

SUPPLEMENTARY INFORMATION

Palladium-Catalyzed Decarboxylative, Decarbonylative and Dehydrogenative C(sp²)-H Acylation at *Room Temperature*

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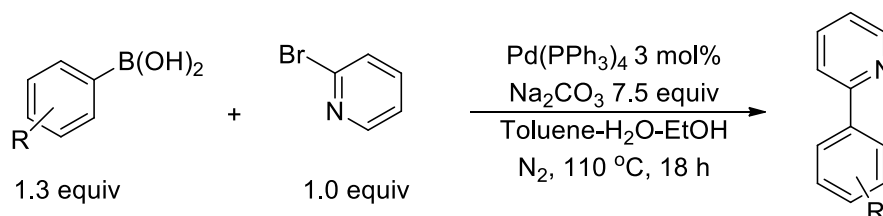
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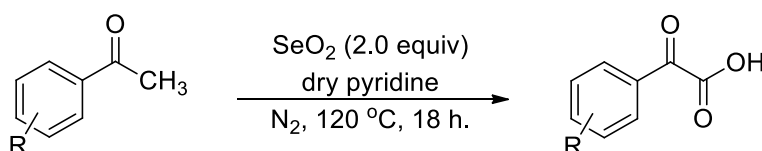
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General experimental procedure for the preparation of 2-phenylpyridines.¹



To a solution of arylboronic acid (2.6 mmol, 1.3 equiv) in toluene (7.0 mL), ethanol (1.5 mL) and H₂O (7.0 mL) Na₂CO₃ (1.6 g, 15 mmol, 7.5 equiv) was added followed by Pd(PPh₃)₄ (69 mg, 0.060 mmol) and 2-bromopyridine (0.2 mL, 2.0 mmol, 1.0 equiv) were added in a 50 mL round bottom flask. The reaction mixture was evacuated and refilled with nitrogen three times and stirred at 110 °C for 18 h. After the completion of the reaction as indicated by TLC, the reaction mixture was cooled to room temperature. To the reaction mixture, aqueous NH₄Cl (15 mL) was added, extracted with ethyl acetate for three times, dried over Na₂SO₄ and evaporated in vacuum to afford the crude product. The crude product was purified by column chromatography on silica gel with using hexane/EtOAc (9/1) to afford pure 2-arylpyridines.

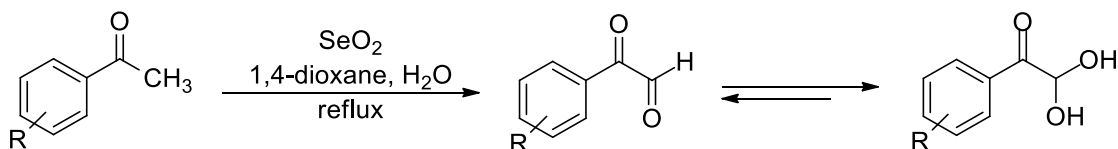
General Experimental procedure for the preparation of arylglyoxylic acids.²



A mixture of acetophenones (8.0 mmol, 1.0 equiv) and selenium dioxide (1.8 g, 16 mmol, 2.0 equiv) in dry pyridine (4.0 mL) was stirred at 120 °C under N₂ for 18 h. After completion of the reaction, as determined by TLC, the solution containing precipitated selenium was filtered using a Buckner funnel and the residue was washed with ethyl acetate (40 mL). The combined filtrate was treated with 1N HCl (60 mL), the organic layer was separated, and the remaining aqueous layer was extracted with ethyl acetate (2x20). The organic layers were combined and treated with

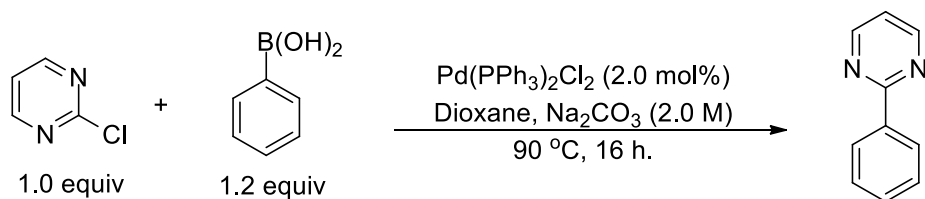
1N NaOH (2x50), and the aqueous layer was separated. Then the aqueous layer was acidified using 1N HCl to about pH 1.5. The mixture was extracted with ethyl acetate (3x40), and the combined organic layers were dried over Na₂SO₄ and evaporated in vacuum to afford the crude product. The crude product was purified by column chromatography on silica gel with using hexane/EtOAc (7/3) to give the pure corresponding arylglyoxylic acids.

General experimental procedure for the preparation of phenylglyoxals.³



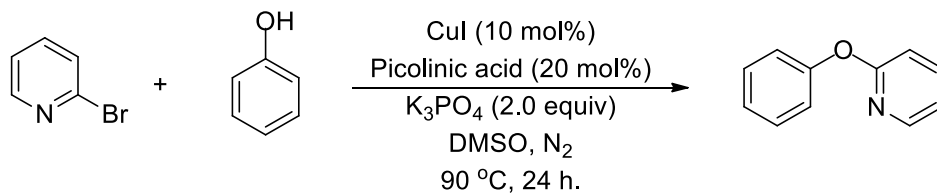
To a 50 mL two-neck round bottom flask fitted with a condenser, was added 1,4-dioxane (13.0 mL), SeO₂ (2.8 g, 25.0 mmol) and water (0.5 mL). The mixture was heated at 50-55 °C and stirred under N₂ atmosphere until the solid was dissolved, then the corresponding acetophenone (25.0 mmol, 1.0 equiv) was added and the reaction mixture was stirred at 110 °C for 4 h. Then the reaction mixture was cooled to room temperature. The solid was removed by filtration; the filtrate was evaporated to afford a crude product. The crude product was purified by silica gel column chromatography (hexane:ethyl acetate/8:2) to give the product as a yellow liquid. This liquid was dissolved in hot water (10 mL) and allowed to crystallize to afford the desired products, arylglyoxal monohydrate as a white solid.

Experimental procedure for the preparation of 2-phenylpyrimidine.⁴



To a round-bottom flask was added 2-chloropyrimidine (229.0 mg, 2.0 mmol, 1.0 equiv), phenylboronic acid (293mg, 2.4 mmol, 1.2 equiv), Pd(PPh₃)₂Cl₂ (28mg, 0.04 mmol, 0.02 equiv) and Na₂CO₃ (2.0 M, 5.0 mL) in dioxane (5.0 mL). The reaction mixture was heated to 90 °C for 16 h under N₂ atmosphere. After completion of the reaction (as indicated by TLC), the heterogeneous aqueous was concentrated under reduced pressure and the residue was extracted with EtOAc (30 mL), washed by H₂O (30 mL) and brine (30 mL). The organic layer was dried over Na₂SO₄, concentrated and purified by column chromatography on silica gel using ethyl acetate/hexane as eluent to afford the desired product, 2-phenylpyrimidine as colorless oil. ¹H NMR (300 MHz, CDCl₃): δ 8.81 (d, *J* = 4.8 Hz, 2H), 8.43-8.46 (m, 2H), 7.48-7.52 (m, 3H), 7.19 (t, *J* = 4.8 Hz, 1H).

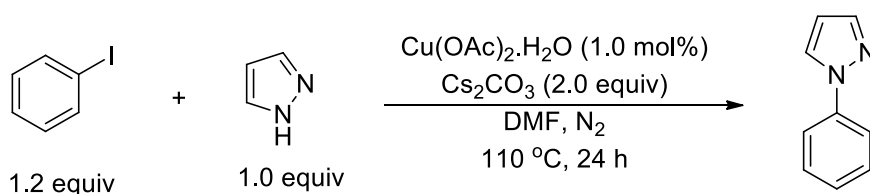
Experimental procedure for the preparation of 2-phenoxypyridine.⁵



To an oven-dried 50 mL round bottomed flask, CuI (122.0 mg, 0.64 mmol, 0.1 equiv), picolinic acid (158 mg, 1.3 mmol, 0.2 equiv), phenol (715 mg, 7.6 mmol, 1.2 equiv) and K₃PO₄ (2.7 g, 12.8 mmol, 2.0 equiv) was added then the flask was evacuated and back-filled with N₂. To this reaction mixture, 2-bromopyridine (0.6 mL, 6.4 mmol, 1.0 equiv) and DMSO (12 mL) was added via syringe. The reaction mixture was stirred at 90 °C for 24 h under N₂. Then the reaction mixture was cooled to room temperature. The mixture was poured into water (30 mL) and extracted with ethyl acetate (30 mL). The organic layer was washed with water (20x2 mL) and brine (10 mL), dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced

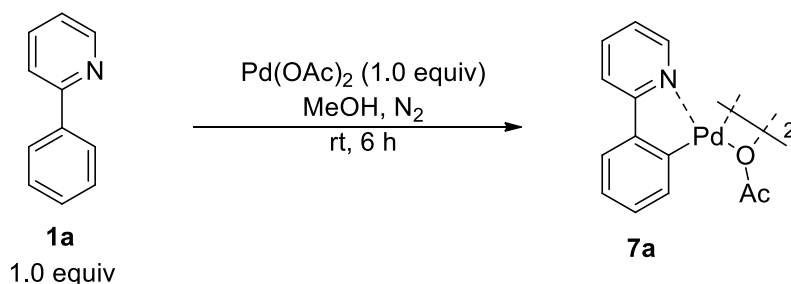
pressure. The crude product was purified by silica gel column chromatography using ethyl acetate/hexane as eluent to afford the desired product, 2-phenoxy pyridine as a white solid. ^1H NMR (300 MHz, CDCl_3): δ 8.21 (dd, $J = 4.8$ Hz, 1.2 Hz, 1H), 7.65-7.71 (m, 1H), 7.41 (t, $J = 7.8$ Hz, 2H), 7.22 (d, $J = 7.5$ Hz, 1H), 7.15 (d, $J = 7.8$ Hz, 2H), 6.99 (dd, $J = 5.1$ Hz, 5.4 Hz, 1H), 6.91 (d, $J = 8.4$ Hz, 1H).

Experimental procedure for the preparation of 1-phenyl-1H-pyrazole.⁶



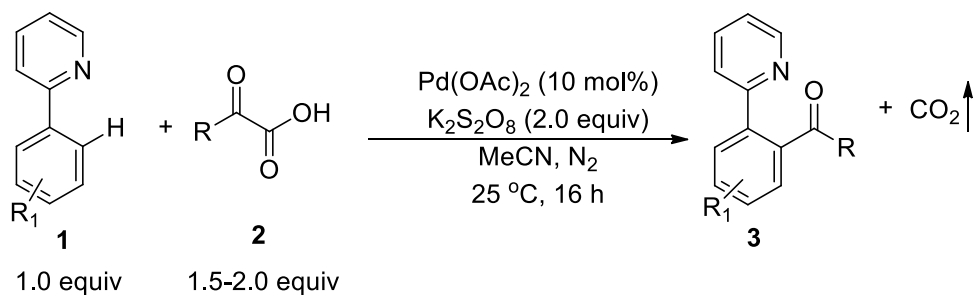
To a solution of $\text{Cu}(\text{OAc})_2 \cdot \text{H}_2\text{O}$ (6.0 mg, 0.03 mmol, 0.01 equiv) in DMF (6.0 mL) were added iodobenzene (0.4 mL, 3.6 mmol, 1.2 equiv), 1H-pyrazole (204 mg, 3.0 mmol, 1.0 equiv), and Cs_2CO_3 (2.0 g, 6.0 mmol, 2.0 equiv) under N_2 . The mixture was stirred at 110°C for 24 h. Then the reaction mixture was cooled to room temperature. The mixture was poured into water (20 mL) and extracted with ethyl acetate (30 mL). The organic layer was washed with water (10x2 mL) and brine (10 mL), dried over anhydrous Na_2SO_4 and the solvent was evaporated under reduced pressure. The crude product was purified by silica gel column chromatography using ethyl acetate/hexane as eluent to afford the desired product, 1-phenyl-1H-pyrazole as colorless oil. ^1H NMR (300 MHz, CDCl_3): δ 7.94 (d, $J = 2.1$ Hz, 1H), 7.69-7.74 (m, 3H), 7.46 (t, $J = 7.5$ Hz, 2H), 7.29 (t, $J = 7.2$ Hz, 1H), 6.48 (t, $J = 1.8$ Hz, 1H).

Experimental procedure for the preparation of 2-phenylpyridine palladacyclo dimer complex (7a).⁷



To an oven-dried 50 mL round bottomed flask, 2-Phenylpyridine (155 mg, 1.0 mmol, 1.0 equiv) was added to a solution of Pd(OAc)₂ (225 mg, 1.0 mol, 1.0 equiv) in MeOH (16 mL) and stirred at room temperature for 6 h under N₂, during which time a yellow solid precipitated was formed in the solution. The precipitate was collected at the top of a plug of celite, and the solids were washed with hexanes (3 x 10 mL). The yellow residue at the top of the celite plug was then washed through with CH₂Cl₂ (2 x 30 mL). The solvent was evaporated under reduced pressure, and the resulting solid was recrystallized from CH₂Cl₂/hexanes to afford the desired product as a yellow solid (82% yield). ¹H NMR (300 MHz, CDCl₃): δ 7.87 (d, *J* = 5.4 Hz, 2H), 7.38 (t, *J* = 7.8 Hz, 2H), 7.09 (d, *J* = 8.1 Hz, 2H), 6.79-6.94 (m, 8H), 6.45 (t, *J* = 6.6 Hz, 2H), 2.29 (s, 6H).

General experimental procedure for the decarboxylative acylation reaction between 2-phenylpyridines and α-ketocarboxylic acids, Scheme 2.



To an oven-dried 10 mL sealed tube, a mixture of 2-phenylpyridines (0.2 mmol, 1.0 equiv), α -ketocarboxylic acids (0.3-0.4 mmol, 1.5-2.0 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II)acetate (4.6 mg, 0.02 mmol, 0.1 equiv) was taken and dry MeCN (3.0 mL) was added to it. After flushing with nitrogen for 30 seconds, immediately the vessel was sealed with a screw cap. The reaction mixture was allowed to stir for 16 h at room temperature. After that the reaction mixture was quenched with NaHCO₃ to remove the unreacted acids. Then the reaction mixture was poured into water (40 mL) and extracted with ethyl acetate (40 mL). The organic layer was washed with water (10 mL) and brine (10 mL), dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The crude product was purified by column chromatography using ethyl acetate/hexane as eluent to afford the desired product.

To note: During optimization, it was found that α -ketocarboxylic acids are hygroscopic in nature thus water or moisture is detrimental to the reaction outcome. Therefore, so after flushing with nitrogen the reaction vessel was immediately sealed with a screw cap.

SPECTRAL DATA

[1,1'-Biphenyl]-4-yl(2-(pyridin-2-yl)phenyl)methanone, 3f, Scheme 2.⁸ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-([1,1'-biphenyl]-4-yl)-2-oxoacetic acid (68 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a light yellow oil, (55.0 mg, 82%). ¹H NMR (600 MHz, CDCl₃): δ 8.41-8.42 (m, 1H), 7.78-7.82 (m, 3H), 7.64 (td, $J = 7.2$ Hz, 1.2 Hz, 1H), 7.52-7.61 (m, 8H), 7.45 (t, $J = 7.2$, Hz, 2H), 7.38 (t, $J = 7.2$ Hz, 1H), 7.03-7.05 (m, 1H); ¹³C NMR (150 MHz, CDCl₃): δ 197.8, 156.8, 149.1, 144.9, 139.9, 139.6, 139.5, 136.6, 136.3, 130.2, 130.1, 129.0, 128.84, 128.82, 128.5, 128.0, 127.2,

126.7, 122.7, 122.0; IR (neat): ν_{\max} 1662, 1595, 1280, 926, 745 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{24}\text{H}_{17}\text{NO}$ $[\text{M}]^+$: 335.1310; found: 335.1314.

(4-Fluorophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3g, Scheme 2.⁹ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(4-fluorophenyl)-2-oxoacetic acid (51.5 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (44.0 mg, 80%). ^1H NMR (600 MHz, CDCl_3): δ 8.38 (d, $J = 4.8$ Hz, 1H), 7.78 (d, $J = 7.8$ Hz, 1H), 7.70-7.73 (m, 2H), 7.59-7.65 (m, 2H), 7.54 (d, $J = 4.2$ Hz, 2H), 7.52 (d, $J = 7.8$ Hz, 1H), 7.04-7.06 (m, 1H), 6.92-6.96 (m, 2H); ^{13}C NMR (150 MHz, CDCl_3): δ 196.7, 165.1 (d, $J = 252.0$ Hz), 156.6, 149.0, 139.4, 139.2, 136.4, 134.3 (d, $J = 3.0$ Hz), 131.9 (d, $J = 9.0$ Hz), 130.3, 129.0, 128.7, 128.6, 122.6, 122.0, 115.1 (d, $J = 21.0$ Hz); IR (neat): ν_{\max} 1666, 1594, 1280, 1232, 1151, 752 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{18}\text{H}_{12}\text{FNONa}$ $[\text{M} + \text{Na}]^+$: 300.0801; found: 300.0806.

(4-Chlorophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3h, Scheme 2.¹⁰ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(4-chlorophenyl)-2-oxoacetic acid (55.5 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (37.5 mg, 64%). ^1H NMR (600 MHz, CDCl_3): δ 8.35-8.36 (m, 1H), 7.79 (d, $J = 7.8$ Hz, 1H), 7.60-7.64 (m, 4H), 7.52-7.56 (m, 3H), 7.24-7.28 (m, 2H), 7.05-7.07 (m, 1H); ^{13}C NMR (75 MHz, CDCl_3): δ 197.0, 156.4, 149.0, 139.4, 139.1, 138.6, 136.45, 136.41, 130.7,

130.3, 129.0, 128.6, 128.3, 122.4, 122.1; IR (neat): ν_{\max} 2925, 1669, 1587, 1280, 1089, 928, 750 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{18}\text{H}_{12}\text{ClNONa}$ [$\text{M} + \text{Na}$] $^{+}$: 316.0505; found: 316.0503.

(4-Bromophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3i, Scheme 2.⁹ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(4-bromophenyl)-2-oxoacetic acid (69 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish solid, (54.5 mg, 81%), mp 102-104 °C. ^1H NMR (600 MHz, CDCl_3): δ 8.35-8.36 (m, 1H), 7.78 (d, $J = 7.8$ Hz, 1H), 7.60-7.64 (m, 2H), 7.52-7.57 (m, 5H), 7.40-7.42 (m, 2H), 7.05-7.07 (m, 1H); ^{13}C NMR (75 MHz, CDCl_3): δ 196.9, 156.4, 148.9, 139.4, 139.0, 136.8, 136.5, 131.3, 130.8, 130.3, 129.0, 128.64, 128.58, 127.2, 122.4, 122.1; IR (neat): ν_{\max} 1670, 1584, 1279, 1067, 927, 750 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{18}\text{H}_{12}\text{BrNONa}$ [$\text{M} + \text{Na}$] $^{+}$: 360.0000; found: 360.0002.

(2-(Pyridin-2-yl)phenyl)(4-(trifluoromethyl)phenyl)methanone, 3j, Scheme 2.⁸ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-(4-(trifluoromethyl)phenyl)acetic acid (65.5 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (37.0 mg, 57%), mp 76-78 °C. ^1H NMR (600 MHz, CDCl_3): δ 8.30-8.31 (m, 1H), 7.78-7.81 (m, 3H), 7.54-7.66 (m, 5H), 7.53 (d, $J = 7.8$ Hz, 2H), 7.02-7.04 (m, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 196.9, 156.0, 148.8, 141.0, 139.4, 138.8, 136.6, 133.2 (q, $J = 31.5$ Hz), 130.5, 129.3, 129.1, 128.8, 128.4, 125.0 (q, $J = 3.0$ Hz), 123.6 (q, $J = 271.5$ Hz),

122.2, 122.1; IR (neat): ν_{\max} 1675, 1587, 1322, 1130, 753 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{19}\text{H}_{12}\text{F}_3\text{NO}$ $[\text{M}]^+$: 327.0871; found: 327.0867.

Naphthalen-1-yl(2-(pyridin-2-yl)phenyl)methanone, 3k, Scheme 2.⁹ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(naphthalen-1-yl)-2-oxoacetic acid (60 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish solid, (34.5 mg, 56%), mp 101-103 $^\circ\text{C}$. ^1H NMR (600 MHz, CDCl_3): δ 8.93 (d, $J = 8.4$ Hz, 1H), 8.14 (d, $J = 4.8$ Hz, 1H), 7.75-7.78 (m, 3H), 7.72 (d, $J = 7.8$ Hz, 1H), 7.63-7.66 (m, 2H), 7.56 (td, $J = 7.8$ Hz, 1.2 Hz, 1H), 7.52 (t, $J = 7.2$ Hz, 1H), 7.35-7.43 (m, 3H), 7.17 (t, $J = 7.8$ Hz, 1H), 6.76-6.78 (m, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 199.6, 157.0, 148.9, 141.0, 140.2, 136.3, 136.0, 133.5, 132.3, 131.0, 130.6, 130.1, 129.6, 128.8, 128.5, 128.0, 127.6, 126.5, 126.2, 123.7, 122.2, 121.4; IR (neat): ν_{\max} 1662, 1586, 1432, 1279, 750 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{22}\text{H}_{15}\text{NO}$ $[\text{M}]^+$: 309.1154; found: 309.1133.

(2-Bromophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3l, Scheme 2.¹¹ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(2-bromophenyl)-2-oxoacetic acid (69 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (54.0 mg, 80%). ^1H NMR (600 MHz, CDCl_3): δ 8.52-8.54 (m, 1H), 7.70-7.71 (m, 1H), 7.61-7.66 (m, 2H), 7.57 (td, $J = 7.8$ Hz, 1.8 Hz, 1H), 7.53 (td, $J = 7.2$ Hz, 1.2 Hz, 1H), 7.44-7.46 (m, 2H), 7.23-7.26 (m, 1H), 7.06-7.09 (m, 2H), 7.01-7.03 (m, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 196.7, 157.1, 149.1, 140.7, 139.4, 138.7, 136.2, 139.9, 131.6, 131.3, 131.2, 130.6,

129.3, 128.6, 126.5, 122.8, 121.8, 121.4; IR (neat): ν_{\max} 1673, 1586, 1464, 1432, 1292, 928, 750 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{18}\text{H}_{12}\text{BrNO}$ $[\text{M}]^+$: 337.0102; found: 337.0101.

(5-Methyl-2-(pyridin-2-yl)phenyl)(phenyl)methanone, 3o, Scheme 2.¹² The same general procedure was followed by using 2-(*p*-tolyl)pyridine (34.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-phenylacetic acid (60 mg, 0.4 mmol, 2.0 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (40.0 mg, 73%), mp 137-139 °C. ^1H NMR (600 MHz, CDCl_3): δ 8.35 (d, $J = 4.8$ Hz, 1H), 7.68-7.70 (m, 3 H), 7.55 (td, $J = 7.8$ Hz, 1.8 Hz, 1H), 7.48 (d, $J = 7.8$ Hz, 1H), 7.42 (d, $J = 7.8$ Hz, 1H), 7.36-7.40 (m, 2H), 7.26-7.28 (m, 2H), 6.98-7.00 (m, 1H), 2.47 (s, 3H); ^{13}C NMR (150 MHz, CDCl_3): δ 198.4, 156.6, 148.9, 139.4, 138.6, 137.9, 136.8, 136.2, 132.2, 130.9, 129.6, 129.4, 128.5, 127.9, 122.4, 121.6, 21.2; IR (neat): ν_{\max} 1666, 1588, 1461, 1250, 698 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{19}\text{H}_{15}\text{NONa}$ $[\text{M} + \text{Na}]^+$: 296.1051; found: 296.1051.

(5-(*tert*-Butyl)-2-(pyridin-2-yl)phenyl)(phenyl)methanone, 3p, Scheme 2.¹³ The same general procedure was followed by using 2-(4-(*tert*-butyl)phenyl)pyridine (42.5 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-phenylacetic acid (60 mg, 0.4 mmol, 2.0 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (38.0 mg, 60%). ^1H NMR (600 MHz, CDCl_3): δ 8.35 (d, $J = 4.2$ Hz, 1H), 7.70-7.73 (m, 3H), 7.64 (dd, $J = 7.8$ Hz, 1.8 Hz, 1H), 7.53-7.56 (m, 2H), 7.48 (d, $J = 7.8$ Hz, 1H), 7.38 (t, $J = 7.2$ Hz, 1H), 7.26-7.28 (m, 2H), 6.98-7.00 (m, 1H), 1.39 (s, 9H); ^{13}C NMR (150 MHz, CDCl_3): δ 198.7, 156.7, 151.8, 148.9, 139.0, 138.0, 136.8, 136.2, 132.2, 129.4, 128.4, 127.9,

127.3, 126.0, 122.4, 121.6, 34.8, 31.2; IR (neat): ν_{\max} 2962, 1667, 1590, 1467, 1249, 751 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{22}\text{H}_{21}\text{NONa}$ [$\text{M} + \text{Na}$] $^{+}$: 338.1521; found: 338.1521.

(4-Methyl-2-(pyridin-2-yl)phenyl)(phenyl)methanone, 3q, Scheme 2.⁹ The same general procedure was followed by using 2-(*m*-tolyl)pyridine (34.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-phenylacetic acid (60 mg, 0.4 mmol, 2.0 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (38.0 mg, 70%), mp 106-108 $^{\circ}\text{C}$. ^1H NMR (600 MHz, CDCl_3): δ 8.40 (d, $J = 4.2$ Hz, 1H), 7.68 (d, $J = 7.2$ Hz, 2H), 7.58 (s, 1H), 7.52-7.55 (m, 1H), 7.47 (d, $J = 7.8$ Hz, 1H), 7.44 (d, $J = 7.8$ Hz, 1H), 7.38 (t, $J = 7.2$ Hz, 1H), 7.34 (d, $J = 7.8$ Hz, 1H), 7.24-7.28 (m, 2H), 7.00-7.02 (m, 1H), 2.51 (s, 3H); ^{13}C NMR (150 MHz, CDCl_3): δ 198.2, 157.1, 149.0, 140.6, 139.9, 138.0, 136.6, 136.1, 132.2, 129.6, 129.5, 129.4, 129.1, 127.9, 123.0, 121.8, 21.5; IR (neat): ν_{\max} 1665, 1588, 1281, 932, 702 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{19}\text{H}_{15}\text{NONa}$ [$\text{M} + \text{Na}$] $^{+}$: 296.1051; found: 296.1050.

(2-(Pyridin-2-yl)phenyl)(*m*-tolyl)methanone, 3r, Scheme 2.¹⁴ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-(*m*-tolyl)acetic acid (49 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (38.0 mg, 70%). ^1H NMR (600 MHz, CDCl_3): δ 8.39 (d, $J = 4.8$ Hz, 1H), 7.77 (d, $J = 7.8$ Hz, 1H), 7.61 (td, $J = 7.2$ Hz, 2.4 Hz, 1H), 7.48-7.58 (m, 6H), 7.22 (d, $J = 7.2$ Hz, 1H), 7.16 (t, $J = 7.8$ Hz, 1H), 7.02-7.04 (m, 1H), 2.29 (s, 3H); ^{13}C NMR (150 MHz, CDCl_3): δ 198.4, 156.9, 149.0, 139.7, 139.6, 137.7, 136.2, 133.2, 130.1, 129.9, 129.1, 128.8, 128.4, 127.9, 127.0, 122.7, 121.9, 21.2; IR (neat):

ν_{\max} 1666, 1588, 1432, 1284, 752 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{19}\text{H}_{15}\text{NO}$ $[\text{M}]^+$: 273.1154; found: 273.1150.

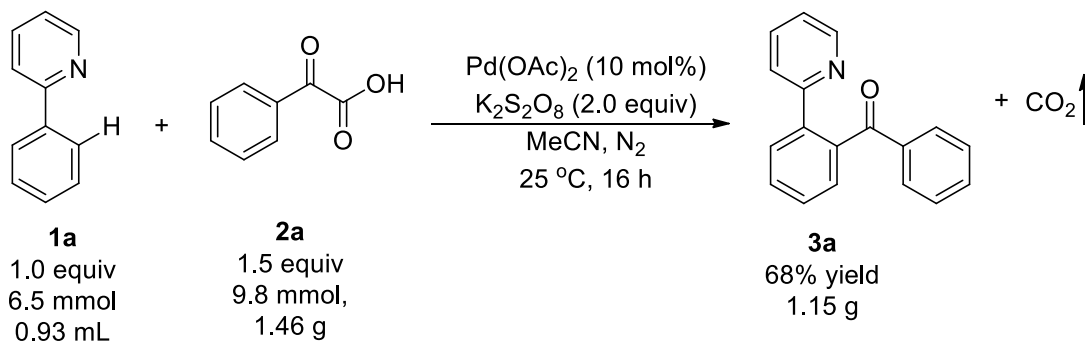
(5-Methoxy-2-(pyridin-2-yl)phenyl)(m-tolyl)methanone, 3s, Scheme 2. The same general procedure was followed by using 2-(4-methoxyphenyl)pyridine (37.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-(m-tolyl)acetic acid (66 mg, 0.4 mmol, 2.0 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (42.5 mg, 70%). ^1H NMR (600 MHz, CDCl_3): δ 8.34 (d, $J = 4.8$ Hz, 1H), 7.72 (d, $J = 8.4$ Hz, 1H), 7.55 (s, 1H), 7.51-7.54 (m, 1H), 7.48 (d, $J = 7.2$ Hz, 1H), 7.44 (d, $J = 7.8$ Hz, 1H), 7.20 (d, $J = 7.8$ Hz, 1H), 7.12-7.16 (m, 2H), 7.05 (d, $J = 2.4$ Hz, 1H), 6.96-6.98 (m, 1H), 3.88 (s, 3H), 2.28 (s, 3H); ^{13}C NMR (150 MHz, CDCl_3): δ 198.1, 159.7, 156.4, 148.8, 140.8, 137.7, 137.6, 136.1, 133.2, 132.0, 130.0, 129.8, 127.9, 126.8, 122.1, 121.3, 116.0, 114.0, 55.5, 21.2; IR (neat): ν_{\max} 1667, 1595, 1464, 1288, 1234, 753 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{20}\text{H}_{17}\text{NO}_2\text{Na}$ $[\text{M} + \text{Na}]^+$: 326.1157; found: 326.1161.

3-Methyl-1-(2-(pyridin-2-yl)phenyl)butan-1-one, 3w, Scheme 2.⁸ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 4-methyl-2-oxopentanoic acid (52 mg, 0.4 mmol, 2.0 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a colourless oil, (34.0 mg, 71%). ^1H NMR (600 MHz, CDCl_3): δ 8.62 (d, $J = 4.2$ Hz, 1H), 7.76 (td, $J = 7.8$ Hz, 1.8 Hz, 1H), 7.61 (d, $J = 7.2$ Hz, 1H), 7.56 (d, $J = 8.4$ Hz, 1H), 7.44-7.52 (m, 3H), 7.24-7.28 (m, 1H), 2.40 (d, $J = 6.6$ Hz, 2H), 2.09-2.16 (m, 1H), 0.87 (d, $J = 7.2$ Hz, 6H); ^{13}C NMR (150 MHz, CDCl_3): δ 206.6, 157.6, 149.2, 142.0, 138.6, 136.7, 130.0, 129.2, 128.5, 127.5, 122.6, 122.2, 51.7, 24.8,

22.6; IR (neat): ν_{\max} 2956, 1693, 1587, 1465, 1208, 754 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{16}\text{H}_{17}\text{NONa}$ [$\text{M} + \text{Na}$] $^{+}$: 262.1208; found: 262.1207.

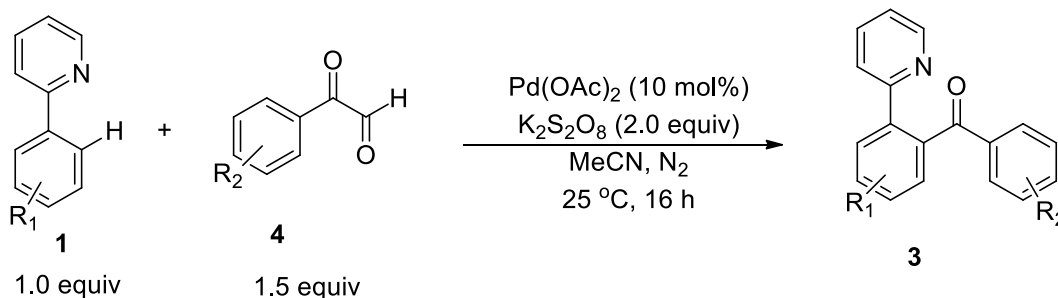
Phenyl(2-(pyrimidin-2-yl)phenyl)methanone, 3x, Scheme 2.¹⁵ The same general procedure was followed by using 2-phenylpyrimidine (31.5 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-phenylacetic acid (45 mg, 0.4 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (33 mg, 63%), mp 129-131 $^{\circ}\text{C}$. ^1H NMR (600 MHz, CDCl_3): δ 8.56 (d, $J = 4.8$ Hz, 2H), 8.38 (d, $J = 7.2$ Hz, 1H), 7.73 (d, $J = 7.2$ Hz, 2H), 7.66 (t, $J = 7.8$ Hz, 1H), 7.61 (t, $J = 7.8$ Hz, 1H), 7.52 (d, $J = 7.2$ Hz, 1H), 7.42 (t, $J = 7.8$ Hz, 1H), 7.30 (t, $J = 7.8$ Hz, 2H), 7.00 (t, $J = 4.8$ Hz, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 197.8, 163.9, 156.6, 140.5, 138.1, 136.9, 132.2, 130.3, 129.9, 129.4, 129.0, 128.6, 128.1, 118.7; IR (neat): ν_{\max} 1664, 1557, 1413, 1281, 752 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{17}\text{H}_{12}\text{N}_2\text{ONa}$ [$\text{M} + \text{Na}$] $^{+}$: 283.0847; found: 283.0841.

Decarboxylative acylation reaction in gram scale (Synthesis of phenyl(2-(pyridin-2-yl)phenyl)methanone, 3a, Scheme 2).



To an oven-dried 100 mL sealed tube, a mixture of 2-phenylpyridines (0.93 mL, 6.5 mmol, 1.0 equiv), 2-oxo-2-phenylacetic acid (1.46g, 9.8 mmol, 1.5 equiv), potassium persulfate (3.51g, 13.0 mmol, 2.0 equiv) and palladium(II)acetate (146 mg, 0.65 mmol, 0.1 equiv) was taken and dry MeCN (50 mL) was added to it. After flushing with nitrogen for 30 seconds, immediately the vessel was sealed with a screw cap. The reaction mixture was allowed to stir for 16 h at room temperature. After that the reaction mixture was quenched with NaHCO₃ to remove the unreacted acids. Then the reaction mixture was poured into water (80 mL) and extracted with ethyl acetate (60x2 mL). The organic layer was washed with water (30x2 mL) and brine (30 mL), dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The pure phenyl(2-(pyridin-2-yl)phenyl)methanone (**3a**) was obtained as a white solid in 68% (1.15 g) yield after column chromatography of the crude reaction mixture using ethyl acetate/hexane (7:3) as eluent.

