Supporting Information

3-Amino-1-methyl-1*H*-pyridin-2-one Directed Pd^{II}-Catalysis: $C(sp^3)$-H Activated Diverse Arylation Reaction

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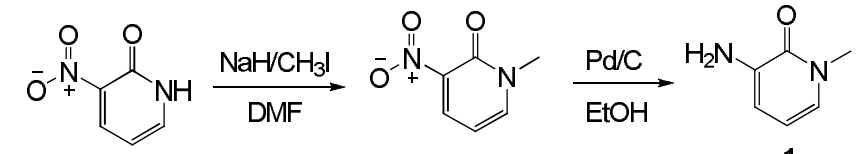
Section I: General Information

Unless otherwise stated, reactions were performed in oven-dried glasswares fitted with rubber septa and were stirred with teflon-coated magnetic stirring bar. Liquid reagents and solvents were transferred through a syringe using standard Schlenk techniques. Toluene and 1,4-dioxane were distilled over sodium-benzophenone ketyl. Dichloromethane (DCM) and 1,2-dichloroethane (DCE) were distilled over calcium hydride. All other solvents and reagents were used as received unless otherwise noted. Reaction temperatures above 25 °C refers to oil bath temperature. Thin layer chromatography was performed using silica gel 60 F-254 precoated plates (0.25 mm) and visualized by UV irradiation. All the compounds were purified by using RediSep® normal-phase silica Flash columns in teledyne ISCO CombiFlash system. Melting points were recorded on a digital melting point apparatus and are uncorrected. ^{1}H NMR spectra were recorded on 400 MHz spectrometers with ^{13}C operating frequencies of 100 MHz. Chemical shifts (δ) are reported in ppm relative to the residual solvent $CDCl_3$ signal (δ = 7.24 for ^{1}H NMR and δ = 77.0 for ^{13}C NMR), DMSO-d_6 signal (δ = 2.47 for ^{1}H NMR and δ = 39.4-40.6 for ^{13}C NMR). Data for ^{1}H NMR spectra are reported as follows: chemical shift (multiplicity, coupling constants, number of hydrogens). Abbreviations are as follows: s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet), br (broad), dd (doublet of doublet). IR spectra were recorded on a FT-IR system and are reported in frequency of absorption (cm^{-1}). High resolution mass spectrometry (HRMS) data was recorded on Q-TOF-micro quadruple mass spectrophotometer using acetonitrile as solvent.

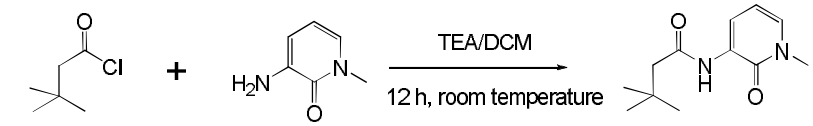
Section II: Preparation of 3-Amino-1-methyl-1*H*-pyridin-2-one (1): Compound 1 was synthesised following the litarature procedure.[1] It is moderately stable because of the presence of free amine.



3-Nitropyridin-2(1*H*)-one 1-Methyl-3-nitropyridin-2(1*H*)-one **1**

Section III: Experimental Procedure for Preparation 3,3-Dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)butanamide (6)

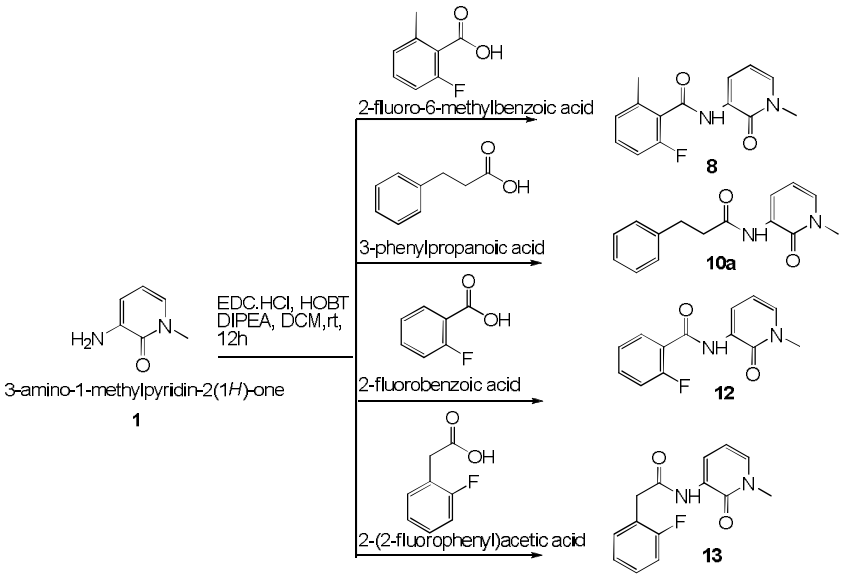
To a stirred solution of 3-amino-1-methyl-1*H*-pyridin-2-one (496 mg, 4 mmol) in dry DCM was added triethyl amine (6 mmol) under N_2 atmosphere and cooled the reaction mixture at 0 °C. Subsequently 3,3-dimethylbutanoyl chloride (538 mg, 4 mmol) was added dropwise and resulting reaction mixture was allowed to stirred for 12 h at room temperature. Upon completion, reaction mixture (monitored by TLC), was quenched with saturated aqueous NH_4Cl, and extracted in DCM (3x50 mL). Combined organic layer was washed with water (2x50 mL), dried over anhydrous Na_2SO_4, removed solvent under *vacuum* and purified by silica gel ComiFlash column chromatography using ethyl acetate/hexane (30:70 v/v) as eluent to get pure product 3,3-dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)butanamide (**6**) as a light brown solid (750 mg, 84%). This compound is highly stable.



3,3-Dimethylbutanoyl chloride 3-Amino-1-methylpyridin-2(1*H*)-one **6a**

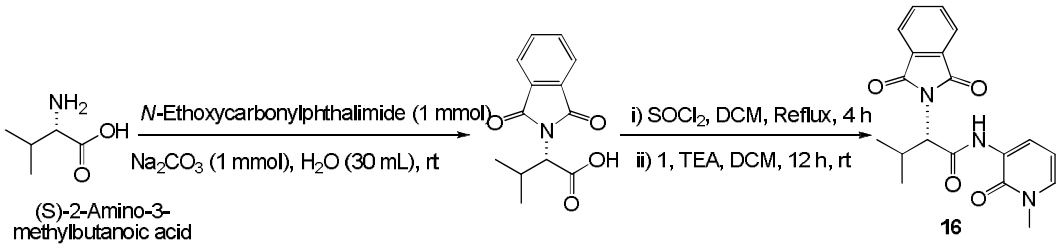
Section IV: General Experimental Procedure for Preparation Aromatic 3-Amino-1-methyl-1*H*-pyridin-2-one amide (8,10,12 and 13)

To a stirred solution of aromatic acid (4 mmol) in dry DCM was added 3-amino-1-methyl-1*H*-pyridin-2-one (4 mmol) followed by HOBT (6 mmol) and DIPEA (12 mmol). Cooled the resulting reaction mixture at 0°C and EDC.HCl (6 mmol) was added and the reaction mixture was allowed to stir for 12 h at room temperature. Upon completion (monitored by TLC), the reaction mixture was quenched with saturated $NaHCO_3$ and extracted in DCM thrice (3x50 mL). Combined organic layer was washed with water (2x50 mL), dried over anhydrous Na_2SO_4, removed solvent under *vacuum* and purified by silica gel CombiFlash column chromatography using ethyl acetate/hexane (30:70 v/v) as eluent to get pure products.



Section V: Procedure for Preparation of (*S*)-2-(1,3-Dioxoisoindolin-2-yl)-3-methyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)butanamide (16)

To a round bottom flask was added amino acid (L-Valine) (1.0 mmol), Na_2CO_3 (1.0 mmol) and water (30 mL) at room temperature. *N*-Ethoxycarbonylphthalimide (1.0 mmol) was added in portions. The reaction mixture was stirred at room temperature for 16 h, then the aqueous solution was slowly acidified with aqueous HCl (6 M) until pH = 1-2 at 0 °C. The mixture was extracted with EtOAc (3×30 mL). Combined organic layer was washed with water (2x50 mL), dried over anhydrous Na_2SO_4, removed solvent under *vacuum* and purified by CombiFlash column chromatography using ethyl acetate/hexane (50:50 v/v) as eluent to get pure product as white solid which was further used to prepare corresponding acid chloride by usual procedure and further to prepare amide as per general procedure mentioned in section III.



Section VI: General Experimental Procedure for Palladium-Catalyzed Arylation of Aliphatic Amide

In an oven dried screw cap sealed tube containing magnetic stirbar, aliphatic amide of 3-amino-1-methyl-1*H*-pyridin-2-one (0.2 mmol), iodoarene (0.2 mmol), $Pd(OAc)_2$ (10 mol %, 0.02 mmol), AgOAc (0.6 mmol), CF_3CO_2Na (0.4 mmol) were added and then 1,4-dioxane (4 mL) was added.
Tightly closed the sealed tube with teflon cap and heated the reaction mixture at 150 °C under vigorous stirring for 17-36 h. After completion, the reaction mixture was cooled to room temperature and filtered through celite with aid of acetone (15 mL). This filtrate was concentrated under reduced pressure and purified by silica gel combiflash column chromatography using acetone/hexane as eluent.

Section VII. General Experimental Procedure for Palladium-Catalyzed Arylation of Aromatic Amide

In an oven–dried screw cap sealed tube containing magnetic bar, aromatic amide of 3-amino-1-methyl-1*H*-pyridin-2-one (0.2 mmol), iodoarene (0.4 mmol), $Pd(OAc)_2$ (10 mol %, 0.02 mmol), AgOAc (0.6 mmol), CF_3CO_2Na (0.4 mmol). and 1,4-dioxane (4 mL) were added. Tightly closed the sealed tube with a teflon cap and heated the reaction mixture at 150 °C under vigorous stirring for 20-30 h. After completion, the reaction mixture was cooled to room temperature and filtered through celite with the aid of acetone (15 mL). The filtrate was concentrated under reduced pressure and purified by CombiFlash column chromatography through silica gel using 20-30 % acetone/hexane as an eluent.

Section VIII. Detail Experimental Procedure for Synthesis of 11a in 4 mmol scale:

In an oven dried screw cap sealed tube (50 mL) containing magnetic bar, *N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-3-phenylpropanamide (**10**, 972 mg, 4 mmol), iodobenzene (1632 mg, 8 mmol), AgOAc (2002 mg, 12 mmol), CF_3CO_2Na (1088 mg, 8 mmol), $Pd(OAc)_2$ (90 mg, 0.4 mmol), and 1,4-dioxane (20 mL) were added. The sealed tube was tightly closed with teflon cap and heated the reaction mixture at 150 °C under vigorous stirring for 24 h. After completion, the reaction mixture was cooled to room temperature and filtered through celite bed and washed with acetone (100 mL). This filtrate was concentrated under reduced pressure and purified by combiflash chromatography using silica gel column by using 20-30 % acetone/hexane as an eluent to get *N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-3,3-diphenylpropanamide (**11a**, 996 mg, 75%) as a colorless solid.

Section IX. General Experimental Procedure for Removal of Directing Group

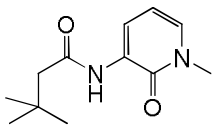
In an oven–dried screw cap reaction tube containing magnetic bar arylated product **11e** (1 mmol) and $LiOH.H_2O$ (5 mmol) were added. Ethanol (2 mL) was added and the reaction was allowed to stir for 16 h at 100 °C. After completion (TLC monitoring) reaction was cooled down to ambient temperature, filtered through a celite bed, and washed with methanol. The combined organic part was evaporated under vacuum and purified by prep-HPLC to furnishe **18** in 91% yield along with recovered 3-amino-1-methyl-1*H*-pyridin-2-one **1** in 75 % yield.

Refrence:

1. Loughlin, W. A.; Jenkins, I. D.; Karis, N. D.; Healy, P. C. *Eur. J. Med. Chem.* 2017, *127*, 341-356.

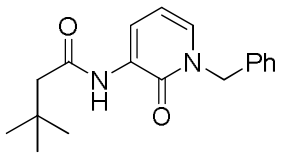
Section X. Characterization Data of Compound 6, 8, 10, 12, and 13

3,3-Dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)butyramide (6a)



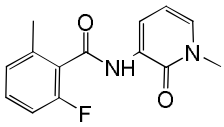
Yield: 84% (750 mg, 3.06 mmol).
Characteristic: Light brown solid.
M.p.: 54-56 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.07 (s, 9H), 2.26 (s, 2H), 3.59 (s, 3H), 6.21 (t, J = 7.1 Hz, 1H), 6.97 (d, J = 5.4 Hz, 1H), 8.32-8.38 (m, 2H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 29.7, 31.1, 37.7, 51.6, 106.5, 121.7, 129.2, 130.3, 157.6, 170.9.
FT-IR (neat, cm^{-1}): 1048, 1084, 1385, 1459, 1516, 1592, 1645, 2924, 3368.
ESI-MS (*m*/*z*) for $C_{12}H_{18}N_2O_2Na$ $[M+Na]^+$: Calculated 245.1266, found 245.1278.

N-(1-benzyl-2-oxo-1,2-dihydropyridin-3-yl)-3,3-dimethylbutanamide (6b*)



Yield: 90% (107 mg, 0.36 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.08 (s, 9H), 2.25 (s, 2H), 5.17 (s, 2H), 6.22 (t, J = 7.1 Hz, 1H), 6.99 (d, J = 6.8 Hz, 1H), 7.25-7.36 (m, 5H), 8.37 (t, J = 7.8 Hz, 2H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 14.1, 29.7, 31.3, 51.6, 52.7, 106.9, 121.8, 127.9, 128.1, 128.9, 129.4, 129.5, 135.8, 157.4, 171.0.
FT-IR (neat, cm^{-1}): 1030, 1127, 1230, 1368, 1456, 1512, 1594, 1645, 1687,2868, 2955, 3370.
ESI-MS (*m*/*z*) for $C_{18}H_{23}N_2O_2$ $[M+H]^+$: Calculated 299.1760, found 299.1737.
***6b** was synthesized using benzylbromide as described in Section III.

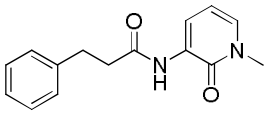
2-Fluoro-6-methyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (8)



Yield: 90% (936 mg, 3.30 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 2.42 (s, 3H), 3.60 (s, 3H), 6.27 (t, J = 6.8 Hz, 1H), 6.95 (t, J = 8.5 Hz, 3H), 7.26 (t, J = 5.28 Hz, 1H), 8.55 (d, J = 6.7 Hz, 1H), 8.74 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 19.2, 37.7, 106.3, 113.0 (d, $^{2}J_1$ = 22 Hz, C-CF), 122.5, 124.6 (d, $^{2}J_2$ = 17 Hz, C-CF), 127.6 (d, ^{1}J = 285 Hz, CF), 130.7, 130.8, 131.1, 138.4, 157.5, 157.9, 160.4, 163.9.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -117.25.
FT-IR (neat, cm^{-1}): 1040, 1234, 1257, 1364, 1464, 1520, 1590, 1645, 2853, 2924, 3228, 3358.

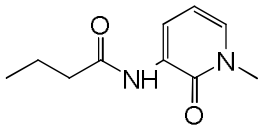
ESI-MS (*m*/*z*) for $C_{14}H_{13}FN_2O_2Na$ $[M+Na]^+$: Calculated 283.0859, found 283.0874.

_N_-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-3-phenylpropanamide (10a)



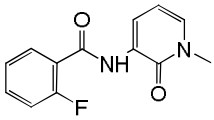
Yield: 88% (901 mg, 3.50 mmol).
Characteristic: Colourless solid.
M.P.: 108-110 ^oC.
^1H NMR (400 MHz, $CDCl_3$): δ 2.71 (t, J = 7.5 Hz, 2H), 3.03 (t, J = 8 Hz, 2H), 3.56 (s, 3H), 6.21 (t, J = 7 Hz, 1H), 6.97 (d, J = 5.4 Hz, 1H), 7.19-7.25 (m, 3H), 7.28 (t, J = 14.6 Hz, 2H), 8.38 (d, J = 5.7 Hz, 2H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 31.1, 37.7, 39.1, 106.4, 122.0, 126.1, 128.1, 128.4, 129.1, 130.4, 140.4, 157.5, 171.1.
FT-IR (KBr, cm^{-1}): 1038, 1234, 1384, 1514, 1585, 1642, 1689, 2855, 2927, 3293.
ESI-MS (*m*/*z*) for $C_{15}H_{17}N_2O_2$ $[M+H]^+$: Calculated 257.1290, found 257.1323.

N-(1-Methyl-2-oxo-1,2-dihydro-pyridin-3-yl)-butyramide (10b*)



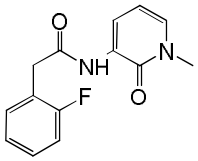
Yield: 86% (585mg, 3.01mmol).
Characteristic: Off-white solid.
M.P.: 88-90 °C.
^1H NMR (300 MHz, $CDCl_3$): δ 0.99 (t, J = 7.2 Hz, 3H), 1.76 (q, J = 10 Hz, 2H), 2.39 (t, J = 10 Hz, 2H), 3.61 (s, 3H), 6.23 (t, J = 6.9 Hz, 1H), 6.97-7.00 (m, 1H), 8.37-8.40 (m, 2H).
^{13}C NMR(75 MHz, $CDCl_3$): δ 13.7, 18.9, 37.8, 39.7, 106.7, 121.9, 129.2, 130.4, 157.7, 172.1.
FT-IR (KBr, cm^{-1}): 1078, 1301, 1397, 1568, 1652, 1691, 2904, 3005, 3313.
ESI-MS (*m*/*z*) for $C_{10}H_{14}N_2O_2Na$ $[M+Na]^+$: Calculated 217.0953, found 217.0961.
***10b** was prepared acoording the method described in Section IV using butanoic acid.

2-Fluoro-_N_-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (12)



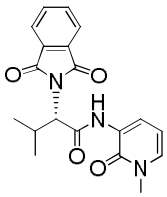
Yield: 85% (836 mg, 3.38 mmol).
Characteristic: Light brown thick liquid.
^1H NMR (400 MHz, $CDCl_3$): δ 3.63 (s, 3H), 6.27 (t, J = 7.2 Hz, 1H), 7.03 (d, J = 5.2 Hz, 1H), 7.17 (m, 1H), 7.30 (d, J = 7.8 Hz, 1H), 7.50 (brs, 1H), 8.10 (d, J = 7.7 Hz, 1H), 8.55 (d, J = 6.2 Hz, 1H), 9.77 (d, J = 13.7 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.8, 106.4, 116.3 (d, $^2J_1$ = 24.5 Hz, C-CF), 121.1 (d, $^2J_2$ = 11 Hz, C-CF), 122.7, 124.7, 124.8, 129.4, 131.7, 131.7, 132.4 (d, ^1J = 282 Hz, CF), 157.8, 159.2, 161.8.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -113.14.
FT-IR (neat, cm^{-1}): 1085, 1238, 1384, 1532, 1595, 1650, 1682, 2852, 2922, 3375.
ESI-MS (*m*/*z*) for $C_{13}H_{12}FN_2O_2$ $[M+H]^+$: Calculated 247.0883, found 247.0914

2-(2-Fluorophenyl)-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (13)



Yield: 80% (832 mg, 2.94 mmol).
Characteristic: Light brown solid.
M.p.: 118-120 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.56 (s, 3H), 3.78 (s, 2H), 6.19 (t, J = 7.2 Hz, 1H), 6.96 (dd, J_1 = 1.7 Hz, J_2 = 1.7 Hz, 1H), 7.08-7.17 (m, 2H), 7.29-7.33 (m, 2H), 8.34 (dd, J_1 = 1.6 Hz, J_2 = 1.6 Hz, 1H), 8.52 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.6, 37.9, 106.4, 115.7 (d, $^{2}J_1$ = 42 Hz, C-CF), 121.4 (d, $^{2}J_2$ = 16 Hz, C-CF), 122.0, 124.4, 124.5, 129.4, 130.2 (d, ^{1}J = 250 Hz, CF), 130.7, 157.5, 159.7, 162.1, 168.6.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -117.04.
FT-IR (KBr, cm^{-1}): 1048, 1232, 1372, 1384, 1531, 1598, 1644, 2853, 2923, 3042, 3250.
ESI-MS (*m*/*z*) for $C_{14}H_{13}FN_2O_2Na$ $[M+Na]^+$: Calculated 283.0859, found 283.0874.

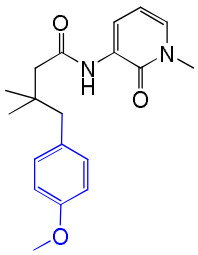
(*R*)-3-(1,3-Dioxoisoindolin-2-yl)-4-methyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)pentanamide (16)



Yield: 65% (230 mg, 0.65 mmol).
Characteristic: Light yellow solid.
M.p.: 138-140 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 0.90 (d, J = 6.6 Hz, 3H), 1.13 (d, J = 6.6 Hz, 3H), 2.99-3.06 (m, 1H), 3.59 (s, 3H), 4.53 (d, J = 11 Hz, 1H), 6.18 (t, J = 7.1 Hz, 1H), 6.97 (d, J = 6.9 Hz, 1H), 7.72-7.74 (m, 2H), 7.88-7.90 (m, 2H), 8.36 (d, J = 7.4 Hz, 1H), 9.57 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 19.4, 20.0, 27.4, 37.7, 63.4, 106.2, 122.6, 123.7, 129.1, 131.0, 131.3, 134.3, 157.6, 167.4, 168.0.
FT-IR (KBr, cm^{-1}): 1070, 1232, 1336,1384, 1519, 1599, 1646, 1718, 1768, 2853, 2925, 2962, 3445.
ESI-MS (*m*/*z*) for $C_{20}H_{20}N_3O_4$ $[M+H]^+$: Calculated. 354.1454, found 354.1428.

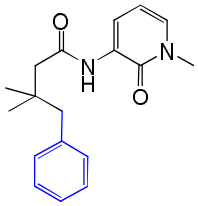
Section XI. Characterization data for 7a-k

4-(4-Methoxyphenyl)-3,3-dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydro-pyridin-3-yl)butyramide (7a)



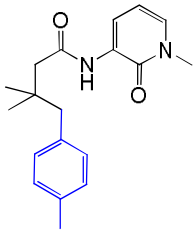
Yield: 72% (47 mg, 0.15 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.04 (s, 6H), 2.23 (s, 2H), 2.64 (s, 2H), 3.59 (s, 3H), 3.79 (s, 3H), 6.22 (t, J = 7 Hz, 1H), 6.81 (d, J = 8.3 Hz, 2H), 6.97 (d, J = 6.6 Hz, 1H), 7.10 (d, J = 8.2 Hz, 2H), 8.31 (brs, 1H), 8.39 (d, J = 6.3 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 27.1, 34.8, 47.3, 48.9, 55.1, 106.6, 113.2, 121.8, 129.2, 130.4, 130.4, 131.6, 131.8, 157.6, 158.0, 171.0.
FT-IR (neat, cm^{-1}): 1244, 1364, 1463, 1511, 1595, 1645, 2854, 2928, 3291, 3367.
ESI-MS (m/z) for $C_{19}H_{25}N_2O_3$ $[M+H]^+$: Calculated 329.1865, found 329.1873.

3,3-Dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-4-phenylbutyramide (7b)



Yield: 76% (45 mg, 0.15 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.06 (s, 6H), 2.25 (s, 2H), 2.70 (s, 2H), 3.59 (s, 3H), 6.22 (t, J = 7 Hz, 1H), 6.97 (d, J = 5.3 Hz, 1H), 7.21 (d, J = 9 Hz, 3H), 7.25 (s, 2H), 8.32 (brs, 1H), 8.40 (d, J = 5.9 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 27.1, 34.7, 37.7, 48.2, 49.0, 106.6, 121.8, 126.0, 127.8, 129.2, 130.4, 130.7, 138.3, 157.7, 170.9.
FT-IR (neat, cm^{-1}): 1047, 1233, 1365, 1384, 1509, 1595, 1645, 2853, 2923, 3291, 3367.
ESI-MS (m/z) for $C_{18}H_{23}N_2O_2$ $[M+H]^+$: Calculated 299.1760, found 299.1761.

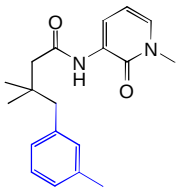
3,3-Dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-4-p-tolylbutyramide (7c)



Yield: 77% (48 mg, 0.16 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.05 (s, 6H), 2.24 (s, 2H), 2.31 (s, 3H), 2.65 (s, 2H), 3.59 (s, 3H), 6.21 (t, J = 6.9 Hz, 1H), 6.97 (d, J = 5.4 Hz, 1H), 7.07 (s, 4H), 8.30 (brs, 1H), 8.39 (d, J = 6.1 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 21.0, 27.1, 29.7, 34.8, 37.8, 47.9, 49.1, 106.6, 121.8, 128.5, 129.2, 130.3, 130.6, 135.2, 135.5, 157.7, 171.0.

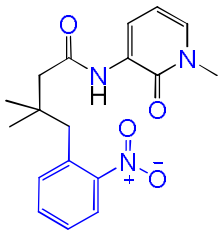
FT-IR (neat, cm^{-1}): 1045, 1124, 1384, 1459, 1511, 1596, 1646, 2853, 2923, 3368.
ESI-MS (*m*/*z*) for $C_{19}H_{24}N_2O_2Na$ $[M+Na]^+$: Calculated 335.1736, found 335.1737.

3,3-Dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-4-*m*-tolylbutyramide (7d)



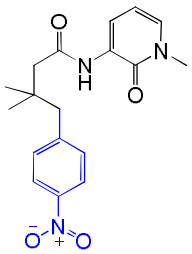
Yield: 64% (40 mg, 0.13 mmol).
Characteristic: Thick liquid.
^1H NMR (400 MHz, $CDCl_3$): δ 1.06 (s, 6H), 2.25 (s, 2H), 2.32 (s, 3H), 2.66 (s, 2H), 3.59 (s, 3H), 6.21 (t, J = 7.2 Hz, 1H), 6.96-7.03 (m, 4H), 7.13-7.15 (m, 1H), 8.31 (brs, 1H), 8.40 (dd, J_1 = 1.5 Hz, J_2 = 1.6 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 21.4, 27.2, 34.7, 37.8, 48.3, 49.1, 106.6, 121.9, 126.8, 127.6, 127.8, 129.2, 130.4, 131.5, 137.2, 138.2, 157.6, 171.0.
FT-IR (neat, cm^{-1}): 1048, 1261, 1384, 1457, 1508, 1595, 1645, 2853, 2923, 3393.
ESI-MS (*m*/*z*) for $C_{19}H_{25}N_2O_2$ $[M+H]^+$: Calculated 313.1916, found 313.1888.

3,3-Dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-4-(2-nitrophenyl)butyramide (7e)



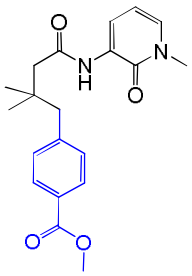
Yield: 45% (31 mg, 0.09 mmol)
Characteristic: Thick liquid.
^1H NMR (400 MHz, $CDCl_3$): δ 1.08 (s, 6H), 2.27 (s, 2H), 3.62 (s, 3H), 3.69 (s, 2H), 6.97 (s, 1H), 7.42 (d, J = 7.6 Hz, 1H), 7.49 (t, J = 6.8 Hz, 1H), 7.60 (t, J = 7.5 Hz, 1H), 7.89 (d, J = 7.9 Hz, 1H), 8.33 (brs, 1H), 8.43 (s, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 29.6, 29.7, 31.2, 38.1, 51.5, 116.9, 122.2, 124.4, 128.6, 128.8, 128.9, 131.8, 132.0, 132.6, 156.9, 171.0.
FT-IR (neat, cm^{-1}): 1052, 1084, 1260, 1384, 1460, 1523, 1599, 1651, 2854, 2924, 3367.
ESI-MS (*m*/*z*) for $C_{18}H_{22}N_3O_4$ $[M+H]^+$: Calculated 344.1610, found 344.1681.

3,3-Dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-4-(4-nitrophenyl)butyramide (7f)



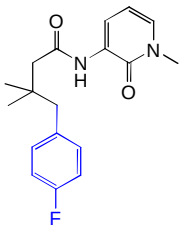
Yield: 80% (55 mg, 0.16 mmol)
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.06 (s, 6H), 2.24 (s, 2H), 2.87 (s, 2H), 3.60 (s, 3H), 6.23 (t, J = 7.4 Hz, 1H), 7.00 (d, J = 5.7 Hz, 1H), 7.40 (d, J = 8.3 Hz, 2H), 8.13 (d, J = 8.3 Hz, 2H), 8.36-8.40 (m, 2H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 27.4, 34.9, 47.0, 48.4, 106.5, 122.0, 123.0, 123.2, 129.0, 130.7, 131.5, 146.5, 146.6, 146.8, 157.8, 170.3.
FT-IR (KBr, cm^{-1}): 1047, 1111, 1345, 1384, 1517, 1596, 1645, 2853, 2923, 3367.
ESI-MS (*m*/*z*) for $C_{18}H_{22}N_3O_4$ $[M+H]^+$: Calculated 344.1610, found 344.1666.

4-[2,2-Dimethyl-3-(1-methyl-2-oxo-1,2-dihydropyridin-3-ylcarbamoyl)-propyl]benzoicacid methyl ester (7g)



Yield: 84% (60 mg, 0.17 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.05 (s, 6H), 2.25 (s, 2H), 2.78 (s, 2H), 3.59 (s, 3H), 3.89 (s, 3H), 6.22 (t, J = 7.2 Hz, 1H), 6.98 (dd, J_1 = 1.7 Hz, J_2 = 1.6 Hz, 1H), 7.28 (d, J = 8.2 Hz, 2H), 7.94 (d, J = 8.2 Hz, 2H), 8.33 (brs ,1H), 8.39 (dd, J_1 = 1.6 Hz, J_2 = 1.6 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 27.2, 34.8, 37.7, 47.7, 48.8, 51.9, 53.4, 106.6, 122.0, 128.0, 129.0, 129.1, 130.5, 130.7, 144.0, 157.6, 167.1, 170.6.
FT-IR (neat, cm^{-1}): 1048, 1261, 1276, 1384, 1459, 1645, 1718, 2852, 2923, 3394.
ESI-MS (*m*/*z*) for $C_{20}H_{25}N_2O_4$ $[M+H]^+$: Calculated 357.1814, found 357.1878.

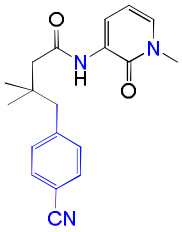
4-(4-Fluorophenyl)-3,3-dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)butyramide (7h)



Yield: 82% (52 mg, 0.16 mmol).
Characteristic: Thick liquid.

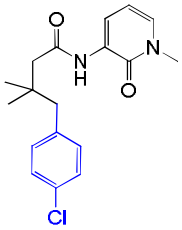
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.03 (s, 6H), 2.23 (s, 2H), 2.69 (s, 2H), 3.59 (s, 3H), 6.22 (t, J = 6.6 Hz, 1H), 6.95 (t, J = 8.7 Hz, 3H), 7.15 (d, J = 5.9 Hz, 2H), 8.33 (brs, 1H), 8.40 (d, J = 6.8 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 27.1, 34.7, 37.8, 47.0, 48.7, 106.6, 114.6 (d, ^{2}J = 36 Hz, C-CF), 121.9, 130.5, 130.7 (d, ^{1}J = 300 Hz, CF), 132.1, 134.1, 157.7, 160.3, 162.7, 170.8.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -117.48.
FT-IR (neat, cm^{-1}): 1049, 1084, 1220, 1261, 1384, 1508, 1597, 1645, 1681, 2853, 2922, 3368.
ESI-MS (*m*/*z*) for $C_{18}H_{21}FN_2O_2Na$ $[M+Na]^+$: Calculated 339.1485, found 339.1501.

