Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

An efficient solvent and temperature tuned access to aldoxime ethers and phenolic functions by Pd-catalyzed C–O cross-coupling of aldoximes with aryl bromides and bromo-chalcones

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General Considerations

All reactions were carried out in flame dried 10 mL two-neck R. B. flask under argon atmosphere. All phosphine ligands, Pd-catalyst such as $[Pd_2(dba)_3]$, $Pd(OAc)_2$, $[(\pi\text{-allylPdCl})_2]$, $[(\pi\text{-cinnamylPdCl})_2]$ were purchased from Sigma-Aldrich and Sterm Chemicals. Dry anhydrous toluene and Cs_2CO_3 were purchased from spectrochemPvt. Ltd., India and purged with nitrogen after every use. All other substituted benzaldehydes, substituted acetophenones and other common reagents were purchased from SpectrochemPvt. Ltd., India, and other common suppliers. Chalcones were prepared by base (KOH) catalysed condensationof acetophenones with benzaldehydes in ethanol. The chalcones thus obtained were then purified either by recrystallization or column chromatography. The Pd-catalyzed cross-coupling products were purified by column chromatography on silica gel (60-120 mesh) using ethyl acetate and hexane mixture as eluent. All the reactions were monitored by thin layer chromatography (TLC) on pre-coated silica gel (Merck Silica gel 60, F_{254}) plates and visualized under light.

Analytical Methods

NMR data were obtained on Jeol 400 MHz spectrometers. All compounds were characterized by ^1H, ^{13}C NMR (399.78 MHz, 100.5 MHz respectively), IR, and HRMS. All ^1H and ^{13}C chemical shifts are reported in parts per million (ppm) and were measured relative to TMS or residual $CDCl_3$ solvent peak. FT-IR spectra were recorded on Perkin-Elmer model RXI using KBr disc. HRMS (ESI) measurements were performed on Thermo Scientific Orbitrap Elite Hybrid Ion Trap-Orbitrap Mass Spectrometer. Melting points were recorded on Buchi M-560 instruments and were uncorrected. Yields referred to isolated compounds.

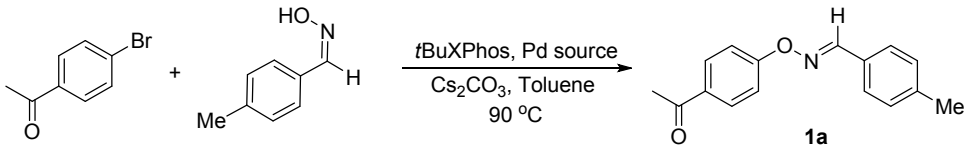
General Procedure for the Pd-Catalyzed C O Cross-Coupling Reaction of Aryl Bromides and Bromo-chalcones with Aldoximes

An oven dried 10 mL two-neck round bottomed flask was equipped with a magnetic stir bar, a rubber septum, condenser and an argon balloon on the top of the condenser with the aid of an adaptor. The flask was charged with Cs_2CO_3 and dried with hot air gun under vacuum. The R.B. flask was allowed to cool under argon atmosphere. Bromo coupling partners, aldoximes, Pd-source and ligands were added in quick succession. The flask was then evacuated and refilled with argon for three times.To this, 2.0 mL of suitable anhydrous solvent for oxime ethers or

hydroxyl compoundswas added via syringe and again the flask was flushed with argon for three times. The flask was placed in a pre-heated oil bath at optimized temperature. The reaction mixture was stirred vigorously until completion of the reaction as indicated by TLC analysis. The reaction mixture was allowed to cool to room temperature and the crude product was purified by column chromatography on silica gel (60-120 mesh size) using ethyl acetate in hexane as eluent. The solvent removal under reduced pressure afforded the desired compounds as a solid.

Experimental Details and Characterization of the Compounds

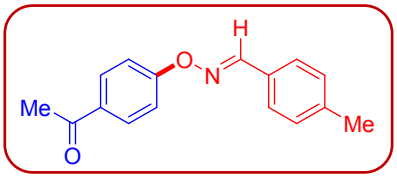
Table 1. Palladium source screen for the Pd-catalyzed coupling of4'-bromoacetophenone with 4-methylbenzaldoxime[a]



Pd Source (1.0 mol %)	**Reaction Time (h)**	**Yield (%)[b]**
$[Pd_2(dba)_3]$	7 h	72
$Pd(OAc)_2$	23 h	NR
$[(\pi\text{-cinnamylPdCl})_2]$	2 h	78
$Pd(PPh_3)_4$	23 h	NR
$[(\pi\text{-allylPdCl})_2]$	1.5	**83**

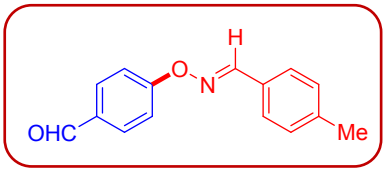
[a]ReactionConditions: 4'-Bromoacetophenone (0.5 mmol, 1.0 eq.), 4-methylbenzaldoxime (0.55 mmol, 1.1 eq.), Cs_2CO_3 (0.75 mmol, 1.5 eq.), Pd Source (1.0 mol %), *t*BuXPhos(**L2)** (2.5 mol %), toluene (2.0 mL), Ar atm. 90 °C, [b]Isolated yield; NR = No Reaction. ND = Not Determined.

(*E*)-4-Methylbenzaldehyde *O*-(4-acetylphenyl) oxime (1c)



The general procedure described above was followed to get the title compound from4'-bromoacetophenone (199 mg, 1.0mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05mmol), Cs_2CO_3 (488 mg, 1.5mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 ^oC. for 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a creamy white solid (215 mg, 85% yield). **m.p.**: 86.9-88.9^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm): 2.41 (s, 3H), 2.59 (s, 3H), 7.26(d, 2H, ^3J = 7.8 Hz), 7.31(d, 2H, ^3J= 8.9 Hz),7.63(d, 2H, ^3J = 8.2 Hz), 7.98(d, 2H, ^3J = 8.7 Hz), 8.42 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.73, 26.57, 114.08, 127.93, 128.23, 129.82, 130.61, 131.58, 141.70, 152.99, 163.33, 197.18; **IR** (KBr) ν = 698, 711, 822, 838, 935, 961, 1112, 1162, 1233, 1274, 1304, 1357, 1503, 1596, 1668, 2361, 2918cm^{-1}; **HRMS (ESI)**calcd. for $C_{16}H_{15}NO_2$: $[M+H]^+$ 254.1181; Found: 254.1178; $[M+Na]^+$ 276.1000; Found: 276.0992.

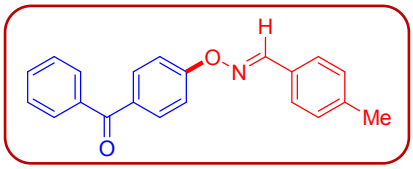
(*E*)-4-(((4-Methylbenzylidene)amino)oxy)benzaldehyde (2c)



The general procedure described above was followed to get the title compound from4-bromobenzaldehyde (185 mg, 1.0mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 ^oC for 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid (215 mg, 90% yield). **m.p.**: 78.9-80.5^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 7.26 (d, 2H, ^3J = 7.7 Hz), 7.39 (d, 2H, ^3J= 8.5 Hz), 7.63 (d, 2H, ^3J = 7.5 Hz), 7.88 (d, 2H, ^3J = 8.4 Hz), 8.43 (s, 1H), 9.92 (s, 1H);**^{13}C NMR**

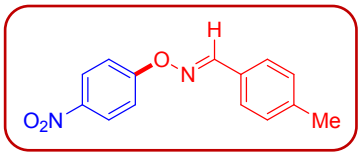
(100 MHz, $CDCl_3$) δ (ppm): 21.72, 114.63, 127.96, 128.05, 129.83, 131.12, 132.00, 141.83, 153.26, 164.35, 191.14; **IR** (KBr) v = 2917, 2729, 1697, 1604, 1502, 1354, 1313, 1293, 1244, 1153, 1107, 1035, 963, 927, 825, 806, 758, 708, 640cm^{-1}; **HRMS (ESI)**calcd. for $C_{15}H_{13}NO_2$: $[M+H]^+$ 240.1025; Found: 240.1021; $[M+Na]^+$ 262.0844; Found: 262.0841.

(*E*)-4-Methylbenzaldehyde *O*-(4-benzoylphenyl) oxime(3c)



The general procedure described above was followed to get the title compound from4-bromobenzophenone (261 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2**) (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 ^oC for 24 hour.The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a creamy yellow solid (309 mg, 98% yield). **m.p.**: 78.5-81.2^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 7.26 (d, 2H, ^3J = 7.6 Hz), 7.34 (d, 2H, ^3J= 8.9 Hz), 7.47-7.50 (t, 2H), 7.57 (d, 1H, ^3J = 7.3 Hz), 7.63 (d, 2H, ^3J = 8.0 Hz), 7.78 (d, 2H, ^3J = 8.3 Hz), 7.87 (d, 2H, ^3J = 8.7 Hz), 8.43 (s, 1H);**^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.71, 113.93, 127.91, 128.23, 128.33, 129.78, 129.95, 131.48, 132.11, 132.52, 138.35, 141.66, 152.96, 163.02, 195.81; **IR** (KBr) v = 2916, 2716, 1669, 1604, 1502, 1390, 1354, 1313, 1293, 1244, 1211, 1107, 1035, 963, 927, 825, 806, 758, 620cm^{-1}; **HRMS (ESI)**calcd. for $C_{21}H_{17}NO_2$: $[M+H]^+$ 316.1338; Found: 316.1334.

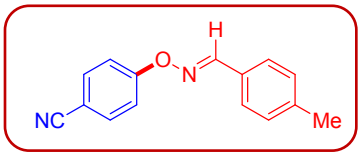
(*E*)-4-Methylbenzaldehyde *O*-(4-nitrophenyl) oxime(4c)



The general procedure described above was followed to get the title compound from4-bromonitrobenzene (202 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2**)

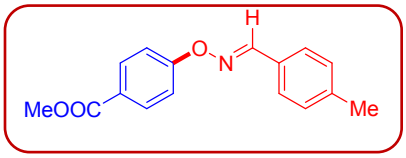
(10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 °Cfor 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a yellow solid (250 mg, 97% yield). **m.p.**: 130.2-132.2 °C;**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.42 (s, 3H), 7.27 (d, 2H, ^3J = 7.3 Hz), 7.35 (d, 2H, ^3J= 9.4 Hz), 7.63 (d, 2H, ^3J = 7.9 Hz), 8.24 (d, 2H, ^3J = 9.1 Hz), 8.44 (s, 1H);**^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.75, 114.36, 125.91, 127.77, 128.05, 129.89, 142.12, 142.54, 153.78, 164.27; **IR** (KBr) v = 2362, 1719, 1602, 1503, 1435, 1352, 1283, 1230, 1158, 1114, 1007, 971, 916, 900, 850, 811, 766, 693cm^{-1};**HRMS (ESI)**calcd. for $C_{14}H_{12}N_2O_2$: $[M+H]^+$ 257.0926; Found: 257.0924.

(*E*)-4-(((4-Methylbenzylidene)amino)oxy)benzonitrile (5c)



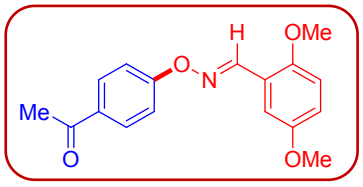
The general procedure described above was followed to get the title compound from4-bromobenzonitrile (182 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 °C for 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a creamy white solid (189 mg, 80% yield). **m.p.**: 94.2-96.3°C;**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 7.26 (d, 2H, ^3J = 7.9 Hz), 7.33 (d, 2H, ^3J = 8.9 Hz), 7.60-7.64 (m, 4H), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.75, 105.30, 115.06, 119.36, 127.91, 127.96, 129.85, 134.02, 141.95, 153.36, 162.66; **IR** (KBr) v =2366, 1719, 1602, 1503, 1435, 1391, 1352, 1230, 1193, 1179, 1158, 1114, 1036, 1007, 971, 943, 916, 900, 850, 811, 766, 693cm^{-1};**HRMS (ESI) calcd**. for $C_{15}H_{12}N_2O_2$: $[M+H]^+$ 237.1028; Found: 237.1021; $[M+Na]^+$ 259.0847.; Found: 259.0842.

(*E*)-Methyl 4-(((4-Methylbenzylidene)amino)oxy)benzoate (6c)



The general procedure described above was followed to get the title compound from methyl 4-bromobenzoate (215 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %),*t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 ^oC for 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as acreamy white solid (258 mg, 96% yield). **m.p.**: 86.2-87.4^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 3.90 (s, 3H), 7.25 (d, 2H, ^3J = 7.8 Hz), 7.29(d, 2H, ^3J= 9.0 Hz), 7.62 (d, 2H, ^3J = 8.0 Hz), 8.04 (d, 2H, ^3J = 8.7 Hz), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.73, 52.06, 113.97, 123.93, 127.89, 128.26, 129.78, 131.60, 141.61, 152.80, 163.15, 166.99; **IR** (KBr) ν = 2362, 1719 1602, 1503, 1391, 1283, 1230, 1193, 1179, 1158, 1114, 1036, 971, 943, 915, 850, 766, 707, 693 cm^{-1}; **HRMS (ESI) calcd**. for $C_{16}H_{15}NO_3$: $[M+H]^+$ 270.1130; Found: 270.1129.

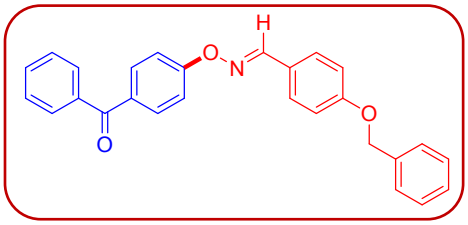
(*E*)-2,5-Dimethoxybenzaldehyde *O*-(4-acetylphenyl) oxime (7c) *E:Z* (3.3 : 1)



The general procedure described above was followed to get the title compound from 4'-bromoacetophenone (199 mg, 1.0 mmol), (*E*)-2,5-dimethoxybenzaldehyde oxime (190 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 ^oC for 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a yellow solid (250 mg, 83% yield). **m.p.**: 136.8-138.7^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):**Isomer *E*:**2.85 (s, 3H),3.84 (s, 3H), 3.85 (s, 3H), 6.98 (d, 1H, ^3J = 9.2 Hz), 6.98-7.01 (m, 1H), 7.30 (d, 2H, ^3J= 8.8 Hz), 7.47 (d, 1H, ^3J = 3.2 Hz), 7.97 (d,

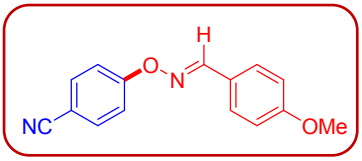
2H, ^3J = 8.7 Hz), 8.83 (s, 1H);**^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 26.58, 55.38, 55.99, 110.79, 112.84, 114.07, 118.88, 130.60, 131.46, 149.06, 152.93, 153.70, 163.40, 197.30; **Isomer *Z* :** 26.46, 56.06, 56.52, 112.68, 115.50, 116.55, 117.66, 119.90, 120.98, 131.02, 153.24, 155.86;**IR** (KBr) ν = 2918, 2847, 2225, 1665, 1596, 1499, 1462, 1417, 1353, 1228, 1162, 1144, 1042, 927, 836, 810, 722, 693, 614cm^{-1}; **HRMS (ESI) calcd**. for $C_{17}H_{17}NO_4$: $[M+H]^+$ 300.1236; Found: 300.1232; $[M+Na]^+$ 322.1055; Found: 322.1052.

(*E*)-4-(Benzyloxy)benzaldehyde*O*-(4-benzoylphenyl) oxime (8c)



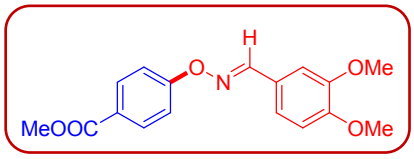
The general procedure described above was followed to get the title compound from4-bromobenzophenone (261 mg, 1.0 mmol), (*E*)-4-(benzyloxy)benzaldehydeoxime (238 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %),*t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 ^{o}C for 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (400 mg, 98% yield). **m.p.**: 89.2-91.2^{o}C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):5.13 (s, 2H), 7.04 (d, 2H, ^3J = 8.6 Hz), 7.33 (d, 2H, ^3J= 8.6 Hz), 7.39-7.50 (m, 7H), 7.56-7.60 (t, 1H), 7.68 (d, 2H, ^3J = 8.6 Hz), 7.79 (d, 2H, ^3J = 7.8 Hz), 7.86 (d, 2H, ^3J = 8.7 Hz), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 70.22, 113.90, 115.41, 123.75, 127.62, 128.34, 128.82, 129.58, 129.95, 131.34, 132.11, 132.55, 136.44, 138.33, 152.49, 161.16, 163.08, 195.89; **IR** (KBr) ν = 2225, 1650, 1592, 1500, 1444, 1617, 1393, 1356, 1316, 1308, 1280, 1249, 1174, 1159, 1113, 994, 920, 847, 834, 737, 696, 680, 648, 630, 616cm^{-1}; **HRMS (ESI) calcd**. for $C_{27}H_{21}NO_3$: $[M+H]^+$ 408.1600; Found: 408.1596; $[M+K]^+$ 446.1159; Found: 446.1195.

(*E*)-4-(((4-Methoxybenzylidene)amino)oxy)benzonitrile(9c)



The general procedure described above was followed to get the title compound from4-bromobenzonitrile (182 mg, 1.0 mmol), (*E*)-4-methoxybenzaldehyde oxime (158 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 $^oC$for 24 hour.The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a creamy brown solid (130 mg, 91% yield).**m.p**.: 126.5-128.9^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):3.86 (s, 3H), 6.96 (d, 2H, ^3J = 8.6 Hz), 7.32 (d, 2H, ^3J= 8.8 Hz), 7.62 (d, 2H, ^3J = 8.6 Hz), 7.66 (d, 2H, ^3J = 8.7 Hz), 8.38 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 55.54, 105.20, 114.60, 115.03, 119.34, 123.22, 129.63, 133.97, 152.97, 162.22, 162.73; **IR** (KBr) ν = 2221, 1603, 1499, 1469, 1442, 1425, 1390, 1350, 1311, 1238, 1189, 1175, 1162, 1110, 1030, 957, 921, 827, 776, 720, 649, 637cm^{-1}; **HRMS (ESI) calcd**. for $C_{15}H_{12}N_2O_2$: $[M+H]^+$ 253.0977; Found: 253.0975; $[M+Na]^+$ 275.0796; Found: 275.0794.

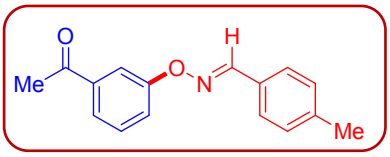
(*E*)-Methyl 4-(((3,4-dimethoxybenzylidene)amino)oxy)benzoate (10c)



The general procedure described above was followed to get the title compound frommethyl 4-bromobenzoate (215 mg, 1.0 mmol), (*E*)-3,4-dimethoxybenzaldehyde oxime (190 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 40 ^oC for 24 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (285 mg, 90% yield). **m.p.**: 73.5-75.8^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):3.90 (s, 3H), 3.93 (s, 3H), 3.97 (s, 3H), 6.19 (d, 1H, ^3J = 8.5 Hz), 7.16(d, 1H, ^3J= 8.3 Hz), 7.28(d, 2H, ^3J = 8.9 Hz), 7.37 (s, 1H), 8.04 (d, 2H, ^3J = 8.7 Hz), 8.37 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 52.05, 56.09, 56.11, 108.58, 110.93,

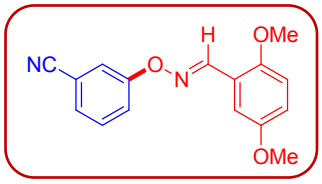
113.98, 123.03, 123.79, 123.88, 131.58, 149.55, 151.82, 152.75, 163.17, 167.03; **IR** (KBr) ν = 2221, 1603, 1469, 1142, 1349, 1311, 1238, 1175, 1162, 1110, 1030, 957, 921, 827, 776, 720, 631, 596cm^{-1}; **HRMS (ESI) calcd**. for $C_{17}H_{17}NO_5$: $[M+H]^+$ 316.1185; Found: 316.1182; $[M+Na]^+$ 338.1004; Found: 338.1002.