General experimental procedure for the decarbonylative acylation reaction between 2-phenylpyridines and phenylglyoxals, Scheme 3.



To an oven-dried 10 mL sealed tube, a mixture of 2-phenylpyridines (0.2 mmol, 1.0 equiv), phenylglyoxals (0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II)acetate (4.6 mg, 0.02 mmol, 0.1 equiv) was taken and dry MeCN (3.0 mL) was added to it. After flushing with nitrogen, immediately the vessel was sealed with a screw cap. The reaction mixture was allowed to stir for 16 h at room temperature. After that the reaction

mixture was quenched with NaHCO₃. Then the reaction mixture was poured into water (40 mL) and extracted with ethyl acetate (40 mL). The organic layer was washed with water (10 mL) and brine (10 mL), dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The crude product was purified by column chromatography using ethyl acetate/hexane as eluent to afford the desired product.

SPECTRAL DATA

Phenyl(2-(pyridin-2-yl)phenyl)methanone, 3a, Scheme 3. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-phenylacetaldehyde (40 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (36.5 mg, 70%), mp 105-107 °C. The spectral data of compound **3a** is in Scheme 2.

(2-(Pyridin-2-yl)phenyl)(p-tolyl)methanone, 3b, Scheme 3. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-(p-tolyl)acetaldehyde (45 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (26 mg, 48%), mp 97-99 °C. The spectral data of compound **3b** is in Scheme 2.

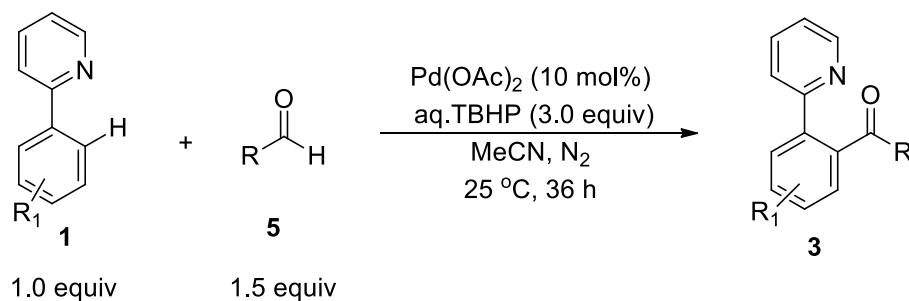
(4-Fluorophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3g, Scheme 3. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(4-fluorophenyl)-2-oxoacetaldehyde (46 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (31.0 mg, 56%). The spectral data of compound **3g** is in Scheme 2.

(4-Chlorophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3h, Scheme 3. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(4-chlorophenyl)-2-oxoacetaldehyde (51.0 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (33.5 mg, 57%). The spectral data of compound **3h** is in Scheme 2.

(2-Bromophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3l, Scheme 3. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-(2-bromophenyl)-2-oxoacetaldehyde (64.0 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (40.5 mg, 60%). The spectral data of compound **3l** is in Scheme 2.

(2-(Pyridin-2-yl)phenyl)(*m*-tolyl)methanone, 3r, Scheme 3. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-(*m*-tolyl)acetaldehyde (45 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv) and palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil (26.0 mg, 47%). The spectral data of compound **3r** is in Scheme 2.

General experimental procedure for the dehydrogenative acylation reaction between 2-phenylpyridines and aldehydes, Scheme 4.



To an oven-dried 7 mL clear vial, a mixture of 2-phenylpyridines (0.2 mmol, 1.0 equiv) and palladium(II)acetate (4.6 mg, 0.02 mmol, 0.1 equiv) was taken and dry MeCN (3.0 mL) was added to it. The corresponding aldehydes (0.3 mmol 1.5 equiv) were added to the reaction mixture. After flushing with nitrogen for 30 seconds, immediately the vessel was sealed with a screw cap. Then aq. TBHP (82 μ L, 0.6 mmol, 3.0 equiv) was added to the reaction mixture via micro-litter syringe. The reaction mixture was allowed to stir for 36 h at room temperature. After completion (as indicated by TLC), the reaction mixture was quenched with NaHCO₃. Then the reaction mixture was poured into water (40 mL) and extracted with ethyl acetate (40 mL). The organic layer was washed with water (10 mL) and brine (10 mL), dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The crude product was purified by column chromatography using ethyl acetate/hexane as eluent to afford the desired product.

SPECTRAL DATA

Phenyl(2-(pyridin-2-yl)phenyl)methanone, 3a, Scheme 4. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), benzaldehyde (32 μ L, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μ L, 0.6 mmol, 3.0 equiv). Column chromatography

(SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (45.0 mg, 87%), mp 105-107 °C. The spectral data of compound **3a** is in Scheme 2.

(2-(Pyridin-2-yl)phenyl)(p-tolyl)methanone, 3b, Scheme 4. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 4-methylbenzaldehyde (36 µL, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 µL, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (42.5 mg, 78%), 97-99 °C. The spectral data of compound **3b** is in Scheme 2.

(4-Methoxyphenyl)(2-(pyridin-2-yl)phenyl)methanone, 3e, Scheme 4. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 4-methoxybenzaldehyde (36.5 µL, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 µL, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a yellowish oil, (39.0 mg, 68%). The spectral data of compound **3e** is in Scheme 2.

1-(4-(2-(Pyridin-2-yl)benzoyl)phenyl)ethanone, 3ac, Scheme 4. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 4-acetylbenzaldehyde (44.5 mg, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 µL, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (44.0 mg, 73%), 80-82 °C. ¹H NMR (600 MHz, CDCl₃): δ 8.30 (d, *J* =

4.8 Hz, 1H), 7.83 (d, $J = 8.4$ Hz, 2H), 7.80 (d, $J = 7.8$ Hz, 1H), 7.75 (d, $J = 8.4$ Hz, 2H), 7.62-7.66 (m, 1H), 7.60 (td, $J = 7.8$ Hz, 1.2 Hz, 1H), 7.56-7.58 (m, 3H), 7.00-7.02 (m, 1H), 2.57 (s, 3H); ^{13}C NMR (150 MHz, CDCl_3): δ 197.6, 197.3, 156.1, 148.8, 141.6, 139.3, 139.2, 139.0, 136.5, 130.5, 129.2, 129.1, 128.8, 128.4, 127.9, 122.2, 122.1, 26.8; IR (neat): ν_{max} 1682, 1433, 1259, 930, 753 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{20}\text{H}_{15}\text{NO}_2$ $[\text{M}]^+$: 301.1103; found: 301.1104.

4-(2-(Pyridin-2-yl)benzoyl)benzotrile, 3ae, Scheme 4.⁹ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 4-formylbenzotrile (40 mg, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL , 0.6 mmol, 3.0 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (26.5 mg, 47%), mp 106-108 $^\circ\text{C}$. ^1H NMR (600 MHz, CDCl_3): δ 8.26 (d, $J = 4.2$ Hz, 1H), 7.81 (d, $J = 7.2$ Hz, 1H), 7.74-7.75 (m, 2H), 7.54-7.67 (m, 7H), 7.02-7.04 (m, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 196.4, 155.7, 148.7, 141.6, 139.2, 138.4, 136.7, 131.9, 130.7, 129.2, 129.0, 128.2, 122.3, 122.0, 118.2, 115.0; IR (neat): ν_{max} 2225, 1671, 1285, 929, 744 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{19}\text{H}_{12}\text{N}_2\text{O}$ $[\text{M}]^+$: 284.0950; found: 284.0958.

(3-Nitrophenyl)(2-(pyridin-2-yl)phenyl)methanone, 3af, Scheme 4.⁹ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 3-nitrobenzaldehyde (45 mg, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL , 0.6 mmol, 3.0 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a colourless oil, (34.0 mg, 56%). ^1H NMR (600 MHz, CDCl_3): δ 8.44 (s, 1H), 8.26 (d, $J = 4.2$ Hz, 1H), 8.22 (d, $J = 7.8$ Hz, 1H), 8.03 (d, $J = 7.8$ Hz, 1H), 7.83 (d, $J = 7.2$ Hz, 1H), 7.58-7.69 (m, 5H), 7.47 (t, $J = 7.8$ Hz,

1H), 7.00-7.02 (m, 1H); ¹³C NMR (150 MHz, CDCl₃): δ 195.5, 155.8, 148.7, 147.9, 139.8, 139.3, 138.2, 136.8, 134.4, 130.8, 129.20, 129.17, 129.0, 128.4, 126.2, 123.6, 122.2, 122.0; IR (neat): ν_{max} 1674, 1531, 1349, 1277, 753 cm⁻¹; HRMS (ESI, m/z) calcd. for C₁₈H₁₂N₂O₃Na [M + Na]⁺: 327.0746; found: 327.0752.

Naphthalen-2-yl(2-(pyridin-2-yl)phenyl)methanone, 3ag, Scheme 4.⁸ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 2-naphthaldehyde (47 mg, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a colourless oil, (37.0 mg, 60%). ¹H NMR (600 MHz, CDCl₃): δ 8.33 (d, *J* = 4.8 Hz, 1H), 8.09 (s, 1H), 7.94 (dd, *J* = 9.0 Hz, 1.8 Hz, 1H), 7.83 (d, *J* = 7.2 Hz, 1H), 7.77-7.81 (m, 3H), 7.65-7.67 (m, 1H), 7.62 (dd, *J* = 7.2 Hz, 1.2 Hz, 1H), 7.51-7.58 (m, 4H), 7.46 (t, *J* = 7.2 Hz, 1H), 6.93-6.95 (m, 1H); ¹³C NMR (150 MHz, CDCl₃): δ 198.2, 156.7, 149.0, 139.7, 139.6, 136.3, 135.3, 135.2, 132.2, 131.5, 130.2, 129.4, 129.1, 128.8, 128.5, 128.1, 128.0, 127.6, 126.4, 124.9, 122.5, 121.9; IR (neat): ν_{max} 1662, 1588, 1465, 1289, 753 cm⁻¹; HRMS (EI, m/z) calcd. for C₂₂H₁₅NO [M]⁺: 309.1154; found: 309.1150.

(5-Methyl-2-(pyridin-2-yl)phenyl)(*p*-tolyl)methanone, 3al, Scheme 4.¹⁴ The same general procedure was followed by using 2-(*p*-tolyl)pyridine (34.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 4-methylbenzaldehyde (36 μL, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a colourless oil, (40.0 mg, 70%). ¹H NMR (600 MHz, CDCl₃): δ 8.37-8.38 (m, 1H), 7.68 (d, *J* = 8.4 Hz, 1H), 7.61 (d, *J* = 8.4 Hz, 2H), 7.53-7.55 (m, 1H), 7.46 (d, *J* = 7.8 Hz, 1H), 7.40 (d, *J* =

7.8 Hz, 1H), 7.32 (s, 1H), 7.07 (d, $J = 8.4$ Hz, 2H), 6.99-7.01 (m, 1H), 2.45 (s, 3H), 2.32 (s, 3H); ^{13}C NMR (150 MHz, CDCl_3): δ 198.2, 156.8, 149.0, 143.0, 139.6, 138.5, 136.7, 136.1, 135.3, 130.7, 129.7, 129.4, 128.72, 128.70, 122.6, 121.6, 21.6, 21.2; IR (neat): ν_{max} 2923, 1663, 1603, 1463, 1290, 757 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{20}\text{H}_{17}\text{NO}$ $[\text{M}]^+$: 287.1310; found: 287.1316.

Phenyl(2-(quinolin-2-yl)phenyl)methanone, 3ao, Scheme 4.¹⁶ The same general procedure was followed by using 2-phenylquinoline (41.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), benzaldehyde (32 μL , 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL , 0.6 mmol, 3.0 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (28.5 mg, 46%), mp 118-120 $^\circ\text{C}$. ^1H NMR (600 MHz, CDCl_3): δ 8.07 (d, $J = 8.4$ Hz, 1H), 7.94 (d, $J = 7.8$ Hz, 1H), 7.76-7.77 (m, 2H), 7.65-7.74 (m, 4H), 7.57-7.61 (m, 3H), 7.43 (d, $J = 7.2$ Hz, 1H), 7.31-7.33 (m, 1H), 7.23 (t, $J = 7.8$ Hz, 2H); ^{13}C NMR (150 MHz, CDCl_3): δ 198.2, 156.1, 147.3, 140.3, 139.4, 138.2, 136.6, 132.1, 130.1, 129.5, 129.2, 129.04, 128.99, 128.82, 128.80, 127.9, 127.2, 126.54, 126.46, 119.9; IR (neat): ν_{max} 1665, 1596, 1282, 931, 768 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{22}\text{H}_{15}\text{NONa}$ $[\text{M} + \text{Na}]^+$: 332.1051; found: 332.1050.

Furan-2-yl(2-(pyridin-2-yl)phenyl)methanone, 3aq, Scheme 4.¹⁷ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), furan-2-carbaldehyde (25 μL , 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL , 0.6 mmol, 3.0 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a colourless oil, (21.0 mg, 42%). ^1H NMR (600 MHz, CDCl_3): δ 8.49 (d, $J = 4.8$ Hz, 1H), 7.78 (d, $J = 7.8$ Hz, 1H), 7.61-7.66 (m, 3H), 7.52-7.54 (m, 2H), 7.43 (s, 1H), 7.10-7.12 (m, 1H), 6.82 (d, $J = 3.0$ Hz, 1H), 6.34-6.35 (m, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 185.4, 157.1, 152.8, 149.2, 146.5, 139.8, 138.3, 136.4,

130.6, 129.1, 129.0, 128.4, 122.7, 121.9, 119.3, 111.9; IR (neat): ν_{\max} 1656, 1566, 1465, 1301, 1019, 753 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{16}\text{H}_{11}\text{NO}_2\text{Na}$ $[\text{M} + \text{Na}]^+$: 272.0687; found: 272.0634.

3-Methyl-1-(2-(pyridin-2-yl)phenyl)butan-1-one, 3w, Scheme 4. The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), 3-methylbutanal (33 μL , 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL , 0.6 mmol, 3.0 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a colourless oil, (31.0 mg, 65%). The spectral data of compound **3w** is in Scheme 2.

Cyclohexyl(2-(pyridin-2-yl)phenyl)methanone, 3ar, Scheme 4.¹⁸ The same general procedure was followed by using 2-phenylpyridine (31.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), cyclohexanecarbaldehyde (36.5 μL , 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL , 0.6 mmol, 3.0 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (46.5 mg, 88%), mp 86-88 $^{\circ}\text{C}$. ^1H NMR (600 MHz, CDCl_3): δ 8.64 (d, $J = 4.2$ Hz, 1H), 7.76 (t, $J = 7.2$ Hz, 1H), 7.68 (d, $J = 7.8$ Hz, 1H), 7.60 (d, $J = 7.8$ Hz, 1H), 7.51 (t, $J = 7.8$ Hz, 1H), 7.44 (t, $J = 7.8$ Hz, 1H), 7.41 (d, $J = 7.2$ Hz, 1H), 7.23-7.25 (m, 1H), 2.18-2.23 (m, 1H), 1.73 (d, $J = 13.2$ Hz, 2H), 1.66-1.69 (m, 2H), 1.55 (d, $J = 13.2$ Hz, 1H), 1.35-1.42 (m, 2H), 1.10-1.17 (m, 1H), 0.94-1.02 (m, 2H); ^{13}C NMR (150 MHz, CDCl_3): δ 210.8, 157.2, 149.3, 141.3, 138.1, 136.8, 129.8, 128.7, 128.6, 128.1, 122.3, 122.3, 50.8, 29.1, 25.9, 25.8; IR (neat): ν_{\max} 2928, 1687, 1586, 1438, 976, 750 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{18}\text{H}_{19}\text{NONa}$ $[\text{M} + \text{Na}]^+$: 288.1364; found: 288.1361.

Benzo[h]quinolin-10-yl(phenyl)methanone, 3at, Scheme 4.⁹ The same general procedure was followed by using benzo[h]quinoline (36.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), benzaldehyde (32 μ L, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μ L, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (51.5 mg, 91%), mp 148-150 °C. ¹H NMR (600 MHz, CDCl₃): δ 8.51 (d, J = 4.2 Hz, 1.8 Hz, 1H), 8.04-8.07 (m, 2H), 7.88 (d, J = 8.4 Hz, 1H), 7.77-7.80 (m, 3H), 7.72 (d, J = 9.0 Hz, 1H), 7.65 (dd, J = 7.2 Hz, 1.2 Hz, 1H), 7.40-7.43 (m, 1H), 7.29-7.32 (m, 3H); ¹³C NMR (150 MHz, CDCl₃): δ 198.6, 147.0, 144.6, 139.2, 138.9, 135.3, 133.8, 131.7, 129.2, 129.0, 128.7, 128.1, 127.8, 127.7, 127.0, 126.4, 126.1, 121.6; IR (neat): ν_{max} 1672, 1417, 1272, 841, 708 cm⁻¹; HRMS (EI, m/z) calcd. for C₂₀H₁₃NO [M]⁺: 283.0997; found: 283.0993.

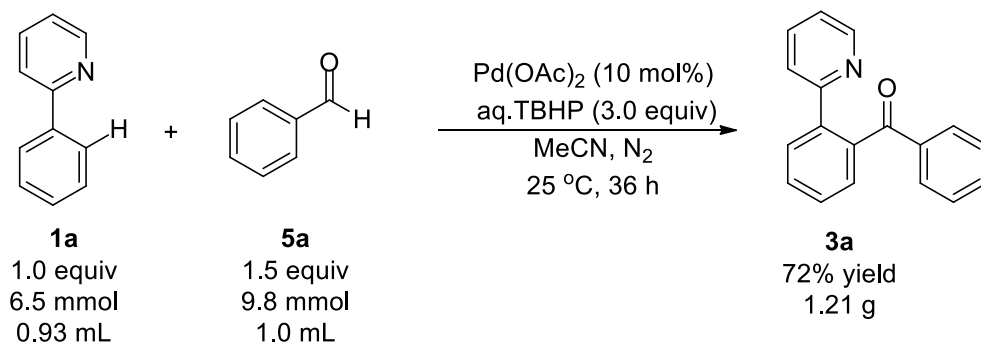
Phenyl(2-(pyrimidin-2-yl)phenyl)methanone, 3x, Scheme 4. The same general procedure was followed by using 2-phenylpyrimidine (31.5 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), benzaldehyde (32 μ L, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μ L, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (34.0 mg, 65%), mp 129-131 °C. The spectral data of compound **3x** is in Scheme 2.

Phenyl(2-(pyridin-2-yloxy)phenyl)methanone, 3au, Scheme 4.¹⁹ The same general procedure was followed except the reaction was run for 72 hours by using 2-phenoxy pyridine (34.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), benzaldehyde (32 μ L, 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μ L, 0.6 mmol, 3.0 equiv). Column chromatography (SiO₂, eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a colourless oil, (12.0 mg, 22%). ¹H NMR (600 MHz, CDCl₃): δ 8.00-8.02 (m, 1H),

7.76 (d, $J = 8.4$ Hz, 2H), 7.56-7.59 (m, 2H), 7.46-7.52 (m, 2H), 7.30-7.34 (m, 3H), 7.27 (d, $J = 8.4$ Hz, 1H), 6.86-6.88 (m, 1H), 6.60 (d, $J = 8.4$ Hz, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 195.3, 163.0, 151.6, 147.0, 139.3, 137.5, 132.8, 132.22, 132.15, 130.3, 129.8, 128.0, 124.7, 122.8, 118.5, 111.5, IR (neat): ν_{max} 1666, 1590, 1432, 1250, 766 cm^{-1} ; HRMS (ESI, m/z) calcd. for $\text{C}_{18}\text{H}_{13}\text{NO}_2\text{Na}$ $[\text{M} + \text{Na}]^+$: 298.0844; found: 298.0861.

(2-(1*H*-Pyrazol-1-yl)phenyl)(phenyl)methanone, 3av, Scheme 4.¹⁹ The same general procedure was followed by using 1-phenyl-1*H*-pyrazole (29.0 mg, 0.2 mmol, 1.0 equiv), palladium(II) acetate (4.5 mg, 0.02 mmol, 0.1 equiv), benzaldehyde (32 μL , 0.3 mmol, 1.5 equiv), and aq. *tert*-butyl hydroperoxide (82 μL , 0.6 mmol, 3.0 equiv). Column chromatography (SiO_2 , eluting with 7:3 hexane/ethyl acetate) afforded the desired product as a white solid, (16.0 mg, 32%), mp 82-84 $^\circ\text{C}$. ^1H NMR (600 MHz, CDCl_3): δ 7.58-7.66 (m, 6H), 7.50 (td, $J = 7.2$ Hz, 1.2 Hz, 1H), 7.43-7.46 (m, 1H), 7.41 (d, $J = 1.8$ Hz, 1H), 7.30 (t, $J = 8.4$ Hz, 2H), 6.19 (t, $J = 1.8$ Hz, 1H); ^{13}C NMR (150 MHz, CDCl_3): δ 195.8, 141.2, 138.6, 136.7, 133.8, 132.9, 131.2, 129.8, 129.6, 129.0, 128.1, 127.5, 123.2, 107.6; IR (neat): ν_{max} 1669, 1590, 1264, 931, 762 cm^{-1} ; HRMS (EI, m/z) calcd. for $\text{C}_{16}\text{H}_{12}\text{N}_2\text{O}$ $[\text{M}]^+$: 248.0950; found: 248.0947.

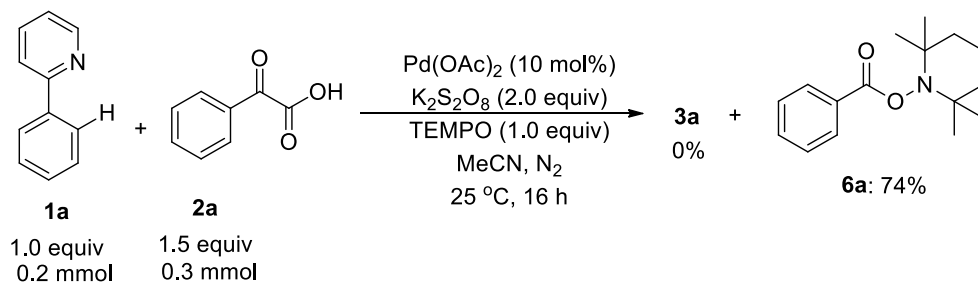
Dehydrogenative acylation reaction in gram scale (Synthesis of phenyl(2-(pyridin-2-yl)phenyl)methanone, 3a, Scheme 4).



To an oven-dried 100 mL sealed tube, a mixture of 2-phenylpyridines (0.93 mL, 6.5 mmol, 1.0 equiv) and palladium(II)acetate (146 mg, 0.65 mmol, 0.1 equiv) was taken and dry MeCN (50 mL) was added to it. Then benzaldehyde (1.0 mL, 9.8 mmol 1.5 equiv) was added to the reaction mixture. After few seconds flushing with nitrogen, immediately 70% aq. TBHP (2.6 mL, 19.5 mmol, 3.0 equiv) was added to the reaction mixture via syringe. The vessel was sealed with a screw cap. The reaction mixture was allowed to stir for 36 h at room temperature. After completion (as indicated by TLC), the reaction mixture was quenched with NaHCO₃. Then the reaction mixture was poured into water (80 mL) and extracted with ethyl acetate (60x2 mL). The organic layer was washed with water (30x2 mL) and brine (30 mL), dried over anhydrous Na₂SO₄ and the solvent was evaporated under reduced pressure. The pure phenyl(2-(pyridin-2-yl)phenyl)methanone (**3a**) was obtained as a white solid in 72% (1.21 g) yield after column chromatography of the crude reaction mixture using ethyl acetate/hexane (7:3) as eluent.

Control experiments, Scheme 5.

The standard decarboxylative acylation reaction with radical scavenger (2,2,6,6-Tetramethylpiperidin-1-yl)oxyl (TEMPO), Scheme 5a.



To an oven-dried 10 mL sealed tube, a mixture of 2-phenylpyridine (31.5 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-phenylacetic acid (45 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv), palladium(II)acetate (4.6 mg, 0.02 mmol, 0.1 equiv) and (2,2,6,6-

Tetramethylpiperidin-1-yl)oxyl (TEMPO) (31.5 mg, 0.2 mmol, 1.0 equiv) was taken and dry MeCN (3.0 mL) was added to it. After few seconds flushing with nitrogen, the vessel was sealed with a screw cap. The reaction mixture was allowed to stir for 16 h at room temperature. After that the reaction mixture was quenched with NaHCO₃. We did not detect any desired acylation product (**3a**) by TLC. However, we isolated TEMPO-acyl adduct, 2,2,6,6-tetramethylpiperidin-1-yl benzoate (**6a**) in 74% yield as a white solid from the reaction mixture.

This control experiment suggested that the reaction may proceed via radical pathway and the acyl radical intermediate may form from the corresponding 2-oxo-2-phenylacetic acids.

2,2,6,6-Tetramethylpiperidin-1-yl benzoate 6a, Scheme 5a.²⁰ Column chromatography (SiO₂, eluting with 95:5 hexane/ethyl acetate) afforded the desired product as a white solid, (39.0 mg, 74%), mp 85-87 °C. ¹H NMR (600 MHz, CDCl₃): δ 8.08-8.10 (m, 2H), 7.59 (t, *J* = 7.2 Hz, 1H), 7.47 (t, *J* = 7.8 Hz, 2H), 1.77-1.82 (m, 2H), 1.67-1.74 (m, 1H), 1.59-1.62 (m, 2H), 1.46-1.49 (m, 1H), 1.29 (s, 6H), 1.13 (s, 6H); ¹³C NMR (150 MHz, CDCl₃): δ 166.4, 132.8, 129.7, 129.5, 128.4, 60.4, 39.0, 31.9, 20.8, 17.0; IR (neat): ν_{max} 2932, 1742, 1452, 1248, 1067, 712 cm⁻¹; HRMS (ESI, *m/z*) calcd. for C₁₆H₂₃NO₂Na [M + Na]⁺: 284.1626; found: 284.1628.

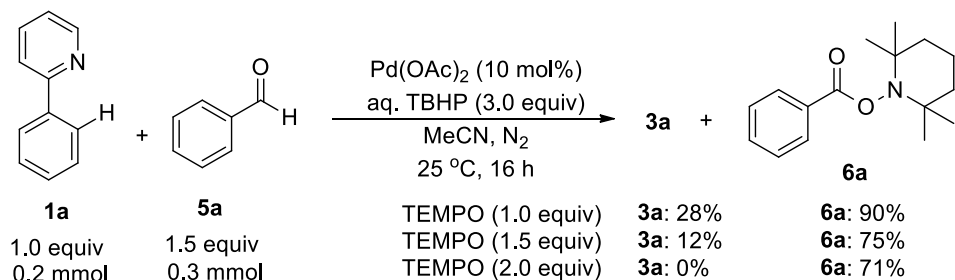
The standard decarbonylative acylation reaction with radical scavenger (2,2,6,6-Tetramethylpiperidin-1-yl)oxyl (TEMPO), Scheme 5a.



To an oven-dried 10 mL sealed tube, a mixture of 2-phenylpyridine (31.5 mg, 0.2 mmol, 1.0 equiv), 2-oxo-2-phenylacetaldehyde (40 mg, 0.3 mmol, 1.5 equiv), potassium persulfate (108 mg, 0.4 mmol, 2.0 equiv), palladium(II)acetate (4.6 mg, 0.02 mmol, 0.1 equiv) and (2,2,6,6-Tetramethylpiperidin-1-yl)oxyl (TEMPO) (31.5 mg, 0.2 mmol, 1.0 equiv) was taken and dry MeCN (3.0 mL) was added to it. After few seconds flushing with nitrogen, the vessel was sealed with a screw cap. The reaction mixture was allowed to stir for 16 h at room temperature. After that the reaction mixture was quenched with NaHCO₃. We did not detect any desired acylation product (**3a**) as indicated by TLC. But we isolated TEMPO-acyl adduct, 2,2,6,6-tetramethylpiperidin-1-yl benzoate (**6a**) in 56% as a white solid from the reaction mixture.

This control experiment suggested that the reaction may proceed via radical pathway and the acyl radical intermediate may form from the corresponding arylglyoxals.

The standard dedrogenative acylation reaction with radical scavenger (2,2,6,6-Tetramethylpiperidin-1-yl)oxyl (TEMPO), Scheme 5a.

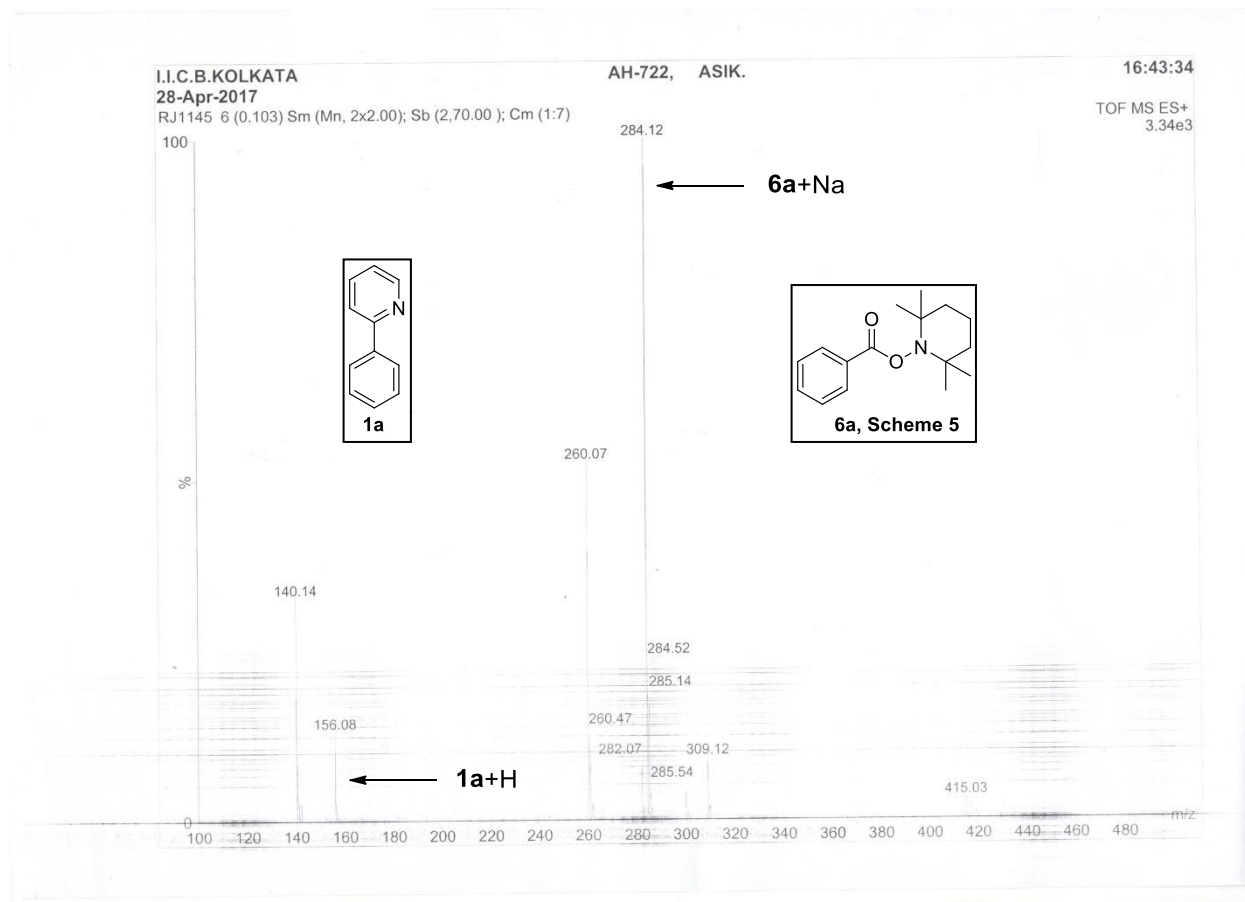


To an oven-dried 7 mL clear vial, a mixture of 2-phenylpyridine (31.5 mg, 0.2 mmol, 1.0 equiv) and palladium(II)acetate (4.6 mg, 0.02 mmol, 0.1 equiv) was taken and dry MeCN (3.0 mL) was added to it. Then benzaldehyde (32.0 μL, 0.3 mmol 1.5 equiv) and (2,2,6,6-Tetramethylpiperidin-1-yl)oxyl (TEMPO) (63.0 mg, 0.4 mmol, 2.0 equiv) was added to the reaction mixture. After flushing with nitrogen, immediately the vessel was sealed with a screw cap. Then aq. TBHP (82 μL, 0.6 mmol, 3.0 equiv) was added to the reaction mixture via micro-

litter syringe. The reaction mixture was allowed to stir for 36 h at room temperature. After that the reaction mixture was quenched with NaHCO_3 . We did not detect any desired acylation product (**3a**) as indicated by TLC. But we isolated TEMPO-acyl adduct, 2,2,6,6-tetramethylpiperidin-1-yl benzoate (**6a**) in 71% as a white solid from the reaction mixture.

When the same experiment was performed with 1.0 equiv of 2,2,6,6-Tetramethylpiperidin-1-yl)oxyl (TEMPO) (31.5 mg, 0.2 mmol), we isolated the desired acylation product (**3a**) in 28% yield and also TEMPO-acyl adduct, 2,2,6,6-tetramethylpiperidin-1-yl benzoate (**6a**) in 90% as a white solid from the reaction mixture. In addition, when the same experiment was performed with 1.5 equiv of (2,2,6,6-tetramethylpiperidin-1-yl)oxyl (TEMPO) (47.0 mg, 0.3 mmol), we isolated the desired acylation product (**3a**) in 12% yield and also TEMPO-acyl adduct, 2,2,6,6-tetramethylpiperidin-1-yl benzoate (**6a**) in 75% as a white solid from the reaction mixture. This control experiment suggested that the reaction may proceed via radical pathway and the acyl radical intermediate may form from the corresponding aldehydes.