4-(4-Cyanophenyl)-3,3-dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)butyramide (7i)



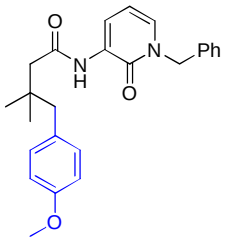
Yield: 79% (51 mg, 0.16 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.04 (s, 6H), 2.22 (s, 2H), 2.81 (s, 2H), 3.60 (s, 3H), 6.23 (t, J = 7.2 Hz, 1H), 7.00 (d, J = 5.2 Hz, 1H), 7.34 (d, J = 8 Hz, 2H), 7.57 (d, J = 8 Hz, 2H), 8.34-8.40 (m, 2H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 27.3, 34.9, 37.8, 47.4, 48.4, 106.6, 110.0, 119.0, 122.0, 129.0, 130.7, 131.5, 131.6, 144.3, 157.6, 170.4.
FT-IR (neat, cm^{-1}): 1052, 1261, 1384, 1458, 1510, 1604, 1643, 2227, 2853, 2922, 3393.
ESI-MS (*m*/*z*) for $C_{19}H_{22}N_3O_2$ $[M+H]^+$: Calculated 324.1712, found 324.1749.

4-(4-Chlorophenyl)-3,3-dimethyl-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)butyramide (7j)



Yield: 60% (40 mg, 0.12 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.03 (s, 6H), 2.23 (s, 2H), 2.69 (s, 2H), 3.59 (s, 3H), 6.22 (t, J = 7.1 Hz, 1H), 6.98 (dd, J_1 = 1.4 Hz, J_2 = 1.6 Hz, 1H), 7.14 (d, J = 8 Hz, 2H), 7.23 (s, 2H), 8.32 (brs, 1H), 8.39 (dd, J_1 = 1.6 Hz, J_2 = 1.6 Hz, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 27.2, 34.7, 37.8, 47.1, 48.7, 106.6, 121.9, 127.9, 129.1, 130.5, 132.0, 132.0, 136.9, 157.7, 170.7.
FT-IR (neat, cm^{-1}): 1049, 1084, 1161, 1261, 1384, 1459, 1509, 1596, 1645, 2853, 2923, 3368.
ESI-MS (*m*/*z*) for $C_{18}H_{22}ClN_2O_2$ $[M+H]^+$: Calculated 333.1370, found 333.1412 and 355.1201.

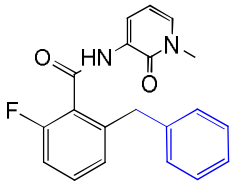
N-(1-benzyl-2-oxo-1,2-dihydropyridin-3-yl)-4-(4-methoxyphenyl)-3,3-dimethylbutanamide (7k)



Yield: 68% (55 mg, 0.14 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.04 (s, 6H), 2.22 (s, 2H), 2.63 (s, 2H), 3.78 (s, 3H), 5.16 (s, 2H), 6.23 (t, J = 7.1 Hz, 1H), 6.81 (d, J = 8.4 Hz, 2H0, 7.00 (d, J = 6.8 Hz, 1H), 7.10 (d, J = 8.4 Hz, 2H), 7.27-7.36 (m, 4H), 8.33 (s, 1H), 8.40 (d, J = 7.2 Hz, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 27.1, 34.8, 47.4, 48.9, 52.8, 55.2, 106.9, 113.2, 112.8, 127.9, 128.1, 128.9, 129.5, 130.4, 131.6, 135.8, 157.4, 158.0, 171.0.
FT-IR (neat, cm^{-1}): 1199, 1385, 1488, 1577, 1651, 1711, 2811, 2954, 3302, 3401.
ESI-MS (*m*/*z*) for $C_{25}H_{29}N_2O_3$ $[M+H]^+$: Calculated 405.2178, found 405.2190.

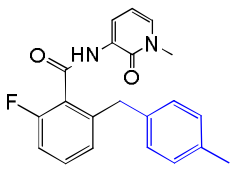
Section XII. Characterization data for 9a-h

2-Benzyl-6-fluoro-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (9a)



Yield: 65% (44 mg, 0.13 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.59 (s, 3H), 4.11 (s, 2H), 6.25 (t, *J* = 7.2 Hz, 1H), 6.96 (t, *J* = 8.2 Hz, 2H), 7.01-7.03 (m, 1H), 7.14 (t, *J* = 8.8 Hz, 3H), 7.21 (d, *J* = 7.3 Hz, 2H), 7.30 (t, *J* = 5.9 Hz, 1H), 8.51 (d, *J* = 7.4 Hz, 1H), 8.65 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.8, 38.6, 106.4, 113.7 (d, $^{2}J_1$ = 22 Hz, C-CF), 122.6, 124.6 (d, $^{2}J_2$ = 17 Hz, C-CF), 126.0, 126.2, 129.0, 129.1, 129.8 (d, ^{1}J = 275 Hz, CF), 131.0, 139.6, 141.8, 157.5, 157.9, 160.4, 163.7.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.56.
FT-IR (neat, cm^{-1}): 1041, 1248, 1365, 1384, 1458, 1518, 1591, 1644, 1738, 2853, 2923, 3364.
ESI-MS (*m*/*z*) for $C_{20}H_{18}FN_2O_2$ $[M+H]^+$: Calculated 337.1352, found 337.1436.

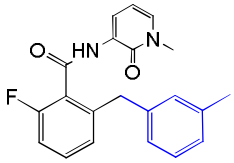
2-Fluoro-6-(4-methylbenzyl)-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (9b)



Yield: 77% (54 mg, 0.15 mmol).

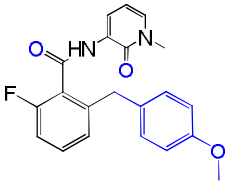
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 2.26 (s, 3H), 3.60 (s, 3H), 4.07 (s, 2H), 6.26 (t, J = 7.1 Hz, 1H), 6.93-6.99 (m, 2H), 7.04 (s, 4H), 7.27 (d, J = 12 Hz, 1H), 8.51 (d, J = 6.3 Hz, 1H), 8.64 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 20.9, 37.8, 38.1, 106.4, 113.5 (d, $^{2}J_1$ = 22 Hz, C-CF), 122.5, 124.6 (d, $^{2}J_2$ = 17 Hz, C-CF), 125.8, 129.1, 130.1 (d, ^{1}J = 213 Hz, CF), 130.9, 131.0, 135.7, 136.6, 142.0, 157.4, 157.8, 160.3, 163.8.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.68.
FT-IR (neat, cm^{-1}): 1037, 1261, 1366, 1364, 1487,1536, 1571, 1648, 1680, 2853, 2962, 3341.
ESI-MS (*m*/*z*) for $C_{21}H_{20}FN_2O_2$ $[M+H]^+$: Calculated 351.1509, found 351.1578.

2-Fluoro-6-(3-methylbenzyl)-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (9c)



Yield: 70% (49 mg, 0.14 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 2.23 (s, 3H), 3.59 (s, 3H), 4.07 (s, 2H), 6.25 (t, J = 7 Hz, 1H), 6.96-7.03 (m, 5H), 7.11 (t, J = 7.3 Hz, 1H), 7.29 (s, 1H), 8.52 (d, J = 6 Hz, 1H), 8.63 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 21.2, 38.5, 38.5, 106.3, 113.6 (d, $^{2}J_1$ = 22 Hz, C-CF), 122.5, 124.6 (d, $^{2}J_2$ = 17 Hz, C-CF), 126.1, 127.0, 129.0, 129.7 (d, ^{1}J = 282 Hz, CF), 129.9, 130.9, 131.0, 138.0, 139.5, 141.9, 157.4, 157.9, 160.3, 163.8.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -115.5.
FT-IR (neat, cm^{-1}): 1040, 1249, 1365, 1384, 1457,1516, 1591, 1645, 1674, 2854, 2922, 3361.
ESI-MS (*m*/*z*) for $C_{21}H_{20}FN_2O_2$ $[M+H]^+$: Calculated 351.1509, found 351.1578.

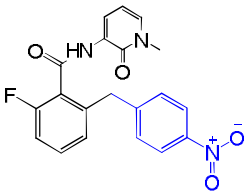
2-Fluoro-6-(4-methoxybenzyl)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (9d)



Yield: 78% (57 mg, 0.16 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.59 (s, 3H), 3.73 (s, 3H), 4.05 (s, 2H), 6.25 (t, J = 7.1 Hz, 1H), 6.75 (d, J = 8.5 Hz, 2H), 6.94-7.03 (m, 3H), 7.06 (d, J = 8.5 Hz, 2H), 7.29 (t, J = 6 Hz, 1H), 8.50 (dd, J_1 = 1.2 Hz, J_2 = 1.2 Hz, 1H), 8.61 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 29.6, 37.7, 55.1, 106.3, 113.5 (d, $^{2}J_1$ = 22 Hz, C-CF), 113.8, 122.5, 124.6 (d, $^{2}J_2$ = 18 Hz, C-CF), 125.8, 129.0, 130.1, 130.4 (d, ^{1}J = 270 Hz, CF), 130.9, 131.1, 131.7, 142.3, 157.4, 158.0, 160.3, 163.8.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.75.
FT-IR (neat, cm^{-1}): 1037, 1247, 1364, 1384, 1458, 1511, 1590, 1643, 1672, 2853, 2923, 3361.

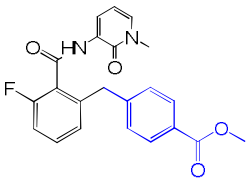
ESI-MS (*m*/*z*) for $C_{21}H_{20}FN_2O_3$ $[M+H]^+$: Calculated 367.1458, found 367.1515.

2-Fluoro-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-6-(4-nitrobenzyl)benzamide (9e)



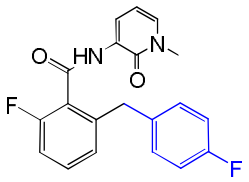
Yield: 66% (50 mg, 0.13 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.56 (s, 3H), 4.22 (s, 2H), 6.24 (t, *J* = 7 Hz, 1H), 7.01-7.08 (m, 3H), 7.31 (d, *J* = 9.3 Hz, 2H), 7.36 (q, *J* = 7.8 Hz, 1H), 8.03 (d, *J* = 8.4 Hz, 2H), 8.41 (d, *J* = 7.3 Hz, 1H), 8.57 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 37.3, 38.2, 105.8, 114.1 (d, $^2J_1$ = 22 Hz, C-CF), 122.2, 124.2 (d, $^2J_2$ = 19 Hz, C-CF), 128.2, 129.4, 129.7 (d, ^1J = 281 Hz, CF), 130.9, 131.0, 139.6, 145.9, 147.0, 156.8, 157.6, 160.0, 162.8.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.09.
FT-IR (neat, cm^{-1}): 1041, 1249, 1346, 1384, 1517, 1595, 1644, 1671, 2853, 2923, 3366.
ESI-MS (*m*/*z*) for $C_{20}H_{17}FN_3O_4$ $[M+H]^+$: Calculated 382.1203, found 382.1263.

4-[3-Fluoro-2-(1-methyl-2-oxo-1,2-dihydropyridin-3-ylcarbamoyl)benzyl]benzoic acid methyl ester (9f)



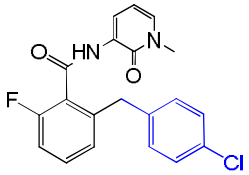
Yield: 67% (53 mg, 0.13 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.58 (s, 3H), 3.86 (s, 3H), 4.17 (s, 2H), 6.24 (t, *J* = 7.1 Hz, 1H), 6.98 (q, *J* = 7.4 Hz, 3H), 7.22 (d, *J* = 8 Hz, 2H), 7.31 (q, *J* = 8.1 Hz, 1H), 7.87 (d, *J* = 8.1 Hz, 2H), 8.47 (d, *J* = 8.4 Hz, 1H), 8.62 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 37.8, 38.7, 51.9, 106.4, 114.1 (d, $^2J_1$ = 22 Hz, C-CF), 122.6, 124.7 (d, $^2J_2$ = 18 Hz, C-CF), 126.1, 128.9, 129.1, 129.7 (d, ^1J = 306 Hz, CF), 129.8, 140.9, 145.0, 157.4, 158.0, 160.5, 163.5, 167.0.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.30.
FT-IR (neat, cm^{-1}): 1044, 1238, 1369, 1374, 1465, 1542, 1571, 1694, 1742, 2856, 2963, 3374.
ESI-MS (*m*/*z*) for $C_{22}H_{20}FN_2O_4$ $[M+H]^+$: Calculated 395.1407, found 395.1484.

2-Fluoro-6-(4-fluorobenzyl)-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (9g)



Yield: 62% (44 mg, 0.12 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.59 (s, 3H), 4.08 (s, 2H), 6.25 (t, J = 7.1 Hz, 1H), 6.89 (t, J = 8.4 Hz, 2H), 6.94-7.03 (m ,3H), 7.10 (t, J = 5.6 Hz, 2H), 7.31 (d, J = 6.0 Hz, 1H), 8.48 (d, J = 7.2 Hz, 1H), 8.61 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.8, 37.9, 106.3, 113.9 (d, $^{2}J_1$ = 23 Hz, C-CF), 115.1, 115.3, 122.5, 124.6 (d, $^{2}J_2$ = 17 Hz, C-CF), 125.9, 130.1 (d, ^{1}J = 227 Hz, CF), 130.5, 131.2, 135.3, 141.7, 157.4, 158.0, 160.2, 160.4, 162.7, 163.6.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.50, -117.03.
FT-IR (neat, cm^{-1}): 1040, 1221, 1365, 1458, 1508, 1590, 1644, 2854, 2924, 3221, 3353.
ESI-MS (*m*/*z*) for $C_{20}H_{17}F_2N_2O_2$ $[M+H]^+$: Calculated 355.1258, found 355.1317.

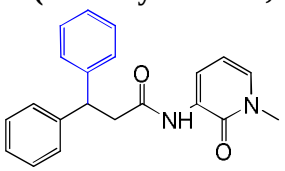
2-(4-Chlorobenzyl)-6-fluoro-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)benzamide (9h)



Yield: 65% (48 mg, 0.13 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.60 (s, 3H), 4.08 (s, 2H), 6.24 (t, J = 7.1 Hz, 1H), 6.97 (t, J = 7.6 Hz, 1H), 7.01-7.03 (m, 2H), 7.07 (d, J = 8.3 Hz, 2H), 7.16 (d, J = 8.3 Hz, 2H), 7.30 (q, J = 8 Hz, 1H), 8.45-8.47 (m, 1H), 8.59 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.7, 38.1, 106.3, 114.0 (d, $^{2}J_1$ = 22 Hz, C-CF), 122.5, 124.7 (d, $^{2}J_2$ = 17 Hz, C-CF), 126.0, 128.5, 130.4, 130.5 (d, ^{1}J = 314 Hz, CF), 131.1, 131.2, 131.2, 138.1, 141.2, 157.4, 157.9, 160.4, 163.6.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.42.
FT-IR (neat, cm^{-1}): 1042, 1094, 1248, 1365, 1458, 1518, 1590, 1644, 1673, 2854, 2924, 3358.
ESI-MS (*m*/*z*) for $C_{20}H_{17}ClFN_2O_2$ $[M+H]^+$: Calculated 371.0963, found 371.1032 and 373.0955.

Section XIII. Characterization data for 11a-h

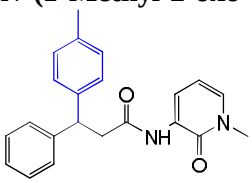
***N*-(1-Methyl-2-oxo-1,2-dihydropyridin-3-yl)-3,3-diphenylpropanamide (11a)**



Yield: 75% (50 mg, 0.15 mmol).
Characteristic: Colourless solid.
M.P.: 140-142 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.14 (d, J = 7.8 Hz, 2H), 3.56 (s, 3H), 4.67 (t, J = 7.8 Hz, 1H), 6.15 (t, J = 7.1 Hz, 1H), 6.93 (dd, J_1 = 1.7 Hz, J_2 = 1.8 Hz, 1H), 7.14-7.21 (m, 2H), 7.25 (d, J = 2.7 Hz, 1H), 7.27 (d, J = 1.6 Hz, 4H), 7.29 (s, 3H), 8.29 (dd, J_1 = 1.6 Hz, J_2 = 1.7 Hz, 1H), 8.34 (brs, 1H).

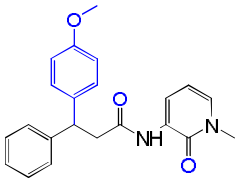
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.6, 43.8, 46.9, 106.4, 122.0, 126.4, 127.6, 128.5, 129.0, 130.5, 143.4, 157.5, 169.8.
FT-IR (KBr, cm^{-1}): 1043, 1160, 1235, 1384, 1453, 1516, 1588, 1644, 2853, 2923, 3273, 3366.
ESI-MS (*m*/*z*) for $C_{21}H_{21}N_2O_2$ $[M+H]^+$: Calculated 333.1603, found 333.1638.

_N_-(1-Methyl-2-oxo-1,2-dihydropyridin-3-yl)-3-phenyl-3-_p_-tolylpropanamide (11b)



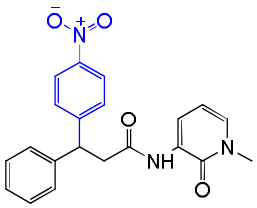
Yield: 88% (61 mg, 0.18 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 2.27 (s, 3H), 3.12 (d, J = 7.8 Hz, 2H), 3.56 (s, 3H), 4.63 (t, J = 7.8 Hz, 1H), 6.15 (t, J = 7.1 Hz, 1H), 6.93 (dd, J_1 = 1.5 Hz, J_2 = 1.5 Hz, 1H), 7.06-7.17 (m, 4H), 7.21 (s, 2H), 7.27 (d, J = 12.3 Hz, 3H), 8.28-8.34 (m, 2H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 20.9, 37.7, 43.8, 46.5, 106.5, 122.0, 126.3, 127.4, 127.5, 128.5, 129.0, 129.2, 130.4, 135.9, 140.4, 143.7, 157.5, 169.9.
FT-IR (neat, cm^{-1}): 1042, 1080, 1105, 12.5, 1384, 1454, 1524, 1579, 1640, 2854, 2923, 3288.
ESI-MS (*m*/*z*) for $C_{22}H_{23}N_2O_2$ $[M+H]^+$: Calculated 347.1759, found 347.1804.

3-(4-Methoxyphenyl)-_N_-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-3-phenylpropionamide (11c)



Yield: 86% (62 mg, 0.12 mmol).
Characteristic: Light brown solid.
M.p.: 120-122 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.10 (d, J = 7.8 Hz, 2H), 3.56 (s, 3H), 3.74 (s, 3H), 4.62 (t, J = 7.8 Hz, 1H), 6.16 (t, J = 7.2 Hz, 1H), 6.80 (d, J = 8.6 Hz, 2H), 6.93 (d , J = 5.8 Hz, 1H), 7.17 (d, J = 8.6 Hz, 3H), 7.26 (d, J = 4.8 Hz, 2H), 7.28 (s, 2H), 8.29 (d, J = 7 Hz, 1H), 8.34 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.7, 44.0, 46.1, 55.1, 106.5, 113.9, 122.0, 126.4, 127.5, 128.5, 128.6, 129.0, 130.5, 135.6, 143.8, 157.5, 158.0, 170.0.
FT-IR (KBr, cm^{-1}): 1036, 1178, 1248, 1384, 1455, 1511, 1578, 1640, 1683, 2853, 2923, 3282.
ESI-MS (*m*/*z*) for $C_{22}H_{23}N_2O_3$ $[M+H]^+$: Calculated 363.1709, found 363.1755.

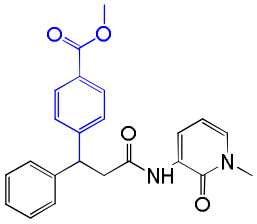
_N_-(1-Methyl-2-oxo-1,2-dihydropyridin-3-yl)-3-(4-nitrophenyl)-3-phenylpropanamide (11d)



Yield: 71% (53 mg, 0.14 mmol).

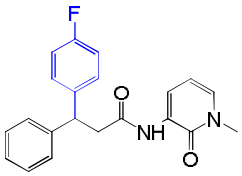
Characteristic: Yellow solid.
M.p.: 141-142 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.18 (dd, J_1 = 1.6 Hz, J_2 = 2.7 Hz, 2H), 3.56 (s, 3H), 4.79 (t, J = 7.7 Hz, 1H), 6.17 (t, J = 7.2 Hz, 1H), 6.95 (dd, J_1 = 1.7 Hz, J_2 = 1.6 Hz, 1H), 7.20-7.23 (m, 3H), 7.29-7.32 (m, 2H), 7.42 (d, J = 8.7 Hz, 2H), 8.13 (d, J = 8.7 Hz, 2H), 8.26 (dd, J_1 = 1.6 Hz, J_2 = 1.6 Hz, 1H), 8.38 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 37.8, 43.1, 46.6, 106.5, 122.3, 123.8, 125.8, 127.1, 127.6, 128.6, 128.9, 130.8, 141.9, 146.6, 151.1, 157.5, 169.0.
FT-IR (KBr, cm^{-1}): 1044, 1160, 1234, 1260, 1347, 1384, 1517, 1595, 1645, 2853, 2923, 3368.
ESI-MS (*m*/*z*) for $C_{21}H_{20}N_3O_4$ $[M+H]^+$: Calculated 378.1454, found 378.1494.

Methyl 4-(3-(1-Methyl-2-oxo-1,2-dihydropyridin-3-ylamino)-3-oxo-1-phenylpropyl)benzoate (11e)



Yield: 68% (53 mg, 0.14 mmol).
Characteristic: Brown solid.
M.P.: 132-134 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.15 (d, J = 7.7 Hz, 2H), 3.56 (s, 3H), 3.86 (s, 3H), 4.73 (t, J = 7.7 Hz, 1H), 6.16 (t, J = 7.2 Hz, 1H), 6.94 (dd, J_1 = 1.6 Hz, J_2 = 1.6 Hz, 1H), 7.18 (t, J = 7.1 Hz, 1H), 7.23 (d, J = 7.1 Hz, 2H), 7.25-7.30 (m, 2H), 7.33 (d, J = 8.2 Hz, 2H), 7.93 (d, J = 8.3 Hz, 2H), 8.27 (dd, J_1 = 1.5 Hz, J_2 = 1.4 Hz, 1H), 8.36 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 37.7, 43.3, 46.8, 51.9, 106.5, 122.2, 126.7, 127.6, 127.7, 128.4, 128.7, 128.9, 129.9, 130.6, 142.6, 148.7, 157.5, 166.8, 169.4.
FT-IR (KBr, cm^{-1}): 1019, 1107, 1281, 1517, 1591, 1646, 1719, 2853, 2924, 3028, 3284.
ESI-MS (*m*/*z*) for $C_{23}H_{23}N_2O_4$ $[M+H]^+$: Calculated 391.1658, found 391.1736.

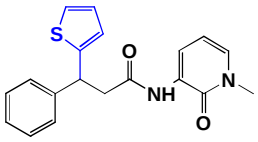
3-(4-Fluorophenyl)-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-3-phenylpropanamide (11f)



Yield: 73% (51 mg, 0.15 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.09-3.12 (m, 2H), 3.56 (s, 3H), 4.66 (s, 1H), 6.16 (t, J = 7.2 Hz, 1H), 6.95 (t, J = 7.2 Hz, 3H), 7.18-7.25 (m, 5H), 7.29 (d, J = 7.2 Hz, 2H), 8.28 (d, J = 7.4 Hz, 1H), 8.33 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 37.8, 43.9, 46.2, 106.5, 115.4 (d, ^{2}J = 21 Hz, C-CF), 122.1, 126.6, 128.7, 129.0 (d, ^{1}J = 307 Hz, CF), 129.1, 139.2, 143.3, 157.5, 160.2, 162.7, 169.6.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -117.00.
FT-IR (neat, cm^{-1}): 1096, 1236, 1384, 1403, 1454, 1508, 1579, 1640, 1683, 2853, 2923, 3277.

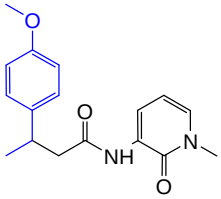
ESI-MS (*m/z*) for $C_{21}H_{20}FN_2O_2$ $[M+H]^+$: Calculated 351.1509, found 351.1470.

N-(1-Methyl-2-oxo-1,2-dihydropyridin-3-yl)-3-phenyl-3-(thiophen-2-yl)propanamide (11g)



Yield: 69% (47mg, 0.14 mmol)
Characteristic: Light brown solid.
M.p.: 120-122°C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.11 (q, J = 7.7 Hz, 1H), 3.20 (q, J = 7.8 Hz, 1H), 3.56 (s, 3H), 4.90 (t, J = 7.7 Hz, 1H), 6.17 (t, J = 7.7 Hz, 1H), 6.88 (t, J = 8.8 Hz, 1H), 6.94 (d, J = 6.8 Hz, 1H), 7.13 (d, J = 4.8 Hz, 1H), 7.21 (s, 3H), 7.25-7.31 (m, 3H), 8.31 (d, J = 7.2 Hz, 1H), 8.36 (s, 1H).
^{13}C NMR (75 MHz, $CDCl_3$): δ 37.8, 42.9, 45.3, 106.5, 122.2, 124.0, 124.2, 126.7, 127.0, 127.5, 128.7, 129.0, 130.6, 143.1, 147.6, 157.5, 169.3.
FT-IR (neat, cm^{-1}): 987, 1266, 1368, 1484, 1519, 1561, 1681, 1692, 2898, 3197.
ESI-MS (*m/z*) for $C_{19}H_{19}N_2O_2S$ $[M+H]^+$: Calculated 339.1167, found 339.1189.

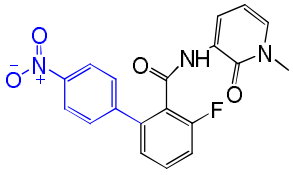
3-(4-Methoxy-phenyl)-N-(1-methyl-2-oxo-1,2-dihydro-pyridin-3-yl)-butyramide (11h)



Yield:. 74% (44 mg, 0.15 mmol)
Characteristic: Light brown solid.
M.P.: 166-168°C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 1.30 (d, J = 6.8 Hz, 3H), 2.54-2.59 (m, 1H), 2.64-2.69 (m, 1H), 3.34 (t, J = 7.1 Hz, 1H), 3.57 (s, 3H), 3.77 (s, 3H), 6.19 (t, J = 6.8 Hz, 1H), 6.83 (d, J = 8.4 Hz, 2H), 6.95 (d, J = 6.6 Hz, 1H), 7.16 (d, J = 8.4 Hz, 2H), 8.33 (t, J = 8.5 Hz, 2H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 14.0, 21.8, 35.9, 46.6, 55.1, 106.6, 113.9, 122.0, 127.6, 129.1, 130.4, 137.7, 157.6, 158.0, 170.8.
FT-IR (KBr, cm^{-1}): 1158, 13834, 1477, 1516, 1573, 1660, 1701, 2798, 2950, 3223.
ESI-MS (*m/z*) for $C_{17}H_{20}N_2O_3Na$ $[M+Na]^+$: Calculated 323.1372, found 323.1395.

Section XIV. Characterization Data for 14a-b, 15a-b, 17

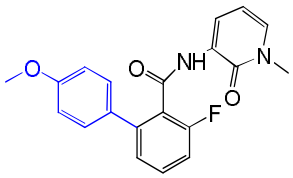
3-Fluoro-4'-nitrobiphenyl-2-carboxylic acid(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)amide (14a)



Yield: 82% (60 mg, 0.16 mmol).
Characteristic: Thick liquid.

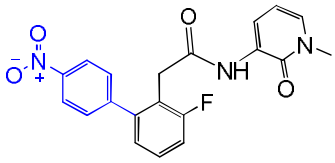
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.55 (s, 3H), 6.20 (t, J = 7 Hz, 1H), 7.00 (d, J = 6.8 Hz, 1H), 7.21 (t, J = 3.4 Hz, 2H), 7.51 (q, J = 7.7 Hz, 1H), 7.60 (d, J = 8.6 Hz, 2H), 8.21 (d, J = 8.5 Hz, 2H), 8.33 (d, J = 7.4 Hz, 1H), 8.63 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 37.7, 106.4, 116.1 (d, $^{2}J_1$ = 22 Hz, C-CF), 122.8, 123.7, 124.3 (d, $^{2}J_2$ = 17 Hz, C-CF), 125.7, 129.4, 130.1 (d, ^{1}J = 295 Hz), 131.5, 140.0, 145.5, 147.4, 157.3, 158.1, 160.6, 162.8.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -114.0.
FT-IR (neat, cm^{-1}): 1044, 1261, 1384, 1459, 1517, 1597, 1644, 2853, 2923, 3361.
ESI-MS (m/z) for $C_{19}H_{15}FN_3O_4$ $[M+H]^+$: Calculated 368.1046, found 368.1083.

3-Fluoro-4'-methoxybiphenyl-2-carboxylic acid (1-methyl-2-oxo-1,2-dihydropyridin-3-yl)amide (14b)



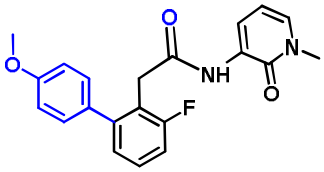
Yield: 70% (49 mg, 0.14 mmol).
Characteristic: Colorless solid.
M.p.: 129-132 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.52 (s, 3H), 3.78 (s, 3H), 6.18 (t, J = 7.1 Hz, 1H), 6.87 (d, J = 8.6 Hz, 2H), 6.95-6.96 (m, 1H), 7.09 (t, J = 8.7 Hz, 1H), 7.18 (d, J = 7.7 Hz, 1H), 7.36-7.44 (m, 3H), 8.40 (d, J = 7 Hz, 1H), 8.50 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 37.7, 55.2, 106.4, 114.2 (d, $^{2}J_1$ = 34 Hz, C-CF), 122.3, 124.2 (d, $^{2}J_2$ = 17 Hz, C-CF), 125.8, 129.6, 130.0 (d, ^{1}J = 200 Hz, CF), 141.7, 141.8, 157.4, 158.3, 159.4, 160.8, 163.9.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -116.85.
FT-IR (KBr, cm^{-1}): 1029, 1115, 1420, 1450, 1647, 2045, 2833, 2945, 3350.
ESI-MS (m/z) for $C_{20}H_{18}FN_2O_3$ $[M+H]^+$: Calculated 353.1301, found 353.1273.

2-(3-Fluoro-4'-nitrobiphenyl-2-yl)-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (15a)



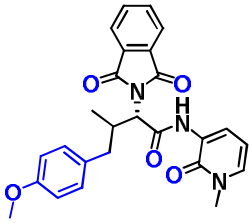
Yield: 79% (60 mg, 0.16 mmol).
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.57 (s, 3H), 3.69 (s, 2H), 6.20 (t, J = 6.6 Hz, 1H), 6.98 (d, J = 6.4 Hz, 1H), 7.10 (d, J = 7.1 Hz, 1H), 7.19 (t, J = 8.2 Hz, 1H), 7.38 (d, J = 6 Hz, 1H), 7.56 (d, J = 7.9 Hz, 2H), 8.27 (t, J = 8.4 Hz, 3H), 8.44 (brs, 1H).
^{13}C NMR(100 MHz, $CDCl_3$): δ 35.2, 37.8, 106.5, 115.5 (d, $^{2}J_1$ = 22 Hz, C-CF), 120.0 (d, $^{2}J_2$ = 15 Hz, C-CF), 122.1, 123.6, 125.6, 129.1, 129.2, 130.0 (d, ^{1}J = 210 Hz, CF), 130.2, 142.6, 146.3, 147.4, 157.5, 160.3, 162.7, 168.3.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -114.45.
FT-IR (neat, cm^{-1}): 1046, 1240, 1384, 1459, 1518, 1597, 1644, 2853, 2923, 3367.
ESI-MS (m/z) for $C_{20}H_{17}FN_3O_4$ $[M+H]^+$: Calculated 382.1203, found 382.1263.

