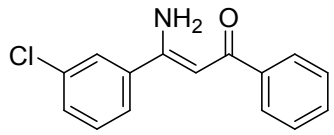
(*Z*)-3-Amino-1-phenyl-3-(*m*-tolyl)prop-2-en-1-one (3aj) as a light yellow solid (60.1 mg, 85% yield); mp 52-53 °C; R_f = 0.4 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3347, 3050, 1588, 1526, 1480, 1326, 1231, 1080,750 cm^{-1};

^{1}H NMR (400 MHz, $CDCl_3$) δ 10.36 (s, 1H), 7.89 (d, J = 7.4 Hz, 2H), 7.39 (d, J = 11.0 Hz, 5H), 7.31-7.22 (m, 2H), 6.07 (s, 1H), 5.54 (s, 1H), 2.35 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.1, 163.3, 140.5, 138.8, 137.6, 131.5, 131.0, 128.9, 128.3, 127.2, 127.0, 123.5, 91.7, 21.5; HRMS (ESI) m/z: calcd for $C_{16}H_{16}NO$ $[M+H]^+$, 238.1226; found 238.1233.

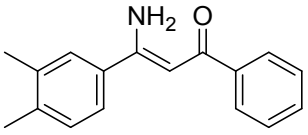
(*Z*)-3-Amino-3-(3-fluorophenyl)-1-phenylprop-2-en-1-one (3ak) as a light yellow oil (44.4 mg, 62% yield); R_f = 0.35 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3355, 1579, 1529, 1477, 1326, 1233, 1018, 750 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.35 (s, 1H), 7.93 (d, J = 7.6 Hz, 2H), 7.50-7.40 (m, 5H), 7.33 (d, J = 9.3 Hz, 1H), 7.19 (d, J = 6.4 Hz, 1H), 6.12 (s, 1H), 5.52 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.4, 164.1, 161.5 (d, J = 34.7 Hz), 140.1, 139.8 (d, J = 7.5 Hz), 131.2, 130.8 (d, J = 8.2 Hz), 128.4, 127.2, 122.1, 122.1, 117.6 (d, J = 21.0 Hz), 117.5, 113.6(d, J = 22.8 Hz), 92.1; HRMS (ESI) m/z: calcd for $C_{15}H_{13}FNO$ $[M+H]^+$, 242.0976; found 242.0984.



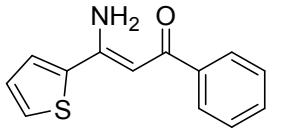
(*Z*)-3-Amino-3-(3-chlorophenyl)-1-phenylprop-2-en-1-one (3al) as a light yellow oil (52.2mg, 68% yield); R_f = 0.35 (petroleum ether: EtOAc = 5: 1) IR (KBr): 3348, 3162, 1602, 1527, 1469, 1322, 1266, 750 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.31 (s, 1H), 7.93 (d, J = 7.4 Hz, 2H), 7.61 (s, 1H), 7.52-7.43 (m, 5H), 7.41-7.35 (m, 1H), 6.10 (s, 1H), 5.47 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.4, 161.2, 140.1, 139.5, 135.1, 131.3, 130.7, 130.3, 128.4, 127.3, 126.7, 124.6, 92.2; HRMS (ESI) m/z: calcd for $C_{15}H_{13}ClNO$ $[M+H]^+$, 258.0680; found 258.0688.



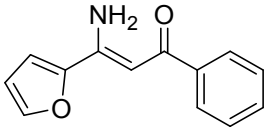
(*Z*)-3-Amino-3-(3,4-dimethylphenyl)-1-phenylprop-2-en-1-one (3am) as a light yellow oil (64.2 mg, 82% yield); R_f = 0.35 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3355, 3160, 2927, 1600, 1534, 1329, 1229, 1019, 753 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.46 (s, 1H), 7.95 (d, J = 7.2 Hz, 2H), 7.50-7.35 (m, 5H), 7.21 (d, J = 7.6 Hz, 1H), 6.15 (s, 1H), 5.60 (s, 1H), 2.32 (d, J = 2.8 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 189.9, 163.3, 140.6, 139.8, 137.4, 135.0, 130.9, 130.2, 128.3, 127.4, 127.2, 123.8, 91.4, 77.4, 77.1, 76.8, 19.9, 19.7; HRMS (ESI) m/z: calcd for $C_{17}H_{18}NO$ $[M+H]^+$, 252.1383; found 252.1374.



(*Z*)-3-Amino-1-phenyl-3-(thiophen-2-yl)prop-2-en-1-one (3an) as a gray solid (50.5 mg, 73% yield); mp 83-84 ^{o}C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3360, 1590, 1538, 1500, 1295, 1230, 743 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.31 (s, 1H), 7.94 (d, J = 7.3 Hz, 2H), 7.50 (d, J = 3.3 Hz, 1H), 7.50-7.42 (m, 4H), 7.09 (d, J = 4.2 Hz, 1H), 6.26 (s, 1H), 5.67 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.2, 155.4, 140.2, 139.9, 131.2, 128.4, 128.2, 128.2, 127.2, 126.6, 91.3; HRMS (ESI) m/z: calcd for $C_{13}H_{12}NOS$ $[M+H]^+$, 230.0634; found 230.0642.



(*Z*)-3-amino-3-(furan-2-yl)-1-phenylprop-2-en-1-one (3ao) as a gray solid (39.0 mg, 61% yield); mp 57-58 ^{o}C; R_f = 0.25 (petroleum ether: EtOAc = 5: 1); IR (KBr):



3368, 3145, 1597, 1519, 1327, 1229, 1018, 752 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.24 (s, 1H), 7.94 (d, J = 6.7 Hz, 2H), 7.50 (s, 1H), 7.47-7.42 (m, 3H), 6.95 (d, J = 3.1 Hz, 1H), 6.49 (d, J = 0.9 Hz, 1H), 6.29 (s, 1H), 6.04 (d, J = 42.4 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.2, 150.9, 149.0, 144.5, 140.4, 131.0, 128.3, 127.1, 112.3, 111.0, 88.3; HRMS (ESI) m/z: calcd for $C_{13}H_{12}NO_2$ $[M+H]^+$, 214.0863; found, 214.0868.

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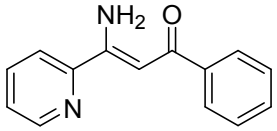
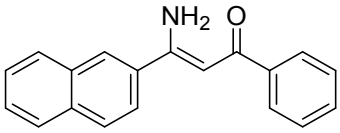
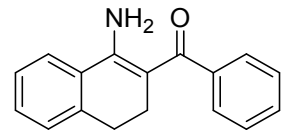
(*Z*)-3-Amino-1-phenyl-3-(pyridin-2-yl)prop-2-en-1-one (3ap) as a white solid (35.0 mg, 52% yield); mp 123-124 °C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3059, 1609, 1527, 1454, 1312, 1010, 741 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.29 (s, 1H), 8.68 (d, J = 3.6 Hz, 1H), 7.98 (d, J = 7.5 Hz, 2H), 7.93 (d, J = 7.9 Hz, 1H), 7.81 (t, J = 7.7 Hz, 1H), 7.46 (q, J = 6.5 Hz, 3H), 7.42-7.38 (m, 1H), 6.52 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.6, 157.4, 151.1, 149.2, 140.6, 137.0, 131.1, 128.3, 127.2, 125.3, 120.5, 89.0; HRMS (ESI) m/z: calcd for $C_{14}H_{13}N_2O$ $[M+H]^+$, 225.1022; found 225.1026.



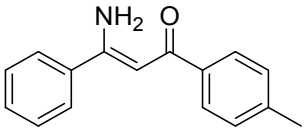
(*Z*)-3-Amino-3-(naphthalen-2-yl)-1-phenylprop-2-en-1-one (3aq) as a white solid (39.1 mg, 48% yield); mp 86.5-87.5 °C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3355, 3056, 1598, 1523, 1315, 1018, 753 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.51 (s, 1H), 8.11 (s, 1H), 7.99 (d, J = 6.9 Hz, 2H), 7.89 (t, J = 9.4 Hz, 3H), 7.68 (d, J = 8.2 Hz, 1H), 7.59-7.51 (m, 2H), 7.46 (d, J = 7.3 Hz, 3H), 6.27 (s, 1H), 5.76 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.1, 163.0, 140.5, 134.8, 134.4, 133.0, 131.1, 128.9, 128.7, 128.4, 127.8, 127.4, 127.3, 127.0, 126.3, 123.6, 92.3; HRMS (ESI) m/z: calcd for $C_{19}H_{16}NO$ $[M+H]^+$, 274.1226; found 274.1222.



(1-Amino-3,4-dihydronaphthalen-2-yl)(phenyl)methanone (3ar) as a gray oil (53.3 mg, 52% yield); R_f = 0.5 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3057, 2962, 1605, 1477, 1307, 1267, 1102, 1025, 802 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 8.14 (s, 1H), 7.58 (d, J = 7.4 Hz, 1H), 7.50 (d, J = 2.4 Hz, 2H), 7.42-7.34 (m, 5H), 7.27 (d, J = 8.0 Hz, 1H), 2.71 (d, J = 7.5 Hz, 2H), 2.56 (d, J = 7.6 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 196.0, 155.7, 142.3, 140.5, 131.2, 130.5, 129.3, 128.1, 128.0, 126.9, 126.9, 122.9, 102.0, 77.4, 77.1, 76.7, 29.8, 25.6; HRMS (ESI) m/z: calcd for $C_{17}H_{16}NO$ $[M+H]^+$, 250.1226; found 250.1228.



(*Z*)-3-Amino-3-phenyl-1-(*p*-tolyl)prop-2-en-1-one (3as) as a white solid (60.1 mg, 85% yield); mp 76-77 °C; R_f = 0.45 (petroleum ether: EtOAc = 5: 1); IR (KBr): 2921, 2851, 1601, 1562, 1527, 1484, 1323, 1229, 759 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.39 (s, 1H), 7.86 (d, J = 8.0 Hz, 2H), 7.64 (d, J = 6.3 Hz, 2H), 7.54-7.42 (m, 3H), 7.24 (d, J = 7.9 Hz, 2H), 6.14 (s, 1H), 5.41 (s, 1H), 2.40 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.1, 162.6, 141.5, 137.8, 137.7, 130.6, 129.0, 129.0, 127.3, 126.4, 91.9, 21.5; HRMS (ESI) m/z: calcd for $C_{16}H_{15}NNaO$ $[M+Na]^+$, 260.1046; found 260.1048.



(*Z*)-3-Amino-3-phenyl-1-(*m*-tolyl)prop-2-en-1-one (3at) as a light yellow oil (60.1 mg, 84% yield); R_f = 0.4 (petroleum ether: EtOAc = 5: 1); IR (KBr): 2922, 1601, 1528, 1484, 1319, 1181, 755 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.41 (s, 1H), 7.80-7.72 (m, 2H), 7.64 (d, J = 7.0 Hz, 2H), 7.52-7.43 (m, 3H), 7.36-7.26 (m, 2H), 6.14 (s, 1H), 5.49 (s, 1H), 2.41 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 190.5, 162.9, 140.4, 138.0, 137.7, 131.8, 130.7, 129.0, 128.2, 127.9, 126.4, 124.4, 92.0, 21.5; HRMS (ESI) m/z: calcd for $C_{16}H_{15}NNaO$ $[M+Na]^+$, 260.1046; found 260.1051.

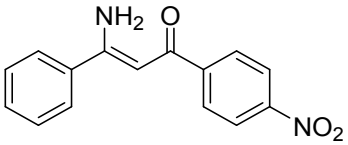
(*Z*)-3-Amino-1-(4-fluorophenyl)-3-phenylprop-2-en-1-one (3au) as a white solid (44.3 mg, 67% yield); mp 74-75 °C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 2921, 2851, 1600, 1530, 1484, 1324, 1221, 765 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.38 (s, 1H), 7.97-7.94 (m, 2H), 7.63 (d, J = 6.5 Hz, 2H), 7.56–7.32 (m, 3H), 7.10 (t, J = 8.6 Hz, 2H), 6.09 (s, 1H), 5.49 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 188.7, 165.8, 163.3 (d, J = 24.1 Hz), 137.5, 136.5 (d, J = 3.1 Hz), 130.8, 129.5 (d, J = 10.8 Hz), 129.1, 126.4, 115.2 (d, J = 21.4 Hz), 91.5; HRMS (ESI) m/z: calcd for $C_{15}H_{12}FNNaO$ $[M+Na]^+$, 264.0795; found 264.0791.

(*Z*)-3-Amino-1-(4-chlorophenyl)-3-phenylprop-2-en-1-one (3av) as a white solid (58.1 mg, 76% yield); mp 76-77 °C; R_f = 0.35 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3165, 3061, 2925, 1594, 1527, 1480, 1325, 1091, 762 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.41 (s, 1H), 7.87 (d, J = 8.5 Hz, 2H), 7.62 (d, J = 6.7 Hz, 2H), 7.48-7.45(m, 3H), 7.38 (d, J = 8.5 Hz, 2H), 6.07 (s, 1H), 5.69 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 188.6, 163.5, 138.7, 137.4, 137.1, 130.9, 129.1, 128.7, 128.5, 126.4, 91.5;.HRMS (ESI) m/z: calcd for $C_{15}H_{12}ClNNaO$ $[M+Na]^+$, 280.0500; found 280.0502.

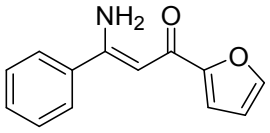
(*Z*)-3-Amino-1-(4-bromophenyl)-3-phenylprop-2-en-1-one (3aw) as a white solid (64.0 mg, 71% yield); mp 79-80 °C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3164, 3060, 2924, 1603, 1528, 1480, 1293, 1033, 760 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.41 (s, 1H), 7.79 (d, J = 8.3 Hz, 2H), 7.61 (d, J = 7.3 Hz, 2H), 7.57-7.51 (m, 2H), 7.50-7.43 (m, 3H), 6.07 (s, 1H), 5.69 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 188.7, 163.5, 139.1, 137.3, 131.5, 130.9, 129.1, 128.9, 126.4, 125.7, 91.5; HRMS (ESI) m/z: calcd for $C_{15}H_{12}BrNNaO$ $[M+Na]^+$, 323.9994; found 323.9996.

(*Z*)-3-Amino-1-(4-methoxyphenyl)-3-phenylprop-2-en-1-one (3ax) as a light yellow oil (46.2 mg, 61% yield); R_f = 0.25 (petroleum ether: EtOAc = 5: 1) IR (KBr): 3162, 2928, 2838, 1598, 1564, 1326, 1256, 1026, 768 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 10.33 (s, 1H), 7.93 (d, J = 8.7 Hz, 2H), 7.64-7.58 (m, 2H), 7.44 (q, J = 6.5 Hz, 3H), 6.91 (d, J = 8.7 Hz, 2H), 6.10 (s, 1H), 5.55 (s, 1H), 3.82 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 189.2, 162.5, 162.1, 137.8, 133.1, 130.6, 129.2, 129.0, 126.4, 113.5, 91.5, 55.4; HRMS (ESI) m/z: calcd for $C_{16}H_{15}NNaO_2$ $[M+Na]^+$, 276.0995; found 276.0993.

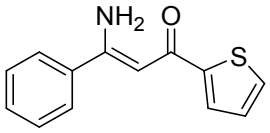
(*Z*)-3-Amino-1-(4-nitrophenyl)-3-phenylprop-2-en-1-one (3ay) as a yellow solid (51.3 mg, 64% yield); mp 134-135 °C; R_f = 0.2 (petroleum ether: EtOAc = 5: 1); IR (KBr): 2924, 2852, 1600, 1528, 1322, 1010, 772 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.55 (s, 1H), 8.25 (d, J = 8.6 Hz, 2H), 8.05 (d, J = 8.5 Hz, 2H), 7.63 (d, J = 7.1 Hz, 2H), 7.56-7.45 (m, 3H), 6.11 (s, 1H), 5.83 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.3, 164.6, 149.1, 145.7, 136.9, 131.3, 129.2, 128.1, 126.4, 123.6, 91.9; HRMS (ESI) m/z: calcd for $C_{15}H_{13}N_2NaO_3$ $[M+Na]^+$, 269.0921; found 269.0921.



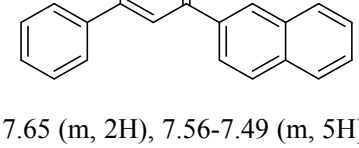
(*Z*)-3-Amino-1-(furan-2-yl)-3-phenylprop-2-en-1-one (3az) as a yellow solid (41.3 mg, 65% yield); mp 83-84 °C; R_f = 0.2 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3152, 2924, 2852, 1604, 1530, 1488, 1325, 1011, 764 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.17 (s, 1H), 7.63 (d, J = 6.5 Hz, 2H), 7.54-7.45 (m, 4H), 7.08 (d, J = 3.3 Hz, 1H), 6.49 (d, J = 1.7 Hz, 1H), 6.09 (s, 1H), 5.45 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 179.3, 162.9, 154.5, 144.4, 137.1, 130.8, 129.0, 126.3, 113.3, 111.9, 91.3; HRMS (ESI) m/z: calcd for $C_{13}H_{11}NNaO_2$ $[M+Na]^+$, 236.0682; found 236.0684.



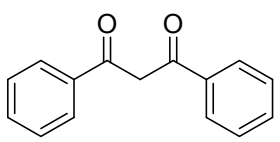
(Z)-3-Amino-3-phenyl-1-(thiophen-2-yl)prop-2-en-1-one (3ba) as a yellow solid (42.0 mg, 61% yield); mp 111-112 °C; R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 2924, 2853, 1597, 1523, 1482, 1314, 1230 788 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.12 (s, 1H), 7.64-7.61 (m, 3H), 7.53-7.39 (m, 4H), 7.12-7.03 (m, 1H), 6.01 (s, 1H), 5.57 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 182.8, 162.8, 147.2, 137.3, 130.8, 130.7, 129.1, 128.3, 127.9, 126.4, 91.6; HRMS (ESI) m/z: calcd for $C_{13}H_{11}NNaOS$ $[M+Na]^+$, 252.0454; found 252.0459.



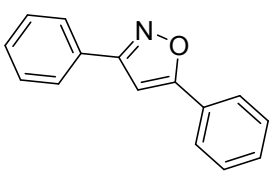
(Z)-3-Amino-1-(naphthalen-2-yl)-3-phenylprop-2-en-1-one (3bb) as a light yellow oil (44.3 mg, 54% yield); R_f = 0.3 (petroleum ether: EtOAc = 5: 1); IR (KBr): 3056, 2923, 2852, 1600, 1526, 1484, 1312, 1189, 792 cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.50 (s, 1H), 8.46 (s, 1H), 8.06 (d, J = 8.5 Hz, 1H), 7.95 (d, J = 7.4 Hz, 1H), 7.92-7.84 (m, 2H), 7.72-7.65 (m, 2H), 7.56-7.49 (m, 5H), 6.31 (s, 1H), 5.51 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 189.9, 163.0, 137.7, 137.6, 134.8, 132.9, 130.8, 129.3, 129.1, 128.0, 127.7, 127.7, 127.3, 126.4, 126.3, 124.2, 92.2; HRMS (ESI) m/z: calcd for $C_{19}H_{15}NNaO$ $[M+Na]^+$, 296.1046; found 296.1048.



1,3-Diphenylpropane-1,3-dione (4) [2] as a white solid; mp 121-122 °C; IR (KBr): 3061, 2925, 1595, 1494, 1455, 1213, 1072, 921, 680 cm^{-1} . ^{1}H NMR (400 MHz, CDCl3) δ 8.04-7.96 (m, 4H), 7.55 (d, J = 7.3 Hz, 2H), 7.52-7.46 (m, 4H), 6.87 (s, 1H); ^{13}C NMR (100 MHz, CDCl3) δ 185.8, 135.6, 132.5, 128.7, 127.2, 93.2.

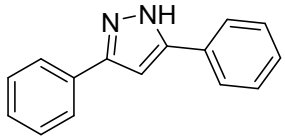


3,5-diphenylisoxazole (5)[3]



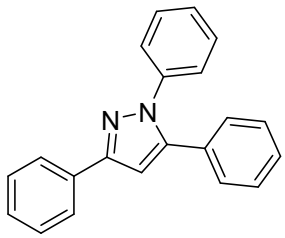
5 as a white solid mp 139-140 °C; IR (KBr): 3049, 1572 , 1487, 1401, 1293, 1075, 949, 820, 690 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 7.73 (d, J = 18.1 Hz, 4H), 7.33 (d, J = 3.3 Hz, 6H), 6.69 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.4, 163.0, 130.3, 130.1, 129.2, 129.0, 129.0, 127.5, 126.9, 125.9, 97.6.

