SUPPORTING INFORMATION

Metal-Free Decarboxylative C(sp^3)-C(sp^3) Bond Formation for the Synthesis of Unnatural Amino Acids and Peptides *via* Convergent Paired Electrolysis Enabled Radical-Radical Cross-Coupling

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1. General Information.

All reagents were obtained from commercial suppliers and used without further purification. Yields for all compounds were determined by the column chromatography which was generally performed on silica gel (200-300 mesh) using petroleum ether (PE)/EtOAc as eluent, and reactions were monitored by thin layer chromatography (TLC) on a glass pate coated with silica gel with fluorescent indicator (GF254) using UV light and iodine chromogenic method. The ^{1}H and ^{13}C nuclear magnetic resonance (NMR) spectra were recorded on a Bruker Advance 400 or 500 MHz NMR spectrometers using $CDCl_3$ as solvent with TMS as internal standard. Chemical shifts are given in ppm (δ) referenced to $CDCl_3$ with 7.27 for ^{1}H and 77.16 for ^{13}C, and to DMSO-d_6 with 2.50 for ^{1}H and 39.52 for ^{13}C. Signals are abbreviated as follows: s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet, and coupling constants are expressed in Hz. Melting points were measured on a SGW® X-4B apparatus and uncorrected. HRMS were recorded on Agilent 6210TOF LC/MS mass spectrometer. LC-MS analysis was conducted on an Agilent Infinity LC/MSD iQ (1260-G6160) instrument.

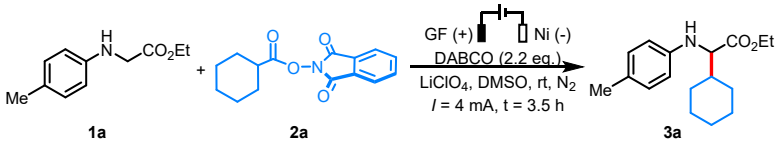
Electrolysis experiments were performed using DJS-292B or HSPY-600(30 V/100 mA) as DC power supply. Two-electrode undivided cell was used for the synthetic part, only the three-electrode system was used for the cyclic voltammetry (CV) experiments. Normal operational voltage range for this reaction is around 2–3V. Cyclic voltammograms were obtained on a CHI 600E potentiostat.

Glycine esters and redox-active esters were prepared according to the previous reports.[1, 2]

2. Condition Optimization.

Interelectrode distance: 3 mm

Table S1. Screening of the reaction conditions.[a]

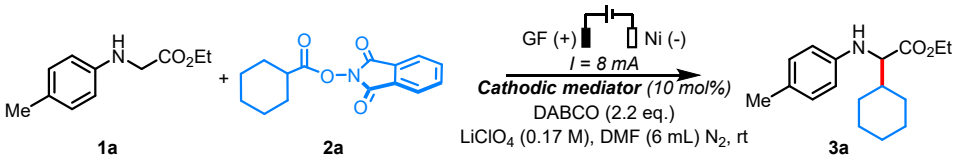


Entry	Variation from standard conditions	Yield[%][b]
1	None	86
2	Interelectrode distance: 6 mm	65
3	Interelectrode distance: 10 mm	39
4	1.2 eq **2a**	67
5	1.1 eq DABCO	53
6	I = 2 mA	20
7	I = 8 mA	51
8	Without current	NR
9	Without $LiClO_4$	55
10	$^{n}Bu_4NClO_4$ instead of $LiClO_4$	60
11	$^{n}Bu_4NBF_4$ instead of $LiClO_4$	64
12	DMF instead of DMSO	69
13	MeCN instead of DMSO	29
14	Interelectrode distance: 10 mm, Cp_2Fe (20 mol%), $NiCl_2·6H_2O$ (10 mol%), dtbbpy (11 mol%)	70

[a]Standard reaction conditions: **1a** (0.2 mmol), **2a** (1.5 equiv), DABCO (2.2 equiv), $LiClO_4$ (0.2 mmol), and DMSO (3.0 mL) in an undivided cell equiped with GF (graphite felt) anode (1 cm × 1 cm × 1 cm) and Ni foam cathode (1 cm × 1 cm) (interelectrode distance: 3 mm) at 23 °C under nitrogen atmosphere, I = 4 mA, E_{cell} = 2-3 V, t = 3.5 h, Q = 2.6 F·mol^{-1}. [b] Isolated yields. NR, no reaction.

Interelectrode distance: 10 mm.

Table S2. Cathodic mediator screening for the reaction of **1a** and **2a.**[a]

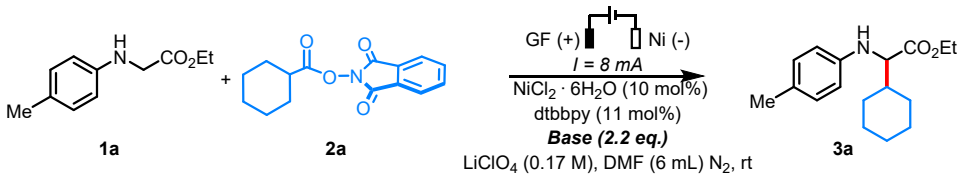


Entry	**Cathodic mediator**		Yield (%)[b]
	Lewis acids (10 mol%)	Ligand (11 mol%)	
1	-	-	14
2	$NiCl_2·6H_2O$	-	48
3	$NiCl_2·6H_2O$	bpy	50
4	$NiCl_2·6H_2O$	dmbpy	52
5	**$NiCl_2·6H_2O$**	**dtbbpy**	**55**
6	$Ni(acac)_2$	dtbbpy	42
7	$Ni(bpy)Cl_2$	dtbbpy	39
8	$NiBr_2$	dtbbpy	36
9	CuI	-	38
10	CuBr	-	41
11	CuCl	-	25
12	$Cu(OAc)_2$	-	40
13	$ZnCl_2$	-	24
14	$FeCl_3$	-	26

[a] 0.3 mmol scale. Q = 2.5 $F·mol^{-1}$. [b] Isolated yields.

Interelectrode distance: 10 mm.

Table S3. Bases screening for the reaction of **1a** and **2a.** [a]

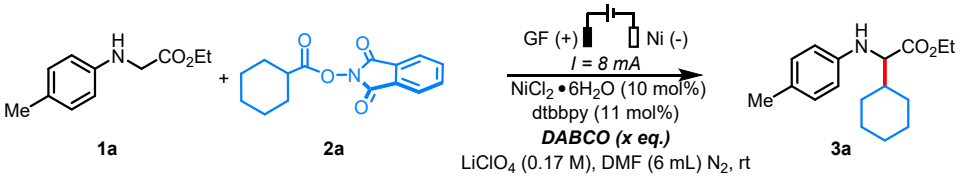


Entry	Bases	Yield (%)[b]
1	Na_2CO_3	26
2	K_2HPO_4	30
3	*t*BuOK	28
4	DIPEA	20
5	DMEDA	NR
6	DIPA	Trace
7	Pyridine	42
8	**DABCO**	**55**
9	Et_3N	45
10	DBU	34
11	2,6-lutidine	31

[a] 0.3 mmol scale. Q = 2.5 F·mol^{-1}. [b] Isolated yields.

Interelectrode distance: 10 mm.

Table S4. DABCO loading screening for the reaction of **1a** and **2a.** [a]

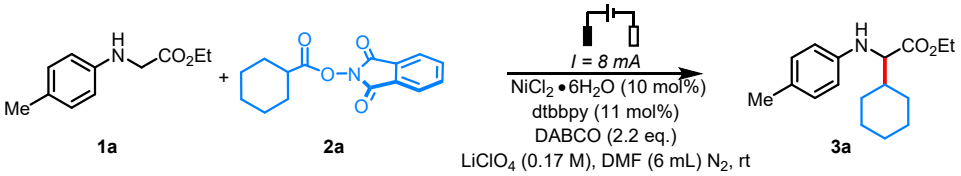


Entry	X (equivalent)	Yield (%)[b]
1	0	20
2	1.5	35
3	2	49
4	**2.2**	**55**
5	3	42

[a] 0.3 mmol scale. Q = 2.5 F·mol^{-1}. [b] Isolated yields.

Interelectrode distance: 10 mm.

Table S5. Electrodes screening for the reaction of **1a** and **2a.** [a]

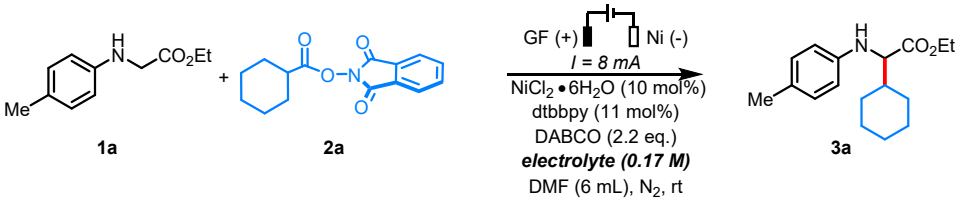


Entry	Electrodes	Yield (%)[b]
1	C / Pt	34
2	C / Ni foam	46
3	RVC / Ni foam	33
4	Pt / Ni foam	41
5	**C felt / Ni foam**	**55**
6	C / C	25
7	Ni foam / Ni foam	37

[a] 0.3 mmol scale. Q = 2.5 F·mol^{-1}. [b] Isolated yields.

Interelectrode distance: 10 mm.

Table S6. Electrolytes screening for the reaction of **1a** and **2a.** [a]



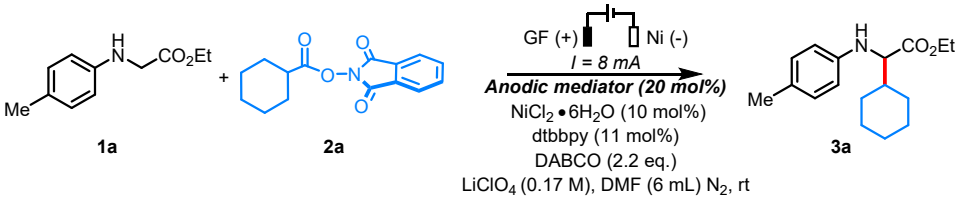
Entry	Electrolytes	Yield (%)[b]
1	$^{n}Bu_4NBF_4$	50
2	$^{n}Bu_4NI$	36
3	$^{n}Bu_4NBr$	34

4	**$LiClO_4$**	**55**
5	Et_4NClO_4	47
6	$^nBu_4NPF_6$	44
7	LiBr	40
8	NH_4I	27

[a] 0.3 mmol scale. Q = 2.5 F·mol^{-1}. [b] Isolated yields.

Interelectrode distance: 10 mm.

Table S7. Anodic mediator screening for the reaction of **1a** and **2a.** [a]

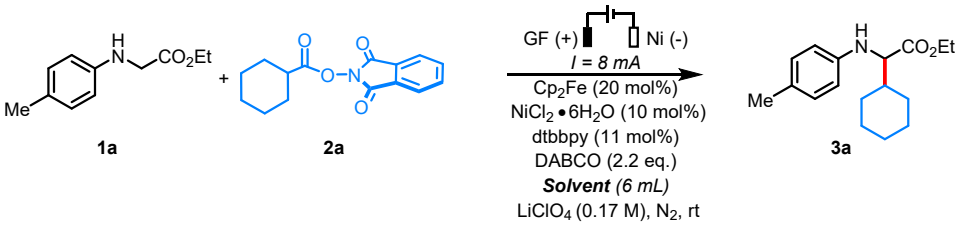


Entry	Anodic mediator	Yield (%)[b]
1	DDQ	NR
2	TBHP	34
3	$(4\text{-BrPh})_3N$	52
4	$(4\text{-MePh})_2N\text{-}N(4\text{-MePh})_2$	58
5	TEMPO	59
6	**Cp_2Fe**	**63**
7	NaBr	32

[a] 0.3 mmol scale. Q = 2.5 F·mol^{-1}. [b] Isolated yields.

Interelectrode distance: 10 mm.

Table S8. Solvents screening for the reaction of **1a** and **2a.** [a]



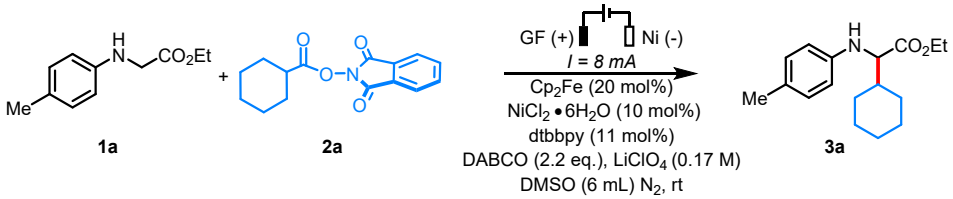
Entry	Solvents	Yield (%)[b]
1	MeCN	29
2	MeOH	Trace
3	EtOH	Trace
4	THF	NR
5	DMF	63
6	DMF:THF = 5:1	NR
7	**DMSO**	**65**
8	NMP	47
9	DMAc	60
10	DMSO: H_2O = 6:0.5	46
11	DMSO: HFIP = 6:0.5	45

12	DMSO: EA = 5:1	58
13	DMSO: MeCN = 5:1	62

[a] 0.3 mmol scale. Q = 2.5 F·mol^{-1}. [b] Isolated yields.

Interelectrode distance: 10 mm.

Table S9. Electricity screening for the reaction of **1a** and **2a.** [a]

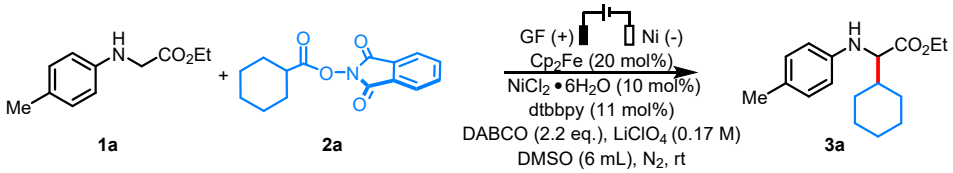


Entry	Electricity (F·mol^{-1})	Yield (%)[b]
1	2	54
2	2.5	65
3	3	58
4	**2.6**	**70**
5	2.7	66

[a] 0.3 mmol scale. [b] Isolated yields.

Interelectrode distance: 10 mm.

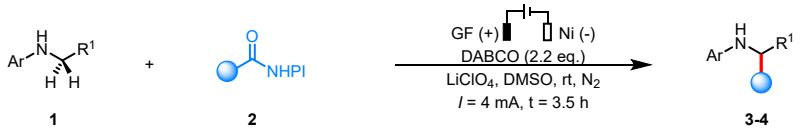
Table S10. Electric current screening for the reaction of **1a** and **2a.** [a]



Entry	I (mA)	Yield (%)[b]
1	4	60
2	6	66
3	**8**	**70**
4	10	63

[a] 0.3 mmol scale. [b] Isolated yields.

3. General Procedure of Metal-Free Decarboxylative C(sp^3)-C(sp^3) Bond Formation.



General procedure: A 10 mL Schlenk tube with a stir bar was charged with glycine derivatives (0.2 mmol), NHPI esters (0.3 mmol), DABCO (0.44 mmol), $LiClO_4$ (0.2

mmol) and DMSO (3 mL). The tube was sealed with rubber septum which equipped with a graphite felt anode (1 cm × 1 cm × 1 cm) and a nickel foam cathode (1 cm × 1 cm × 1.5 mm) (interelectrode distance: 3 mm) and stirred for 5-10 min at room temperature. It was then evacuated, and backfilled with nitrogen for three cycles. The reaction mixture was stirred and electrolyzed at a constant current of 4 mA under room temperature for 3.5 h (2.6 F·mol^{-1}). When the reaction was finished, the electrodes were taken out and rinsed with EtOAc and the mixture was washed with water and extracted with EtOAc (3 x 20 mL). The combined organic solution was dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The given residue was purified by column chromatography through silica gel to provide the desired product.

General procedure for gram scale synthesis: A 250-mL beaker-type cell was equipped with a graphite felt anode (3 cm × 3 cm × 1 cm), a nickel foam (3 cm × 3 cm × 1.5 mm) cathode (interelectrode distance: 3-5 mm) and a stirring bar. The flask was charged with glycine derivatives (**1a**, 9 mmol), NHPI esters (**2a**, 13.5 mmol), DABCO (2.2 equiv.), $LiClO_4$ (9 mmol). Seal the device tightly and introduce nitrogen into the flask (three times). Then, DMSO (135 mL) was added via a syringe under nitrogen atmosphere. The reaction mixture was stirred and electrolyzed at a constant current of 72 mA under room temperature for 8.7 h (2.6 F·mol^{-1}). When the reaction was finished, the mixture was washed with water and extracted with EtOAc (3 x 150 mL). The combined organic solution was dried over anhydrous Na_2SO_4 and concentrated under reduced pressure. The given residue was purified by column chromatography through silica gel to provide the desired product.

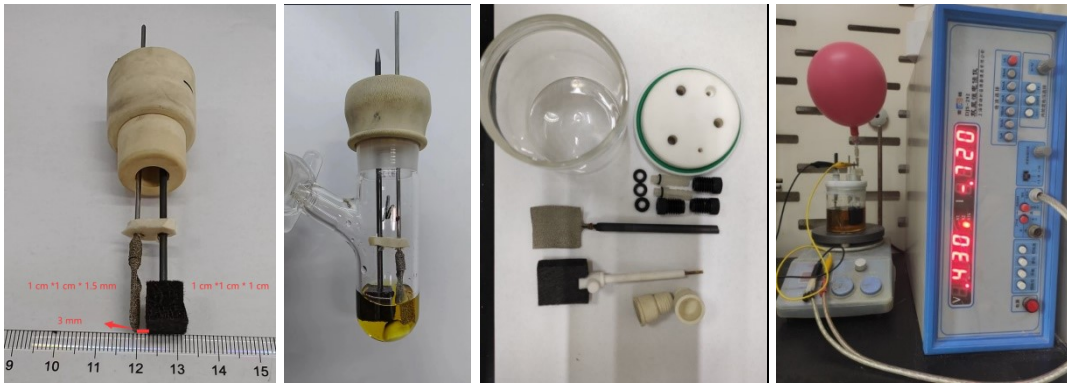
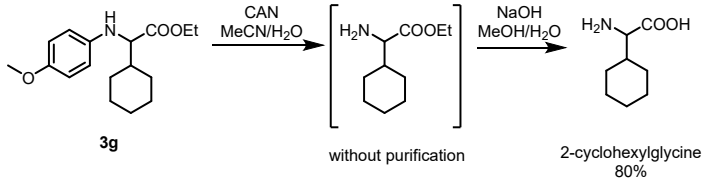


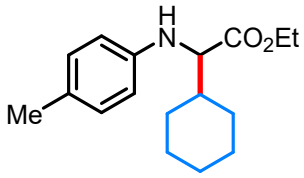
Figure S1. Reaction set-up.

4. Deprotection Procedure for the Synthesis of Unnatural Amino Acid.

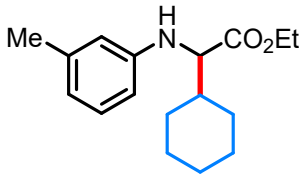


According to reported literature[3]. A mixture of **3g** (0.3 mmol, 87.4 mg) and CAN (cerium ammonium, 1.8 mmol, 986.8 mg) in 5:2 solution of H_2O/MeCN (3.0 mL) was stirred at 0 °C for 2 h. The mixture was modulated to alkalescence with saturated aqueous sodium carbonate. Then the mixture was extracted by DCM for three times, washed with brine, dried over Na_2SO_4 and concentrated in vacuo. The residue was dissolved in 2:1 solution of MeOH/H_2O (1 mL), followed by the addition of NaOH (0.33 mmol, 13.2 mg). The mixture was stirred under room temperature for 2h. After completion of the reaction monitored by TLC, the mixture was concentrated under reduced pressure. The mixture was modulated to pH 5-6 with 1 N HCl. The precipitate was filtered to afford the corresponding unnatural amino acid 2-cyclohexylglycine in 80 % yield, 38 mg. **LC-MS** m/z (ESI) calcd for $C_8H_{16}NO_2$ $[M+H]^+$: 158.1, found: 158.1.

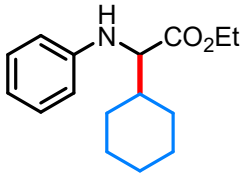
5. Characterization of Products.



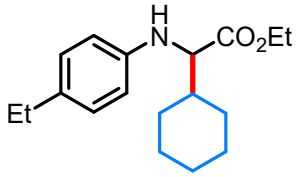
Ethyl 2-cyclohexyl-2-(*p*-tolylamino)acetate (3a): Yield: 86%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.00 (d, *J* = 8.2 Hz, 2H), 6.61 – 6.56 (m, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 3.85 (d, *J* = 6.1 Hz, 1H), 2.25 (s, 3H), 1.93 – 1.85 (m, 1H), 1.85 – 1.75 (m, 3H), 1.75 – 1.67 (m, 2H), 1.27 (t, *J* = 7.1 Hz, 6H), 1.21 – 1.15 (m, 2H); **^{13}C NMR** (101 MHz, $CDCl_3$) δ 174.0, 145.2, 129.8, 127.4, 113.8, 62.5, 60.8, 41.3, 29.7, 29.2, 26.2, 20.4, 14.3; The spectra data matched with values reported in the literature.[3]



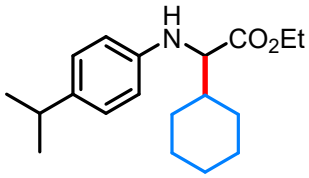
Ethyl 2-cyclohexyl-2-(*m*-tolylamino)acetate (3b): Yield: 81%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.07 (t, *J* = 7.7 Hz, 1H), 6.59 – 6.55 (m, 1H), 6.50 – 6.44 (m, 2H), 4.20 (dd, *J* = 7.1, 2.0 Hz, 2H), 3.89 (d, *J* = 6.2 Hz, 1H), 2.29 (s, 3H), 1.88 (dpd, *J* = 10.2, 3.3, 2.0, 1.4 Hz, 1H), 1.83 – 1.76 (m, 3H), 1.71 (dddd, *J* = 12.8, 9.5, 5.5, 2.5 Hz, 2H), 1.32 – 1.25 (m, 6H), 1.20 (dddd, *J* = 12.7, 9.5, 3.1, 1.8 Hz, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.7, 147.5, 139.0, 129.1, 119.0, 114.4, 110.6, 62.0, 60.7, 41.3, 29.6, 29.2, 26.2, 26.10, 26.06, 21.6, 14.3; **HRMS** m/z (ESI) calcd for $C_{17}H_{26}NO_2$ $[M+H]^+$: 276.1958, found: 276.1953.



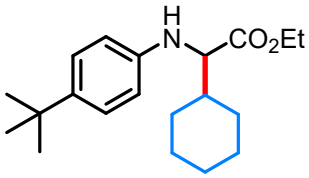
Ethyl 2-cyclohexyl-2-(phenylamino)acetate (3c): Yield: 89%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.21 – 7.15 (m, 2H), 6.74 (tt, *J* = 7.4, 1.1 Hz, 1H), 6.68 – 6.62 (m, 2H), 4.19 (q, *J* = 7.1 Hz, 3H), 3.89 (d, *J* = 6.1 Hz, 1H), 1.92 – 1.85 (m, 1H), 1.83 – 1.75 (m, 3H), 1.71 (dddd, *J* = 14.4, 11.3, 4.5, 2.5 Hz, 2H), 1.30 – 1.21 (m, 6H), 1.21 – 1.16 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.6, 147.5, 129.2, 118.1, 113.5, 62.0, 60.8, 41.3, 29.6, 29.2, 26.2, 26.10, 26.06, 14.3; The spectra data matched with values reported in the literature.[3]



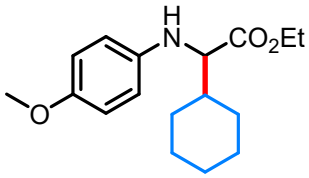
Ethyl 2-cyclohexyl-2-((4-ethylphenyl)amino)acetate (3d): Yield: 88%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.08 – 6.99 (m, 2H), 6.66 – 6.58 (m, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.87 (d, *J* = 6.1 Hz, 1H), 2.56 (q, *J* = 7.6 Hz, 2H), 1.96 – 1.86 (m, 1H), 1.85 – 1.75 (m, 3H), 1.72 (dt, *J* = 3.5, 1.7 Hz, 2H), 1.34 – 1.25 (m, 6H), 1.24 – 1.16 (m, 5H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.8, 145.3, 133.9, 128.5, 113.7, 62.4, 60.7, 41.3, 29.6, 29.2, 27.9, 26.2, 26.1, 26.0, 15.8, 14.3; **HRMS** m/z (ESI) calcd for $C_{18}H_{28}NO_2$ $[M+H]^+$: 290.2115, found: 290.2113.



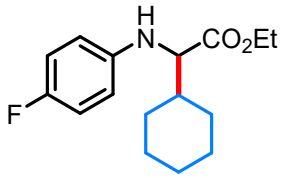
Ethyl 2-cyclohexyl-2-((4-isopropylphenyl)amino)acetate (3e): Yield: 87%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.10 – 7.02 (m, 2H), 6.66 – 6.57 (m, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.86 (d, *J* = 6.1 Hz, 1H), 2.83 (hept, *J* = 6.9 Hz, 1H), 1.88 (d, *J* = 12.1 Hz, 1H), 1.80 (dq, *J* = 11.8, 3.1 Hz, 3H), 1.71 (dd, *J* = 14.3, 10.3 Hz, 2H), 1.28 (t, *J* = 7.1 Hz, 5H), 1.23 (dd, *J* = 7.0, 0.7 Hz, 7H), 1.21 – 1.14 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.8, 145.4, 138.6, 127.1, 113.6, 62.4, 60.7, 41.4, 33.1, 29.6, 29.2, 26.2, 26.10, 26.06, 24.17, 24.16, 14.3; **HRMS** m/z (ESI) calcd for $C_{19}H_{30}NO_2$ $[M+H]^+$: 304.2271, found: 304.2266.



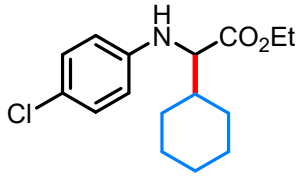
Ethyl 2-((4-(*tert*-butyl)phenyl)amino)-2-cyclohexylacetate (3f): Yield: 84%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.26 – 7.18 (m, 2H), 6.65 – 6.59 (m, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.87 (d, *J* = 6.1 Hz, 1H), 1.95 – 1.85 (m, 1H), 1.84 – 1.76 (m, 3H), 1.75 – 1.66 (m, 2H), 1.30 (s, 9H), 1.30 – 1.17 (m, 8H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.8, 145.0, 126.0, 113.2, 62.3, 60.7, 41.3, 33.8, 31.5, 29.6, 29.1, 26.2, 26.1, 26.0, 14.3; The spectra data matched with values reported in the literature.[4]



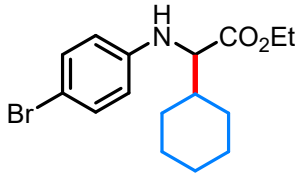
Ethyl 2-cyclohexyl-2-((4-methoxyphenyl)amino)acetate (3g): Yield: 80%, R_f = 0.3 (PE: EA = 30:1). Light yellow oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 6.81 – 6.74 (m, 2H), 6.67 – 6.60 (m, 2H), 4.16 (qd, *J* = 7.1, 1.2 Hz, 2H), 3.77 (d, *J* = 6.2 Hz, 1H), 3.75 (s, 3H), 1.88 (ddt, *J* = 11.3, 3.7, 1.9 Hz, 1H), 1.83 – 1.72 (m, 3H), 1.72 – 1.65 (m, 2H), 1.31 – 1.22 (m, 6H), 1.21 – 1.11 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.9, 152.7, 141.5, 115.3, 114.8, 63.5, 60.7, 55.7, 41.3, 29.7, 29.2, 26.2, 26.10, 26.07, 14.3; The spectra data matched with values reported in the literature.[3]



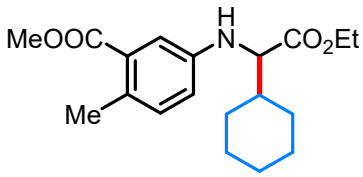
Ethyl 2-cyclohexyl-2-((4-fluorophenyl)amino)acetate (3h): Yield: 83%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 6.91 – 6.84 (m, 2H), 6.61 – 6.55 (m, 2H), 4.17 (qd, *J* = 7.1, 1.3 Hz, 2H), 3.78 (d, *J* = 6.2 Hz, 1H), 1.87 (dt, *J* = 12.6, 1.8 Hz, 1H), 1.83 – 1.73 (m, 3H), 1.73 – 1.66 (m, 2H), 1.25 (q, *J* = 7.1, 6.4 Hz, 6H), 1.21 – 1.14 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.6, 156.2 (d, $J_{C\text{-}F}$ = 234.5 Hz), 143.8, 115.7 (d, $J_{C\text{-}F}$ = 22.8 Hz), 114.7 (d, $J_{C\text{-}F}$ = 7.5 Hz), 63.1, 60.8, 41.3, 29.7, 29.2, 26.2, 26.09, 26.06, 14.3; The spectra data matched with values reported in the literature.[3]



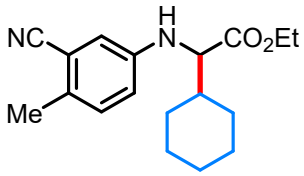
Ethyl 2-((4-chlorophenyl)amino)-2-cyclohexylacetate (3i): Yield: 82%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.15 – 7.08 (m, 2H), 6.58 – 6.53 (m, 2H), 4.18 (q, *J* = 7.1 Hz, 2H), 3.82 (d, *J* = 6.1 Hz, 1H), 1.85 (ddt, *J* = 12.6, 3.4, 1.8 Hz, 1H), 1.82 – 1.74 (m, 3H), 1.72 – 1.66 (m, 2H), 1.31 – 1.23 (m, 6H), 1.20 – 1.15 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.4, 146.1, 129.1, 122.7, 114.7, 62.2, 60.9, 41.2, 29.6, 29.2, 26.2, 26.1, 26.0, 14.3; The spectra data matched with values reported in the literature.[4]



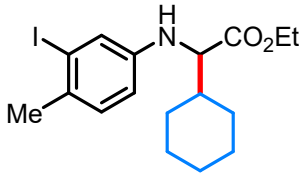
Ethyl 2-((4-bromophenyl)amino)-2-cyclohexylacetate (3j): Yield: 80%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.27 – 7.22 (m, 2H), 6.54 – 6.49 (m, 2H), 4.18 (q, *J* = 7.1 Hz, 2H), 3.81 (d, *J* = 6.1 Hz, 1H), 1.89 – 1.82 (m, 1H), 1.81 – 1.73 (m, 3H), 1.69 (ddd, *J* = 14.4, 3.6, 1.8 Hz, 2H), 1.26 (t, *J* = 7.1 Hz, 6H), 1.19 – 1.13 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.3, 146.4, 132.0, 115.1, 109.8, 62.1, 60.9, 41.2, 29.6, 29.2, 26.14, 26.05, 26.0, 14.3; **HRMS** m/z (ESI) calcd for $C_{16}H_{22}BrNNaO_2$ $[M+Na]^+$: 362.0726, found: 362.0716.



Methyl 5-((1-cyclohexyl-2-ethoxy-2-oxoethyl)amino)-2-methylbenzoate (3k): Yield: 66%, R_f = 0.3 (PE: EA = 10:1). Colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.20 (d, *J* = 2.7 Hz, 1H), 7.02 (d, *J* = 8.3 Hz, 1H), 6.69 (dd, *J* = 8.3, 2.7 Hz, 1H), 4.17 (ddq, *J* = 10.8, 7.1, 3.6 Hz, 2H), 4.11 (d, *J* = 4.9 Hz, 1H), 3.86 (s, 3H), 2.45 (s, 3H), 1.87 – 1.81 (m, 1H), 1.79 – 1.65 (m, 5H), 1.25 (t, *J* = 7.1 Hz, 5H), 1.17 (ddt, *J* = 21.9, 12.2, 2.4 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 173.6, 168.2, 145.3, 132.5, 129.9, 129.5, 117.4, 115.4, 62.2, 60.9, 51.8, 41.3, 29.6, 29.1, 26.2, 26.1, 26.1, 20.8, 14.3. **LC-MS** m/z (ESI) calcd for $C_{19}H_{28}NO_4$ $[M+H]^+$: 334.2, found: 334.2.

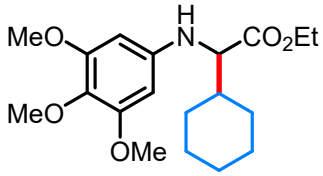


Ethyl 2-((3-cyano-4-methylphenyl)amino)-2-cyclohexylacetate (3l): Yield: 60%, R_f = 0.3 (PE: EA = 20:1). Colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.07 (d, *J* = 8.4 Hz, 1H), 6.78 (d, *J* = 2.6 Hz, 1H), 6.74 (dd, *J* = 8.3, 2.7 Hz, 1H), 4.23 (d, *J* = 10.0 Hz, 1H), 4.21 – 4.15 (m, 2H), 3.80 (dd, *J* = 9.4, 5.9 Hz, 1H), 2.39 (s, 3H), 1.85 – 1.75 (m, 4H), 1.67 (s, 2H), 1.28 – 1.23 (m, 6H), 1.20 – 1.13 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 173.2, 145.6, 131.1, 131.0, 118.6, 118.6, 115.8, 113.0, 61.9, 61.1, 41.2, 29.6, 29.1, 26.1, 26.0, 26.0, 19.3, 14.3. **LC-MS** m/z (ESI) calcd for $C_{18}H_{25}N_2O_2$ $[M+H]^+$: 301.2, found: 301.2.

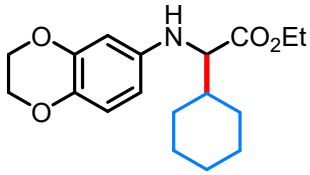


Ethyl 2-cyclohexyl-2-((3-iodo-4-methylphenyl)amino)acetate (3m): Yield: 78%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.13 (d, *J* = 2.5 Hz, 1H), 7.00 (dd, *J* = 8.2, 0.7 Hz, 1H), 6.54 (dd, *J* = 8.2, 2.5 Hz, 1H), 4.19 (p, *J* = 7.2 Hz, 2H), 3.79 (d, *J* = 6.2 Hz, 1H), 2.31 (s, 3H), 1.87 – 1.82 (m, 1H), 1.82 – 1.74 (m, 3H), 1.72 – 1.65 (m, 2H), 1.28 (t, *J* = 7.1 Hz, 6H), 1.19 – 1.12 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.4, 146.3, 130.5, 129.7, 123.7, 113.8, 101.6, 62.1, 60.9, 41.2, 29.6, 29.1, 26.7, 26.2, 26.05, 26.02, 14.3; **HRMS** m/z (ESI) calcd for $C_{17}H_{25}INO_2$ $[M+H]^+$:

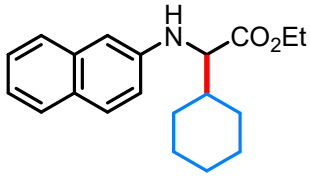
402.0924, found: 402.0921.



Ethyl 2-cyclohexyl-2-((3,4,5-trimethoxyphenyl)amino)acetate (3n): Yield: 68%, R_f = 0.3 (PE: EA = 6:1). White solid. M.p. = 123 - 124 °C. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 5.91 (s, 2H), 4.19 (qd, *J* = 7.1, 0.8 Hz, 2H), 3.82 (s, 6H), 3.80 (d, *J* = 6.4 Hz, 1H), 3.76 (s, 3H), 1.92 – 1.86 (m, 1H), 1.82 – 1.75 (m, 3H), 1.72 – 1.66 (m, 2H), 1.27 (t, *J* = 7.1 Hz, 6H), 1.22 – 1.16 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.7, 153.9, 143.8, 130.8, 100.0, 91.5, 62.8, 61.0, 60.9, 55.9, 41.3, 29.7, 29.3, 26.2, 26.1, 26.0, 14.4; **HRMS** m/z (ESI) calcd for $C_{19}H_{30}NO_5$ $[M+H]^+$: 352.2118, found: 352.2112.

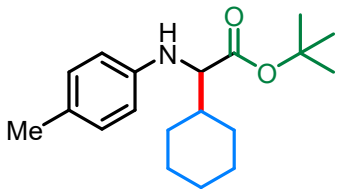


Ethyl 2-cyclohexyl-2-((2,3-dihydrobenzo[b][1,4]dioxin-6-yl)amino)acetate (3o): yield: R_f = 0.2 (PE: EA = 10:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.73 – 6.63 (m, 1H), 6.21 – 6.11 (m, 2H), 4.25 – 4.10 (m, 6H), 3.88 (s, 1H), 3.73 (d, *J* = 6.0 Hz, 1H), 1.86 – 1.64 (m, 6H), 1.29 – 1.08 (m, 8H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 174.0, 144.0, 142.4, 136.1, 117.7, 107.5, 102.5, 64.7, 64.2, 62.9, 60.8, 41.3, 29.6, 29.2, 26.2, 26.1, 26.1, 14.4. **LC-MS**: m/z (ESI) calcd for $C_{18}H_{26}N_2O_4$ $[M+H]^+$: 320.2, found: 320.2.

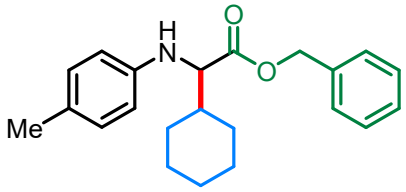


Ethyl 2-cyclohexyl-2-(naphthalen-2-ylamino)acetate (3p): Yield: 80%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.72 – 7.60 (m, 3H), 7.38 (ddd, *J* = 8.2, 6.8, 1.3 Hz, 1H), 7.29 – 7.20 (m, 1H), 6.96 (dd, *J* = 8.8, 2.4 Hz, 1H), 6.85 (d, *J* = 2.4 Hz, 1H), 4.50 – 4.29 (m, 1H), 4.22 (qd, *J* = 7.1, 5.0 Hz, 2H), 4.05 (d, *J* = 6.2 Hz, 1H), 1.99 – 1.91 (m, 1H), 1.90 – 1.80 (m, 3H), 1.81 – 1.69 (m, 2H), 1.29 (t, *J* = 7.1 Hz, 6H), 1.27 – 1.21 (m, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.6, 145.0, 135.0, 129.0, 127.9, 127.6, 126.3, 126.0, 122.3, 118.3, 105.6, 62.1, 60.9, 41.3, 29.6, 29.3, 26.2, 26.12, 26.07, 14.3; **HRMS** m/z (ESI) calcd for $C_{20}H_{26}NO_2$ $[M+H]^+$: 312.1958, found:

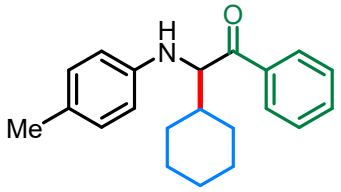
312.1949.



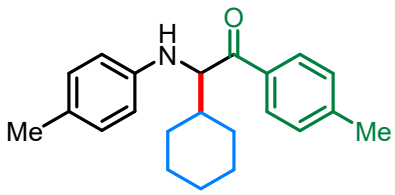
***Tert*-butyl 2-cyclohexyl-2-(*p*-tolylamino)acetate (3q):** Yield: 83%, R_f = 0.3 (PE: EA = 30:1). Light yellow solid. M.p. = 61 - 62 °C. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 6.98 (d, *J* = 8.2 Hz, 2H), 6.59 (d, *J* = 8.3 Hz, 2H), 3.73 (d, *J* = 5.7 Hz, 1H), 2.24 (s, 3H), 1.87 – 1.82 (m, 1H), 1.77 (dddd, *J* = 16.4, 13.6, 7.4, 4.2 Hz, 4H), 1.71 – 1.65 (m, 1H), 1.44 (s, 9H), 1.30 – 1.17 (m, 5H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 172.9, 145.3, 129.7, 127.2, 113.9, 81.4, 63.0, 41.4, 29.6, 29.2, 28.1, 26.3, 26.22, 26.16, 20.4; The spectra data matched with values reported in the literature.[4]



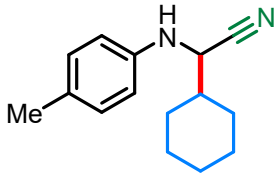
Benzyl 2-cyclohexyl-2-(*p*-tolylamino)acetate (3r): Yield: 80%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.38 – 7.35 (m, 2H), 7.34 – 7.26 (m, 2H), 7.00 (d, *J* = 8.1 Hz, 2H), 6.68 – 6.53 (m, 2H), 5.17 (d, *J* = 2.6 Hz, 2H), 4.13 – 3.98 (m, 1H), 3.94 (d, *J* = 6.2 Hz, 1H), 2.27 (s, 3H), 1.93 – 1.84 (m, 1H), 1.83 – 1.72 (m, 3H), 1.70 (dt, *J* = 14.3, 3.2 Hz, 2H), 1.33 – 1.14 (m, 6H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.7, 145.1, 135.6, 129.7, 128.5, 128.25, 128.21, 127.4, 113.8, 66.5, 62.6, 41.3, 29.6, 29.2, 26.2, 26.04, 26.01, 20.4; The spectra data matched with values reported in the literature.[4]



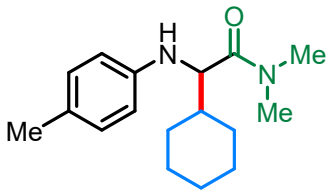
2-cyclohexyl-1-phenyl-2-(*p*-tolylamino)ethenone (3s): Yield: 76%, R_f = 0.3 (PE: EA = 30:1). Yellow solid. M.p. = 77 - 78 °C. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 8.05 – 7.93 (m, 2H), 7.69 – 7.55 (m, 1H), 7.53 – 7.48 (m, 2H), 7.03 – 6.92 (m, 2H), 6.71 – 6.59 (m, 2H), 4.86 (d, *J* = 4.5 Hz, 1H), 2.22 (s, 3H), 1.85 (dd, *J* = 7.6, 3.9 Hz, 1H), 1.81 – 1.70 (m, 3H), 1.65 – 1.61 (m, 2H), 1.42 – 1.29 (m, 2H), 1.14 (m, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 201.5, 146.0, 136.3, 133.4, 129.8, 128.8, 128.3, 127.2, 114.2, 63.6, 42.0, 30.9, 27.8, 26.4, 26.2, 26.1, 20.3; The spectra data matched with values reported in the literature.[4]



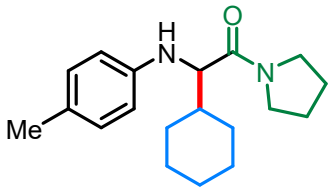
2-cyclohexyl-1-(*p*-tolyl)-2-(p-tolylamino)ethanone (3t): Yield: 80%, R_f = 0.3 (PE: EA = 30:1). Yellow oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.95 – 7.84 (m, 2H), 7.36 – 7.28 (m, 2H), 7.06 – 6.92 (m, 2H), 6.73 – 6.57 (m, 2H), 4.85 (d, *J* = 4.5 Hz, 1H), 2.44 (s, 3H), 2.23 (s, 3H), 1.86 (tdd, *J* = 8.2, 5.8, 2.4 Hz, 1H), 1.81 – 1.69 (m, 3H), 1.64 (tdd, *J* = 10.7, 5.6, 2.8 Hz, 2H), 1.37 (qd, *J* = 13.5, 13.1, 3.9 Hz, 2H), 1.14 (ddt, *J* = 9.7, 7.8, 3.3 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 201.0, 146.0, 144.3, 133.7, 129.7, 129.5, 128.4, 127.1, 114.2, 63.4, 42.1, 30.8, 27.9, 26.4, 26.2, 26.1, 21.7, 20.3; **HRMS** m/z (ESI) calcd for $C_{22}H_{28}NO$ $[M+H]^+$: 322.2165, found: 322.2157.



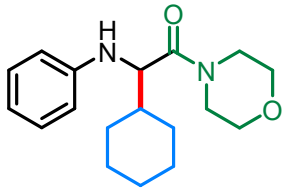
2-cyclohexyl-2-(*p*-tolylamino)acetonitrile (3u): Yield: 75%, R_f = 0.3 (PE: EA = 20:1). White solid. M. p. = 90 - 91 °C. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.11 – 7.03 (m, 2H), 6.69 – 6.61 (m, 2H), 4.04 (d, *J* = 6.4 Hz, 1H), 2.28 (s, 3H), 2.06 – 1.93 (m, 2H), 1.91 – 1.79 (m, 3H), 1.75 (ddt, *J* = 12.8, 3.6, 1.8 Hz, 1H), 1.35 – 1.21 (m, 5H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 142.9, 130.0, 129.3, 119.0, 114.4, 52.3, 40.8, 29.7, 28.9, 26.0, 25.7, 25.6, 20.5; **HRMS** m/z (ESI) calcd for $C_{15}H_{21}N_2$ $[M+H]^+$: 229.1699, found: 229.1701.



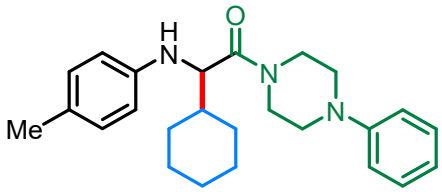
2-cyclohexyl-*N*,*N*-dimethyl-2-(*p*-tolylamino)acetamide (3v): yield: 72%, R_f = 0.2 (PE: EA = 4:1). White solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.95 (d, *J* = 8.3 Hz, 2H), 6.61 – 6.51 (m, 2H), 4.52 (s, 1H), 4.10 (d, *J* = 6.0 Hz, 1H), 3.09 (s, 3H), 2.95 (s, 3H), 2.21 (s, 3H), 1.89 (d, *J* = 12.2 Hz, 1H), 1.80 – 1.72 (m, 2H), 1.67 (q, *J* = 10.6, 8.7 Hz, 3H), 1.28 – 1.09 (m, 5H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 173.5, 146.0, 129.8, 127.2, 114.2, 59.1, 42.0, 37.4, 35.7, 30.2, 28.8, 26.3, 26.3, 26.2, 20.4. **LC-MS**: m/z (ESI) calcd for $C_{17}H_{27}N_2O$ $[M+H]^+$: 275.2, found: 275.2.



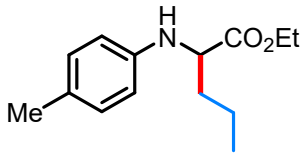
2-cyclohexyl-1-(pyrrolidin-1-yl)-2-(*p*-tolylamino)ethan-1-one (3w): yield: 62%, R_f = 0.2 (PE: EA = 4:1). White solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.94 (d, *J* = 8.2 Hz, 2H), 6.66 – 6.47 (m, 2H), 4.46 (s, 1H), 3.91 (d, *J* = 6.5 Hz, 1H), 3.54 (t, *J* = 6.7 Hz, 2H), 3.50 – 3.38 (m, 2H), 2.21 (s, 3H), 1.94 (ddd, *J* = 12.8, 8.6, 5.5 Hz, 3H), 1.85 (qd, *J* = 6.7, 2.7 Hz, 2H), 1.28 – 1.09 (m, 10H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 172.0, 146.0, 129.8, 126.9, 114.0, 61.2, 46.7, 45.8, 42.0, 30.2, 29.7, 29.0, 26.3, 26.2, 26.1, 24.1, 20.4. **LC-MS**: m/z (ESI) calcd for $C_{19}H_{29}N_2O$ $[M+H]^+$: 301.2, found: 301.2.



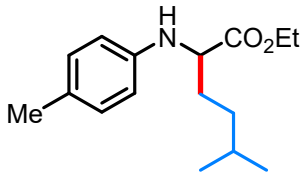
2-cyclohexyl-1-morpholino-2-(phenylamino)ethan-1-one (3x): yield: 70%, R_f = 0.2 (PE: EA = 3:1). White solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.15 (dd, *J* = 8.5, 7.3 Hz, 2H), 6.70 (t, *J* = 7.3 Hz, 1H), 6.62 (d, *J* = 8.0 Hz, 2H), 4.11 (d, *J* = 6.1 Hz, 1H), 3.73 – 3.54 (m, 8H), 1.93 – 1.85 (m, 1H), 1.80 – 1.73 (m, 2H), 1.72 – 1.62 (m, 3H), 1.25 (d, *J* = 6.1 Hz, 3H), 1.17 – 1.07 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 172.0, 148.1, 129.3, 118.1, 113.9, 67.0, 66.7, 58.3, 46.3, 42.5, 42.0, 30.3, 28.8, 26.3, 26.2, 26.1. **HRMS**: m/z (ESI) calcd. for $C_{18}H_{27}N_2O_2$ $[M+H]^+$: 303.2067, found: 303.2066



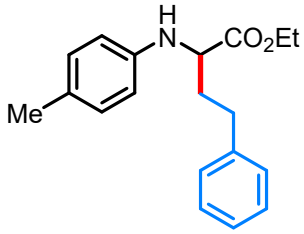
2-cyclohexyl-1-(4-phenylpiperazin-1-yl)-2-(p-tolylamino)ethan-1-one (3y): yield: 71%, R_f = 0.2 (PE: EA = 2:1). White solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.31 – 7.25 (m, 2H), 6.98 – 6.88 (m, 5H), 6.59 – 6.54 (m, 2H), 4.37 (s, 1H), 4.12 (d, *J* = 6.0 Hz, 1H), 3.75 (dt, *J* = 22.8, 5.1 Hz, 4H), 3.22 – 3.03 (m, 4H), 2.21 (s, 3H), 1.94 – 1.86 (m, 1H), 1.74 (t, *J* = 4.9 Hz, 2H), 1.71 – 1.60 (m, 3H), 1.26 – 1.22 (m, 3H), 1.18 – 1.11 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 172.0, 150.8, 145.9, 129.8, 129.3, 127.4, 120.7, 116.7, 114.3, 59.0, 49.9, 49.6, 45.7, 42.0, 30.4, 28.8, 26.3, 26.2, 26.2, 20.4. **LC-MS**: m/z (ESI) calcd. for $C_{25}H_{34}N_3O$ $[M+H]^+$: 392.3, found: 392.2.



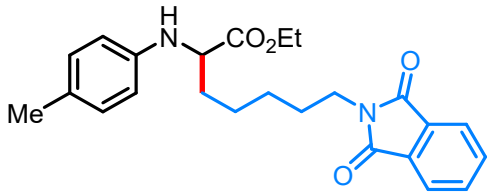
Ethyl 2-(*p*-tolylamino)pentanoate (4a): Yield: 75%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.10 – 6.87 (m, 2H), 6.69 – 6.47 (m, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 4.04 (dd, *J* = 7.0, 6.2 Hz, 1H), 2.25 (s, 3H), 1.90 – 1.69 (m, 2H), 1.55 – 1.43 (m, 2H), 1.26 (t, *J* = 7.1 Hz, 3H), 0.97 (t, *J* = 7.4 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 174.3, 144.5, 129.8, 127.6, 113.8, 60.9, 57.0, 35.2, 20.4, 18.9, 14.2, 13.8; **HRMS** m/z (ESI) calcd for $C_{14}H_{22}NO_2$ $[M+H]^+$: 236.1645, found: 236.1638.



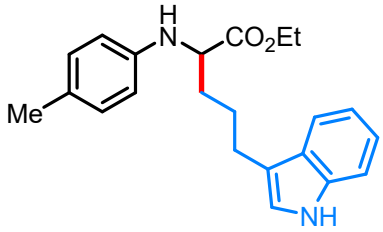
Ethyl 5-methyl-2-(*p*-tolylamino)hexanoate (4b): Yield: 76%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.04 – 6.96 (m, 2H), 6.63 – 6.52 (m, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 4.01 (t, *J* = 6.5 Hz, 1H), 2.25 (s, 3H), 1.91 – 1.71 (m, 2H), 1.58 (dq, *J* = 13.3, 6.7 Hz, 1H), 1.36 – 1.30 (m, 2H), 1.26 (t, *J* = 7.1 Hz, 3H), 0.92 (dd, *J* = 6.6, 3.8 Hz, 6H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 174.4, 144.7, 129.8, 127.5, 113.7, 60.9, 57.3, 34.6, 31.0, 27.9, 22.5, 22.4, 20.4, 14.3; **HRMS** m/z (ESI) calcd for $C_{16}H_{26}NO_2$ $[M+H]^+$: 264.1958, found: 264.1954.



