Supporting information

Cp*Co(III)-Catalyzed Selective Alkylation of C-H Bonds of Arenes and Heteroarenes with α–Diazocarbonyl Compounds

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1) General Comments:

All reactions were carried out in reaction tube under dry nitrogen atmosphere. All diazoesters were synthesized from corresponding esters, according to the literature procedure.[1] All the *N*-pyridyl indole derivatives were synthesized according to the literature procedure.[2] $[Cp^*CoI_2CO]$,[3a] $[Cp^*CoI_2]_2$[3b] and $[Cp^*Co(MeCN)_3](SbF_6)_2$[3c] were synthesized from Co_2CO_8 according to the literature procedure. Dry toluene was prepared by distilling over sodium ketyl and stored over using molecular sieves 4Å under N_2 atmosphere. Column chromatography was performed using silica gel (100-200 mesh) and ethylacetate-hexanes with various percentage of polarity depending on the nature of the substrate as an eluent, unless otherwise specified.

Caution*: Diazo compounds can decompose violently with the loss of nitrogen. Although no problems were faced in the present study, the appropriate precautions should be taken.*

2. Analytical Methods:

NMR data were recorded on 400 and 500 MHz spectrometers. ^{1}Hand ^{13}C NMR spectra were referenced to signals of either deuterated solvents or residual protiated solvents. Infrared spectra were recorded on a Thermo Nicolet iS10 FT spectrometer. HRMS were recorded by electron spry ionization (ESI) method on a Q-TOF Micro with lock spray source.

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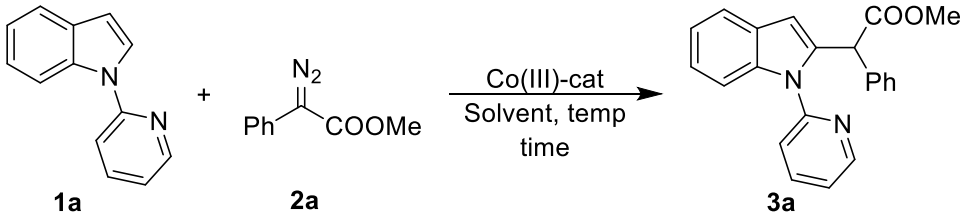
1. Ghorai, J.; Anbarasan, P. *J. Org. Chem.***2015**, *80*, 3455.
2. Ackermann, L.; Lygin, A. V. *Org. Lett.* **2011**, *13*, 3332.
3. a) Sun, B.; Yoshino, T.; Matsunaga, S.; Kanai, M. *Adv. Synth.Catal*. **2014**, *356*, 1491.; b) Sun, B.; Yoshino, T.; Matsunaga, S.; Kanai, M. *Chem. Commun.* **2015**, *51*, 4659; C) Yu, D.-G.; Gensch, T.; Azambuja, F.; Vásquez-Céspedes, S.; and Glorius, F. *J. Am. Chem. Soc*. **2014**, *136*, 17722

3.1. Cp*Co(III)-Catalyzed Selective Alkylation of Indoles 1a: Optimization

One oven dried Schlenk tube was charged with *N*-pyridyl indole **1a** (50 mg, 0.25 mmol, 1 equiv), diazo compound **2a** (0.31 mmol, 1.2 equiv) and Cp*Co(III)–catalyst (y mol%). The inner atmosphere was made inert through repeated (thrice) evacuation and refilled with nitrogen. Dry solvent (1.5 mL) was added to the reaction mixture and the reaction mixture stirred at same temperature throughout a mentioned time period. After completion of the reaction (monitored by TLC) the reaction mixture was cooled to room temperature and passes through a pad of celite, and concentrated to get the crude product. The crude product was purified by column chromatography through silica gel to afford the expected product **3a**.



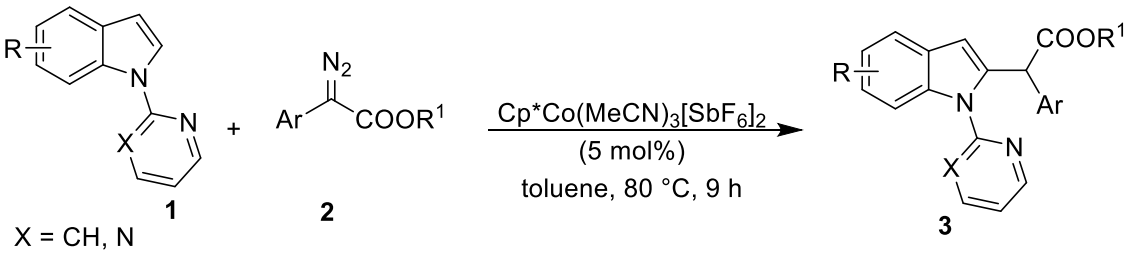
1a **2a** **3a**

Entry	Catalyst (y mol %)	Solvent	Temp. (℃)	Time (h)	Conv. 1a (%)	Yield (%)[a]
1	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	120	6	73	61
2	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	100	6	89	70
3	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	80	9	100	86
4	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	60	12	93	77
5	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	30	24	0	0
6	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (3)	Toluene	80	9	83	52
7	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	$PhCF_3$	80	9	95	84
8	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	DCE	80	9	100	59
9	$[Cp^*CoI_2CO]$ (5)	Toluene	80	12	79	61
10	$[Cp^*CoI_2]_2$ (5)	Toluene	80	12	67	52
11	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (7.5)	Toluene	80	8	100	86

12	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	THF	80	9	91	73
13	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	PhCl	80	9	85	69
14	Co(acac)3	Toluene	80	14	41	23
15	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	MeCN	80	9	91	59
16[b]	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	80	9	96	85
17[c]	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	80	9	100	88
18[d]	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	80	9	94	80
19	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	70	11	100	84
20	$[Cp^*Co(MeCN)_3][SbF_6]_2$ (5)	Toluene	90	8	100	80

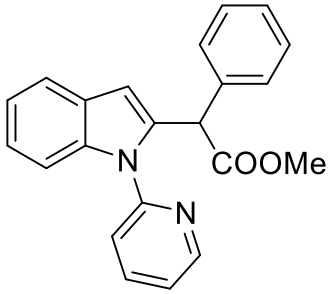
Reaction conditions: **1a** (0.25 mmol, 1 equiv), **2a** (0.31 mmol, 1.2 equiv), $[Cp^*Co(MeCN)_3][SbF_6]_2$ (5 mol%), solvent (1.5 mL for 0.25 mmol), temp, Time. [a] all are isolated yields. [b] diazoester was added slowly over a period of 30 minuets, [c] 1.5 equiv of diazoester was used, [d] 1.0 equiv. of diazoester was used.

3.2. Typical procedure of Cp*Co(III)-catalyzed selective alkylation of indoles:



One dry reaction tube was charged with *N*-pyridyl indole **1** (0.25 mmol, 1 equiv), diazo compound **2** (0.31 mmol, 1.2 equiv) and $Cp^*Co(MeCN)_3[SbF_6]_2$ (5 mol%). The inner atmosphere was made inert through repeated (thrice) evacuation and refilled with nitrogen. Dry toluene (1.5 mL) was added under nitrogen atmosphere and the reaction tube was sealed with glass stopper and kept in a preheated oil bath at 80 °C and stirred at same temperature for 9 hours. After completion of the reaction, the reaction mixture was cooled to room temperature and passes through a pad of celite, concentrated to get the crude product. The crude product was purified by column chromatography to afford the C-2 alkyl indole **3**.

3.2.1. Methyl 2-phenyl-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3a):



Yield: 86 %; colourless liquid; *Rf*= 0.55 in 2:3 EtOAc/Hexane.

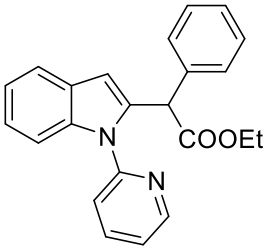
IR (ν_{max}, cm^{-1}): 2933, 1739, 1654, 1481, 1459, 1273, 912, 658.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.60 (d, *J* = 3.2 Hz, 1H, ArH), 7.78 (t, *J* = 7.5 Hz, 1H, ArH), 7.56 (d, *J* = 7.2 Hz, 1H, ArH), 7.32 (d, *J* = 7.8 Hz, 2H, ArH), 7.24–7.11 (m, 8H, ArH), 6.44 (s, 1H, ArH), 5.63 (s, 1H, CH), 3.60 (s, 3H, CH_3),

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.9, 151.3, 149.4, 138.4, 138.1, 137.3, 136.8, 129.0, 128.6, 128.1, 127.7, 122.7, 122.0, 121.0, 120.9, 110.1, 105.6, 52.4, 50.7.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{23}H_{20}N_2NaO_3$, 365.1266, found 365.1264.

3.2.2. Ethyl 2-phenyl-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate(3b):



Yield: 82 %; colourless liquid; *Rf*= 0.55 in 2:3 EtOAc/Hexane.

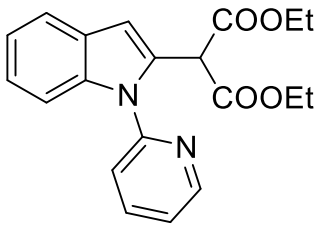
IR (ν_{max}, cm^{-1}): 2921, 1742, 1660, 1472, 1465, 1280, 925, 654.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.60 (d, *J* = 4.7 Hz, 1H, ArH), 7.75 (td, *J* = 7.6, 1.8 Hz, 1H, ArH), 7.55 (d, *J* = 6.1 Hz, 1H, ArH), 7.32–7.29 (m, 2H, ArH), 7.26–7.23 (m, 6H, ArH), 7.15–7.12 (m, 2H, ArH), 6.43 (s, 1H, ArH), 5.62 (s, 1H, CH), 4.06 (q, *J* = 6.9 Hz, 2H, CH_2), 1.13 (t, *J* = 7.0 Hz, 3H, CH_3),

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.4, 151.3, 149.4, 138.3, 138.2, 137.3, 136.9, 129.0, 128.5, 128.1, 127.6, 122.6, 122.0, 121.0, 120.9, 120.9, 110.1, 105.5, 61.3, 50.8, 14.1.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{23}H_{21}N_2O_2$, 357.1603, found 357.1607.

3.2.3. Diethyl 2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)malonate (3c):



Yield: 79 %; colourless liquid; *Rf*= 0.59 in 2:3 EtOAc/Hexane.

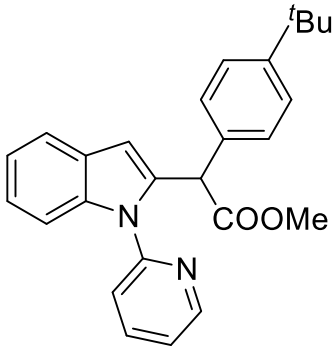
IR (ν_{max}, cm^{-1}): 2958, 1741, 1674, 1469, 1401, 1285, 896, 685.

^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.57–8.55 (m, 1H, ArH), 7.88 (td, *J* = 7.6, 1.9 Hz, 1H, ArH), 7.66–7.63 (m, 1H, ArH), 7.56 (d, *J* = 8.0 Hz, 1H, ArH), 7.45 (d, *J* = 8.0 Hz, 1H, ArH), 7.29–7.25 (m, 1H, ArH), 7.23–7.15 (m, 2H, ArH), 6.80 (s, 1H, ArH), 5.33 (s, 1H, CH), 4.22 (q, *J* = 7.1 Hz, 4H, $2CH_2$), 1.24 (t, *J* = 7.1 Hz, 6H, $2CH_3$).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 167.3, 151.0, 149.3, 138.5, 136.7, 131.8, 128.3, 123.0, 121.8, 121.2, 121.2, 120.2, 110.4, 105.8, 61.9, 52.0, 14.1.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{20}H_{20}N_2O_4Na$, 375.1321, found 375.1323.

3.2.4. Methyl 2-(4-(tert-butyl)phenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3d):



Yield: 83 %; pale yellow liquid; *Rf*= 0.57 in 2:3 EtOAc/Hexane.

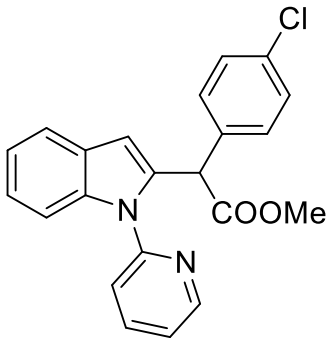
IR (ν_{max}, cm^{-1}): 2935, 1736, 1645, 1484, 1462, 1280, 936, 625.

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.59 (d, *J* = 4.8 Hz, 1H, ArH), 7.76 (td, *J* = 7.8, 1.8 Hz, 1H, ArH), 7.55–7.54 (m, 1H, ArH), 7.34–7.23 (m, 5H, ArH),7.18–7.10 (m, 4H, ArH), 6.43 (s, 1H, ArH), 5.58 (s, 1H, ArH), 3.57 (s, 3H, CH), 1.28 (s, 9H, $3CH_3$)

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 172.0, 151.3, 150.4, 149.4, 138.3, 138.3, 137.2, 133.7, 128.6, 128.1, 125.5, 122.5, 121.9, 121.0, 120.9, 120.8, 110.1, 105.5, 52.2, 50.2, 34.5, 31.3.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{26}H_{27}N_2O_2$, 399.2073, found 399.2083.

3.2.5. Methyl 2-(4-chlorophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3e):



Yield: 84 %; brown liquid; *Rf*= 0.52 in 2:3 EtOAc/Hexane.

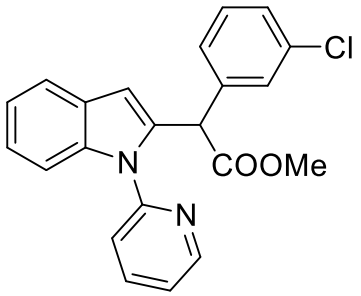
IR (ν_{max}, cm^{-1}): 2936, 1745, 1675, 1460, 1450, 1265, 896, 725, 645.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.51 (dd, *J* = 4.8, 1.8 Hz, 1H, ArH), 7.71 (td, *J* = 7.9, 1.9 Hz, 1H, ArH), 7.51–7.45 (m, 1H, ArH), 7.25–7.07 (m, 6H, ArH), 6.39 (s, 1H, ArH), 5.56 (s, 1H, CH), 3.54 (s, 3H, CH_3)

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.6, 151.1, 149.4, 138.5, 137.4, 137.3, 135.4, 133.6, 130.3, 128.7, 128.0, 122.9, 122.1, 121.1, 121.0, 120.9, 110.2, 105.5, 52.5, 50.0.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{22}H_{18}ClN_2O_2$, 377.1057, found 377.1052.

3.2.6. Methyl 2-(3-chlorophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3f):



Yield: 76 %; yellow liquid; *Rf*= 0.55 in 2:3 EtOAc/Hexane.

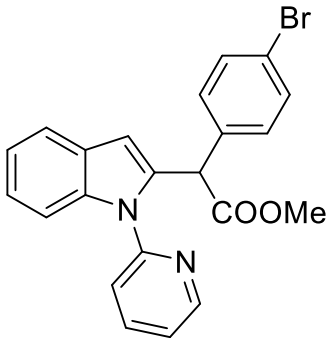
IR (ν_{max}, cm^{-1}): 2954, 1736, 1661, 1468, 1470, 1246, 945, 714, 661.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.61 (d, *J* = 4.8 Hz, 1H, ArH), 7.79 (td, *J* = 7.6, 1.9 Hz, 1H, ArH), 7.61–7.59 (m, 1H, ArH), 7.34–7.27 (m, 3H, ArH), 7.22–7.11 (m, 6H, ArH), 6.51 (s, 1H, ArH), 5.64 (s, 1H, CH), 3.64 (s, 3H, CH_3)

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.3, 151.1, 149.5, 138.8, 138.4, 137.2, 137.2, 134.3, 129.7, 129.1, 128.1, 127.9, 127.2, 122.9, 122.1, 121.1, 121.0, 120.9, 110.2, 105.6, 52.6, 50.2.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{22}H_{18}ClN_2O_2$, 377.1057, found 377.1052.

3.2.7. Methyl 2-(4-bromophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3g):



Yield: 65 %; brown liquid; *Rf*= 0.57 in 2:3 EtOAc/Hexane.

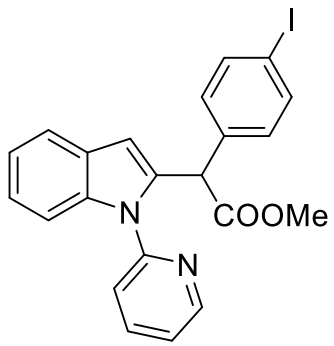
IR (ν_{max}, cm^{-1}): 2931, 1741, 1652, 1481, 1457, 1241, 896, 645, 612.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.61 (d, *J* = 4.8 Hz, 1H, ArH), 7.80 (td, *J* = 7.6, 1.9 Hz, 1H, ArH), 7.61–7.59 (m, 1H, ArH), 7.40–7.35 (m, 4H, ArH), 7.29–7.26 (m, 1H, ArH), 7.19–7.11 (m, 4H, ArH), 6.48 (s, 1H, ArH), 5.65 (s, 1H, CH), 3.63 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.5, 151.1, 149.4, 138.5, 137.3, 137.2, 135.9, 131.7, 130.7, 128.0, 122.8, 122.1, 121.7, 121.1, 120.9, 120.8, 110.1, 105.5, 52.5, 50.0.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{22}H_{17}BrN_2O_2Na$, 443.0371, found 443.0370.

3.2.8. Methyl 2-(4-iodophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3h):



Yield: 71 %; brown liquid; *Rf*= 0.52 in 2:3 EtOAc/Hexane.

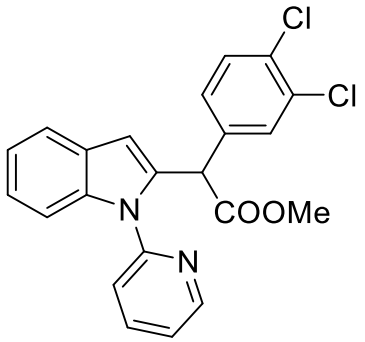
IR (ν_{max}, cm^{-1}): 2936, 1731, 1653, 1487, 1457, 1277, 919, 650, 596.

^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.58 (d, J = 4.9 Hz, 1H, ArH), 7.78 (td, J = 7.5, 1.9 Hz, 1H, ArH), 7.57 (d, J = 8.2 Hz, 3H, ArH), 7.32 (d, J = 7.9 Hz, 2H, ArH), 7.27–7.23 (m, 1H, ArH), 7.18–7.11 (m, 2H, ArH), 6.97 (d, J = 8.3 Hz, 2H, ArH), 6.45 (s, 1H, ArH), 5.60 (s, 1H, CH), 3.60 (s, 3H, CH_3)

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.4, 151.0, 149.4, 138.5, 137.6, 137.3, 137.2, 136.5, 130.9, 128.0, 122.8, 122.1, 121.1, 120.9, 120.8, 110.1, 105.6, 93.4, 52.5, 50.1.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{22}H_{17}IN_2O_2Na$, 491.0232, found 491.0231.

3.2.9. Methyl 2-(3,4-dichlorophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3i):



Yield: 81 %; colourless solid; *Rf*= 0.46 in 2:3 EtOAc/Hexane.

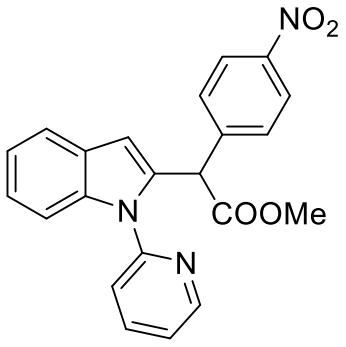
IR (ν_{max}, cm^{-1}): 2936, 1740, 1666, 1475, 1462, 1277, 917, 714, 630.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.59 (d, *J* = 4.8 Hz, 1H, ArH), 7.80 (td, *J* = 7.5, 1.3 Hz, 1H, ArH), 7.60 (d, *J* = 8.0 Hz, 1H, ArH,), 7.33–7.05 (m, 8H, ArH), 6.51 (s, 1H, ArH), 5.64 (s, 1H, CH), 3.64 (s, 3H, CH).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.1, 150.9, 149.4, 138.6, 137.2, 137.0, 136.7, 132.5, 131.8, 130.9, 130.4, 128.3, 127.9, 123.0, 122.2, 121.2, 121.0, 120.8, 110.2, 105.5, 52.7, 49.6.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{23}H_{19}Cl_2N_2O_2$, 425.8024, found 425.8021.

3.2.10. Methyl 2-(4-nitrophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3j):



Yield: 87 %; yellow solid; *Rf*= 0.45 in 2:3 EtOAc/Hexane.

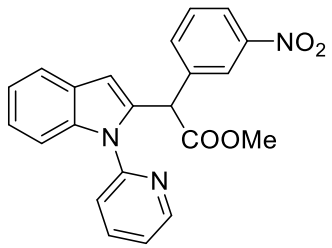
IR (ν_{max}, cm^{-1}): 2938, 1737, 1659, 1558, 1369, 1487, 1453, 1277, 919, 651.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.59 (d, *J* = 8.5 Hz, 1H, ArH), 8.09 (d, *J* = 7.4 Hz, 2H, ArH), 7.80 (t, *J* = 7.7 Hz, 1H, ArH), 7.61 (d, *J* = 7.5 Hz, 1H, ArH), 7.40–7.33 (m, 4H, ArH), 7.29–7.27 (m, 1H, ArH), 7.21–7.16 (m, 2H, ArH), 6.54 (s, 1H, ArH), 5.84 (s, 1H, CH), 3.68 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.8, 150.9, 149.4, 147.3, 144.2, 138.6, 137.2, 136.2, 129.9, 127.9, 123.6, 123.2, 122.2, 121.3, 121.0, 120.7, 110.2, 105.7, 52.8, 50.2.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{22}H_{18}N_3O_4$, 388.1297, found 388.1296.

3.2.11. Methyl 2-(3-nitrophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3k):



Yield: 89 %; yellow solid; *Rf*= 0.49 in 2:3 EtOAc/Hexane.

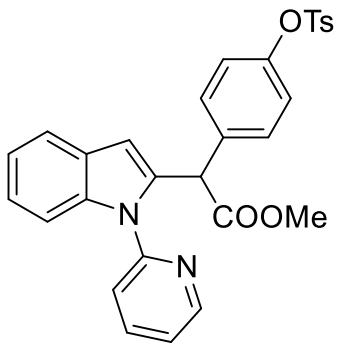
IR (ν_{max}, cm^{-1}): 1746, 1660, 1525, 1478, 1455, 1278, 928, 641.

^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.61 (d, J = 4.9 Hz, 1H, ArH), 8.09–8.06 (m, 1H, ArH), 8.03 (s, 1H, ArH), 7.78 (td, J = 7.6, 1.9 Hz, 1H, ArH), 7.62–7.59 (m, 2H, ArH), 7.41 (t, J = 7.9 Hz, 1H, ArH,), 7.34–7.25 (m, 3H, ArH), 7.20–7.15 (m, 2H, ArH), 6.55 (s, 1H, ArH), 5.82 (s, 1H, CH), 3.68 (s, 3H, CH_3)

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.0, 150.9, 149.5, 148.2, 139.0, 138.6, 137.2, 136.5, 135.2, 129.4, 128.0, 124.1, 123.2, 122.7, 122.3, 121.3, 121.1, 120.8, 110.2, 105.5, 52.8, 50.0.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{22}H_{17}N_3NaO_4$, 410.1117, found 410.1117.

3.2.12. Methyl 2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-(4-(tosyloxy)phenyl)acetate (3l):



Yield: 83 %; colourless solid; *Rf*= 0.43 in 2:3 EtOAc/Hexane.

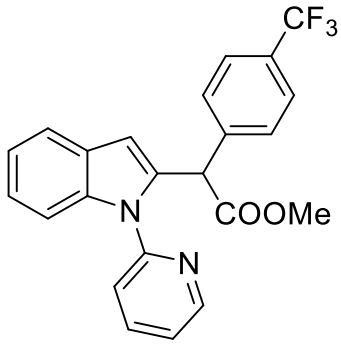
IR (ν_{max}, cm^{-1}): 2937, 1744, 1651, 1489, 1475, 1339, 1260, 1035, 925, 640.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.57 (dd, *J* = 5.2, 1.9 Hz, 1H, ArH), 7.77 (td, *J* = 7.6, 1.9 Hz, 1H, ArH), 7.68 (d, *J* = 8.3 Hz, 2H, ArH), 7.58–7.56 (m, 1H, ArH), 7.30–7.11 (m, 9H, ArH), 6.85 (d, *J* = 8.7 Hz, 2H, ArH,), 6.41 (s, 1H, ArH), 5.63 (s, 1H, CH), 3.61 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.4, 151.1, 149.5, 149.0, 145.5, 138.5, 137.4, 137.2, 135.8, 132.5, 130.2, 129.8, 128.5, 128.0, 122.9, 122.4, 122.1, 121.1, 120.9, 120.9, 110.1, 105.4, 52.5, 49.9, 21.8.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{29}H_{24}N_2O_5SNa$, 535.1304, found 535.1301.

3.2.13. Methyl 2-(1-(pyridin-2-yl)-1H-indol-2-yl)-2-(4-(trifluoromethyl)phenyl) acetate (3m):



Yield: 81 %; brown gummy liquid; *Rf*= 0.55 in 2:3 EtOAc/Hexane.

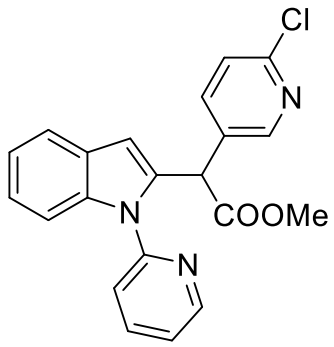
IR (ν_{max}, cm^{-1}): 2954, 1747, 1678, 1469, 1412, 1318, 1265, 921, 640.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.62 (d, J = 4.8 Hz, 1H, ArH), 7.77 (td, J = 7.8, 1.8 Hz, 1H, ArH), 7.63 (d, J = 7.0 Hz, 1H, ArH,), 7.49–7.19 (m, 9H, ArH), 6.54 (s, 1H, ArH), 5.78 (s, 1H, CH), 3.68 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.3, 151.0, 149.4, 138.5, 137.8, 137.1, 132.5, 129.0, 128.0, 125.8, 124.5, 123.9 (q, J = 273 Hz,), 122.9, 122.2, 121.1, 121.0, 120.9, 110.1, 105.4, 52.6, 50.3.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{23}H_{18}F_3N_2O_2$, 411.1320, found 411.1323.

3.2.14. Methyl 2-(6-chloropyridin-3-yl)-2-(1-(pyridin-2-yl)-1H-indol-2-yl)acetate (3n):



Yield: 83 %; brown gummy liquid; *Rf*= 0.47 in 2:3 EtOAc/Hexane.

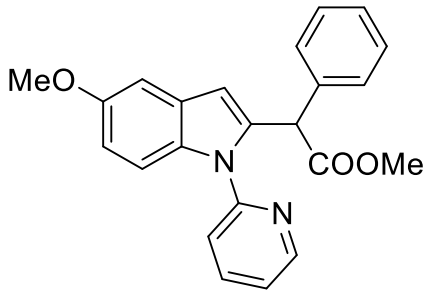
IR (ν_{max}, cm^{-1}): 2949, 1744, 1661, 1489, 1471, 1270, 916, 645.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.60 (dd, J = 4.8, 1.4 Hz, 1H, ArH), 8.13 (d, J = 2.4 Hz, 1H, ArH), 7.80 (td, J = 7.7, 1.8 Hz, 1H, ArH), 7.64–7.60 (m, 2H, ArH), 7.35–7.27 (m, 3H, ArH), 7.23–7.14 (m, 3H, ArH), 6.54 (s, 1H, ArH), 5.73 (s, 1H, CH), 3.67 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.8, 150.8, 150.6, 149.7, 149.5, 139.4, 138.6, 137.1, 136.2, 131.8, 127.9, 124.1, 123.2, 122.3, 121.3, 121.0, 120.7, 110.2, 105.4, 52.7, 47.2.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{21}H_{17}ClN_3O_2$, 378.1009, found 378.1005.

3.2.15. Methyl 2-(5-methoxy-1-(pyridin-2-yl)-1H-indol-2-yl)-2-phenylacetate (3o):



Yield: 89 %; colourless solid; *Rf*= 0.50 in 2:3 EtOAc/Hexane.

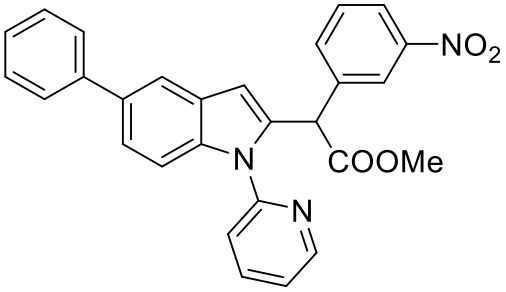
IR (ν_{max}, cm^{-1}): 2928, 1745, 1659, 1475, 1442, 1425, 1269, 919, 685.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.61 (d, *J* = 4.0 Hz, 1H, ArH), 7.80 (t, *J* = 7.9 Hz, 1H, ArH), 7.35–7.33 (m, 7H, ArH), 7.05 (s, 1H, ArH), 6.83 (dd, *J* = 8.9, 2.0 Hz, 1H, ArH), 6.38 (s, 1H, ArH), 5.64 (s, 1H, CH), 3.85 (s, 3H, CH_3), 3.63 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.9, 155.0, 151.4, 149.4, 138.5, 138.4, 136.9, 132.3, 129.0, 128.7, 128.6, 127.6, 121.8, 120.6, 112.5, 111.0, 105.5, 102.7, 55.9, 52.4, 50.8.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{23}H_{21}N_2O_3$, 373.1552, found 373.1557.

3.2.16. Methyl 2-(3-nitrophenyl)-2-(5-phenyl-1-(pyridin-2-yl)-1*H*-indol-2 yl) acetate (3p):



Yield: 85 %; colourless solid; *Rf*= 0.49 in 2:3 EtOAc/Hexane.

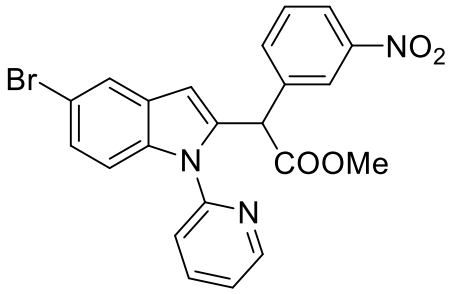
IR (ν_{max}, cm^{-1}): 2939, 1746, 1651, 1557, 1484, 1463, 1277, 925, 684.

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.63 (d, *J* = 4.8 Hz, 1H, ArH), 8.10–8.06 (m, 2H, ArH), 7.82–7.79 (m, 2H, ArH), 7.63 (d, *J* = 7.98 Hz, 3H, ArH), 7.46–7.28 (m, 8H, ArH), 6.62 (s, 1H, ArH), 5.85 (s, 1H, CH), 3.71 (s, 3H, CH_3)

$^{13}C\{1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 170.9, 150.9, 149.6, 148.2, 142.1, 139.0, 138.6, 137.2, 136.7, 135.2, 134.9, 129.4, 128.8, 128.5, 127.4, 126.7, 124.1, 122.9, 122.7, 122.4, 120.7, 119.5, 110.5, 105.9, 52.8, 50.1.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{29}H_{24}N_3O_4$, 478.1767, found 478.1762.

3.2.17. Methyl 2-(5-bromo-1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-(3-nitrophenyl) acetate (3q):



Yield: 88 %; yellow solid; *Rf*= 0.45 in 2:3 EtOAc/Hexane.

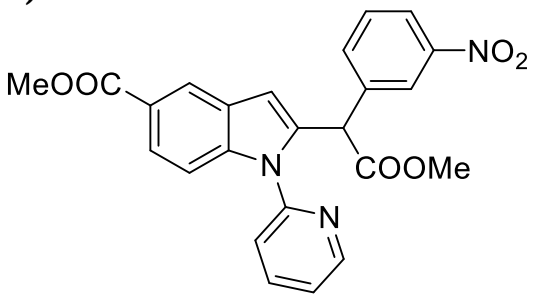
IR (ν_{max}, cm^{-1}): 2938, 1733, 1657, 1562, 1488, 1472, 1457, 1316, 1276, 911, 657, 647.

^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.61 (d, *J* = 4.8 Hz, 1H, ArH), 8.09 (d, *J* = 8.1 Hz, 1H, ArH), 8.01 (t, *J* = 1.9 Hz, 1H, ArH), 7.80 (td, *J* = 7.6, 1.9 Hz, 1H, ArH), 7.72 (d, *J* = 1.8 Hz, 1H, ArH), 7.58 (d, *J* = 7.8 Hz, 1H, ArH), 7.43 (t, *J* = 7.9 Hz, 1H, ArH), 7.32–7.29 (m, 1H, ArH), 7.27–7.25 (m, 2H, ArH), 7.17 (d, *J* = 8.8 Hz, 1H, ArH), 6.50 (s, 1H, ArH), 5.77 (s, 1H, CH), 3.68 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 170.7, 150.5, 149.7, 148.2, 138.8, 138.7, 137.7, 135.9, 135.1, 129.5, 126.0, 124.0, 123.6, 122.8, 122.7, 120.8, 114.4, 111.7, 104.8, 52.9, 49.9.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{23}H_{19}BrN_3O_4$, 480.0559, found 480.0554.

3.2.18. Methyl 2-(2-methoxy-1-(3-nitrophenyl)-2-oxoethyl)-1-(pyridin-2-yl)-1*H*-indole-5-carboxylate (3r):



Yield: 85 %; colourless gummy liquid; *Rf*= 0.45 in 2:3 EtOAc/Hexane.

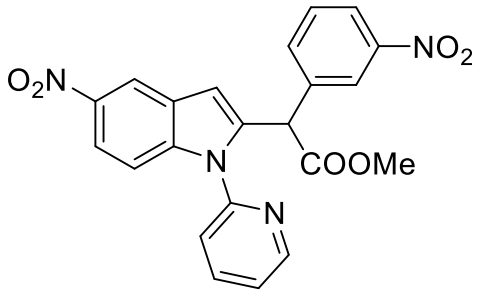
IR (ν_{max}, cm^{-1}): 2925, 1739, 1657, 1532, 1474, 1467, 1341, 1270, 927, 663.

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.63 (d, J = 4.66 Hz, 1H, ArH), 8.09 (d, J = 8.4 Hz, 1H, ArH), 8.04–8.03 (m, 2H, ArH), 7.84 (td, J = 8.1, 1.4 Hz, 2H, ArH), 7.63–7.59 (m, 2H, ArH), 7.43 (t, J = 7.7 Hz, 1H, ArH,), 7.35–7.32 (m, 2H, ArH), 6.60 (s, 1H, ArH), 5.81 (s, 1H, CH), 3.88 (s, 3H, CH_3), 3.68 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 170.6, 167.8, 150.3, 149.7, 148.2, 139.8, 139.0, 138.5, 136.7, 135.1, 131.5, 129.6, 124.9, 124.1, 122.9, 122.4, 121.1, 120.7, 112.4, 105.6, 52.9, 52.1, 50.0.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{24}H_{19}N_3O_6Na$, 468.1172, found 468.1174.

3.2.19. Methyl 2-(5-nitro-1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-(3-nitrophenyl) acetate (3s):



Yield: 79 %; yellow solid; *Rf*= 0.39 in 2:3 EtOAc/Hexane.

IR (ν_{max}, cm^{-1}): 2931, 1736, 1659, 1533, 1483, 1451, 1378, 1242, 936, 647.

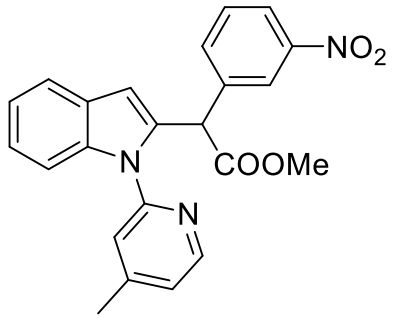
^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.67–8.66 (m, 1H, ArH), 8.55 (d, J = 2.1 Hz, 1H, ArH), 8.13–8.07 (m, 2H, ArH), 8.00 (t, J = 2.0 Hz, 1H, ArH), 7.87 (td, J = 7.7, 1.9 Hz, 1H, ArH), 7.60 (d, J = 7.7 Hz, 1H,

ArH), 7.47 (t, *J* = 7.8 Hz, 1H, ArH), 7.41–7.38 (m, 1H, ArH), 7.32–7.28 (m, 2H, ArH), 6.72 (s, 1H, ArH), 5.73 (s, 1H, CH), 3.68 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 170.3, 150.0, 149.9, 148.3, 142.8, 140.1, 140.0, 139.1, 138.1, 135.0, 129.8, 127.2, 124.0, 123.5, 123.1, 121.1, 118.7, 118.0, 110.3, 106.9, 53.1, 49.9.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{22}H_{17}N_4O_6$, 433.1148, found 433.1140.

3.2.20. Methyl 2-(1-(4-methylpyridin-2-yl)-1H-indol-2-yl)-2-(3-nitrophenyl)acetate (3t):



Yield: 87 %; yellow gummy liquid; *Rf*= 0.43 in 2:3 EtOAc/Hexane.

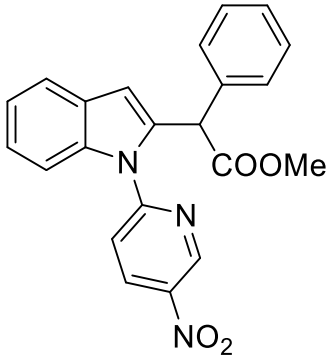
IR (ν_{max}, cm^{-1}): 2928, 1741, 1675, 1542, 1489, 1447, 1357, 1224, 967, 686.

^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.45 (d, *J* = 4.5 Hz, 1H, ArH), 8.09 (d, *J* = 8.1 Hz, 1H, ArH), 8.03 (s, 1H, ArH), 7.61 (t, *J* = 6.4 Hz, 2H, ArH), 7.42 (t, *J* = 8.0 Hz, 1H, ArH), 7.33 (d, *J* = 7.9 Hz, 1H, ArH), 7.20–7.11 (m, 4H, ArH), 6.56 (s, 1H, ArH), 5.78 (s, 1H, CH), 3.70 (s, 3H, CH_3), 2.37 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.0, 150.9, 150.2, 149.1, 148.1, 139.1, 137.2, 136.5, 135.2, 129.3, 127.9, 124.1, 123.5, 123.0, 122.6, 121.4, 121.2, 121.0, 110.3, 105.2, 52.8, 50.0, 21.1.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{23}H_{20}N_3O_4$, 402.1454, found 402.1449.

3.2.21. Methyl 2-(1-(5-nitropyridin-2-yl)-1*H*-indol-2-yl)-2-phenylacetate (3u):



Yield: 81 %; yellow liquid; *Rf*= 0.45 in 2:3 EtOAc/Hexane.

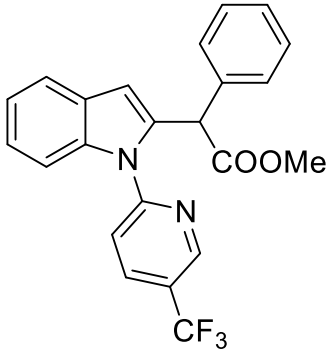
IR (ν_{max}, cm^{-1}): 2925, 1741, 1669, 1516, 1471, 1469, 1347, 1242, 947, 654.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.61 (dd, J = 4.8, 1.3 Hz, 1H, ArH), 8.09–8.03 (m, 2H, ArH), 7.78 (td, J = 9.6, 1.9 Hz, 1H, ArH), 7.62–7.60 (m, 2H, ArH), 7.42 (t, J = 7.9 Hz, 1H, ArH), 7.34–7.27 (m, 3H, ArH), 7.21–7.15 (m, 2H, ArH), 6.56 (s, 1H, ArH), 5.83 (s, 1H, CH), 3.69 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.9, 150.9, 149.5, 148.2, 139.0, 138.6, 137.2, 136.5, 135.2, 129.4, 128.0, 124.1, 123.2, 122.3, 121.3, 120.7, 110.2, 105.5, 52.8, 50.0.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{22}H_{18}N_3O_4$, 388.1297, found 388.1296.

3.2.22. Methyl 2-phenyl-2-(1-(5-(trifluoromethyl)pyridin-2-yl)-1*H*-indol-2-yl)acetate (3v):



Yield: 69 %; colourless liquid; *Rf*= 0.55 in 2:3 EtOAc/Hexane.

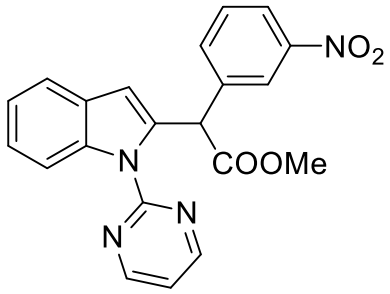
IR (ν_{max}, cm^{-1}): 2937, 1745, 1621, 1472, 1474, 1314, 1221, 937, 635.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.59 (d, J = 1.9 Hz, 1H, ArH), 7.75 (t, J = 7.9 Hz, 1H, ArH), 7.60–7.15 (m, 10H, ArH), 6.51 (s, 1H, ArH), 5.74 (s, 1H, CH), 3.65 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.3, 151.1, 149.5, 138.5, 137.9, 137.3, 137.1, 132.5, 130.7 (q, J = 32.2 Hz), 129.0, 128.0, 125.8 (q, J = 3.7 Hz), 124.5 (q, J = 3.7 Hz), 124.0 (q, J = 272 Hz), 123.0, 122.2, 121.2, 121.0, 120.9, 110.1, 105.4, 52.6, 50.3.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{23}H_{18}F_3N_2O_2$, 411.1320, found 411.1323.

3.2.23. Methyl 2-(3-nitrophenyl)-2-(1-(pyrimidin-2-yl)-1*H*-indol-2-yl)acetate (3w):



Yield: 80 %; yellow sticky liquid; *Rf*= 0.45 in 2:3 EtOAc/Hexane.

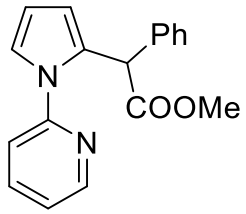
IR (ν_{max}, cm^{-1}): 2939, 1742, 1650, 1545, 1491, 1475, 1360, 1248, 921, 646.

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.72 (d, J = 4.8 Hz, 2H, ArH), 8.51 (d, J = 8.5 Hz, 1H, ArH,), 8.26 (t, J = 1.8 Hz, 1H, ArH), 8.18–8.16 (m, 1H, ArH), 7.71 (d, J = 7.7 Hz, 1H, ArH,), 7.54–7.50 (m, 2H, ArH), 7.30 (td, J = 7.1, 1.1 Hz, 1H, ArH), 7.21 (t, J = 7.1 Hz, 1H, ArH,), 7.11 (t, J = 4.8 Hz, 1H, ArH), 6.28 (s, 1H, ArH), 6.11 (s, 1H, CH), 3.71 (s, 3H, CH_3)

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.5, 157.9, 148.4, 139.6, 137.2, 136.9, 135.4, 129.6, 128.6, 124.4, 124.1, 122.8, 122.5, 120.6, 117.0, 115.4, 110.3, 52.7, 52.5.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{21}H_{17}N_4O_4$, 389.1250, found 389.1256.

3.2.24. Methyl 2-phenyl-2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl)acetate (3x):



Yield: 73 %; colourless liquid; *Rf*= 0.55 in 3:7 EtOAc/Hexane.

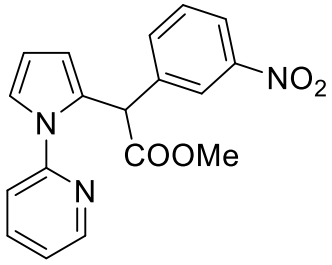
IR (ν_{max}, cm^{-1}): 2945, 1748, 1667, 1496, 1445, 1261, 911, 614.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.43 (d, *J* = 4.8 Hz, 1H, ArH), 7.74 (ddd, *J* = 8.1, 7.5, 1.9 Hz, 1H, ArH), 7.32–7.25 (m, 6H, ArH), 7.15 (ddd, *J* = 7.47, 5.31, 0.9 Hz, 1H, ArH), 7.08 (dd, *J* = 2.8, 1.7 Hz, 1H, ArH), 6.22 (t, *J* = 3.2 Hz, 1H, ArH), 5.89–5.87 (m, 1H, ArH), 5.65 (s, 1H, CH), 3.61 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 172.9, 152.9, 148.1, 138.7, 137.7, 131.4, 129.0, 128.6, 127.5, 121.0, 120.9, 116.1, 112.79, 109.6, 52.3, 51.5.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{18}H_{17}N_2O_2$, 293.1290, found 293.1290.

3.2.25. Methyl 2-(3-nitrophenyl)-2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl)acetate (3y):



Yield: 79 %; yellow liquid; *Rf*= 0.47 in 3:7 EtOAc/Hexane.

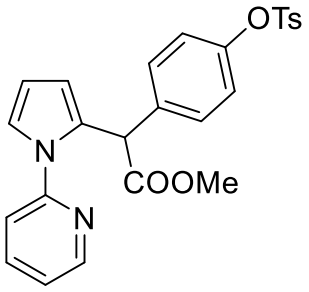
IR (ν_{max}, cm^{-1}): 2925, 1745, 1648, 1559, 1457, 1462, 1347, 1285, 916, 654.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.41 (d, *J* = 4.9 Hz, 1H, ArH), 8.16–8.08 (m, 2H, ArH), 7.74 (ddd, *J* = 8.2, 7.7, 2.0 Hz, 1H, ArH), 7.65 (d, *J* = 7.7 Hz, 1H, ArH), 7.46 (t, *J* = 8.0 Hz, 1H, ArH), 7.26–7.06 (m, 3H, ArH), 6.26 (t, *J* = 3.3 Hz, 1H, ArH), 6.03–6.01 (m, 1H, ArH), 5.89 (s, 1H, CH), 3.66 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.8, 152.5, 148.3, 148.1, 140.1, 138.9, 135.2, 129.7, 129.3, 124.2, 122.4, 121.4, 121.2, 116.1, 112.6, 109.9, 52.5, 50.6.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{18}H_{16}N_3O_4$, 338.1141, found 338.1143.