2-(3-Fluoro-4'-methoxybiphenyl-2-yl)-*N*-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (15b)



Yield: 71% (52 mg, 0.14 mmol).
Characteristic: Brown solid.
M.p.: 137-140 ^{o}C.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.56 (s, 3H), 3.74 (d, J = 2.3 Hz, 2H), 3.82 (s, 3H), 6.19 (t, J = 7.1 Hz, 1H), 6.91-6.96 (m, 3H), 7.11 (d, J = 8 Hz, 2H), 7.28 (s, 2H), 7.30 (d, J = 8.1 Hz, 1H), 8.33 (dd, J_1 = 1.7 Hz, J_2 = 1.7 Hz, 1H), 8.43 (brs, 1H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 35.6, 37.8, 55.2, 106.5, 114.0 (d, $^{2}J_1$ = 39 Hz, C-CF), 120.0 (d, $^{2}J_2$ = 16 Hz, C-CF), 121.9, 126.1, 128.6, 128.7, 130.3, 130.6 (d, ^{1}J = 283 Hz, CF), 144.7, 157.6, 159.1, 160.4, 162.8, 169.1.
^{19}F NMR (376.5 MHz, DMSO-d_6): δ -114.52.
FT-IR (KBr, cm^{-1}): 1028, 1114, 1417, 1450, 1515, 1646, 2044, 2523, 2833, 2945, 3349.
ESI-MS (m/z) for $C_{21}H_{20}FN_2O_3$ $[M+H]^+$: Calculated 367.1458, found 367.1498.

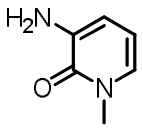
_N_-((1_S_)-1-(1,3-dioxoisoindolin-2-yl)-3-(4-methoxyphenyl)-2-methylpropyl)-2-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (17)



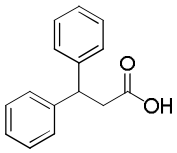
Yield: 65% (60 mg, 0.13 mmol).
Characteristic: Thick liquid.
Diastereomeric ratio (dr): 4:1.
^{1}H NMR (400 MHz, $CDCl_3$): δ 0.76-0.78 (d, J = 6.8 Hz, 3H) , 2.31-2.37 (m, 1H), 3.0 (dd, J_1 = 3.5 Hz, J_2 = 3.8 Hz, 1H), 3.15 (t, J = 6.8 Hz, 1H), 3.59-3.63 (s, 3H), 3.74-3.76 (s, 3H), 4.72 (d, J = 10.5 Hz, 1H), 6.19 (t, J = 7.2 Hz, 1H), 6.80 (d, J = 8.5 Hz, 2H), 6.98 (d, J = 6.9 Hz, 1H), 7.14 (d, J = 8.4 Hz, 2H), 7.68-7.73 (m, 2H), 7.87-7.89 (m, 2H), 8.37 (d, J = 7.4 Hz, 1H), 9.70 (brs, 1H).
^{13}C NMR (100 MHz, $CDCl_3$): δ 15.7, 34.4, 37.7, 39.3, 55.2, 61.6, 106.3, 113.7, 122.7, 123.8, 129.1, 130.3, 131.0, 131.2, 131.4, 134.4, 158.0, 167.2, 168.0.
FT-IR (neat, cm^{-1}): 1099, 1248, 1335, 1384, 1512, 1600, 1646, 1718, 1775, 2854, 2924, 3466.
ESI-MS (m/z) for $C_{26}H_{26}N_3O_5$ $[M+H]^+$: Calculated 460.1872, found 460.1901.

Section XV. Characterization Data for 1, 18

3-Amino-1-methyl-1*H*-pyridin-2-one (1)



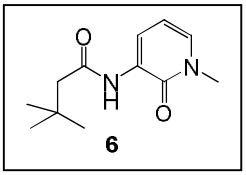
Characteristic: Thick liquid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.42 (s, 3H), 5.05 (brs, 2H), 6.00 (t, J = 6.9 Hz, 1H), 6.42 (dd, J_1 = 1.6 Hz, J_2 = 1.6 Hz), 6.87 (dd, J_1 = 1.6 Hz, J_2 = 1.6 Hz, 1H).
3,3-Diphenylpropionic acid (18)

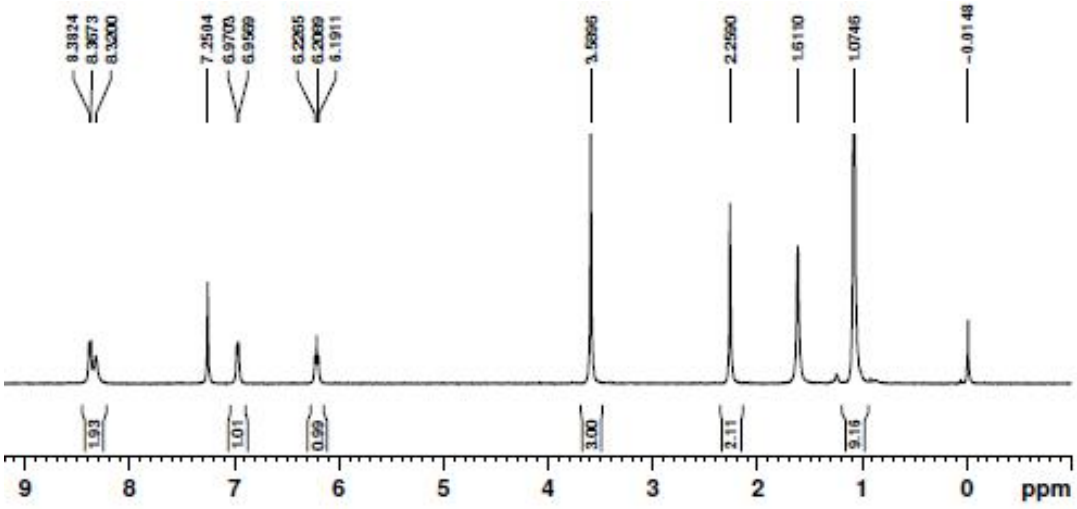


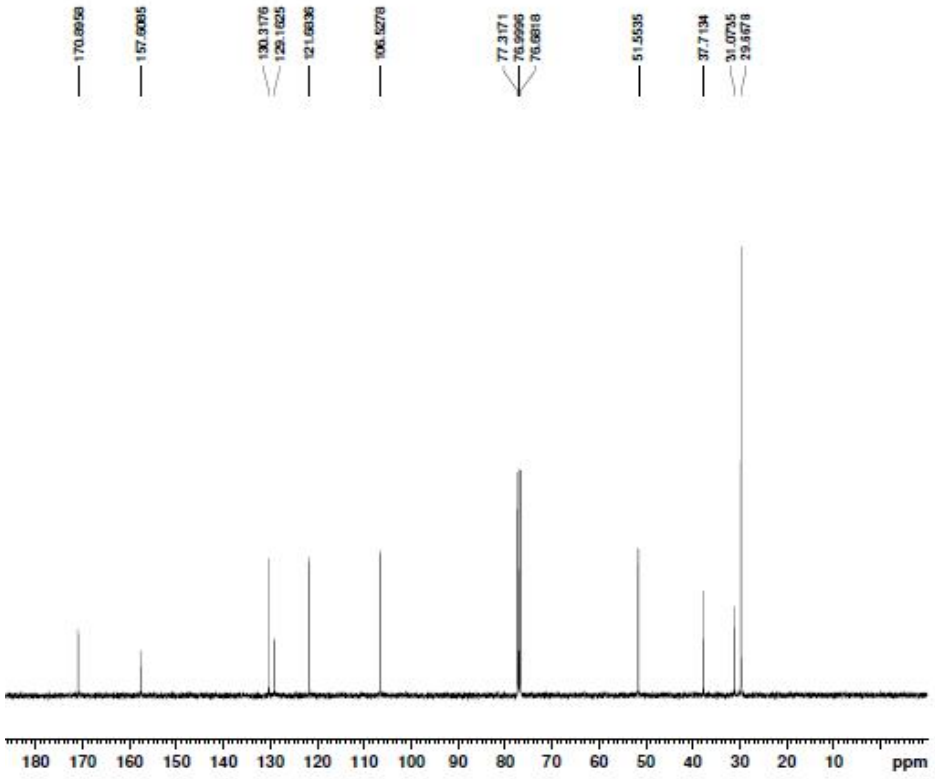
Yield: 91% (40 mg).
Characteristic: Colourless solid.
^{1}H NMR (400 MHz, $CDCl_3$): δ 3.01 (d, J = 7.9 Hz, 2H), 4.41 (t, J = 7.9 Hz, 1H), 7.15 (t, J = 7 Hz, 2H), 7.24-7.32 (m, 8H), 12.11 (brs, 1H).

