Supporting Information

Electrochemical C3 Acyloxylation Reactions of 2*H*-Indazoles with Carboxylic Acids via C(sp^2)−O Coupling

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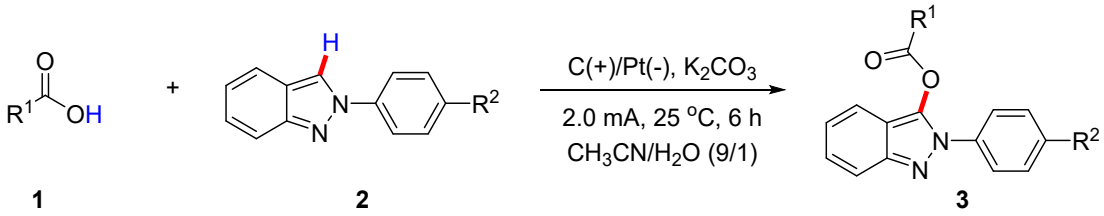
1 General information

2*H*-indazoles were synthesized in our laboratory according to the literatures.[1, 2] Unless specifically emphasized, chemicals and materials used in the experiments were purchased from suppliers and used directly without further purification. NMR spectra were recorded on a Bruker spectrometer at 400 MHz (^{1}H NMR) and 100 MHz (^{13}C NMR) with $CDCl_3$ as the solvent using tetramethylsilane (TMS) as the internal standard. High resolution mass spectra (HRMS) were measured with an Agilent 6230 TOF instrument.

2 General procedure for electrochemical C3 acyloxylation of 2*H*-indazoles



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Carboxylic acids (**1**, 0.2 mmol), 2*H*-indazoles (**2**, 0.4 mmol), K_2CO_3 (0.1 mmol) and CH_3CN/H_2O (10 mL, V/V = 9/1) were added to a 25 mL undivided three-necked flask with a stir bar. The three-necked flask was equipped with a carbon plate anode (2.25 cm^2) and a platinum plate cathode (2.25 cm^2). The reaction mixture was stirred and electrolyzed at a constant current of 2.0 mA at 25 °C for 6 h. After completion of the reaction, anhydrous sodium sulfate was added to the mixture to remove water. Then, the mixture was concentrated in vacuo and the residue was purified by column chromatography using petroleum ether/ethyl acetate as the eluent to afford a product.

3 Detail descriptions for products

***2-Phenyl-2H-indazol-3-yl benzoate (3aa)*:**

White solid (48.8 mg, 78%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.19-8.17 (m, 2H), 7.77-

7.74 (m, 2H), 7.73-7.67 (m, 2H), 7.55-7.46 (m, 5H), 7.42-7.38 (m, 1H), 7.36-7.32 (m, 1H), 7.12-7.08 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.7, 148.0, 138.2, 136.8, 134.7, 130.7, 129.4, 129.0, 128.7, 127.4, 127.4, 124.4, 122.3, 119.3, 118.2, 111.9; HRMS m/z (ESI): calc. for $C_{20}H_{15}N_2O_2$ ([M+H$^+$]) 315.1128, found 315.1130.

***2-Phenyl-2H-indazol-3-yl 4-fluorobenzoate (3ba)*:**

White solid (41.5 mg, 63%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.22-8.18 (m, 2H), 7.74-7.70 (m, 3H), 7.54-7.47 (m, 3H), 7.41 (t, *J* = 7.4 Hz, 1H), 7.34 (t, *J* = 7.7 Hz, 1H), 7.21 (t, *J* = 8.6 Hz, 2H), 7.12-7.08 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.8 (*J* = 256.0 Hz), 161.8, 148.0, 138.1, 136.6, 133.5 (*J* = 9.0 Hz), 129.4, 128.8, 127.4, 124.4, 123.7 (*J* = 3.0 Hz), 122.5, 119.2, 118.3, 116.4 (*J* = 22.0 Hz), 111.9. HRMS m/z (ESI): calc. for $C_{20}H_{14}FN_2O_2$ ([M+H$^+$]) 333.1034, found 333.1036.

2-Phenyl-2H-indazol-3-yl 4-chlorobenzoate (3ca):

White solid (45.2 mg, 65%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.12-8.09 (m, 2H), 7.73-7.70 (m, 3H), 7.53-7.47 (m, 5H), 7.43-7.39 (m, 1H), 7.36-7.32 (m, 1H), 7.12-7.09 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 161.9, 148.0, 141.5, 138.1, 136.5, 132.1, 129.5, 129.5, 128.8, 127.5, 125.9, 124.4, 122.5, 119.2, 118.3, 111.9. HRMS m/z (ESI): calc. for $C_{20}H_{14}ClN_2O_2$ ([M+H$^+$]) 349.0738, found 349.0740.

2-Phenyl-2H-indazol-3-yl 4-bromobenzoate (3da):

White solid (51.6 mg, 66%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.04-8.01 (m, 2H), 7.72-7.67 (m, 5H),7.53-7.47 (m, 3H), 7.44-7.40 (m, 1H), 7.36-7.32 (m, 1H), 7.13-7.09 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.1, 148.1, 138.1, 136.5, 132.5, 132.1, 130.3, 129.5, 128.9, 127.5, 126.4, 124.4, 122.5, 119.2, 118.3, 111.9. HRMS m/z (ESI): calc. for $C_{20}H_{14}BrN_2O_2$ ([M+H$^+$]) 393.0233, found 393.0236.

2-Phenyl-2H-indazol-3-yl 3-bromobenzoate (3ea):

White solid (40.7 mg, 52%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.31 (t, *J* = 1.8 Hz, 1H),

8.11-8.08 (m, 1H), 7.82-7.80 (m, 1H), 7.74-7.70 (m, 3H), 7.53-7.47 (m, 3H), 7.44-7.39 (m, 2H), 7.36-7.32 (m, 1H), 7.13-7.09 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 161.5, 148.0, 138.1, 137.7, 136.4, 133.6, 130.6, 129.5, 129.4, 129.2, 128.9, 127.5, 124.5, 123.1, 122.6, 119.1, 118.3, 118.4. HRMS m/z (ESI): calc. for $C_{20}H_{14}BrN_2O_2$ ([M+H$^+$]) 393.0233, found 393.0237.

2-Phenyl-2H-indazol-3-yl 2-bromobenzoate (3fa):

Light yellow solid (41.7 mg, 53%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.95-7.92 (m, 1H), 7.77-7.70 (m, 4H), 7.59 (d, *J* = 8.6 Hz, 1H), 7.53-7.49 (m, 2H), 7.46-7.42 (m, 3H), 7.37-7.32 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 161.9, 148.0, 138.1, 136.4, 135.1, 134.2, 132.2, 129.4, 129.3, 128.9, 127.6, 127.4, 124.7, 123.1, 122.5, 119.2, 118.3, 111.9. HRMS m/z (ESI): calc. for $C_{20}H_{14}BrN_2O_2$ ([M+H$^+$]) 393.0233, found 393.0236.

2-Phenyl-2H-indazol-3-yl 4-(tert-butyl)benzoate (3ga):

White solid (46.0 mg, 62%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.12 (d, *J* = 8.5 Hz, 2H), 7.78-7.76 (m, 2H), 7.71 (d, *J* = 8.9 Hz, 1H), 7.57-7.47 (m, 5H), 7.44-7.39 (m, 1H), 7.35-7.31 (m, 1H), 7.11-7.07 (m, 1H), 1.38 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.7, 158.8, 148.1, 138.3, 137.0, 130.7, 129.4, 128.7, 127.4, 126.1, 124.7, 124.4, 122.3, 119.4, 118.2, 112.0, 35.5, 31.1. HRMS m/z (ESI): calc. for $C_{24}H_{23}N_2O_2$ ([M+H$^+$]) 371.1754, found 371.1756.

2-Phenyl-2H-indazol-3-yl 4-methylbenzoate (3ha):

White solid (41.6 mg, 63%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.07 (d, *J* = 8.2 Hz, 2H), 7.76-7.73 (m, 2H), 7.70 (d, *J* = 8.9 Hz, 1H), 7.53 (d, *J* = 8.5 Hz, 1H), 7.50-7.45 (m, 2H), 7.42-7.38 (m, 1H), 7.35-7.31 (m, 3H), 7.11-7.07 (m, 1H), 2.47 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.8, 148.1, 145.9, 138.3, 137.0, 130.8, 129.8, 129.4, 128.7, 127.4, 124.7, 124.4, 122.3, 119.4, 118.3, 112.0, 22.0. HRMS m/z (ESI): calc. for $C_{21}H_{17}N_2O_2$ ([M+H$^+$]) 329.1285, found 329.1286.

2-Phenyl-2H-indazol-3-yl 3-methylbenzoate (3ia):

White solid (37.2 mg, 57%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.99 (d, *J* = 6.0 Hz, 2H), 7.75 (d, *J* = 8.0 Hz, 2H), 7.71 (d, *J* = 8.8 Hz, 1H), 7.54-7.47 (m, 4H), 7.44-7.39 (m, 2H), 7.35-7.31 (m, 1H), 7.11-7.08 (m, 1H), 2.44 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 163.0, 148.1, 139.0, 138.3, 137.0, 135.6, 131.3, 129.4, 129.0, 128.7, 127.9, 127.4, 127.4, 124.4, 122.3, 119.3, 118.3, 112.0, 21.4. HRMS m/z (ESI): calc. for $C_{21}H_{17}N_2O_2$ ([M+H$^+$]) 329.1285, found 329.1284.

2-Phenyl-2H-indazol-3-yl 2-methylbenzoate (3ja):

White solid (39.5 mg, 60%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.15 (d, *J* = 7.5 Hz, 1H), 7.74 (d, *J* = 7.8 Hz, 2H), 7.71 (d, *J* = 8.9 Hz, 1H), 7.55-7.47 (m, 4H), 7.44-7.40 (m, 1H), 7.36-7.32 (m, 3H), 7.12-7.09 (m, 1H), 2.60 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.9, 148.1, 142.6, 138.3, 137.0, 133.9, 132.4, 131.6, 129.4, 128.8, 127.4, 126.4, 126.4, 124.6, 122.3, 119.2, 118.3, 112.1, 22.0. HRMS m/z (ESI): calc. for $C_{21}H_{17}N_2O_2$ ([M+H$^+$]) 329.1285, found 329.1283.

2-Phenyl-2H-indazol-3-yl 2,4,6-trimethoxybenzoate (3ka):

White solid (45.3 mg, 56%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.75 (d, *J* = 7.5 Hz, 1H), 7.71 (d, *J* = 7.2 Hz, 2H), 7.62 (d, *J* = 8.5 Hz, 1H), 7.52-7.45 (m, 3H), 7.38-7.35 (m, 1H), 7.17-7.14 (m, 1H), 6.91 (s, 2H), 2.32 (s, 3H), 2.28 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.9, 148.0, 141.1, 138.1, 136.9, 136.4, 129.3, 129.0, 129.0, 127.8, 127.2, 125.3, 122.4, 118.9, 118.3, 111.8, 21.2, 20.1. HRMS m/z (ESI): calc. for $C_{23}H_{21}N_2O_5$ ([M+H$^+$]) 405.1455, found 405.1458.

2-Phenyl-2H-indazol-3-yl 1-naphthoate (3la):

Light yellow solid (27.2 mg, 37%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.94 (d, *J* = 8.6 Hz, 1H), 8.50-8.48 (m, 1H), 8.17 (d, *J* = 8.2 Hz, 1H), 7.96-7.93 (m, 1H), 7.80-7.78 (m, 2H), 7.74 (d, *J* = 8.9 Hz, 1H), 7.67-7.63 (m, 1H), 7.61-7.56 (m, 3H), 7.50-7.47 (m, 2H), 7.43-

7.34 (m, 2H), 7.15-7.11 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.9, 148.2, 138.4, 137.1, 135.7, 134.1, 132.3, 132.0, 129.5, 129.0, 129.0, 128.8, 127.4, 127.0, 125.6, 124.7, 124.6, 123.5, 122.4, 119.3, 118.4, 112.2. HRMS m/z (ESI): calc. for $C_{24}H_{17}N_2O_2$ ([M+H$^+$]) 365.1285, found 365.1287.

2-Phenyl-2H-indazol-3-yl [1,1'-biphenyl]-2-carboxylate (3ma):

Light yellow liquid (42.1 mg, 54%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.00 (d, *J* = 7.7 Hz, 1H), 7.68 (d, *J* = 9.1 Hz, 1H), 7.63 (d, *J* = 7.8 Hz, 3H), 7.53-7.43 (m, 5H), 7.39-7.35 (m, 4H), 7.33-7.29 (m, 3H), 7.09-7.05 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 163.9, 147.9, 144.1, 140.5, 138.2, 136.6, 132.9, 131.5, 130.7, 129.3, 128.7, 128.5, 128.3, 127.8, 127.7, 127.5, 127.2, 124.6, 122.1, 119.1, 118.1, 111.7. HRMS m/z (ESI): calc. for $C_{26}H_{19}N_2O_2$ ([M+H$^+$]) 391.1441, found 391.1445.

2-Phenyl-2H-indazol-3-yl 2-benzylbenzoate (3na):

White solid (47.0 mg, 58%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.14 (d, *J* = 7.8 Hz, 1H), 7.71 (d, *J* = 8.8 Hz, 1H), 7.66 (d, *J* = 7.2 Hz, 2H), 7.60-7.56 (m, 1H), 7.48-7.38 (m, 4H), 7.37-7.29 (m, 3H), 7.28 (s, 1H), 7.24-7.21 (m, 2H), 7.12 (d, *J* = 7.0 Hz, 2H), 7.08-7.04 (m, 1H), 4.44 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.9, 148.0, 144.5, 140.3, 138.2, 136.8, 133.9, 132.4, 131.8, 129.4, 129.0, 128.7, 128.6, 127.3, 126.9, 126.6, 126.3, 124.5, 122.2, 119.2, 118.2, 112.0, 39.8. HRMS m/z (ESI): calc. for $C_{27}H_{21}N_2O_2$ ([M+H$^+$]) 405.1598, found 405.1598.

2-Phenyl-2H-indazol-3-yl 2-phenethylbenzoate (3oa):

White solid (54.2 mg, 65%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.23 (d, *J* = 7.8 Hz, 1H), 7.81-7.77 (m, 3H), 7.59 (d, *J* = 8.5 Hz, 1H), 7.57-7.53 (m, 1H), 7.50 (t, *J* = 7.7 Hz, 2H), 7.43-7.36 (m, 3H), 7.31-7.26 (m, 3H), 7.22-7.13 (m, 4H), 3.31-3.27 (m, 2H), 2.85-2.81 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.8, 148.0, 146.0, 141.5, 138.2, 136.9, 133.9, 131.9, 131.7, 129.3, 128.7, 128.6, 128.4, 127.3, 126.6, 126.0, 126.0, 124.5,

122.3, 119.0, 118.3, 112.1, 37.8, 37.0. HRMS m/z (ESI): calc. for $C_{28}H_{23}N_2O_2$ ([M+H$^+$]) 419.1754, found 419.1758.

2-Phenyl-2H-indazol-3-yl 2-benzoylbenzoate (3pa):

Light yellow liquid (54.0 mg, 65%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.91-7.88 (m, 2H), 7.87-7.84 (m, 1H), 7.75 (d, *J* = 7.6 Hz, 1H), 7.57-7.51 (m, 4H), 7.32-7.27 (m, 3H), 7.19-7.11 (m, 3H), 7.02 (d, *J* = 7.0 Hz, 2H), 6.99-6.95 (m, 1H), 6.84 (d, *J* = 7.8 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 168.0, 167.4, 151.6, 146.7, 140.1, 137.4, 133.1, 132.6, 130.3, 130.3, 129.7, 128.6, 126.7, 126.3, 125.6, 125.4, 125.1, 125.0, 124.9, 122.1, 116.7, 101.2. HRMS m/z (ESI): calc. for $C_{27}H_{19}N_2O_3$ ([M+H$^+$]) 419.1390, found 419.1397.

2-Phenyl-2H-indazol-3-yl thiophene-3-carboxylate (3qa):

White solid (25.8 mg, 40%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.35 (d, *J* = 2.4 Hz, 1H), 7.74 (d, *J* = 7.7 Hz, 2H), 7.71 (d, *J* = 8.8Hz, 1H), 7.64 (d, *J* = 5.0 Hz, 1H), 7.54 (d, *J* = 8.5 Hz, 1H), 7.49 (t, *J* = 7.7 Hz, 2H), 7.43-7.40 (m, 2H), 7.33 (t, *J* = 7.7 Hz, 1H), 7.12-7.08 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 158.2, 148.0, 138.2, 136.6, 135.9, 130.5, 129.4, 128.7, 128.3, 127.4, 127.2, 124.4, 122.3, 119.3, 118.2, 111.9. HRMS m/z (ESI): calc. for $C_{18}H_{13}N_2O_2S$ ([M+H$^+$]) 321.0692, found 321.0692.