3,5-diphenyl-1*H*-pyrazole (6a)[4]



6a as a white solid mp 190-192 °C; IR (KBr): 3417, 3101, 1610, 1494, 1211, 1072, 922, 681 cm^{-1}; 1H NMR (400 MHz, DMSO) δ 13.38 (s, 1H), 7.86 (s, 4H), 7.46 (s, 4H), 7.35 (s, 2H), 7.19 (s, 1H); ^{13}C NMR (100 MHz, DMSO) δ 129.3, 128.5, 126.9, 125.6, 100.1.

1,3,5-triphenyl-1*H*-pyrazole (6b)[5]



6b as a white solid, mp 132-133 °C; IR (KBr): 3062, 2926, 2862, 1595, 1213, 1034, 921, 667 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$) δ 8.07 (d, J = 7.4 Hz, 2H), 7.54 (d, J = 7.1 Hz, 2H), 7.48 (d, J = 7.5 Hz, 2H), 7.42 (d, J = 7.4 Hz, 2H), 7.38 (d, J = 6.7 Hz, 7H), 6.93 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.1, 144.5, 140.3, 133.2, 130.7, 129.0, 128.9, 128.8, 128.6, 128.4, 128.1, 127.5, 126.0, 125.4, 105.4.

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(2) H. S, P ,Rao and N. Muthanna, *Eur. J. Org. Chem*. 2015, 1525.

(3) S. Pusch and T. Opatz, *Org. Lett*. 2014, **16**, 5430.

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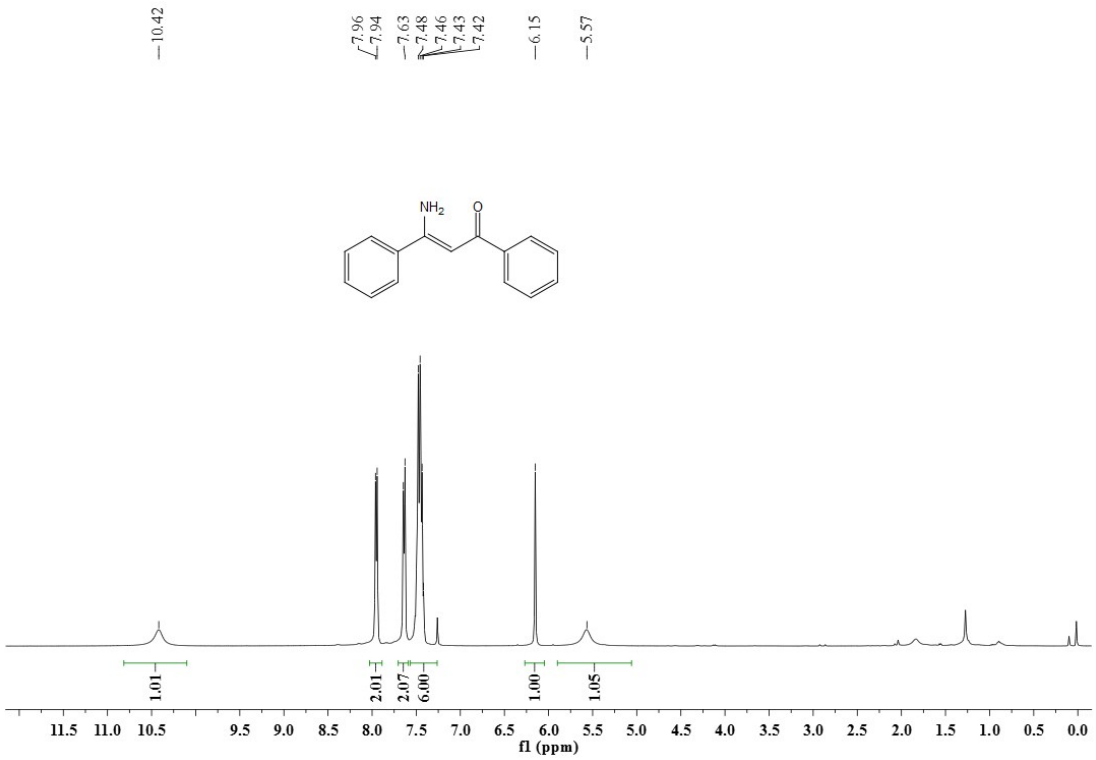
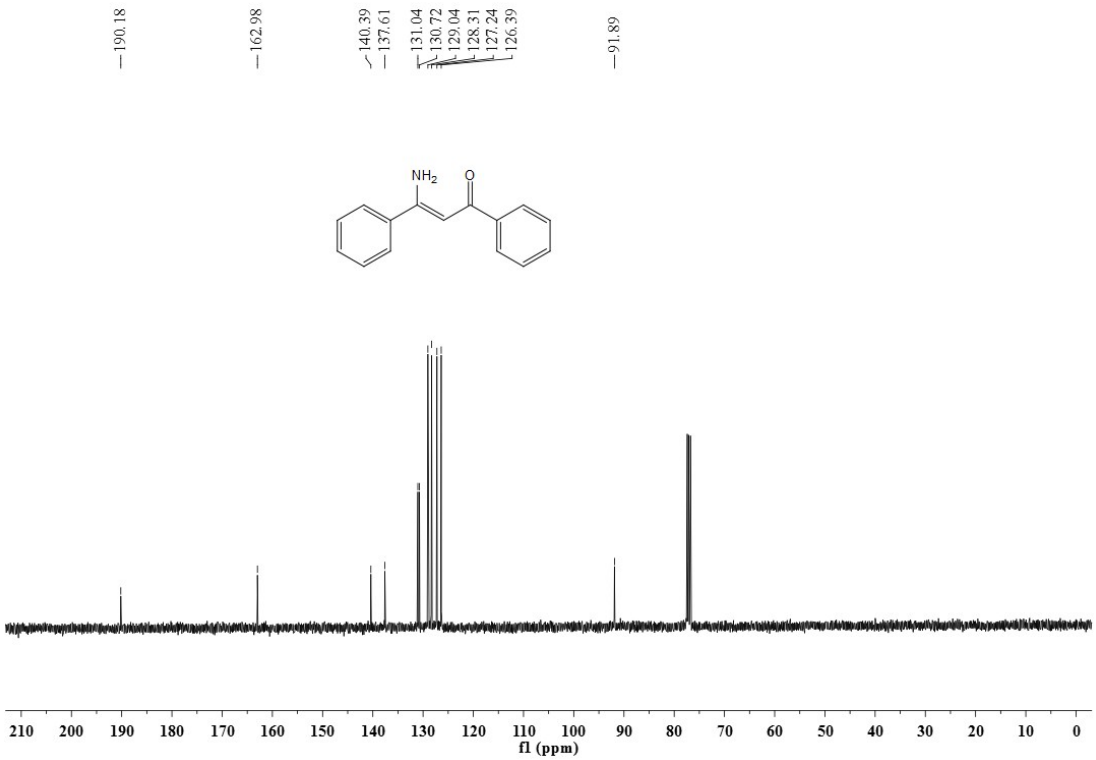
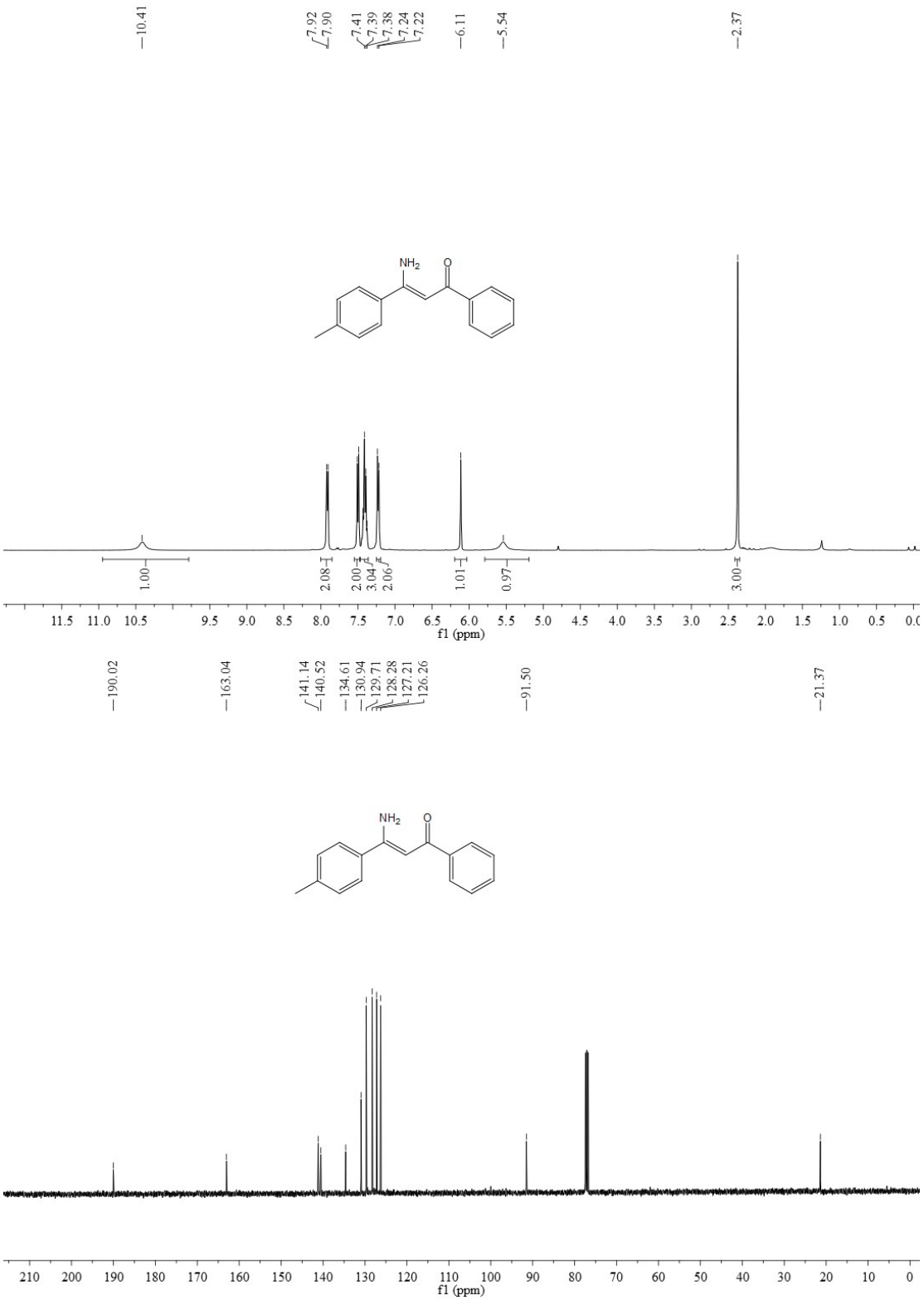
F : Copies of ^1H and ^{13}C NMR spectra

^1H NMR and ^{13}C NMR of (*Z*)-3-amino-1,3-diphenylprop-2-en-1-one (3aa)

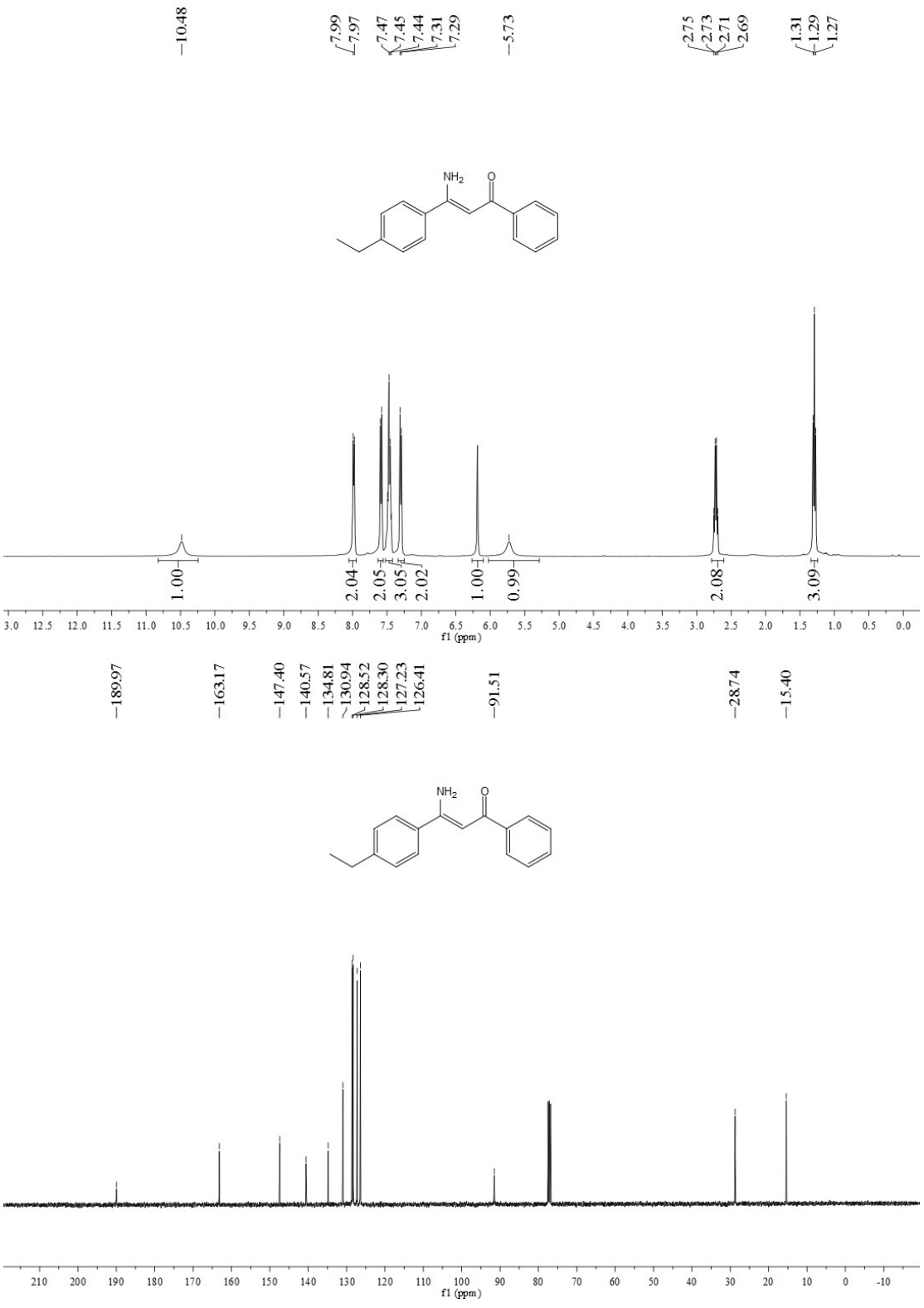




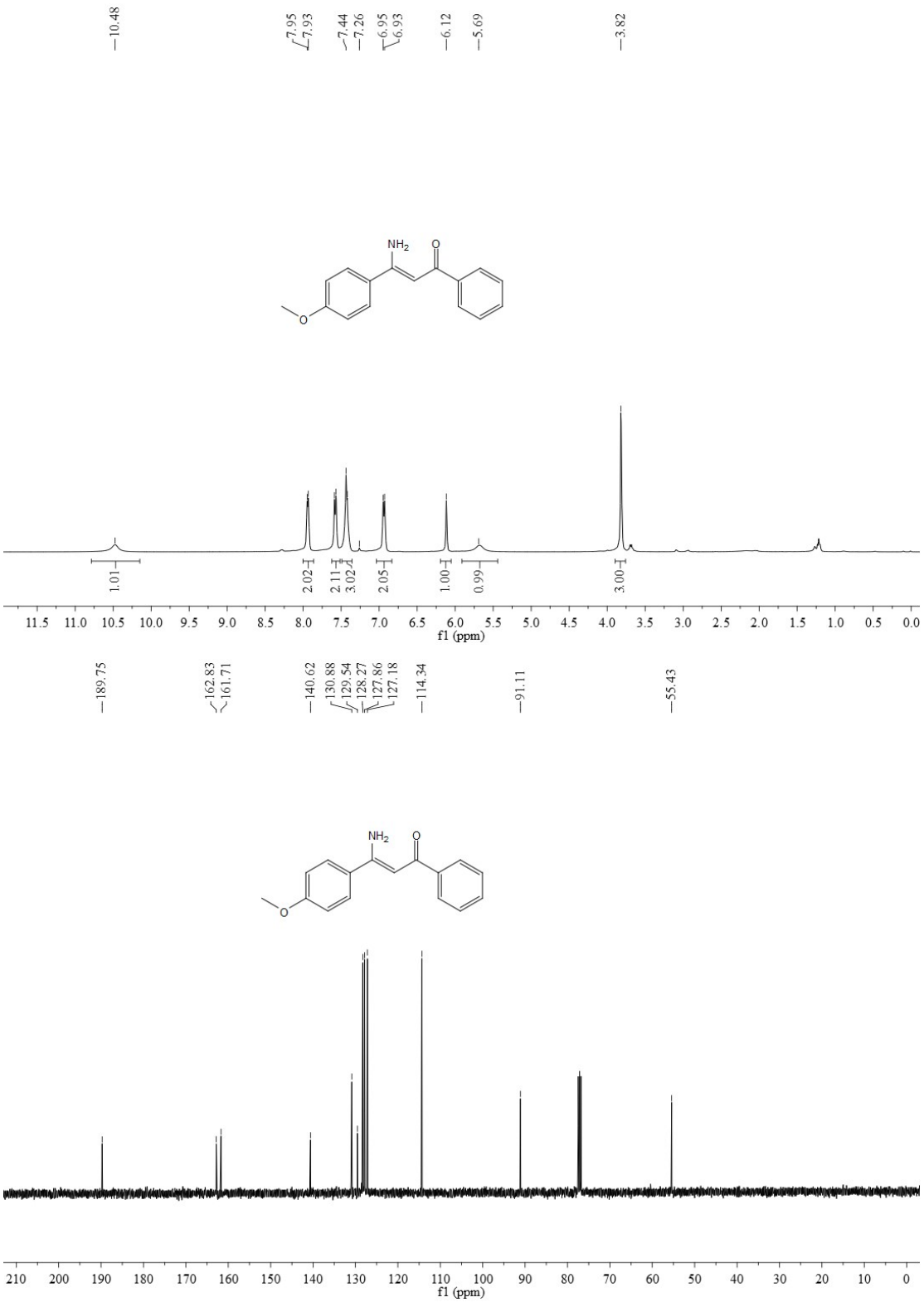
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-phenyl-3-(p-tolyl)prop-2-en-1-one (3ab)



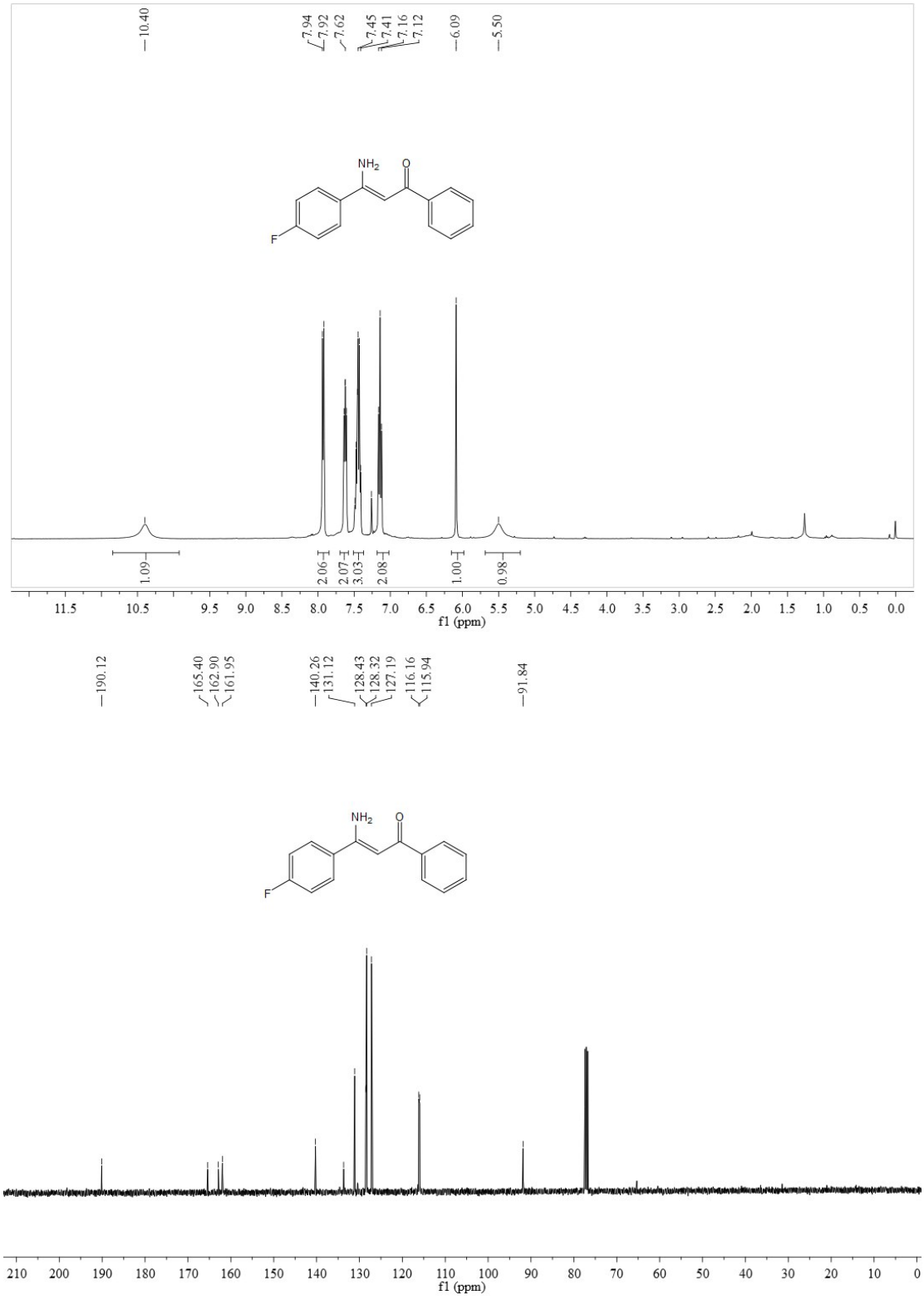
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(4-ethylphenyl)-1-phenylprop-2-en-1-one (3ac)