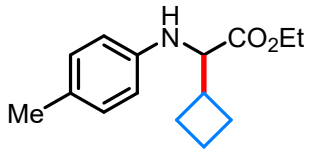
Ethyl 4-phenyl-2-(*p*-tolylamino)butanoate (4c): Yield: 73%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.32 (t, *J* = 7.5 Hz, 2H), 7.29 – 7.13 (m, 3H), 7.01 (d, *J* = 8.1 Hz, 2H), 6.56 (d, *J* = 8.4 Hz, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 4.07 (dd, *J* = 7.2, 5.7 Hz, 1H), 2.81 (t, *J* = 7.9 Hz, 2H), 2.27 (s, 3H), 2.23 – 2.13 (m, 1H), 2.13 – 2.01 (m, 1H), 1.28 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 174.1, 144.6, 141.0, 129.8, 128.51, 128.46, 127.6, 126.1, 113.8, 61.0, 56.5, 34.7, 31.8, 20.4, 14.3; The spectra data matched with values reported in the literature.[5]



Ethyl 7-(1,3-dioxoisoindolin-2-yl)-2-(*p*-tolylamino)heptanoate (4d): Yield: 76%, R_f = 0.3 (PE: EA = 6:1). Yellow oil. **^{1}H NMR** (500 MHz,$CDCl_3$) δ 7.84 (dd, *J* = 5.4, 3.1 Hz, 2H), 7.71 (dd, *J* = 5.5, 3.0 Hz, 2H), 7.05 – 6.88 (m, 2H), 6.59 – 6.49 (m, 2H), 4.17 (q, *J* = 7.1 Hz, 2H), 4.00 (dd, *J* = 6.9, 6.0 Hz, 1H), 3.71 – 3.66 (m, 2H), 2.22 (s, 3H), 1.84 – 1.66 (m, 4H), 1.48 (tdd, *J* = 13.0, 6.8, 3.2 Hz, 2H), 1.44 – 1.34 (m, 2H), 1.24 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 174.2, 168.39, 168.36, 144.5, 133.82, 133.76, 132.2, 132.1, 129.7, 127.5, 123.12, 123.08, 113.7, 60.9, 57.0, 37.8, 32.9, 28.3, 26.5, 25.1, 20.3, 14.2; **HRMS** m/z (ESI) calcd for $C_{24}H_{29}N_2O_4$ $[M+H]^+$: 409.2121, found: 409.2113.

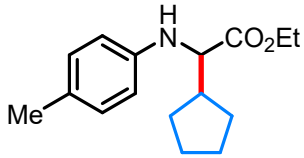


Ethyl 5-(1*H*-indol-3-yl)-2-(*p*-tolylamino)pentanoate (4e): Yield: 72%, R_f = 0.3 (PE: EA = 6:1). Yellow oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.65 (d, *J* = 7.8 Hz, 1H), 7.36 (d, *J* = 8.1 Hz, 1H), 7.25 (tt, *J* = 8.1, 1.3 Hz, 1H), 7.21 – 7.13 (m, 1H), 7.07 – 7.01 (m, 2H), 6.96 (d, *J* = 2.2 Hz, 1H), 6.65 – 6.55 (m, 2H), 4.27 – 4.16 (m, 2H), 4.16 – 4.10 (m, 1H), 2.87 (td, *J* = 6.9, 3.0 Hz, 2H), 2.30 (s, 3H), 2.00 – 1.83 (m, 4H), 1.26 (td, *J* = 7.1, 1.3 Hz, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 174.6, 144.7, 136.4, 129.9, 127.7, 127.5, 121.9, 121.5, 119.2, 118.9, 115.9, 113.9, 111.2, 61.1, 57.2, 32.9, 26.1, 24.9, 20.5, 14.3; **HRMS** m/z (ESI) calcd for $C_{22}H_{27}N_2O_2$ $[M+H]^+$: 351.2067, found: 351.2062.

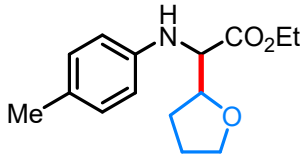


Ethyl 2-cyclobutyl-2-(*p*-tolylamino)acetate (4f): Yield: 80%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.04 – 6.97 (m, 2H), 6.62 – 6.52 (m, 2H), 4.17 (qq, *J* = 6.9, 3.7 Hz, 2H), 3.96 (d, *J* = 8.1 Hz, 1H), 2.69 (qd, *J* = 8.1, 1.6 Hz, 1H), 2.25 (s, 3H), 2.11 – 2.01 (m, 3H), 1.97 – 1.84 (m, 3H), 1.25 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.5, 145.1, 129.7, 127.5, 113.7, 61.5, 60.8, 38.4, 25.4, 24.8, 20.4, 18.1, 14.3; **HRMS** m/z (ESI) calcd for $C_{15}H_{22}NO_2$ $[M+H]^+$: 248.1645;

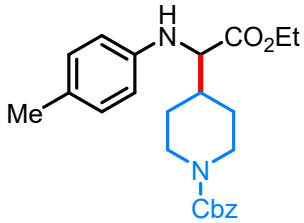
found: 248.1637.



Ethyl 2-cyclopentyl-2-(*p*-tolylamino)acetate (4g): Yield: 81%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz,$CDCl_3$) δ 7.05 – 6.94 (m, 2H), 6.62 – 6.54 (m, 2H), 4.17 (q, *J* = 7.1 Hz, 2H), 3.85 (d, *J* = 7.9 Hz, 1H), 2.24 (s, 3H), 1.90 – 1.80 (m, 1H), 1.77 – 1.63 (m, 3H), 1.62 – 1.53 (m, 2H), 1.52 – 1.40 (m, 2H), 1.26 (q, *J* = 7.7, 7.1 Hz, 4H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 174.3, 145.1, 129.7, 127.4, 113.7, 61.3, 60.7, 43.2, 29.4, 29.1, 25.4, 25.1, 20.4, 14.3; **HRMS** m/z (ESI) calcd for $C_{16}H_{24}NO_2$ $[M+H]^+$: 262.1802, found: 262.1794.

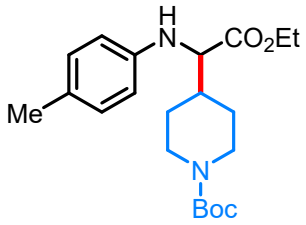


Ethyl 2-(tetrahydrofuran-2-yl)-2-(*p*-tolylamino)acetate (4h): Yield: 77%, 1:1 d.r., R_f = 0.3 (PE: EA = 6:1). Colorless oil. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.01 (d, *J* = 8.2 Hz, 2H), 6.68 – 6.63 (m, 1H), 6.62 – 6.57 (m, 1H), 4.37 – 4.25 (m, 1H), 4.22 (qd, *J* = 7.1, 4.9 Hz, 2H), 4.08 (dd, *J* = 20.0, 4.4 Hz, 1H), 3.94 (ddt, *J* = 34.4, 8.3, 6.6 Hz, 1H), 3.82 (dddd, *J* = 10.9, 8.2, 7.2, 6.0 Hz, 1H), 2.26 (s, 3H), 2.09 – 1.88 (m, 4H), 1.27 (td, *J* = 7.1, 1.6 Hz, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 172.7, 172.3, 145.2, 144.6, 129.8, 129.7, 127.8, 127.6, 114.1, 113.9, 79.9, 79.4, 69.2, 68.7, 61.24, 61.15, 60.2, 28.4, 28.1, 26.1, 25.6, 20.42, 20.41, 14.3, 14.2; The spectra data matched with values reported in the literature.[6]

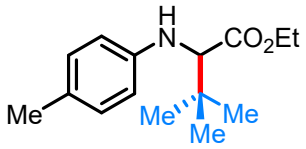


Benzyl 4-(2-ethoxy-2-oxo-1-(*p*-tolylamino)ethyl)piperidine-1-carboxylate (4i): Yield: 74%, R_f = 0.3 (PE: EA = 6:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.38 (d, *J* = 4.0 Hz, 4H), 7.35 – 7.31 (m, 1H), 7.08 – 6.94 (m, 2H), 6.64 – 6.52 (m, 2H), 5.15 (s, 2H), 4.40 – 4.21 (m, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 3.90 (d, *J* = 6.3 Hz, 1H), 2.79 (s, 2H), 2.26 (s, 3H), 1.94 (dt, *J* = 17.2, 8.6 Hz, 1H), 1.86 (dt, *J* = 13.2, 2.7 Hz, 1H), 1.68 (d, *J* = 11.2 Hz, 1H), 1.49 – 1.35 (m, 2H), 1.26 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126

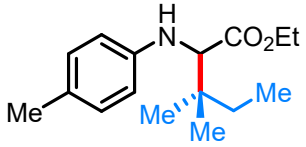
MHz, $CDCl_3$) δ 173.1, 155.1, 144.6, 136.8, 129.8, 128.4, 127.9, 127.8, 113.9, 67.0, 61.6, 61.0, 43.9, 43.8, 39.6, 20.3, 14.2; **HRMS** m/z (ESI) calcd for $C_{24}H_{31}N_2O_4$ $[M+H]^+$: 411.2278, found: 411.2270.



***Tert*-butyl 4-(2-ethoxy-2-oxo-1-(*p*-tolylamino)ethyl)piperidine-1-carboxylate (4j):** Yield: 73%, R_f = 0.3 (PE: EA = 6:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.03 – 6.95 (m, 2H), 6.61 – 6.52 (m, 2H), 4.18 (q, *J* = 7.1 Hz, 4H), 3.88 (d, *J* = 6.3 Hz, 1H), 2.69 (s, 2H), 2.24 (s, 3H), 1.97 – 1.85 (m, 1H), 1.82 (dt, *J* = 13.3, 2.8 Hz, 1H), 1.64 (tt, *J* = 13.1, 2.6 Hz, 1H), 1.46 (s, 9H), 1.42 – 1.33 (m, 2H), 1.25 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.2, 154.6, 144.7, 129.8, 127.8, 113.9, 79.4, 61.7, 61.0, 39.7, 28.4, 20.3, 14.2; **HRMS** m/z (ESI) calcd for $C_{21}H_{32}N_2NaO_4$ $[M+Na]^+$: 399.2254, found: 399.2256.

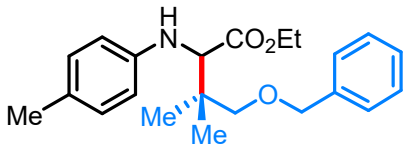


Ethyl 3,3-dimethyl-2-(*p*-tolylamino)butanoate (4k): Yield: 81%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.02 – 6.97 (m, 2H), 6.63 – 6.59 (m, 2H), 4.18 – 4.13 (m, 2H), 3.76 (s, 1H), 2.25 (s, 3H), 1.25 (t, *J* = 7.1 Hz, 3H), 1.09 (s, 9H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.5, 145.4, 129.7, 127.6, 114.1, 66.0, 60.5, 34.4, 26.8, 20.4, 14.3; **HRMS** m/z (ESI) calcd for $C_{15}H_{24}NO_2$ $[M+H]^+$: 250.1802, found: 250.1795.

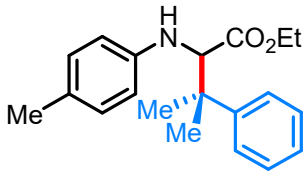


Ethyl 3,3-dimethyl-2-(*p*-tolylamino)pentanoate (4l): Yield: 85%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.06 – 6.93 (m, 2H), 6.66 – 6.56 (m, 2H), 4.16 (qd, *J* = 7.1, 3.1 Hz, 2H), 3.85 (s, 1H), 2.25 (s, 3H), 1.47 (qd, *J* = 13.8, 7.5 Hz, 2H), 1.25 (t, *J* = 7.1 Hz, 3H), 1.03 (d, *J* = 11.1 Hz, 6H), 0.93 (t, *J* = 7.5 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.6, 145.4, 129.7, 127.6, 114.1, 64.3, 60.4, 37.0, 32.1, 23.4, 23.1, 20.3, 14.3, 8.2; **HRMS** m/z (ESI) calcd for $C_{16}H_{26}NO_2$ $[M+H]^+$: 264.1958,

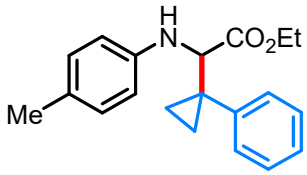
found: 264.1956.



Ethyl 4-(benzyloxy)-3,3-dimethyl-2-(*p*-tolylamino)butanoate (4m): Yield: 71%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.46 – 7.34 (m, 4H), 7.35 – 7.28 (m, 1H), 6.98 (d, *J* = 8.1 Hz, 2H), 6.65 – 6.56 (m, 2H), 4.61 – 4.48 (m, 2H), 4.16 (q, *J* = 7.1 Hz, 2H), 4.11 (s, 1H), 3.57 (d, *J* = 8.9 Hz, 1H), 3.23 (d, *J* = 8.9 Hz, 1H), 2.26 (s, 3H), 1.25 (t, *J* = 7.1 Hz, 3H), 1.17 (s, 3H), 1.04 (s, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.5, 145.4, 138.5, 129.7, 128.3, 127.53, 127.49, 127.3, 113.9, 73.3, 63.2, 60.5, 38.3, 23.1, 21.5, 20.4, 14.3; **HRMS** m/z (ESI) calcd for $C_{22}H_{30}NO_3$ $[M+H]^+$: 356.2220, found: 356.2207.

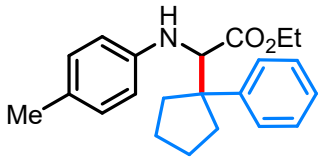


Ethyl 3-methyl-3-phenyl-2-(p-tolylamino)butanoate (4n): Yield: 65%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.47 – 7.41 (m, 2H), 7.35 (dd, *J* = 8.5, 7.0 Hz, 2H), 7.27 – 7.22 (m, 1H), 6.96 (d, *J* = 8.2 Hz, 2H), 6.57 – 6.49 (m, 2H), 4.13 (s, 1H), 3.95 (qt, *J* = 7.2, 3.6 Hz, 2H), 2.23 (s, 3H), 1.53 (d, *J* = 15.0 Hz, 6H), 1.02 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 172.9, 145.5, 145.2, 129.7, 128.1, 127.7, 126.54, 126.48, 114.2, 66.7, 60.5, 41.5, 25.7, 25.1, 20.4, 13.9. **HRMS** m/z (ESI) calcd for $C_{20}H_{26}NO_2$ $[M+H]^+$: 312.1958, found: 312.1954.

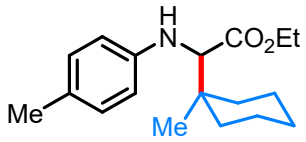


Ethyl 2-(1-phenylcyclopropyl)-2-(p-tolylamino)acetate (4o): Yield: 62%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz,CDC_{l3}) δ 7.45 – 7.38 (m, 2H), 7.38 – 7.32 (m, 2H), 7.32 – 7.28 (m, 1H), 7.01 (d, *J* = 8.2 Hz, 2H), 6.63 – 6.52 (m, 2H), 4.16 (qd, *J* = 7.1, 4.8 Hz, 2H), 3.91 (s, 1H), 2.27 (s, 3H), 1.29 (ddd, *J* = 10.0, 5.7, 4.2 Hz, 1H), 1.22 (t, *J* = 7.1 Hz, 3H), 1.04 (ddd, *J* = 9.0, 6.0, 4.6 Hz, 1H), 0.98 (ddd, *J* = 10.2, 5.7, 4.6 Hz, 1H), 0.93 (ddd, *J* = 9.1, 5.9, 4.2 Hz, 1H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 172.3, 144.6, 141.3, 130.4, 129.7, 128.1, 127.5, 127.2, 113.9, 63.7, 60.8, 28.7, 20.3,

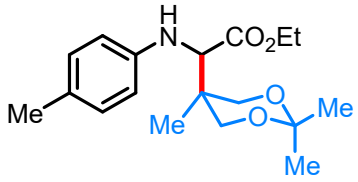
14.1, 11.6, 11.0; **HRMS** m/z (ESI) calcd for $C_{20}H_{24}NO_2$ $[M+H]^+$: 310.1802, found: 310.1797.



Ethyl 2-(1-phenylcyclopentyl)-2-(p-tolylamino)acetate (4p): Yield: 64%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, CDC_{l3}) δ 7.35 (d, *J* = 4.6 Hz, 4H), 7.30 – 7.25 (m, 1H), 7.00 – 6.93 (m, 2H), 6.58 – 6.50 (m, 2H), 4.14 (s, 1H), 4.05 – 3.93 (m, 2H), 2.45 – 2.26 (m, 2H), 2.23 (s, 3H), 2.07 (dtd, *J* = 12.8, 7.6, 1.9 Hz, 2H), 1.97 – 1.85 (m, 1H), 1.84 – 1.75 (m, 1H), 1.73 – 1.63 (m, 2H), 1.08 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 172.7, 145.2, 143.4, 129.7, 127.9, 127.8, 127.6, 126.6, 114.1, 63.4, 60.5, 54.8, 35.4, 35.3, 22.9, 22.7, 20.3, 14.0; **HRMS** m/z (ESI) calcd for $C_{22}H_{28}NO_2$ $[M+H]^+$: 338.2114, found: 338.2108.

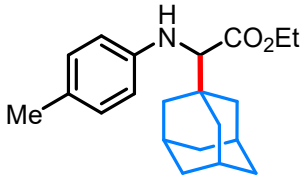


Ethyl 2-(1-methylcyclohexyl)-2-(p-tolylamino)acetate (4q): Yield: 73%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.01 – 6.97 (m, 2H), 6.63 – 6.60 (m, 2H), 4.15 (qd, *J* = 7.1, 2.2 Hz, 2H), 3.92 (s, 1H), 2.25 (s, 3H), 1.51 (ddd, *J* = 16.1, 5.7, 3.5 Hz, 8H), 1.35 – 1.31 (m, 2H), 1.25 (t, *J* = 7.1 Hz, 3H), 1.06 (s, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.5, 145.5, 129.8, 127.5, 114.1, 65.0, 60.4, 37.1, 35.0, 26.1, 21.8, 21.7, 20.4, 14.3; **HRMS** m/z (ESI) calcd for $C_{18}H_{28}NO_2$ $[M+H]^+$: 290.2115, found: 290.2108.

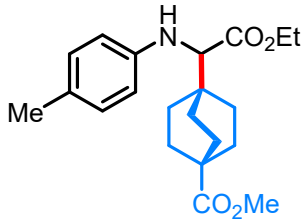


Ethyl 2-(*p*-tolylamino)-2-(2,2,5-trimethyl-1,3-dioxan-5-yl)acetate (4r): Yield: 61%, R_f = 0.3 (PE: EA = 6:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.06 – 6.96 (m, 2H), 6.81 – 6.59 (m, 2H), 4.37 (s, 1H), 4.27 – 4.13 (m, 2H), 3.99 (dd, *J* = 11.8, 1.8 Hz, 1H), 3.92 (dd, *J* = 12.0, 1.8 Hz, 1H), 3.61 (dd, *J* = 24.2, 11.9 Hz, 2H), 2.25 (s, 3H), 1.63 – 1.48 (m, 3H), 1.47 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H), 0.93 (s, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.0, 145.6, 129.8, 128.1, 114.8, 98.3, 66.9, 66.7, 61.1, 60.1, 37.1, 25.8, 21.8, 20.4, 16.0, 14.3; **HRMS** m/z (ESI) calcd for $C_{18}H_{28}NO_4$ $[M+H]^+$: 322.2012,

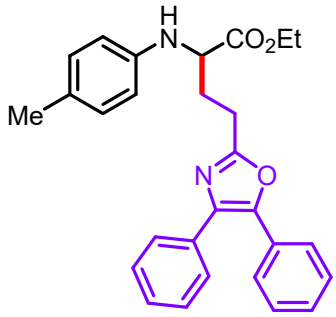
found: 322.2011.



Ethyl 2-((3R,5R,7R)-adamantan-1-yl)-2-(*p*-tolylamino)acetate (4s): Yield: 90%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.03 – 6.96 (m, 2H), 6.64 – 6.58 (m, 2H), 4.17 (q, *J* = 7.1 Hz, 2H), 3.65 (s, 1H), 2.26 (s, 3H), 1.84 (dt, *J* = 12.3, 2.6 Hz, 3H), 1.76 (dt, *J* = 12.3, 2.8 Hz, 3H), 1.72 – 1.66 (m, 3H), 1.65 – 1.60 (m, 3H), 1.27 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 172.9, 145.6, 129.7, 127.3, 114.0, 66.9, 60.4, 39.0, 36.9, 36.3, 28.4, 20.3, 14.3; **HRMS** m/z (ESI) calcd for $C_{21}H_{30}NO_2$ $[M+H]^+$: 328.2271, found: 328.2268.

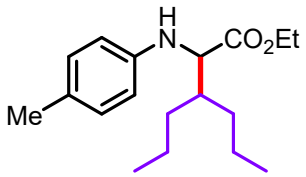


Methyl 4-(2-ethoxy-2-oxo-1-(*p*-tolylamino)ethyl)bicyclo[2.2.2]octane-1-carboxylate (4t): Yield: 89%, R_f = 0.3 (PE: EA = 20:1). Yellow solid. M. p. = 111 - 112 °C. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.02 – 6.95 (m, 2H), 6.62 – 6.54 (m, 2H), 4.14 (q, *J* = 7.1 Hz, 2H), 3.70 (s, 1H), 3.66 (s, 3H), 2.24 (s, 3H), 1.87 – 1.73 (m, 9H), 1.57 – 1.49 (m, 3H), 1.24 (t, *J* = 7.1 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 178.0, 172.9, 145.0, 129.8, 127.9, 114.2, 64.8, 60.7, 51.7, 38.7, 35.0, 28.1, 27.3, 20.4, 14.3; **HRMS** m/z (ESI) calcd for $C_{21}H_{30}NO_4$ $[M+H]^+$: 360.2169, found: 360.2163.

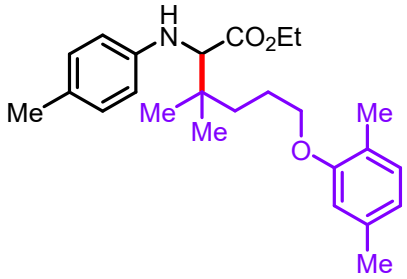


Ethyl 4-(4,5-diphenyloxazol-2-yl)-2-(*p*-tolylamino)butanoate (5a): Yield: 75%, R_f = 0.3 (PE: EA = 6:1). Yellow oil. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.67 (dt, *J* = 7.3, 1.3 Hz, 2H), 7.62 – 7.55 (m, 2H), 7.43 – 7.32 (m, 6H), 7.01 (d, *J* = 8.0 Hz, 2H), 6.62 (d, *J* = 8.0 Hz, 2H), 4.28 – 4.24 (m, 1H), 4.21 (qd, *J* = 7.1, 4.1 Hz, 2H), 3.14 – 3.00 (m, 2H), 2.53 – 2.43 (m, 1H), 2.35 (dq, *J* = 14.7, 7.5 Hz, 1H), 2.26 (s, 3H), 1.28 (t, *J* = 7.2 Hz, 3H);

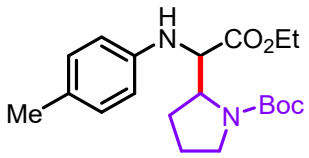
^{13}C NMR (151 MHz, $CDCl_3$) δ 173.6, 162.5, 145.4, 144.4, 135.1, 132.5, 129.8, 129.0, 128.64, 128.58, 128.4, 128.1, 127.9, 127.8, 126.5, 113.9, 61.4, 56.6, 30.1, 24.6, 20.4, 14.2; **HRMS** m/z (ESI) calcd for $C_{28}H_{29}N_2O_3$ $[M+H]^+$: 441.2173, found: 441.2168.



Ethyl 3-propyl-2-(*p*-tolylamino)hexanoate (5b): Yield: 82%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.00 (d, *J* = 8.1 Hz, 2H), 6.58 (d, *J* = 8.0 Hz, 2H), 4.24 – 4.13 (m, 2H), 4.06 (dd, *J* = 5.0, 1.2 Hz, 1H), 2.26 (s, 3H), 1.92 – 1.83 (m, 1H), 1.51 – 1.31 (m, 8H), 1.27 (t, *J* = 7.1 Hz, 3H), 0.97 – 0.88 (m, 6H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 174.2, 145.2, 129.8, 127.4, 113.8, 60.7, 59.4, 40.7, 32.8, 32.2, 20.40, 20.35, 20.3, 14.34, 14.31, 14.29. **HRMS** m/z (ESI) calcd for $C_{18}H_{30}NO_2$ $[M+H]^+$: 292.2271, found: 292.2278.

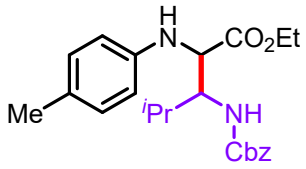


Ethyl 6-(2,5-dimethylphenoxy)-3,3-dimethyl-2-(*p*-tolylamino)hexanoate (5c): Yield: 79%, R_f = 0.3 (PE: EA = 30:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.03 (dd, *J* = 11.4, 7.7 Hz, 3H), 6.70 (d, *J* = 7.5 Hz, 1H), 6.67 – 6.60 (m, 3H), 4.18 (tdd, *J* = 7.2, 6.2, 1.3 Hz, 2H), 4.00 – 3.93 (m, 2H), 3.90 (d, *J* = 1.4 Hz, 1H), 2.34 (s, 3H), 2.27 (s, 3H), 2.22 (s, 3H), 2.00 – 1.81 (m, 2H), 1.63 (tt, *J* = 11.0, 3.2 Hz, 2H), 1.27 (td, *J* = 7.2, 1.2 Hz, 3H), 1.12 (dd, *J* = 7.5, 1.4 Hz, 6H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 173.4, 157.0, 145.3, 136.4, 130.3, 129.8, 127.7, 123.6, 120.7, 114.2, 112.0, 68.3, 64.7, 60.6, 36.8, 36.1, 24.1, 24.0, 23.5, 21.4, 20.4, 15.7, 14.3; **HRMS** m/z (ESI) calcd for $C_{25}H_{35}NNaO_3$ $[M+Na]^+$: 420.2509, found: 420.2485.

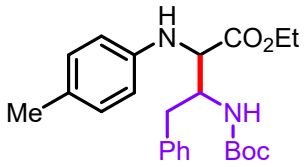


***Tert*-butyl 2-(2-ethoxy-2-oxo-1-(*p*-tolylamino)ethyl)pyrrolidine-1-carboxylate (5d):** Yield: 76%, 1:1 d.r., R_f = 0.3 (PE: EA = 15:1). Light yellow oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 6.97 (dd, *J* = 18.4, 7.9 Hz, 2H), 6.61 (t, *J* = 8.2 Hz, 2H), 5.28 – 4.90

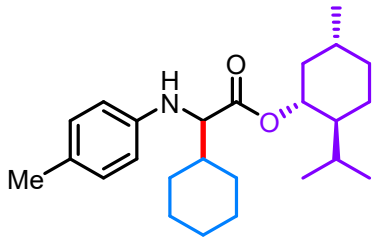
(m, 0.29H), 4.71 (d, J = 3.6 Hz, 0.29H), 4.53 (d, J = 21.5 Hz, 0.59H), 4.40 (d, J = 8.0 Hz, 0.50H), 4.35 – 4.26 (m, 0.39H), 4.18 (dddt, J = 17.8, 10.8, 7.1, 3.3 Hz, 2.12H), 3.69 – 3.02 (m, 2H), 2.23 (s, 3H), 2.03 – 1.75 (m, 4H), 1.55 (dd, J = 41.4, 14.7 Hz, 9H), 1.31 – 1.26 (m, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 172.9, 172.6, 155.9, 154.9, 154.1, 145.6, 144.9, 144.1, 129.7, 129.6, 127.2, 126.6, 123.6, 113.8, 113.4, 113.1, 61.3, 61.1, 60.5, 59.8, 59.2, 58.1, 57.8, 47.1, 28.6, 28.5, 27.3, 26.6, 24.3, 23.7, 20.3, 14.2, 14.1; **HRMS** m/z (ESI) calcd for $C_{20}H_{30}N_2NaO_4$ $[M+Na]^+$: 385.2098, found: 385.2096.



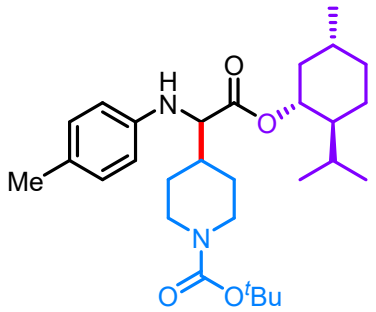
Ethyl 3-(((benzyloxy)carbonyl)amino)-4-methyl-2-(*p*-tolylamino)pentanoate (5e): Yield: 78%, d.r. > 20:1, R_f = 0.3 (PE: EA = 6:1). Colorless oil. **^{1}H NMR** (600 MHz, $CDCl_3$) δ 7.46 – 7.30 (m, 5H), 7.01 (d, J = 8.0 Hz, 2H), 6.61 (d, J = 8.1 Hz, 2H), 5.12 (s, 2H), 5.04 – 4.95 (m, 1H), 4.23 – 4.12 (m, 3H), 4.02 – 3.94 (m, 1H), 2.26 (s, 3H), 1.93 (tq, J = 11.9, 6.1, 5.4 Hz, 1H), 1.27 (t, J = 7.2 Hz, 3H), 1.09 (d, J = 6.7 Hz, 3H), 0.99 (d, J = 6.8 Hz, 3H); **^{13}C NMR** (151 MHz, $CDCl_3$) δ 172.8, 156.7, 144.9, 136.4, 129.9, 128.5, 128.14, 128.09, 128.05, 114.2, 66.9, 61.5, 59.5, 58.7, 29.7, 20.4, 20.3, 18.1, 14.1; **HRMS** m/z (ESI) calcd for $C_{23}H_{31}N_2O_4$ $[M+H]^+$: 399.2278, found: 399.2290.



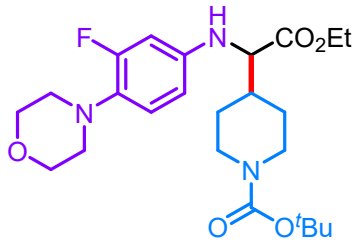
Ethyl 3-((*tert*-butoxycarbonyl)amino)-4-phenyl-2-(*p*-tolylamino)butanoate (5f): Yield: 76%, d.r. > 20:1, R_f = 0.3 (PE: EA = 6:1). Colorless oil. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.31 (t, J = 7.5 Hz, 2H), 7.24 (dt, J = 7.1, 3.2 Hz, 3H), 7.00 (d, J = 8.1 Hz, 2H), 6.63 – 6.56 (m, 2H), 4.71 (d, J = 9.5 Hz, 1H), 4.49 (s, 1H), 4.20 (q, J = 6.7 Hz, 2H), 4.07 (d, J = 3.7 Hz, 1H), 3.04 (dd, J = 14.0, 6.5 Hz, 1H), 2.83 (t, J = 10.9 Hz, 1H), 2.26 (s, 3H), 1.38 (s, 9H), 1.29 (t, J = 7.2 Hz, 3H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 172.4, 155.3, 144.8, 137.4, 129.8, 129.4, 128.5, 128.1, 126.6, 114.4, 79.6, 61.6, 60.1, 53.5, 38.3, 28.2, 20.4, 14.1; **HRMS** m/z (ESI) calcd for $C_{24}H_{32}N_2NaO_4$ $[M+Na]^+$: 435.2254, found: 435.2270.



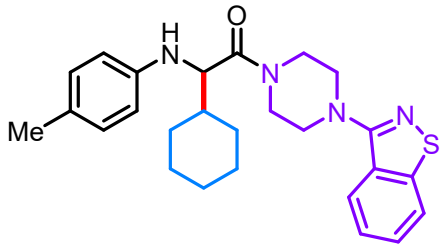
(1R,2S,5R)-2-isopropyl-5-methylcyclohexyl 2-cyclohexyl-2-(p-tolylamino)acetate (5g): yield: 64%, d.r. = 1:1, R_f = 0.3 (PE: EA = 50:1). Colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) (two isomers) δ 7.01 – 6.91 (m, 2H), 6.55 (dd, *J* = 8.3, 5.9 Hz, 2H), 4.65 (qd, *J* = 11.1, 4.4 Hz, 1H), 3.97 (s, 1H), 3.81 (dd, *J* = 18.7, 6.0 Hz, 1H), 2.22 (s, 3H), 1.96 – 1.87 (m, 2H), 1.83 – 1.74 (m, 4H), 1.73 – 1.58 (m, 6H), 1.33 – 1.17 (m, 9H), 0.90 – 0.85 (m, 6H), 0.60 (dd, *J* = 20.0, 6.9 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) (two isomers) δ 173.6, 173.5, 145.4, 145.2, 129.7, 129.7, 127.4, 127.3, 114.1, 113.7, 75.0, 74.9, 62.9, 62.8, 46.9, 41.3, 41.3, 40.8, 40.8, 34.2, 31.4, 29.9, 29.8, 29.6, 29.4, 28.9, 26.3, 26.2, 26.2, 26.1, 26.1, 26.1, 25.9, 25.5, 23.0, 22.7, 22.1, 22.0, 20.9, 20.9, 20.4, 20.4, 15.9, 15.4. **LC-MS** m/z (ESI) calcd for $C_{25}H_{40}NO_2$ $[M+H]^+$: 386.3, found: 386.3.



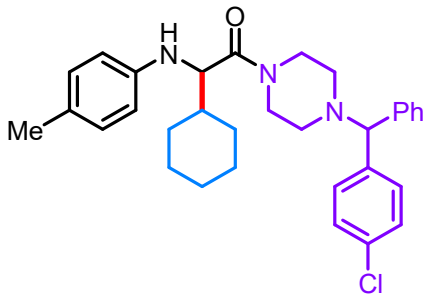
***tert*-butyl 4-(2-(((1R,2S,5R)-2-isopropyl-5-methylcyclohexyl)oxy)-2-oxo-1-(p-tolylamino)ethyl)piperidine-1-carboxylate (5h):** yield: 52%, d.r. = 1:1, R_f = 0.2 (PE: EA = 10:1). Colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) (one isomers) δ 6.96 (d, *J* = 8.1 Hz, 2H), 6.54 (d, *J* = 8.4 Hz, 2H), 4.63 (td, *J* = 10.9, 4.3 Hz, 1H), 4.05 (d, *J* = 86.0 Hz, 3H), 3.87 (d, *J* = 6.3 Hz, 1H), 2.69 (s, 2H), 2.22 (s, 3H), 1.96 – 1.84 (m, 2H), 1.81 – 1.72 (m, 1H), 1.70 – 1.54 (m, 6H), 1.45 (s, 9H), 1.38 – 1.22 (m, 4H), 0.87 (d, *J* = 6.5 Hz, 4H), 0.77 (d, *J* = 7.0 Hz, 3H), 0.56 (d, *J* = 6.9 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) (one isomers) δ 173.0, 154.7, 145.0, 129.8, 127.7, 113.9, 79.5, 75.4, 62.2, 46.8, 40.8, 39.7, 34.1, 31.4, 28.5, 25.5, 22.7, 22.0, 20.9, 20.4, 15.4. **LC-MS** m/z (ESI) calcd for $C_{29}H_{46}N_2NaO_4$ $[M+Na]^+$: 509.3, found: 509.3.



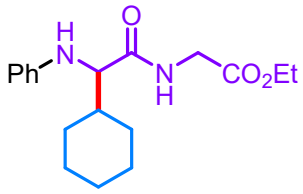
tert-butyl 4-(2-ethoxy-1-((3-fluoro-4-morpholinophenyl)amino)-2-oxoethyl)piperidine-1-carboxylate (5i): yield: 54%, R_f = 0.3 (PE: EA = 2:1), white solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.81 (t, J = 9.0 Hz, 1H), 6.44 – 6.31 (m, 2H), 4.15 (dq, J = 24.1, 7.1 Hz, 5H), 3.87 – 3.82 (m, 4H), 3.80 (d, J = 6.4 Hz, 1H), 2.99 – 2.92 (m, 4H), 2.68 (s, 2H), 1.95 – 1.71 (m, 3H), 1.61 (d, J = 13.0 Hz, 2H), 1.45 (s, 9H), 1.27 – 1.24 (m, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 173.1, 156.8 (d, $J_{C\text{-}F}$ = 245.6 Hz), 154.7, 143.7 (d, $J_{C\text{-}F}$ = 10.2 Hz), 131.6 (d, $J_{C\text{-}F}$ = 4.4 Hz), 120.3 (d, $J_{C\text{-}F}$ = 2.6 Hz), 109.3 (d, $J_{C\text{-}F}$ = 24.2 Hz), 102.5, 79.6, 67.2, 61.7, 61.3, 51.7, 39.7, 28.4, 14.3. **LC-MS** m/z (ESI) calcd for $C_{24}H_{36}FN_3NaO_5$ $[M+Na]^+$: 488.3, found: 488.2.



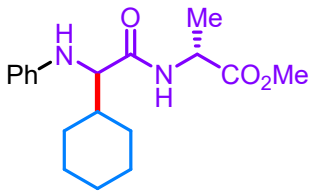
1-(4-(benzo[d]isothiazol-3-yl)piperazin-1-yl)-2-cyclohexyl-2-(p-tolylamino)ethan-1-one (5j): yield: 56%, R_f = 0.3 (PE: EA = 4:1), white solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.88 (d, J = 8.2 Hz, 1H), 7.83 (d, J = 8.1 Hz, 1H), 7.49 (ddd, J = 8.1, 6.9, 1.1 Hz, 1H), 7.38 (ddd, J = 8.1, 6.9, 1.0 Hz, 1H), 6.99 – 6.95 (m, 2H), 6.58 (d, J = 8.4 Hz, 2H), 4.38 (s, 1H), 4.15 (d, J = 5.9 Hz, 1H), 3.98 – 3.71 (m, 4H), 3.62 – 3.40 (m, 4H), 2.22 (s, 3H), 1.94 – 1.88 (m, 1H), 1.79 – 1.65 (m, 5H), 1.30 – 1.12 (m, 5H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 172.2, 163.3, 152.8, 145.9, 134.3, 129.9, 129.8, 127.9, 127.8, 127.4, 124.2, 123.6, 123.6, 120.7, 114.2, 59.0, 50.5, 49.9, 45.5, 42.0, 41.8, 30.4, 28.8, 26.3, 26.2, 26.2, 20.4. **LC-MS** m/z (ESI) calcd for $C_{26}H_{33}N_4OS$ $[M+H]^+$: 449.2, found: 449.2.



1-(4-((4-chlorophenyl)(phenyl)methyl)piperazin-1-yl)-2-cyclohexyl-2-(*p*-tolylamino) ethan-1-one (5k): yield: 51%, R_f = 0.5 (PE: EA = 4:1), white solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.38 – 7.32 (m, 4H), 7.30 – 7.23 (m, 4H), 7.23 – 7.18 (m, 1H), 6.93 (d, *J* = 8.1 Hz, 2H), 6.55 – 6.47 (m, 2H), 4.37 (s, 1H), 4.18 (s, 1H), 4.03 (d, *J* = 5.9 Hz, 1H), 3.59 (dt, *J* = 24.6, 5.1 Hz, 4H), 2.34 (dt, *J* = 16.9, 5.1 Hz, 4H), 2.21 (s, 3H), 1.96 – 1.54 (m, 11H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 171.8, 146.0, 141.6, 140.8, 134.7, 132.9, 129.8, 129.1, 128.9, 128.8, 127.7, 127.5, 127.2, 123.9, 114.1, 75.2, 58.8, 52.1, 51.7, 45.9, 42.1, 42.0, 30.4, 28.8, 28.7, 26.3, 26.2, 20.4. **LC-MS** m/z (ESI) calcd for $C_{32}H_{39}ClN_3O$ $[M+H]^+$: 516.3, found: 516.3.

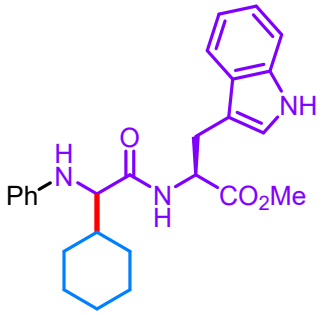


Ethyl (2-cyclohexyl-2-(phenylamino)acetyl)glycinate (5l): yield: 62%, R_f = 0.2 (PE: EA = 4:1), white solid. **^{1}H NMR** (400 MHz, DMSO-d_6) δ 8.35 (t, *J* = 6.0 Hz, 1H), 7.03 (t, *J* = 7.7 Hz, 2H), 6.61 (d, *J* = 8.0 Hz, 2H), 6.52 (t, *J* = 7.3 Hz, 1H), 5.59 (d, *J* = 7.4 Hz, 1H), 4.04 (q, *J* = 7.2 Hz, 2H), 3.80 (d, *J* = 5.8 Hz, 2H), 3.54 (t, *J* = 7.0 Hz, 1H), 1.86 (d, *J* = 11.6 Hz, 1H), 1.65 (d, *J* = 34.5 Hz, 5H), 1.16 (q, *J* = 11.4, 7.1 Hz, 8H). **^{13}C NMR** (101 MHz, DMSO) δ 173.7, 170.2, 148.9, 129.2, 116.6, 113.1, 62.8, 60.8, 41.1, 40.9, 29.5, 29.2, 26.4, 26.3, 14.5. **LC-MS** m/z (ESI) calcd for $C_{18}H_{27}N_2O_3$ $[M+H]^+$: 319.2, found: 319.2.

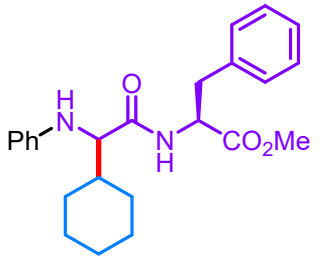


Methyl (2-cyclohexyl-2-(phenylamino)acetyl)-*D*-alaninate (5m): yield: 63%, d.r. =1:1, R_f = 0.25 (PE: EA = 4:1), white solid. **^{1}H NMR** (400 MHz, DMSO-d_6) (two isomers) δ 8.47 – 8.27 (m, 1H), 7.03 (ddd, *J* = 8.4, 7.2, 3.2 Hz, 2H), 6.61 (ddd, *J* = 8.6, 2.6, 1.1 Hz, 2H), 6.57 – 6.46 (m, 1H), 5.52 (t, *J* = 7.8 Hz, 1H), 4.28 (q, *J* = 7.1 Hz, 1H),

3.57 (d, J = 0.9 Hz, 3H), 1.86 (t, J = 14.0 Hz, 1H), 1.66 (d, J = 30.7 Hz, 5H), 1.27 – 1.11 (m, 8H). **^{13}C NMR** (101 MHz, DMSO-d_6) (two isomers) δ 173.3, 172.9, 148.9, 129.1, 116.5, 113.1, 62.2, 52.2, 47.7, 41.0, 29.5, 26.4, 26.2, 17.6. **LC-MS** m/z (ESI) calcd for $C_{18}H_{27}N_2O_3$ $[M+H]^+$: 319.2, found: 319.2.

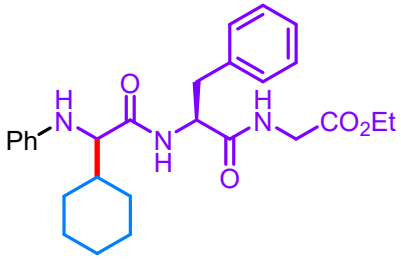


Methyl (2-cyclohexyl-2-(phenylamino)acetyl)-L-tryptophanate (5n): yield: 60%, d.r. =1:1, R_f = 0.3 (PE: EA = 2:1), white solid. **^{1}H NMR** (400 MHz, $CDCl_3$) (one isomer) δ 8.16 (s, 1H), 7.52 (d, J = 7.9 Hz, 1H), 7.33 (d, J = 8.1 Hz, 1H), 7.21 – 7.06 (m, 5H), 6.87 (d, J = 2.3 Hz, 1H), 6.76 (t, J = 7.3 Hz, 1H), 6.55 (d, J = 7.9 Hz, 2H), 4.92 (td, J = 7.5, 5.4 Hz, 1H), 3.66 (d, J = 15.8 Hz, 1H), 3.60 (s, 3H), 3.51 (d, J = 4.6 Hz, 1H), 3.26 (qd, J = 14.9, 6.3 Hz, 2H), 1.98 – 1.85 (m, 1H), 1.77 – 1.56 (m, 5H), 1.19 – 0.99 (m, 5H). **^{13}C NMR** (101 MHz, $CDCl_3$) (one isomer) δ 172.8, 172.1, 147.4, 136.1, 129.2, 127.6, 122.7, 122.2, 119.5, 118.8, 118.5, 113.9, 111.3, 110.1, 64.7, 52.8, 52.3, 40.9, 30.0, 27.9, 27.5, 26.2, 26.1. **LC-MS** m/z (ESI) calcd for $C_{26}H_{32}N_3O_3$ $[M+H]^+$: 434.2, found: 434.2.



Methyl (2-cyclohexyl-2-(phenylamino)acetyl)-L-phenylalaninate (5o): yield: 53%, d.r. =1.3:1, R_f = 0.5 (PE: EA = 2:1), colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) (two isomers) δ 7.26 – 7.14 (m, 4H), 7.12 – 7.08 (m, 1H), 7.05 – 6.99 (m, 1H), 6.85 – 6.71 (m, 2H), 6.64 – 6.51 (m, 2H), 4.96 (dtd, J = 27.3, 8.7, 5.5 Hz, 1H), 3.97 – 3.80 (m, 1H), 3.67 (d, J = 31.2 Hz, 3H), 3.55 (dt, J = 33.7, 3.9 Hz, 1H), 3.14 (ddd, J = 61.3, 13.9, 5.7 Hz, 1H), 2.94 (dt, J = 13.4, 6.5 Hz, 1H), 2.04 – 1.81 (m, 1H), 1.77 – 1.48 (m, 5H), 1.38 – 1.05 (m, 5H). **^{13}C NMR** (101 MHz, $CDCl_3$) (two isomers) δ 172.8, 172.5, 171.8, 171.7, 147.4, 147.1, 136.1, 135.3, 129.4, 129.2, 129.2, 129.1, 128.6, 127.0, 127.0, 119.1, 118.9, 114.0, 113.5, 65.1, 64.4, 52.8, 52.3, 52.1, 41.1, 41.0, 38.0, 37.9, 30.3,

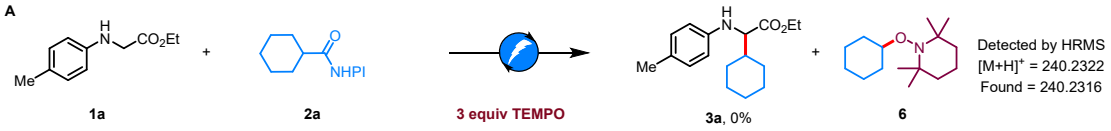
30.0, 28.0, 27.9, 26.3, 26.2, 26.2, 26.2, 26.1, 26.0. **LC-MS** m/z (ESI) calcd for $C_{24}H_{31}N_2O_3$ $[M+H]^+$: 395.2, found: 395.2.



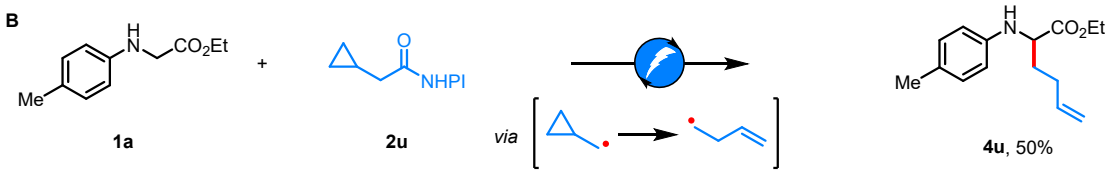
Ethyl (2-cyclohexyl-2-(phenylamino)acetyl)-L-phenylalanylglycinate (5p): yield: 60%, d.r. =1.3:1, R_f = 0.1 (PE: EA = 2:1), colorless oil. **^{1}H NMR** (400 MHz, $CDCl_3$) (two isomers) δ 7.30 – 7.04 (m, 6H), 6.98 – 6.71 (m, 2H), 6.63 – 6.45 (m, 2H), 4.88 – 4.77 (m, 1H), 4.24 – 4.08 (m, 2H), 3.94 – 3.85 (m, 1H), 3.79 – 3.67 (m, 1H), 3.55 (t, *J* = 5.2 Hz, 1H), 3.29 (dd, *J* = 14.3, 5.3 Hz, 1H), 2.99 (t, *J* = 7.1 Hz, 1H), 2.87 (dd, *J* = 14.3, 9.9 Hz, 1H), 1.92 (tt, *J* = 10.9, 2.9 Hz, 1H), 1.74 – 1.59 (m, 3H), 1.26 (td, *J* = 7.1, 2.1 Hz, 4H), 1.10 (dtd, *J* = 20.8, 11.9, 10.2, 5.9 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) (two isomers) δ 173.5, 173.5, 171.1, 171.1, 169.4, 169.3, 147.2, 147.1, 136.8, 136.0, 129.5, 129.4, 129.2, 129.1, 128.6, 128.6, 126.9, 126.9, 119.1, 118.9, 113.6, 64.7, 64.5, 61.5, 61.4, 53.8, 53.7, 41.4, 41.2, 41.1, 40.8, 37.7, 37.2, 30.1, 29.8, 28.3, 28.2, 26.2, 26.2, 26.1, 26.0, 26.0, 14.2, 14.2. **LC-MS** m/z (ESI) calcd for $C_{27}H_{36}N_3O_4$ $[M+H]^+$: 466.3, found: 466.2.

6. Mechanism Investigation.

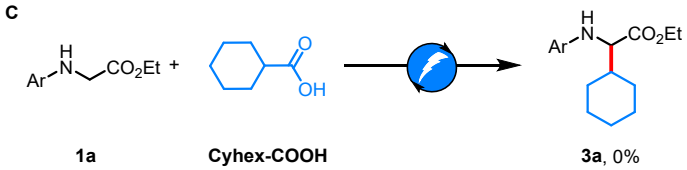
6.1 Control Experiments.



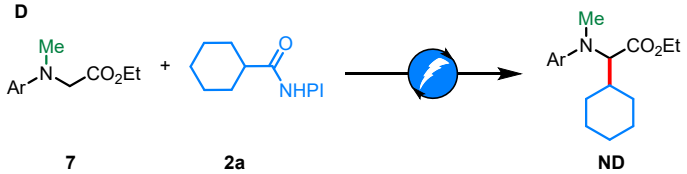
According to the general procedure, 3 eq. TEMPO was added. **3a** was not detected and **6** was detected by **HRMS**. **HRMS** m/z (ESI) calcd for $C_{15}H_{30}NO$ $[M+H]^+$: 240.2322, found: 240.2316.



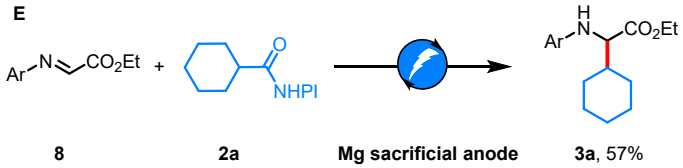
According to the general procedure, the product **4u** was isolated via flash chromatography (PE: EA = 30:1) as a colorless oil (30 mg, 40% yield). **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.00 (d, *J* = 8.2 Hz, 2H), 6.63 – 6.48 (m, 2H), 5.91 – 5.77 (m, 1H), 5.16 – 4.99 (m, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 4.06 (dd, *J* = 7.2, 5.8 Hz, 1H), 2.25 (s, 3H), 1.95 (dtd, *J* = 13.5, 7.7, 5.7 Hz, 1H), 1.84 (dq, *J* = 13.6, 7.4 Hz, 1H), 1.28 (d, *J* = 1.1 Hz, 3H), 1.26 (d, *J* = 7.1 Hz, 2H); **^{13}C NMR** (126 MHz, $CDCl_3$) δ 174.2, 144.6, 137.3, 129.8, 127.6, 115.6, 113.8, 61.0, 56.6, 32.3, 29.7, 20.4, 14.2; **HRMS** m/z (ESI) calcd for $C_{15}H_{22}NO_2$ $[M+H]^+$: 248.1645, found: 248.1638.



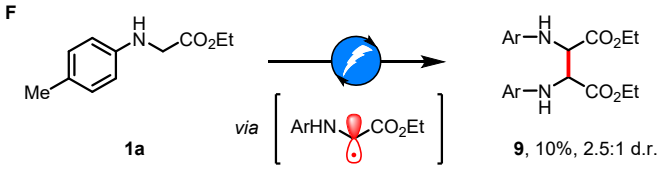
According to the general procedure, Cyhex-COOH was used as substrate and no desired product was formed.



According to the general procedure, *N*-protected glycine derivative **7** was used as substrate and no desired product was formed.



The imine **8** was prepared according to the previously reported procedure.[7] According to the general procedure, imine **8** was used as substrate and Mg was used as anode. After electrolysis, the reaction mixture affords desired product **3a** in 57% yield.