2-Phenyl-2H-indazol-3-yl 3-methylbenzofuran-2-carboxylate (3ra):

White solid (28.0 mg, 38%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.84-7.81 (m, 2H), 7.73 (d, *J* = 8.9 Hz, 1H), 7.68 (d, *J* = 7.9 Hz, 1H), 7.60 (d, *J* = 7.7 Hz, 2H), 7.55 (d, *J* = 7.5 Hz, 1H), 7.50 (t, *J* = 7.9 Hz, 2H), 7.42 (d, *J* = 7.3 Hz, 1H), 7.39-7.33 (m, 2H), 7.14-7.10 (m, 1H), 2.60 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 156.1, 155.2, 148.0, 138.4, 138.2, 136.1, 130.3, 129.4, 129.3, 128.8, 128.8, 127.4, 124.5, 123.8, 122.5, 121.6, 119.3, 118.3, 112.5, 112.0, 9.8. HRMS m/z (ESI): calc. for $C_{23}H_{17}N_2O_3$ ([M+H$^+$]) 369.1234, found 369.1237.

2-Phenyl-2H-indazol-3-yl 1-phenylcyclopropane-1-carboxylate (3sa):

Light yellow solid (38.4 mg, 54%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.66 (d, *J* = 8.8 Hz, 1H), 7.51-7.44 (m, 6H), 7.43-7.34 (m, 5H), 7.30 (t, *J* = 7.7 Hz, 1H), 7.08 (t, *J* = 7.6 Hz, 1H), 1.77-1.74 (m, 2H), 1.43-1.40 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 170.7, 147.8, 138.0, 137.8, 136.9, 130.7, 129.2, 128.5, 128.4, 128.0, 127.2, 124.3, 122.0, 119.3, 118.1, 111.5, 29.0, 18.2. HRMS m/z (ESI): calc. for $C_{23}H_{19}N_2O_2$ ([M+H$^+$]) 355.1441, found 355.1442.

2-Phenyl-2H-indazol-3-yl 3-phenylpropanoate (3ta):

Light yellow solid (15.7 mg, 23%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.66 (d, *J* = 9.0 Hz, 1H), 7.63-7.61 (m, 2H), 7.50-7.43 (m, 3H), 7.35-7.27 (m, 5H), 7.22-7.20 (m, 2H), 7.07-7.04 (m, 1H), 3.06-3.02 (m, 2H), 2.97-2.93 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 169.0, 147.9, 139.5, 138.1, 136.6, 129.4, 128.9, 128.8, 128.4, 127.4, 126.9, 124.5, 122.3, 119.0, 118.2, 111.8, 35.49, 30.68. HRMS m/z (ESI): calc. for $C_{22}H_{19}N_2O_2$ ([M+H$^+$]) 343.1441, found 343.1443.

2-(4-fluorophenyl)-2H-indazol-3-yl benzoate (3ab):

White solid (36.6 mg, 55%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.18 (d, *J* = 7.3 Hz, 2H), 7.75-7.69 (m, 4H), 7.54 (t, *J* = 8.8 Hz, 3H), 7.34 (t, *J* = 7.5 Hz, 1H), 7.17 (t, *J* = 8.5 Hz, 2H), 7.12-7.09 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.7, 162.5 (d, *J* = 248.0 Hz), 148.1, 136.9, 134.9, 134.3 (d, *J* = 3.0 Hz), 130.7, 129.1, 127.5, 127.4, 126.3 (d, *J* = 8.0 Hz), 122.5, 119.2, 118.2, 116.4 (d, *J* = 23.0 Hz), 111.9. HRMS m/z (ESI): calc. for $C_{20}H_{14}FN_2O_2$ ([M+H$^+$]) 333.1034, found 333.1036.

2-(4-chlorophenyl)-2H-indazol-3-yl benzoate (3ac):

White solid (36.3 mg, 52%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.19 (d, *J* = 7.2 Hz, 2H), 7.74-7.68 (m, 4H), 7.56 (t, *J* = 7.8 Hz, 2H), 7.52 (d, *J* = 8.6 Hz, 1H), 7.47-7.44 (m, 2H), 7.36-7.32 (m, 1H), 7.12-7.08 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.7, 148.2,

136.8, 135.0, 134.6, 130.8, 129.7, 129.2, 127.7, 127.4, 125.5, 122.6, 119.3, 118.3, 112.1. HRMS m/z (ESI): calc. for $C_{20}H_{14}ClN_2O_2$ ([M+H$^+$]) 349.0738, found 349.0737.

2-(4-bromophenyl)-2H-indazol-3-yl benzoate (3ad):

White solid (39.2 mg, 50%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.19 (d, *J* = 7.2 Hz, 2H), 7.74-7.64 (m, 4H), 7.62-7.54 (m, 4H), 7.51 (d, *J* = 8.6 Hz, 1H), 7.36-7.32 (m, 1H), 7.12-7.08 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.7, 148.3, 137.3, 136.9, 135.0, 132.6, 130.8, 129.2, 127.7, 127.3, 125.8, 122.6, 119.3, 118.3, 112.1. HRMS m/z (ESI): calc. for $C_{20}H_{14}BrN_2O_2$ ([M+H$^+$]) 393.0233, found 393.0232.

2-(p-tolyl)-2H-indazol-3-yl benzoate (3ae):

White solid (42.0 mg, 64%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.20-8.18 (m, 2H), 7.72-7.67 (m, 2H), 7.62 (d, *J* = 8.4 Hz, 2H), 7.56-7.52 (m, 3H), 7.35-7.31 (m, 1H), 7.28-7.26 (m, 2H), 7.11-7.07 (m, 1H), 2.39 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.8, 147.9, 138.8, 136.7, 135.8, 134.7, 130.8, 130.0, 129.1, 127.6, 127.3, 124.2, 122.2, 119.2, 118.2, 112.0, 21.3. HRMS m/z (ESI): calc. for $C_{21}H_{17}N_2O_2$ ([M+H$^+$]) 329.1285, found 329.1285.

2-(4-methoxyphenyl)-2H-indazol-3-yl benzoate (3af):

White solid (45.5 mg, 66%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.20 (d, *J* = 7.2 Hz, 2H), 7.73-7.65 (m, 4H), 7.58-7.54 (m, 3H), 7.37-7.33 (m, 1H), 7.13-7.10 (m, 1H), 7.02-6.98 (m, 2H), 3.85 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 162.8, 159.8, 147.8, 136.7, 134.7, 131.2, 130.8, 129.1, 127.6, 127.2, 125.8, 122.2, 119.2, 118.1, 114.5, 111.8, 55.6. HRMS m/z (ESI): calc. for $C_{21}H_{17}N_2O_3$ ([M+H$^+$]) 345.1234, found 345.1237.

ethyl 4-(3-(benzoyloxy)-2H-indazol-2-yl)benzoate (3ag):

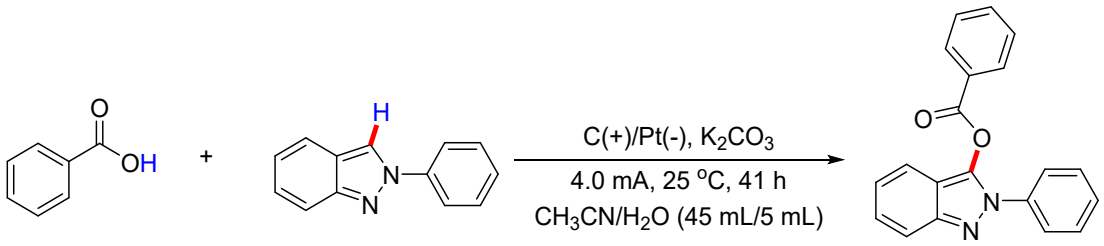
White solid (30.6 mg, 40%). ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.21-8.19 (m, 2H), 8.18-8.15 (m, 2H), 7.89-7.87 (m, 2H), 7.74-7.69 (m, 2H), 7.58-7.51 (m, 3H), 7.36-7.32 (m, 1H), 7.12-7.08 (m, 1H), 4.41-4.36 (m, 2H), 1.40 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100

MHz, $CDCl_3$): δ 165.8, 162.6, 148.5, 141.8, 137.1, 135.0, 130.9, 130.8, 130.4, 129.2, 127.9, 127.3, 123.8, 122.8, 119.4, 118.4, 112.3, 61.5, 14.4. HRMS m/z (ESI): calc. for $C_{23}H_{19}N_2O_4$ ([M+H$^+$]) 387.1339, found 387.1338.

4 Procedure for cyclic voltammetry

Cyclic voltammetry experiments were carried out in a 25 mL undivided cell at room temperature on a CHI600e workstation. The total amount of solvent was 10 mL, including 9 mL CH_3CN and 1 mL H_2O. The working electrode was an L-type glassy carbon (diameter, 3.0 mm) while the counter electrode was a platinum plate (2.25 cm^2). In addition, an Ag/Ag$^+$ (0.1 mol/L $AgNO_3$ in CH_3CN) was used as the reference electrode.

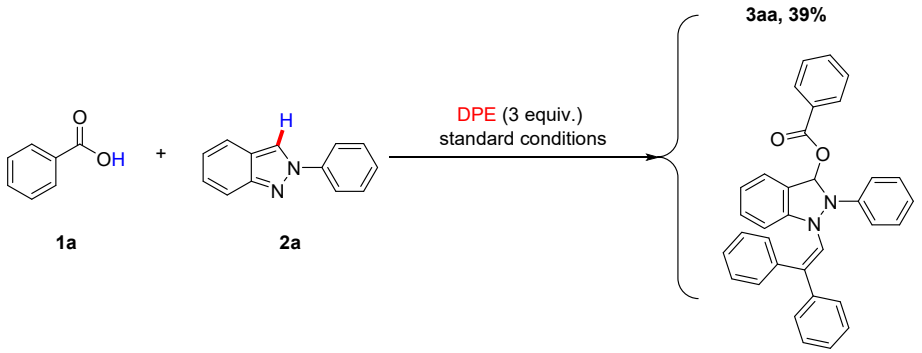
5 Gram scale synthesis



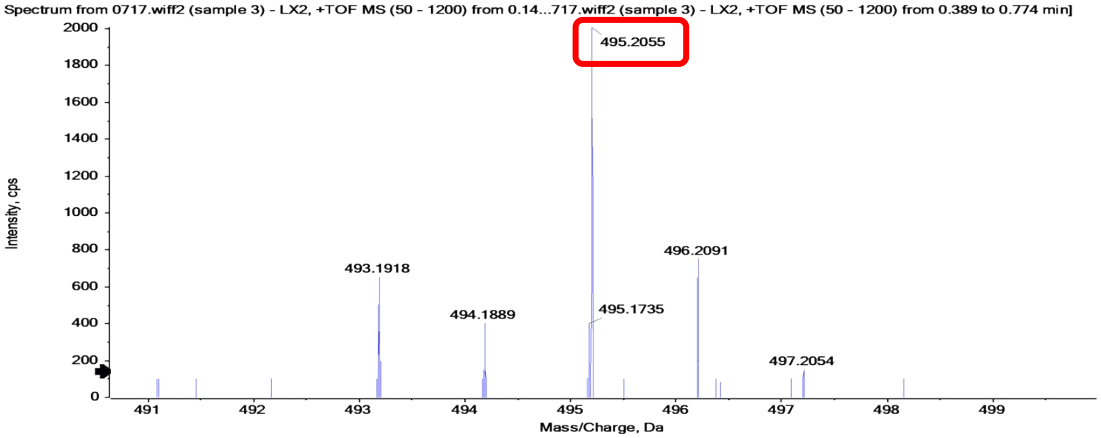
1a, 3 mmol **2a,** 6 mmol **3aa,** 61%, 0.577 g

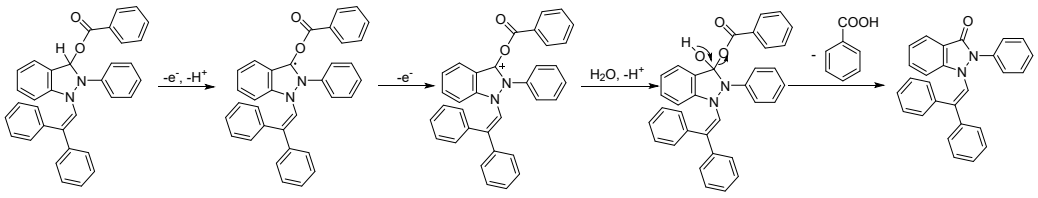
Benzoic acid (**1a**, 3 mmol), 2-phenyl-2*H*-indazole (**2a**, 6 mmol), K_2CO_3 (1.5 mmol) and CH_3CN/H_2O (50 mL, V/V = 45/5) were added to a 50 mL undivided cell with a stir bar. The cell was equipped with a carbon plate anode (4.5 cm^2) and a platinum plate cathode (4.5 cm^2). The reaction mixture was stirred and electrolyzed at a constant current of 4.0 mA at 25 °C for 41 h. After completion of the reaction, anhydrous sodium sulfate was added to the mixture to remove water. Then, the mixture was concentrated in vacuo and the residue was purified by column chromatography using petroleum ether/ethyl acetate as the eluent to afford a product.

6 HRMS of DPE-trapped compound 4 and its corresponding oxidation product 5



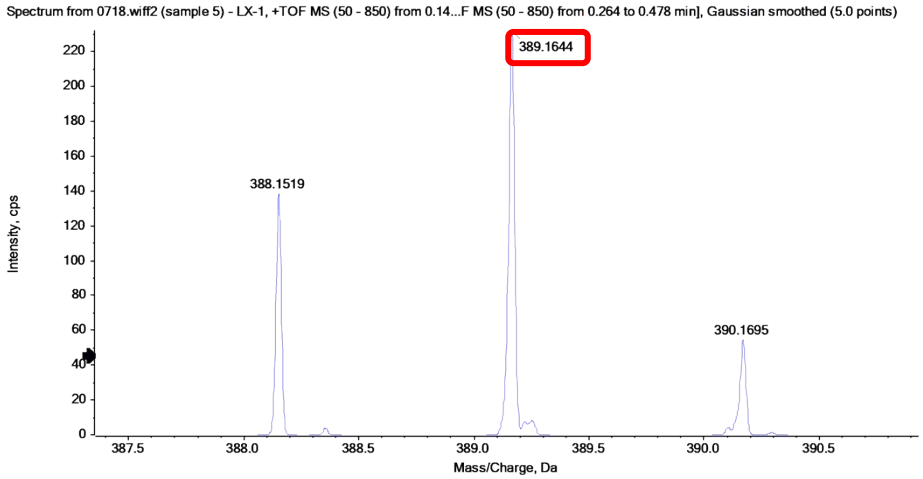
4, detected by HRMS
calc. for $C_{34}H_{27}N_2O_2$ ([M+H$^+$]) 495.2067
found 495.2055





4 **5**

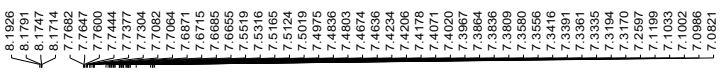
detected by HRMS
calc. for $C_{27}H_{21}N_2O$ ([M+H$^+$]) 389.1648
found 389.1644

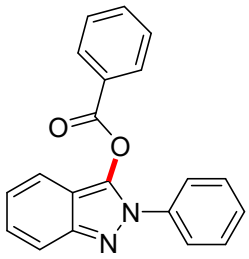


7 References

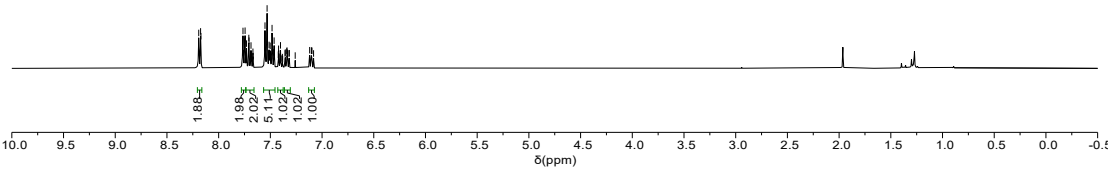
1. M. Kondo, S. Takizawa, Y. Z. Jiang and H. Sasai, *Chem. Eur. J.*, 2019, **25**, 9866-9869.
2. M. R. Kumar, A. Park, N. Park and S. Lee, *Org. Lett.*, 2011, **13**, 3542-3545.