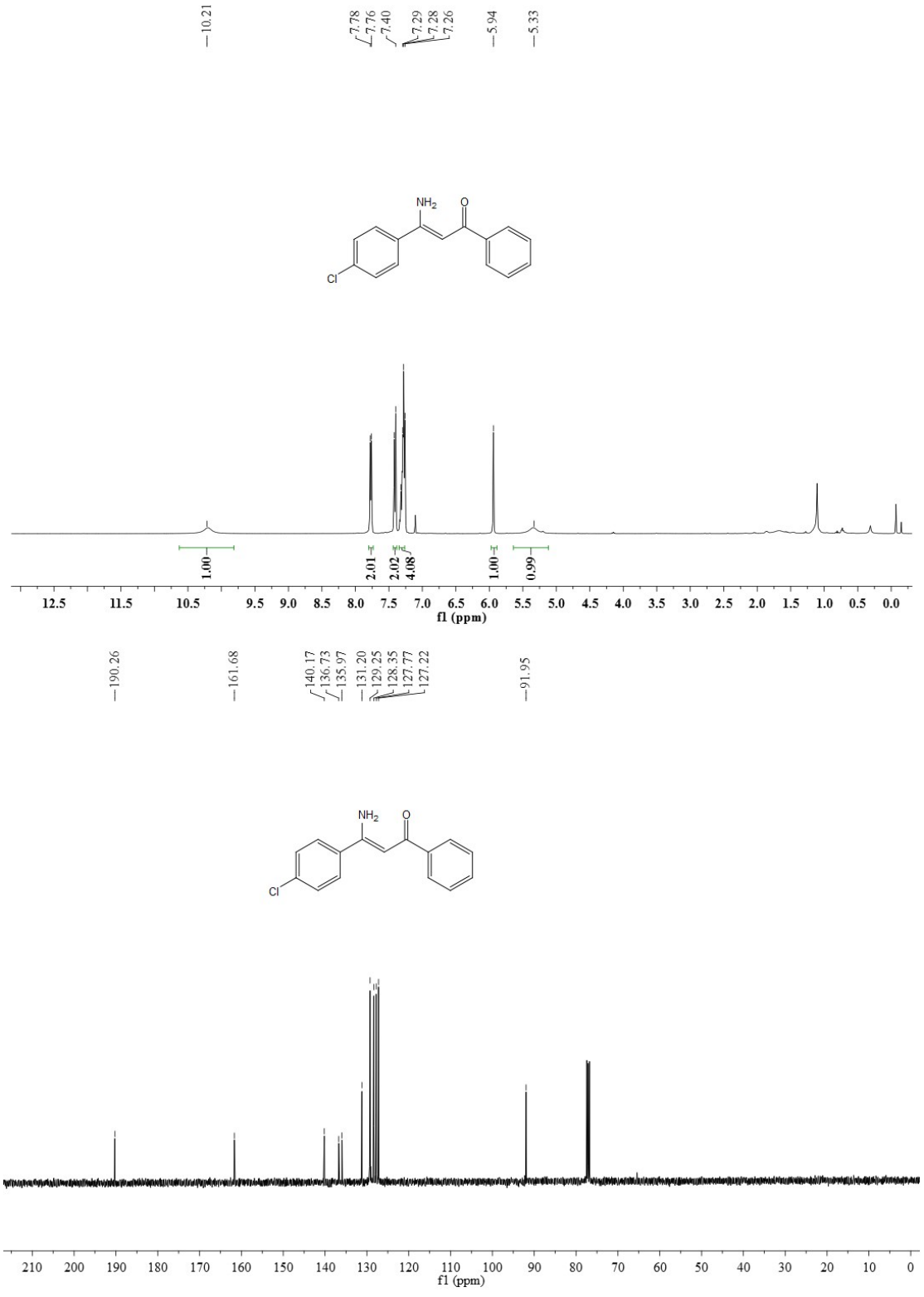
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(4-methoxyphenyl)-1-phenylprop-2-en-1-one (3ad)



^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(4-fluorophenyl)-1-phenylprop-2-en-1-one (3ae)



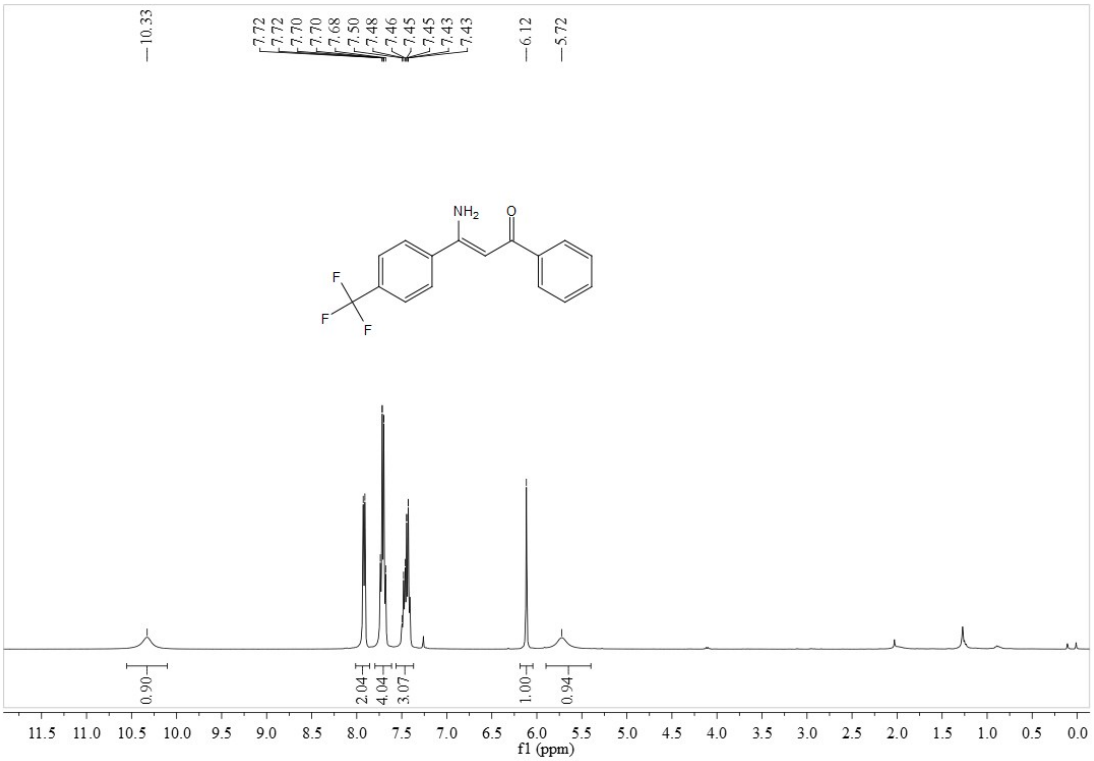
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(4-chlorophenyl)-1-phenylprop-2-en-1-one(3af)

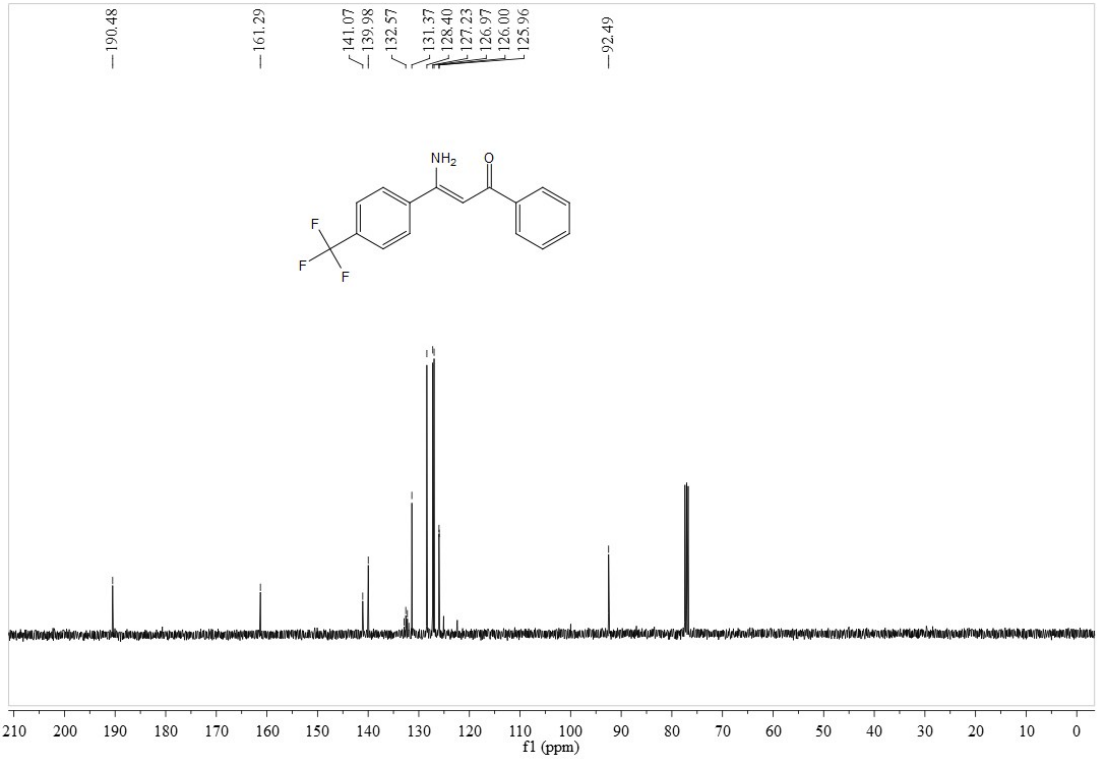


^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(4-bromophenyl)-1-phenylprop-2-en-1-one (3ag)

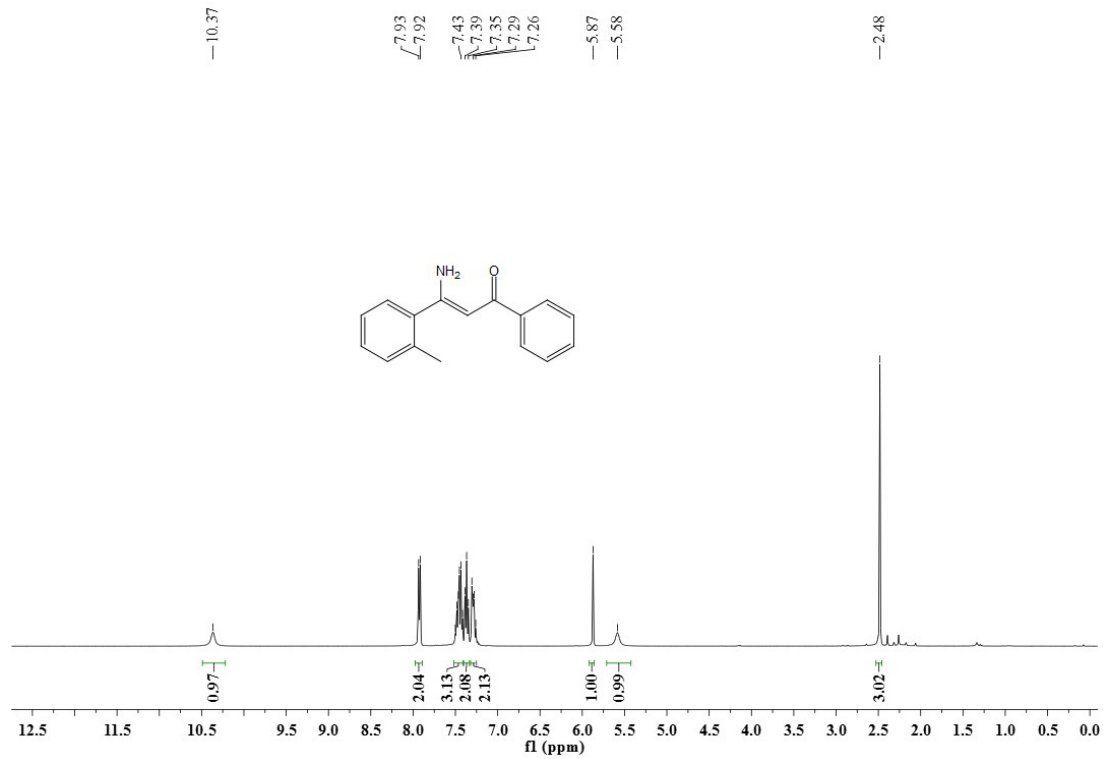
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-phenyl-3-(4-(trifluoromethyl)phenyl)prop-2-en-1-

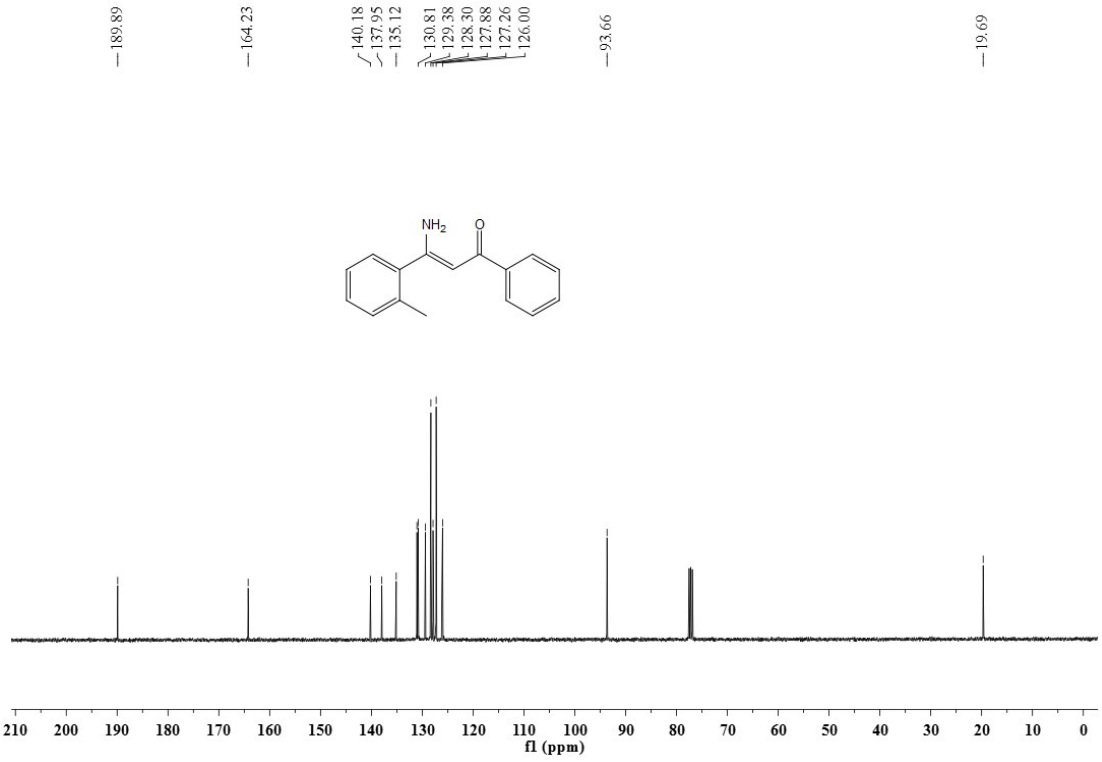
one (3ah)



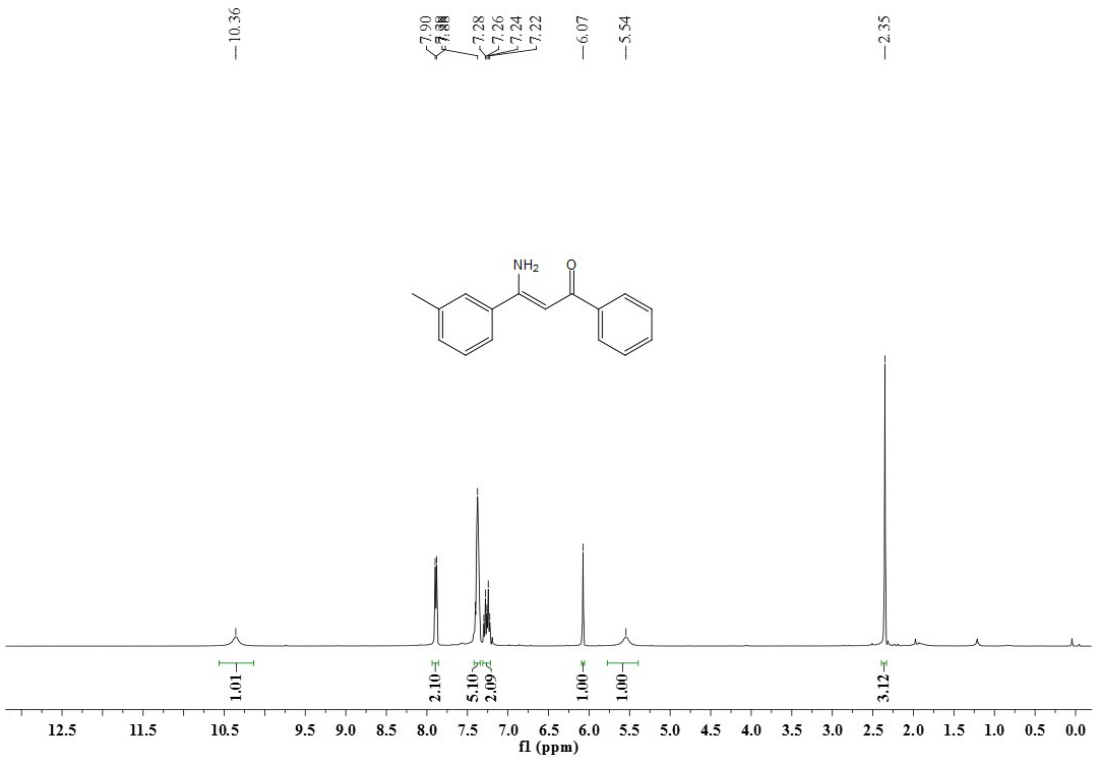


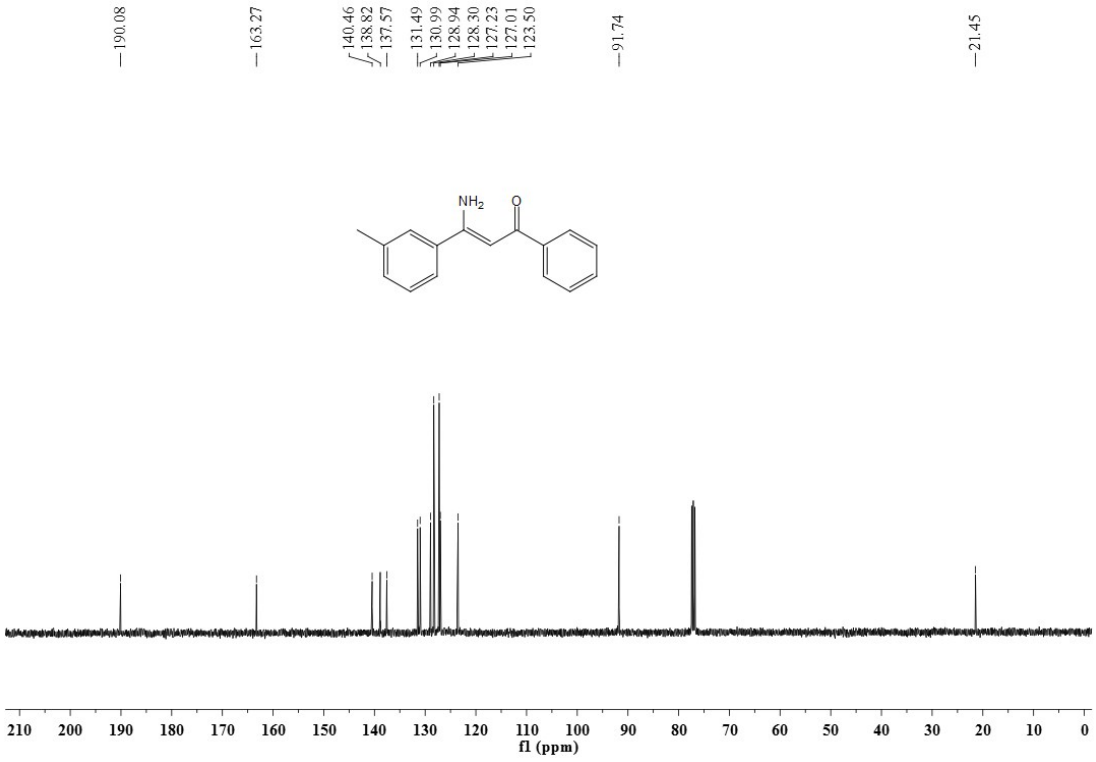
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-phenyl-3-(*o*-tolyl)prop-2-en-1-one (3ai)