According to the general procedure, the product **9** was isolated via flash chromatography (PE: EA = 10:1) as a colorless oil (8 mg, 10% yield). **^{1}H NMR** (500 MHz, $CDCl_3$) (two isomers) δ 7.01 (dd, *J* = 8.5, 2.5 Hz, 2H), 6.66 – 6.61 (m, 2H), 4.60 (d, *J* = 18.8 Hz, 1H), 4.28 – 4.16 (m, 2H), 2.26 (s, 3H), 1.31 – 1.23 (m, 3H). **LC-MS** m/z (ESI) calcd for $C_{22}H_{29}N_2O_4$ $[M+H]^+$: 385.2, found: 385.2.

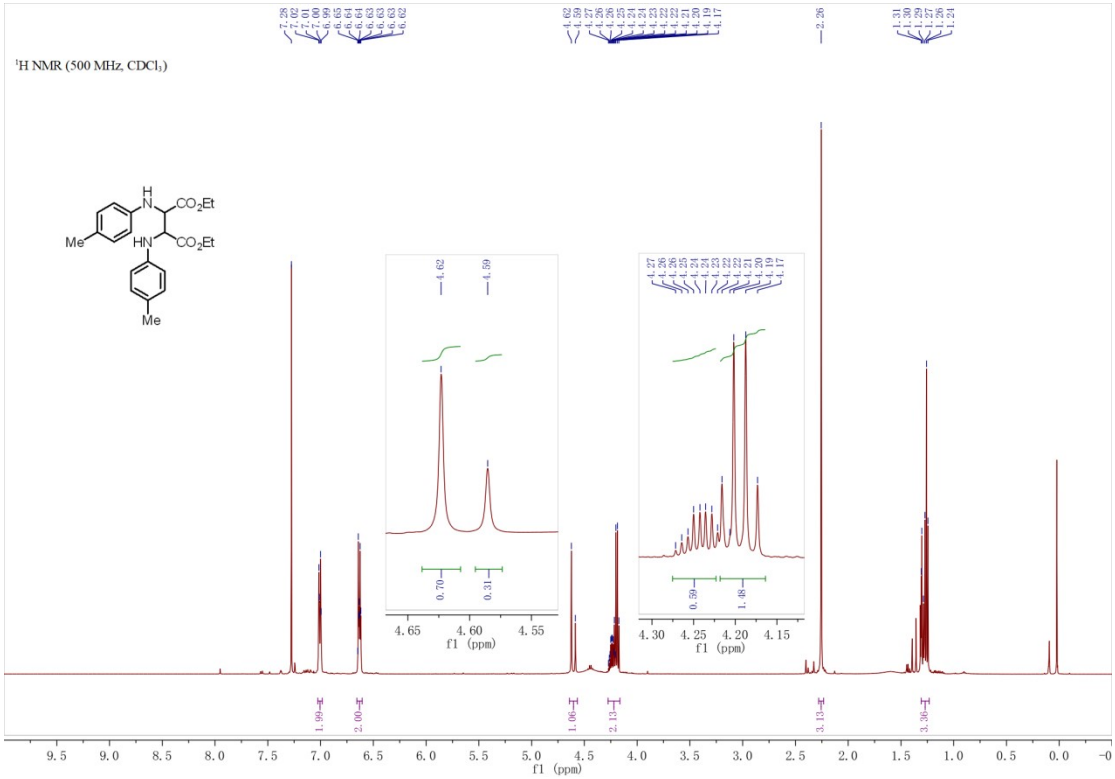


Figure S2. ^{1}H-NMR of product **9.**

6.2 Cyclic Voltammetry Studies.

All the voltammetric experiments were recorded with a CHI600E potentiostat at room temperature in DMSO. $LiClO_4$ (0.1 M) was used as the supporting electrolyte, a glass carbon electrode (diameter, 3 mm) and a platinum wire were used as working and counter electrodes, respectively. The working electrode potentials were measured versus $Ag/AgNO_3$ reference electrode (internal solution, 0.1 M $AgNO_3$ in DMAc). The redox potential of ferrocene/ferrocenium (Fc/Fc^+) was measured (same experimental conditions) and used to provide an internal reference. The potential values were then adjusted relative to Fc/Fc^+, and electrochemical studies in organic solvents were recorded accordingly. The scan rate was 100 mV s^{-1}.

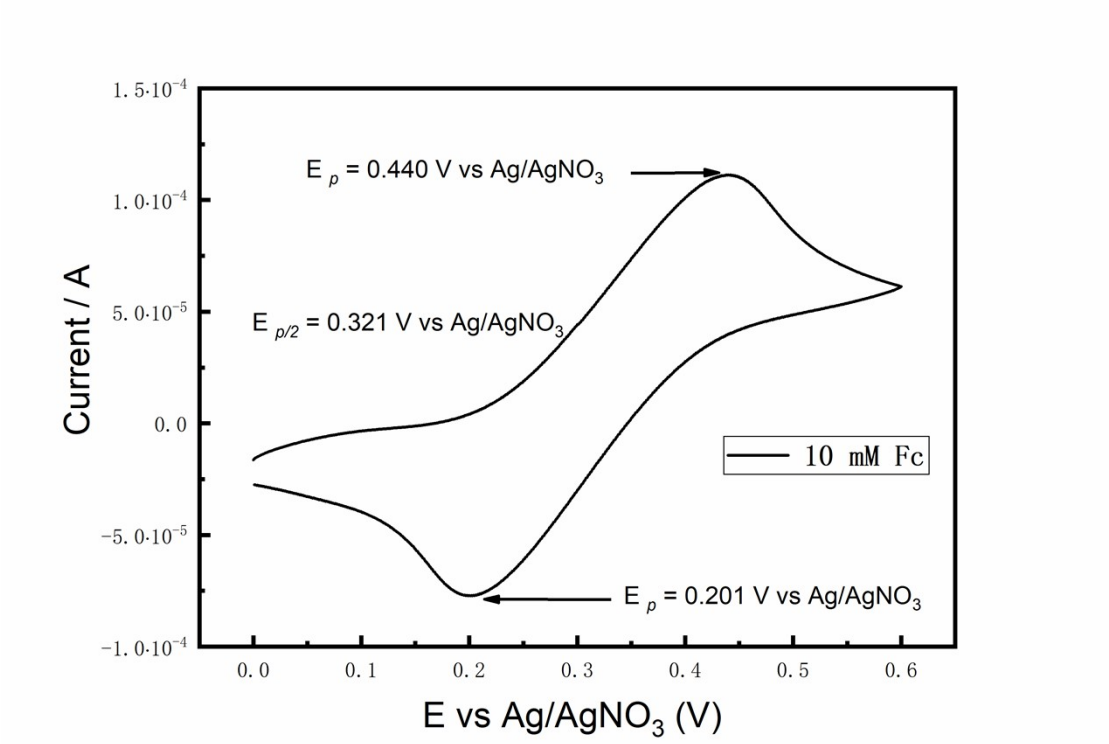


Figure S3. Cyclic voltammograms of 10 mM Ferrocene, DMSO solvent, 0.1M $LiClO_4$ supporting electrolyte, GC working electrode, 100 mV/s scan rate.

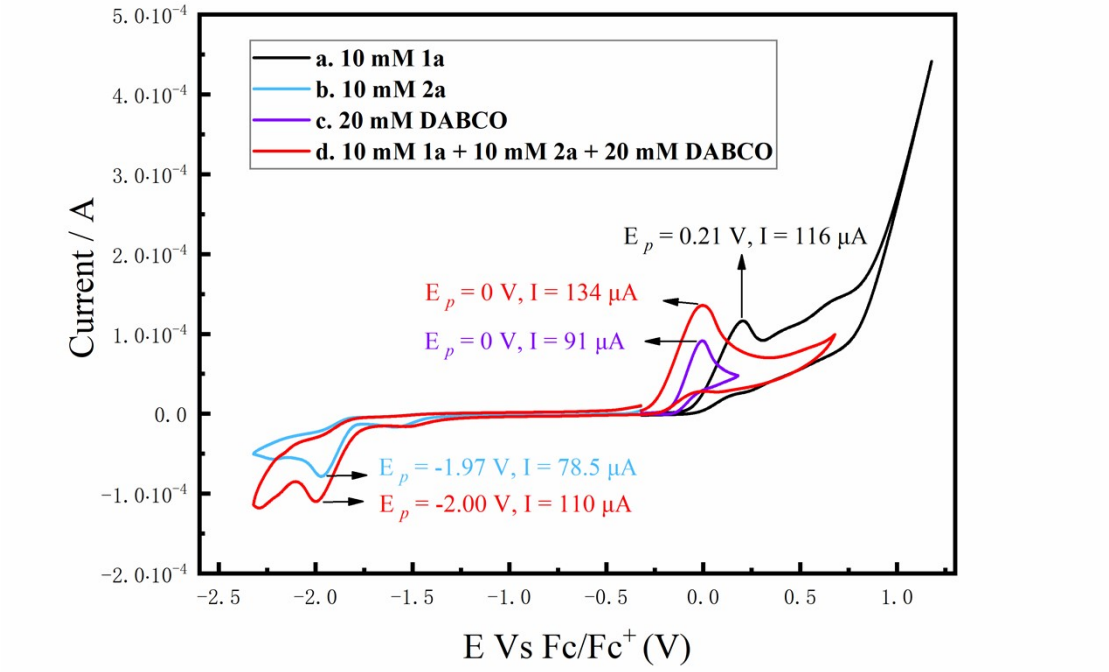


Figure S4. Cyclic voltammograms. a) 10 mM **1a**. c) 10 mM **2a**. c) 20 mM **DABCO**. d) 10 mM **1a** + 10 mM **2a** + 20 mM **DABCO**. Scan rate: 100 mv/s.

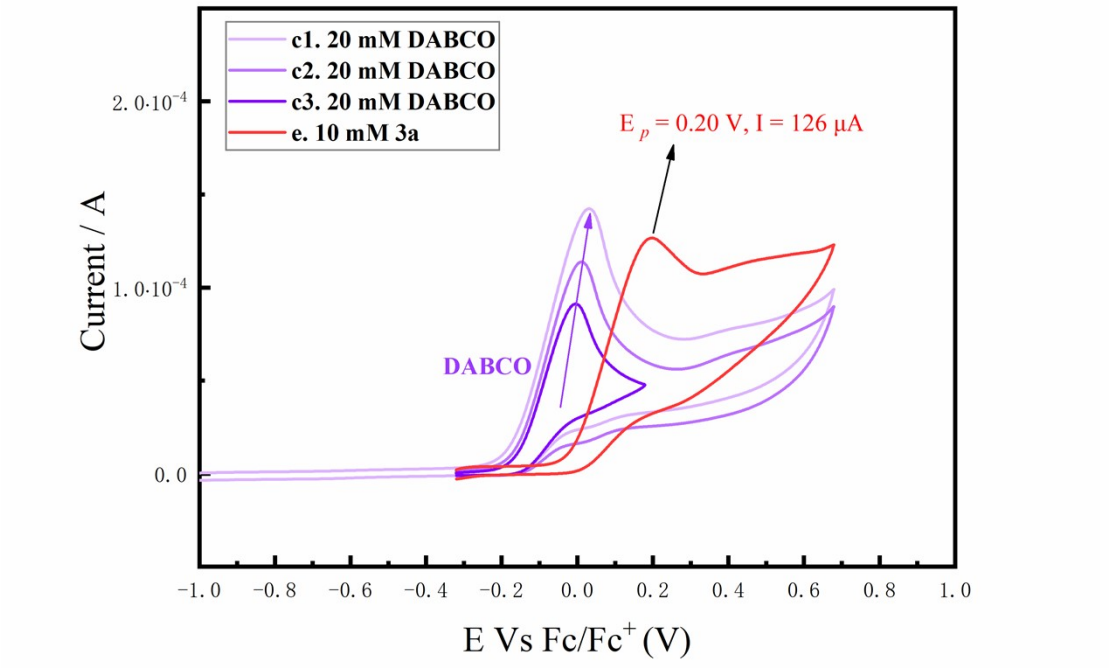


Figure S5. Cyclic voltammograms. c1) 20 mM **DABCO** (-1.0 ~ 0.7 V vs Fc/Fc^+). c2) 20 mM **DABCO** (-0.3~ 0.7 V vs Fc/Fc^+). c3) 20 mM **DABCO** (-0.3 ~ 0.2 V vs Fc/Fc^+). e) 10 mM **3a**. Scan rate: 100 mv/s.

6.3 Voltage Monitoring Experiments.

According to the general procedure, however the undivided cell was equipped with graphite felt anode (10 mm × 10 mm × 5 mm), nickel cathode (10 mm × 10 mm × 1.5 mm) and $Ag/AgNO_3$ as reference electrode, the real-time potential of reaction was monitored under standard conditions.

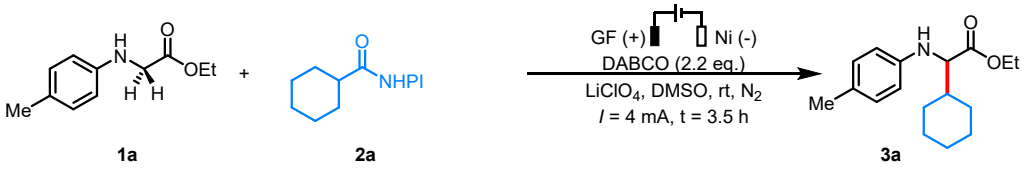


Table S11. Voltage of the reaction at different time under standard conditions.

Time (min)	0	5	10	20	30	60	120	180	210
Voltage of anode	0.21	0.25	0.26	0.27	0.27	0.27	0.30	0.29	0.29
Voltage of cathode	-1.38	-1.40	-1.45	-1.40	-1.45	-1.48	-1.45	-1.55	-1.50

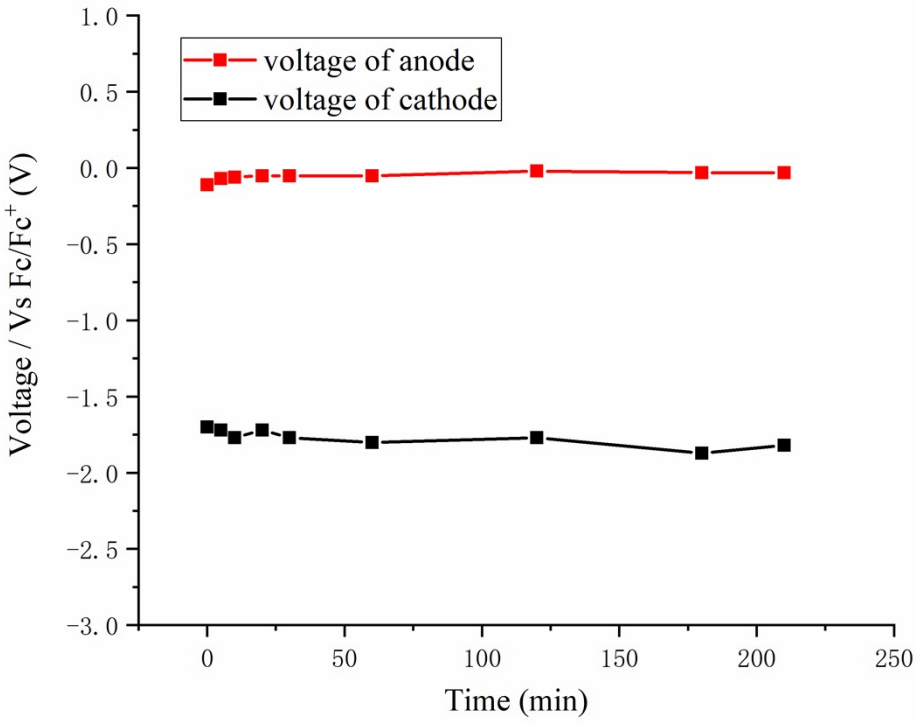


Figure S6. Voltage monitoring of the reaction under standard conditions.

The anode potential was around 0 V *vs* Fc/Fc^+. The cathode potential was around -1.8 V *vs* Fc/Fc^+.

7. References.

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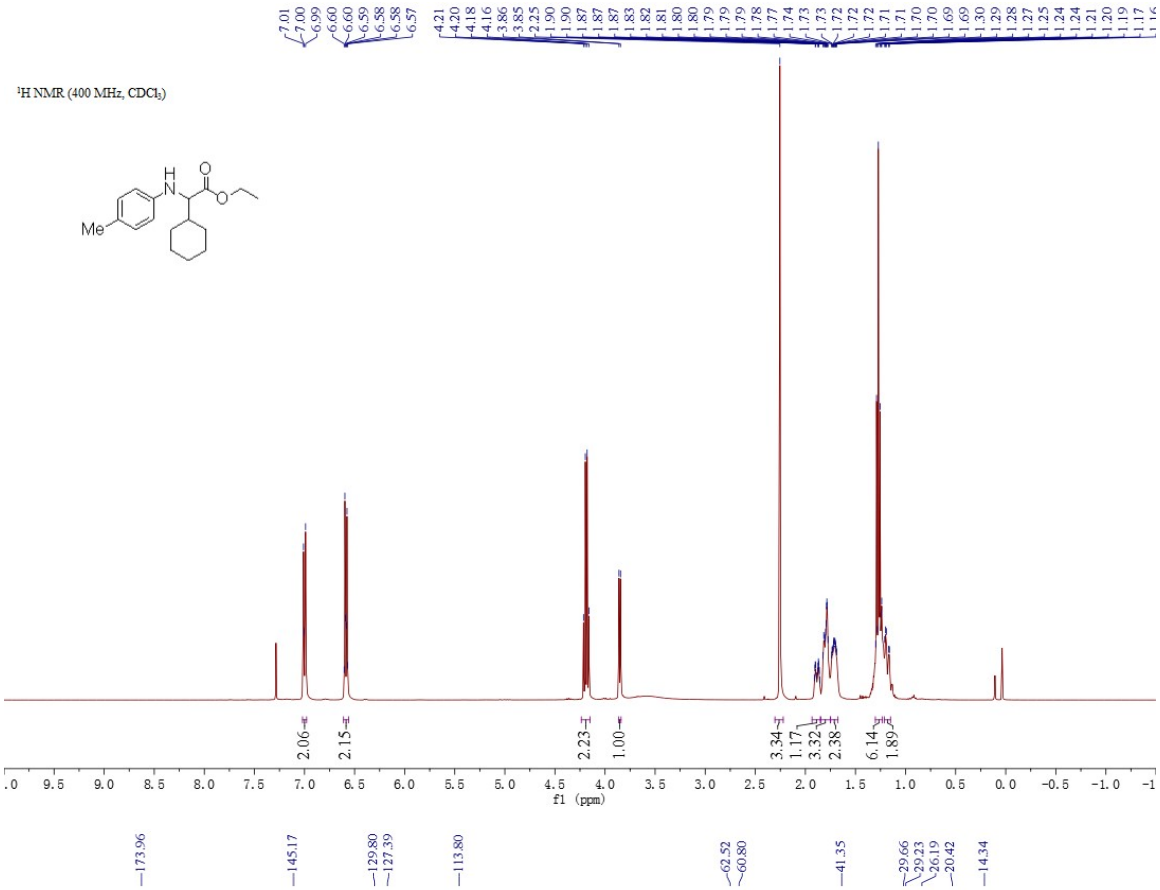
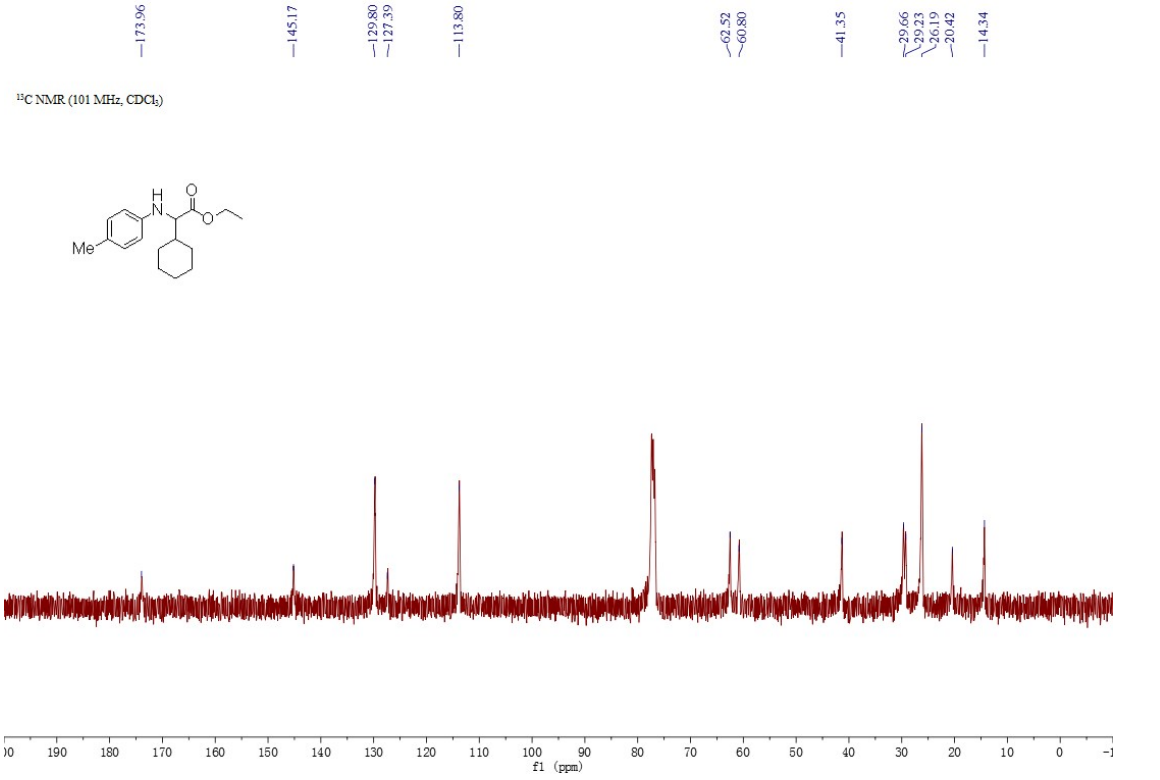
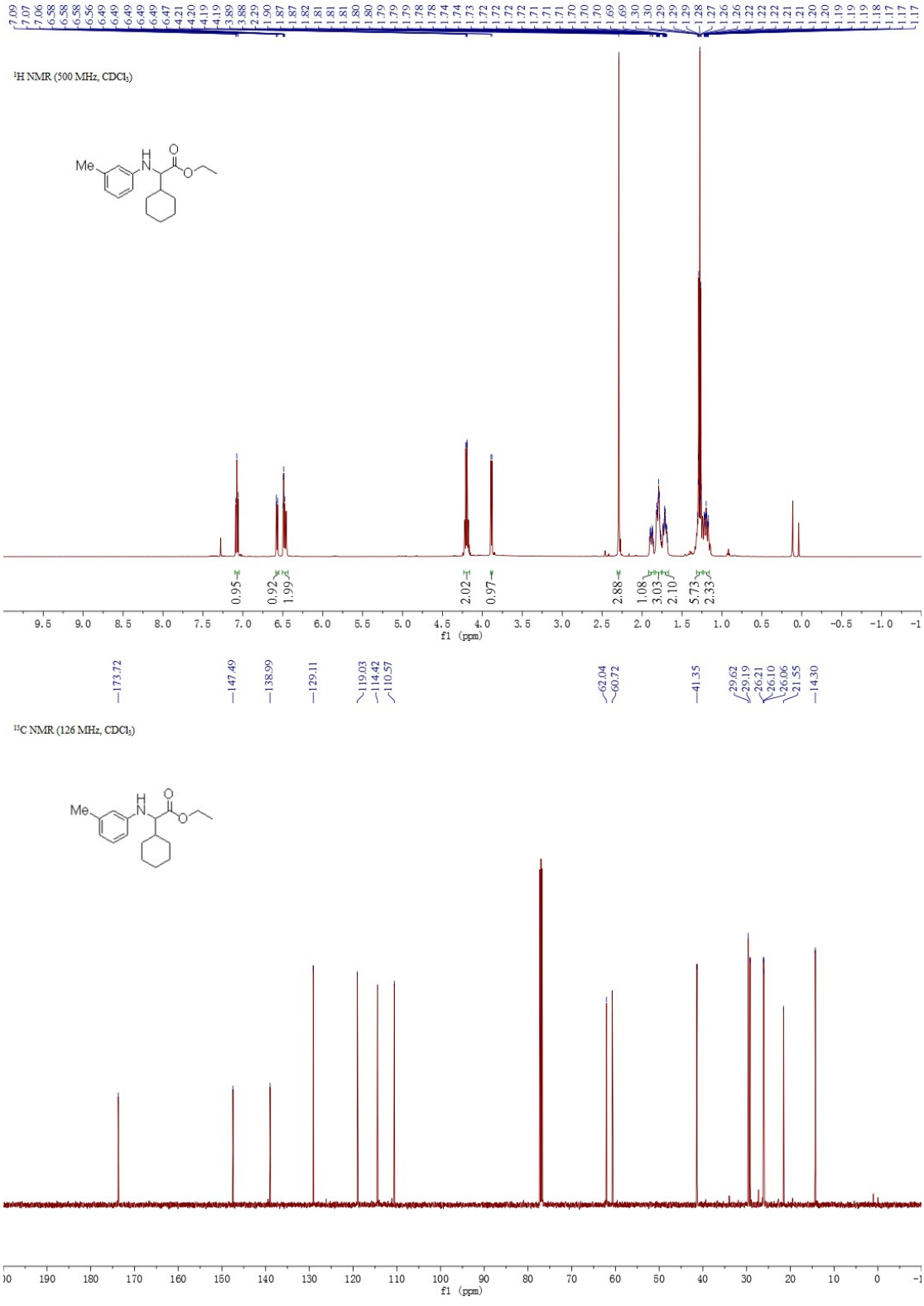
8. NMR spectra of all compounds.

Ethyl 2-cyclohexyl-2-(*p*-tolylamino)acetate (3a)

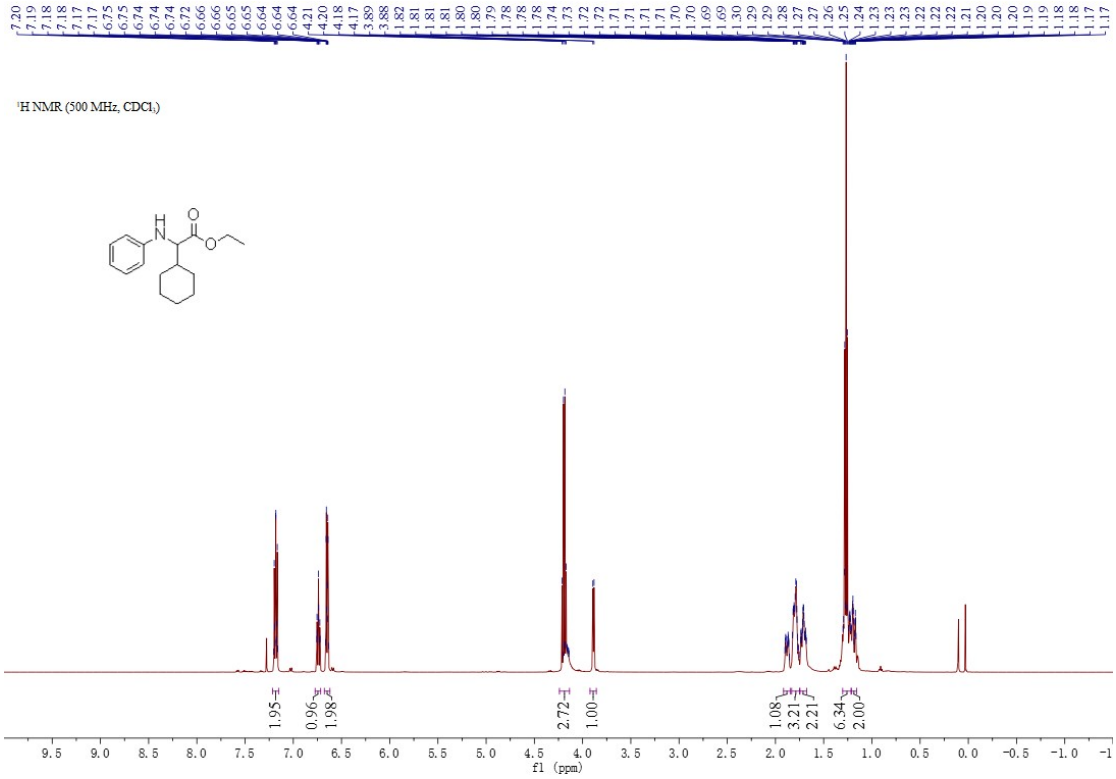


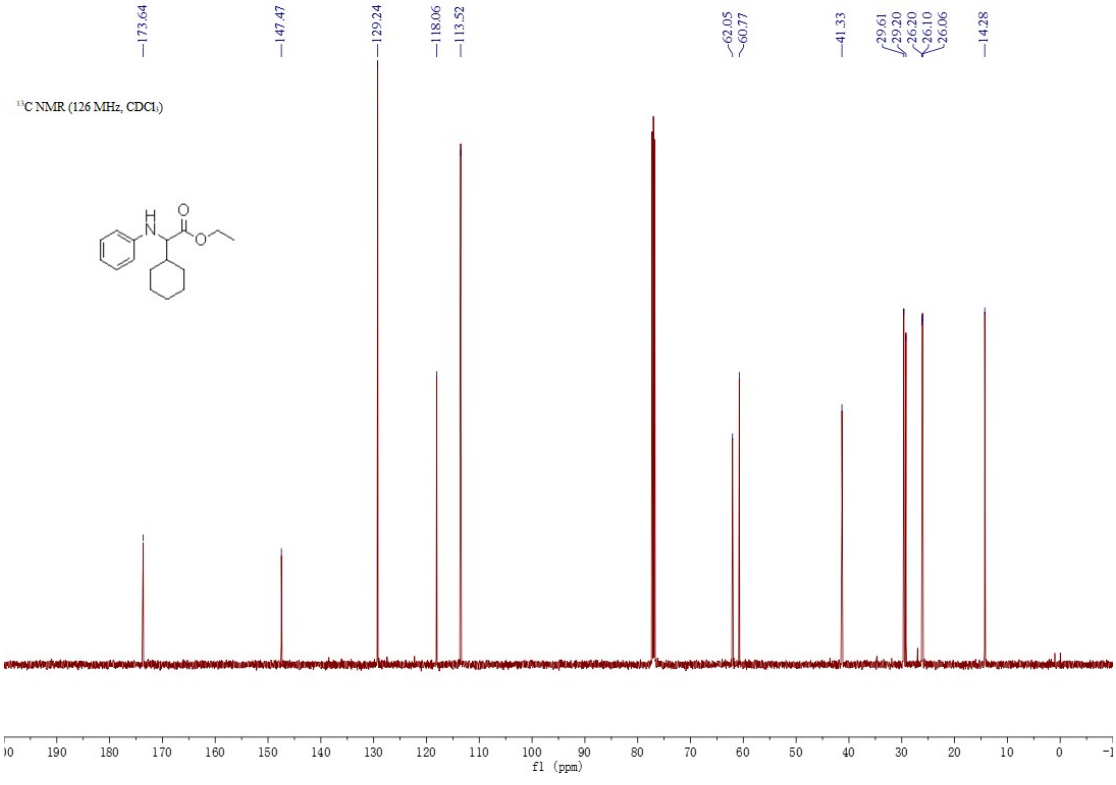


Ethyl 2-cyclohexyl-2-(*m*-tolylamino)acetate (3b)

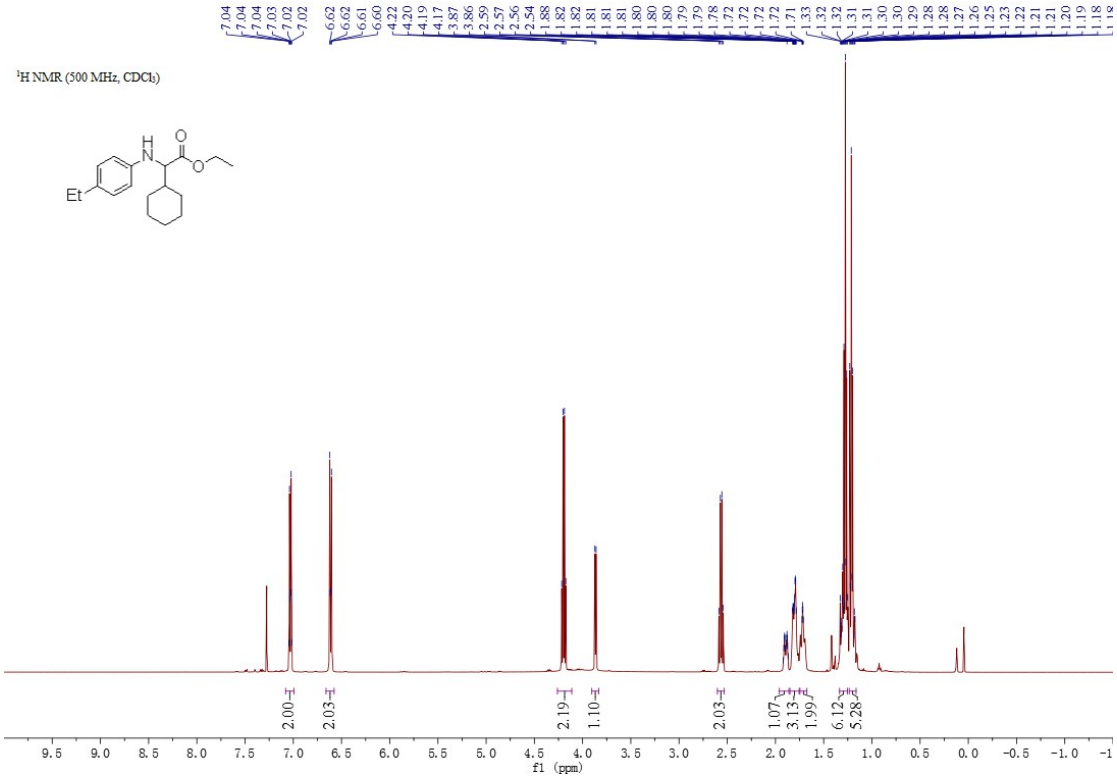


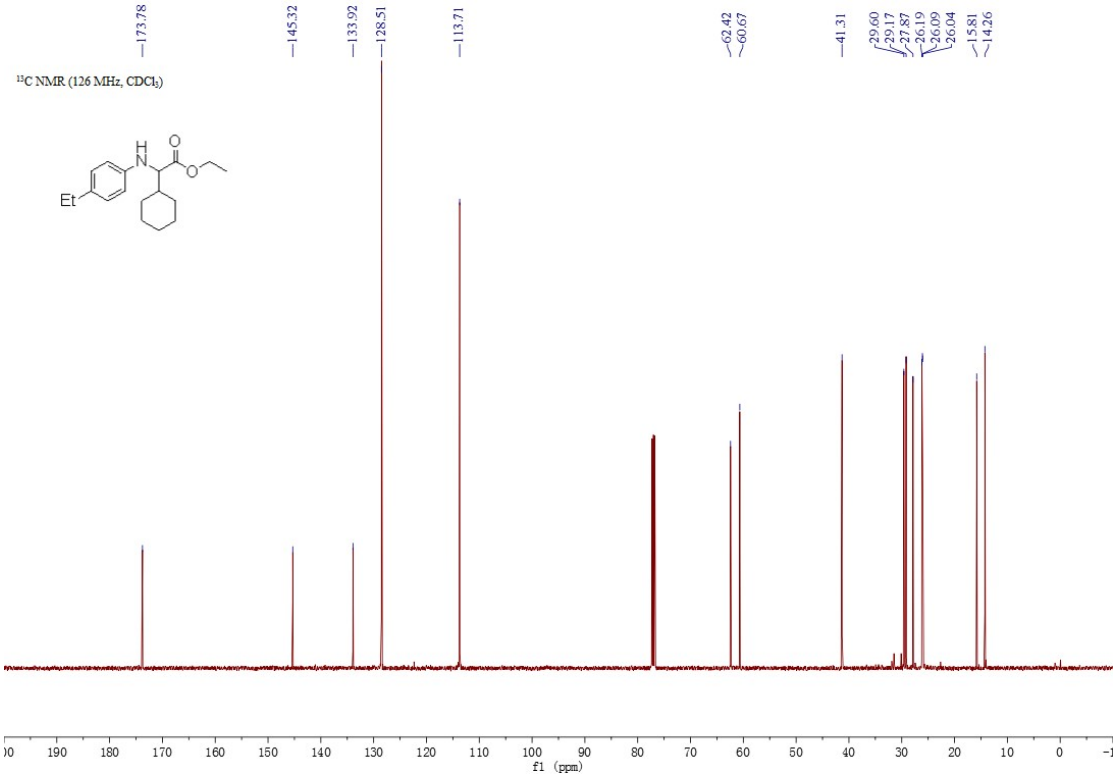
Ethyl 2-cyclohexyl-2-(phenylamino)acetate (3c)



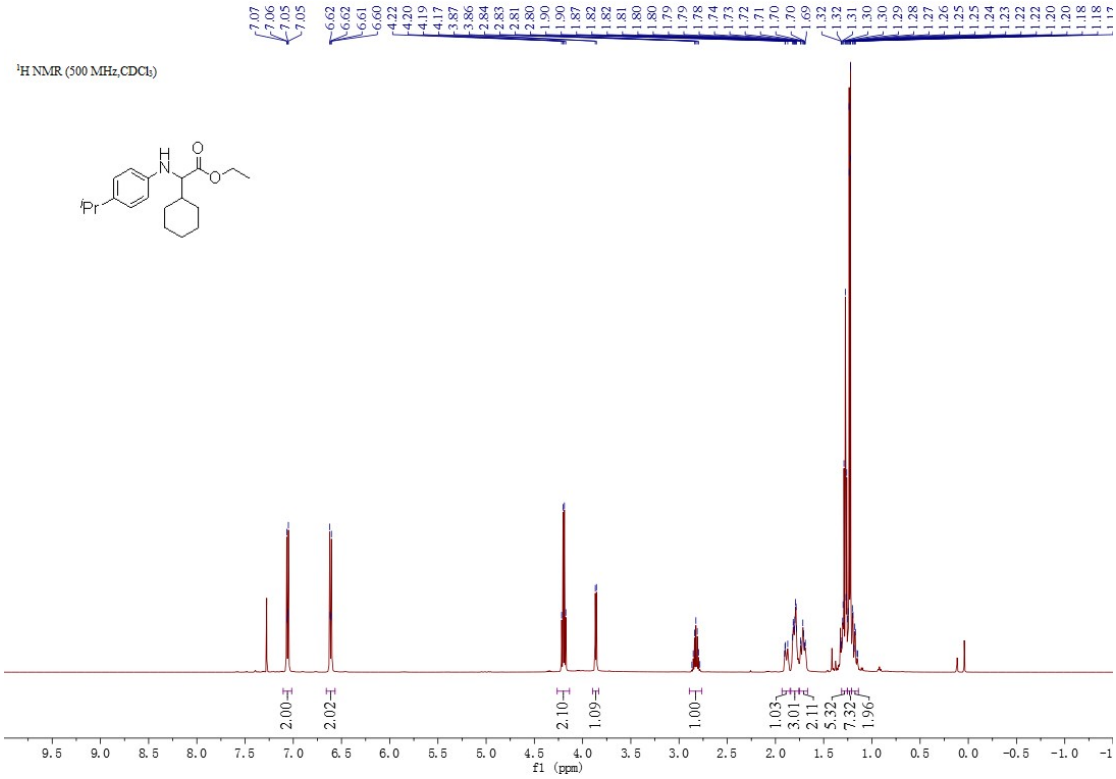


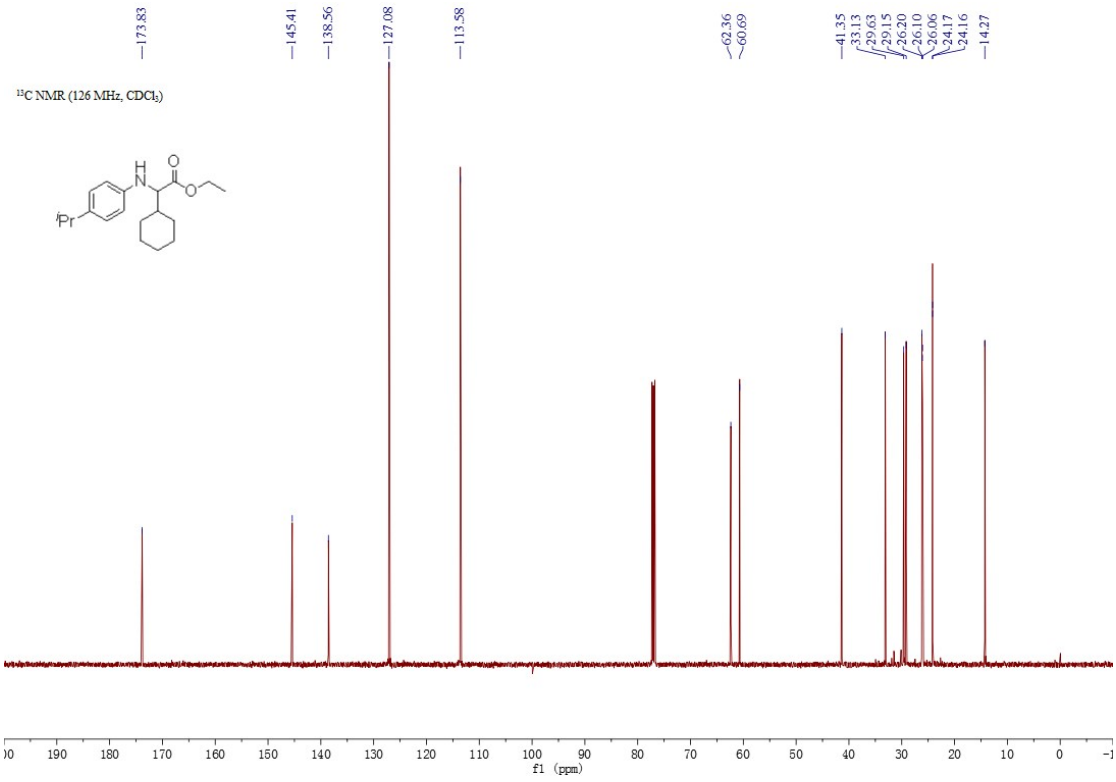
Ethyl 2-cyclohexyl-2-((4-ethylphenyl)amino)acetate (3d)



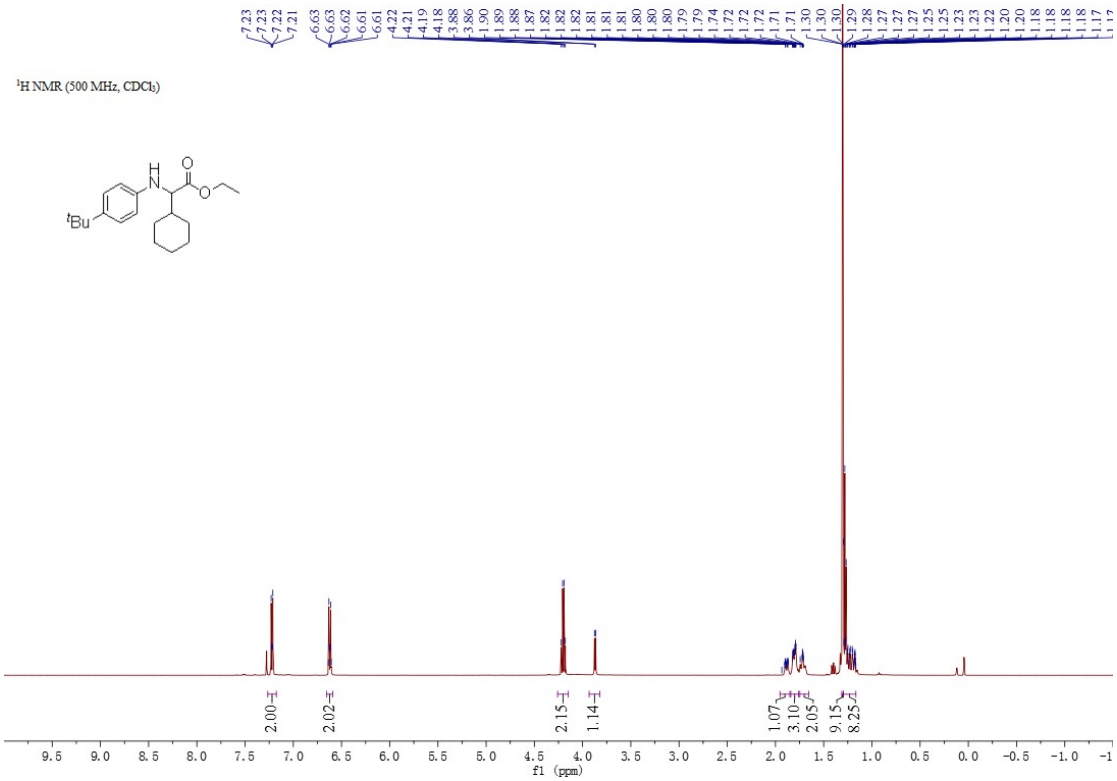


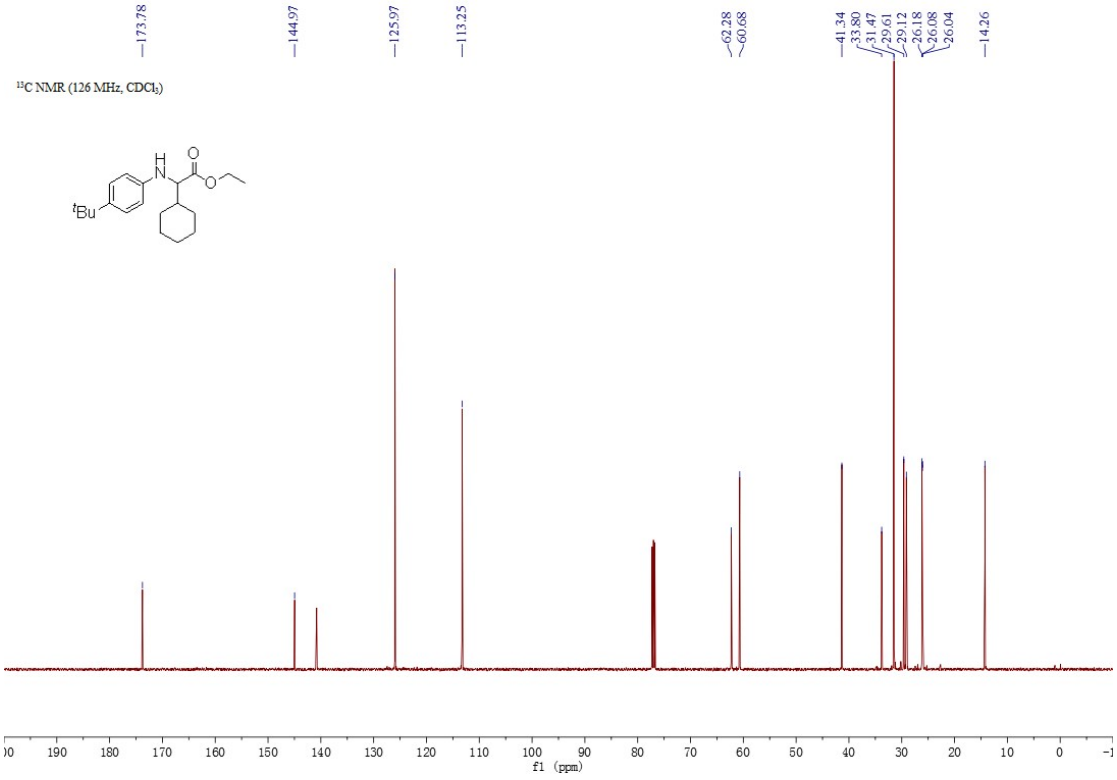
Ethyl 2-cyclohexyl-2-((4-isopropylphenyl)amino)acetate (3e)



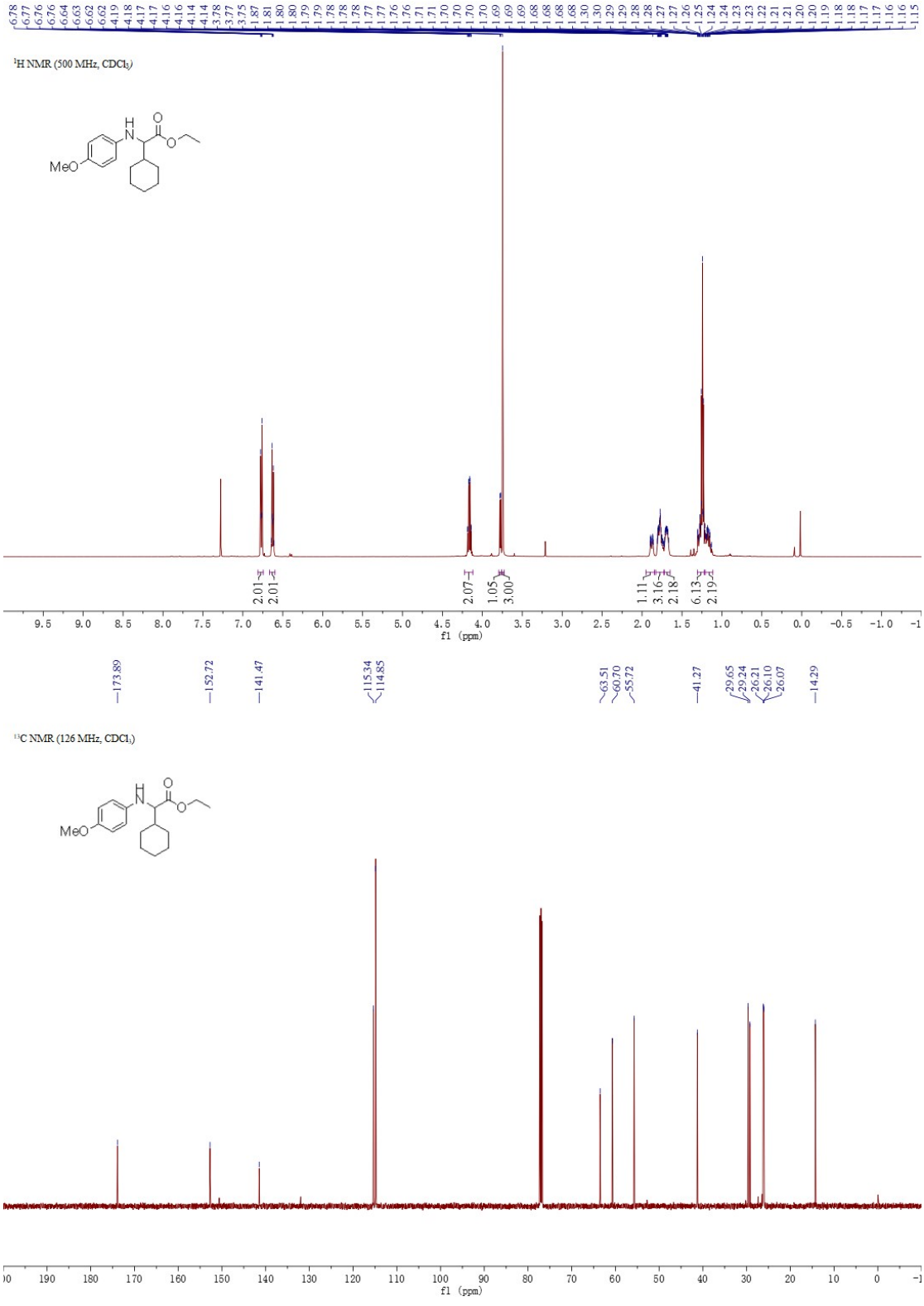


Ethyl 2-((4-(*tert*-butyl)phenyl)amino)-2-cyclohexylacetate (3f)