3.2.26. Methyl 2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl)-2-(4-(tosyloxy)phenyl) acetate (3z):



Yield: 73 %; colourless solid; *Rf*= 0.55 in 3:7 EtOAc/Hexane.

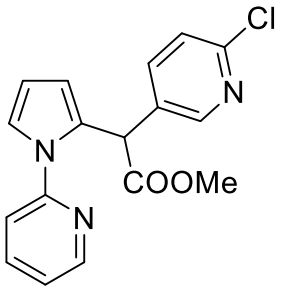
IR (ν_{max}, cm^{-1}): 2912, 1750, 1660, 1489, 1451, 1335, 1269, 915, 602.

^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.39 (d, J = 4.8 Hz, 1H, ArH), 7.75–7.68 (m, 3H, ArH), 7.29 (d, J = 8.0 Hz, 2H, ArH), 7.23–7.05 (m, 5H, ArH), 6.91 (d, J = 8.6 Hz, 2H, ArH), 6.22 (t, J = 3.2 Hz, 1H, ArH), 5.83–5.81 (m, 1H, ArH), 5.66 (s, 1H, ArH), 3.60 (s, 3H, CH_3), 2.44 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 172.3, 152.7, 148.8, 148.0, 145.4, 138.7, 136.8, 132.4, 130.8, 130.2, 129.8, 128.5, 122.4, 121.2, 121.0, 116.1, 112.5, 109.6, 52.3, 50.7, 21.7.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{25}H_{23}N_2O_5S$, 463.1328, found 463.1328.

3.2.27. Methyl 2-(6-chloropyridin-3-yl)-2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl) acetate (3aa):



Yield: 71 %; yellow liquid; *Rf*= 0.42 in 3:7 EtOAc/Hexane.

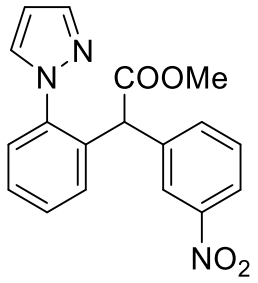
IR (ν_{max}, cm^{-1}): 2941, 1741, 1668, 1472, 1458, 1248, 917, 714, 669.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.40 (d, J = 4.8 Hz, 1H, ArH), 8.26 (d, J = 2.4 Hz, 1H, ArH), 7.77–7.73 (m, 1H, ArH), 7.64 (dd, J = 8.2, 2.5 Hz, 1H, ArH), 7.26–7.06 (m, 4H, ArH), 6.26 (t, J = 3.2 Hz, 1H, ArH), 6.03–6.02 (m, 1H, ArH), 5.80 (s, 1H, CH), 3.64 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.7, 152.5, 150.4, 150.1, 148.0, 139.4, 138.9, 132.8, 129.6, 124.1, 121.4, 121.2, 116.0, 112.5, 109.9, 52.5, 47.9.

HRMS: m/z: $[M+Na]^+$ Calculated for $C_{17}H_{14}ClN_3O_2Na$, 350.0672, found 350.0677.

3.2.28. Methyl 2-(2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5a):



Yield: 81 %; yellow liquid; *Rf*= 0.45 in 3:7 EtOAc/Hexane.

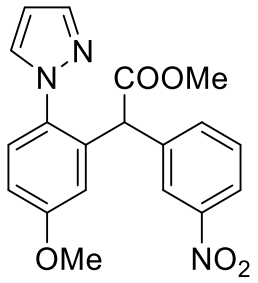
IR (ν_{max}, cm^{-1}): 2951, 1749, 1664, 1547, 1491, 1429, 1351, 1253, 922, 678.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.06 (d, J = 7.9 Hz, 1H, ArH), 8.00 (s, 1H, ArH), 7.76 (s, 1H, ArH), 7.48–7.37 (m, 6H, ArH), 7.30 (d, J = 7.2 Hz, 1H, ArH), 6.40 (t, J = 1.9 Hz, 1H, ArH), 5.58 (s, 1H, CH), 3.70 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.8, 148.3, 141.1, 140.0, 139.5, 135.1, 134.0, 131.0, 129.5, 129.3, 129.2, 128.7, 126.8, 123.8, 122.4, 106.9, 52.7, 50.8.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{18}H_{16}N_3O_4$, 338.1141, found 338.1139.

3.2.29. Methyl 2-(5-methoxy-2-(1H-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl) acetate (5b):



Yield: 82 %; yellow gummy liquid; *Rf*= 0.43 in 3:7 EtOAc/Hexane.

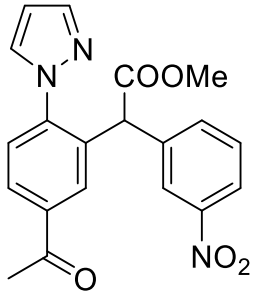
IR (ν_{max}, cm^{-1}): 2947, 1742, 1689, 1518, 1478, 1445, 1352, 1271, 921, 641.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.06 (d, *J* = 7.9 Hz, 1H, ArH), 7.99 (s, 1H, ArH), 7.72 (d, *J* = 1.8 Hz, 1H, ArH), 7.48–7.38 (m, 2H, ArH), 7.34 (d, *J* = 2.3 Hz, 1H, ArH), 7.23 (d, *J* = 8.6 Hz, 1H, ArH), 6.96 (d, *J* = 2.8 Hz, 1H, ArH), 6.88 (dd, *J* = 8.6, 2.8 Hz, 1H, ArH), 6.36 (t, *J* = 2.2 Hz, 1H, ArH), 5.40 (s, 1H, CH), 3.81 (s, 3H, CH), 3.69 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.1, 159.9, 148.2, 140.8, 139.7, 135.6, 135.0, 132.8, 131.3, 129.3, 128.2, 123.8, 122.4, 115.3, 112.9, 106.6, 55.6, 52.7, 50.7.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{19}H_{18}N_3O_5$, 368.1246, found 368.1241.

3.2.30. Methyl 2-(5-acetyl-2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5c):



Yield: 81 %; yellow gummy liquid; *Rf*= 0.41 in 3:7 EtOAc/Hexane.

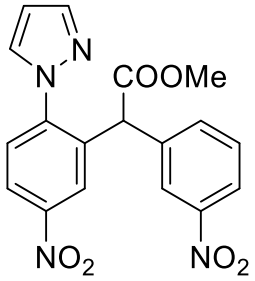
IR (ν_{max}, cm^{-1}): 2933, 1742, 1725, 1675, 1553, 1489, 1479, 1358, 1261, 891, 614.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.08–7.94 (m, 4H, ArH), 7.77 (s, 1H, ArH), 7.52–7.38 (m, 4H, ArH), 6.43 (s, 1H, ArH), 5.79 (s, 1H, CH), 3.70 (s, 3H, CH_3), 2.57 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 196.5, 171.4, 148.2, 142.8, 141.7, 139.4, 136.9, 134.9, 133.9, 130.8, 129.9, 129.6, 128.7, 126.4, 123.8, 122.6, 107.7, 52.8, 50.9, 26.6.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{20}H_{18}N_3O_5$, 380.1246, found 380.1243.

3.2.31. Methyl 2-(5-nitro-2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5d):



Yield: 85 %; yellow solid; *Rf*= 0.42 in 3:7 EtOAc/Hexane.

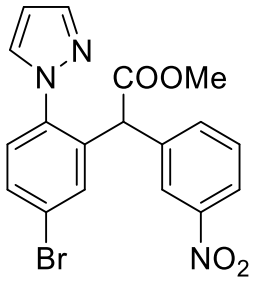
IR (ν_{max}, cm^{-1}): 2937, 1731, 1653, 1551, 1489, 1451, 1367, 1276, 899, 641.

^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.27–8.14 (m, 3H, ArH), 8.03 (s, 1H, ArH), 7.84 (s, 1H, ArH), 7.60–7.48 (m, 4H, ArH), 6.51 (s, 1H, ArH), 5.90 (s, 1H, CH), 3.72 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.9, 148.5, 147.2, 144.0, 142.4, 138.8, 135.2, 134.8, 130.9, 130.0, 126.7, 125.8, 124.0, 124.0, 123.1, 108.4, 53.1, 51.1.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{18}H_{15}N_4O_6$, 383.0992, found 383.0989.

3.2.32. Methyl 2-(5-bromo-2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5e):



Yield: 86 %; brown liquid; *Rf*= 0.46 in 3:7 EtOAc/Hexane.

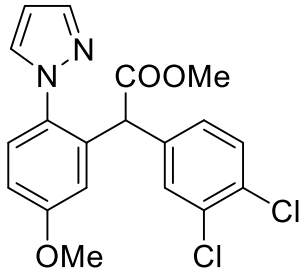
IR (ν_{max}, cm^{-1}): 2942, 1735, 1678, 1541, 1467, 1442, 1357, 1281, 936, 645.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.15–8.12 (m, 1H, ArH), 8.00 (s, 1H, ArH), 7.81 (d, *J* = 1.6 Hz, 1H, ArH), 7.71–7.42 (m, 6H, ArH), 6.43 (t, *J* = 2.0 Hz, 1H, ArH), 5.82 (s, 1H, CH), 3.70 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 170.9, 148.5, 142.6, 142.2, 138.8, 135.0, 134.7, 134.2, 132.4, 130.8, 129.9, 126.7, 123.9, 123.0, 117.7, 108.2, 53.1, 50.8.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{18}H_{15}BrN_3O_4$, 416.0246, found 416.0244.

3.2.33. Methyl 2-(3,4-dichlorophenyl)-2-(5-methoxy-2-(1H-pyrazol-1-yl)phenyl) acetate (5f):



Yield: 69 %; yellowish liquid; *Rf*= 0.49 in 3:7 EtOAc/Hexane.

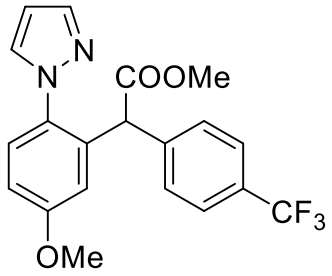
IR (ν_{max}, cm^{-1}): 2937, 1739, 1655, 1485, 1451, 1273, 918, 652, 612.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.72 (d, *J* = 1.85 Hz, 1H, ArH), 7.36 (d, *J* = 2.3 Hz, 1H, ArH), 7.31 (d, *J* = 8.3 Hz, 1H, ArH), 7.23–7.21 (m, 2H, ArH), 6.98 (dd, *J* = 8.3, 2.1 Hz, 1H, ArH), 6.92 (d, *J* = 2.7 Hz, 1H, ArH), 6.86 (dd, *J* = 8.6, 2.8 Hz, 1H, ArH), 6.38 (t, *J* = 2.1 Hz, 1H, ArH), 5.22 (s, 1H, CH), 3.80 (s, 3H, CH_3), 3.66 (s, 3H, CH_3).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.8, 159.8, 140.8, 137.8, 135.9, 132.8, 132.6, 131.7, 131.4, 130.7, 130.4, 128.2, 128.1, 115.5, 112.7, 106.5, 55.6, 52.6, 50.3.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{20}H_{19}Cl_2N_2O_3$, 405.0773, found 405.0769.

3.2.34. Methyl 2-(5-methoxy-2-(1*H*-pyrazol-1-yl)phenyl)-2-(4-(trifluoromethyl)phenyl)acetate (5g):



Yield: 80 %; colourless liquid; *Rf*= 0.52 in 3:7 EtOAc/Hexane.

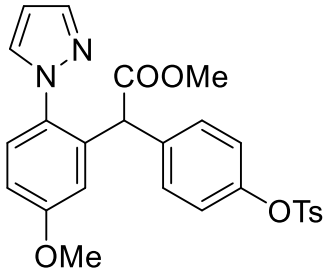
IR (ν_{max}, cm^{-1}): 2936, 1745, 1651, 1467, 1441, 1212, 1116, 927, 624.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.73 (d, *J* = 1.4 Hz, 1H, ArH), 7.48 (d, *J* = 6.9 Hz, 1H, ArH), 7.38–7.32 (m, 4H, ArH), 7.22 (d, *J* = 8.5 Hz, 1H, ArH), 6.92 (d, *J* = 2.8 Hz, 1H, ArH), 6.87 (dd, *J* = 8.6, 2.8 Hz, 1H, ArH), 6.37 (t, *J* = 2.1 Hz, 1H, ArH), 5.34 (s, 1H, CH), 3.80 (s, 3H, CH_3), 3.67 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 172.0, 159.8, 140.8, 138.6, 136.2, 132.8, 132.3, 131.4, 130.9 (q, *J* = 32 Hz), 129.1, 128.2, 125.6 (q, *J* = 3.8 Hz), 124.3 (q, *J* = 3.8 Hz), 124.0 (q, *J* = 273 Hz), 115.4, 112.8, 106.5, 55.6, 52.6, 51.1.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{21}H_{20}F_3N_2O_3$, 405.1426, found 405.1424.

3.2.35. Methyl 2-(5-methoxy-2-(1H-pyrazol-1-yl)phenyl)-2-(4-(tosyloxy) phenyl)acetate (5h):



Yield: 69 %; colourless solid; *Rf*= 0.47 in 3:7 EtOAc/Hexane.

IR (ν_{max}, cm^{-1}): 2945, 1743, 1661, 1476, 1452, 1341, 1264, 935, 642.

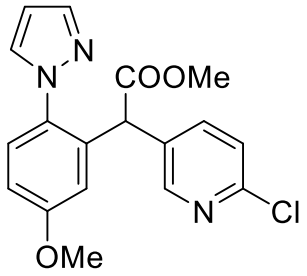
^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.70 (d, *J* = 1.7 Hz, 1H, ArH), 7.67 (d, *J* = 8.2 Hz, 2H, ArH), 7.32 (d, *J* = 2.2 Hz, 1H, ArH), 7.28 (d, *J* = 8.1 Hz, 2H, ArH), 7.20 (d, *J* = 8.3 Hz, 1H, ArH), 7.06 (d, *J* = 8.6 Hz,

1H, ArH), 6.89–6.81 (m, 4H, ArH), 6.34 (t, *J* = 2.1 Hz, 1H, ArH), 5.19 (s, 1H, CH), 3.77 (s, 3H, CH_3), 3.62 (s, 3H, CH_3), 2.42 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 172.1, 159.7, 148.8, 145.4, 140.7, 136.6, 136.5, 132.7, 132.4, 131.4, 130.0, 129.8, 128.5, 128.1, 122.4, 115.6, 112.5, 106.4, 55.5, 52.5, 50.5, 21.7.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{26}H_{25}N_2O_6S$, 493.1433, found 493.1437.

3.2.36. Methyl 2-(6-chloropyridin-3-yl)-2-(5-methoxy-2-(1H-pyrazol-1-yl)phenyl) acetate (5i):



Yield: 77 %; brown liquid; *Rf*= 0.41 in 3:7 EtOAc/Hexane.

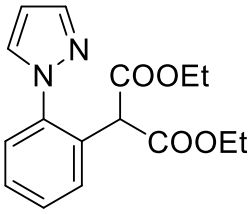
IR (ν_{max}, cm^{-1}): 2943, 1737, 1674, 1491, 1442, 1274, 936, 642, 712.

^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.03 (d, *J* = 2.5 Hz, 1H, ArH), 7.72 (d, *J* = 1.8 Hz, 1H, ArH), 7.50 (dd, *J* = 8.2, 2.4 Hz, 1H, ArH), 7.35 (d, *J* = 2.3 Hz, 1H, ArH), 7.22–7.18 (m, 2H, ArH), 6.93 (d, *J* = 2.7 Hz, 1H, ArH), 6.87 (dd, *J* = 8.6, 2.8 Hz, 1H, ArH), 6.38 (t, *J* = 2.2 Hz, 1H, ArH), 5.29 (s, 1H, CH), 3.80 (s, 3H, CH_3), 3.68 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 171.6, 159.8, 150.5, 149.7, 140.9, 139.1, 135.5, 132.7, 132.5, 131.3, 128.3, 124.1, 115.1, 112.9, 106.7, 55.7, 52.8, 48.1.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{18}H_{17}O_3N_3Cl$, 258.0958, found 258.0953.

3.2.37. Diethyl 2-(2-(1H-pyrazol-1-yl)phenyl)malonate (5j):



Yield: 86 %; colourless liquid; *Rf*= 0.55 in 3:7 EtOAc/Hexane.

IR (ν_{max}, cm^{-1}): 2968, 1733, 1651, 1483, 1474, 1285, 902, 644.

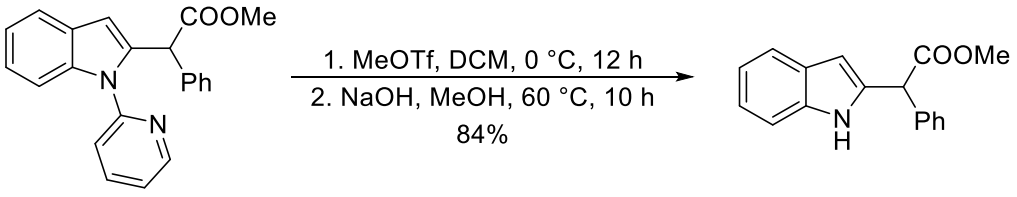
^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.69 (d, *J* = 1.7 Hz, 1H, ArH), 7.64 (dd, *J* = 2.3, 0.5 Hz, 1H, ArH), 7.62–7.60 (m, 1H, ArH), 7.44–7.37 (m, 2H, ArH), 7.33–7.30 (m, 1H, ArH), 6.42 (t, *J* = 1.9 Hz, 1H, ArH), 4.88 (s, 1H, CH), 4.17 (q, *J* = 7.1 Hz, 4H, ArH), 1.21 (t, *J* = 7.1 Hz, 6H, ArH).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 168.0, 141.0, 139.7, 131.0, 130.2, 129.0, 128.8, 128.5, 126.0, 106.8, 61.8, 52.7, 13.9.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{16}H_{19}N_2O_4$, 303.1345, found 303.1341.

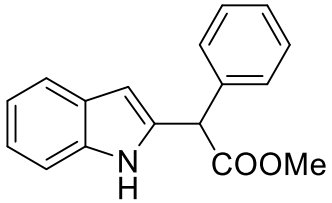
4. Removal of pyridine directing group:

In an oven dried Schlenk tube Methyl trifluoromethanesulfonate (0.175 mmol) was added dropwise to a solution of **3a** (50 mg, 0.146 mmol) in dichloromethane (3 mL) at 0 °C, and the resulting solution was stirred for 12 h at RT. Then the solvent was removed under vacuum, and the residue was dissolved in MeOH (1 mL) and 2 M aq. NaOH solution (0.6 mL) was added, and stirring was continued at 60 °C for 10 h.



After cooling to RT, the solvents were removed under reduced pressure, and the resulting residue was extracted with EtOAc. The combined organic layers were washed with brine, dried over Na_2SO_4, and concentrated resulted crude product. The residue was purified by column chromatography to provide compound **6** with 84% yield.

4.1. Methyl 2-(1*H*-indol-2-yl)-2-phenylacetate (6):



Yield: 84 %; red liquid; *Rf*= 0.52 in 2:3 EtOAc/Hexane.

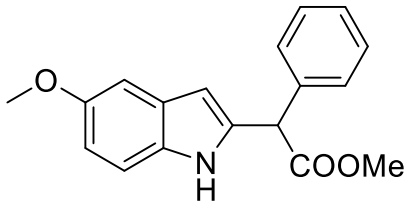
IR (ν_{max}, cm^{-1}): 3402, 2937, 1731, 1659, 1472, 1271, 910, 657.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.71 (s, br, 1H, NH), 7.54 (d, J = 7.8 Hz, 1H, ArH), 7.31–7.25 (m, 6H, ArH), 7.14 (t, J = 7.9 Hz, 1H, ArH), 7.06 (t, J = 7.6 Hz, 1H, ArH), 6.38 (s, 1H, ArH), 5.20 (s, 1H, CH), 3.76 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 172.4, 137.5, 136.4, 134.6, 128.9, 128.1, 128.0, 127.8, 122.0, 120.5, 120.0, 111.1, 102.3, 52.8, 50.7.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{17}H_{16}NO_2$, 266.1181, found 266.1185.

4.2. Methyl 2-(5-methoxy-1H-indol-2-yl)-2-phenylacetate (7):



Yield: 69 %; red liquid; *Rf*= 0.51 in 2:3 EtOAc/Hexane.

IR (ν_{max}, cm^{-1}): 3457, 2954, 1747, 1649, 1467, 1487, 1246, 941, 671.

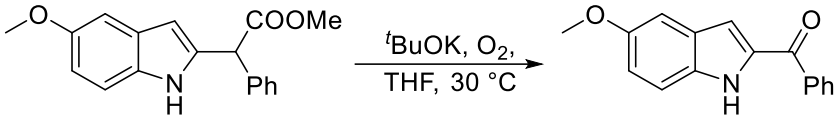
^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 8.63 (s, br, 1H, NH), 7.40–7.31 (m, 3H, ArH), 7.25–7.20 (m, 3H, ArH), 7.01 (s, 1H, ArH), 6.82 (d, J = 8.5 Hz, 1H, ArH), 6.31 (s, 1H, ArH), 5.18 (s, 1H, CH), 3.82 (s, 3H, CH_3), 3.78 (s, 3H, CH_3).

$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 187.0, 155.0, 138.2, 134.9, 133.1, 132.4, 129.3, 128.5, 128.2, 118.5, 113.2, 112.3, 103.0, 55.8.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{18}H_{18}NO_3$, 296.1287, found 296.1289.

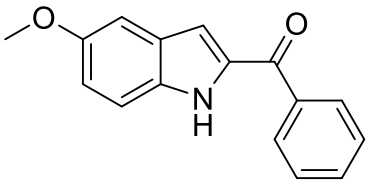
5. Synthesis of (5-methoxy-1*H*-indol-2-yl)(phenyl)methanone (8):

In an oven dried reaction tube compound **7** was added and the reaction tube was flushed with oxygen gas. 0.2 mL of dry THF was added to the reaction tube and followed by 13 mg *t*BuOK was added. The reaction mixture was stirred at RT for 15 minutes the reaction was quenched with saturated ammonium chloride



and the compound was extracted with EtOAc. The combined layer was dried with anhydrous sodium sulphate and concentrated under vacuum to get the crude product. The compound was purified by silica gel column chromatography afforded 17 mg of compound (**8**).

5.1. (5-methoxy-1*H*-indol-2-yl)(phenyl)methanone (8):



Yield: 68 %; red liquid; *Rf*= 0.52 in 1:4 EtOAc/Hexane.

IR (ν_{max}, cm^{-1}): 3396, 3047, 2941, 1735, 1656, 1491, 1474, 1212, 947, 635.

^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 9.23 (s, br, 1H, NH), 7.98 (d, J = 7.0 Hz, 2H, ArH), 7.61–7.53 (m, 3H, ArH), 7.37 (d, J = 8.8 Hz, 1H, ArH), 7.08–7.05 (m, 3H, ArH), 3.85 (s, 3H, CH_3).

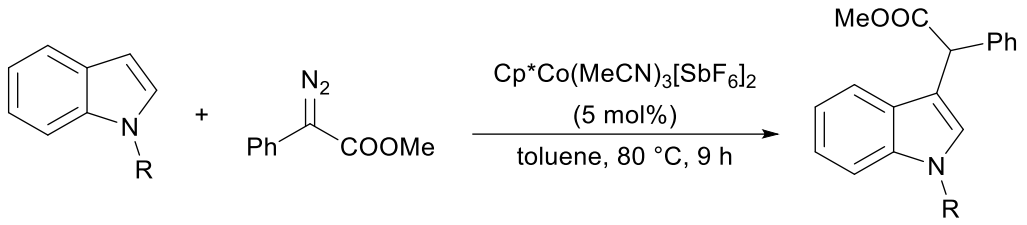
$^{13}C\{1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 187.0, 155.0, 138.2, 134.9, 133.1, 132.4, 129.3, 128.5, 128.2, 118.5, 113.2, 112.3, 103.0, 55.8.

HRMS: m/z: $[M+H]^+$ Calculated for $C_{16}H_{14}NO_2$, 252.1025, found 252.1022.

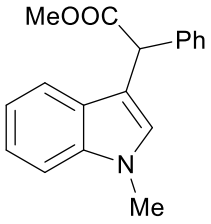
6. Mechanistic investigation for Cp*Co(III)-catalyzed alkylation of indole.

6.1. Influence of directing group.

In order to emphasize the necessity of the directing group *N*-methylindole and *N*-phenylindole were subjected under the optimized reaction conditions. Only selective C3-alkylated product 9a and 9b was isolated, no C2-alkylation occur.



6.1.1. Methyl 2-(1-methyl-1*H*-indol-3-yl)-2-phenylacetate (9a)

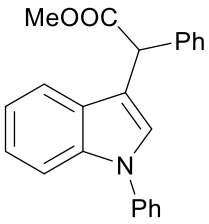


Yield: 69 %; colourless liquid; *Rf*= 0.49 in 2:3 EtOAc/Hexane.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.47–7.43 (m, 3H, ArH), 7.34–7.26 (m, 4H, ArH), 7.24–7.20 (m, H, ArH), 7.09–7.06 (m, 8H, ArH), 5.27 (s, 1H, CH), 3.76 (s, 6H, $2CH_3$).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 173.6, 138.8, 137.1, 128.6, 128.5, 128.0, 127.3, 127.1, 121.9, 119.3, 119.1, 112.1, 109.4, 52.4, 48.9, 32.9.

6.1.2. Methyl 2-phenyl-2-(1-phenyl-1*H*-indol-3-yl)acetate (9b)



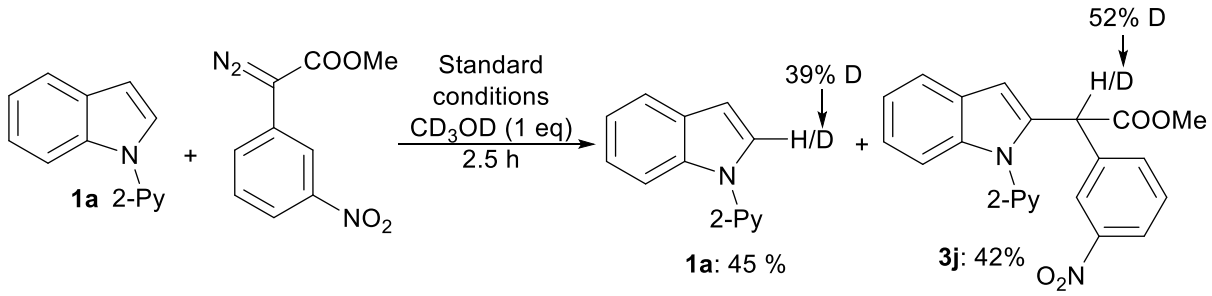
Yield: 63 %; colourless liquid; *Rf*= 0.50 in 2:3 EtOAc/Hexane.

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.57–7.48 (m, 8H, ArH), 7.38–7.28 (m, 5H, ArH), 7.22 (t, J = 8.0 Hz, 1H, ArH), 7.13 (t, J = 7.5 Hz, 1H, ArH), 5.33 (s, 1H, CH), 3.78 (s, 3H, $2CH_3$).

^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C): δ 173.3, 139.7, 138.4, 136.3, 129.7, 128.7, 128.6, 128.1, 127.5, 127.0, 126.5, 124.4, 122.8, 120.4, 119.4, 114.7, 110.8, 52.4, 48.9.

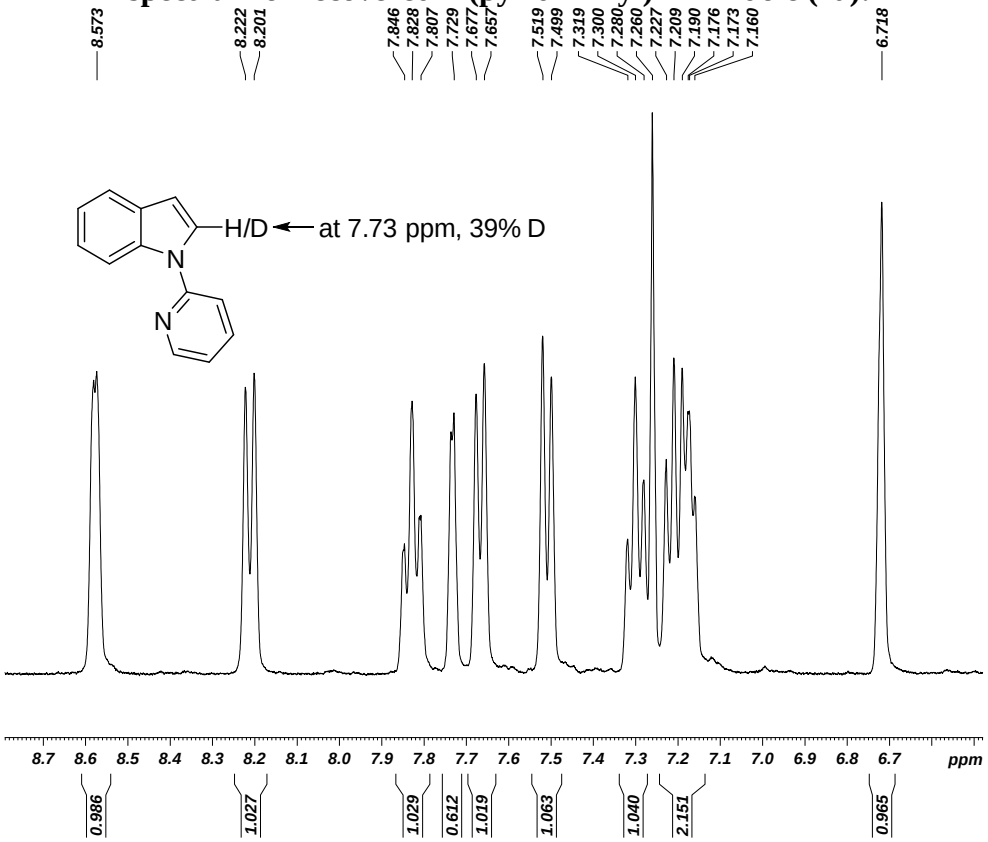
6.2. Deuterium exchange experiment.

One oven dried Schlenk tube was charged with *N*-pyridyl indole **1a** (50 mg, 0.25 mmol, 1 equiv), diazo compound **2j** (0.31 mmol, 1.2 equiv) and $Cp^*Co(MeCN)_3[SbF_6]_2$ (5 mol%). The inner atmosphere was made inert through repeated (thrice) evacuation and refilled with nitrogen. Dry solvent (1.5 mL), followed by CD_3OD (9 mg, 1 equiv) was added to the reaction mixture and the reaction mixture was stirred at 80 °C for 2.5 h.



The reaction mixture was cooled to room temperature and dissolved in 8 mL DCM and filtered through a small pad of Celite. Solvent was evaporated to get the crude reaction mixture, from which starting material and product were isolated through column chromatography. The isolated compounds are analyzed by ^{1}H NMR. The spectrum indicates that there is about 39% of C2 hydrogen of indole(1a) are exchanged with D and about 52% of benzylic H are exchanged with D.

^{1}H NMR spectrum of recovered 1-(pyridin-2-yl)-1*H*-indole (1a):

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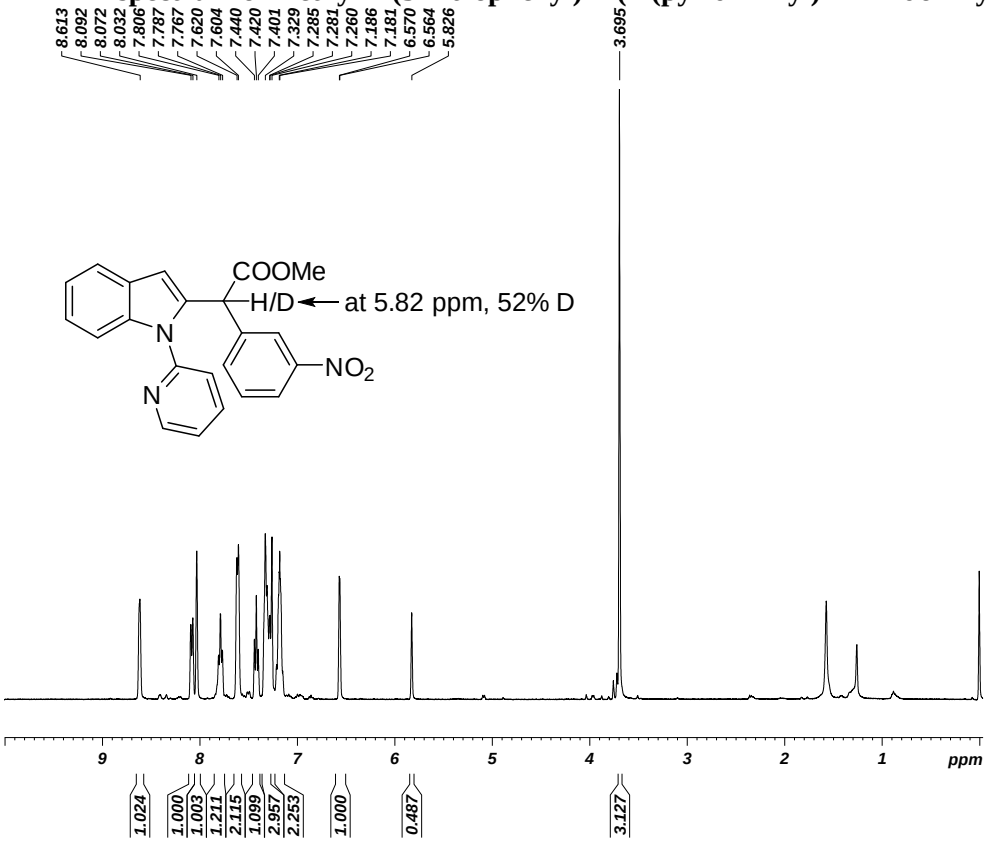
Current Data Parameters
NAME          05.18
EXPNO           466
PROCNO            1

F2 - Acquisition Parameters
Date_       20180521
Time           13.04
INSTRUM         spect
PROBHD  5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              200.34
DW              62.400 usec
DE               6.50 usec
TE              298.1 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1               1H
P1              15.70 usec
PLW1         7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300098 MHz
WDW               EM
SSB      0
LB            0.30 Hz
GB       0
PC            1.00
```

^{1}H NMR spectrum of methyl 2-(3-nitrophenyl)-2-(1-(pyridin-2-yl)-1H-indol-2-yl)acetate (3j):




```
Current Data Parameters
NAME          05.18
EXPNO           265
PROCNO            1

F2 - Acquisition Parameters
Date_       20180523
Time            8.04
INSTRUM         spect
PROBHD  5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              200.34
DW              62.400 usec
DE               6.50 usec
TE              299.2 K
D1           0.50000000 sec
TD0                1

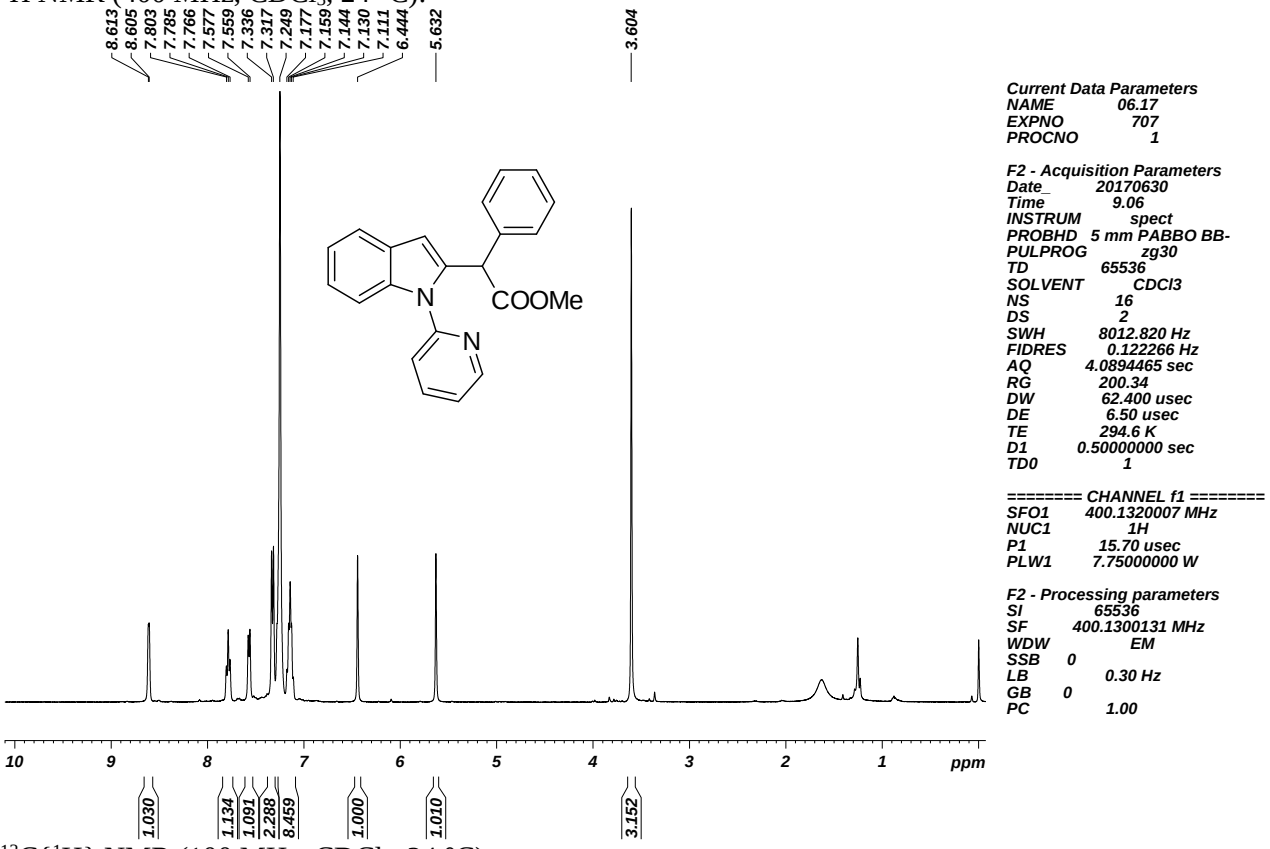
======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1               1H
P1              15.70 usec
PLW1         7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300097 MHz
WDW               EM
SSB      0
LB            0.30 Hz
GB       0
PC            1.00
```

7. Spectral data of synthesized compounds

Methyl 2-phenyl-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3a):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



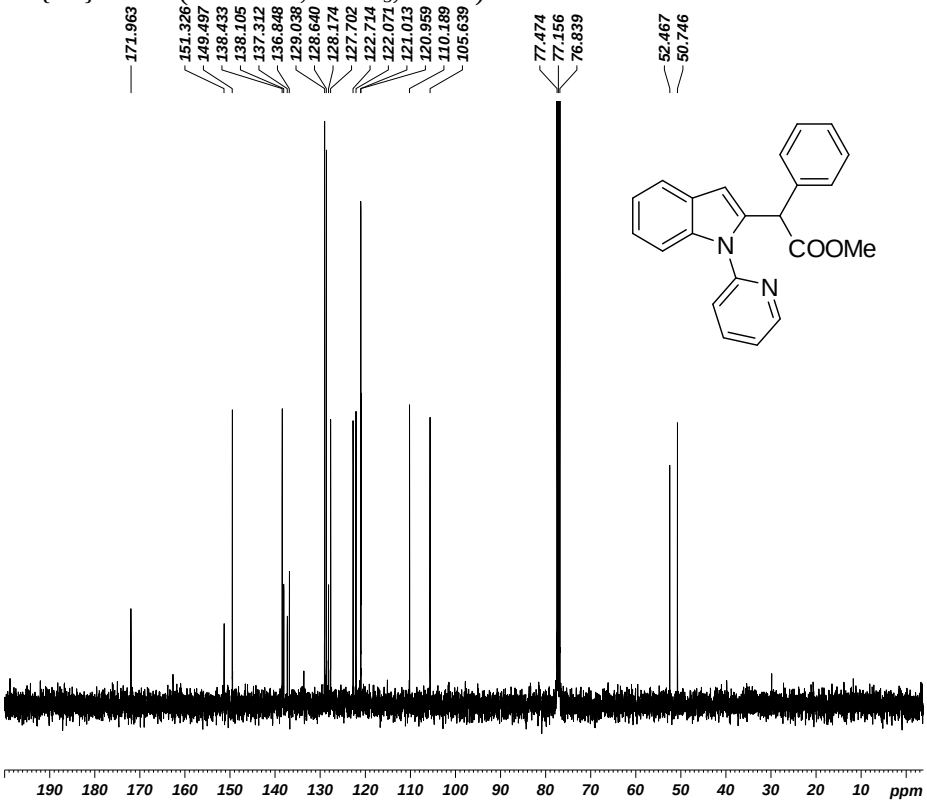

```
Current Data Parameters
NAME          06.17
EXPNO          707
PROCNO           1

F2 - Acquisition Parameters
Date_       20170630
Time            9.06
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT        CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              200.34
DW               62.400 usec
DE                6.50 usec
TE              294.6 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300131 MHz
WDW               EM
SSB      0
LB             0.30 Hz
GB       0
PC             1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          06.17
EXPNO          708
PROCNO           1

F2 - Acquisition Parameters
Date_       20170630
Time            9.25
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG       zgpg30
TD             16540
SOLVENT        CDCl3
NS               700
DS                 4
SWH         24038.461 Hz
FIDRES       1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              295.1 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

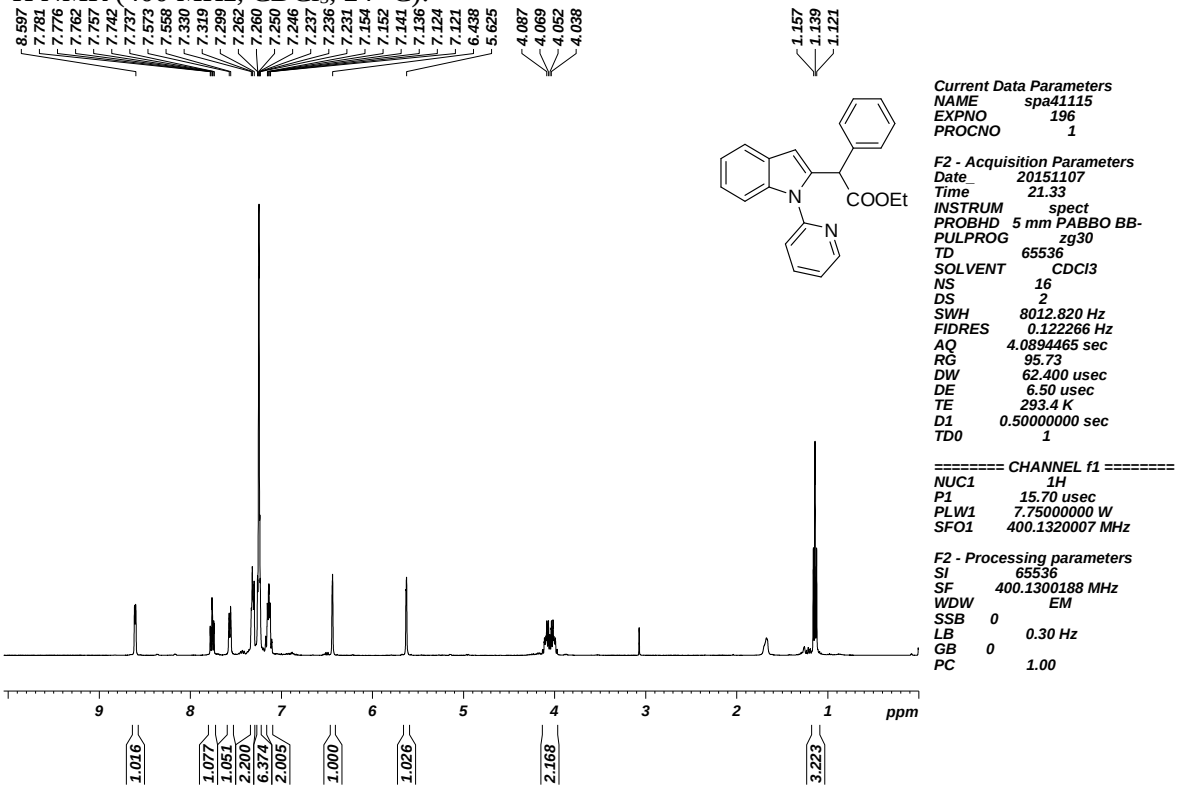
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1               9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2           90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