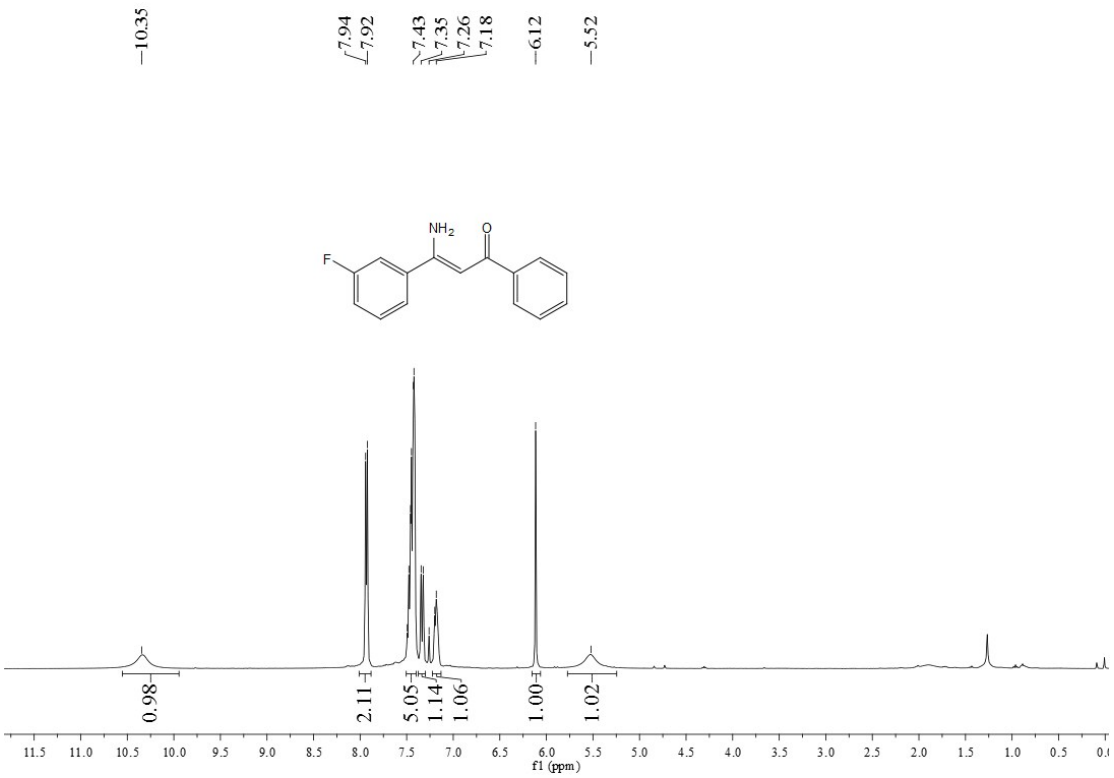


^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-phenyl-3-(m-tolyl)prop-2-en-1-one (3aj)





^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(3-fluorophenyl)-1-phenylprop-2-en-1-one (3ak)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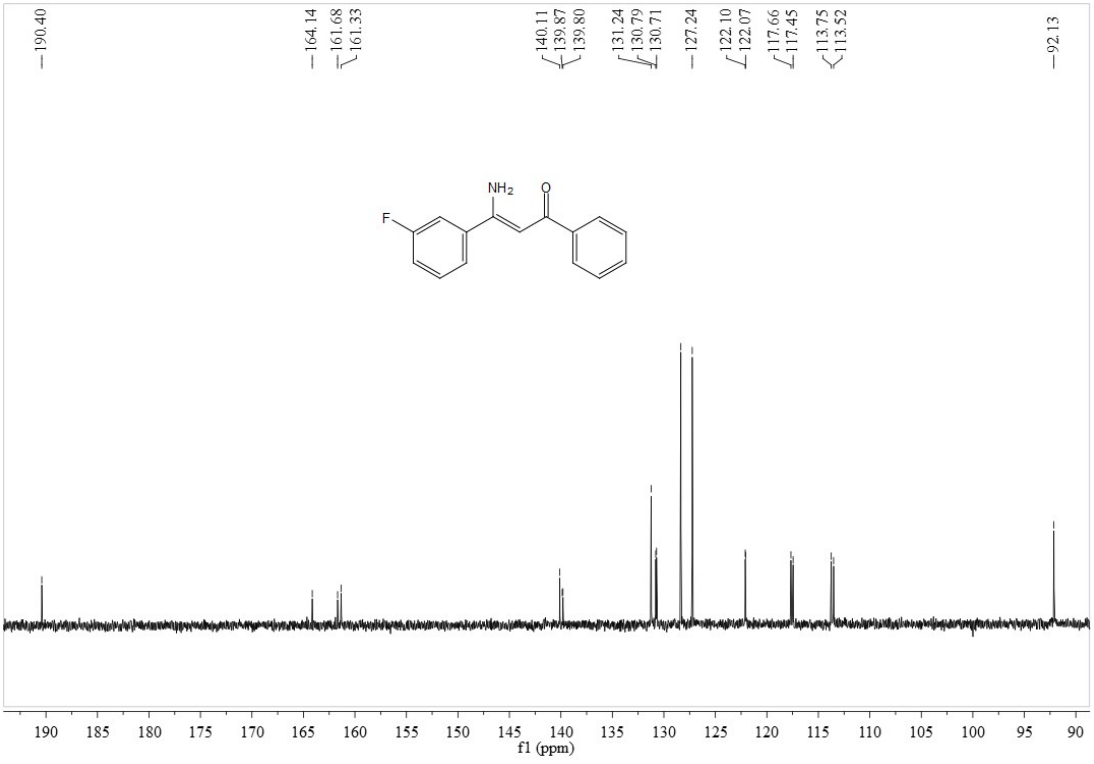
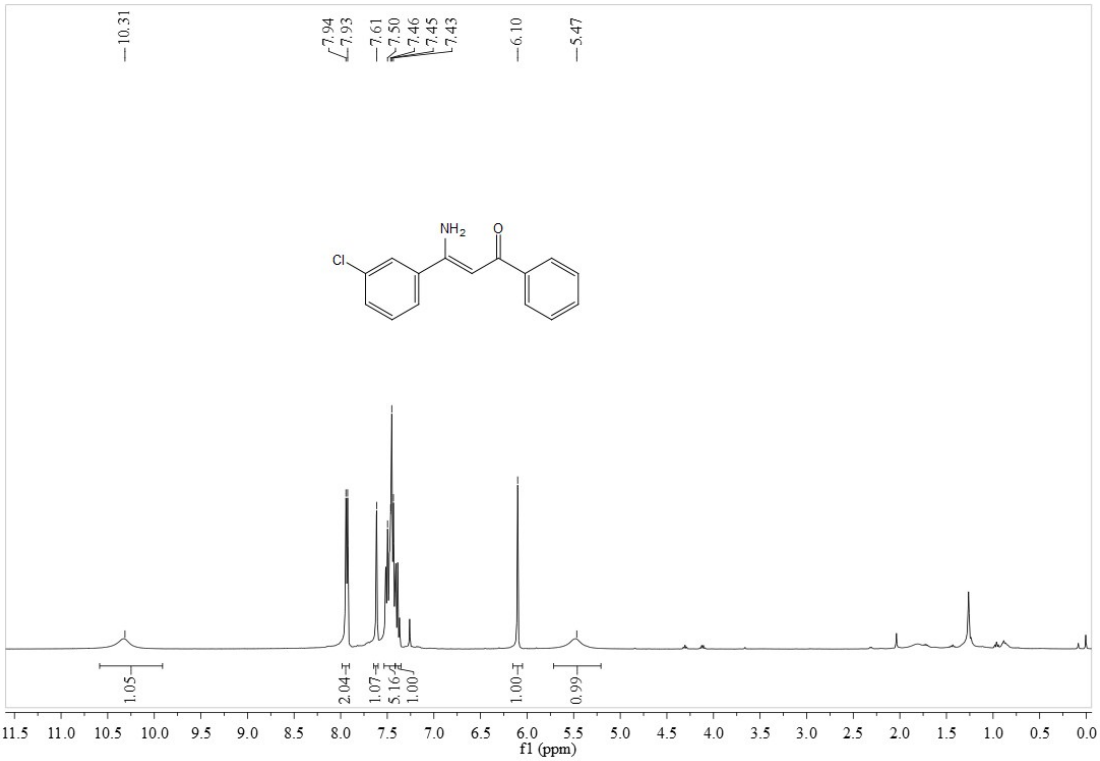
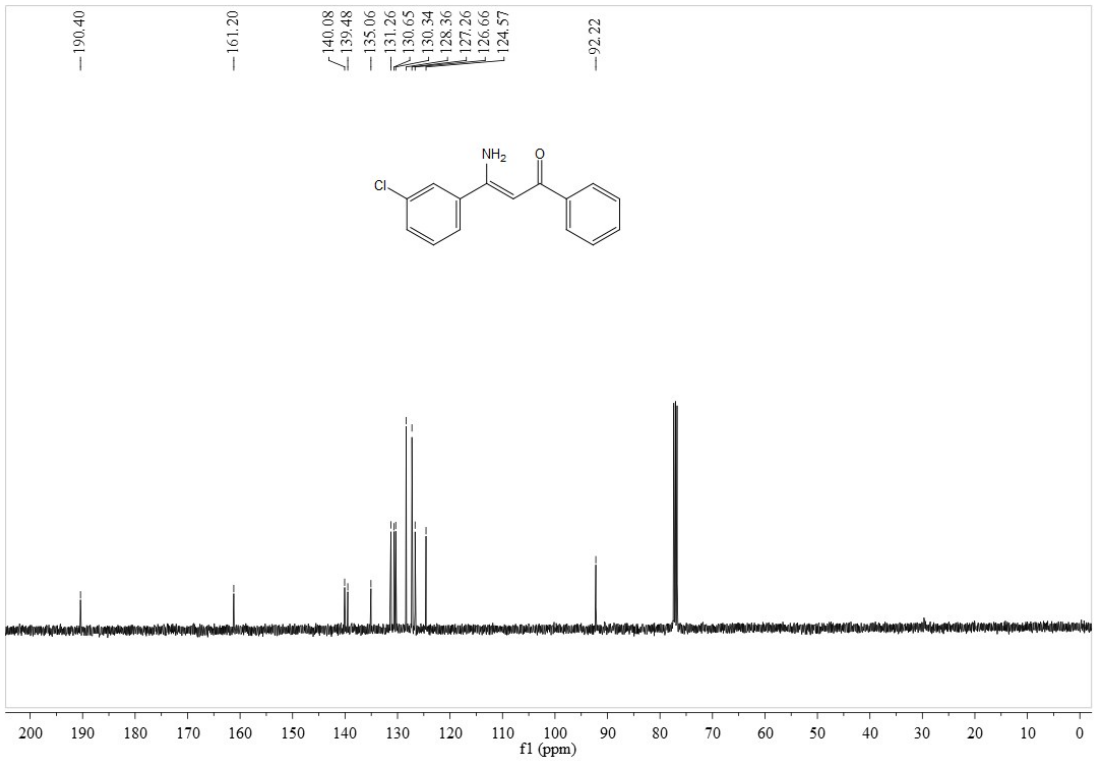
7.94
7.92
7.43
7.35
7.26
7.18
6.12
5.52
NH2
O
F
0.98
2.11
5.05
1.14
1.06
1.00
1.02
f1 (ppm)

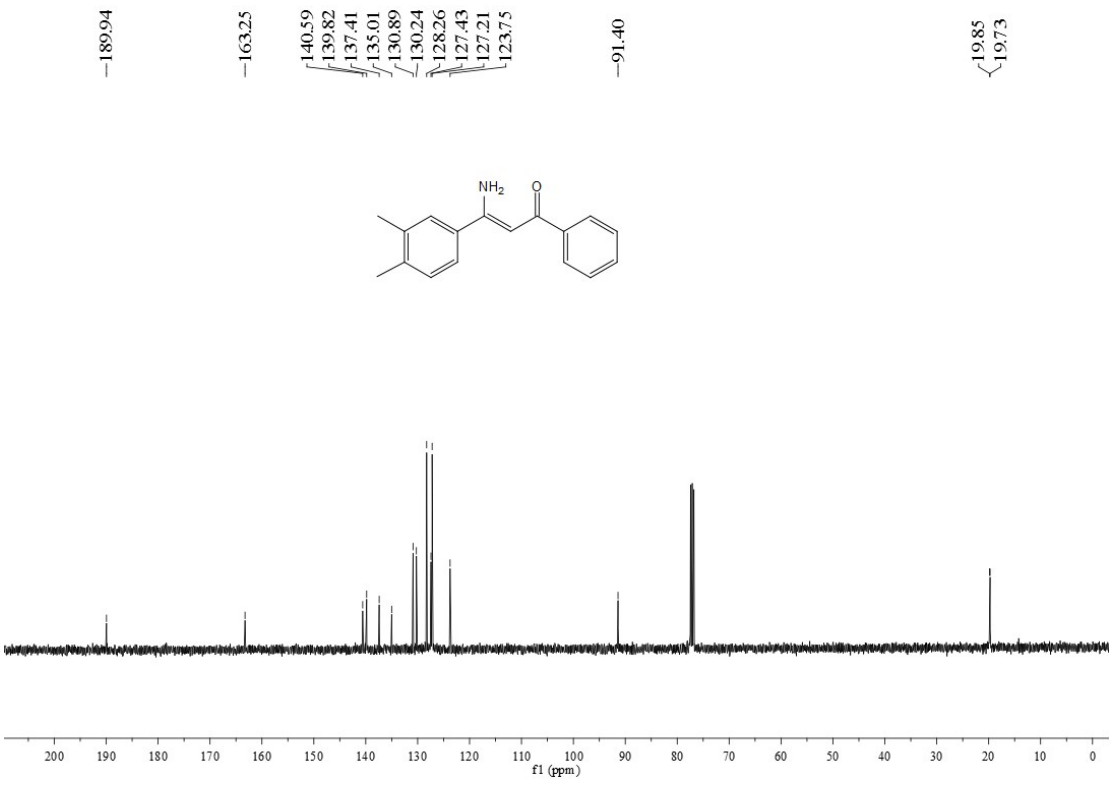

190.40
164.14
161.68
161.33
140.11
139.87
139.80
131.24
130.79
130.71
127.24
122.10
122.07
117.66
117.45
113.75
113.52
92.13
NH2
O
F
f1 (ppm)

^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(3-chlorophenyl)-1-phenylprop-2-en-1-one (3al)

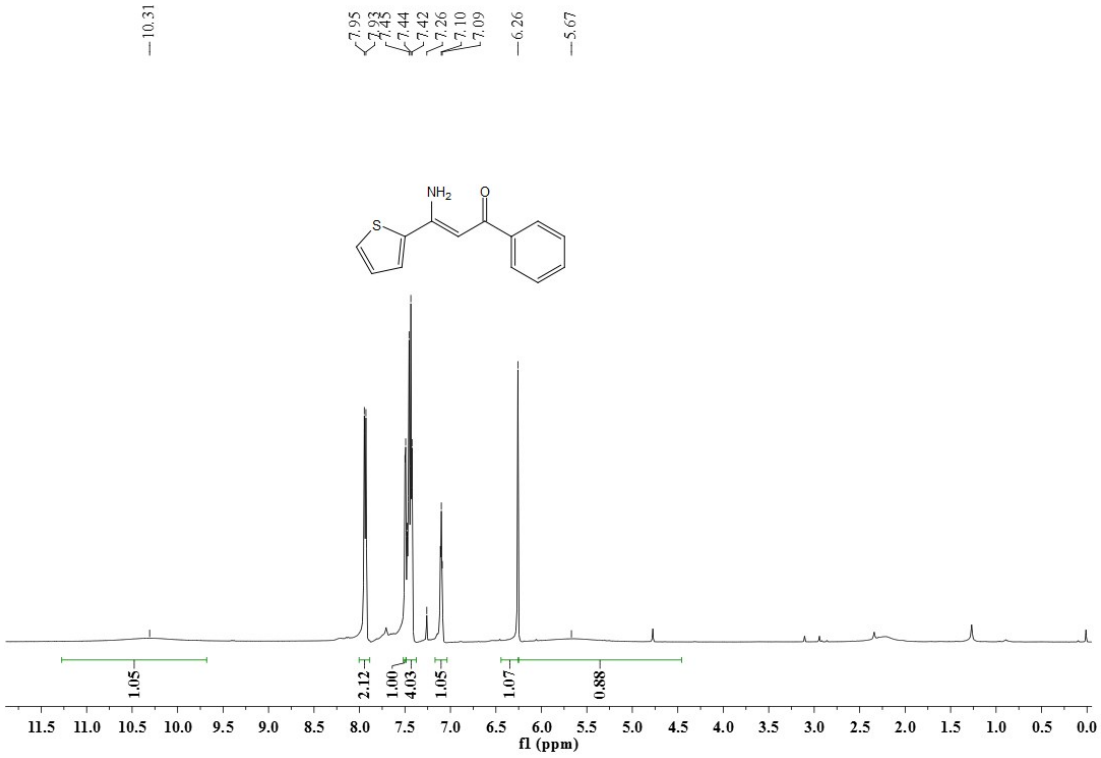


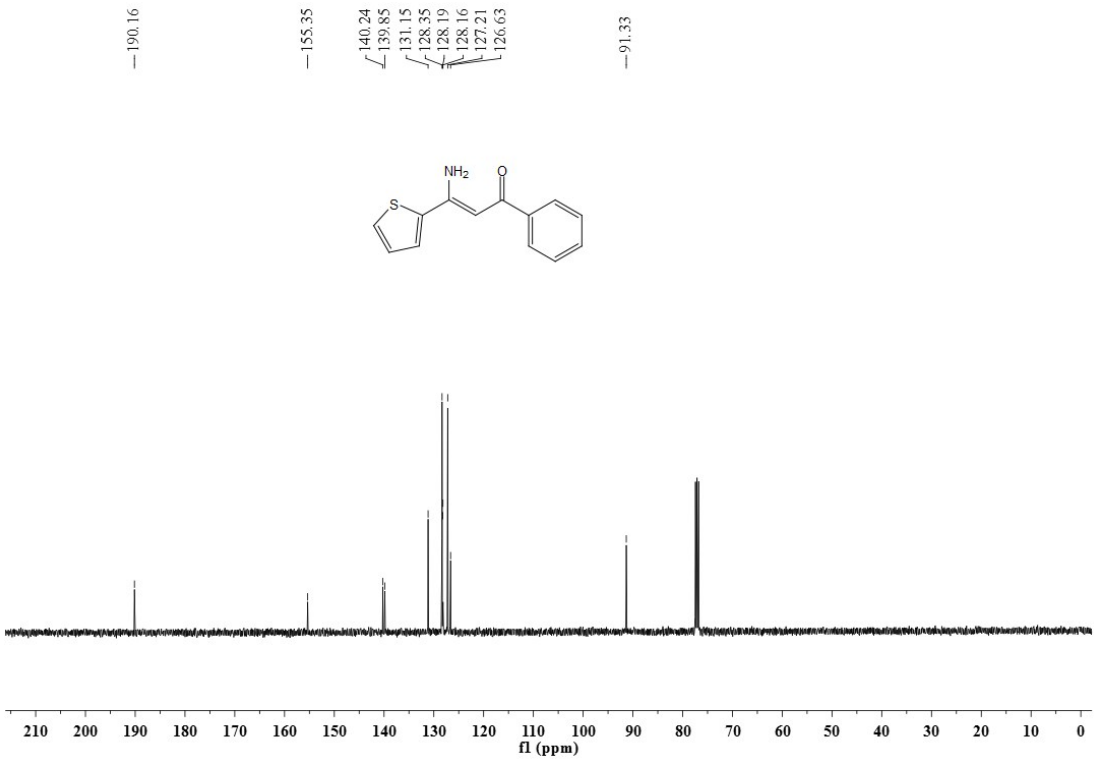


^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(3,4-dimethylphenyl)-1-phenylprop-2-en-1-one (3am)