Section XVI. ^{1}H and ^{13}C NMR spectra

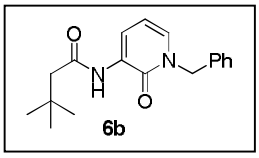
^{1}H & ^{13}C NMR of 6a

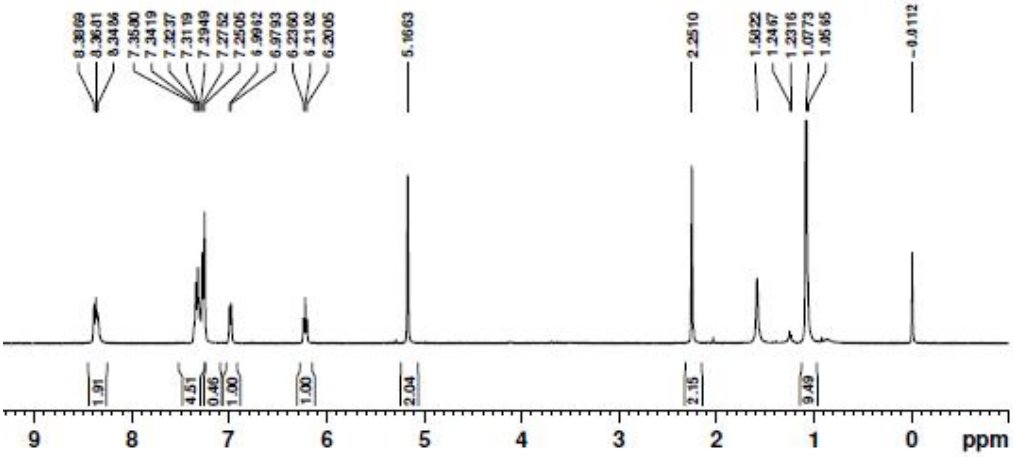


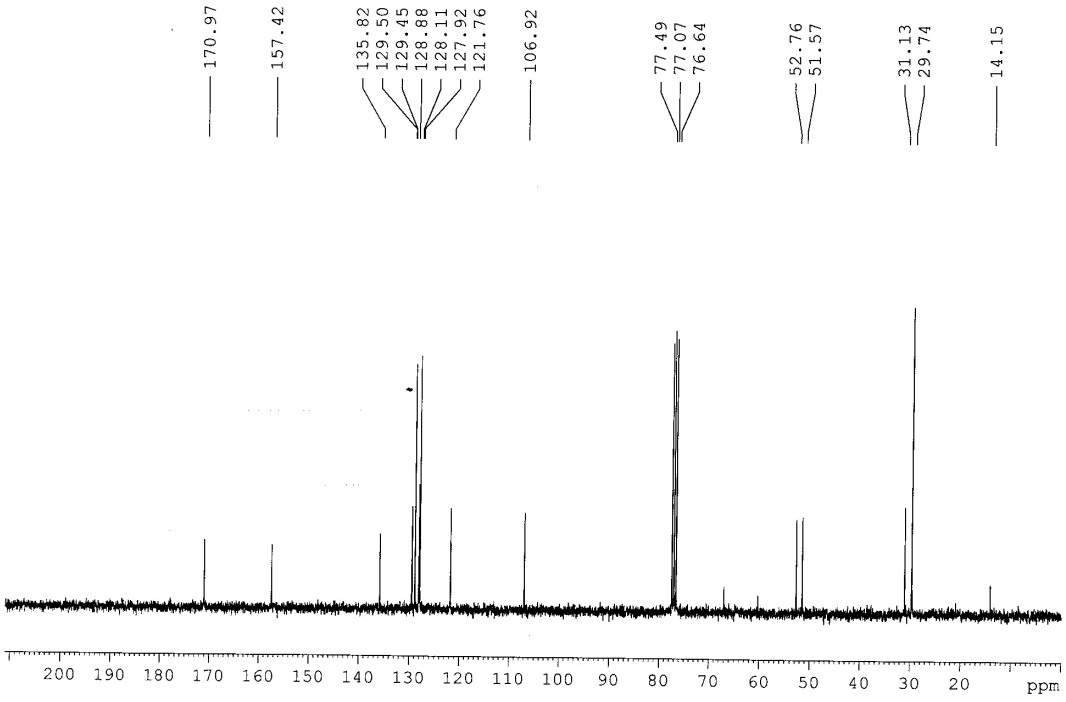




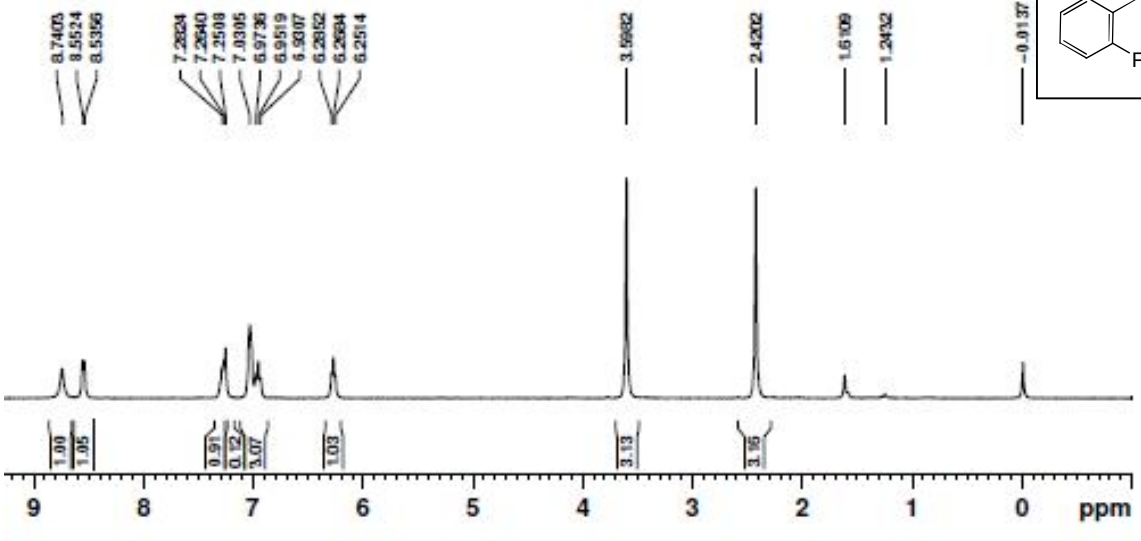
^{1}H & ^{13}C NMR of 6b

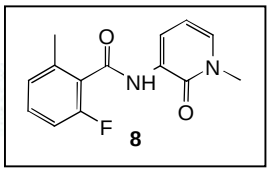


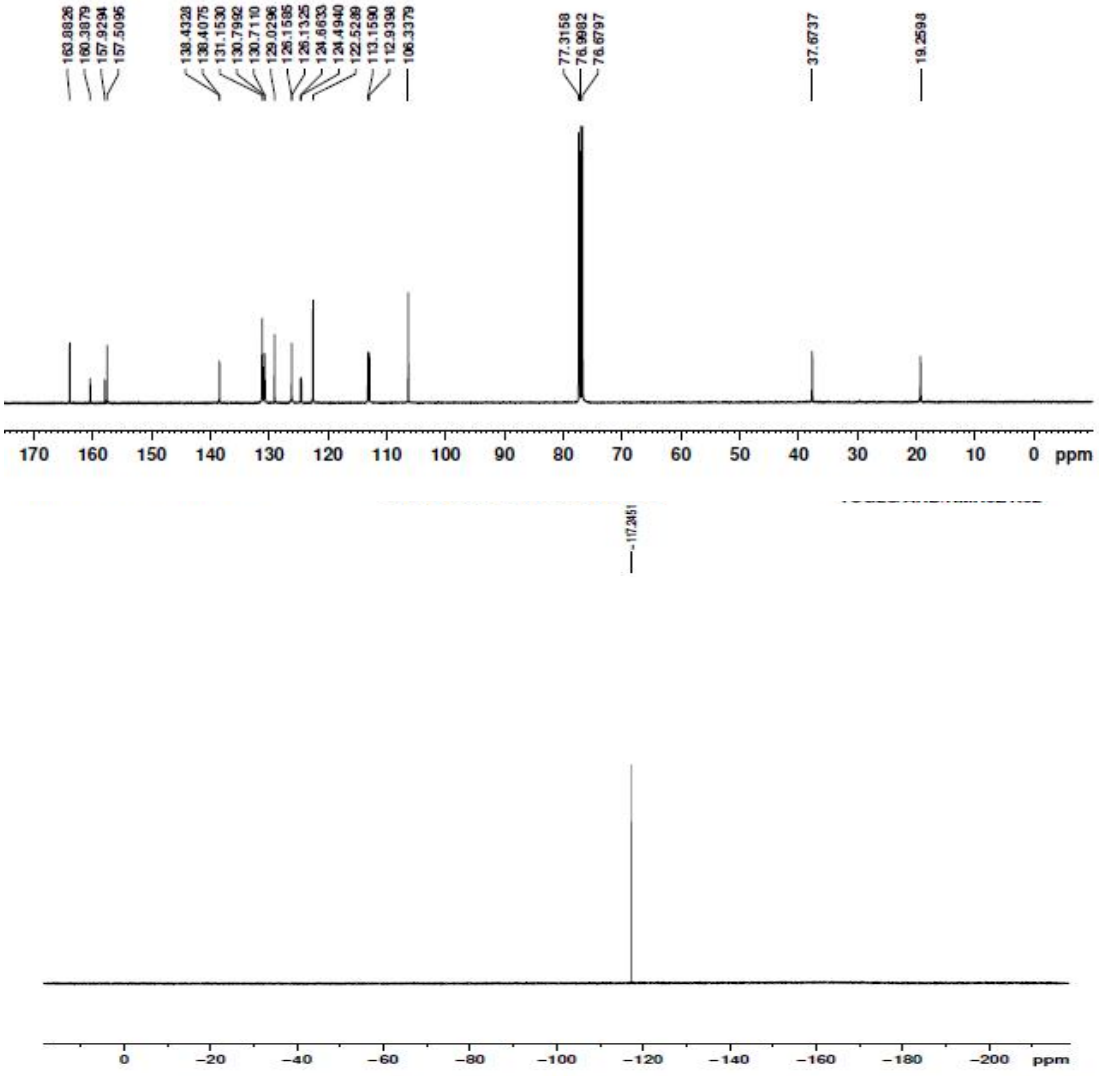




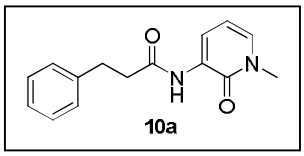
^{1}H, ^{13}C NMR & ^{19}F NMR of 8

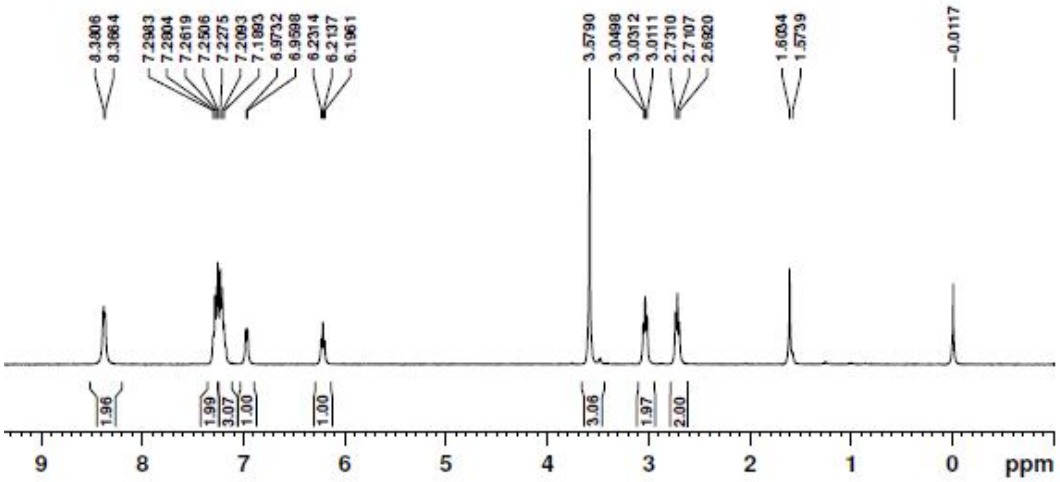


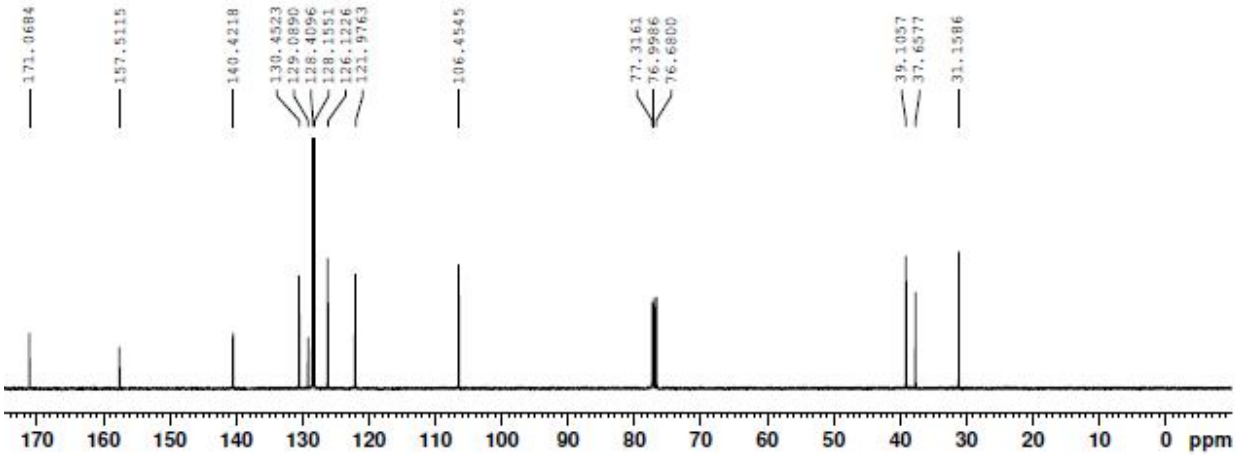




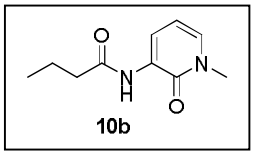
^{1}H & ^{13}C NMR of 10a

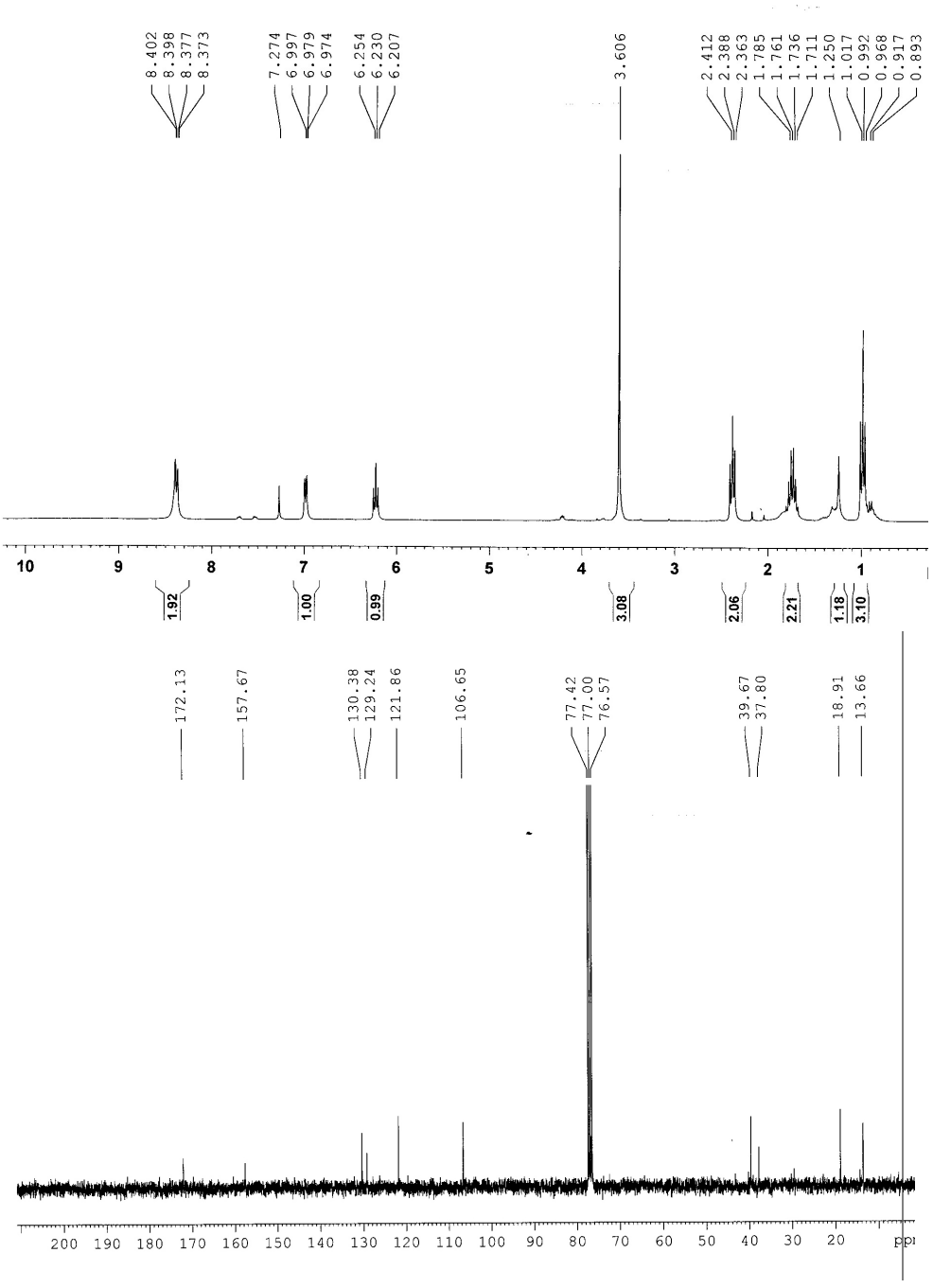




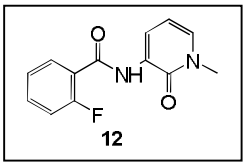


^{1}H & ^{13}C NMR of 10b

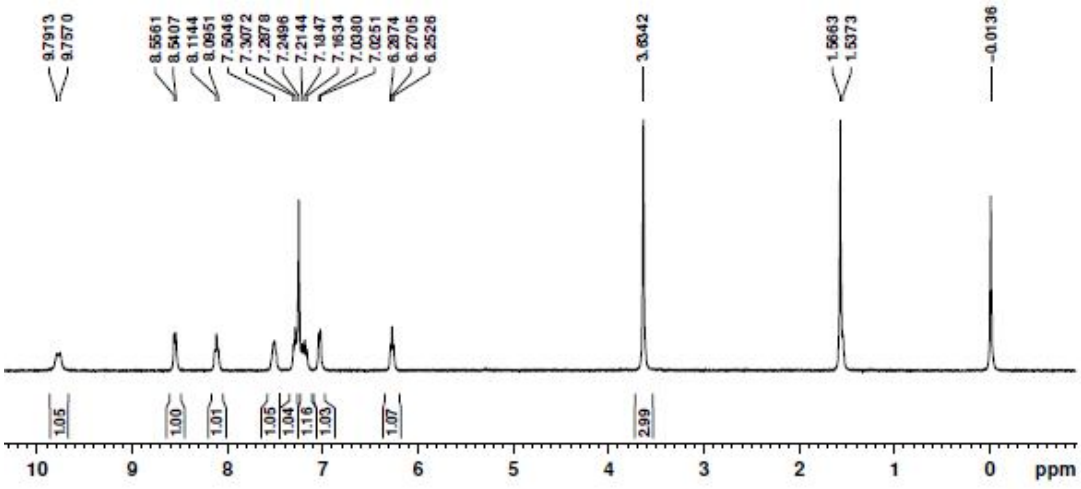


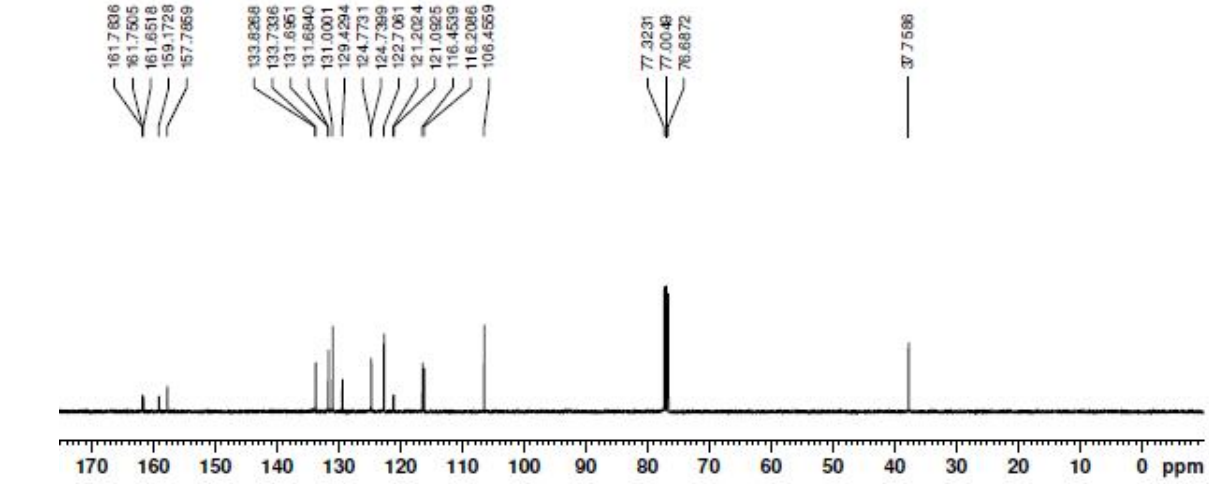


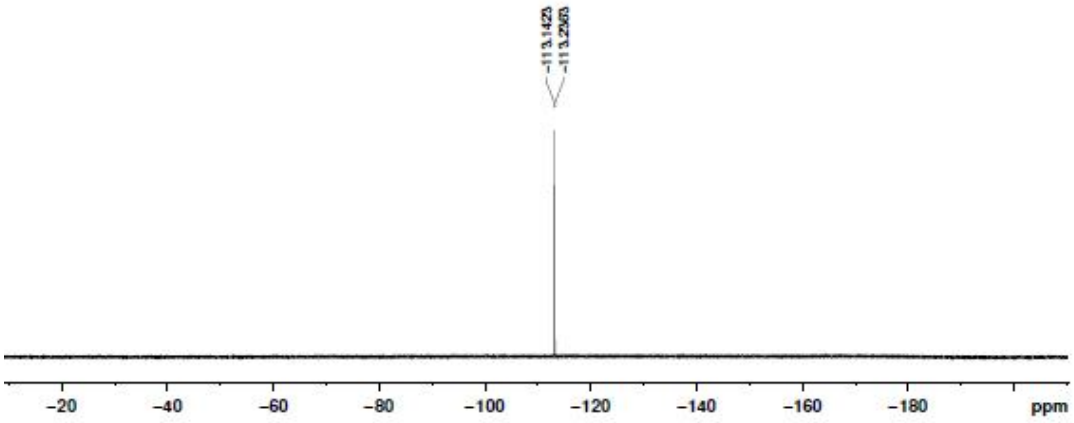
^{1}H, ^{13}C NMR & ^{19}F NMR of 12



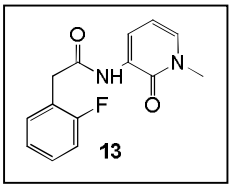
12

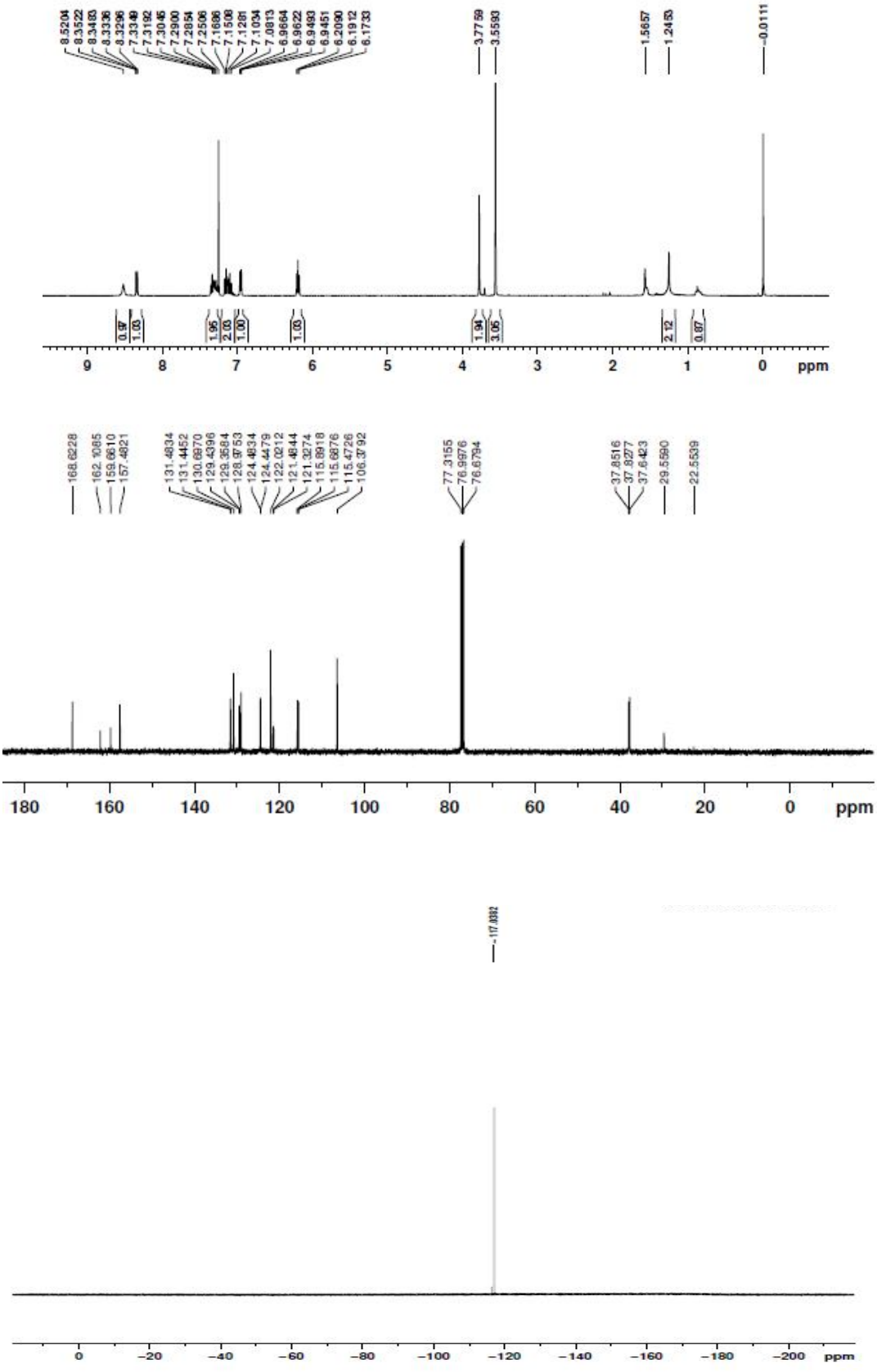




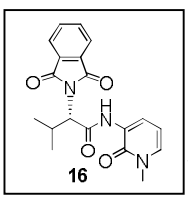


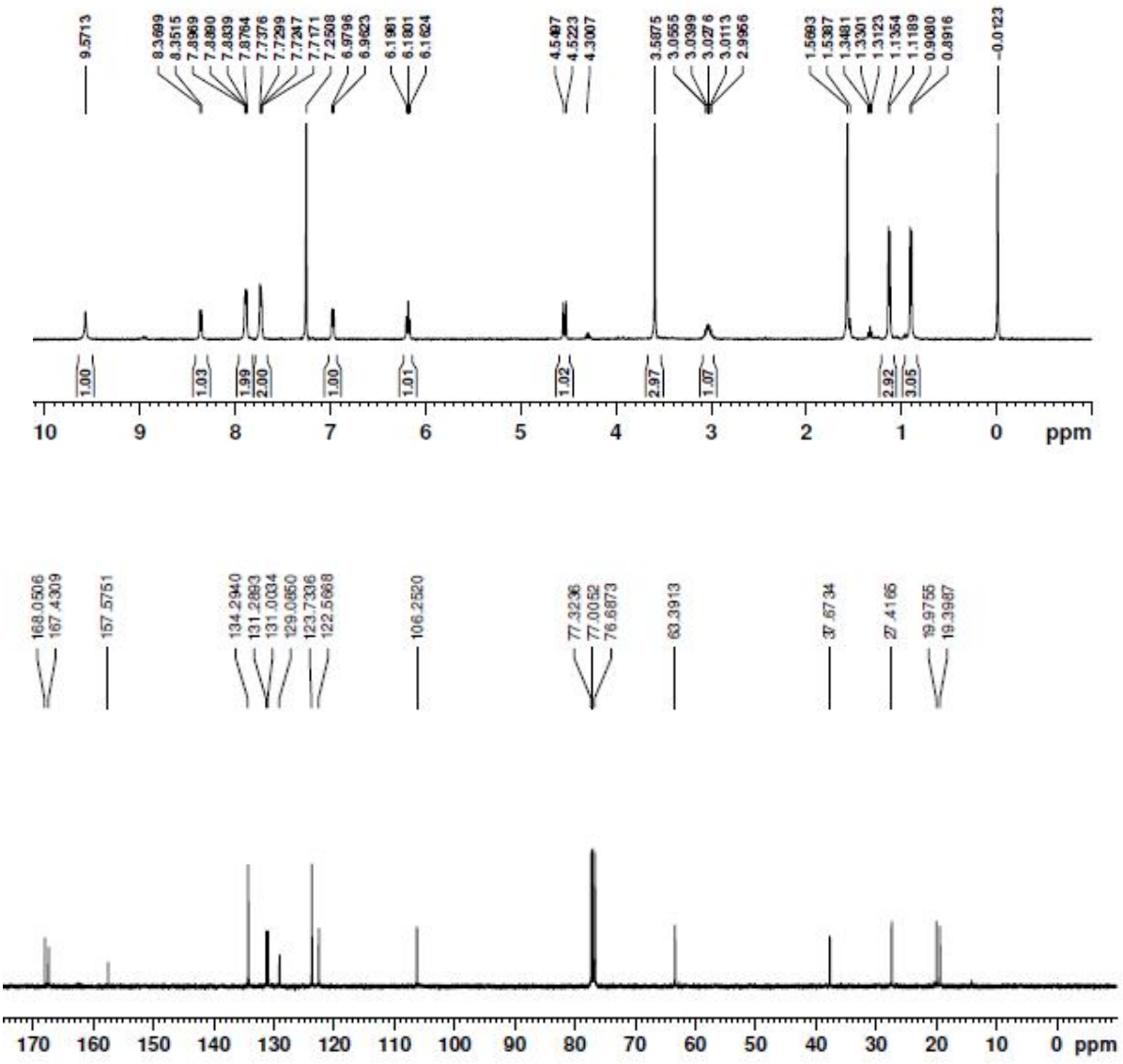
^{1}H, ^{13}C NMR & ^{19}F of 13



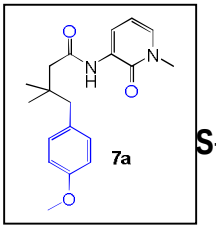


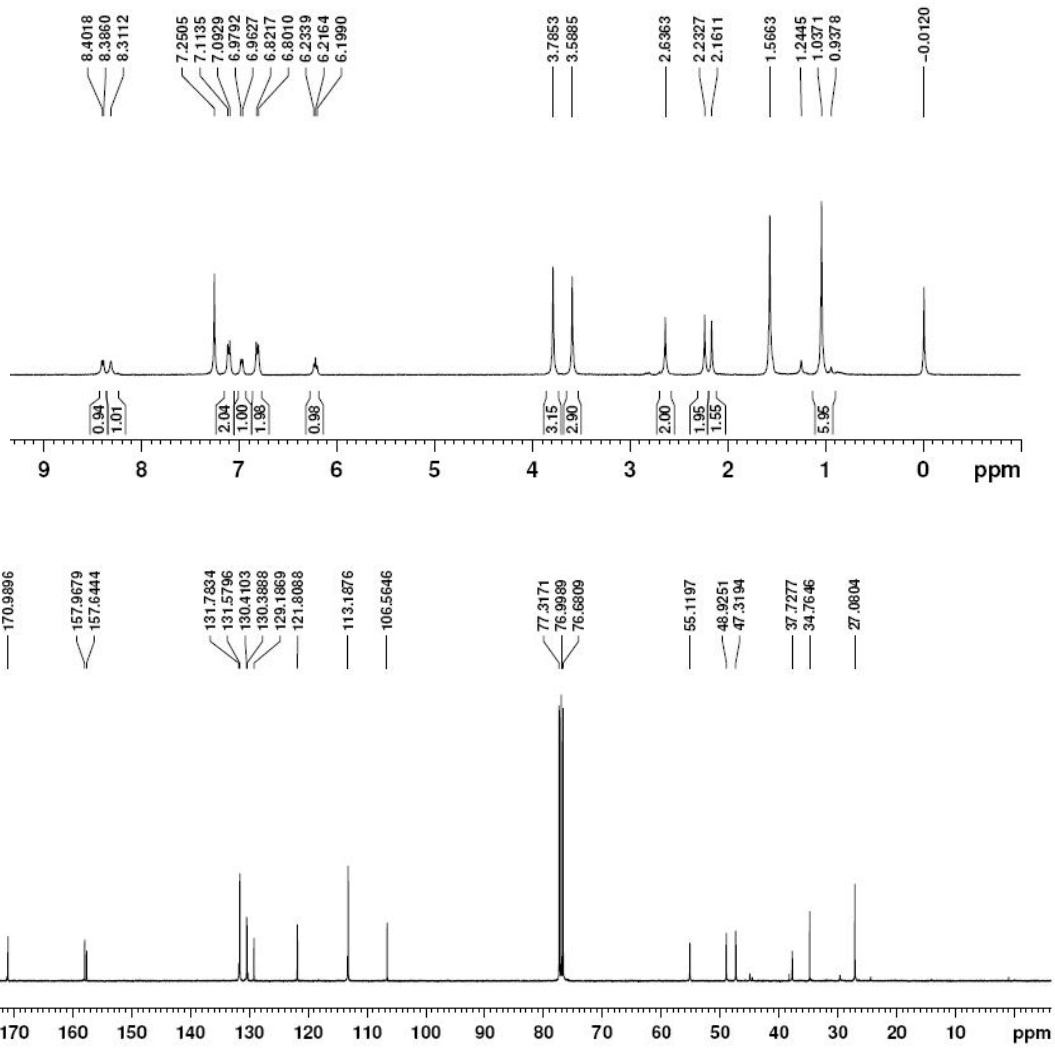
^{1}H & ^{13}C NMR of 16



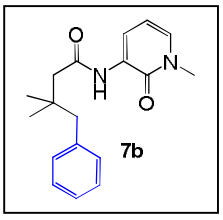


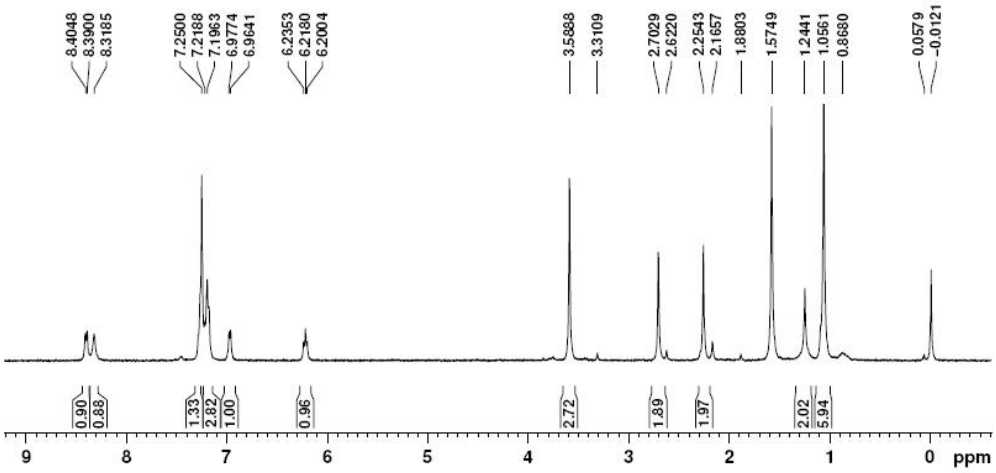
^{1}H & ^{13}C NMR of 7a

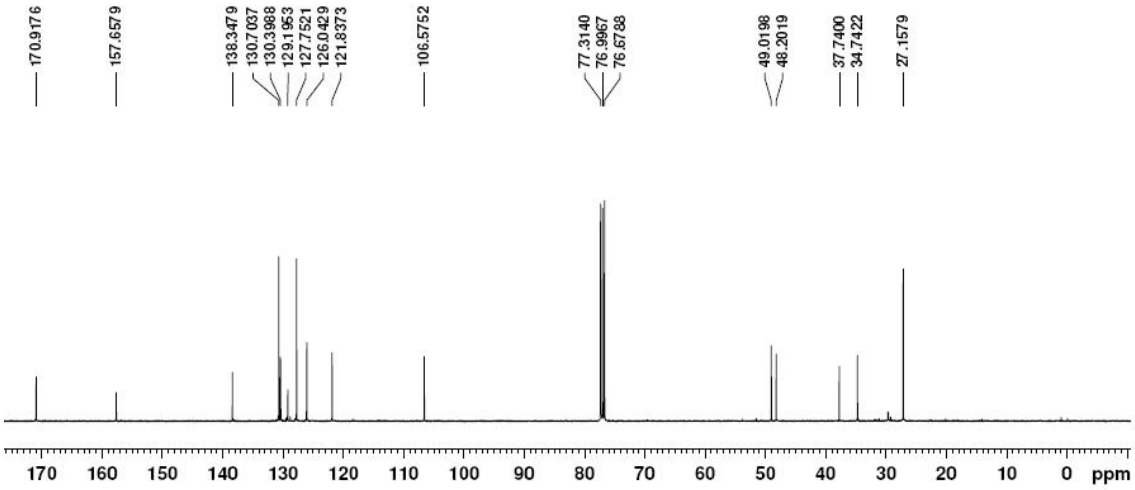




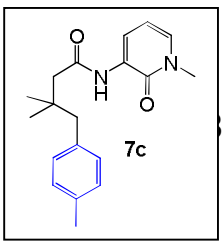
^{1}H & ^{13}C NMR of 7b



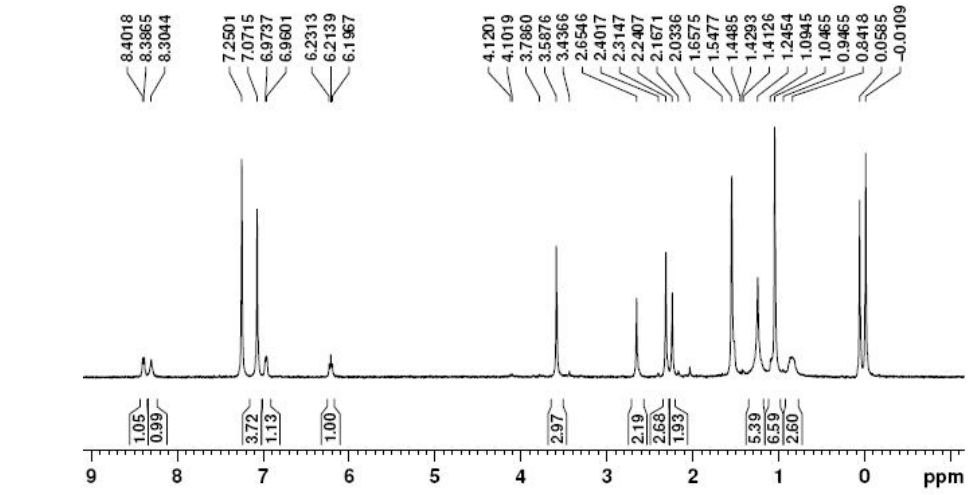


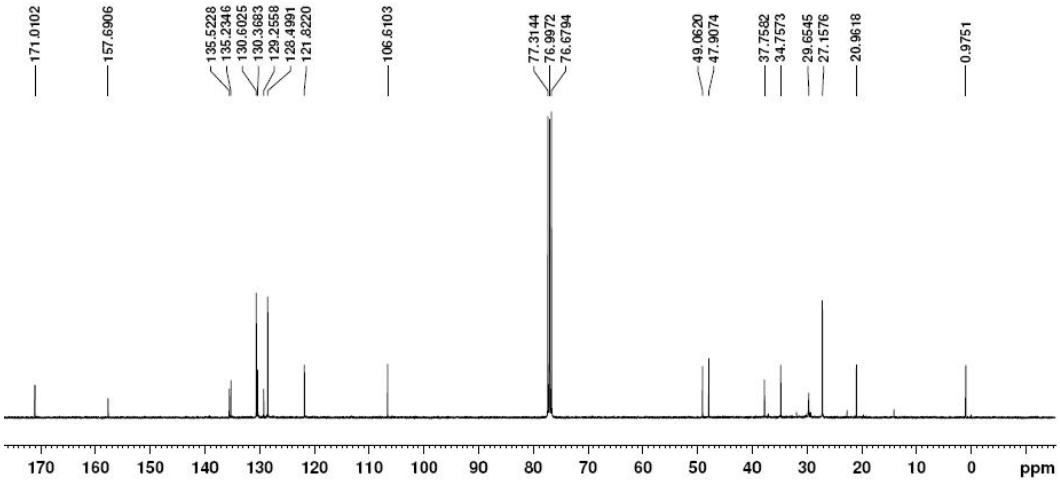


^{1}H & ^{13}C NMR of 7c

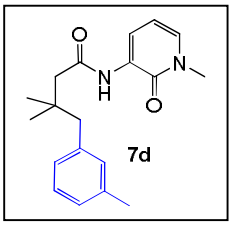


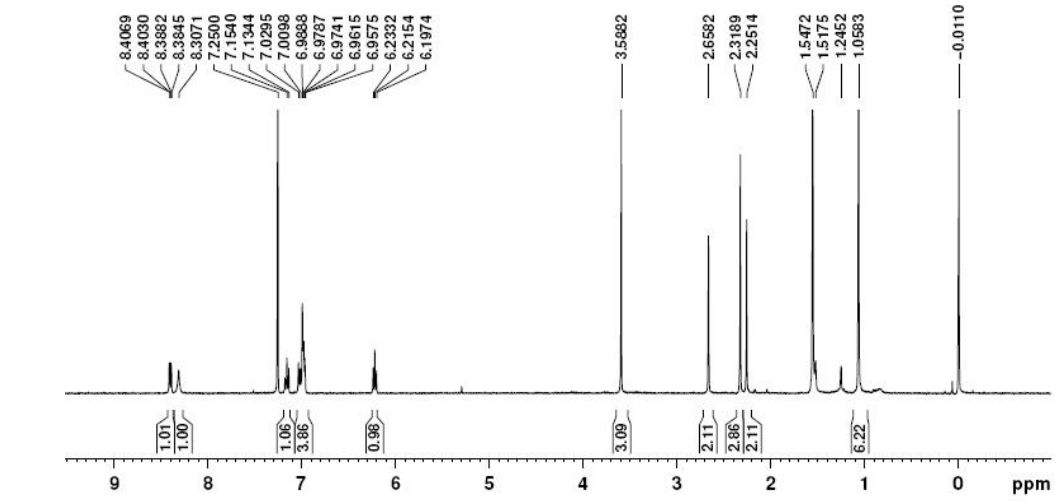
1

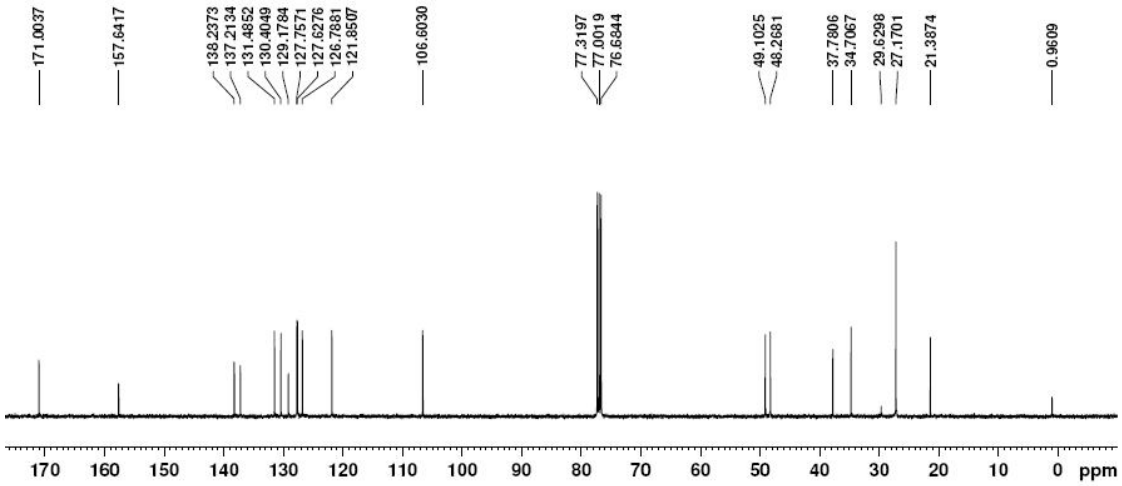

8.4018
8.3865
8.3044
7.2501
7.0715
6.9737
6.9601
6.2313
6.2139
6.1967
4.1201
4.1019
3.7860
3.5876
3.4366
2.6546
2.4017
2.3147
2.2407
2.1671
2.0336
1.6575
1.5477
1.4485
1.4293
1.4126
1.2454
1.0945
1.0465
0.9465
0.8418
0.0585
-0.0109
1.05
0.99
3.72
1.13
1.00
2.97
2.19
2.68
1.93
5.39
6.59
2.60
9 8 7 6 5 4 3 2 1 0 ppm


171.0102
157.6906
135.5228
135.2346
130.6025
130.3683
129.2558
128.4991
121.8220
106.6103
77.3144
76.9972
76.6794
49.0620
47.9074
37.7582
34.7573
29.6545
27.1576
20.9618
0.9751
170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