(*E*)-4-Methylbenzaldehyde *O*-(3-acetylphenyl) oxime (11c)



The general procedure described above was followed to get the title compound from3'-bromoacetophenone (199 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (7.3 mg, 2.0 mol %), RockPhos (**L7)** (23.4 mg, 5.0 mol %), with toluene as solvent (2.0 mL) were heated at 90^{o}C for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(244 mg, 88% yield). **m.p.**: 83.5-85.9^{o}C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm): 2.40 (s, 3H), 2.62 (s, 3H), 7.25 (d, 2H, ^3J = 7.8 Hz), 7.40-7.47 (m, 2H), 7.63 (d, 3H, ^3J = 7.8 Hz), 7.84 (s, 1H), 8.40 (s, 1H);**^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.68, 26.93, 114.17, 119.40, 122.35, 127.81, 128.41, 129.63, 129.74, 138.52, 141.41, 152.33, 159.77, 198.04; **IR** (KBr) ν = 2361, 1668, 1597, 1503, 1358, 1303, 1358, 1274, 1234, 1162, 1112, 961, 935, 838, 822, 711, 698cm^{-1}; **HRMS (ESI) calcd**. for $C_{16}H_{15}NO_2$: $[M+H]^+$ 254.1181; Found: 254.1184.

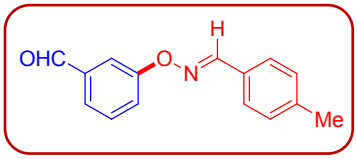
(*E*)-3-(((2,5-Dimethoxybenzylidene)amino)oxy)benzonitrile (12c) *E:Z* (3.3:2)



The general procedure described above was followed to get the title compound from3-bromobenzonitrile (182 mg, 1.0 mmol), (*E*)-2,5-dimethoxybenzaldehyde oxime (190 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (7.3 mg, 2.0 mol %), RockPhos (**L7)**

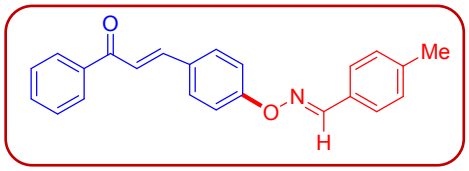
(23.4 mg, 5.0 mol %), with toluene as solvent (2.0 mL) were heated at 90 °C for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as acreamy white solid (240 mg, 85% yield). **m.p.**: 97.2-99.6°C;**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):**Isomer *E*:**3.84 (s, H), 3.85 (s, 3H), 6.89 (d, 1H, ^3J = 9.1 Hz), 7.01(d, 1H, ^3J = 9.0Hz),7.05-7.07 (m, 1H), 7.31(d,1H, ^3J= 6.6 Hz), 7.41-7.44 (m, 2H), 7.59 (s, 1H), 8.81 (s, 1H);**^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 56.00, 56.35, 101.76, 110.60, 112.70, 112.87, 113.08, 119.11, 119.66, 120.97, 125.85, 130.29, 149.06, 152.91, 153.72, 159.62; **Isomer *Z* :**56.03, 56.50, 117.64, 117.81, 118.87, 119.14, 120.75, 123.70, 130.38, 152.91, 153.24; **IR** (KBr) ν = 2221, 1603, 1514, 1491, 1470, 1442, 1425, 1391, 1350, 1311, 1238, 1175, 1162, 1110, 1030, 957, 921, 827, 756, 649cm^{-1}; **HRMS (ESI) calcd**. for $C_{16}H_{14}N_2O_2$: $[M+H]^+$ 283.1083; Found: 283.1080; $[M+Na]^+$ 305.0902; Found: 305.0899.

(*E*)-3-(((4-Methylbenzylidene)amino)oxy)benzaldehyde (13c)



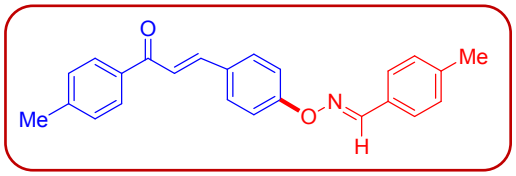
The general procedure described above was followed to get the title compound from3-bromobenzaldehyde (185 mg, 1.0mmol),(*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (7.3 mg, 2.0mol %), RockPhos (**L7)** (23.4 mg, 5.0 mol %), with toluene as solvent (2.0 mL) were heated at 90 °C for 1.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid (234 mg, 98% yield). **m.p.**: 72.5-74.5°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 7.25 (d, 2H, ^3J = 7.5Hz),7.49(d, 2H, ^3J= 4.8Hz),7.55-7.57 (m, 1H), 7.63(d, 2H, ^3J = 8.0Hz),7.80 (s, 1H), 8.42 (s, 1H), 10.02 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.72, 114.72, 120.80, 124.13, 127.85, 128.28, 129.78, 130.08, 137.78, 141.54, 152.56, 160.11, 192.31; **IR** (KBr) ν = 1696, 1578, 1511, 1480, 1437, 1382, 1347, 1316, 1285, 1255, 1172, 1126, 1078, 1041, 1000, 966, 913, 866, 794, 676cm^{-1}; **HRMS (ESI) calcd**. for $C_{15}H_{13}NO_2$: $[M+H]^+$ 240.1025; Found: 240.1020; $[M+Na]^+$ 262.0844; Found: 262.0839.

(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-oxo-3-phenylprop-1-en-1-yl)phenyl) oxime (16c)



The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-phenylprop-2-en-1-one (143 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 °C for 4.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid (135 mg, 79% yield). **m.p.**: 103.5-106.0°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 7.25 (d, 2H, ^3J = 6.9 Hz), 7.31 (d, 2H, ^3J = 8.8 Hz), 7.45 (d, 1H, ^3J = 15.6 Hz), 7.49-7.53 (t, 2H), 7.58 (d, 1H, ^3J = 7.3 Hz), 7.63 (d, 2H, ^3J = 7.2 Hz), 7.65 (d, 2H, ^3J = 8.4 Hz), 7.82 (d, 1H, ^3J = 15.5 Hz), 8.03 (d, 2H, ^3J = 7.1 Hz), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.71, 114.88, 120.22, 127.84, 128.34, 128.58, 128.71, 129.00, 129.77, 130.22, 132.75, 138.58, 141.53, 144.92, 152.60, 161.55, 190.84; **IR** (KBr) ν = 2366, 1668, 1578, 1498, 1459, 1428, 1388, 1325, 1298, 1274, 1217, 1158, 1101, 1041, 1016, 987, 932, 842, 817, 786, 745, 676, 662cm^{-1}; **HRMS (ESI) calcd**. for $C_{23}H_{19}NO_2$: $[M+H]^+$ 342.1494; Found: 342.1487; $[M+Na]^+$ 364.1313; Found: 364.1303.

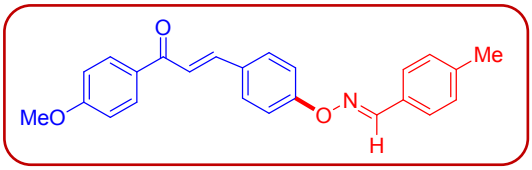
(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-oxo-3-(*p*-tolyl)prop-1-en-1-yl)phenyl) oxime (17c)



The general procedure described above was followed to get the title compound from (*E*)-3-(4-bromophenyl)-1-*p*-tolylprop-2-en-1-one (150 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 °C for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel

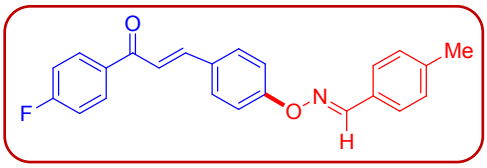
60-120 mesh) to afford the title compound as a light yellow solid (130 mg, 73% yield). **m.p.**: 105.2-107.8°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 2.44 (s, 3H), 7.25(d, 2H, ^3J = 7.8Hz), 7.30 (d, 2H, ^3J = 8.3Hz), 7.46 (d, 1H, ^3J = 15.6Hz),7.51-7.55 (m, 1H), 7.62(d,2H, ^3J = 7.7Hz), 7.64(d,1H, ^3J = 8.3Hz), 7.81 (d, 1H, ^3J = 15.6Hz), 7.94(d,2H, ^3J = 8.0Hz), 8.40 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.72, 21.82, 114.85, 120.17, 127.84, 128.34, 128.75, 129.09, 129.44, 129.77, 130.18, 132.19, 135.92, 141.52, 144.56, 152.57, 161.47, 190.44; **IR** (KBr) v = 1668, 1596, 1558, 1508, 1450, 1425, 1390, 1338, 1295, 1254, 1218, 1168, 1109, 1035, 1016, 998, 934, 838, 777, 725, 686, 663 cm^{-1};$C_{24}H_{21}NO_2$: $[M+H]^+$ 356.1651; Found: 356.1647; $[M+K]^+$ 394.1209; Found: 394.1221.

(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-(4-methoxyphenyl)-3-oxoprop-1-en-1-yl)phenyl) oxime (18c)



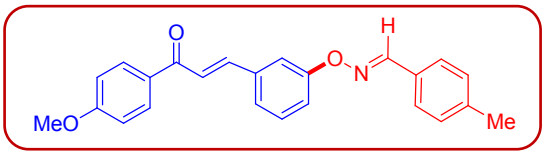
The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-(4-methoxyphenyl)prop-2-en-1-one (158 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 °C for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(144 mg, 74% yield). **m.p.**: 89.5-91.9°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 3.89 (s, 3H), 6.99 (d, 2H, ^3J = 9.0 Hz), 7.25 (d, 2H, ^3J = 8.0 Hz), 7.30 (d, 2H, ^3J = 8.9 Hz), 7.46 (d, 1H, ^3J = 15.5 Hz), 7.63 (d, 2H, ^3J = 8.0 Hz), 7.64 (d, 2H, ^3J = 8.5 Hz), 7.80 (d, 1H, ^3J = 15.6 Hz), 8.05 (d, 2H, ^3J = 8.9 Hz), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.74, 55.64, 113.94, 114.87, 120.00, 127.85, 128.39, 129.22, 129.79, 130.11, 130.91, 131.43, 141.53, 144.07, 152.56, 161.40, 163.45, 189.06; **IR** (KBr) v = 2365, 1660, 1578, 1509, 1456, 1425, 1395, 1338, 1295, 1243, 1218, 1165, 1108, 1038, 1018, 996, 930, 836, 777, 723, 686cm^{-1}; **HRMS (ESI) calcd**. for $C_{24}H_{21}NO_3$: $[M+H]^+$ 372.1600; Found: 372.1613; $[M+Na]^+$ 394.1419; Found: 394.1430.

(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-(4-fluorophenyl)-3-oxoprop-1-en-1-yl)phenyl) oxime (19c)



The general procedure described above was followed to get the title compound from (*E*)-3-(4-bromophenyl)-1-(4-fluorophenyl)prop-2-en-1-one (152 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 4.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(134 mg, 76% yield). **m.p.**: 133.5-135.7^oC;**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 7.16-7.20 (t,2H), 7.25 (d, 2H, ^3J = 7.6 Hz), 7.31 (d, 2H, ^3J = 8.7 Hz), 7.42 (d, 1H, ^3J = 15.5 Hz), 7.63 (d, 2H, ^3J = 7.8 Hz), 7.64 (d, 2H, ^3J = 8.7 Hz), 7.81 (d, 1H, ^3J = 15.5 Hz), 8.04-8.08 (m, 2H), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.73, 114.90, 115.82 (d,$^3J_{C\text{-}F}$ = 21.1 Hz),119.64, 127.85, 128.59 (d,$^2J_{C\text{-}F}$ = 54.7 Hz), 129.79, 130.27, 131.15 (d,$^4J_{C\text{-}F}$ = 9.1 Hz), 134.87(d,$^4J_{C\text{-}F}$ = 2.9 Hz), 141.58, 145.14, 152.65, 161.63, 165.63, 165.63 (d,$^1J_{C\text{-}F}$ = 253.1 Hz), 189.11; **IR** (KBr) ν = 2369, 1656, 1591, 1571, 1504, 1446, 1419, 1390, 1337, 1292, 1243, 1216, 1162, 1109, 1034, 1016, 995, 979, 930, 834, 813, 717, 748, 723, 686cm^{-1}; **HRMS (ESI) calcd**. for $C_{23}H_{18}FNO_2$: $[M+H]^+$ 360.1400; Found: 360.1415.

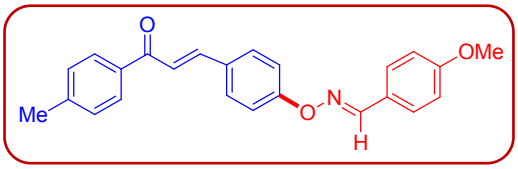
(*E*)-4-Methylbenzaldehyde *O*-(3-((*E*)-3-(4-methoxyphenyl)-3-oxoprop-1-en-1-yl)phenyl) oxime (20c)



The general procedure described above was followed to get the title compound from(*E*)-3-(3-bromophenyl)-1-(4-methoxyphenyl)prop-2-en-1-one (158 mg, 0.5 mmol), (*E*)-4-methyl-benzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were

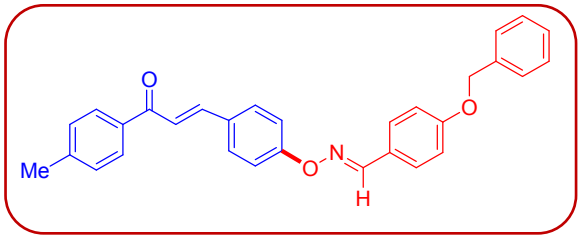
heated at 75 °C for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(150 mg, 81% yield). **m.p.**: 115.9-117.9°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 3.89 (s, 3H), 6.99 (d, 2H, ^3J = 8.9 Hz), 7.26 (d, 2H, ^3J = 8.0 Hz), 7.29-7.33 (t, 2H), 7.37 (d, 1H, ^3J = 7.8 Hz), 7.55 (d, 2H, ^3J = 15.5 Hz), 7.63 (d, 2H, ^3J = 8.3 Hz), 7.8 (d, 1H, ^3J = 15.6 Hz), 8.05 (d, 2H, ^3J = 8.9 Hz), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.68, 55.61, 113.98, 116.73, 122.43, 122.60, 127.79, 128.51, 129.75, 129.93, 131.01, 131.16, 136.48, 141.35, 144.09, 152.20, 159.94, 163.58, 189.03;**IR** (KBr) ν = 2917, 1668, 1576, 1509, 1456, 1419, 1392, 1338, 1286, 1203, 1116, 1045, 1019, 985, 940, 836, 825, 776, 758, 735, 696, 668 cm^{-1}; **HRMS (ESI) calcd**. for $C_{24}H_{21}NO_3$: $[M+H]^+$ 372.1600; Found: 372.1618.

(*E*)-4-Methoxybenzaldehyde *O*-(4-((*E*)-3-oxo-3-(*p*-tolyl)prop-1-en-1-yl)phenyl) oxime (21c)



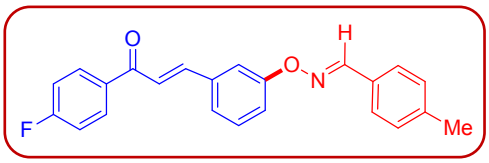
The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-*p*-tolylprop-2-en-1-one (150 mg, 0.5 mmol), (*E*)-4-methoxybenzaldehyde oxime (79 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2**) (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 °C for 4.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(150 mg, 81% yield). **m.p.**: 107.9-110.0°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm): 2.44 (s, 3H), 3.86 (s, 3H), 6.96 (d, 2H, ^3J = 8.5 Hz), 7.29 (d, 2H, ^3J = 8.7 Hz), 7.30 (d, 2H, ^3J = 8.0 Hz), 7.45 (d, 1H, ^3J = 15.5 Hz), 7.64 (d, 2H, ^3J = 8.4 Hz), 7.68 (d, 2H, ^3J = 8.7 Hz), 7.81 (d, 1H, ^3J = 15.5 Hz), 7.94 (d, 2H, ^3J = 8.0 Hz), 8.37 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.77, 55.52, 114.48, 114.80, 120.09, 123.65, 128.74, 128.96, 129.47, 130.16, 134.10, 135.91, 143.61, 144.61, 152.17, 161.54, 161.91, 190.43; **IR** (KBr) ν = 2921, 2342, 1652, 1600, 1505, 1334, 1293, 1247, 1216, 1165, 1100, 1030, 988, 923, 811, 737, 678 cm^{-1};**HRMS (ESI) calcd**. for $C_{24}H_{21}NO_3$: $[M+H]^+$ 372.1600; Found: 372.1582.

(*E*)-4-(Benzyloxy)benzaldehyde*O*-(4-((*E*)-3-oxo-3-(*p*-tolyl)prop-1-en-1-yl)phenyl) oxime (22c)



The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-*p*-tolylprop-2-en-1-one (150 mg, 0.5 mmol), (*E*)-4-(benzyloxy)benzaldehydeoxime (119 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 4.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (162 mg, 73% yield).**m.p.**: 102.3-105.3^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.44 (s, 3H), 5.12 (s, 2H), 7.03 (d, 2H, ^3J = 8.7 Hz), 7.29 (d, 2H, ^3J = 8.7 Hz), 7.31 (d, 2H, ^3J = 8.0 Hz), 7.35-7.47 (m, 6H), 7.55 (d, 1H, ^3J = 8.5 Hz), 7.64 (d, 1H, ^3J = 8.9 Hz),7.68 (d, 2H, ^3J = 8.7 Hz), 7.81 (d, 1H, ^3J = 15.4 Hz), 7.94 (d, 2H, ^3J = 8.1 Hz), 8.38 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.82, 70.24, 114.83, 115.41, 120.20, 123.94, 127.63, 128.35, 128.75, 128.83, 129.44, 129.52, 130.17, 130.55, 136.00, 136.49, 143.58, 144.53, 152.13, 161.10, 161.53, 190.37; **IR** (KBr) ν = 2368, 1654, 1597, 1572, 1510, 1451, 1391, 1360, 1343, 1291, 1265, 1240, 1214, 1167, 1140, 1023, 1011, 983, 920, 863, 828, 808, 734, 670, 639cm^{-1}; **HRMS (ESI) calcd**. for $C_{30}H_{25}NO_3$: $[M+H]^+$ 448.1913; Found: 448.1947.

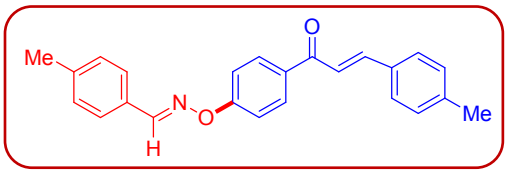
(*E*)-4-Methylbenzaldehyde *O*-(3-((*E*)-3-(4-fluorophenyl)-3-oxoprop-1-en-1-yl)phenyl) oxime(23c)



The general procedure described above was followed to get the title compound from(*E*)-3-(3-bromophenyl)-1-(4-fluorophenyl)prop-2-en-1-one (152 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-

allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid (131 mg, 70% yield). **m.p.**: 110.5-112.9 ^oC; **^{1}H NMR (400 MHz, CDCl$_3$)** δ (ppm):3.86 (s, 3H), 6.97 (d, 2H, ^3J = 8.4 Hz), 7.16-7.21 (t, 2H), 7.31 (d, 2H, ^3J = 7.7 Hz), 7.38 (d, 1H, ^3J = 15.5 Hz), 7.49-7.53 (t, 2H), 7.68 (d, 2H, ^3J = 8.6 Hz), 7.81 (d, 1H, ^3J = 15.7 Hz), 8.05-8.08 (m, 2H), 8.39 (s, 1H); **^{13}C NMR (100 MHz, CDCl$_3$)** δ (ppm): 55.51, 113.99, 114.50, 115.88 (d,$^3J_{C\text{-}F}$ = 21.3 Hz), 117.04, 122.37 (d,$^2J_{C\text{-}F}$ = 51.9 Hz), 123.79, 129.43, 129.98, 131.28 (d,$^4J_{C\text{-}F}$ = 8.4 Hz), 134.11, 134.61, 136.13, 145.22, 151.90, 160.02, 161.87, 165.74 (d,$^1J_{C\text{-}F}$ = 255.0 Hz), 189.17; **IR** (KBr) ν = 2366, 1698, 1580, 1513, 1485, 1441, 1348, 1314, 1283, 1259, 1177, 1163, 1131, 1111, 1076, 998, 970, 916, 876, 863, 818, 797, 765, 718, 678, 642cm^{-1}; **HRMS (ESI) calcd**. for $C_{20}H_{20}FNO_3$: $[M+H]^+$ 390.1505; Found: 390.1510.