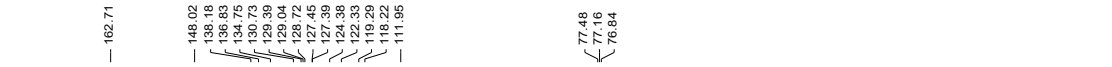
8 NMR spectra of prepared compounds

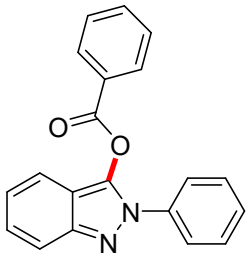




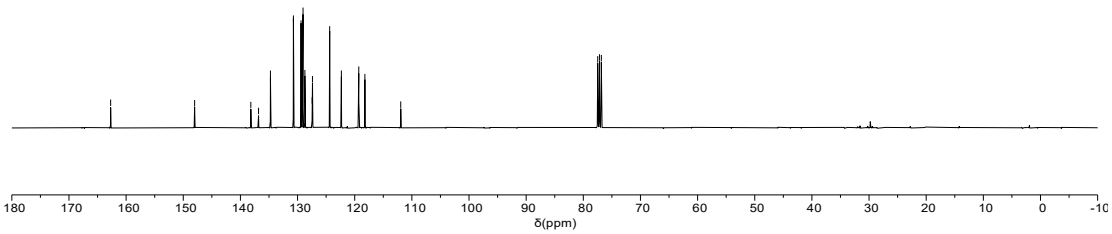
3aa

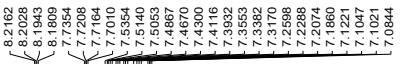






3aa

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8.1809
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7.7208
7.7164
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7.5354
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7.5053
7.4867
7.4670
7.4300
7.4116
7.3932
7.3553
7.3382
7.3170
7.2598
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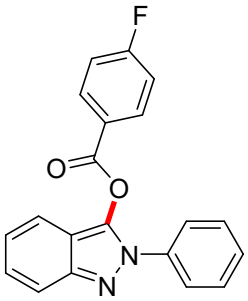
7.1221
7.1047
7.1021
7.0844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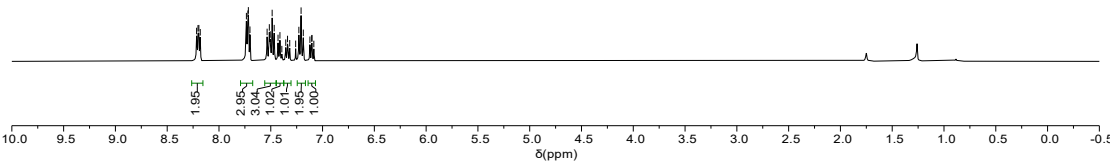
O
O
N
N

3ba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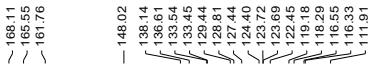
2.95
3.04
1.02
1.01
1.95
1.00
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ(ppm)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148.02
138.14
136.61
133.54
133.45
129.44
128.81
127.44
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116.33
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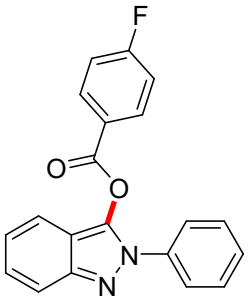
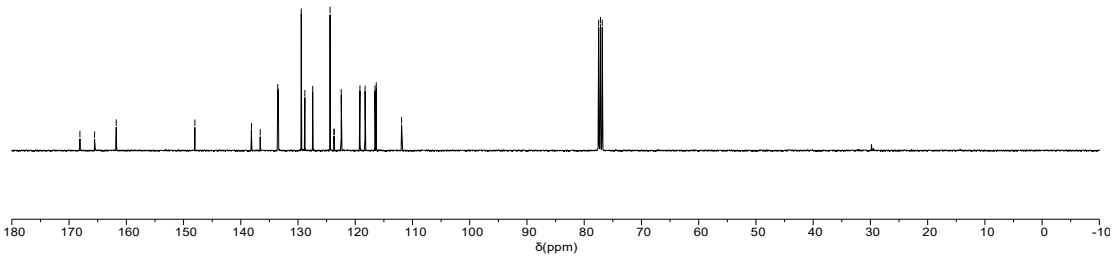
77.48
77.16
76.84


F
O
O
N
N

3ba


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
δ(ppm)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8.0945
8.0890
7.7298
7.7264
7.7218
7.7070
7.6995
7.5307
7.5222
7.5179
7.5091
7.5056
7.5008
7.4859
7.4659
7.4315
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7.4131
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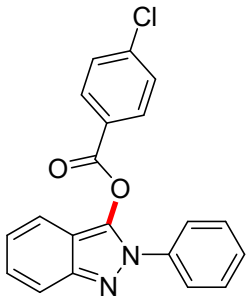
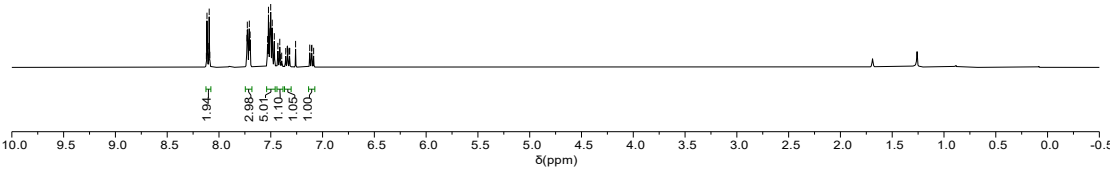
7.1028
7.0862


Cl
O
O
N
N

3ca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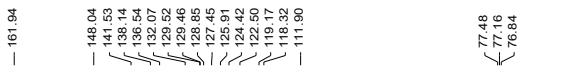
1.00
δ(ppm)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132.07
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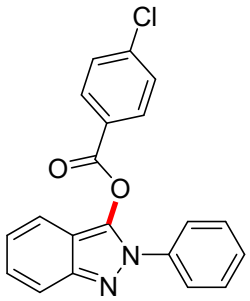
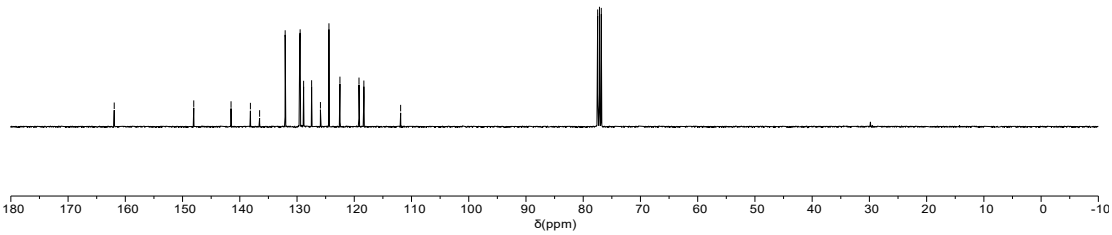
77.48
77.16
76.84


Cl
O
O
N
N

3ca


δ(ppm)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7.6660
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7.4321
7.4291
7.4191
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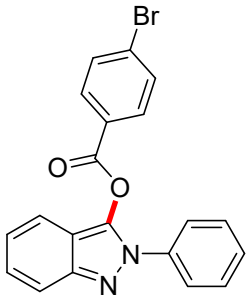
7.0857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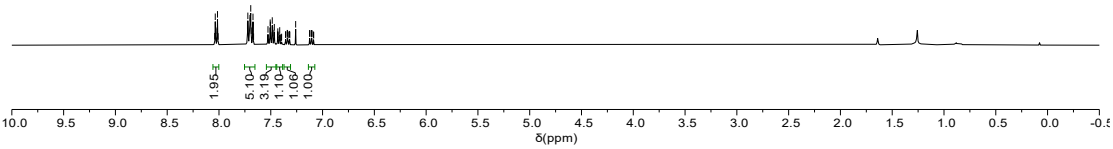
O
N
N

3da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1.06
1.00
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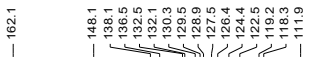
δ(ppm)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132.1
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124.4
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118.3
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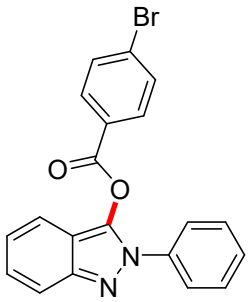
77.5
77.2
76.8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O
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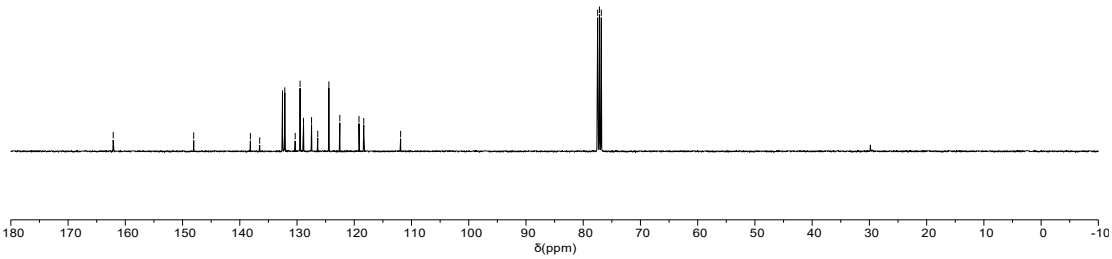
N

3da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δ(ppm)


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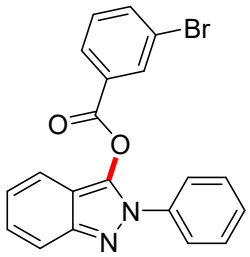
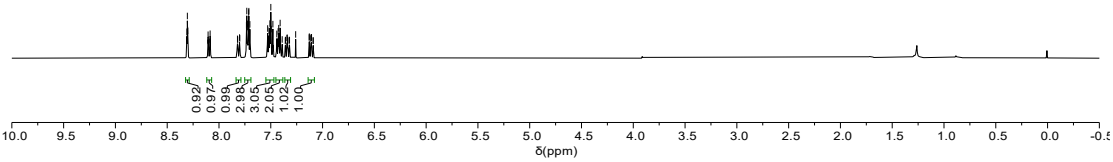

Br
O
O
N
N

3ea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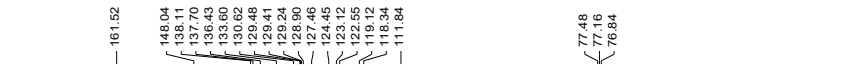
2.05
1.02
1.00
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ(ppm)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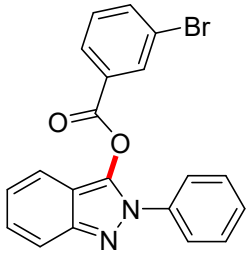
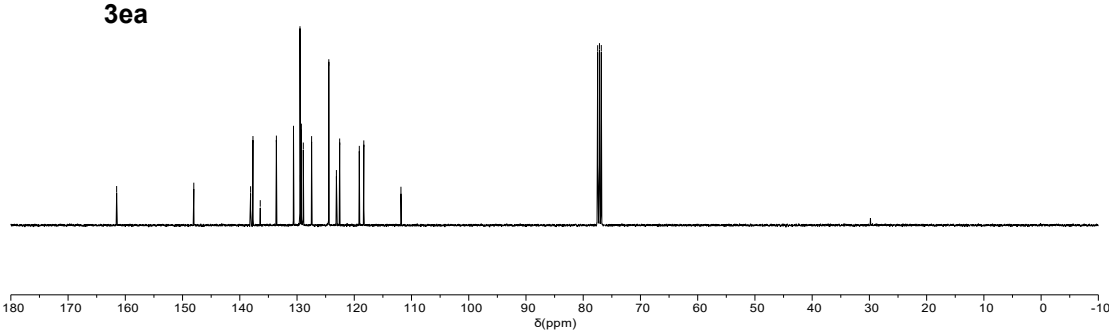
77.16
76.84


Br
O
O
N
N

3ea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δ(ppm)


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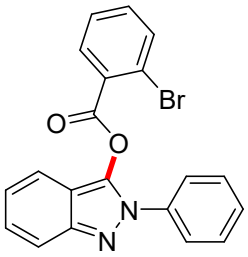
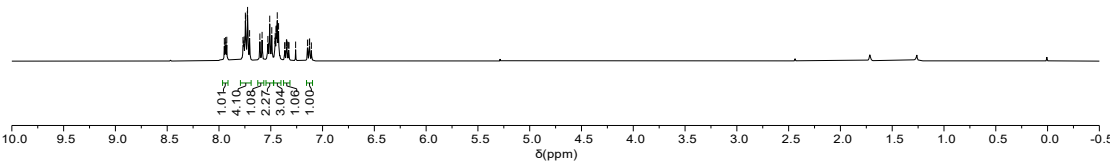
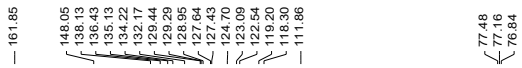
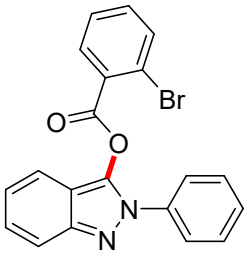

Br
O
O
N
N

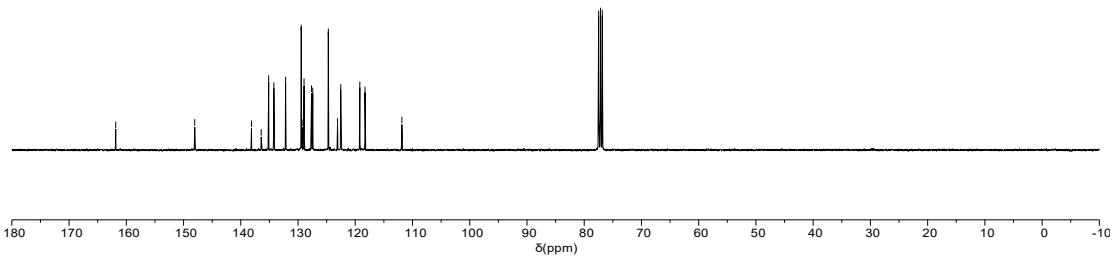
3fa

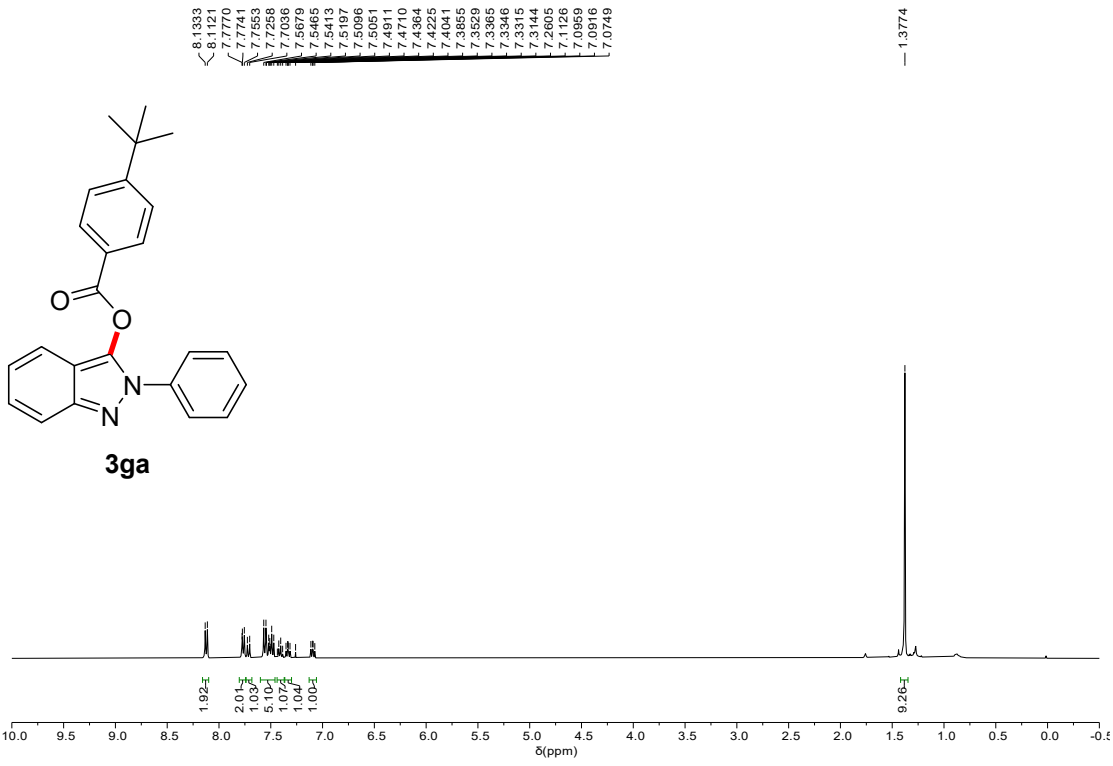

1.01
4.10
1.08
2.27
3.04
1.06
1.00
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
δ(ppm)