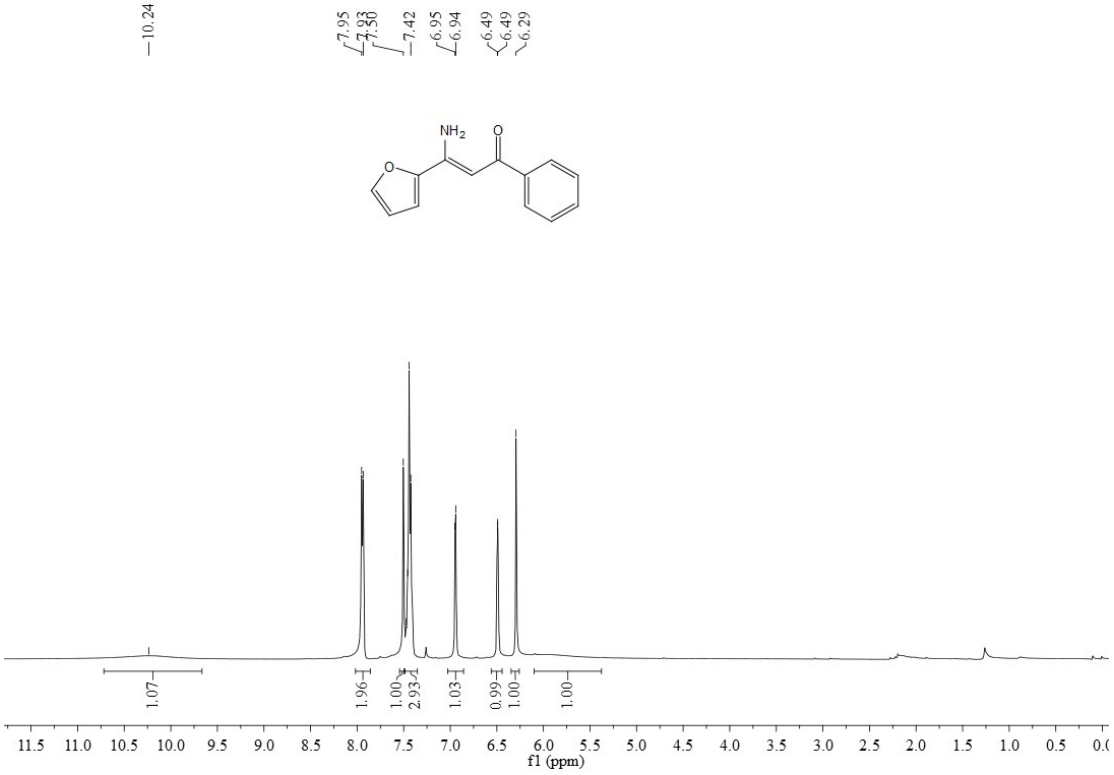


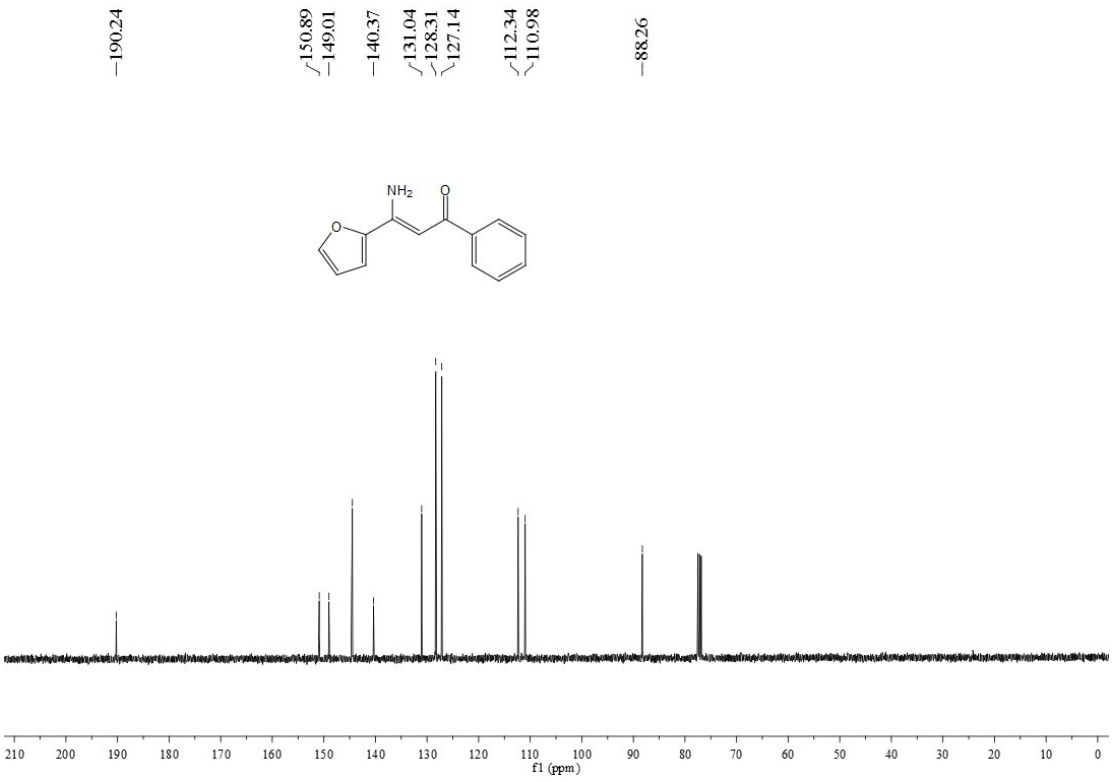
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-phenyl-3-(thiophen-2-yl)prop-2-en-1-one (3an)



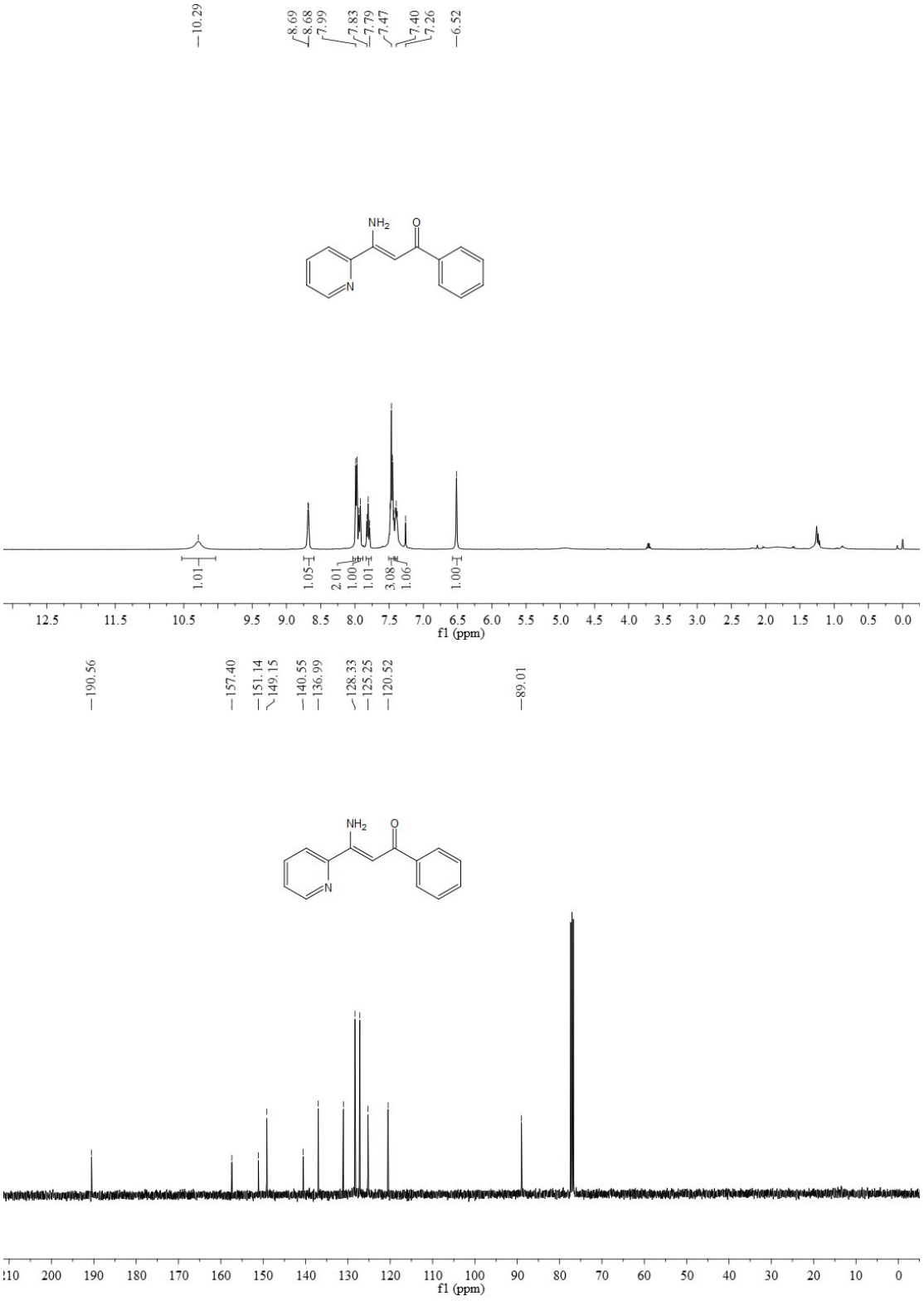


^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(furan-2-yl)-1-phenylprop-2-en-1-one (3ao)

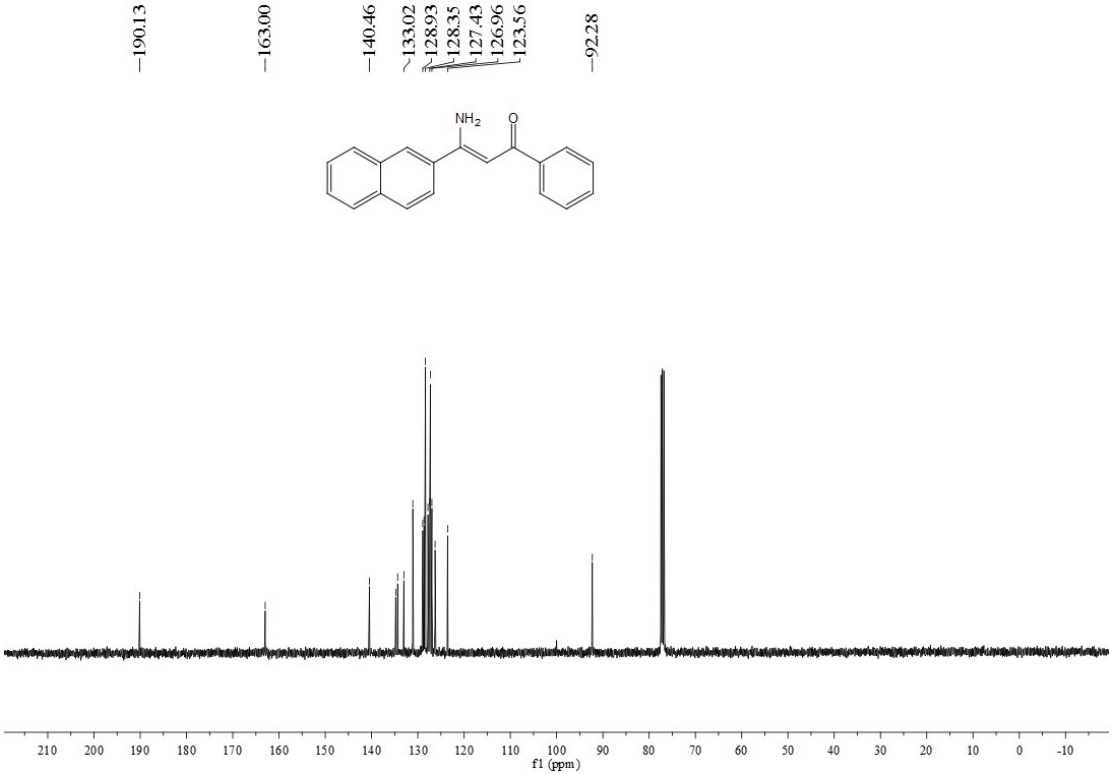




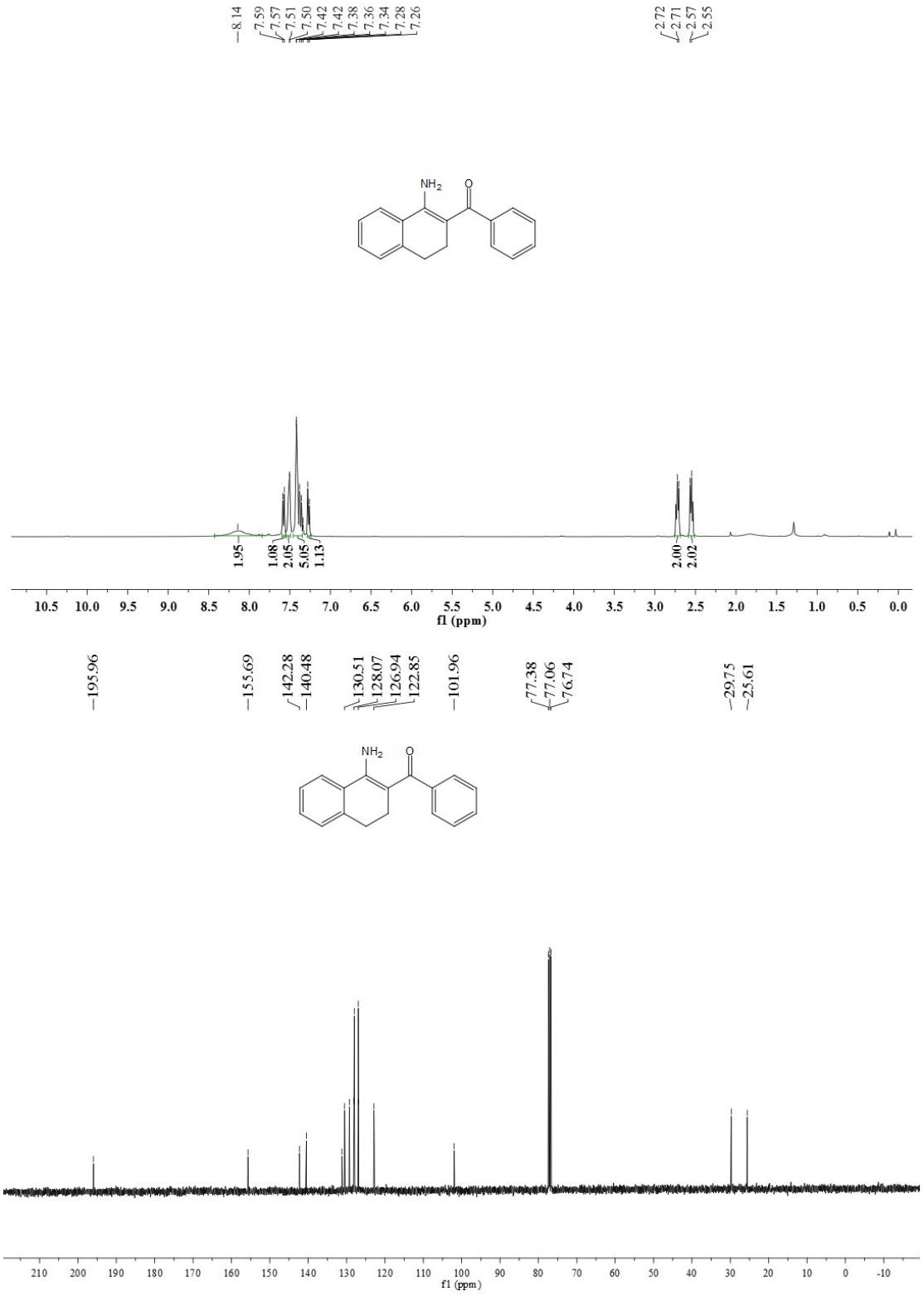
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-phenyl-3-(pyridin-2-yl)prop-2-en-1-one (3ap)



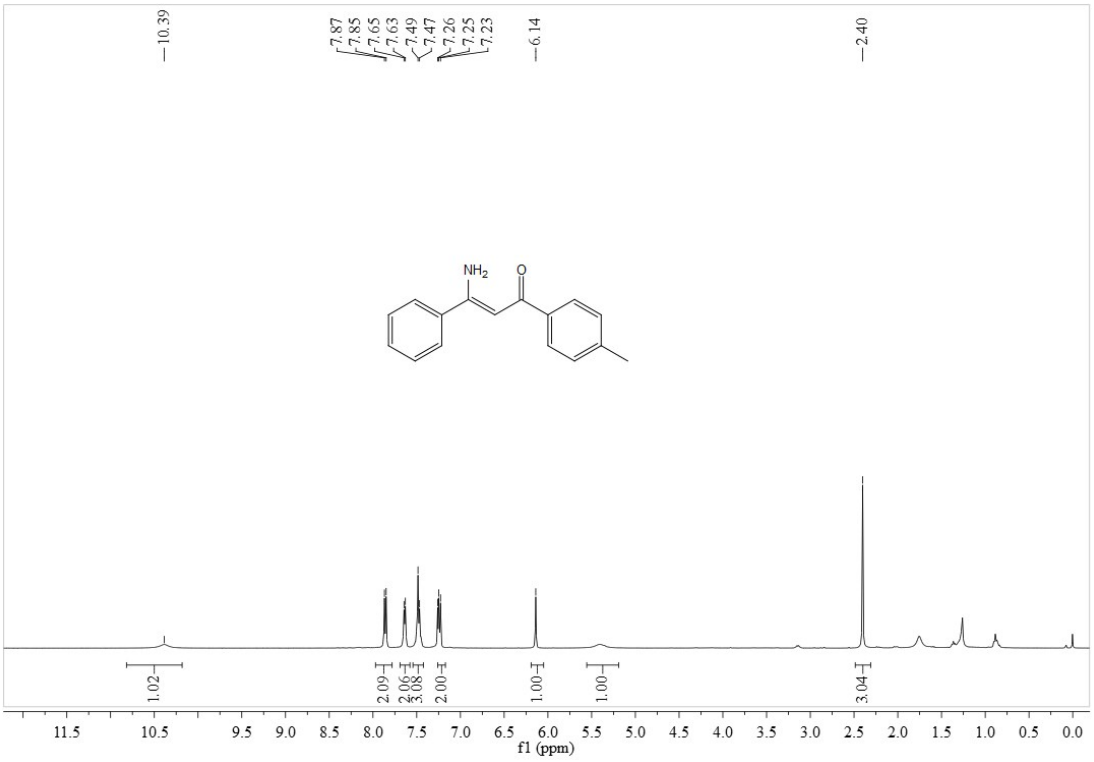
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-(naphthalen-2-yl)-1-phenylprop-2-en-1-one (3aq)

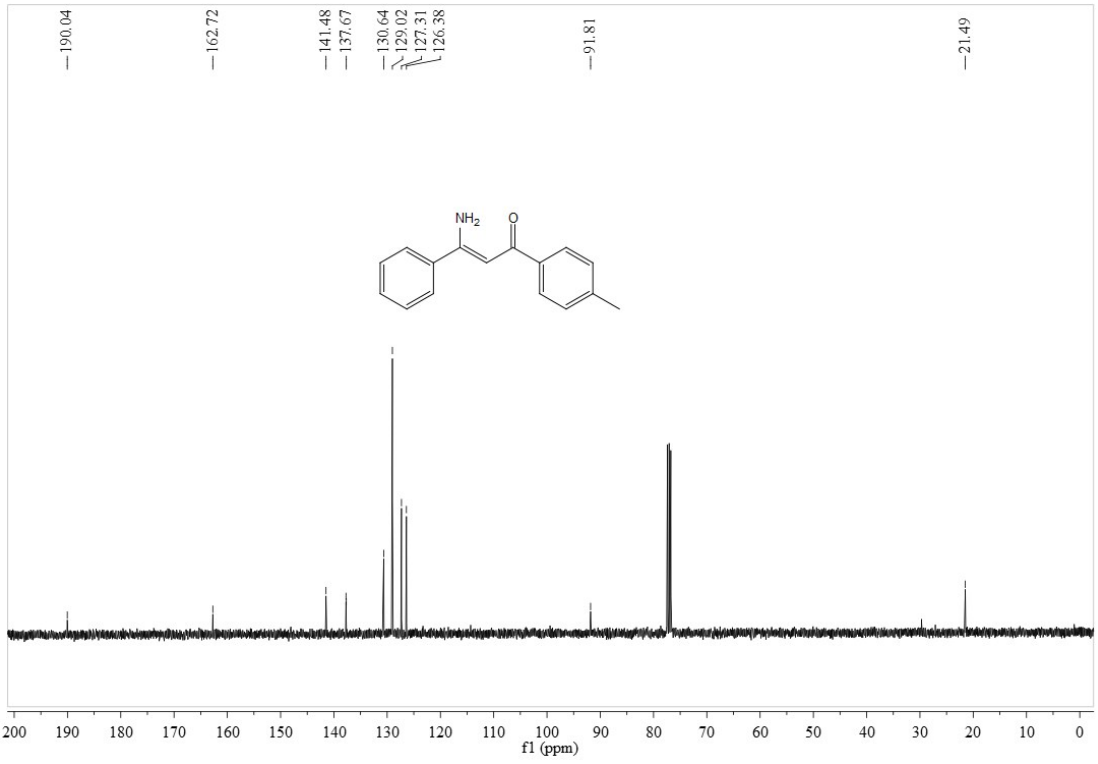


^{1}H NMR and ^{13}C NMR of (1-amino-3,4-dihydronaphthalen-2-yl)(phenyl)methanone (3ar)