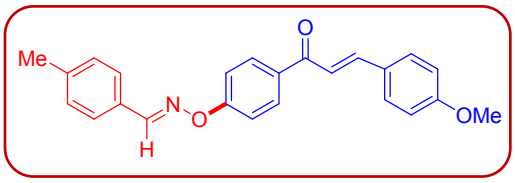
(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-(*p*-tolyl)acryloyl)phenyl) oxime (24c)



The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-*p*-tolylprop-2-en-1-one (150 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 $^oC$for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(165 mg, 93% yield). **m.p.**: 123.2-126.1^oC; **^{1}H NMR (400 MHz, CDCl$_3$)** δ (ppm):2.40 (s, 3H), 2.41 (s, 3H), 7.23 (d, 2H, ^3J = 8.0 Hz), 7.25-7.27 (m, 3H), 7.36 (d, 2H, ^3J = 8.7 Hz), 7.56 (d, 2H, ^3J = 7.8 Hz), 7.64 (d, 2H, ^3J = 8.0 Hz), 7.8 (d, 1H, ^3J = 15.5 Hz), 8.07 (d, 2H, ^3J = 8.9 Hz), 8.43 (s, 1H); **^{13}C NMR (100 MHz, CDCl$_3$)** δ (ppm): 21.68, 21.74, 114.18, 115.71, 120.99, 127.91, 128.57, 129.79, 129.81, 130.79, 132.39, 132.44, 141.05, 141.66, 144.47, 152.94, 163.17, 189.27; **IR** (KBr) ν = 2364, 1652, 1595, 1576, 1511, 1504, 1416, 1390, 1330, 1305, 1287, 1252, 1221, 1208, 1159, 1110,

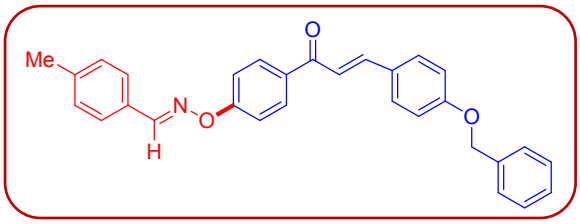
1024, 988, 928, 841, 812, 734cm^{-1}; **HRMS (ESI) calcd**. for $C_{24}H_{21}NO_2$: $[M+H]^+$ 356.1651; Found: 356.1630; $[M+Na]^+$ 378.1470; Found: 378.1476.

(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-(4-methoxyphenyl)acryloyl)phenyl) oxime (25c)



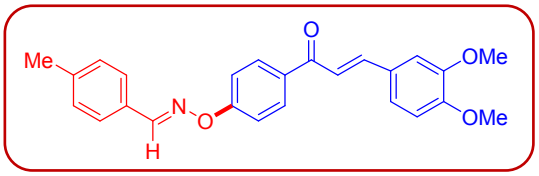
The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-(4-methoxyphenyl)prop-2-en-1-one (158 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol%), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(125 mg, 67% yield). **m.p.**: 86.2-88.8^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm): 2.41 (s, 3H), 3.86 (s, 3H), 6.94 (d, 2H, ^3J = 8.7 Hz), 7.26 (d, 2H, ^3J = 8.0 Hz), 7.35 (d, 2H, ^3J = 8.7 Hz), 7.45 (d, 1H, ^3J = 15.5 Hz), 7.60-7.65 (t, 4H), 7.79 (d, 1H, ^3J = 15.5 Hz), 8.07 (d, 2H, ^3J = 8.9 Hz), 8.43 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.74, 55.54, 114.16, 114.50, 119.70, 127.91, 128.24, 129.80, 130.29, 130.39, 130.69, 132.63, 141.65, 144.12, 152.90, 161.64, 163.06, 189.10;**IR** (KBr) ν = 2366, 1653, 1606, 1550, 1503, 1420, 1383, 1337, 1289, 1244, 1221, 1162, 1031, 1014, 990, 925, 834, 810, 739, 679 cm^{-1}; **HRMS (ESI) calcd**. for $C_{24}H_{21}NO_3$: $[M+H]^+$ 372.1600; Found: 372.1601.

(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-(4-(benzyloxy)phenyl)acryloyl)phenyl) oxime (26c) *E:Z* (6.6 : 3.3)



The general procedure described above was followed to get the title compound from(*E*)-3-(4-(benzyloxy)phenyl)-1-(4-bromophenyl)prop-2-en-1-one (196 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 $^oC$for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(206 mg, 92% yield). **m.p.**: 132.2-134.0^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):**Isomer *E*:**2.41 (s, 3H), 5.12 (s, 2H), 6.90 (d, 1H, ^3J = 8.4 Hz), 7.02 (d, 2H, ^3J = 8.1 Hz), 7.25-7.27 (t, 2H), 7.36 (d, 2H, ^3J = 8.4 Hz),7.39-7.48 (m, 6H), 7.64 (d, 2H, ^3J = 8.2 Hz), 7.8 (d, 1H, ^3J = 15.6 Hz), 7.97 (d, 1H, ^3J = 8.5 Hz), 8.07 (d, 1H, ^3J = 8.8 Hz), 8.43 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.72, 70.25, 114.20, 115.42, 119.87, 127.62, 127.92, 128.14, 128.26, 128.80, 129.80, 130.32, 130.73, 131.14, 132.60, 136.57, 141.65, 144.20, 152.94, 160.86, 163.14, 189.26; **Isomer *Z* :** 21.69, 70.23, 115.33, 115.74, 119.91, 128.14, 128.24, 128.29, 128.30, 130.24, 136.58, 143.79, 160.76, 189.11; **IR** (KBr) ν = 2365, 1649, 1595, 1506, 1339, 1288, 1215, 1162, 1111, 1007, 981, 918, 814, 734cm^{-1}; **HRMS (ESI) calcd**. for $C_{30}H_{25}NO_3$: $[M+H]^+$ 448.1913; Found: 448.1934.

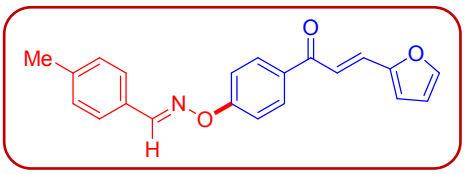
(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-(3,4-dimethoxyphenyl)acryloyl)phenyl) oxime (27c)



The general procedure described above was followed to get the title compound from (*E*)-1-(4-bromophenyl)-3-(3,4-dimethoxyphenyl)prop-2-en-1-one (173 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 3.0 h. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (140 mg, 70% yield). **m.p.**: 84.2-86.9 ^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 3.94 (s, 3H), 3.96 (s, 3H), 6.91 (d, 1H, ^3J = 8.2 Hz), 7.18 (s, 1H), 7.23-7.27 (m, 3H), 7.36

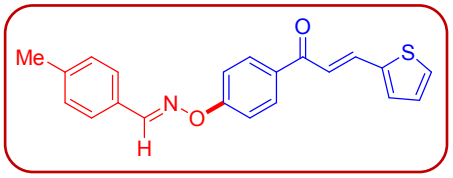
(d, 2H, ^3J = 8.9 Hz), 7.43 (d, 1H, ^3J = 15.6 Hz), 7.64 (d, 2H, ^3J = 8.0 Hz), 7.77 (d, 1H, ^3J = 15.6 Hz), 8.07 (d, 2H, ^3J = 8.9 Hz), 8.43 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.73, 56.09, 56.12, 110.21, 111.24, 114.18, 120.01, 123.18, 127.91, 128.17, 128.25, 129.80, 130.73, 132.58, 141.66, 144.51, 149.34, 151.41, 152.92, 163.12, 189.17;**IR** (KBr) ν = 2367, 1656, 1574, 1504, 1492, 1391, 1335, 1304, 1250, 1217, 1147, 1112, 1086, 1032, 1017, 989, 973, 920, 837, 818, 792, 989, 973, 920, 837, 818, 792, 672 cm^{-1}; **HRMS (ESI) calcd**. for $C_{25}H_{23}NO_4$: $[M+H]^+$ 402.1705; Found: 402.1708.

(*E*)-4-Methylbenzaldehyde *O*-(4-((*E*)-3-(furan-2-yl)acryloyl)phenyl) oxime (28c)



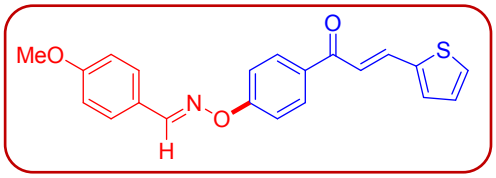
The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-(furan-2-yl)prop-2-en-1-one (138 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^{o}Cfor 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a yellow solid (160 mg, 98% yield). **m.p.**: 127.5-129.5^{o}C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.40 (s, 3H), 6.50-6.52 (m, 1H), 6.7 (d, 1H, ^3J = 3.4 Hz), 7.25 (d, 2H, ^3J = 7.7 Hz), 7.34 (d, 2H, ^3J = 8.6 Hz), 7.48 (d, 1H, ^3J = 15.6Hz), 7.52 (s, 1H), 7.57 (s, 1H), 7.63 (d, 2H, ^3J = 7.7 Hz), 8.07 (d, 2H, ^3J = 8.4 Hz), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.72, 112.74, 114.17, 116.03, 119.33, 127.90, 128.21, 129.78, 130.22, 130.71, 132.33, 141.64, 144.86, 151.92, 152.91, 163.19, 188.35;**IR** (KBr) ν = 2854, 1551, 1597, 1503, 1470, 1412, 1359, 1329, 1290, 1254, 1223, 1155, 1109, 1015, 977, 923, 817, 749, 687, 634 cm^{-1};**HRMS (ESI) calcd**. for $C_{21}H_{17}NO_3$: $[M+H]^+$ 332.1287; Found: 332.1292.

(*E*)-4-Methylbenzaldehyde*O*-(4-((*E*)-3-(thiophen-2-yl)acryloyl)phenyl)oxime (29c)



The general procedure described above was followed to get the title compound from (*E*)-1-(4-bromophenyl)-3-(thiophen-2-yl)prop-2-en-1-one (146 mg, 0.5 mmol), (*E*)-4-methyl-benzaldehyde oxime (71 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 1.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a yellow solid(145 mg, 84% yield). **m.p.**: 132.2-134.2^oC; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.41 (s, 3H), 7.08-7.11 (t, 1H), 7.26 (d, 2H, ^3J = 8.1 Hz), 7.36 (d, 2H, ^3J = 7.4 Hz), 7.38 (d, 2H, ^3J = 8.0 Hz), 7.42 (d, 1H, ^3J = 5.0 Hz), 7.64 (d, 2H, ^3J = 8.3 Hz), 7.95 (d, 1H, ^3J = 15.2 Hz), 8.06 (d, 2H, ^3J = 8.9 Hz), 8.43(s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.74, 114.19, 120.77, 127.91, 128.20, 128.44, 128.65, 129.80, 130.70, 132.00, 132.24, 136.69, 140.68, 141.66, 152.93, 163.20, 188.38; **IR** (KBr) v = 2358, 1655, 1589, 1568, 1523, 1451, 1418, 1398, 1334, 1298, 1222, 1028, 1018, 973, 856, 928, 853, 840, 838, 812, 764, 752, 687, 648cm^{-1}; **HRMS (ESI) calcd**. for $C_{21}H_{17}NO_2S$: $[M+H]^+$ 348.1058; Found: 348.10.64.

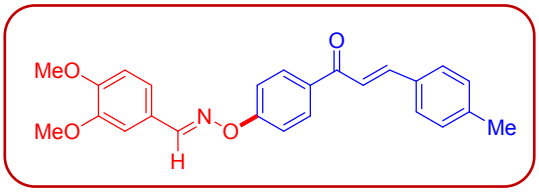
(*E*)-4-methoxybenzaldehyde *O*-(4-((*E*)-3-(thiophen-2-yl)acryloyl)phenyl) oxime(30c)



The general procedure described above was followed to get the title compound from (*E*)-1-(4-bromophenyl)-3-(thiophen-2-yl)prop-2-en-1-one (146 mg, 0.5 mmol), (*E*)-4-methoxy-benzaldehyde oxime (79 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 1.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a yellow solid (145

mg, 84% yield). **m.p.**: 127.2-129.0°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm): 3.86 (s, 3H), 6.50 (q, 1H), 6.70 (d, 1H, ^3J = 3.3 Hz), 6.96 (d, 2H, ^3J = 8.8 Hz), 7.32-7.34 (m, 2H), 7.46-7.52 (m, 2H), 7.59 (d, 1H, ^3J = 15.2 Hz), 7.68 (d, 2H, ^3J = 8.8 Hz), 8.06-8.08 (m, 2H), 8.39 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 55.40, 112.58, 114.01, 114.40, 115.81, 119.27, 123.42, 129.43, 130.05, 130.57, 132.14, 144.69, 151.83, 152.39, 161.89, 163.14, 188.21; **IR** (KBr) v = 2320, 1605, 1570, 1538, 1520, 1442, 1409, 1387, 1328, 1282, 1225, 1038, 1005, 985, 856, 917, 840, 828, 812, 764, 752, 687, 665 cm^{-1}; **HRMS (ESI) calcd**. for $C_{21}H_{17}NO_3S$: $[M+H]^+$ 363.0929; Found: 363.0936.

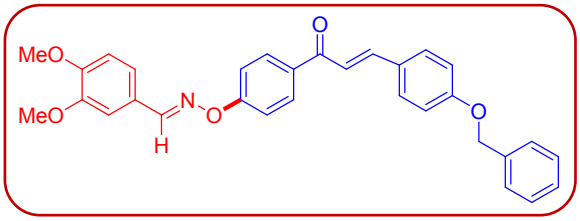
(*E*)-3,4-Dimethoxybenzaldehyde *O*-(4-((*E*)-3-(*p*-tolyl)acryloyl)phenyl) oxime (31c) *E:Z* (3.3 : 1)



The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-*p*-tolylprop-2-en-1-one (150 mg, 0.5 mmol), (*E*)-3,4-dimethoxybenzaldehyde oxime (95 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol%), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 °C for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (190 mg, 95% yield). **m.p.**: 108.1-109.9°C; **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm): **Isomer *E* :** 2.39 (s, 3H), 3.94 (s, 3H), 3.97 (s, 3H), 6.91 (d, 1H, ^3J = 8.4 Hz), 7.18 (d, 1H, ^3J = 7.6 Hz), 7.23 (d, 2H, ^3J = 7.8 Hz), 7.34-7.39 (m, 3H), 7.52-7.56 (m, 3H), 7.8 (d, 1H, ^3J = 15.8 Hz), 8.08 (d, 2H, ^3J = 8.6 Hz), 8.39 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.64, 56.11, 56.14, 108.69, 111.00, 114.23, 115.67, 123.09, 123.81, 128.56, 129.82, 130.78, 132.49, 132.45, 141.04, 144.49, 149.61, 151.90, 152.87, 163.23, 189.29;**Isomer *Z*:**21.62, 56.21, 56.26, 111.31, 111.40, 113.99, 114.11, 121.09, 126.61, 128.50, 129.78, 131.20, 140.87, 144.06, 189.26; **IR**(KBr) v = 2369, 1655, 1600, 1567, 1517, 1444, 1415, 1334, 1305, 1287, 1268, 1221, 1205, 1159, 1130, 1017,

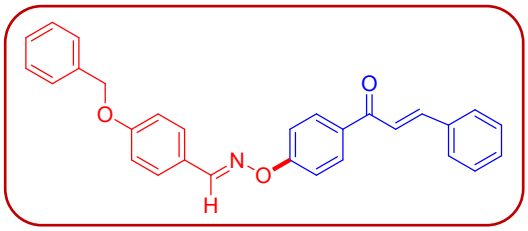
986, 920, 845, 809, 764, 733, 645, 616 cm^{-1}; **HRMS (ESI) calcd**. for $C_{25}H_{23}NO_4$: $[M+H]^+$ 402.1705; Found: 402.1708.

(*E*)-3,4-Dimethoxybenzaldehyde *O*-(4-((*E*)-3-(4-(benzyloxy)phenyl)acryloyl)phenyl) oxime (32c)



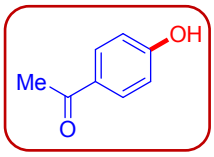
The general procedure described above was followed to get the title compound from(*E*)-3-(4-(benzyloxy)phenyl)-1-(4-bromophenyl)prop-2-en-1-one (196 mg, 0.5 mmol), (*E*)-3,4-dimethoxybenzaldehyde oxime (95 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (180 mg, 73% yield). **m.p.**: 122.2-124.4^oC;**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):3.94 (s, 3H), 3.98 (s, 3H), 5.12 (s, 2H), 6.91 (d, 1H, ^3J = 8.2 Hz), 7.01 (d, 2H, ^3J = 8.7 Hz), 7.18 (d, 1H, ^3J = 8.1 Hz), 7.34-7.47 (m, 9H), 7.61 (d, 2H, ^3J = 8.9 Hz), 7.79 (d, 1H, ^3J = 15.4 Hz), 8.07 (d, 2H, ^3J = 8.9 Hz), 8.39 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 56.06, 56.12, 70.19, 108.53, 110.89, 114.16, 115.37, 119.77, 123.08, 123.75, 127.60, 128.09, 128.29, 128.78, 130.29, 130.70, 132.54, 136.52, 144.14, 149.53, 151.81, 152.82, 160.82, 163.10, 189.12;**IR** (KBr) ν = 2369, 1654, 1594, 1572, 1510, 1451, 1421, 1391, 1360, 1343, 1291, 1214, 1140, 1023, 1011, 983, 961, 920, 863, 840, 828, 808, 749, 734, 697 cm^{-1}; **HRMS (ESI)** calcd. for $C_{31}H_{27}NO_5$: $[M+H]^+$ 494.1967; Found: 494.1992.

(*E*)-4-(Benzyloxy)benzaldehyde*O*-(4-cinnamoylphenyl) oxime (33c)*E:Z* (3.3 : 1)



The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-phenylprop-2-en-1-one (143 mg, 0.5 mmol), (*E*)-4-(benzyloxy)benzaldehydeoxime (119 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light yellow solid(153 mg, 71% yield). **m.p.**: 103.3-105.5^oC;**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):**Isomer *E*:**5.13 (s, 2H), 7.04 (d, 2H, ^3J = 8.2 Hz), 7.36 (d, 3H, ^3J = 8.9 Hz), 7.41-7.44 (m, 6H), 7.57 (d, 1H, ^3J = 15.5 Hz), 7.65-7.70 (m, 4H), 7.83 (d, 1H, ^3J = 15.4 Hz), 8.08 (d, 2H, ^3J = 8.2 Hz), 8.41 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 70.26, 114.20, 115.46, 122.13, 127.61, 128.33, 128.82, 128.86, 129.03, 129.06, 129.60, 130.49, 130.82, 132.30, 135.22, 136.49, 144.28, 152.54, 161.22, 163.34, 189.11; **Isomer *Z* :** 70.42, 115.24, 115.71, 123.80, 128.21, 128.46, 128.90, 129.03, 130.23, 130.36, 131.20, 132.16, 134.15, 143.84, 152.32; **IR** (KBr) ν = 2365, 1661, 1592, 1568, 1513, 1496, 1449, 1403, 1337, 1303, 1261, 1218, 1164, 1109, 1023, 978, 956, 931, 827, 761, 722, 660 cm^{-1}; **HRMS (ESI) calcd**. for $C_{29}H_{23}NO_3$: $[M+H]^+$ 434.1756; Found: 434.1759.