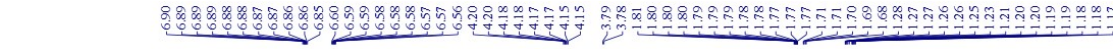




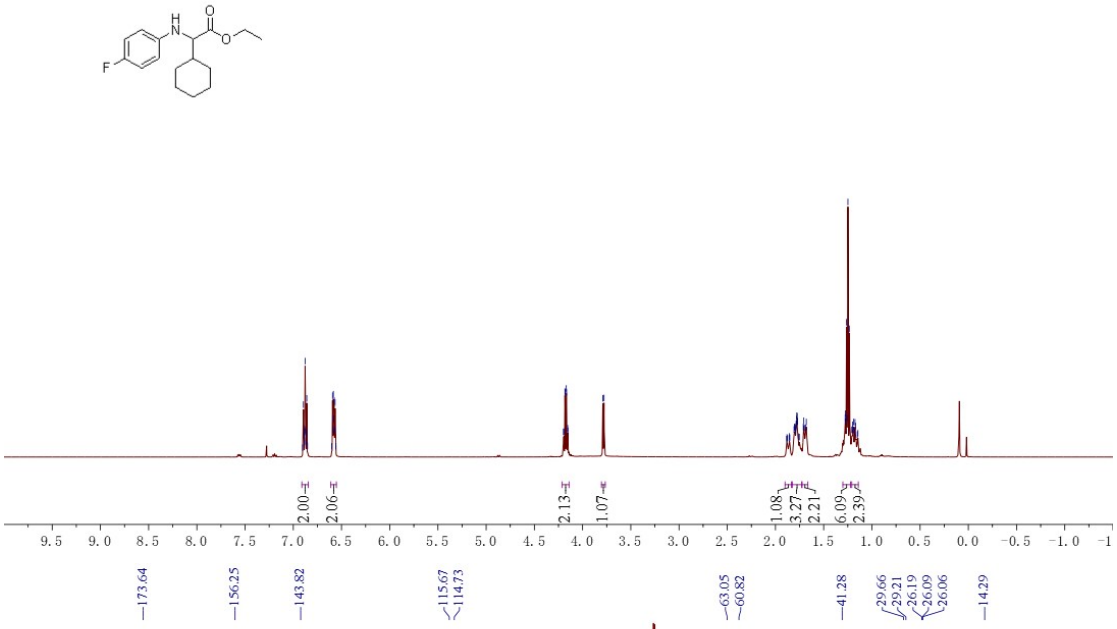
Ethyl 2-cyclohexyl-2-((4-methoxyphenyl)amino)acetate (3g)



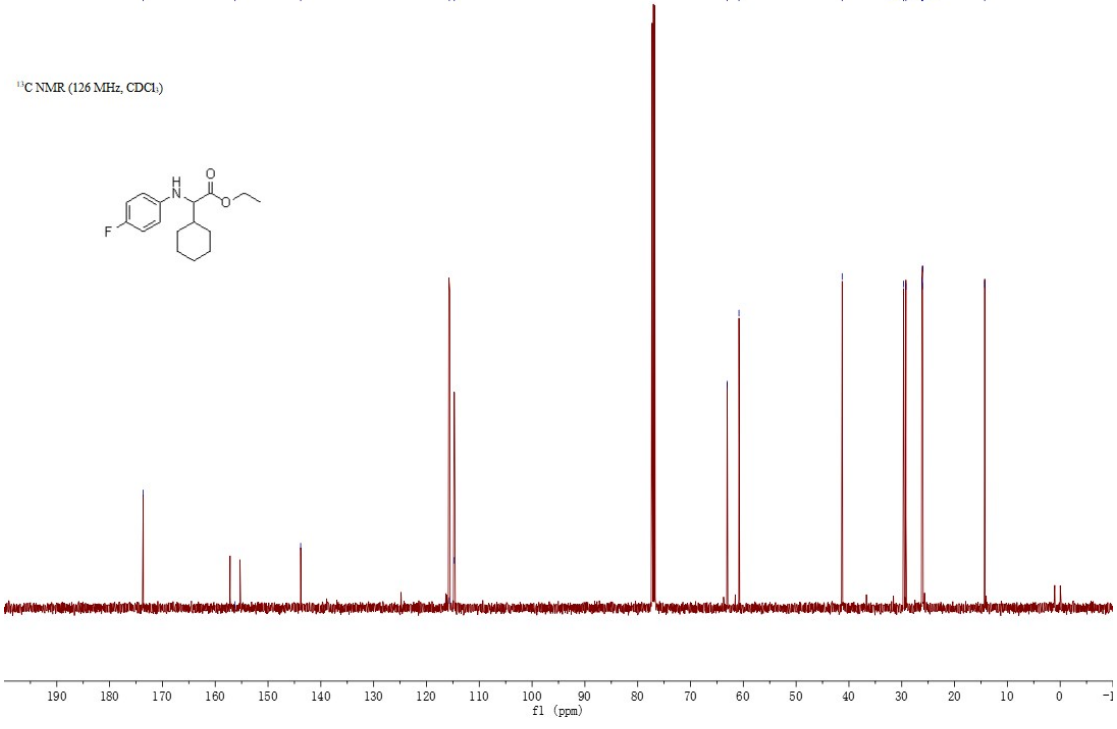
Ethyl 2-cyclohexyl-2-((4-fluorophenyl)amino)acetate (3h)



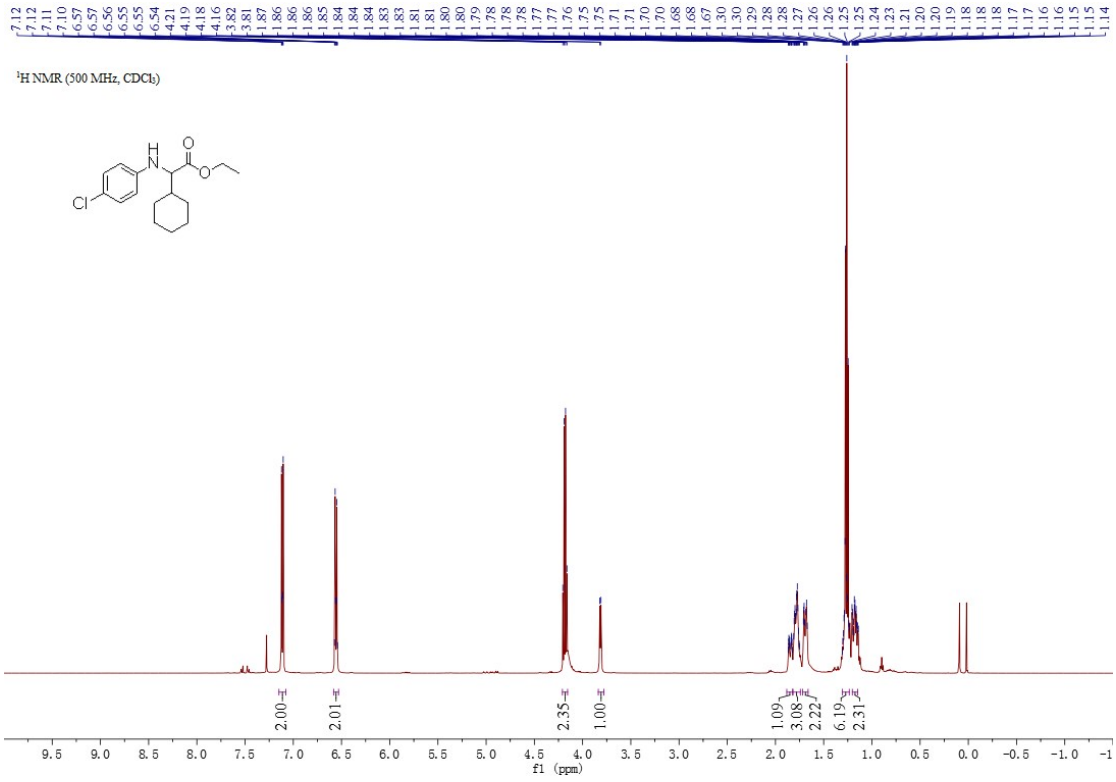
^{1}H NMR (500 MHz, $CDCl_3$)

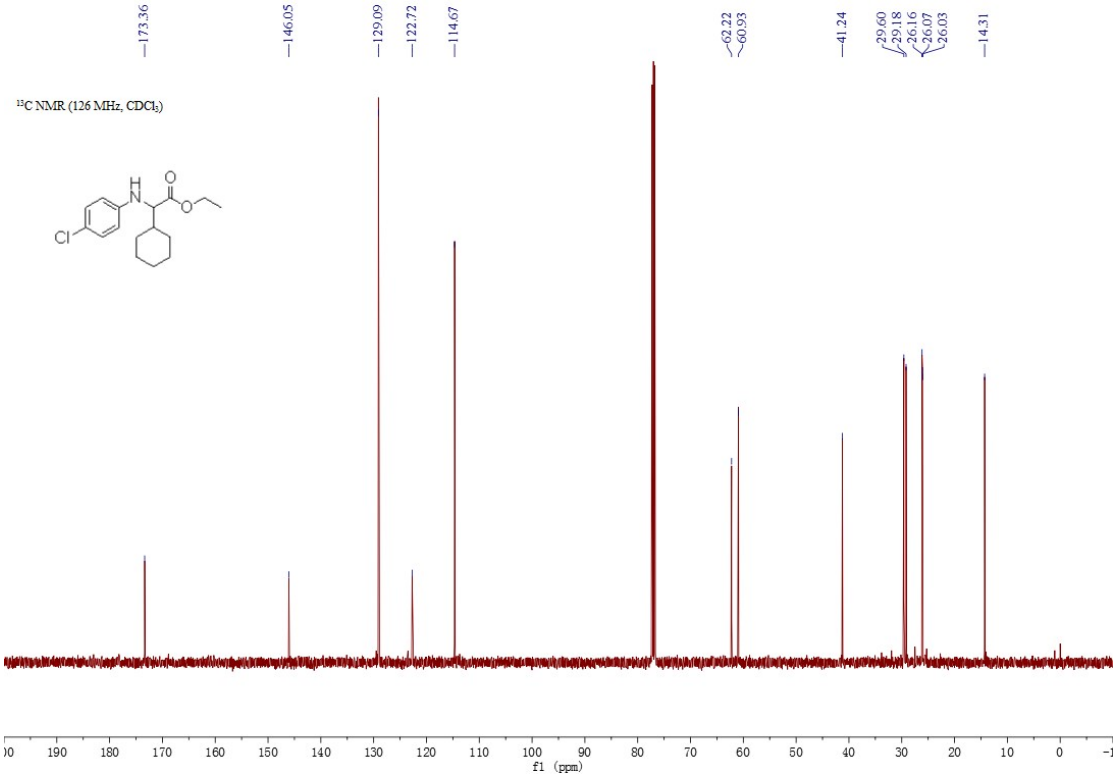


^{13}C NMR (126 MHz, $CDCl_3$)

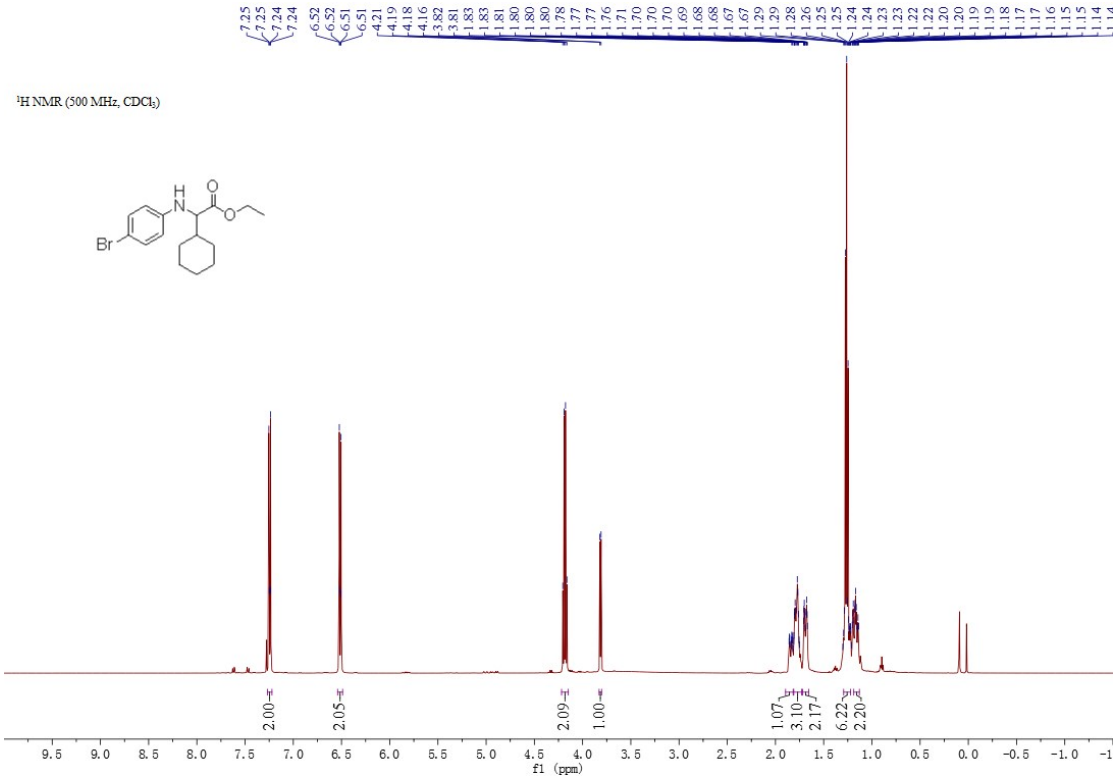


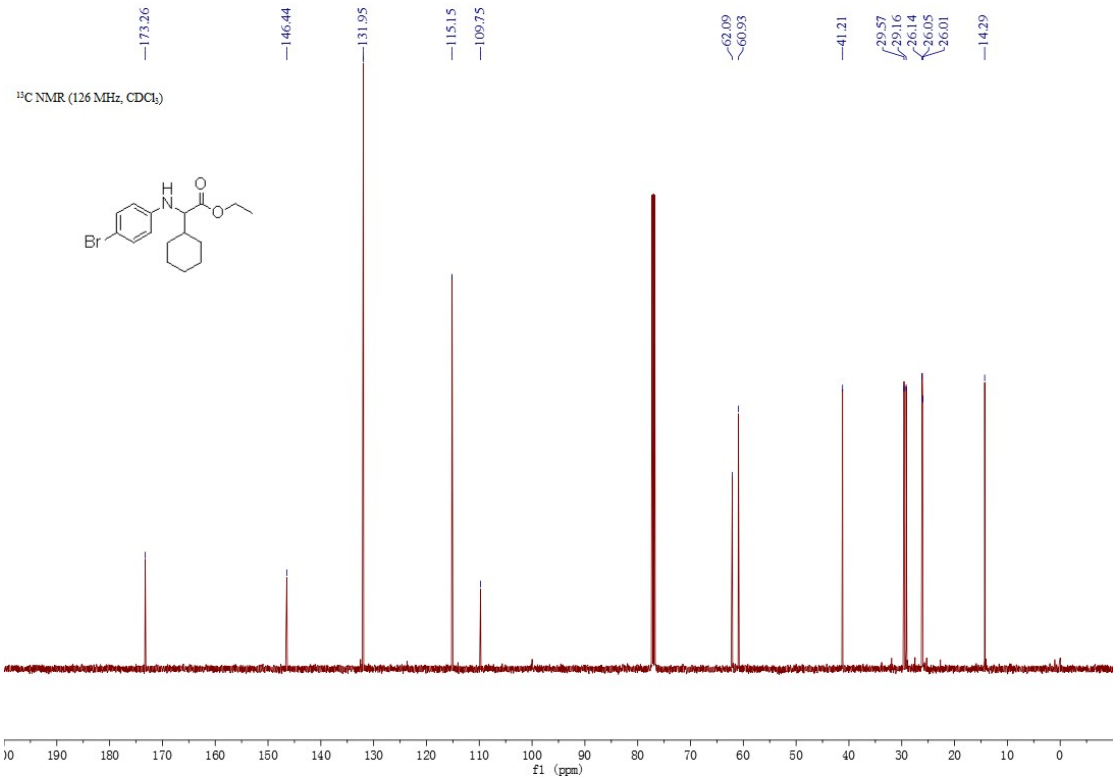
Ethyl 2-((4-chlorophenyl)amino)-2-cyclohexylacetate (3i)



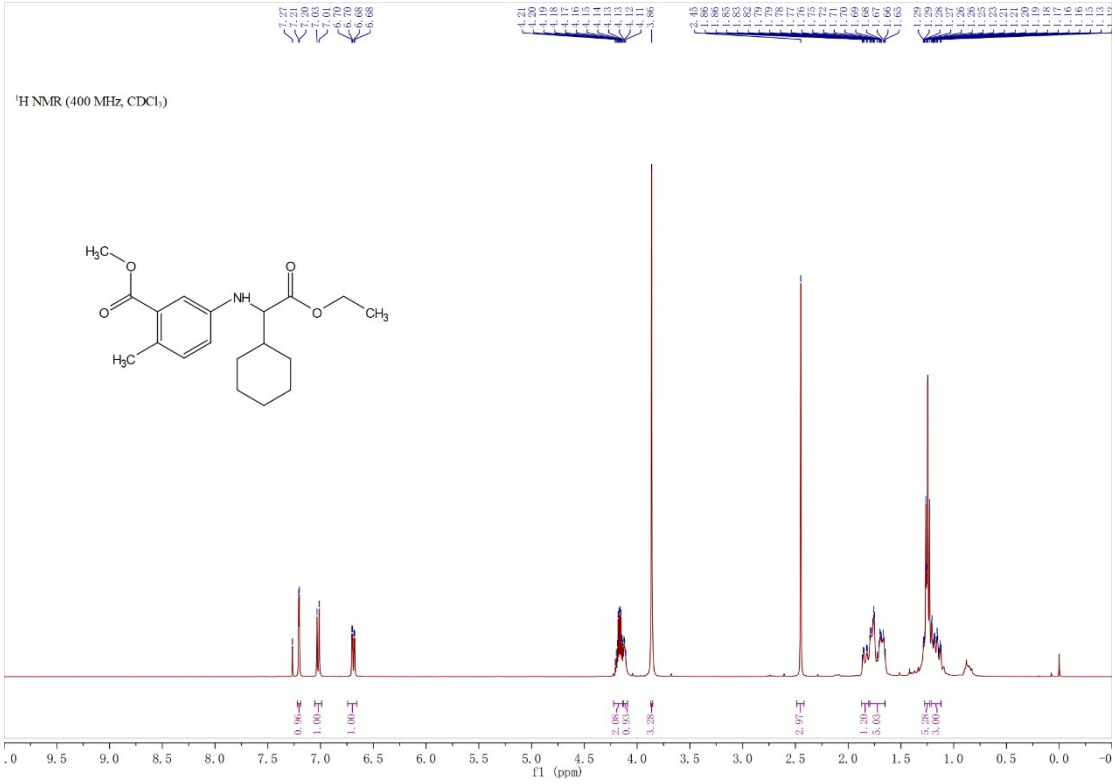


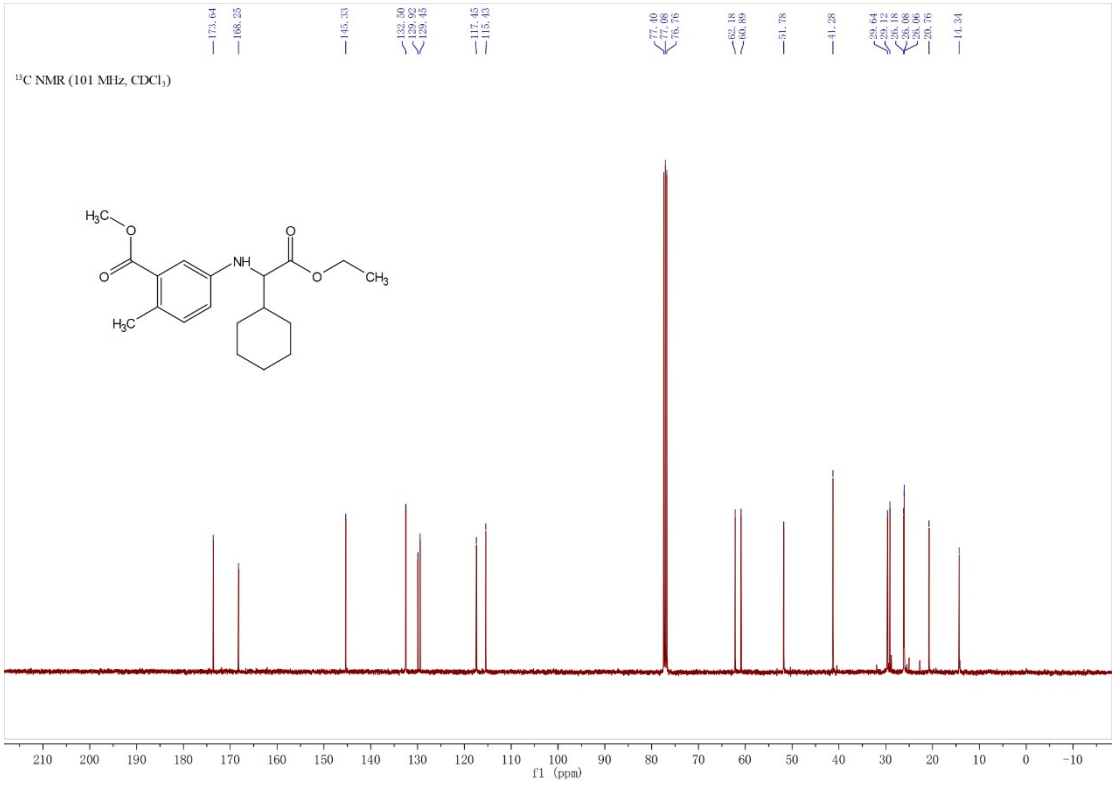
Ethyl 2-((4-bromophenyl)amino)-2-cyclohexylacetate (3j)



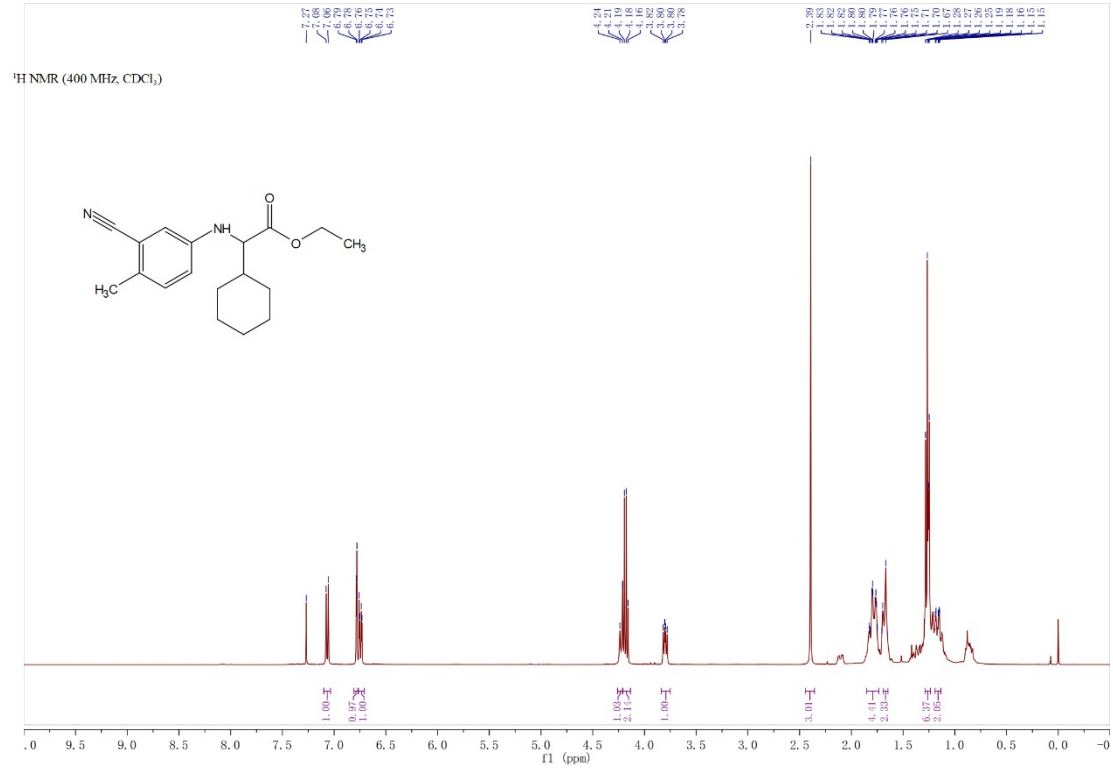


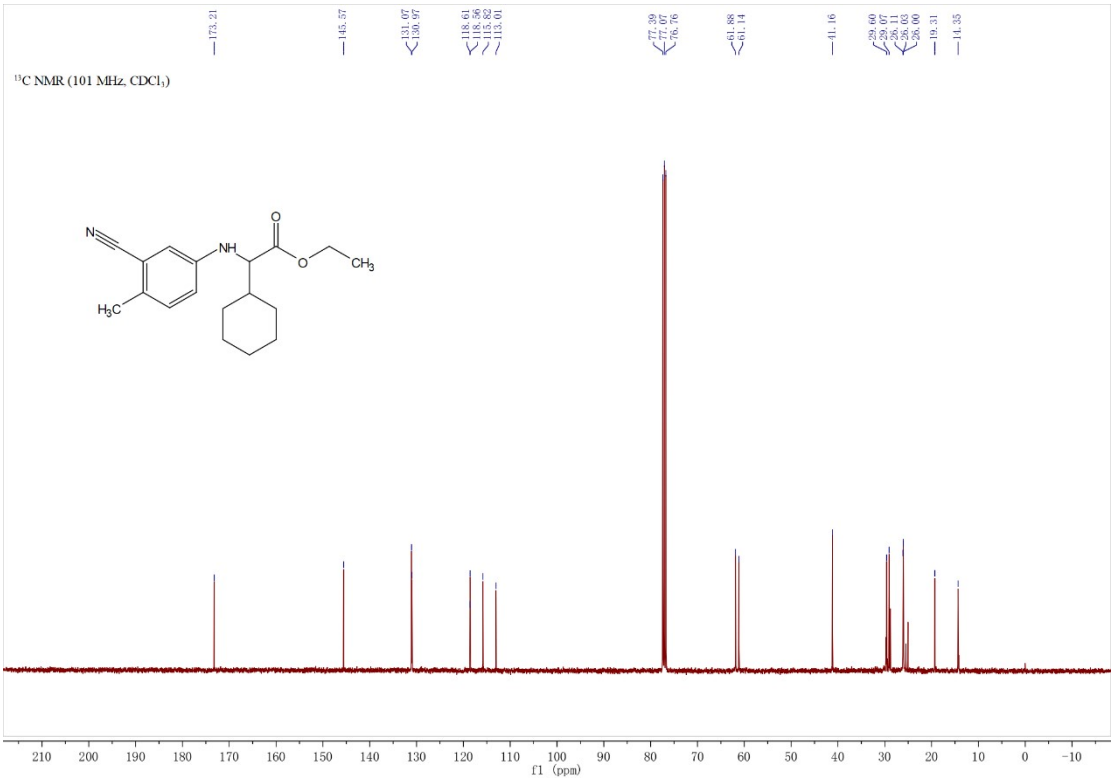
Methyl 5-((1-cyclohexyl-2-ethoxy-2-oxoethyl)amino)-2-methylbenzoate (3k)



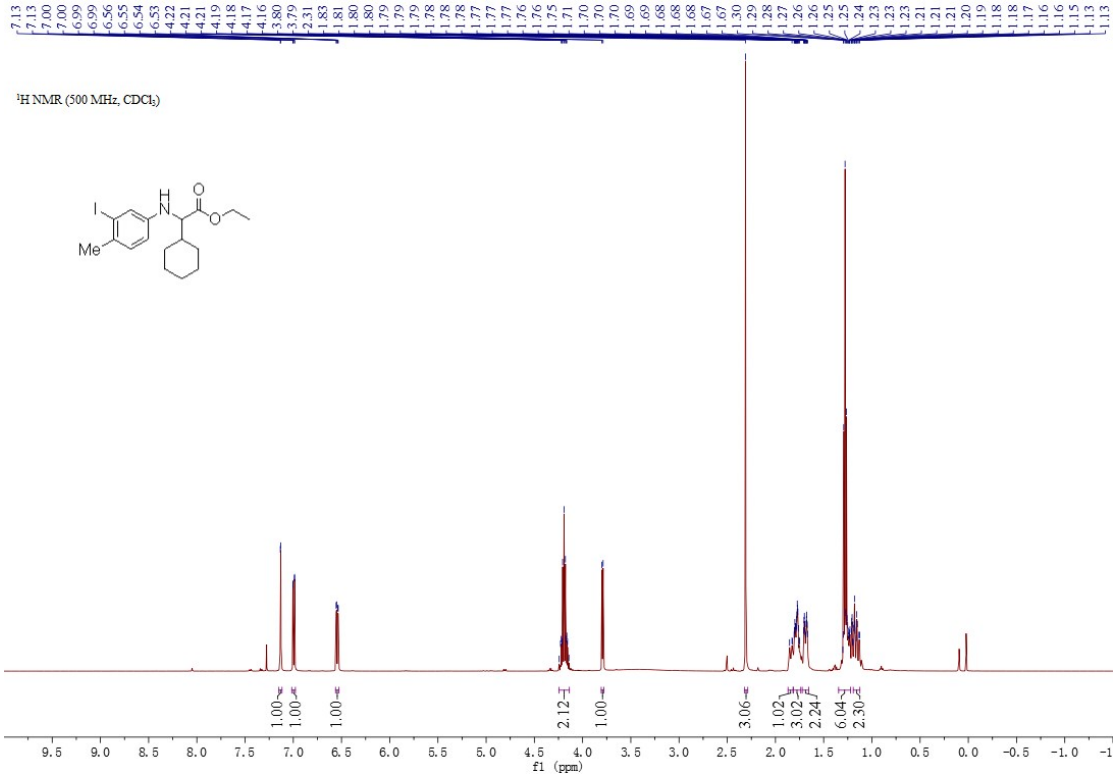


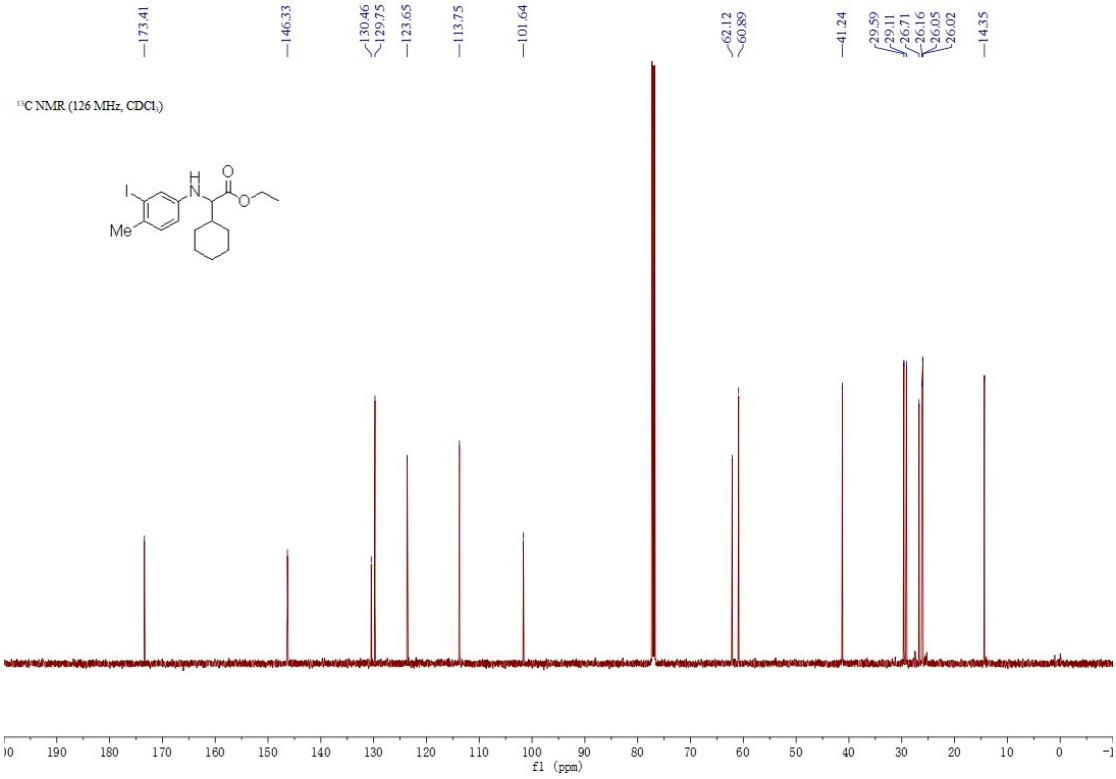
Ethyl 2-((3-cyano-4-methylphenyl)amino)-2-cyclohexylacetate (3l):





Ethyl 2-cyclohexyl-2-((3-iodo-4-methylphenyl)amino)acetate (3m)





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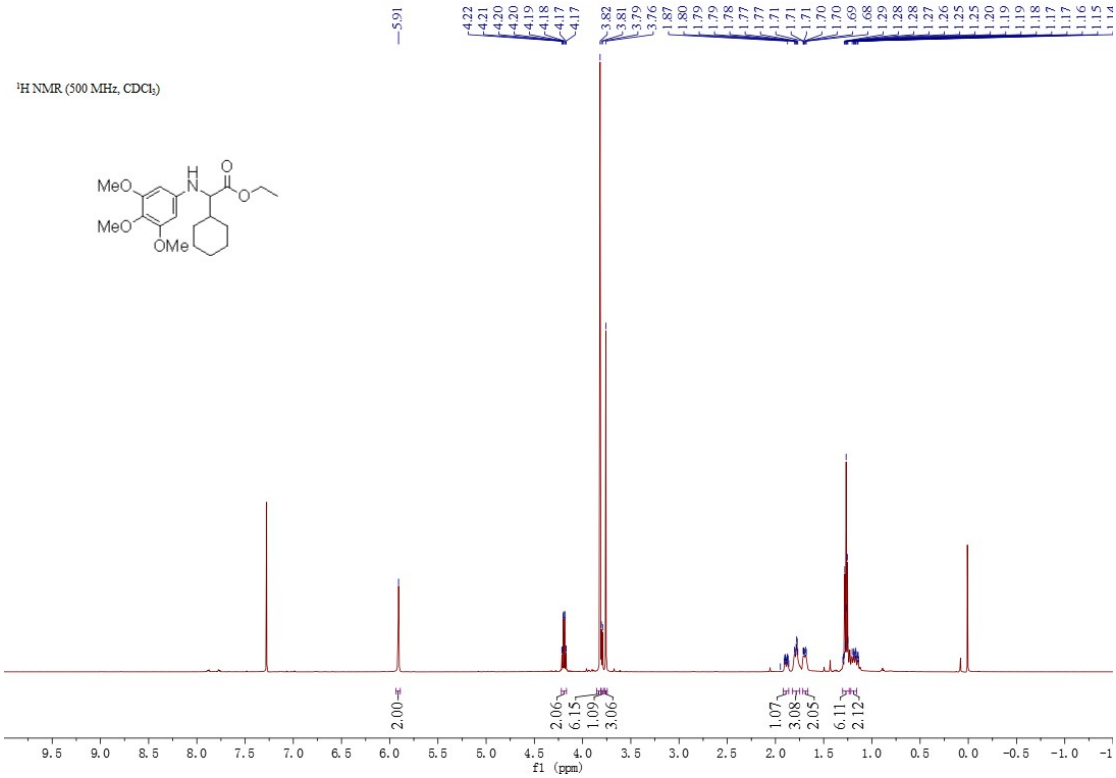
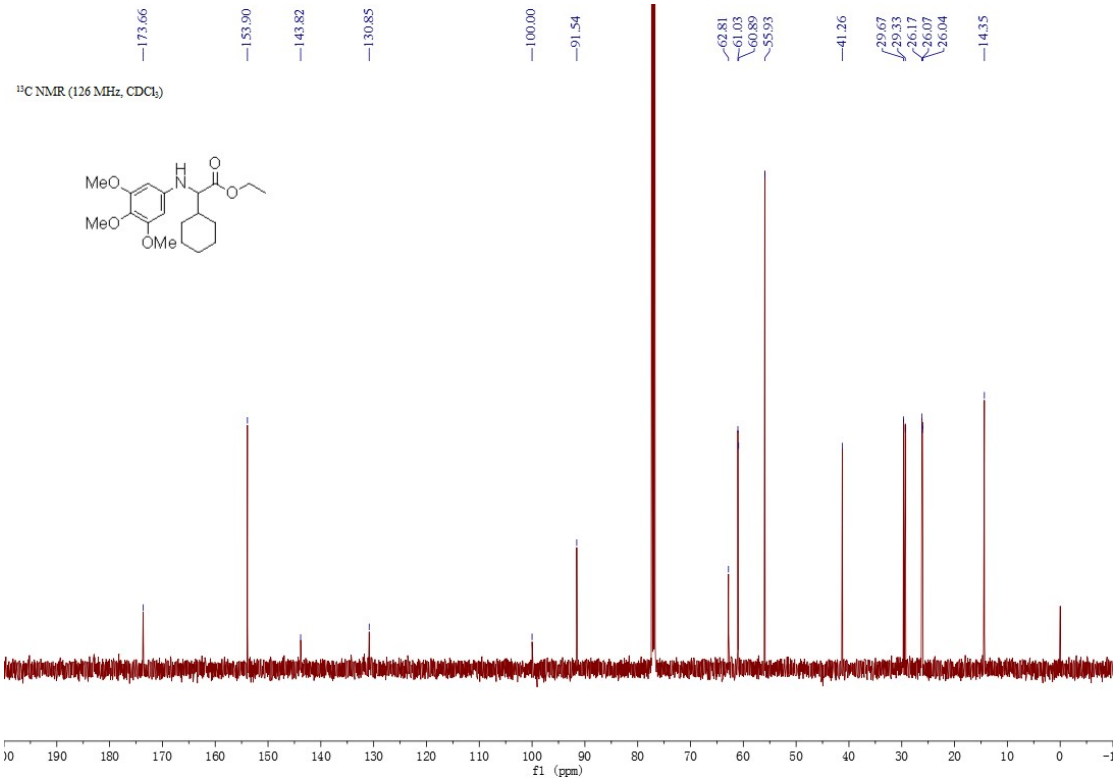
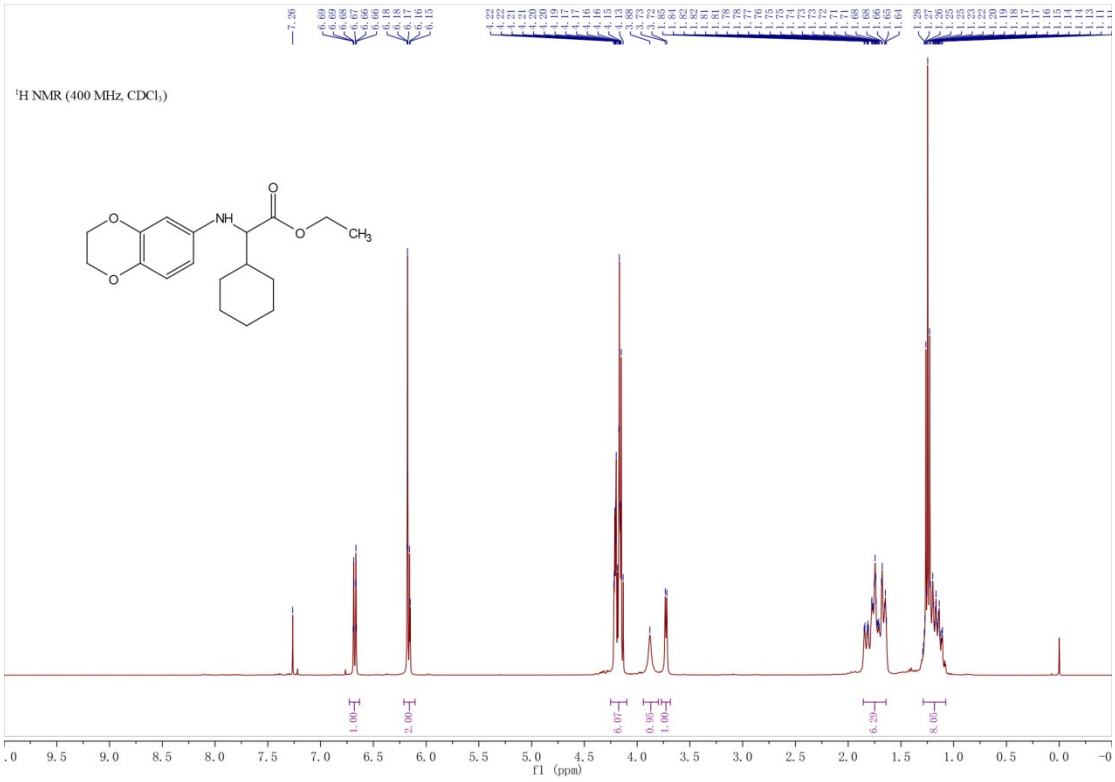
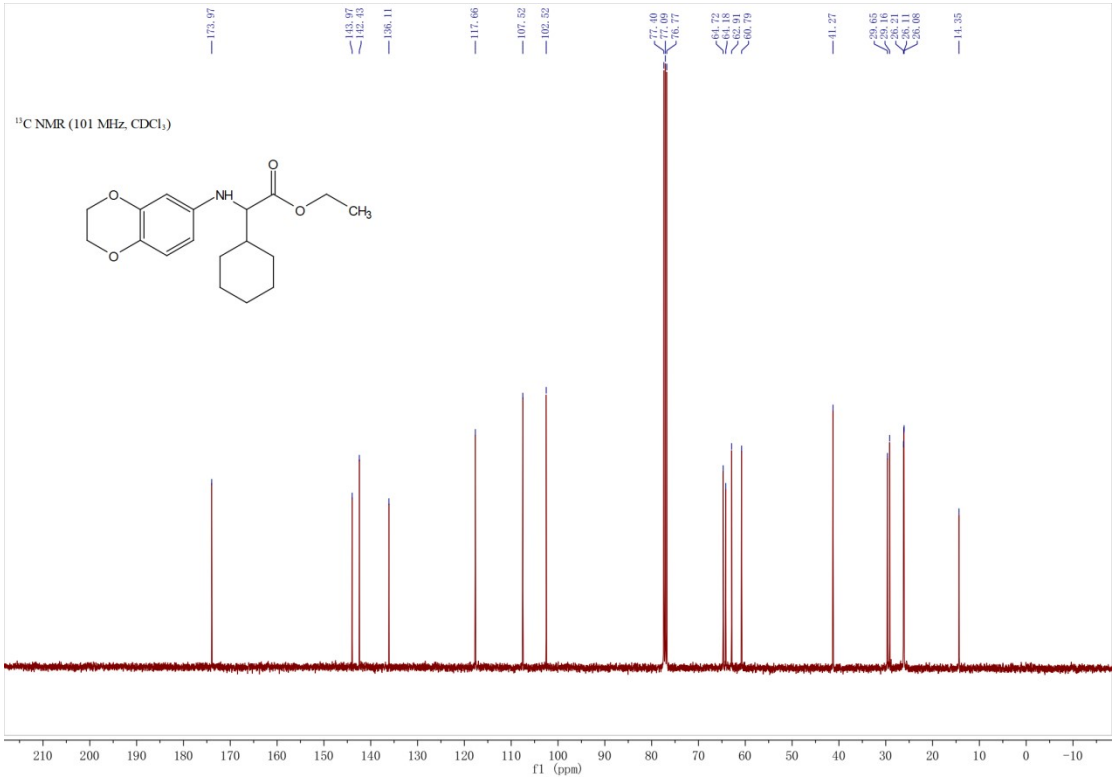


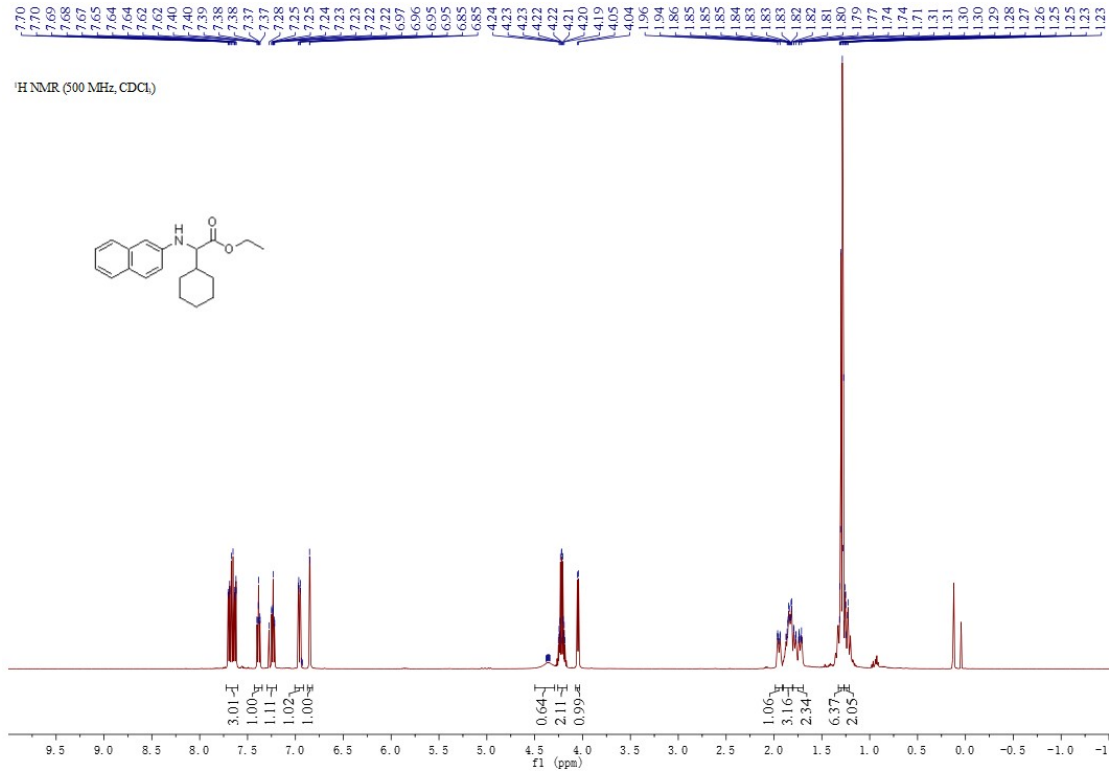


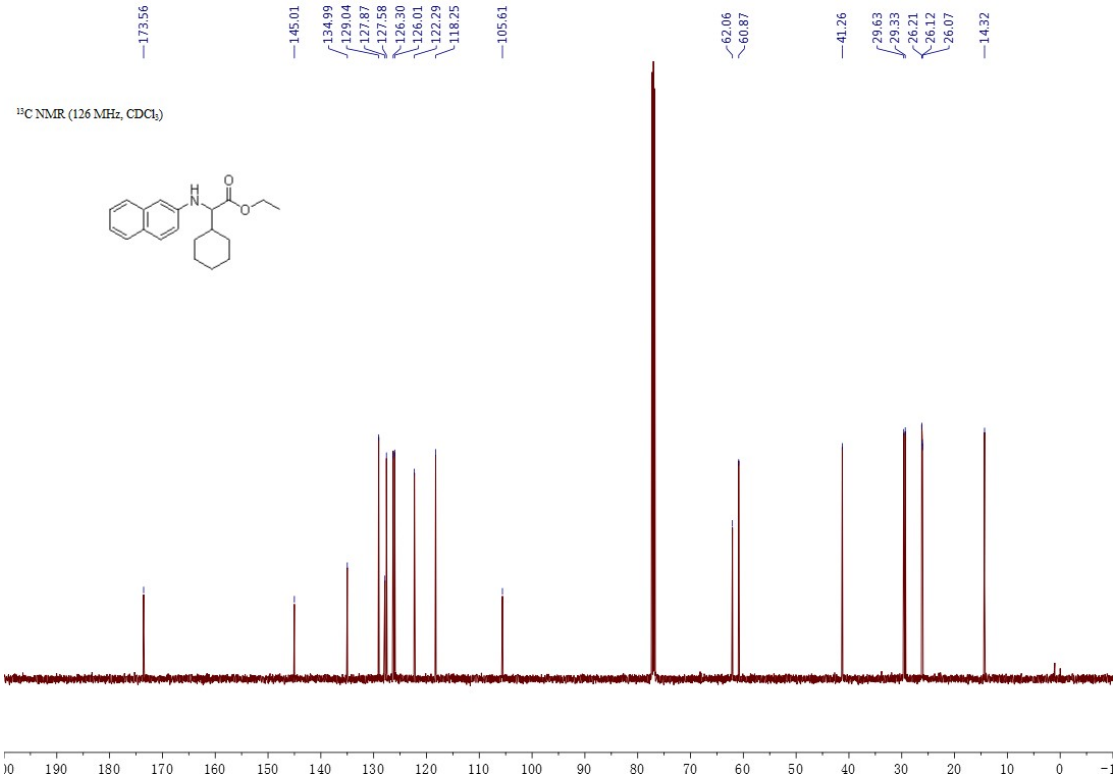
Ethyl 2-cyclohexyl-2-((2,3-dihydrobenzo[b][1,4]dioxin-6-yl)amino)acetate (3o):



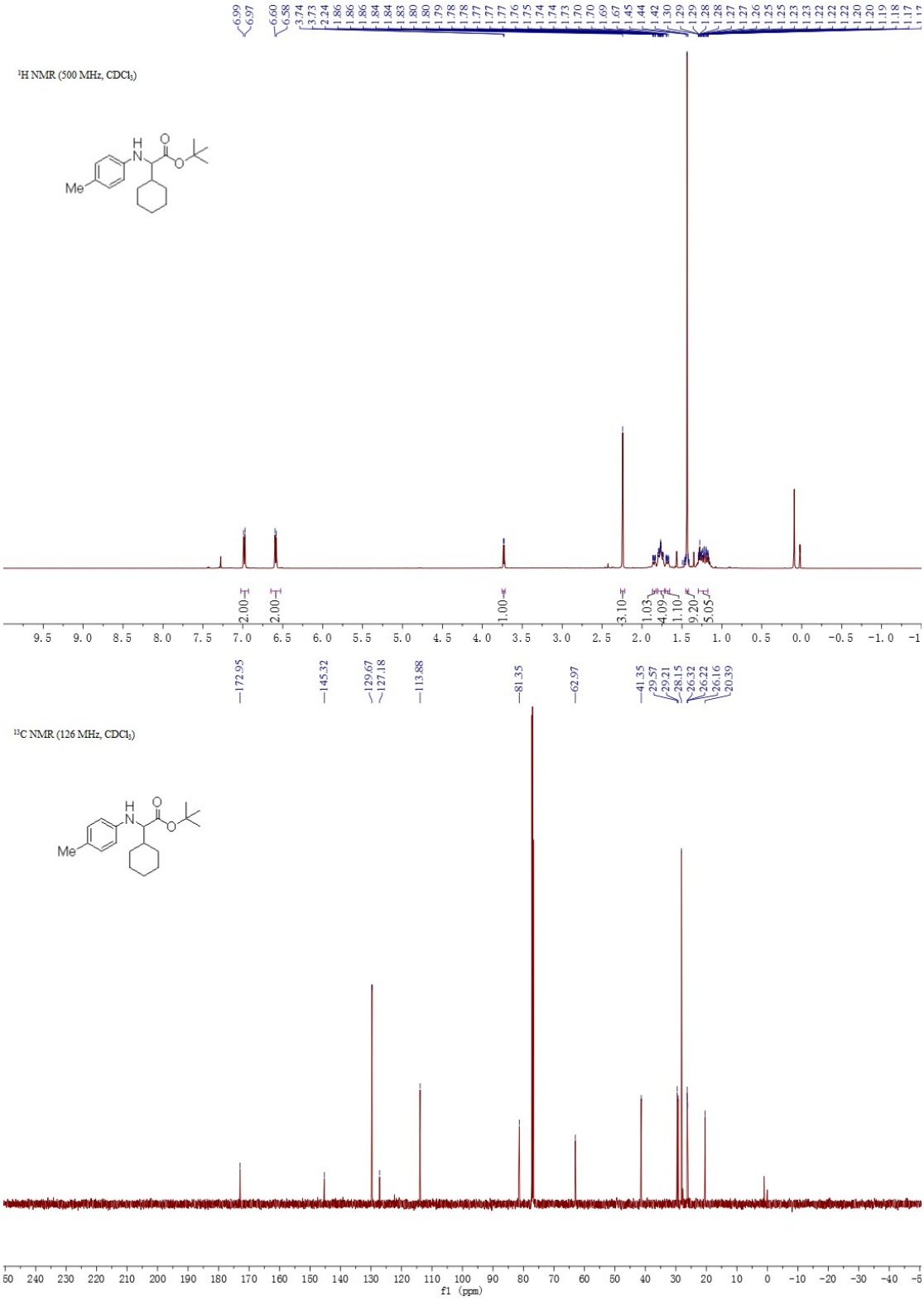


Ethyl 2-cyclohexyl-2-(naphthalen-2-ylamino)acetate (3p)