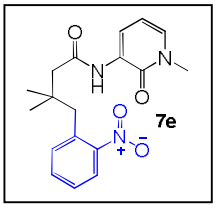
^{1}H & ^{13}C NMR of 7d

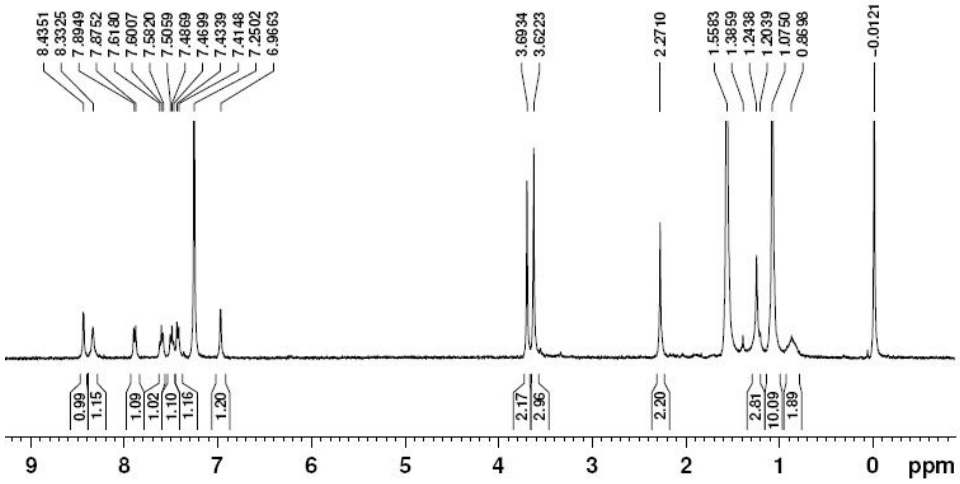


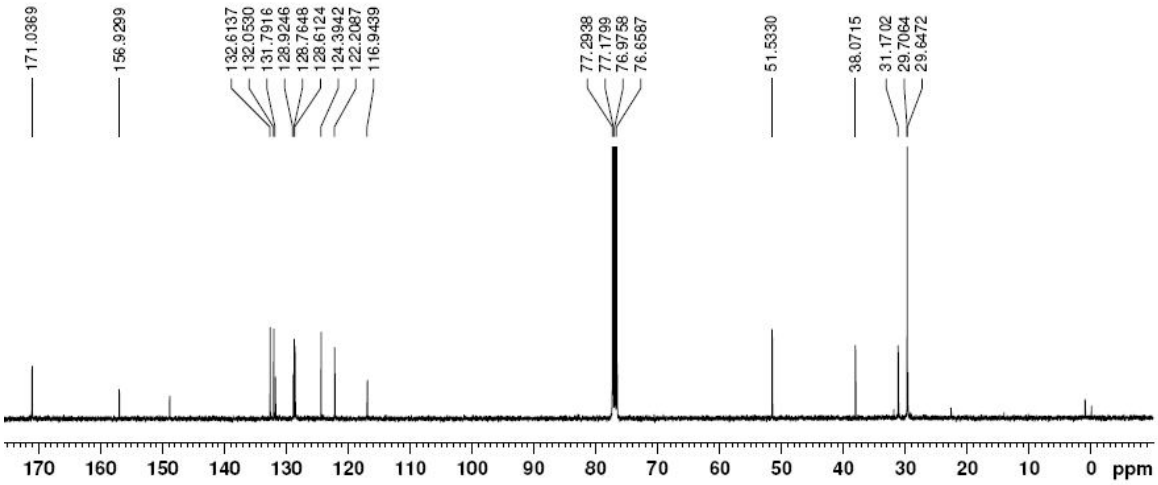




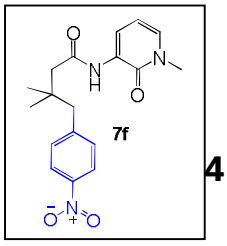
^{1}H & ^{13}C NMR of 7e

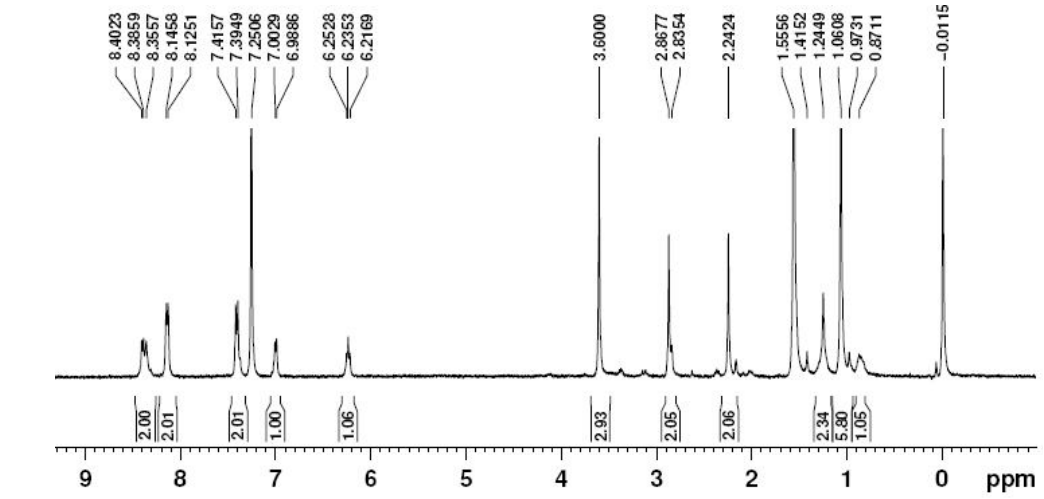


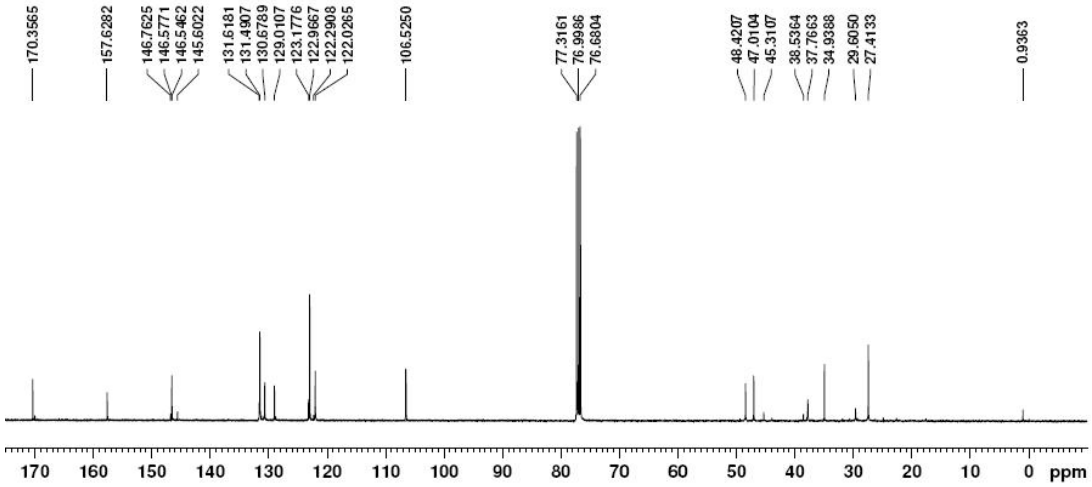




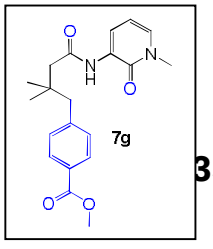
^{1}H & ^{13}C NMR of 7f

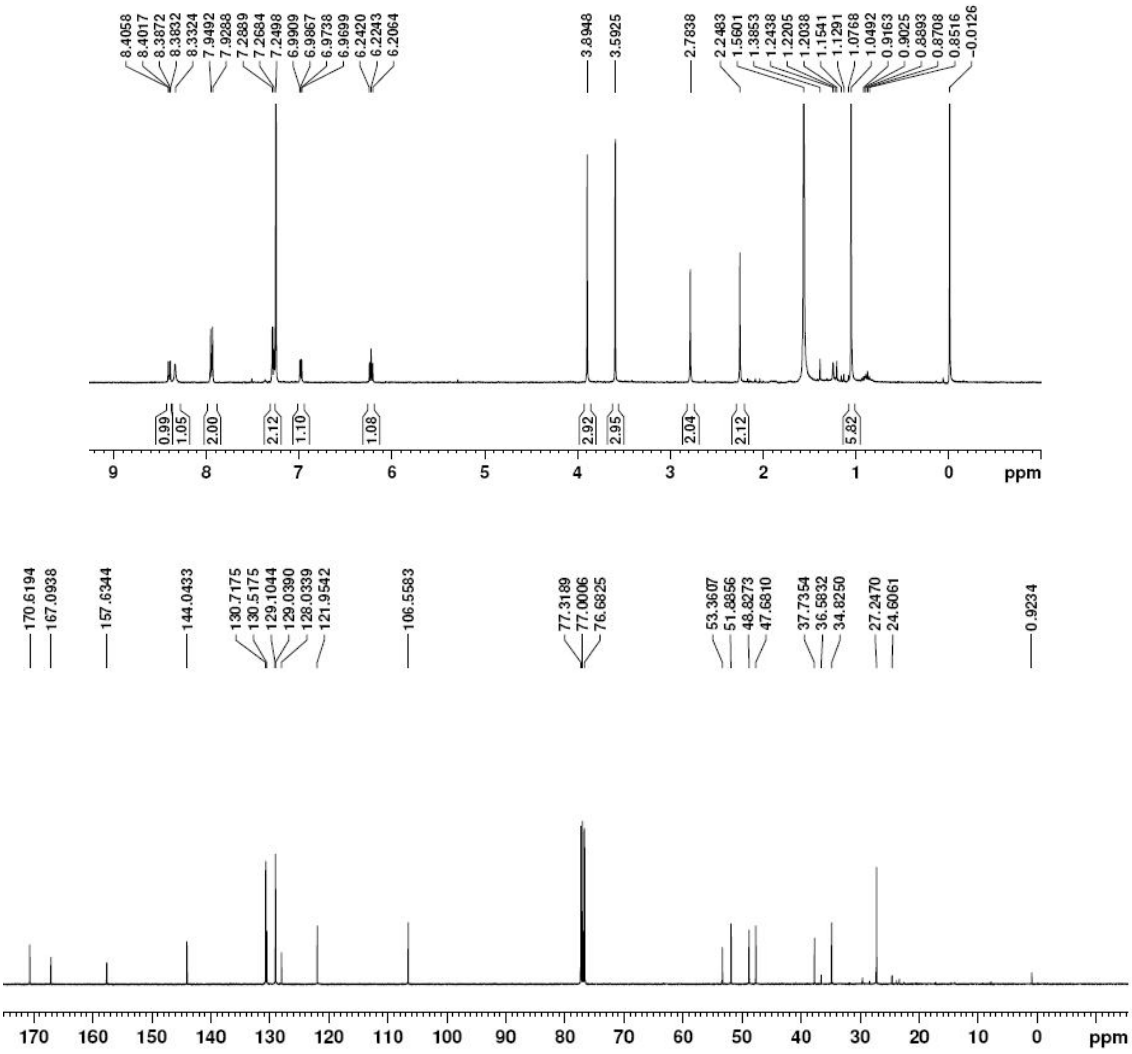




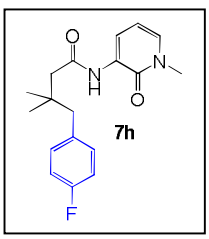


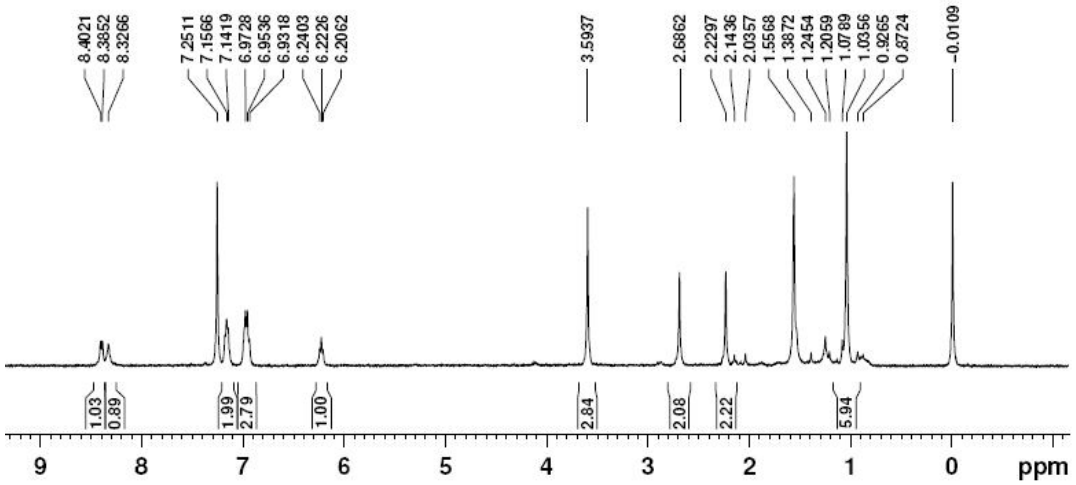
^{1}H & ^{13}C NMR of 7g

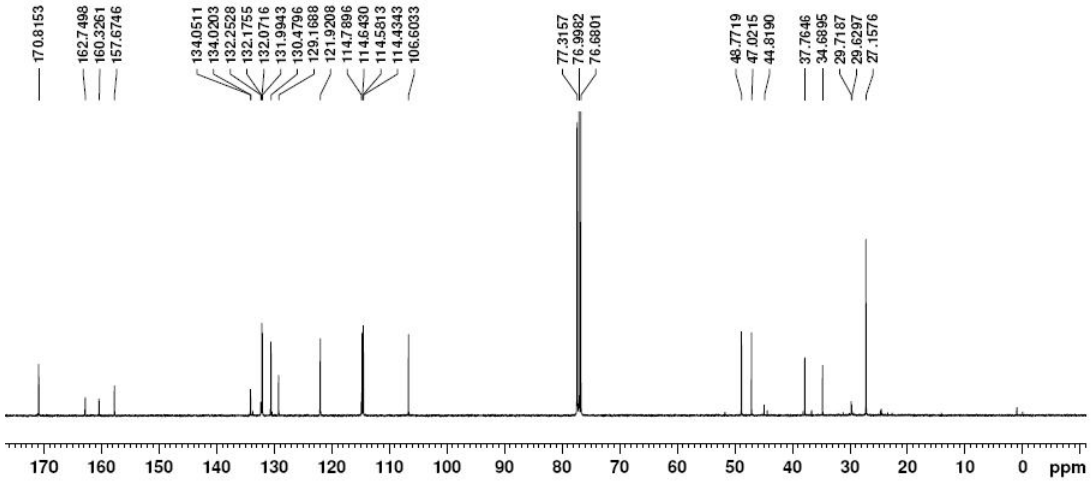


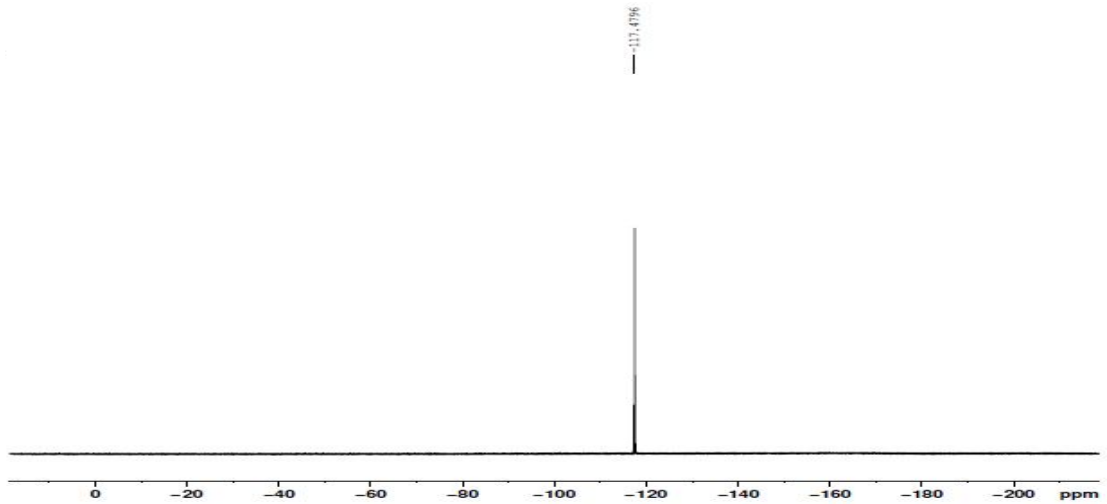


^{1}H , ^{13}C & ^{19}F NMR of 7h

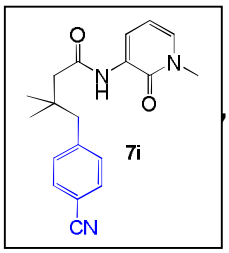


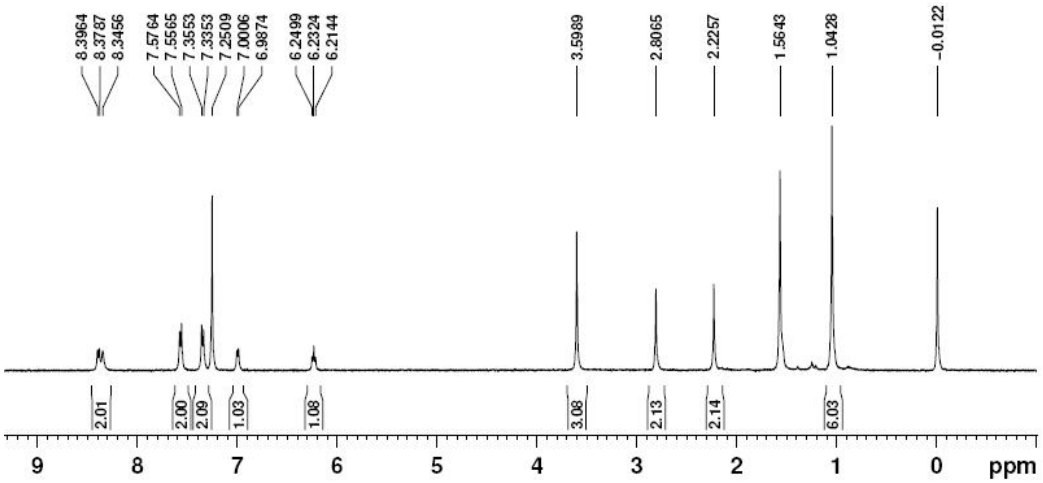


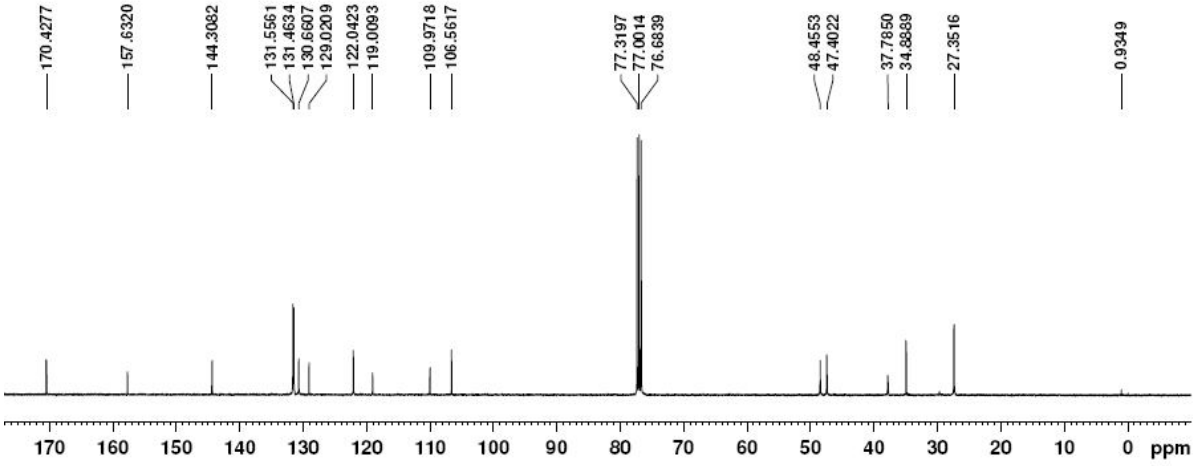




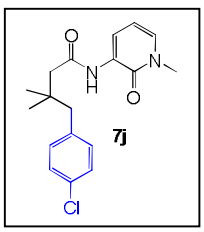
^{1}H & ^{13}C NMR of 7i

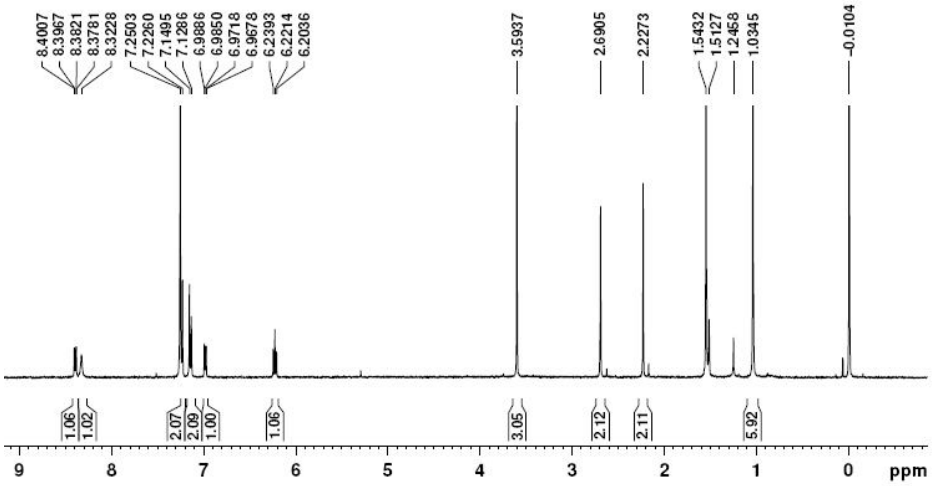


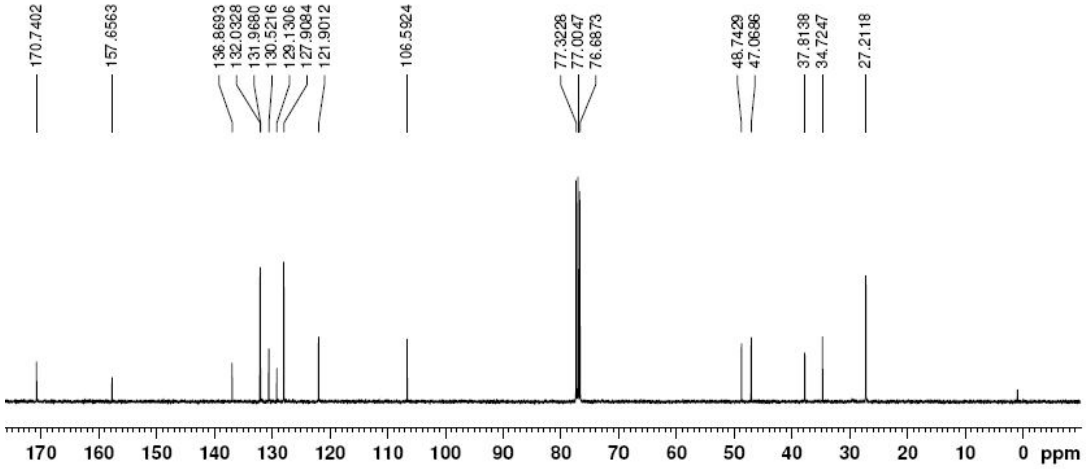




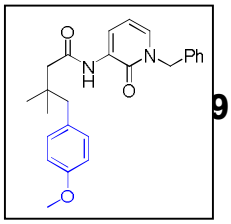
^{1}H & ^{13}C NMR of 7j







^{1}H & ^{13}C NMR of 7k



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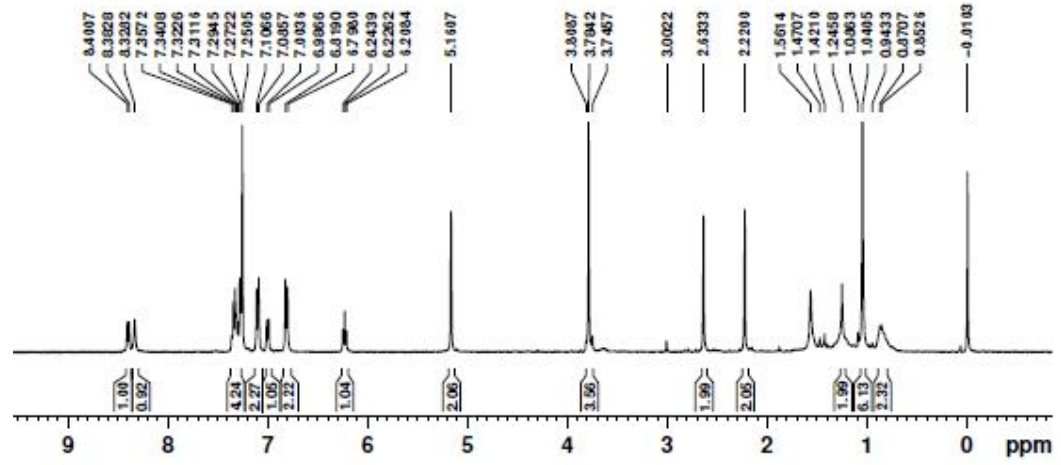
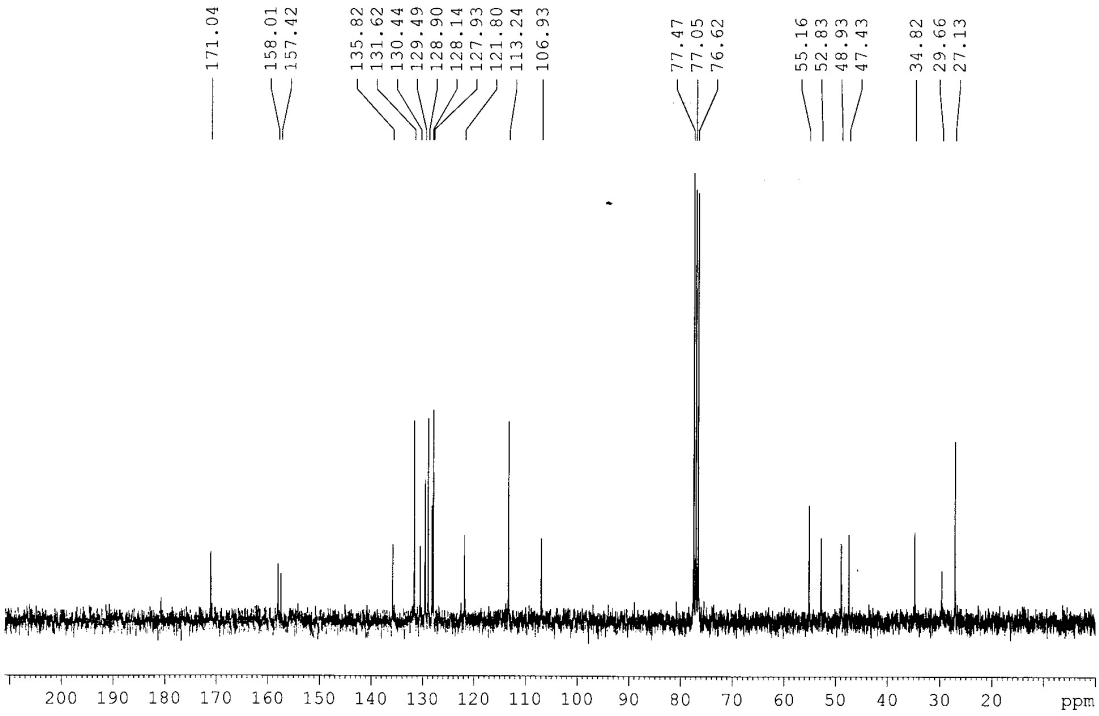
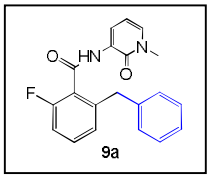
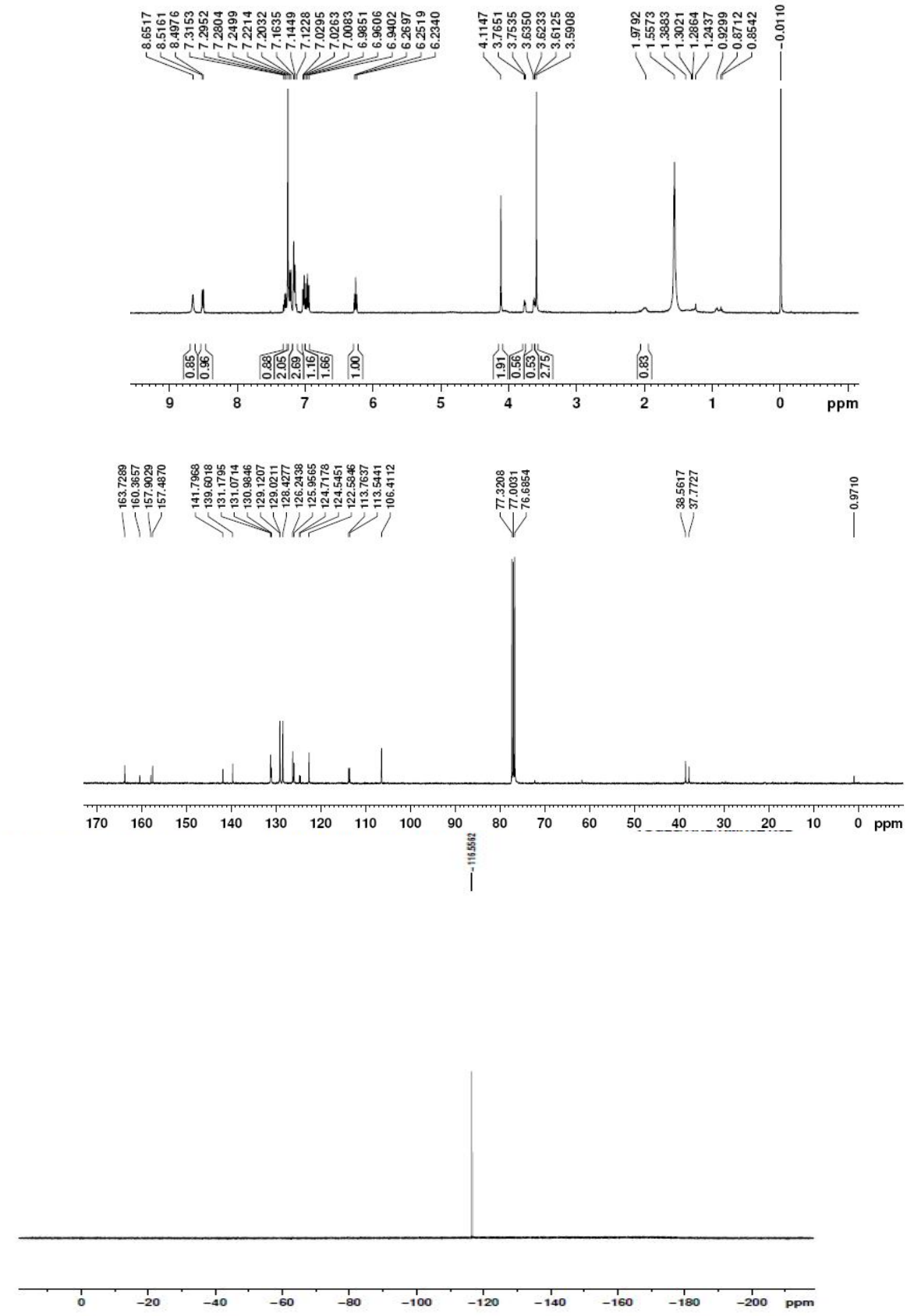