161.85
148.05
138.13
136.43
135.13
134.22
132.17
129.44
129.29
128.95
127.64
127.43
124.70
123.09
122.54
119.20
118.30
111.86
77.48
77.16
76.84

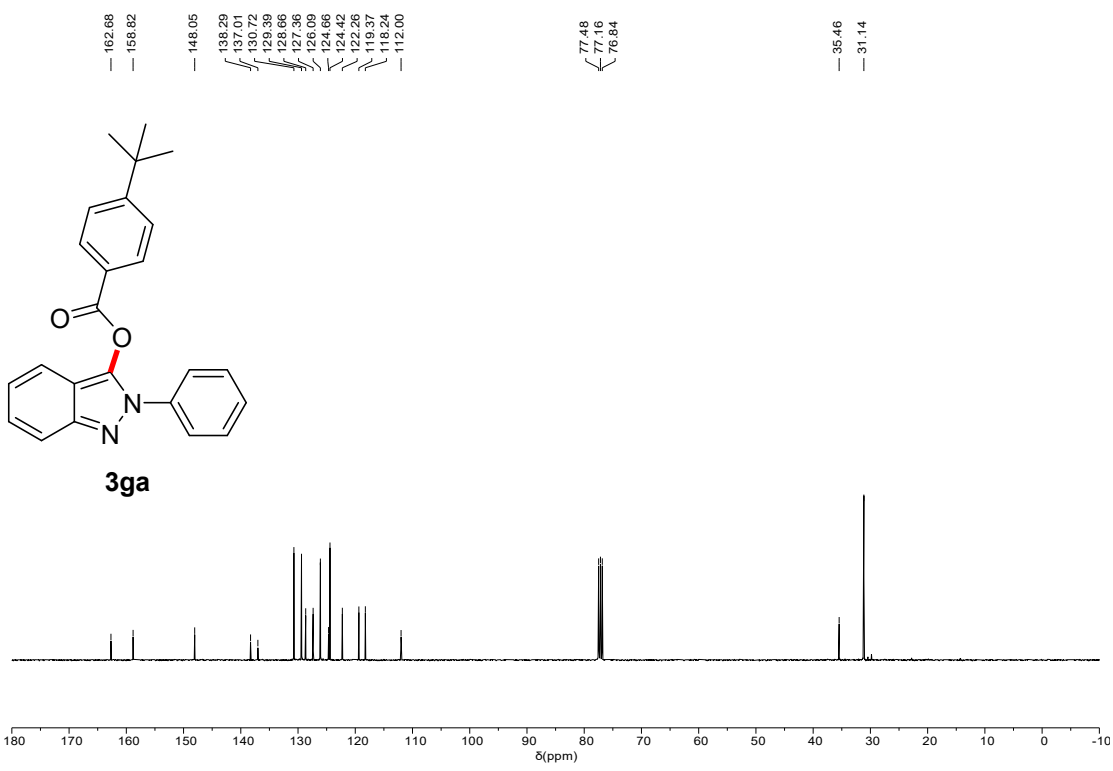

Br
O
O
N
N

3fa

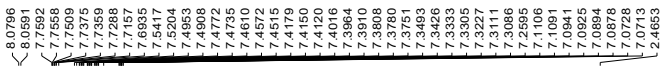

180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
δ(ppm)

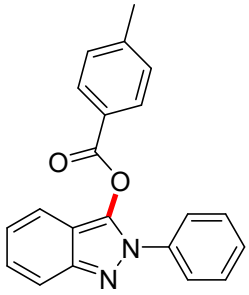

8.1333
8.1121
7.7770
7.7741
7.7553
7.7258
7.7036
7.5679
7.5465
7.5413
7.5197
7.5096
7.5051
7.4911
7.4710
7.4364
7.4225
7.4041
7.3855
7.3529
7.3365
7.3346
7.3315
7.3144
7.2605
7.1126
7.0959
7.0916
7.0749
1.3774
O
O
N
N
1.92
2.01
1.03
5.10
1.07
1.04
1.00
9.26
δ(ppm)

3ga

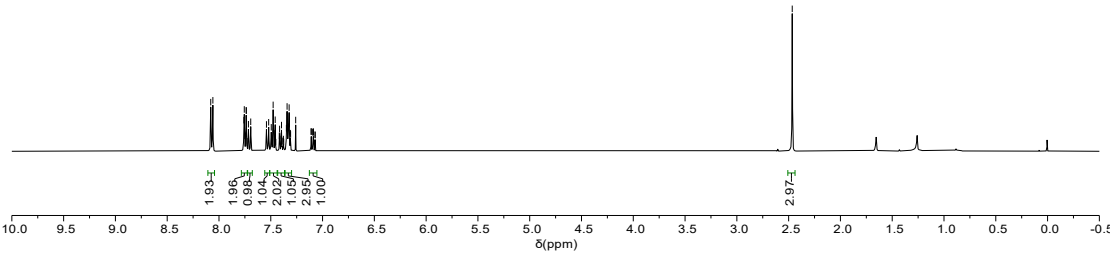

162.68
158.82
148.05
138.29
137.01
130.72
129.39
128.86
127.36
126.09
124.66
124.42
122.26
119.37
118.24
112.00
77.48
77.16
76.84
35.46
31.14
O
O
N
N
δ(ppm)

3ga

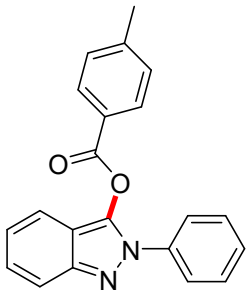

8.0796
8.0591
7.7592
7.7558
7.7509
7.7375
7.7359
7.7288
7.7157
7.6935
7.5417
7.5204
7.4953
7.4908
7.4772
7.4735
7.4610
7.4572
7.4515
7.4179
7.4150
7.4120
7.4016
7.3964
7.3910
7.3808
7.3780
7.3751
7.3493
7.3426
7.3333
7.3305
7.3227
7.3111
7.3086
7.2595
7.1106
7.1091
7.0941
7.0925
7.0894
7.0878
7.0728
7.0713
2.4653


O
O
N
N

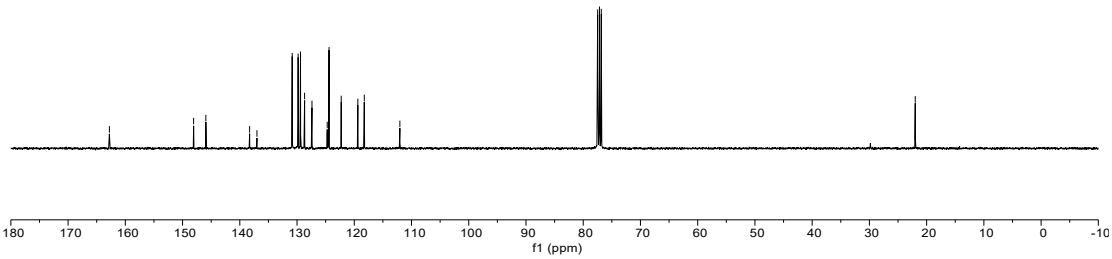
3ha


1.93
1.96
0.98
1.04
2.02
1.05
2.95
1.00
2.97
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
δ(ppm)

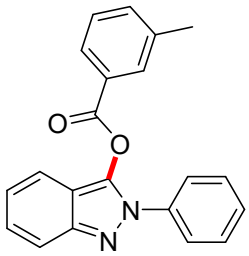

162.78
148.07
145.93
138.28
137.00
130.84
129.80
129.39
128.88
127.39
124.72
124.41
122.28
119.37
118.25
112.03
77.48
77.16
76.84
21.99


O
O
N
N

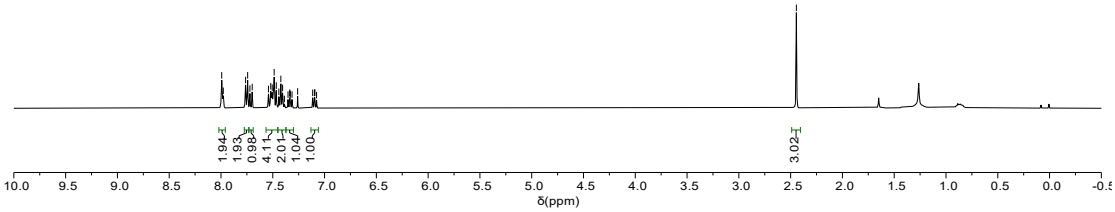
3ha

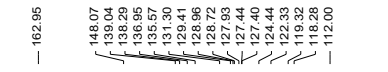

180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

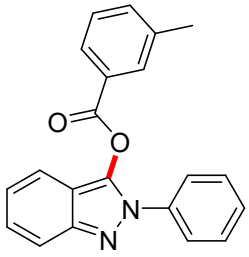

7.9930
7.9779
7.7624
7.7425
7.7208
7.6987
7.5415
7.5197
7.5054
7.4866
7.4662
7.4414
7.4222
7.4053
7.3879
7.3528
7.3363
7.3339
7.3310
7.3142
7.2600
7.1148
7.0980
7.0958
7.0939
7.0771
2.4447



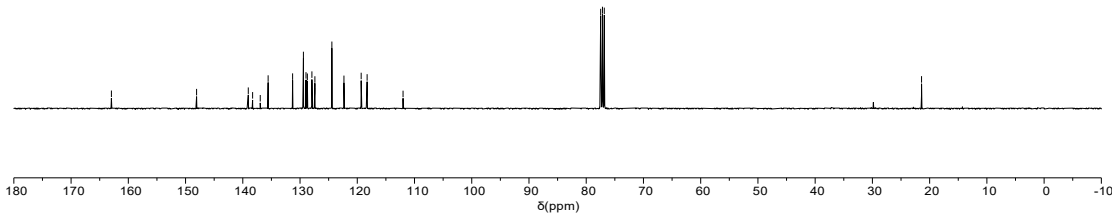
3ia

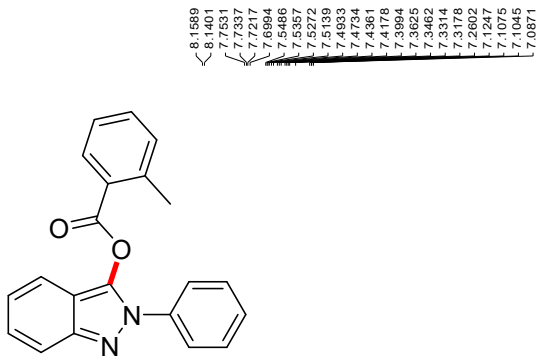

1.94
1.93
0.98
4.11
2.01
1.04
1.00
3.02
δ(ppm)


162.95
148.07
139.04
138.29
136.95
135.57
131.30
129.41
128.96
128.72
127.93
127.44
127.40
124.44
122.33
119.32
118.28
112.00
77.48
77.16
76.84
21.41

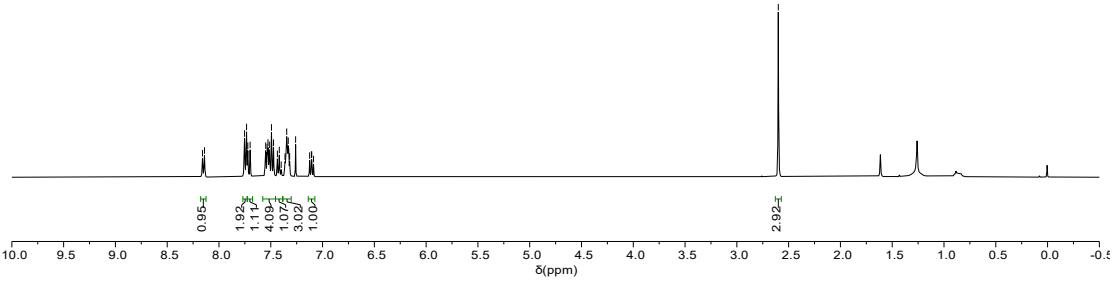


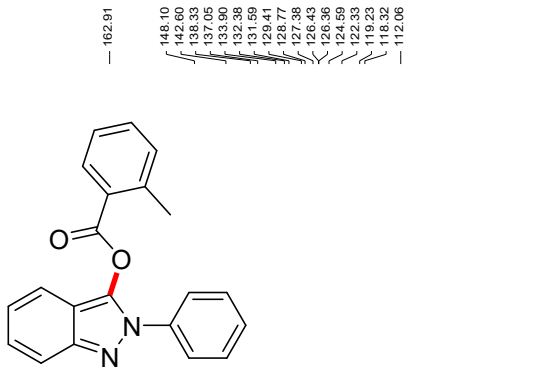
3ia


δ(ppm)

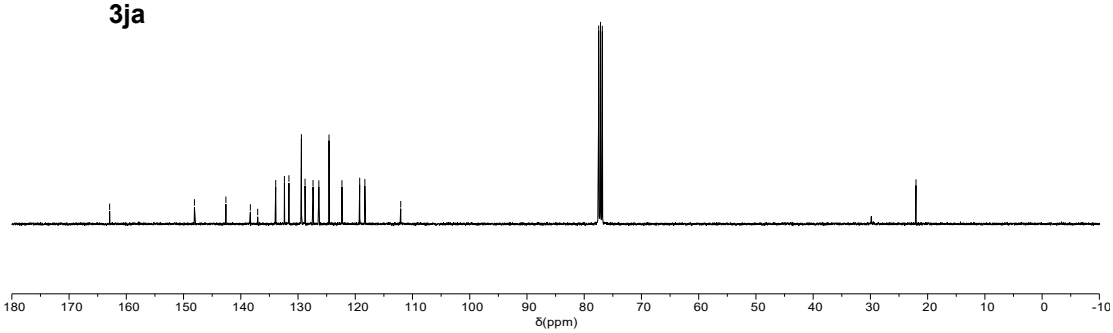

8.1589
8.1401
7.7531
7.7337
7.7217
7.6994
7.5486
7.5357
7.5272
7.5139
7.4933
7.4734
7.4361
7.4178
7.3994
7.3625
7.3462
7.3314
7.3178
7.2602
7.1247
7.1075
7.1045
7.0871
2.6000
O
O
N
N