ESI mass of the crude reaction mixture for TEMPO experiment



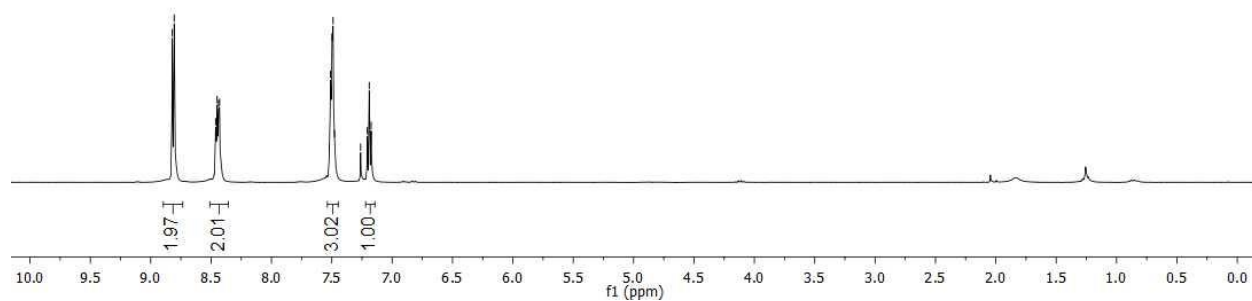
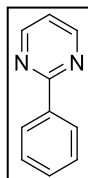
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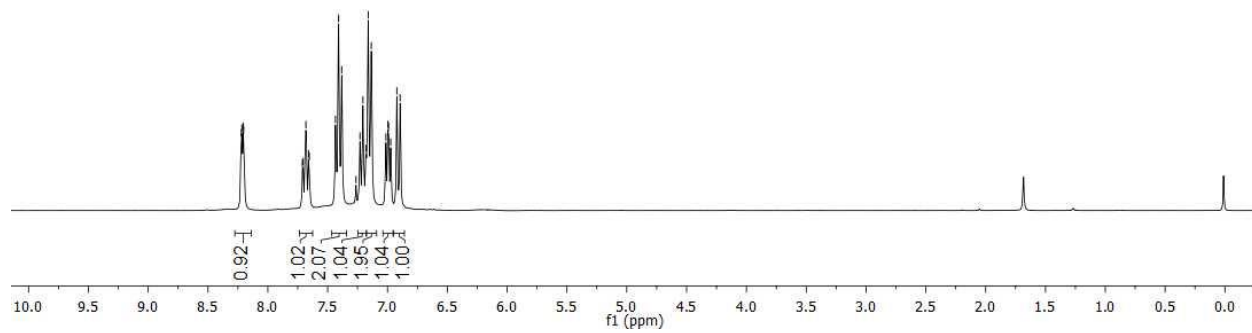
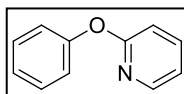
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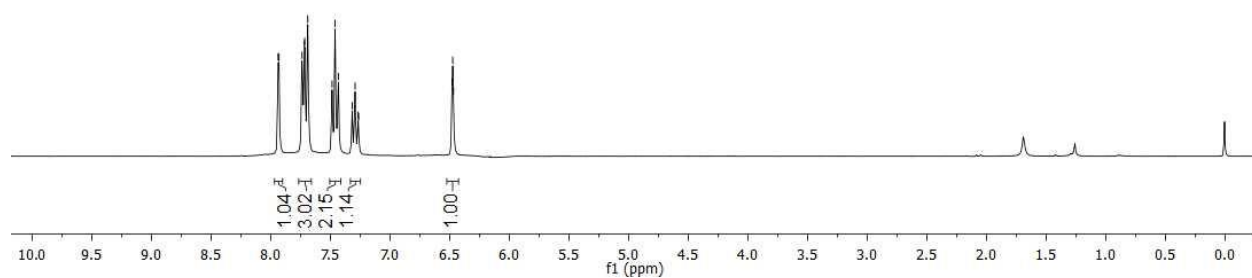
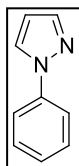
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8.206
8.202
7.711
7.705
7.682
7.660
7.654
7.435
7.409
7.382
7.263
7.230
7.205
7.180
7.161
7.135
7.013
6.996
6.991
6.973
6.922
6.894



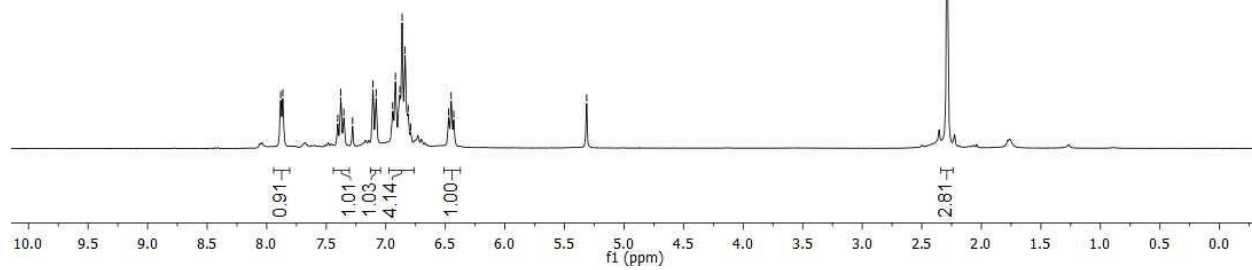
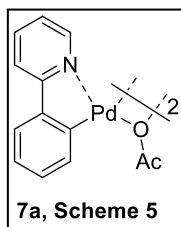
AH-654-1H/1

7.839
7.932
7.738
7.719
7.716
7.690
7.486
7.461
7.434
7.317
7.293
7.268
7.264
6.481
6.475
6.469



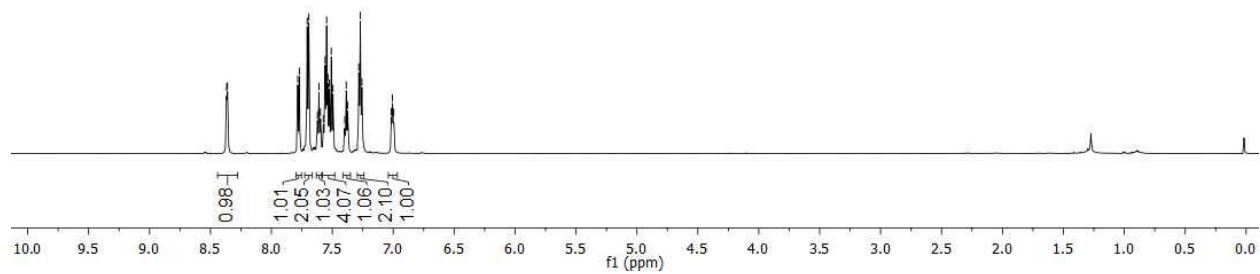
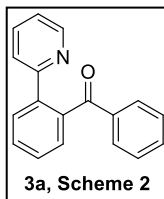
AH-677-1H/1

7.883
7.865
7.404
7.378
7.352
7.279
7.108
7.081
6.943
6.919
6.882
6.862
6.838
6.812
6.791
6.472
6.451
6.429
5.314
-2.286



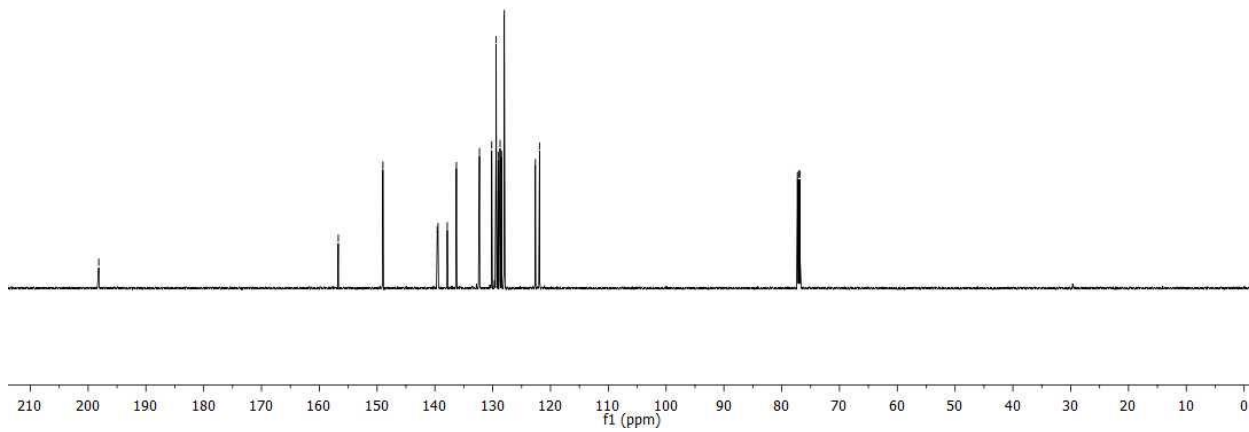
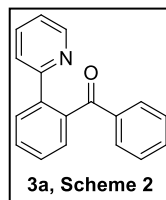
acylation NMR/AH-607 P
AH-607 1H-NMR in CDCl₃

8.367
8.360
7.784
7.771
7.706
7.693
7.622
7.610
7.598
7.574
7.559
7.547
7.536
7.524
7.508
7.495
7.398
7.386
7.373
7.282
7.270
7.257
7.015
7.007
6.996



acylation NMR/AH-607 C
AH-607 13C-NMR in CDCl₃

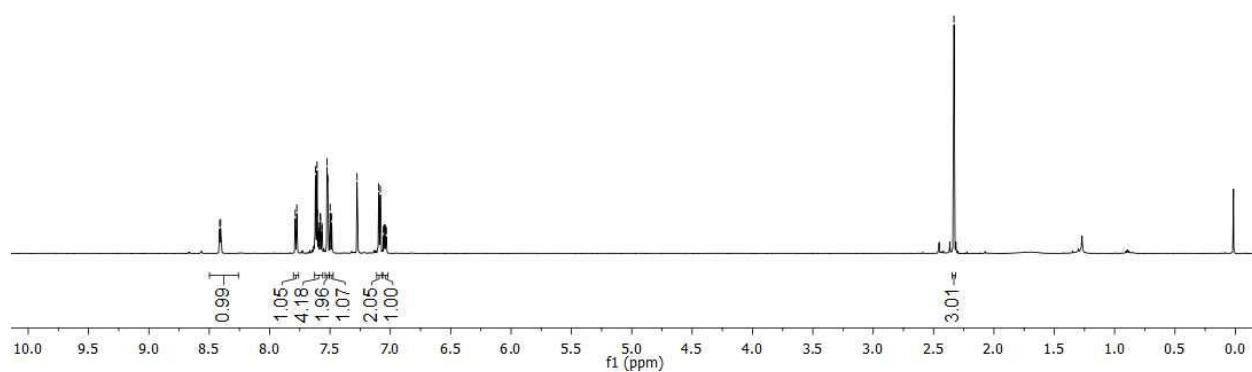
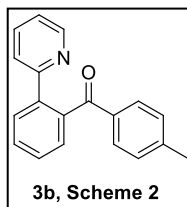
198.0
156.72
148.99
139.60
139.46
137.86
136.28
132.29
130.17
129.41
129.06
128.72
128.47
128.00
122.62
121.90
77.28
77.07
76.85



acylation NMR/AH-595 P
AH-595 1H-NMR in CDCl₃

8.413
8.406
7.787
7.775
7.620
7.616
7.607
7.603
7.595
7.590
7.581
7.578
7.568
7.565
7.525
7.518
7.499
7.485
7.276
7.096
7.083
7.056
7.055
7.048
7.047
7.044
7.042
7.036
7.034

-2.331



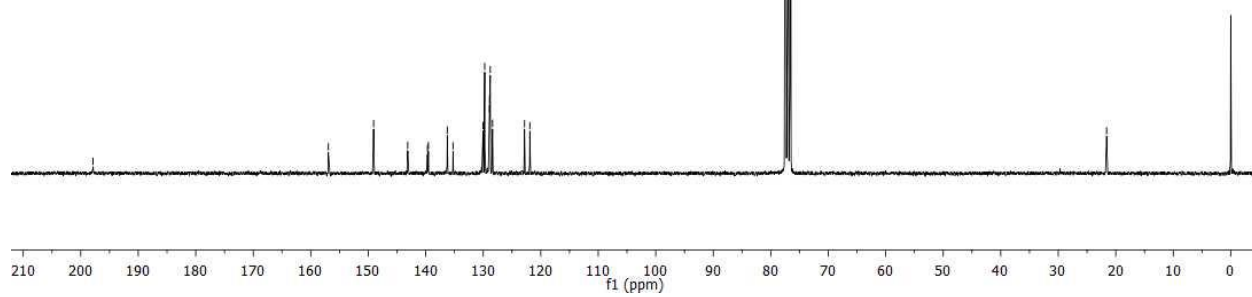
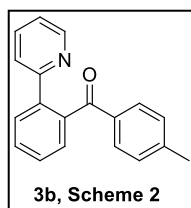
AH-595-C/7

-197.87

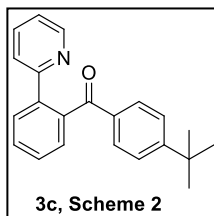
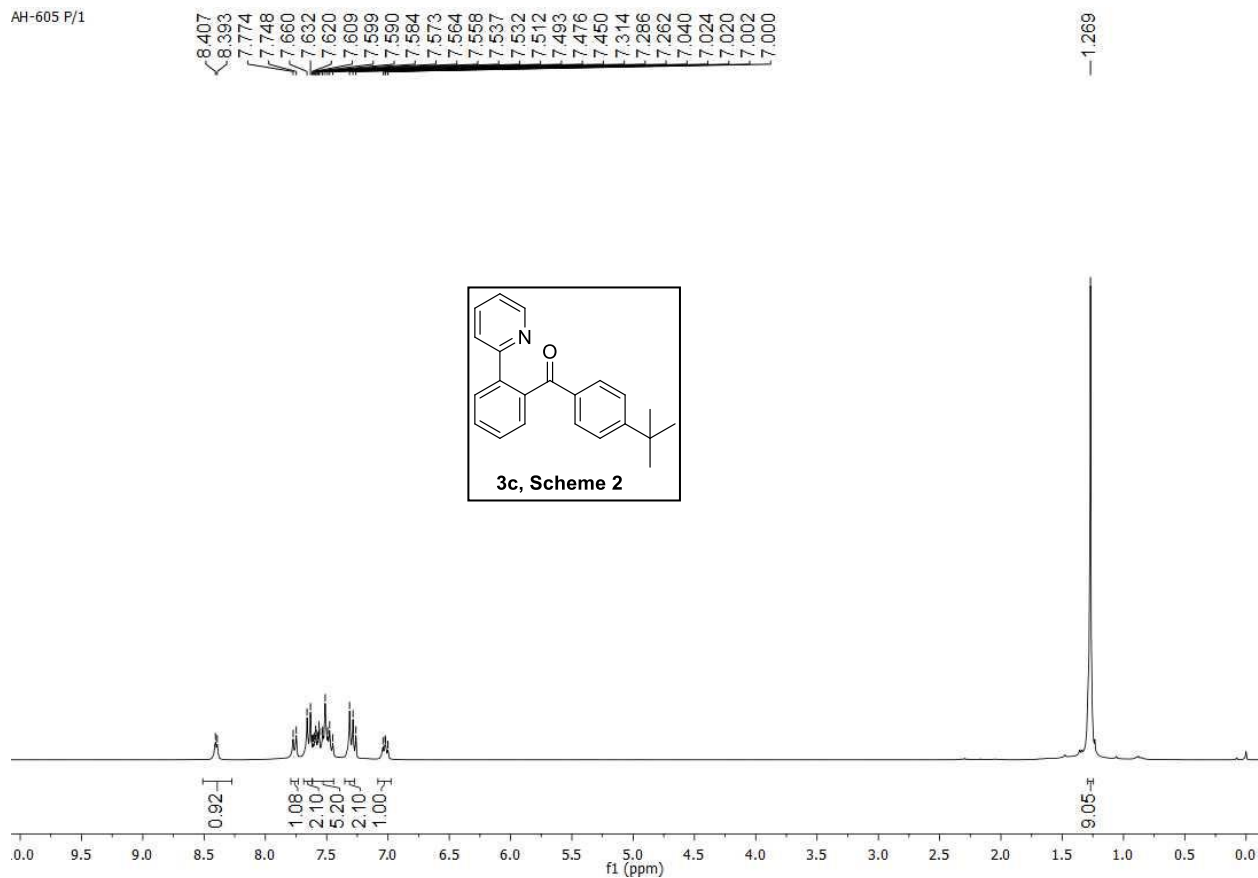
156.94
149.07
143.14
139.69
139.54
136.25
135.26
130.03
129.74
128.92
128.90
128.79
128.39
122.82
121.91

77.44
77.02
76.59

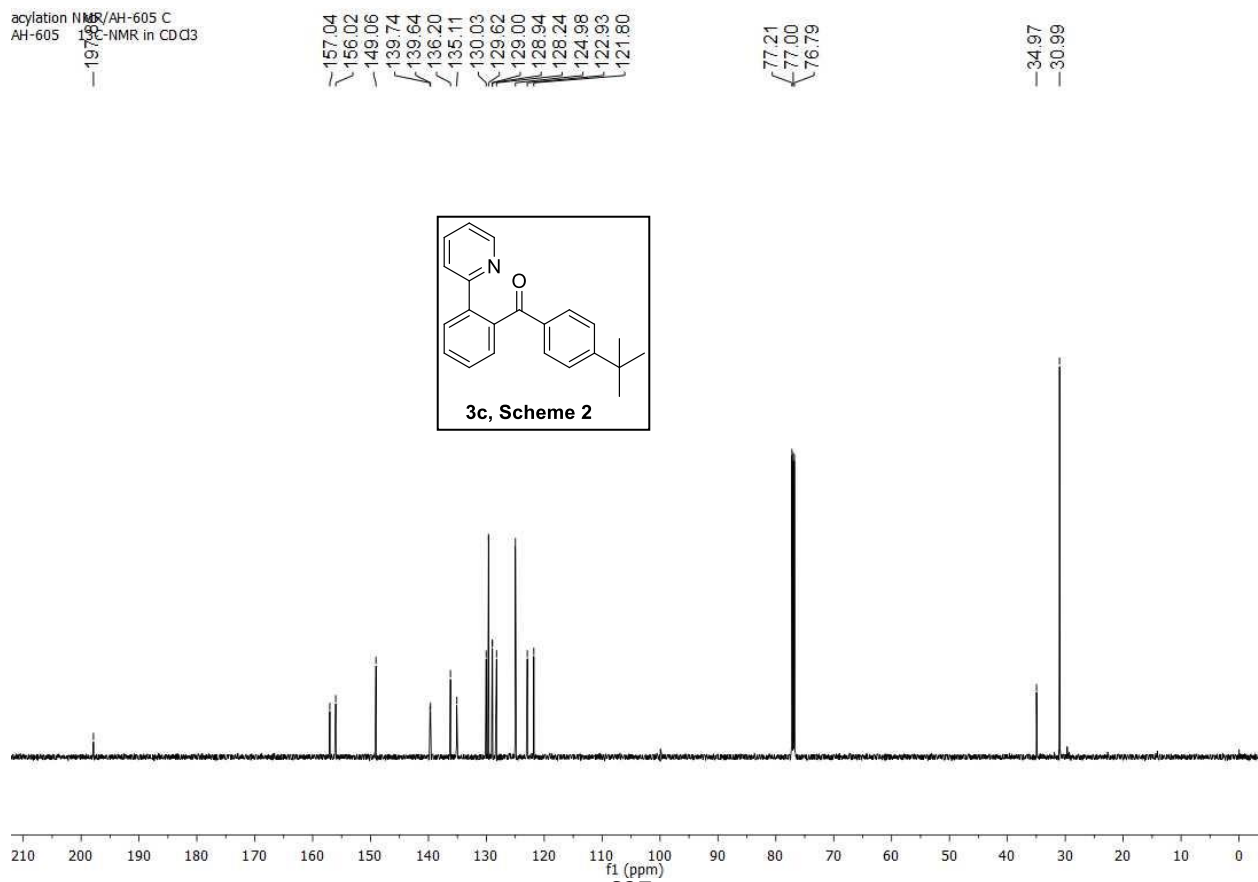
-21.59



AH-605 P/1



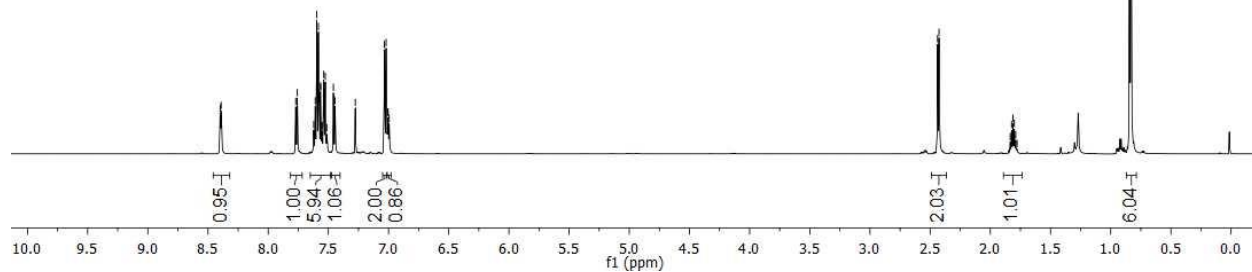
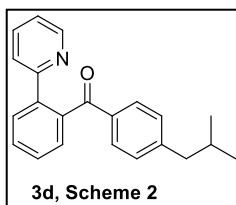
acylation NMR/AH-605 C
AH-605 ¹³C-NMR in CDCl₃



acylation NMR/AH-623 P
AH-623 1H-NMR in CDCl₃

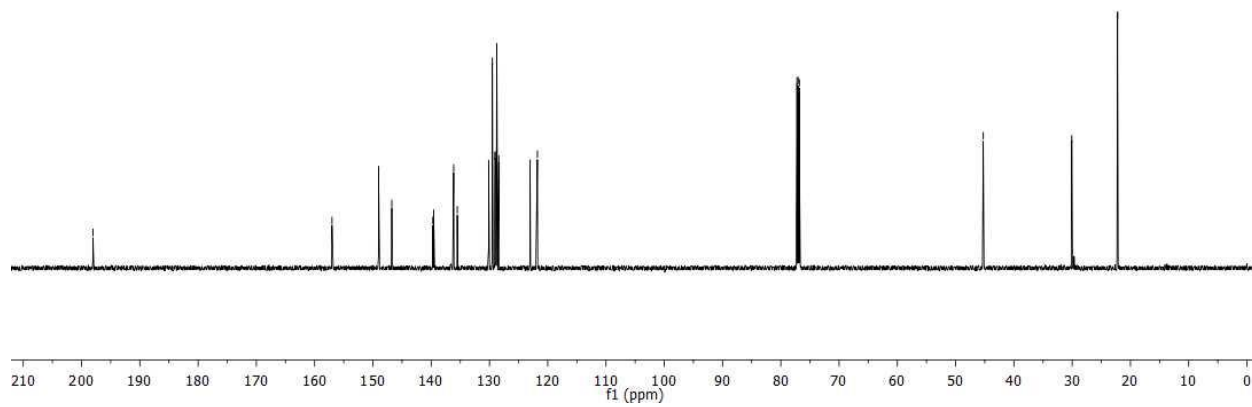
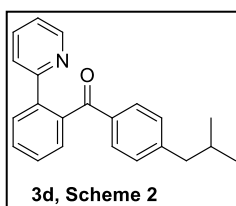
8.398
8.391
7.771
7.758
7.622
7.609
7.597
7.583
7.579
7.577
7.565
7.564
7.554
7.552
7.539
7.526
7.513
7.458
7.445
7.276
7.034
7.020
7.007
7.003
6.995

2.438
2.426
1.835
1.823
1.812
1.801
1.790
1.778
0.843
0.832



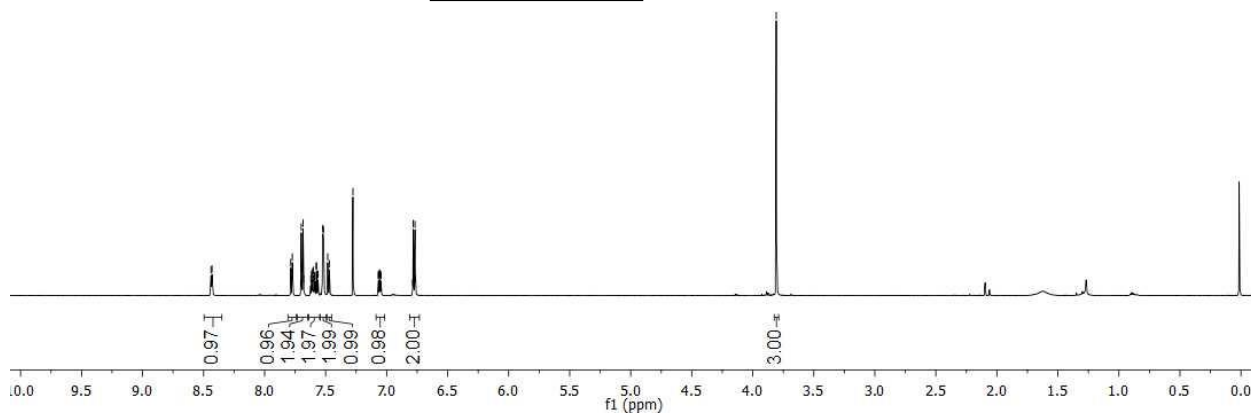
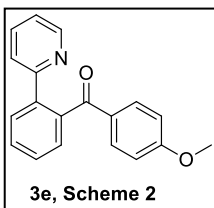
acylation NMR/AH-623 C
AH-623 13C-NMR in CDCl₃

198.05
157.02
149.02
146.76
139.72
139.57
136.14
135.52
130.13
129.50
129.08
128.89
128.74
128.40
123.02
121.77
77.23
77.02
76.81
45.26
30.07
22.21



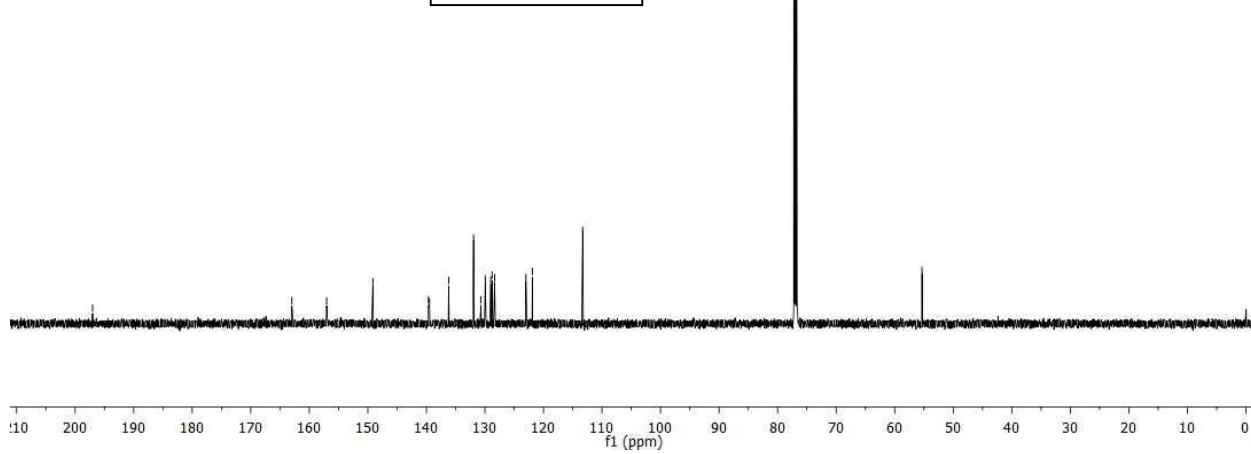
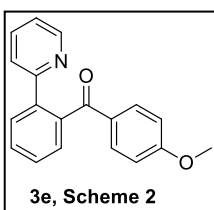
acylation NMR/AH-594 P
AH-594 1H-NMR in CDCl₃

8.439
8.431
7.786
7.773
7.704
7.699
7.686
7.688
7.684
7.680
7.621
7.614
7.614
7.607
7.601
7.594
7.590
7.587
7.577
7.575
7.565
7.562
7.524
7.517
7.483
7.470
7.276
7.068
7.067
7.060
7.059
7.056
7.054
7.048
7.046
6.787
6.783
6.779
6.771
6.768
6.763
3.808



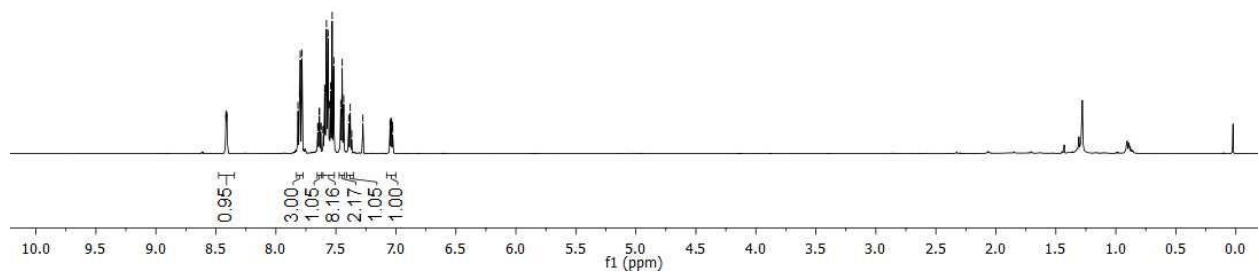
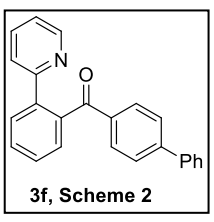
acylation NMR/AH-594 C
AH-594 13C-NMR in CDCl₃

19.732
162.98
157.04
149.14
139.65
139.46
136.18
131.93
130.70
129.94
129.00
128.77
128.34
122.99
121.90
113.29
77.19
76.98
76.77
55.34



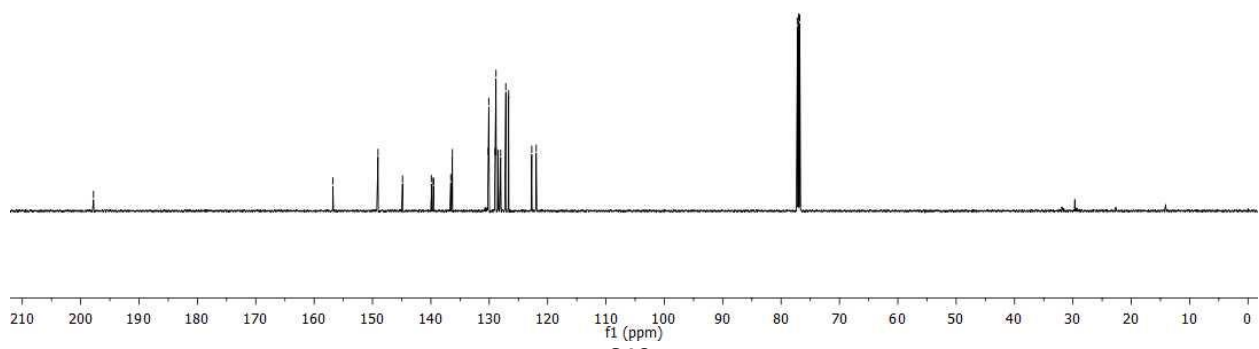
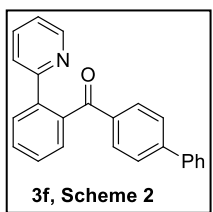
acylation NMR/AH-661 F
AH-661 1H-NMR in

8.417
8.416
8.415
8.409
8.408
7.816
7.803
7.797
7.783
7.651
7.649
7.639
7.637
7.626
7.624
7.607
7.604
7.594
7.591
7.579
7.565
7.554
7.544
7.531
7.517
7.460
7.448
7.435
7.393
7.381
7.368
7.275
7.049
7.047
7.041
7.039
7.036
7.035
7.028
7.027



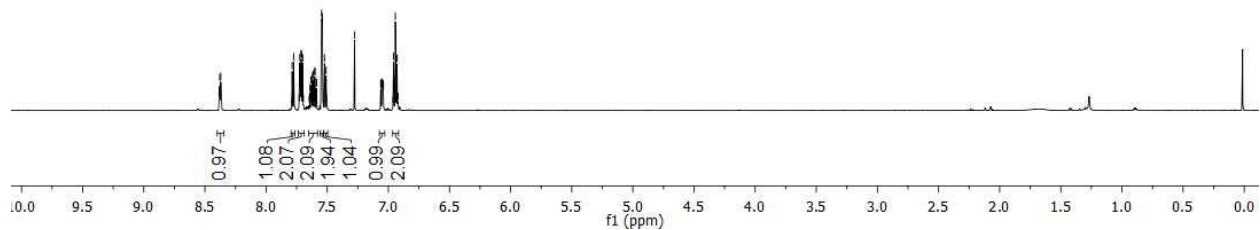
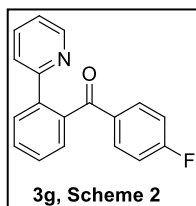
acylation NMR/AH-661 C
AH-661 13C-NMR in CDCl3

197.99
156.79
149.06
144.86
139.92
139.60
139.52
136.59
136.31
130.17
130.08
129.01
128.84
128.82
128.48
128.04
127.16
126.68
122.72
121.96
77.23
77.01
76.80



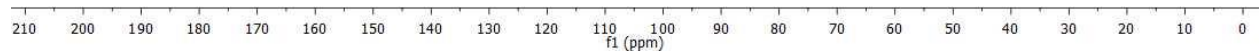
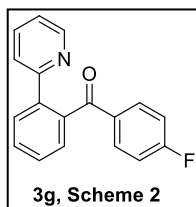
acylation NMR/AH-597 P
AH-597 1H-NMR in CDCl₃

8.379
7.787
7.774
7.729
7.724
7.720
7.715
7.709
7.703
7.700
7.695
7.647
7.641
7.634
7.626
7.621
7.615
7.613
7.607
7.602
7.599
7.590
7.587
7.546
7.539
7.522
7.509
7.276
7.062
7.061
7.054
7.053
7.050
7.048
7.042
7.040
6.962
6.957
6.954
6.943
6.932
6.928
6.924
6.921