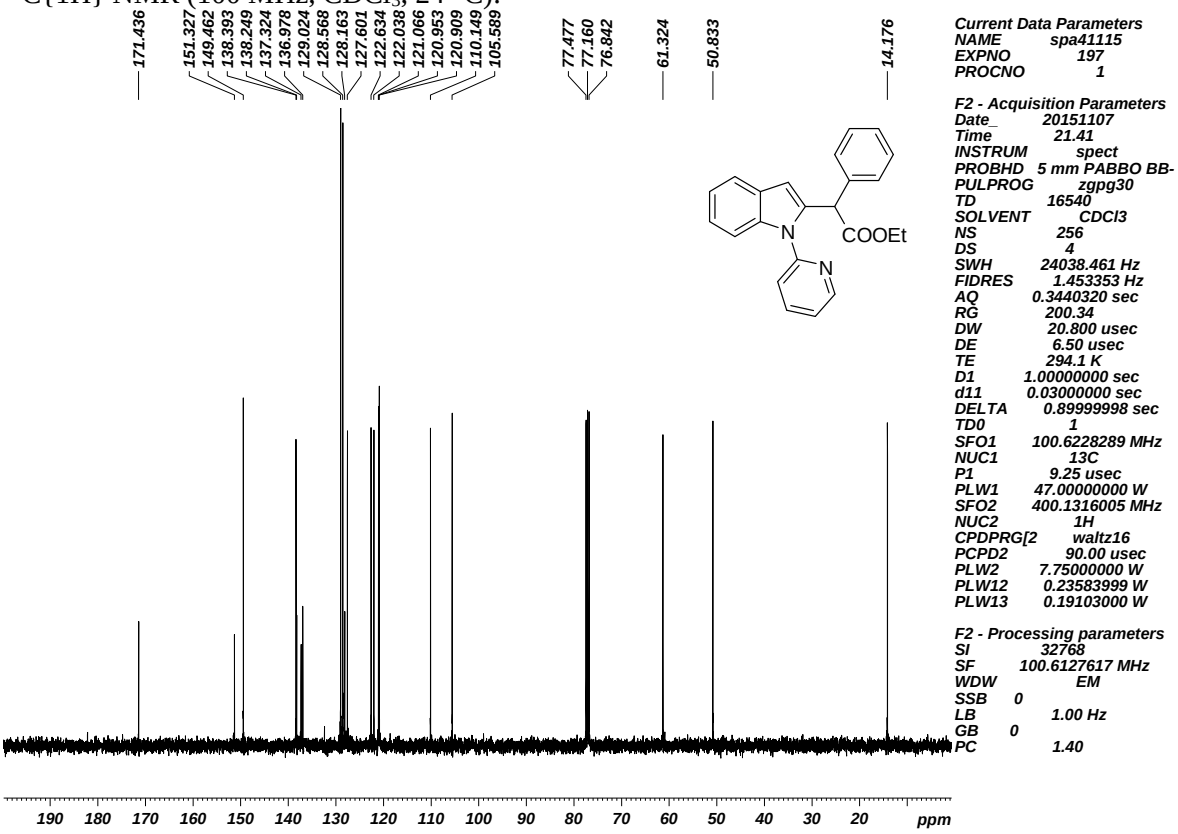
F2 - Processing parameters
SI             32768
SF         100.6127574 MHz
WDW               EM
SSB      0
LB             1.00 Hz
GB       0
PC             1.40
```

Ethyl 2-phenyl-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3b):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

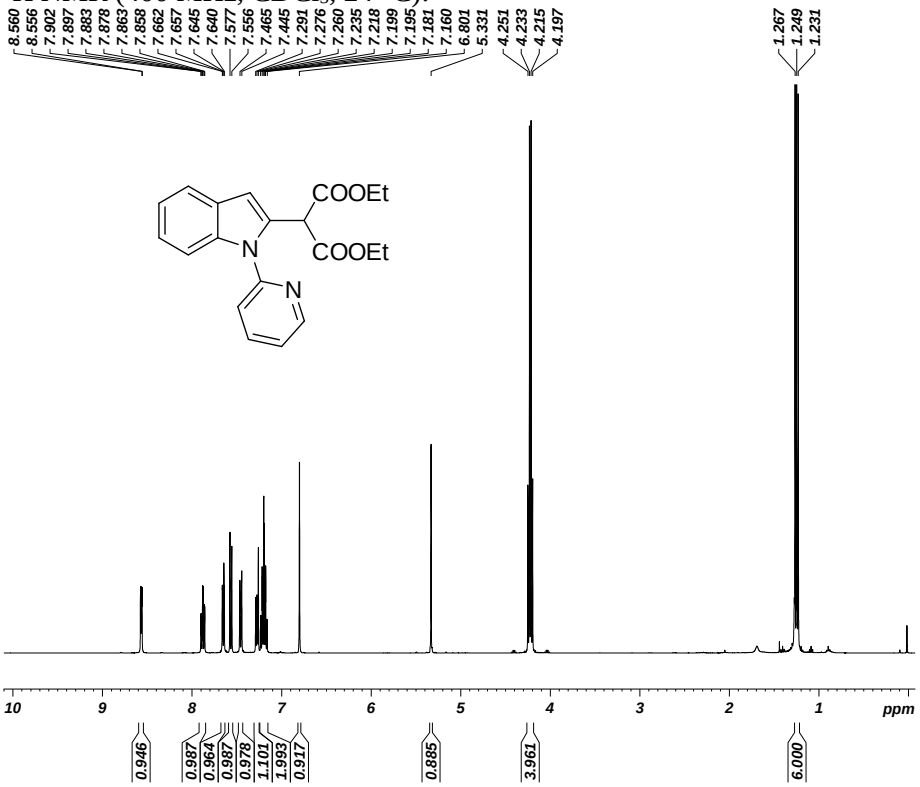


^{13}C{1H} NMR (100 MHz, $CDCl_3$, 24 °C):



Diethyl 2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)malonate (3c):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



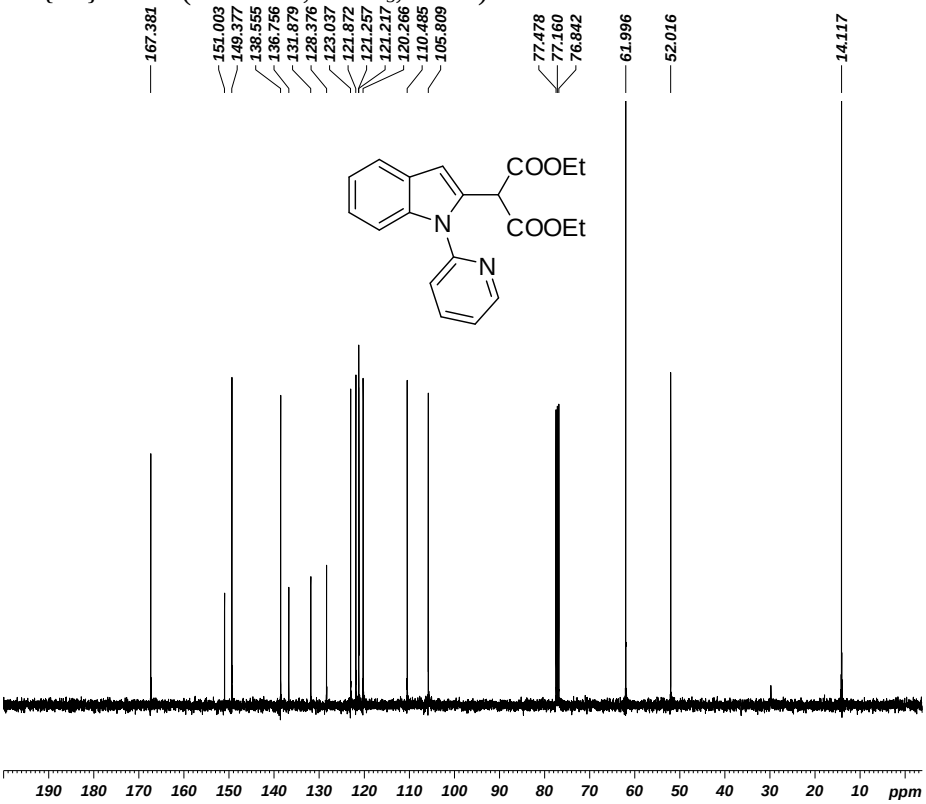

```
Current Data Parameters
NAME          07.16
EXPNO            77
PROCNO            1

F2 - Acquisition Parameters
Date_       20160704
Time            9.19
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              88.51
DW              62.400 usec
DE               6.50 usec
TE              297.7 K
D1           0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300095 MHz
WDW               EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          07.16
EXPNO            78
PROCNO            1

F2 - Acquisition Parameters
Date_       20160704
Time            9.25
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW              20.800 usec
DE               6.50 usec
TE              298.2 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0               1

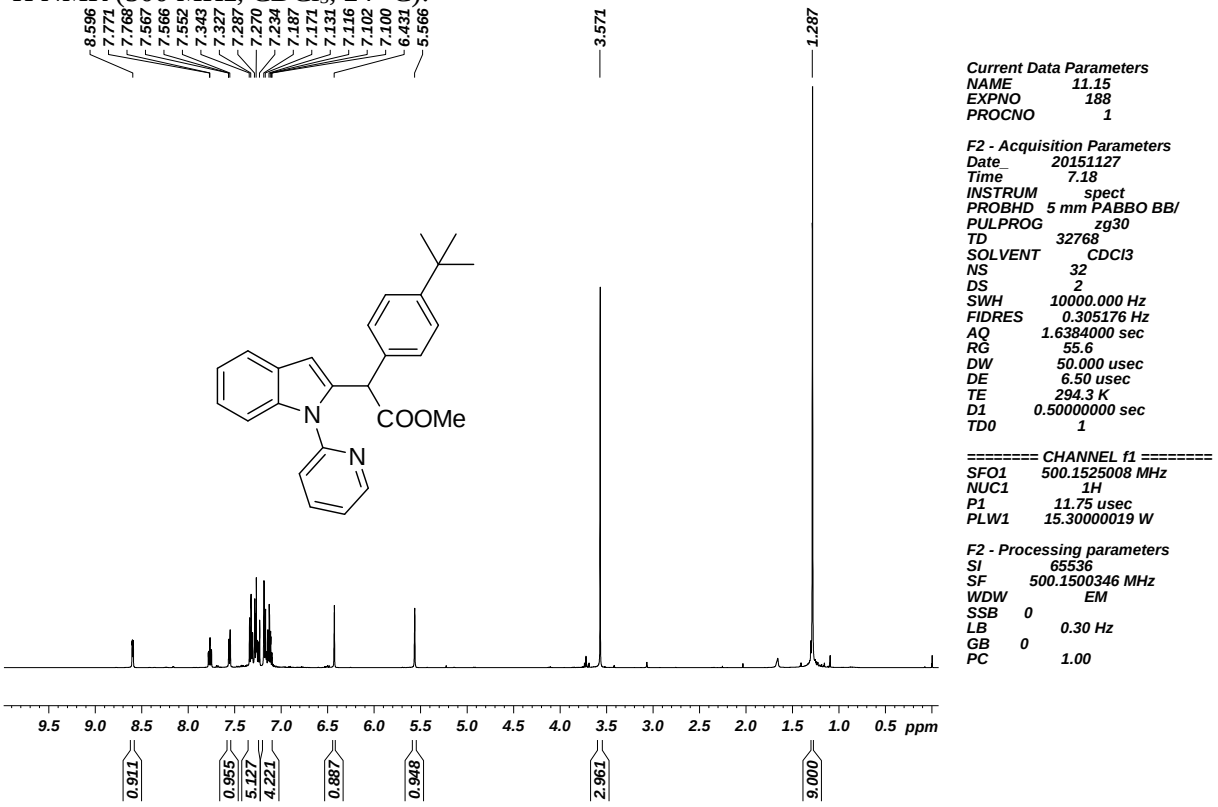
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1               9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2           90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI             32768
SF         100.6127615 MHz
WDW               EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(4-(tert-butyl)phenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3d):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



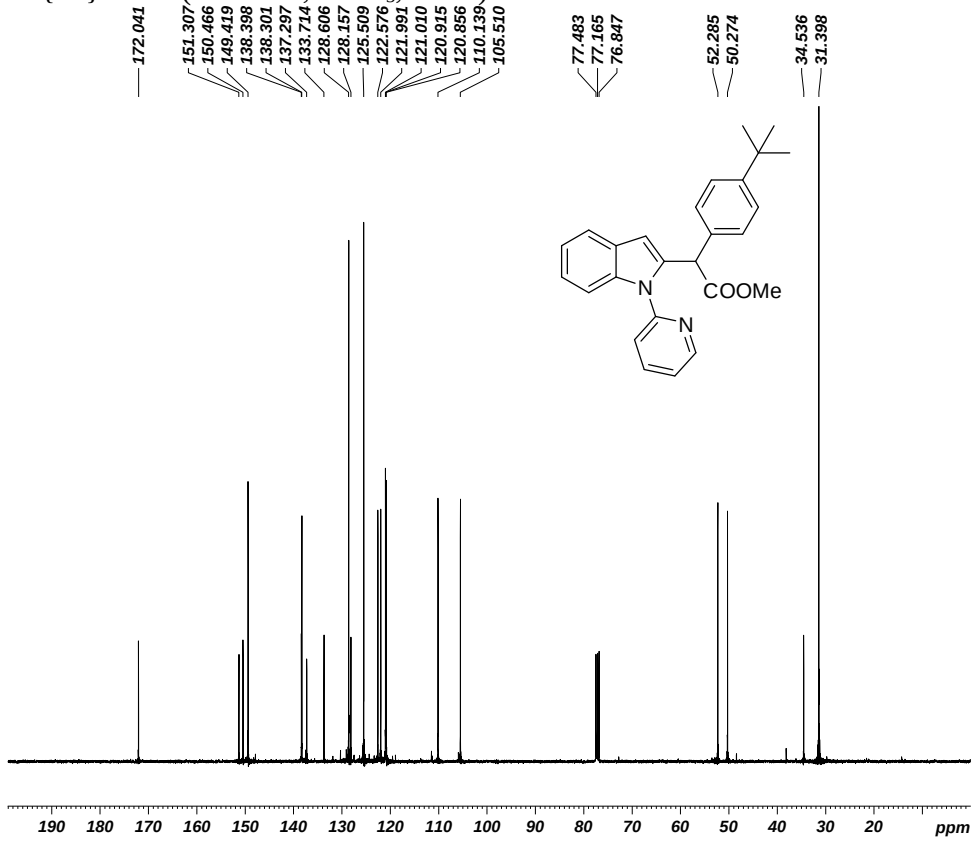

```
Current Data Parameters
NAME          11.15
EXPNO           188
PROCNO            1

F2 - Acquisition Parameters
Date_       20151127
Time            7.18
INSTRUM         spect
PROBHD   5 mm PABBO BB/
PULPROG         zg30
TD             32768
SOLVENT         CDCl3
NS                32
DS                 2
SWH        10000.000 Hz
FIDRES       0.305176 Hz
AQ         1.6384000 sec
RG              55.6
DW             50.000 usec
DE              6.50 usec
TE             294.3 K
D1         0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       500.1525008 MHz
NUC1               1H
P1             11.75 usec
PLW1       15.30000019 W

F2 - Processing parameters
SI             65536
SF         500.1500346 MHz
WDW               EM
SSB     0
LB             0.30 Hz
GB      0
PC             1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):

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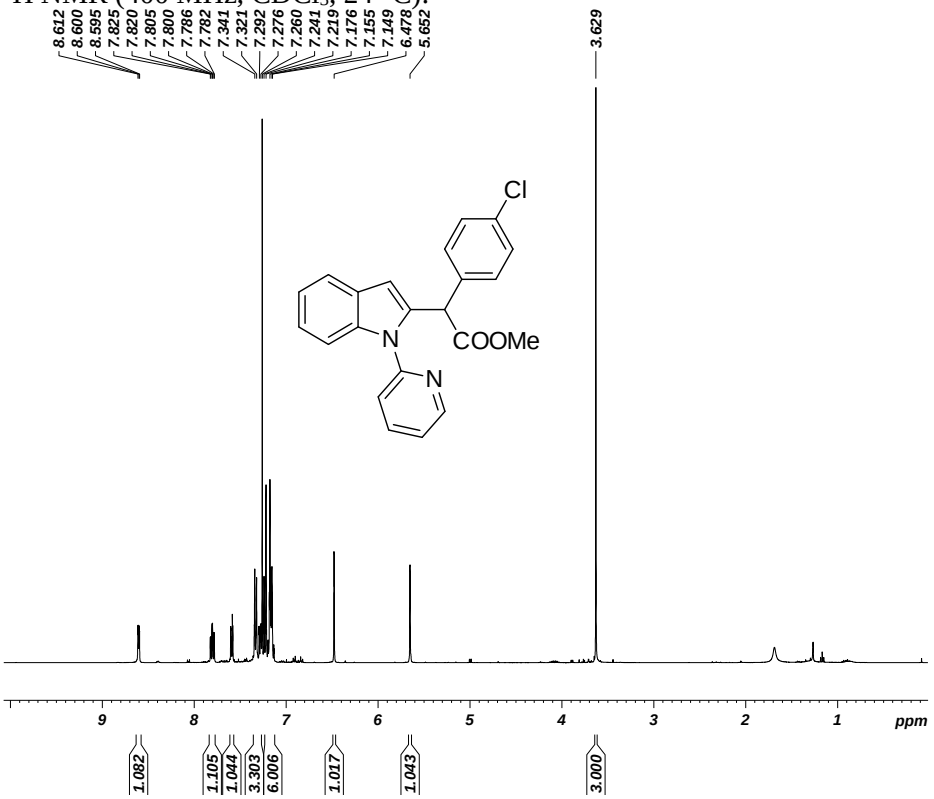
Current Data Parameters
NAME          spa41115
EXPNO              411
PROCNO               1

F2 - Acquisition Parameters
Date_       20151129
Time            8.35
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS              1000
DS                 4
SWH        24038.461 Hz
FIDRES       1.453353 Hz
AQ         0.3440320 sec
RG             200.34
DW             20.800 usec
DE              6.50 usec
TE             299.0 K
D1         1.00000000 sec
d11        0.03000000 sec
DELTA      0.89999998 sec
TD0               1
SFO1       100.6228289 MHz
NUC1              13C
P1              9.25 usec
PLW1       47.00000000 W
SFO2       400.1316005 MHz
NUC2               1H
CPDPRG[2       waltz16
PCPD2          90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.19103000 W

F2 - Processing parameters
SI             32768
SF         100.6127690 MHz
WDW               EM
SSB     0
LB             1.00 Hz
GB      0
PC             1.40
```

Methyl 2-(4-chlorophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3e):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

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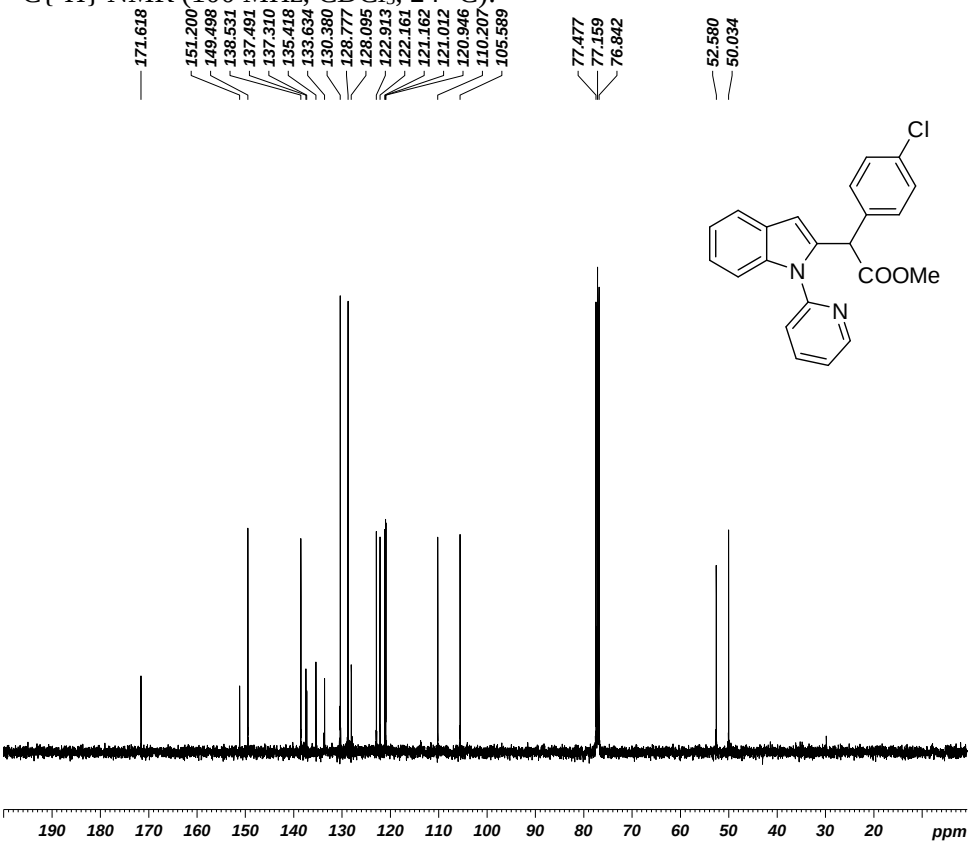
Current Data Parameters
NAME          12.15
EXPNO           369
PROCNO            1

F2 - Acquisition Parameters
Date_       20151221
Time            1.35
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG              153.13
DW               62.400 usec
DE                6.50 usec
TE              296.7 K
D1           0.50000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W
SFO1        400.1320007 MHz

F2 - Processing parameters
SI             65536
SF          400.1300095 MHz
WDW                EM
SSB       0
LB              0.30 Hz
GB        0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



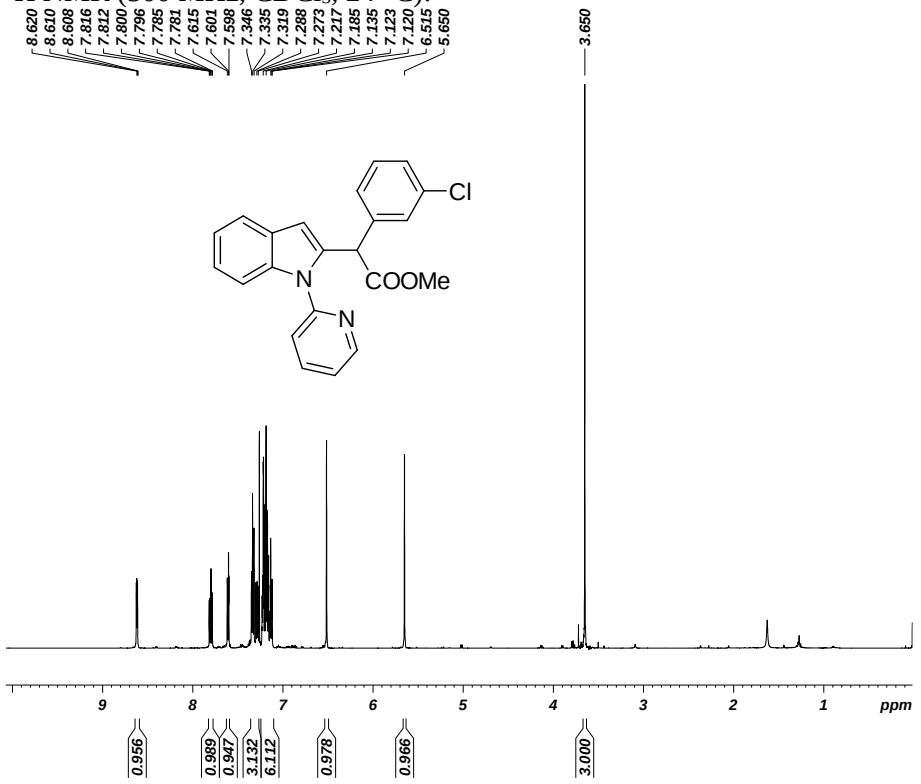

```
Current Data Parameters
NAME          spa41215
EXPNO             370
PROCNO              1

F2 - Acquisition Parameters
Date_       20151221
Time            1.49
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD             16540
SOLVENT         CDCl3
NS                512
DS                  4
SWH          24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              297.3 K
D1           1.00000000 sec
d11          0.03000000 sec
DELTA        0.89999998 sec
TD0               1
SFO1        100.6228289 MHz
NUC1              13C
P1                9.25 usec
PLW1         47.00000000 W
SFO2        400.1316005 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.19103000 W

F2 - Processing parameters
SI             32768
SF          100.6127573 MHz
WDW                EM
SSB       0
LB              1.00 Hz
GB        0
PC              1.40
```

Methyl 2-(3-chlorophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3f):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



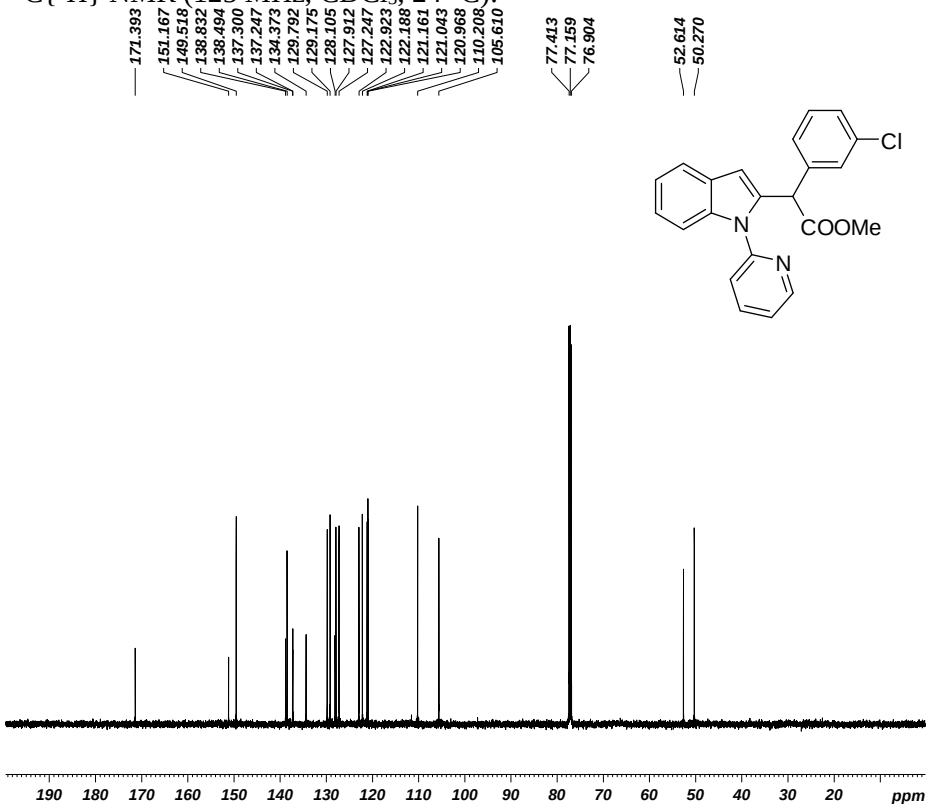

```
Current Data Parameters
NAME          01.16
EXPNO          227
PROCNO           1

F2 - Acquisition Parameters
Date_        20160114
Time           14.18
INSTRUM         spect
PROBHD  5 mm PABBO BB/
PULPROG         zg30
TD             32768
SOLVENT         CDCl3
NS                32
DS                 2
SWH        10000.000 Hz
FIDRES         0.305176 Hz
AQ          1.6384000 sec
RG              101.5
DW             50.000 usec
DE              6.50 usec
TE             297.9 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       500.1525008 MHz
NUC1              1H
P1             11.75 usec
PLW1       15.30000019 W

F2 - Processing parameters
SI             65536
SF         500.1500220 MHz
WDW               EM
SSB     0
LB             0.30 Hz
GB      0
PC             1.00
```

^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME         spa50116
EXPNO             228
PROCNO              1

F2 - Acquisition Parameters
Date_        20160114
Time           14.31
INSTRUM         spect
PROBHD  5 mm PABBO BB/
PULPROG        zgpg30
TD             20480
SOLVENT         CDCl3
NS               512
DS                 4
SWH        29761.904 Hz
FIDRES         1.453218 Hz
AQ          0.3440640 sec
RG              202.34
DW             16.800 usec
DE              6.50 usec
TE             298.8 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

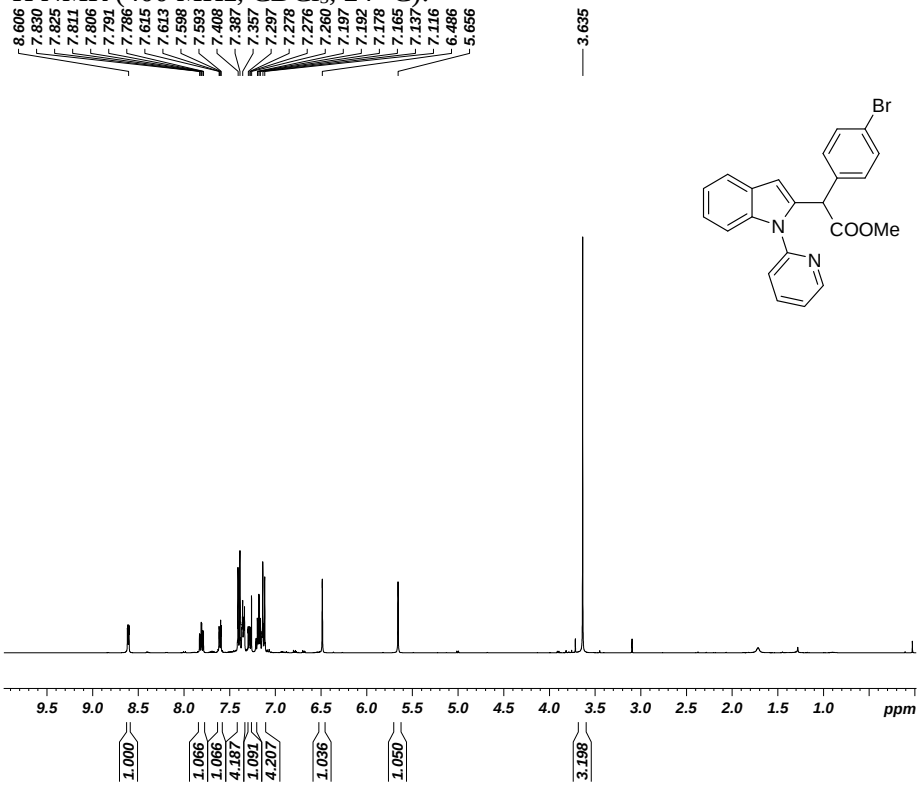
======== CHANNEL f1 ========
SFO1       125.7753932 MHz
NUC1              13C
P1              9.63 usec
PLW1       103.00000000 W

======== CHANNEL f2 ========
SFO2       500.1520006 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2          80.00 usec
PLW2       15.30000019 W
PLW12       0.33006001 W
PLW13       0.21123999 W

F2 - Processing parameters
SI             32768
SF         125.7628070 MHz
WDW               EM
SSB     0
LB             1.00 Hz
GB      0
PC             1.40
```

Methyl 2-(4-bromophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3g):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



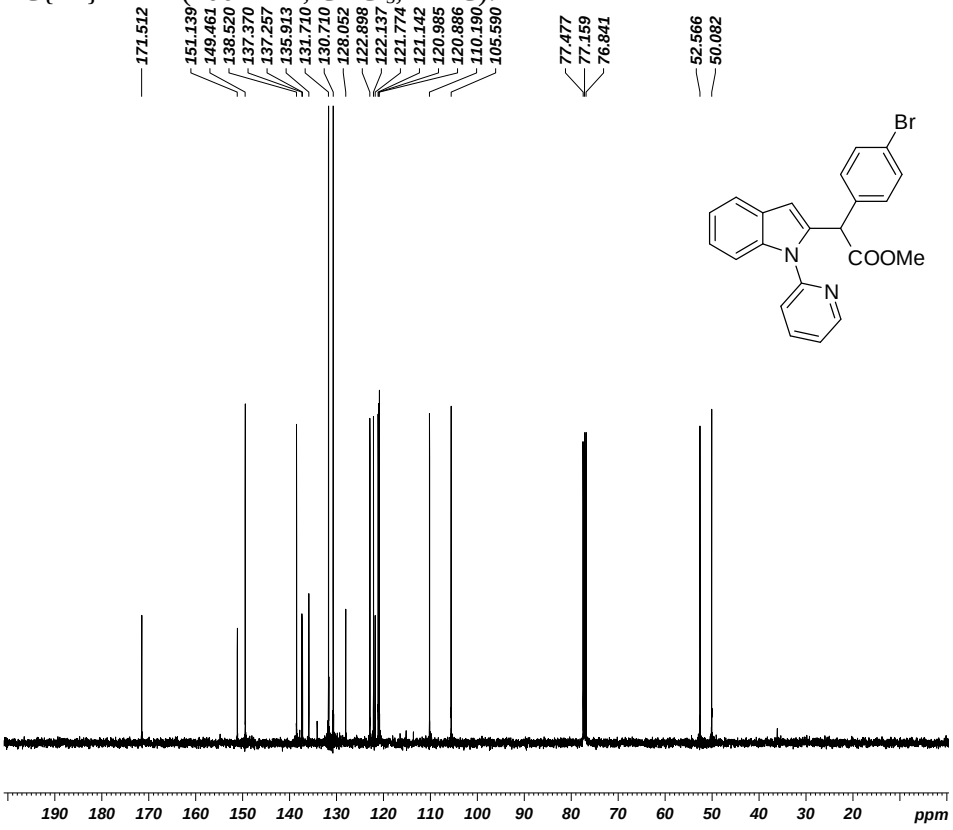

```
Current Data Parameters
NAME          spa41215
EXPNO              133
PROCNO               1

F2 - Acquisition Parameters
Date_         20151213
Time              1.02
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                  16
DS                   2
SWH            8012.820 Hz
FIDRES         0.122266 Hz
AQ             4.0894465 sec
RG                95.73
DW              62.400 usec
DE               6.50 usec
TE               290.5 K
D1             0.50000000 sec
TD0                  1

======== CHANNEL f1 ========
NUC1                1H
P1             15.70 usec
PLW1           7.75000000 W
SFO1           400.1320007 MHz

F2 - Processing parameters
SI               65536
SF           400.1300092 MHz
WDW                 EM
SSB                  0
LB              0.30 Hz
GB                   0
PC                1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



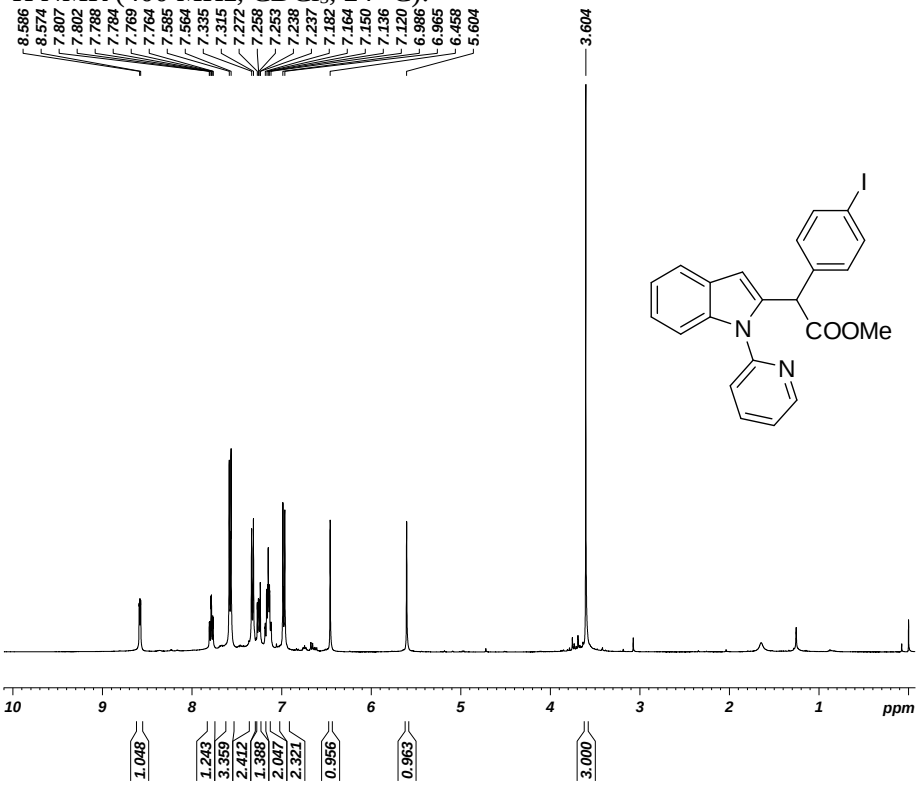

```
Current Data Parameters
NAME          spa41215
EXPNO              144
PROCNO               1

F2 - Acquisition Parameters
Date_         20151213
Time             13.22
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD               16540
SOLVENT          CDCl3
NS                 500
DS                   4
SWH           24038.461 Hz
FIDRES         1.453353 Hz
AQ             0.3440320 sec
RG                200.34
DW              20.800 usec
DE               6.50 usec
TE               295.1 K
D1             1.00000000 sec
d11            0.03000000 sec
DELTA          0.89999998 sec
TD0                  1
SFO1           100.6228289 MHz
NUC1                13C
P1              9.25 usec
PLW1           47.00000000 W
SFO2           400.1316005 MHz
NUC2                1H
CPDPRG[2        waltz16
PCPD2           90.00 usec
PLW2           7.75000000 W
PLW12          0.23583999 W
PLW13          0.19103000 W

F2 - Processing parameters
SI               32768
SF           100.6127623 MHz
WDW                 EM
SSB                  0
LB              1.00 Hz
GB                   0
PC                1.40
```

Methyl 2-(4-iodophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3h):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



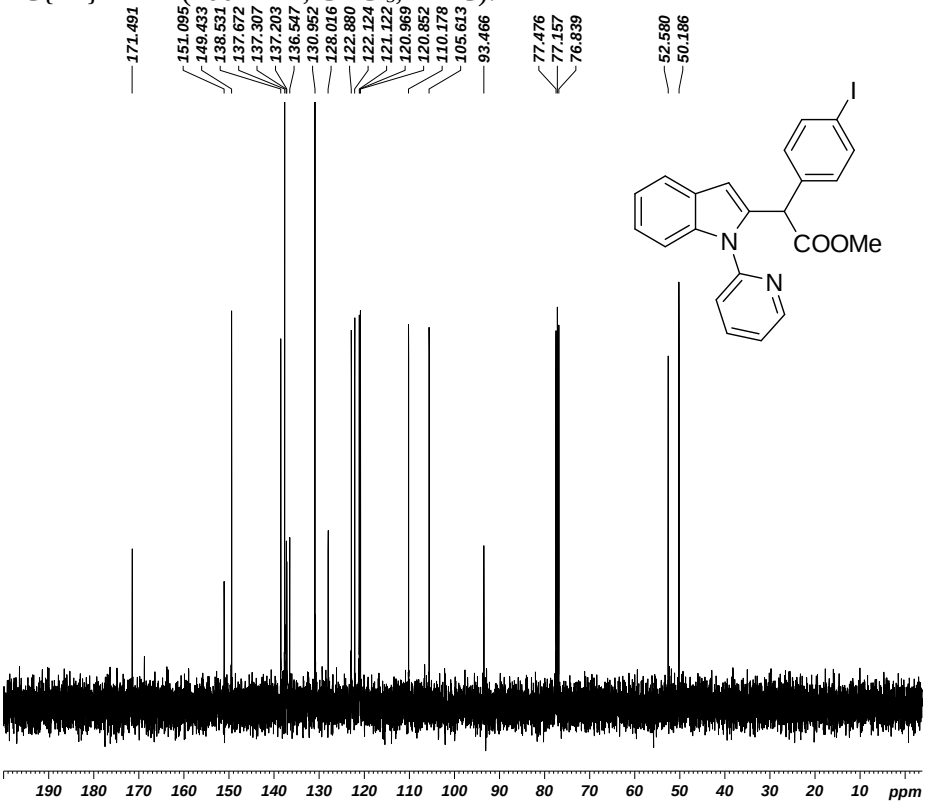

```
Current Data Parameters
NAME          12.15
EXPNO            38
PROCNO            1

F2 - Acquisition Parameters
Date_       20151210
Time            8.07
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG             108.26
DW            62.400 usec
DE             6.50 usec
TE             295.1 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1              1H
P1             15.70 usec
PLW1        7.75000000 W
SFO1       400.1320007 MHz

F2 - Processing parameters
SI             65536
SF         400.1300183 MHz
WDW               EM
SSB    0
LB           0.30 Hz
GB     0
PC             1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          12.15
EXPNO           126
PROCNO            1

F2 - Acquisition Parameters
Date_       20151212
Time           14.48
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH         24038.461 Hz
FIDRES       1.453353 Hz
AQ           0.3440320 sec
RG              6.15
DW            20.800 usec
DE             6.50 usec
TE             292.2 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

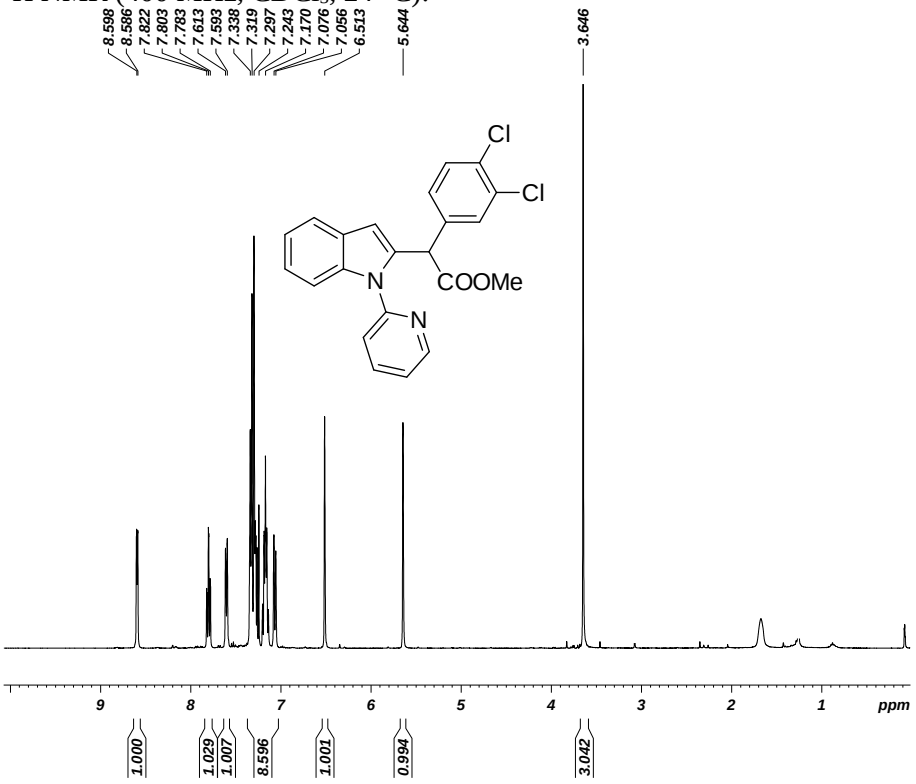
======== CHANNEL f1 ========
NUC1             13C
P1             9.25 usec
PLW1        47.00000000 W
SFO1       100.6228289 MHz

======== CHANNEL f2 ========
CPDPRG[2       waltz16
NUC2              1H
PCPD2          90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.19103000 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI             32768
SF         100.6127649 MHz
WDW               EM
SSB    0
LB             1.00 Hz
GB     0
PC             1.40
```

Methyl 2-(3,4-dichlorophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3i):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



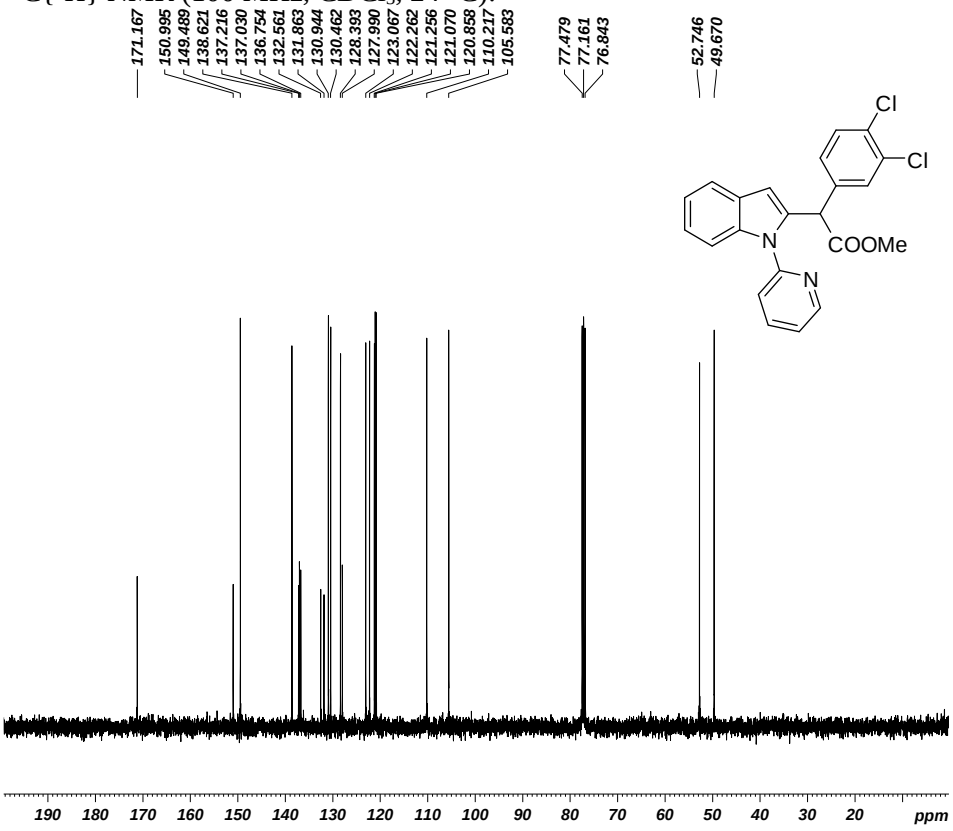

```
Current Data Parameters
NAME          12.15
EXPNO           327
PROCNO            1

F2 - Acquisition Parameters
Date_       20151219
Time            0.16
INSTRUM         spect
PROBHD  5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG               124.58
DW               62.400 usec
DE                6.50 usec
TE               291.6 K
D1           0.50000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W
SFO1         400.1320007 MHz

F2 - Processing parameters
SI             65536
SF          400.1300158 MHz
WDW                EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



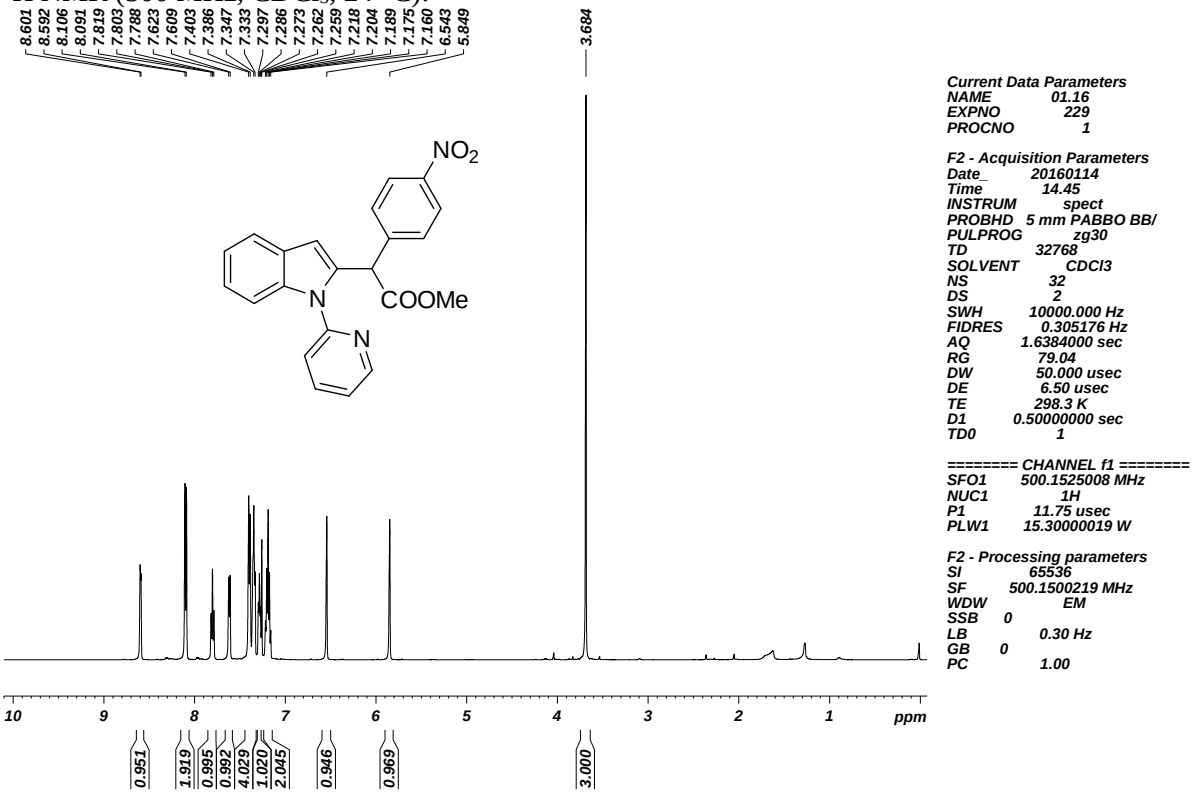