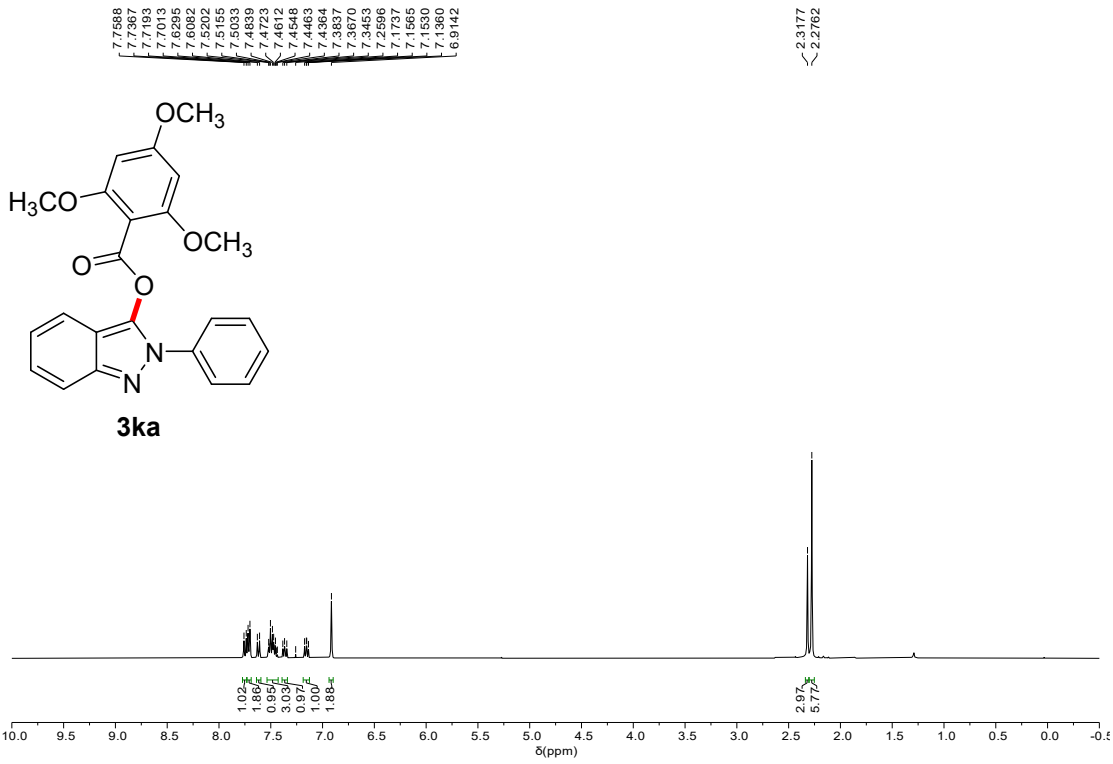
3ja

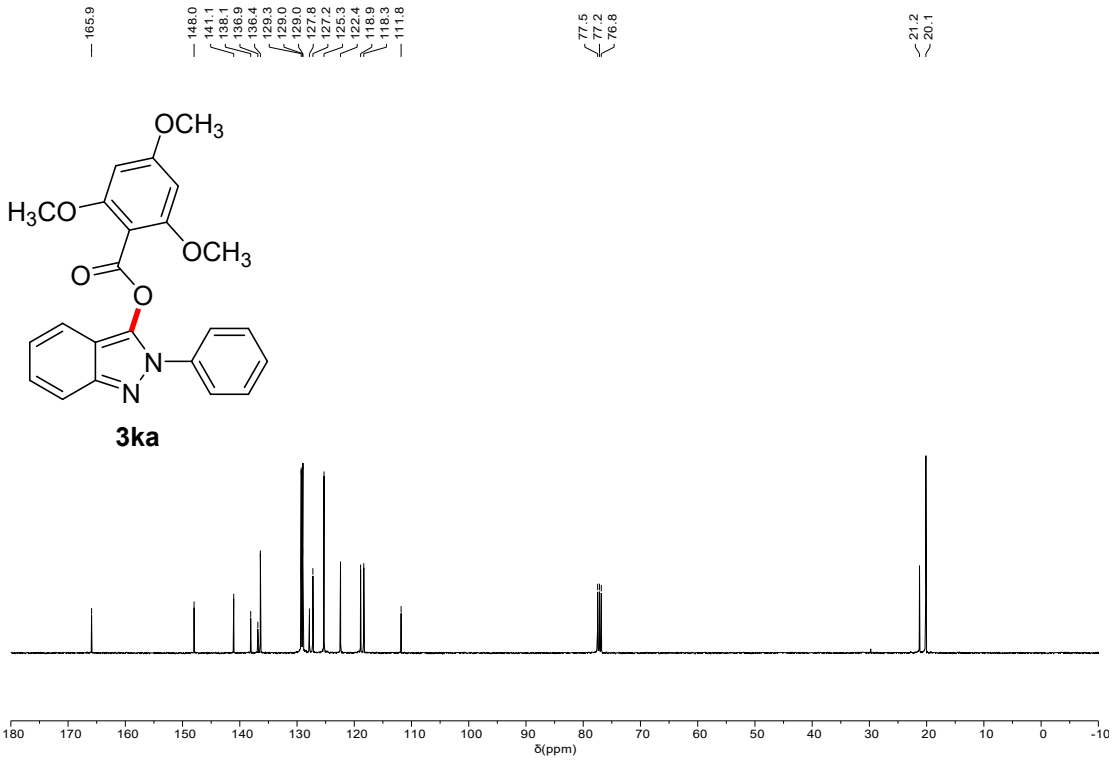

0.95
1.92
1.11
4.09
1.07
3.02
1.00
2.92
δ(ppm)


162.91
148.10
142.60
138.33
137.05
133.90
132.38
131.59
129.41
128.77
127.38
126.43
126.36
124.59
122.33
119.23
118.32
112.06
77.48
77.16
76.84
22.04
O
O
N
N

3ja


δ(ppm)


7.7588
7.7367
7.7193
7.7013
7.6295
7.6082
7.5202
7.5155
7.5033
7.4839
7.4723
7.4612
7.4548
7.4463
7.4364
7.3837
7.3670
7.3453
7.2596
7.1737
7.1565
7.1530
7.1360
6.9142
2.3177
2.2762
OCH3
H3CO
OCH3
O
O
N
N
3ka
1.02
1.86
0.95
3.03
0.97
1.00
1.88
2.97
5.77
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ(ppm)


165.9
148.0
141.1
138.1
136.9
136.4
129.3
129.0
129.0
127.8
127.2
125.3
122.4
118.9
118.3
111.8
77.5
77.2
76.8
21.2
20.1
OCH3
H3CO
OCH3
O
O
N
N
3ka
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
δ(ppm)


8.9497
8.9281
8.4985
8.4956
8.4801
8.4773
8.1778
8.1573
7.9558
7.9372
7.9345
7.8018
7.7983
7.7936
7.7798
7.7783
7.7527
7.7304
7.6746
7.6710
7.6575
7.6537
7.6495
7.6362
7.6323
7.6128
7.6038
7.5932
7.5916
7.5848
7.5794
7.5763
7.5649
7.5042
7.4998
7.4861
7.4826
7.4699
7.4661
7.4287
7.4259
7.4230
7.4125
7.4075
7.4019
7.3889
7.3803
7.3779
7.3638
7.3614
7.3583
7.3557
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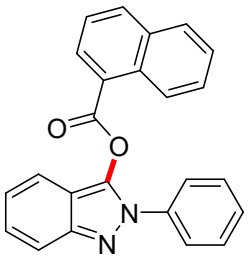
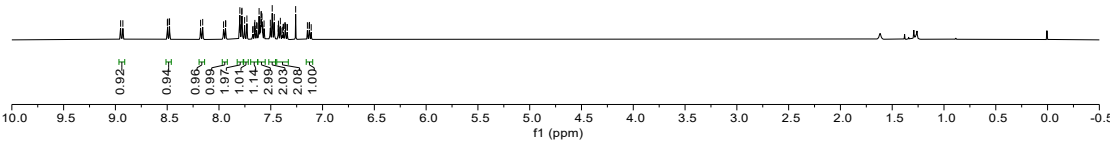
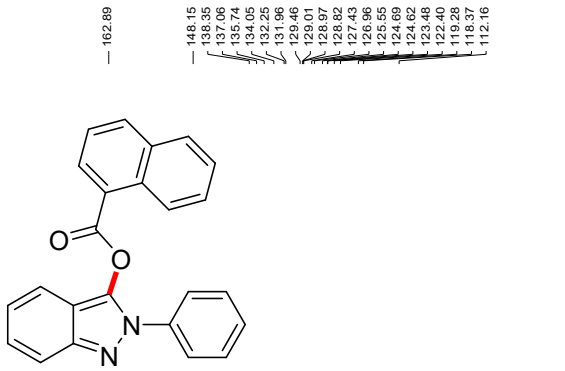
7.2598
7.1464
7.1297
7.1263
7.1097


O
O
N
N

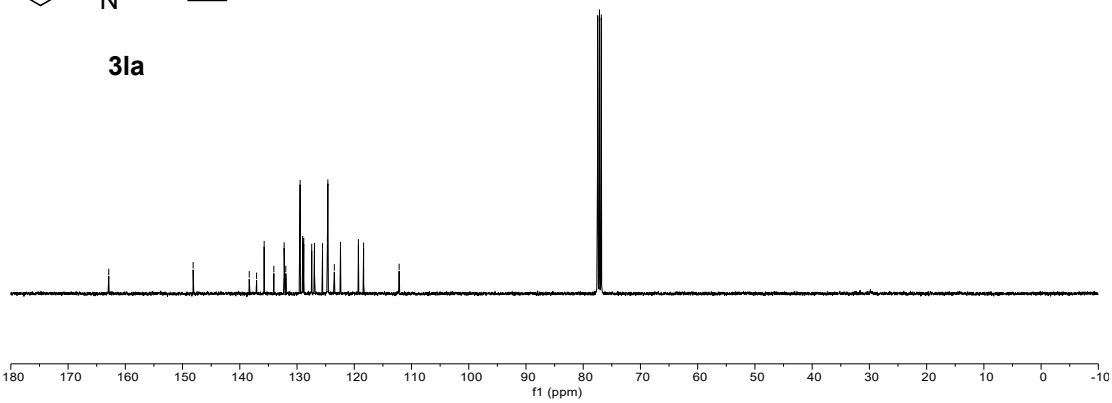
3la

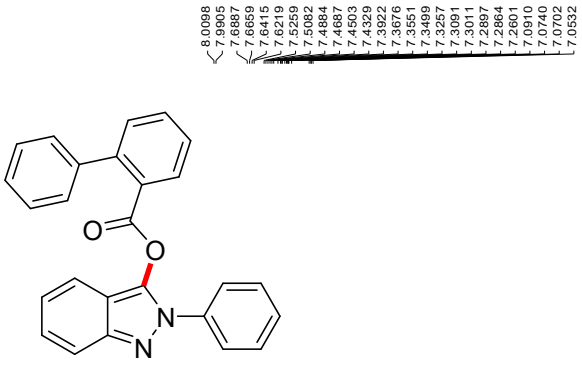

0.92
0.94
0.96
0.99
1.97
1.01
1.14
2.99
2.03
2.08
1.00
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


162.89
148.15
138.35
137.06
135.74
134.05
132.25
131.96
129.46
129.01
128.97
128.82
127.43
126.96
125.55
124.69
124.62
123.48
122.40
119.28
118.37
112.16
77.48
77.16
76.84

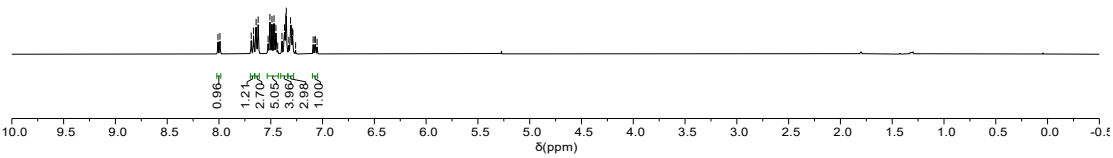
O
O
N
N

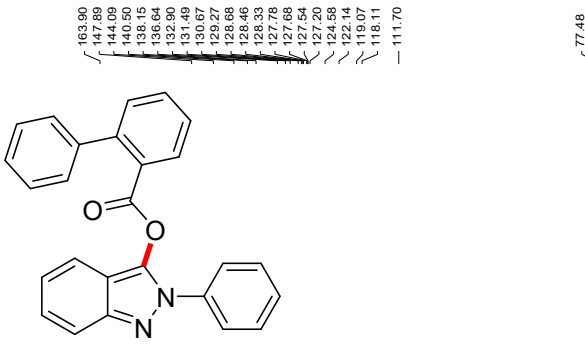
3la


180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

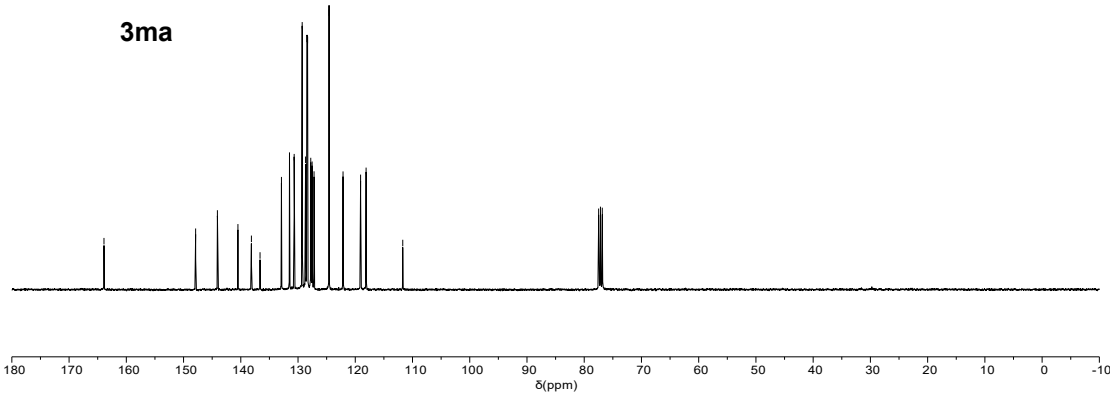

8.0098
7.9905
7.6887
7.6659
7.6415
7.6219
7.5259
7.5082
7.4884
7.4687
7.4503
7.4329
7.3922
7.3676
7.3551
7.3499
7.3257
7.3091
7.3011
7.2897
7.2864
7.2601
7.0910
7.0740
7.0702
7.0532
O
O
N
N

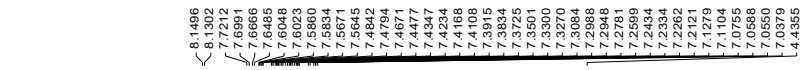
3ma

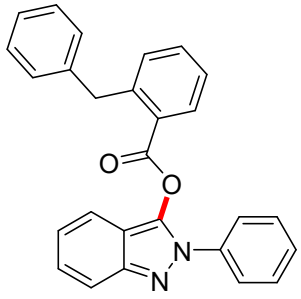

0.96
1.21
2.70
5.05
3.96
2.98
1.00
δ(ppm)


163.90
147.89
144.09
140.50
138.15
136.64
132.90
131.49
130.67
129.27
128.68
128.46
128.33
127.78
127.68
127.54
127.20
124.58
122.14
119.07
118.11
111.70
77.48
77.16
76.84
O
O
N
N

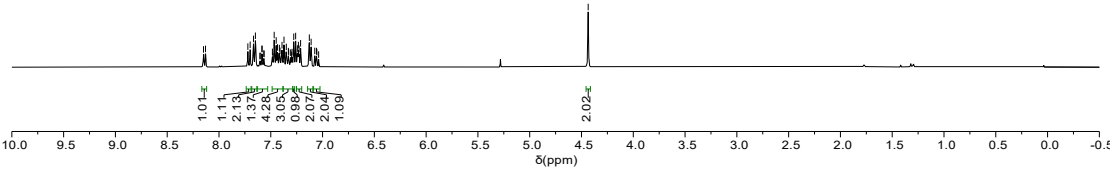
3ma


δ(ppm)


8.1496
8.1302
7.7212
7.6991
7.6666
7.6485
7.6048
7.6023
7.5860
7.5834
7.5671
7.5645
7.4842
7.4794
7.4671
7.4477
7.4347
7.4234
7.4168
7.4108
7.3915
7.3834
7.3725
7.3501
7.3300
7.3270
7.3084
7.2988
7.2948
7.2781
7.2599
7.2434
7.2334
7.2262
7.2121
7.1279
7.1104
7.0755
7.0588
7.0550
7.0379
4.4355

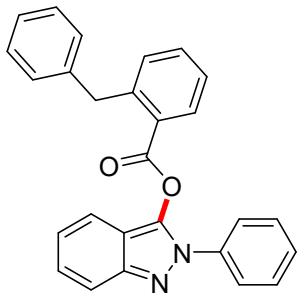

O
O
N
N

3na

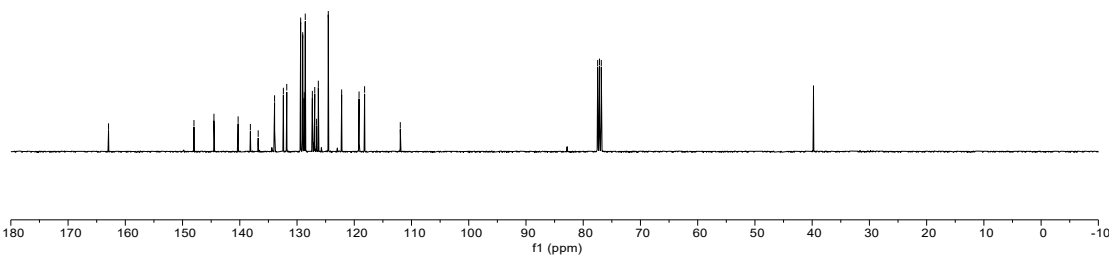

1.01
1.11
2.13
1.37
4.28
3.05
0.99
2.07
2.04
1.09
2.02
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
δ(ppm)