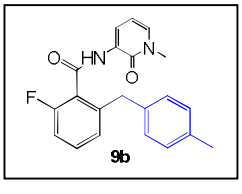


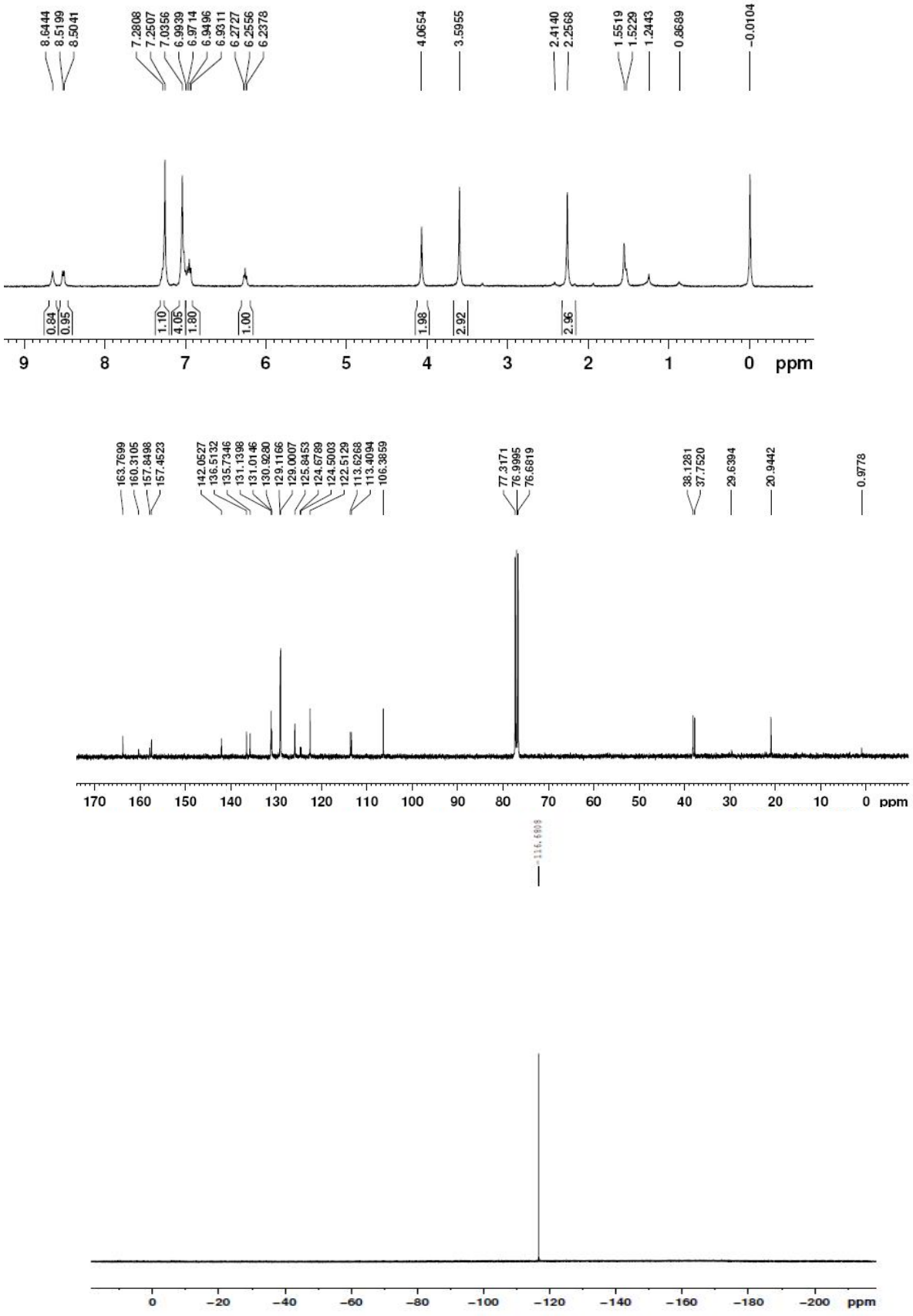
^{1}H, ^{13}C NMR & ^{19}F of 9a



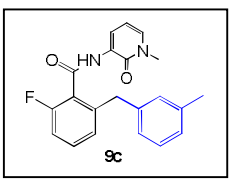


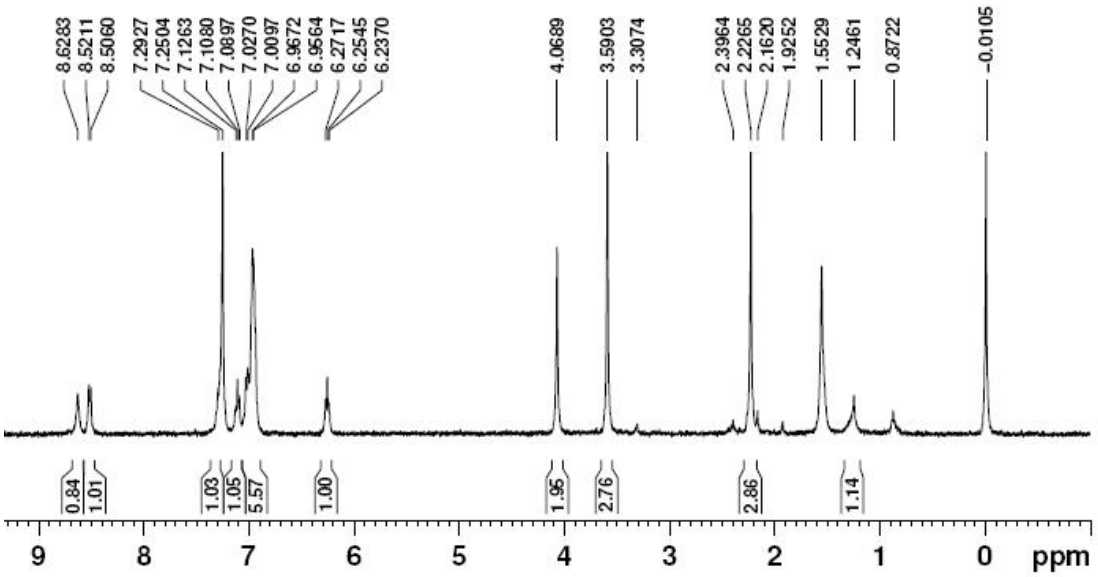
^{1}H, ^{13}C NMR & ^{19} F NMR of 9b





^{1}H, ^{13}C & ^{19}F NMR of 9c

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7.2504
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7.1080
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7.0270
7.0097
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6.9564
6.2717
6.2545
6.2370
4.0689
3.5903
3.3074
2.3964
2.2265
2.1620
1.9252
1.5529
1.2461
0.8722
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0.84
1.01
1.03
1.05
5.57
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2.76
2.86
1.14
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8
7
6
5
4
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2
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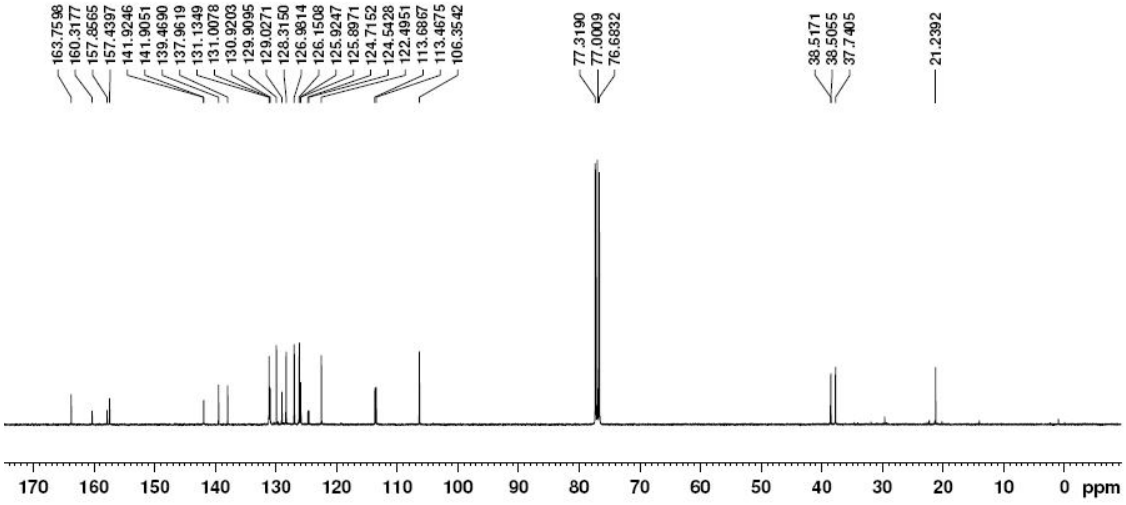
0
ppm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129.9095
129.0271
128.3150
126.9814
126.1508
125.9247
125.8971
124.7152
124.5428
122.4951
113.6867
113.4675
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76.6832
38.5171
38.5055
37.7405
21.2392
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140
130
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100
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60
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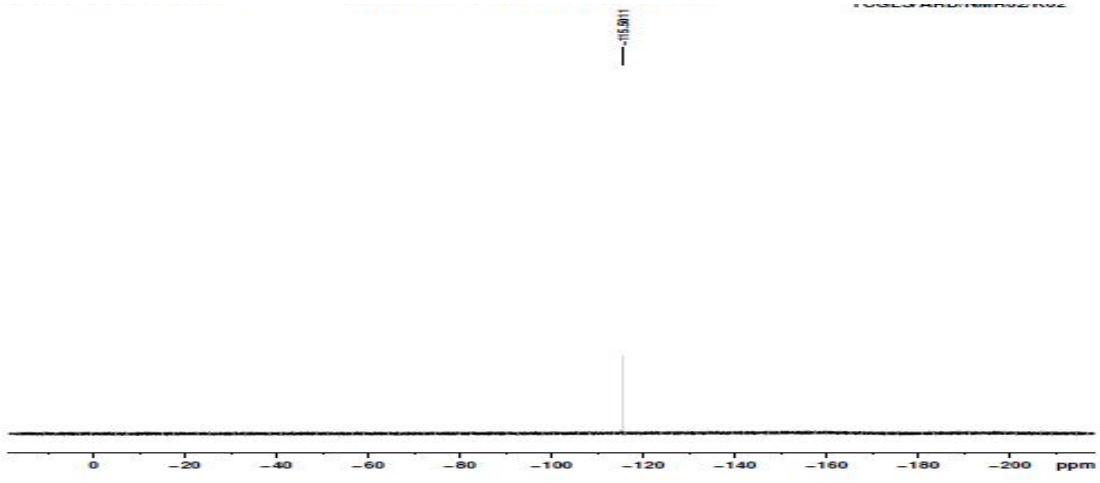
20
10
0
ppm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-100
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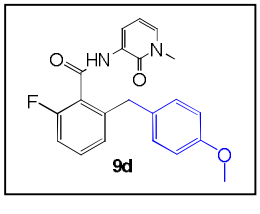
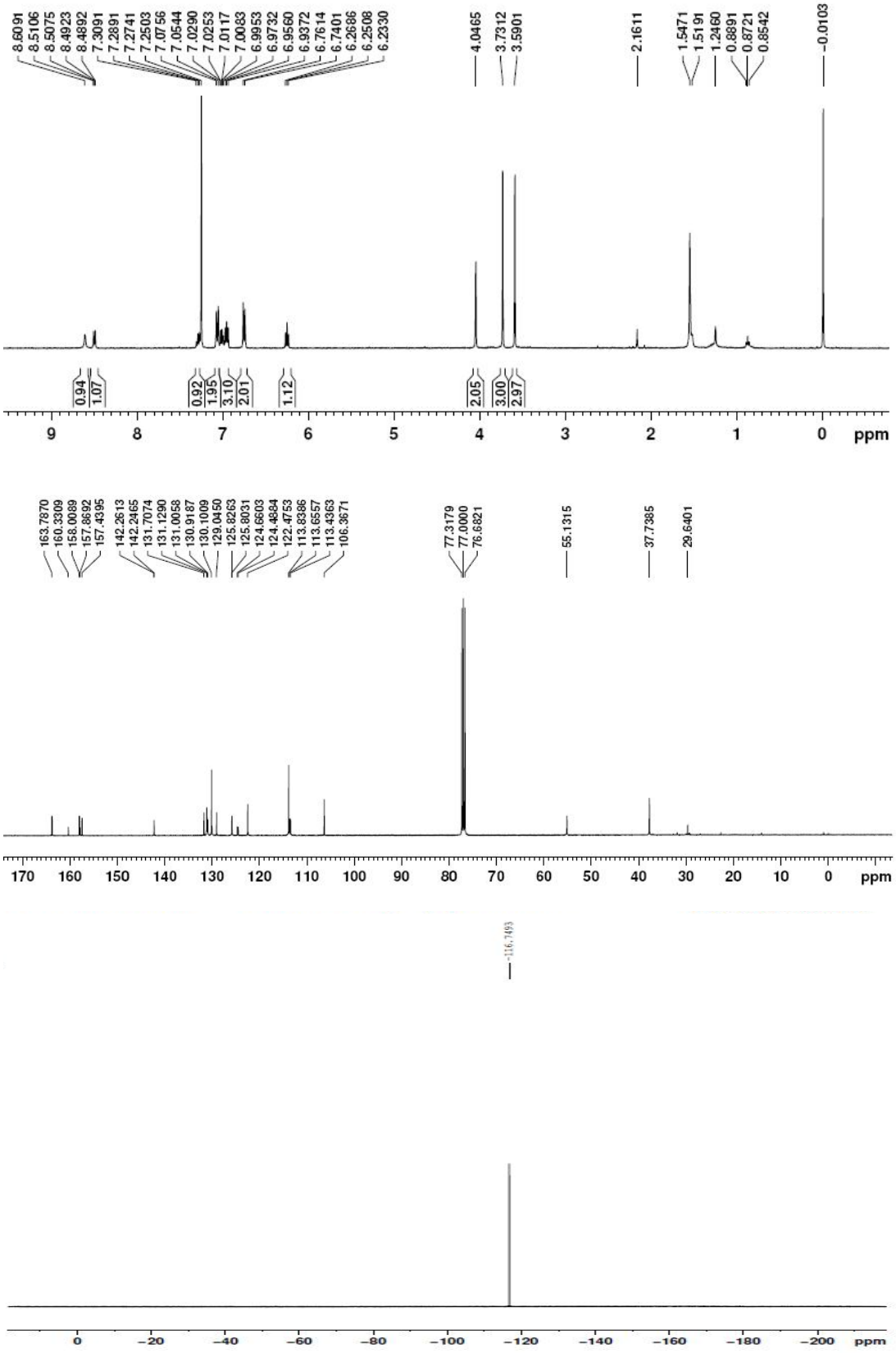
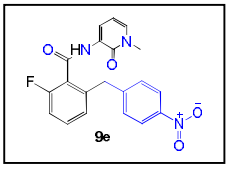
-140
-160
-180
-200
ppm