```
Current Data Parameters
NAME         spa41215
EXPNO             328
PROCNO              1

F2 - Acquisition Parameters
Date_       20151219
Time            0.23
INSTRUM         spect
PROBHD  5 mm PABBO BB-
PULPROG         zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG               200.34
DW               20.800 usec
DE                6.50 usec
TE               292.1 K
D1           1.00000000 sec
d11          0.03000000 sec
DELTA        0.89999998 sec
TD0                 1
SFO1         100.6228289 MHz
NUC1               13C
P1                9.25 usec
PLW1         47.00000000 W
SFO2         400.1316005 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.19103000 W

F2 - Processing parameters
SI             32768
SF          100.6127614 MHz
WDW                EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(4-nitrophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3j):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



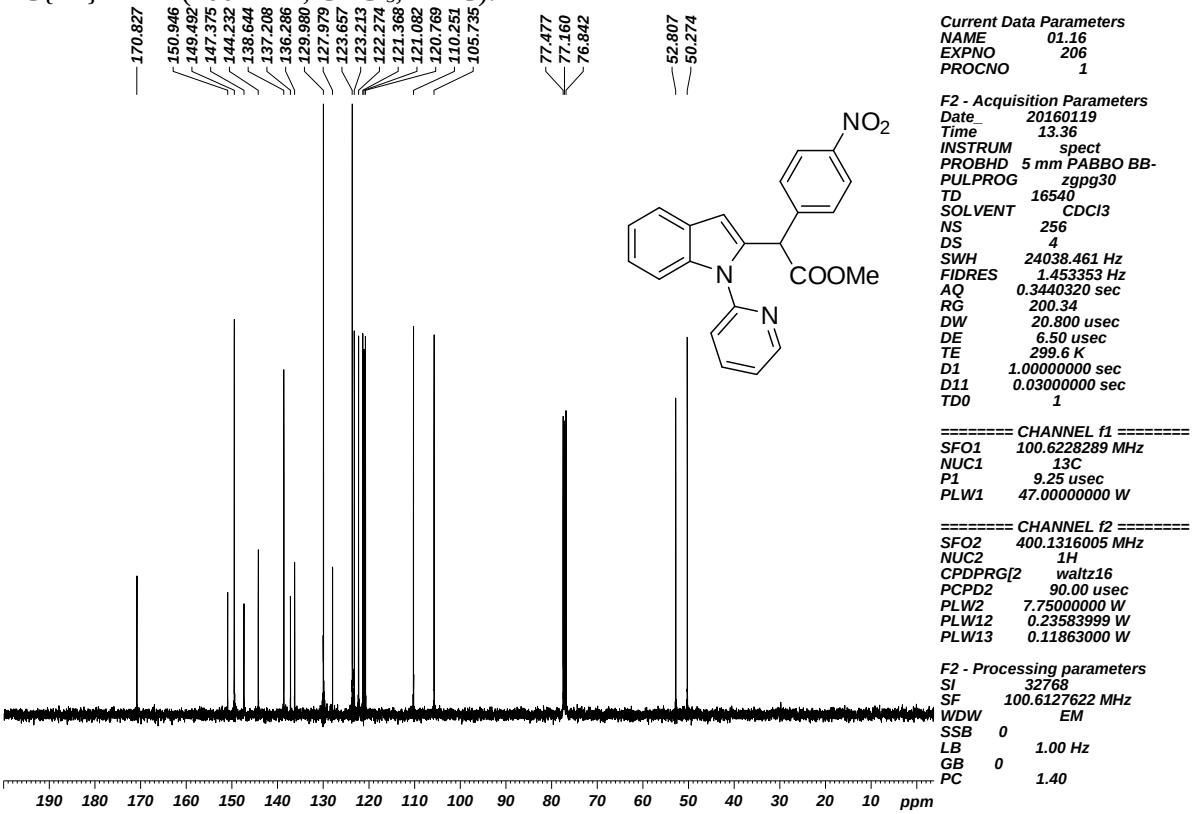

```
Current Data Parameters
NAME          01.16
EXPNO           229
PROCNO            1

F2 - Acquisition Parameters
Date_       20160114
Time           14.45
INSTRUM         spect
PROBHD  5 mm PABBO BB/
PULPROG         zg30
TD             32768
SOLVENT         CDCl3
NS                32
DS                 2
SWH        10000.000 Hz
FIDRES       0.305176 Hz
AQ         1.6384000 sec
RG              79.04
DW             50.000 usec
DE              6.50 usec
TE             298.3 K
D1         0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       500.1525008 MHz
NUC1              1H
P1             11.75 usec
PLW1       15.30000019 W

F2 - Processing parameters
SI             65536
SF         500.1500219 MHz
WDW               EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          01.16
EXPNO           206
PROCNO            1

F2 - Acquisition Parameters
Date_       20160119
Time           13.36
INSTRUM         spect
PROBHD  5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH        24038.461 Hz
FIDRES       1.453353 Hz
AQ         0.3440320 sec
RG              200.34
DW             20.800 usec
DE              6.50 usec
TE             299.6 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0               1

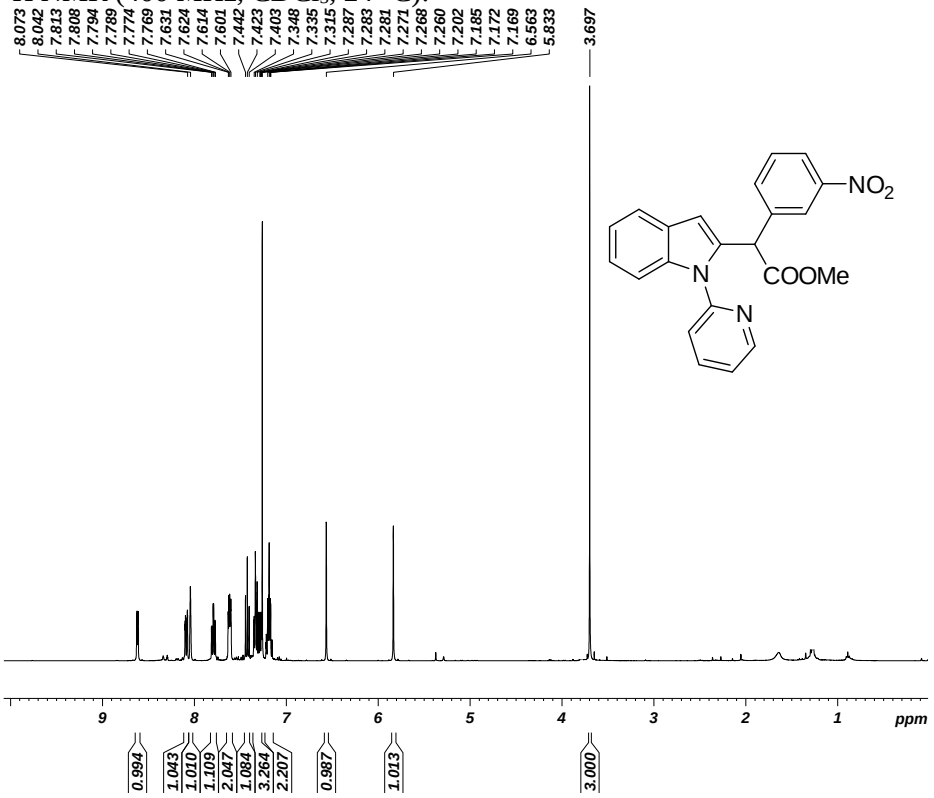
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1              9.25 usec
PLW1       47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2           90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.11863000 W

F2 - Processing parameters
SI             32768
SF         100.6127622 MHz
WDW               EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(3-nitrophenyl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3k):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



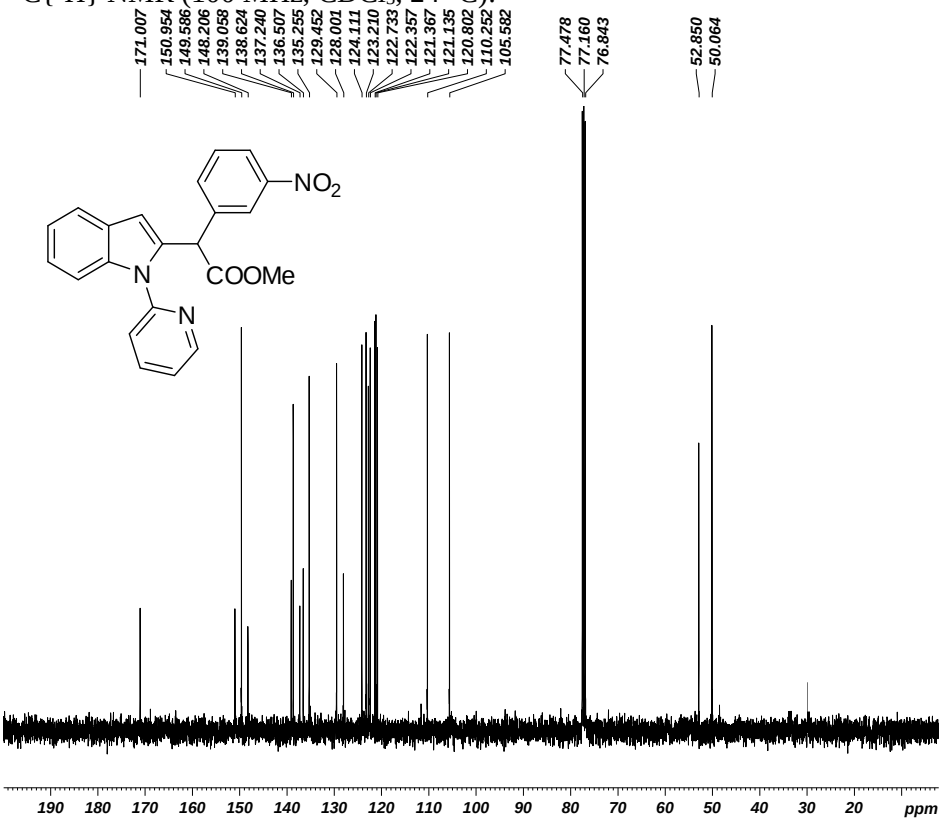

```
Current Data Parameters
NAME            10.15
EXPNO             658
PROCNO              1

F2 - Acquisition Parameters
Date_         20151030
Time             19.33
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT          CDCl3
NS                 16
DS                  2
SWH           8012.820 Hz
FIDRES        0.122266 Hz
AQ            4.0894465 sec
RG                124.58
DW                62.400 usec
DE                 6.50 usec
TE                294.9 K
D1            0.50000000 sec
TD0                 1

======== CHANNEL f1 ========
NUC1               1H
P1              15.70 usec
PLW1         7.75000000 W
SFO1        400.1320007 MHz

F2 - Processing parameters
SI              65536
SF          400.1300092 MHz
WDW                EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            10.15
EXPNO             674
PROCNO              1

F2 - Acquisition Parameters
Date_         20151031
Time              8.47
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT          CDCl3
NS                256
DS                  4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ            0.3440320 sec
RG                200.34
DW                20.800 usec
DE                 6.50 usec
TE                295.7 K
D1            1.00000000 sec
D11           0.03000000 sec
TD0                 1

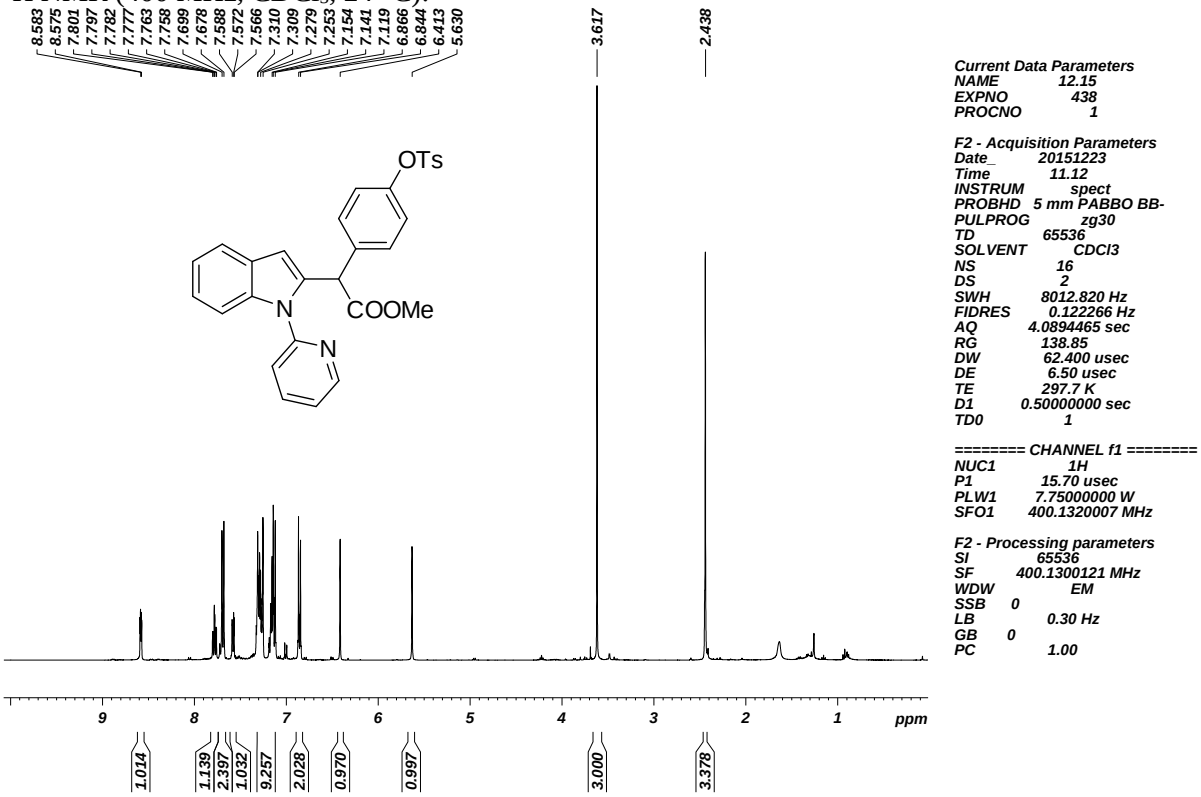
======== CHANNEL f1 ========
NUC1              13C
P1              9.25 usec
PLW1         47.00000000 W
SFO1        100.6228289 MHz

======== CHANNEL f2 ========
CPDPRG[2        waltz16
NUC2               1H
PCPD2           90.00 usec
PLW2         7.75000000 W
PLW12        0.23583999 W
PLW13        0.19103000 W
SFO2        400.1316005 MHz

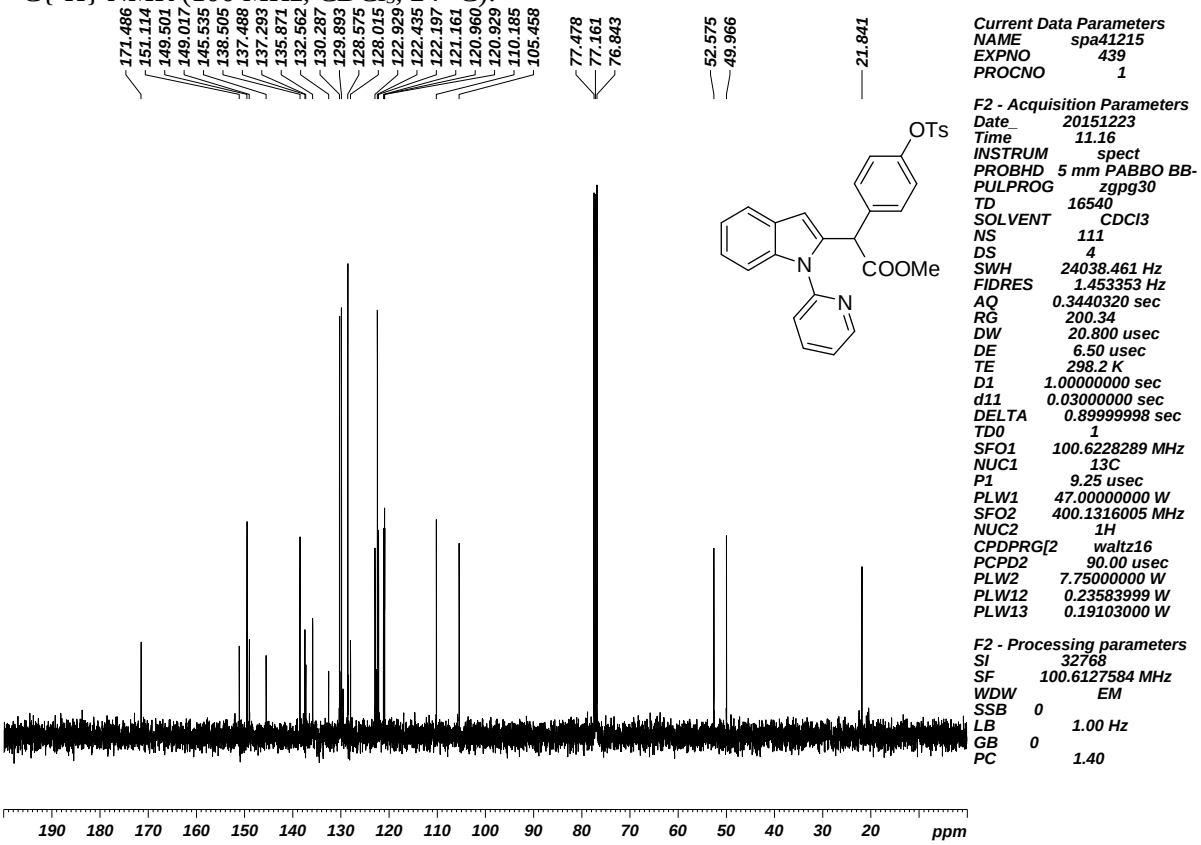
F2 - Processing parameters
SI              32768
SF          100.6127588 MHz
WDW                EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-(4-(tosyloxy)phenyl)acetate (3l):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

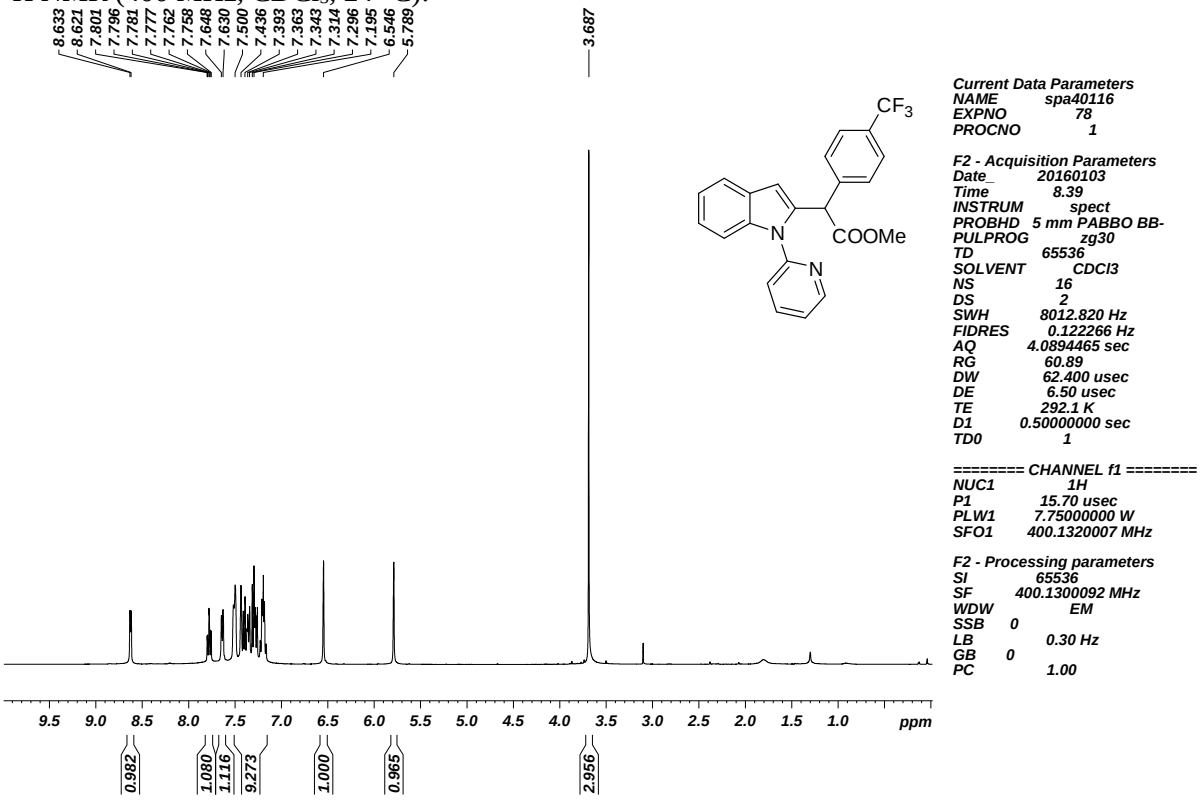


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):

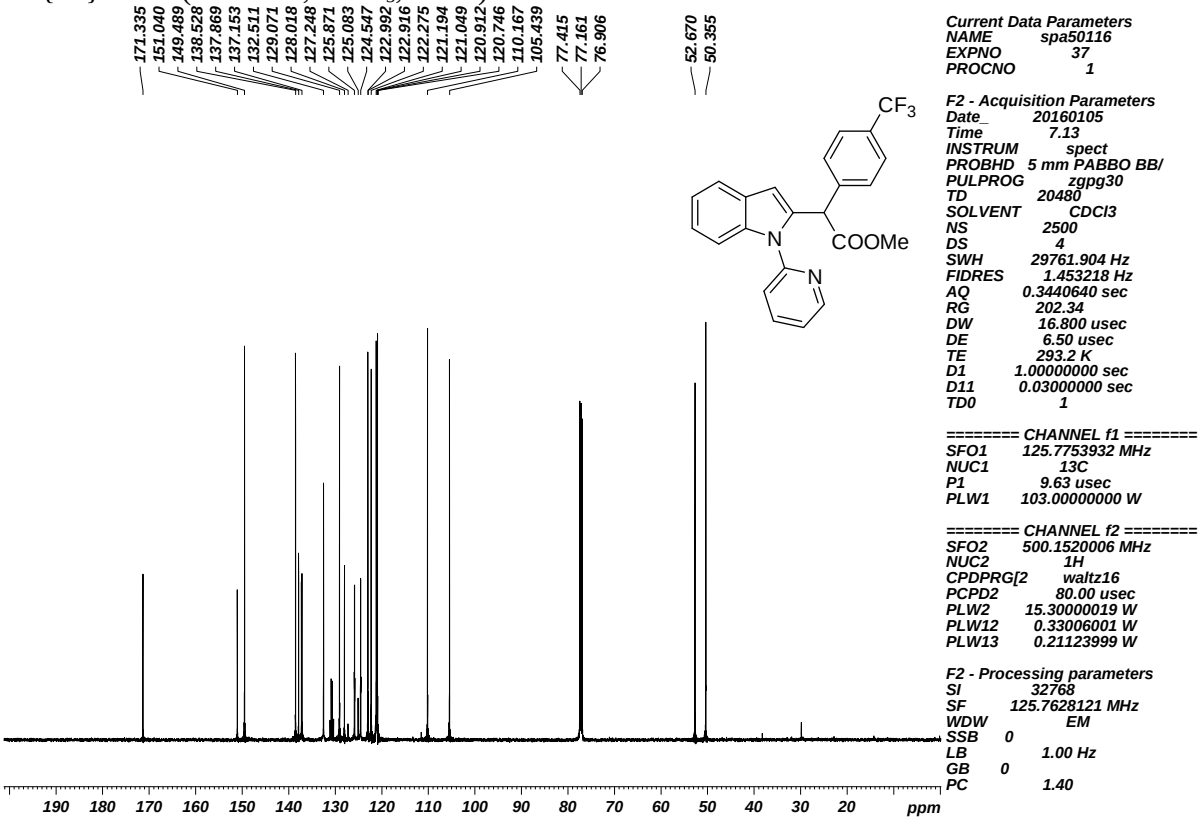


Methyl 2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-(4-(trifluoromethyl)phenyl)acetate (3m):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

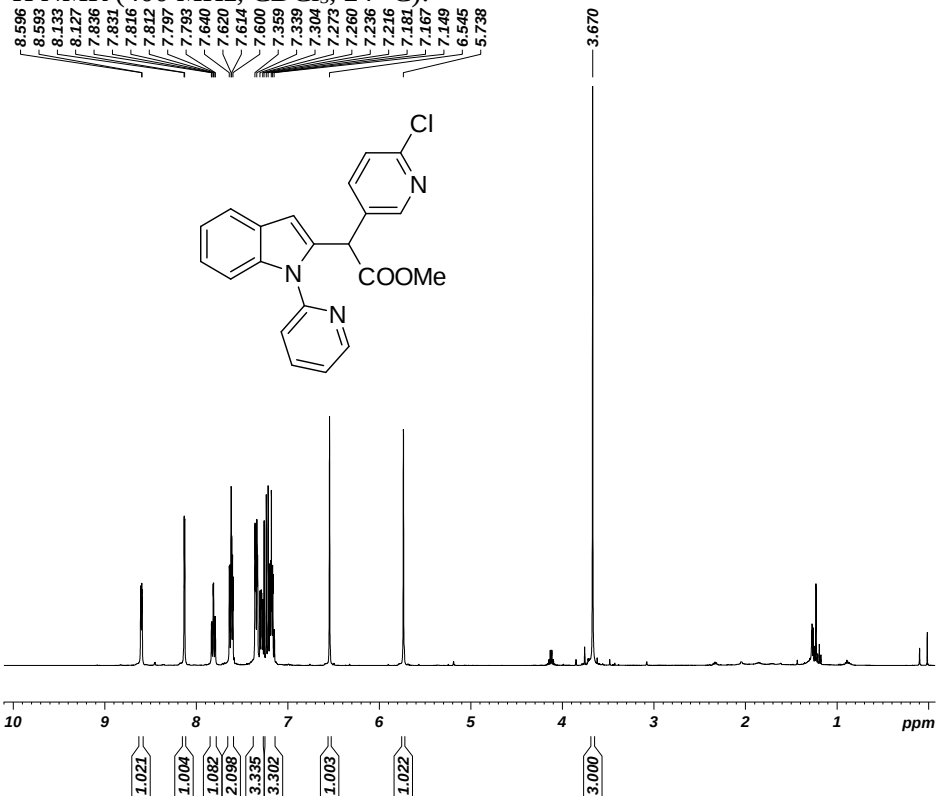


^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$, 24 °C):



Methyl 2-(6-chloropyridin-3-yl)-2-(1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3n):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



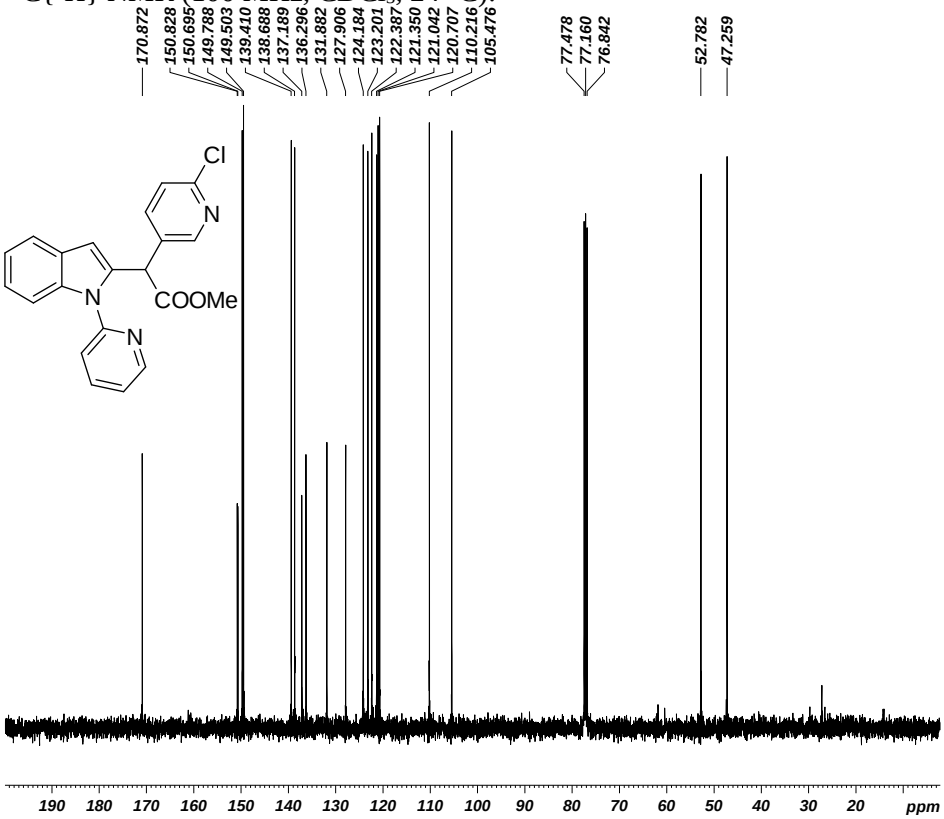

```
Current Data Parameters
NAME          04.16
EXPNO          233
PROCNO           1

F2 - Acquisition Parameters
Date_       20160412
Time            8.39
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH         8012.820 Hz
FIDRES       0.122266 Hz
AQ          4.0894465 sec
RG               88.51
DW               62.400 usec
DE                6.50 usec
TE              299.0 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF          400.1300095 MHz
WDW               EM
SSB     0
LB           0.30 Hz
GB      0
PC           1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          04.16
EXPNO          234
PROCNO           1

F2 - Acquisition Parameters
Date_       20160412
Time            8.46
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH         24038.461 Hz
FIDRES       1.453353 Hz
AQ          0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              299.3 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

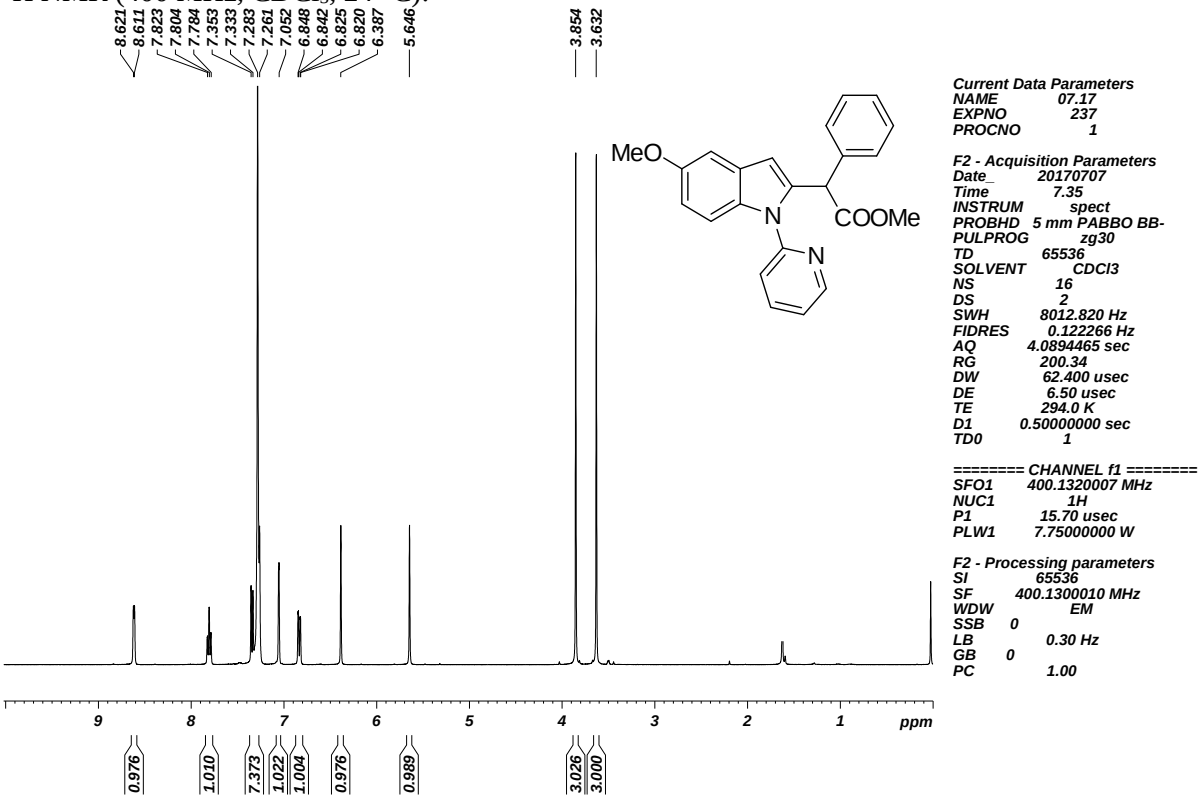
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1              13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI             32768
SF          100.6127641 MHz
WDW               EM
SSB     0
LB           1.00 Hz
GB      0
PC           1.40
```

Methyl 2-(5-methoxy-1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-phenylacetate (3o):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



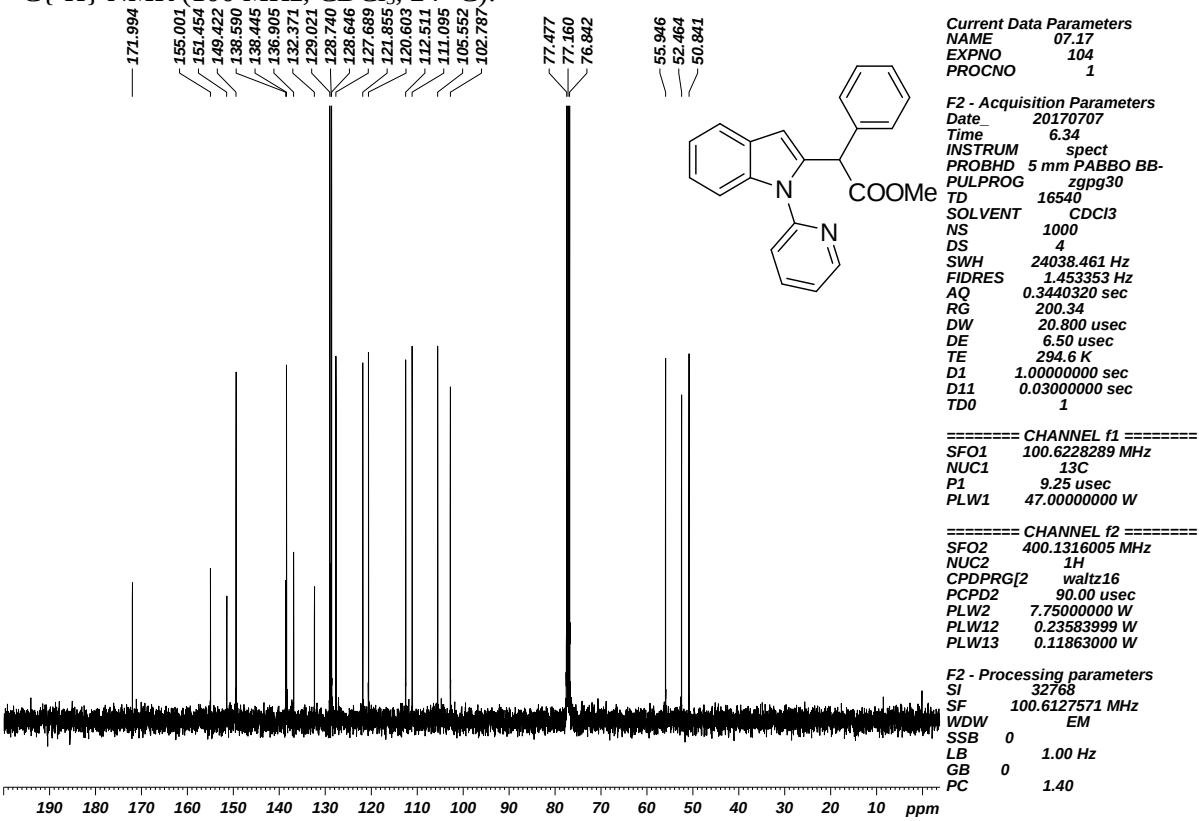

```
Current Data Parameters
NAME          07.17
EXPNO          237
PROCNO           1

F2 - Acquisition Parameters
Date_       20170707
Time            7.35
INSTRUM        spect
PROBHD  5 mm PABBO BB-
PULPROG        zg30
TD            65536
SOLVENT        CDCl3
NS               16
DS                2
SWH         8012.820 Hz
FIDRES       0.122266 Hz
AQ          4.0894465 sec
RG             200.34
DW           62.400 usec
DE            6.50 usec
TE            294.0 K
D1          0.50000000 sec
TD0              1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1              1H
P1             15.70 usec
PLW1        7.75000000 W

F2 - Processing parameters
SI            65536
SF         400.1300010 MHz
WDW              EM
SSB     0
LB           0.30 Hz
GB      0
PC             1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          07.17
EXPNO          104
PROCNO           1

F2 - Acquisition Parameters
Date_       20170707
Time            6.34
INSTRUM        spect
PROBHD  5 mm PABBO BB-
PULPROG       zgpg30
TD            16540
SOLVENT        CDCl3
NS             1000
DS                4
SWH         24038.461 Hz
FIDRES       1.453353 Hz
AQ          0.3440320 sec
RG             200.34
DW           20.800 usec
DE            6.50 usec
TE            294.6 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0              1

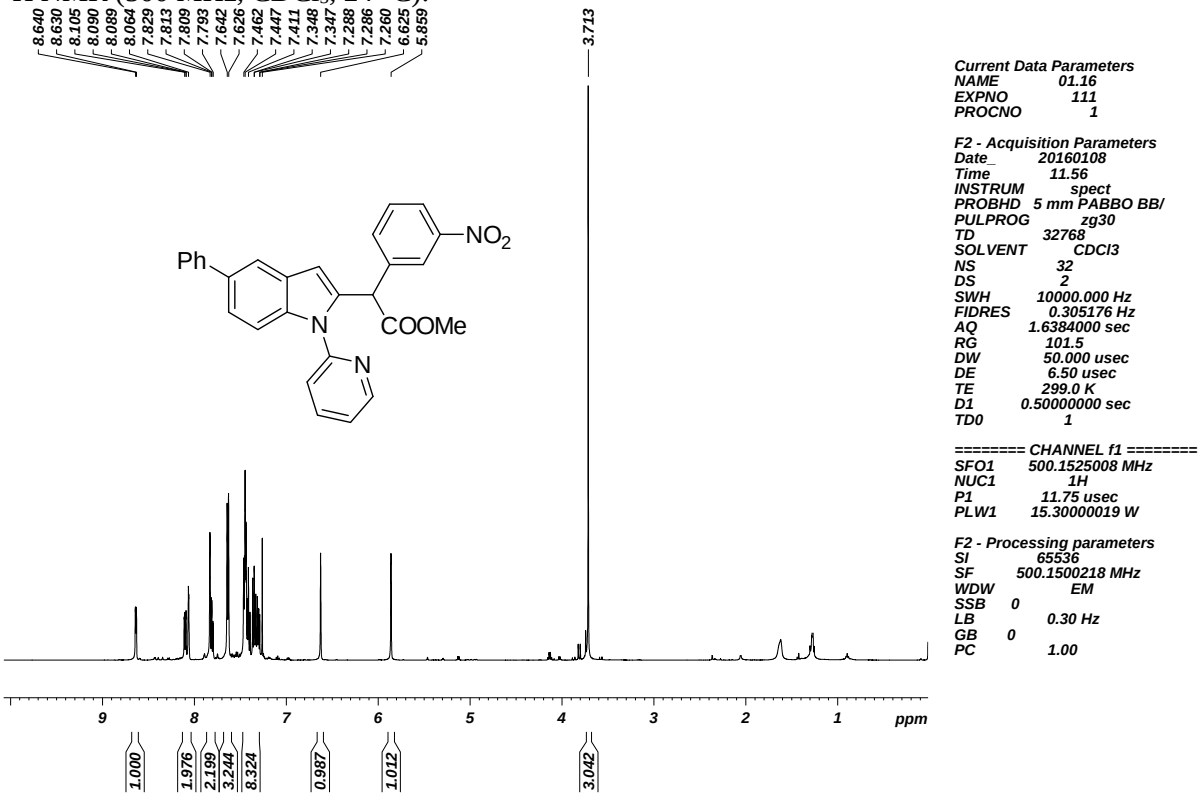
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1              13C
P1             9.25 usec
PLW1        47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2          90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.11863000 W

F2 - Processing parameters
SI            32768
SF         100.6127571 MHz
WDW              EM
SSB     0
LB             1.00 Hz
GB      0
PC             1.40
```

Methyl 2-(3-nitrophenyl)-2-(5-phenyl-1-(pyridin-2-yl)-1*H*-indol-2-yl)acetate (3p):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