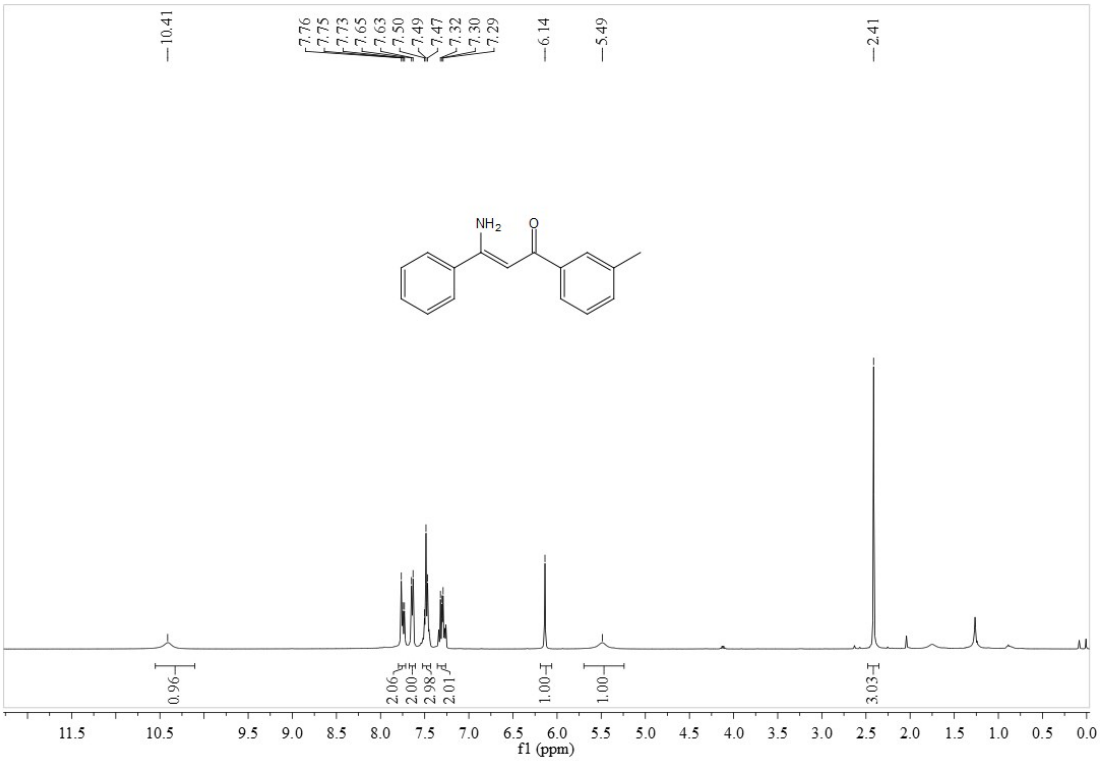


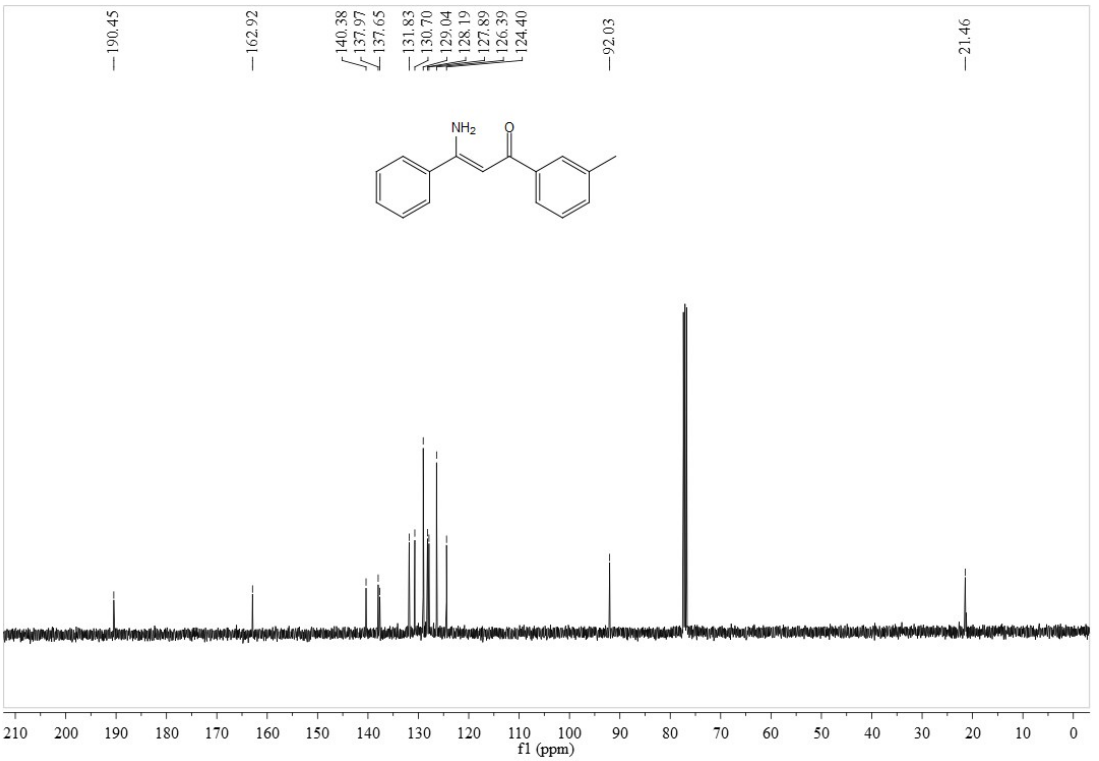
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-phenyl-1-(*p*-tolyl)prop-2-en-1-one (3as)



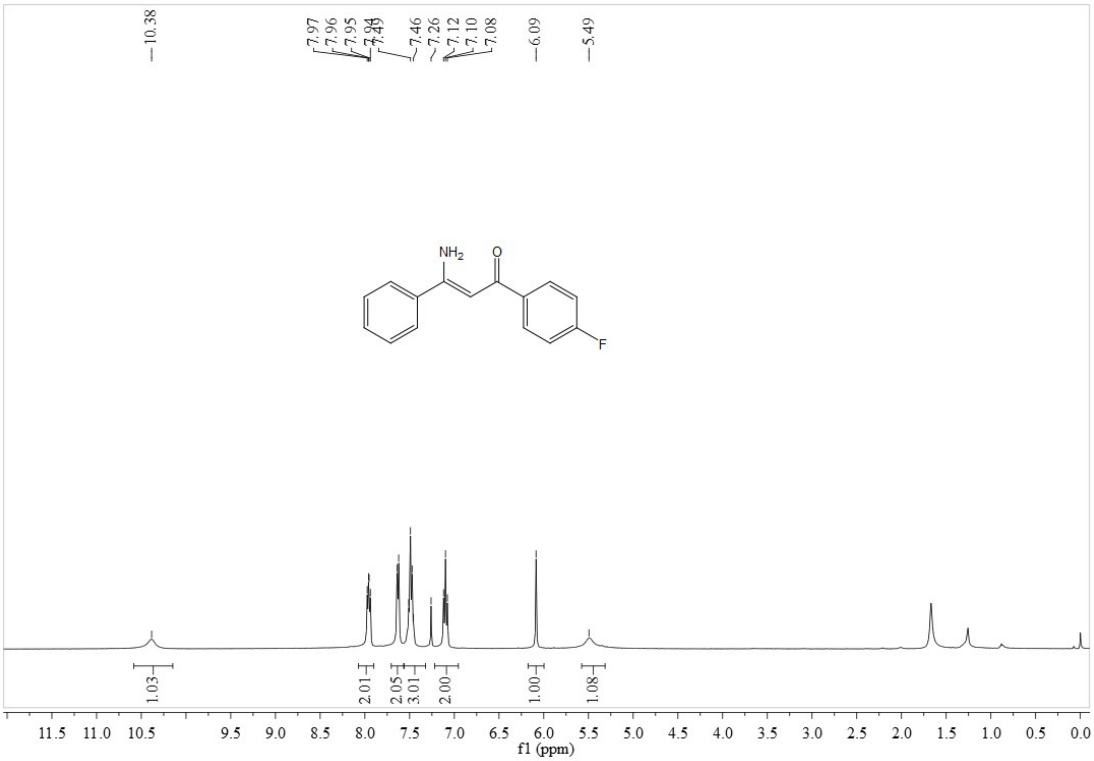


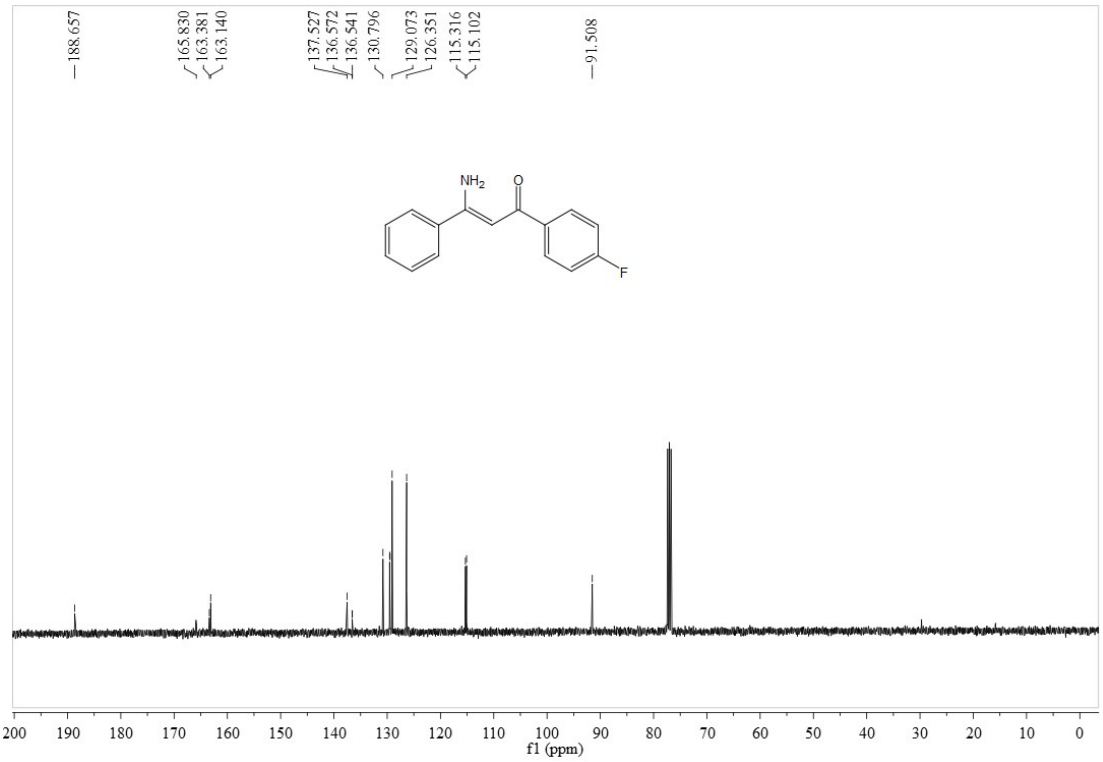
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-phenyl-1-(*m*-tolyl)prop-2-en-1-one (3at)



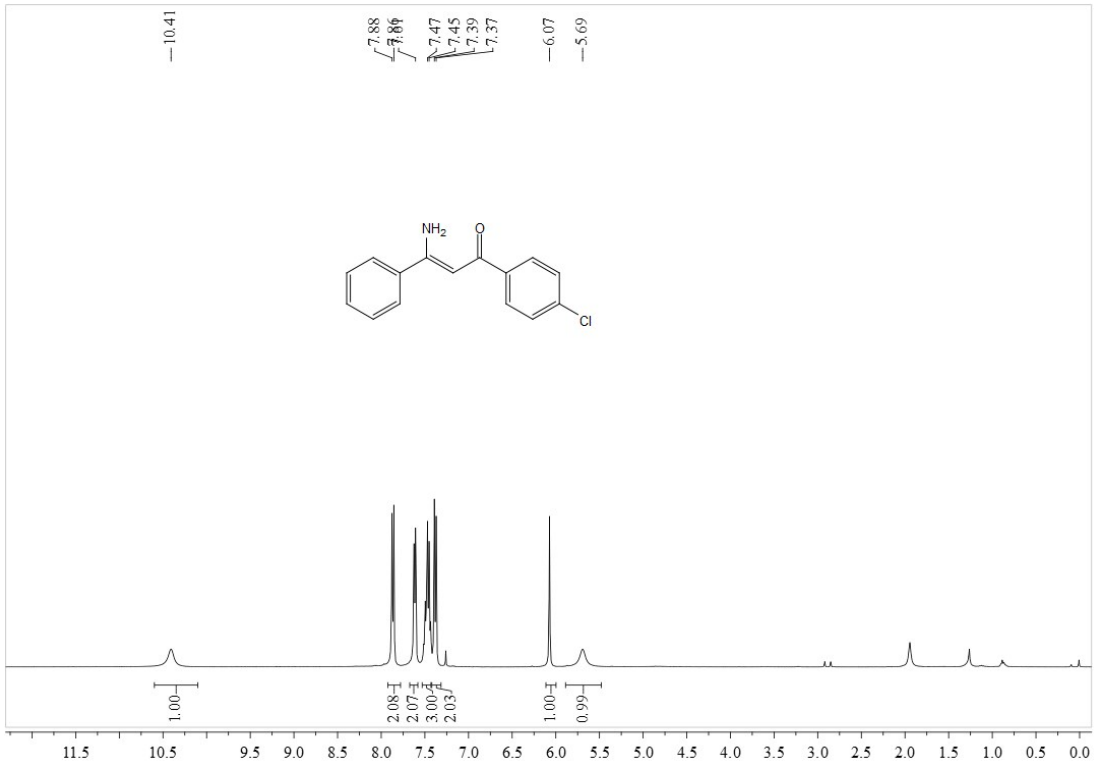


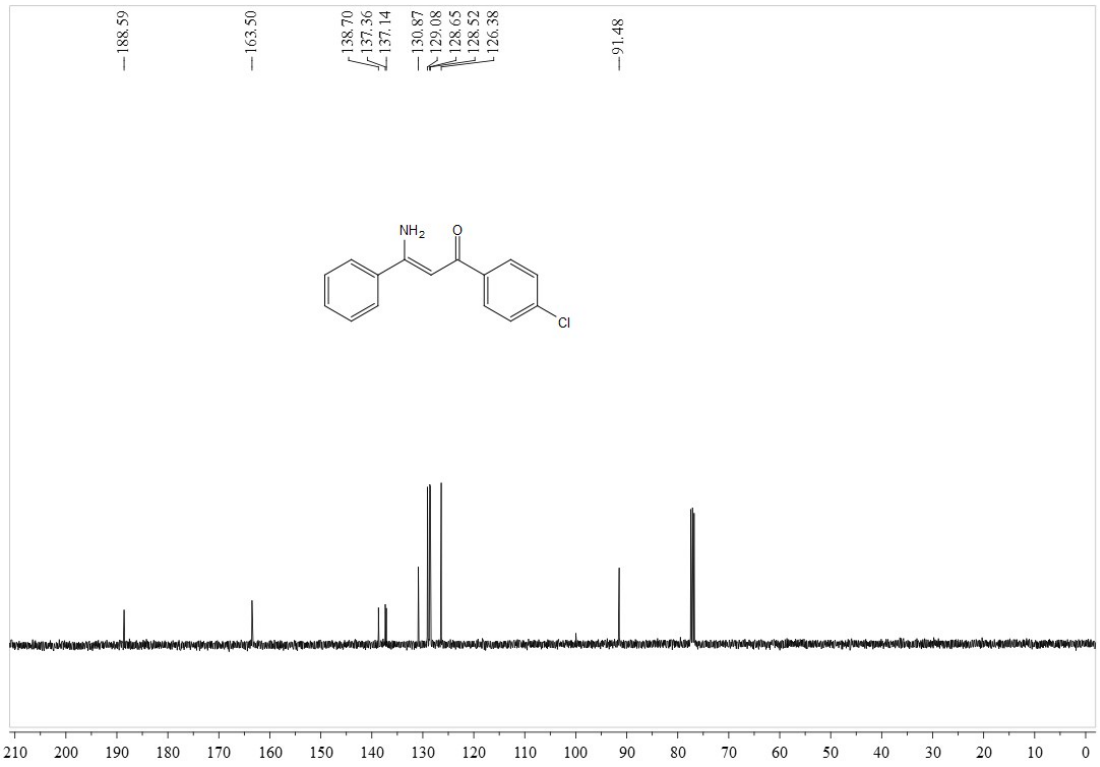
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-(4-fluorophenyl)-3-phenylprop-2-en-1-one (3au)



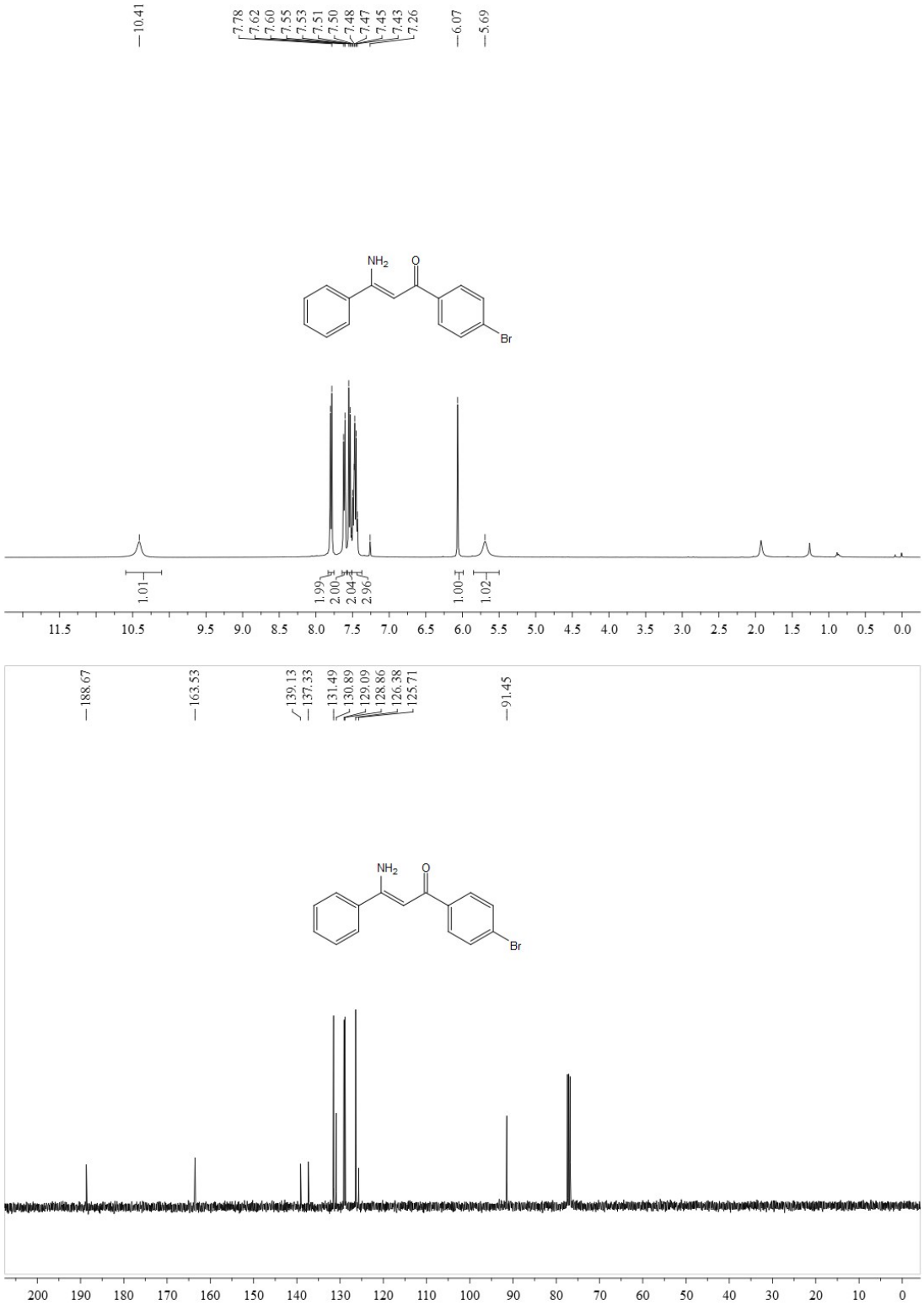


^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-(4-chlorophenyl)-3-phenylprop-2-en-1-one (3av)