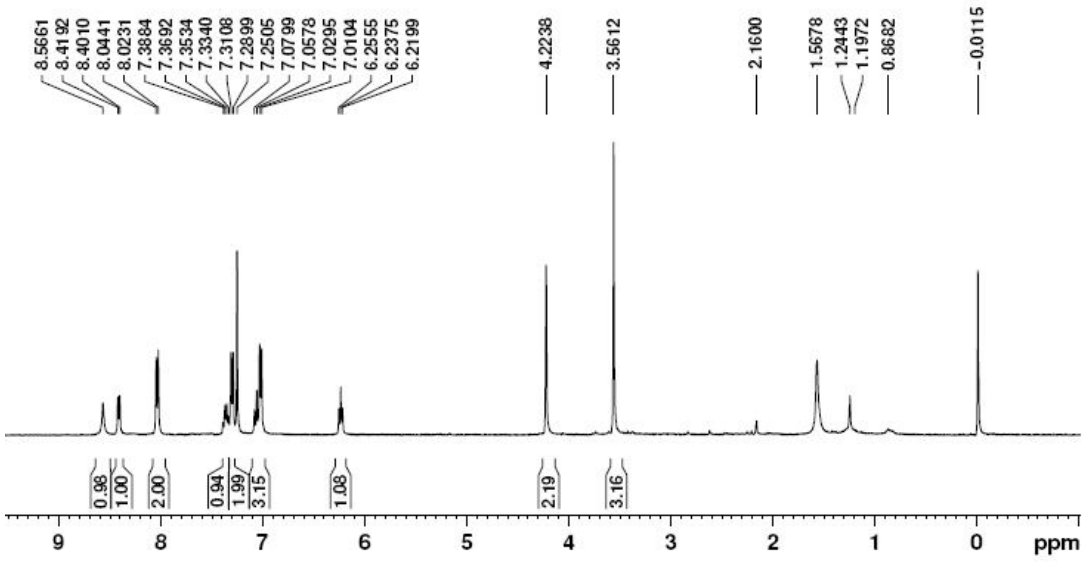

O
HN
N
O
F
O
9d

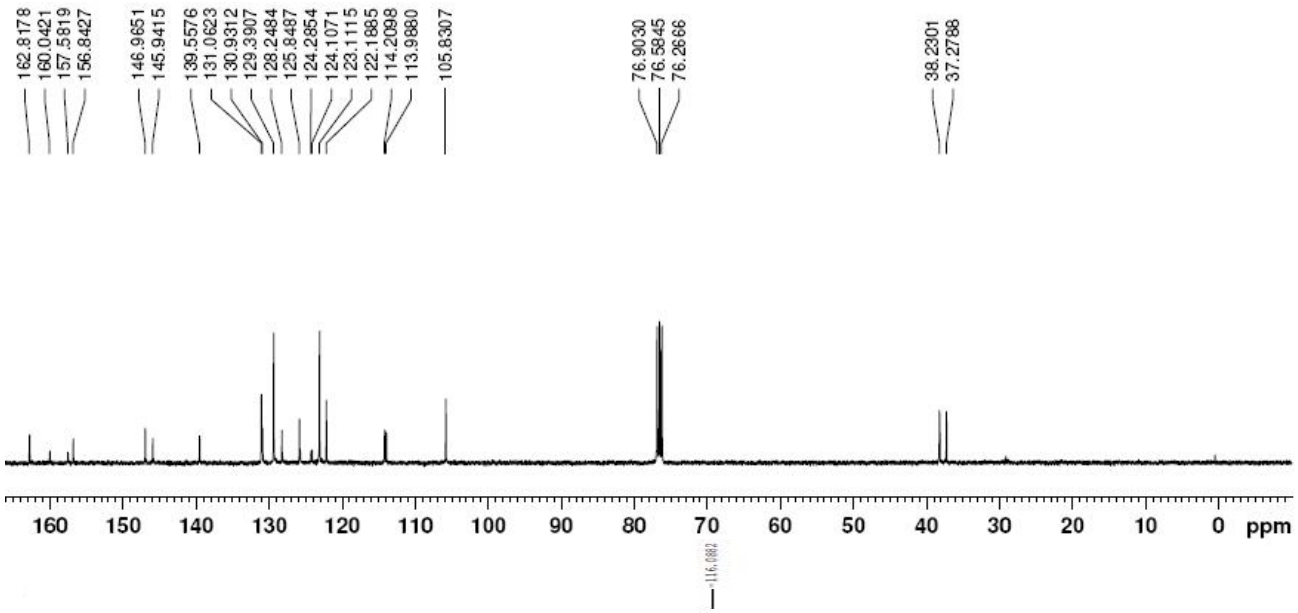
^{1}H, ^{13}C & ^{19}F NMR of 9d

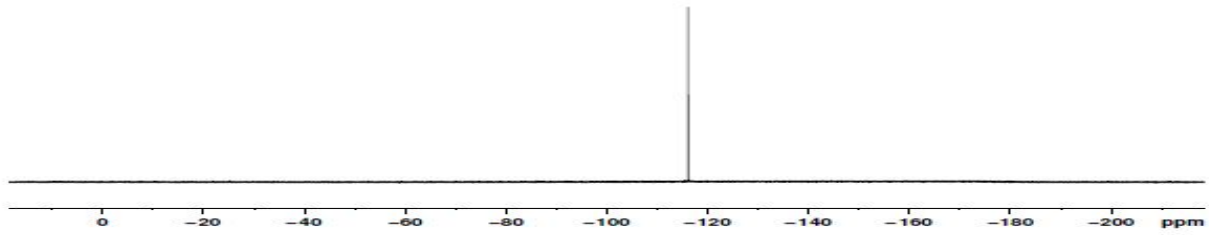


^{1}H, ^{13}C NMR & ^{19}F NMRof 9e

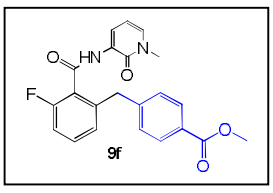


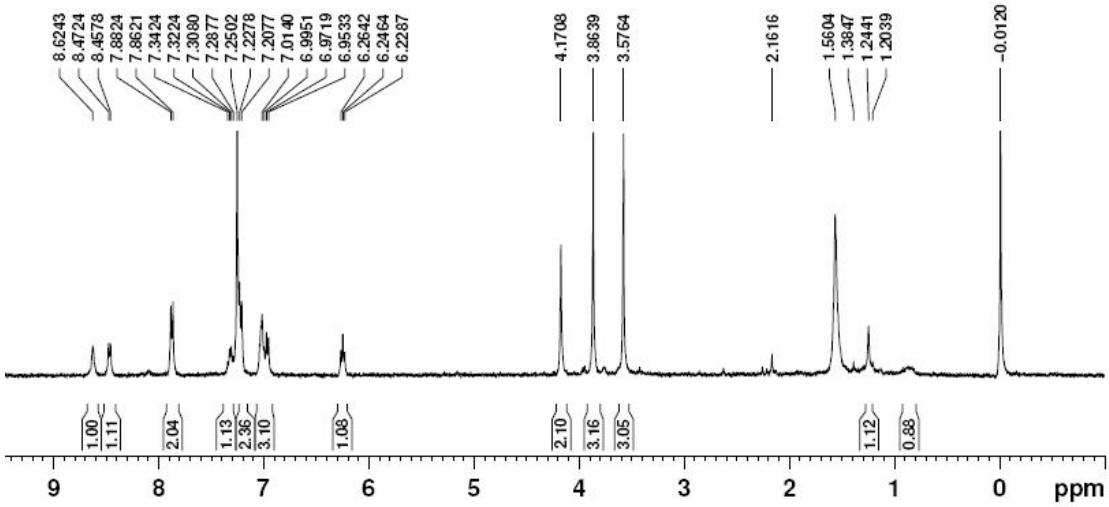


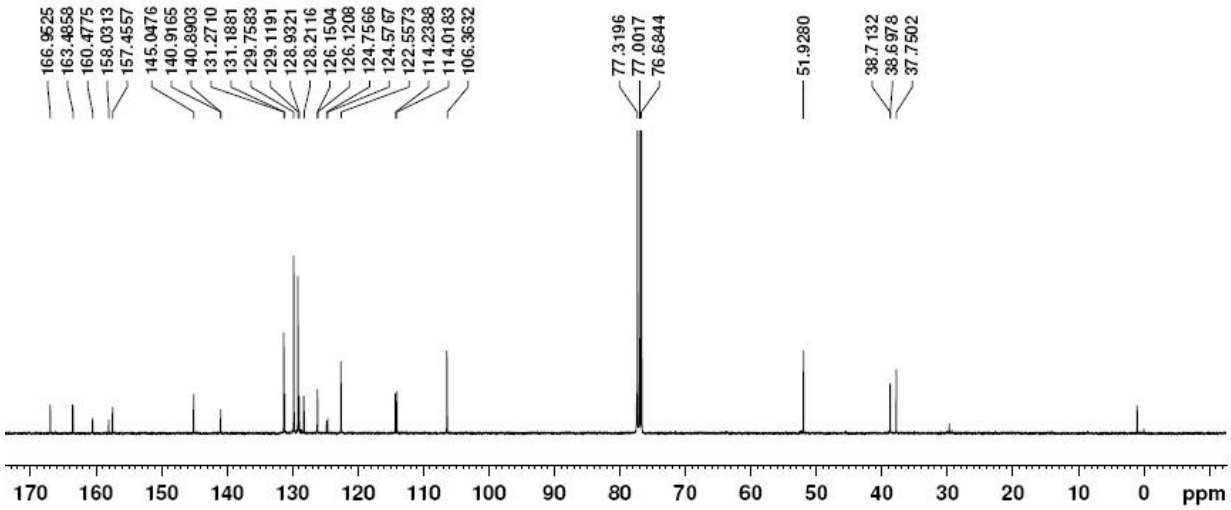


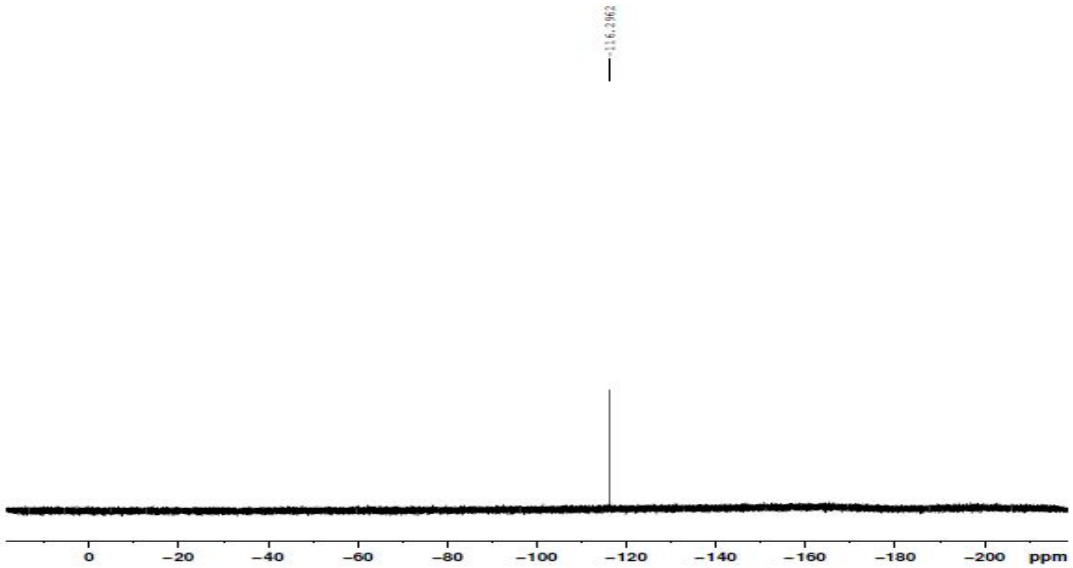


^{1}H, ^{13}C NMR & ^{19}F of 9f

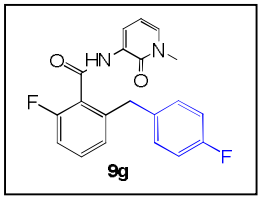


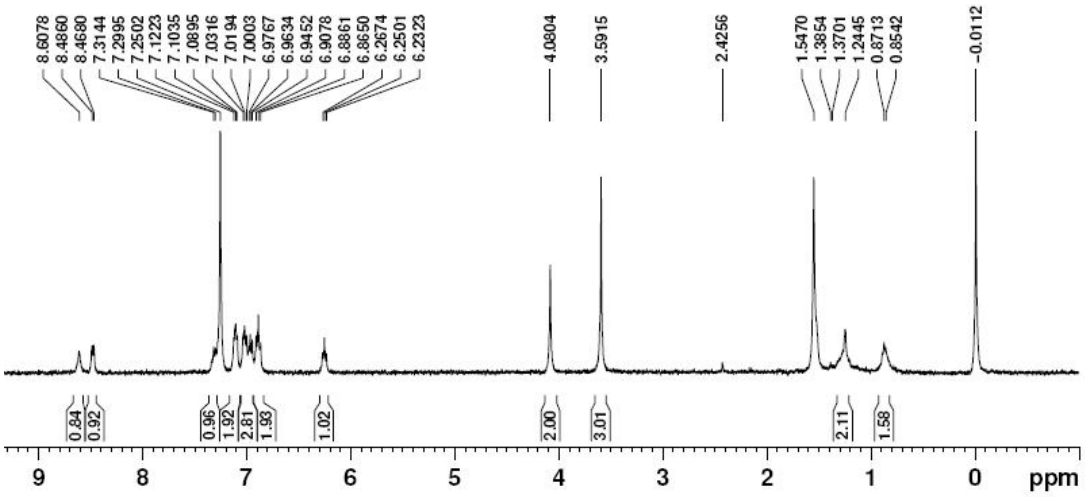


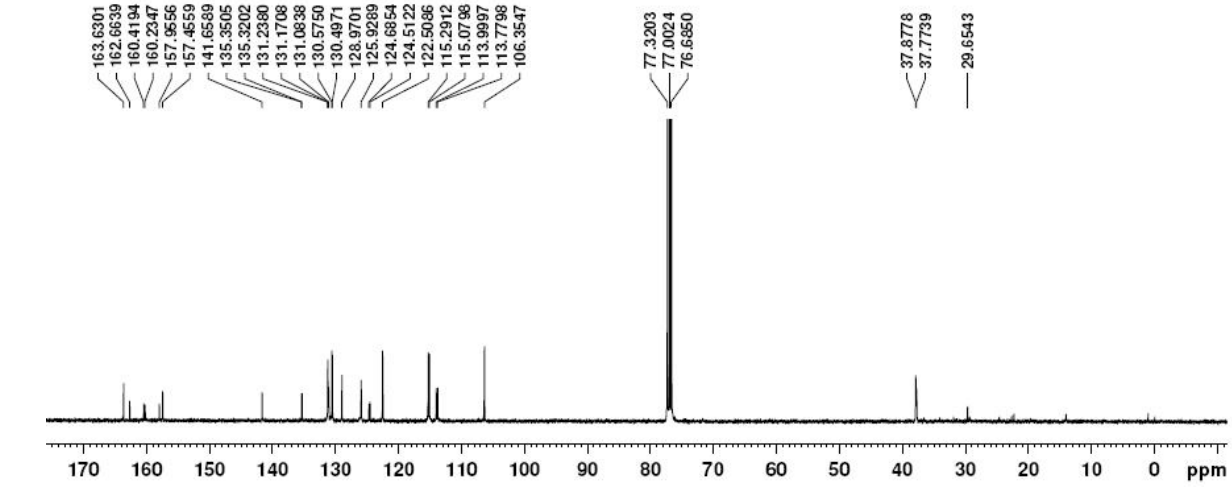


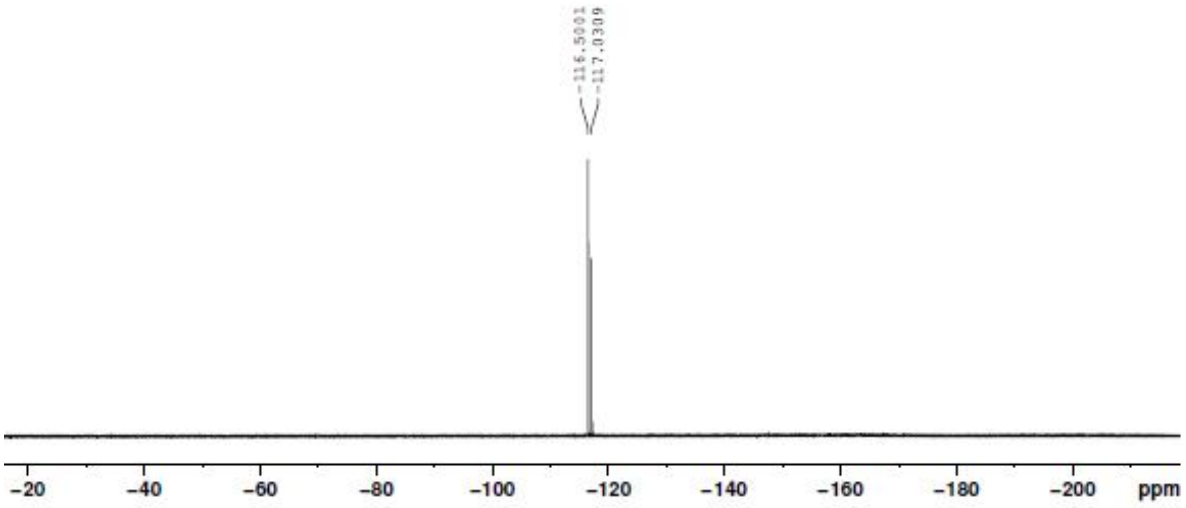


^{1}H, ^{13}C & ^{19}F NMR of 9g

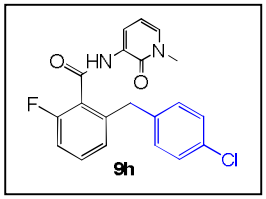


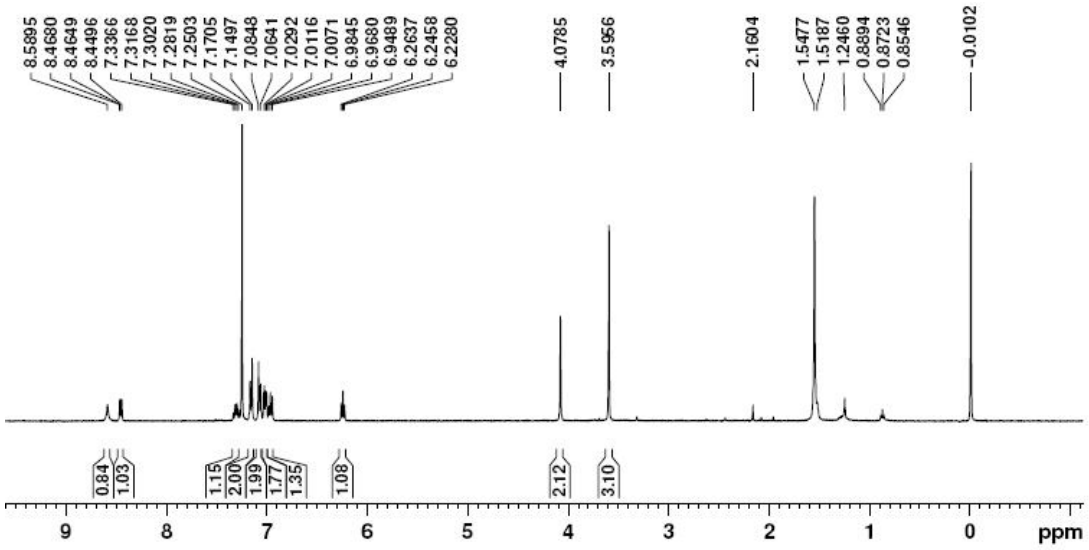


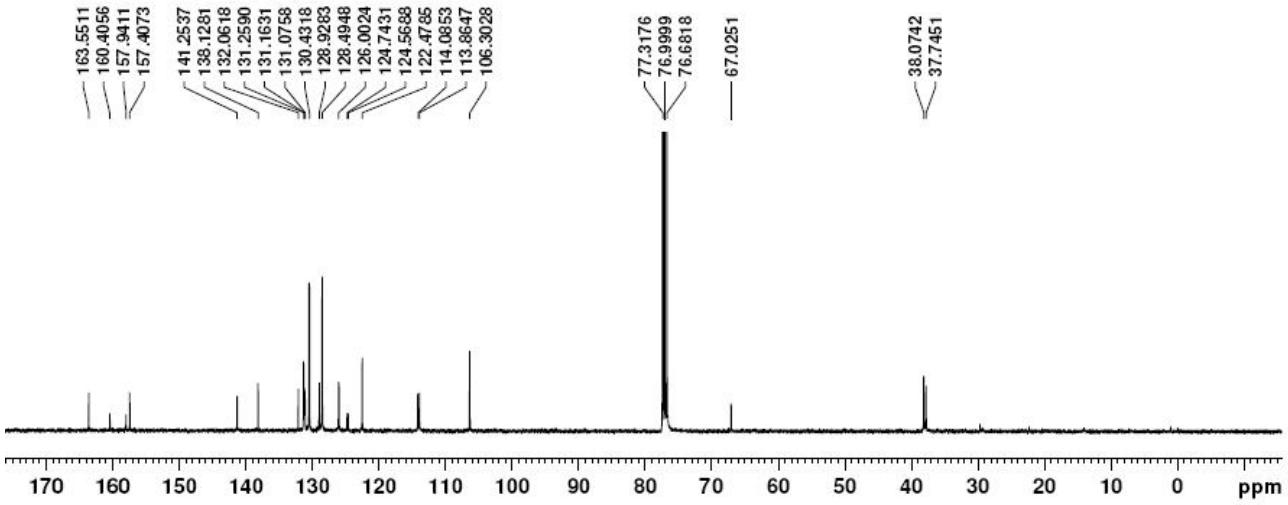


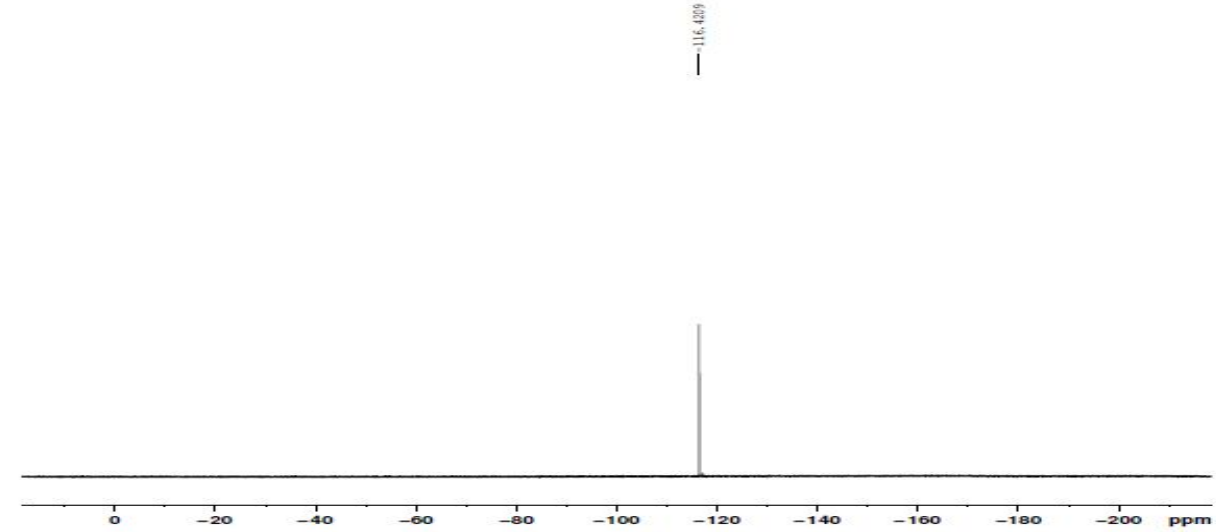


^{1}H , ^{13}C NMR & ^{19}F NMR of 9h

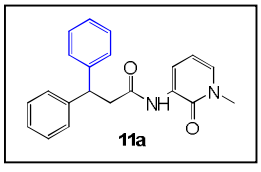


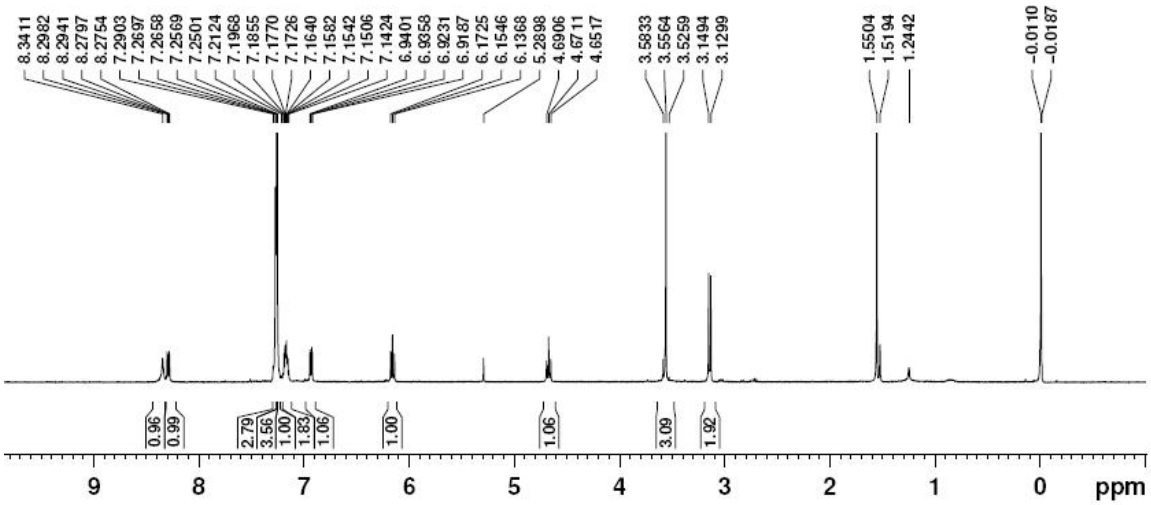


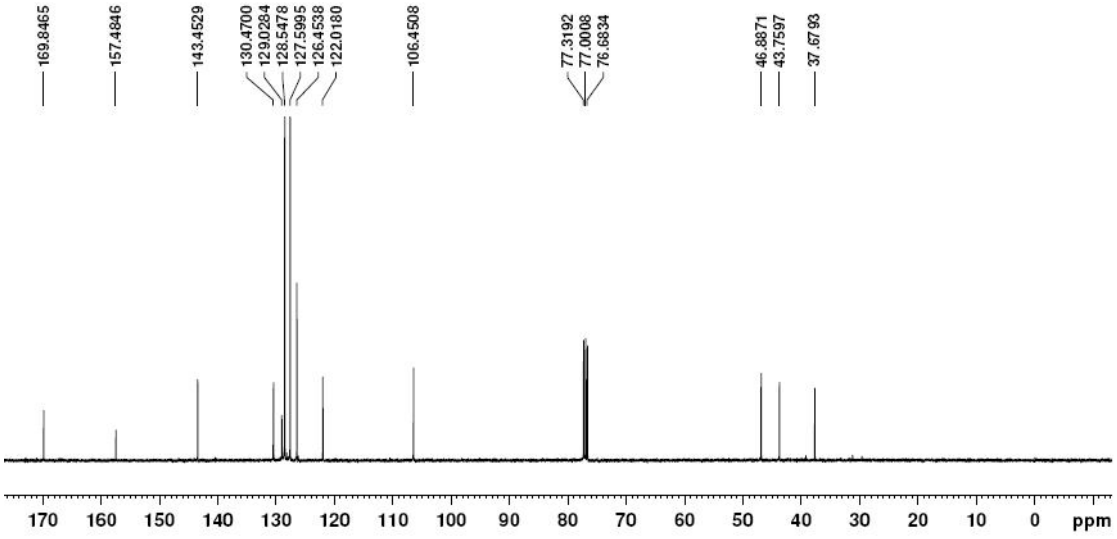




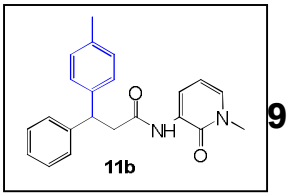
^{1}H & ^{13}C NMR of 11a







^{1}H & ^{13}C NMR of 11b



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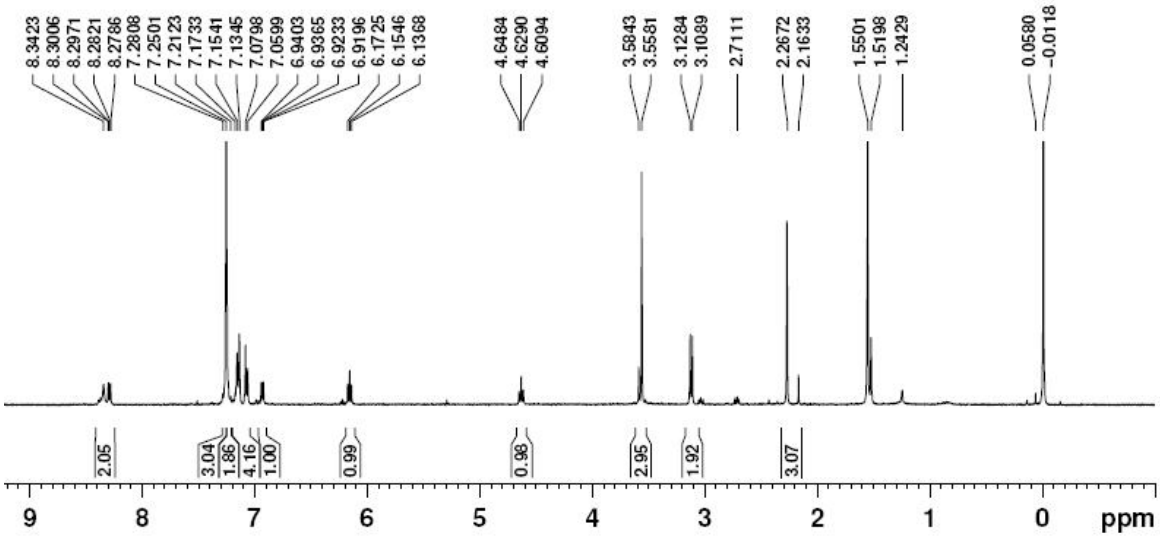
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7.0798
7.0599
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6.9365
6.9233
6.9196
6.1725
6.1546
6.1368
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4.6290
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3.5843
3.5581
3.1284
3.1089
2.7111
2.2672
2.1633
1.5501
1.5198
1.2429
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3.04
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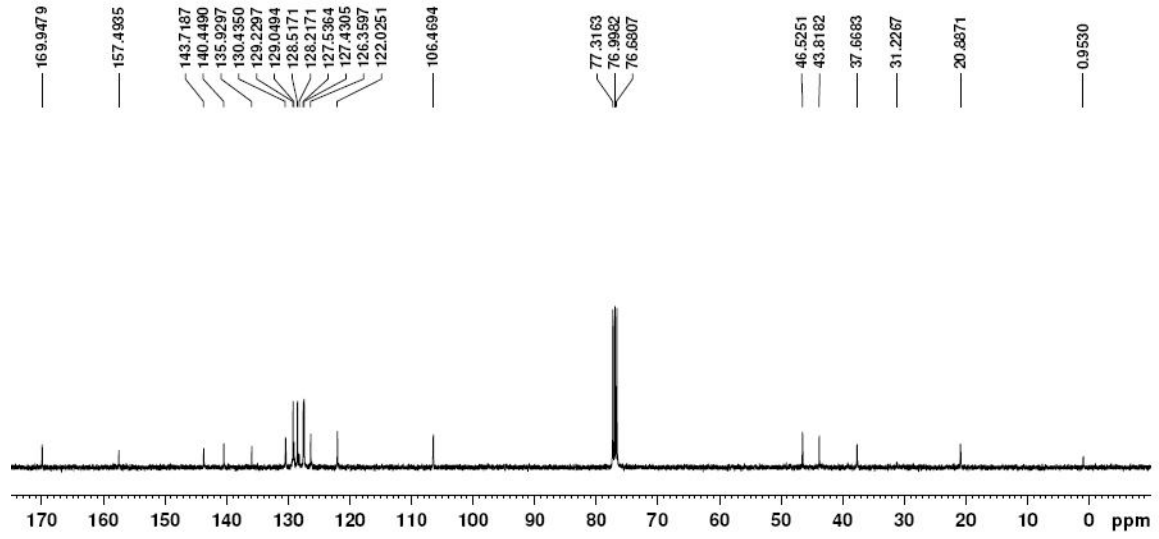
ppm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76.6807
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43.8182
37.6683
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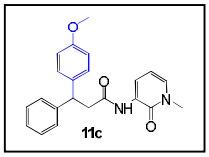
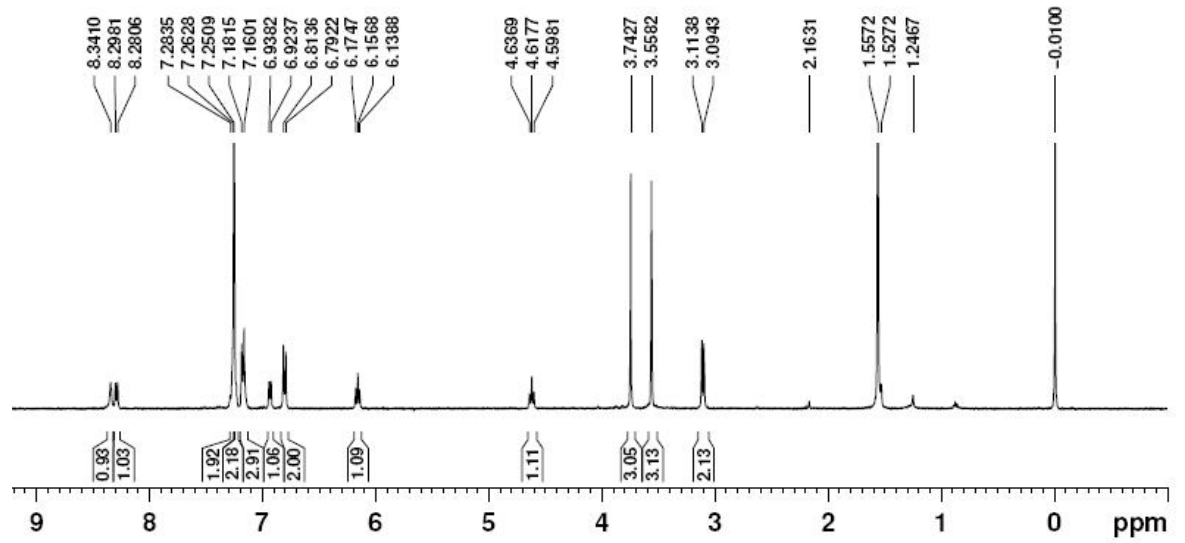
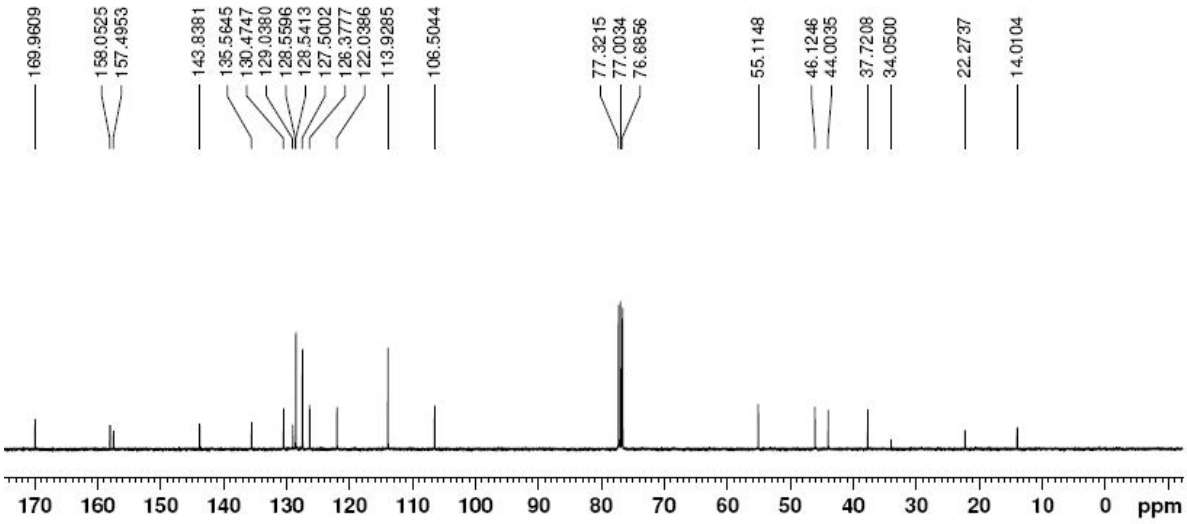
10
0
ppm

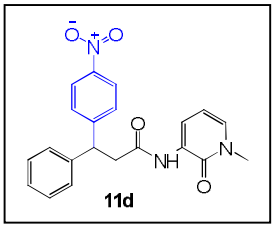
^{1}H & ^{13}C NMR of 11c

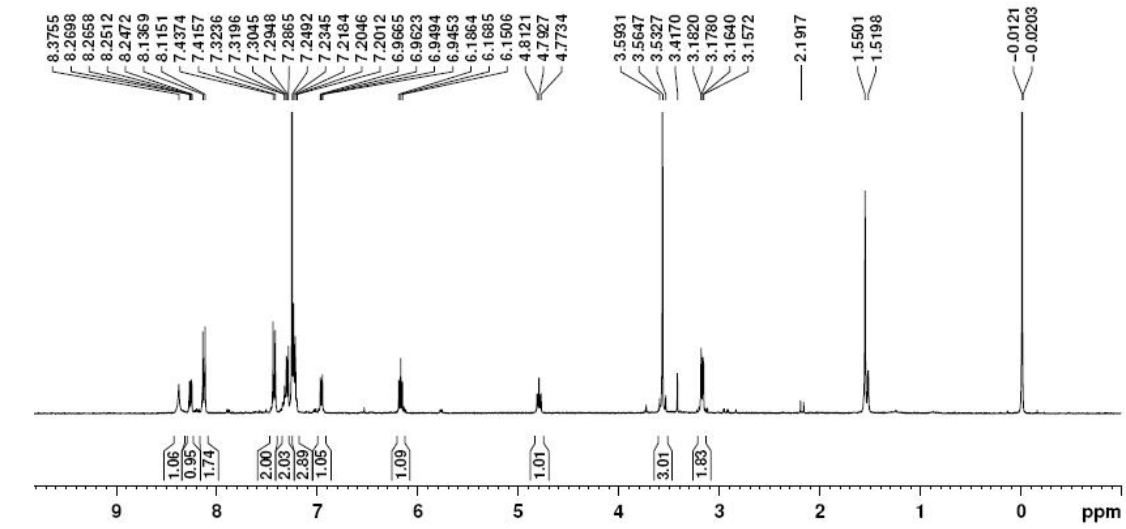


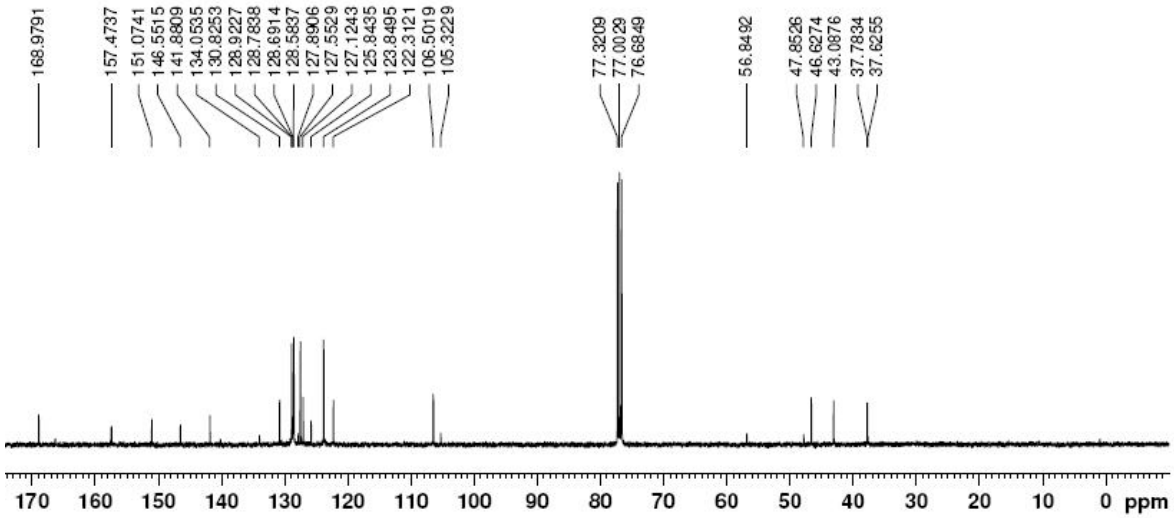




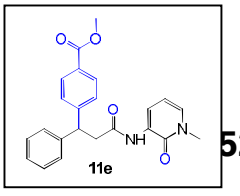
^{1}H & ^{13}C NMR of 11d

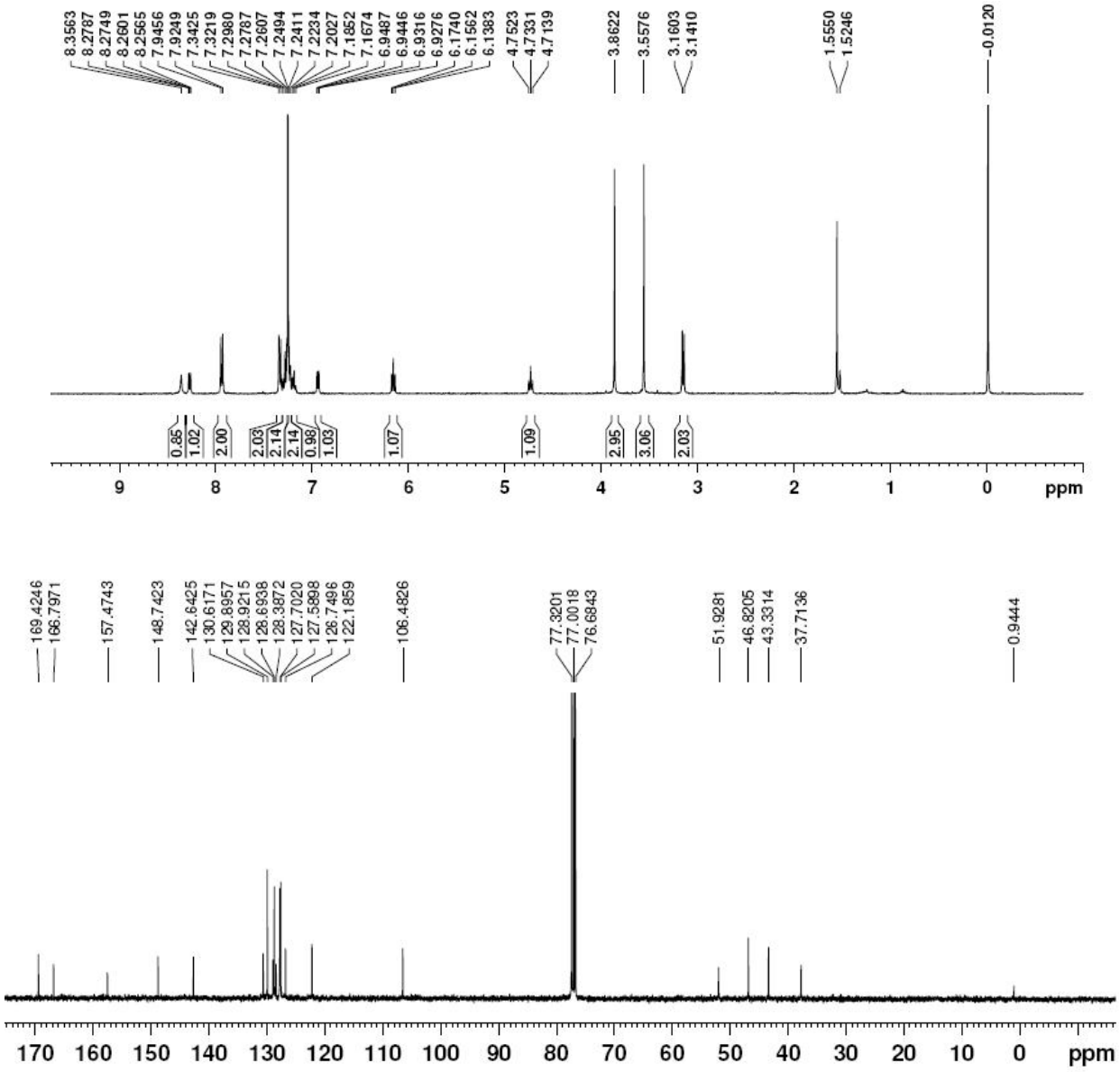




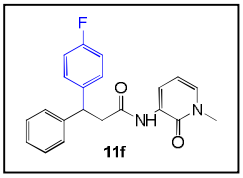


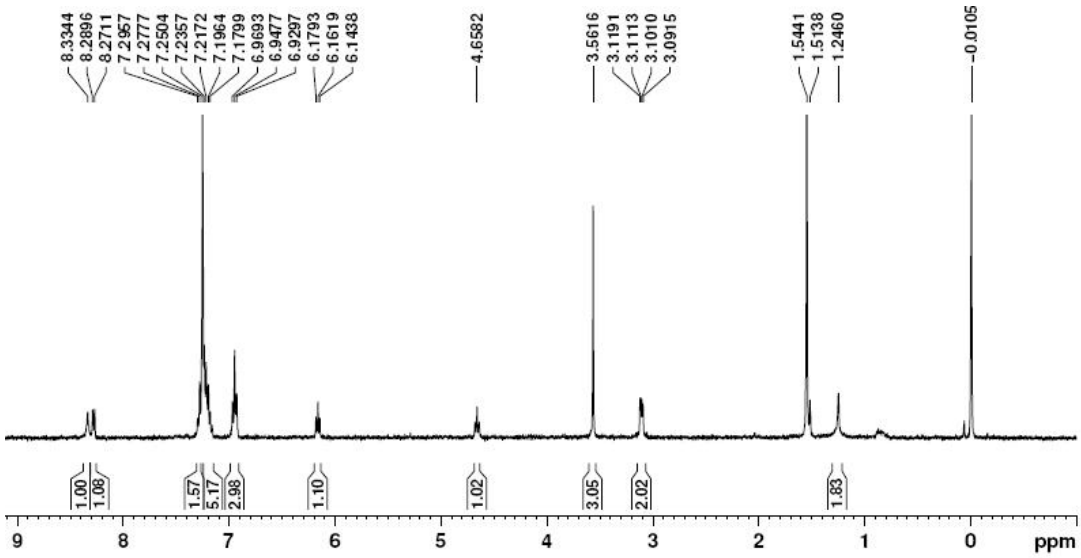
^{1}H & ^{13}C NMR of 11e





^{1}H, ^{13}C & ^{19}F NMR of 11f

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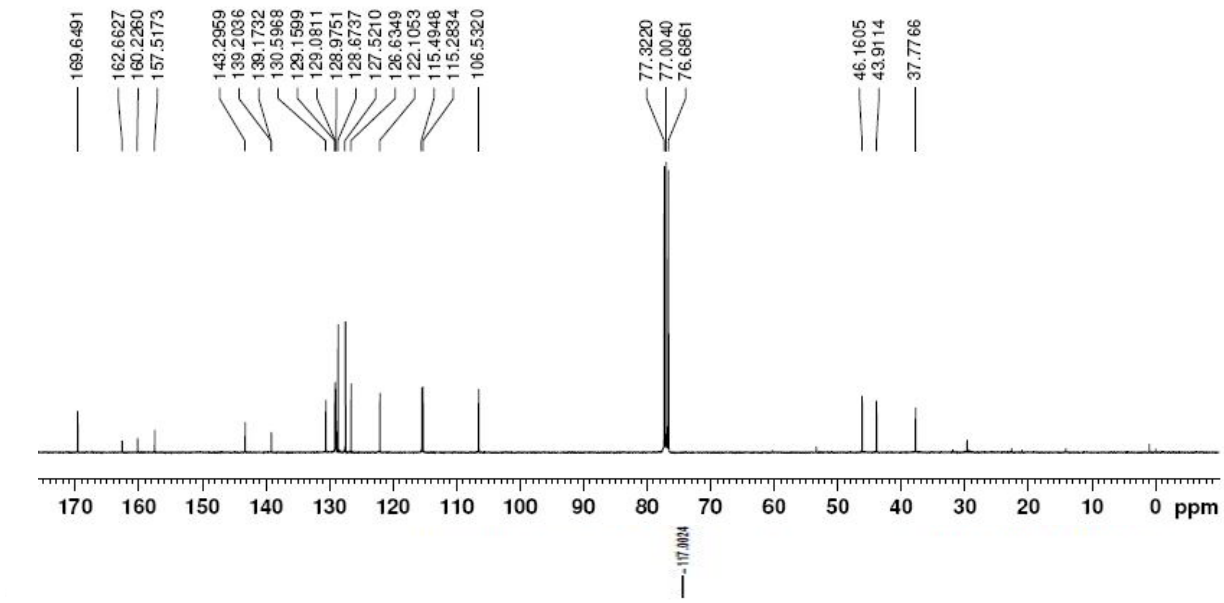
8.2896
8.2711
7.2957
7.2777
7.2504
7.2357
7.2172
7.1964
7.1799
6.9693
6.9477
6.9297
6.1793
6.1619
6.1438
4.6582
3.5616
3.1191
3.1113
3.1010
3.0915
1.5441
1.5138
1.2460
-0.0105
1.00
1.08
1.57
5.17
2.98
1.10
1.02
3.05
2.02
1.83
9
8
7
6
5
4
3
2
1
0
ppm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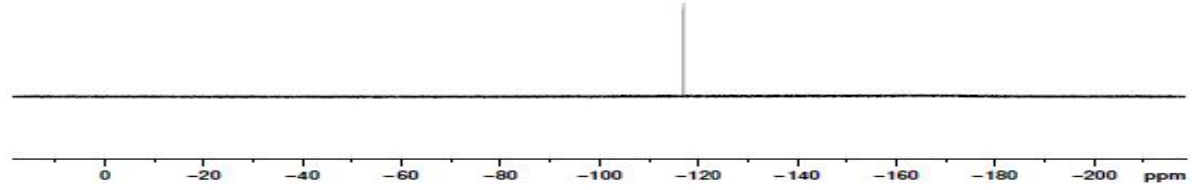
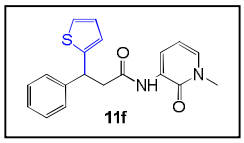
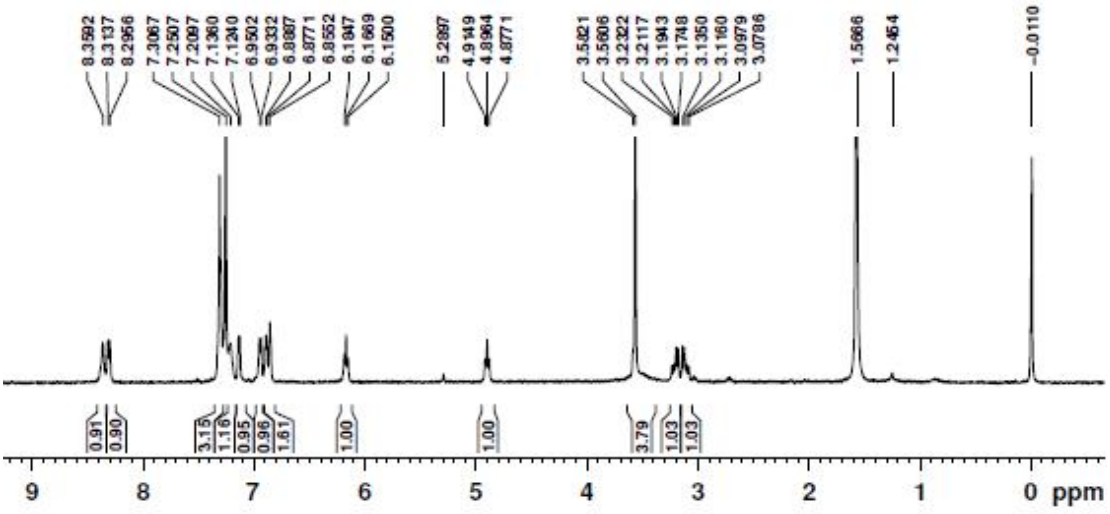
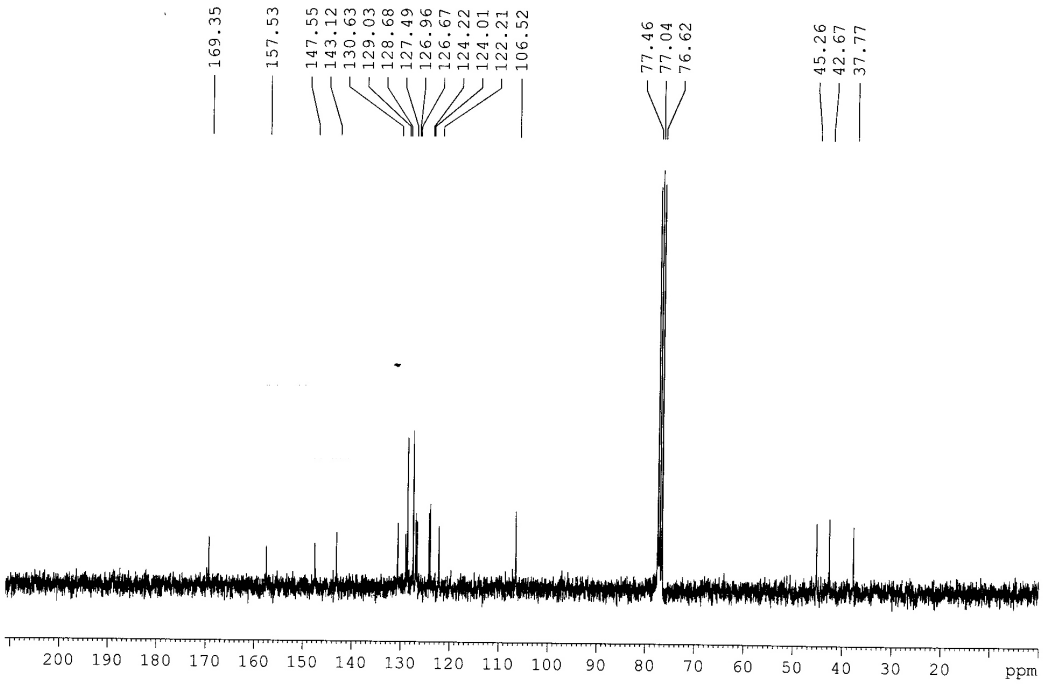
162.6627
160.2260
157.5173
143.2959
139.2036
139.1732
130.5968
129.1599
129.0811
128.9751
128.6737
127.5210
126.6349
122.1053
115.4948
115.2834
106.5320
77.3220
77.0040
76.6861
46.1605
43.9114
37.7766
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
ppm