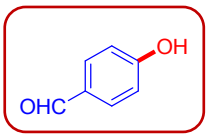
4'-Hydroxyacetophenone (1p)[1]



The general procedure described above was followed to get the title compound from4'-bromoacetophenone (199 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^oC for 1.0 hour.The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (125 mg, 92% yield). **m.p.**: 107.2-108.5^oC (lit. 105.0-105.5 ^oC); **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.58 (s, 3H), 6.92(d, 2H, ^3J = 8.6 Hz), 7.9(d, 2H, ^3J= 8.7 Hz); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 26.40, 115.72, 129.55,

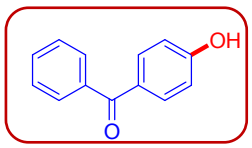
131.41, 161.92, 199.23.The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

4-Hydroxybenzaldehyde (2p)[2]



The general procedure described above was followed to get the title compound from4-bromobenzaldehyde (185 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 75^{o}C for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as abrown solid (120 mg, 98% yield). **m.p**.: 112.3-114.3^{o}C (lit. 112-116 ^{o}C);**^{1}H NMR (400 MHz, CDCl$_3$)** δ (ppm):6.98 (d, 2H, ^{3}J = 8.5 Hz), 7.81 (d, 2H, ^{3}J= 8.4 Hz), 9.85 (s, 1H); **^{13}C NMR (100 MHz, CDCl$_3$)** δ (ppm): 116.28, 129.44, 132.84, 162.54, 191.92. The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

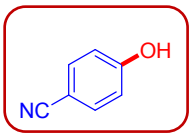
4-Hydroxybenzophenone (3p)[3]



The general procedure described above was followed to get the title compound from4-bromobenzophenone (261 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 75^{o}C for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a creamy white solid (162 mg, 82% yield). **m.p.**: 127.9-130.5^{o}C (lit. 132-135 ^{o}C); **^{1}H NMR (400 MHz, CDCl$_3$)** δ (ppm):6.94(d, 2H, ^{3}J = 8.7Hz), 7.46 (d, 1H, ^{3}J = 7.5Hz),7.48 (d, 1H, ^{3}J = 7.5 Hz), 7.57 (t, 1H, ^{3}J = 7.5 Hz), 7.75 (d, 2H, ^{3}J = 6.6 Hz), 7.77 (d,

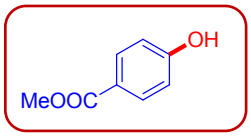
2H, ^3J = 7.7 Hz); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 115.57, 128.41, 129.37, 130.00, 132.35, 133.31, 138.14, 161.29, 197.17. The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

4-Hydroxybenzonitrile (5p)[1,4]



The general procedure described above was followed to get the title compound from4-bromobenzonitrile (182 mg, 1.0mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 75^{o}C for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as abrown solid (117 mg, 98% yield). **m.p.**: 108.8-110.2^{o}C (lit. 109.0-109.5 ^{o}C);**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):6.93 (d, 2H, ^3J = 8.5 Hz), 7.55 (d, 2H, ^3J = 8.4 Hz); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 102.85, 116.61, 119.46, 134.43, 160.56.The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

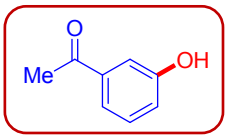
Methyl 4-hydroxybenzoate(6p)[4]



The general procedure described above was followed to get the title compound frommethyl 4-bromobenzoate (215 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (3.65 mg, 1.0 mol %), *t*BuXPhos (**L2)** (10.6 mg, 2.5 mol %), with THF as solvent (2.0 mL) were heated at 75 ^{o}C for 4.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a lightbrown solid (120 mg, 79% yield). **m.p.**: 125.6-127.8^{o}C (lit. 127-129 ^{o}C);**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):3.89 (s, 3H),6.87 (d, 2H, ^3J = 8.7 Hz), 7.95 (d, 2H, ^3J= 8.6 Hz); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 52.26, 115.46, 122.15, 132.08, 160.62,

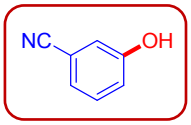
167.73.The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

3'-Hydroxyacetophenone (11p)[4]



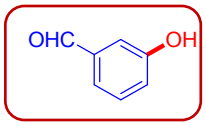
The general procedure described above was followed to get the title compound from3'-bromoacetophenone (199 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (7.3 mg, 2.0 mol %), *t*BuBrettPhos (**L7)** (24.4 mg, 5.0 mol %), with DMF as solvent (2.0 mL) were heated at 90 ^{o}C for 5.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as acreamy white solid (125 mg, 90% yield). **m.p.**: 93.2-95.8^{o}C (lit. 92-94 ^{o}C);**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.60 (s, 3H), 7.09-7.12 (m, 1H), 7.31-7.35 (t, 1H), 7.5 (d, 1H, ^{3}J = 7.8Hz),7.52-7.53 (m, 1H);**^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 26.90, 114.85, 121.11, 130.03, 138.31, 156.63, 156.66, 199.92.

3-Hydroxybenzonitrile (12p)[5]



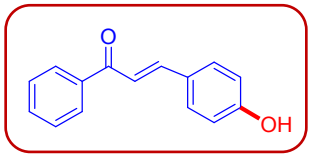
The general procedure described above was followed to get the title compound from3-bromobenzonitrile (182 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (7.3 mg, 2.0 mol %),*t*BuBrettPhos (**L7)** (24.4 mg, 5.0 mol %), with DMF as solvent (2.0 mL) were heated at 90 ^{o}C for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as abrown solid (113 mg, 95% yield). **m.p.**: 74.8-77.2^{o}C (lit. 78-81 ^{o}C);**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):7.10 (d, 1H, ^{3}J = 8.1Hz),7.13 (s, 1H), 7.21 (d, 1H, ^{3}J = 7.6Hz),7.31-7.35 (t, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 112.63, 118.80, 118,88, 121.00, 124.40, 130.70, 156.57. The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

3-Hydroxybenzaldehyde (13p)[6]



The general procedure described above was followed to get the title compound from3-bromobenzaldehyde (185 mg, 1.0 mmol), (*E*)-4-methylbenzaldehyde oxime (142 mg, 1.05 mmol), Cs_2CO_3 (488 mg, 1.5 mmol), [(π-allylPdCl)$_2$] (7.3 mg, 2.0 mol %), *t*BuBrettPhos (**L7)** (24.4 mg, 5.0 mol %), with DMF as solvent (2.0 mL) were heated at 90^{o}C for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (112 mg, 92% yield). **m.p.**: 99.1-100.9^{o}C (lit. 100-103 ^{o}C);**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):7.17-7.19 (m, 1H), 7.39-7.45 (m, 3H), 9.92 (s, 1H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 114.89, 122.59, 123.75, 130.56, 137.67, 156.78, 193.34.The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

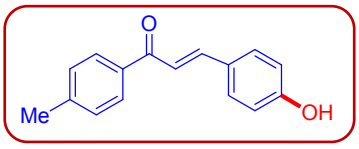
(*E*)-3-(4-Hydroxyphenyl)-1-phenylprop-2-en-1-one (16p)[7]



The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-phenylprop-2-en-1-one (143 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 ^{o}C for 1.0 hour.The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a brown solid(101 mg, 91% yield).**m.p.**: 179.2-181.5^{o}C (lit. 183-187 ^{o}C); **^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):6.88 (d, 2H, ^3J = 8.4 Hz), 7.4 (d, 1H, ^3J = 15.5 Hz), 7.48-7.52 (t, 2H), 7.54-7.58 (t, 3H), 7.78 (d, 1H, ^3J = 15.6 Hz), 8.01 (d, 2H, ^3J = 7.1 Hz); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 116.27, 119.58, 128.63, 128.75, 130.69, 132.85, 138.54, 145.54, 145.55, 158.87, 191.42; **HRMS (ESI) calcd**. for $C_{15}H_{12}O_2$:

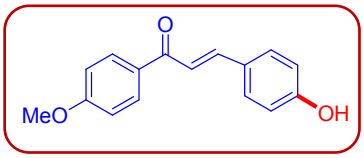
$[M+H]^+$ 225.0916; Found: 225.0907.The ^1H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

(*E*)-3-(4-Hydroxyphenyl)-1-p-tolylprop-2-en-1-one (17p)[8]



The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-p-tolylprop-2-en-1-one (150 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 °C for 1.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a light brown solid (100 mg, 85% yield). **m.p.**: 185.2-186.8 °C(lit. 182-183 °C);**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):2.43 (s, 3H), 6.9(d, 2H, ^3J = 8.5 Hz), 7.3(d, 2H, ^3J = 8.0 Hz), 7.4(d, 1H, ^3J = 15.5 Hz), 7.54(d, 2H, ^3J = 8.4 Hz), 7.77(d, 1H, ^3J = 15.6 Hz), 7.93(d, 2H, ^3J = 8.2 Hz); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 21.81, 116.27, 119.41, 127.29, 128.79, 129.46, 130.66, 135.84, 143.80, 145.29, 158.97, 191.04; **IR** (KBr) ν = 1656, 1572, 1503, 1467, 1386, 1378, 1286, 1256, 1232, 1126, 1029, 996, 950, 885, 756, 625 cm^{-1}; **HRMS (ESI) calcd**. for $C_{16}H_{14}O_2$: $[M+H]^+$ 239.1072; Found: 239.1069; $[M+Na]^+$ 261.0891; Found: 261.0885.

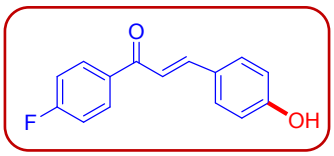
(*E*)-3-(4-Hydroxyphenyl)-1-(4-methoxyphenyl)prop-2-en-1-one (18p)[7]



The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-(4-methoxyphenyl)prop-2-en-1-one (158 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 °C for 1.0 hour. The crude reaction mixture was purified through

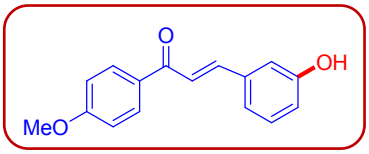
column chromatography (silica gel 60-120 mesh) to afford the title compound as a lightbrown solid (122 mg, 97% yield). **m.p.**: 182.8-183.8°C(lit. 184-186 °C);**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):3.89 (s, 3H), 6.89 (d, 2H, ^3J = 8.5 Hz), 6.98 (d, 2H, ^3J = 8.9 Hz), 7.42 (d, 1H, ^3J = 15.6 Hz), 7.54 (d, 2H, ^3J = 8.6 Hz), 7.77 (d, 1H, ^3J = 15.6 Hz), 8.03 (d, 2H, ^3J = 8.9 Hz); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 55.65, 113.99, 116.21, 119.39, 127.64, 130.57, 130.96, 131.36, 144.56, 158.60, 163.56, 189.52; **HRMS (ESI) calcd**. for $C_{16}H_{14}O_3$: $[M+H]^+$ 255.1021; Found: 255.1018.The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

(*E*)-1-(4-Fluorophenyl)-3-(4-hydroxyphenyl)prop-2-en-1-one (19p)[9]



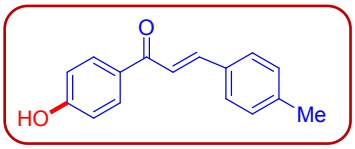
The general procedure described above was followed to get the title compound from(*E*)-3-(4-bromophenyl)-1-(4-fluorophenyl)prop-2-en-1-one (152 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol%), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 °C for 50 min. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a brown solid(96 mg, 80% yield). **m.p.**: 186.7-188.0°C;**^{1}H NMR (400 MHz, $CDCl_3$)** δ (ppm):6.90 (d, 2H, ^3J = 8.6 Hz), 7.15-7.19 (t, 2H), 7.38 (d, 1H, ^3J = 15.6 Hz), 7.55 (d, 2H, ^3J = 8.5 Hz), 7.78 (d, 1H, ^3J = 15.6 Hz), 8.03-8.06 (q, 2H); **^{13}C NMR (100 MHz, $CDCl_3$)** δ (ppm): 115.87 (d,$^2J_{C\text{-}F}$ = 21.6 Hz), 116.26, 119.05, 127.28, 129.90, 130.74, 131.2 (d,$^3J_{C\text{-}F}$ = 9.0 Hz), 132.31, 145.66, 158.90, 189.62; **HRMS (ESI) calcd**. for $C_{15}H_{11}FO_2$: $[M+H]^+$ 243.0821; Found: 243.0816; $[M+Na]^+$ 265.0641; Found: 265.0635.The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

(*E*)-3-(3-Hydroxyphenyl)-1-(4-methoxyphenyl)prop-2-en-1-one (20p)[7]



The general procedure described above was followed to get the title compound from(E)-3-(3-bromophenyl)-1-(4-methoxyphenyl)prop-2-en-1-one (158 mg, 0.5 mmol), (*E*)-4-methyl-benzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 ^oC for 1.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as abrown solid (102 mg, 81% yield). **m.p.**: 189.5-192.0^oC;**^{1}H NMR (400 MHz, DMSO-D$_6$)** δ (ppm):3.91 (s, 3H), 6.90 (d, 1H, ^3J = 7.7 Hz), 7.12 (d, 2H, ^3J = 8.6 Hz), 7.25-2.29 (m, 2H), 7.32 (d, 1H, ^3J = 9.7 Hz), 7.65 (d, 1H, ^3J = 15.5 Hz), 7.88 (d, 1H, ^3J = 15.6 Hz), 8.2 (d, 2H, ^3J = 8.9 Hz), 9.66 (s, 1H); **^{13}C NMR (100 MHz, DMSO-d$_6$)** δ (ppm): 55.71, 114.18, 115.27, 117.78, 119.95, 121.93, 130.05, 130.54, 131.07, 136.19, 143.58, 157.83, 163.37, 187.58; **IR** (KBr) ν = 2365, 1646, 1603, 1561, 1509, 1466, 1383, 1339, 1285, 1254, 1221, 1166, 1035, 1020, 990, 842, 820, 738 cm^{-1}; **HRMS (ESI) calcd**. for $C_{16}H_{14}O_3$: $[M+H]^+$ 255.1021; Found: 255.1004; $[M+Na]^+$ 278.0841; Found: 278.0823.

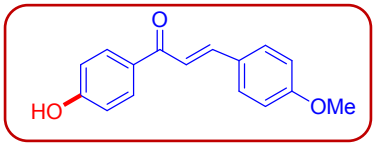
(*E*)-1-(4-Hydroxyphenyl)-3-p-tolylprop-2-en-1-one (24p)



The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-p-tolylprop-2-en-1-one (150 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 ^oC for 4.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as abrown solid (116 mg, 98% yield). **m.p.**: 175.8-

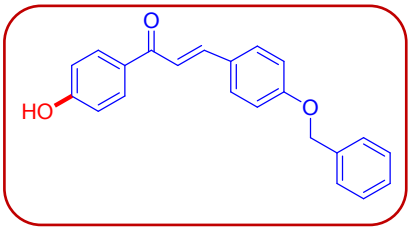
177.9°C;**^{1}H NMR (400 MHz, DMSO-D$_6$)** δ (ppm):2.49 (s, 3H), 5.98 (d, 2H, ^3J = 8.7 Hz), 6.34 (d, 2H, ^3J = 8.0 Hz), 6.73 (d, 1H, ^3J = 15.7 Hz), 6.83 (d, 2H, ^3J = 8.0 Hz), 6.93 (d, 1H, ^3J = 15.8 Hz), 7.14 (d, 2H, ^3J = 8.7 Hz), 9.53 (s, 1H); **^{13}C NMR (100 MHz, DMSO-d$_6$)** δ (ppm): 21.16, 115.48, 121.08, 128.84, 129.29, 129.63, 131.24, 132.25, 140.45, 142.92, 162.25, 187.25; **IR** (KBr) v = 2334, 1668, 1510, 1466, 1338, 1285, 1265, 1222, 1184, 1003, 985, 856, 835, 725, 636 cm^{-1}; **HRMS (ESI) calcd**. for $C_{16}H_{14}O_2$: $[M+H]^+$ 239.1072; Found: 239.1068; $[M+Na]^+$ 261.0891; Found: 261.0889.

(*E*)-1-(4-Hydroxyphenyl)-3-(4-methoxyphenyl)prop-2-en-1-one (25p)[10]



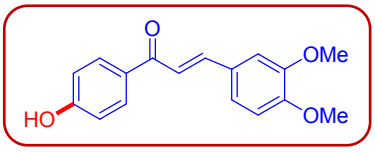
The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-(4-methoxyphenyl)prop-2-en-1-one (158 mg, 0.5 mmol), (*E*)-4-methyl-benzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 °C for 6.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as alight brown solid (122 mg, 97% yield). **m.p.**: 186.9-188.2°C (lit. 190 °C);**^{1}H NMR (400 MHz, DMSO-D$_6$)** δ (ppm):2.86 (s, 3H), 5.94 (d, 2H, ^3J = 8.5 Hz), 6.05 (d, 2H, ^3J = 8.5 Hz), 6.7 (d, 1H, ^3J = 15.3 Hz), 6.82 (d, 1H, ^3J = 15.6 Hz), 6.87 (d, 2H, ^3J = 8.4 Hz), 7.11 (d, 2H, ^3J = 8.4 Hz), 9.49 (s, 1H); **^{13}C NMR (100 MHz, DMSO-d$_6$)** δ (ppm): 55.45, 114.49, 115.48, 119.65, 127.62, 129.47, 130.68, 131.17, 142.87, 161.25, 162.15, 187.23; **HRMS (ESI) calcd**. for $C_{16}H_{14}O_3$: $[M+H]^+$ 255.1021; Found: 255.1018;$[M+Na]^+$ 277.0841; Found: 277.0838.The ^{1}H and ^{13}C NMR spectra of the compound were in good agreement with those previously reported in the literature.

(*E*)-3-(4-(Benzyloxy)phenyl)-1-(4-hydroxyphenyl)prop-2-en-1-one (26p)



The general procedure described above was followed to get the title compound from(*E*)-3-(4-(benzyloxy)phenyl)-1-(4-bromophenyl)prop-2-en-1-one (196 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90^{o}Cfor 50 min. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as a lightbrown solid (161 mg, 98% yield). **m.p.**: 194.5-196.8^{o}C;**^{1}H NMR (400 MHz, DMSO-D$_6$)** δ (ppm):4.22 (s, 2H), 5.95(d, 2H, ^3J = 8.7 Hz), 6.14 (d, 2H, ^3J = 8.7 Hz), 6.39-6.53 (m, 5H), 6.7(d, 1H, ^3J = 15.7Hz),6.83 (d, 1H, ^3J = 15.5Hz), 6.87 (d, 2H, ^3J = 8.7 Hz), 7.11(d, 2H, ^3J = 8.5 Hz), 9.49 (s, 1H); **^{13}C NMR (100 MHz, DMSO-d$_6$)** δ (ppm): 69.46, 115.31, 115.45, 119.77, 127.81, 127.90, 128.08, 128.60, 129.43, 130.66, 131.17, 136.82, 142.77, 160.29, 162.13, 187.19; **IR** (KBr) ν = 2325, 1656, 1558, 1529, 1485, 1325, 1285, 1275, 1256, 1178, 1052, 1028, 980, 858, 825, 759, 662 cm^{-1}; **HRMS (ESI) calcd**. for $C_{22}H_{18}O_3$: $[M+H]^+$ 331.1334; Found 331.1315.