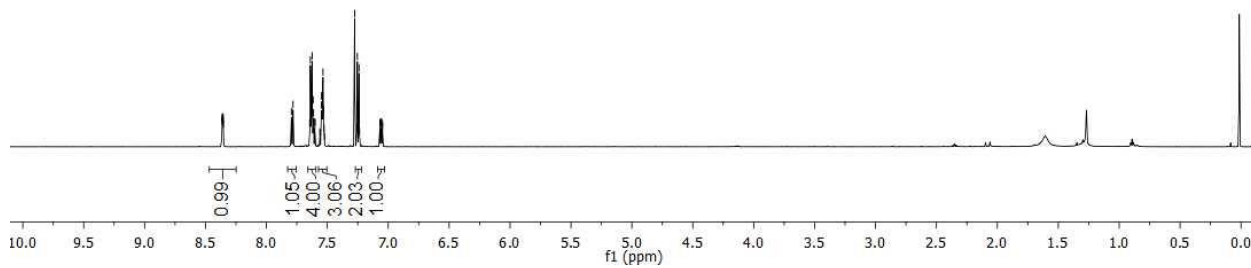
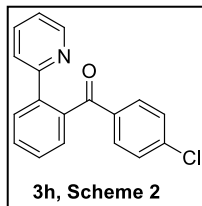


acylation NMR/AH-597 C
AH-597 13C-NMR in CDCl₃

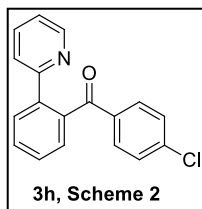
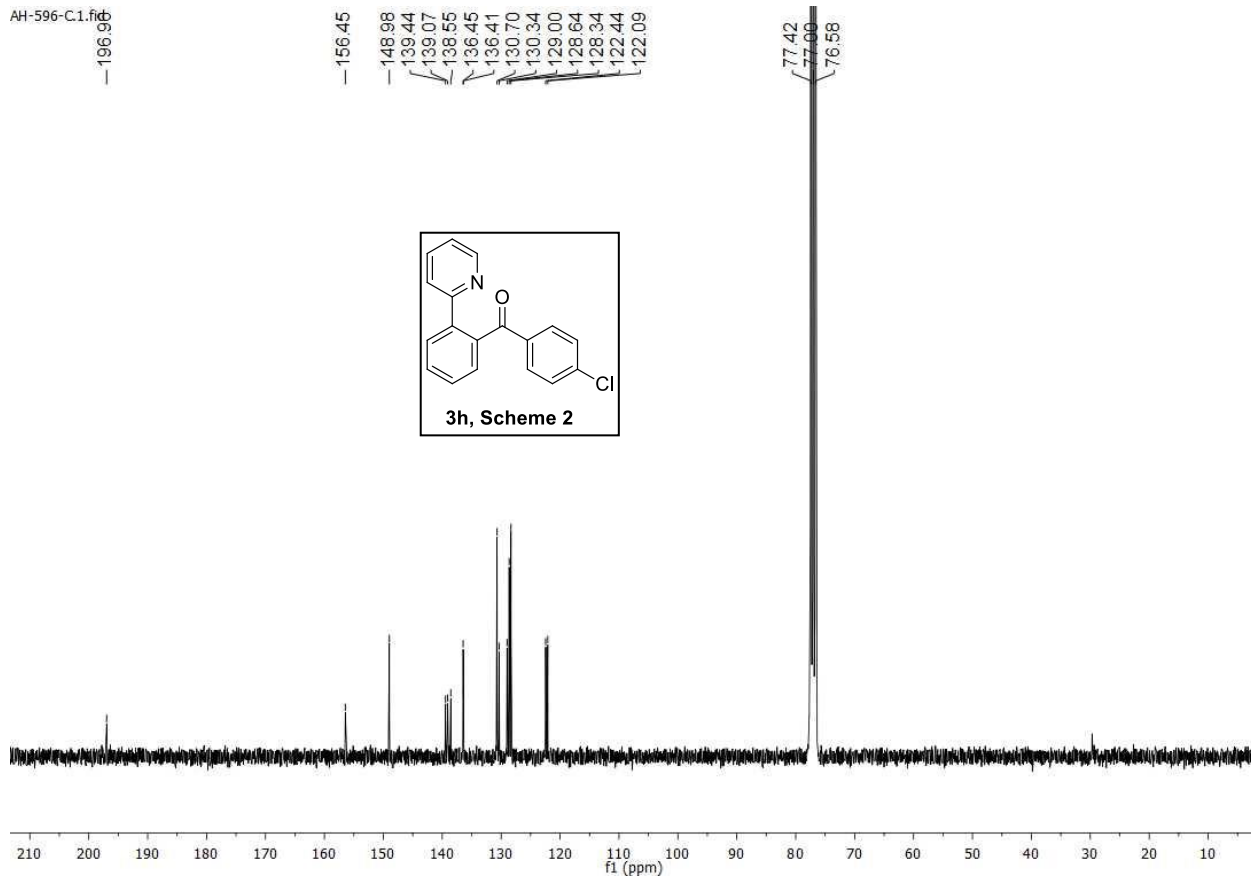
196.67
165.94
164.26
156.59
149.00
139.45
139.16
136.38
134.31
134.29
131.95
131.89
130.28
128.95
128.73
128.58
122.60
122.02
115.18
77.20
77.16
76.99
76.78



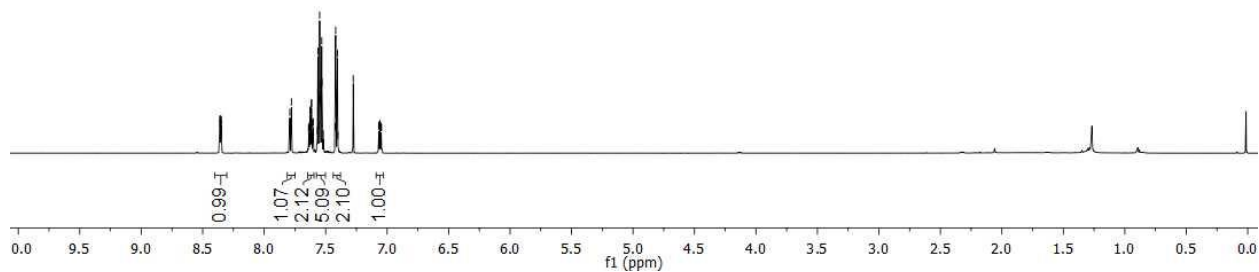
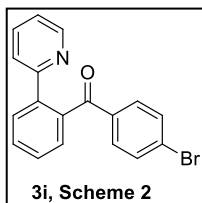
acylation NMR/AH-596
 AH-596 1H-NMR
 8.366
 8.365
 8.358
 8.356
 8.354
 8.353
 7.795
 7.782
 7.644
 7.639
 7.635
 7.634
 7.629
 7.627
 7.625
 7.621
 7.617
 7.613
 7.603
 7.600
 7.561
 7.559
 7.548
 7.546
 7.544
 7.538
 7.536
 7.531
 7.527
 7.523
 7.276
 7.257
 7.254
 7.250
 7.242
 7.240
 7.236
 7.068
 7.067
 7.060
 7.059
 7.056
 7.054
 7.048
 7.046



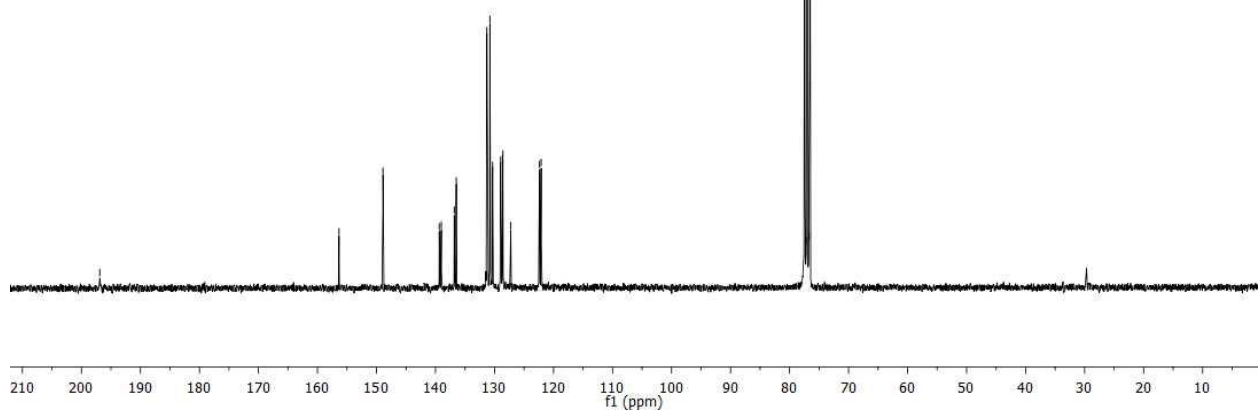
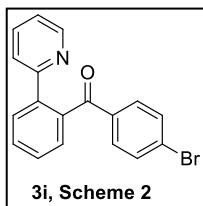
AH-596-C1.fid



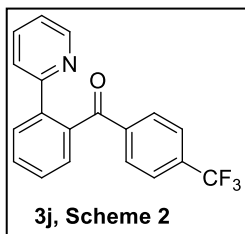
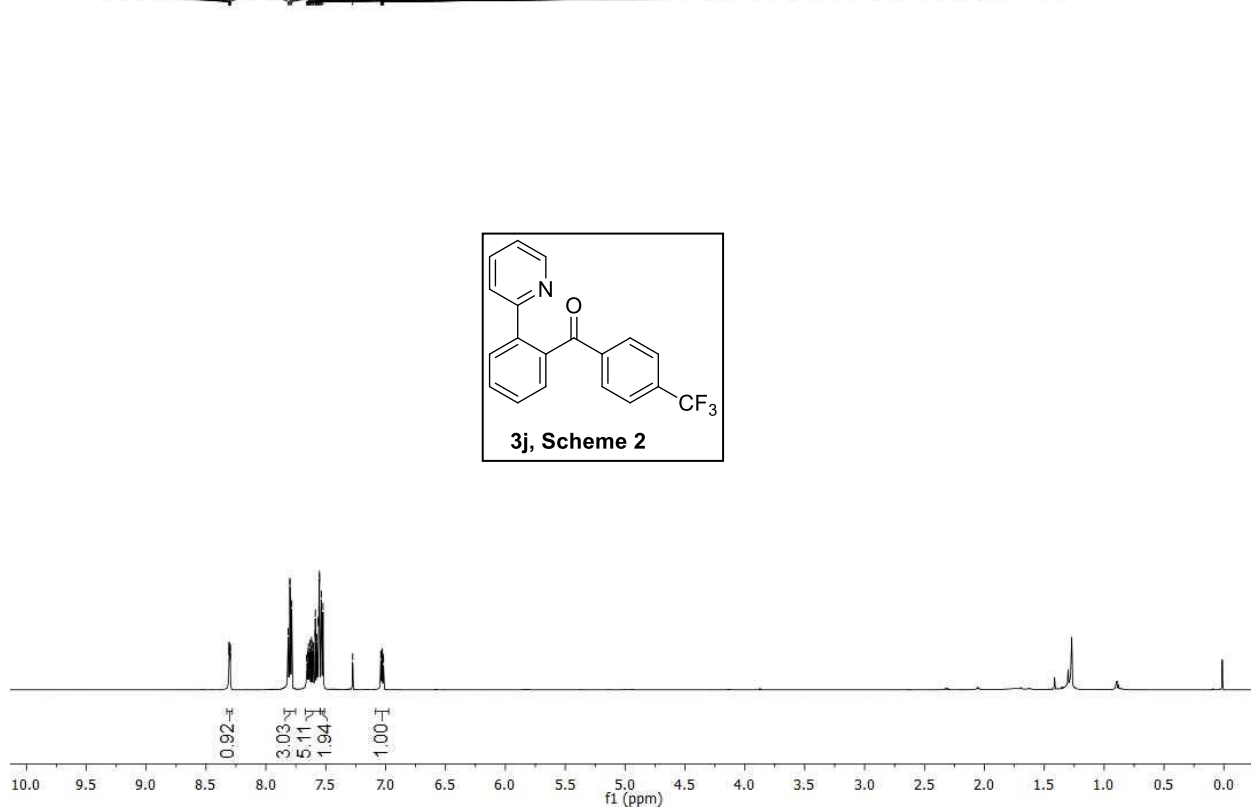
acylation NMR/AH-598
 AH-598
 8.363
 8.354
 8.351
 8.349
 8.350
 8.349
 7.791
 7.778
 7.639
 7.636
 7.630
 7.628
 7.625
 7.623
 7.617
 7.615
 7.615
 7.612
 7.605
 7.602
 7.567
 7.563
 7.560
 7.552
 7.549
 7.546
 7.545
 7.543
 7.541
 7.532
 7.530
 7.519
 7.516
 7.422
 7.419
 7.415
 7.407
 7.404
 7.400
 7.276
 7.069
 7.067
 7.061
 7.059
 7.056
 7.055
 7.048
 7.047



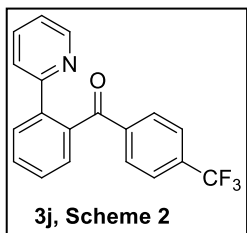
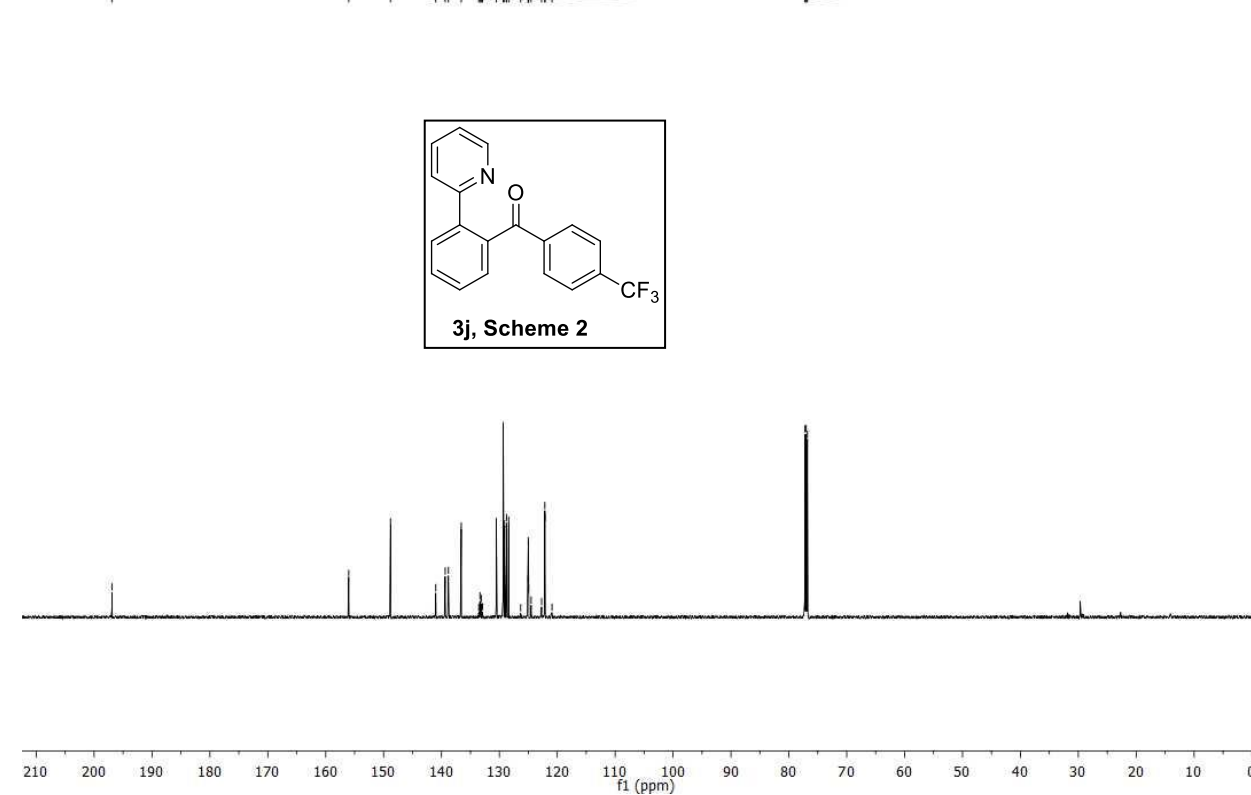
AH-598-C1
 196.88
 156.35
 148.90
 139.36
 139.01
 136.82
 136.48
 131.30
 130.78
 130.32
 128.96
 128.64
 128.58
 127.25
 122.38
 122.10
 77.42
 77.20
 77.00
 76.68
 76.58



acylation NMR
 AH-659 1H-NMR in CDCl₃

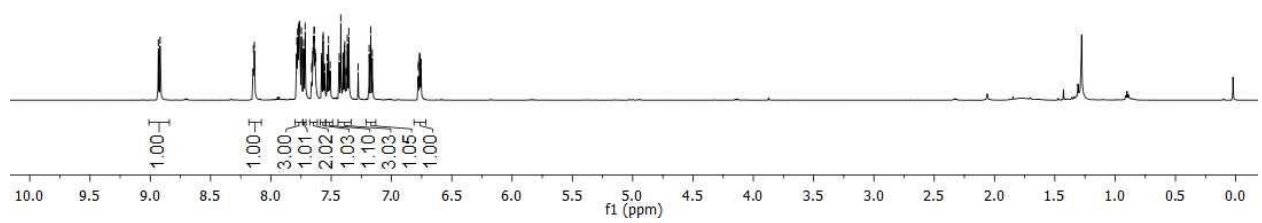
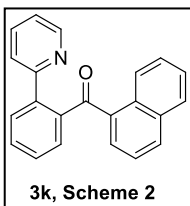


acylation NMR
 AH-659 C
 AH-659 13C-NMR in CDCl₃



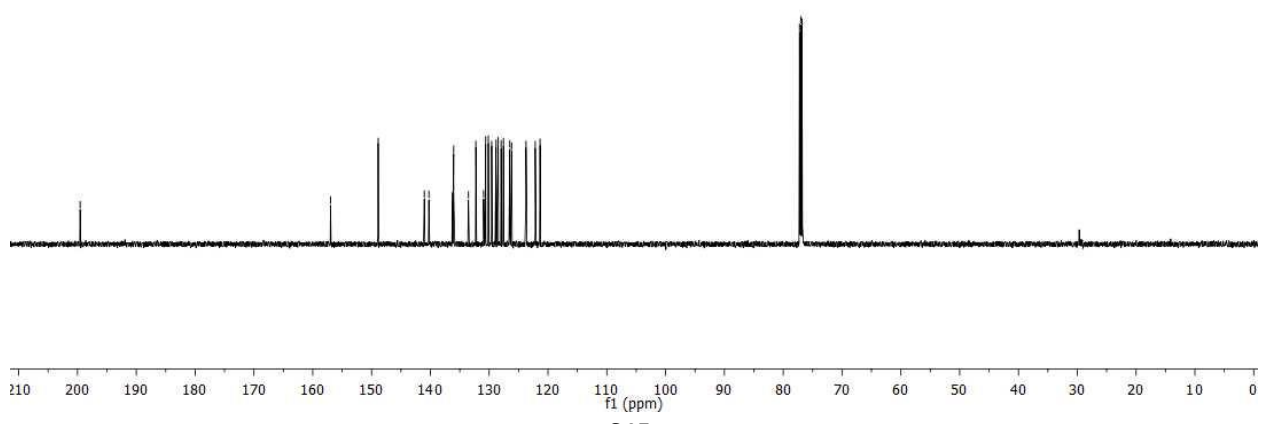
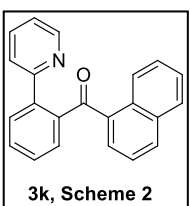
acylation NMR/AH-635
AH-635 1H-NMR in CDCl₃

8.145
8.137
7.785
7.778
7.771
7.765
7.761
7.760
7.747
7.729
7.716
7.660
7.655
7.652
7.650
7.648
7.642
7.640
7.636
7.634
7.629
7.627
7.581
7.579
7.568
7.567
7.554
7.534
7.522
7.509
7.434
7.421
7.403
7.400
7.390
7.388
7.366
7.354
7.276
7.185
7.172
7.160
6.777
6.776
6.768
6.766
6.764
6.757
6.756

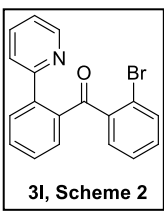
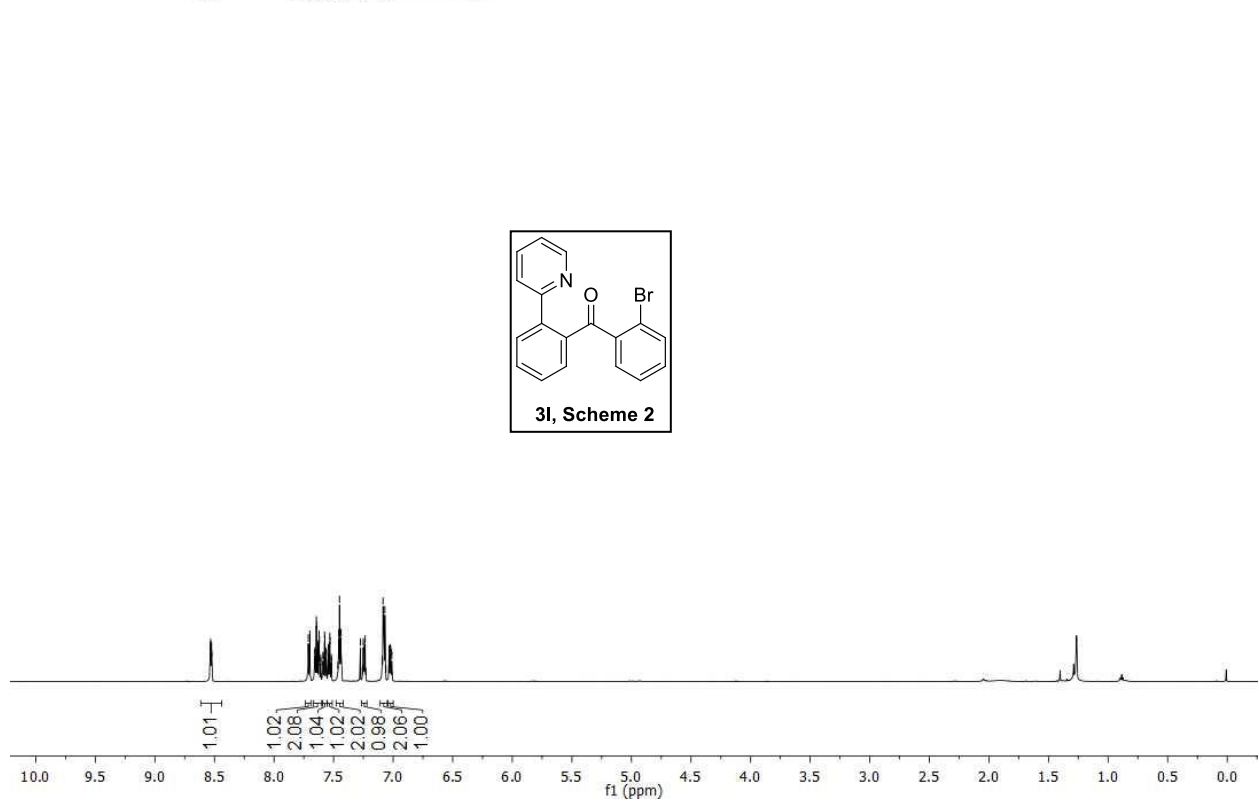


acylation NMR/AH-635 C
AH-635 13C-NMR in CDCl₃

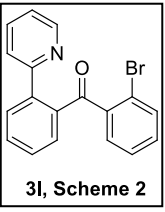
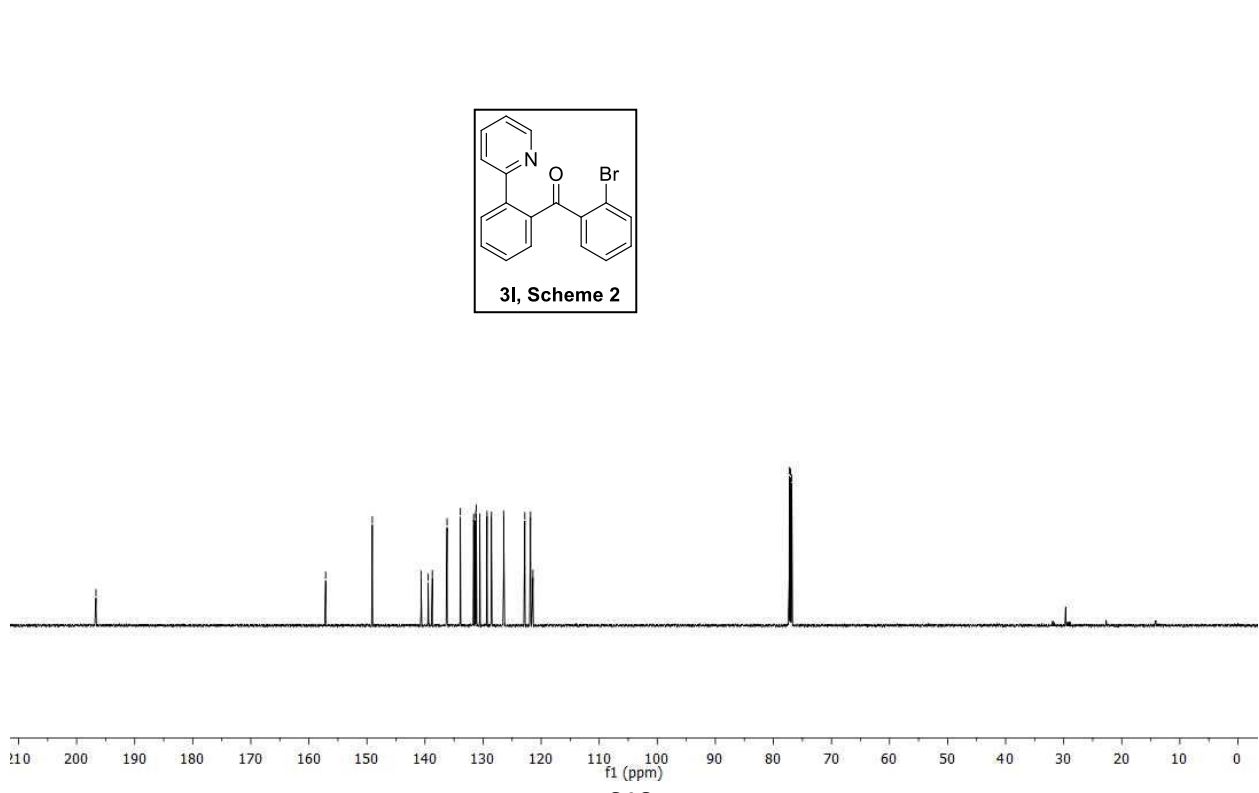
199.50
156.97
148.87
141.03
140.25
136.26
136.04
133.52
132.26
130.95
130.59
130.14
129.57
128.83
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126.49
126.18
123.74
122.16
121.35
77.23
77.02
76.81



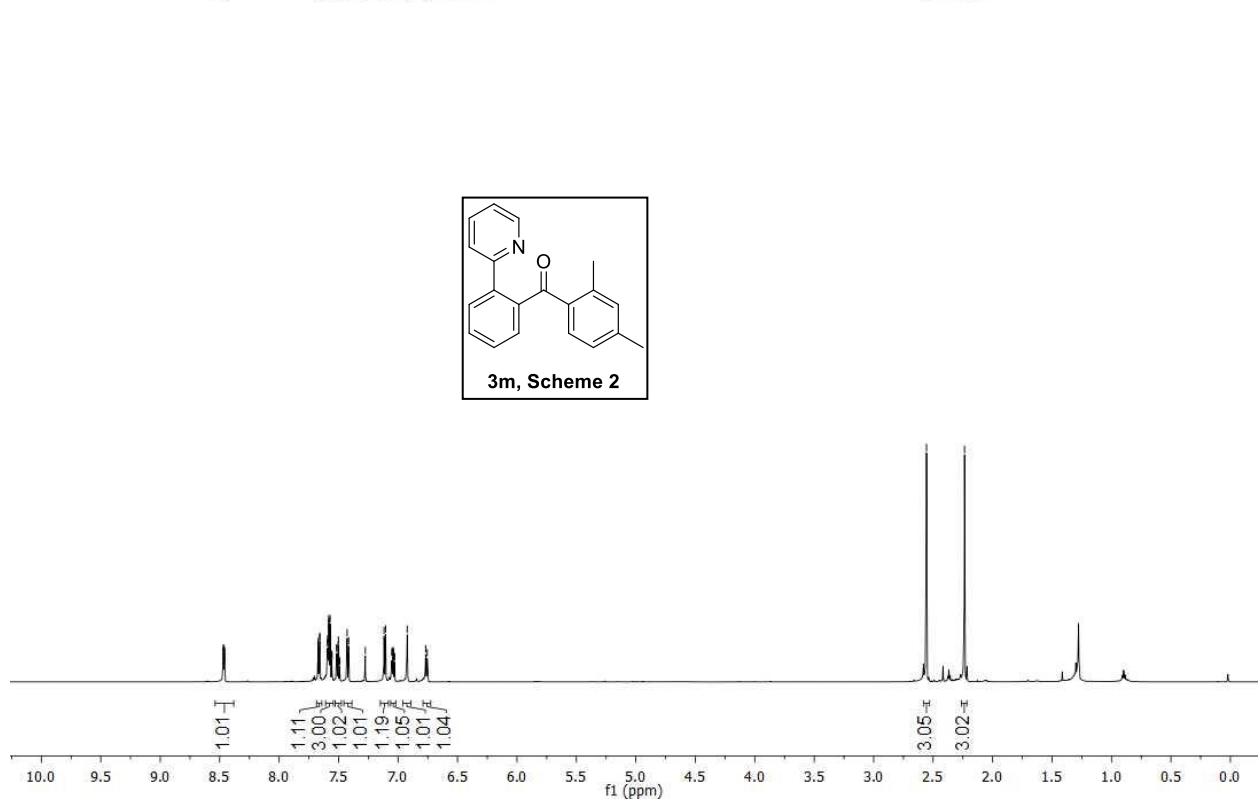
acylation NMR/AH-634 C
 AH-634 C-NMR in CDCl₃



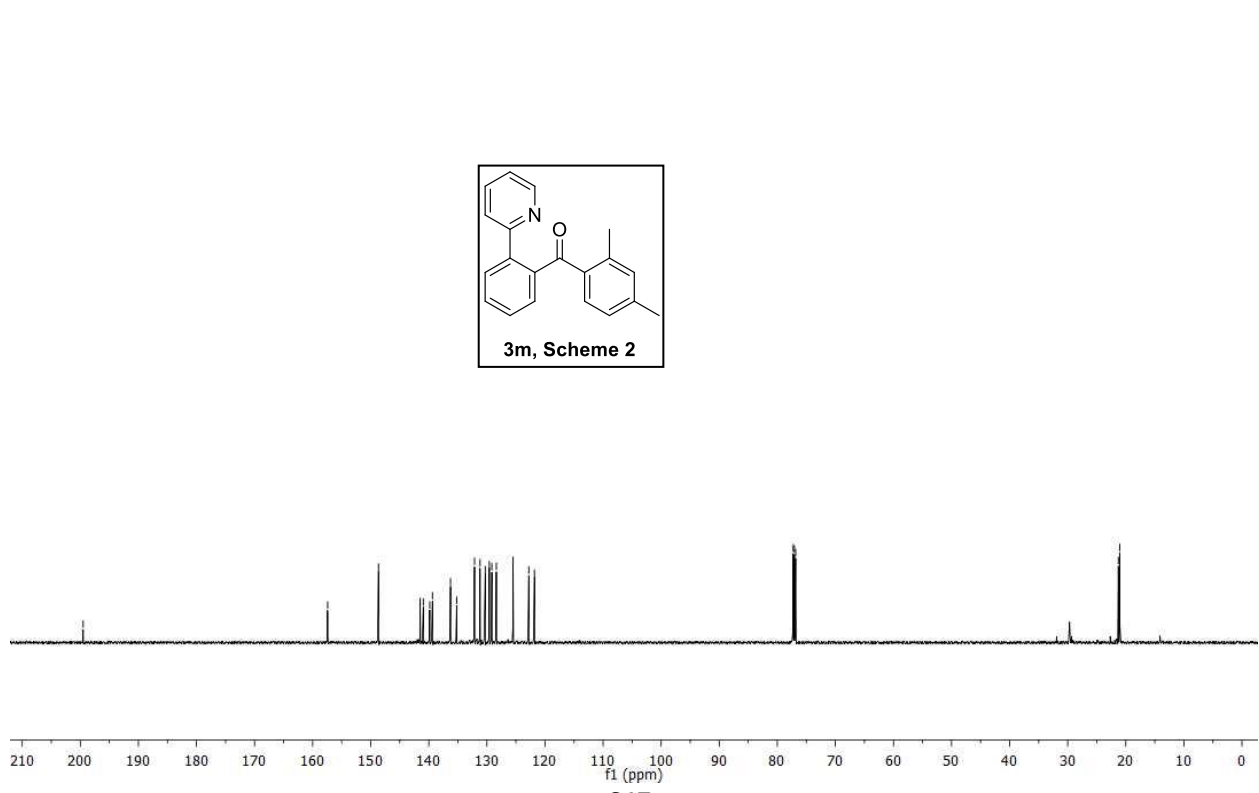
acylation NMR/AH-634 C
 AH-634 C-NMR in CDCl₃



acylation NMR/AH-662 C
 AH-662 1H-NMR in CDCl₃

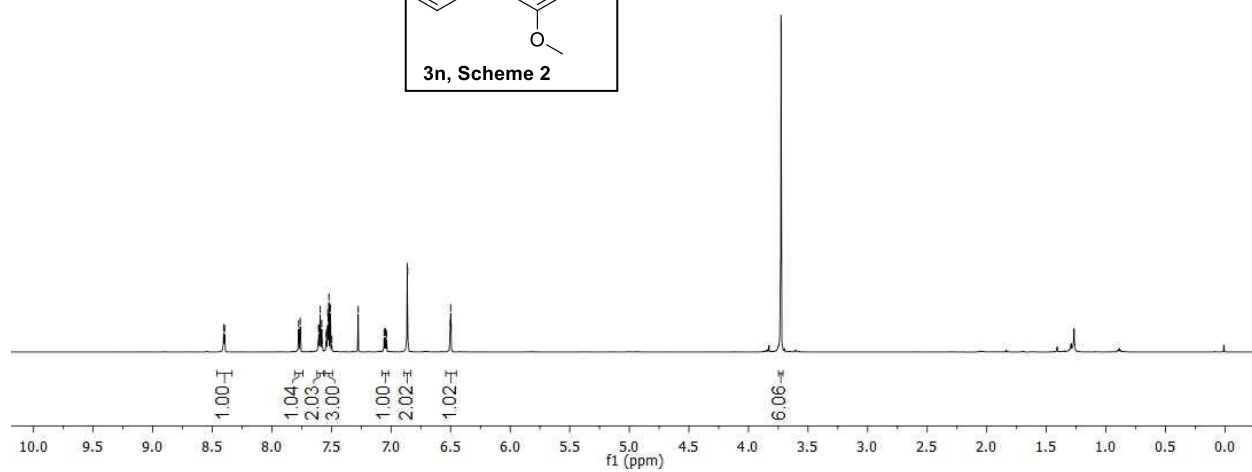
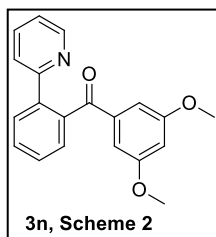


acylation NMR/AH-662 C
 AH-662 13C-NMR in CDCl₃



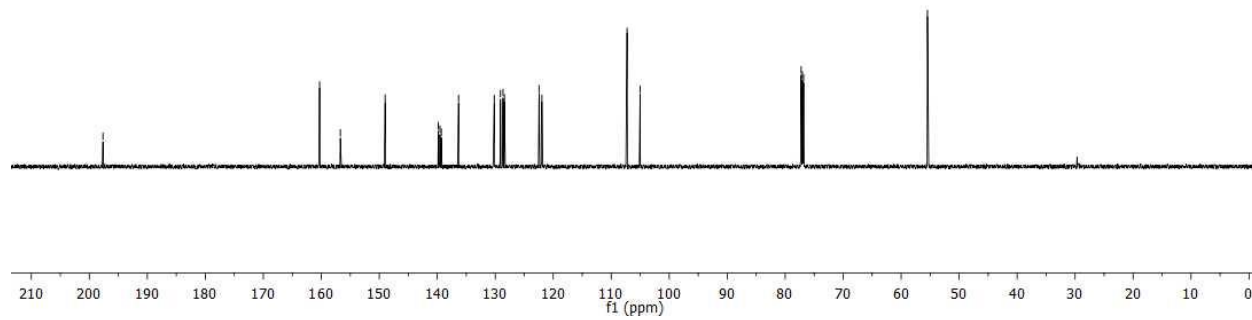
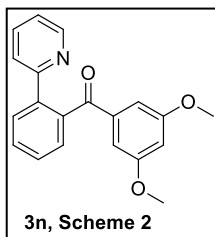
acylation NMR/AH-624 P
AH-624 1H-NMR in CDCl₃