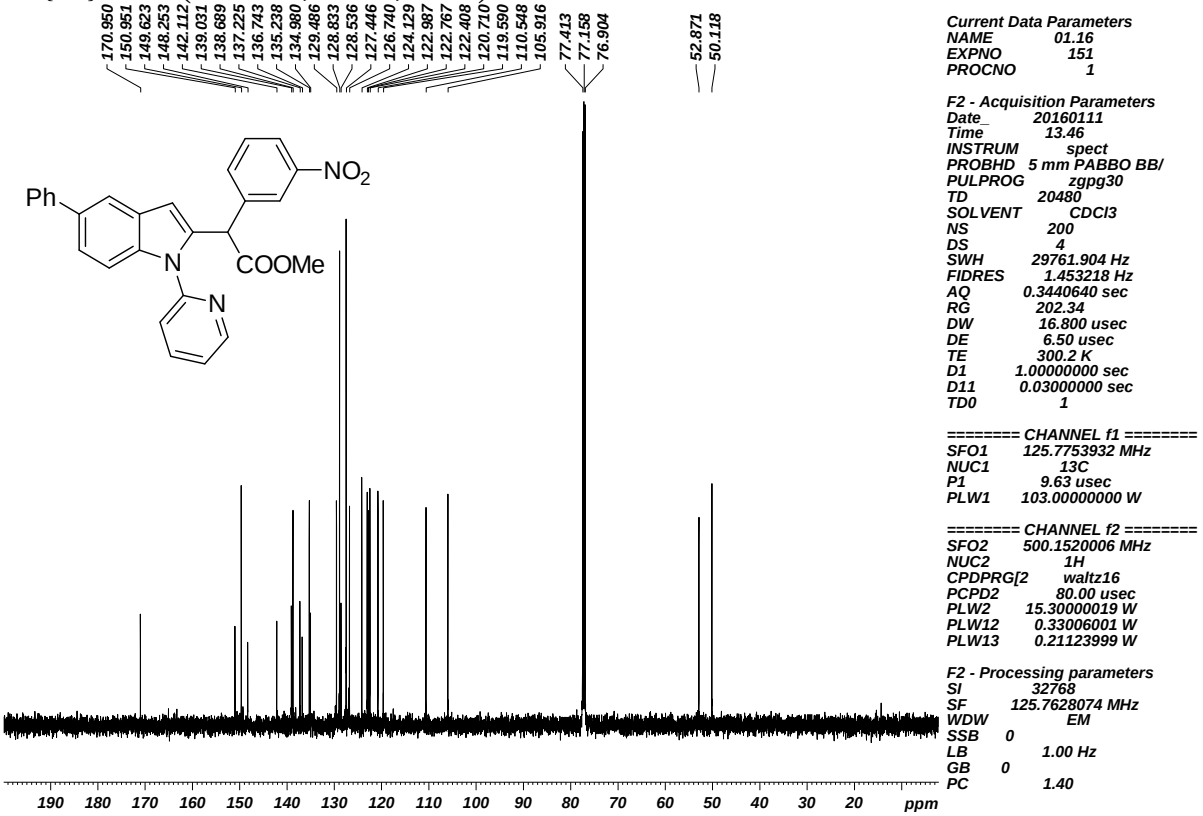

```
Current Data Parameters
NAME            01.16
EXPNO            111
PROCNO             1

F2 - Acquisition Parameters
Date_         20160108
Time             11.56
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                 32
DS                  2
SWH         10000.000 Hz
FIDRES          0.305176 Hz
AQ          1.6384000 sec
RG               101.5
DW              50.000 usec
DE               6.50 usec
TE              299.0 K
D1          0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        500.1525008 MHz
NUC1               1H
P1             11.75 usec
PLW1        15.30000019 W

F2 - Processing parameters
SI              65536
SF          500.1500218 MHz
WDW                EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            01.16
EXPNO            151
PROCNO             1

F2 - Acquisition Parameters
Date_         20160111
Time             13.46
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG         zgpg30
TD              20480
SOLVENT          CDCl3
NS                200
DS                  4
SWH         29761.904 Hz
FIDRES          1.453218 Hz
AQ          0.3440640 sec
RG               202.34
DW              16.800 usec
DE               6.50 usec
TE              300.2 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0                1

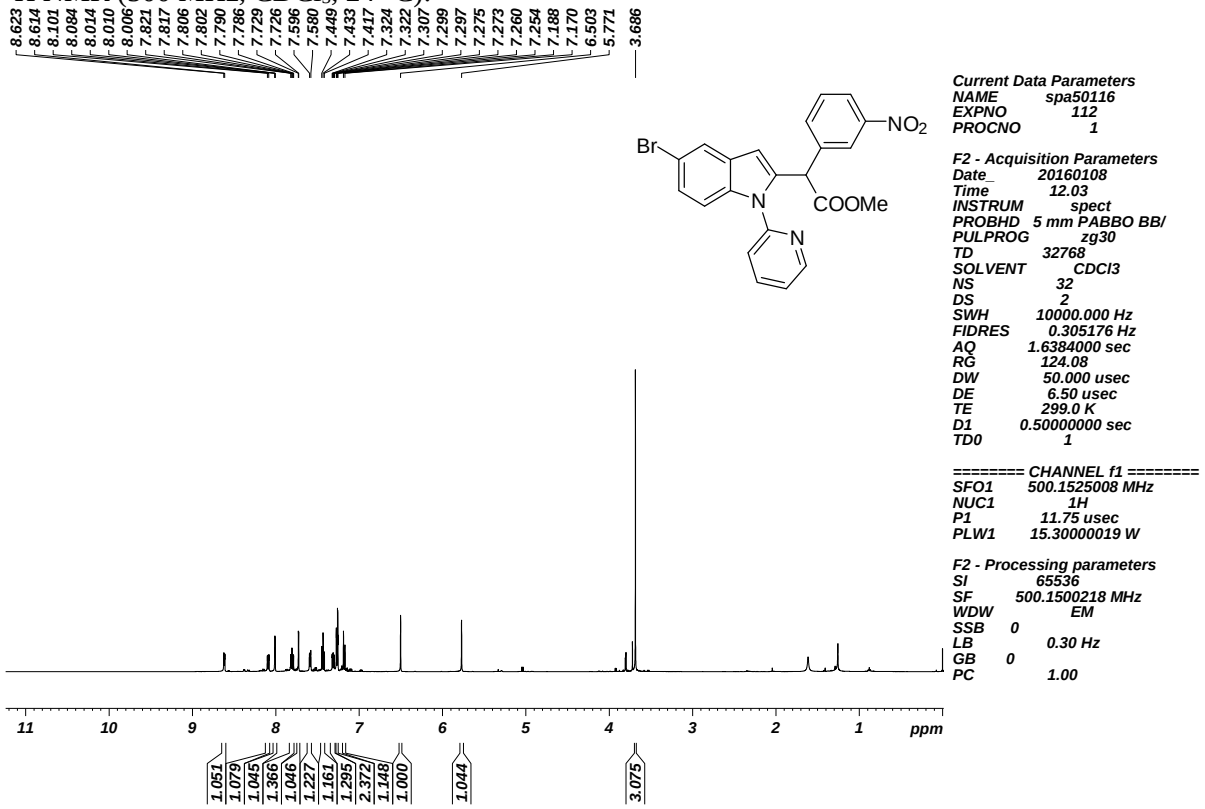
======== CHANNEL f1 ========
SFO1        125.7753932 MHz
NUC1               13C
P1              9.63 usec
PLW1        103.00000000 W

======== CHANNEL f2 ========
SFO2        500.1520006 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2           80.00 usec
PLW2        15.30000019 W
PLW12        0.33006001 W
PLW13        0.21123999 W

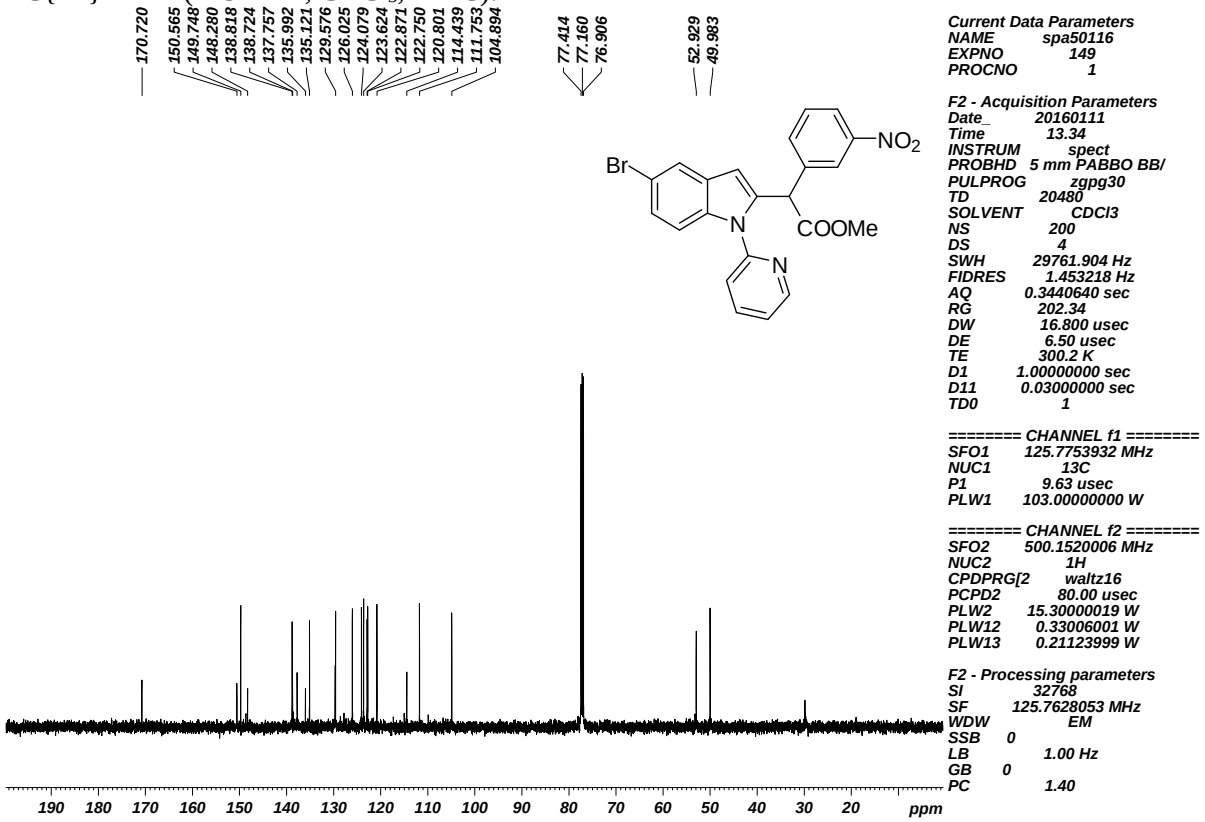
F2 - Processing parameters
SI              32768
SF          125.7628074 MHz
WDW                EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(5-bromo-1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-(3-nitrophenyl)acetate (3q):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):

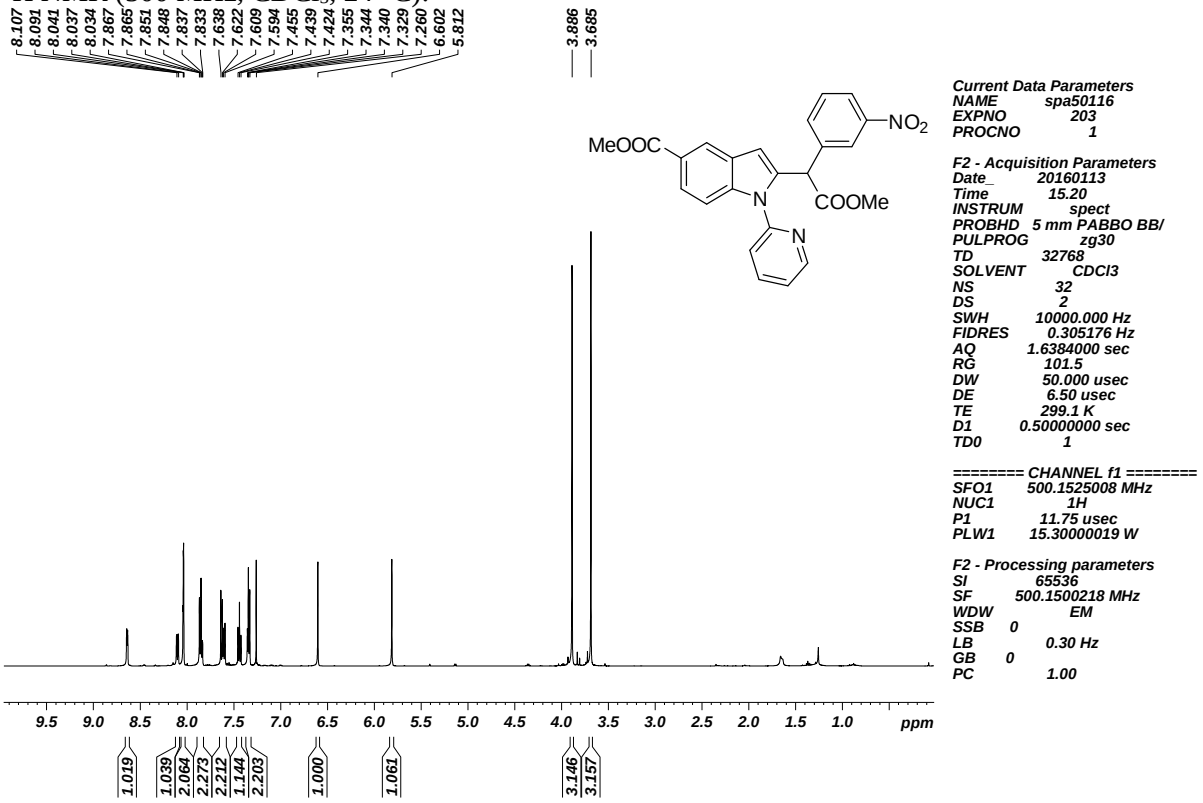


^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$, 24 °C):



Methyl 2-(2-methoxy-1-(3-nitrophenyl)-2-oxoethyl)-1-(pyridin-2-yl)-1*H*-indole-5-carboxylate (3r):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



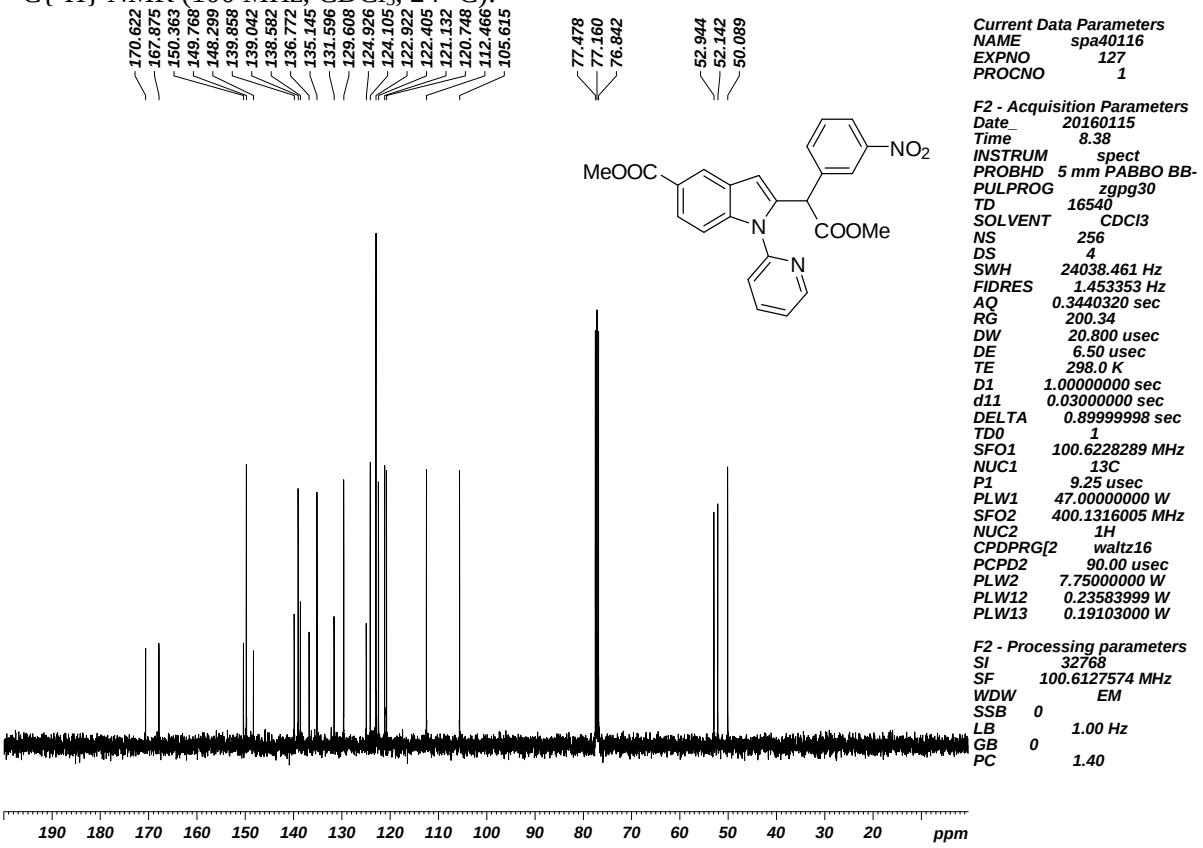

```
Current Data Parameters
NAME          spa50116
EXPNO            203
PROCNO             1

F2 - Acquisition Parameters
Date_         20160113
Time             15.20
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                 32
DS                  2
SWH          10000.000 Hz
FIDRES           0.305176 Hz
AQ           1.6384000 sec
RG                101.5
DW             50.000 usec
DE              6.50 usec
TE              299.1 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1         500.1525008 MHz
NUC1               1H
P1               11.75 usec
PLW1         15.30000019 W

F2 - Processing parameters
SI               65536
SF           500.1500218 MHz
WDW                EM
SSB       0
LB               0.30 Hz
GB        0
PC               1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



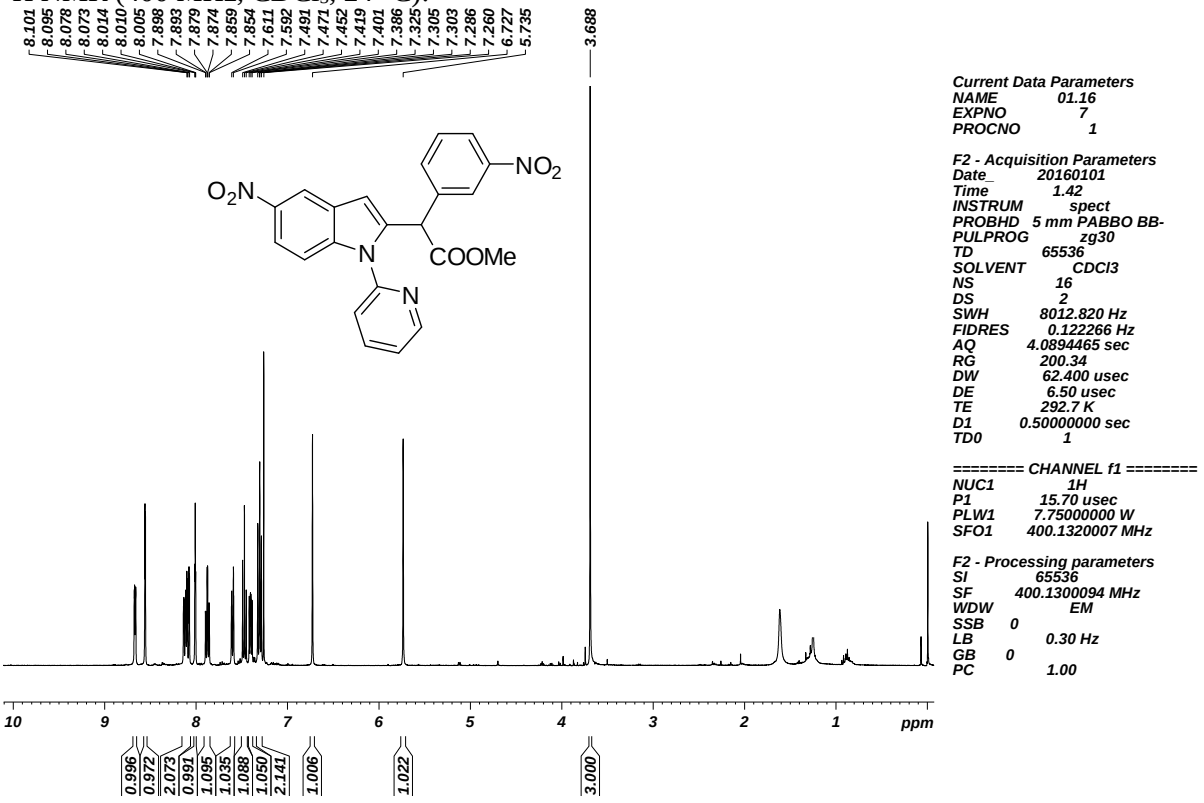

```
Current Data Parameters
NAME          spa40116
EXPNO              127
PROCNO             1

F2 - Acquisition Parameters
Date_         20160115
Time              8.38
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT          CDCl3
NS                256
DS                 4
SWH          24038.461 Hz
FIDRES           1.453353 Hz
AQ           0.3440320 sec
RG                200.34
DW             20.800 usec
DE              6.50 usec
TE              298.0 K
D1           1.00000000 sec
d11          0.03000000 sec
DELTA        0.89999998 sec
TD0                1
SFO1         100.6228289 MHz
NUC1               13C
P1               9.25 usec
PLW1         47.00000000 W
SFO2         400.1316005 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2          90.00 usec
PLW2         7.75000000 W
PLW12        0.23583999 W
PLW13        0.19103000 W

F2 - Processing parameters
SI               32768
SF           100.6127574 MHz
WDW                EM
SSB       0
LB               1.00 Hz
GB        0
PC               1.40
```

Methyl 2-(5-nitro-1-(pyridin-2-yl)-1*H*-indol-2-yl)-2-(4-nitrophenyl)acetate (3s):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



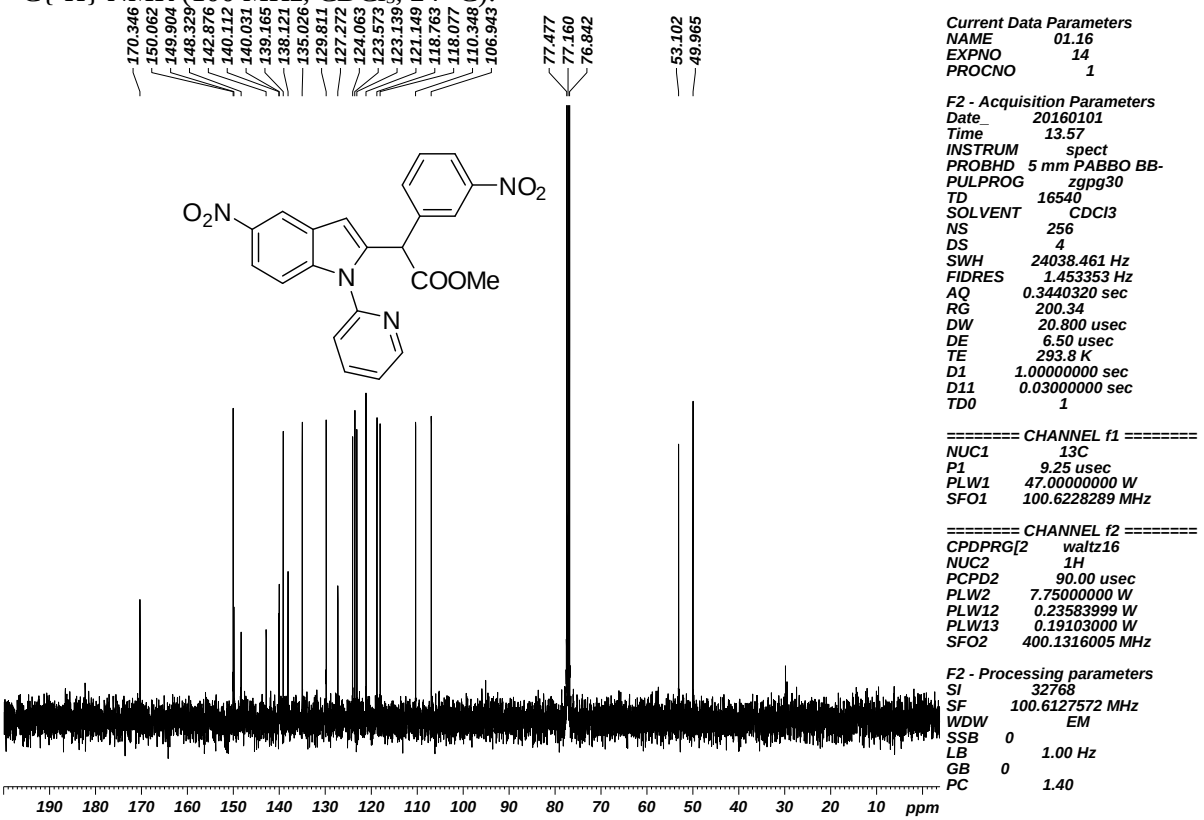

```
Current Data Parameters
NAME            01.16
EXPNO              7
PROCNO             1

F2 - Acquisition Parameters
Date_         20160101
Time              1.42
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT          CDCl3
NS                16
DS                 2
SWH            8012.820 Hz
FIDRES         0.122266 Hz
AQ             4.0894465 sec
RG              200.34
DW              62.400 usec
DE               6.50 usec
TE              292.7 K
D1             0.50000000 sec
TD0                1

======== CHANNEL f1 ========
NUC1               1H
P1              15.70 usec
PLW1           7.75000000 W
SFO1          400.1320007 MHz

F2 - Processing parameters
SI              65536
SF          400.1300094 MHz
WDW                EM
SSB     0
LB           0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            01.16
EXPNO              14
PROCNO              1

F2 - Acquisition Parameters
Date_         20160101
Time              13.57
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT          CDCl3
NS                256
DS                 4
SWH            24038.461 Hz
FIDRES         1.453353 Hz
AQ             0.3440320 sec
RG              200.34
DW              20.800 usec
DE               6.50 usec
TE              293.8 K
D1             1.00000000 sec
D11            0.03000000 sec
TD0                1

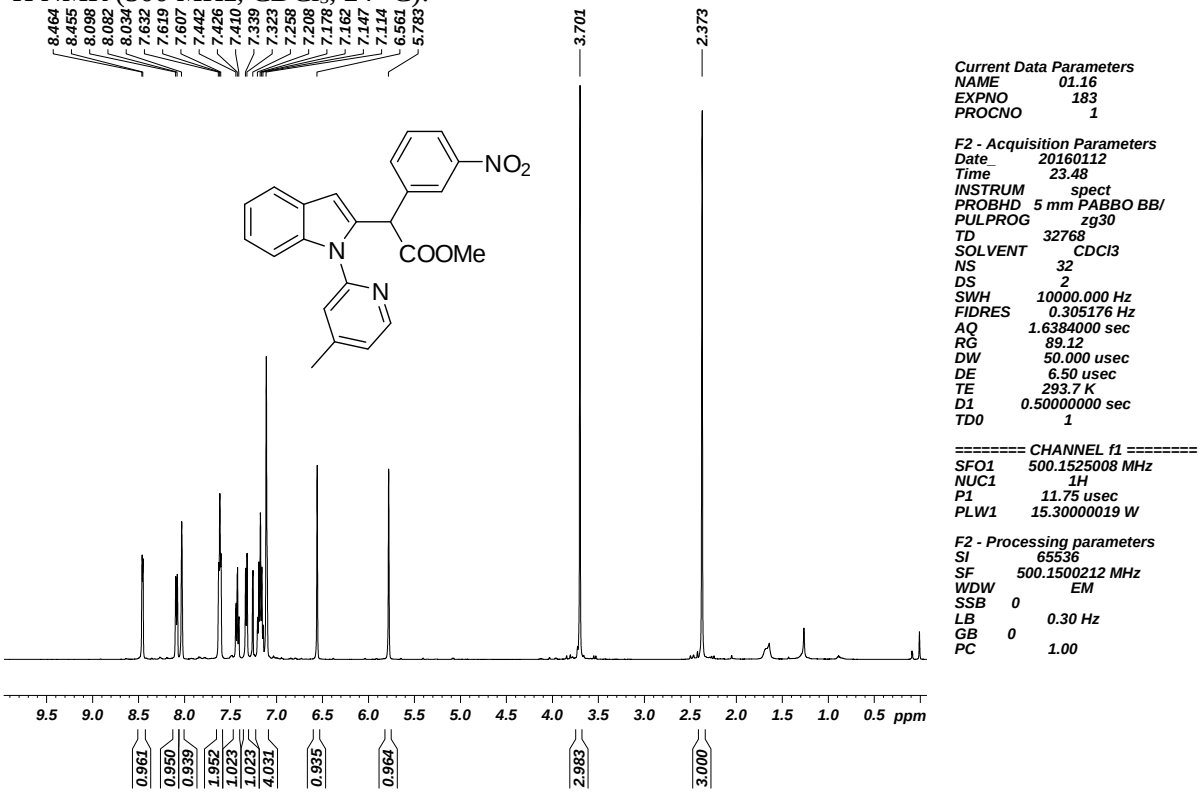
======== CHANNEL f1 ========
NUC1              13C
P1              9.25 usec
PLW1           47.00000000 W
SFO1          100.6228289 MHz

======== CHANNEL f2 ========
CPDPRG[2        waltz16
NUC2               1H
PCPD2           90.00 usec
PLW2           7.75000000 W
PLW12          0.23583999 W
PLW13          0.19103000 W
SFO2          400.1316005 MHz

F2 - Processing parameters
SI              32768
SF          100.6127572 MHz
WDW                EM
SSB     0
LB           1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(1-(4-methylpyridin-2-yl)-1*H*-indol-2-yl)-2-(3-nitrophenyl)acetate (3t):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



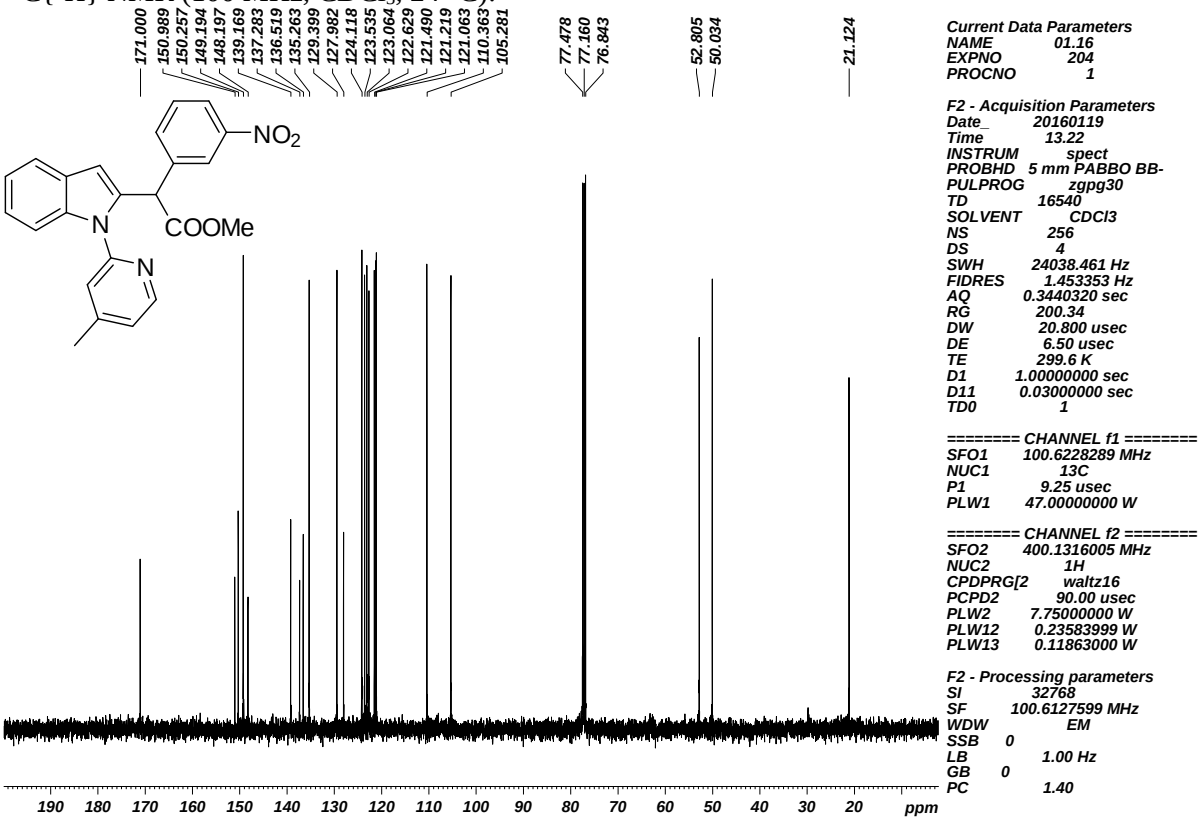

```
Current Data Parameters
NAME            01.16
EXPNO            183
PROCNO             1

F2 - Acquisition Parameters
Date_         20160112
Time            23.48
INSTRUM          spect
PROBHD   5 mm PABBO BB/
PULPROG          zg30
TD              32768
SOLVENT          CDCl3
NS                 32
DS                  2
SWH         10000.000 Hz
FIDRES        0.305176 Hz
AQ          1.6384000 sec
RG               89.12
DW              50.000 usec
DE               6.50 usec
TE              293.7 K
D1          0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        500.1525008 MHz
NUC1               1H
P1              11.75 usec
PLW1        15.30000019 W

F2 - Processing parameters
SI              65536
SF          500.1500212 MHz
WDW                EM
SSB      0
LB              0.30 Hz
GB       0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            01.16
EXPNO            204
PROCNO             1

F2 - Acquisition Parameters
Date_         20160119
Time            13.22
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT          CDCl3
NS                256
DS                  4
SWH         24038.461 Hz
FIDRES        1.453353 Hz
AQ          0.3440320 sec
RG               200.34
DW              20.800 usec
DE               6.50 usec
TE              299.6 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0                1

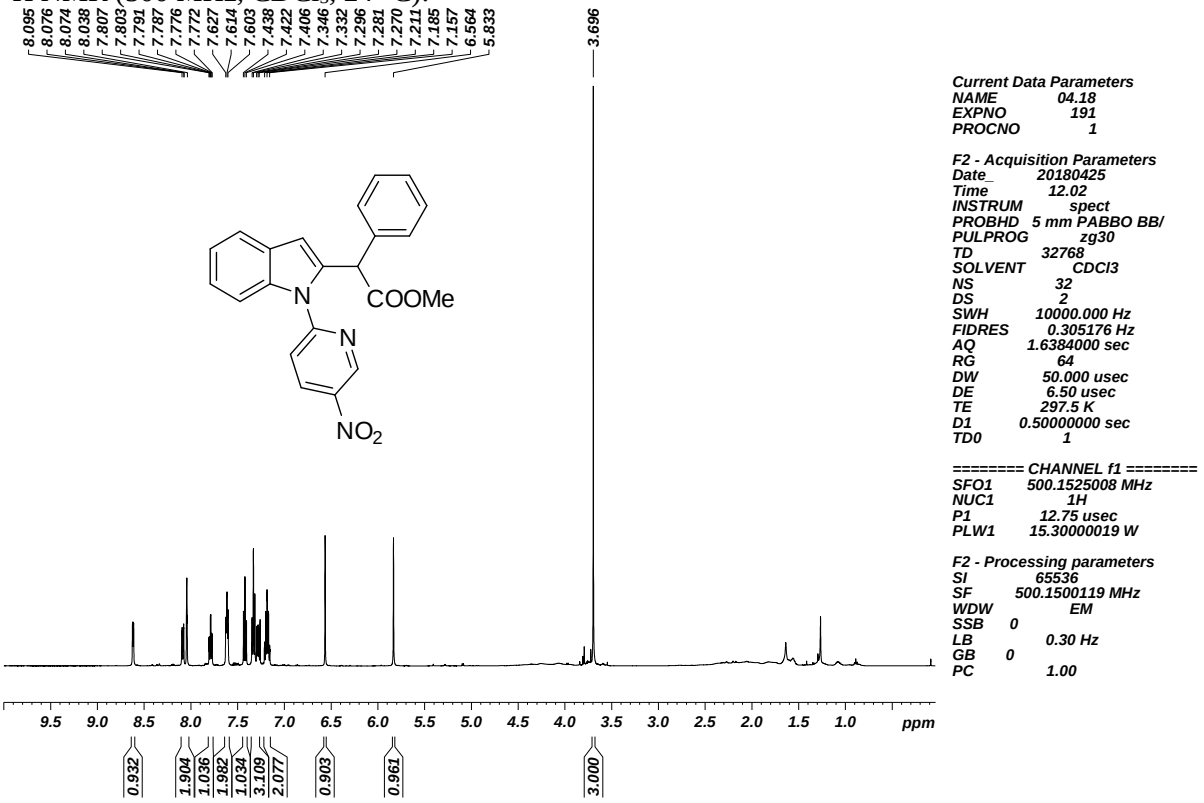
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1               13C
P1               9.25 usec
PLW1        47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2         7.75000000 W
PLW12        0.23583999 W
PLW13        0.11863000 W

F2 - Processing parameters
SI              32768
SF          100.6127599 MHz
WDW                EM
SSB      0
LB              1.00 Hz
GB       0
PC              1.40
```

Methyl 2-(1-(5-nitropyridin-2-yl)-1*H*-indol-2-yl)-2-phenylacetate (3u):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



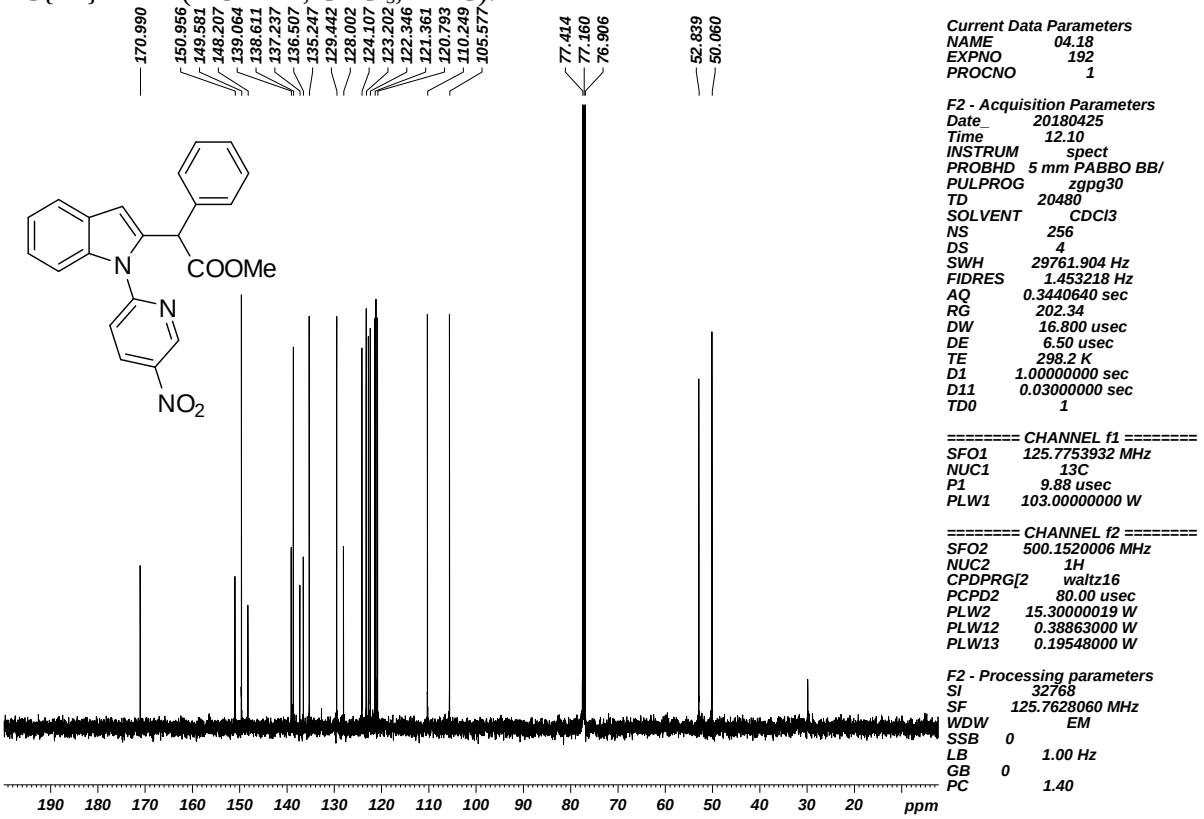

```
Current Data Parameters
NAME          04.18
EXPNO          191
PROCNO           1

F2 - Acquisition Parameters
Date_       20180425
Time           12.02
INSTRUM         spect
PROBHD  5 mm PABBO BB/
PULPROG         zg30
TD             32768
SOLVENT         CDCl3
NS                32
DS                 2
SWH        10000.000 Hz
FIDRES       0.305176 Hz
AQ         1.6384000 sec
RG                64
DW             50.000 usec
DE              6.50 usec
TE             297.5 K
D1         0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       500.1525008 MHz
NUC1              1H
P1             12.75 usec
PLW1       15.30000019 W

F2 - Processing parameters
SI             65536
SF         500.1500119 MHz
WDW               EM
SSB     0
LB           0.30 Hz
GB      0
PC             1.00
```

^{13}C{^{1}H} NMR (125 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          04.18
EXPNO          192
PROCNO           1

F2 - Acquisition Parameters
Date_       20180425
Time           12.10
INSTRUM         spect
PROBHD  5 mm PABBO BB/
PULPROG        zgpg30
TD             20480
SOLVENT         CDCl3
NS               256
DS                 4
SWH        29761.904 Hz
FIDRES       1.453218 Hz
AQ         0.3440640 sec
RG              202.34
DW             16.800 usec
DE              6.50 usec
TE             298.2 K
D1         1.00000000 sec
D11        0.03000000 sec
TD0               1

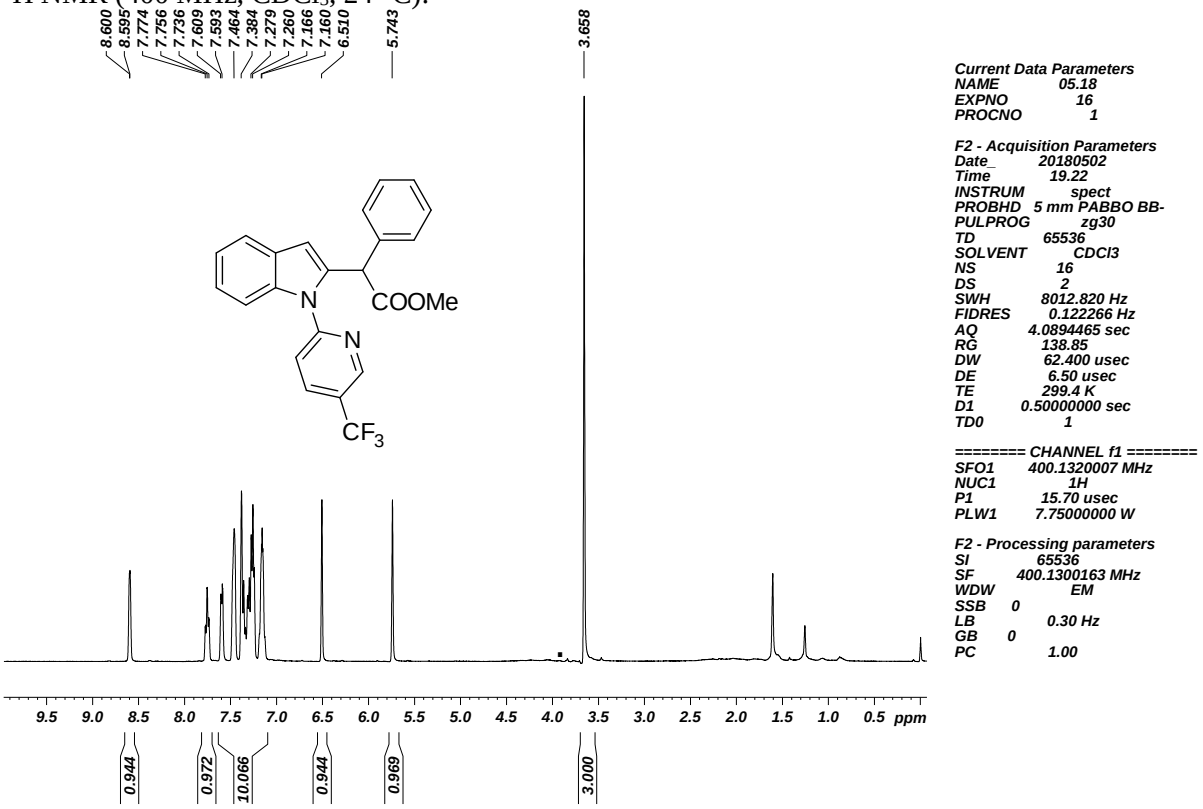
======== CHANNEL f1 ========
SFO1       125.7753932 MHz
NUC1              13C
P1              9.88 usec
PLW1       103.00000000 W

======== CHANNEL f2 ========
SFO2       500.1520006 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2          80.00 usec
PLW2       15.30000019 W
PLW12       0.38863000 W
PLW13       0.19548000 W

F2 - Processing parameters
SI             32768
SF         125.7628060 MHz
WDW               EM
SSB     0
LB             1.00 Hz
GB      0
PC             1.40
```

Methyl 2-phenyl-2-(1-(5-(trifluoromethyl)pyridin-2-yl)-1*H*-indol-2-yl)acetate (3v):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