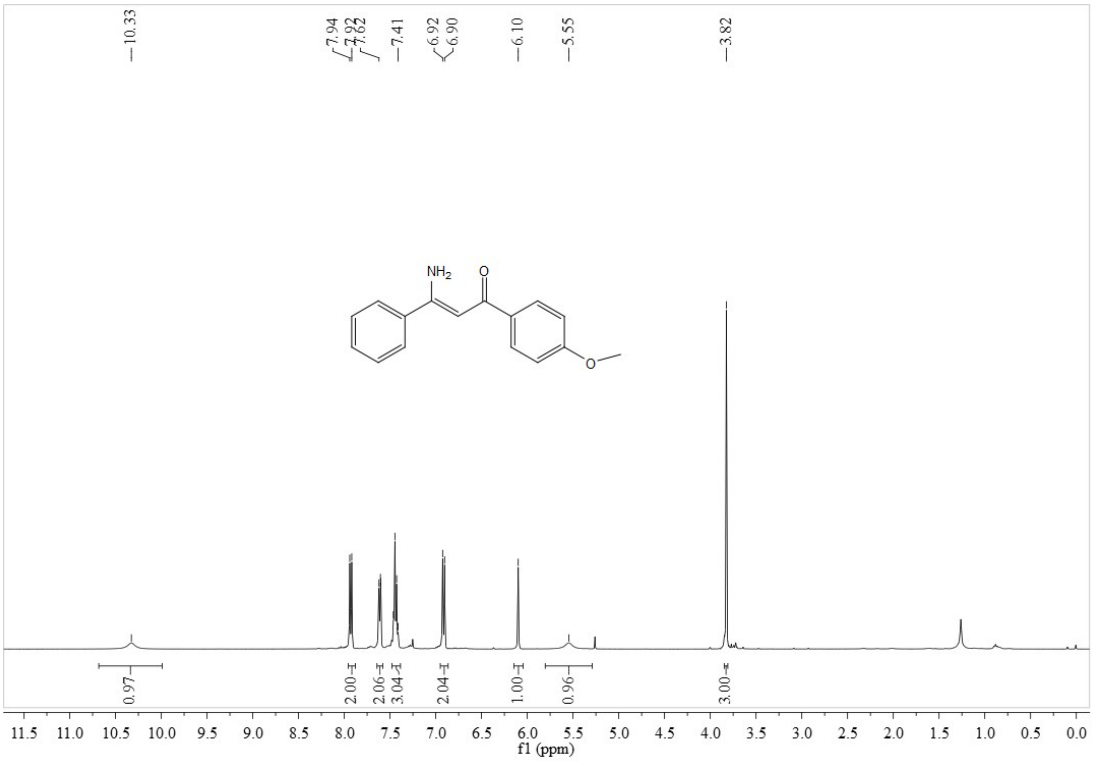


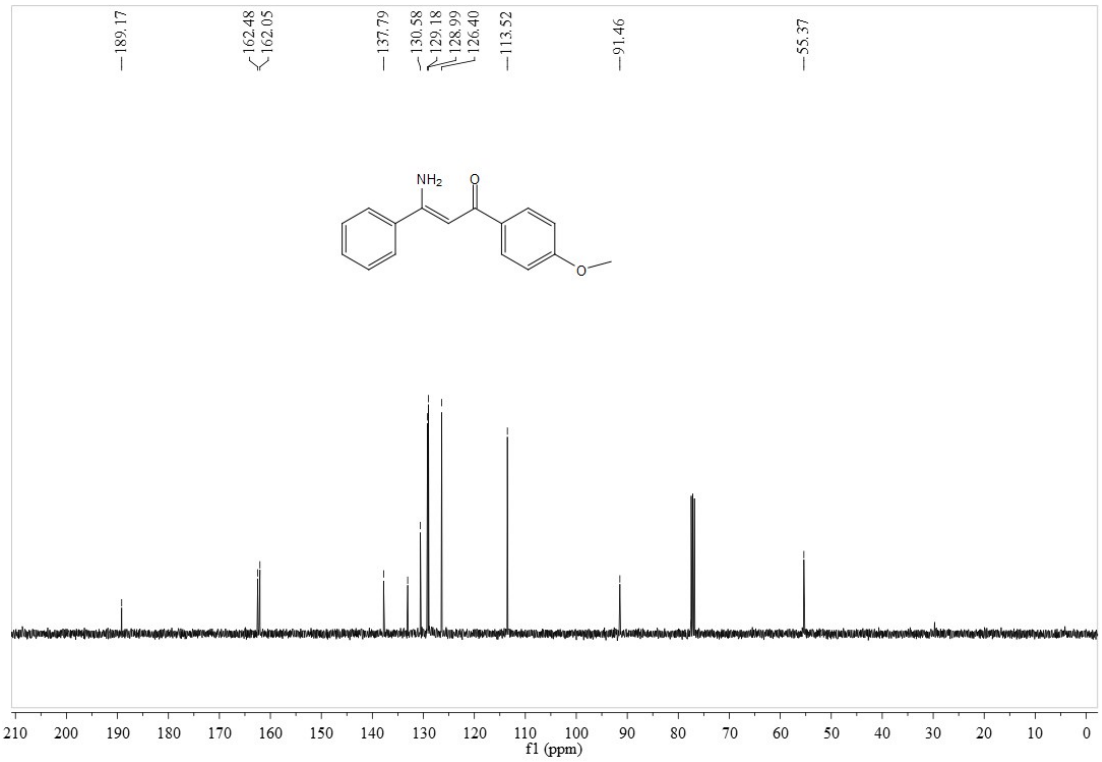


^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-(4-bromophenyl)-3-phenylprop-2-en-1-one (3aw)

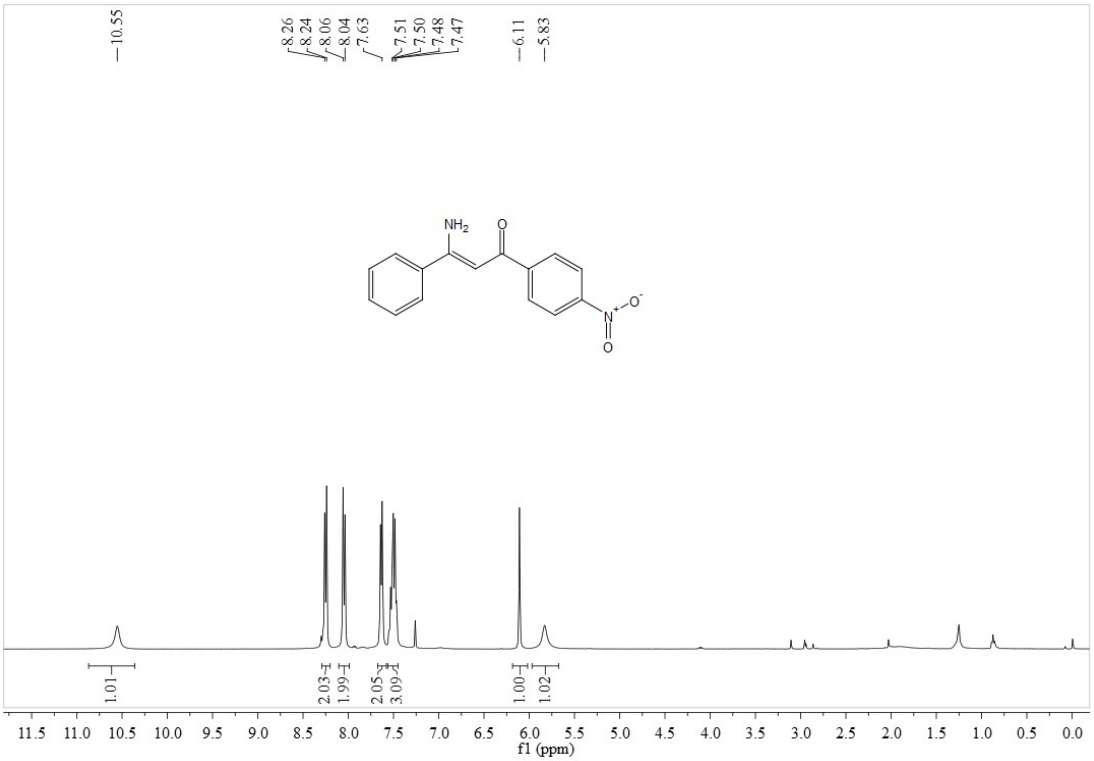


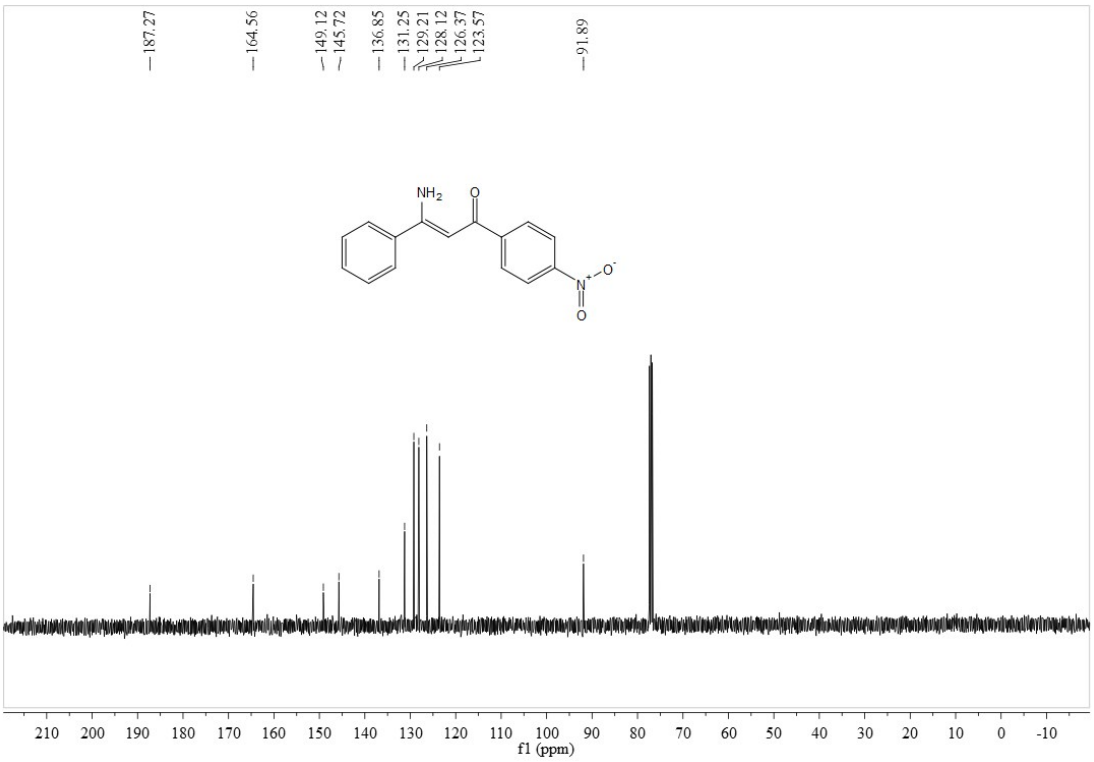
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-(4-methoxyphenyl)-3-phenylprop-2-en-1-one (3ax)



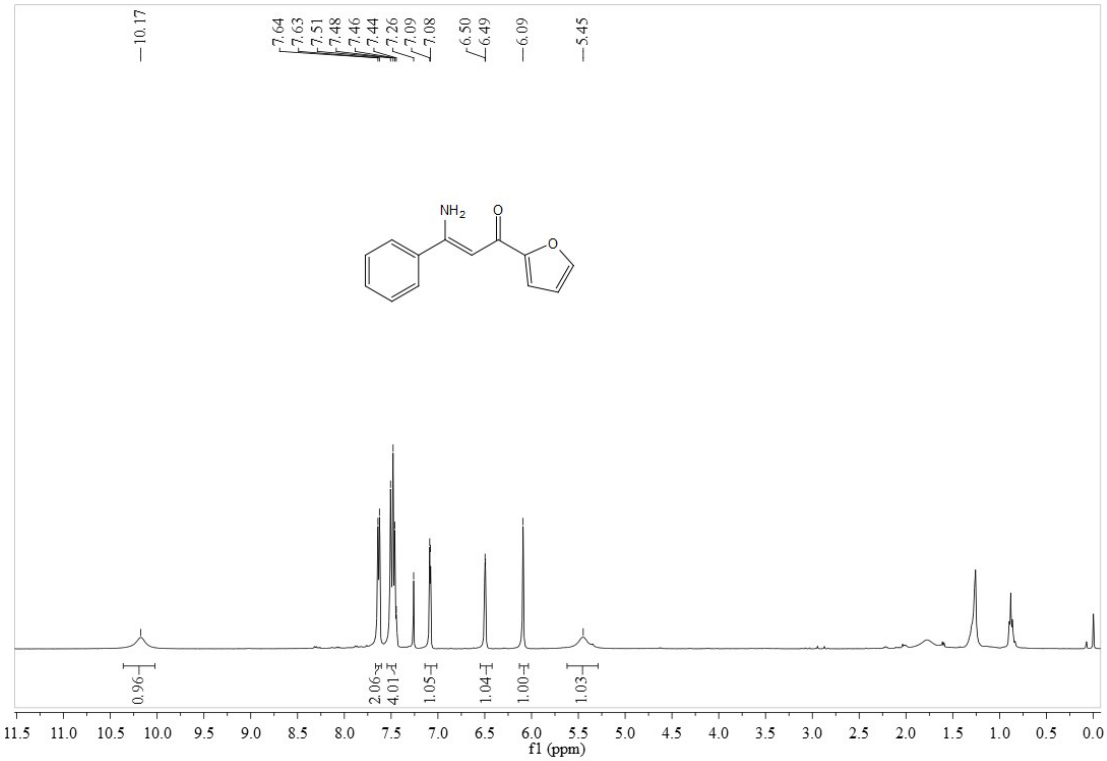


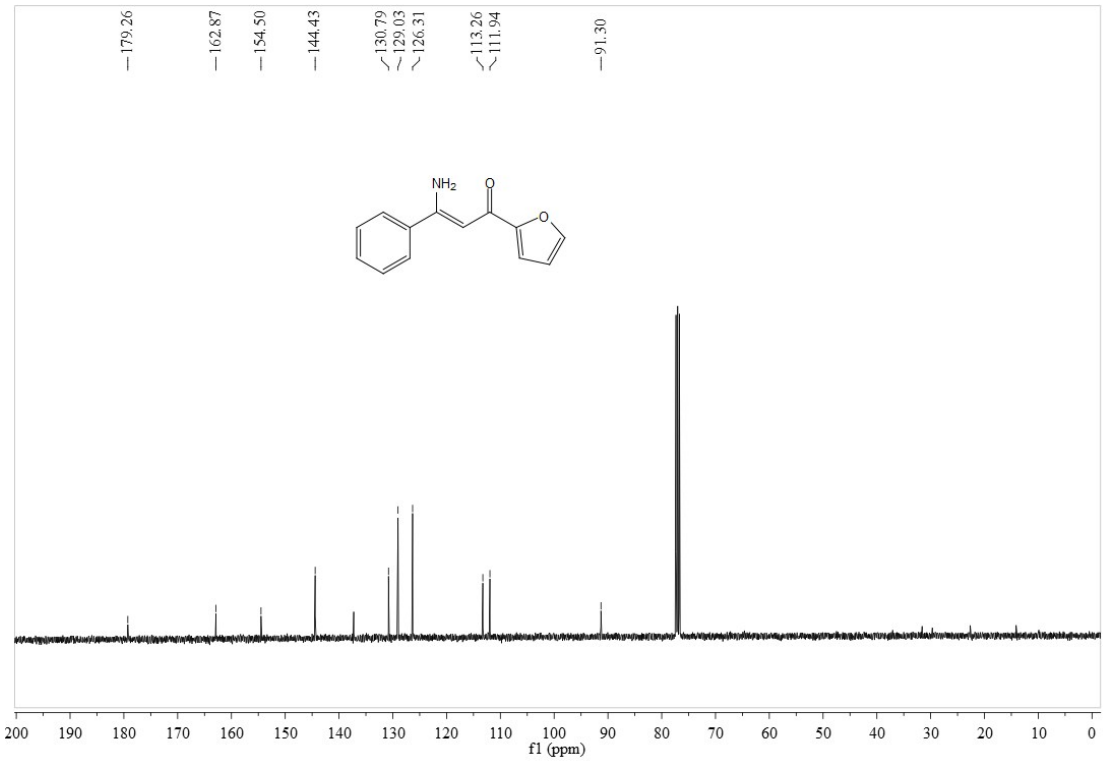
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-(4-nitrophenyl)-3-phenylprop-2-en-1-one (3ay)



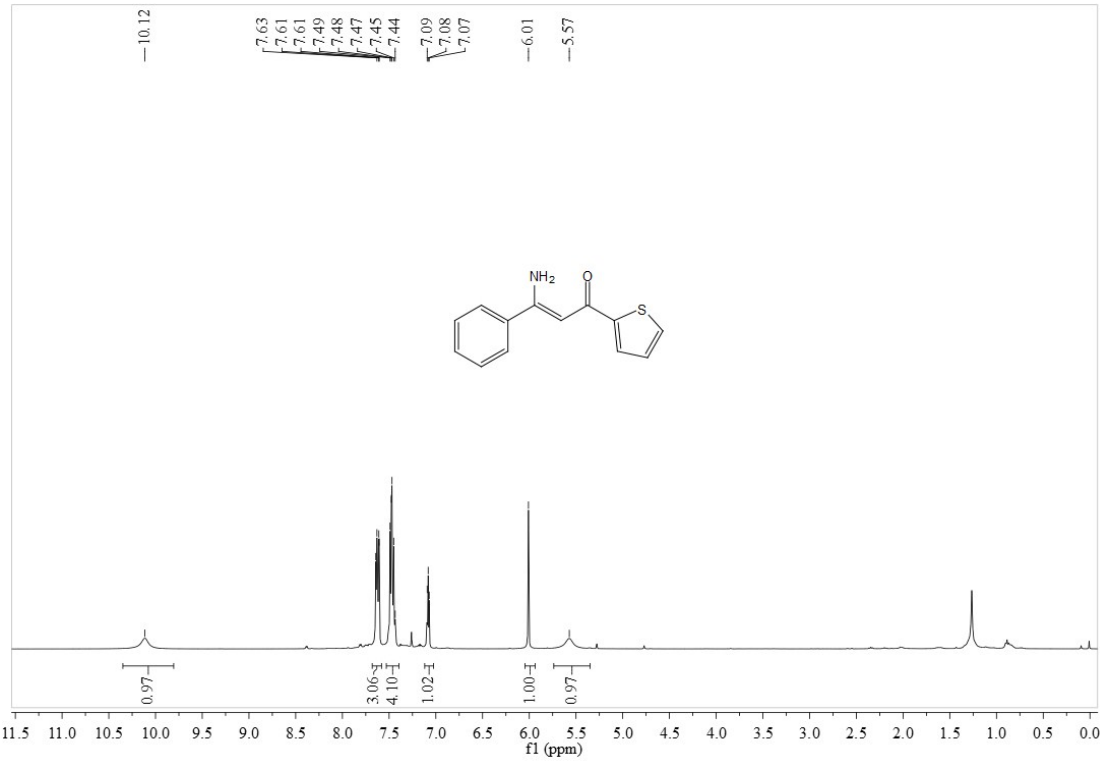


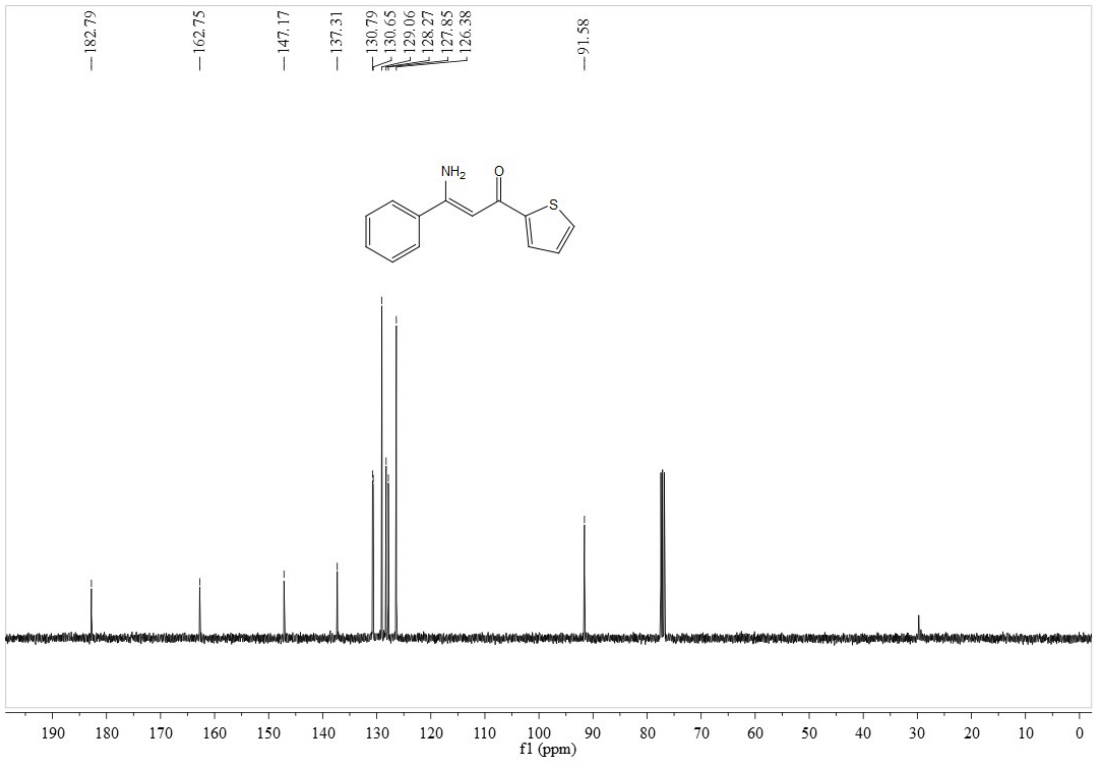
^{1}H NMR and ^{13}C NMR of (Z)-3-Amino-1-(furan-2-yl)-3-phenylprop-2-en-1-one (3az)