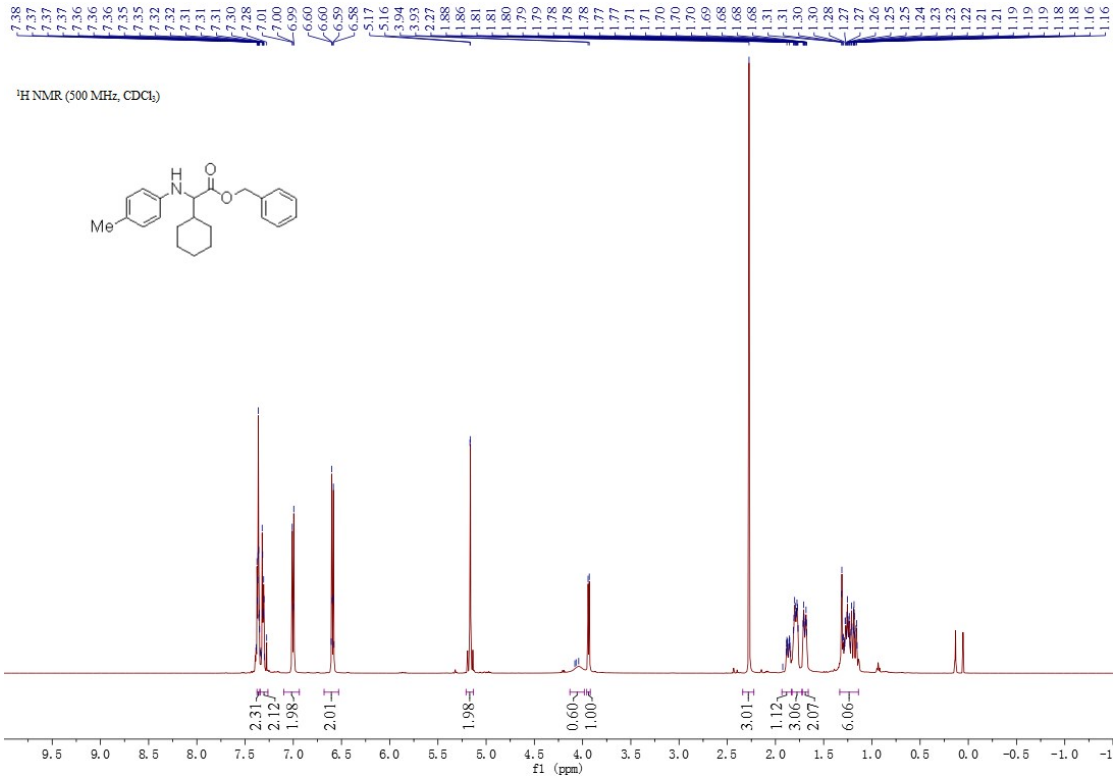


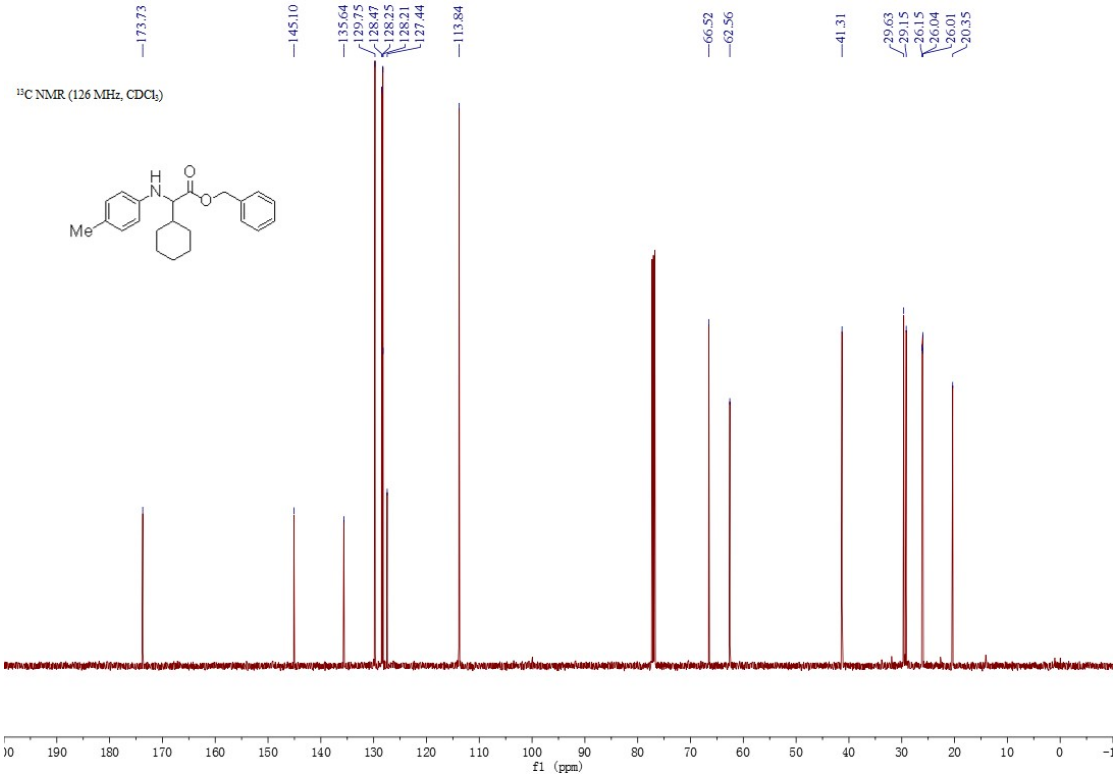


Tert-butyl 2-cyclohexyl-2-(*p*-tolylamino)acetate (3q)

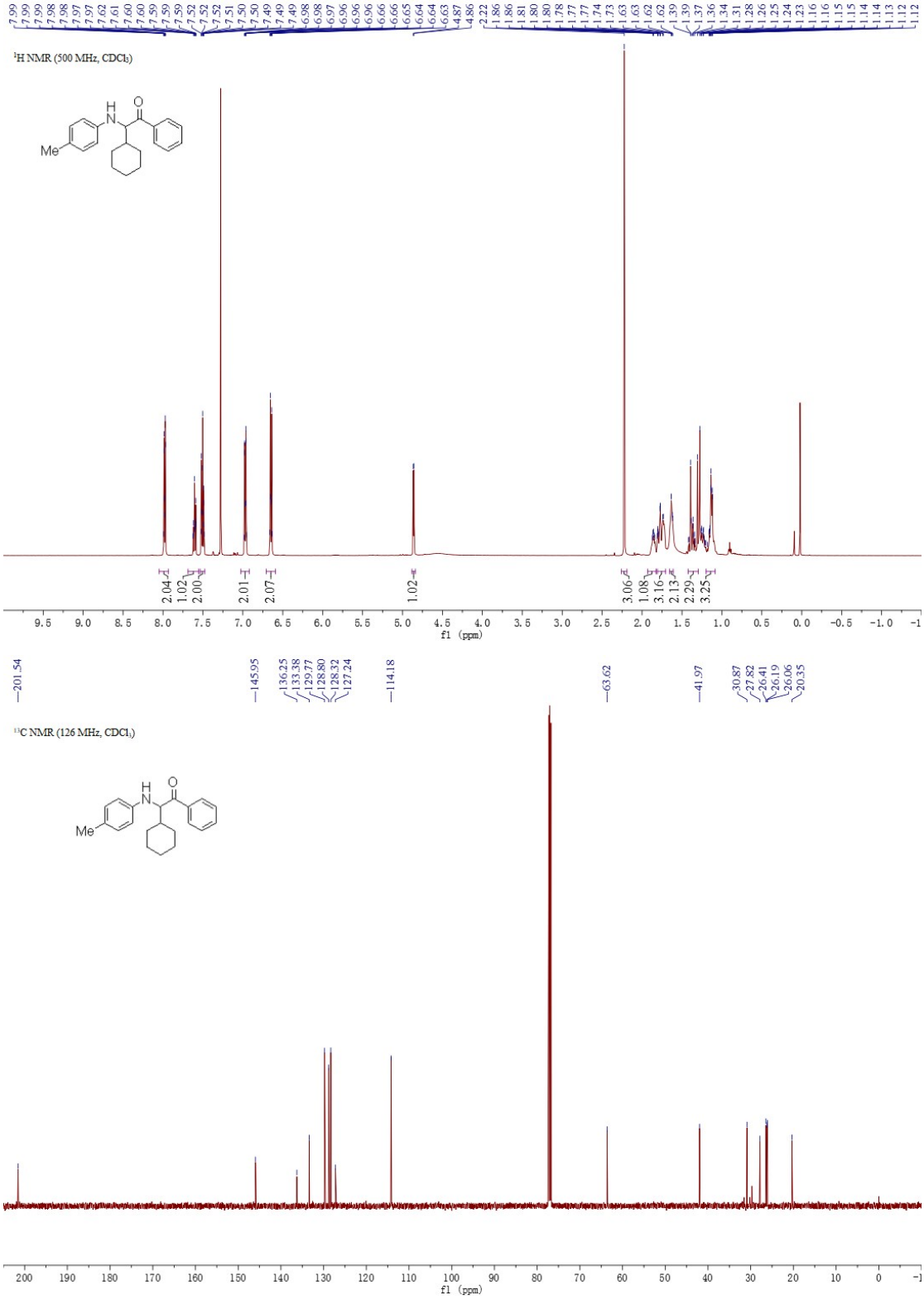


Benzyl 2-cyclohexyl-2-(p-tolylamino)acetate (3r)



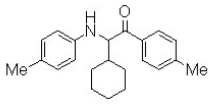


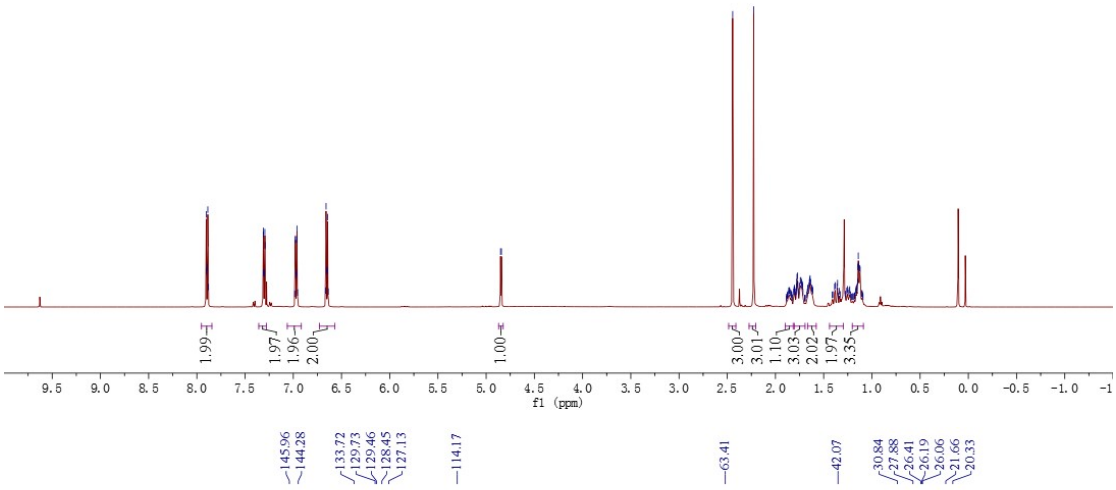
2-cyclohexyl-1-phenyl-2-(p-tolylamino)ethenone (3s)



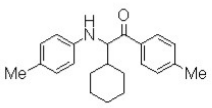
2-cyclohexyl-1-(p-tolyl)-2-(p-tolylamino)ethanone (3t)

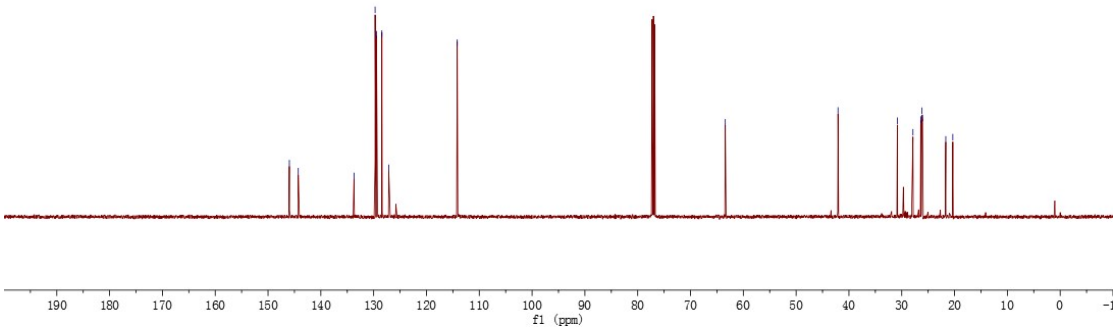
^{1}H NMR (500 MHz, $CDCl_3$)



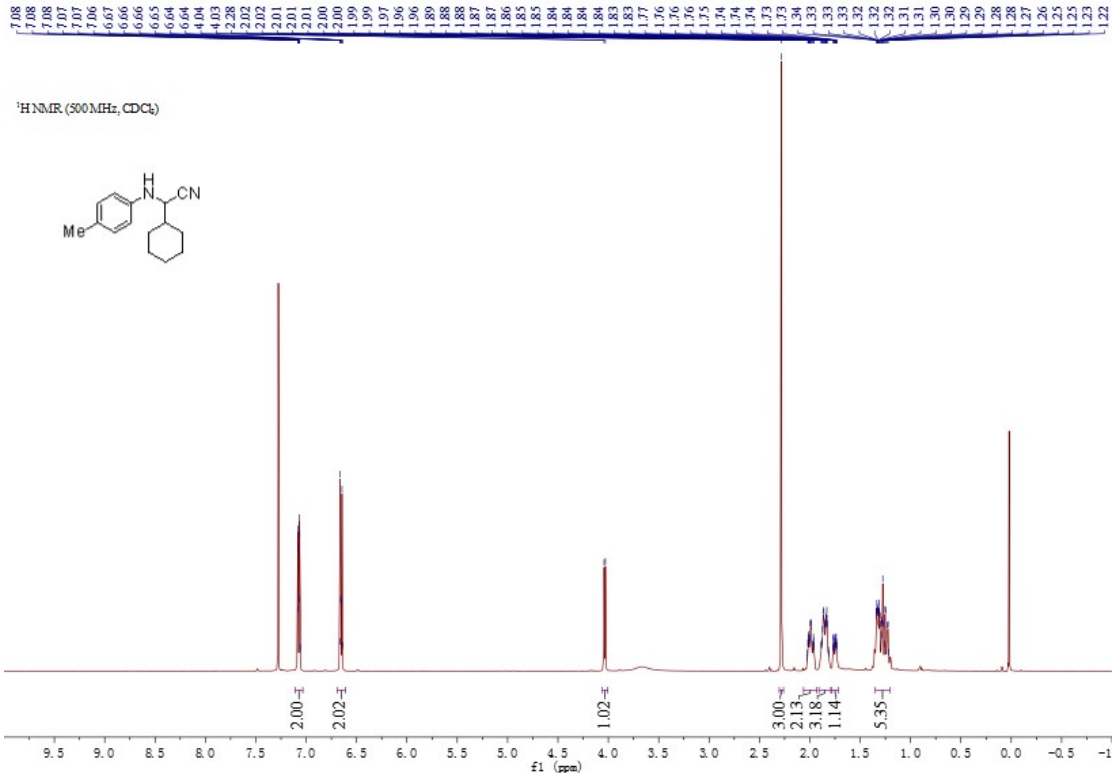


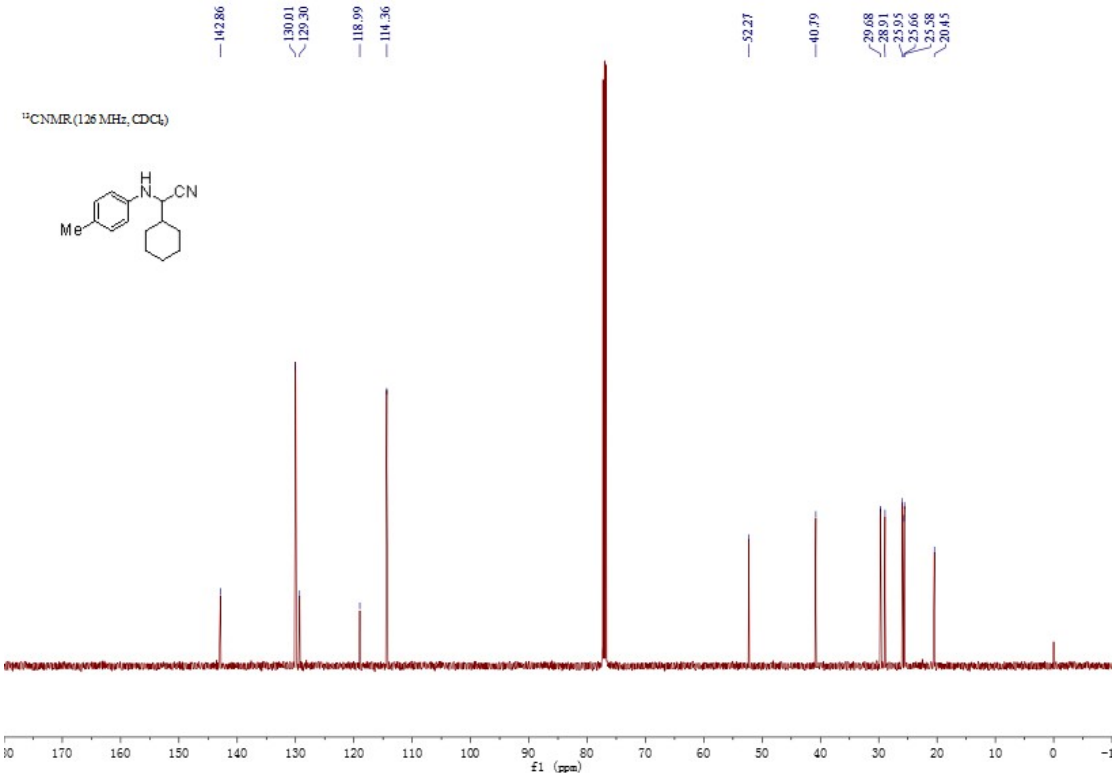
^{13}C NMR (126 MHz, $CDCl_3$)



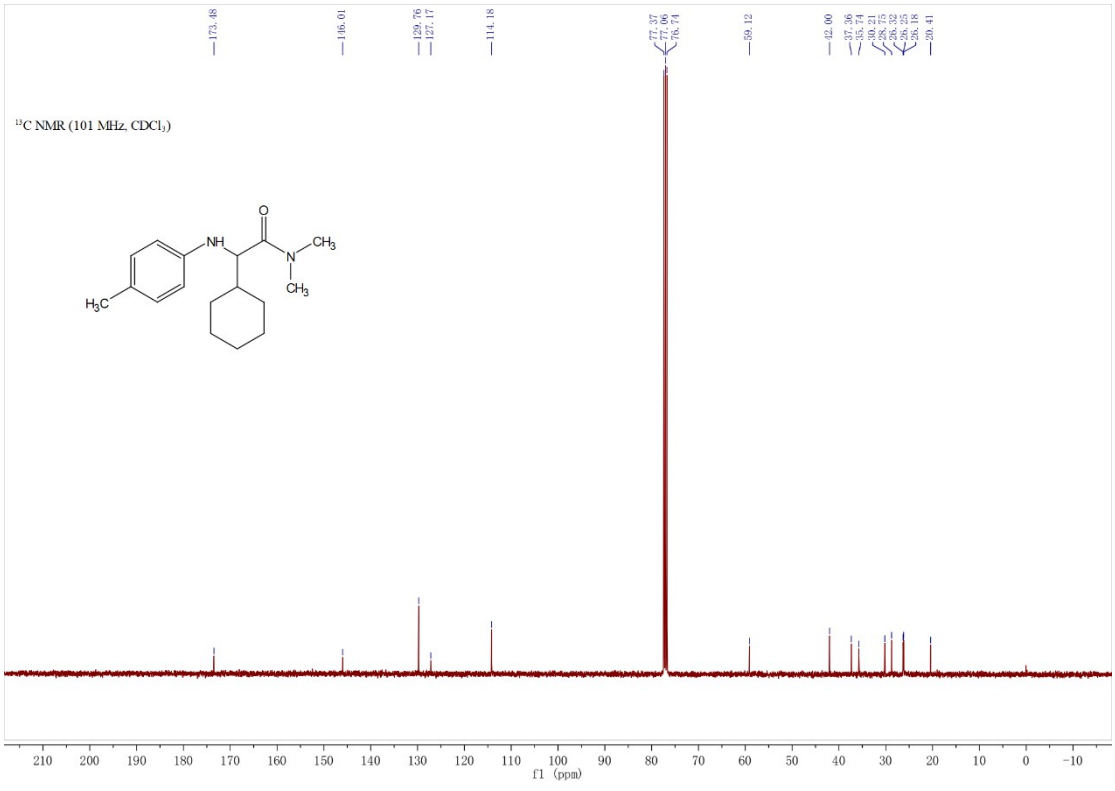


2-cyclohexyl-2-(p-tolylamino)acetonitrile (3u)

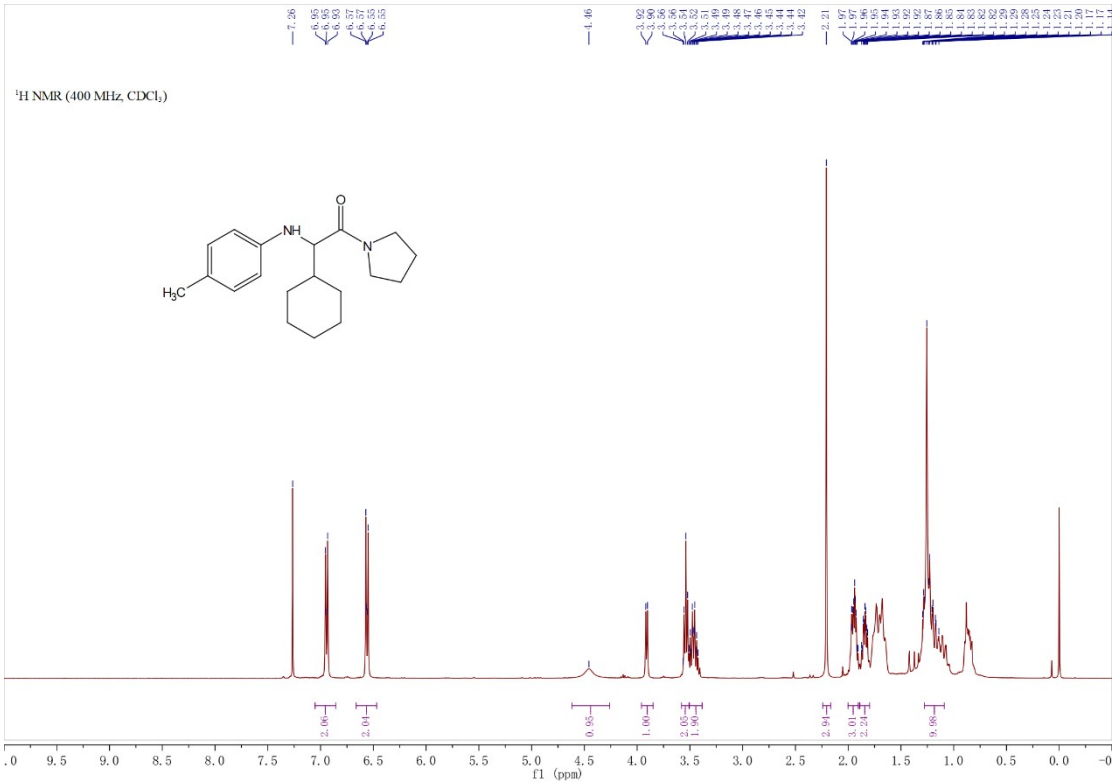


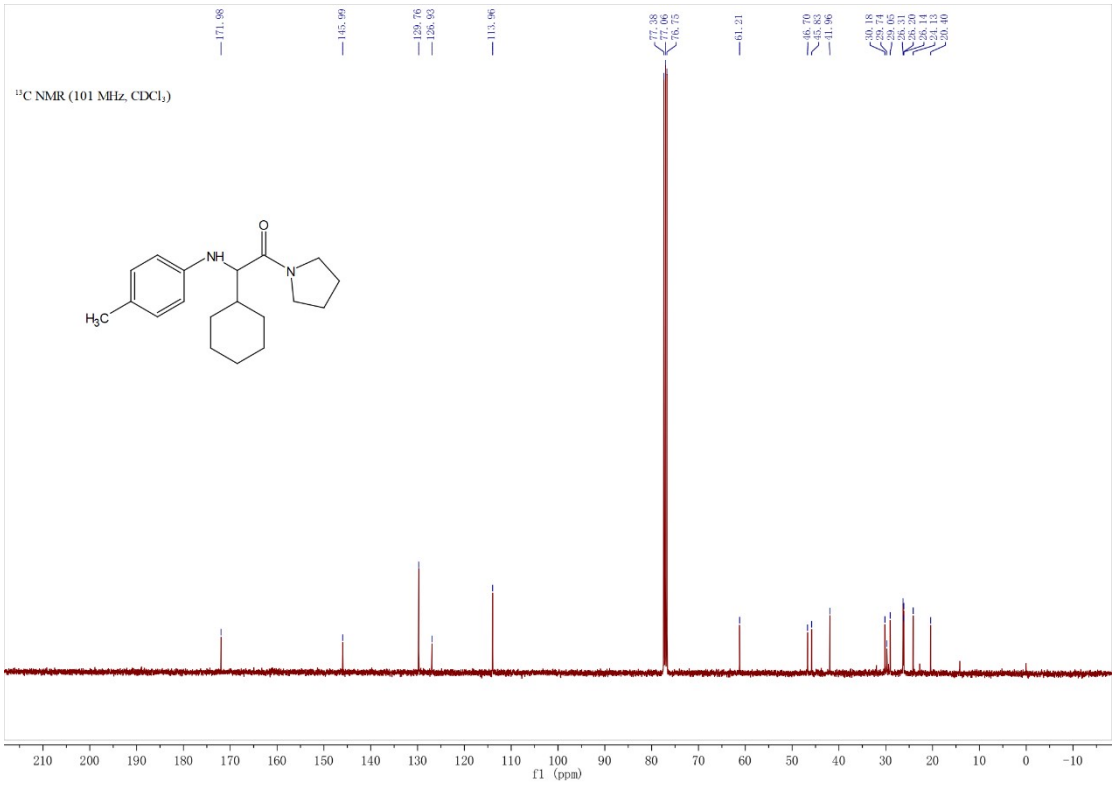


2-cyclohexyl-*N*,*N*-dimethyl-2-(*p*-tolylamino)acetamide (3v):

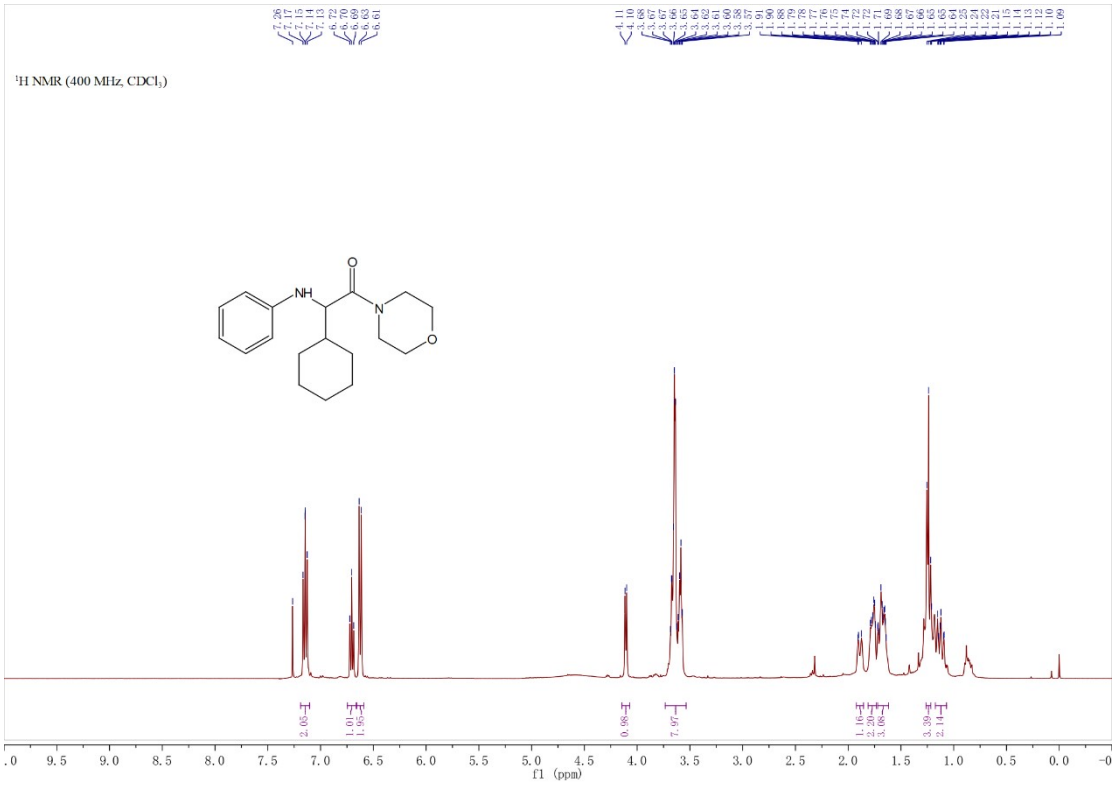


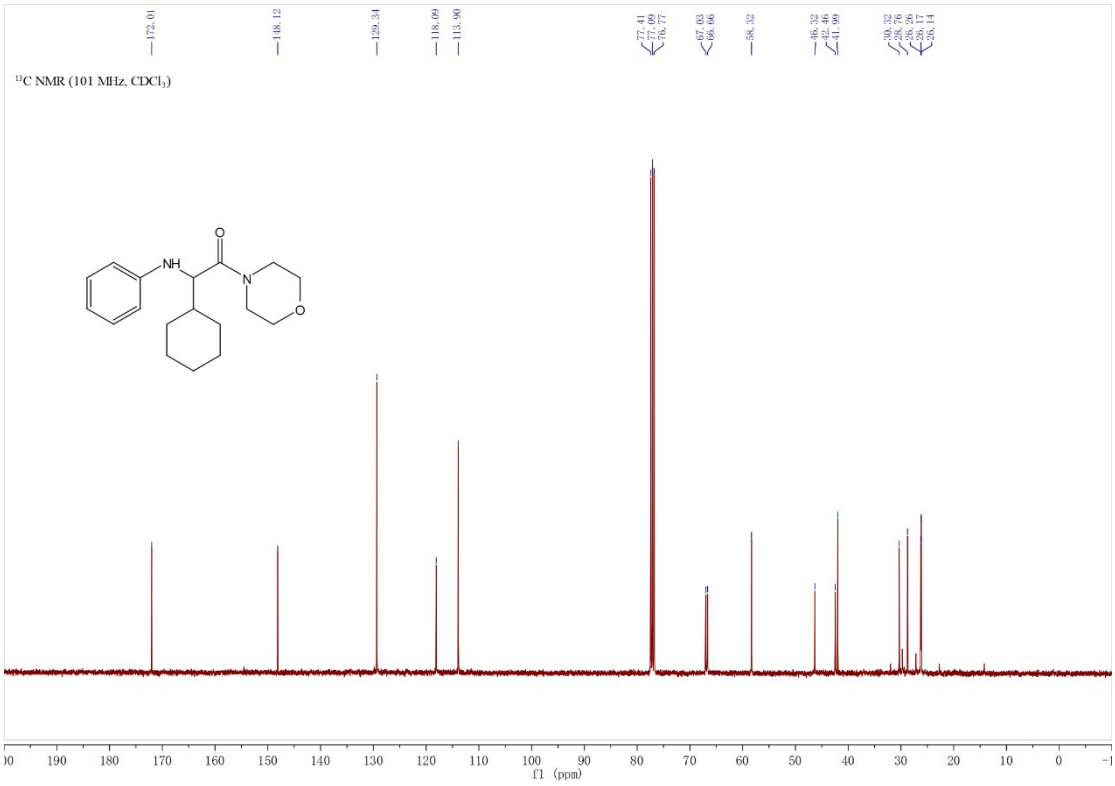
2-cyclohexyl-1-(pyrrolidin-1-yl)-2-(*p*-tolylamino)ethan-1-one (3w)



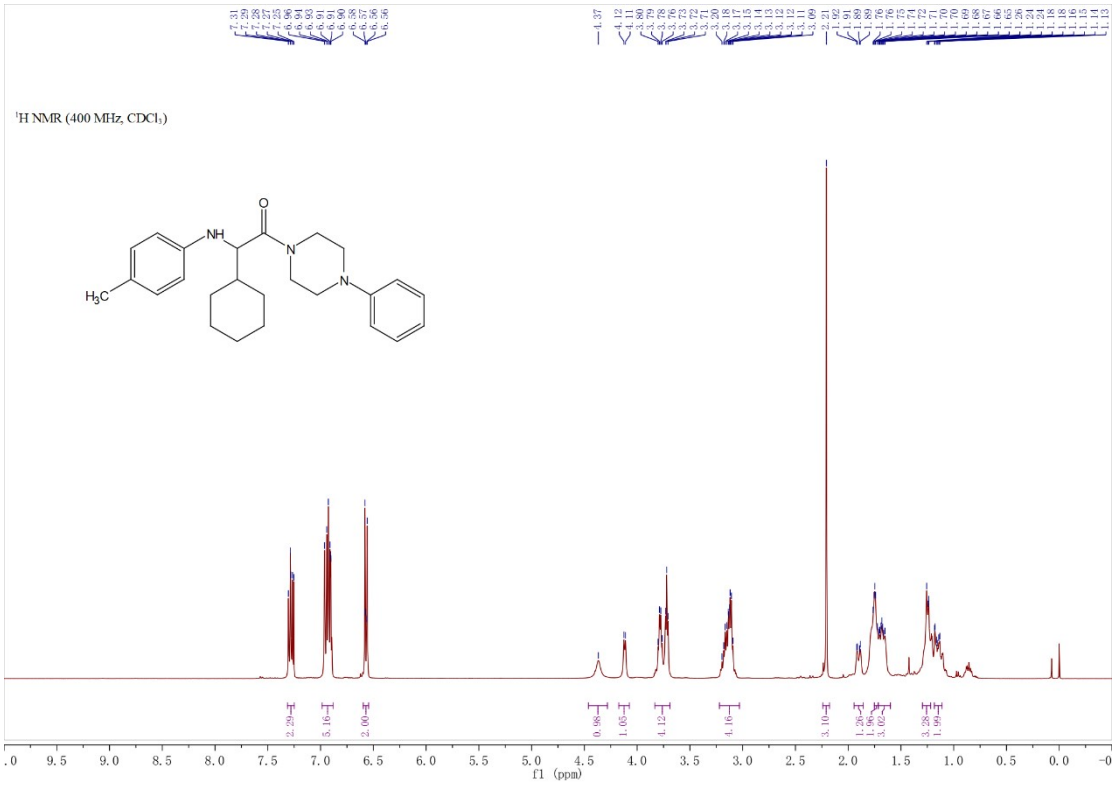


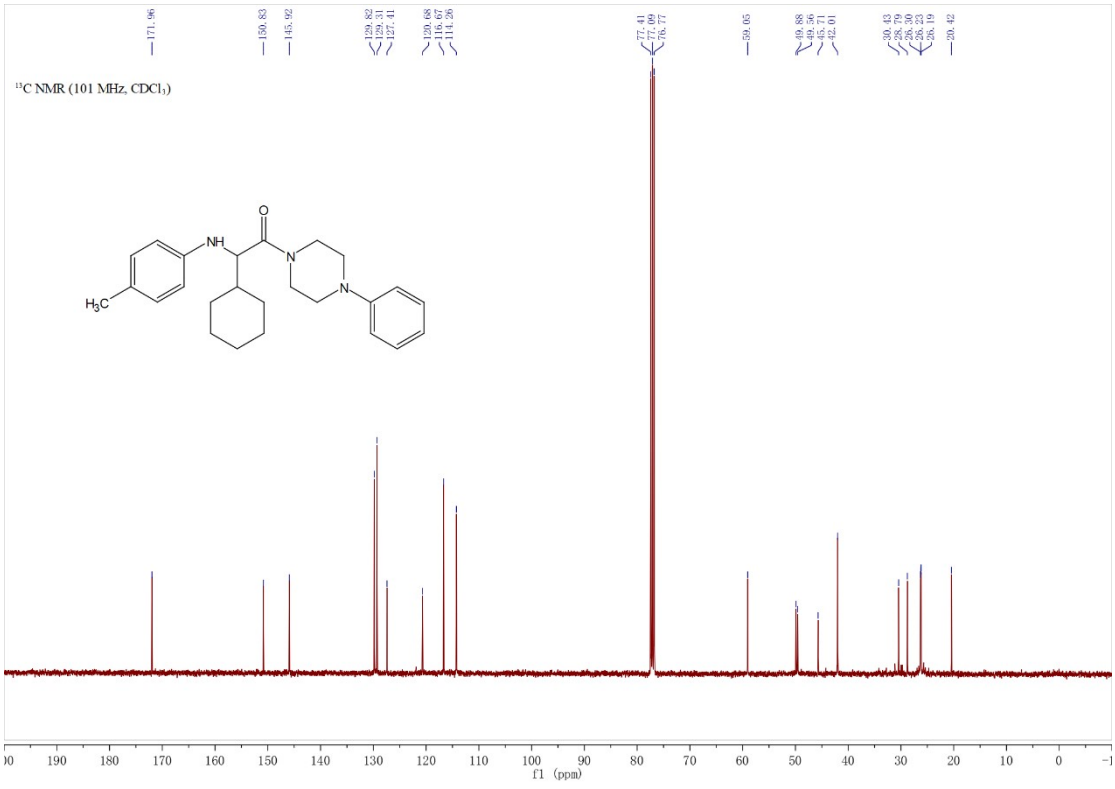
2-cyclohexyl-1-morpholino-2-(phenylamino)ethan-1-one (3x):



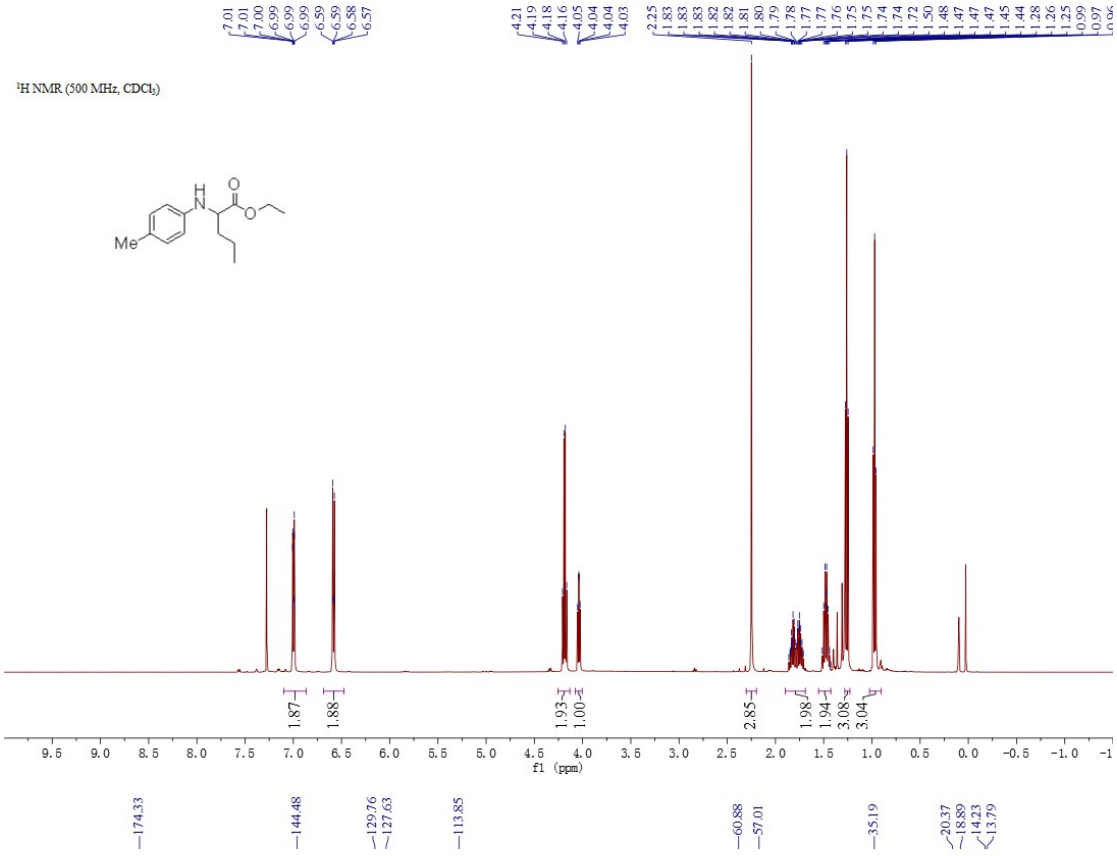


2-cyclohexyl-1-(4-phenylpiperazin-1-yl)-2-(p-tolylamino)ethan-1-one (3y)

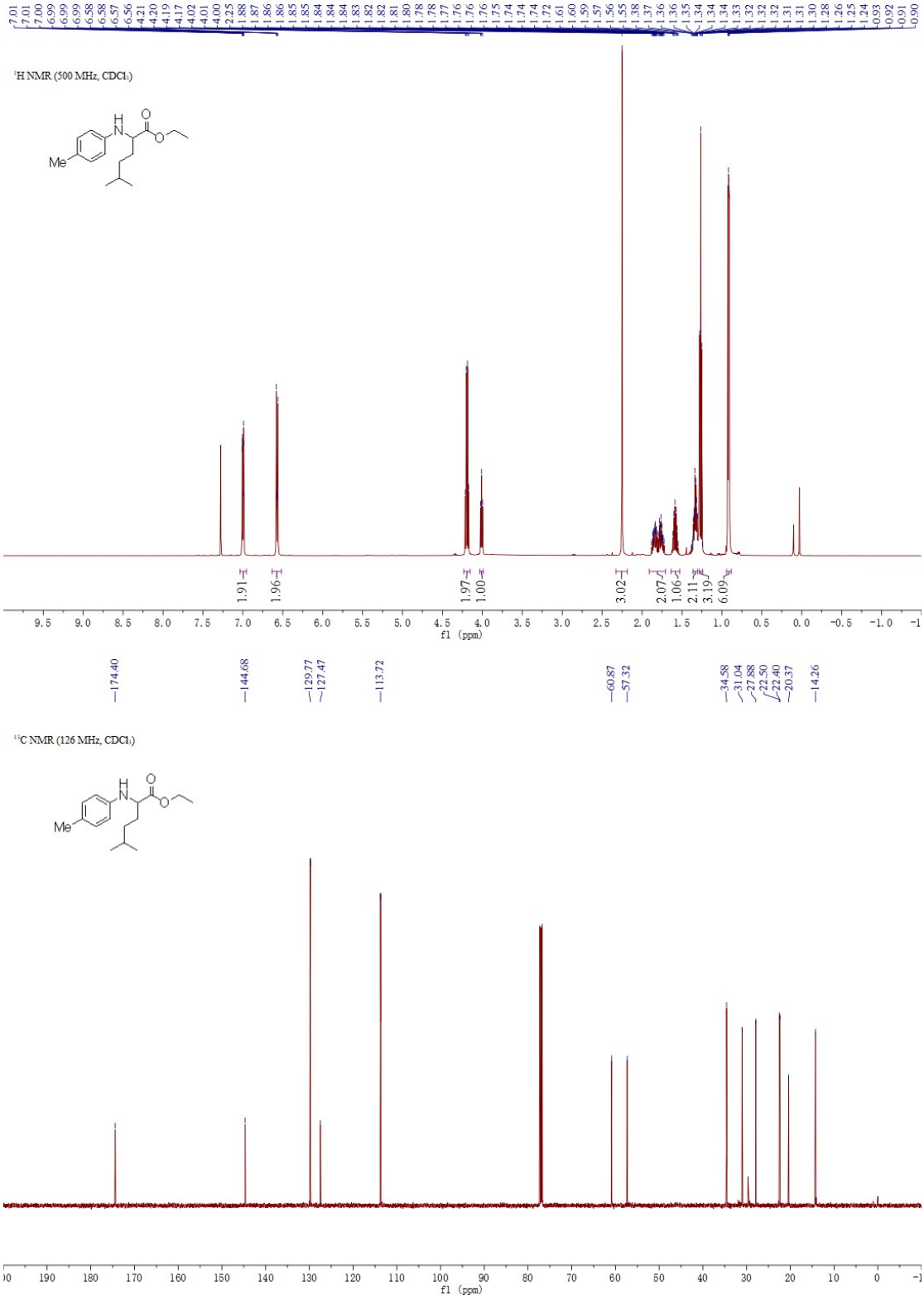




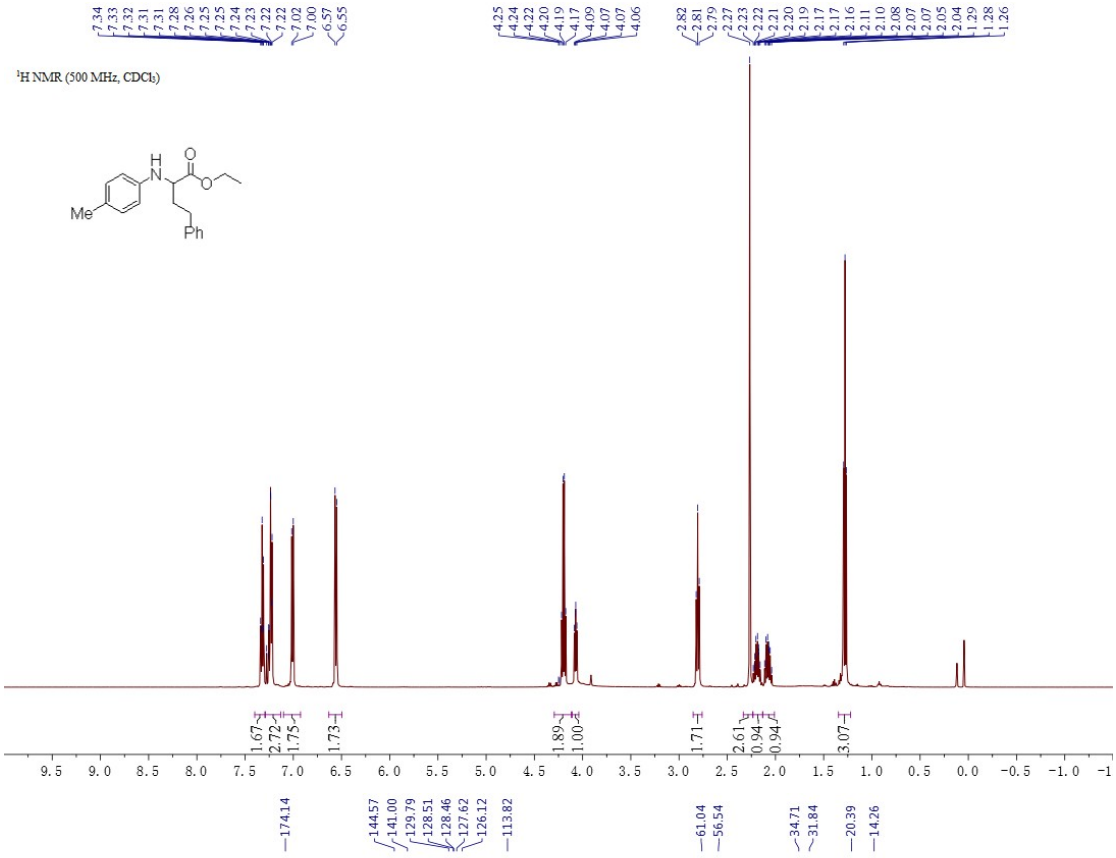
Ethyl 2-(*p*-tolylamino)pentanoate (4a)



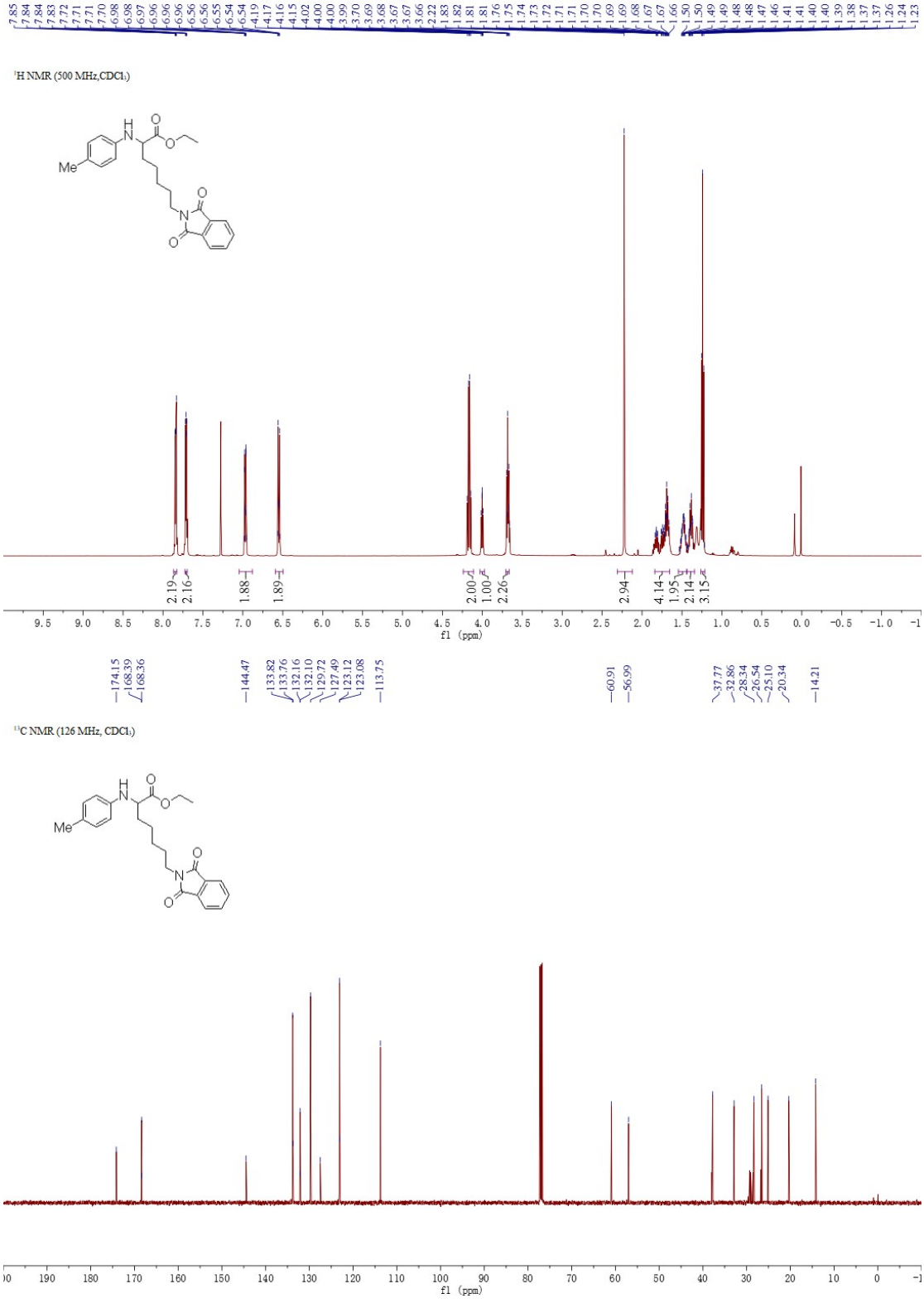
Ethyl 5-methyl-2-(*p*-tolylamino)hexanoate (4b)