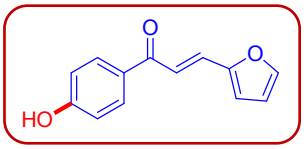
(*E*)-3-(3,4-Dimethoxyphenyl)-1-(4-hydroxyphenyl)prop-2-en-1-one (27p)



The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-(3,4-dimethoxyphenyl)prop-2-en-1-one (173 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 ^{o}C for 3.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as ayellow solid

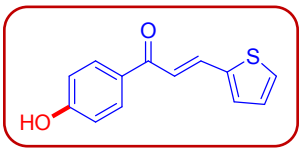
(134 mg, 95% yield). **m.p.**: 196.8-198.5°C; **^{1}H NMR (400 MHz, DMSO-D$_6$)** δ (ppm):2.87 (s, 3H), 2.92 (s, 3H), 5.97 (d, 2H, ^3J = 7.4 Hz), 6.07 (d, 1H, ^3J = 8.2 Hz), 6.41 (d, 1H, ^3J = 7.7 Hz),6.58 (s, 1H), 6.7 (d, 1H, ^3J = 15.5 Hz), 6.86 (d, 1H, ^3J = 15.7 Hz), 7.14 (d, 2H, ^3J = 8.0 Hz), 9.5 (s, 1H); **^{13}C NMR (100 MHz, DMSO-d$_6$)** δ (ppm): 55.65, 55.79, 110.63, 111.60, 115.43, 119.71, 123.78, 127.80, 129.47, 131.20, 143.38, 149.11, 151.12, 162.12, 187.21; **IR** (KBr) ν = 2345, 1646, 1603, 1559, 1510, 1466, 1338, 1285, 1254, 1221, 1166, 1035, 1020, 990, 842, 820, 749, 636cm^{-1}; **HRMS (ESI) calcd**. for $C_{17}H_{16}O_4$: $[M+H]^+$ 285.1127; Found: 285.1123.

(*E*)-3-(Furan-2-yl)-1-(4-hydroxyphenyl)prop-2-en-1-one (28p)



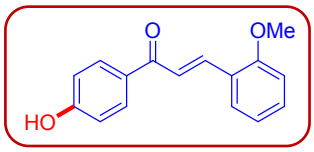
The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-(furan-2-yl)prop-2-en-1-one (138 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol%), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 °C for 2.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as ayellow solid (105 mg, 99% yield). **m.p**.: 165.8-168.2°C;**^{1}H NMR (400 MHz, DMSO-D$_6$)** δ (ppm):5.74 (s, 1H), 5.96 (d, 2H, ^3J = 8.7 Hz), 6.13 (d, 1H, ^3J = 3.5 Hz), 6.59 (s, 2H), 6.95 (s, 1H), 7.04 (d, 2H, ^3J = 8.7 Hz), 9.55 (s, 1H); **^{13}C NMR (100 MHz, DMSO-d$_6$)** δ (ppm): 113.12, 115.58, 116.42, 118.90, 129.10, 129.54, 131.05, 145.93, 151.39, 162.29, 186.69; **IR** (KBr) ν = 2319, 1603, 1565, 1518, 1345, 1298, 1278, 1128, 958, 853, 758, 625 cm^{-1}; **HRMS (ESI) calcd**. for $C_{13}H_{10}O_3$: $[M+H]^+$ 215.0708; Found: 215.0704; $[M+Na]^+$ 237.0528; Found: 237.0523.

(*E*)-1-(4-Hydroxyphenyl)-3-(thiophen-2-yl)prop-2-en-1-one (29p)



The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-(thiophen-2-yl)prop-2-en-1-one (146 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90^{o}C for 1.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as ayellow solid (109 mg, 95% yield). **m.p.**: 172.6-174.8^{o}C;**^{1}H NMR (400 MHz, DMSO-D$_6$)** δ (ppm):5.93 (d, 2H, ^3J = 8.6 Hz), 6.19-6.21 (q, 1H), 6.56 (d, 1H, ^3J = 15.0 Hz), 6.67 (d, 1H, ^3J = 3.9 Hz), 6.77 (d, 1H, ^3J = 5.0 Hz), 6.88 (d, 1H, ^3J = 15.3 Hz), 7.03 (d, 2H, ^3J = 9.0 Hz), 9.51 (s, 1H); **^{13}C NMR (100 MHz, DMSO-d$_6$)** δ (ppm): 115.55, 120.47, 128.78, 129.06, 130.00, 131.14, 132.46, 135.68, 140.04, 162.30, 186.73; **IR** (KBr) v= 2317, 1610, 1573, 1509, 1486, 1376, 1316, 1253, 1228, 1169, 1169, 1095, 963, 856, 820, 729 cm^{-1};**HRMS (ESI) calcd**. for $C_{13}H_{10}O_2S$: $[M+H]^+$ 231.0480; Found: 231.0484.

(*E*)-1-(4-Hydroxyphenyl)-3-(2-methoxyphenyl)prop-2-en-1-one (34p)



The general procedure described above was followed to get the title compound from(*E*)-1-(4-bromophenyl)-3-(2-methoxyphenyl)prop-2-en-1-one (158 mg, 0.5 mmol), (*E*)-4-methylbenzaldehyde oxime (71 mg, 0.525 mmol), Cs_2CO_3 (244 mg, 0.75 mmol), [(π-allylPdCl)$_2$] (5.49 mg, 3.0 mol %), *t*BuXPhos (**L2)** (15.9 mg, 7.5 mol %), with DMF as solvent (2.0 mL) were heated at 90 ^{o}C for 4.0 hour. The crude reaction mixture was purified through column chromatography (silica gel 60-120 mesh) to afford the title compound as abrown solid (111 mg, 87% yield). **m.p.**: 194.5-196.8^{o}C; **^{1}H NMR (400 MHz, CDCl$_3$)** δ (ppm): 3.84 (s, 3H), 6.92 (d, 2H, ^3J = 8.7 Hz), 6.97 (d, 2H, ^3J = 8.3 Hz), 7.44 (d, 1H, ^3J = 15.9 Hz), 7.58 (d, 2H, ^3J = 8.7 Hz), 7.79 (d, 1H, ^3J = 15.5 Hz), 7.98 (d, 2H, ^3J = 8.4 Hz); **^{13}C NMR (100 MHz, CDCl$_3$)** δ (ppm): 55.54, 114.52, 115.74, 115.79, 119.56, 127.78, 130.37, 130.38, 131.29, 131.33, 144.44, 144.61, 161.74, 161.75; **IR** (KBr) v= 2365, 1646, 1603, 1561, 1509, 1466, 1383, 1339, 1285, 1254, 1221, 1166, 1035, 1020, 990, 820, 738 cm^{-1};**HRMS (ESI) calcd**. for $C_{16}H_{14}O_3$: $[M+H]^+$ 255.1021; Found: 255.1028.