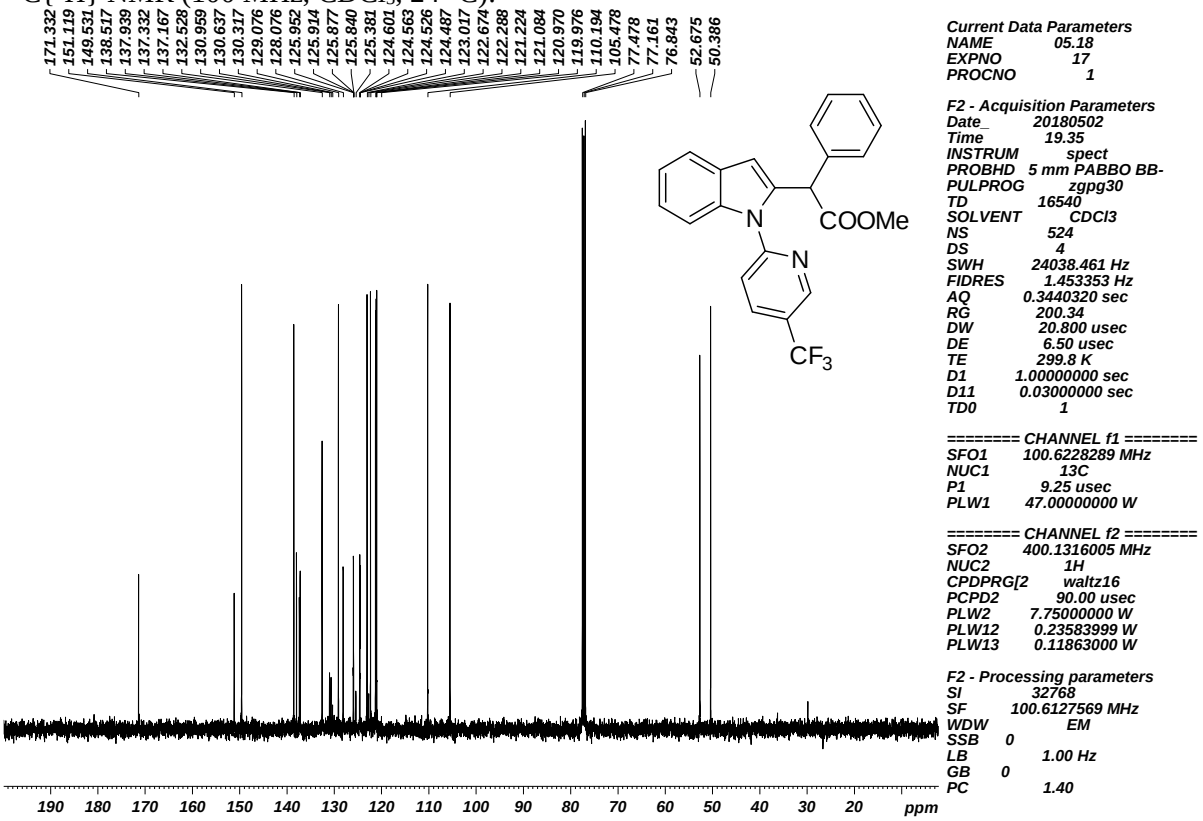

```
Current Data Parameters
NAME            05.18
EXPNO             16
PROCNO             1

F2 - Acquisition Parameters
Date_         20180502
Time             19.22
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT          CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              138.85
DW              62.400 usec
DE               6.50 usec
TE              299.4 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1               1H
P1              15.70 usec
PLW1        7.75000000 W

F2 - Processing parameters
SI              65536
SF         400.1300163 MHz
WDW                EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            05.18
EXPNO             17
PROCNO             1

F2 - Acquisition Parameters
Date_         20180502
Time             19.35
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT          CDCl3
NS                524
DS                 4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW              20.800 usec
DE               6.50 usec
TE              299.8 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

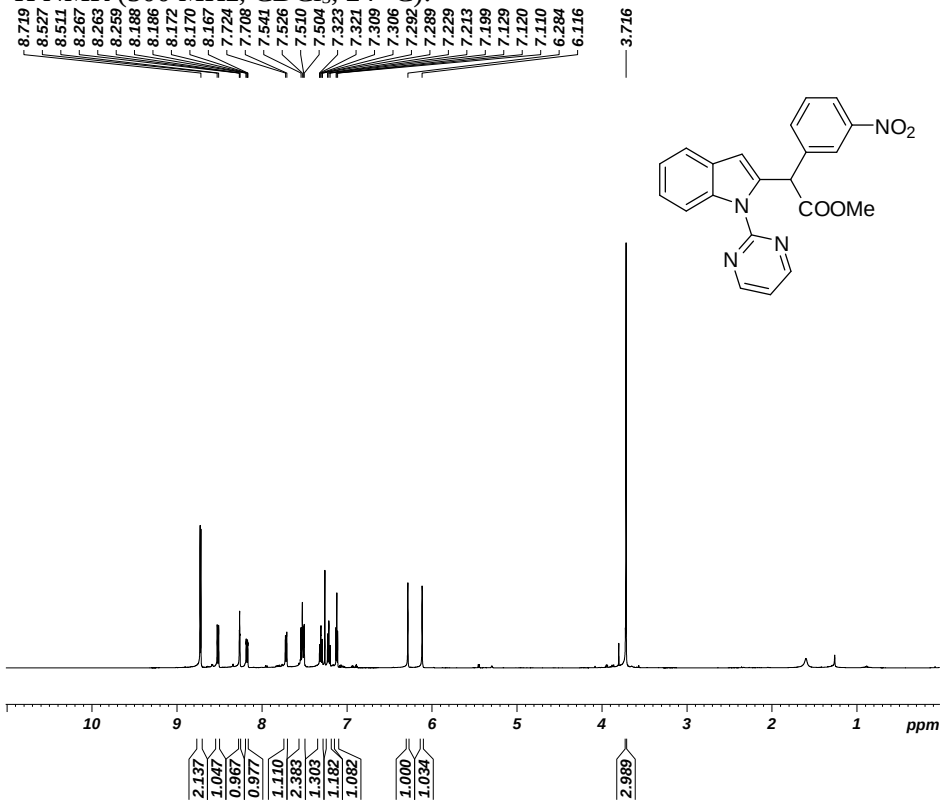
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1               13C
P1               9.25 usec
PLW1        47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2               1H
CPDPRG[2         waltz16
PCPD2           90.00 usec
PLW2         7.75000000 W
PLW12        0.23583999 W
PLW13        0.11863000 W

F2 - Processing parameters
SI              32768
SF         100.6127569 MHz
WDW                EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(3-nitrophenyl)-2-(1-(pyrimidin-2-yl)-1*H*-indol-2-yl)acetate (3w):

^{1}H NMR (500 MHz, $CDCl_3$, 24 °C):



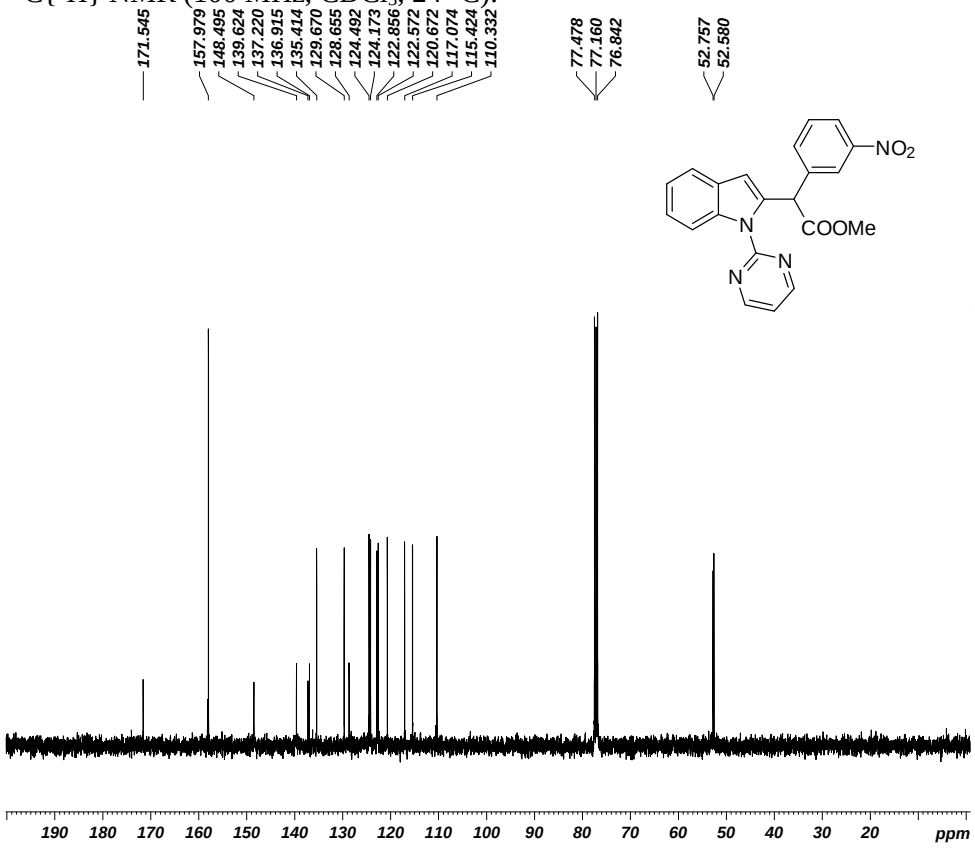

```
Current Data Parameters
NAME          spa50116
EXPNO              204
PROCNO               1

F2 - Acquisition Parameters
Date_         20160113
Time             15.25
INSTRUM           spect
PROBHD   5 mm PABBO BB/
PULPROG           zg30
TD               32768
SOLVENT          CDCl3
NS                  32
DS                   2
SWH          10000.000 Hz
FIDRES        0.305176 Hz
AQ           1.6384000 sec
RG                124.08
DW             50.000 usec
DE              6.50 usec
TE              299.1 K
D1           0.50000000 sec
TD0                  1

======== CHANNEL f1 ========
SFO1         500.1525008 MHz
NUC1                 1H
P1                11.75 usec
PLW1         15.30000019 W

F2 - Processing parameters
SI                65536
SF           500.1500218 MHz
WDW                  EM
SSB       0
LB             0.30 Hz
GB        0
PC                1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



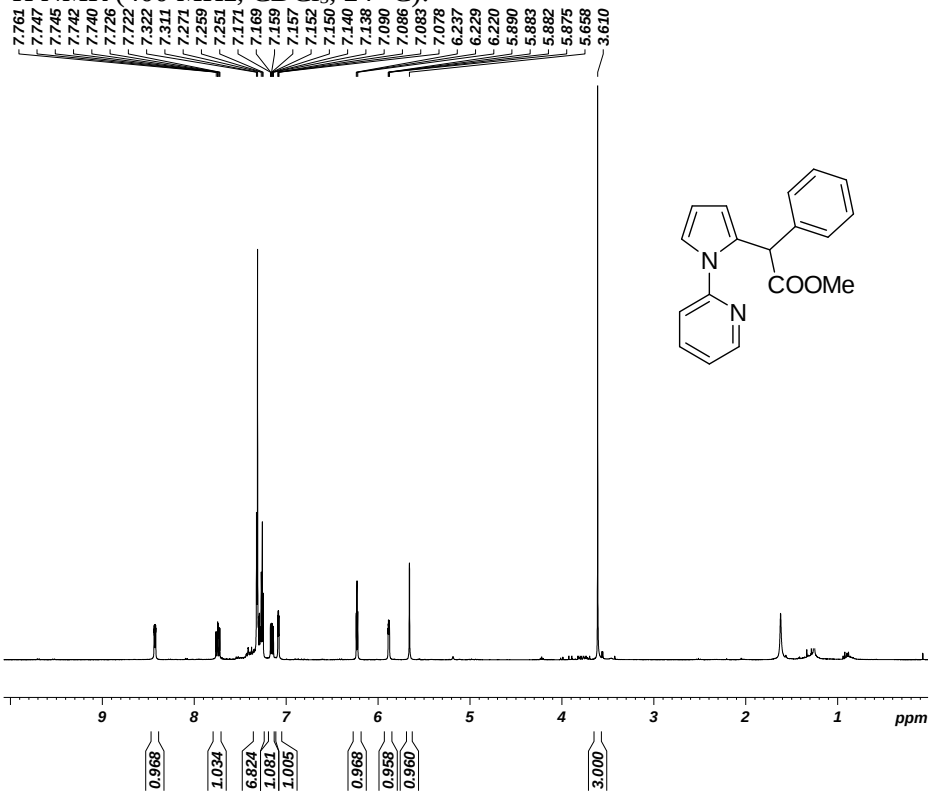

```
Current Data Parameters
NAME          spa40116
EXPNO              129
PROCNO               1

F2 - Acquisition Parameters
Date_         20160115
Time             8.52
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG          zgpg30
TD               16540
SOLVENT          CDCl3
NS                 256
DS                   4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ           0.3440320 sec
RG                200.34
DW             20.800 usec
DE              6.50 usec
TE              298.1 K
D1           1.00000000 sec
d11          0.03000000 sec
DELTA        0.89999998 sec
TD0                  1
SFO1         100.6228289 MHz
NUC1                13C
P1               9.25 usec
PLW1         47.00000000 W
SFO2         400.1316005 MHz
NUC2                 1H
CPDPRG[2         waltz16
PCPD2           90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.19103000 W

F2 - Processing parameters
SI                32768
SF           100.6127570 MHz
WDW                  EM
SSB       0
LB             1.00 Hz
GB        0
PC                1.40
```

Methyl 2-phenyl-2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl)acetate (3x):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



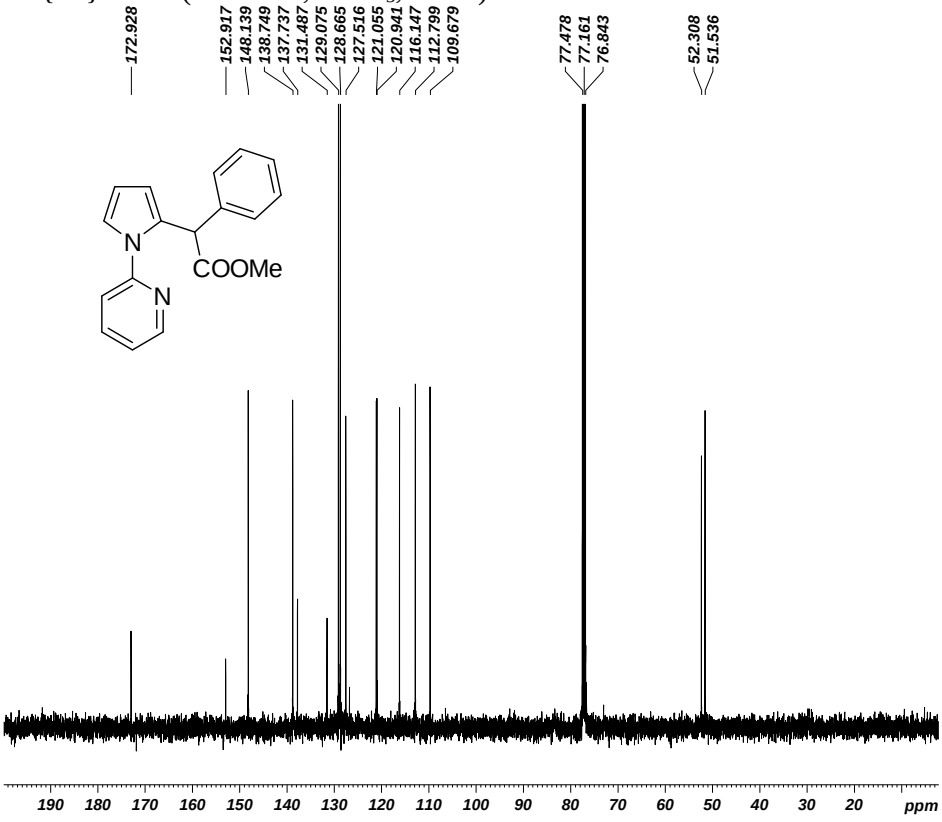

```
Current Data Parameters
NAME          12.15
EXPNO           166
PROCNO            1

F2 - Acquisition Parameters
Date_       20151214
Time            7.05
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG               200.34
DW            62.400 usec
DE             6.50 usec
TE             291.0 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
NUC1              1H
P1             15.70 usec
PLW1        7.75000000 W
SFO1       400.1320007 MHz

F2 - Processing parameters
SI             65536
SF         400.1300098 MHz
WDW               EM
SSB     0
LB           0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          12.15
EXPNO           167
PROCNO            1

F2 - Acquisition Parameters
Date_       20151214
Time            7.35
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS              1000
DS                 4
SWH         24038.461 Hz
FIDRES       1.453353 Hz
AQ           0.3440320 sec
RG               200.34
DW            20.800 usec
DE             6.50 usec
TE             292.0 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

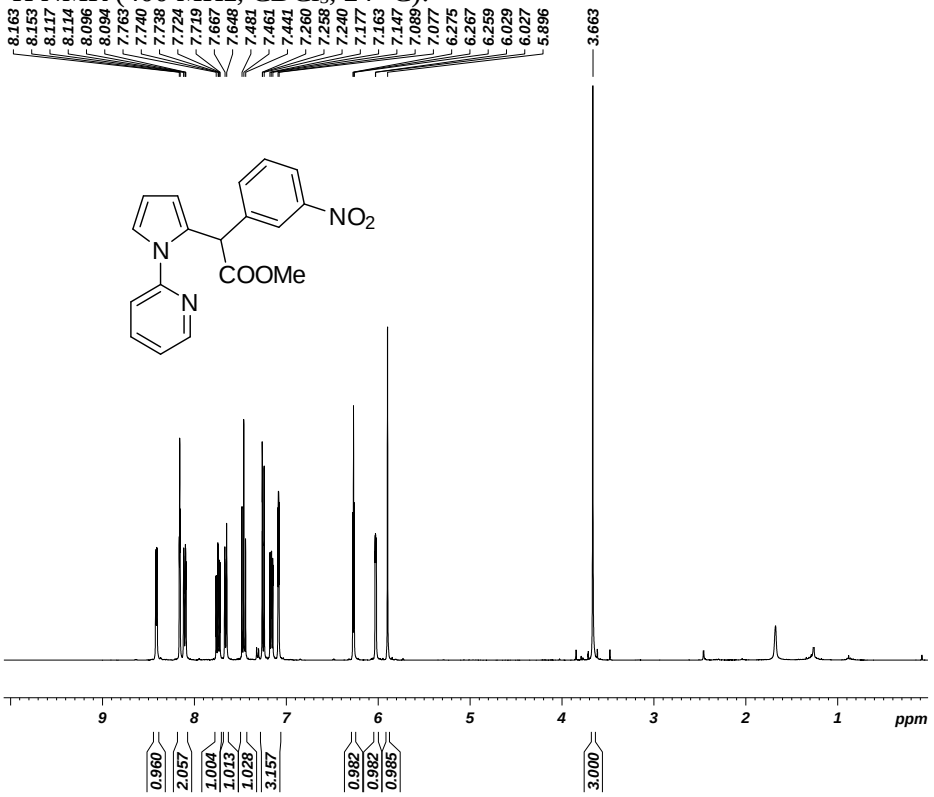
======== CHANNEL f1 ========
NUC1             13C
P1             9.25 usec
PLW1       47.00000000 W
SFO1      100.6228289 MHz

======== CHANNEL f2 ========
CPDPRG[2       waltz16
NUC2              1H
PCPD2          90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.19103000 W
SFO2       400.1316005 MHz

F2 - Processing parameters
SI             32768
SF         100.6127574 MHz
WDW               EM
SSB     0
LB           1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(3-nitrophenyl)-2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl)acetate (3y):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



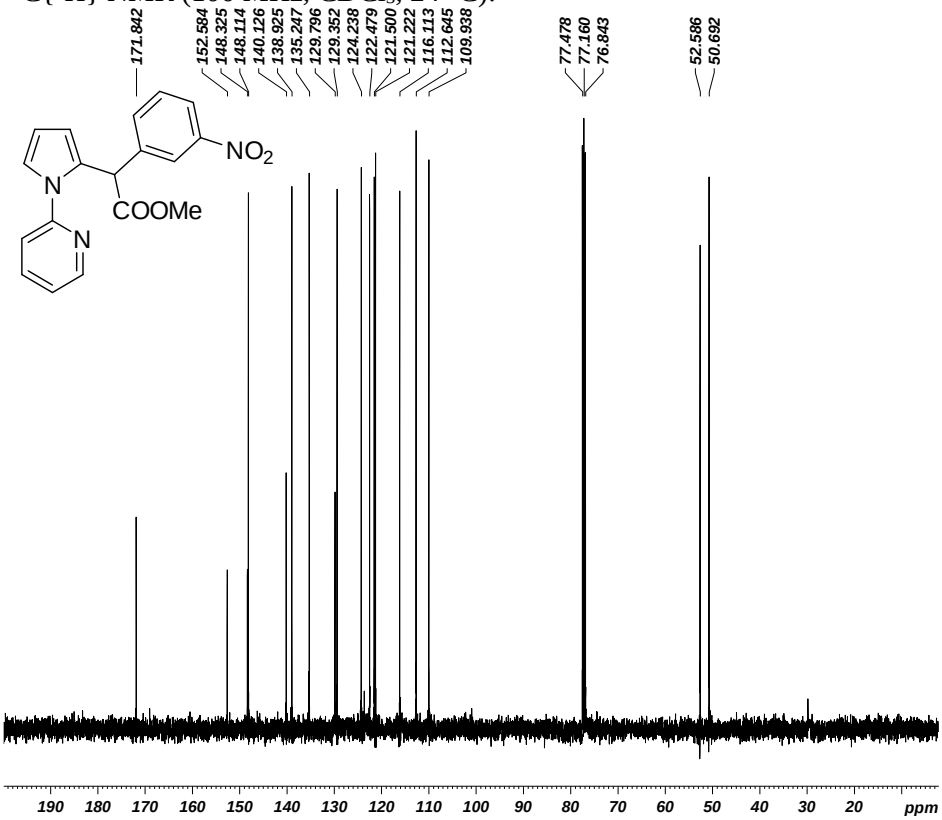

```
Current Data Parameters
NAME          03.16
EXPNO          421
PROCNO           1

F2 - Acquisition Parameters
Date_       20160317
Time          10.09
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG             108.26
DW              62.400 usec
DE               6.50 usec
TE             299.0 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF          400.1300103 MHz
WDW               EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          03.16
EXPNO          422
PROCNO           1

F2 - Acquisition Parameters
Date_       20160317
Time          10.16
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW              20.800 usec
DE               6.50 usec
TE             299.4 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

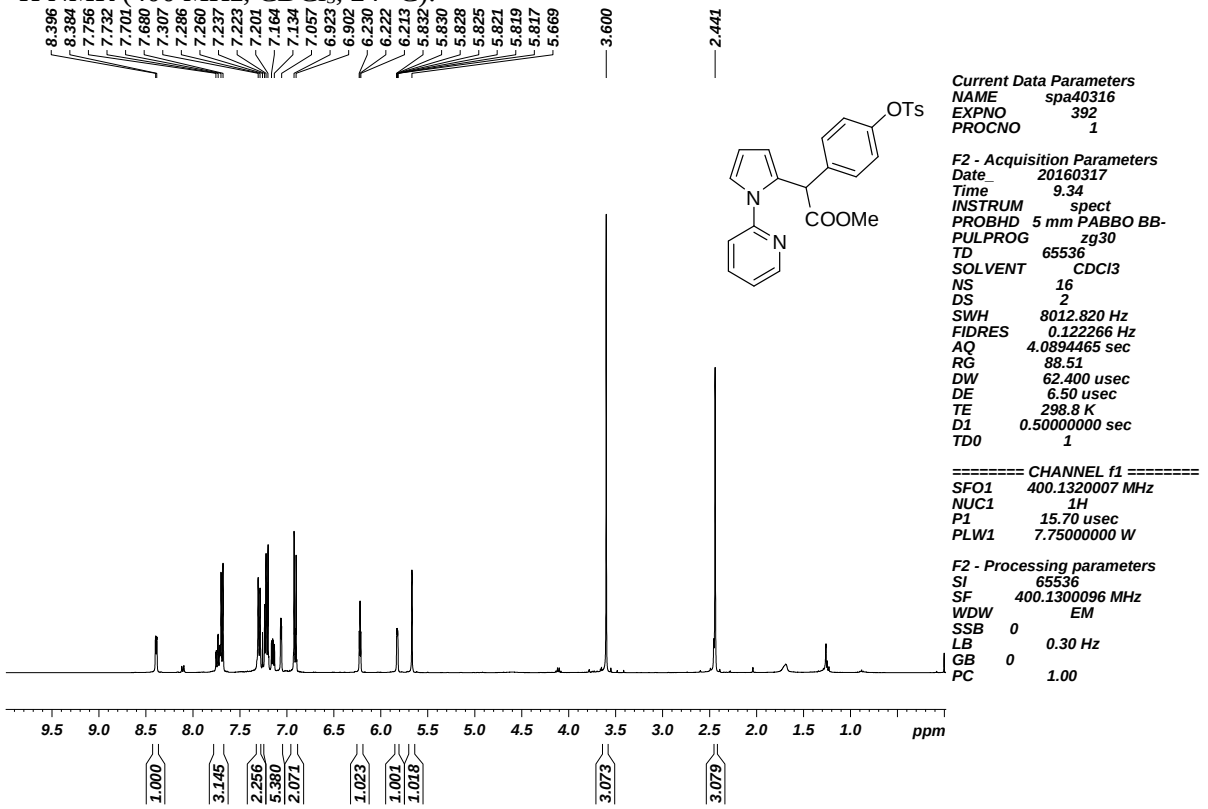
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

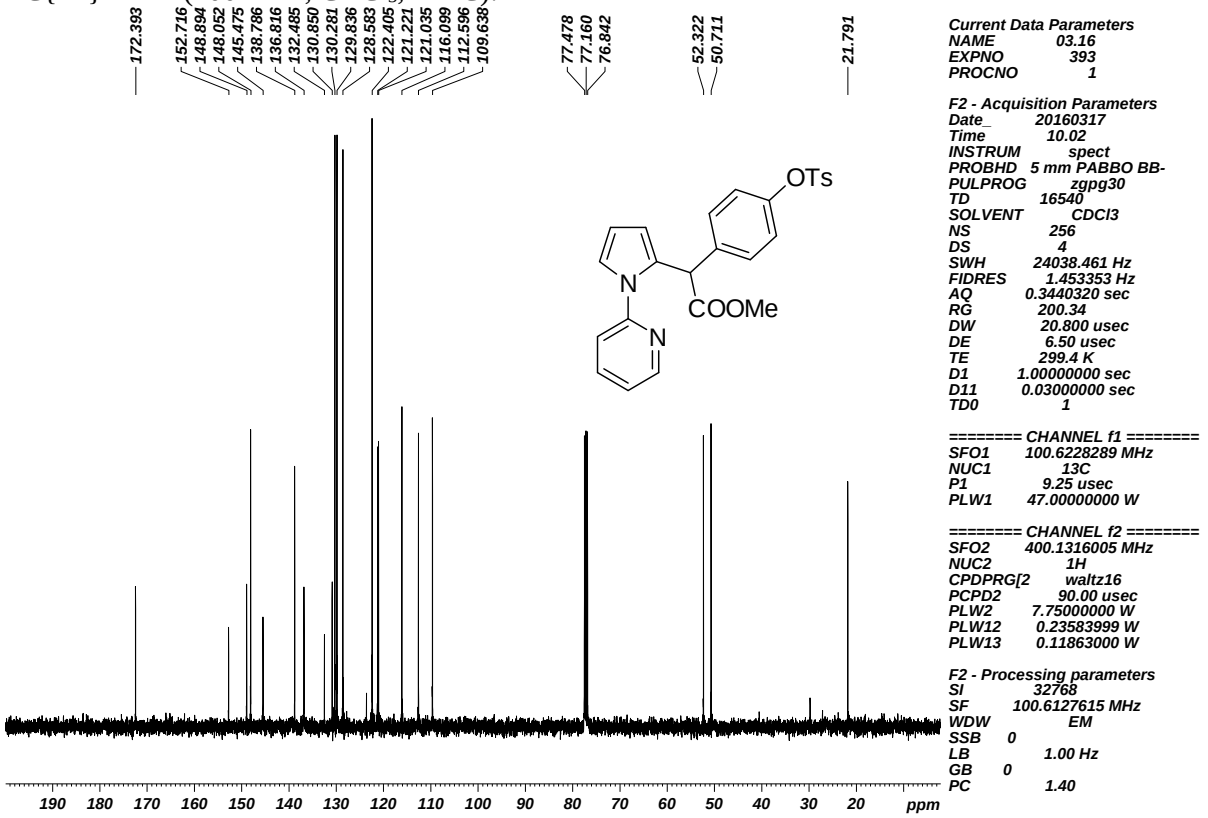
F2 - Processing parameters
SI             32768
SF          100.6127603 MHz
WDW               EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl)-2-(4-(tosyloxy)phenyl)acetate (3z):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

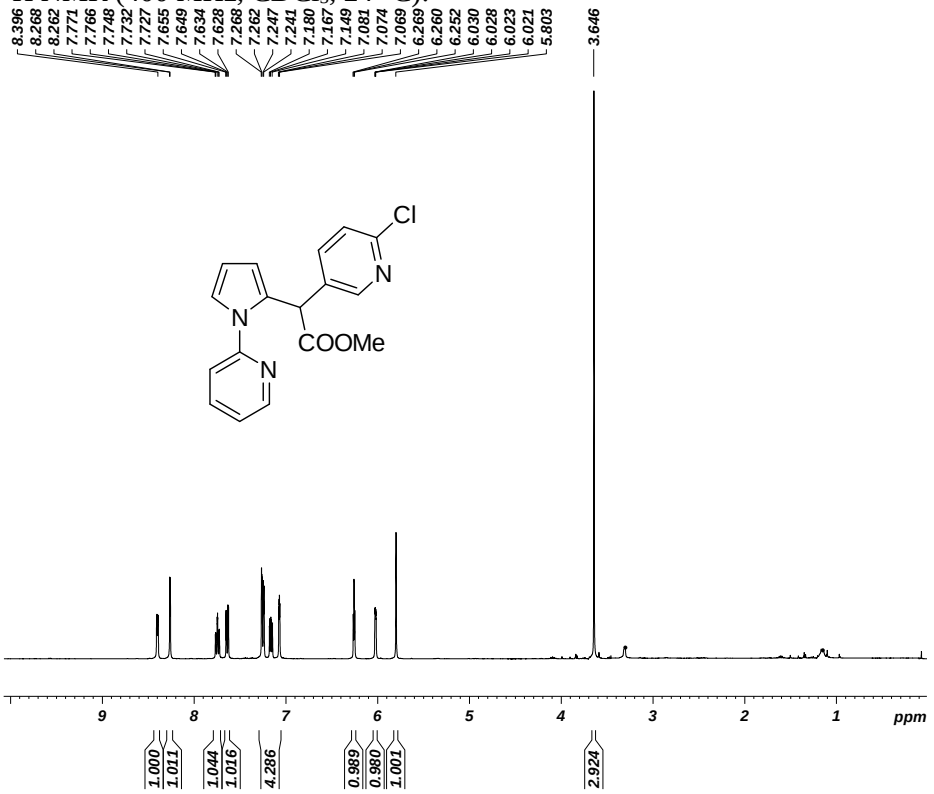


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



Methyl 2-(6-chloropyridin-3-yl)-2-(1-(pyridin-2-yl)-1*H*-pyrrol-2-yl)acetate (3aa):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



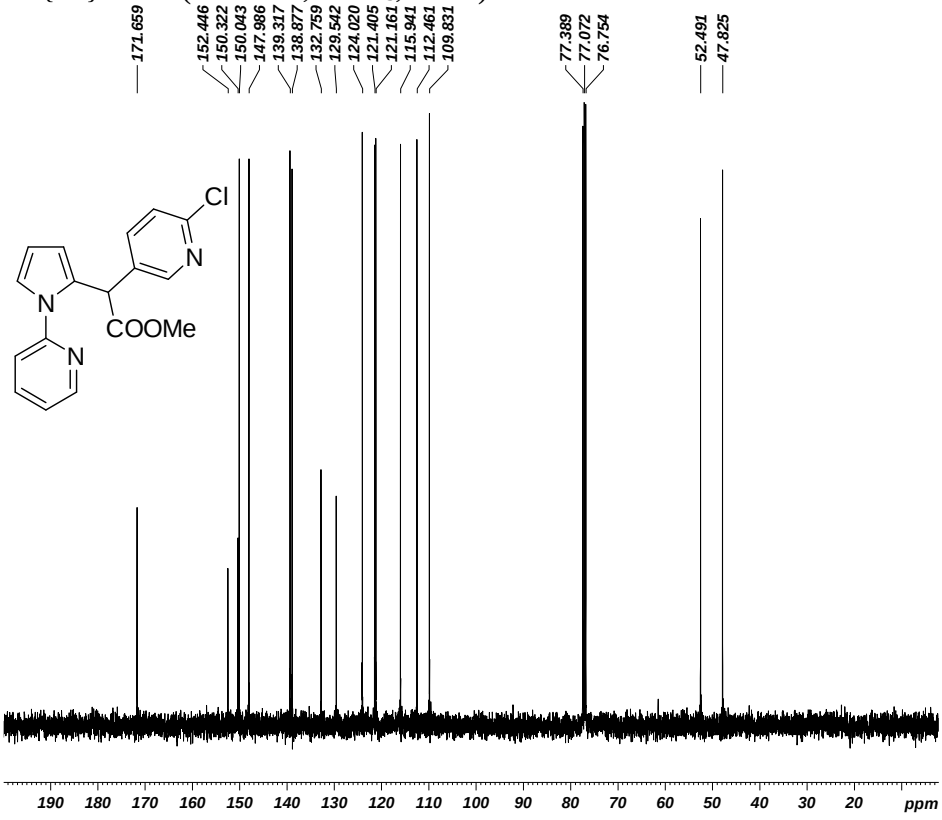

```
Current Data Parameters
NAME            04.16
EXPNO             46
PROCNO             1

F2 - Acquisition Parameters
Date_         20160402
Time              9.24
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT          CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG              108.26
DW               62.400 usec
DE                6.50 usec
TE              298.7 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1               1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI              65536
SF          400.1300074 MHz
WDW                EM
SSB       0
LB              0.30 Hz
GB        0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            04.16
EXPNO             47
PROCNO             1

F2 - Acquisition Parameters
Date_         20160402
Time              9.26
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT          CDCl3
NS                256
DS                 4
SWH         24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              299.0 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

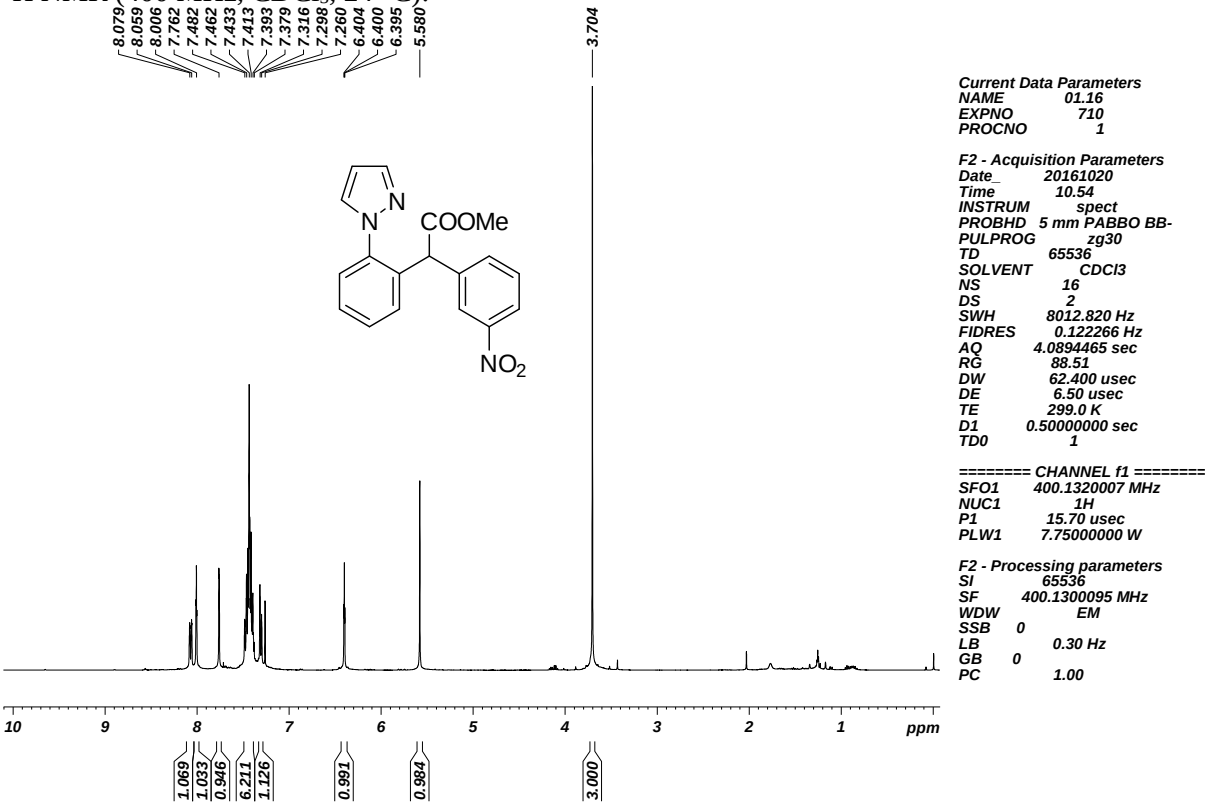
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1               13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI              32768
SF          100.6127690 MHz
WDW                EM
SSB       0
LB              1.00 Hz
GB        0
PC              1.40
```

Methyl 2-(2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5a):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



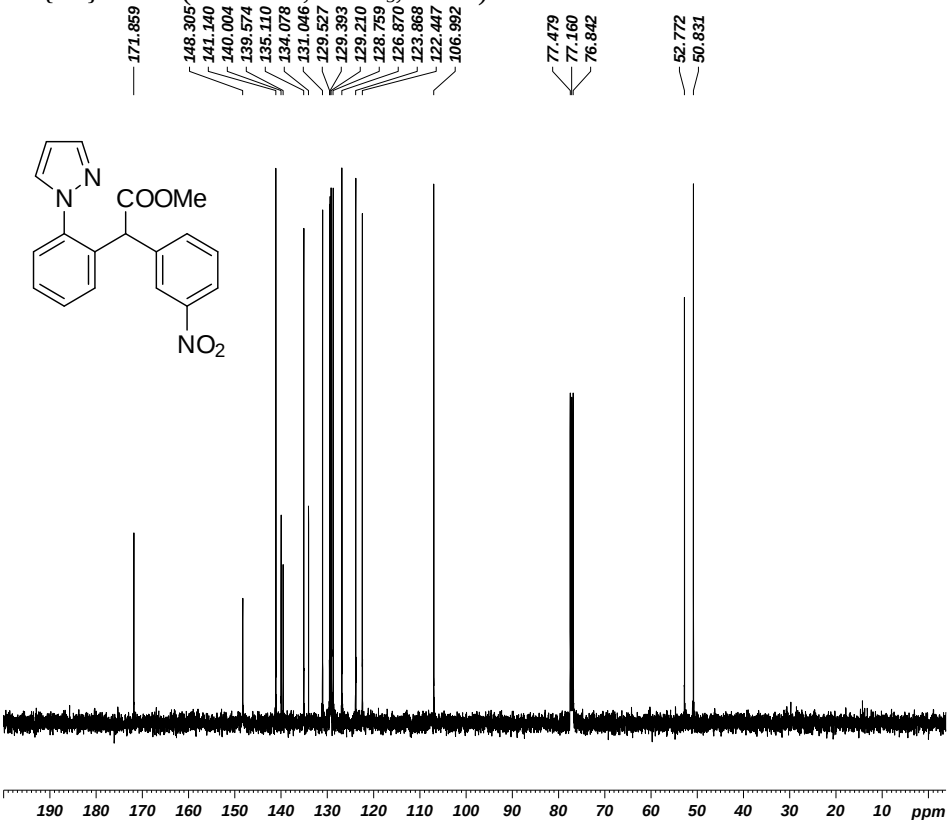

```
Current Data Parameters
NAME          01.16
EXPNO          710
PROCNO           1

F2 - Acquisition Parameters
Date_       20161020
Time          10.54
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              88.51
DW              62.400 usec
DE               6.50 usec
TE              299.0 K
D1           0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF          400.1300095 MHz
WDW               EM
SSB      0
LB             0.30 Hz
GB       0
PC             1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          01.16
EXPNO          711
PROCNO           1

F2 - Acquisition Parameters
Date_       20161020
Time          11.01
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW              20.800 usec
DE               6.50 usec
TE              299.7 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0               1

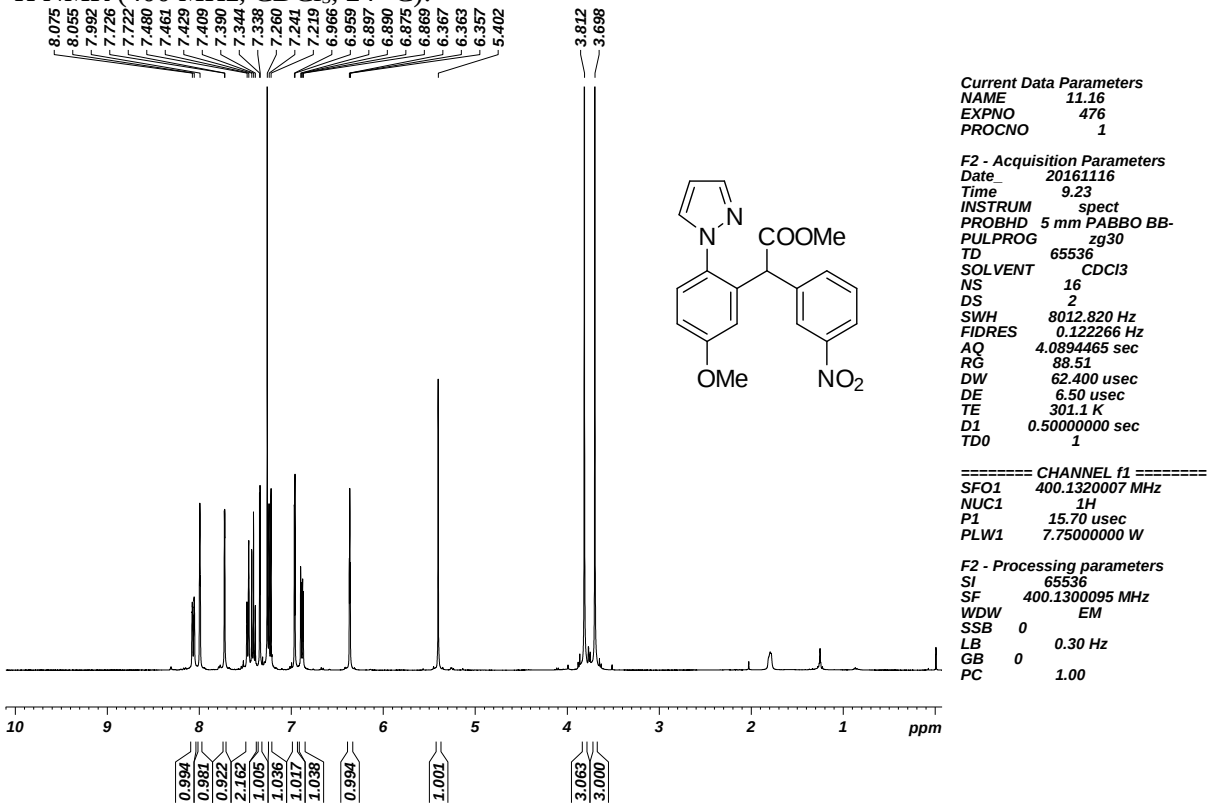
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1               9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2           90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI             32768
SF          100.6127612 MHz
WDW               EM
SSB      0
LB             1.00 Hz
GB       0
PC             1.40
```

Methyl 2-(5-methoxy-2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5b):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



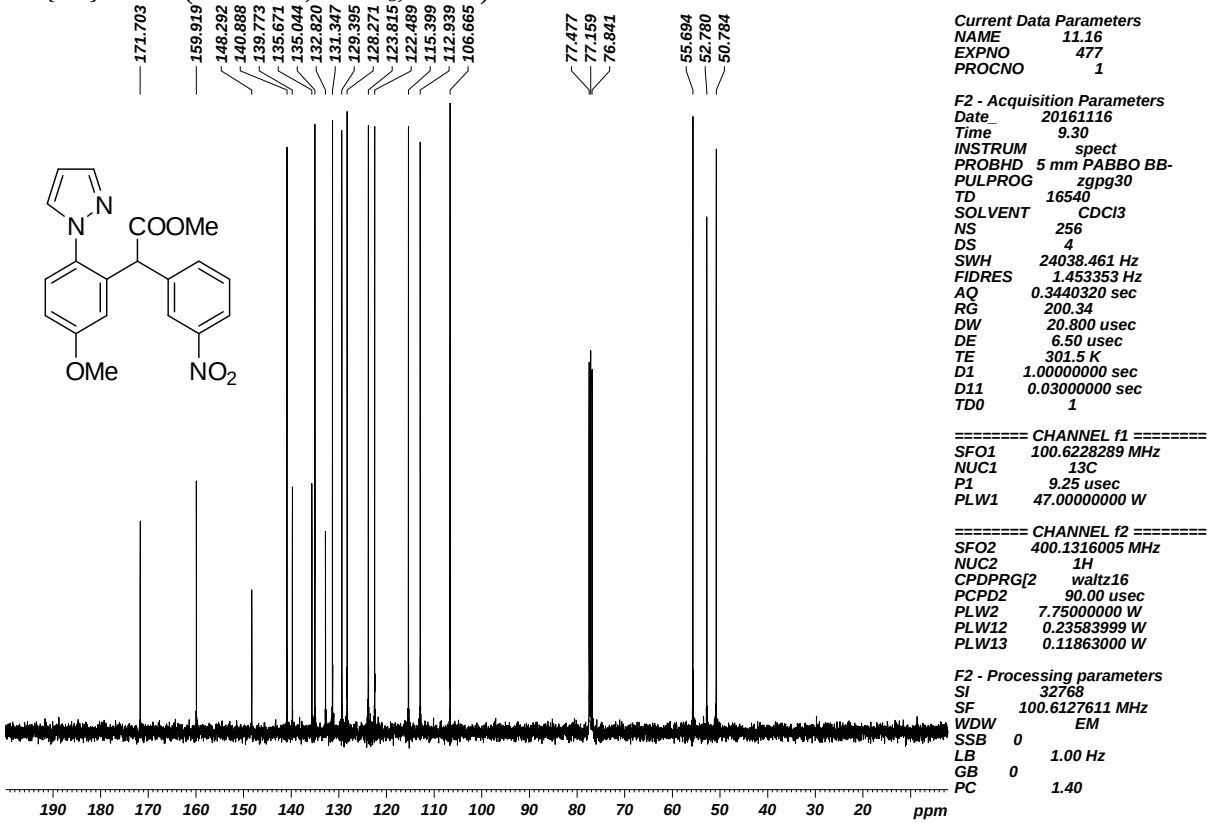
Current Data Parameters
NAME 11.16
EXPNO 476
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161116
Time 9.23
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 88.51
DW 62.400 usec
DE 6.50 usec
TE 301.1 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300095 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



Current Data Parameters
NAME 11.16
EXPNO 477
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161116
Time 9.30
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 301.5 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

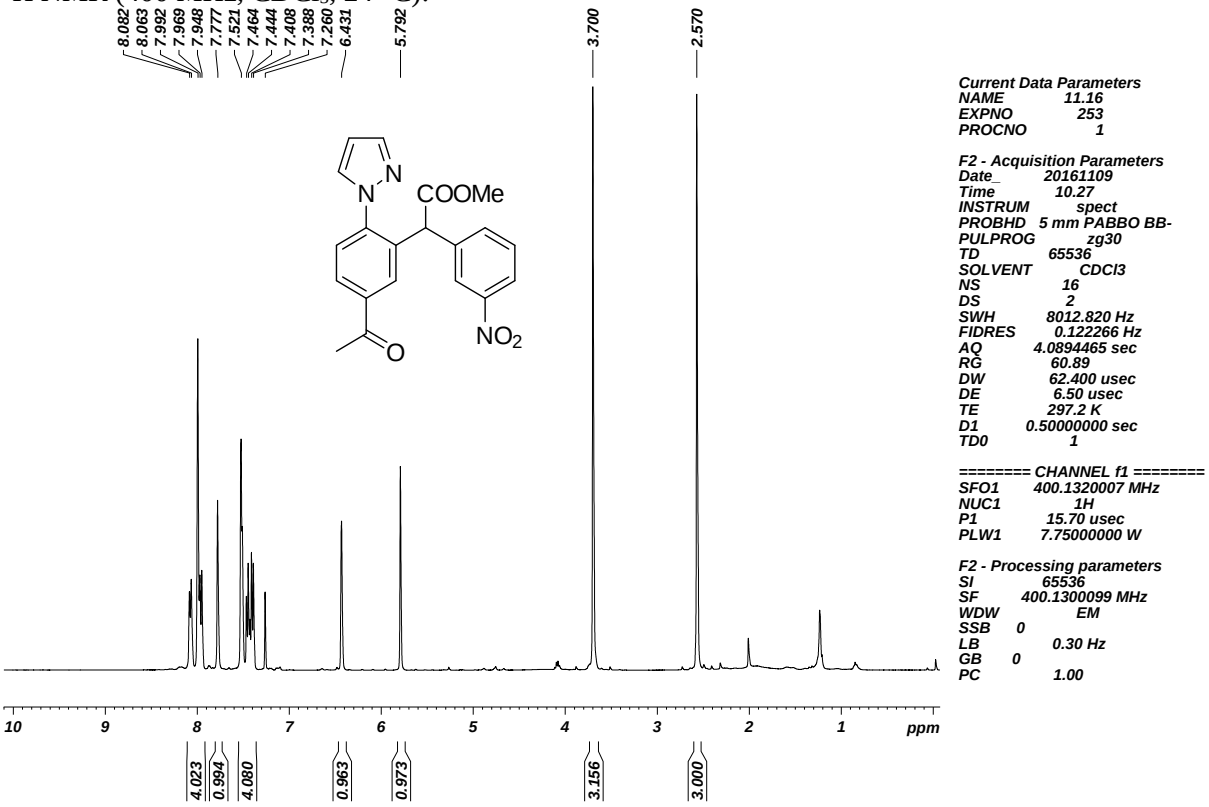
======== CHANNEL f1 ========
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ========
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768
SF 100.6127611 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Methyl 2-(5-acetyl-2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5c):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