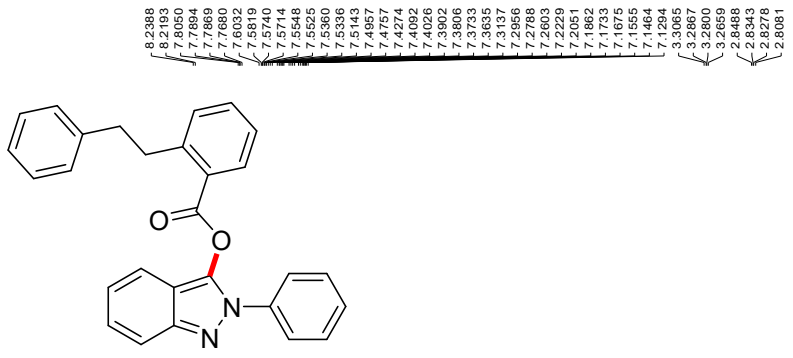

162.93
148.01
144.52
140.29
138.15
136.79
133.92
132.39
131.79
129.37
129.01
128.73
128.56
127.32
126.91
126.58
126.28
124.54
122.21
119.16
118.20
111.96


77.48
77.16
76.84
39.77

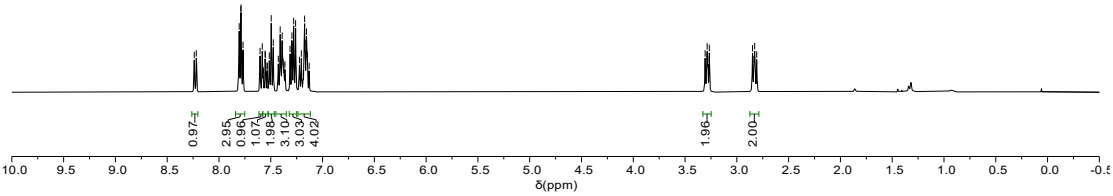

O
O
N
N

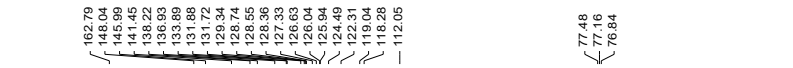
3na

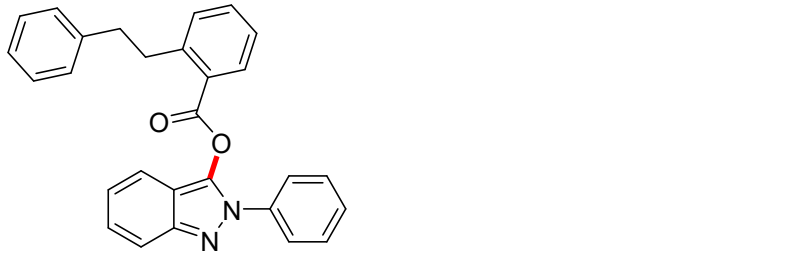

180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)



3oa







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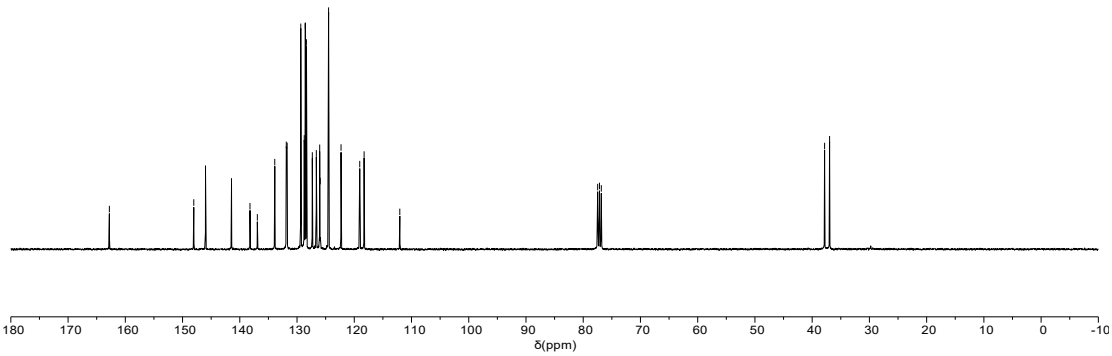

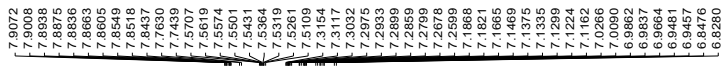
7.9072
7.9008
7.8938
7.8875
7.8836
7.8663
7.8605
7.8549
7.8518
7.8437
7.7630
7.7439
7.5707
7.5619
7.5574
7.5501
7.5431
7.5364
7.5319
7.5261
7.5109
7.3154
7.3117
7.3032
7.2975
7.2933
7.2899
7.2859
7.2799
7.2678
7.2599
7.1868
7.1821
7.1665
7.1469
7.1375
7.1335
7.1299
7.1224
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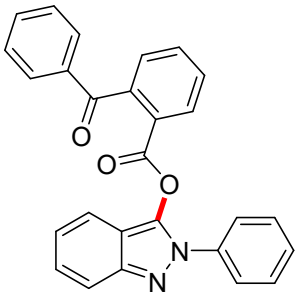
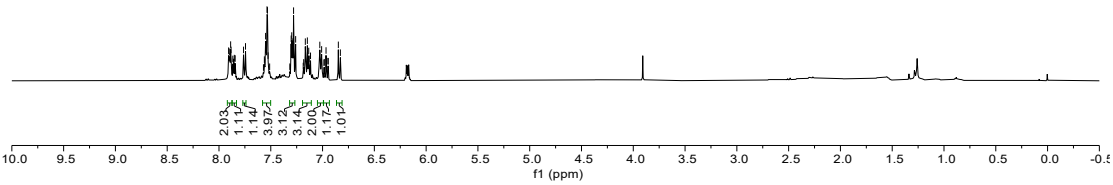
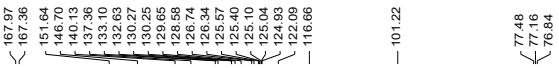
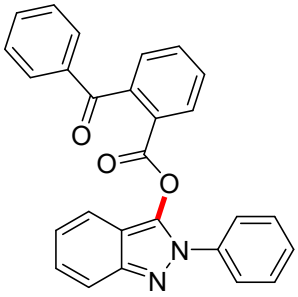
6.9664
6.9481
6.9457
6.8476
6.8280



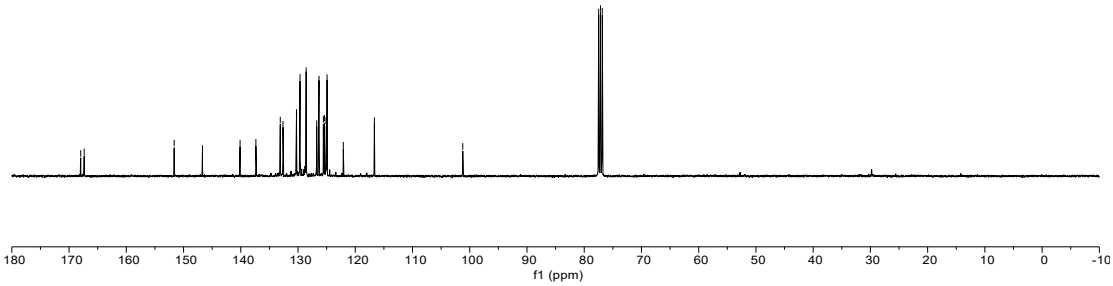
3pa


2.03
1.11
1.14
3.97
3.12
3.14
2.00
1.17
1.01
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)

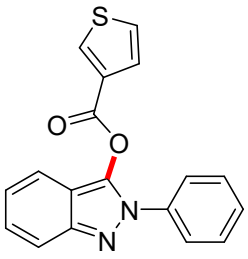

167.97
167.36
151.64
146.70
140.13
137.96
133.10
132.63
130.27
130.25
129.65
128.88
126.74
126.34
125.57
125.40
125.10
125.04
124.93
122.09
116.66
101.22
77.48
77.16
76.84



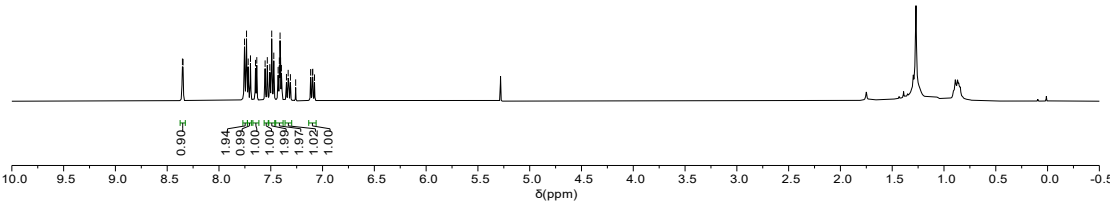
3pa

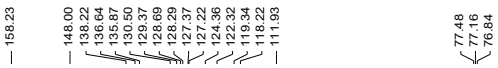

180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

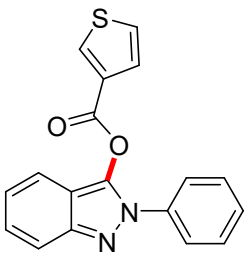

8.3530
8.3471
7.7534
7.7341
7.7180
7.6959
7.6476
7.6351
7.5547
7.5334
7.5094
7.4909
7.4708
7.4289
7.4173
7.4103
7.4052
7.3972
7.3486
7.3320
7.3103
7.2598
7.1154
7.0987
7.0944
7.0777


S
O
O
N
N

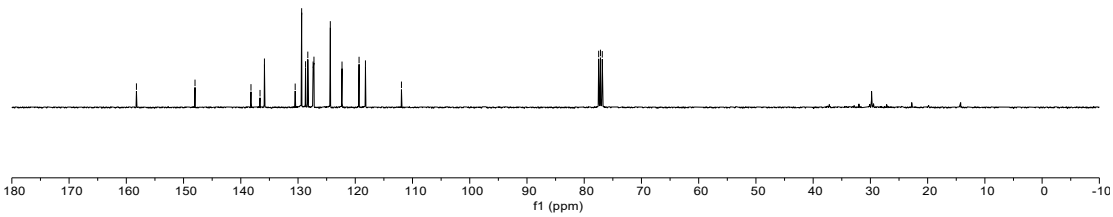
3qa

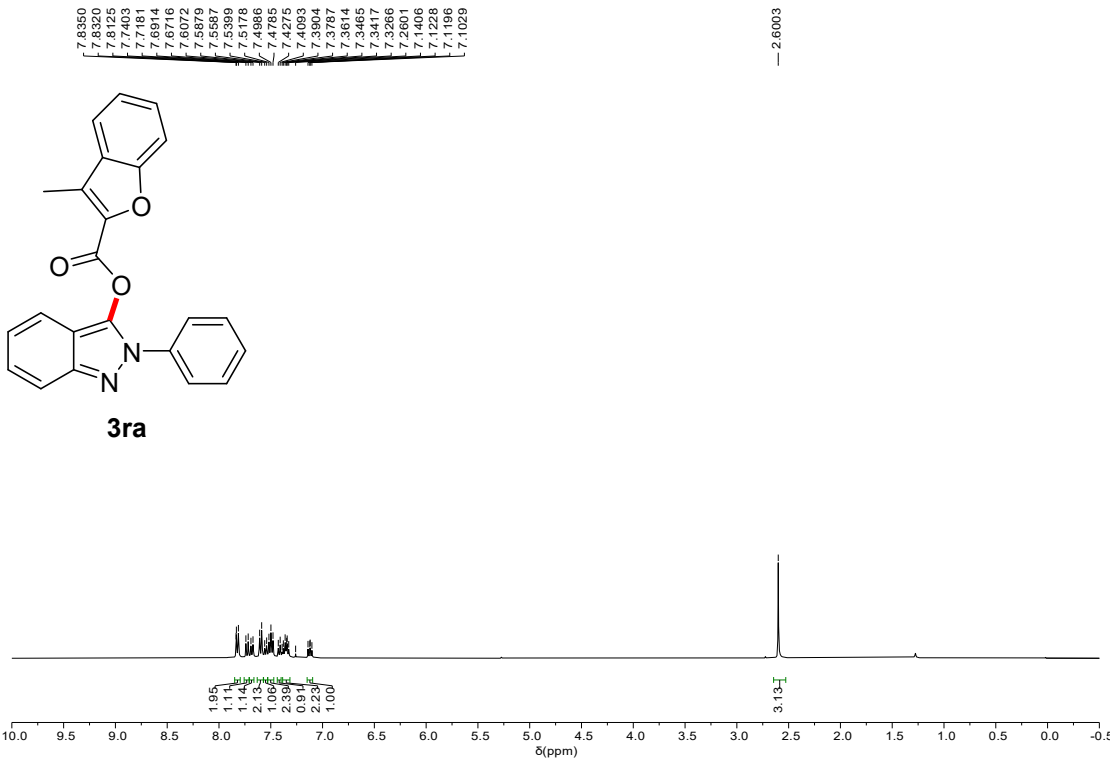

0.90
1.94
0.99
1.00
1.00
1.99
1.97
1.02
1.00
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ(ppm)

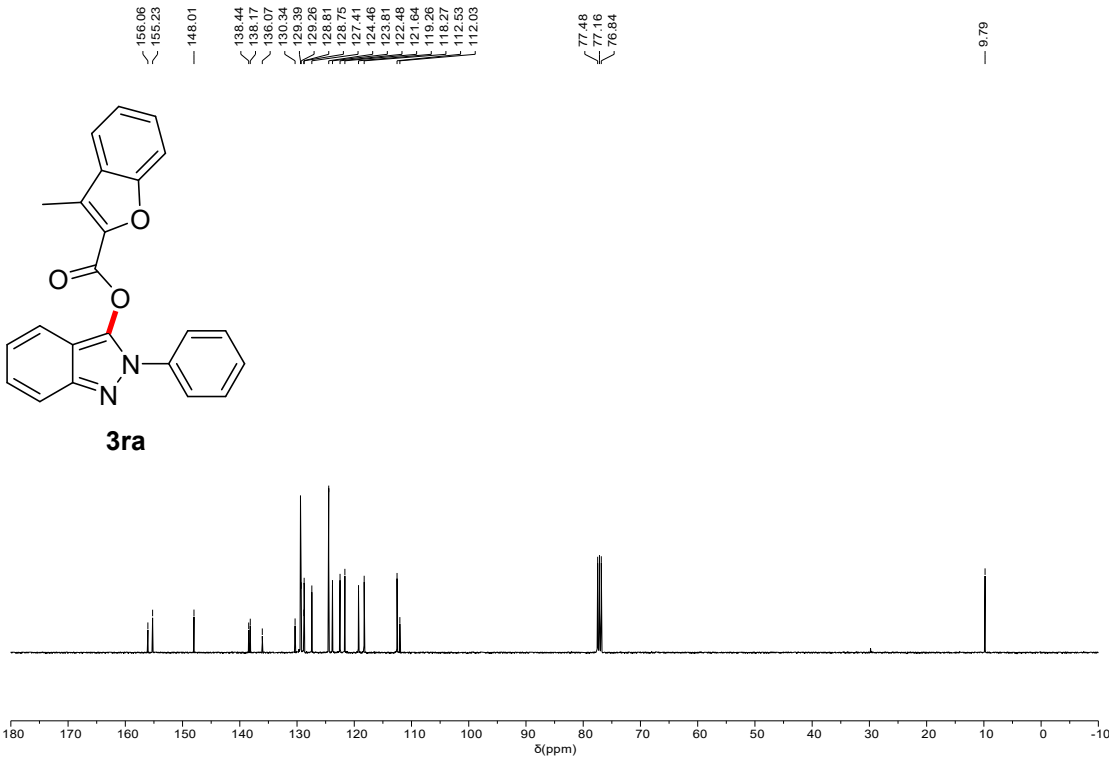

158.23
148.00
138.22
136.64
135.87
130.50
129.37
128.69
128.29
127.37
127.22
124.36
122.32
119.34
118.22
111.93
77.48
77.16
76.84