8.405
8.397
7.775
7.762
7.608
7.605
7.594
7.581
7.543
7.541
7.531
7.528
7.521
7.508
7.497
7.275
7.058
7.050
7.049
7.046
7.037
6.864
6.861
6.503
6.499
6.495
-3.727



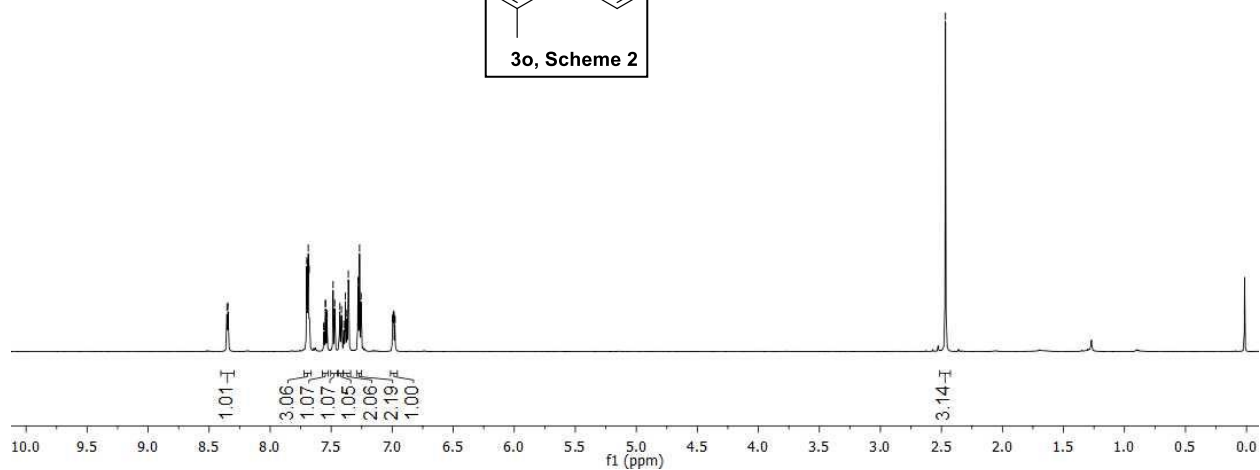
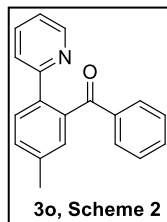
acylation NMR/AH-624 C
AH-624 13C-NMR in CDCl₃

197.78
160.29
156.71
148.99
139.82
139.54
139.30
136.32
130.17
129.10
128.66
128.42
122.44
121.95
107.27
105.02
77.25
77.04
76.83
55.46



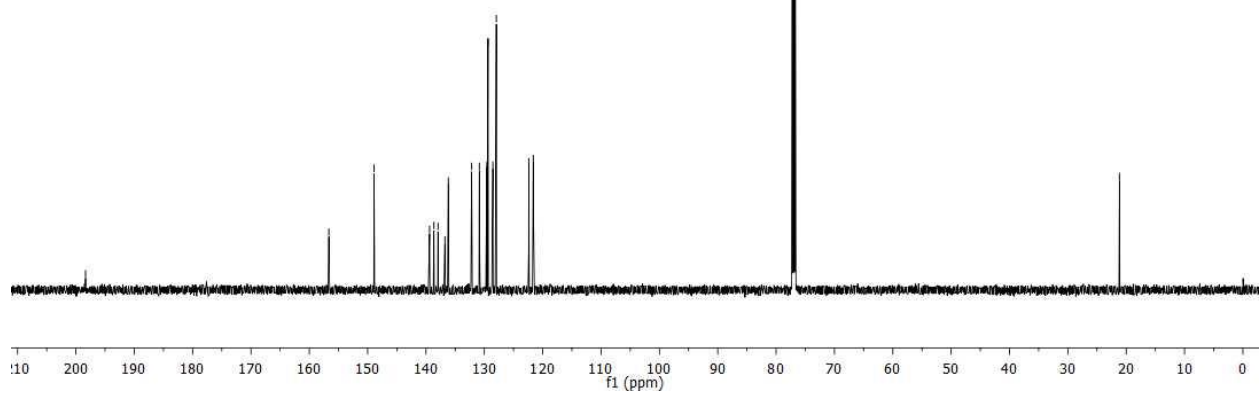
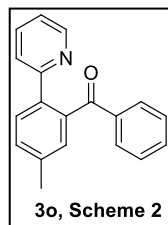
acylation NMR/AH-593 P
AH-593 1H-NMR in CDCl₃

8.354
8.346
7.700
7.693
7.688
7.686
7.680
7.561
7.558
7.548
7.545
7.536
7.533
7.484
7.471
7.429
7.416
7.396
7.384
7.372
7.360
7.281
7.276
7.268
7.255
6.999
6.997
6.991
6.989
6.986
6.985
6.978
6.977
-2.467



acylation NMR/AH-593 C
AH-593 13C-NMR in CDCl₃

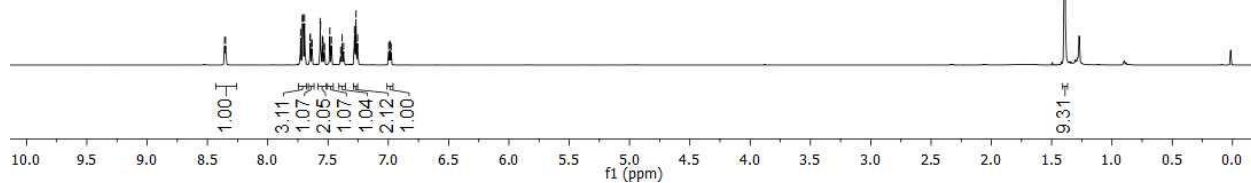
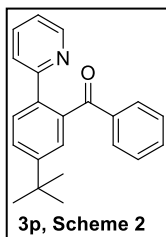
198.32
156.65
148.90
139.39
138.65
137.94
136.76
136.17
132.18
130.86
129.58
129.37
128.54
127.94
122.39
121.61
77.20
77.14
76.99
76.94
76.78
-21.15



acylation NMR/AH-620 P
AH-620 1H-NMR in CDCl₃

8.357
8.350
7.727
7.714
7.708
7.695
7.649
7.646
7.636
7.633
7.565
7.562
7.545
7.543
7.532
7.530
7.485
7.472
7.395
7.383
7.371
7.281
7.276
7.268
7.255
6.997
6.989
6.985
6.977

1.391

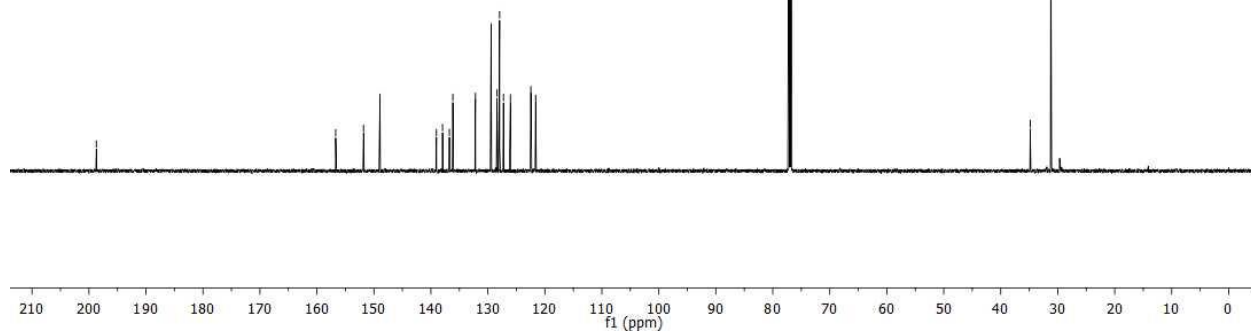
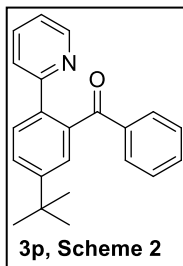


acylation NMR/AH-620 C
AH-620 13C-NMR in CDCl₃

198.7
156.71
151.81
148.93
139.03
137.95
136.75
136.15
132.18
129.43
128.40
127.94
127.26
126.04
122.45
121.61

77.21
77.00
76.79

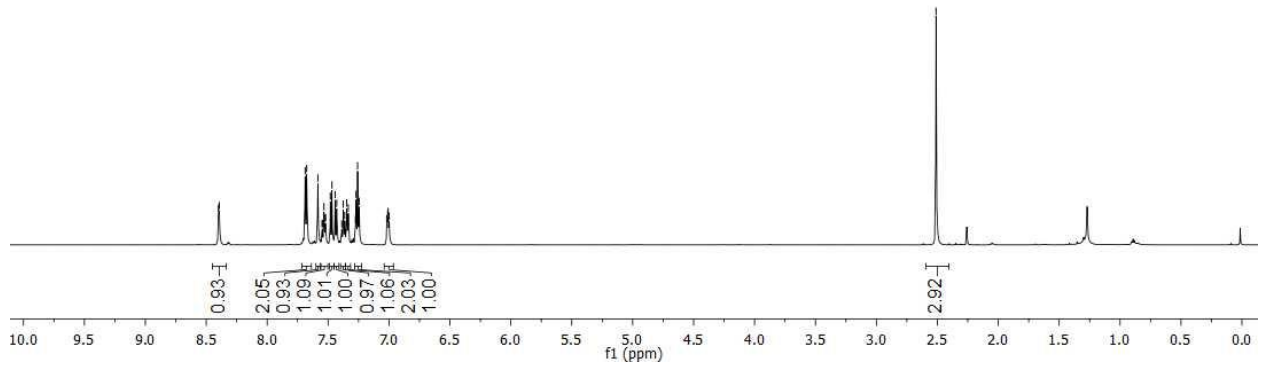
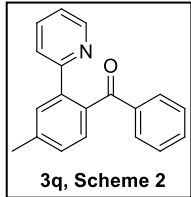
34.82
31.20



acylation NMR/AH-621 P
AH-621 1H-NMR in CDCl₃

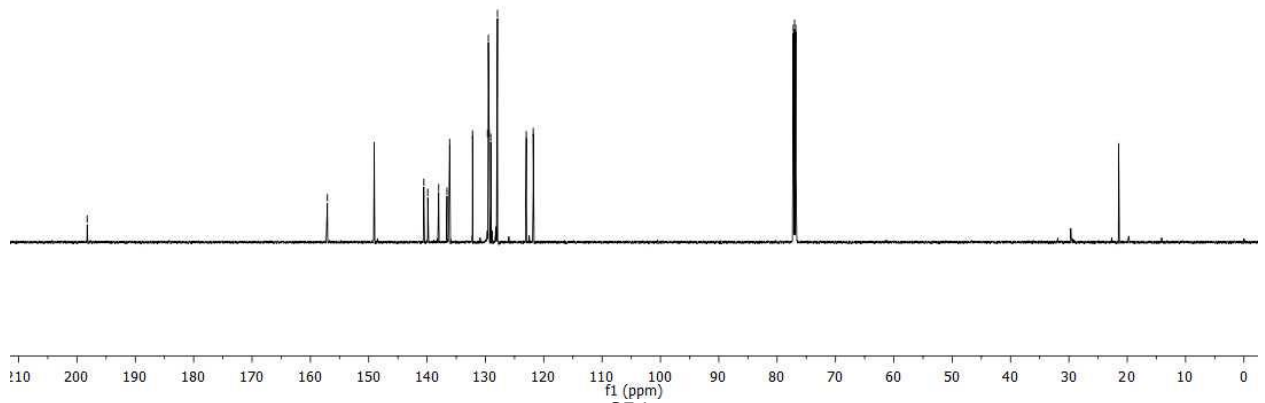
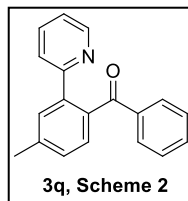
8.400
8.393
7.688
7.676
7.584
7.549
7.547
7.534
7.523
7.521
7.481
7.468
7.442
7.429
7.388
7.376
7.363
7.347
7.334
7.276
7.271
7.258
7.245
7.019
7.011
7.007
6.999

-2.510



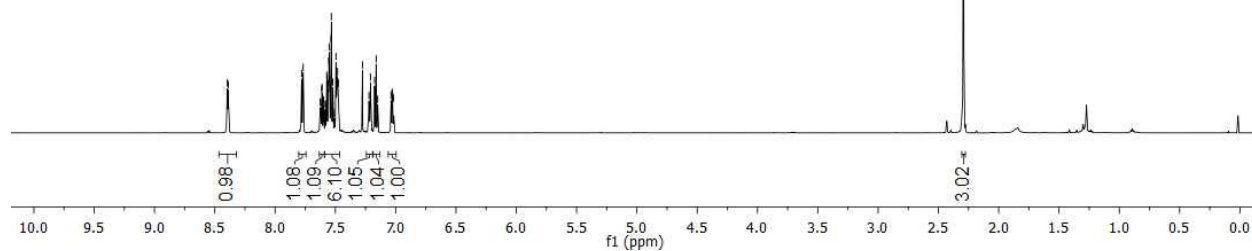
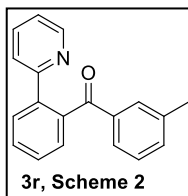
acylation NMR/AH-621 C
AH-621 13C-NMR in CDCl₃

198.36
157.08
149.05
140.55
139.87
138.01
136.56
136.12
132.20
129.64
129.49
129.35
129.07
127.93
122.99
121.80
77.23
77.02
76.81
21.46



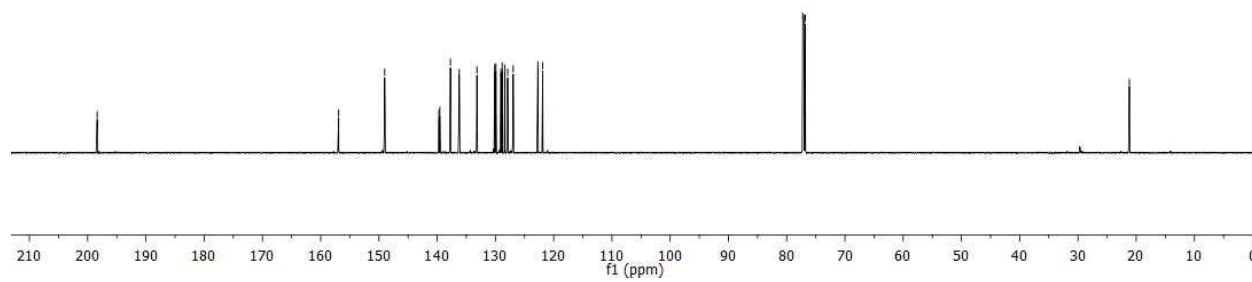
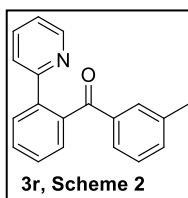
acylation NMR/AH-613 P
AH-613 1H-NMR in CDCl₃

8.396
8.388
7.780
7.767
7.625
7.621
7.613
7.610
7.601
7.597
7.584
7.582
7.571
7.569
7.559
7.555
7.551
7.536
7.533
7.521
7.509
7.495
7.488
7.482
7.475
7.275
7.221
7.209
7.175
7.162
7.149
7.038
7.030
7.026
7.018
-2.292



acylation NMR/AH-613 C
AH-613 13C-NMR in CDCl₃

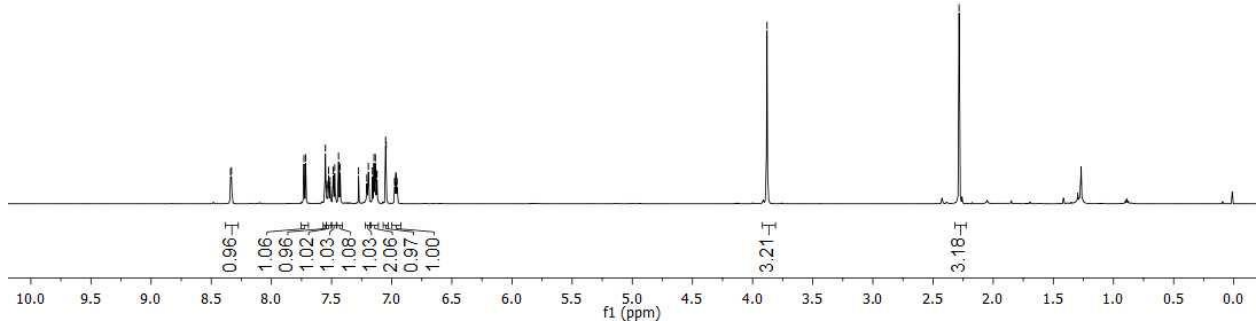
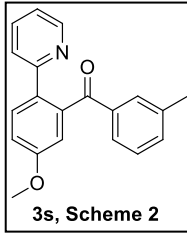
198.33
156.91
149.01
139.69
139.55
137.72
136.22
133.17
130.12
129.92
129.06
128.84
128.37
127.90
126.95
122.72
121.88
77.25
77.04
76.82
21.17



acylation NMR/AH-619 P
AH-619 1H-NMR in CDCl₃

8.340
8.332
7.729
7.715
7.551
7.540
7.538
7.525
7.515
7.512
7.486
7.474
7.442
7.429
7.276
7.207
7.194
7.160
7.148
7.140
7.135
7.125
7.122
7.050
7.046
6.975
6.974
6.967
6.965
6.963
6.955
3.880

-2.284



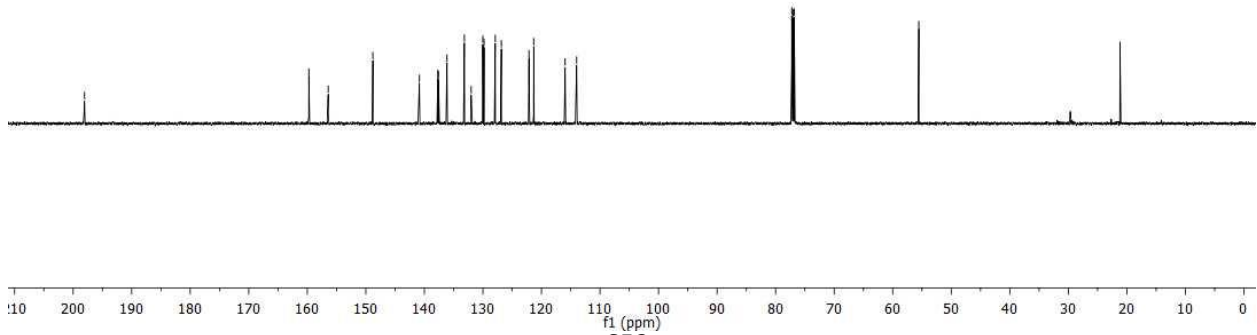
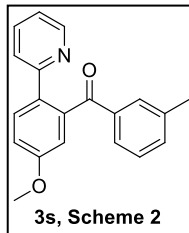
acylation NMR/AH-619 C
AH-619 13C-NMR in CDCl₃

198.9
159.74
156.42
148.80
140.85
137.71
137.59
136.74
133.17
132.01
130.02
129.81
129.89
126.85
122.73
121.32
115.96
113.99

77.24
77.03
76.82

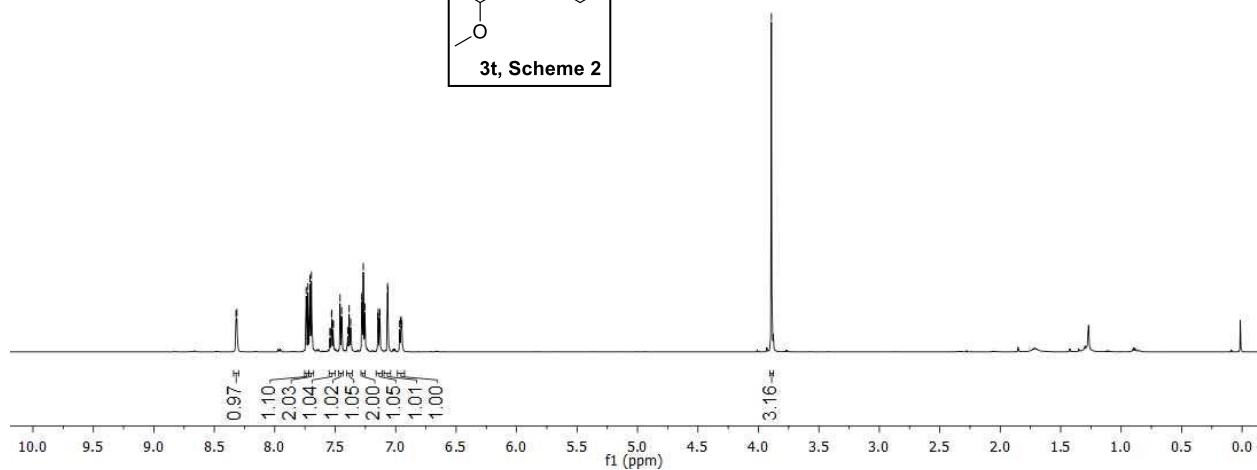
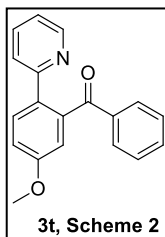
-55.54

-21.16



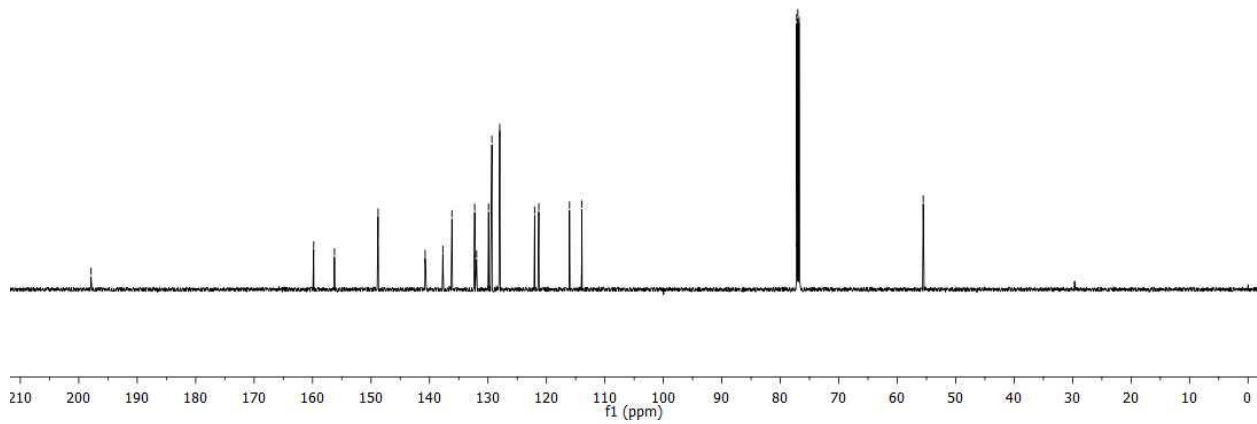
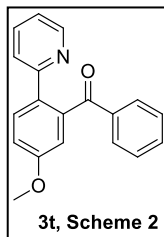
acylation NMR/AH-604 P
AH-604 1H-NMR in CDCl₃

8.321
8.313
7.740
7.726
7.709
7.697
7.543
7.541
7.530
7.528
7.518
7.515
7.460
7.447
7.397
7.385
7.372
7.280
7.276
7.268
7.255
7.149
7.144
7.134
7.130
7.067
7.063
6.968
6.959
6.959
6.956
6.947
3.892



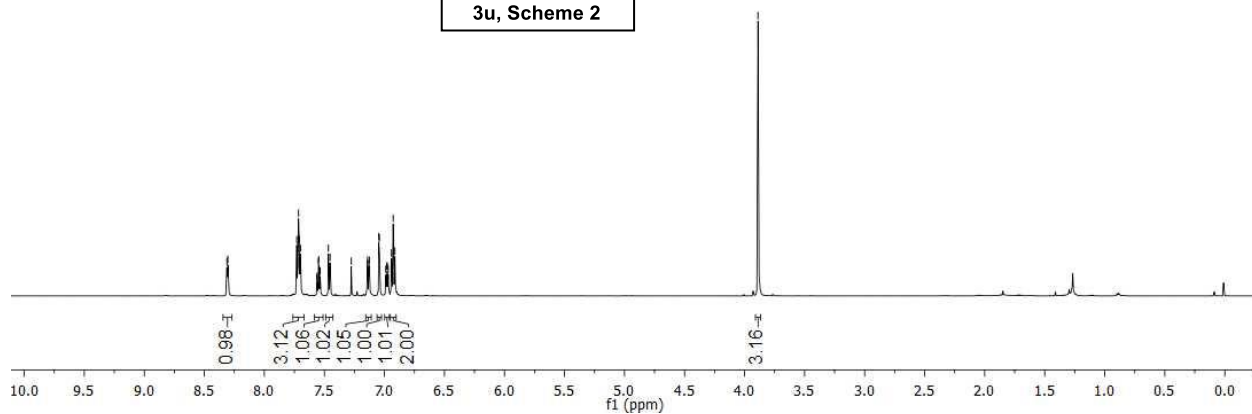
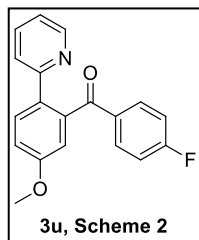
acylation NMR/AH-604 C
AH-604 13C-NMR in CDCl₃

197.38
159.82
156.26
148.80
140.75
137.72
136.17
132.27
131.95
129.90
129.33
127.98
122.02
121.31
116.06
113.95
77.21
77.17
77.00
76.79
55.55



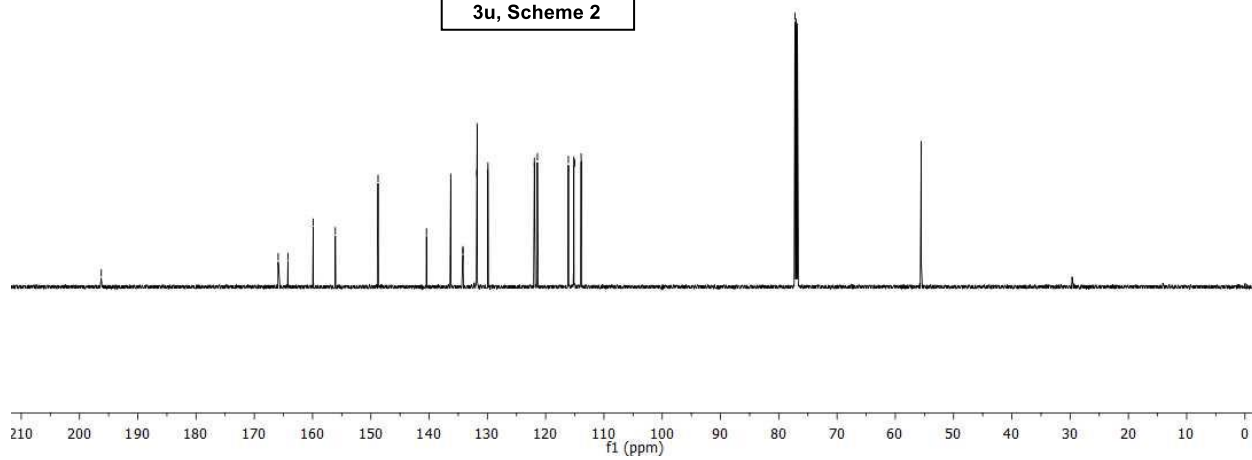
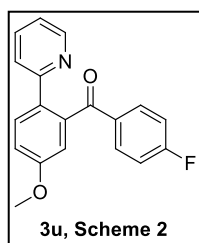
acylation NMR/AH-617 P
AH-617 1H-NMR in CDCl₃

8.312
8.304
7.730
7.723
7.715
7.709
7.699
7.563
7.550
7.548
7.537
7.466
7.453
7.276
7.144
7.140
7.130
7.125
7.047
7.043
6.988
6.980
6.976
6.968
6.941
6.927
6.913
3.888



acylation NMR/AH-617 C
AH-617 13C-NMR in CDCl₃

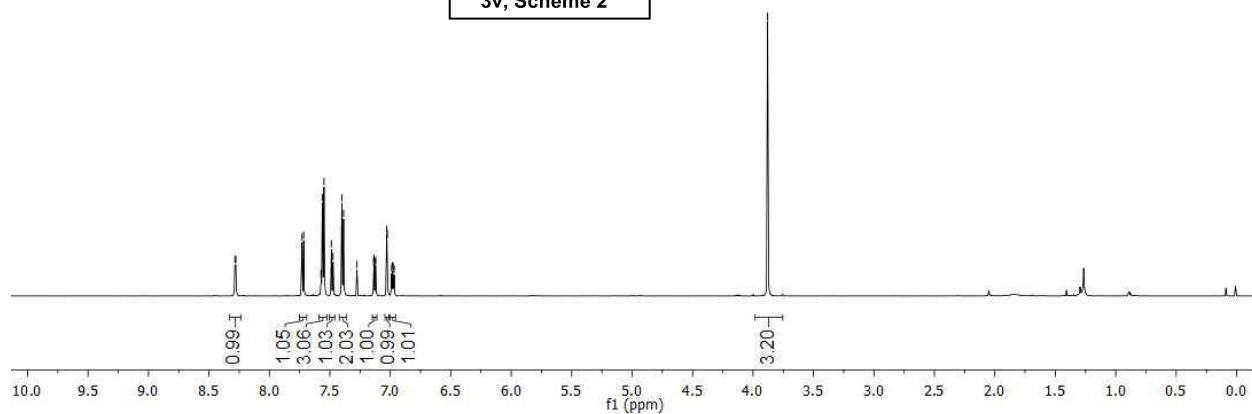
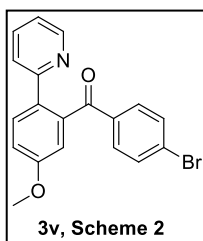
196.52
165.91
164.23
159.90
156.11
148.77
140.46
136.29
134.22
134.20
131.82
131.76
129.91
121.94
121.43
116.10
115.17
115.03
113.91
77.22
77.01
76.80
55.55



acylation NMR/AH-618 P
AH-618 1H-NMR in CDCl3

8.285
8.277
7.730
7.716
7.573
7.570
7.562
7.548
7.487
7.474
7.401
7.386
7.276
7.139
7.134
7.124
7.120
7.029
7.024
6.988
6.980
6.976
6.968

3.880



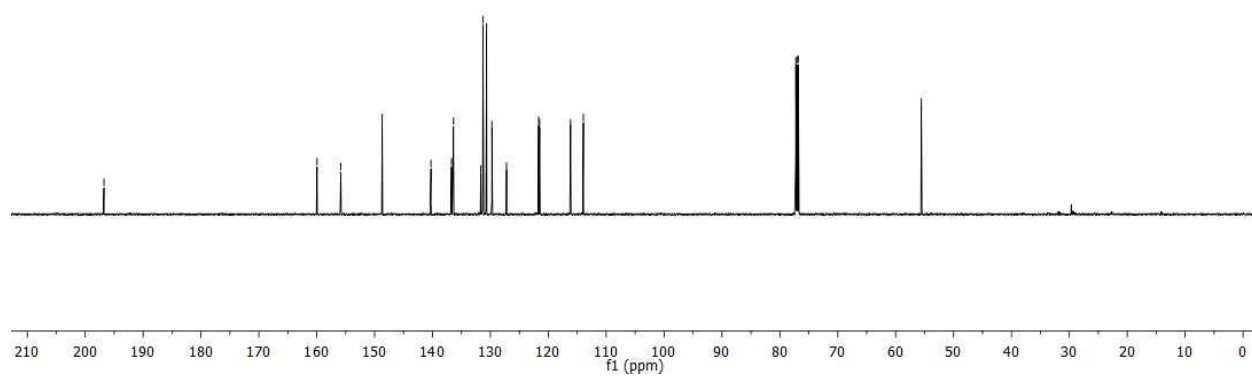
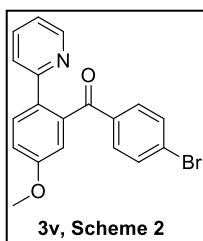
acylation NMR/AH-618 C
AH-618 13C-NMR in CDCl3

196.6

159.94
155.84
148.69
140.27
136.72
136.39
131.66
131.29
130.66
129.75
127.21
121.67
121.49
116.15
113.94

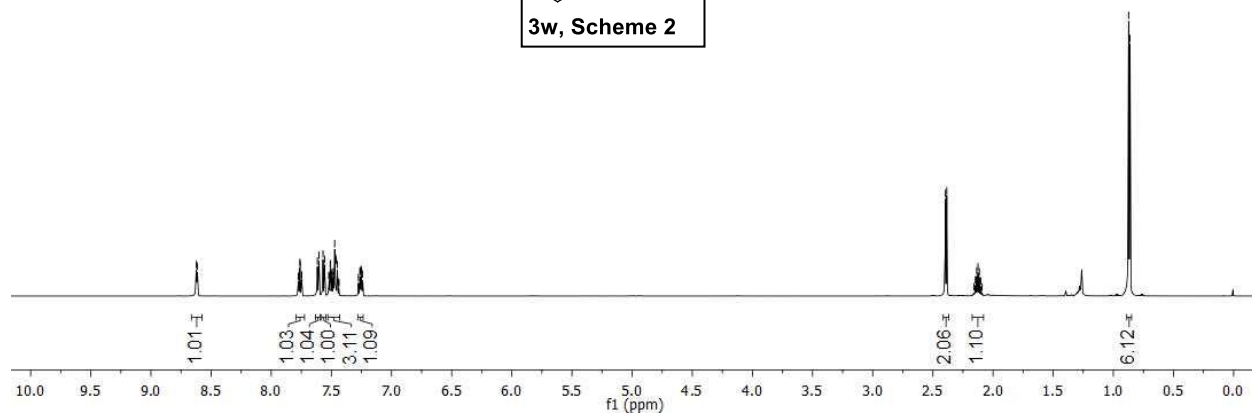
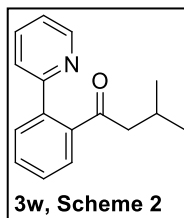
77.24
77.03
76.82

55.56



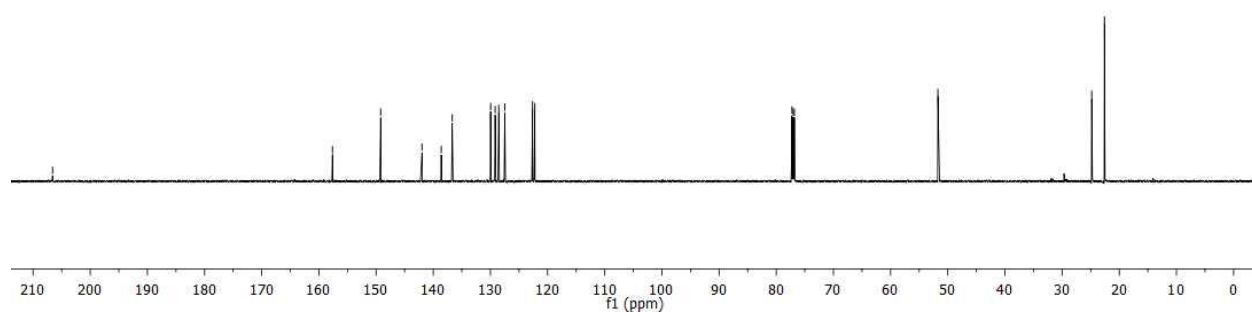
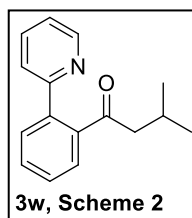
acylation NMR/AH-638 P
AH-638 1H-NMR in