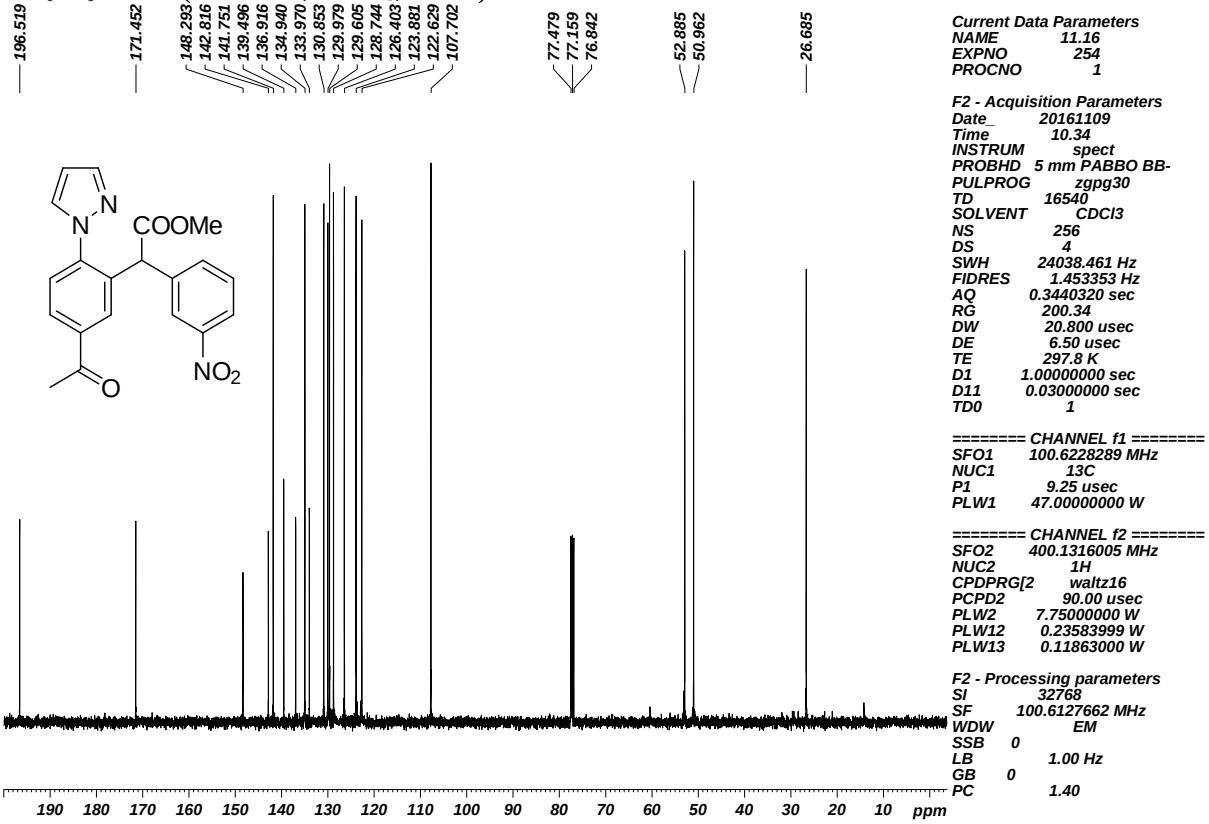

```
Current Data Parameters
NAME          11.16
EXPNO           253
PROCNO            1

F2 - Acquisition Parameters
Date_       20161109
Time           10.27
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG               60.89
DW               62.400 usec
DE                6.50 usec
TE              297.2 K
D1           0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF          400.1300099 MHz
WDW               EM
SSB       0
LB             0.30 Hz
GB        0
PC             1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          11.16
EXPNO           254
PROCNO            1

F2 - Acquisition Parameters
Date_       20161109
Time           10.34
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              297.8 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0               1

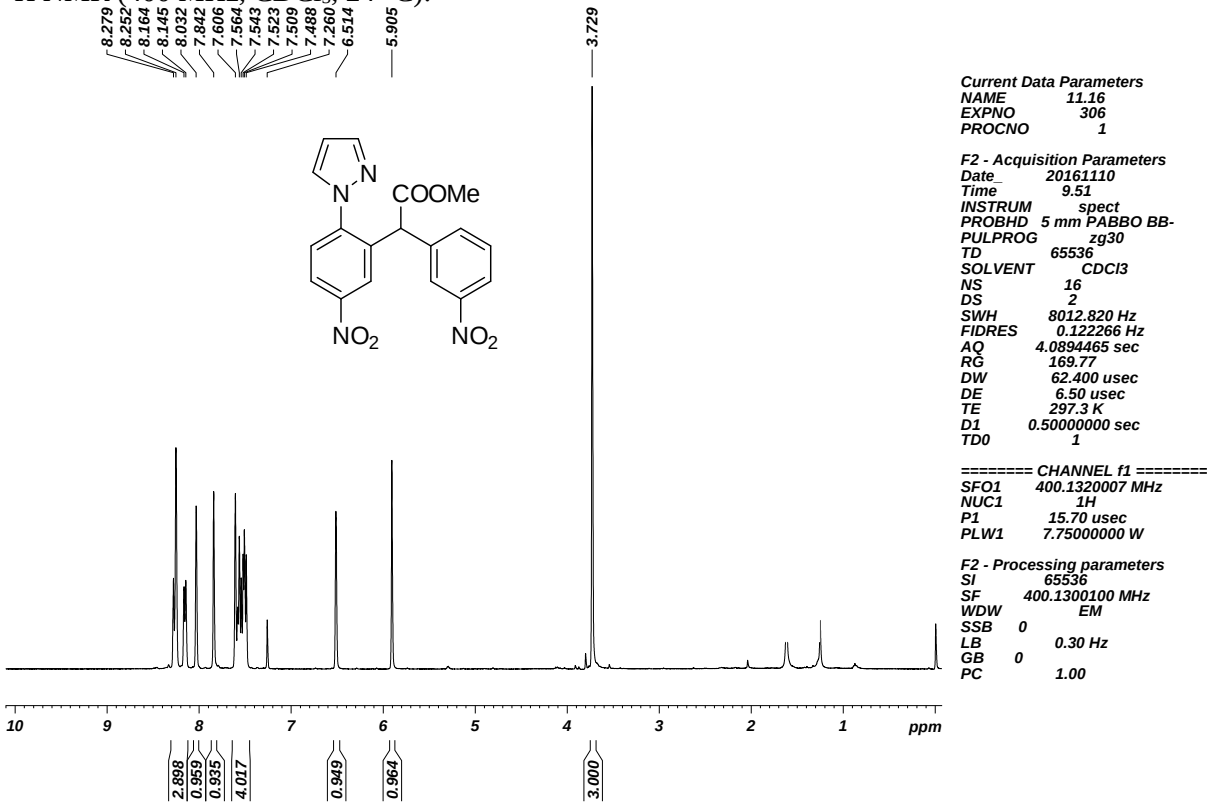
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1              13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

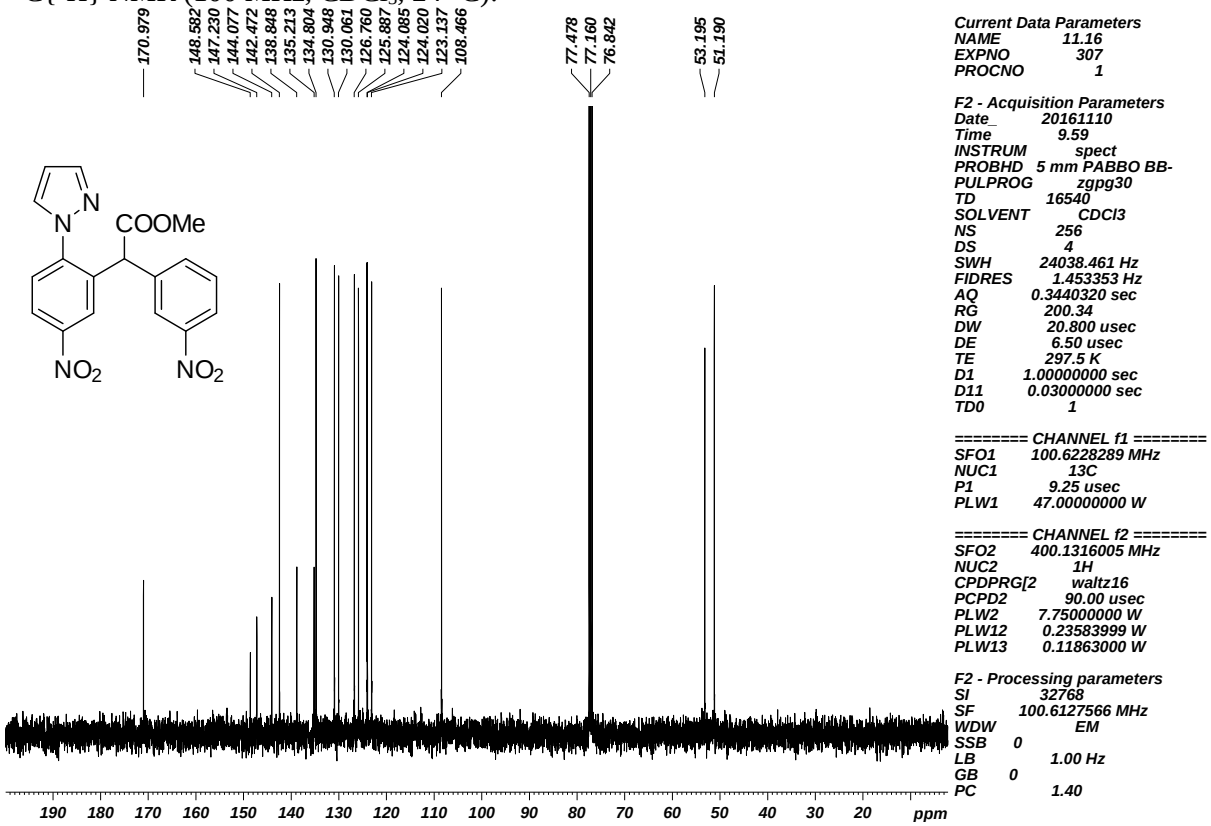
F2 - Processing parameters
SI             32768
SF          100.6127662 MHz
WDW               EM
SSB       0
LB             1.00 Hz
GB        0
PC             1.40
```

Methyl 2-(5-nitro-2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5d):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

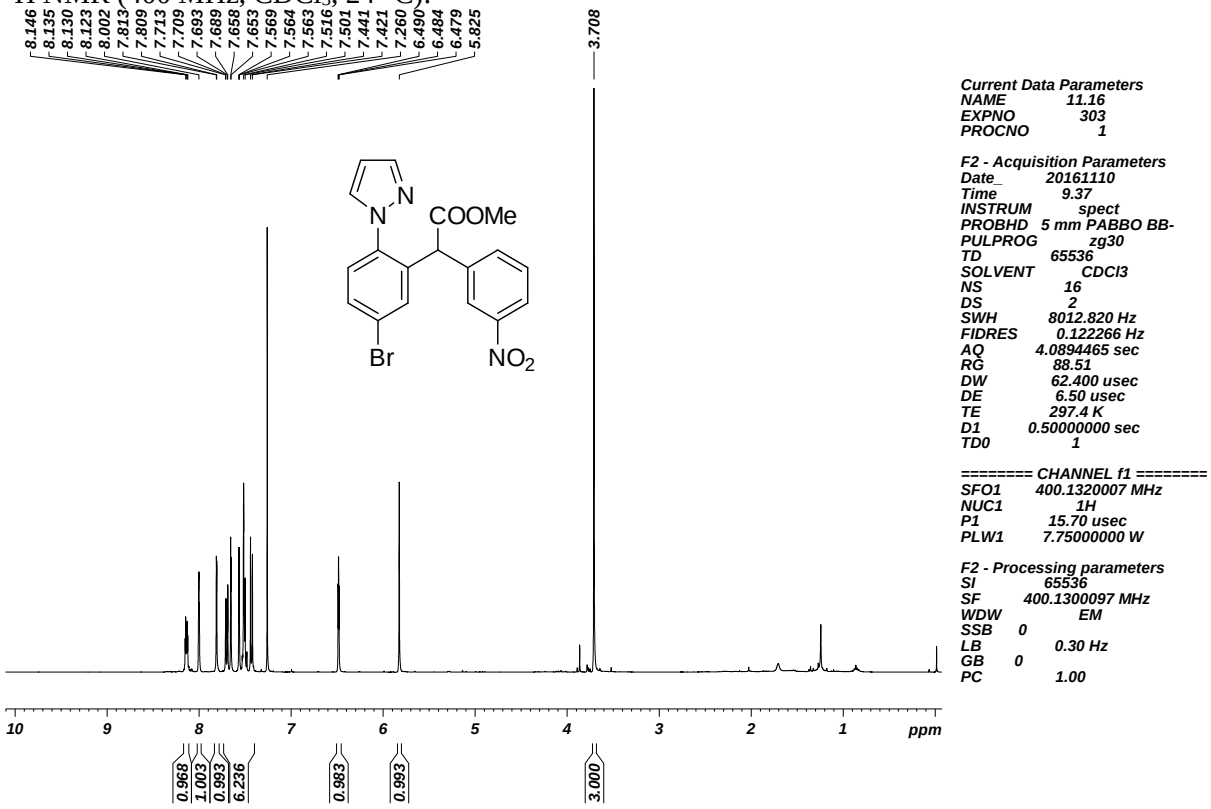


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



Methyl 2-(5-bromo-2-(1*H*-pyrazol-1-yl)phenyl)-2-(3-nitrophenyl)acetate (5e):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



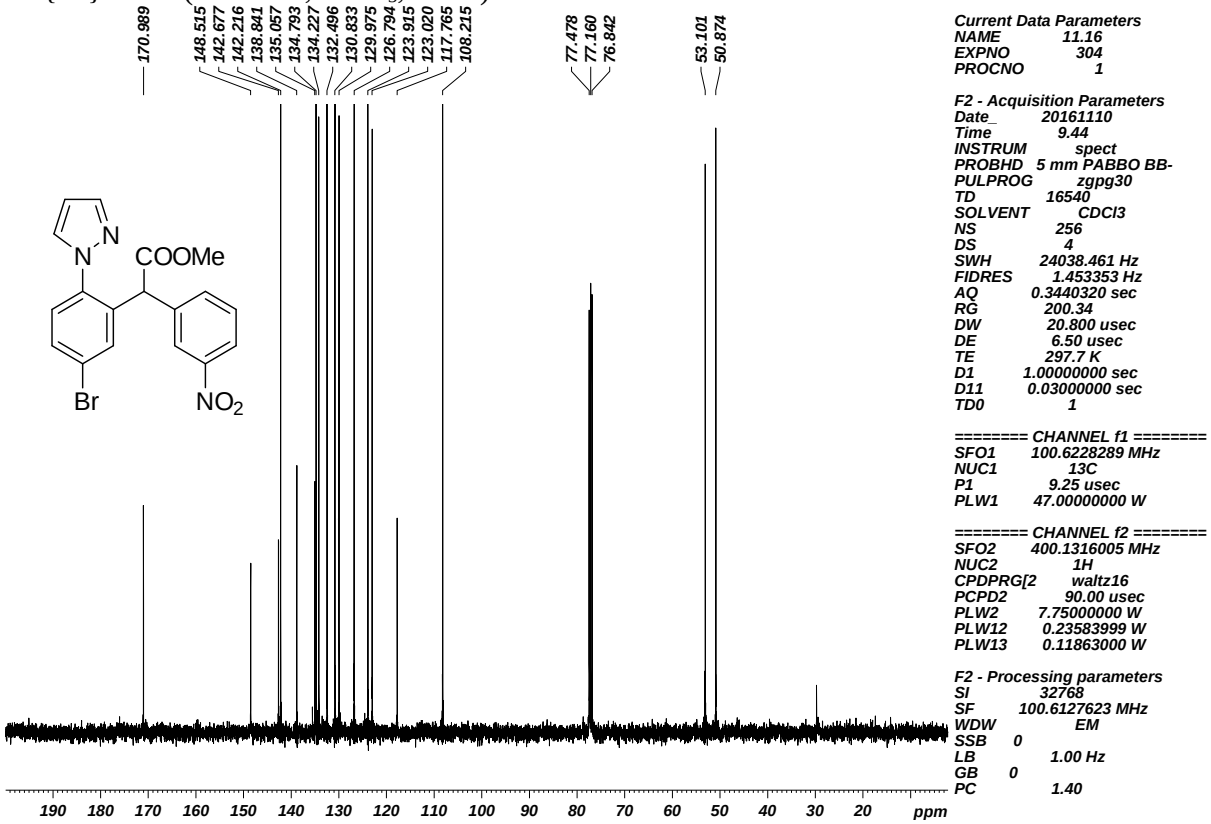

```
Current Data Parameters
NAME          11.16
EXPNO           303
PROCNO            1

F2 - Acquisition Parameters
Date_       20161110
Time            9.37
INSTRUM        spect
PROBHD  5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH          8012.820 Hz
FIDRES          0.122266 Hz
AQ           4.0894465 sec
RG               88.51
DW               62.400 usec
DE                6.50 usec
TE              297.4 K
D1           0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI             65536
SF          400.1300097 MHz
WDW               EM
SSB     0
LB              0.30 Hz
GB      0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          11.16
EXPNO           304
PROCNO            1

F2 - Acquisition Parameters
Date_       20161110
Time            9.44
INSTRUM        spect
PROBHD  5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH          24038.461 Hz
FIDRES          1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW               20.800 usec
DE                6.50 usec
TE              297.7 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0               1

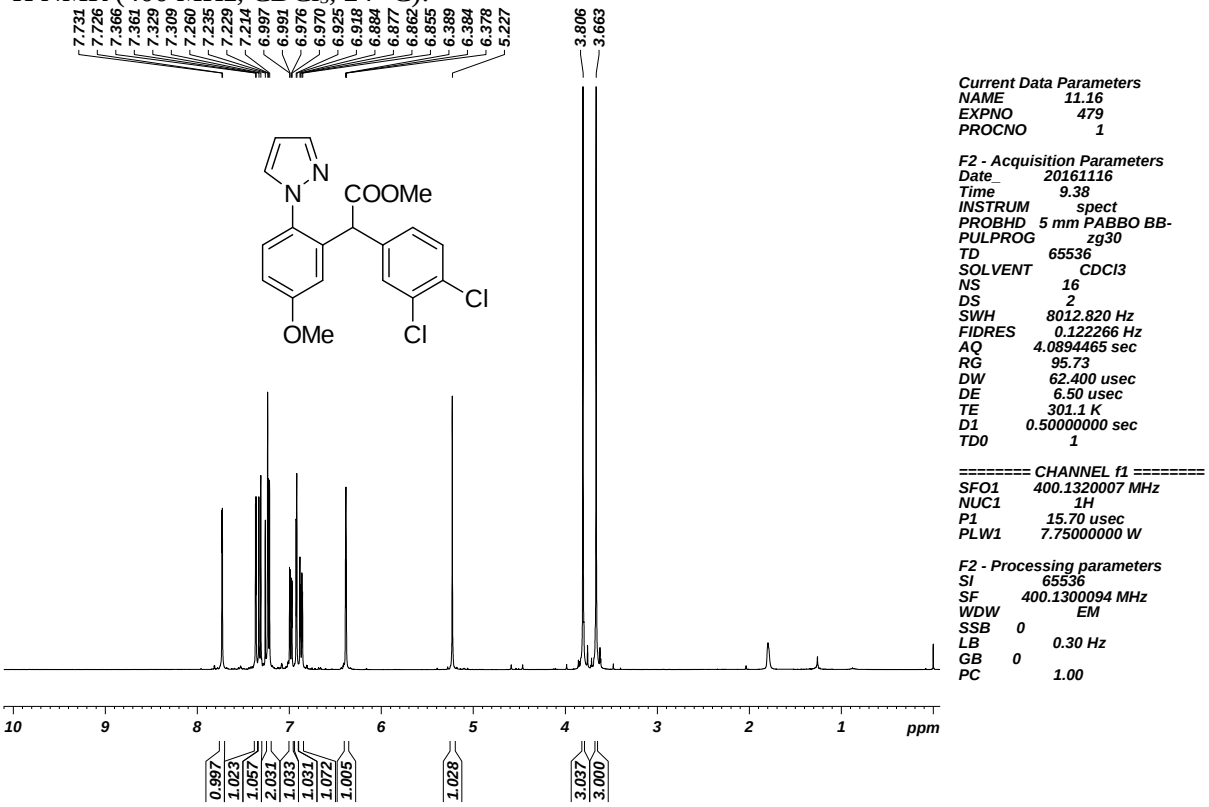
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1              13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2              1H
CPDPRG[2        waltz16
PCPD2            90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI             32768
SF          100.6127623 MHz
WDW               EM
SSB     0
LB              1.00 Hz
GB      0
PC              1.40
```

Methyl 2-(3,4-dichlorophenyl)-2-(5-methoxy-2-(1*H*-pyrazol-1-yl)phenyl) acetate (5f):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



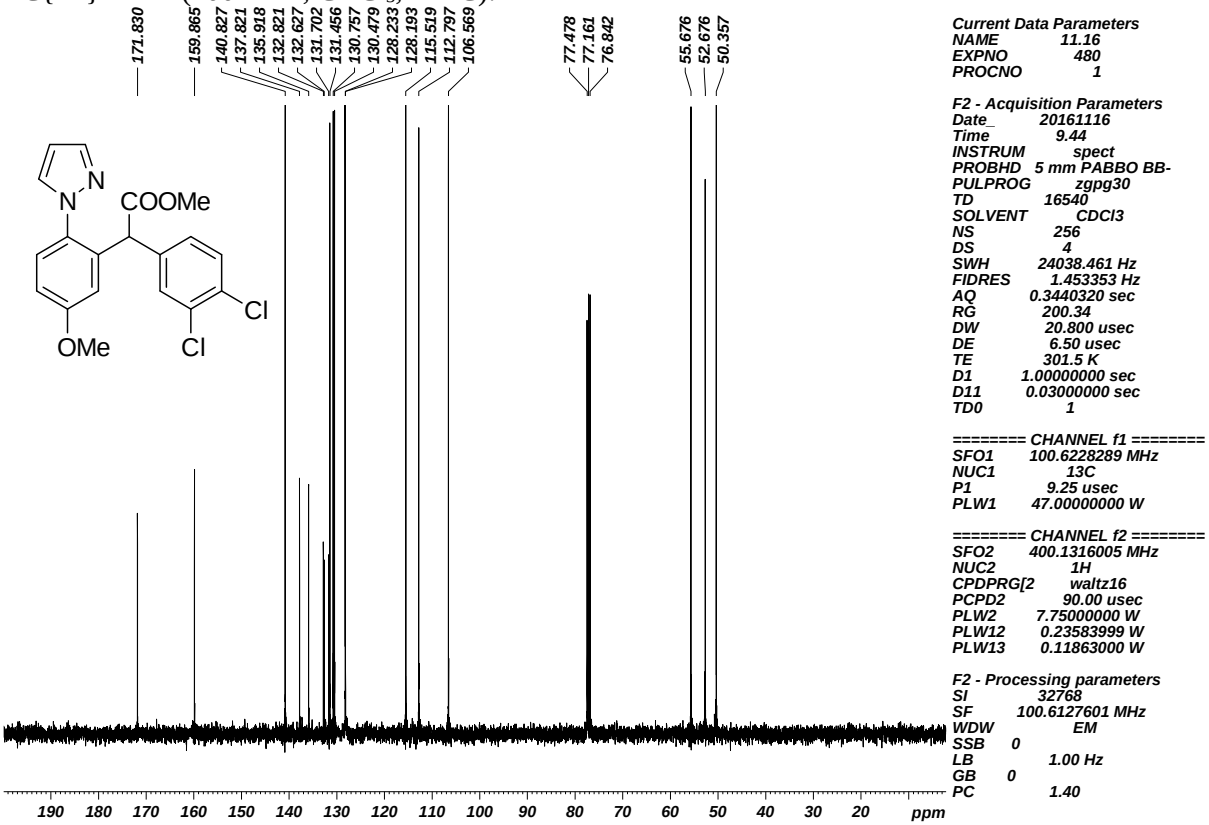
Current Data Parameters
NAME 11.16
EXPNO 479
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161116
Time 9.38
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 95.73
DW 62.400 usec
DE 6.50 usec
TE 301.1 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300094 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



Current Data Parameters
NAME 11.16
EXPNO 480
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161116
Time 9.44
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 301.5 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

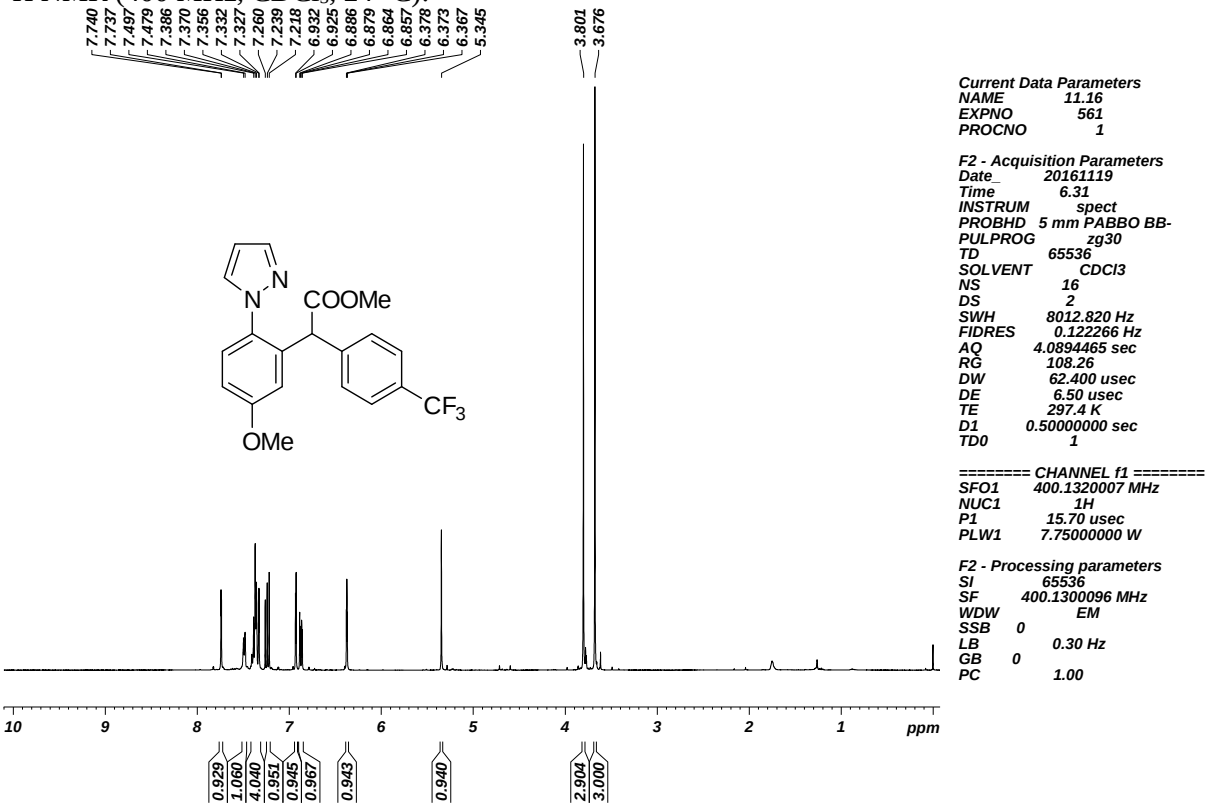
======== CHANNEL f1 ========
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ========
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768
SF 100.6127601 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Methyl 2-(5-methoxy-2-(1*H*-pyrazol-1-yl)phenyl)-2-(4 (trifluoromethyl)phenyl) acetate (5g):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



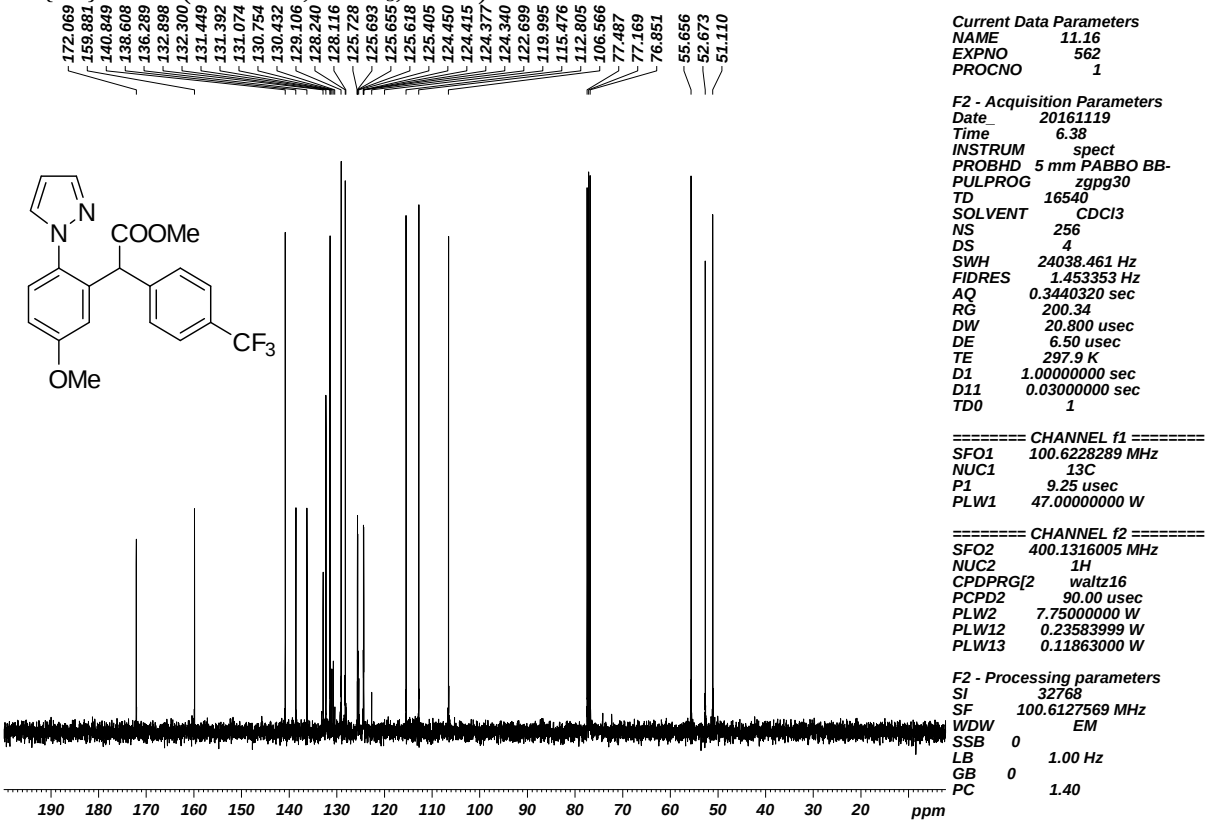

```
Current Data Parameters
NAME          11.16
EXPNO           561
PROCNO            1

F2 - Acquisition Parameters
Date_       20161119
Time            6.31
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH         8012.820 Hz
FIDRES       0.122266 Hz
AQ          4.0894465 sec
RG             108.26
DW              62.400 usec
DE               6.50 usec
TE             297.4 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1              1H
P1               15.70 usec
PLW1        7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300096 MHz
WDW               EM
SSB      0
LB              0.30 Hz
GB       0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          11.16
EXPNO           562
PROCNO            1

F2 - Acquisition Parameters
Date_       20161119
Time            6.38
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH         24038.461 Hz
FIDRES       1.453353 Hz
AQ          0.3440320 sec
RG             200.34
DW              20.800 usec
DE               6.50 usec
TE             297.9 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

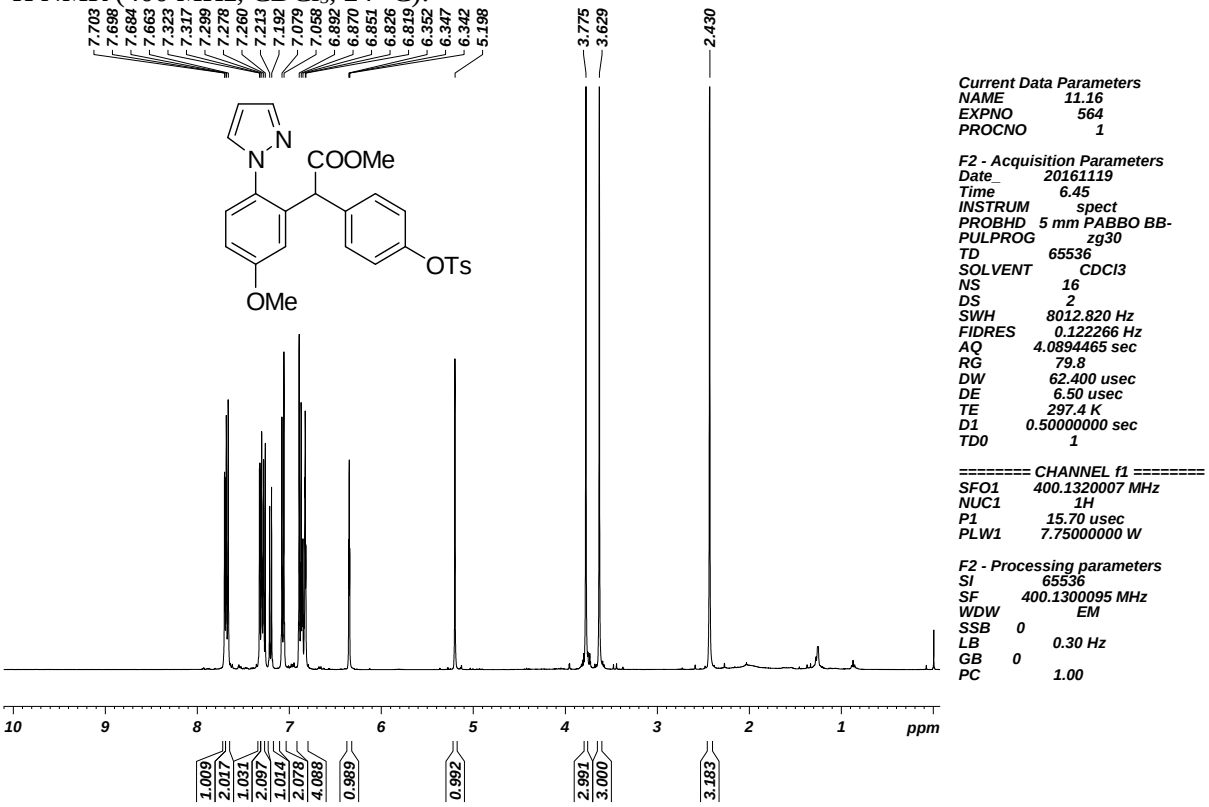
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1               9.25 usec
PLW1       47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2           90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.11863000 W

F2 - Processing parameters
SI             32768
SF         100.6127569 MHz
WDW               EM
SSB      0
LB              1.00 Hz
GB       0
PC              1.40
```

Methyl 2-(5-methoxy-2-(1*H*-pyrazol-1-yl)phenyl)-2-(4-methoxyphenyl)acetate (5h):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



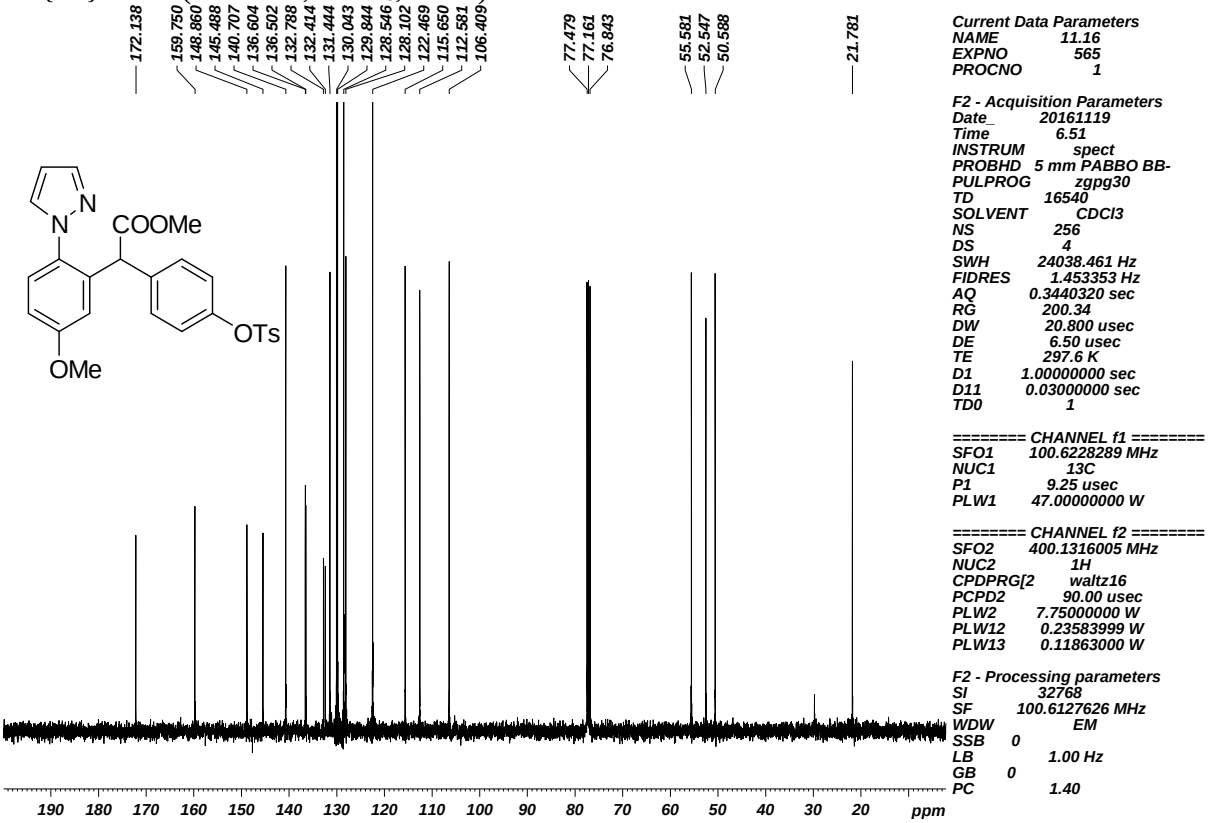

```
Current Data Parameters
NAME          11.16
EXPNO           564
PROCNO            1

F2 - Acquisition Parameters
Date_       20161119
Time            6.45
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG         zg30
TD             65536
SOLVENT         CDCl3
NS                16
DS                 2
SWH         8012.820 Hz
FIDRES       0.122266 Hz
AQ          4.0894465 sec
RG               79.8
DW             62.400 usec
DE              6.50 usec
TE             297.4 K
D1          0.50000000 sec
TD0               1

======== CHANNEL f1 ========
SFO1       400.1320007 MHz
NUC1              1H
P1             15.70 usec
PLW1        7.75000000 W

F2 - Processing parameters
SI             65536
SF         400.1300095 MHz
WDW               EM
SSB     0
LB           0.30 Hz
GB      0
PC           1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME          11.16
EXPNO           565
PROCNO            1

F2 - Acquisition Parameters
Date_       20161119
Time            6.51
INSTRUM         spect
PROBHD   5 mm PABBO BB-
PULPROG        zgpg30
TD             16540
SOLVENT         CDCl3
NS               256
DS                 4
SWH        24038.461 Hz
FIDRES       1.453353 Hz
AQ          0.3440320 sec
RG              200.34
DW             20.800 usec
DE              6.50 usec
TE             297.6 K
D1          1.00000000 sec
D11         0.03000000 sec
TD0               1

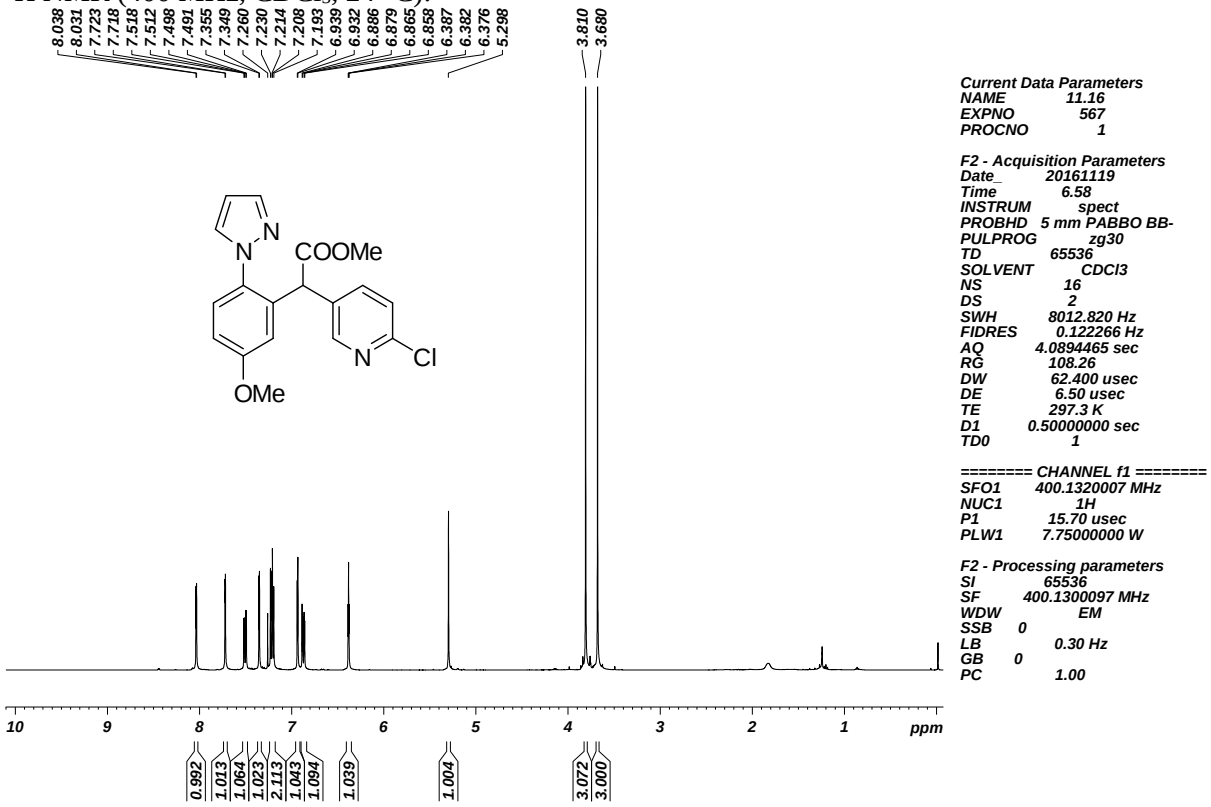
======== CHANNEL f1 ========
SFO1       100.6228289 MHz
NUC1              13C
P1              9.25 usec
PLW1       47.00000000 W

======== CHANNEL f2 ========
SFO2       400.1316005 MHz
NUC2              1H
CPDPRG[2       waltz16
PCPD2          90.00 usec
PLW2        7.75000000 W
PLW12       0.23583999 W
PLW13       0.11863000 W

F2 - Processing parameters
SI             32768
SF         100.6127626 MHz
WDW               EM
SSB     0
LB            1.00 Hz
GB      0
PC            1.40
```

Methyl 2-(6-chloropyridin-3-yl)-2-(5-methoxy-2-(1*H*-pyrazol-1-yl)phenyl)acetate (5i):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