References

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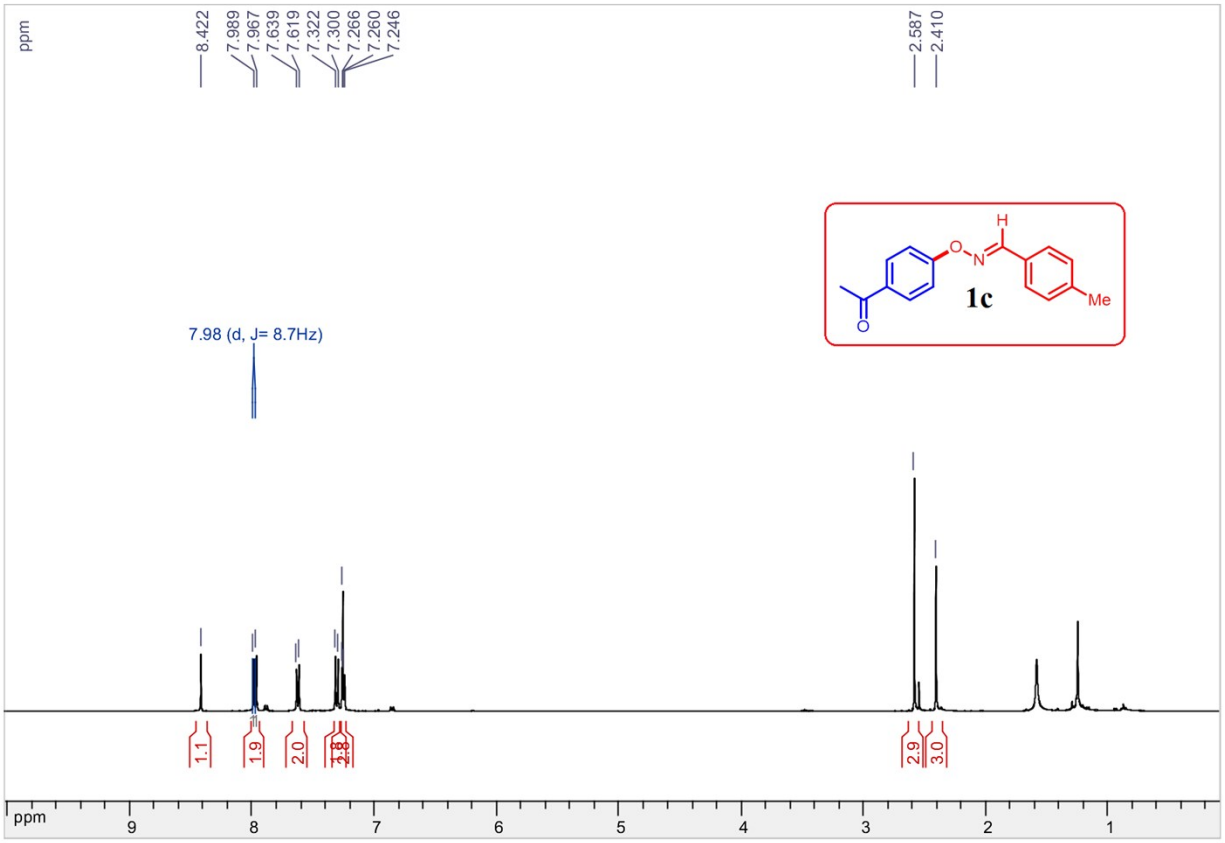
NMR Spectra of the Isolated Products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7.967
7.639
7.619
7.322
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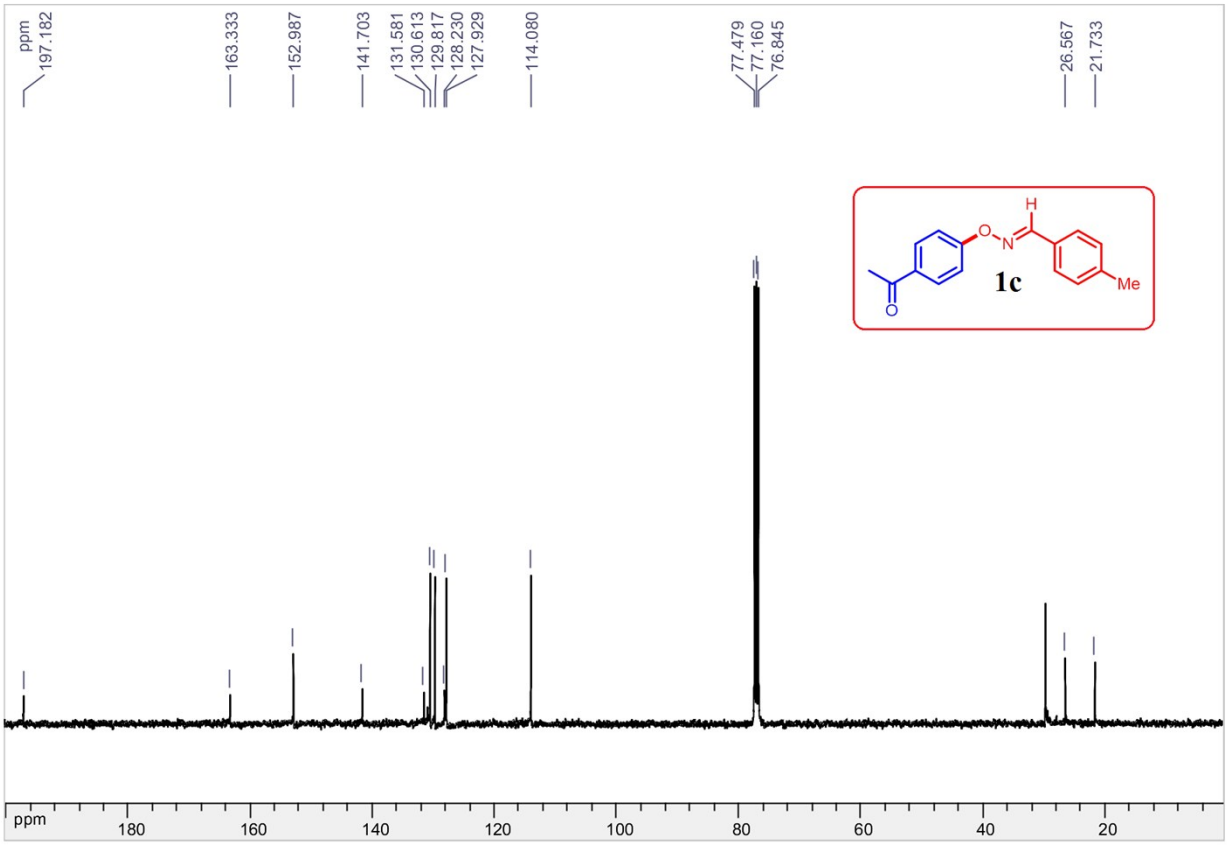
7.266
7.260
7.246
2.587
2.410
7.98 (d, J= 8.7Hz)
1c
1.1
1.9
2.0
2.8
2.9
3.0
ppm
9
8
7
6
5
4
3
2
1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ppm
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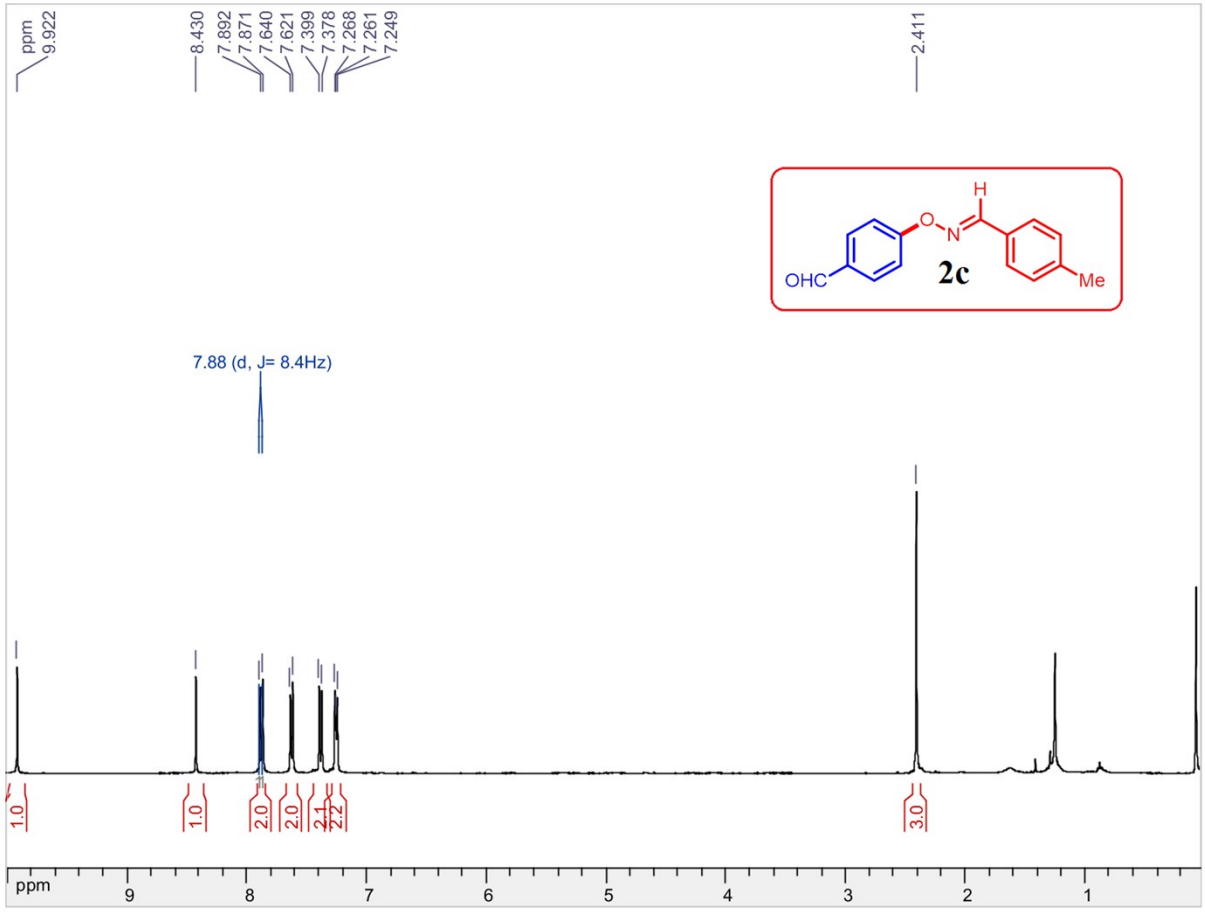
160
140
120
100
80
60
40
20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7.871
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7.399
7.378
7.268
7.261
7.249
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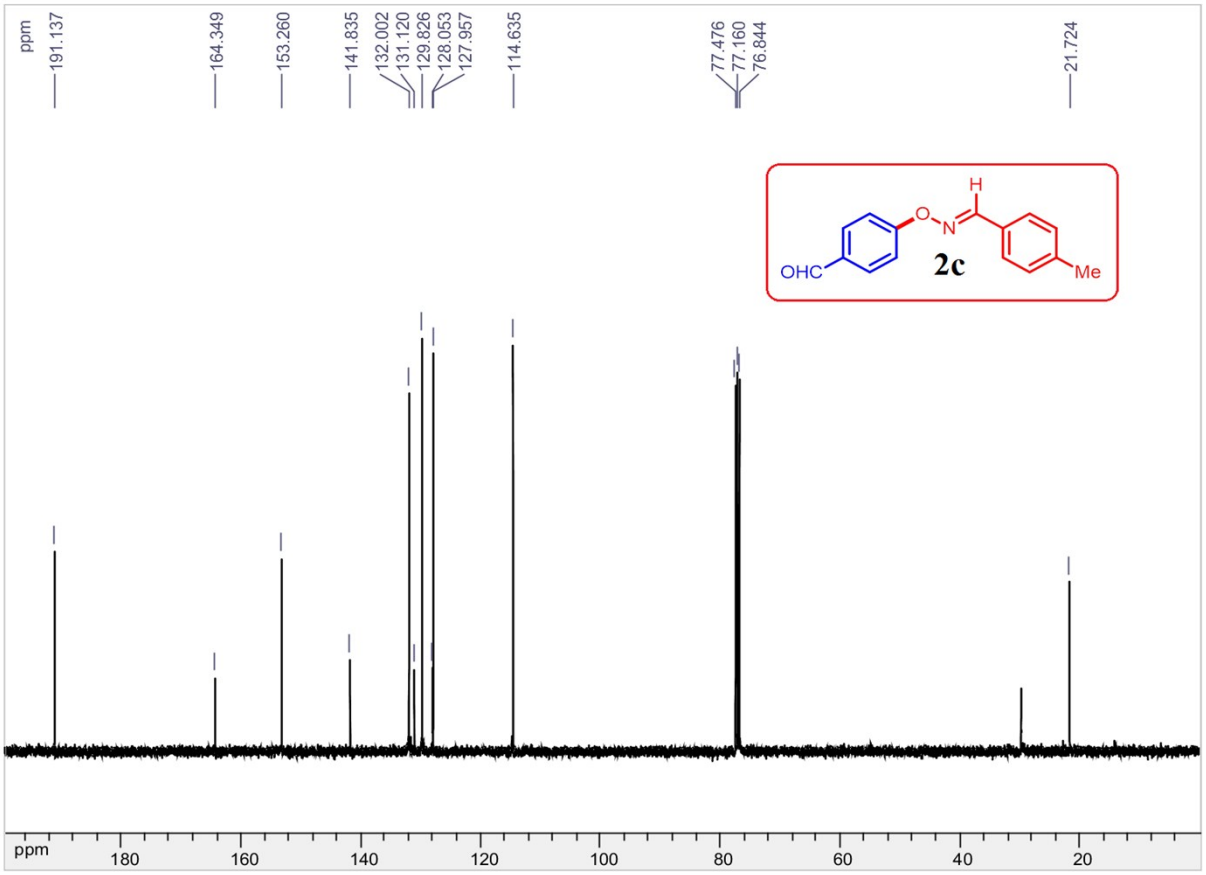
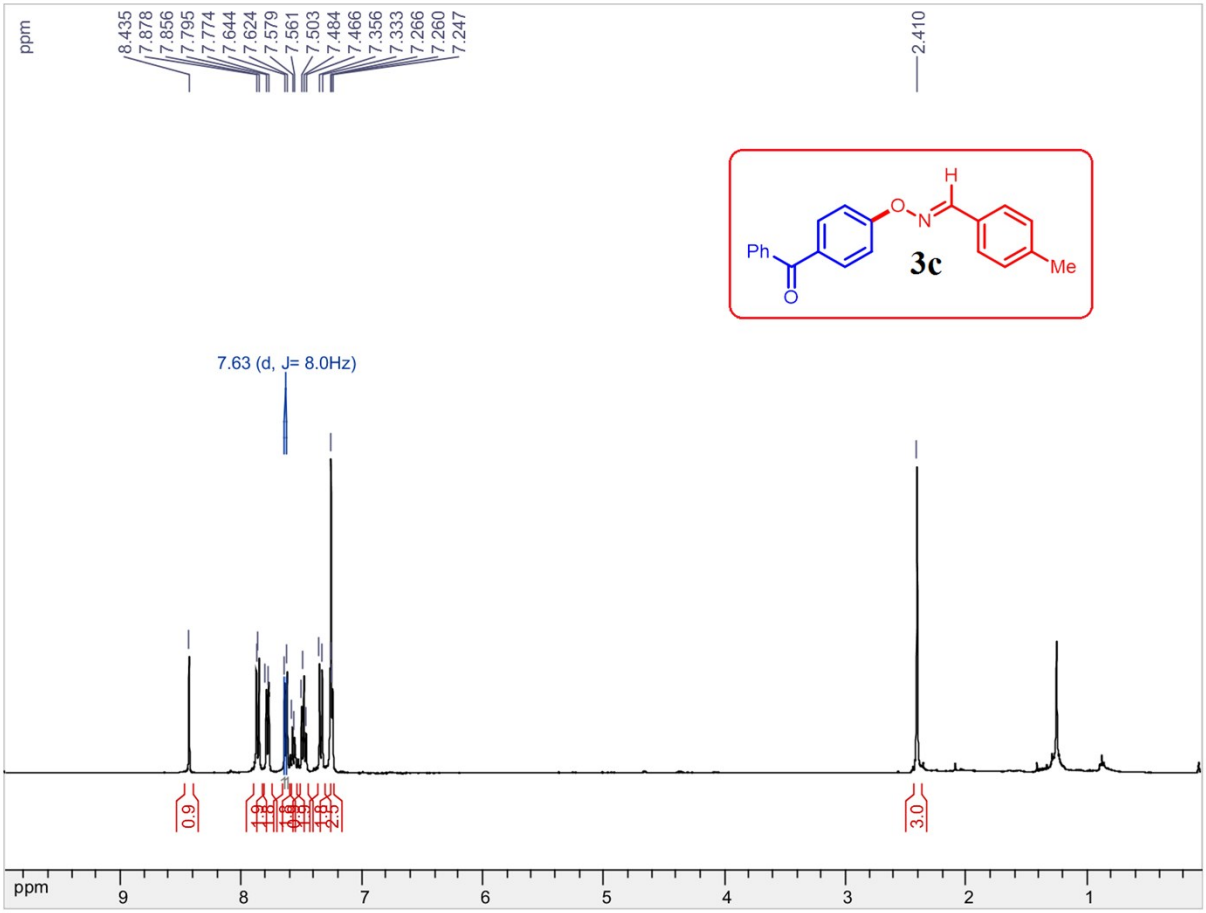
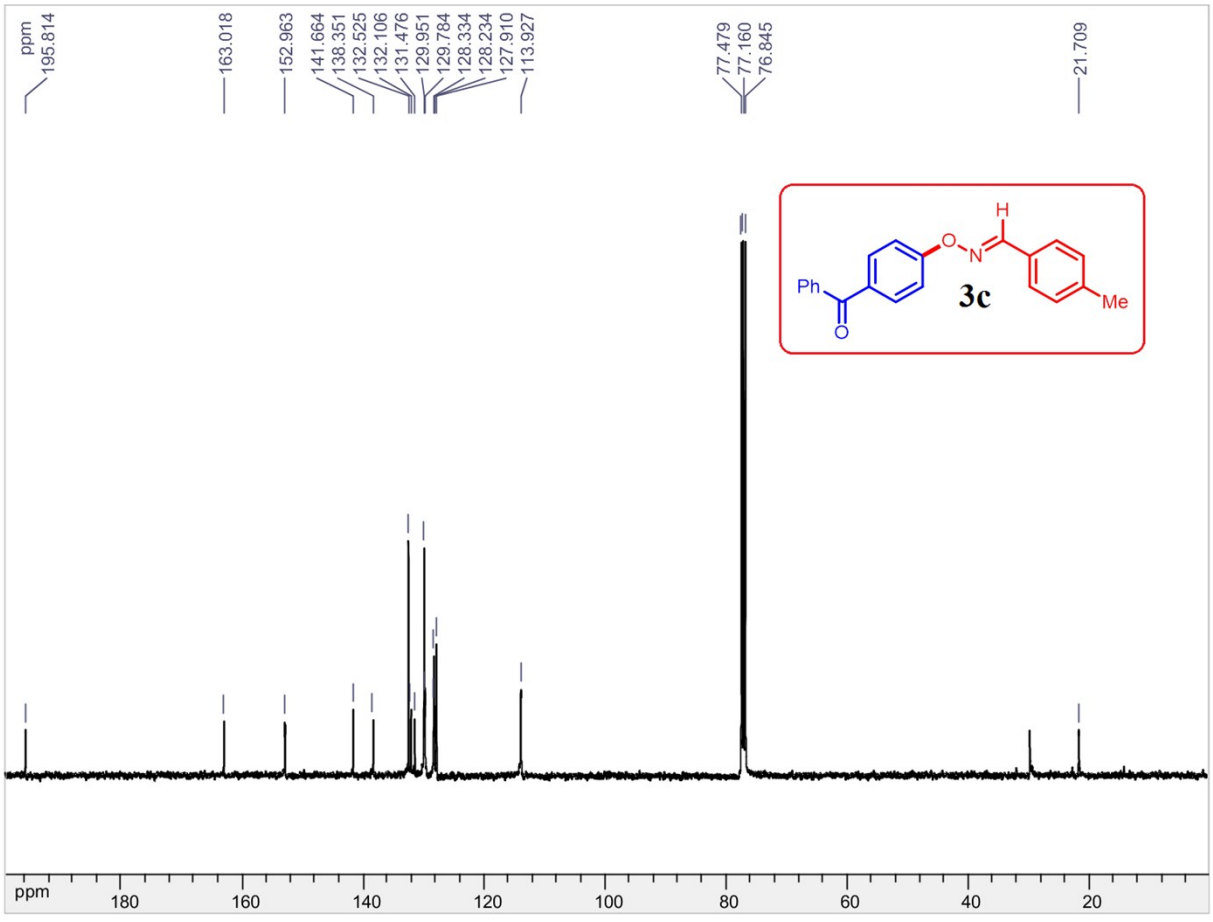
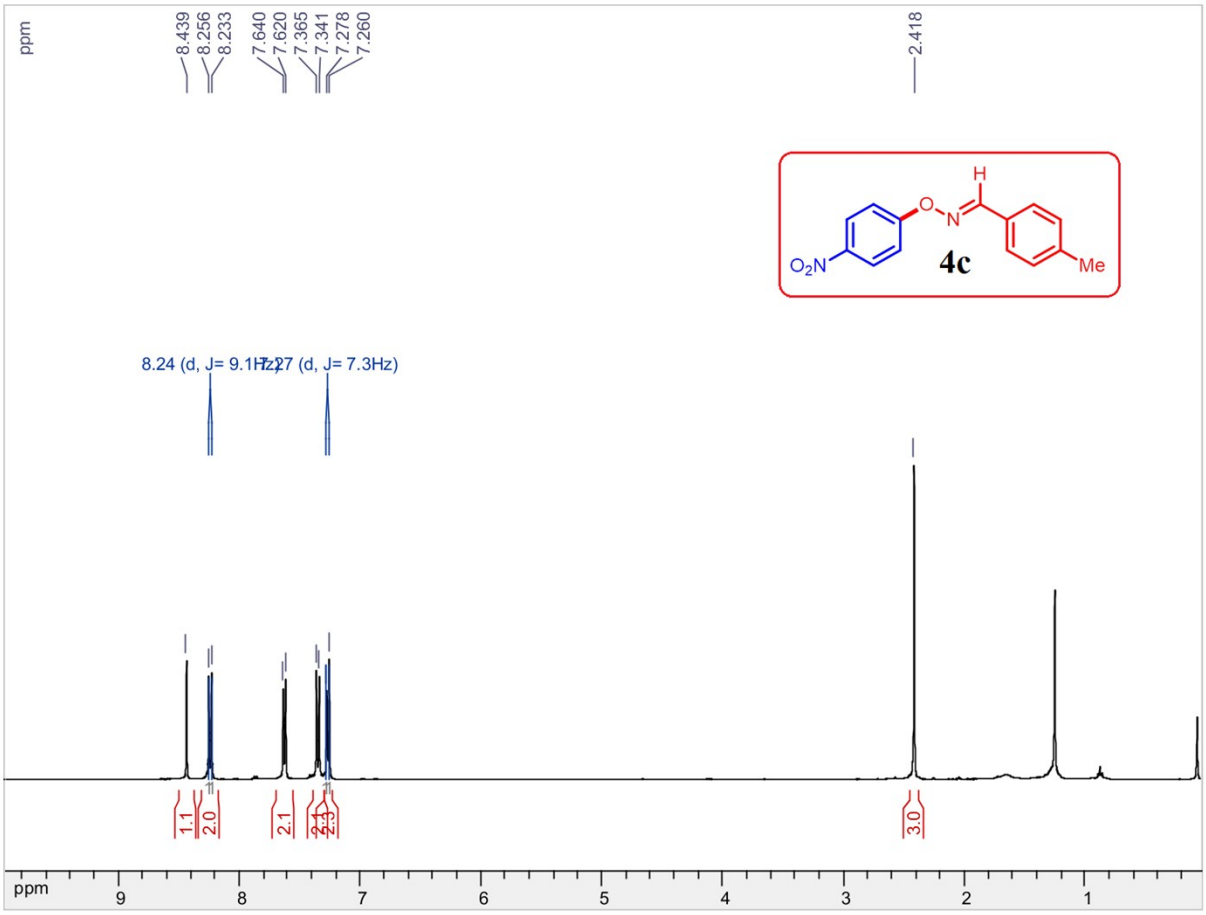
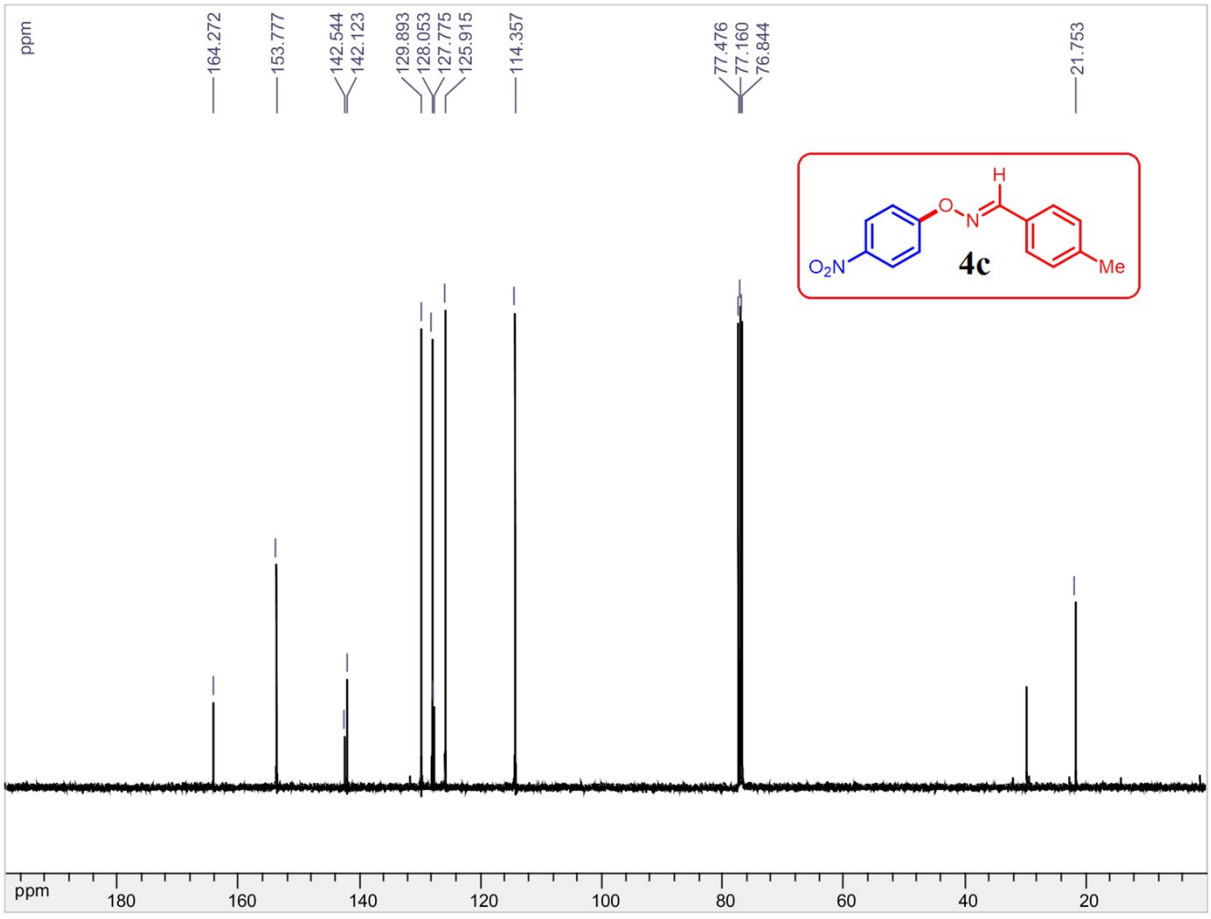
OHC
2c
Me
7.88 (d, J= 8.4Hz)
1.0
1.0
2.0
2.0
2.1
2.2
3.0
ppm
9
8
7
6
5
4
3
2
1

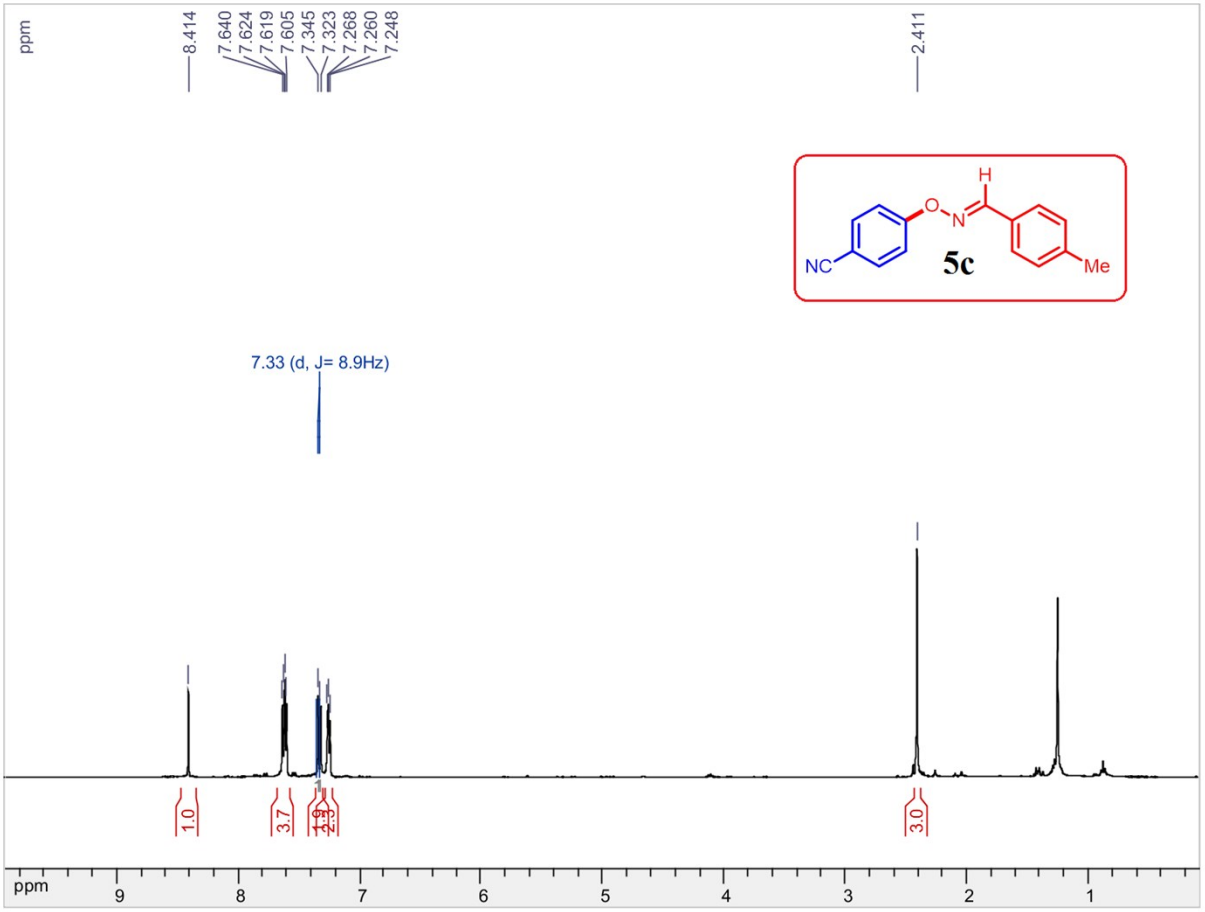

ppm
191.137
164.349
153.260
141.835
132.002
131.120
129.826
128.053
127.957
114.635
77.476
77.160
76.844
21.724
OHC
2c
Me
ppm
180
160
140
120
100
80
60
40
20