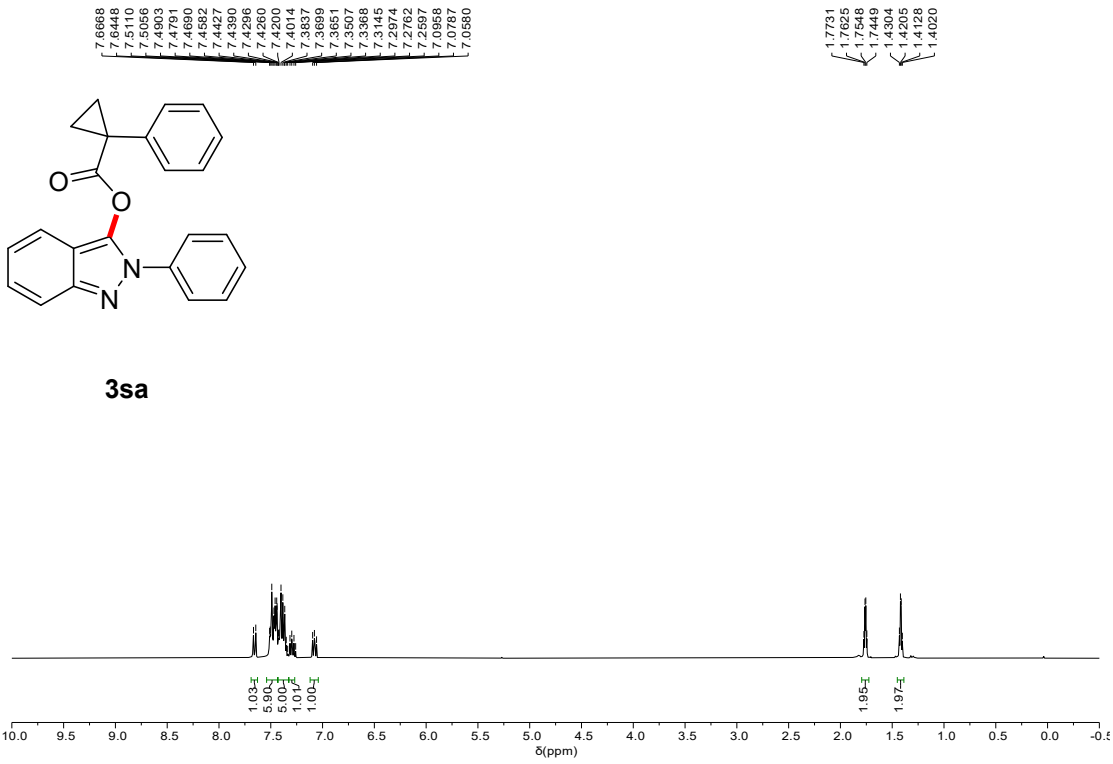

S
O
O
N
N

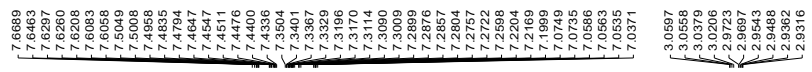
3qa

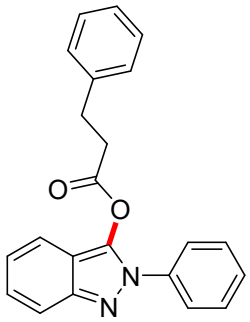

180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


7.8350
7.8320
7.8125
7.7403
7.7181
7.6914
7.6716
7.6072
7.5879
7.5587
7.5399
7.5178
7.4986
7.4785
7.4275
7.4093
7.3904
7.3787
7.3614
7.3465
7.3417
7.3266
7.2601
7.1406
7.1228
7.1196
7.1029
2.6003
O
O
O
N
N
3ra
1.95
1.11
1.14
2.13
1.06
2.39
0.91
2.23
1.00
3.13
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ(ppm)

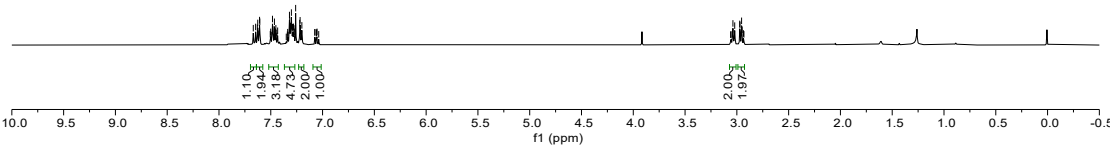

156.06
155.23
148.01
138.44
138.17
136.07
130.34
129.39
129.26
128.81
128.75
127.41
124.46
123.81
122.48
121.64
119.26
118.27
112.53
112.03
77.48
77.16
76.84
9.79
O
O
O
N
N
3ra
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
δ(ppm)

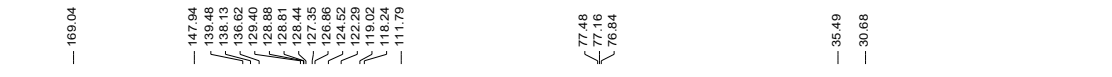

7.6668
7.6448
7.5110
7.5056
7.4903
7.4791
7.4690
7.4582
7.4427
7.4390
7.4296
7.4260
7.4200
7.4014
7.3837
7.3699
7.3651
7.3507
7.3368
7.3145
7.2974
7.2762
7.2597
7.0958
7.0787
7.0580
1.7731
1.7625
1.7548
1.7449
1.4304
1.4205
1.4128
1.4020
O
O
N
N
3sa
1.03
5.90
5.00
1.01
1.00
1.95
1.97
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ(ppm)
170.65
147.80
138.01
137.81
136.89
130.73
129.16
128.53
128.44
127.96
127.19
124.29
122.01
119.32
118.08
111.54
77.48
77.16
76.84
28.97
18.21
O
O
N
N
3sa
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

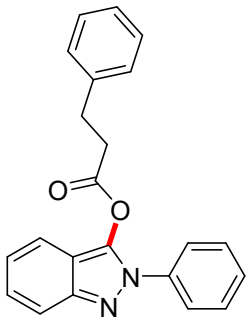

7.6689
7.6463
7.6297
7.6260
7.6208
7.6083
7.6058
7.5049
7.5008
7.4958
7.4835
7.4794
7.4647
7.4547
7.4511
7.4476
7.4400
7.4336
7.3504
7.3401
7.3367
7.3329
7.3196
7.3170
7.3114
7.3090
7.3009
7.2899
7.2876
7.2857
7.2804
7.2757
7.2722
7.2598
7.2204
7.2169
7.1999
7.0749
7.0735
7.0586
7.0563
7.0535
7.0371
3.0597
3.0558
3.0379
3.0206
2.9723
2.9697
2.9543
2.9488
2.9362
2.9316



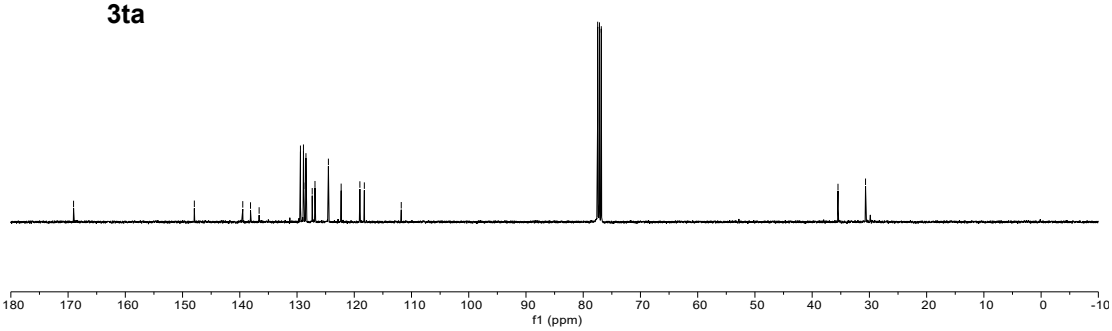
3ta

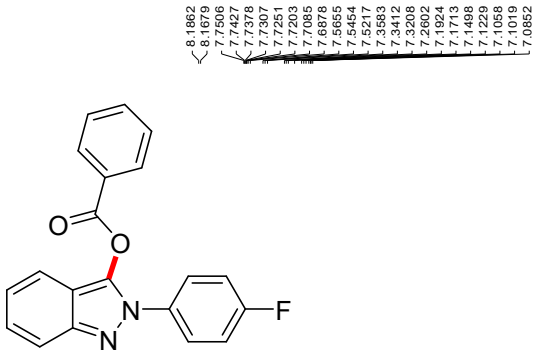

1.10
1.94
3.18
4.73
2.00
1.00
2.00
1.97
f1 (ppm)


169.04
147.94
139.48
138.13
136.62
129.40
128.88
128.81
128.44
127.35
126.86
124.52
122.29
119.02
118.24
111.79
77.48
77.16
76.84
35.49
30.68



3ta


f1 (ppm)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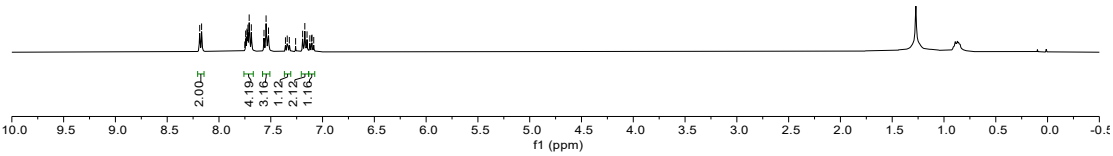
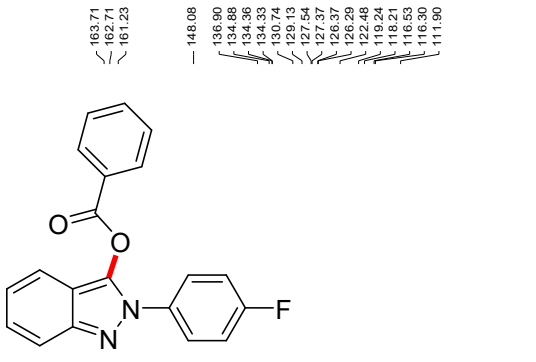
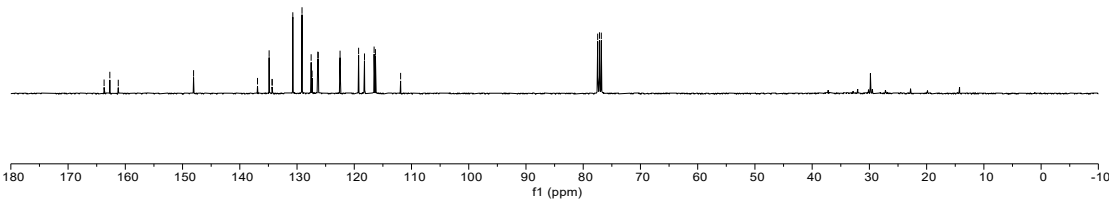
8.1679
7.7506
7.7427
7.7378
7.7307
7.7251
7.7203
7.7085
7.6878
7.5655
7.5454
7.5217
7.3583
7.3412
7.3208
7.2602
7.1924
7.1713
7.1498
7.1229
7.1058
7.1019
7.0852
O
O
N
N
F

3ab

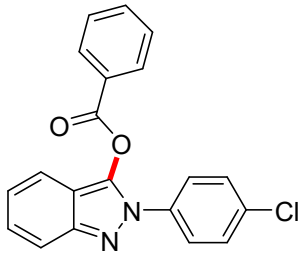

2.00
4.19
3.16
1.12
2.12
1.16
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


163.71
162.71
161.23
148.08
136.90
134.88
134.36
134.33
130.74
129.13
127.54
127.37
126.37
126.29
122.48
119.24
118.21
116.53
116.30
111.90
77.48
77.16
76.84
O
O
N
N
F

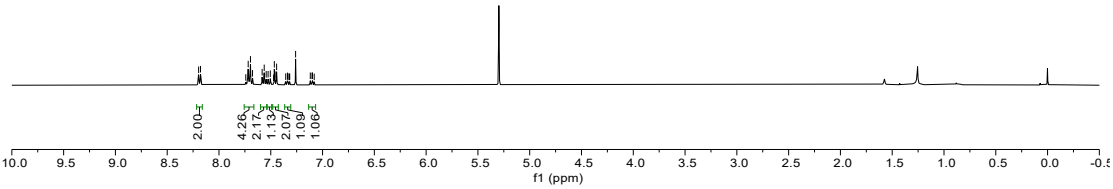
3ab

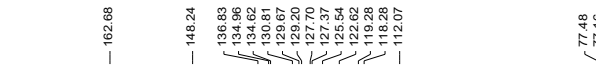

180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

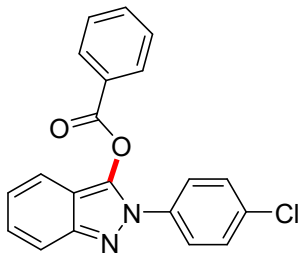

8.1967
8.1787
7.7412
7.7180
7.7132
7.6961
7.6762
7.5834
7.5635
7.5444
7.5260
7.5046
7.4725
7.4656
7.4608
7.4485
7.4436
7.3558
7.3392
7.3362
7.3337
7.3193
7.3172
7.2603
7.1184
7.1018
7.0972
7.0806


O
O
N
N
Cl

3ac


2.00
4.26
2.17
1.13
2.07
1.09
1.06
10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
f1 (ppm)


162.68
148.24
136.83
134.96
134.62
130.81
129.67
129.20
127.70
127.37
125.54
122.62
119.28
118.28
112.07
77.48
77.16
76.84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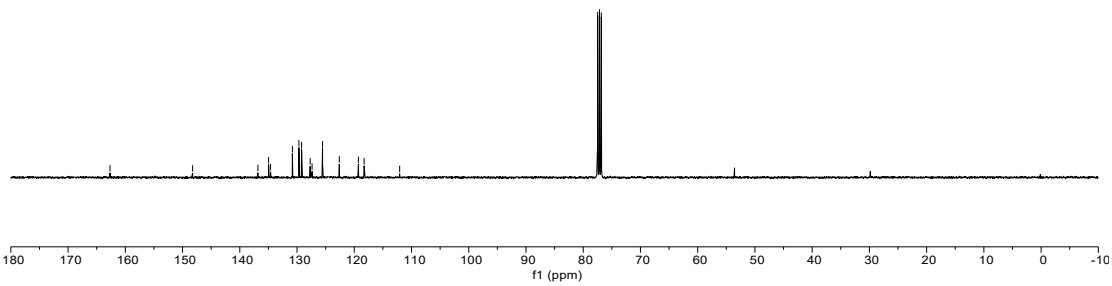
O
N
N
Cl

3ac


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)


8.1985
8.1804
7.7413
7.7225
7.7037
7.6981
7.6757
7.6624
7.6572
7.6400
7.6173
7.6005
7.5949
7.5836
7.5636
7.5446
7.5235
7.5021
7.3550
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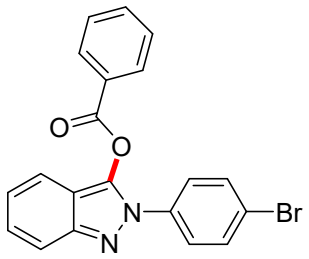
7.3329
7.3184
7.3164
7.2596
7.1168
7.1002
7.0956
7.0790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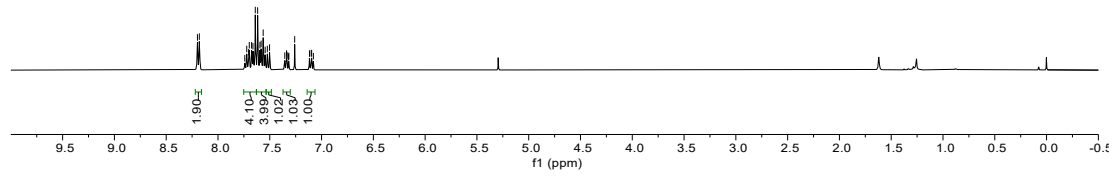
N
N
Br