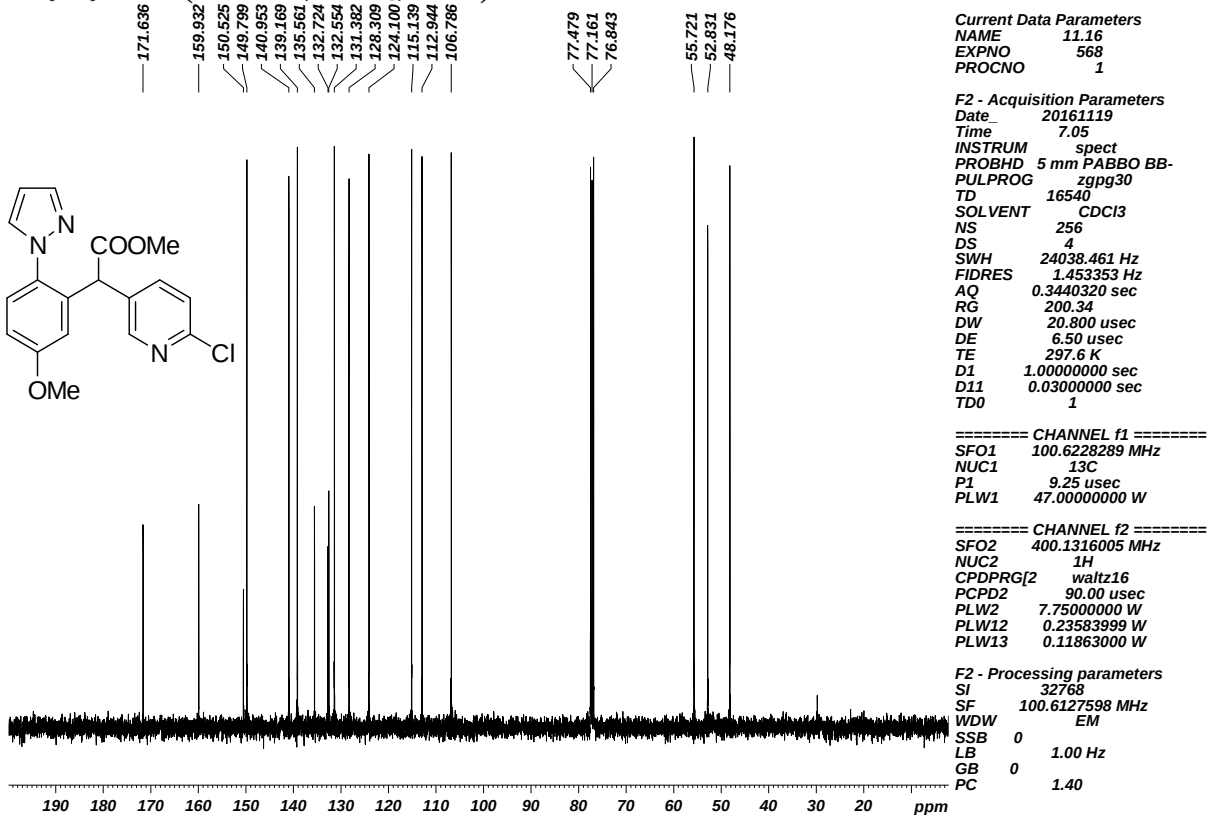
Current Data Parameters
NAME 11.16
EXPNO 567
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161119
Time 6.58
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 108.26
DW 62.400 usec
DE 6.50 usec
TE 297.3 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 400.1320007 MHz
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300097 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



Current Data Parameters
NAME 11.16
EXPNO 568
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161119
Time 7.05
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 256
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 297.6 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

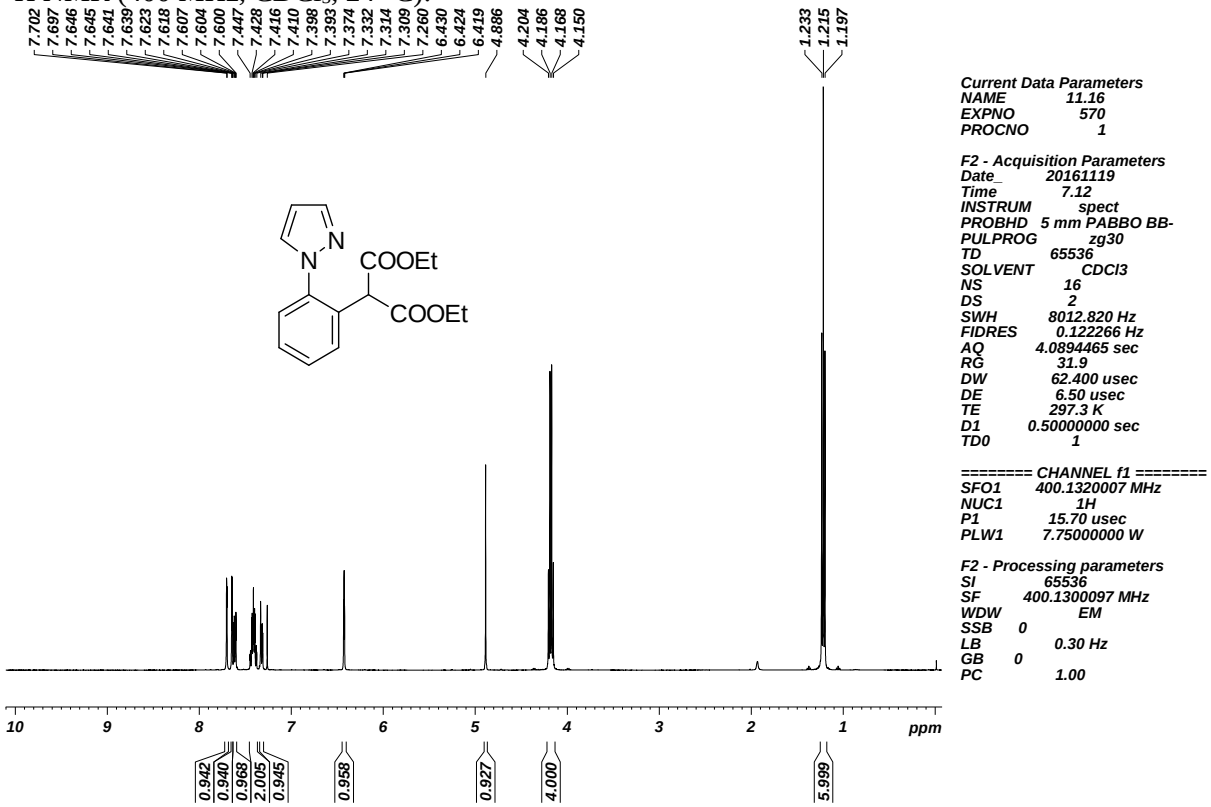
======== CHANNEL f1 ========
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ========
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

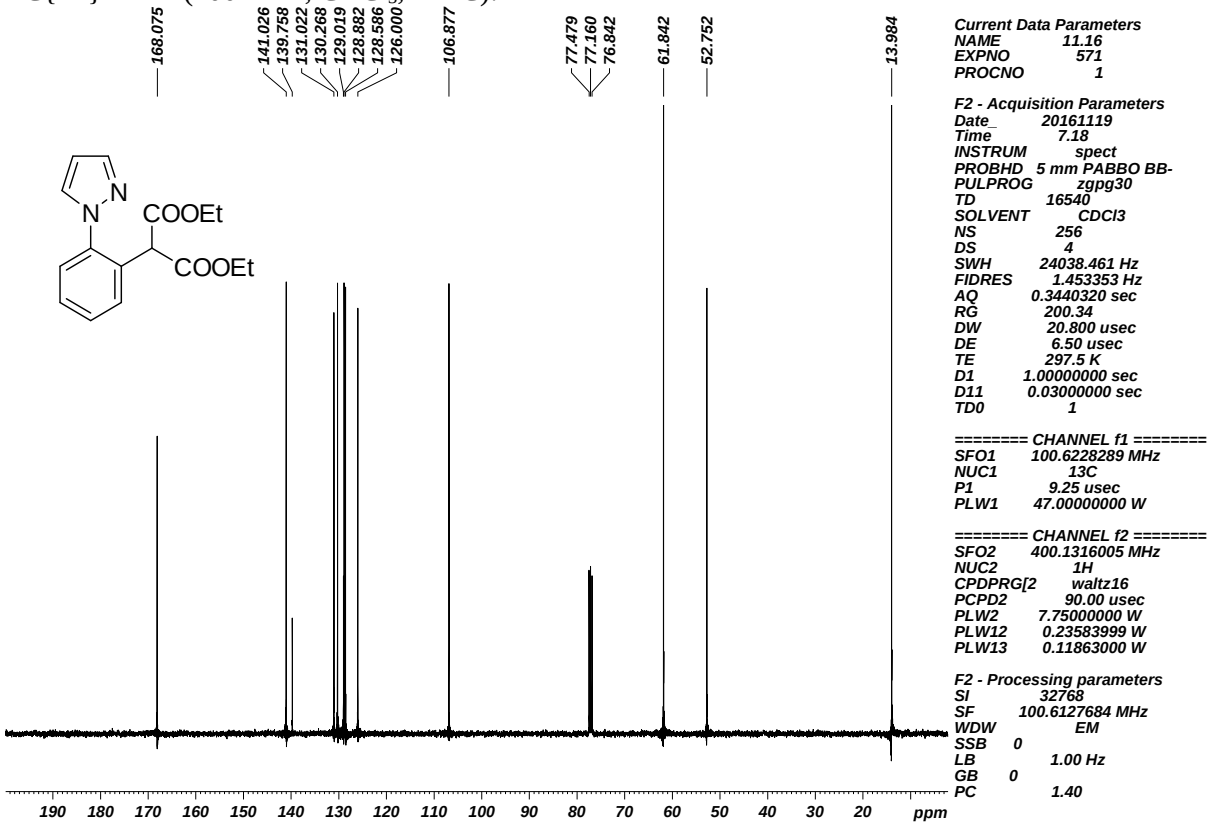
F2 - Processing parameters
SI 32768
SF 100.6127598 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

Diethyl 2-(2-(1*H*-pyrazol-1-yl)phenyl)malonate (5j):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

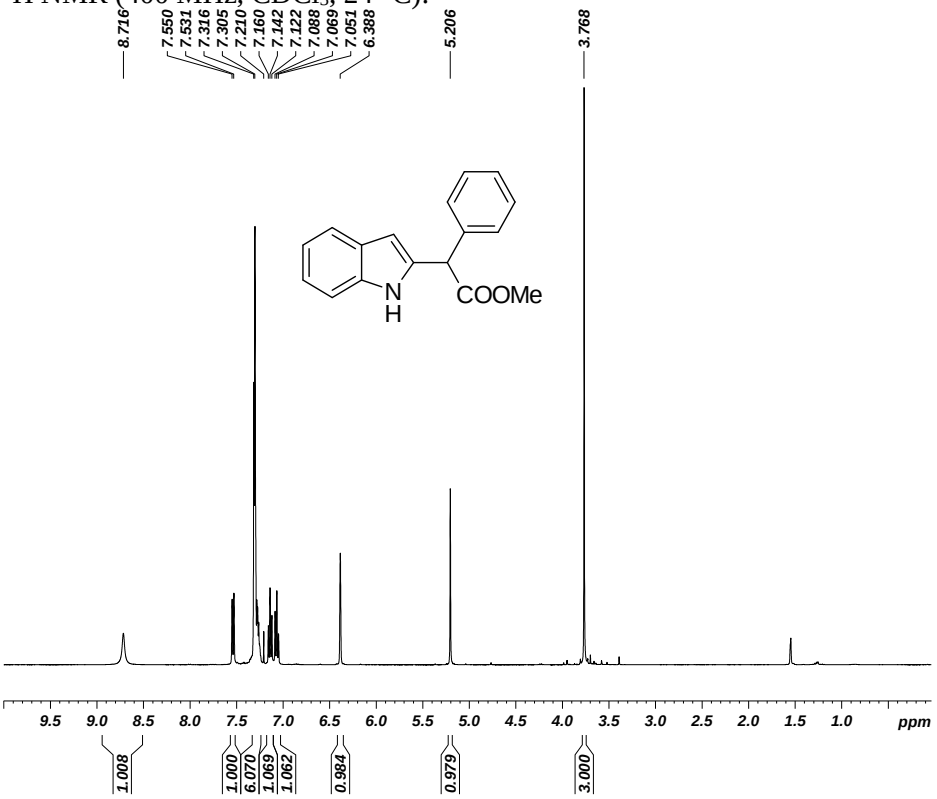


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



Methyl 2-(1*H*-indol-2-yl)-2-phenylacetate (6):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



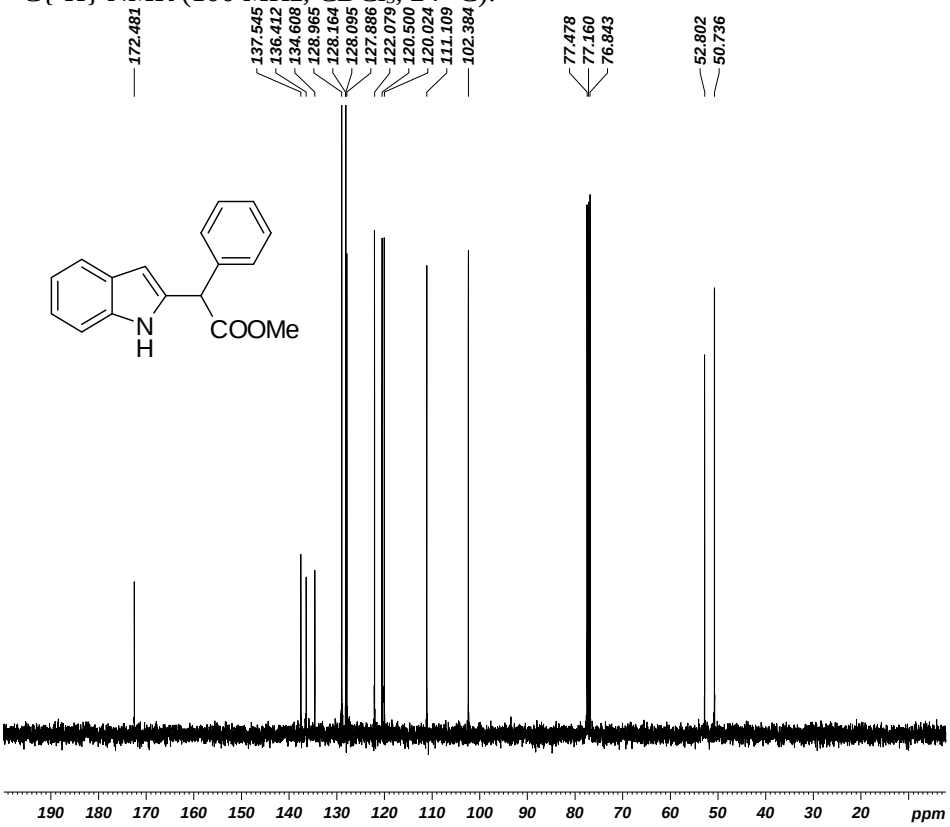

```
Current Data Parameters
NAME            03.18
EXPNO             15
PROCNO             1

F2 - Acquisition Parameters
Date_         20180302
Time              8.14
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG           zg30
TD               65536
SOLVENT           CDCl3
NS                  16
DS                   2
SWH           8012.820 Hz
FIDRES        0.122266 Hz
AQ            4.0894465 sec
RG                108.26
DW                62.400 usec
DE                 6.50 usec
TE                299.6 K
D1            0.50000000 sec
TD0                 1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1                1H
P1                15.70 usec
PLW1         7.75000000 W

F2 - Processing parameters
SI               65536
SF          400.1300292 MHz
WDW                 EM
SSB      0
LB               0.30 Hz
GB       0
PC               1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            03.18
EXPNO             16
PROCNO             1

F2 - Acquisition Parameters
Date_         20180302
Time              8.21
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD               16540
SOLVENT           CDCl3
NS                 256
DS                   4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ            0.3440320 sec
RG                200.34
DW                20.800 usec
DE                 6.50 usec
TE                300.1 K
D1            1.00000000 sec
D11           0.03000000 sec
TD0                 1

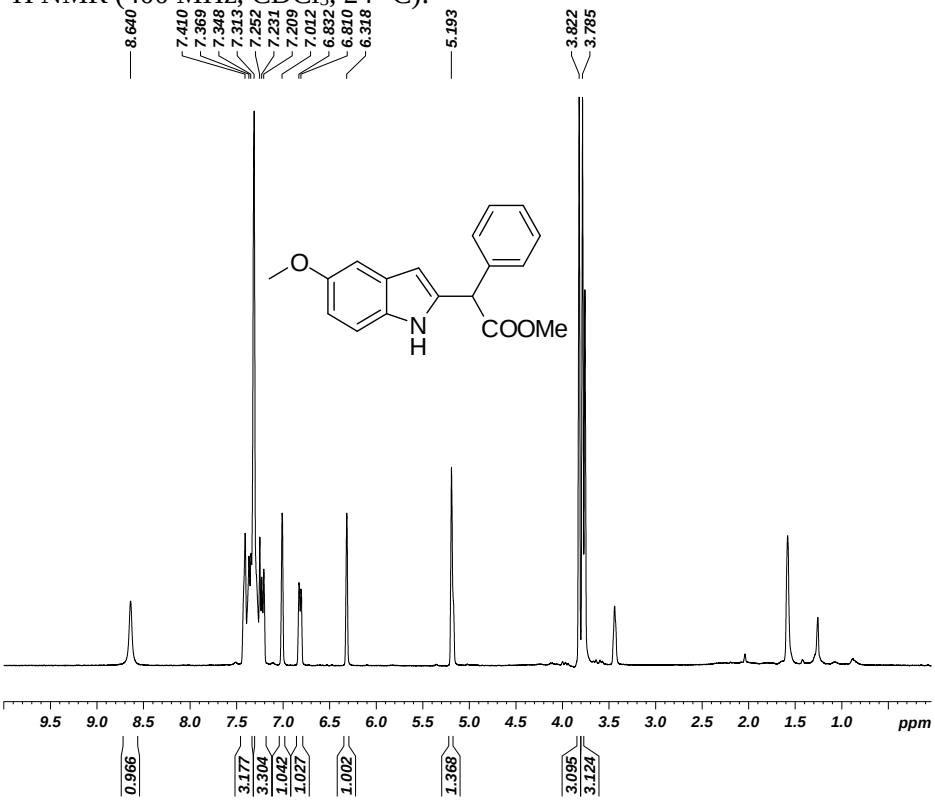
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1                13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2                1H
CPDPRG[2        waltz16
PCPD2             90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

F2 - Processing parameters
SI               32768
SF          100.6127606 MHz
WDW                 EM
SSB      0
LB               1.00 Hz
GB       0
PC               1.40
```

Methyl 2-(5-methoxy-1*H*-indol-2-yl)-2-phenylacetate:

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



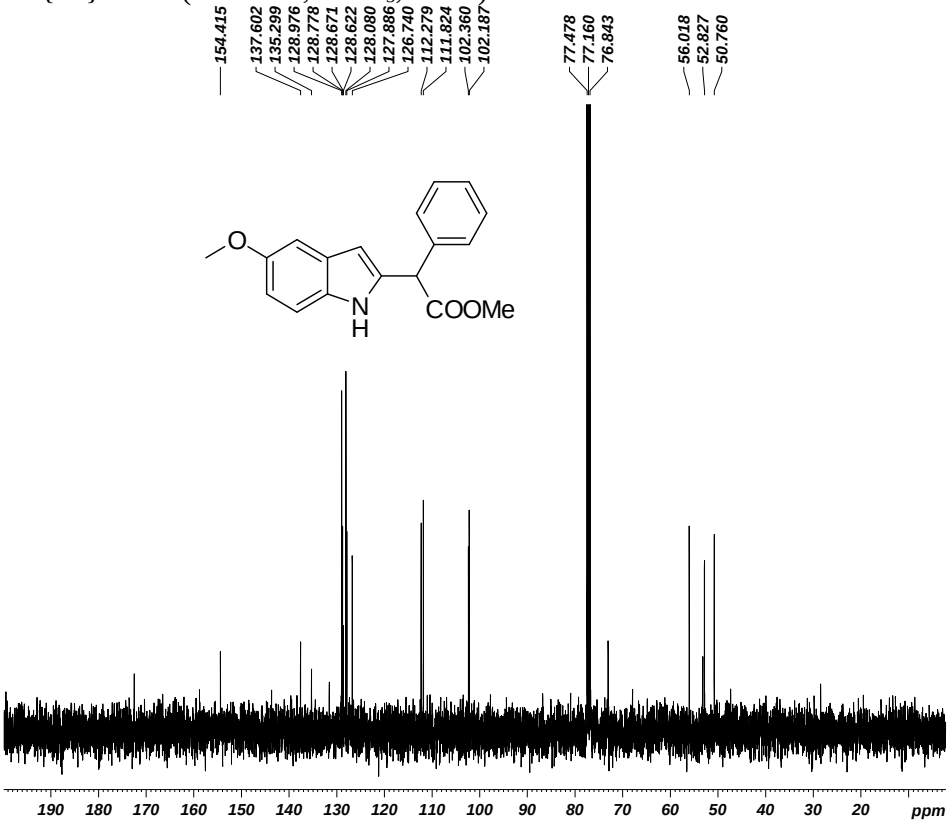

```
Current Data Parameters
NAME            04.18
EXPNO            604
PROCNO             1

F2 - Acquisition Parameters
Date_         20180501
Time            12.47
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG          zg30
TD              65536
SOLVENT          CDCl3
NS                 11
DS                  2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG              200.34
DW              62.400 usec
DE               6.50 usec
TE              299.7 K
D1           0.50000000 sec
TD0                1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1               1H
P1               15.70 usec
PLW1          7.75000000 W

F2 - Processing parameters
SI              65536
SF          400.1300129 MHz
WDW                EM
SSB      0
LB              0.30 Hz
GB       0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            04.18
EXPNO            605
PROCNO             1

F2 - Acquisition Parameters
Date_         20180501
Time            12.48
INSTRUM          spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD              16540
SOLVENT          CDCl3
NS                 81
DS                  4
SWH          24038.461 Hz
FIDRES        1.453353 Hz
AQ           0.3440320 sec
RG              200.34
DW              20.800 usec
DE               6.50 usec
TE              299.7 K
D1           1.00000000 sec
D11          0.03000000 sec
TD0                1

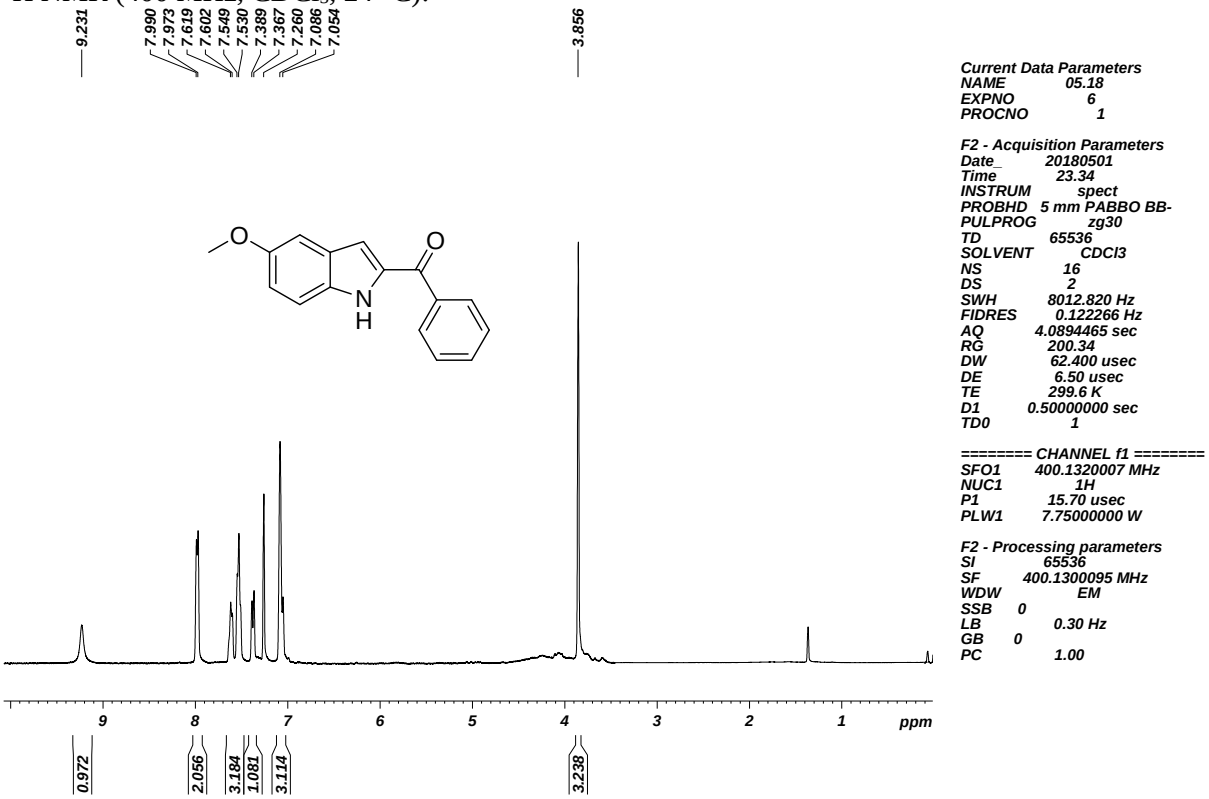
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1               13C
P1               9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2               1H
CPDPRG[2        waltz16
PCPD2           90.00 usec
PLW2          7.75000000 W
PLW12         0.23583999 W
PLW13         0.11863000 W

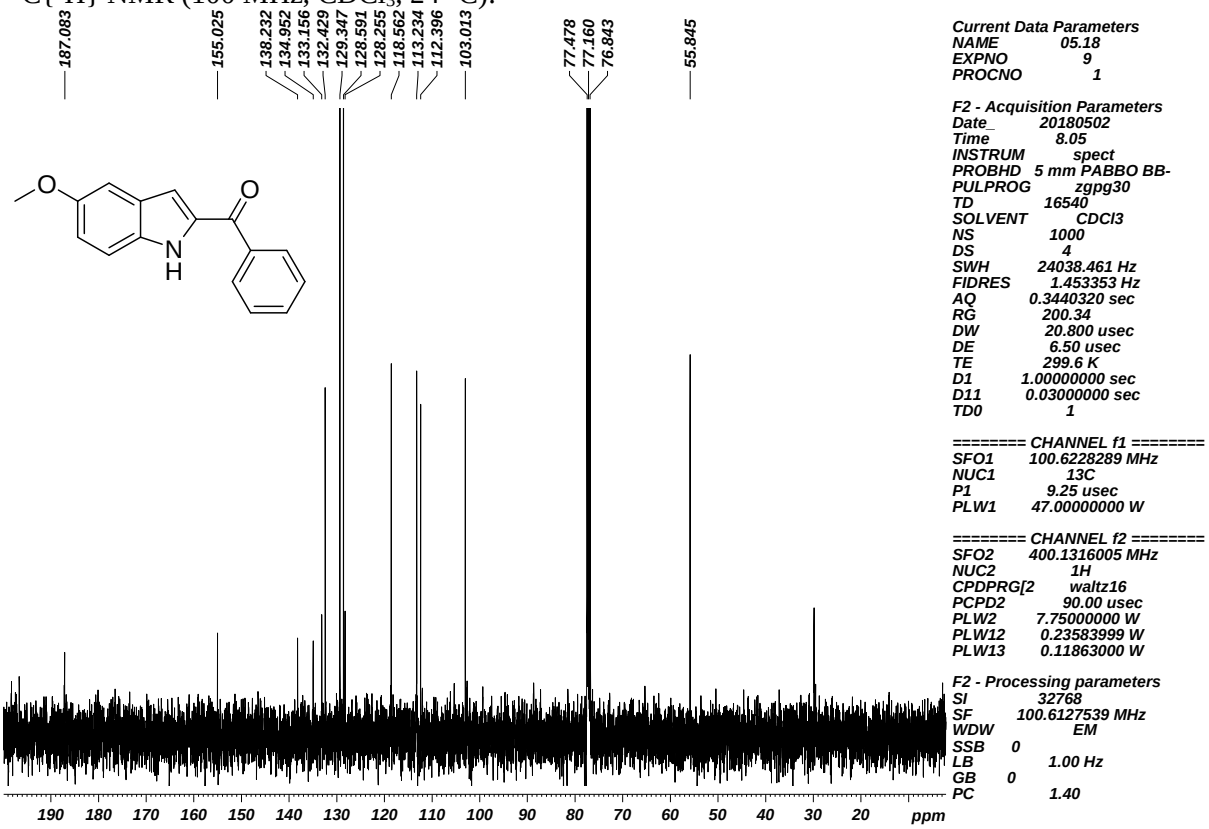
F2 - Processing parameters
SI              32768
SF          100.6127556 MHz
WDW                EM
SSB      0
LB              1.00 Hz
GB       0
PC              1.40
```

(5-Methoxy-1*H*-indol-2-yl)(phenyl)methanone (8):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

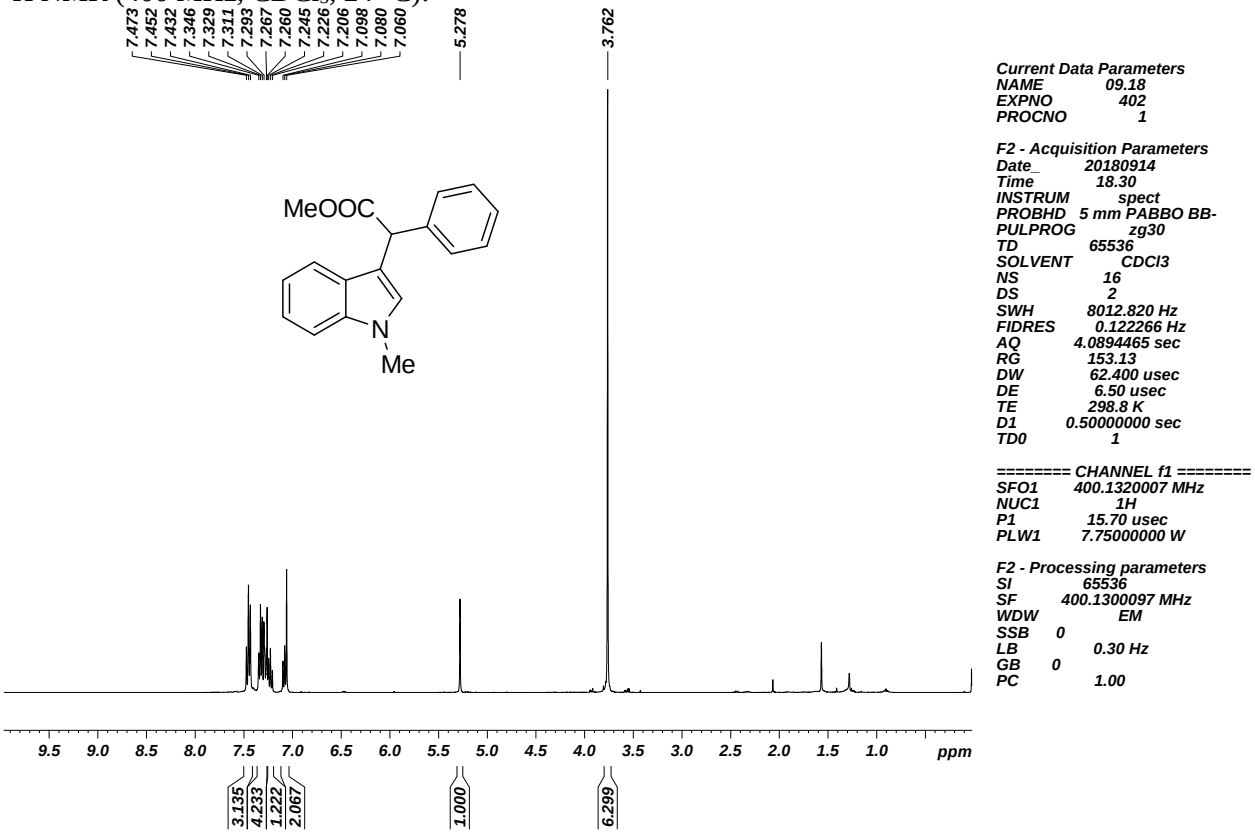


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):

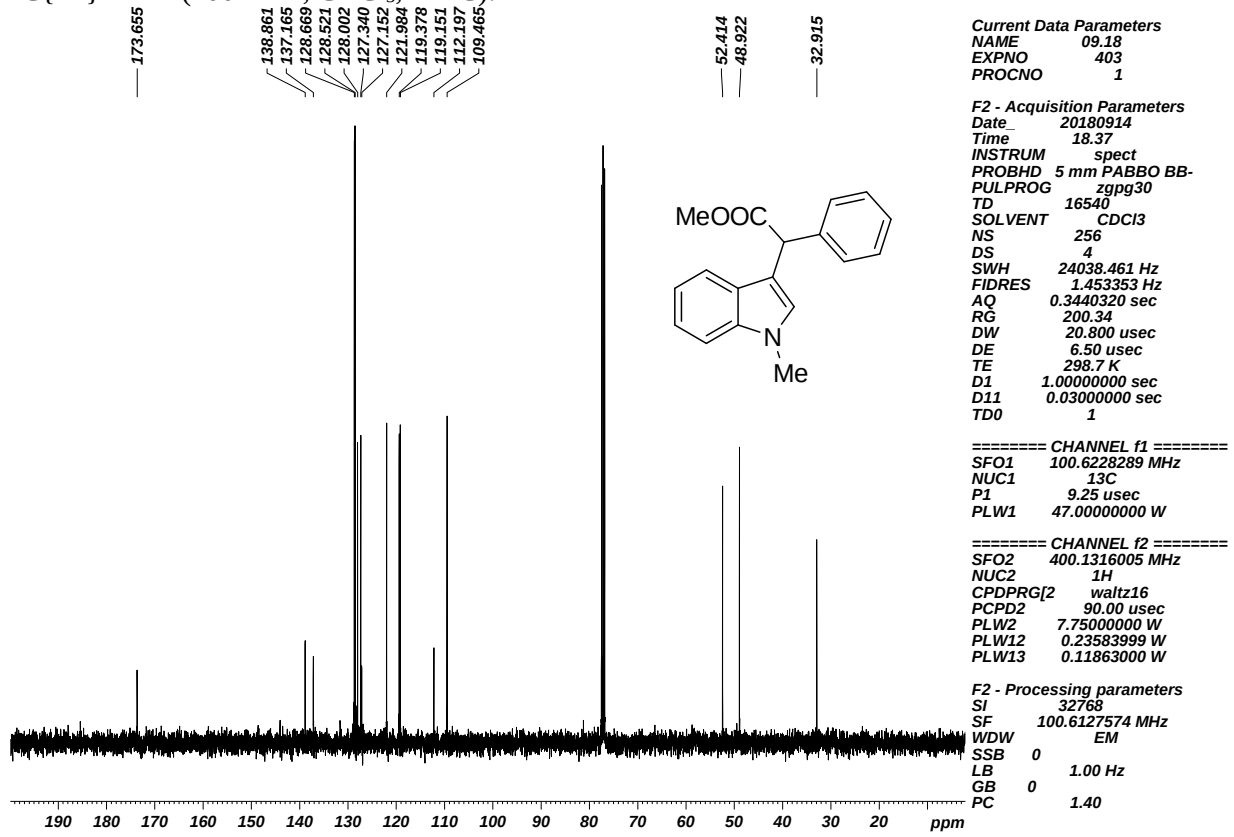


Methyl 2-(1-methyl-1H-indol-3-yl)-2-phenylacetate (9a):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):

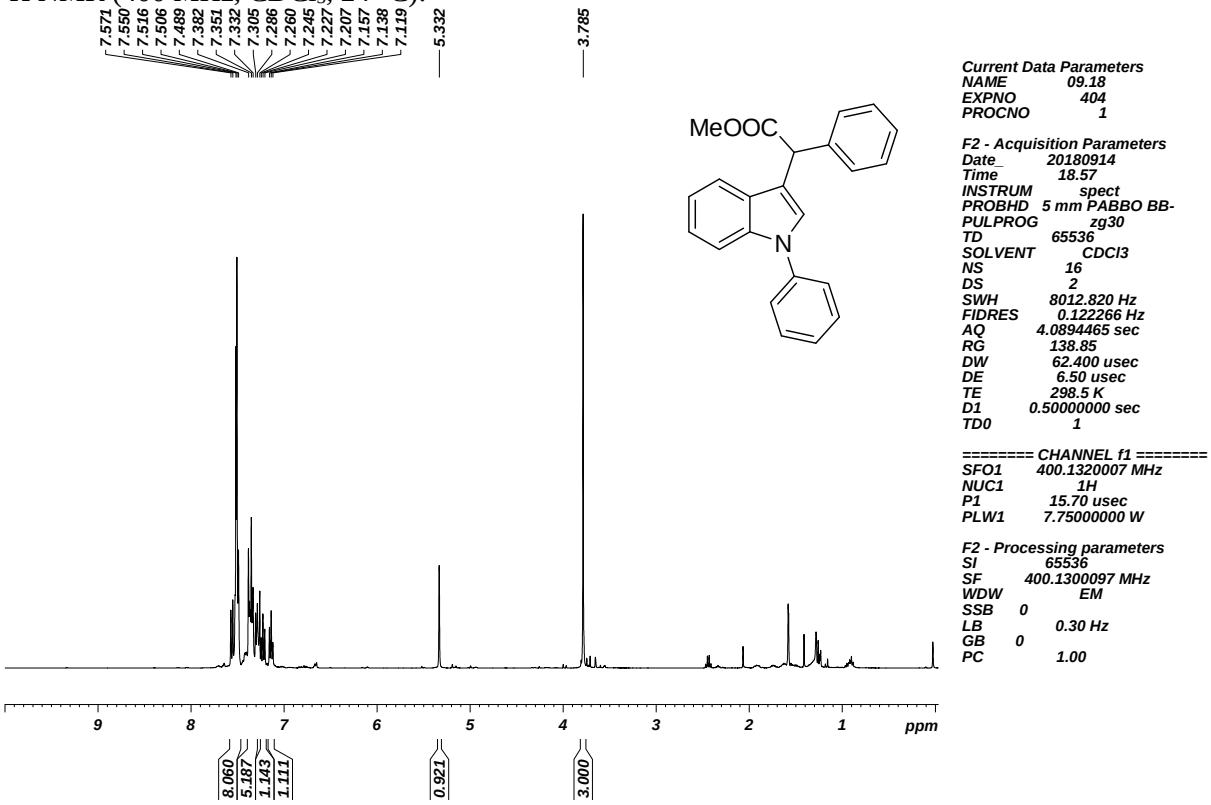


^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):



Methyl 2-phenyl-2-(1-phenyl-1H-indol-3-yl)acetate (9b):

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):



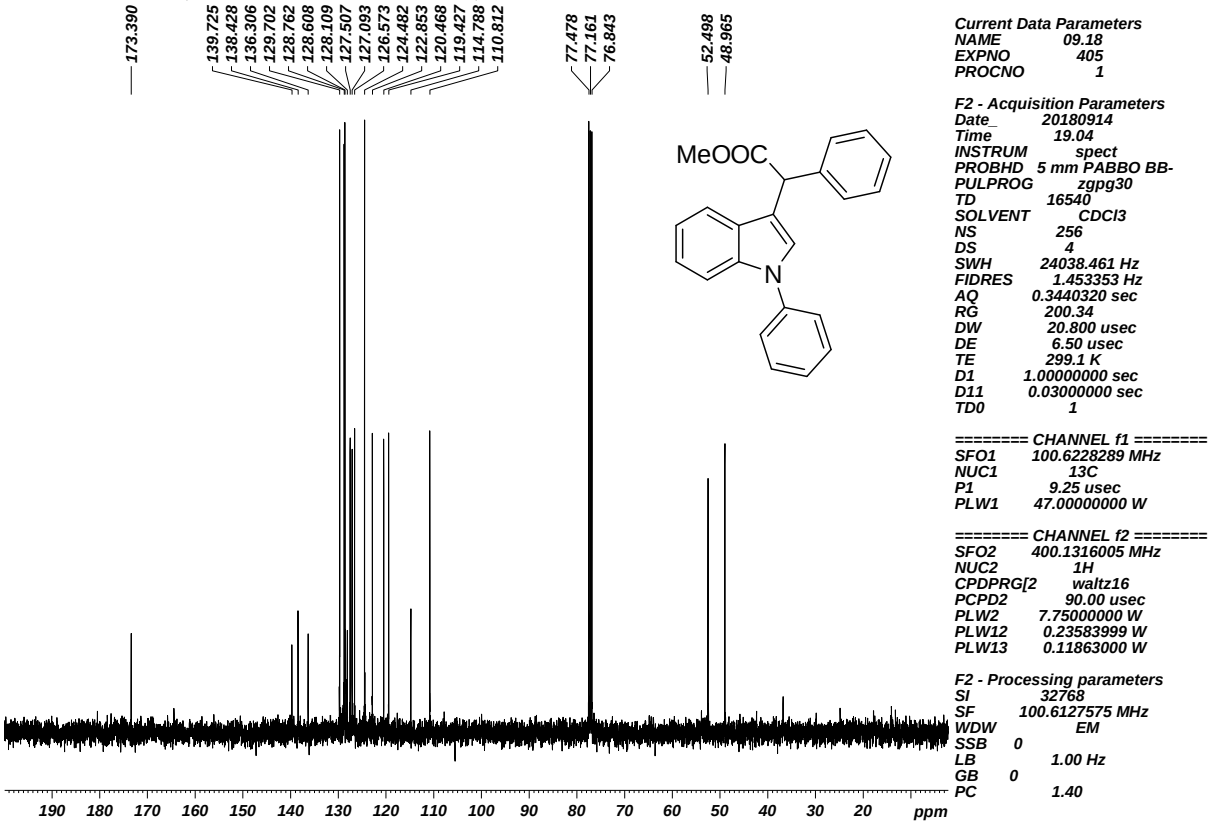

```
Current Data Parameters
NAME            09.18
EXPNO             404
PROCNO              1

F2 - Acquisition Parameters
Date_         20180914
Time             18.57
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG           zg30
TD               65536
SOLVENT          CDCl3
NS                  16
DS                   2
SWH           8012.820 Hz
FIDRES         0.122266 Hz
AQ            4.0894465 sec
RG               138.85
DW               62.400 usec
DE                6.50 usec
TE               298.5 K
D1            0.50000000 sec
TD0                 1

======== CHANNEL f1 ========
SFO1        400.1320007 MHz
NUC1                1H
P1                15.70 usec
PLW1         7.75000000 W

F2 - Processing parameters
SI               65536
SF          400.1300097 MHz
WDW                 EM
SSB      0
LB              0.30 Hz
GB       0
PC              1.00
```

^{13}C{^{1}H} NMR (100 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            09.18
EXPNO             405
PROCNO              1

F2 - Acquisition Parameters
Date_         20180914
Time             19.04
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG         zgpg30
TD               16540
SOLVENT          CDCl3
NS                 256
DS                   4
SWH          24038.461 Hz
FIDRES         1.453353 Hz
AQ            0.3440320 sec
RG               200.34
DW               20.800 usec
DE                6.50 usec
TE               299.1 K
D1            1.00000000 sec
D11           0.03000000 sec
TD0                 1

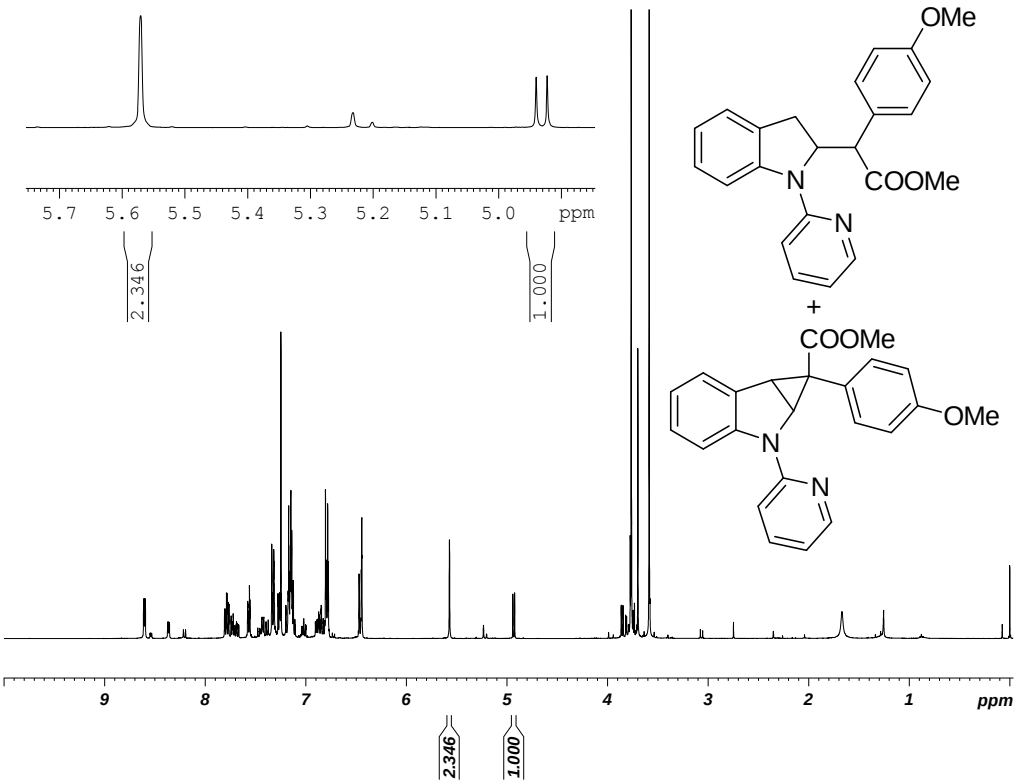
======== CHANNEL f1 ========
SFO1        100.6228289 MHz
NUC1                13C
P1                9.25 usec
PLW1         47.00000000 W

======== CHANNEL f2 ========
SFO2        400.1316005 MHz
NUC2                1H
CPDPRG[2         waltz16
PCPD2           90.00 usec
PLW2         7.75000000 W
PLW12        0.23583999 W
PLW13        0.11863000 W

F2 - Processing parameters
SI               32768
SF          100.6127575 MHz
WDW                 EM
SSB      0
LB              1.00 Hz
GB       0
PC              1.40
```

Mixture of Methyl 2-(4-methoxyphenyl)-2-(1-(pyridin-2-yl)-1H-indol-2-yl)acetate and methyl 1-(4-methoxyphenyl)-2-(pyridin-2-yl)-1,2-dihydrocyclopropa[b]indole-1-carboxylate

^{1}H NMR (400 MHz, $CDCl_3$, 24 °C):




```
Current Data Parameters
NAME            11.15
EXPNO             125
PROCNO              1

F2 - Acquisition Parameters
Date_         20151105
Time              3.19
INSTRUM           spect
PROBHD   5 mm PABBO BB-
PULPROG           zg30
TD                65536
SOLVENT           CDCl3
NS                  16
DS                   2
SWH          8012.820 Hz
FIDRES       0.122266 Hz
AQ           4.0894465 sec
RG                124.58
DW                62.400 usec
DE                 6.50 usec
TE                293.5 K
D1           0.50000000 sec
TD0                 1

======== CHANNEL f1 ========
NUC1               1H
P1                15.70 usec
PLW1         7.75000000 W
SFO1         400.1320007 MHz

F2 - Processing parameters
SI                65536
SF           400.1300148 MHz
WDW                EM
SSB       0
LB                0.30 Hz
GB        0
PC                1.00
```