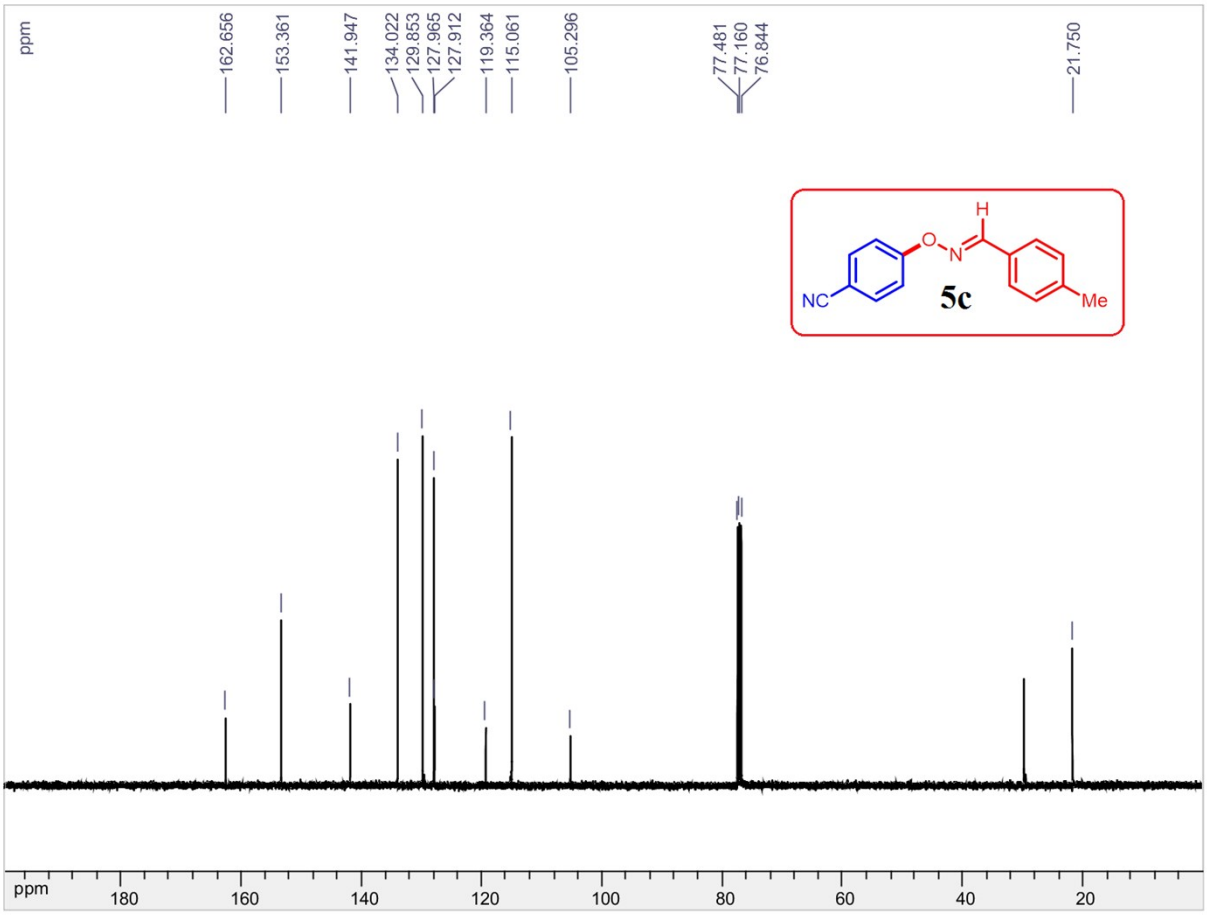

ppm
8.435
7.878
7.856
7.795
7.774
7.644
7.624
7.579
7.561
7.503
7.484
7.466
7.356
7.333
7.266
7.260
7.247
2.410
Ph
O
N
H
Me
3c
7.63 (d, J= 8.0Hz)
0.9
3.0
ppm
9
8
7
6
5
4
3
2
1

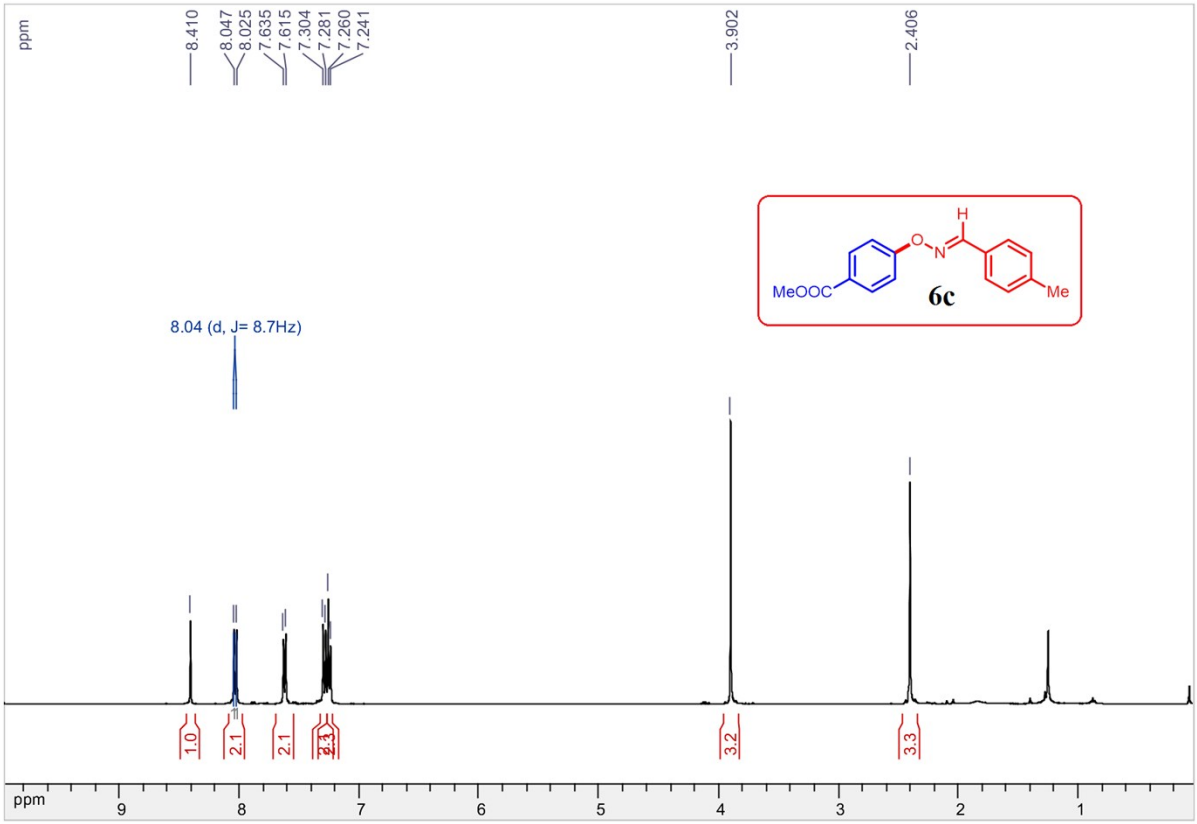

ppm
195.814
163.018
152.963
141.664
138.351
132.525
132.106
131.476
129.951
129.784
128.334
128.234
127.910
113.927
77.479
77.160
76.845
21.709
Ph
O
N
H
Me
3c
ppm
180
160
140
120
100
80
60
40
20

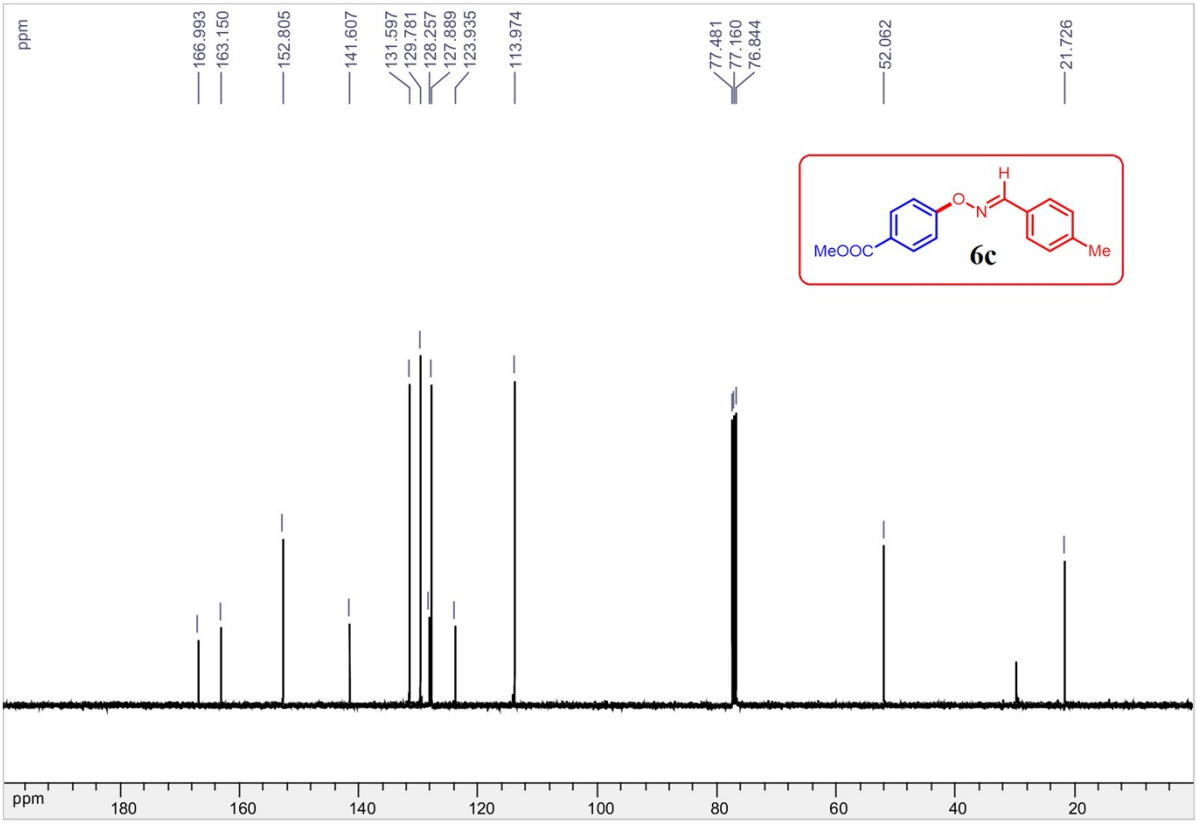

ppm
8.439
8.256
8.233
7.640
7.620
7.365
7.341
7.278
7.260
2.418
4c
8.24 (d, J= 9.1Hz)
7.27 (d, J= 7.3Hz)
1.1
2.0
2.1
2.3
3.0
ppm
9
8
7
6
5
4
3
2
1

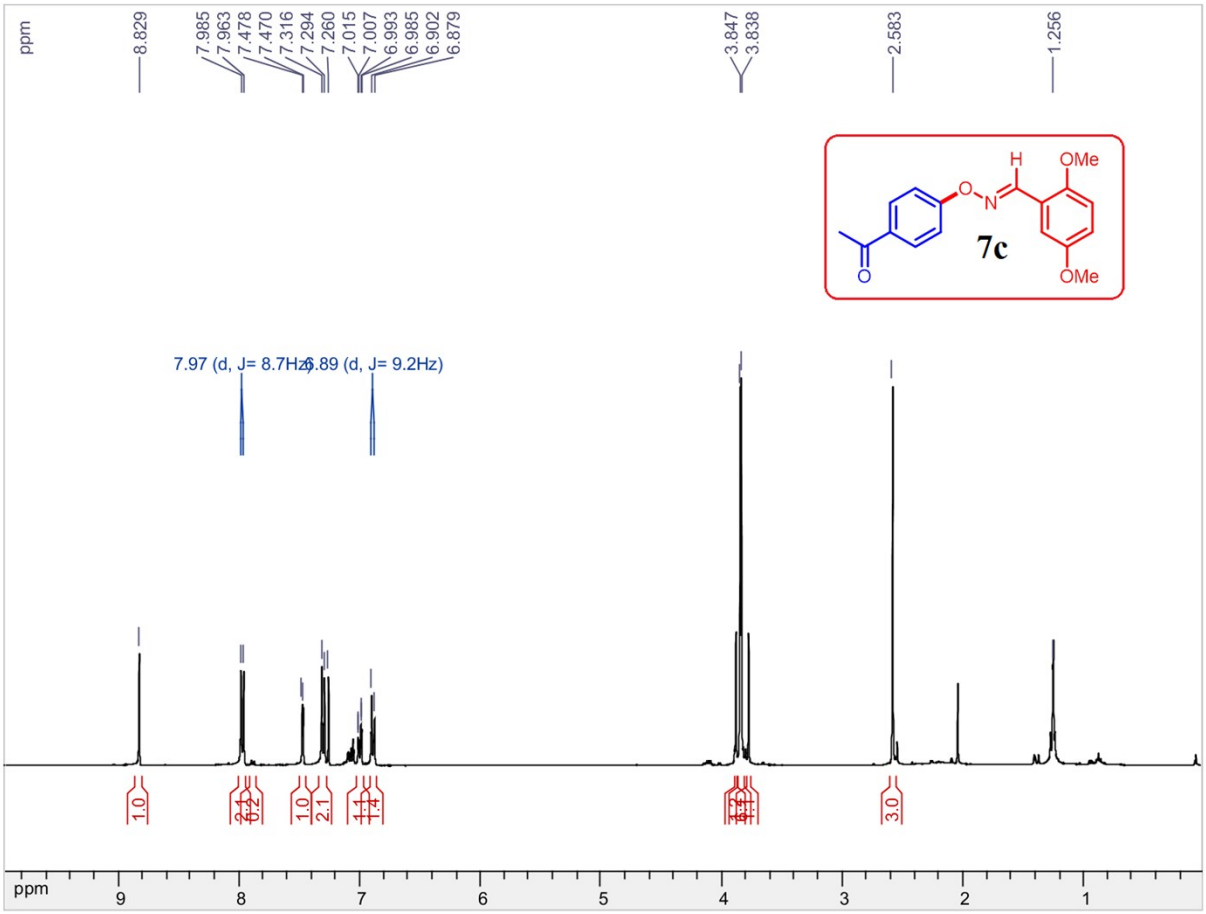

ppm
164.272
153.777
142.544
142.123
129.893
128.053
127.775
125.915
114.357
77.476
77.160
76.844
21.753
4c
ppm
180
160
140
120
100
80
60
40
20

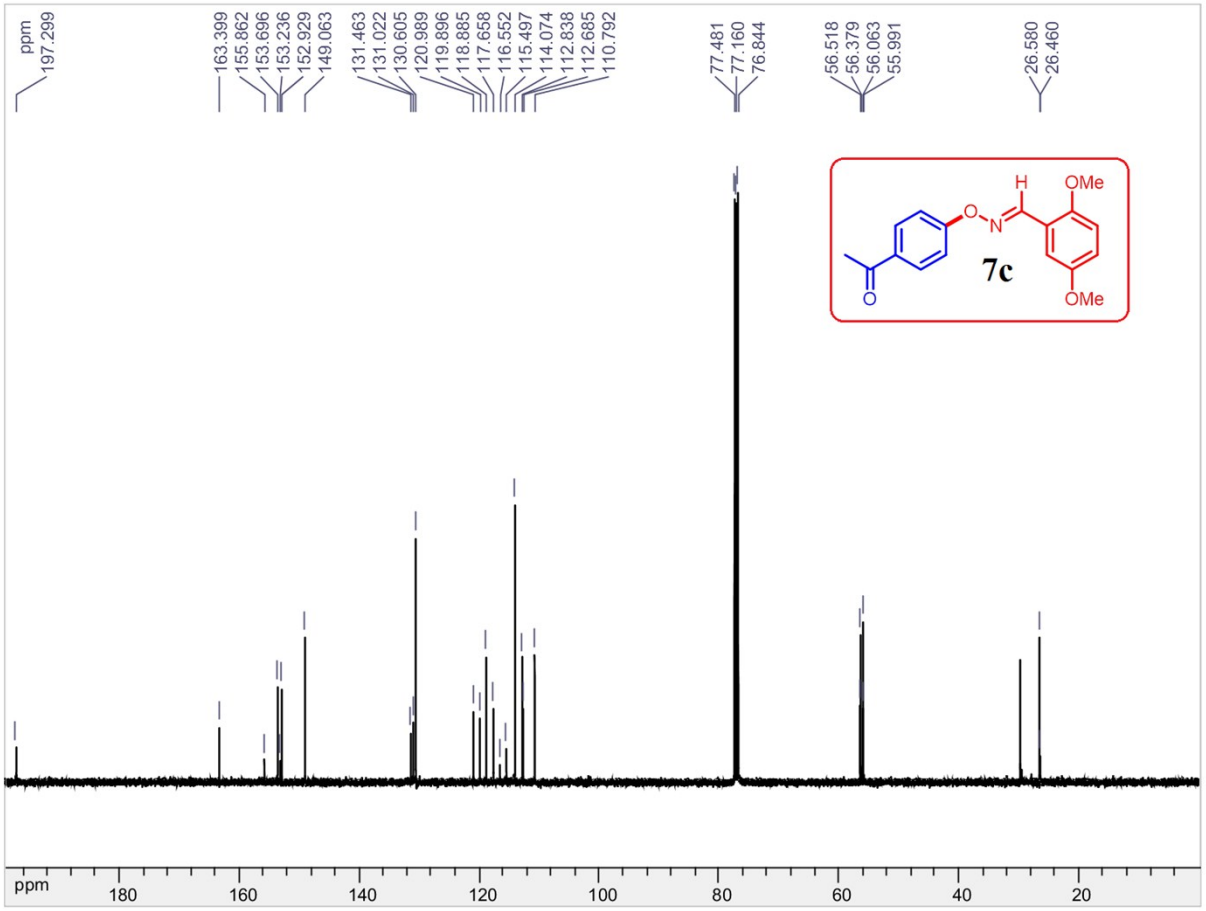

ppm
8.414
7.640
7.624
7.619
7.605
7.345
7.323
7.268
7.260
7.248
2.411
7.33 (d, J= 8.9Hz)
1.0
3.7
1.9
2.3
3.0
ppm
9
8
7
6
5
4
3
2
1
NC
5c
Me

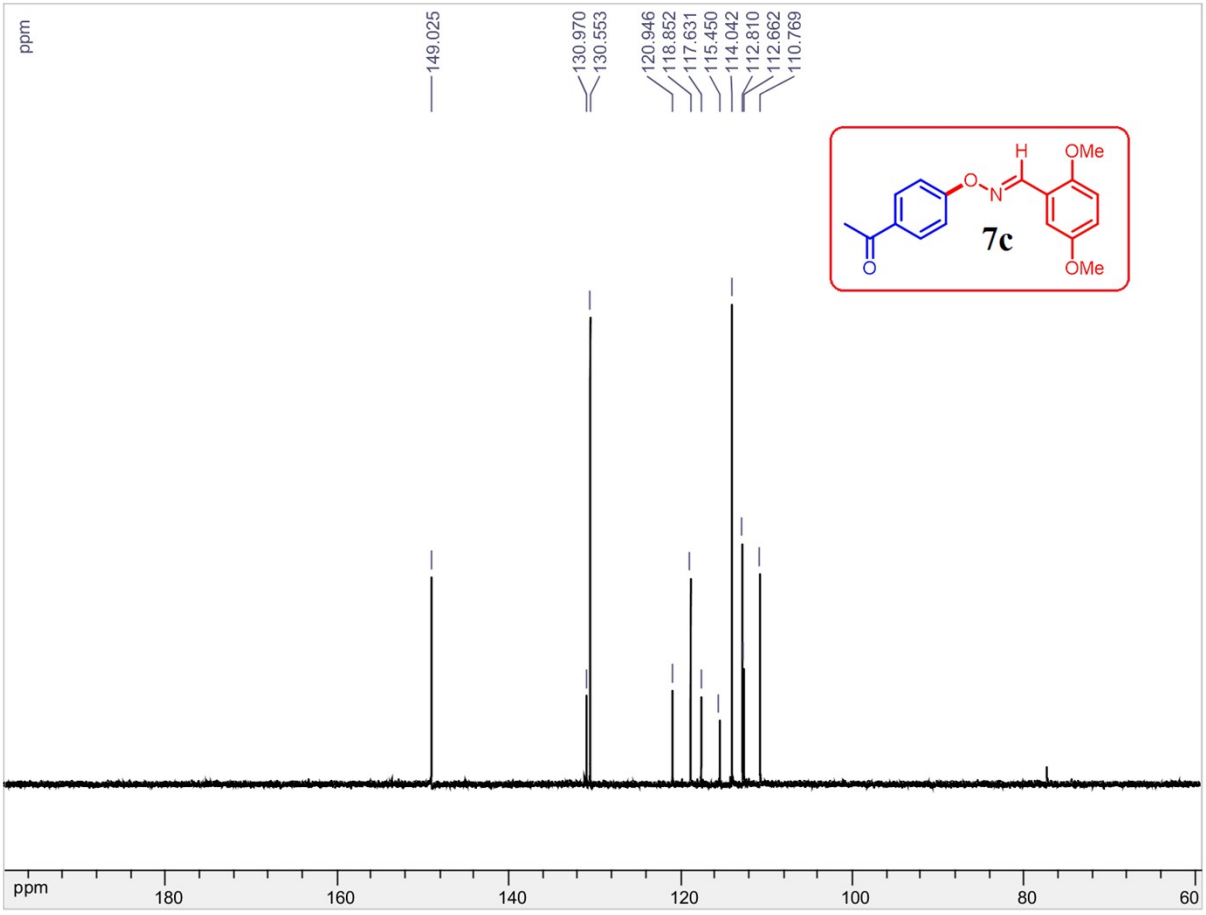

ppm
162.656
153.361
141.947
134.022
129.853
127.965
127.912
119.364
115.061
105.296
77.481
77.160
76.844
21.750
ppm
180
160
140
120
100
80
60
40
20
NC
5c
Me