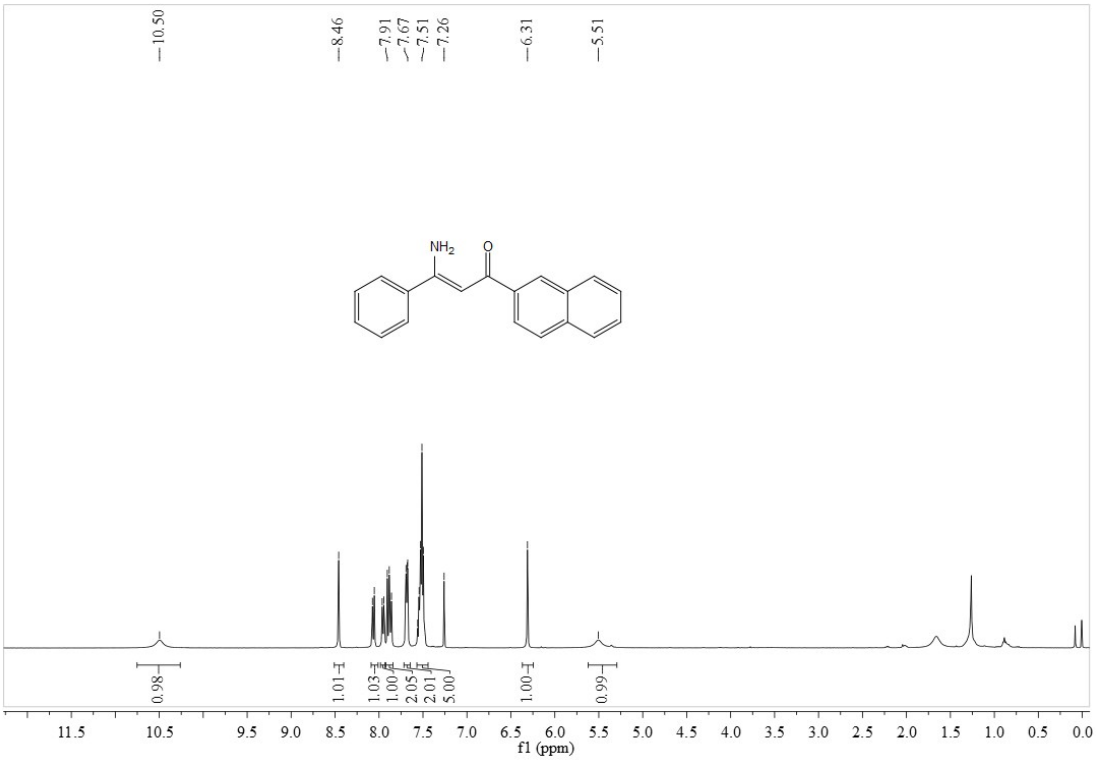


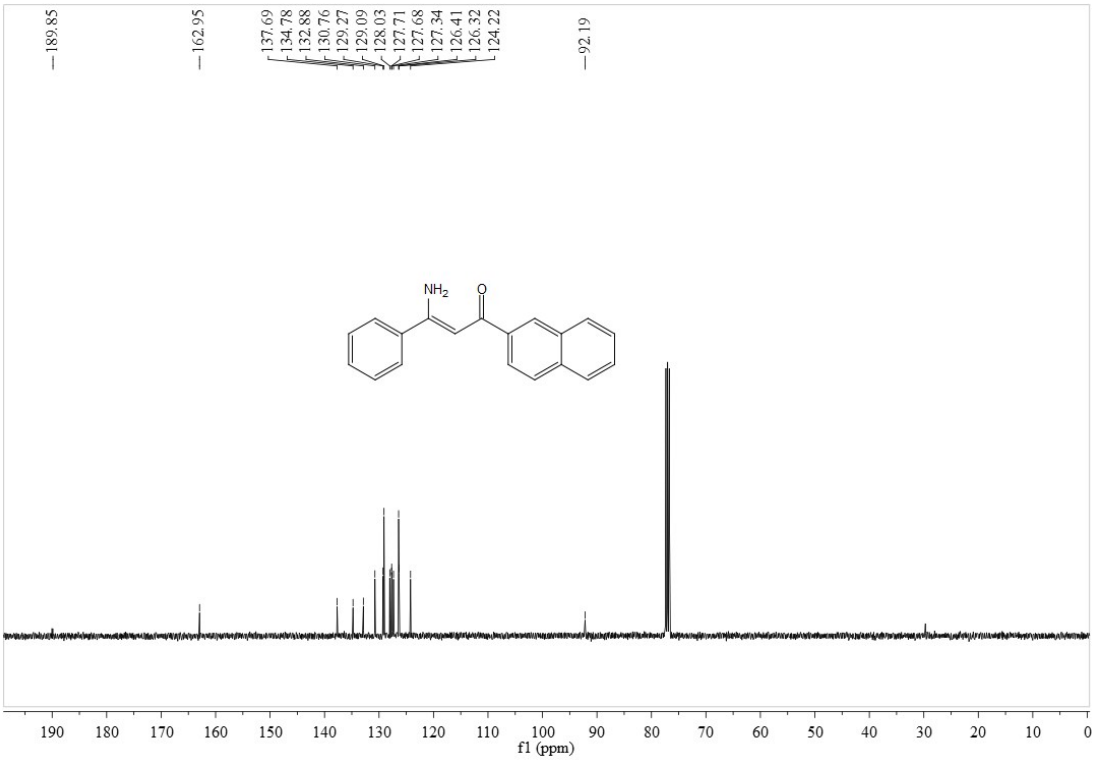
^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-3-phenyl-1-(thiophen-2-yl)prop-2-en-1-one (3ba)



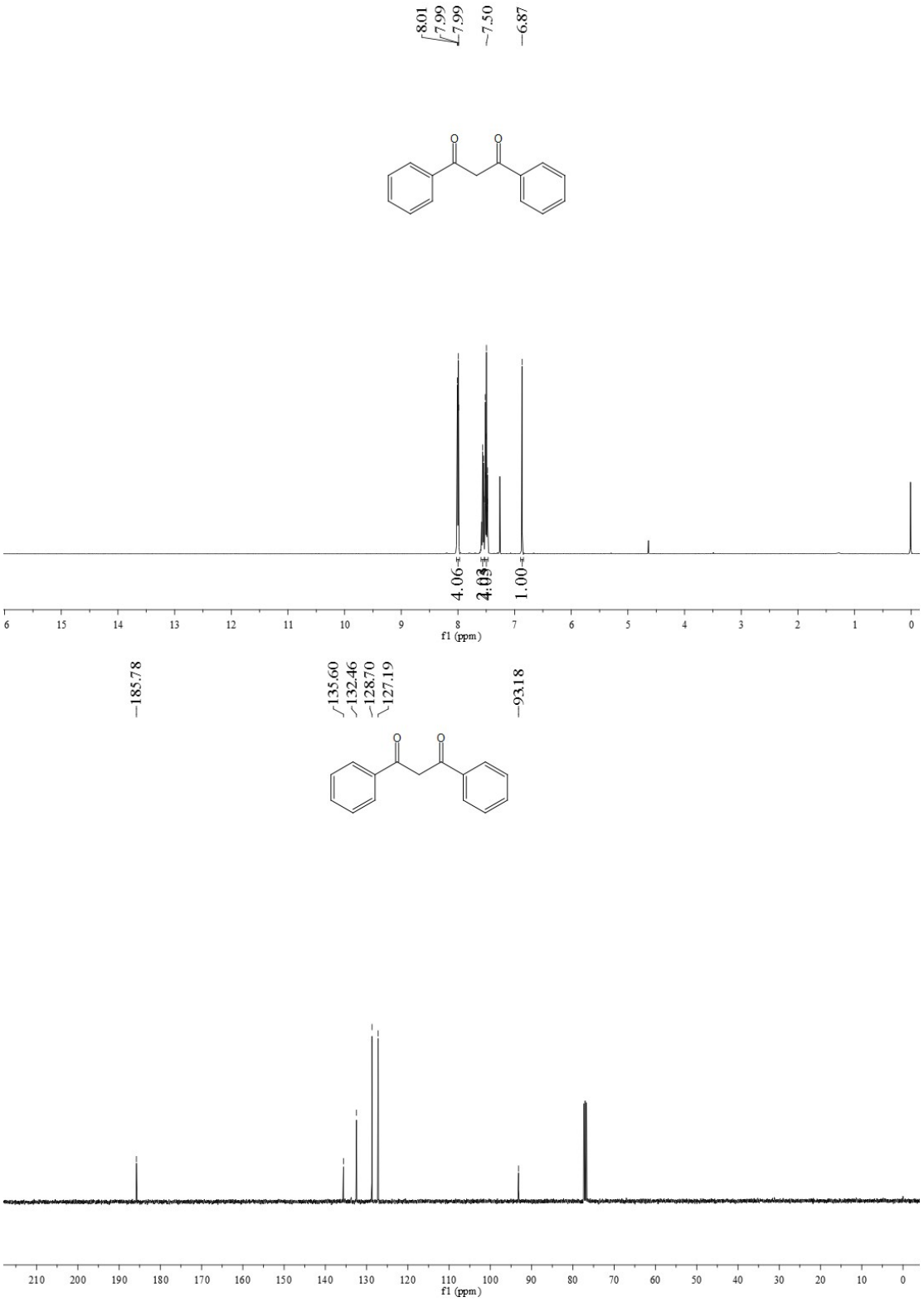


^{1}H NMR and ^{13}C NMR of (*Z*)-3-amino-1-(naphthalen-2-yl)-3-phenylprop-2-en-1-one (3bb)

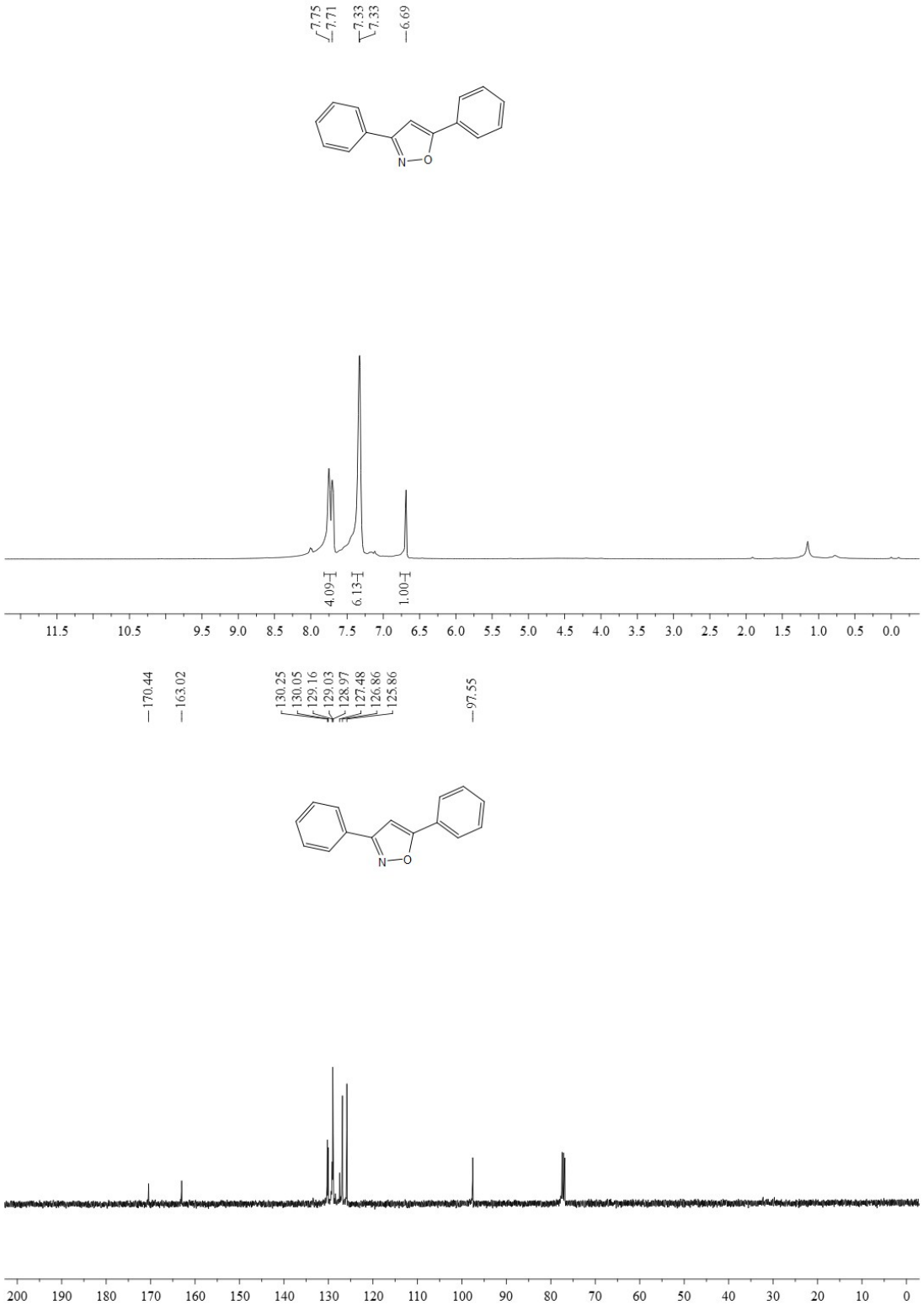




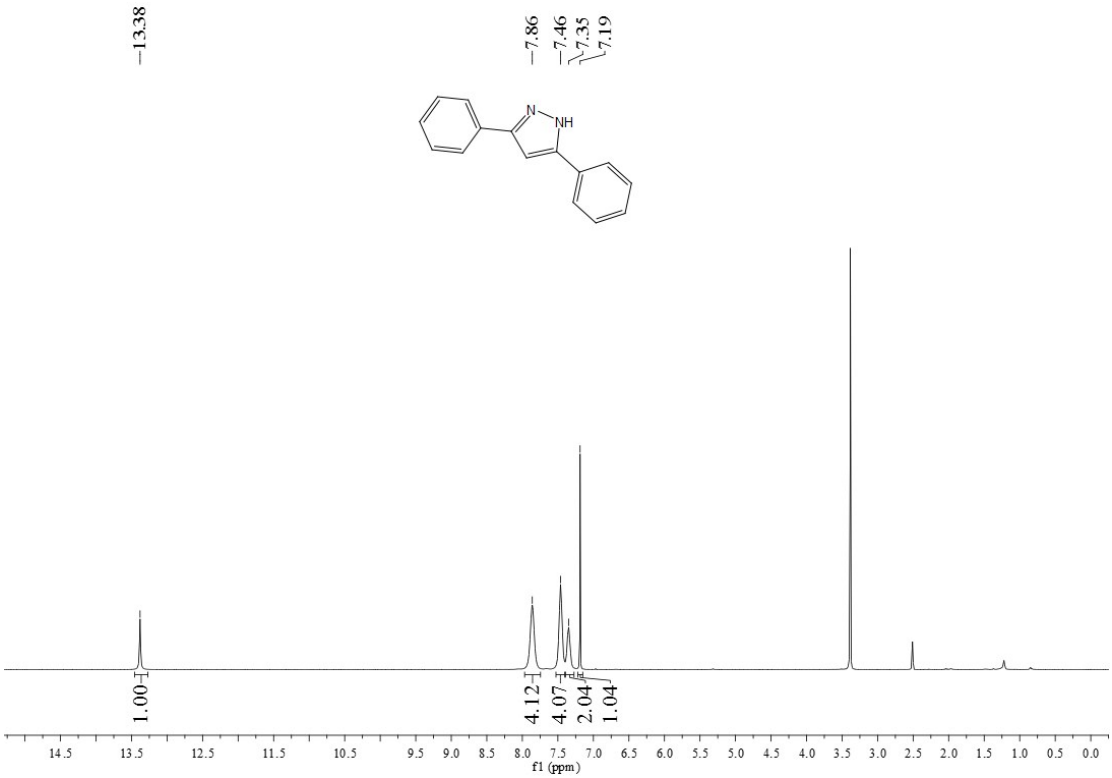
^{1}H NMR and ^{13}C NMR of 1,3-diphenylpropane-1,3-dione (4)

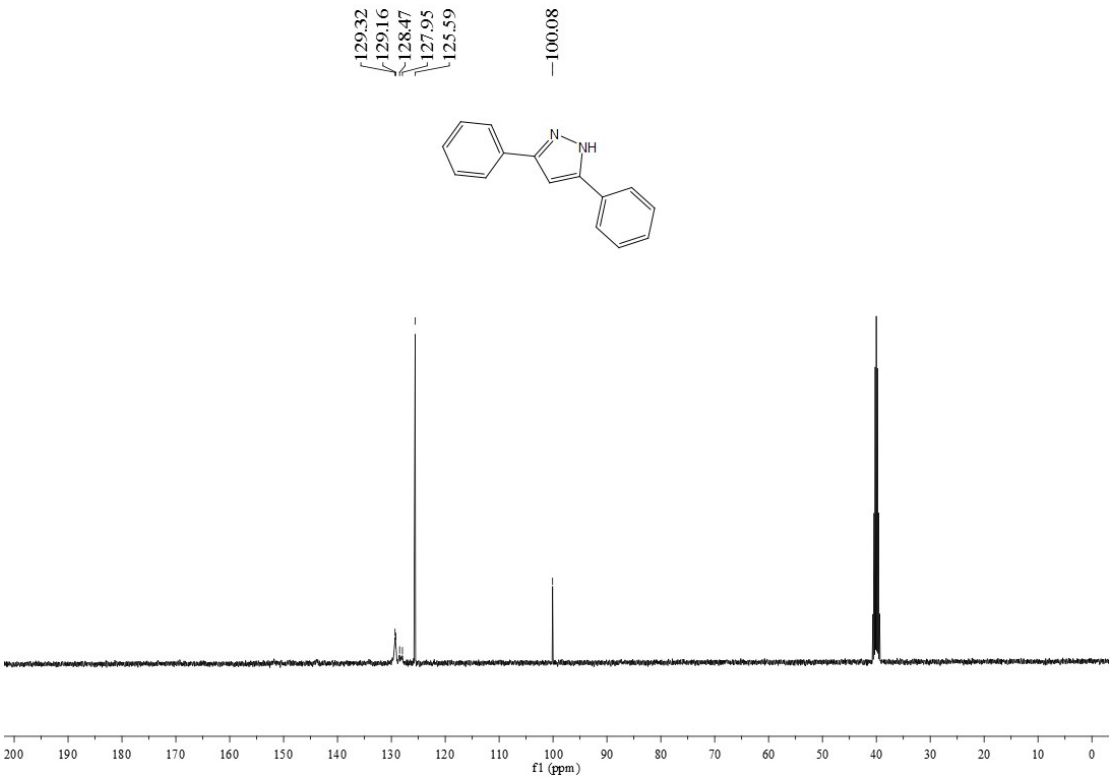


^{1}H NMR and ^{13}C NMR of 3,5-diphenylisoxazole (5)



^{1}H NMR and ^{13}C NMR of 3,5-diphenyl-1H-pyrazole (6a)





^{1}H NMR and ^{13}C NMR of 3,5-diphenylisoxazole (6b)