8.632
8.615
7.774
7.771
7.761
7.759
7.749
7.746
7.616
7.604
7.570
7.556
7.521
7.519
7.509
7.507
7.497
7.494
7.485
7.482
7.472
7.470
7.463
7.462
7.450
7.439
7.437
7.275
7.262
7.261
7.254
7.253
7.250
7.242
2.396
2.385
2.158
2.147
2.136
2.114
2.102
2.091
0.873
0.861



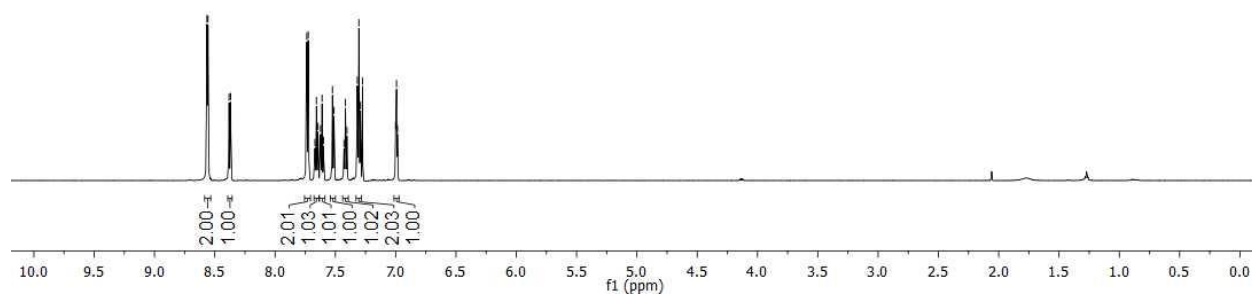
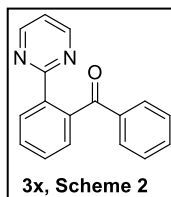
acylation NMR/AH-638 C
AH-638 13C-NMR in CDCl3

206.55
157.63
149.19
141.97
138.60
136.68
129.96
129.17
128.53
127.48
122.62
122.24
77.25
77.04
76.83
51.72
24.82
22.60



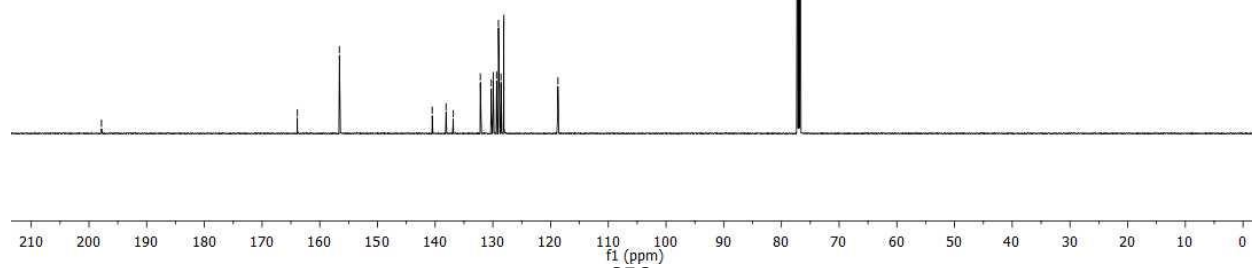
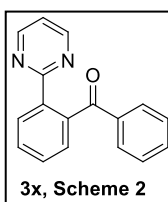
acylation NMR/AH-719 P
 AH-719 1H-NMR

8.885
 8.857
 8.831
 8.369
 7.737
 7.725
 7.670
 7.657
 7.644
 7.623
 7.610
 7.598
 7.524
 7.512
 7.429
 7.416
 7.404
 7.318
 7.305
 7.292
 7.275
 7.001
 6.983
 6.985



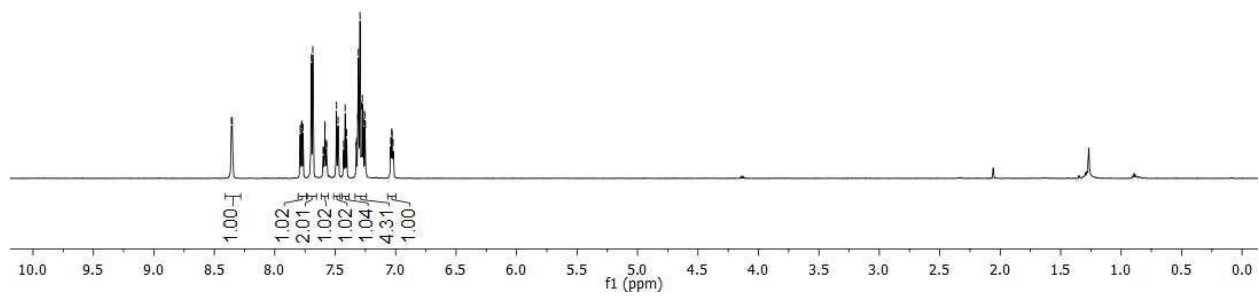
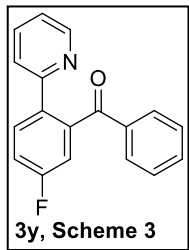
acylation NMR/AH-719 C
 AH-719 13C-NMR in CDCl3

197.83
 163.88
 156.60
 140.51
 138.12
 136.87
 132.17
 130.27
 129.94
 129.36
 129.04
 128.60
 128.10
 118.73
 77.21
 77.00
 76.79



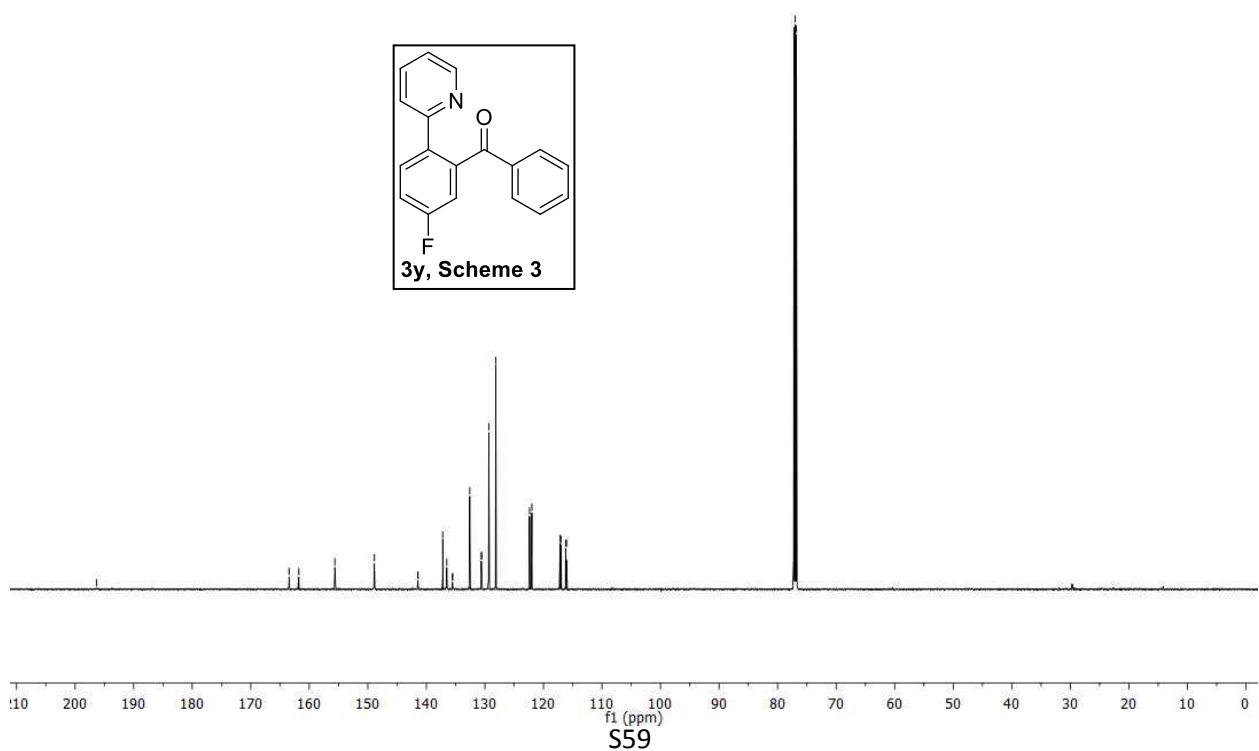
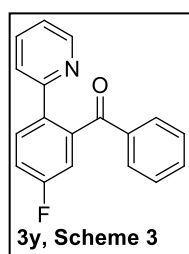
DECARBONYLATIVE NMR DATA/AH-704 C
 AH704 1H-NMR in CDCl₃

8.357, 8.351, 7.781, 7.775, 7.766, 7.698, 7.685, 7.599, 7.597, 7.586, 7.584, 7.573, 7.571, 7.489, 7.476, 7.430, 7.418, 7.405, 7.327, 7.323, 7.313, 7.308, 7.295, 7.282, 7.275, 7.269, 7.265, 7.255, 7.251, 7.041, 7.032, 7.030, 7.021



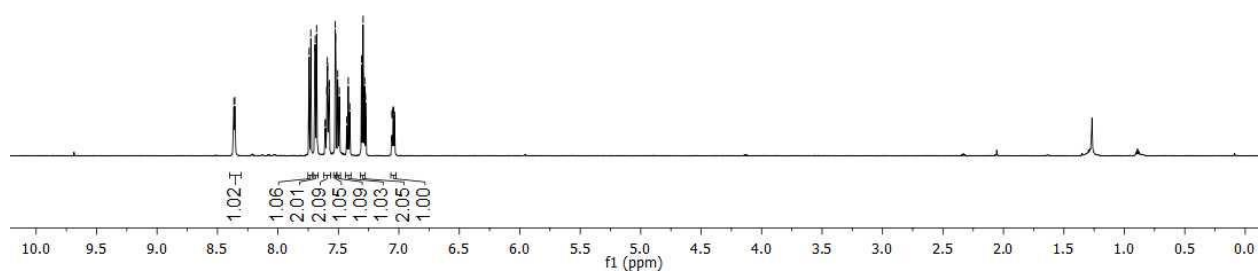
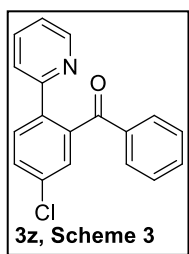
DECARBONYLATIVE NMR DATA/AH-704 C
 AH704 13C-NMR in CDCl₃

196.16, 163.45, 161.79, 155.63, 148.89, 141.46, 141.43, 137.21, 136.52, 135.54, 135.53, 132.59, 130.61, 130.56, 129.34, 128.14, 122.38, 121.98, 117.15, 117.01, 116.21, 116.06, 77.21, 77.00, 76.79



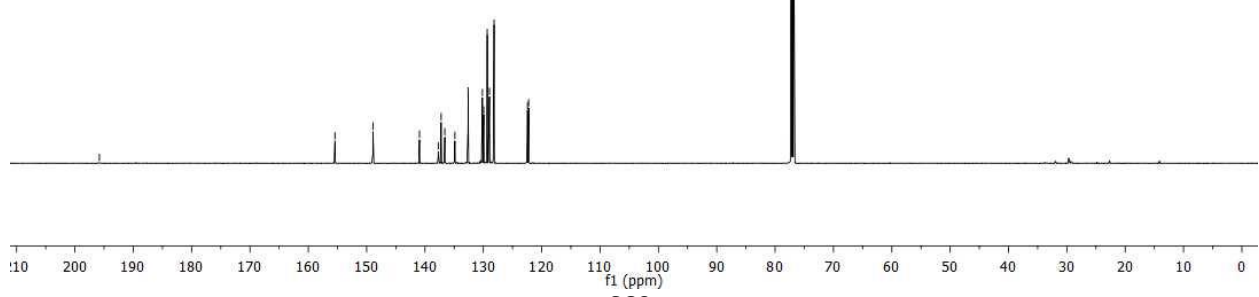
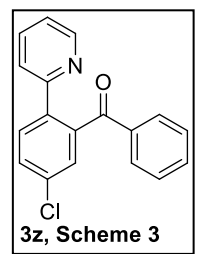
DECARBONYLATIVE NMR DATA/AH-696 C
 AH-696 1H-NMR in CDCl₃

8.35
 7.74
 7.728
 7.694
 7.692
 7.680
 7.678
 7.610
 7.607
 7.597
 7.592
 7.588
 7.584
 7.581
 7.578
 7.574
 7.526
 7.523
 7.506
 7.492
 7.432
 7.430
 7.428
 7.418
 7.408
 7.406
 7.404
 7.309
 7.296
 7.283
 7.275
 7.056
 7.055
 7.048
 7.047
 7.044
 7.036
 7.035



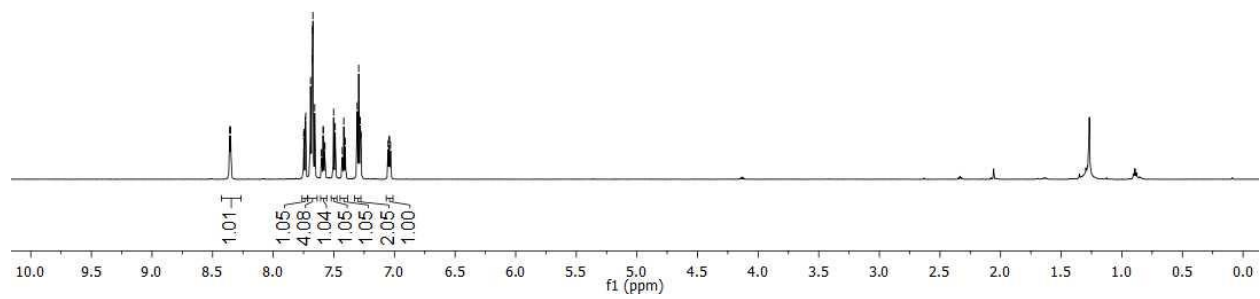
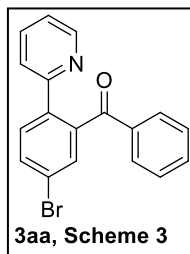
DECARBONYLATIVE NMR DATA/AH-696 C
 AH-696 13C-NMR in CDCl₃

195.86
 155.43
 148.95
 137.72
 136.61
 134.88
 132.62
 130.16
 129.94
 129.34
 128.95
 128.16
 122.43
 122.24
 77.22
 77.01
 76.80



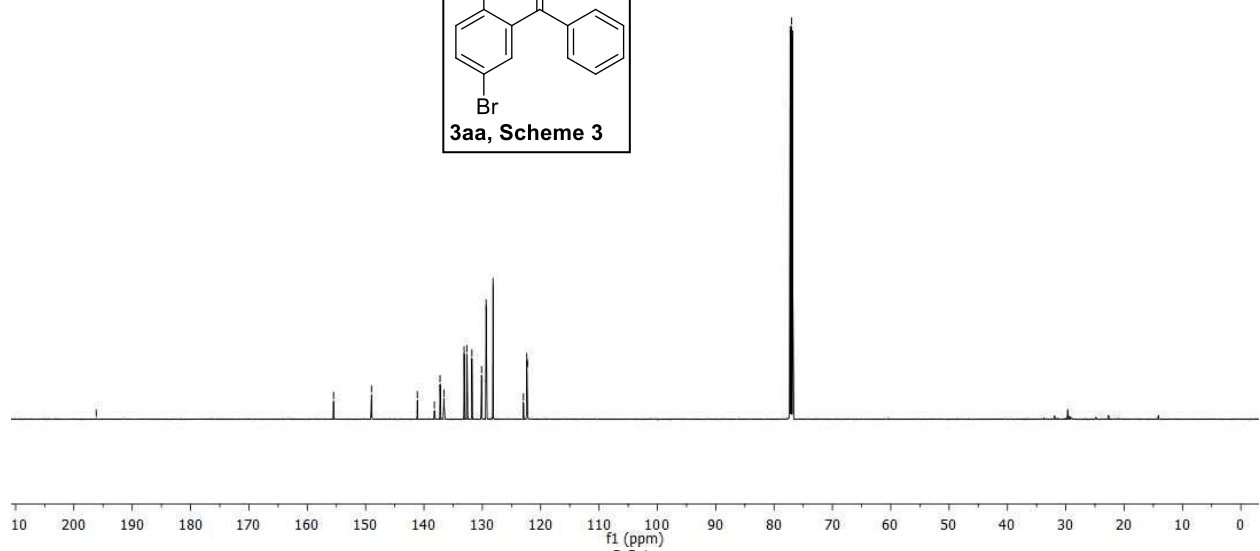
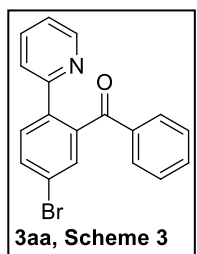
DECARBONYLATIVE NMR DATA/AH-702 C
 AH702 1H-NMR in CDCl₃

8.352
 8.351
 7.746
 7.746
 7.736
 7.732
 7.682
 7.680
 7.676
 7.672
 7.668
 7.602
 7.599
 7.589
 7.586
 7.576
 7.574
 7.502
 7.489
 7.430
 7.418
 7.406
 7.308
 7.295
 7.282
 7.275
 7.052
 7.044
 7.041
 7.032

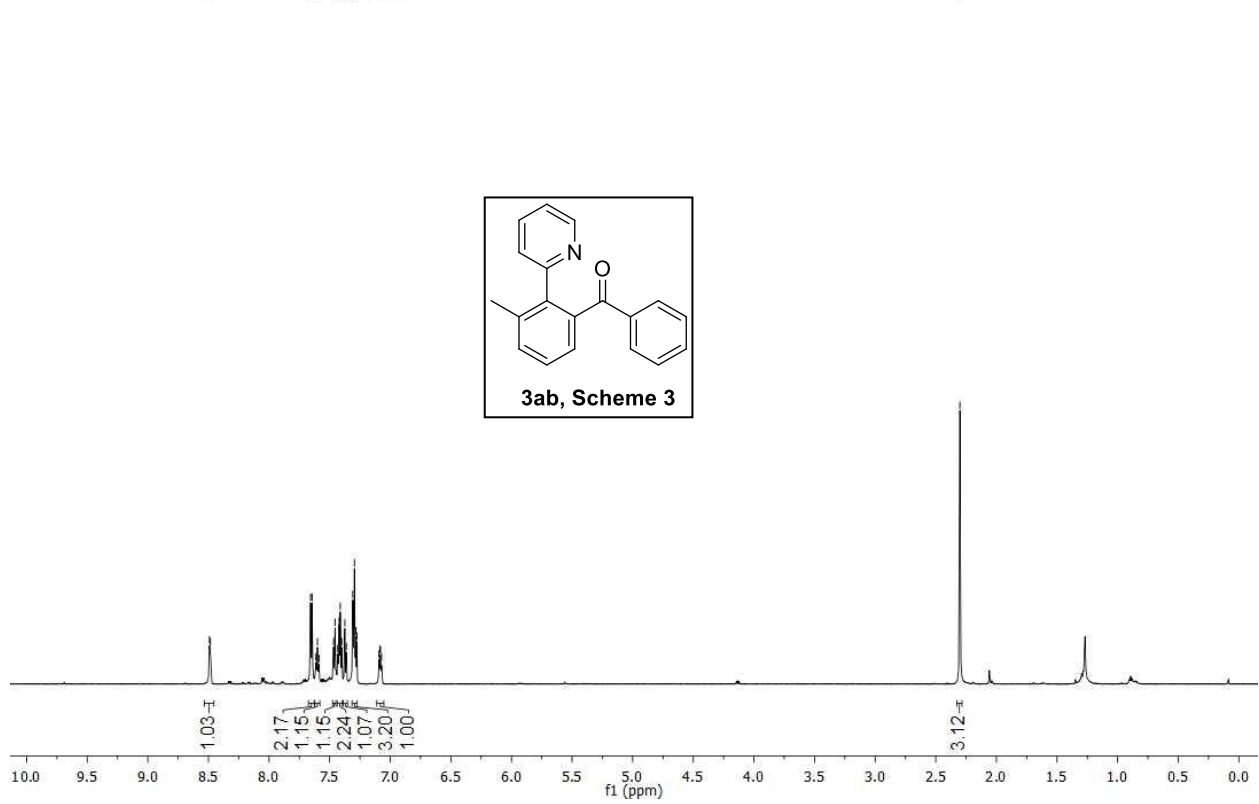


DECARBONYLATIVE NMR DATA/AH-702 C
 AH702 13C-NMR in CDCl₃

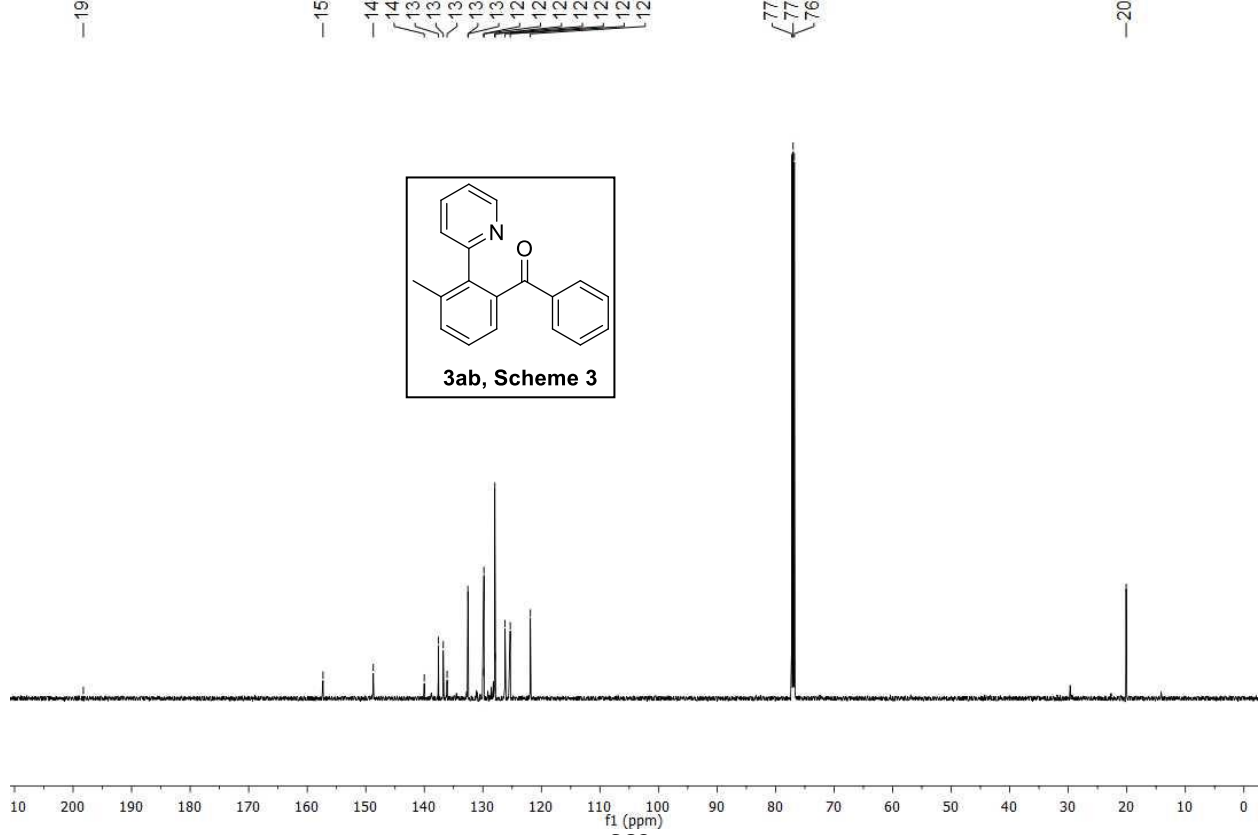
196.18
 155.50
 148.98
 141.74
 138.22
 137.24
 136.57
 133.11
 132.62
 131.79
 130.13
 129.35
 128.16
 122.95
 122.38
 122.26
 77.22
 77.01
 76.80



DECARBONYLATIVE NMR DATA/AH-697 C
 AH-697 1H-NMR in CDCl₃



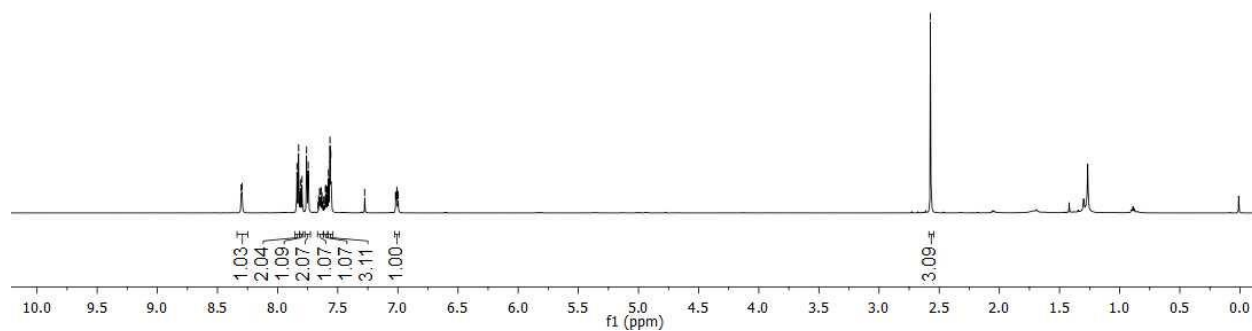
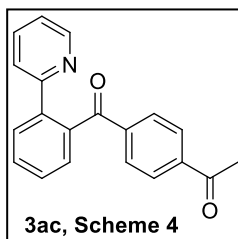
DECARBONYLATIVE NMR DATA/AH-697 C
 AH-697 13C-NMR in CDCl₃



acylation NMR/AH-639 P
AH-639 1H-NMR in CDCl3

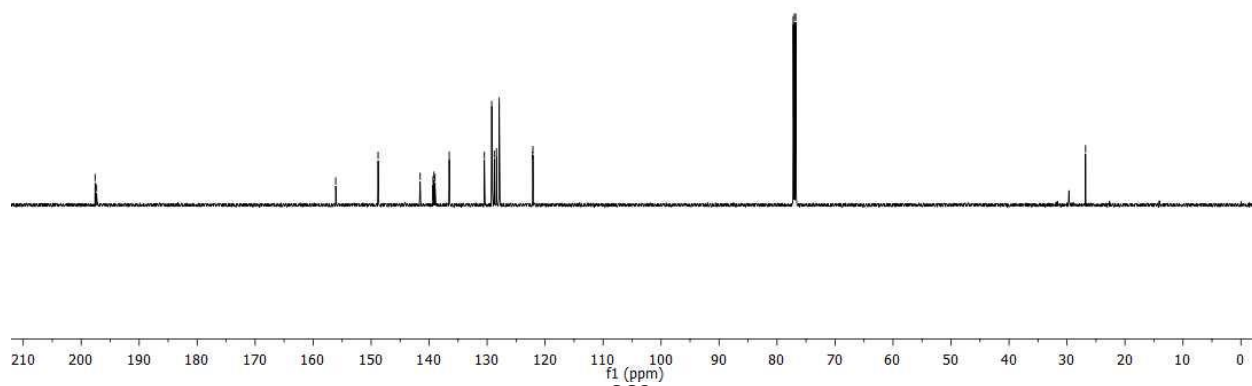
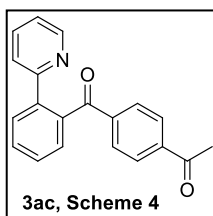
8.303
8.295
7.839
7.825
7.810
7.797
7.759
7.745
7.664
7.658
7.651
7.644
7.638
7.631
7.624
7.615
7.613
7.602
7.600
7.590
7.587
7.577
7.564
7.558
7.276
7.019
7.018
7.008
7.006
7.000
6.998

-2.573

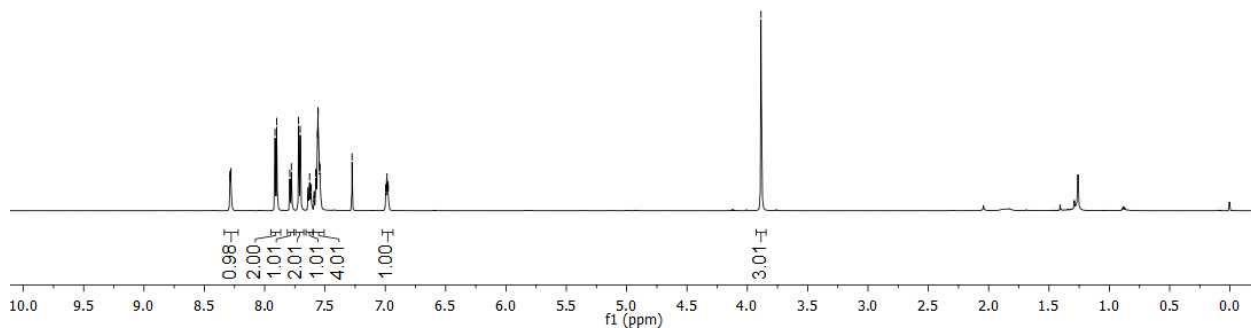
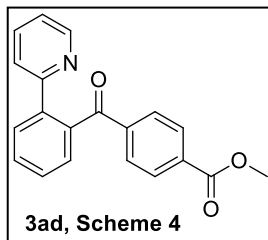


acylation NMR/AH-639 C
AH-639 13C-NMR in CDCl3

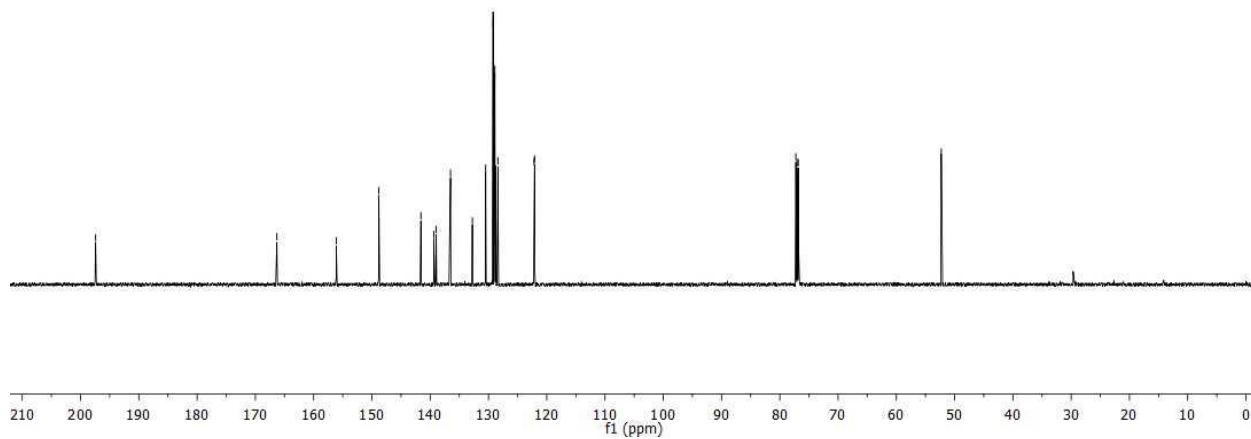
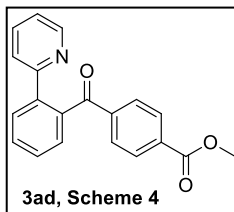
197.60
197.53
156.10
148.80
141.55
139.33
139.17
138.99
136.53
130.48
129.21
129.12
128.76
128.36
127.91
122.16
122.10
77.21
77.00
76.79
26.80



acylation NMR/AH-646 F
 AH-646 1H-NMR

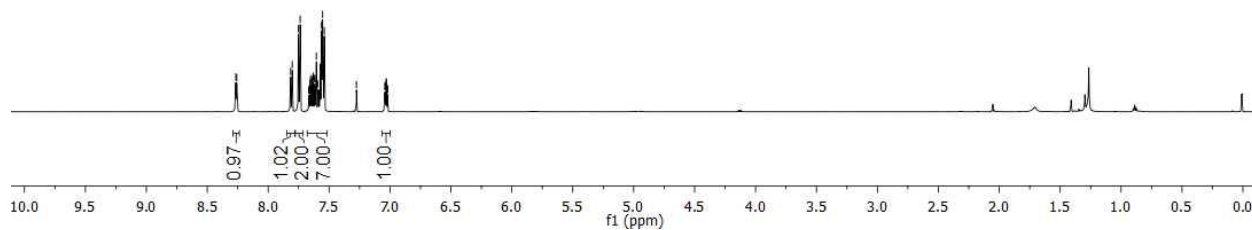
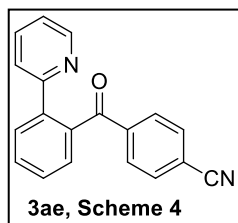


acylation NMR/AH-646 C
 AH-646 13C-NMR in CDCl3



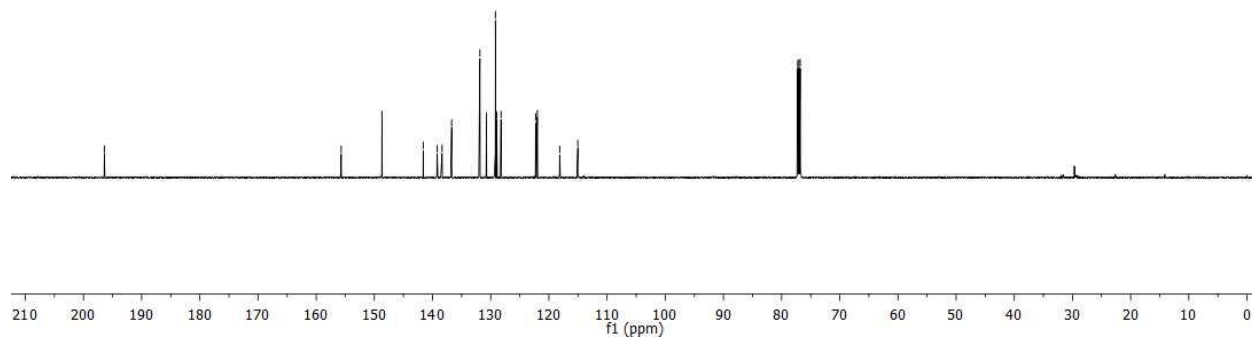
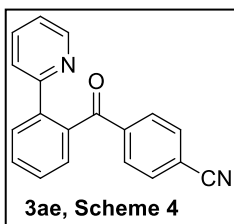
acylation NMR/AH-647 P
AH-647 1H-NMR in CDCl₃

8.265
8.258
7.815
7.803
7.751
7.749
7.740
7.737
7.667
7.664
7.656
7.654
7.653
7.643
7.640
7.630
7.628
7.618
7.615
7.605
7.591
7.586
7.584
7.573
7.572
7.562
7.560
7.553
7.550
7.539
7.275
7.042
7.040
7.034
7.031
7.030
7.028
7.022
7.020