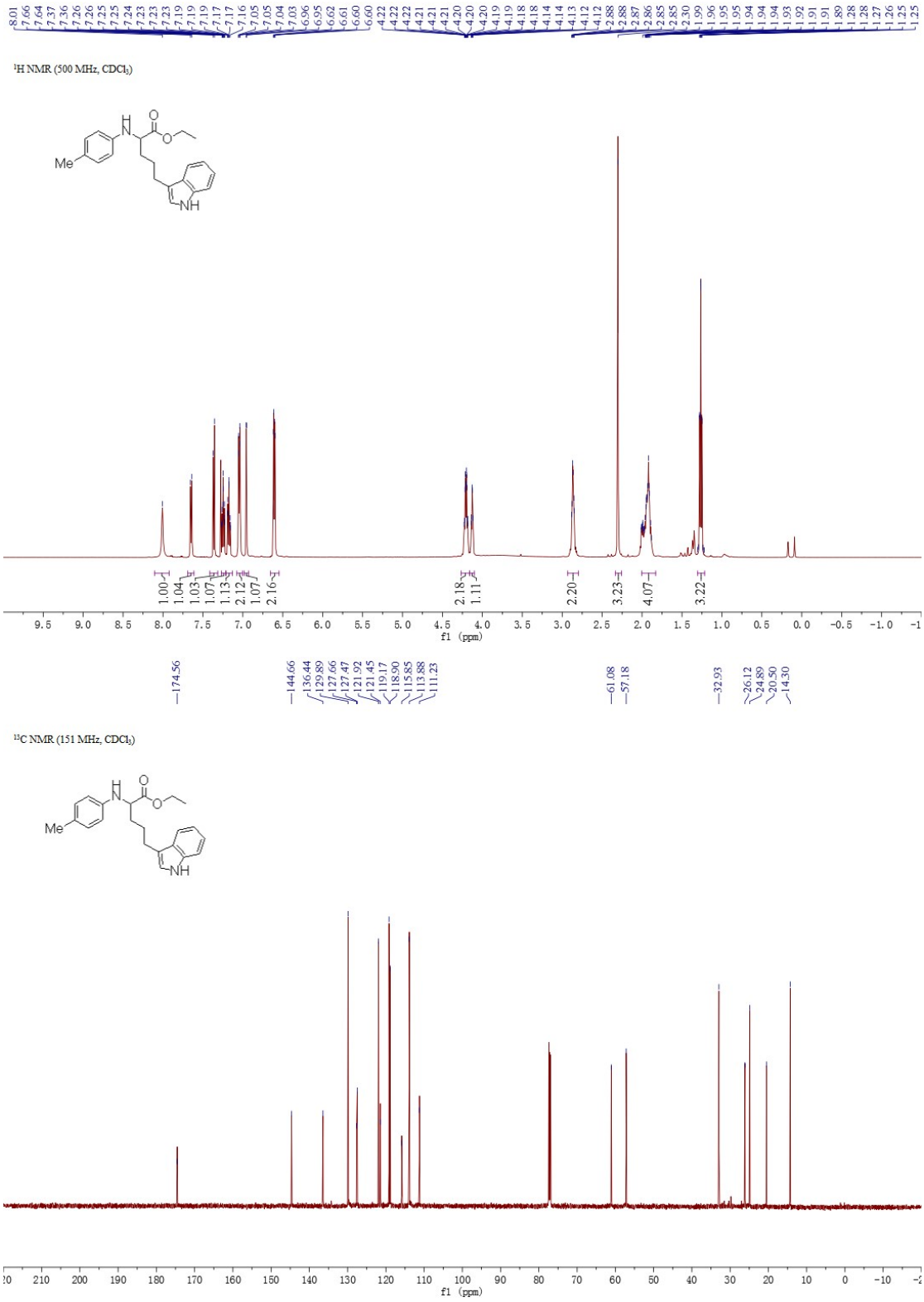
Ethyl 4-phenyl-2-(*p*-tolylamino)butanoate (4c)



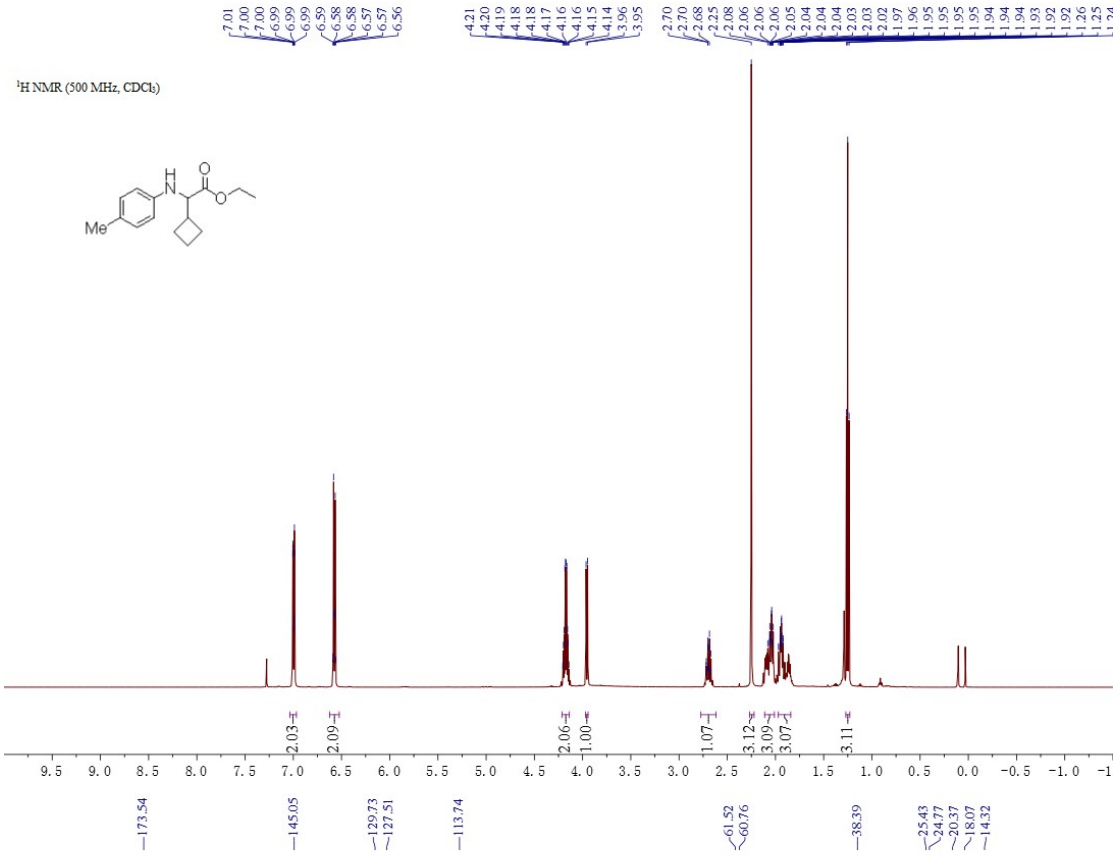
Ethyl 7-(1,3-dioxoisoindolin-2-yl)-2-(*p*-tolylamino)heptanoate (4d)

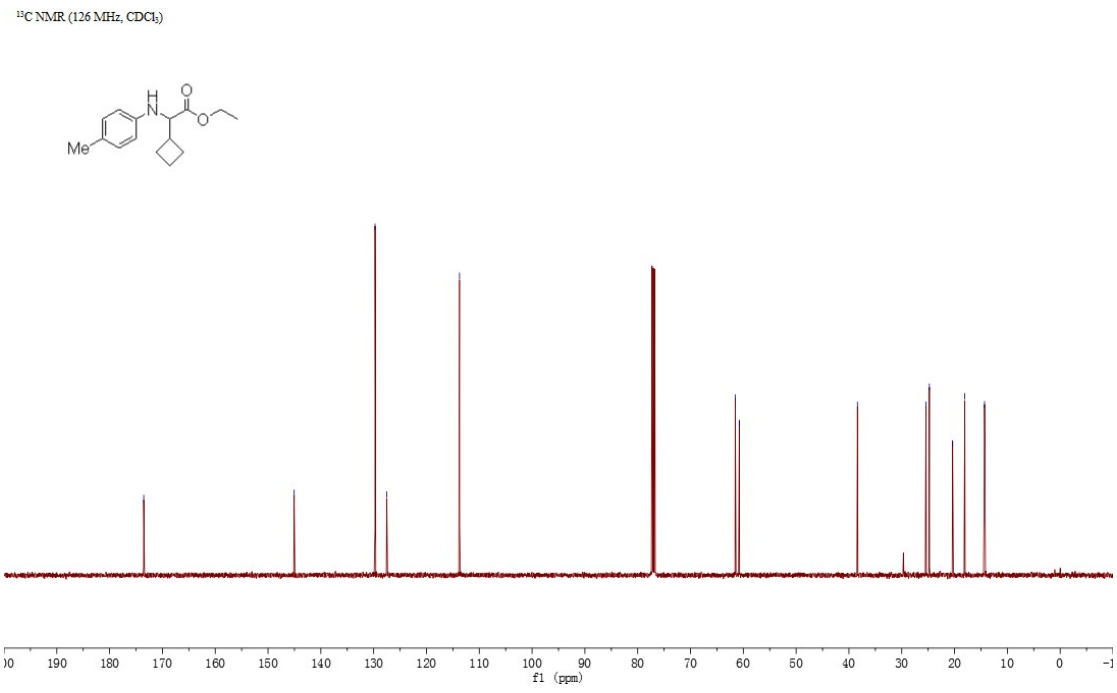


Ethyl 5-(1H-indol-3-yl)-2-(*p*-tolylamino)pentanoate (4e)

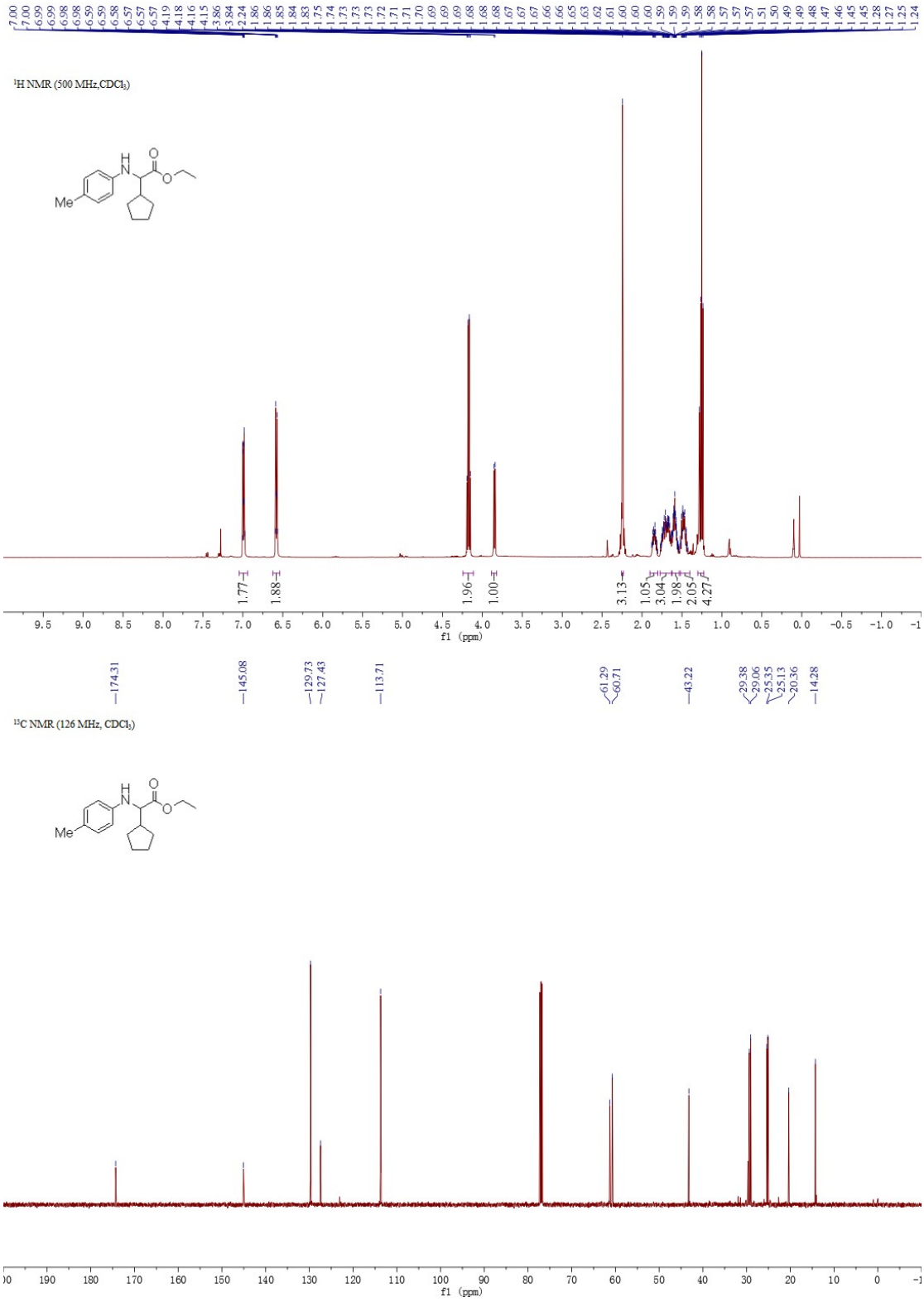


Ethyl 2-cyclobutyl-2-(*p*-tolylamino)acetate (4f)

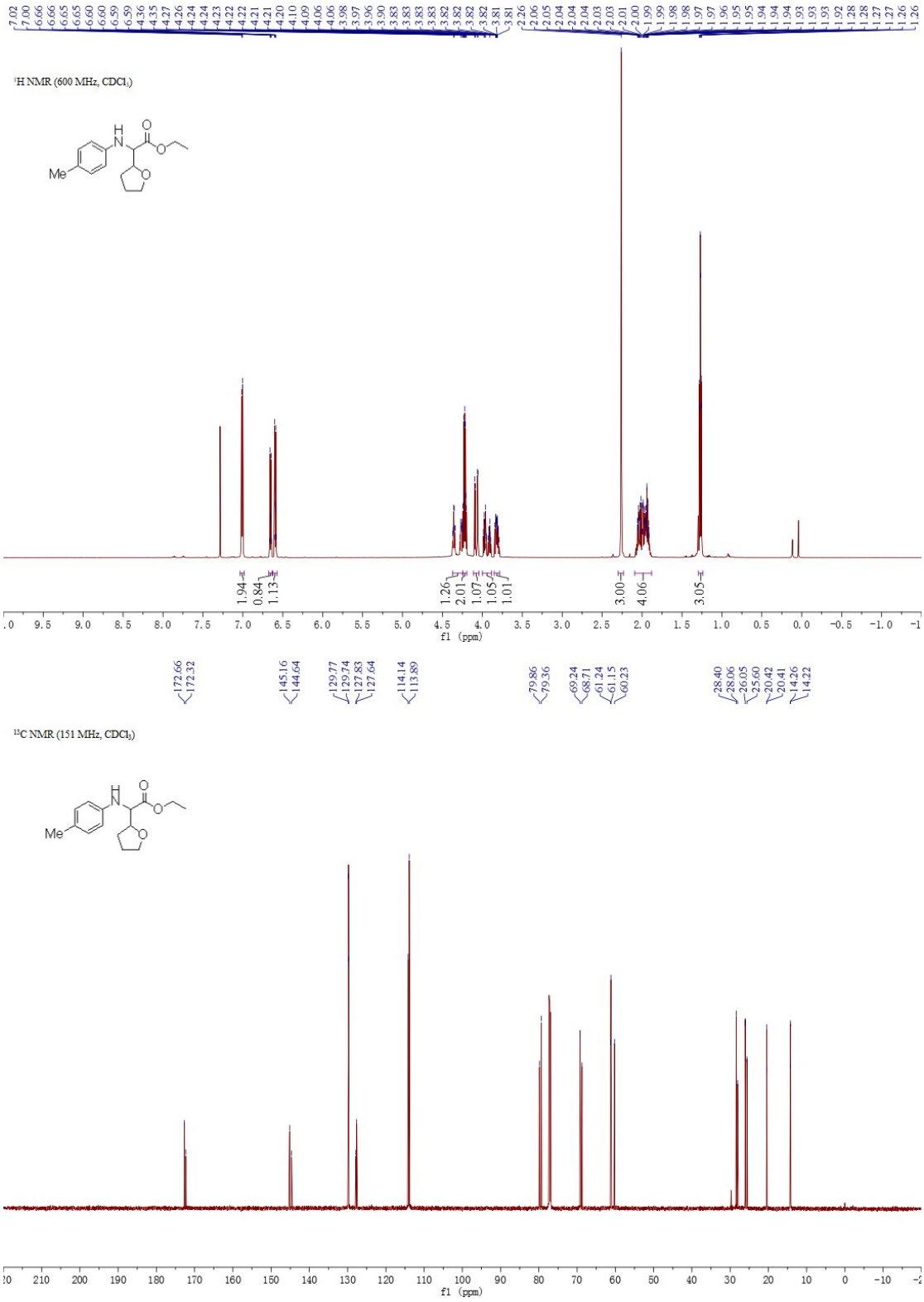




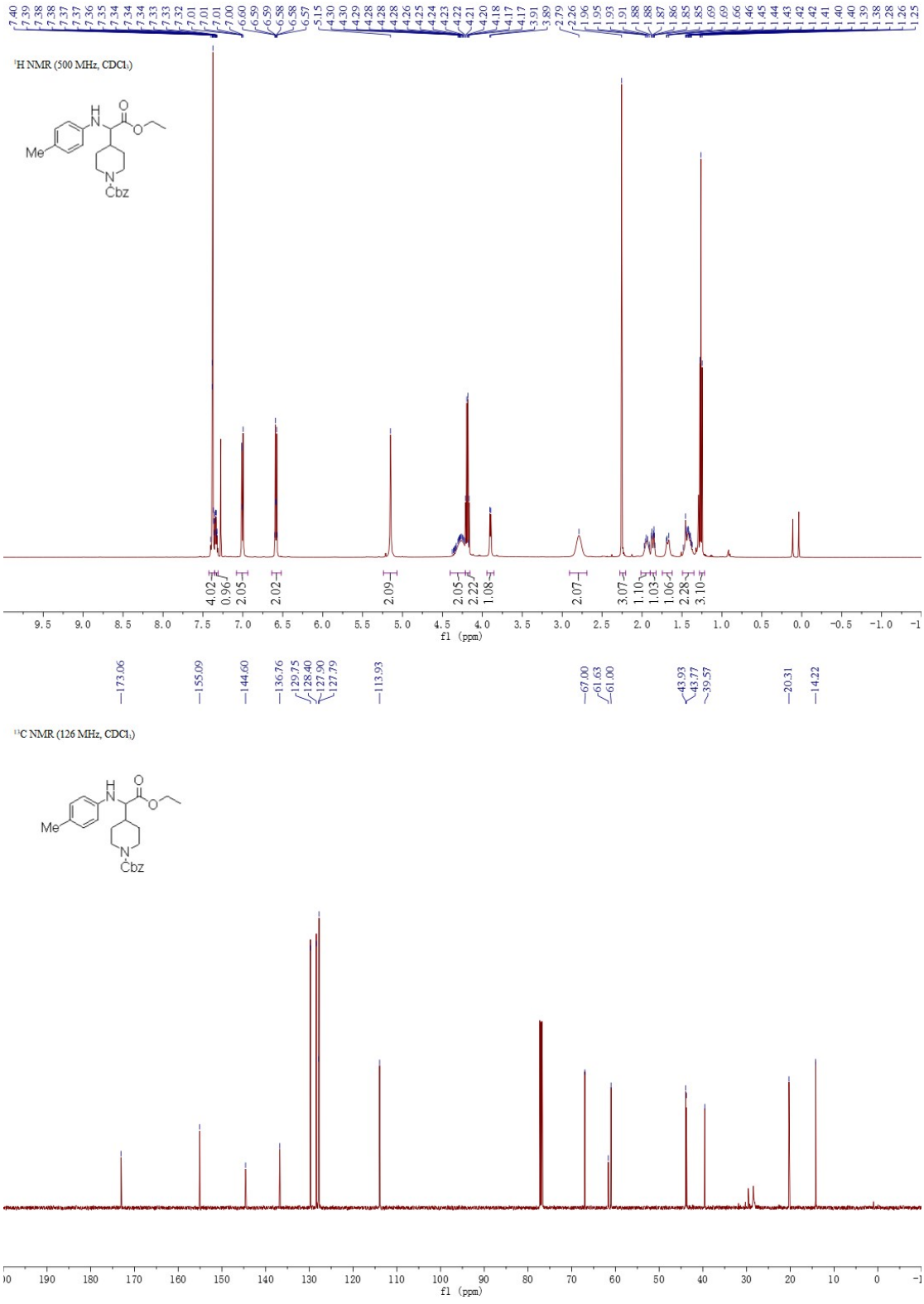
Ethyl 2-cyclopentyl-2-(*p*-tolylamino)acetate (4g)



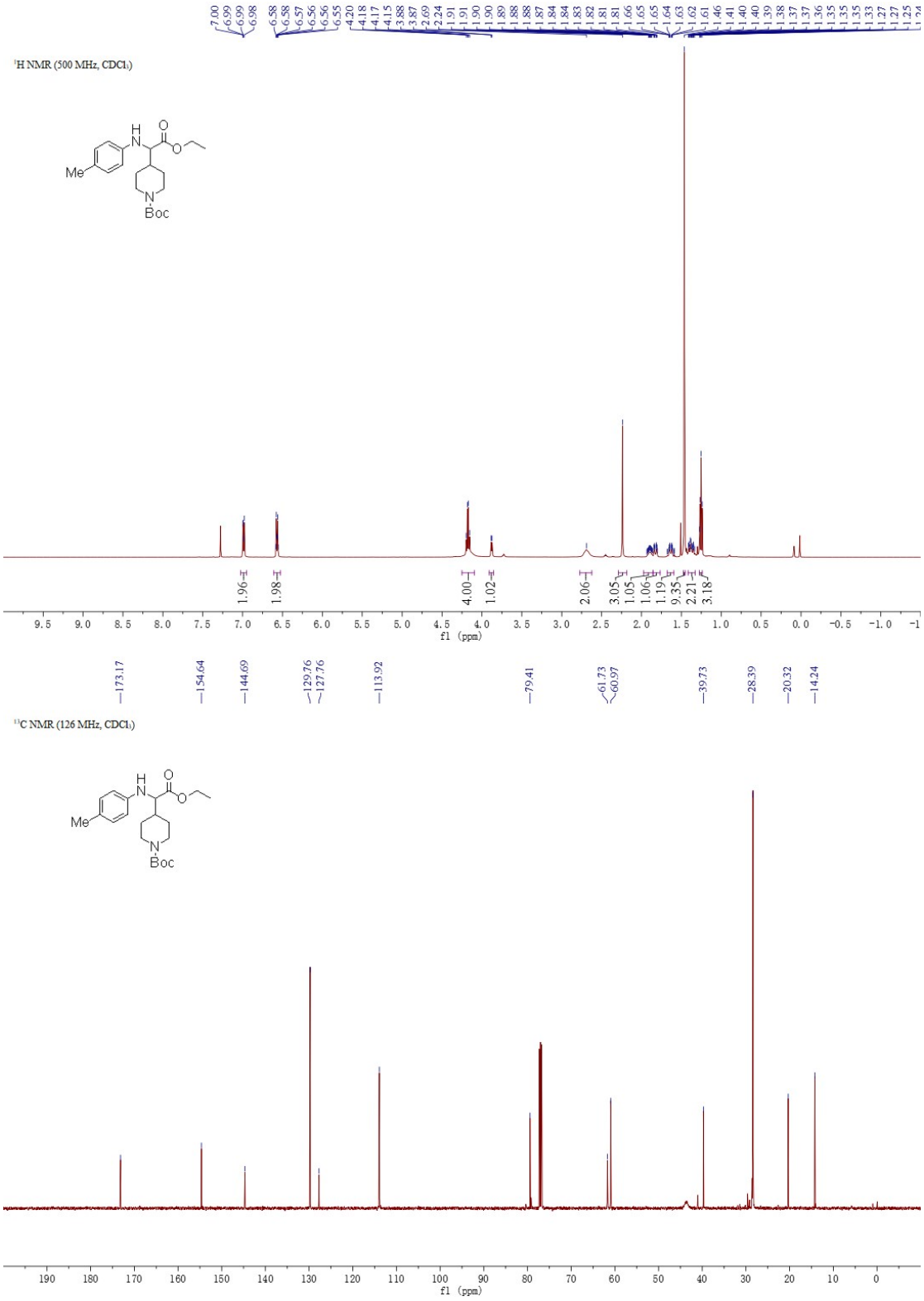
Ethyl 2-(tetrahydrofuran-2-yl)-2-(*p*-tolylamino)acetate (4h)



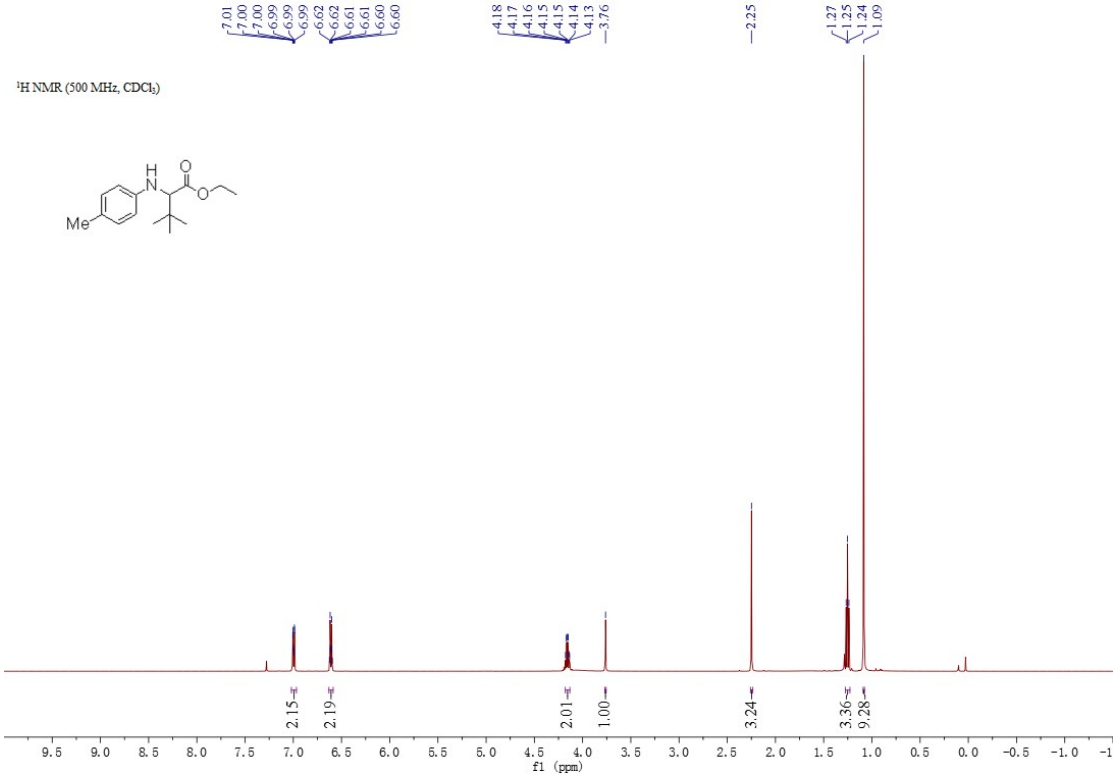
Benzyl 4-(2-ethoxy-2-oxo-1-(*p*-tolylamino)ethyl)piperidine-1-carboxylate (4i)

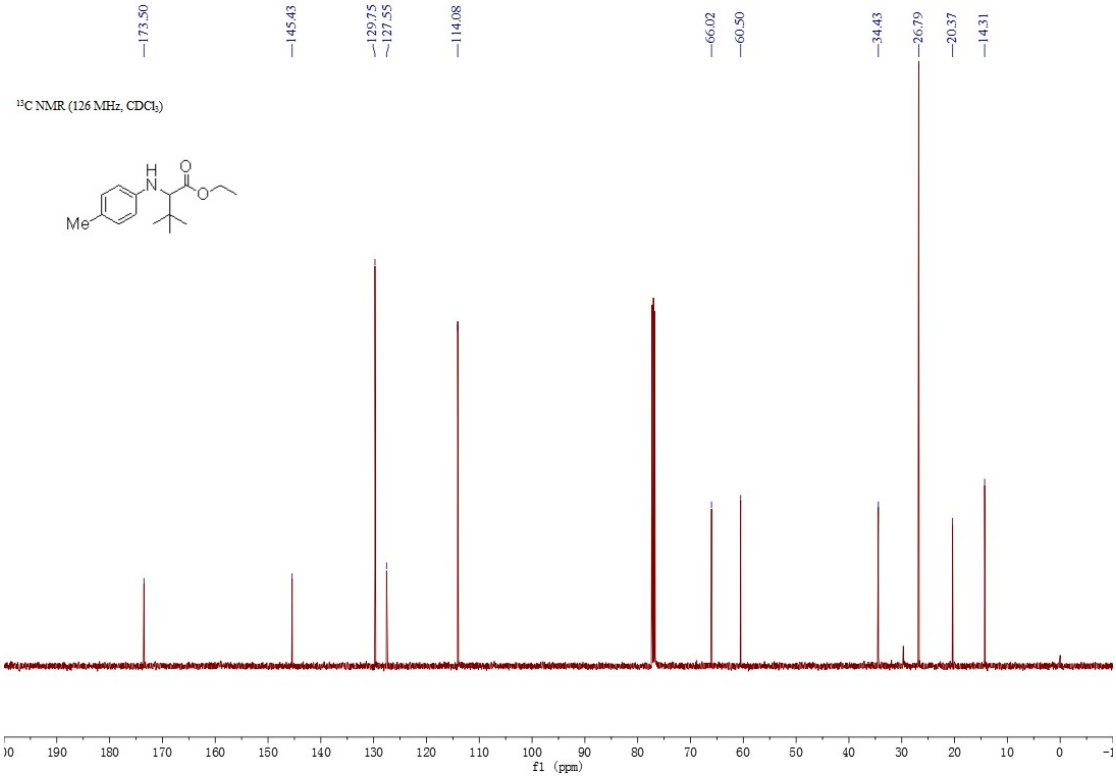


Tert-butyl 4-(2-ethoxy-2-oxo-1-(*p*-tolylamino)ethyl)piperidine-1-carboxylate (4j)

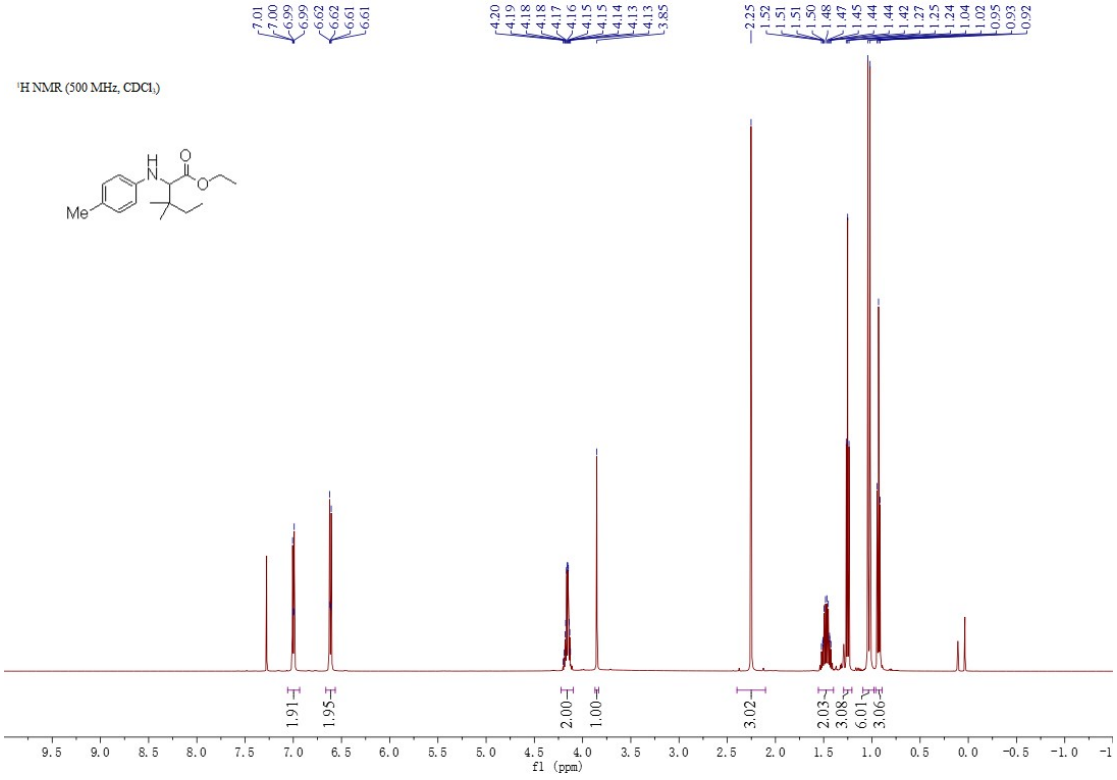


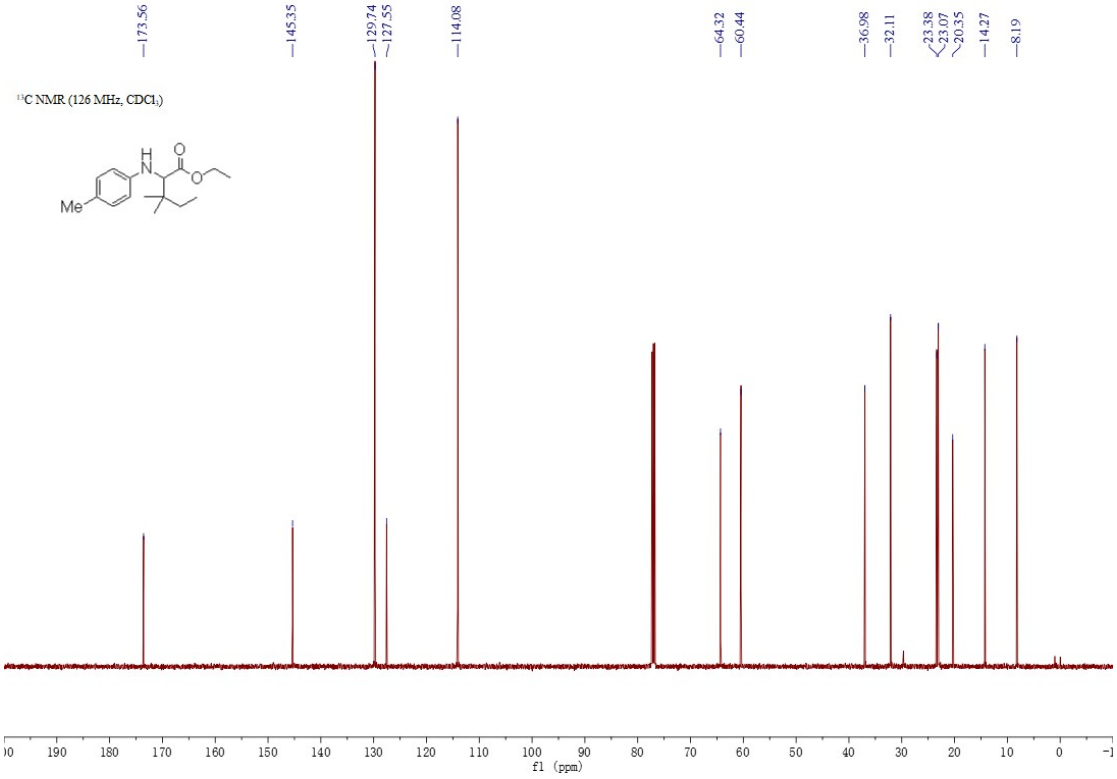
Ethyl 3,3-dimethyl-2-(*p*-tolylamino)butanoate (4k)



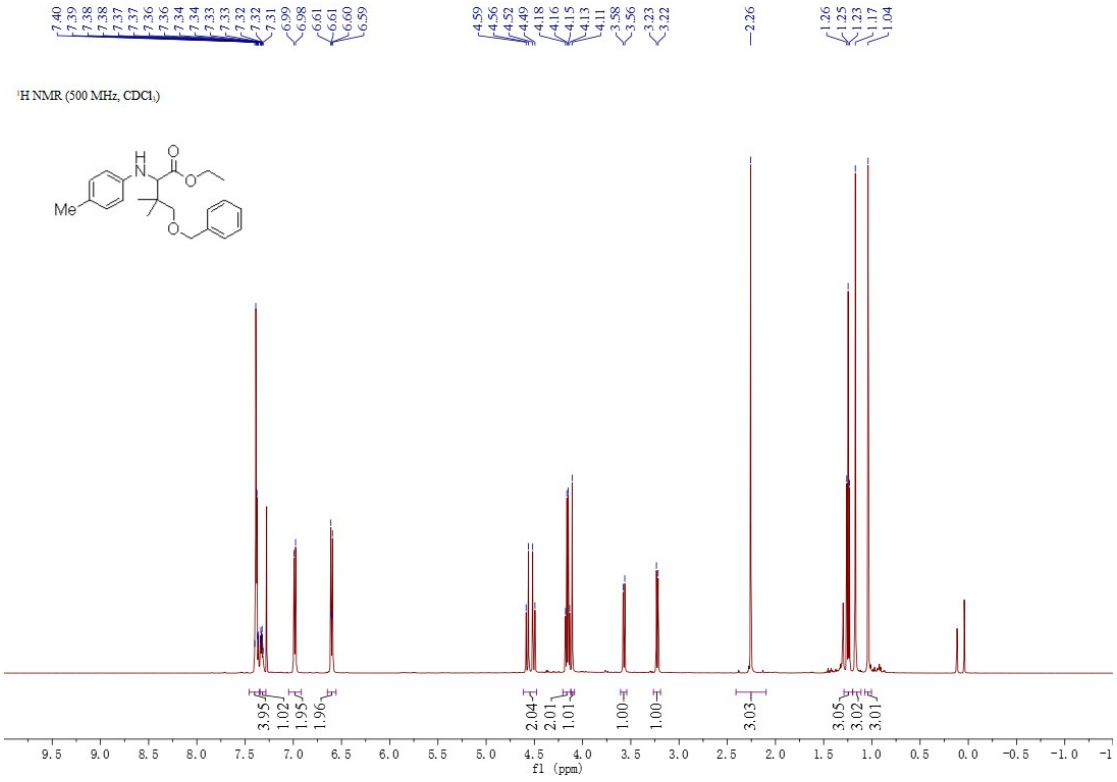


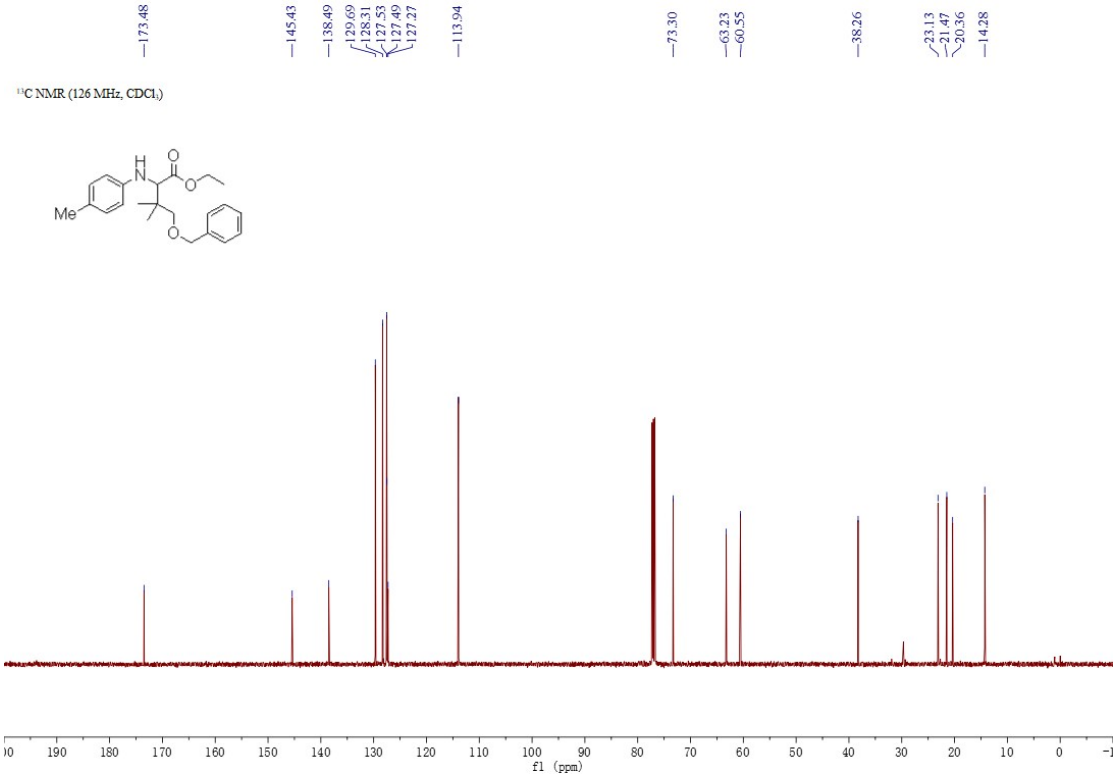
Ethyl 3,3-dimethyl-2-(*p*-tolylamino)pentanoate (4l)



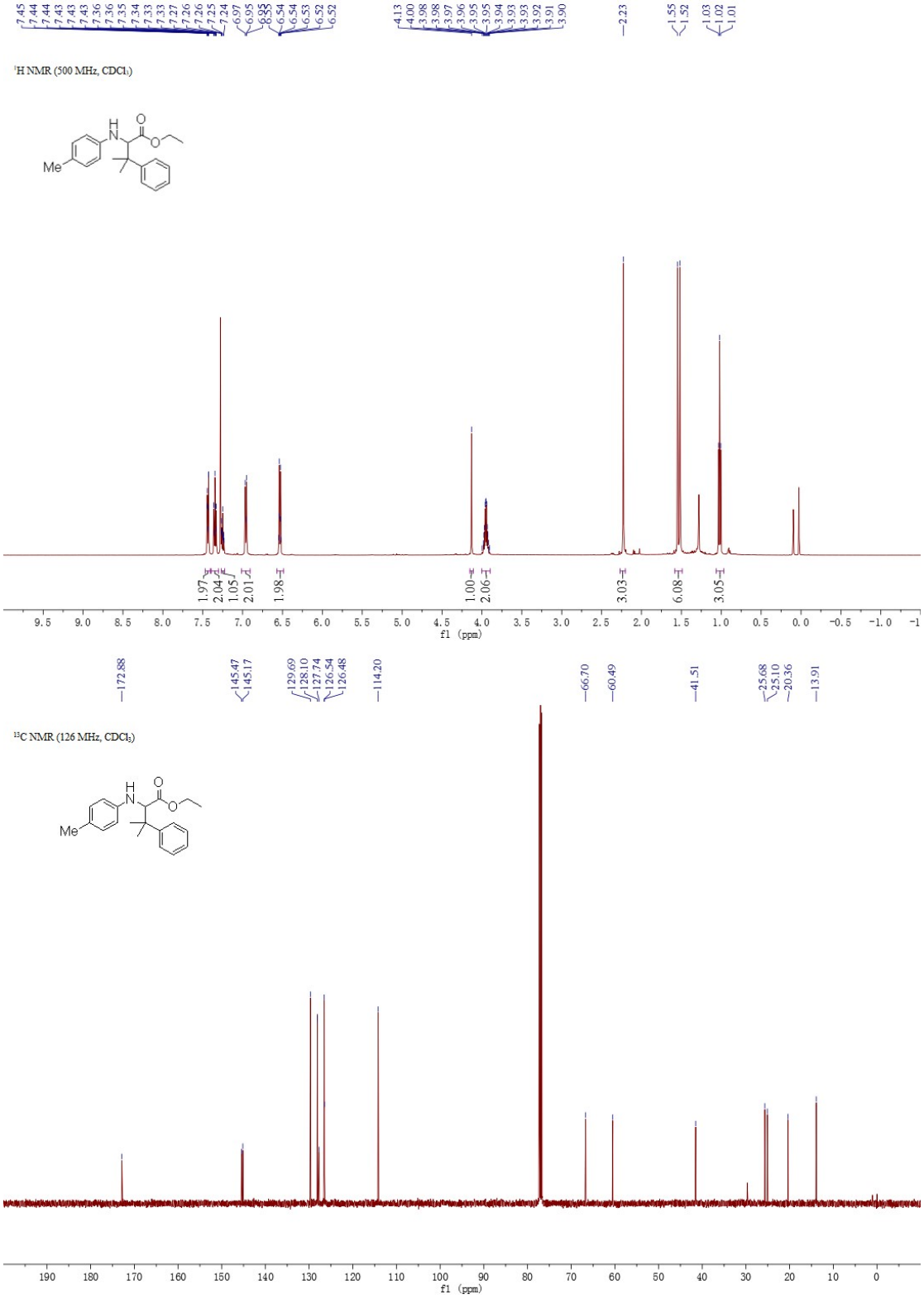


Ethyl 4-(benzyloxy)-3,3-dimethyl-2-(p-tolylamino)butanoate (4m)

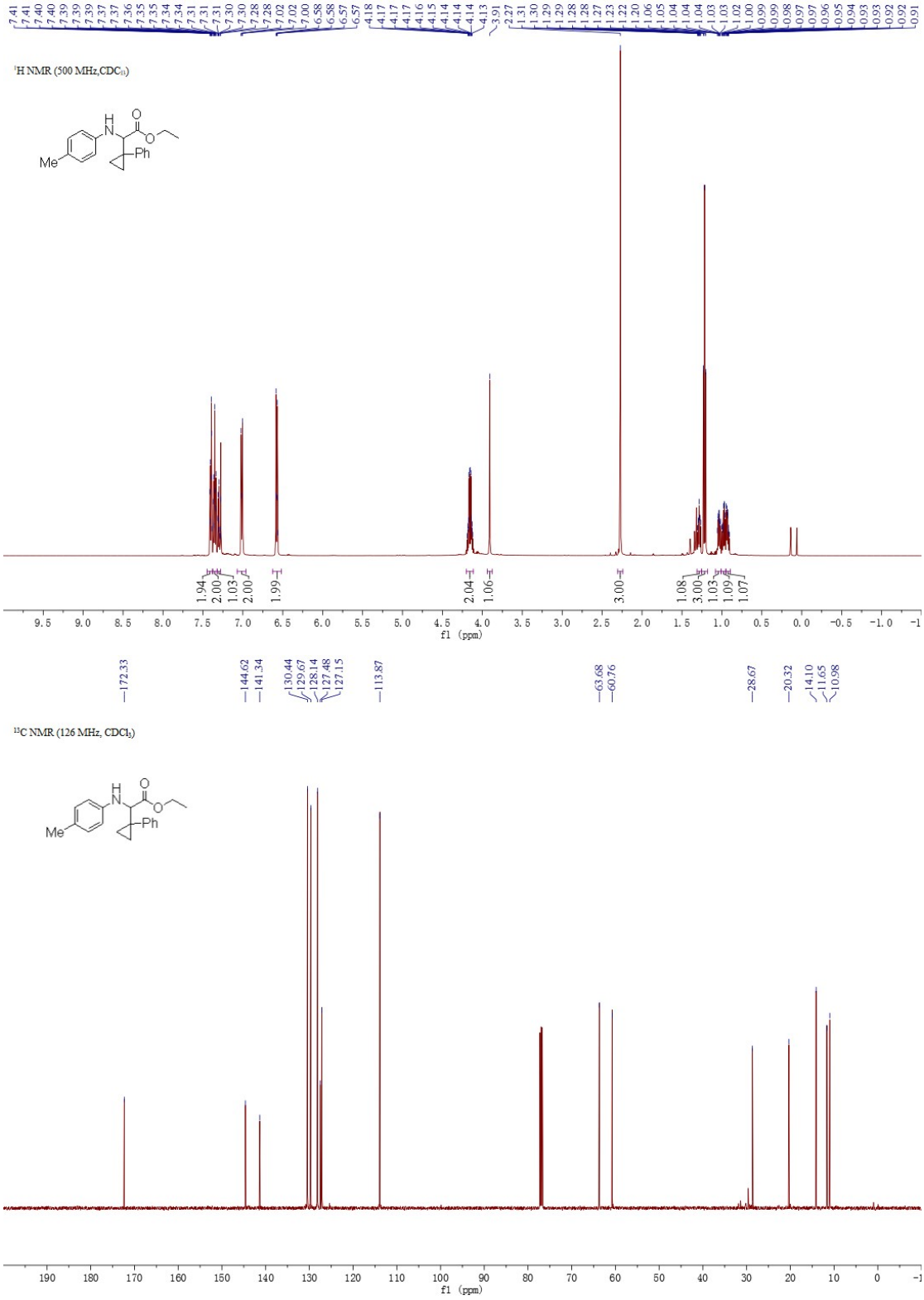




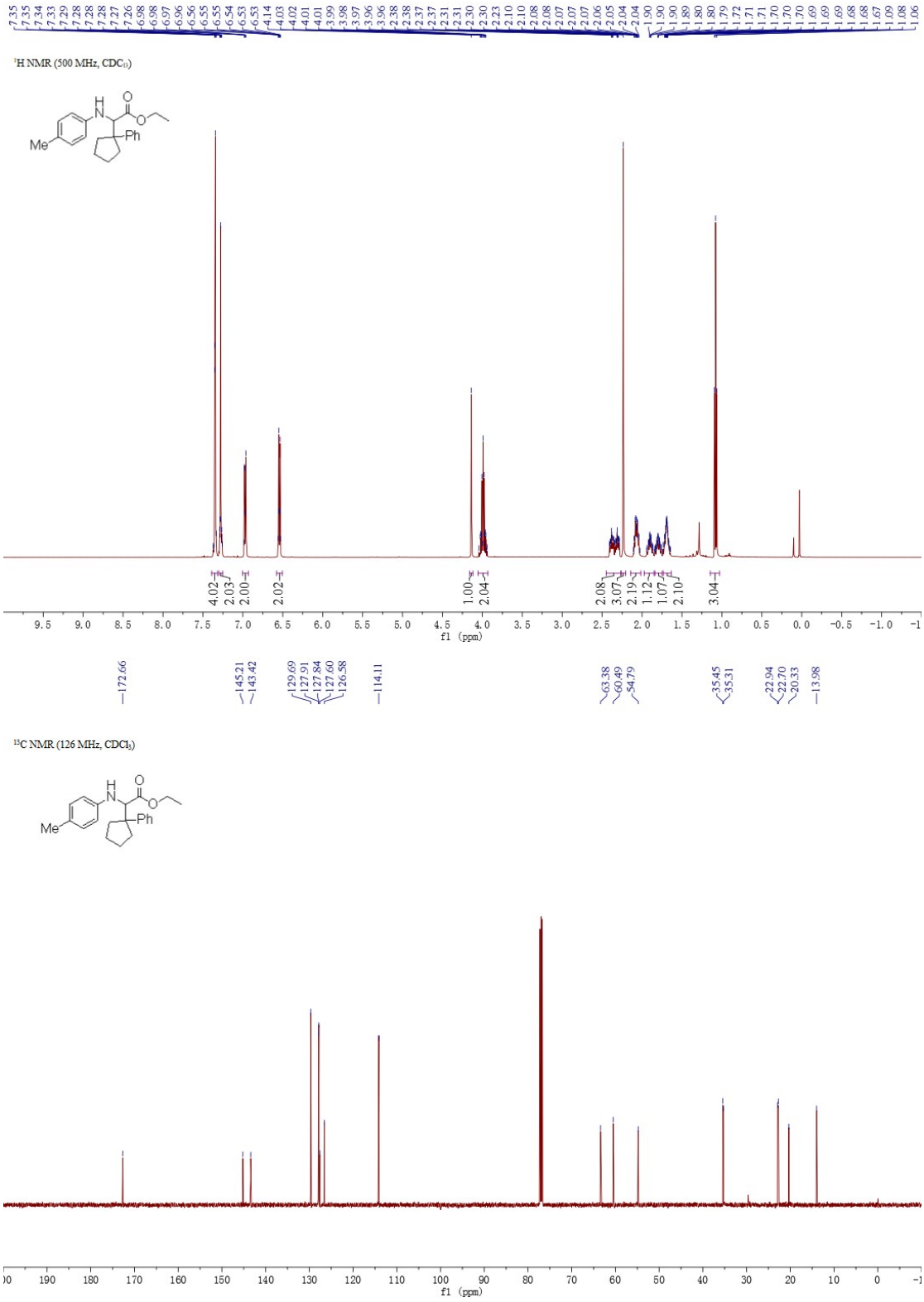
Ethyl 3-methyl-3-phenyl-2-(p-tolylamino)butanoate (4n)