3ad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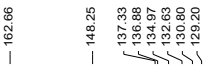
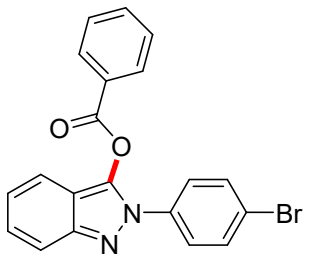
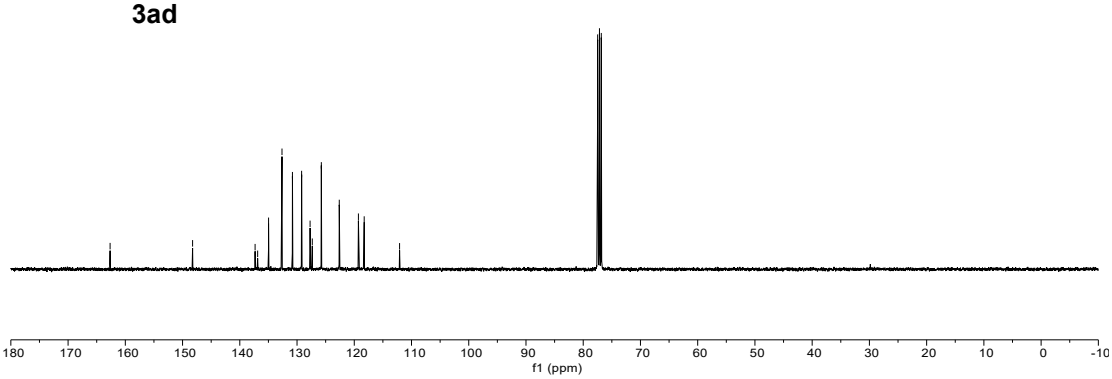
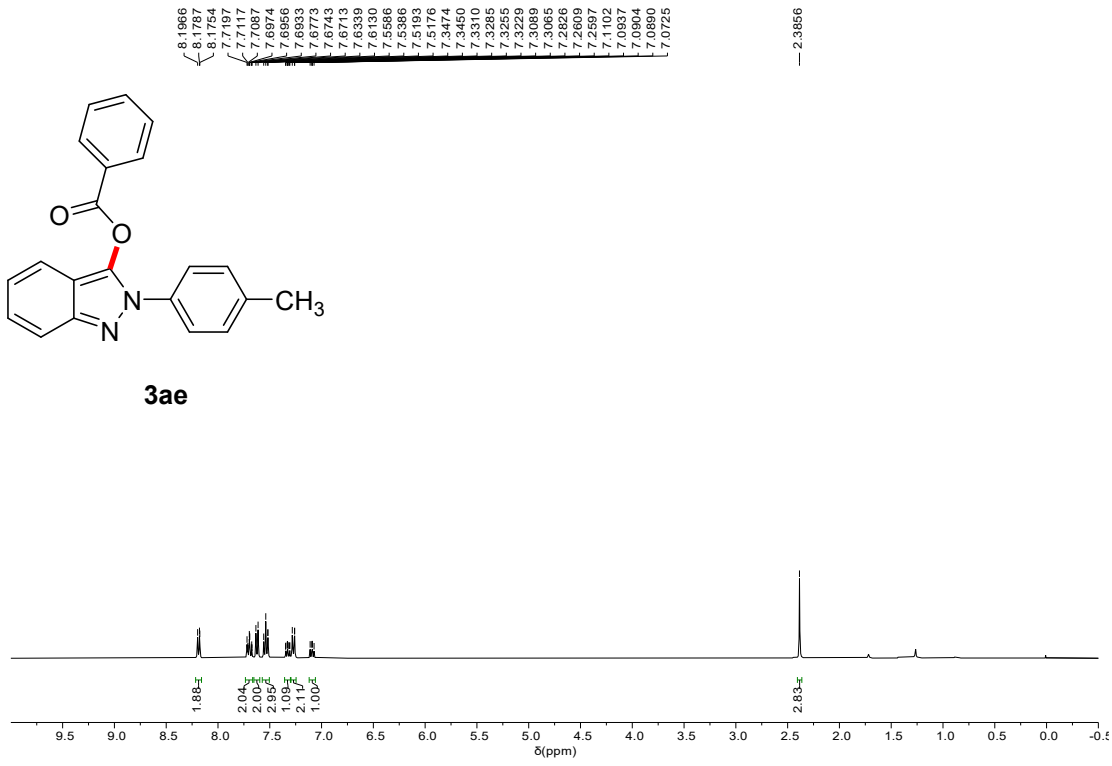
4.10
3.99
1.02
1.03
1.00
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


162.66
148.25
137.33
136.88
134.87
132.63
130.80
129.20
127.72
127.33
125.75
122.62
119.27
118.27
112.08
77.48
77.16
76.84


O
O
N
N
Br

3ad


180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


8.1966
8.1787
8.1754
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7.7117
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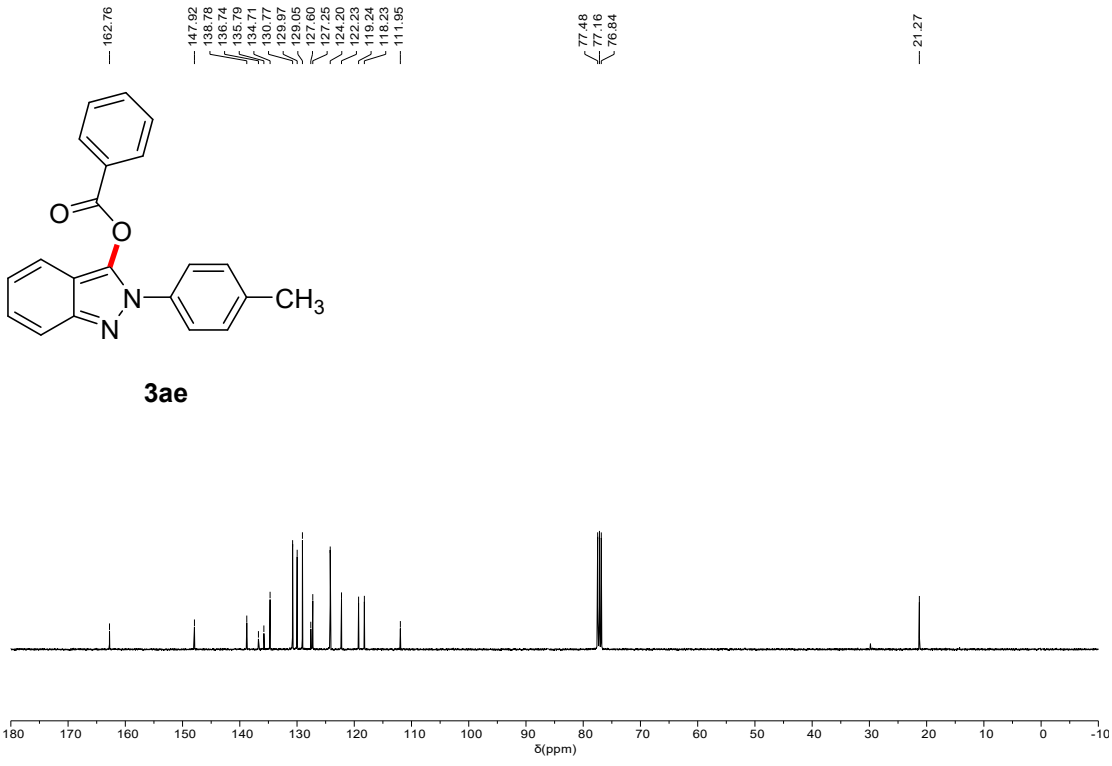
7.6974
7.6956
7.6933
7.6773
7.6743
7.6713
7.6339
7.6130
7.5586
7.5386
7.5193
7.5176
7.3474
7.3450
7.3310
7.3285
7.3255
7.3229
7.3089
7.3065
7.2826
7.2609
7.2597
7.1102
7.0937
7.0904
7.0890
7.0725
2.3856
O
O
N
N
CH3
1.88
2.04
2.00
2.95
1.09
2.11
1.00
2.83
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ(ppm)

3ae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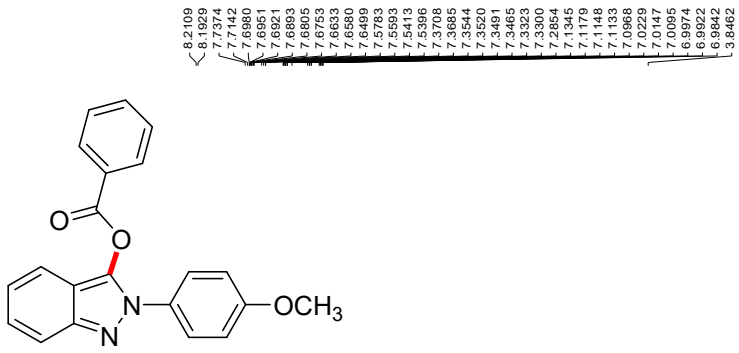
147.92
138.78
136.74
135.79
134.71
130.77
129.97
129.05
127.60
127.25
124.20
122.23
119.24
118.23
111.95
77.48
77.16
76.84
21.27
O
O
N
N
CH3
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
δ(ppm)

3ae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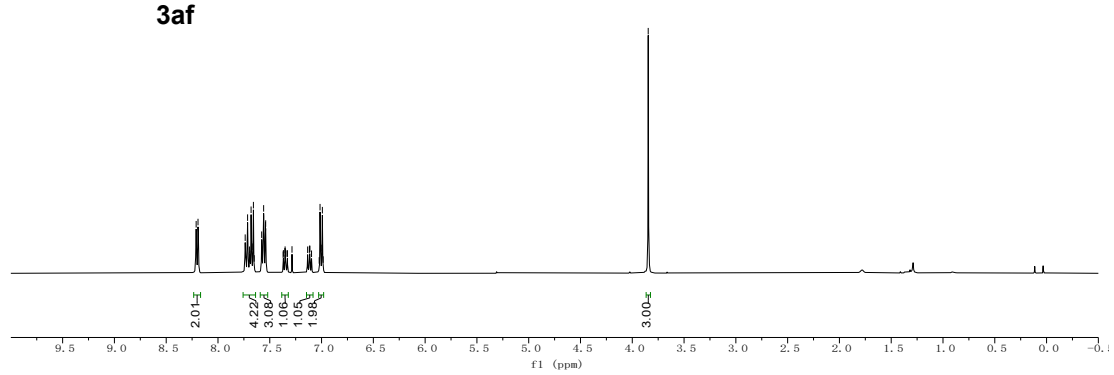
8.1929
7.7374
7.7142
7.6980
7.6951
7.6921
7.6893
7.6805
7.6753
7.6633
7.6580
7.6499
7.5783
7.5593
7.5413
7.5396
7.3708
7.3685
7.3544
7.3520
7.3491
7.3465
7.3323
7.3300
7.2854
7.1345
7.1179
7.1148
7.1133
7.0968
7.0229
7.0147
7.0095
6.9974
6.9922
6.9842
3.8462
O
O
N
N
OCH3

3af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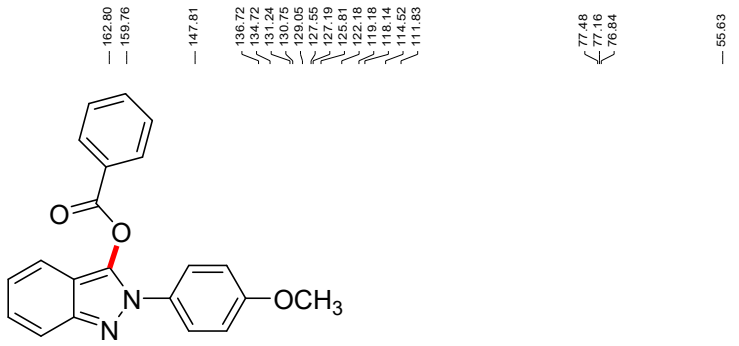
4.22
3.08
1.06
1.05
1.98
3.00
f1 (ppm)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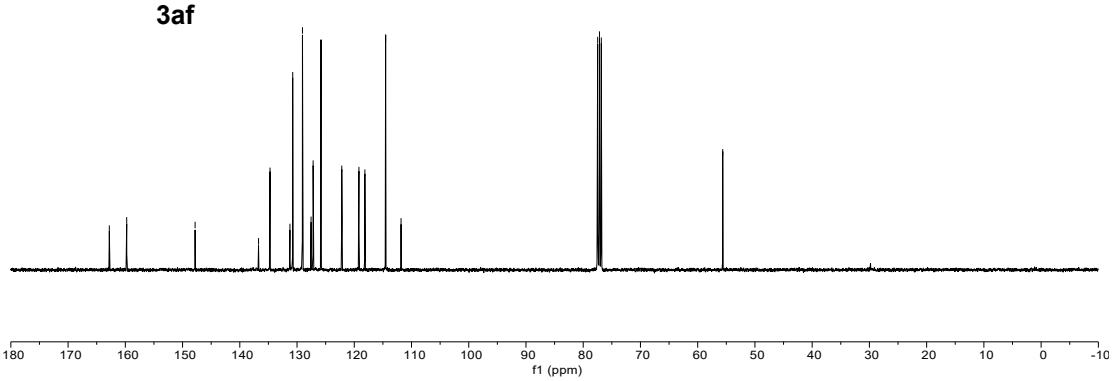
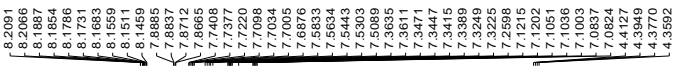
159.76
147.81
136.72
134.72
131.24
130.75
129.05
127.55
127.19
125.81
122.18
119.18
118.14
114.52
111.83
77.48
77.16
76.84
55.63
O
O
N
N
OCH3

3af


f1 (ppm)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8.1887
8.1854
8.1786
8.1731
8.1683
8.1559
8.1511
8.1459
7.8885
7.8837
7.8712
7.8665
7.7408
7.7377
7.7220
7.7098
7.7034
7.7005
7.6876
7.5833
7.5634
7.5443
7.5303
7.5089
7.3635
7.3611
7.3471
7.3447
7.3415
7.3389
7.3249
7.3225
7.2598
7.1215
7.1202
7.1051
7.1036
7.1003
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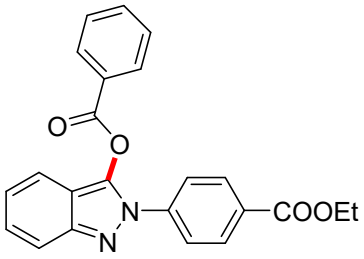
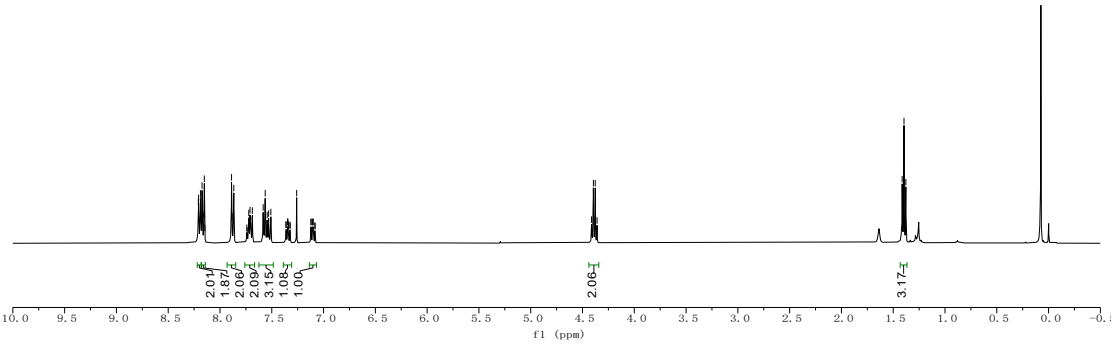
7.0824
4.4127
4.3949
4.3770
4.3592
1.4137
1.3958
1.3780


O
O
N
N
COOEt

3ag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1.87
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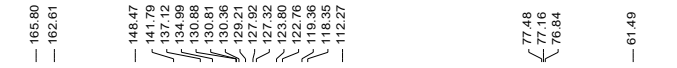
2.09
3.15
1.08
1.00
2.06
3.17
f1 (ppm)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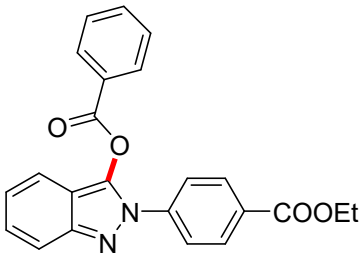
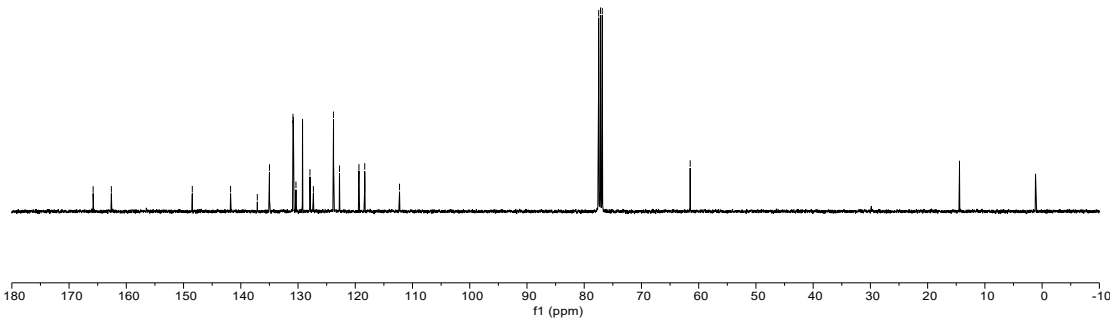
162.61
148.47
141.79
137.12
134.99
130.88
130.81
130.36
129.21
127.92
127.32
123.80
122.76
119.36
118.35
112.27
77.48
77.16
76.84
61.49
14.43


O
O
N
N
COOEt

3ag


f1 (ppm)