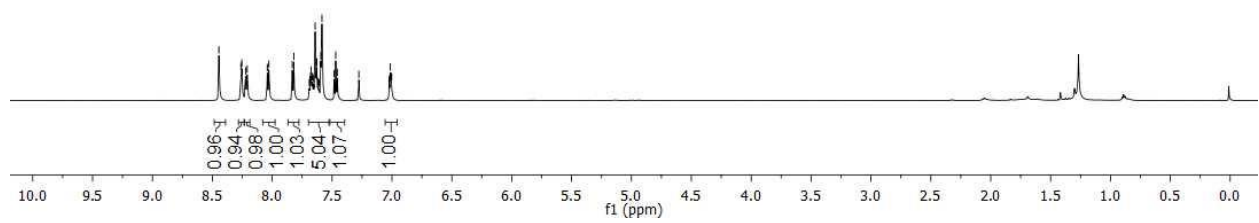
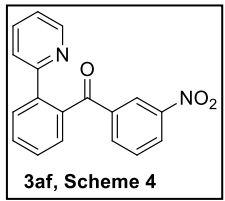


acylation NMR/AH-647 C
AH-647 13C-NMR in CDCl₃

196.73
155.70
148.69
141.60
139.20
138.36
136.71
131.86
130.73
129.19
128.97
128.23
122.28
121.98
118.15
115.02
77.23
77.02
76.81



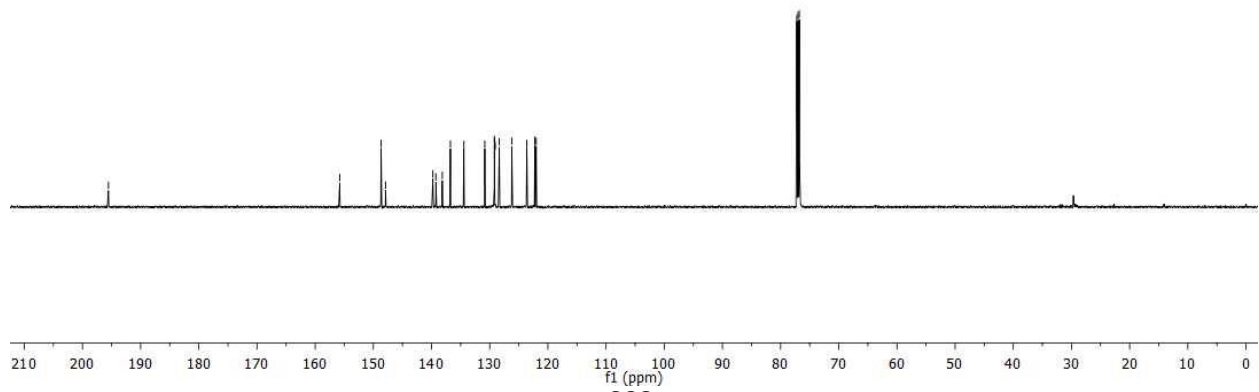
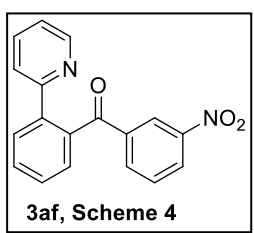
8.21
8.20
8.22
8.21
8.01
8.01
7.82
7.82
7.69
7.68
7.68
7.67
7.66
7.66
7.64
7.64
7.63
7.62
7.61
7.61
7.60
7.59
7.58
7.58
7.47
7.47
7.45
7.27
7.24
7.21
7.21
7.01
7.00
7.00



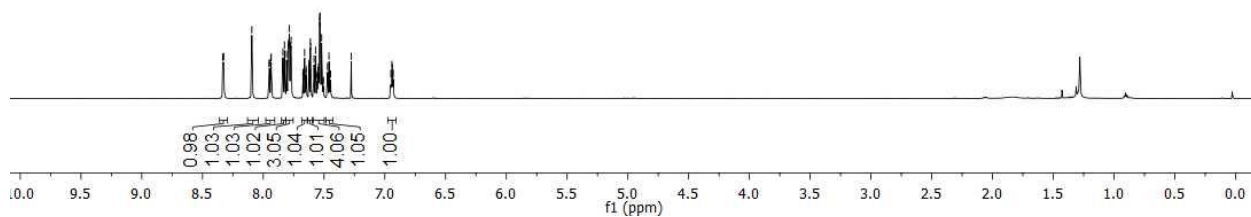
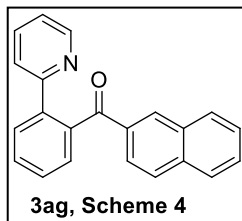
acylation NMR AH-649 C
AH-649 ¹³C-NMR in CDCl₃

195.52
155.78
148.66
147.90
139.78
139.26
138.15
136.75
134.44
130.84
129.20
129.17
129.05
128.35
126.21
123.62
122.25
122.01

77.21
77.00
76.98
76.79

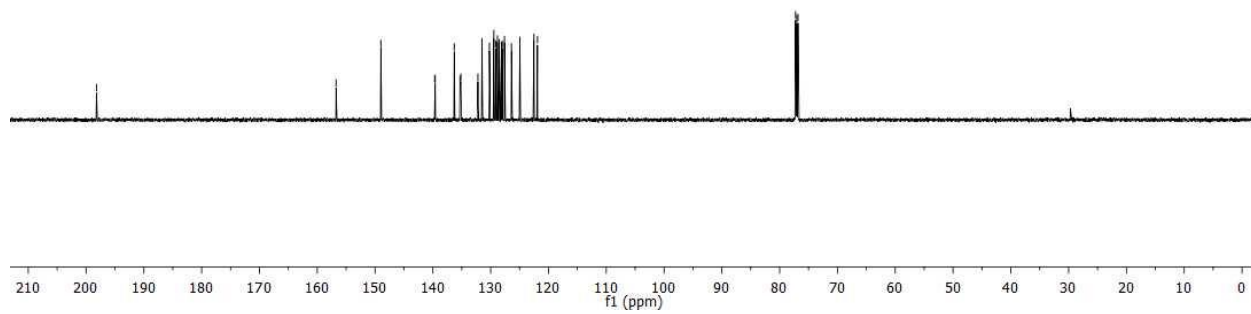
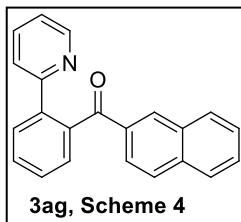


8.331
8.099
7.951
7.914
7.894
7.887
7.826
7.808
7.784
7.790
7.785
7.776
7.771
7.674
7.673
7.660
7.649
7.647
7.625
7.623
7.613
7.611
7.582
7.570
7.557
7.550
7.545
7.537
7.535
7.534
7.520
7.508
7.506
7.471
7.459
7.446
7.276
6.950
6.942
6.939
6.931

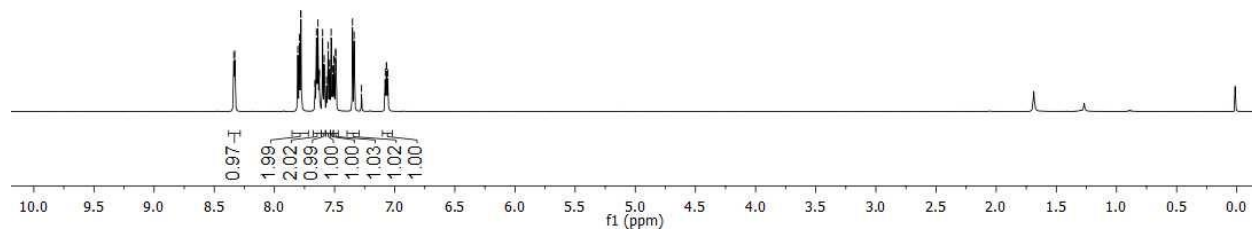
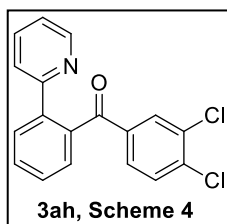
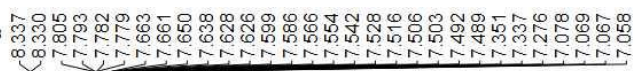


acylation NMR/AH-637 C
AH-637 ¹³C-NMR in CDCl₃

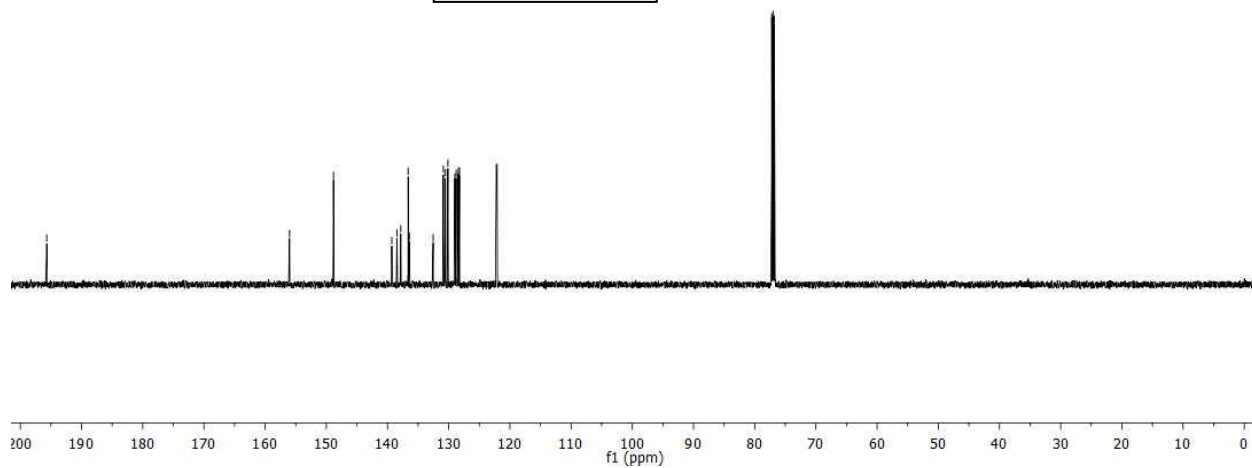
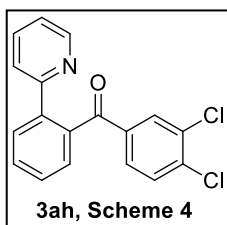
198.13
156.74
148.99
139.67
139.59
136.30
135.31
135.15
132.20
131.50
130.21
129.45
129.13
128.82
128.50
128.13
127.98
127.61
126.40
124.94
122.51
121.90
77.25
77.04
76.83



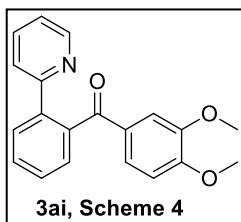
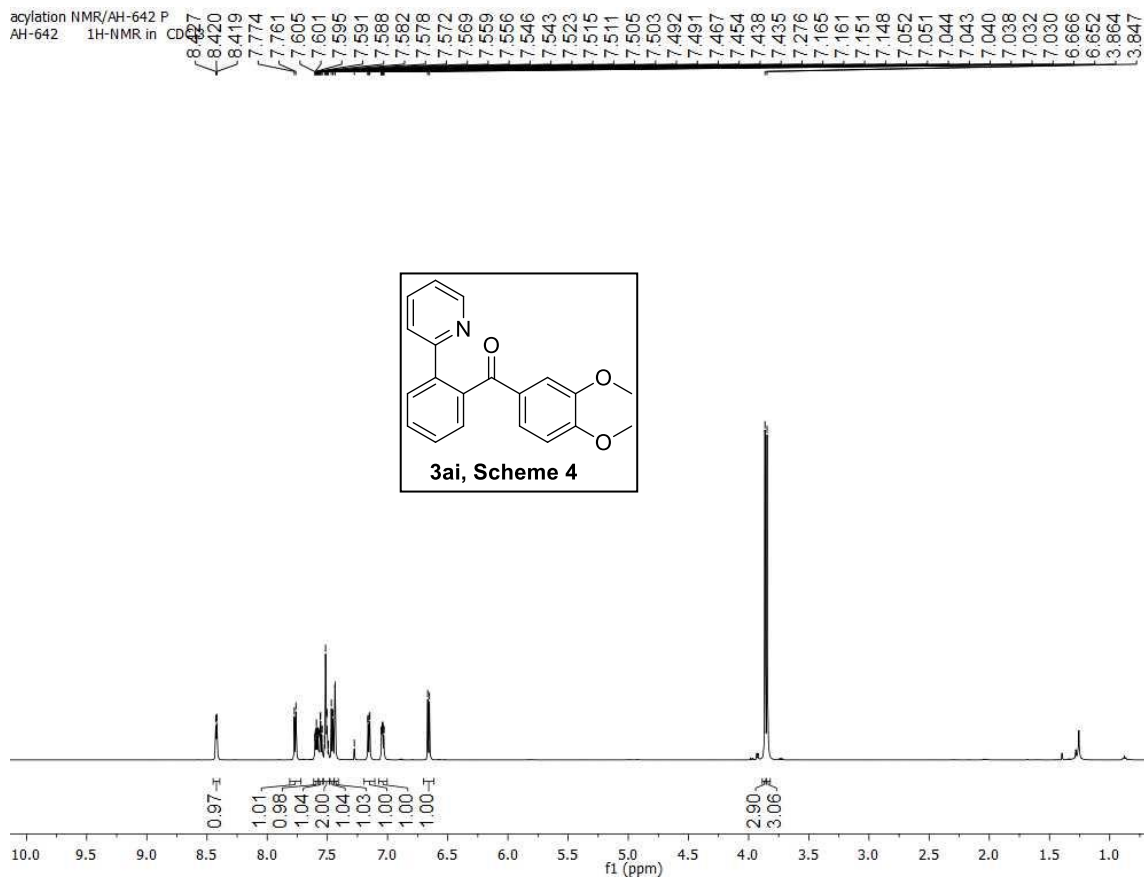
acylation NMR/AH-643 P
AH-643 1H-NMR in CDCl3



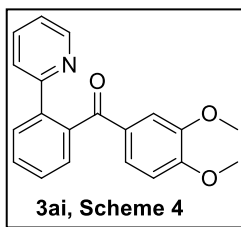
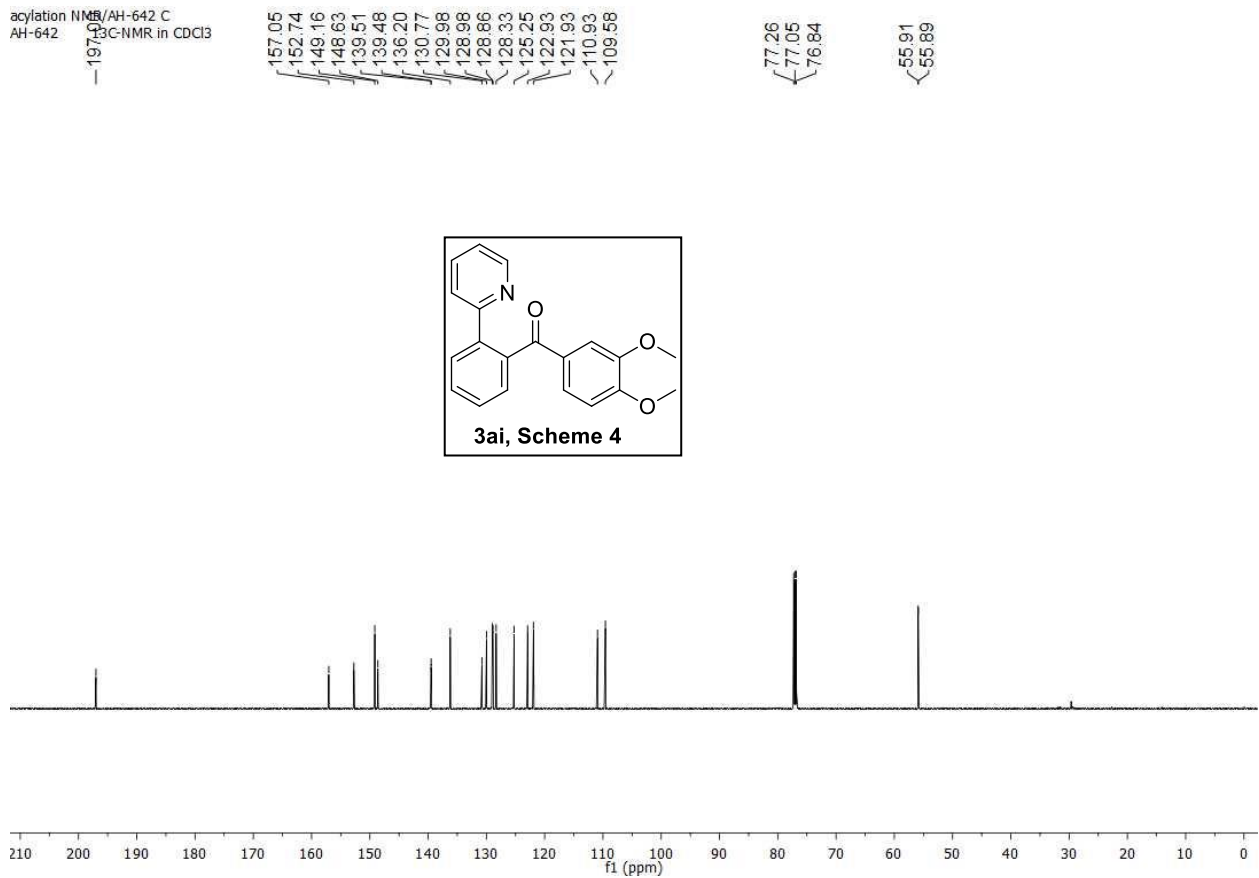
acylation NMR/AH-643 C
AH-643 13C-NMR in CDCl3



acylation NMR/AH-642 P
AH-642 1H-NMR in CDCl₃



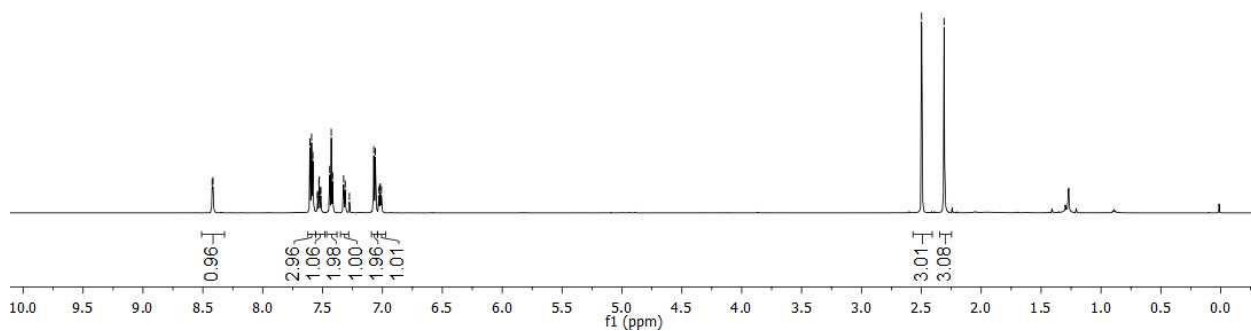
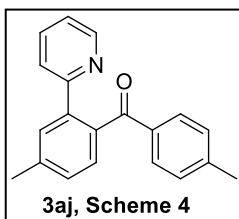
acylation NMR/AH-642 C
AH-642 13C-NMR in CDCl₃



acylation NMR/AH-628 P
AH-628 1H-NMR in CDCl₃

8.422
8.415
7.606
7.592
7.581
7.544
7.541
7.531
7.528
7.518
7.515
7.440
7.428
7.416
7.324
7.311
7.276
7.073
7.059
7.029
7.021
7.018
7.009

-2.498
-2.310



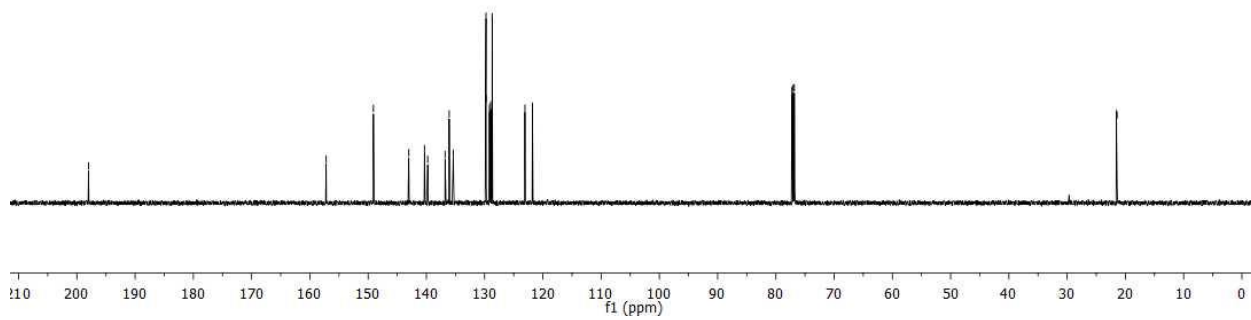
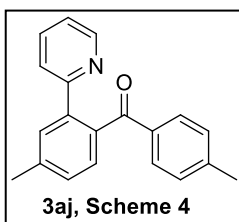
acylation NMR/AH-628 C
AH-628 13C-NMR in CDCl₃

197.93

157.21
149.09
143.02
140.32
139.77
136.79
136.08
135.38
129.76
129.73
129.17
128.97
128.70
123.07
121.78

77.26
77.04
76.83

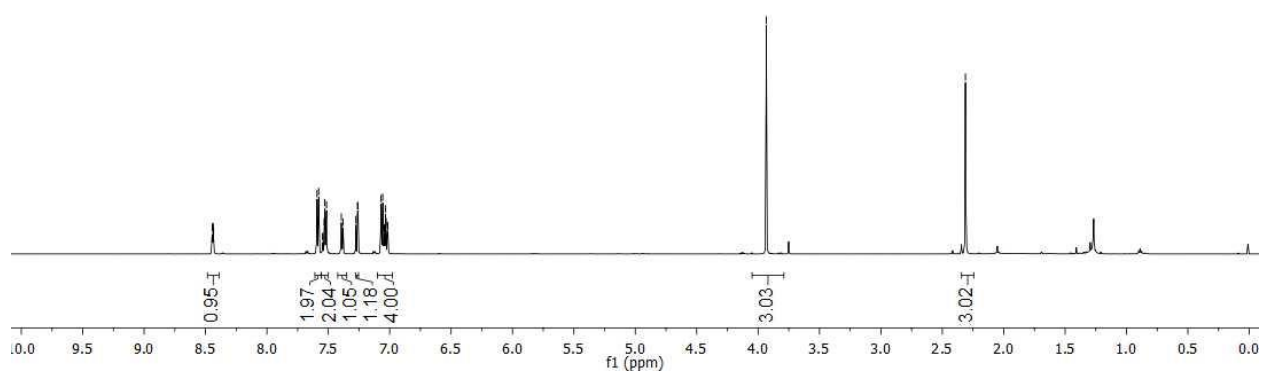
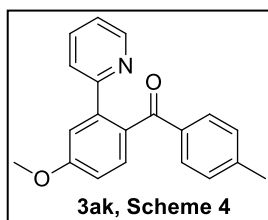
21.55
21.43



acylation NMR/AH-625 B
AH-625 1H-NMR in

8.415
8.414
8.439
8.437
8.434
7.592
7.578
7.547
7.544
7.534
7.529
7.521
7.518
7.515
7.394
7.381
7.276
7.263
7.258
7.070
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7.034
7.029
7.020
7.015
3.933

-2.312



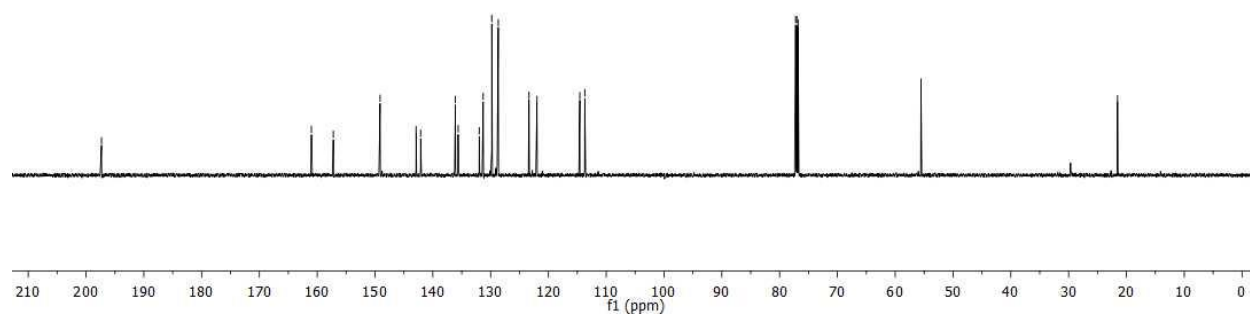
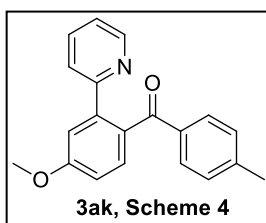
acylation NMR/AH-625 C
AH-625 13C-NMR in CDCl3

161.01
157.22
149.13
142.90
142.11
136.10
135.62
131.97
131.29
129.80
128.67
123.36
121.98
114.57
113.71

77.24
77.02
76.81

-55.54

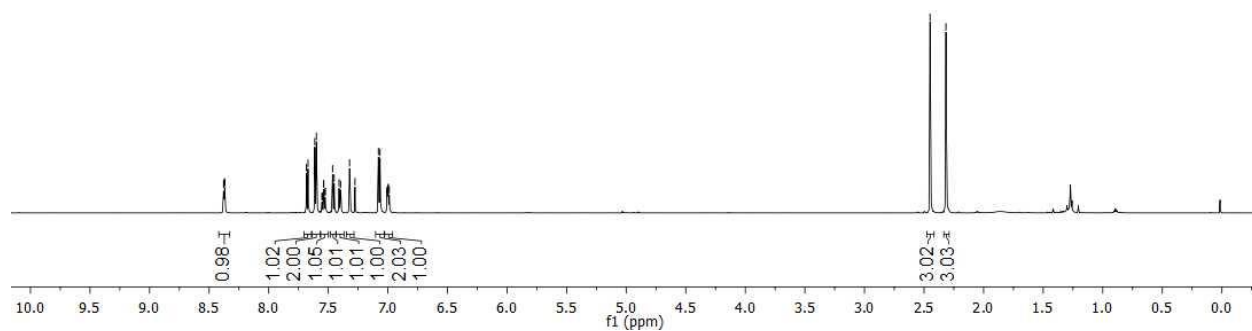
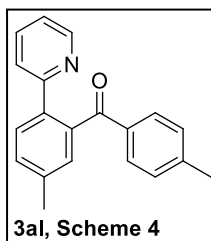
-21.53



acylation NMR/AH-626 P
AH-626 1H-NMR in CDCl₃

8.379
8.378
8.371
8.370
7.684
7.670
7.614
7.600
7.553
7.551
7.550
7.539
7.538
7.527
7.526
7.464
7.451
7.410
7.397
7.322
7.276
7.080
7.066
7.009
7.007
7.001
6.999
6.996
6.988

2.450
2.316



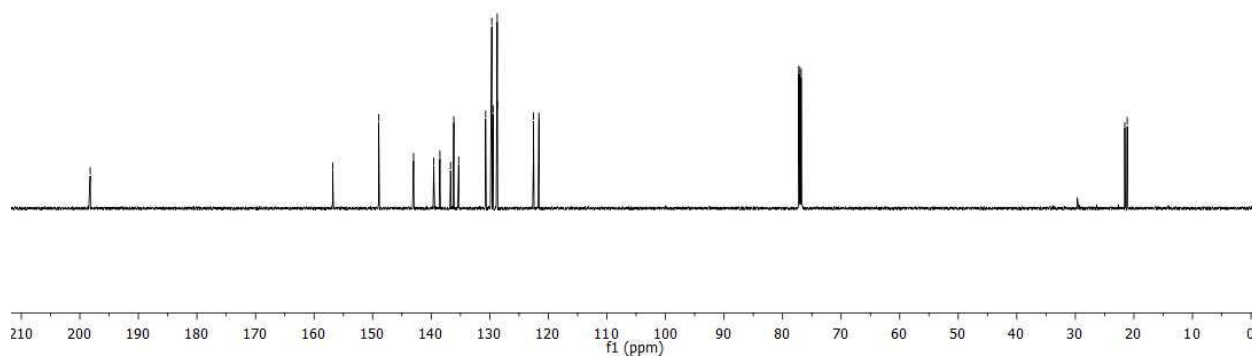
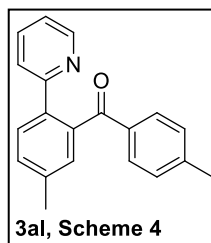
acylation NMR/AH-626 C
AH-626 13C-NMR in CDCl₃

198.96

156.82
148.96
143.01
139.57
138.51
136.69
136.14
135.31
130.71
129.66
129.43
128.72
128.70
122.55
121.61

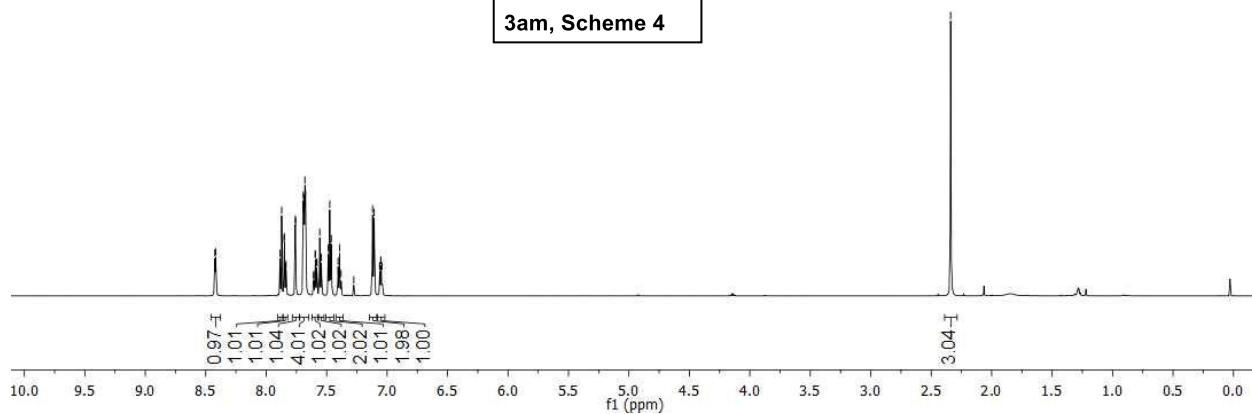
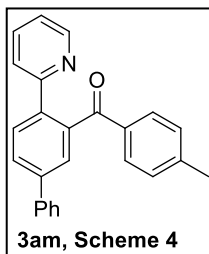
77.24
77.03
76.81

21.56
21.15



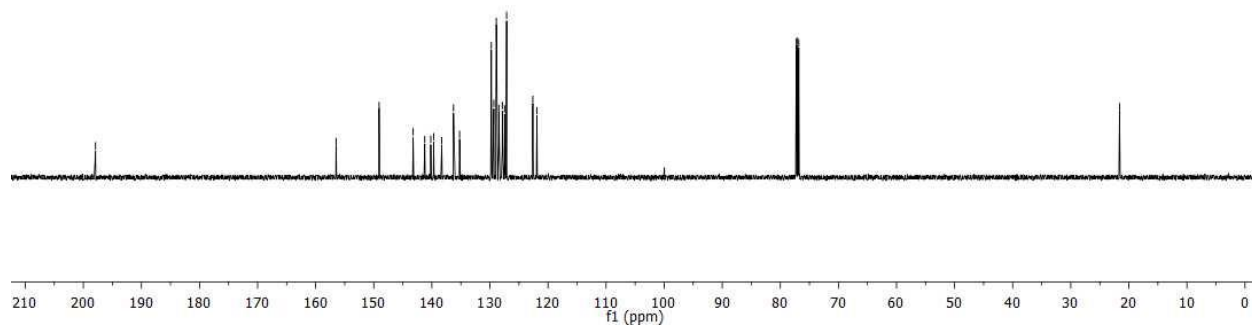
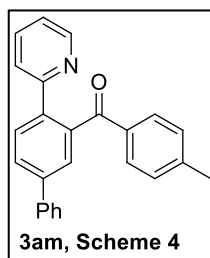
acylation NMR/AH-630 P
AH-630 1H-NMR in CDCl₃

8.424
8.417
7.885
7.872
7.852
7.849
7.839
7.836
7.759
7.756
7.693
7.688
7.686
7.680
7.674
7.608
7.605
7.595
7.593
7.583
7.580
7.557
7.544
7.487
7.474
7.461
7.405
7.393
7.381
7.276
7.120
7.107
7.062
7.061
7.052
7.050
7.042
2.339