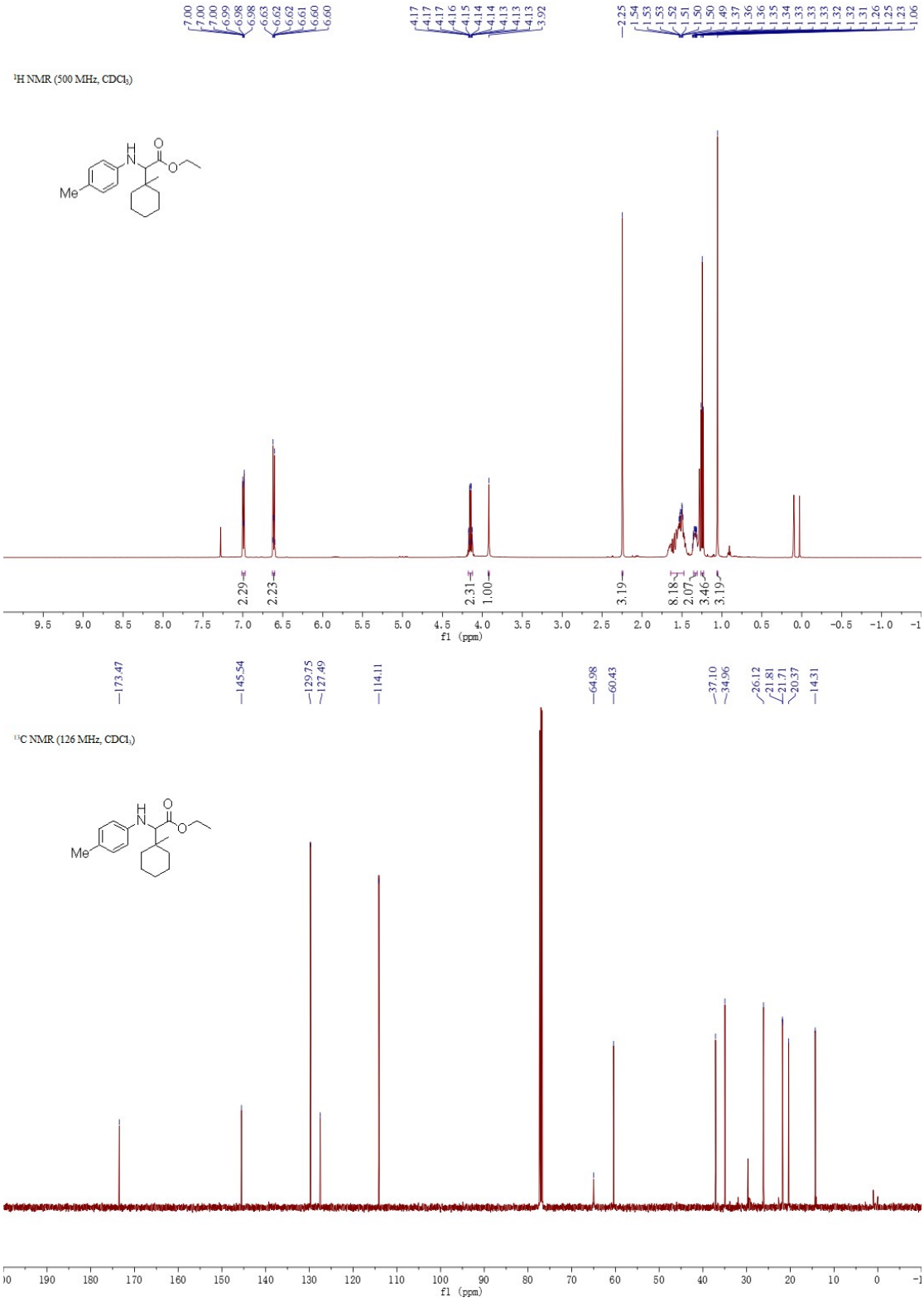
Ethyl 2-(1-phenylcyclopropyl)-2-(p-tolylamino)acetate (4o)



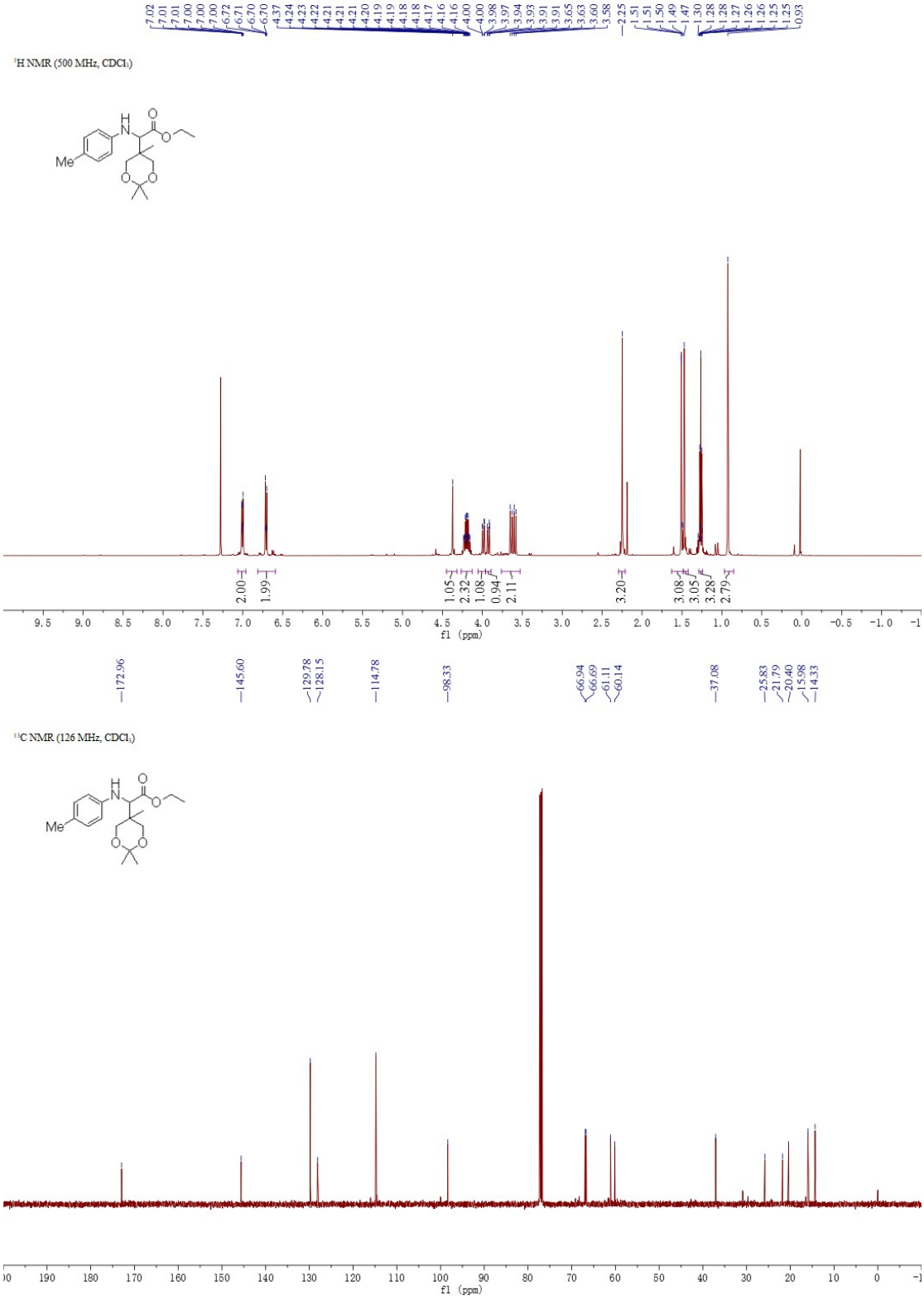
Ethyl 2-(1-phenylcyclopentyl)-2-(p-tolylamino)acetate (4p)



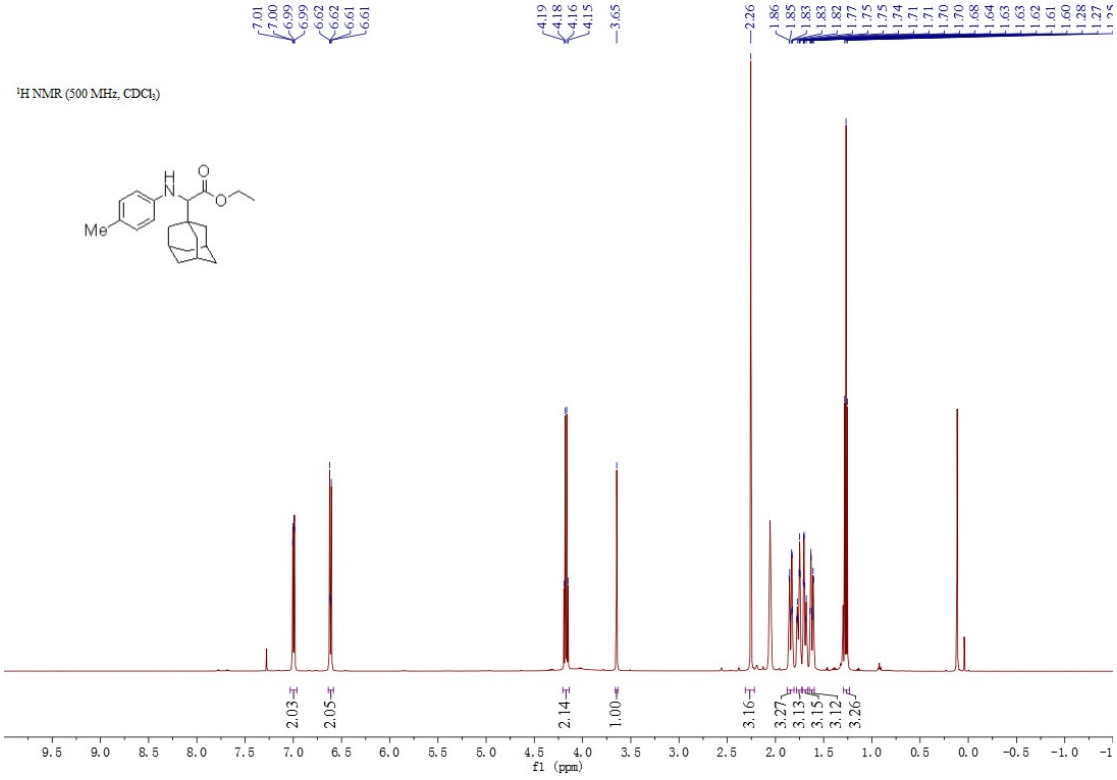
Ethyl 2-(1-methylcyclohexyl)-2-(p-tolylamino)acetate (4q)

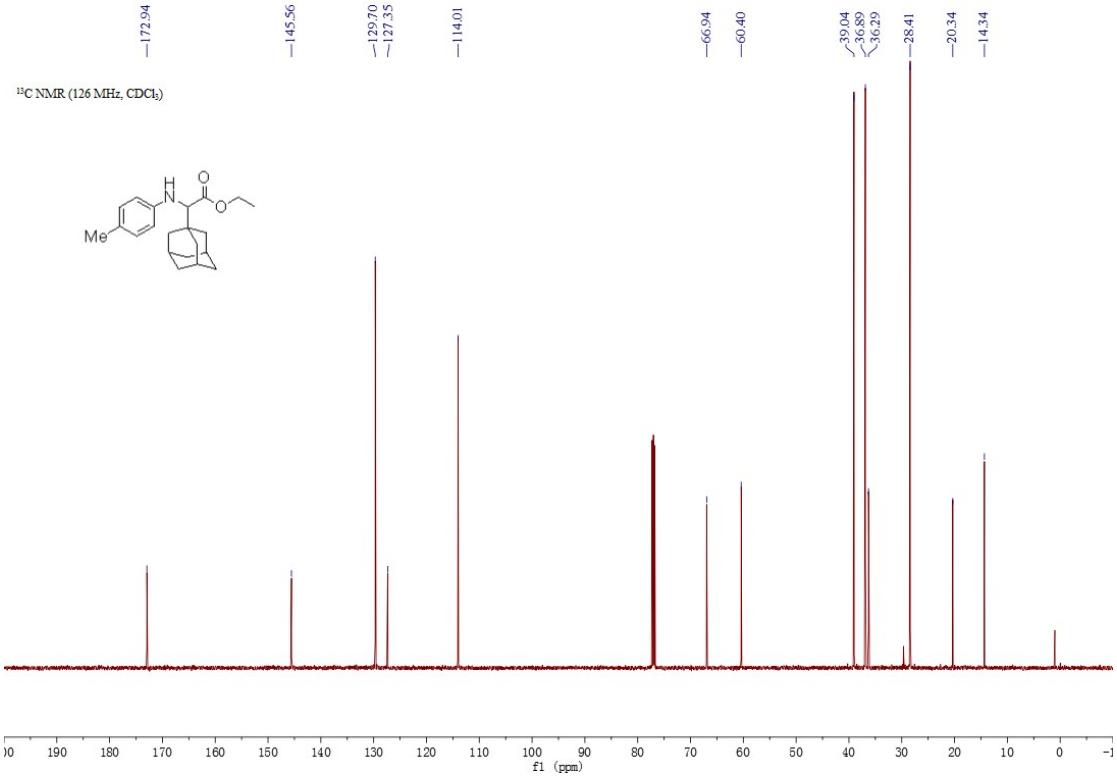


Ethyl 2-(p-tolylamino)-2-(2,2,5-trimethyl-1,3-dioxan-5-yl)acetate (4r)

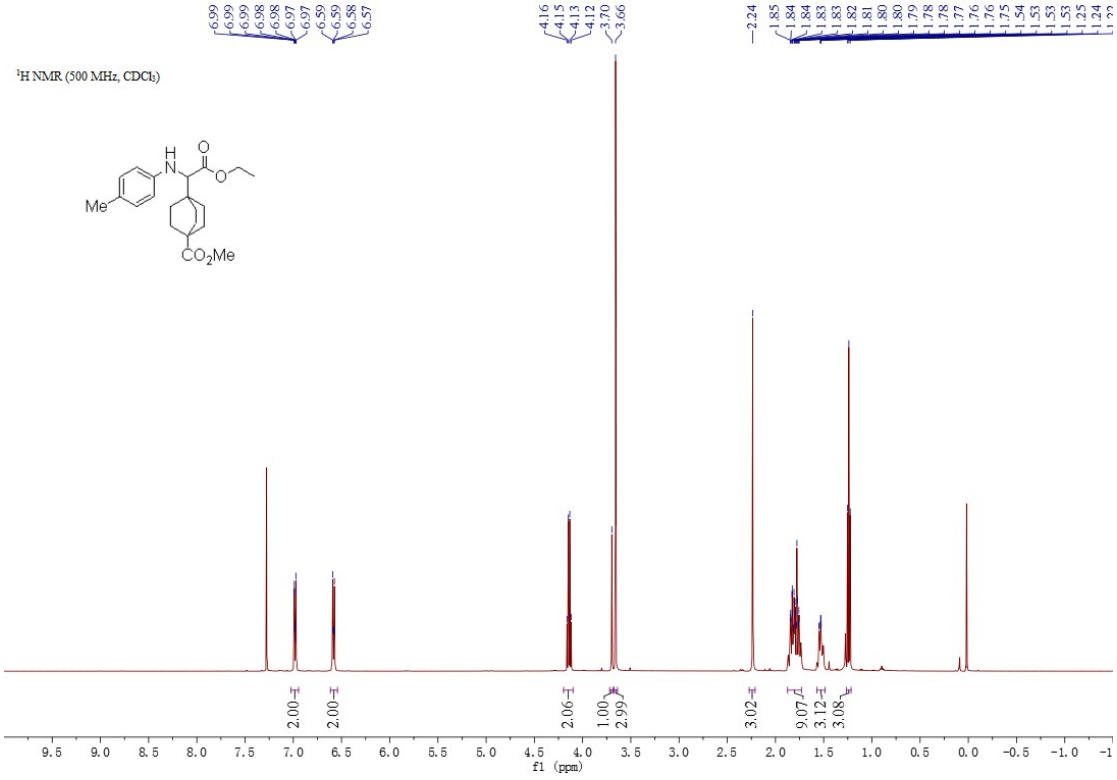


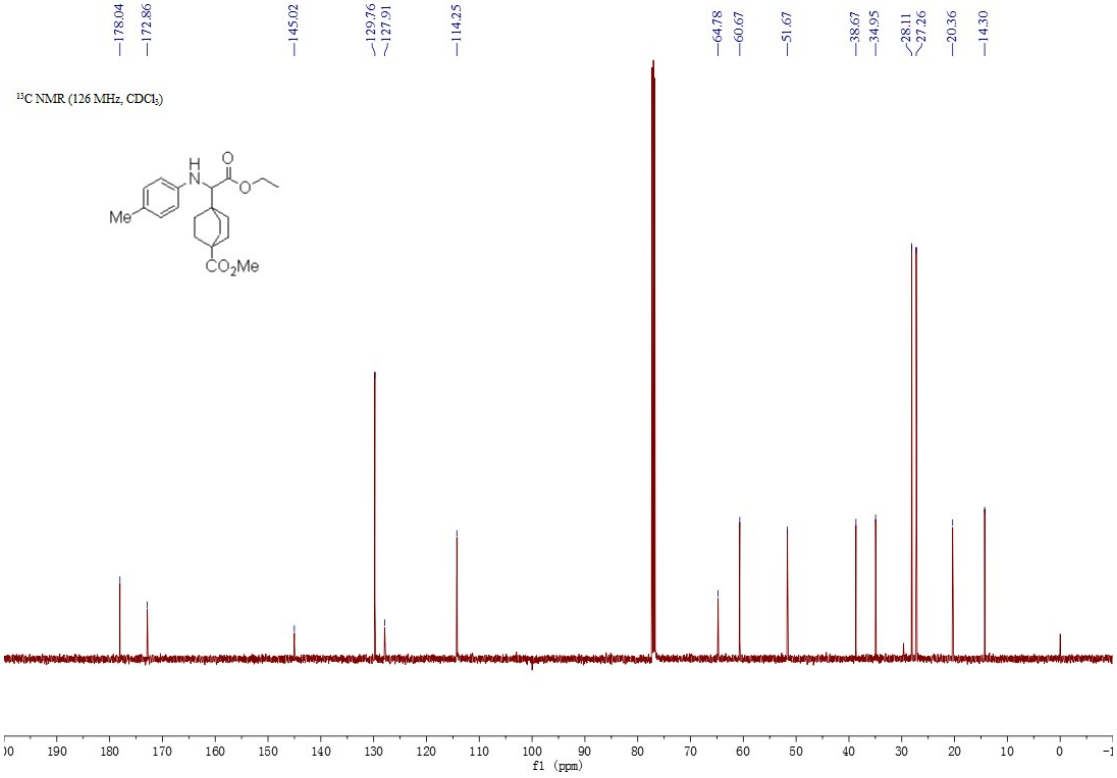
Ethyl 2-((3R,5R,7R)-adamantan-1-yl)-2-(p-tolylamino)acetate (4s)





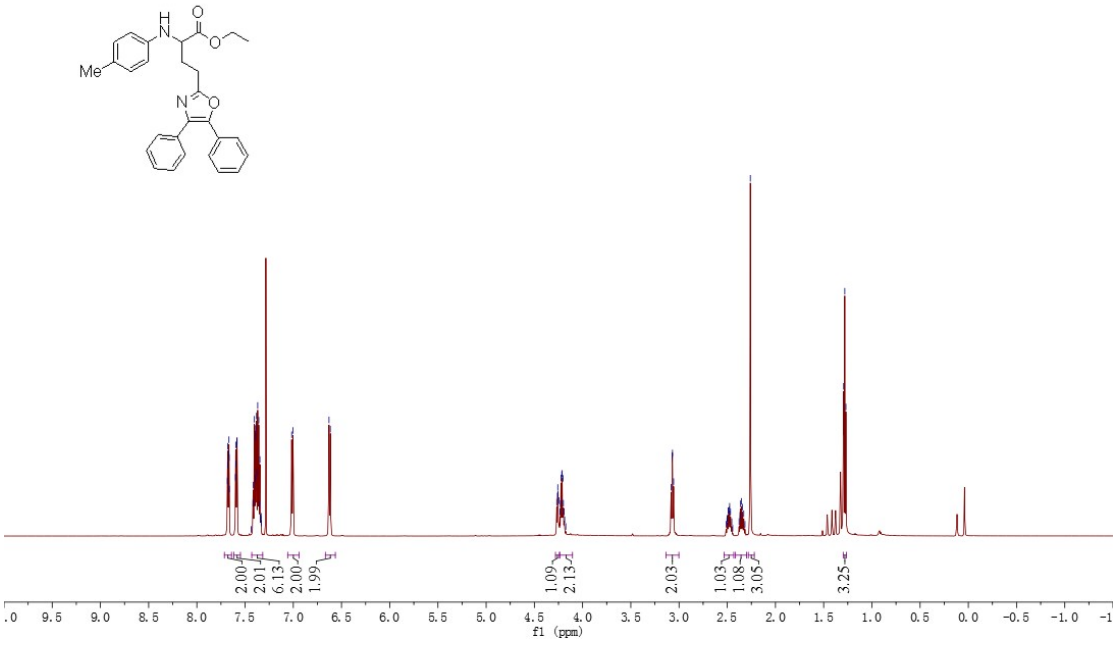
Methyl 4-(2-ethoxy-2-oxo-1-(p-tolylamino)ethyl)bicyclo[2.2.2]octane-1-carboxylate (4t)



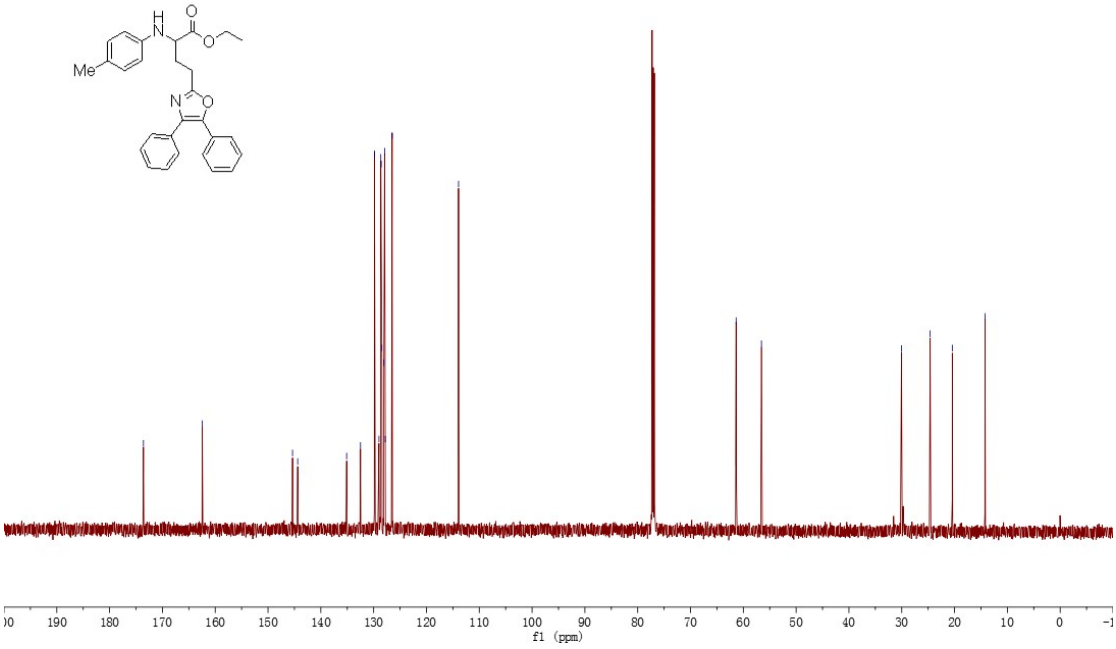


Ethyl 4-(4,5-diphenyloxazol-2-yl)-2-(p-tolylamino)butanoate (5a)

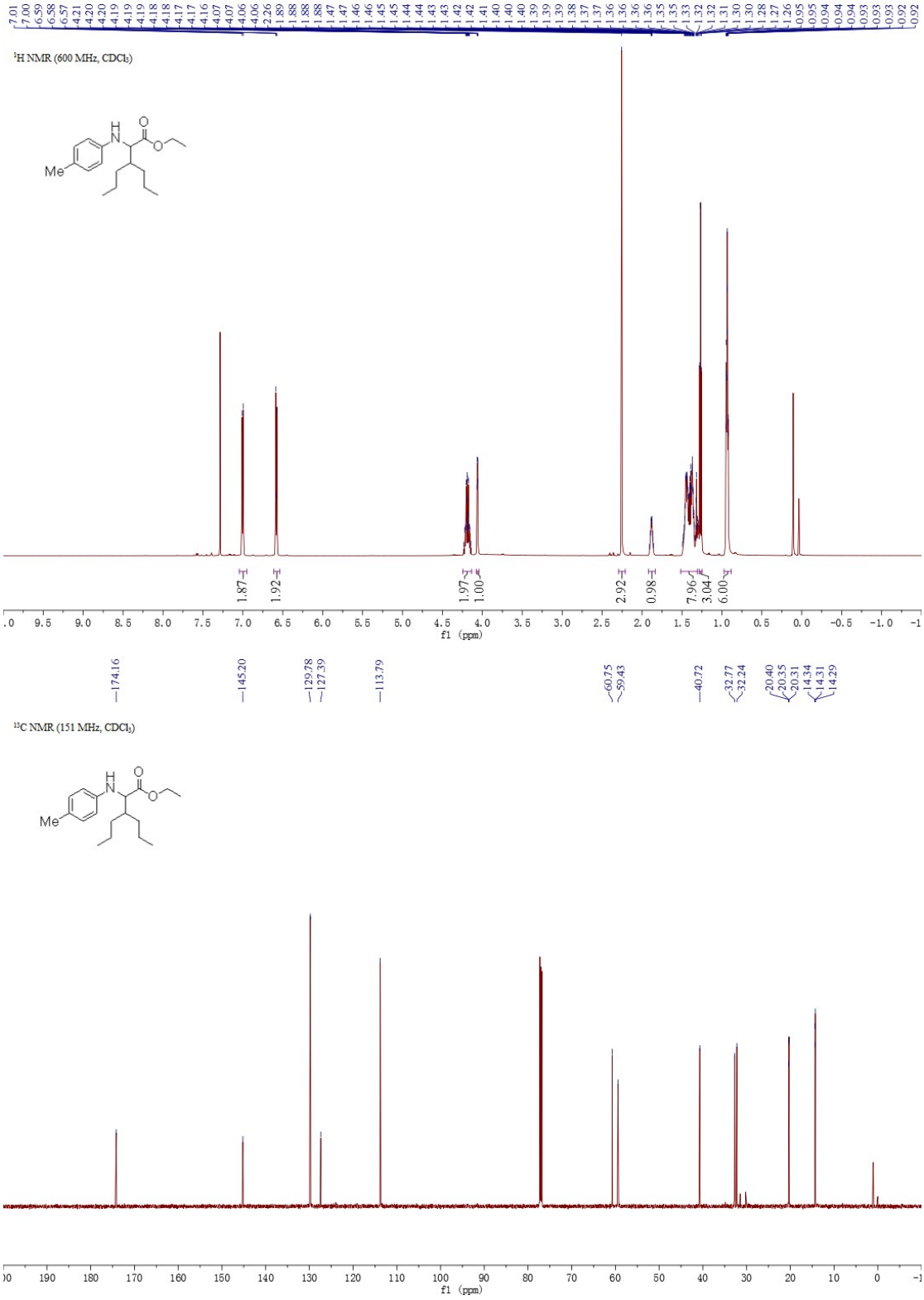
^{1}H NMR (600 MHz, $CDCl_3$)



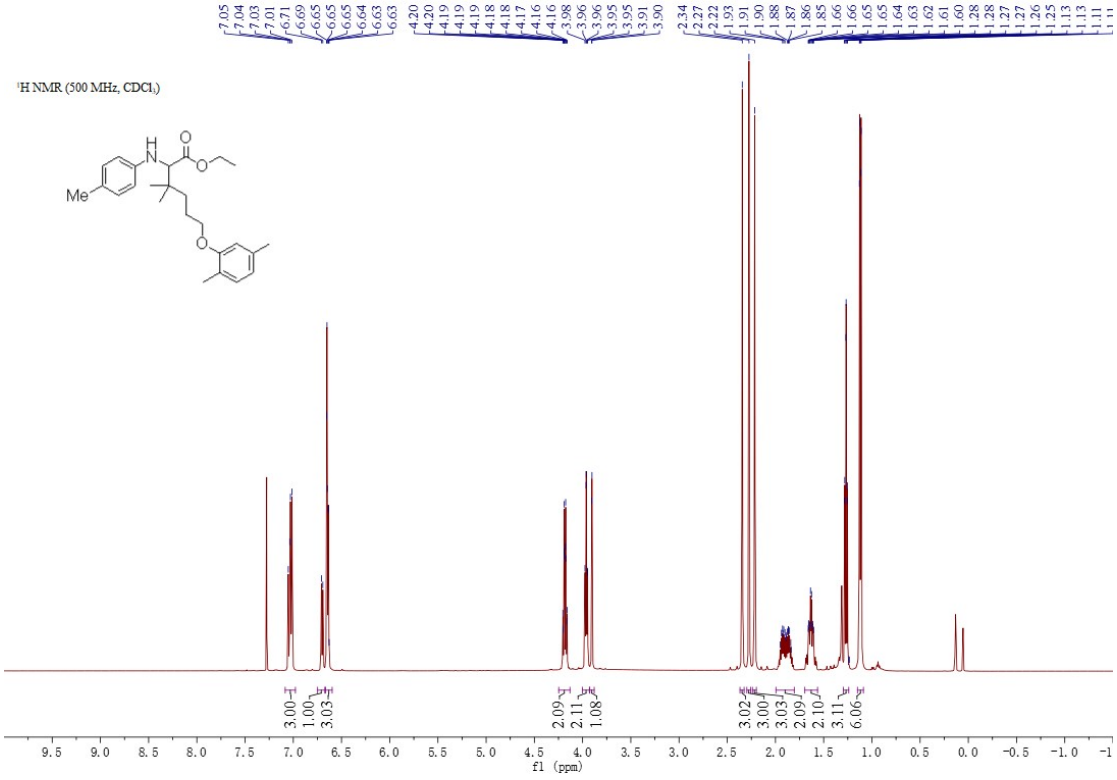
^{13}C NMR (151 MHz, $CDCl_3$)

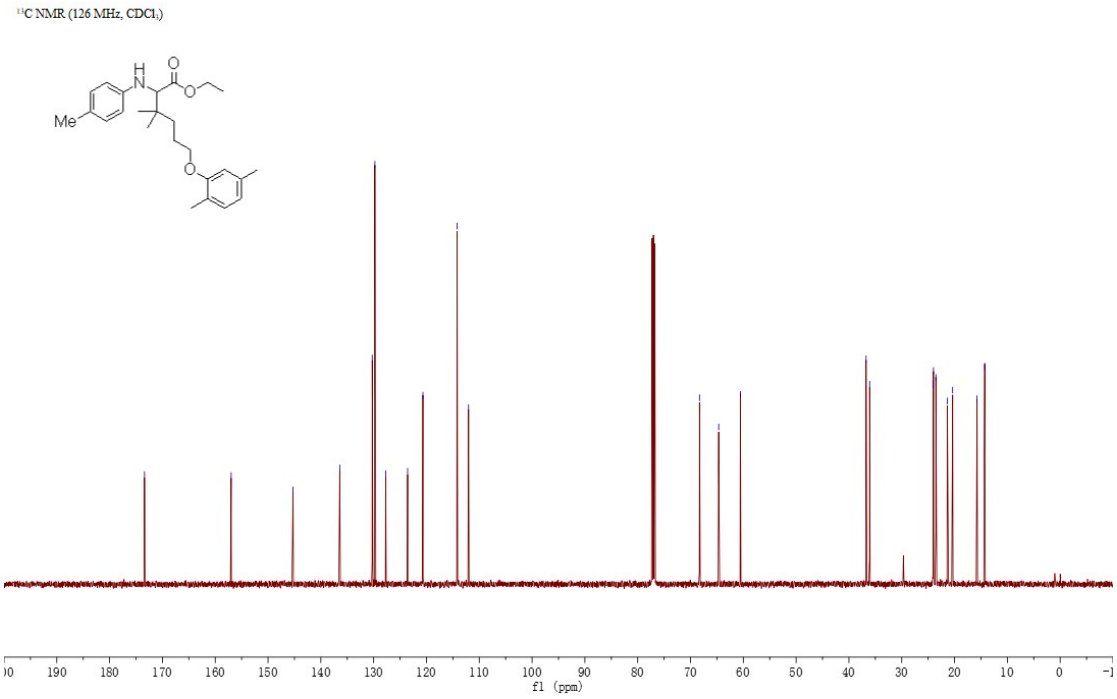


Ethyl 3-propyl-2-(p-tolylamino)hexanoate (5b)

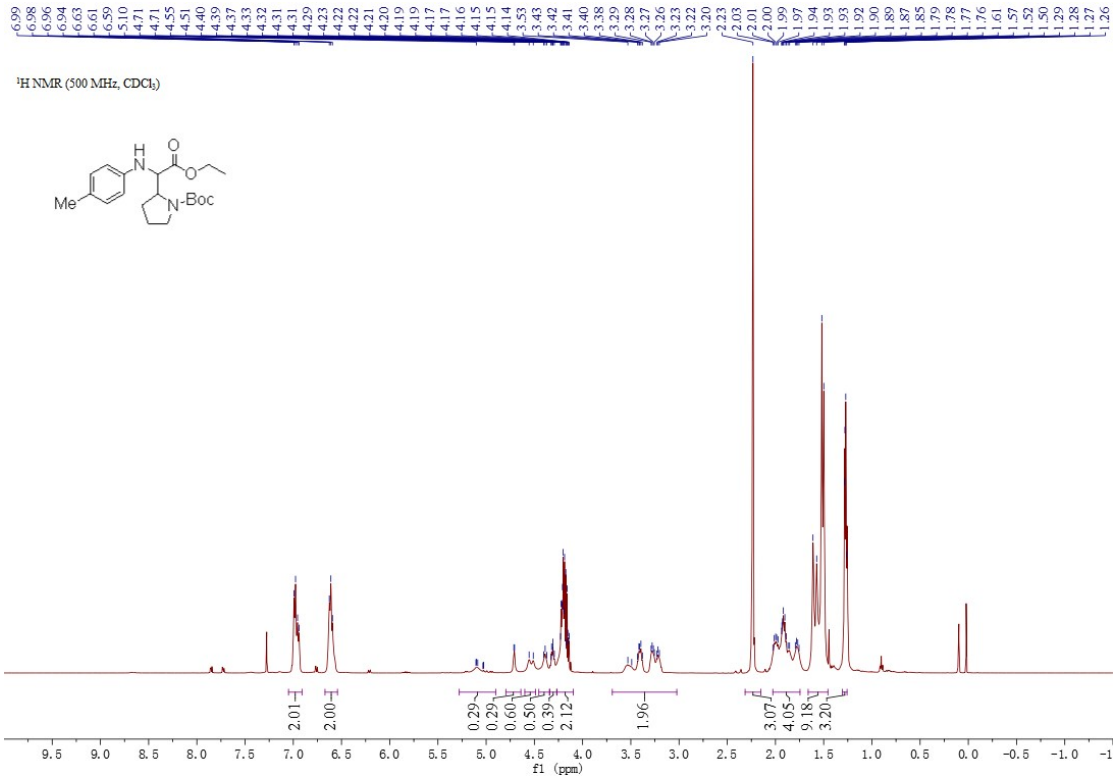


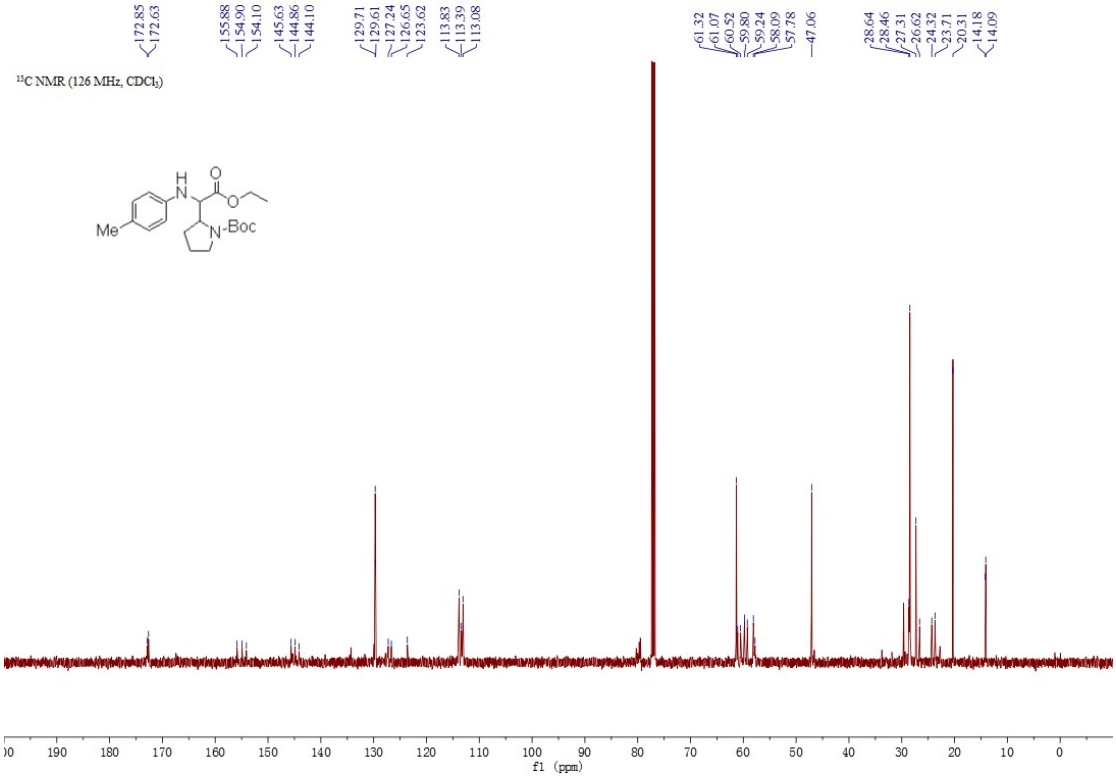
Ethyl 6-(2,5-dimethylphenoxy)-3,3-dimethyl-2-(p-tolylamino)hexanoate (5c)





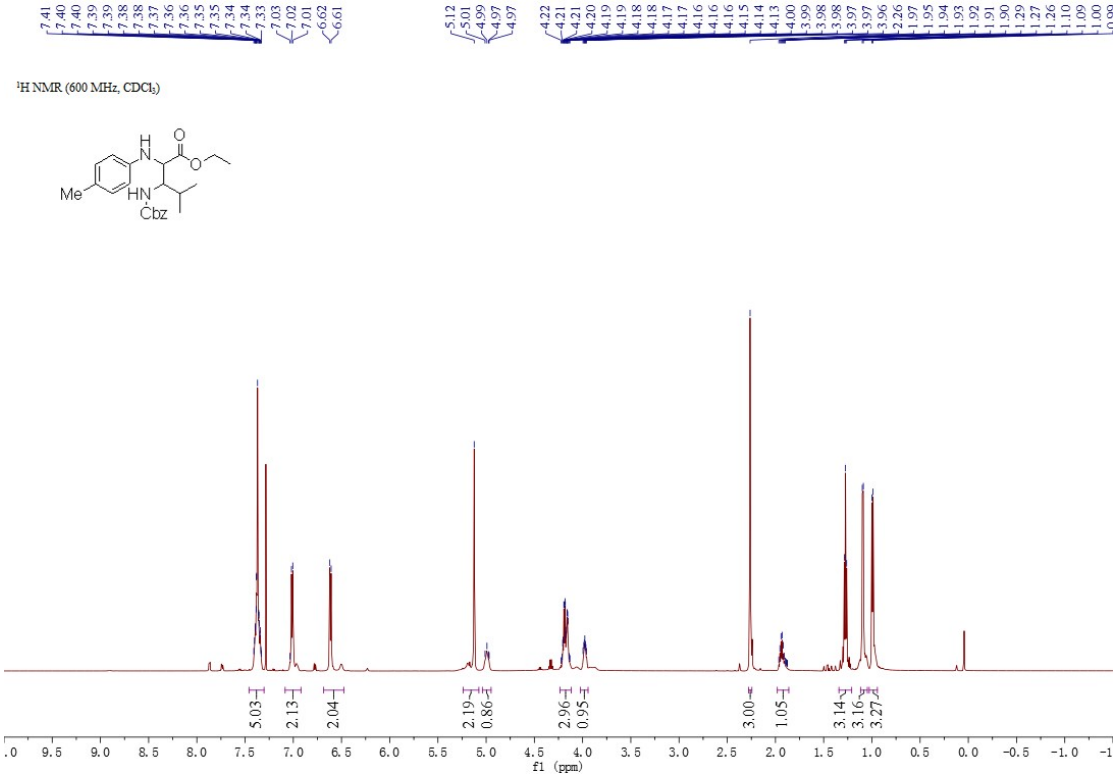
Tert-butyl 2-(2-ethoxy-2-oxo-1-(p-tolylamino)ethyl)pyrrolidine-1-carboxylate (5d)



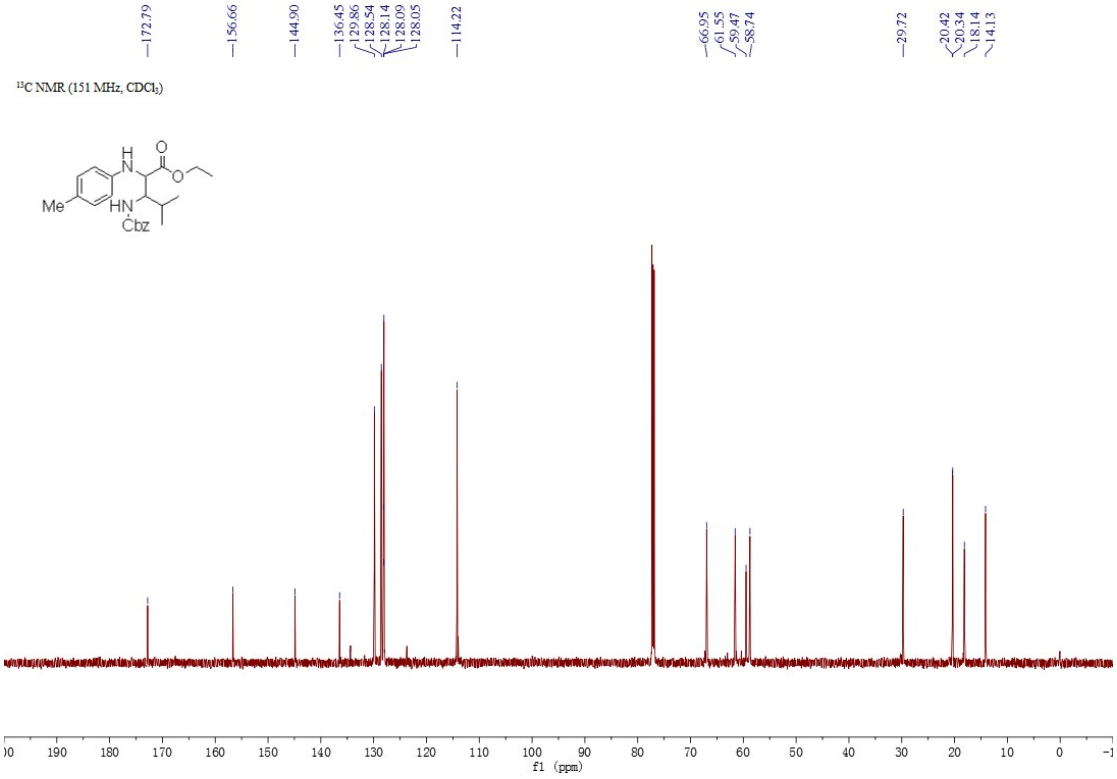


Ethyl 3-(((benzyloxy)carbonyl)amino)-4-methyl-2-(p-tolylamino)pentanoate (5e)

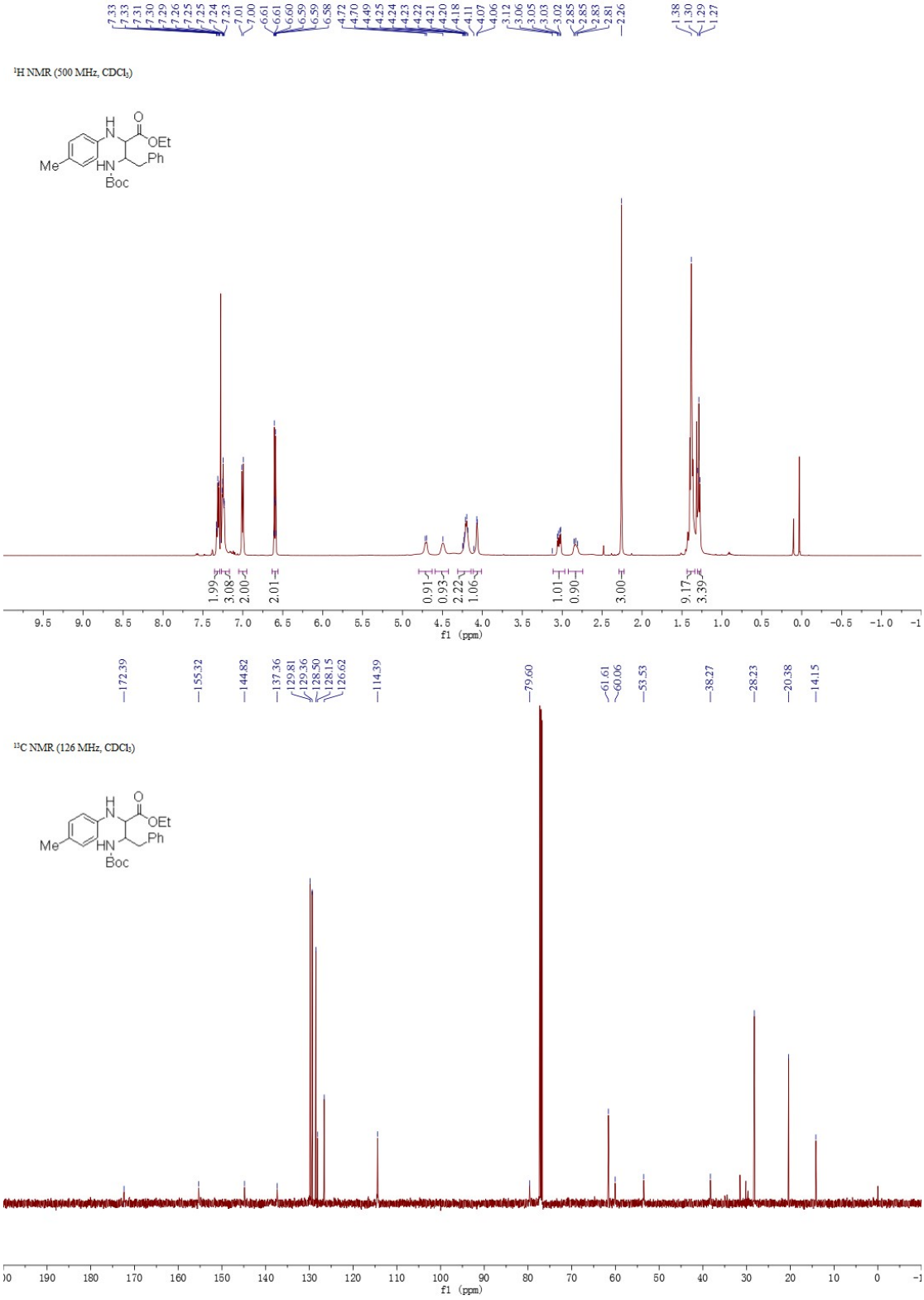
^{1}H NMR (600 MHz, $CDCl_3$)



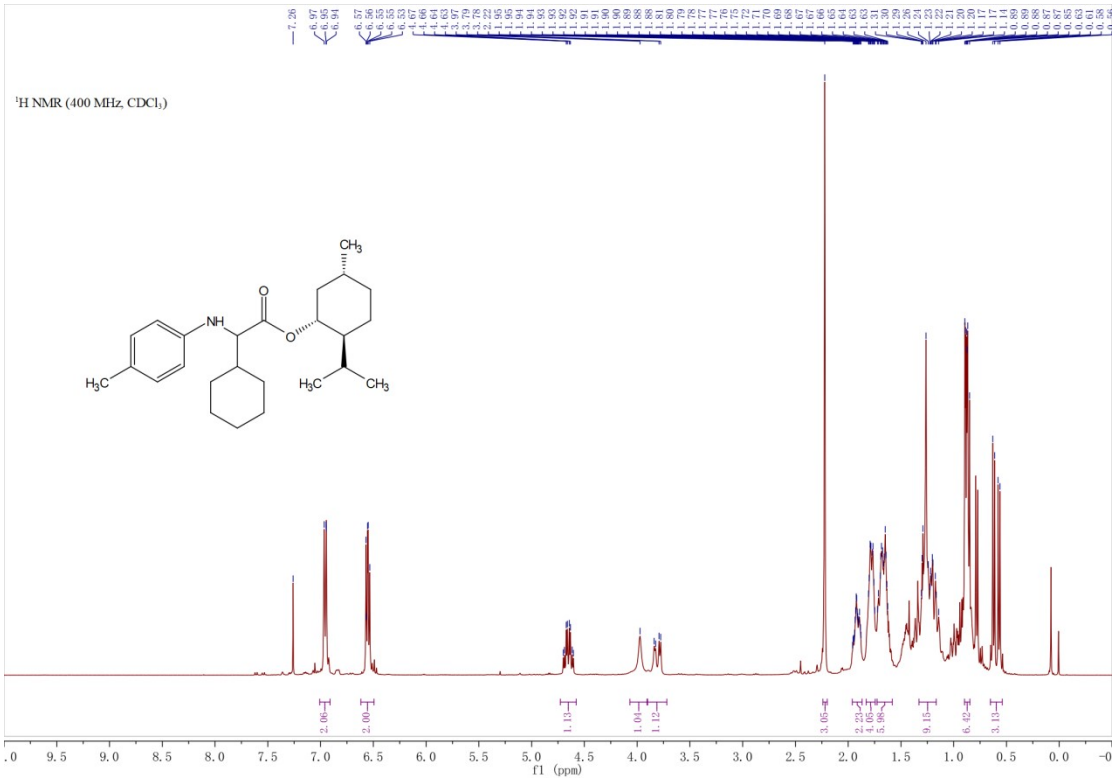
^{13}C NMR (151 MHz, $CDCl_3$)

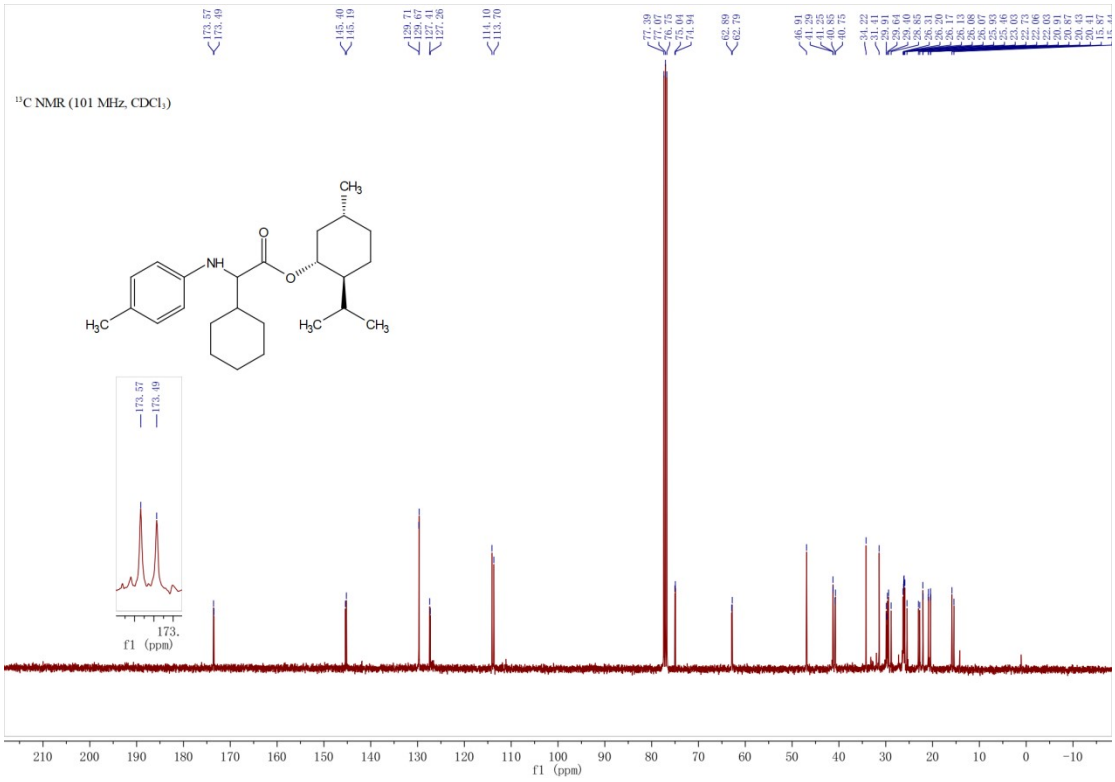


Ethyl 3-((tert-butoxycarbonyl)amino)-4-phenyl-2-(p-tolylamino)butanoate (5f)