-117.0024
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
ppm

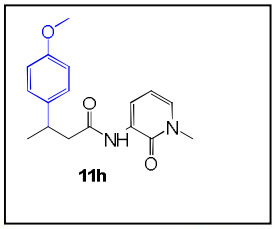
^{1}H & ^{13}C NMR of 11g

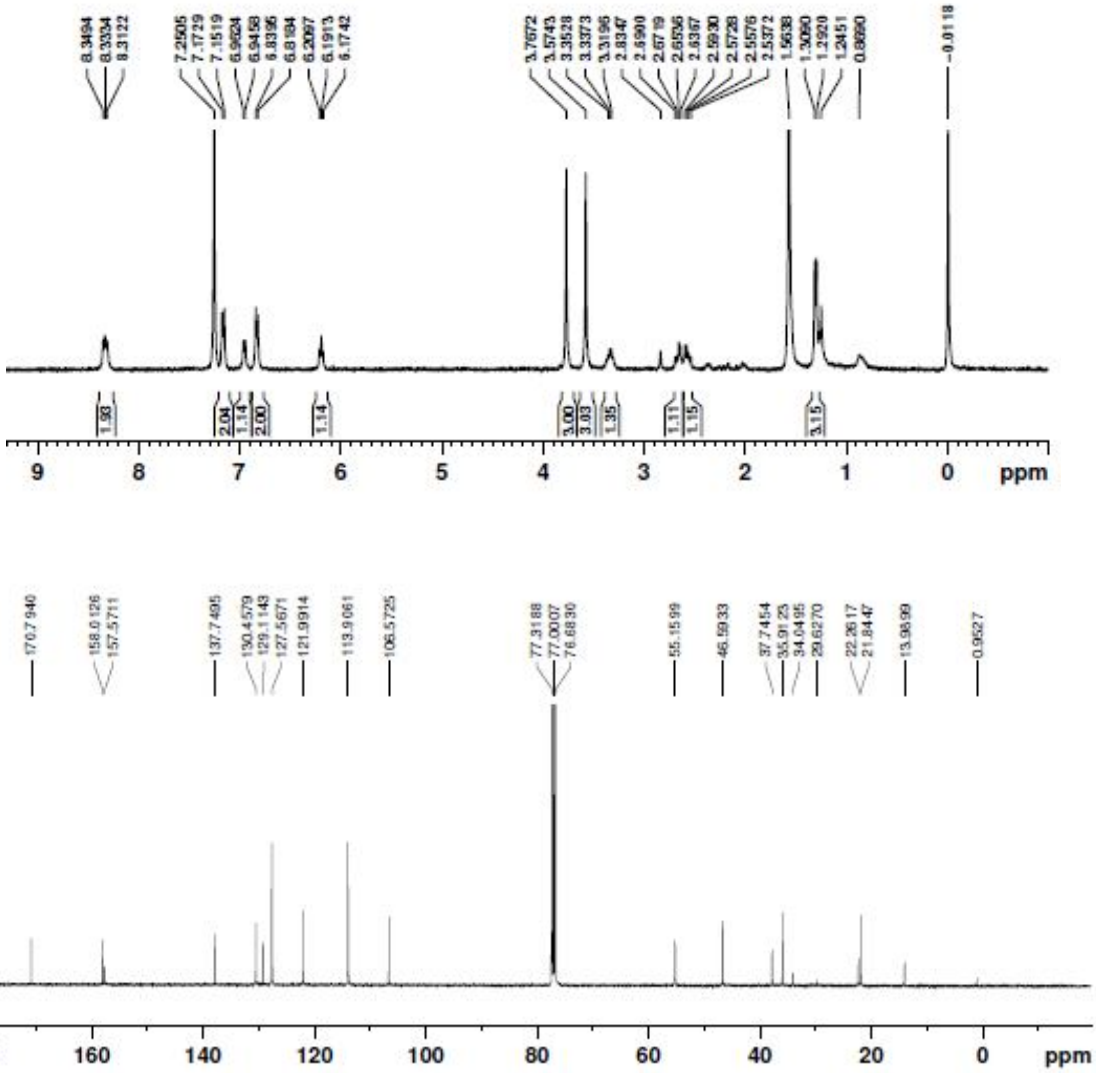




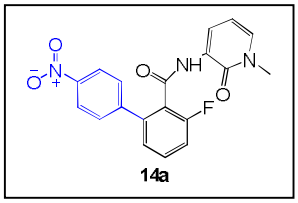


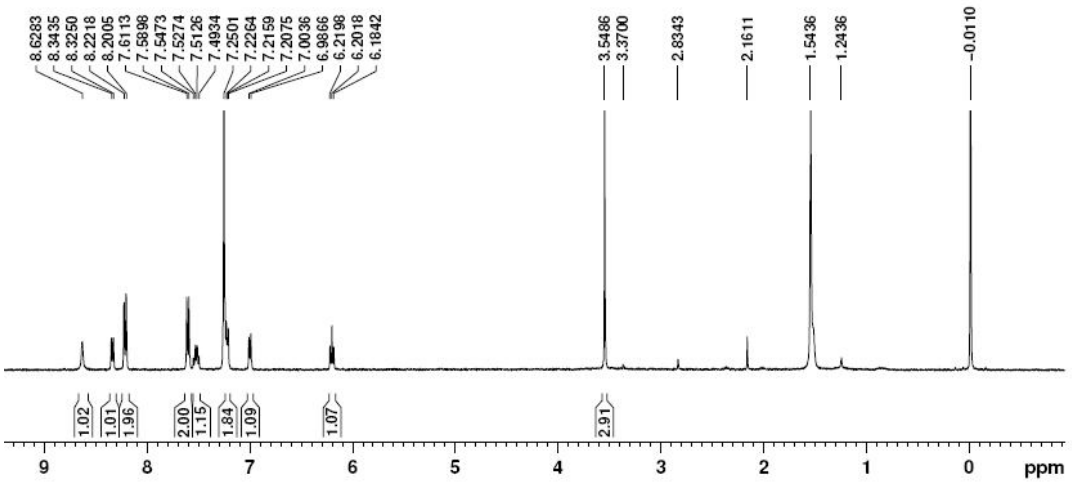
^{1}H & ^{13}C NMR of 11h

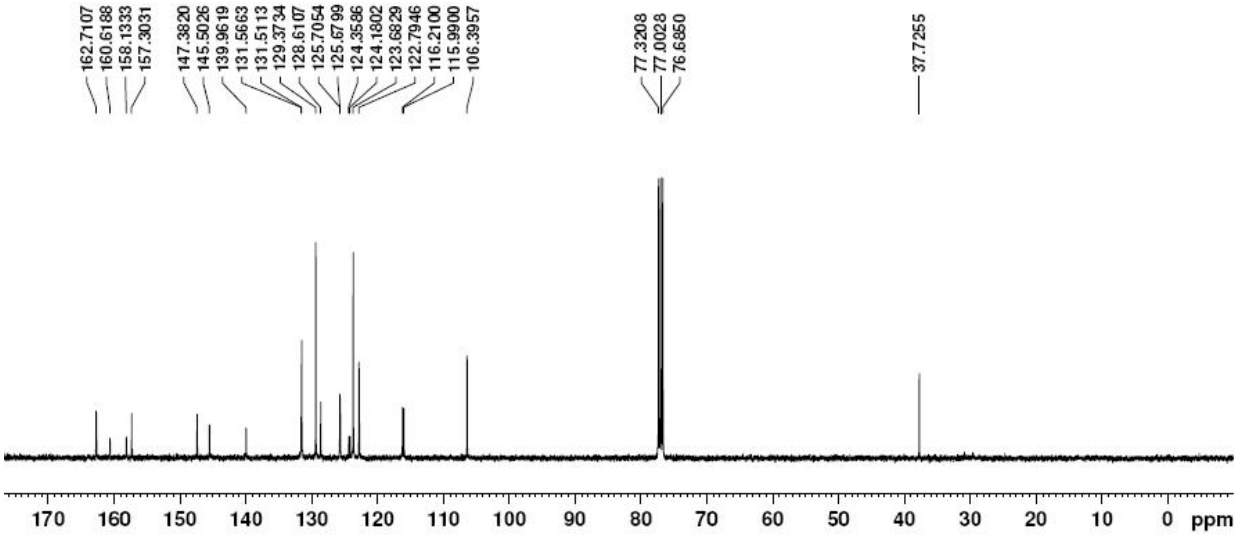


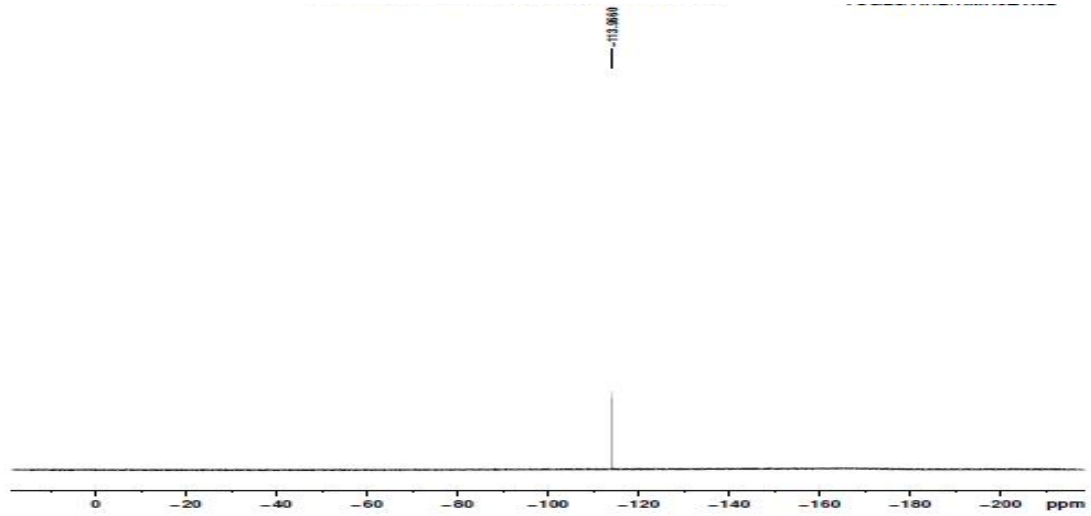


^{1}H, ^{13}C NMR and ^{19}F of 14a

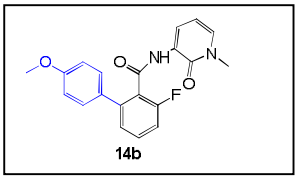


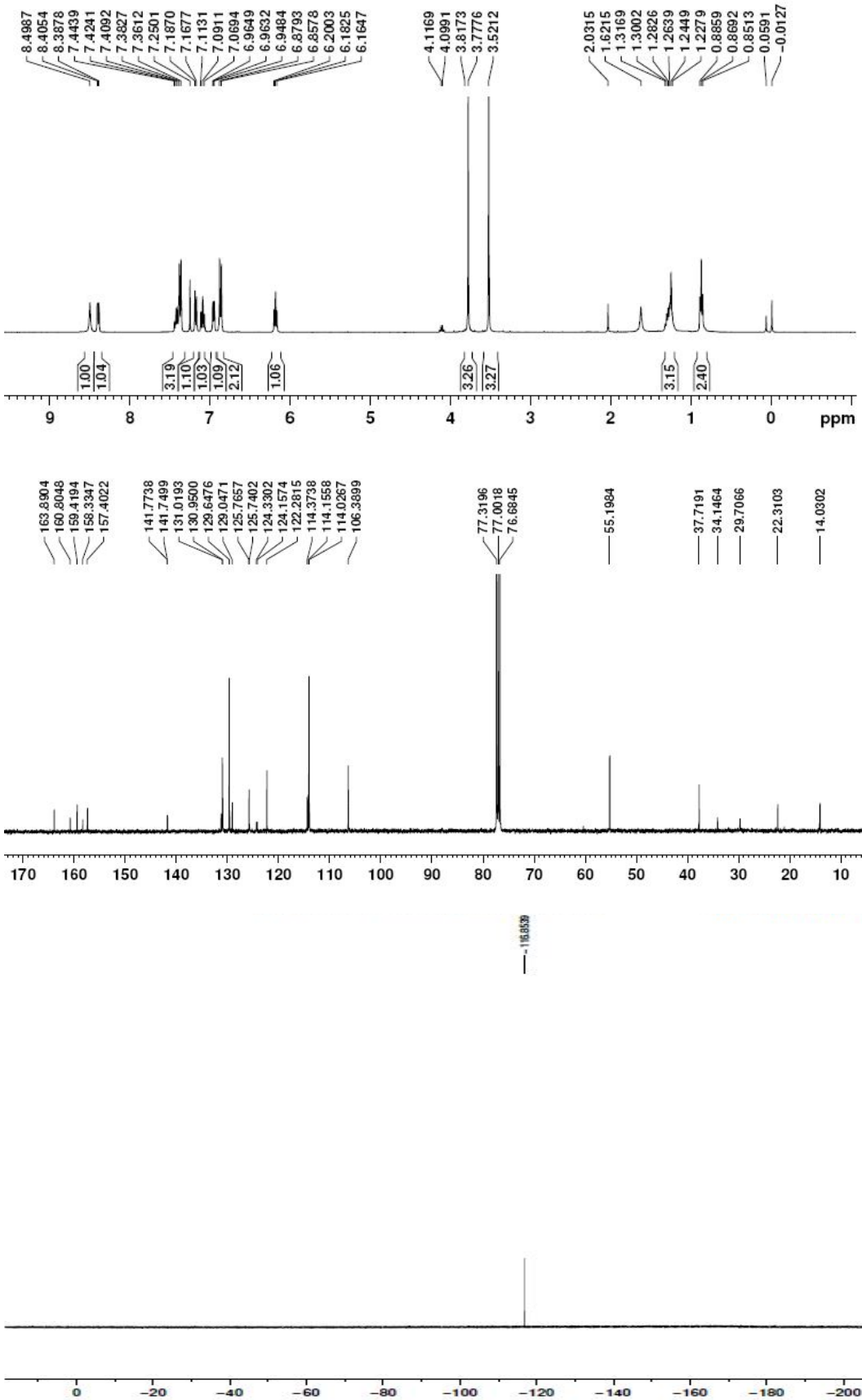




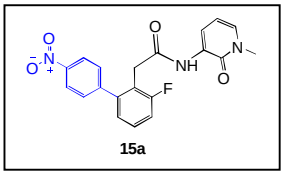


^{1}H , ^{13}C & ^{19}F NMR of 14b

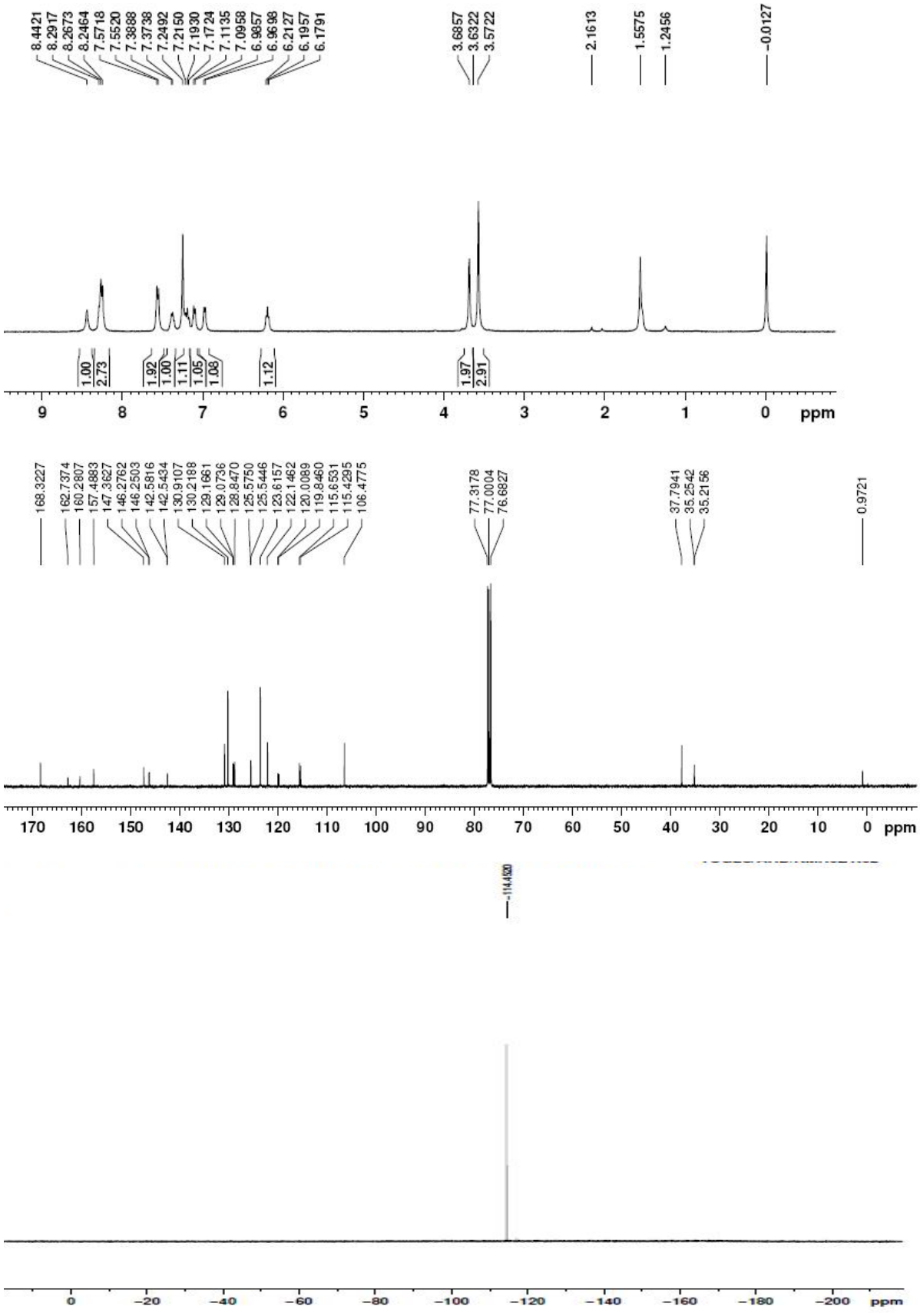




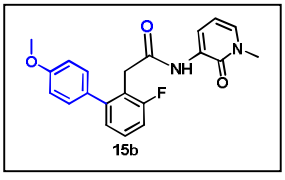
^{1}H, ^{13}C& ^{19}F NMR of 15a

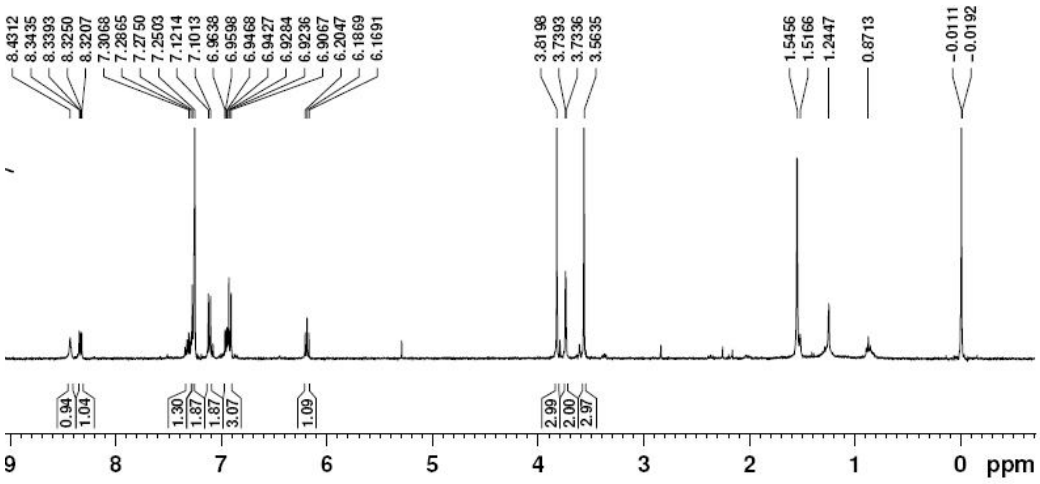


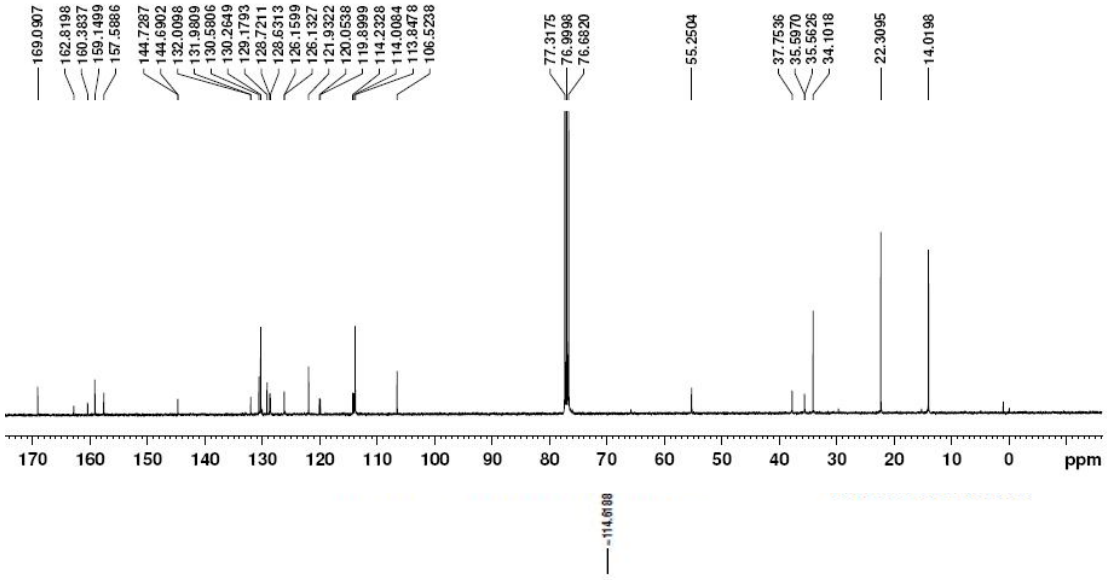
15a

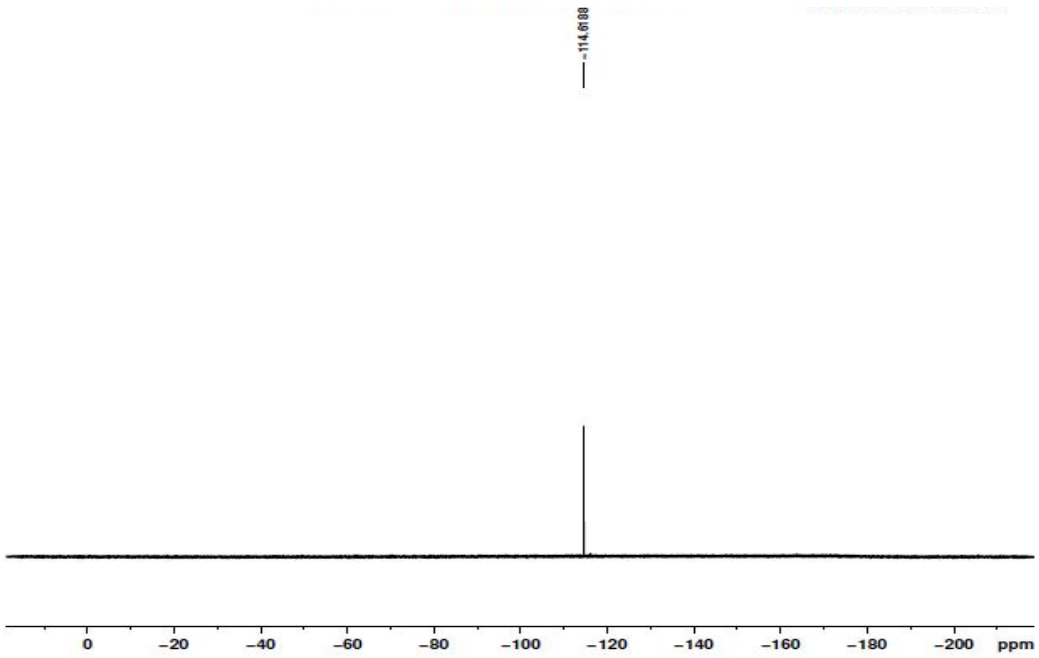


^{1}H, ^{13}C & ^{19}F NMR of 15b

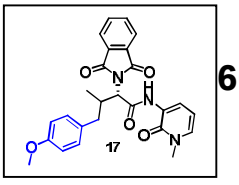




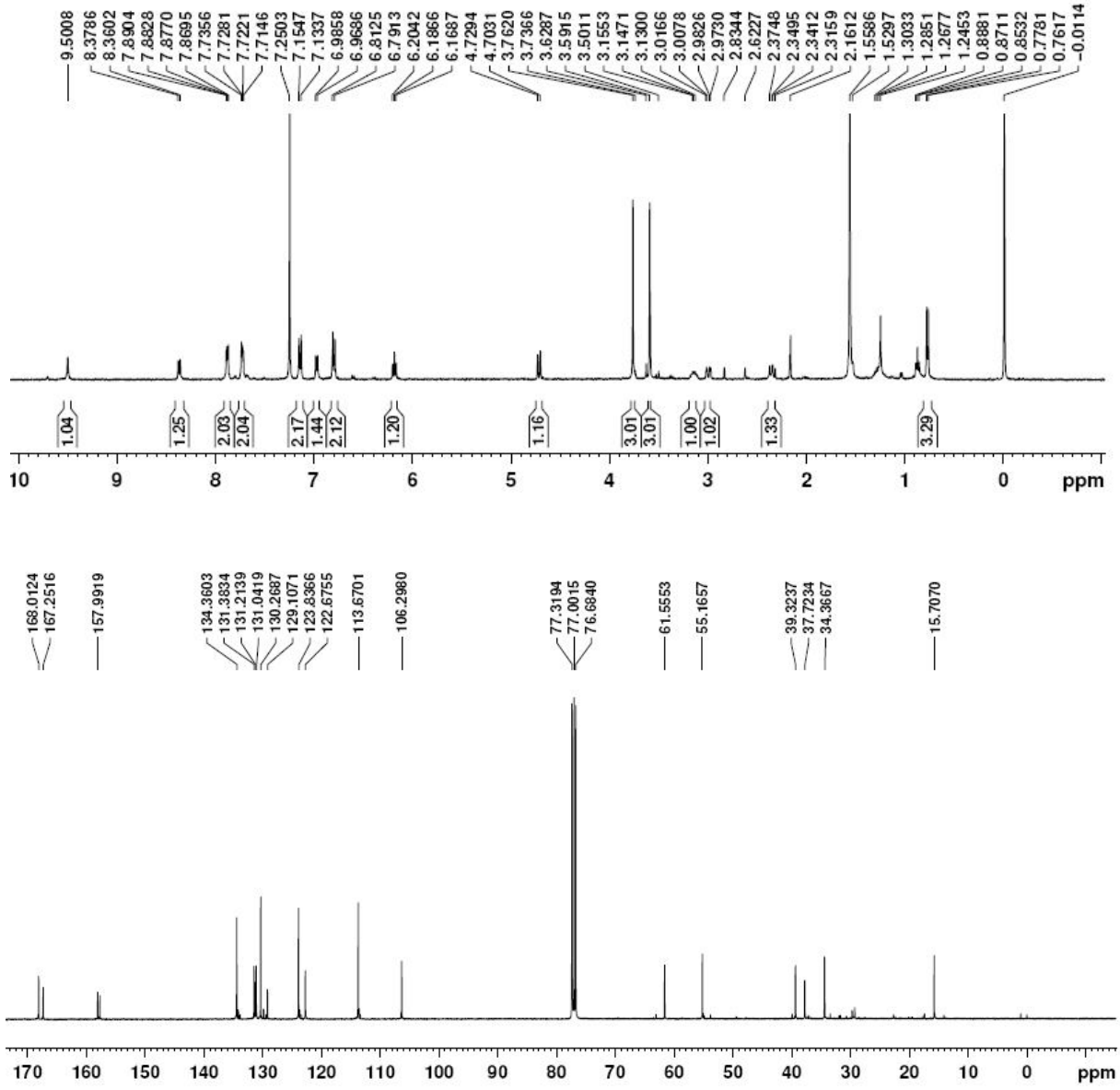




^{1}H & ^{13}C NMR of 17



60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8.3602
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7.8828
7.8770
7.8695
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7.7281
7.7221
7.7146
7.2503
7.1547
7.1337
6.9858
6.9686
6.8125
6.7913
6.2042
6.1866
6.1687
4.7294
4.7031
3.7620
3.7366
3.6287
3.5915
3.5011
3.1553
3.1471
3.1300
3.0166
3.0078
2.9826
2.9730
2.8344
2.6227
2.3748
2.3495
2.3412
2.3159
2.1612
1.5586
1.5297
1.3033
1.2851
1.2677
1.2453
0.8881
0.8711
0.8532
0.7781
0.7617
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1.04
1.25
2.03
2.04
2.17
1.44
2.12
1.20
1.16
3.01
3.01
1.00
1.02
1.33
3.29
10
9
8
7
6
5
4
3
2
1
0
ppm
168.0124
167.2516
157.9919
134.3603
131.3834
131.2139
131.0419
130.2687
129.1071
123.8366
122.6755
113.6701
106.2980
77.3194
77.0015
76.6840
61.5553
55.1657
39.3237
37.7234
34.3667
15.7070
170
160
150
140
130
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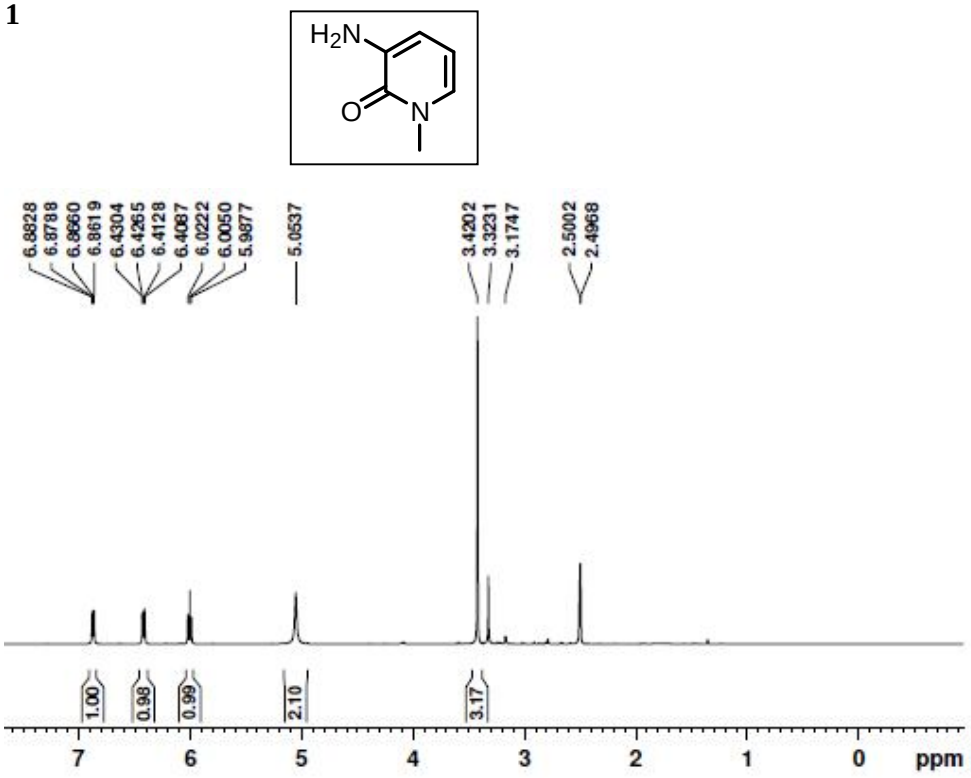
110
100
90
80
70
60
50
40
30
20
10
0
ppm

^{1}H NMR of 1



^{1}H NMR of 18