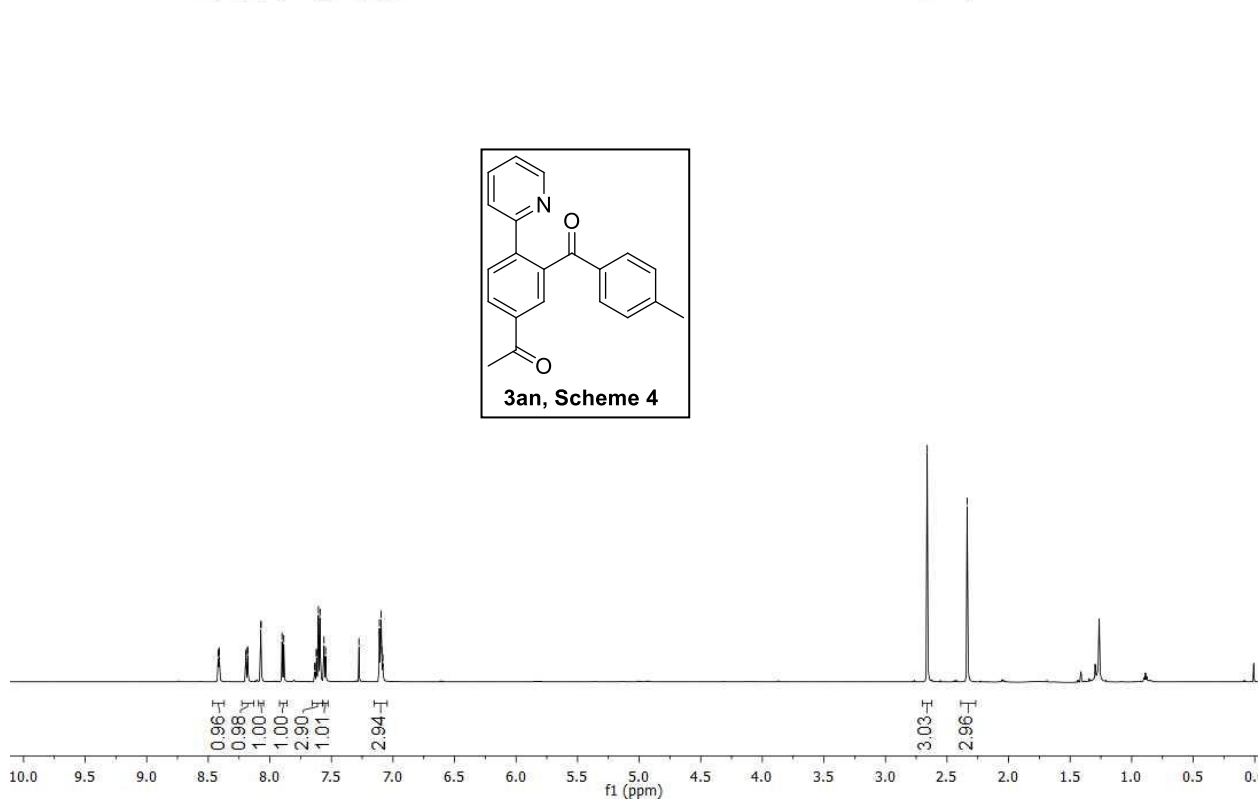


acylation NMR/AH-630 C
AH-630 13C-NMR in CDCl₃

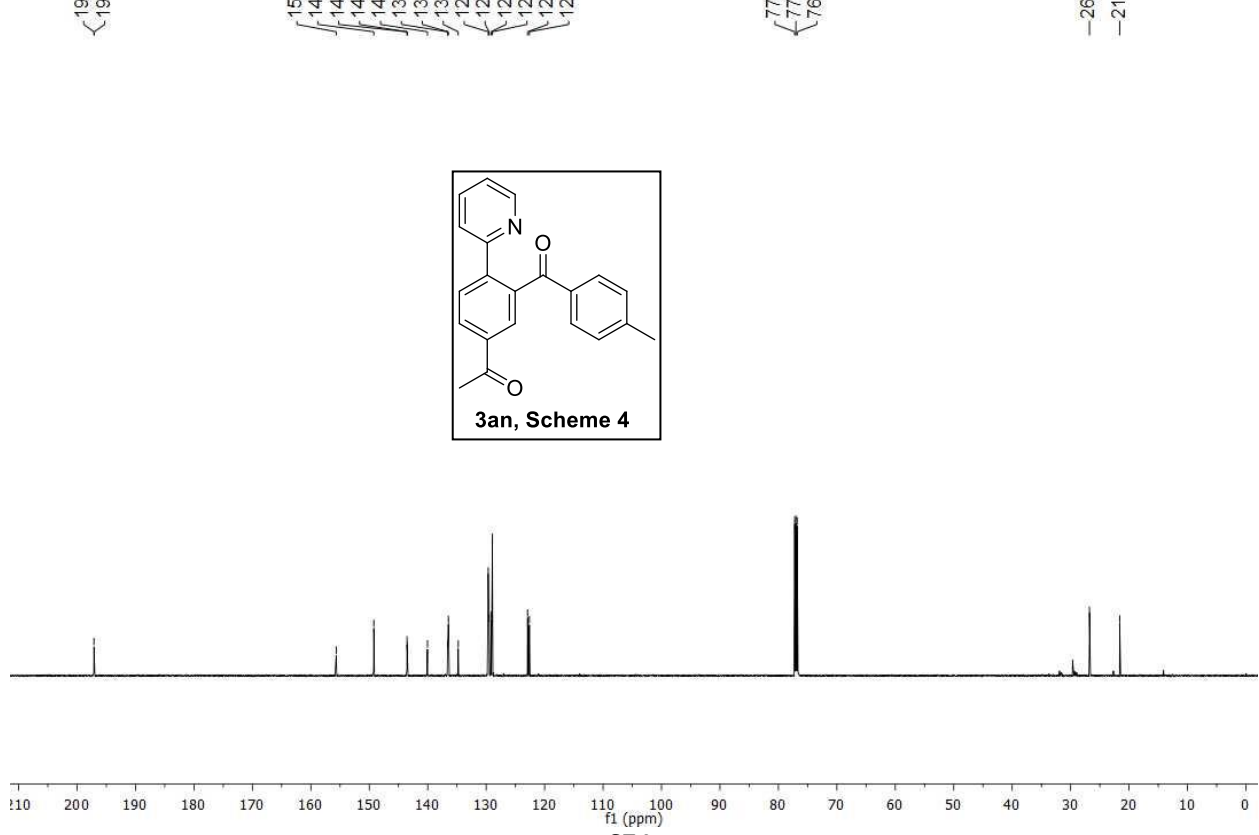
156.49
149.08
143.23
141.22
140.19
139.70
138.30
136.27
135.22
129.76
129.33
128.90
128.84
128.47
127.87
127.48
127.13
122.61
121.91
77.25
77.04
76.83
21.60



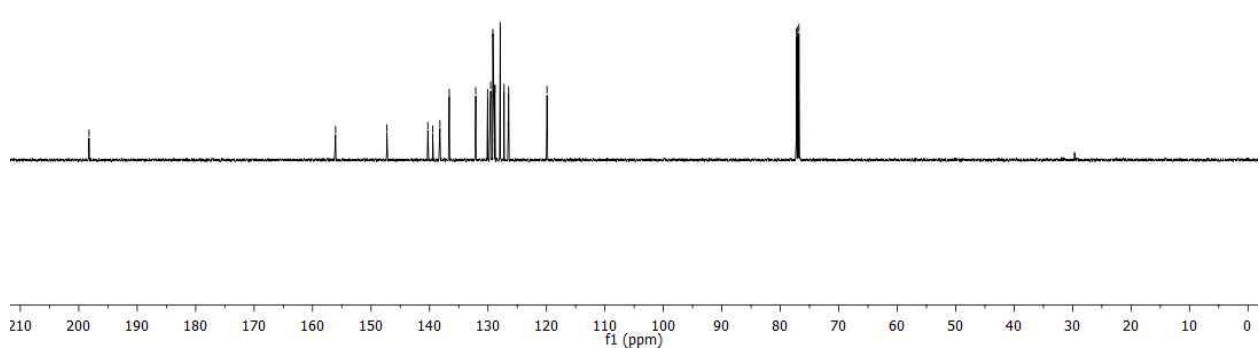
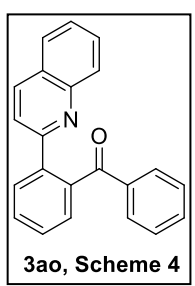
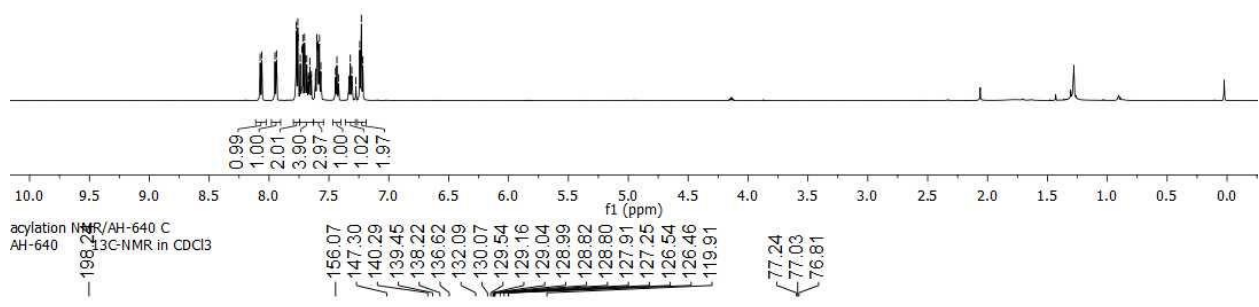
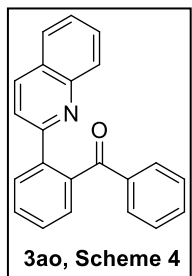
acylation NMR AH-627 C
 AH-627 NMR in CDCl₃



acylation NMR AH-627 C
 AH-627 NMR in CDCl₃

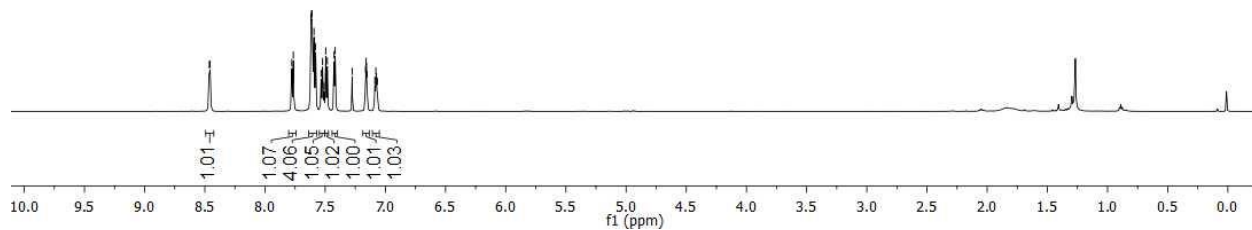
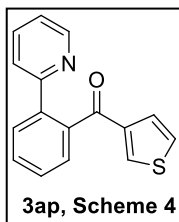


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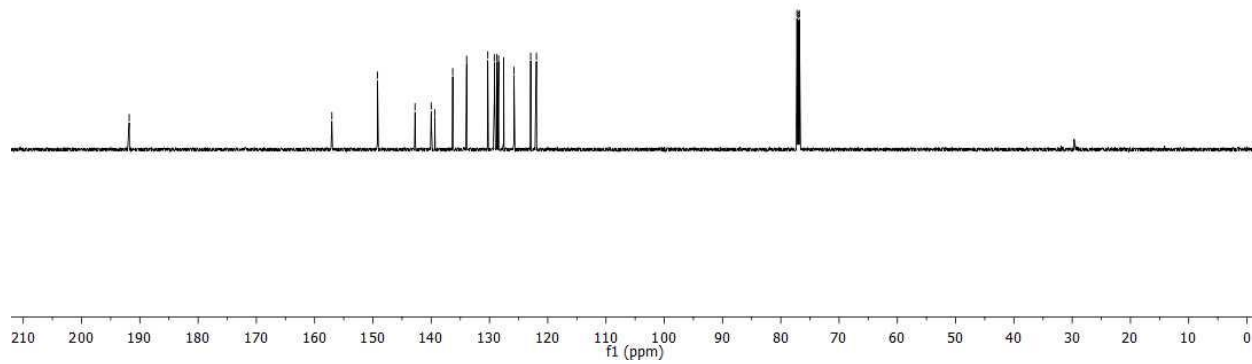
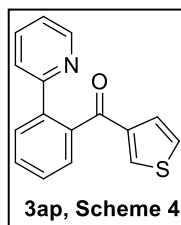
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 AH-644 1H-NMR in CDCl₃

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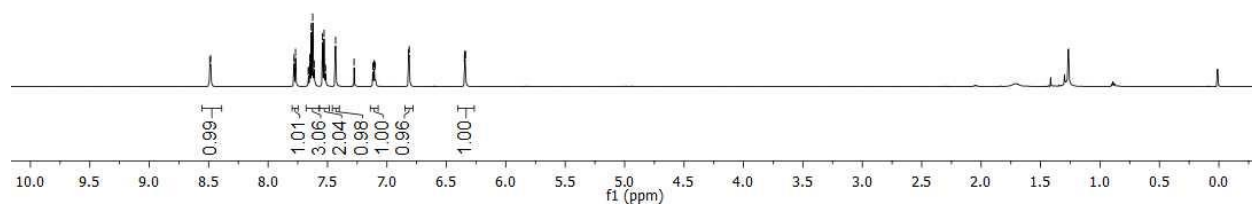
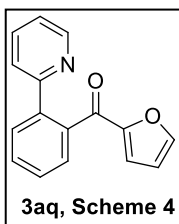
acylation NMR/AH-644 C
 AH-644 13C-NMR in CDCl₃

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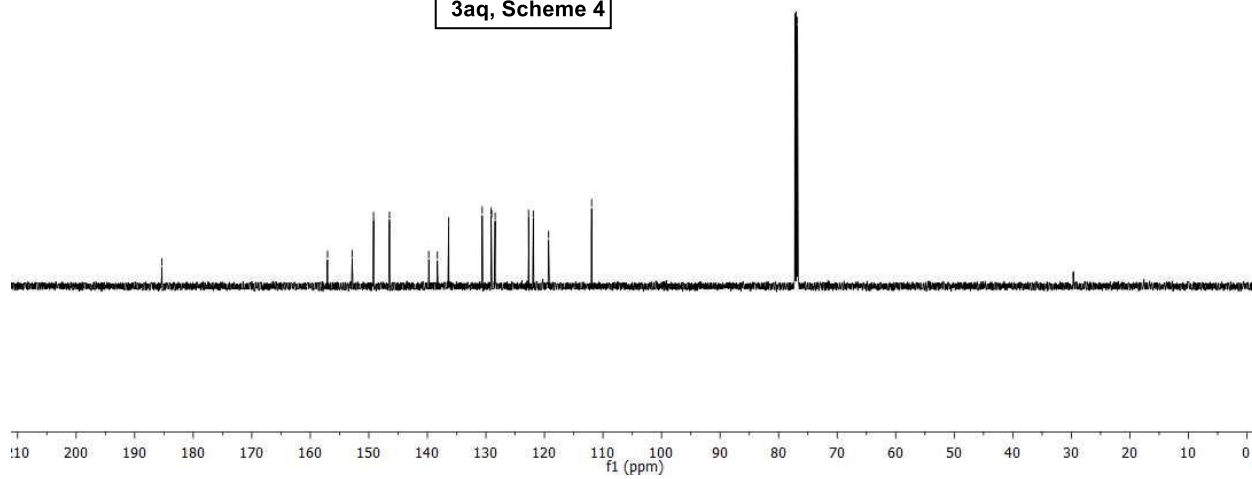
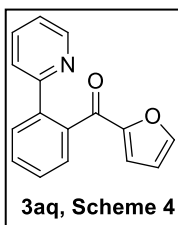
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 AH-645 1H-NMR in CDCl₃

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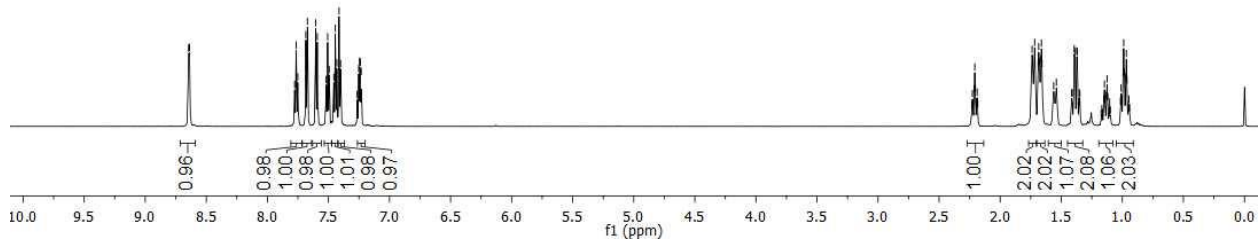
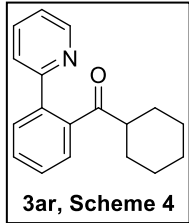


acylation NMR/AH-645 C
 AH-645 13C-NMR in CDCl₃

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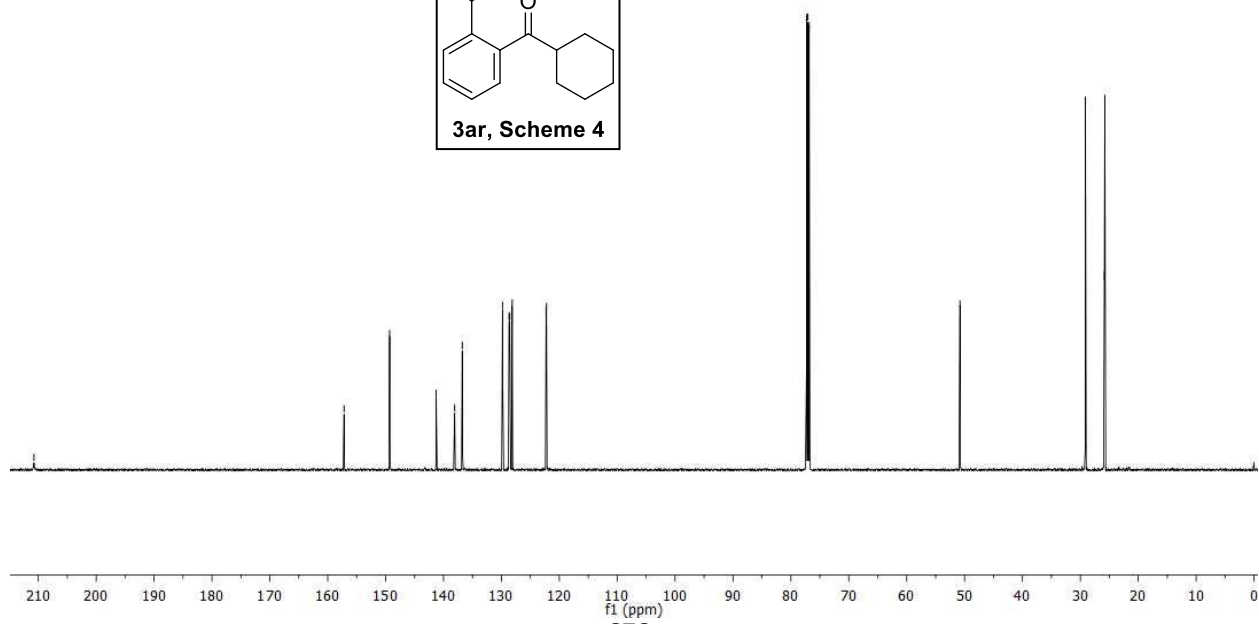
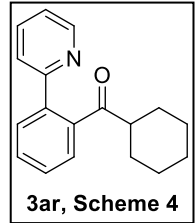


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acq101001
 AH-667
 13C-NMR in CDCl3

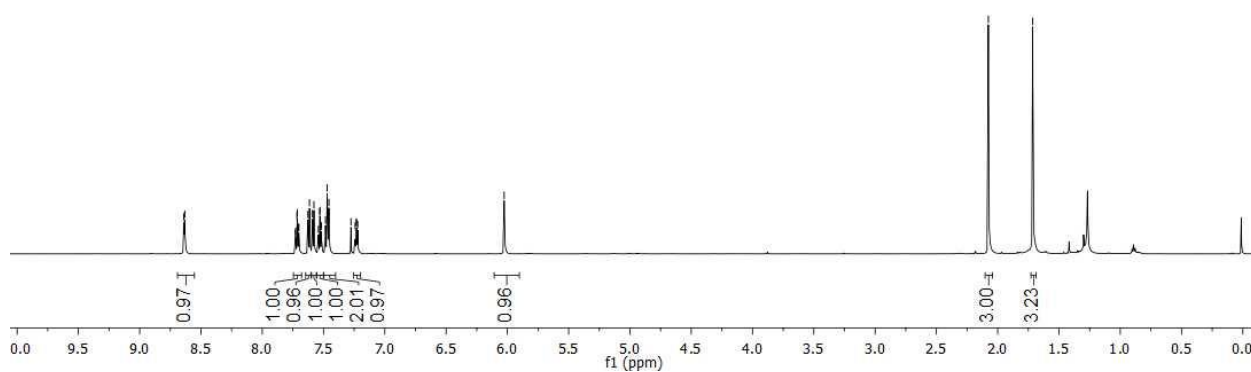
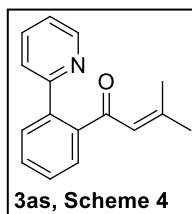
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 128.68
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 122.29
 122.22
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 77.06
 76.85
 50.79
 29.12
 25.86
 25.77



acylation NMR/AH-651 R
AH-651 1H-NMR in

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7.727
7.717
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7.702
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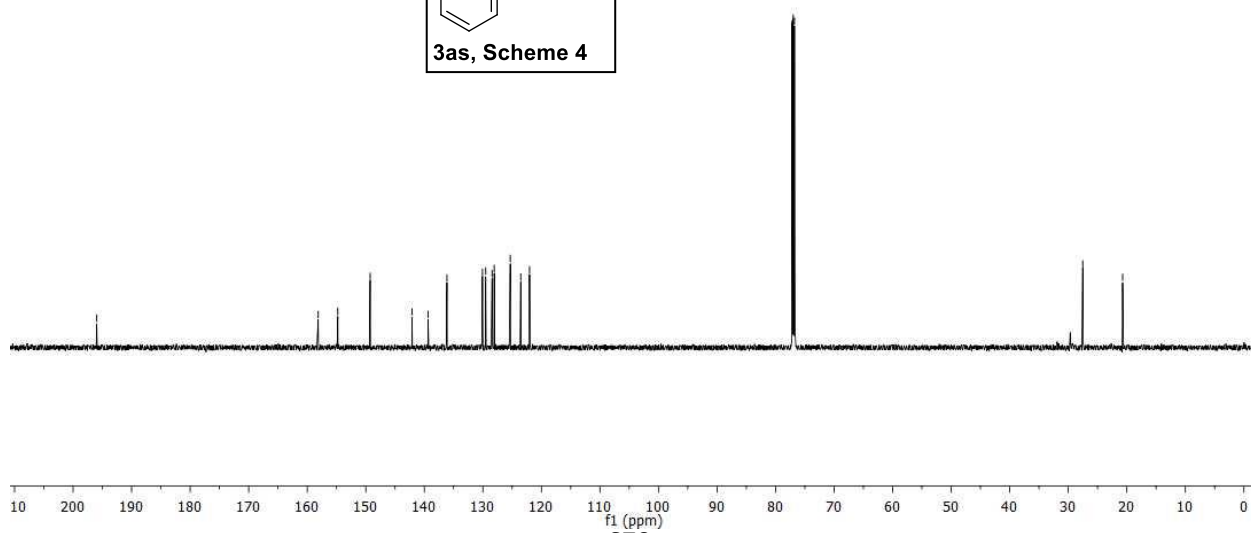
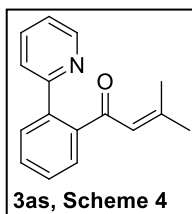


acylation NMR/AH-651 C
AH-651 13C-NMR in CDCl3

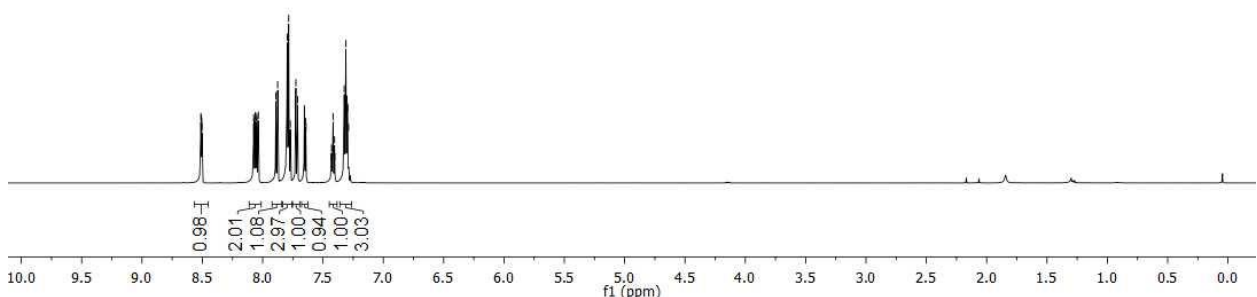
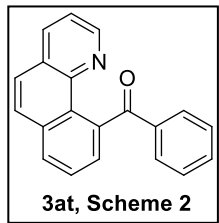
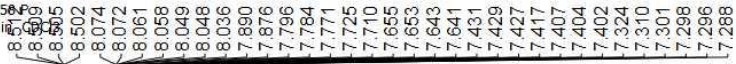
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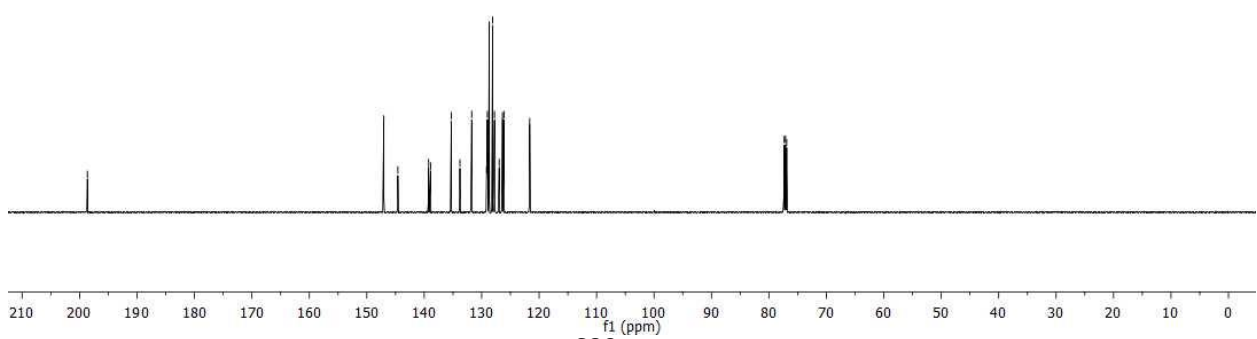
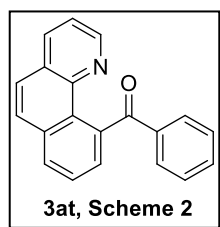
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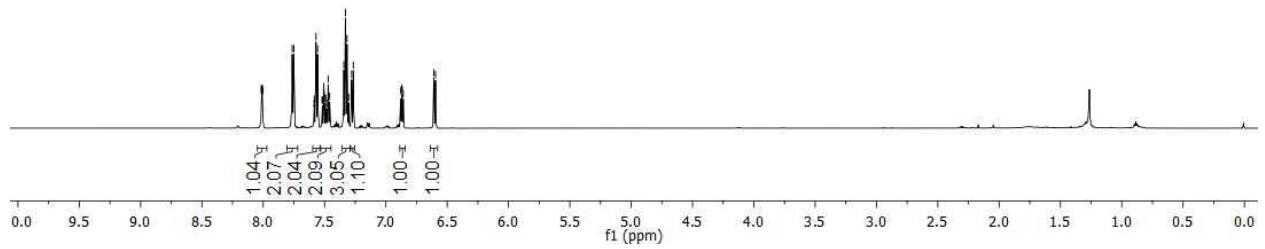
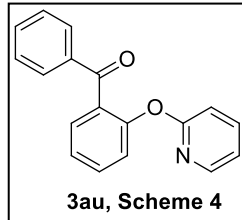
acylation NMR/AH-658 C
 AH-658 1H-NMR in CDCl₃



acylation NMR/AH-658 C
 AH-658 13C-NMR in CDCl₃

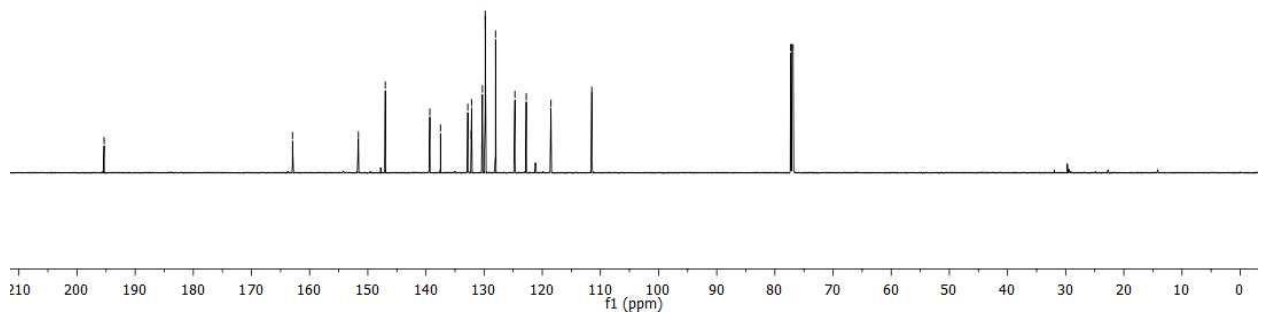
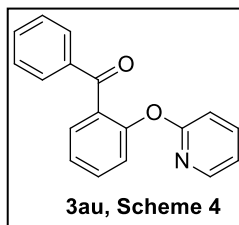


acylation NMR AH-669 C
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 6.595

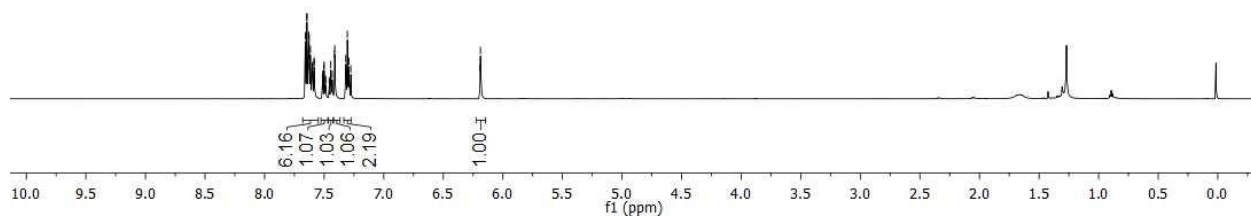
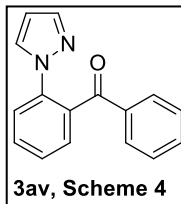


acylation NMR AH-669 C
 AH-669 13C NMR in CDCl3

195.3
 162.95
 151.62
 146.99
 139.33
 137.50
 132.80
 132.22
 132.15
 130.29
 129.81
 128.03
 124.70
 122.76
 118.51
 111.49
 77.29
 77.08
 76.87

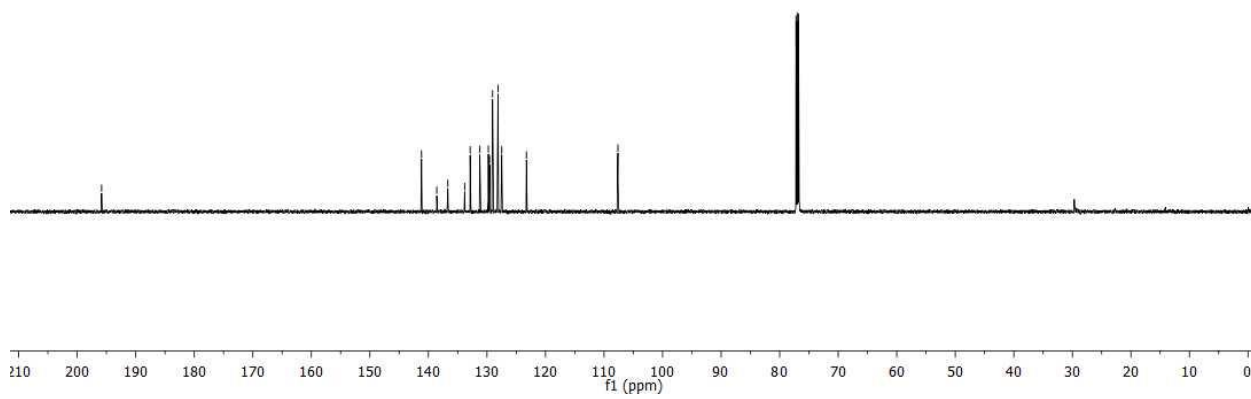
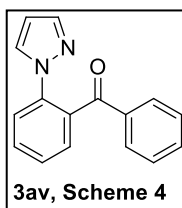


acylation NMR AH-656 C
 AH-656 13C NMR in CDCl₃
 7.738, 7.711, 7.683, 7.655, 7.627, 7.599, 7.596, 7.596, 7.585, 7.584, 7.502, 7.500, 7.445, 7.414, 7.411, 7.319, 7.305, 7.293, 7.277, 6.189, 6.185



acylation NMR AH-656 C
 AH-656 13C NMR in CDCl₃

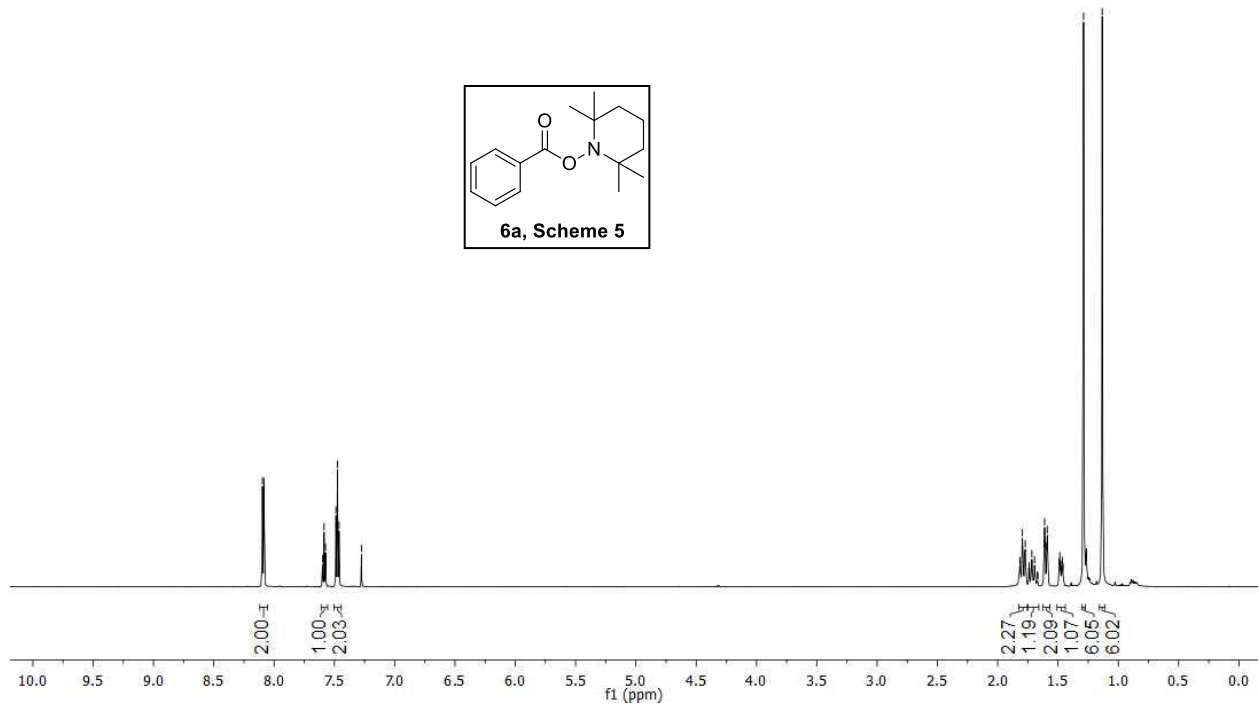
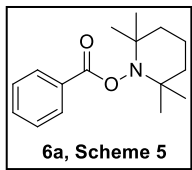
195.32, 141.18, 138.58, 136.69, 133.80, 132.87, 131.22, 129.76, 129.55, 129.04, 128.11, 127.48, 123.25, 107.63, 77.21, 76.99, 76.78



RJ-0517/3
AH-723 1H-NMR in CDCl₃

8.096
8.084
8.083
7.598
7.586
7.573
7.487
7.474
7.461
7.275

1.817
1.812
1.796
1.772
1.743
1.739
1.734
1.717
1.695
1.672
1.667
1.616
1.611
1.594
1.589
1.480
1.485
1.480
1.474
1.469
1.463
1.457
1.288
1.134



RJ-0517/4
AH-723 13C-NMR in CDCl₃

166.37
132.83
129.67
129.54
128.42
77.24
77.03
76.82
60.38
39.02
31.94
20.83
16.98