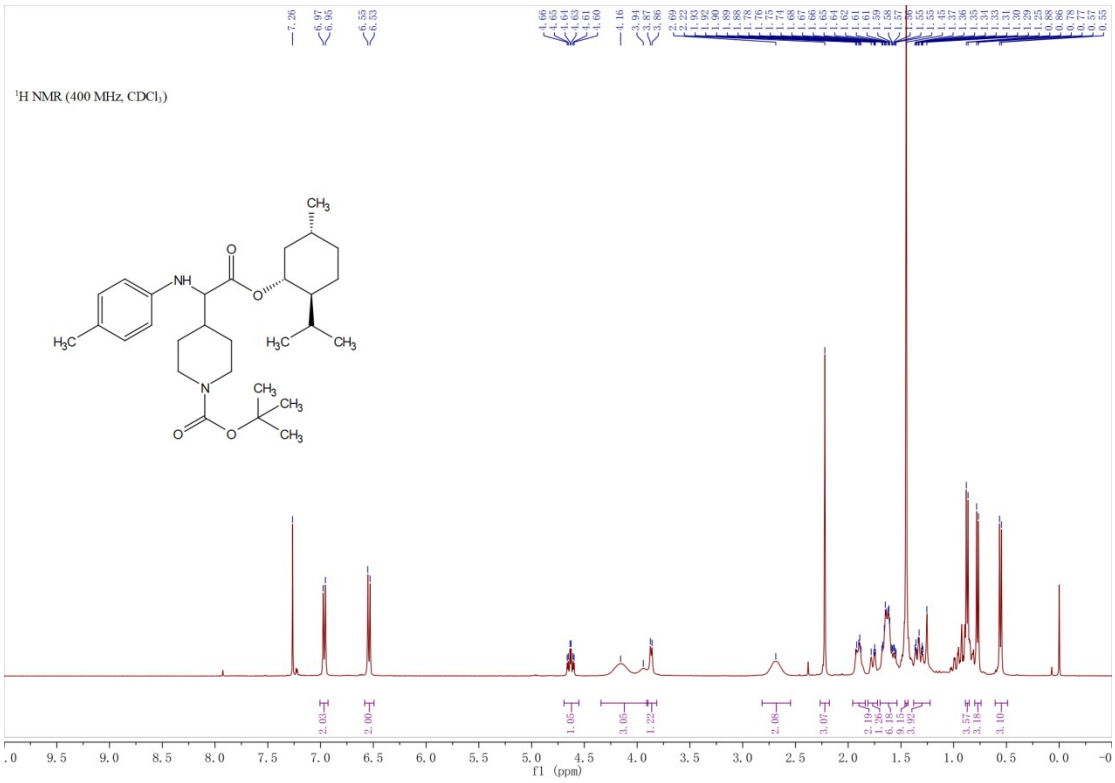


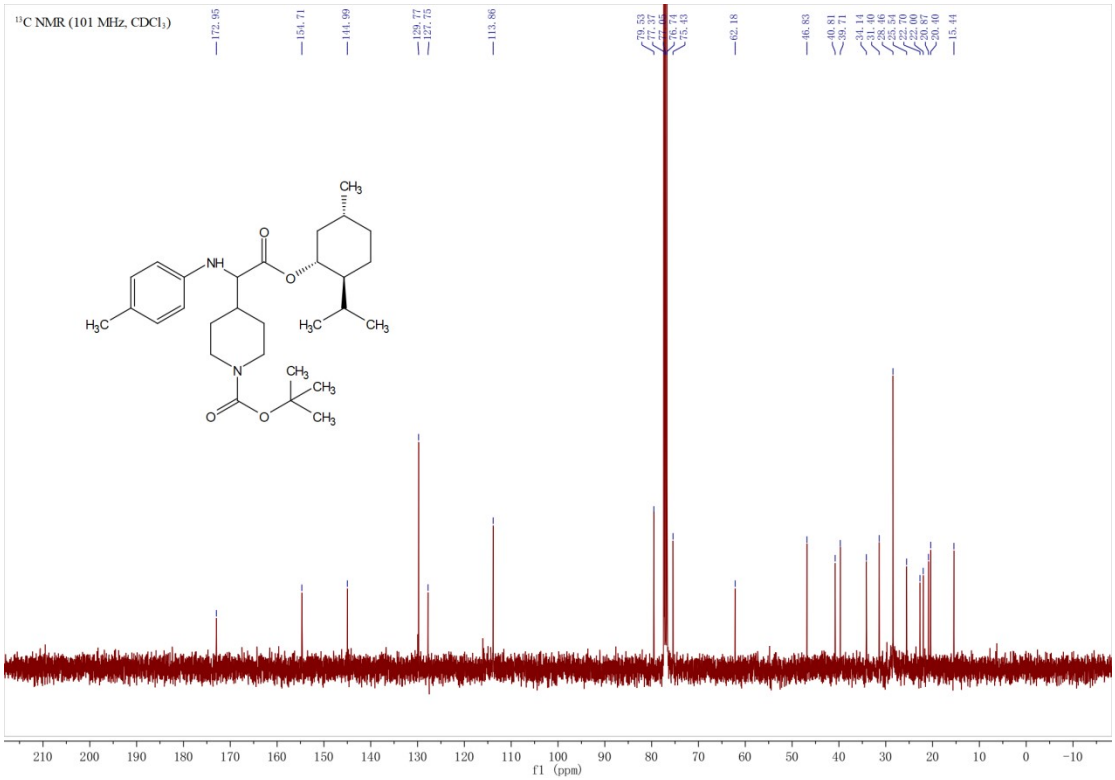
(1R,2S,5R)-2-isopropyl-5-methylcyclohexyl 2-cyclohexyl-2-(p-tolylamino)acetate (5g):



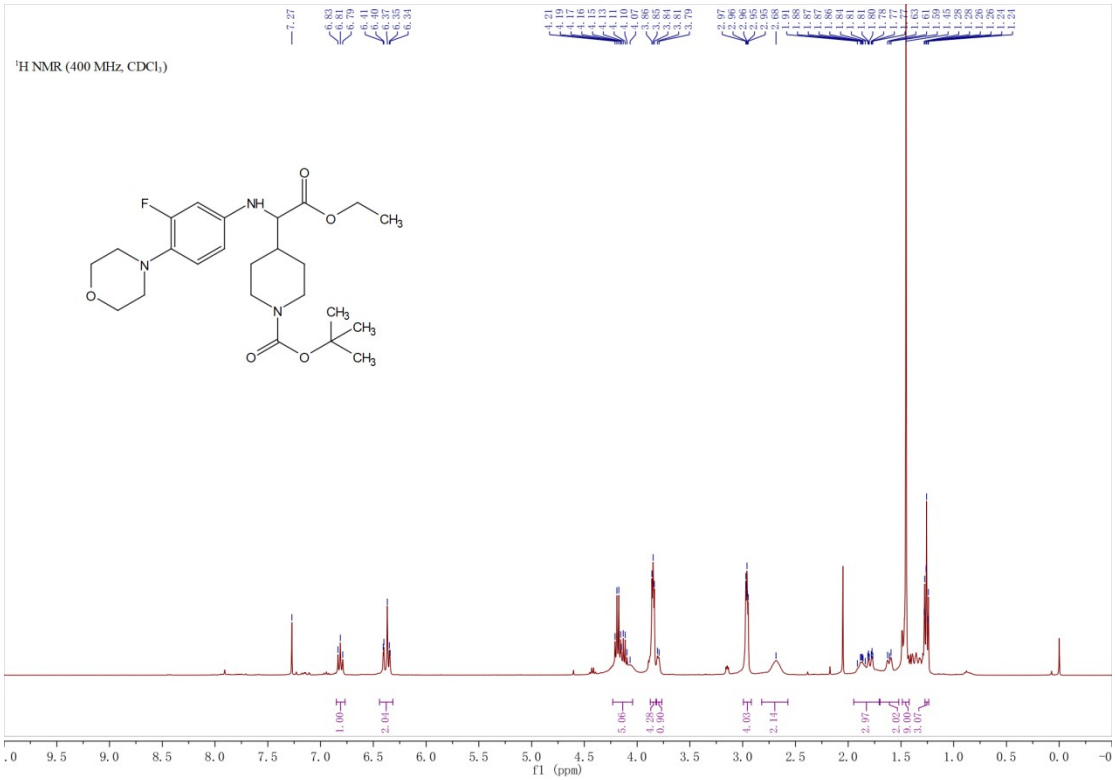


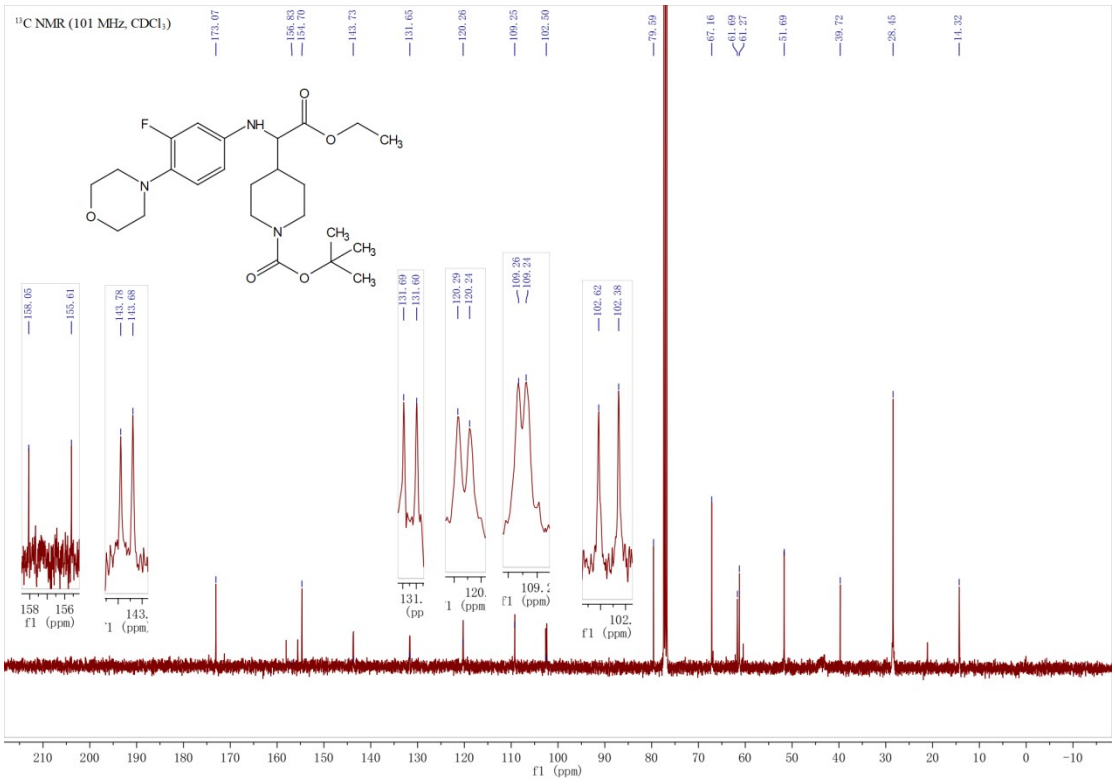
***tert*-butyl 4-(2-(((1R,2S,5R)-2-isopropyl-5-methylcyclohexyl)oxy)-2-oxo-1-(p-tolylamino)ethyl)piperidine-1-carboxylate (5h):**



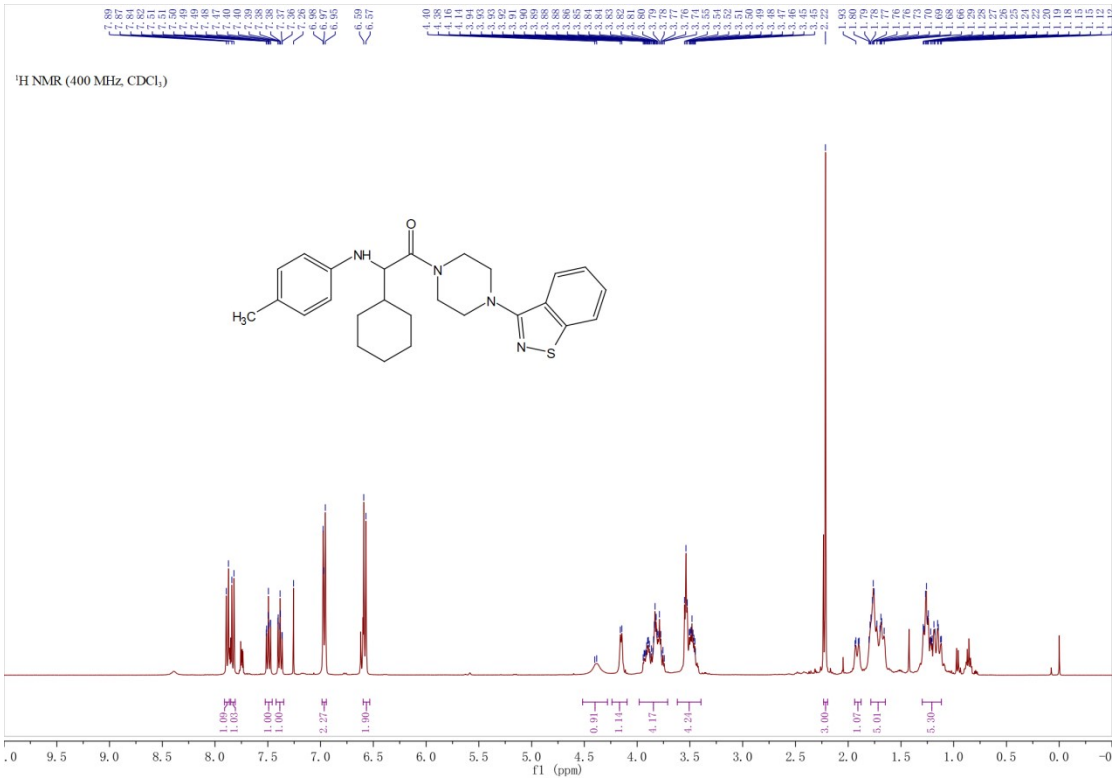


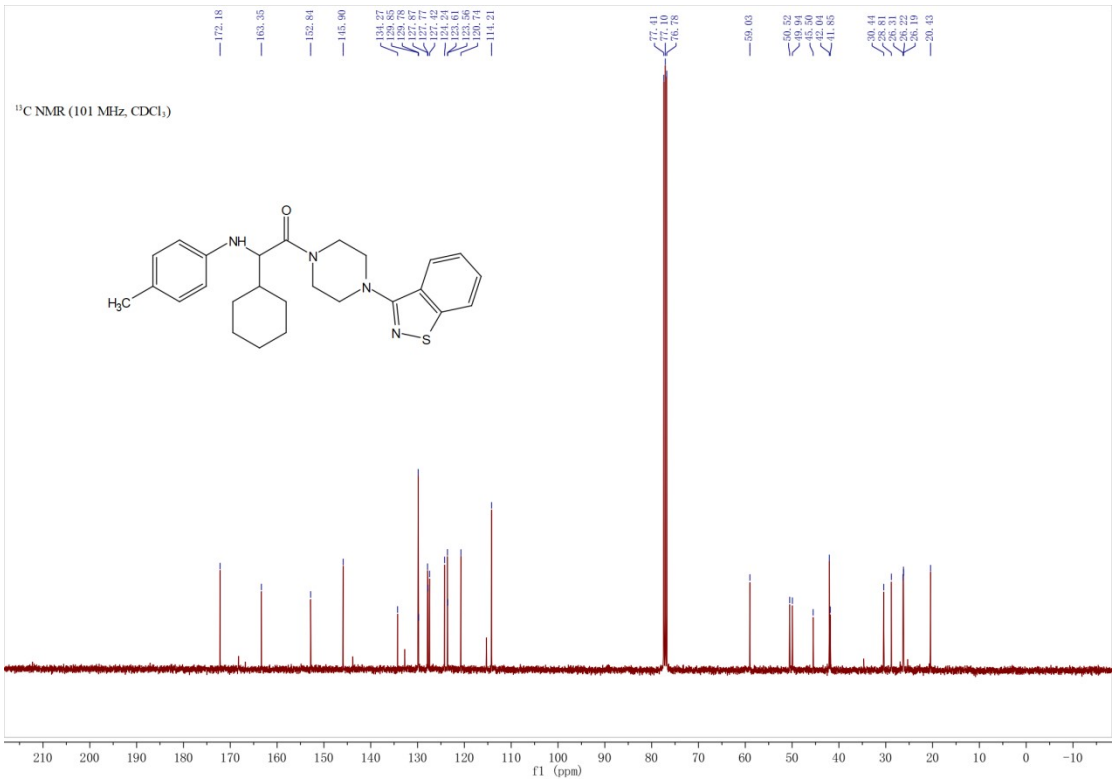
tert-butyl 4-(2-ethoxy-1-((3-fluoro-4-morpholinophenyl)amino)-2-oxoethyl)piperidine-1-carboxylate (5i):



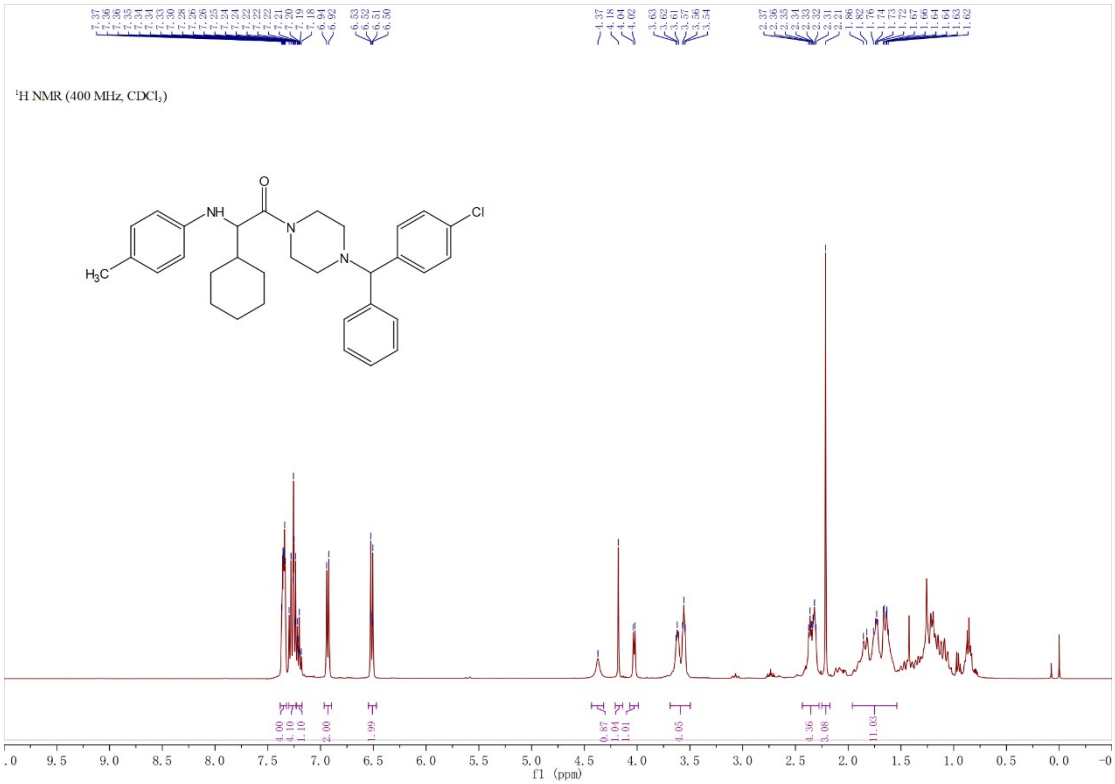


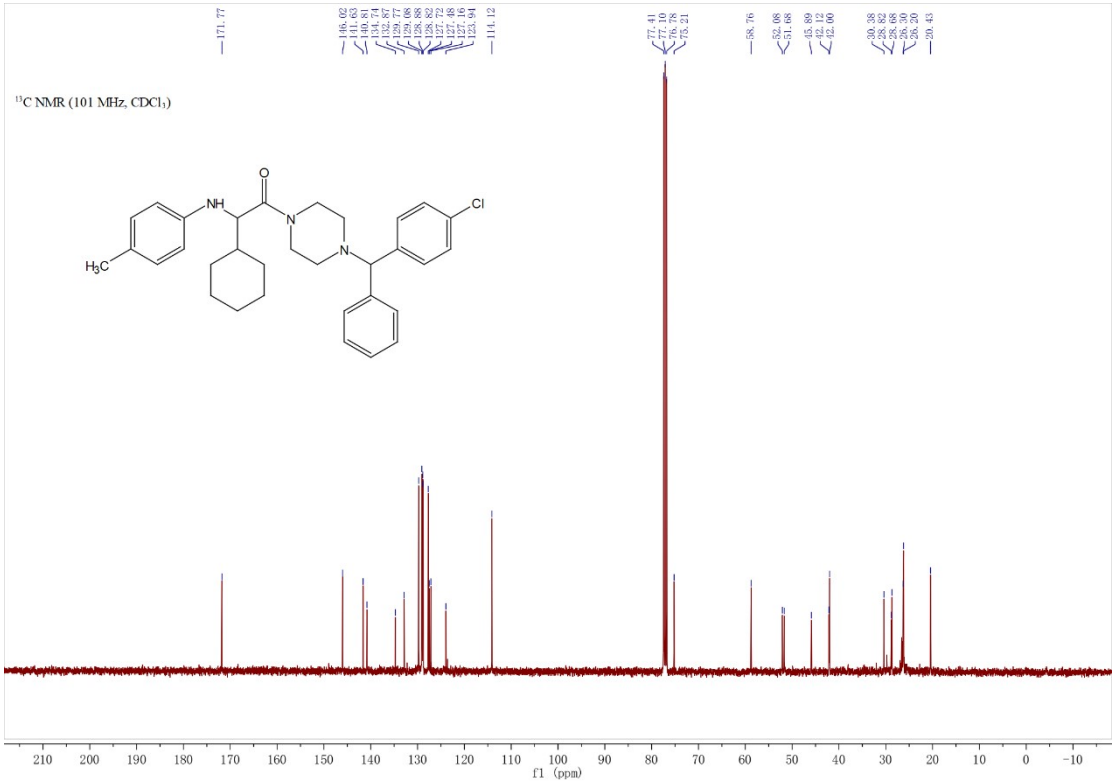
1-(4-(benzo[d]isothiazol-3-yl)piperazin-1-yl)-2-cyclohexyl-2-(p-tolylamino)ethan-1-one (5j):



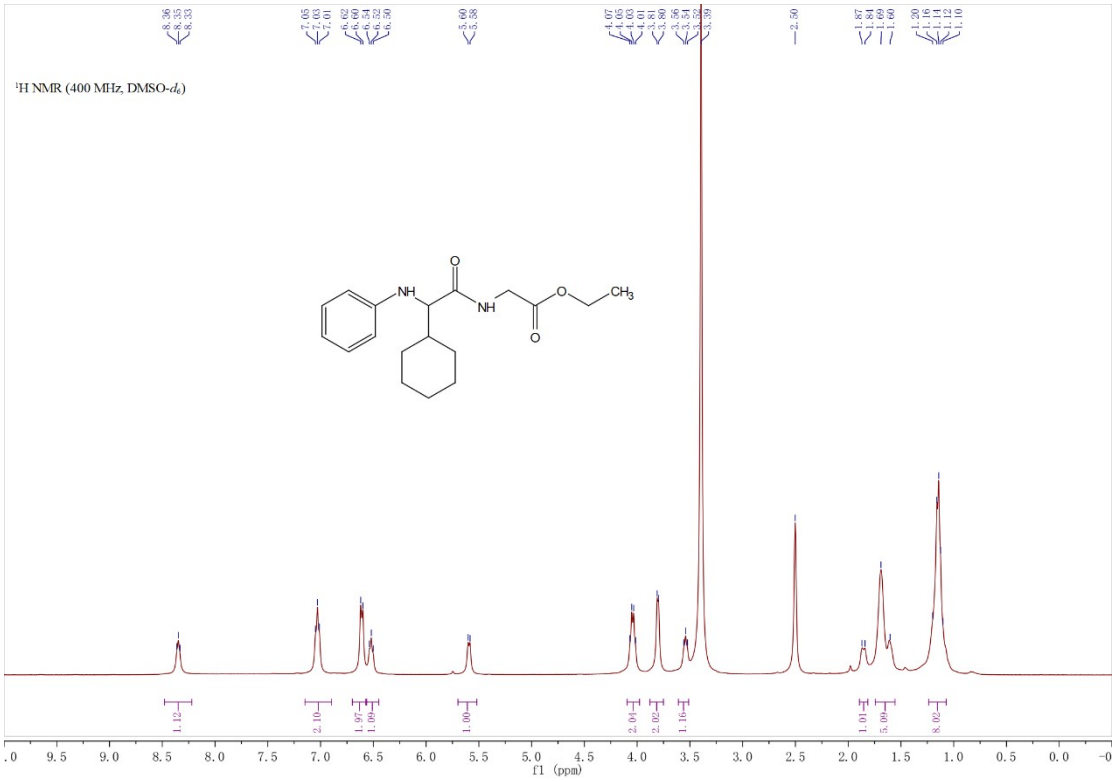


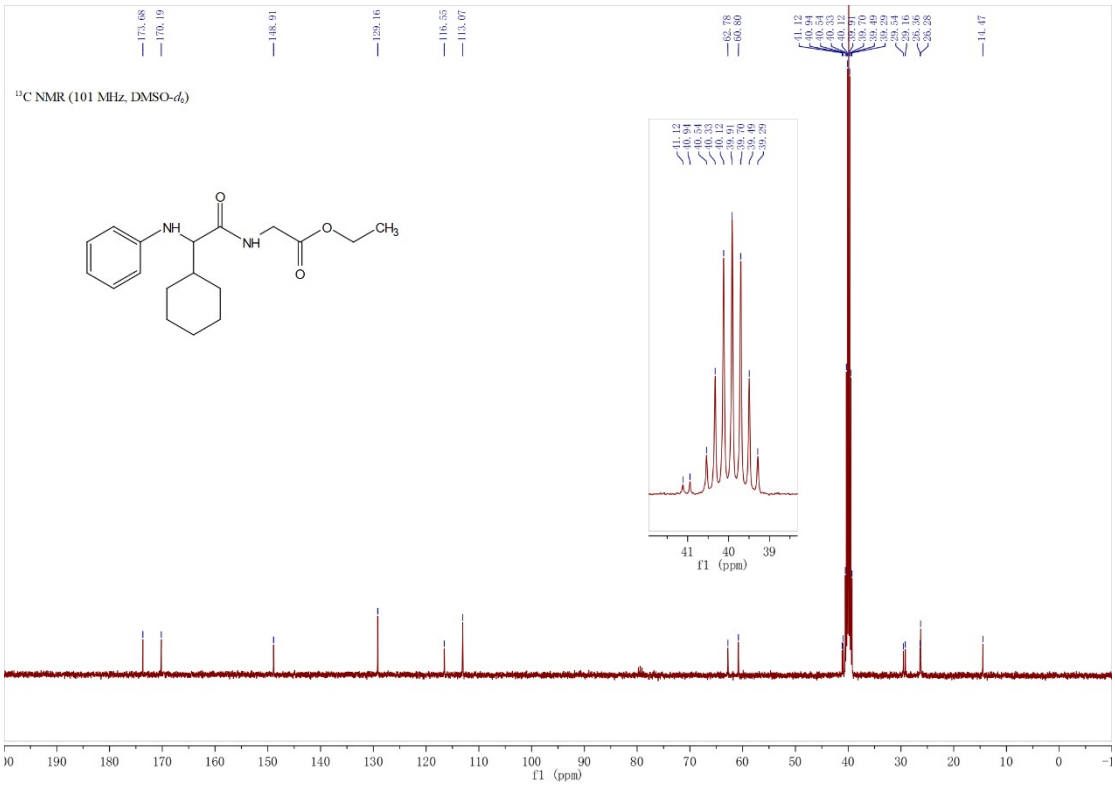
1-(4-((4-chlorophenyl)(phenyl)methyl)piperazin-1-yl)-2-cyclohexyl-2-(*p*-tolylamino) ethan-1-one (5k):



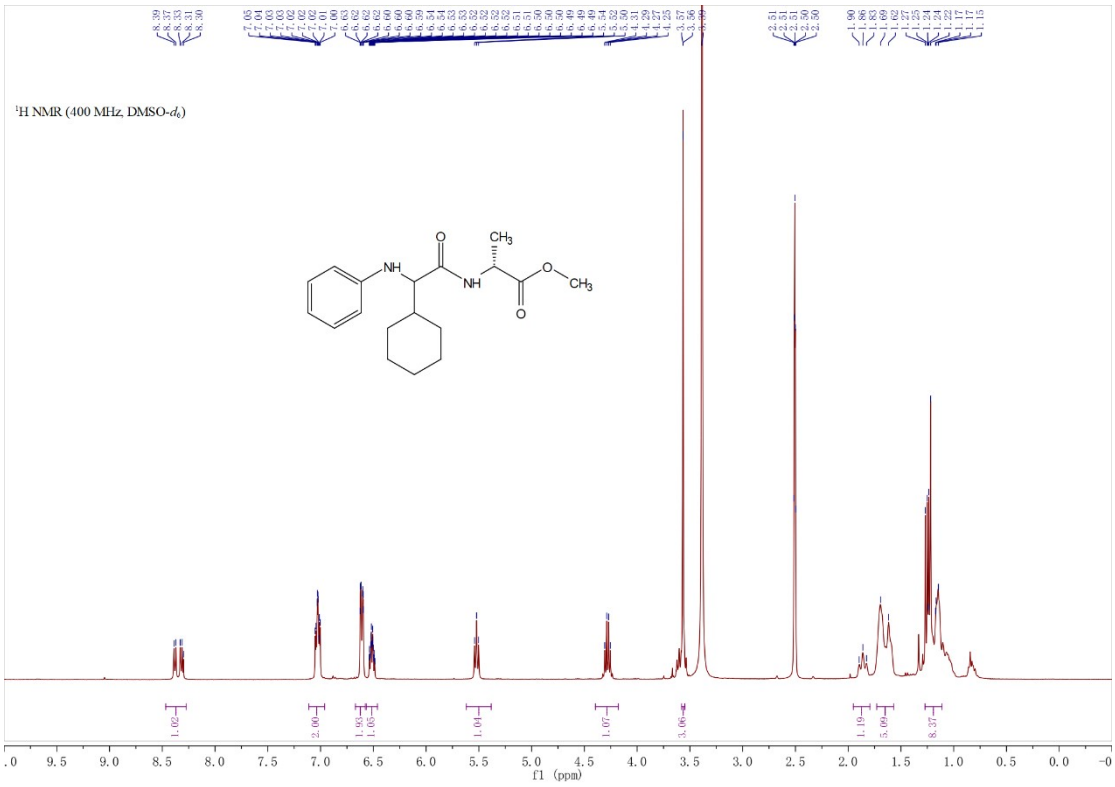


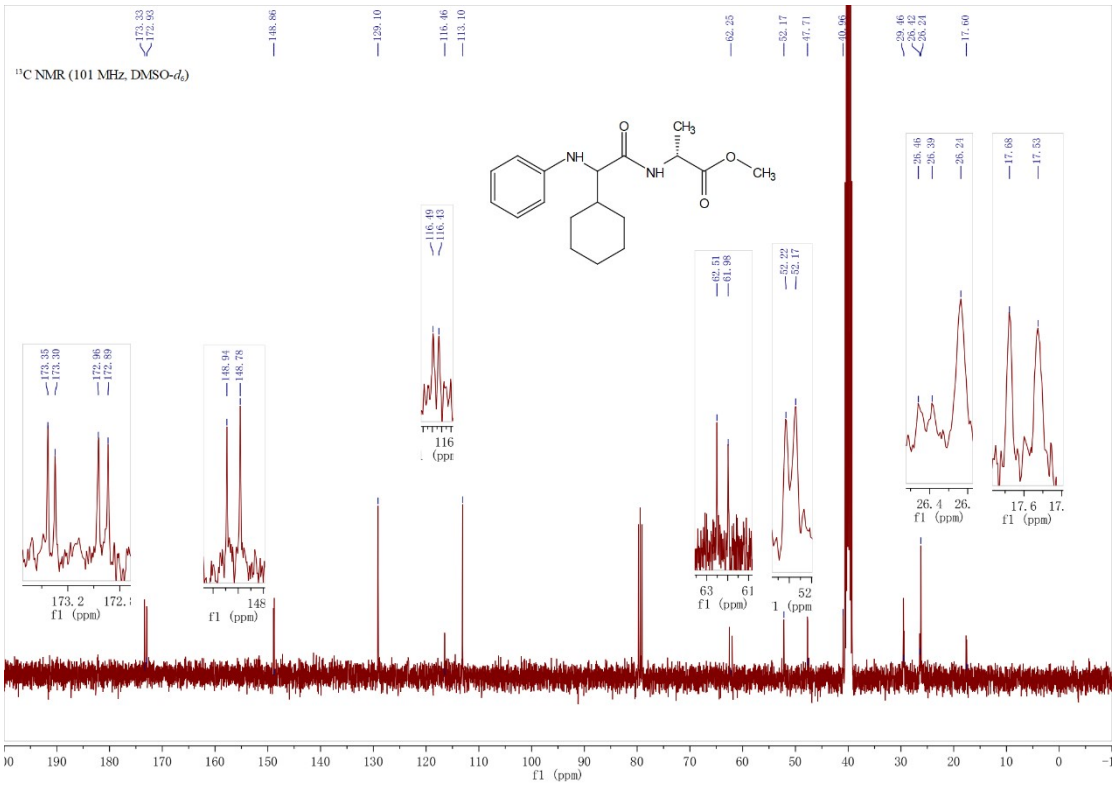
Ethyl (2-cyclohexyl-2-(phenylamino)acetyl)glycinate (5l):



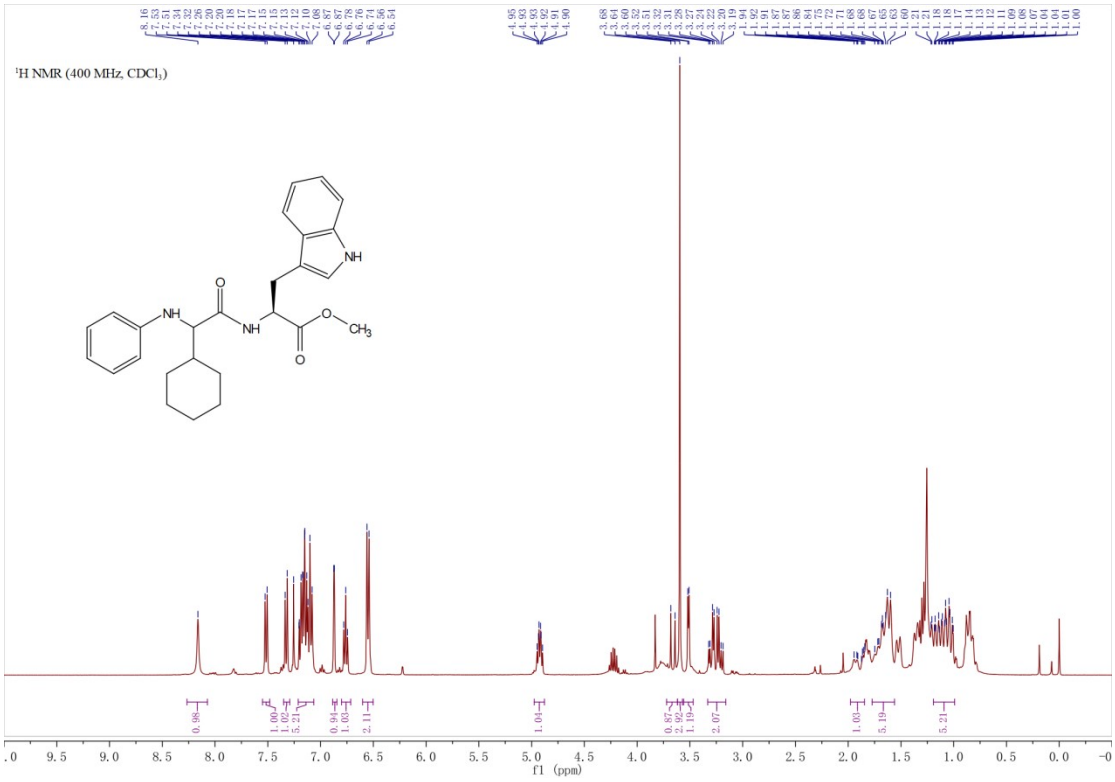


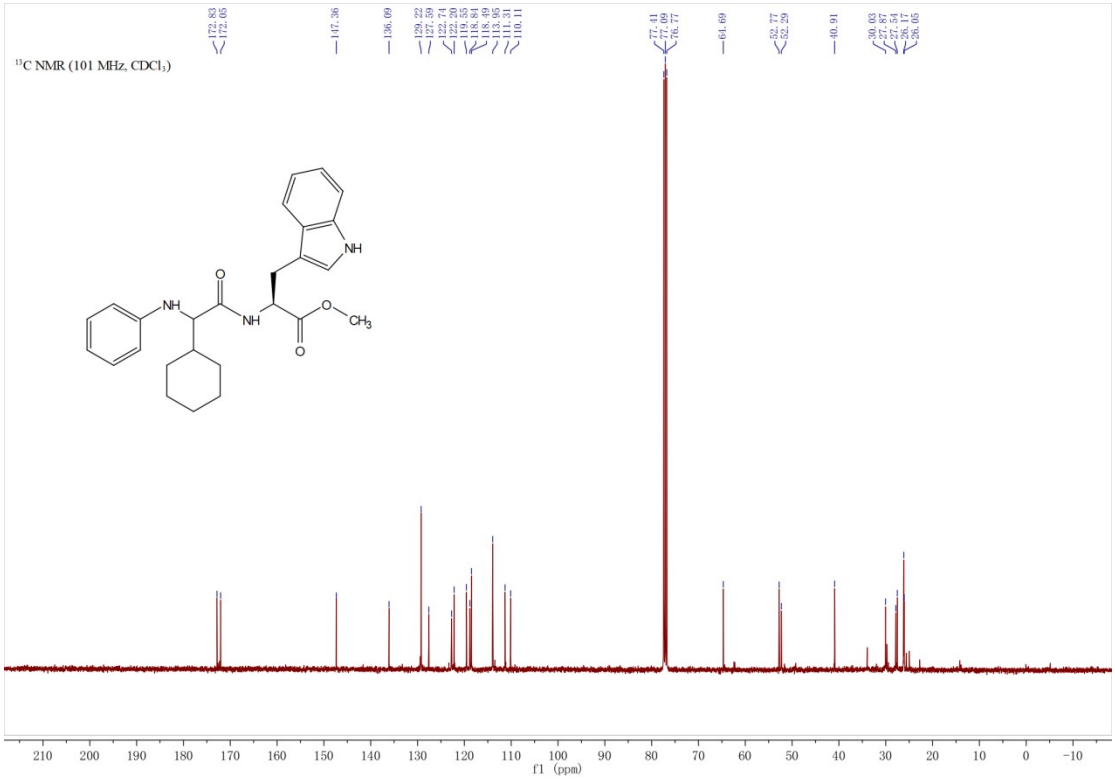
Methyl (2-cyclohexyl-2-(phenylamino)acetyl)-*D*-alaninate (5m)



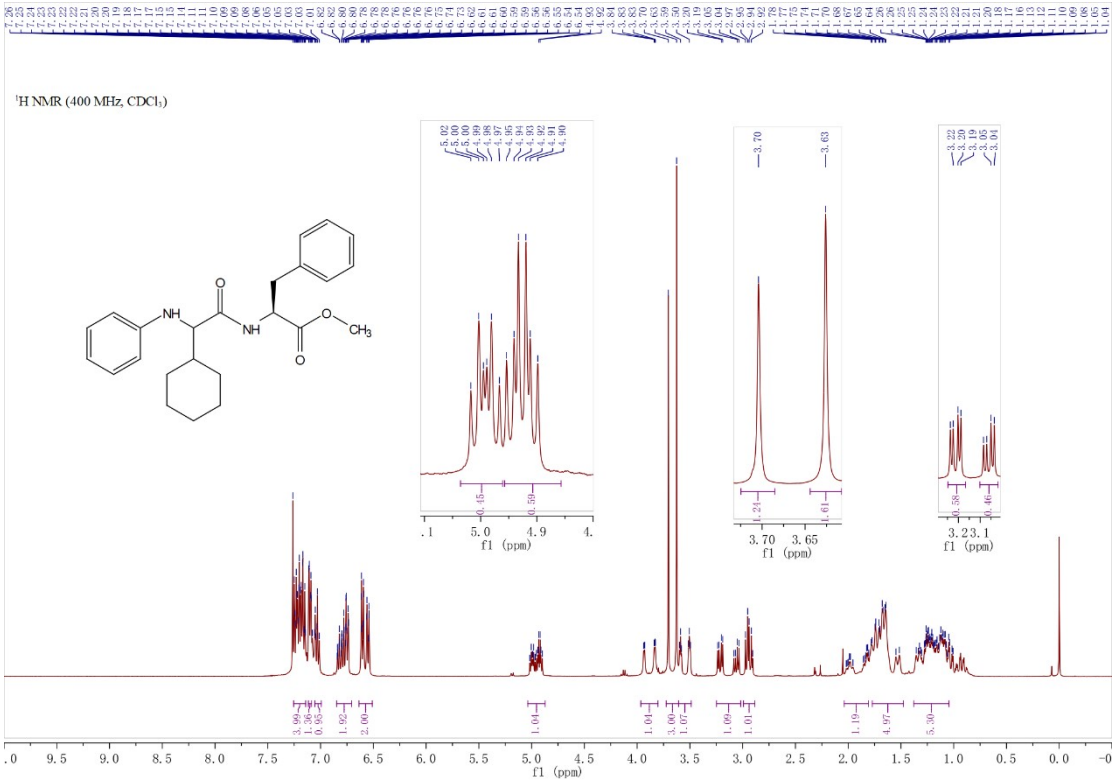


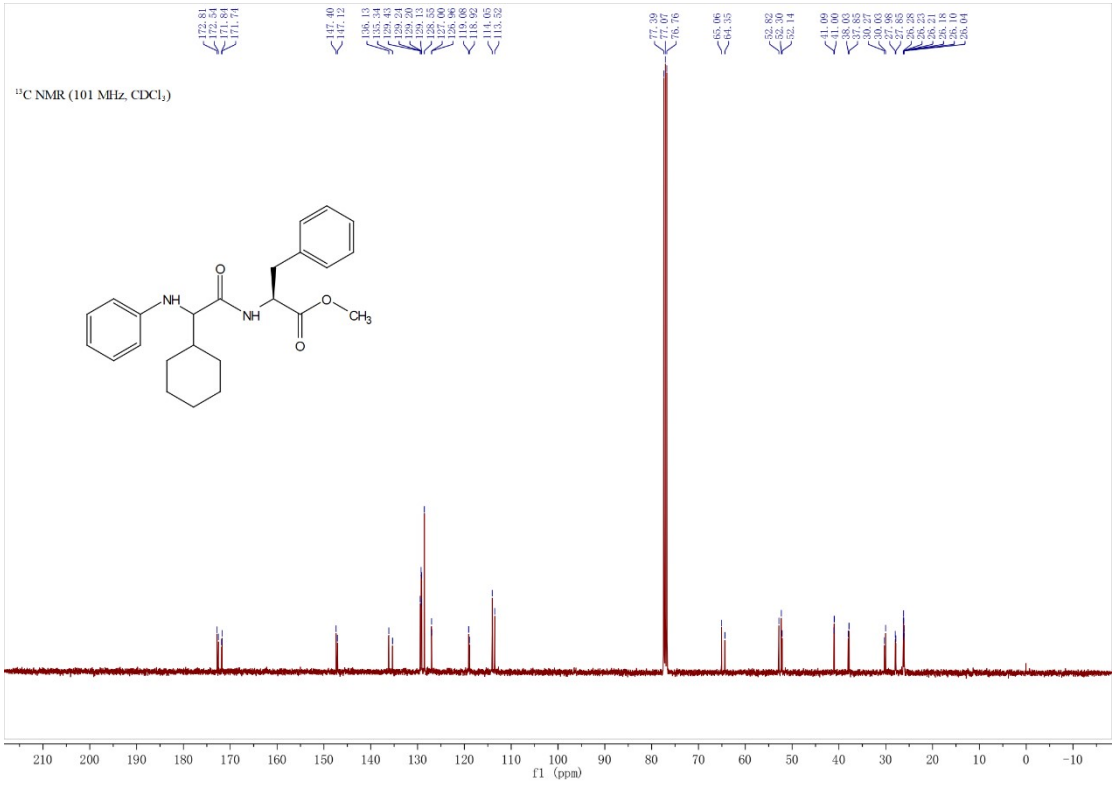
Methyl (2-cyclohexyl-2-(phenylamino)acetyl)-L-tryptophanate (5n)



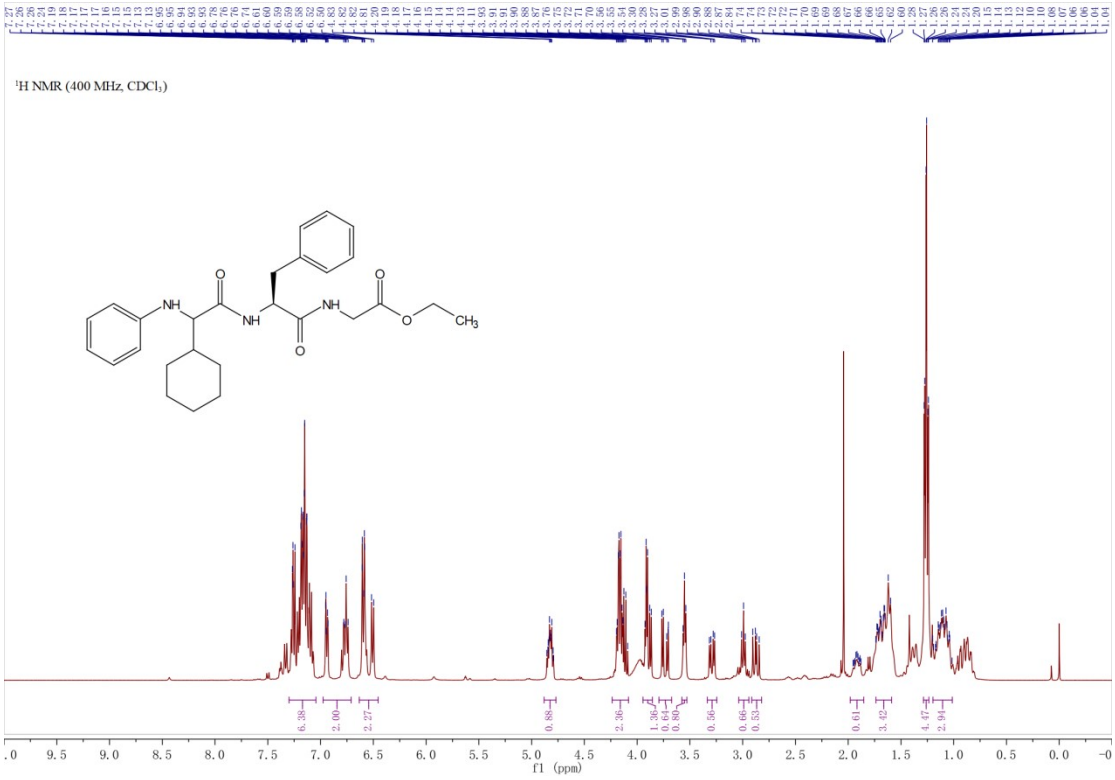


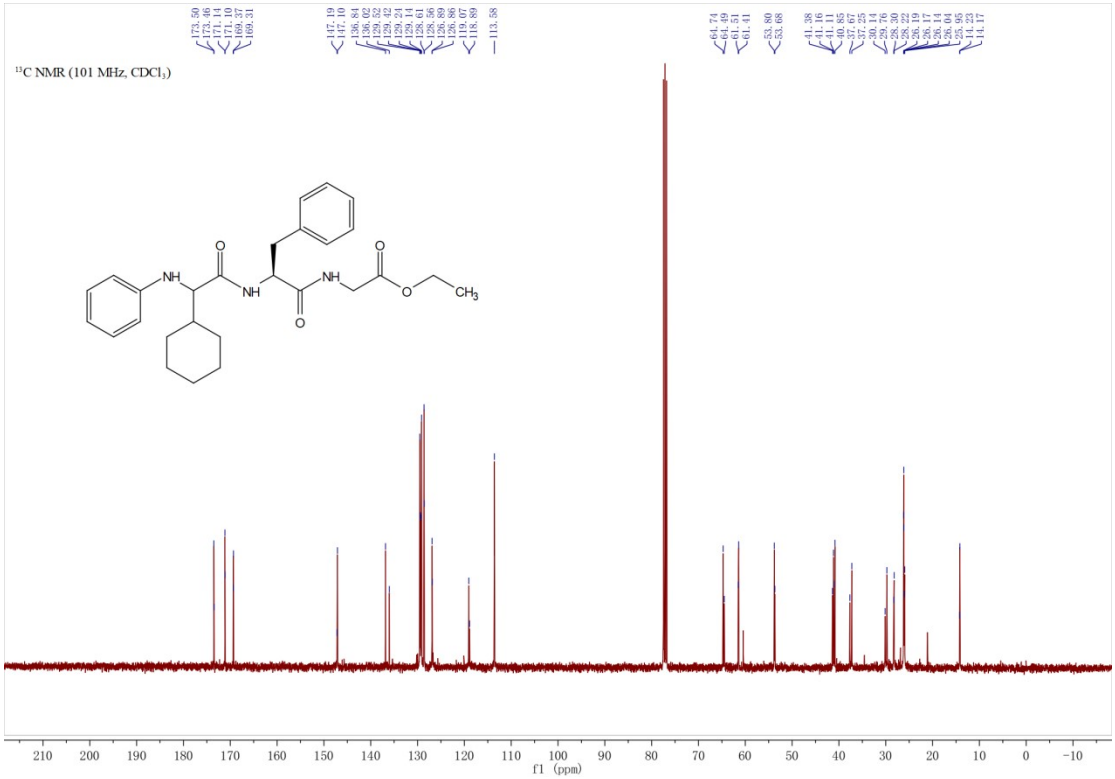
Methyl (2-cyclohexyl-2-(phenylamino)acetyl)-L-phenylalaninate (5o)





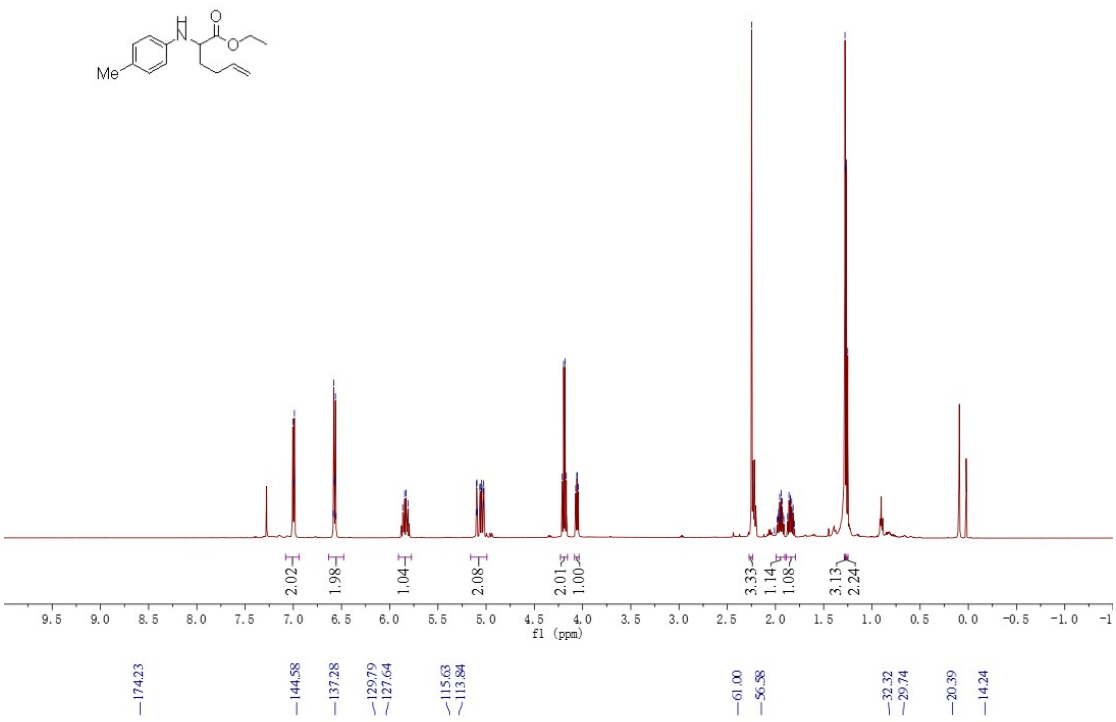
Ethyl (2-cyclohexyl-2-(phenylamino)acetyl)-L-phenylalanylglycinate (5p)





Ethyl 2-(p-tolylamino)hex-5-enoate (4u)

^{1}H NMR (500 MHz, $CDCl_3$)



^{13}C NMR (126 MHz, $CDCl_3$)