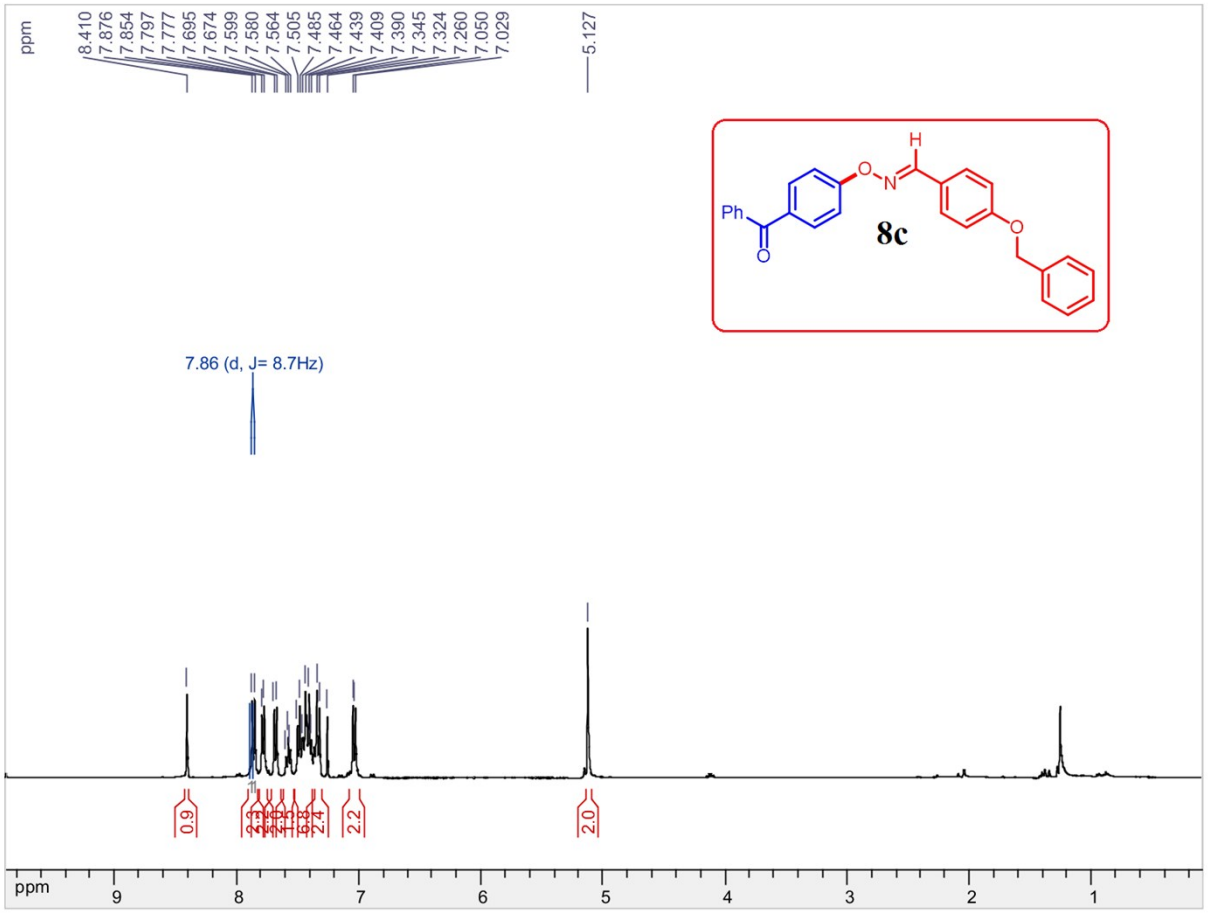

ppm
8.410
8.047
8.025
7.635
7.615
7.304
7.281
7.260
7.241
3.902
2.406
8.04 (d, J= 8.7Hz)
MeOOC
Me
6c
1.0
2.1
2.1
2.1
3.2
3.3
ppm
9
8
7
6
5
4
3
2
1

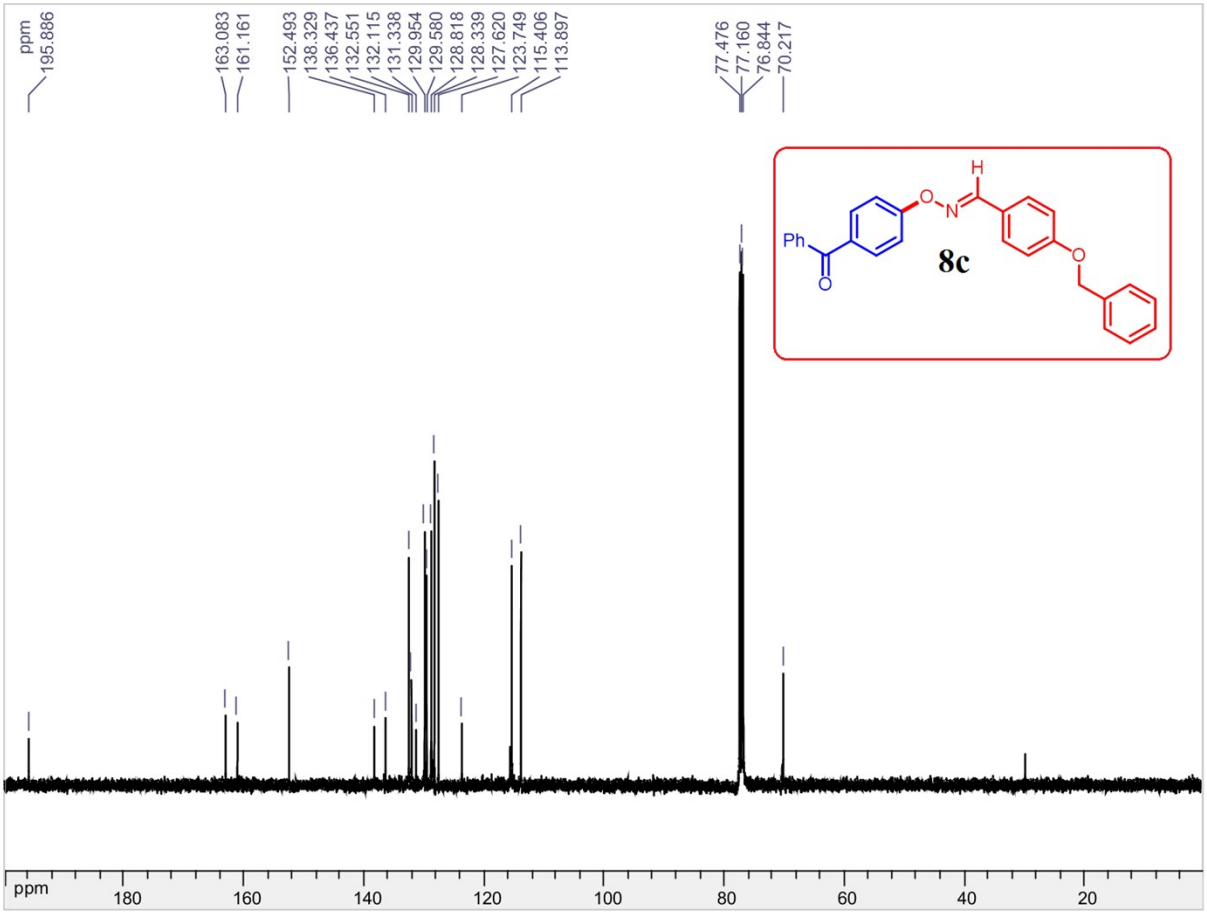

ppm
166.993
163.150
152.805
141.607
131.597
129.781
128.257
127.889
123.935
113.974
77.481
77.160
76.844
52.062
21.726
MeOOC
Me
6c
ppm
180
160
140
120
100
80
60
40
20

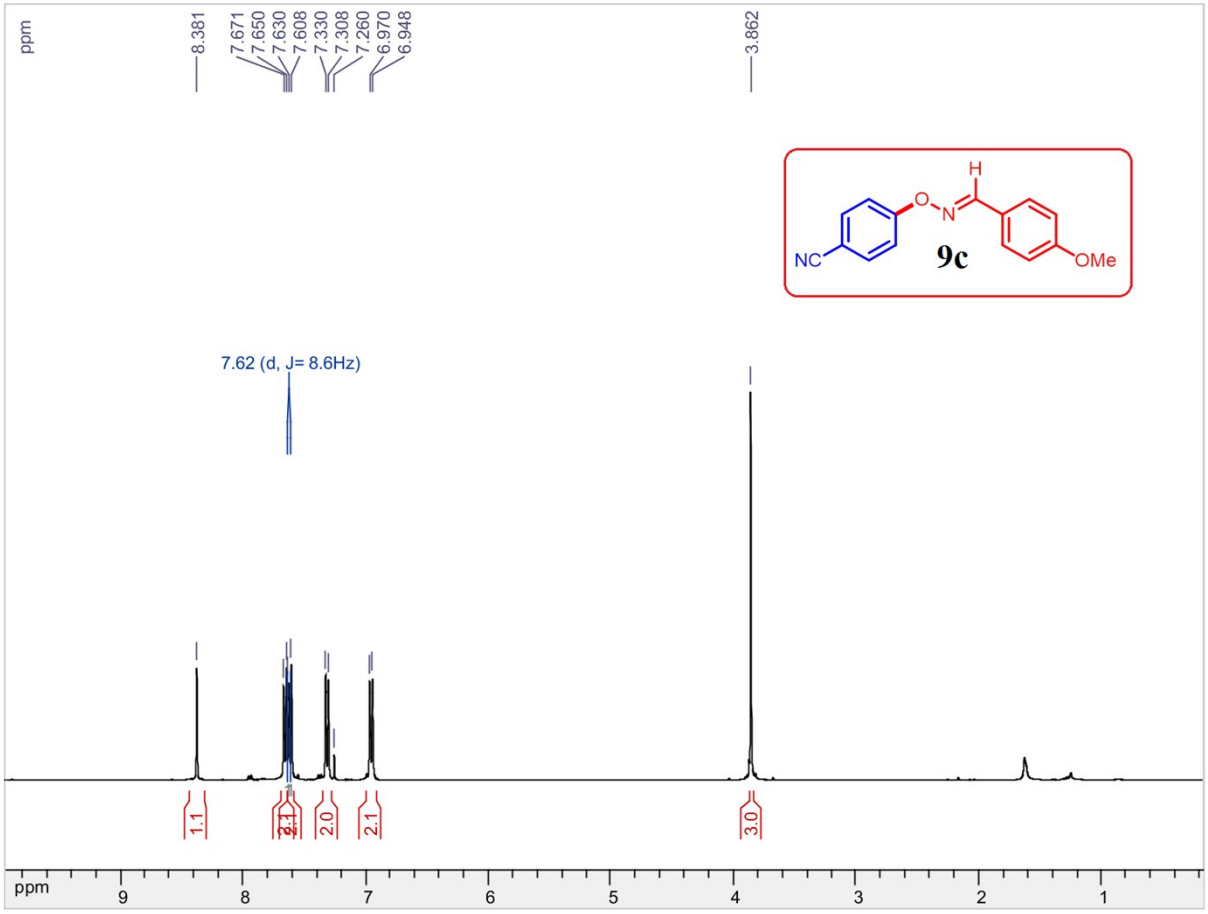

ppm
8.829
7.985
7.963
7.478
7.470
7.316
7.294
7.260
7.015
7.007
6.993
6.985
6.902
6.879
3.847
3.838
2.583
1.256
7.97 (d, J= 8.7Hz)
6.89 (d, J= 9.2Hz)
7c
OMe
OMe
H
O
N
O
1.0
2.1
1.0
2.1
3.0
ppm
9
8
7
6
5
4
3
2
1

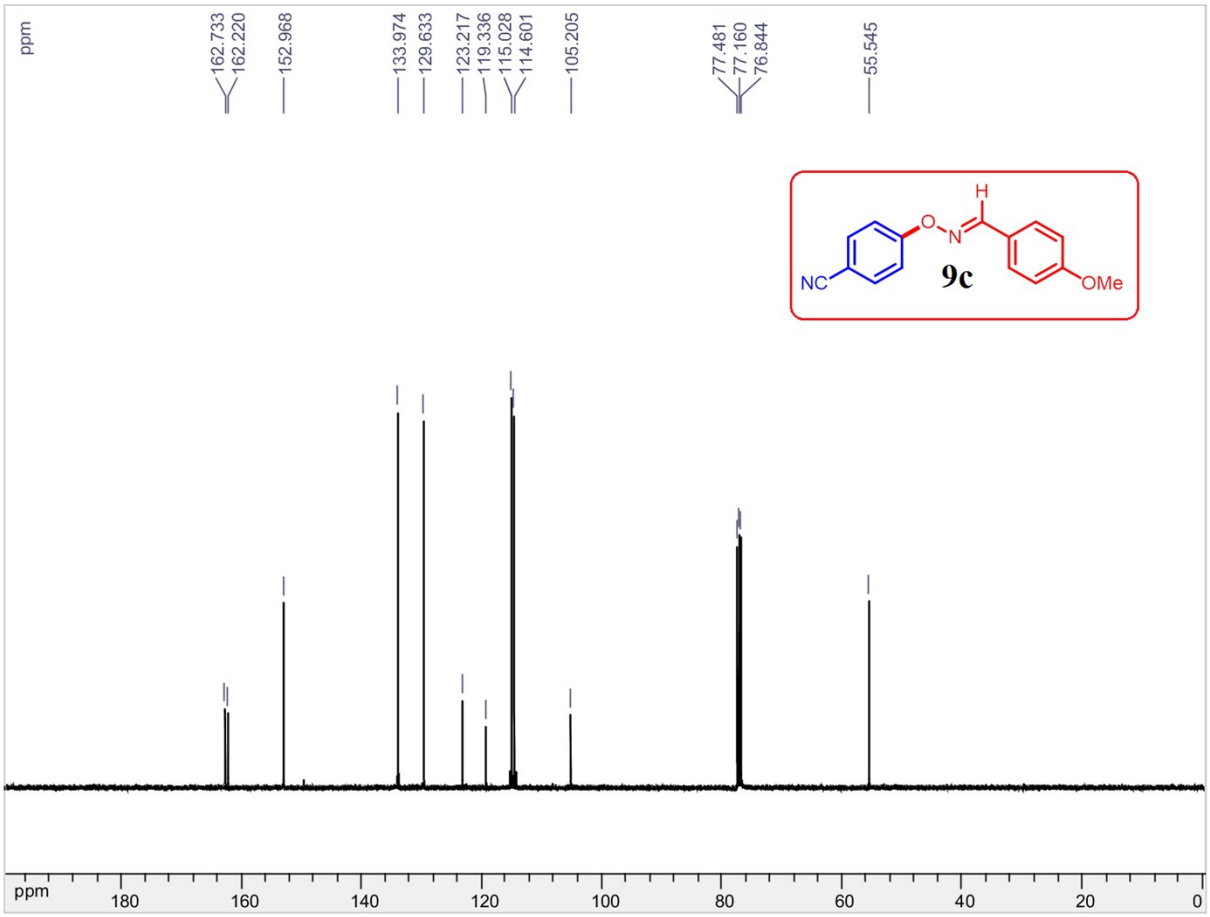

ppm
197.299
163.399
155.862
153.696
153.236
152.929
149.063
131.463
131.022
130.605
120.989
119.896
118.885
117.658
116.552
115.497
114.074
112.838
112.685
110.792
77.481
77.160
76.844
56.518
56.379
56.063
55.991
26.580
26.460
7c
OMe
OMe
H
O
N
O
ppm
180
160
140
120
100
80
60
40
20

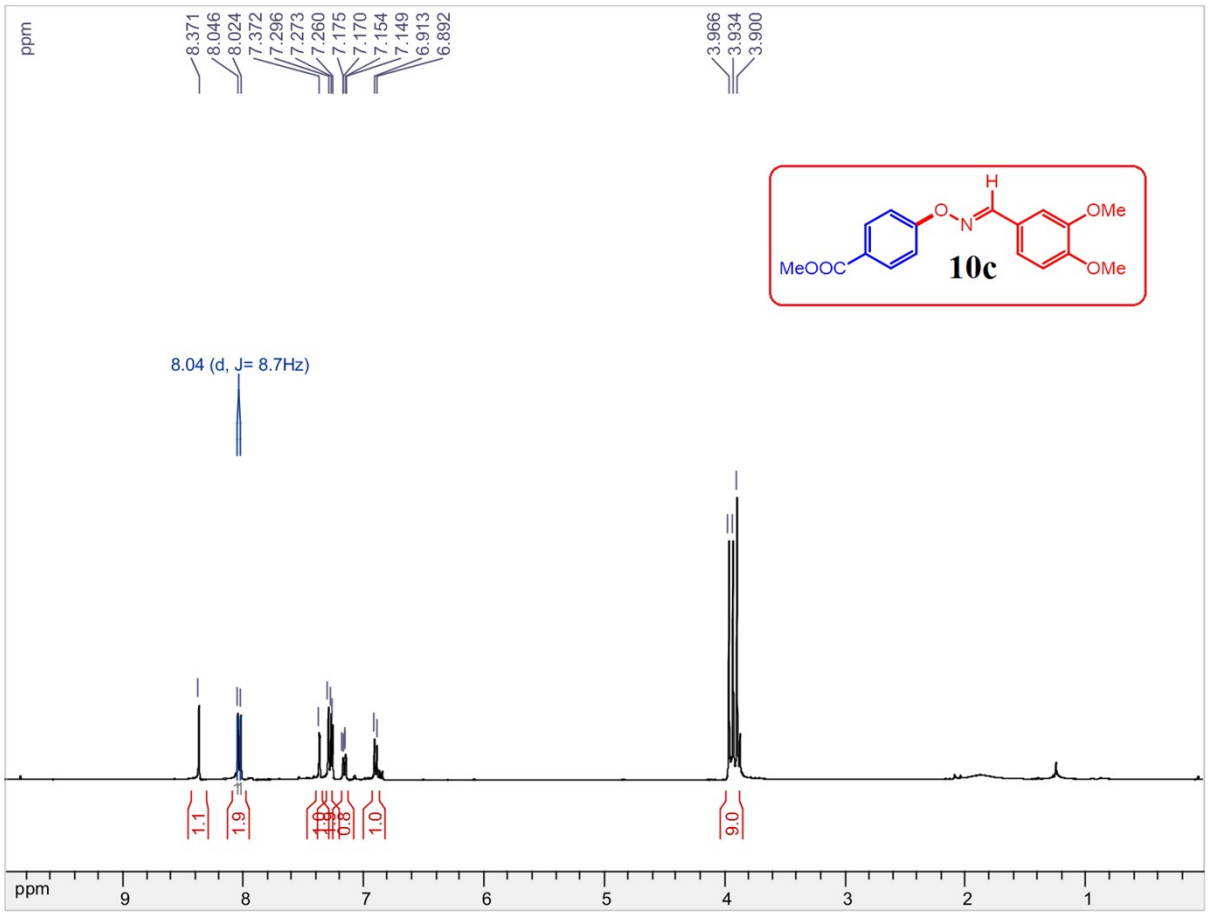

ppm
149.025
130.970
130.553
120.946
118.852
117.631
115.450
114.042
112.810
112.662
110.769
H
OMe
O
N
O
7c
OMe
ppm
180
160
140
120
100
80
60

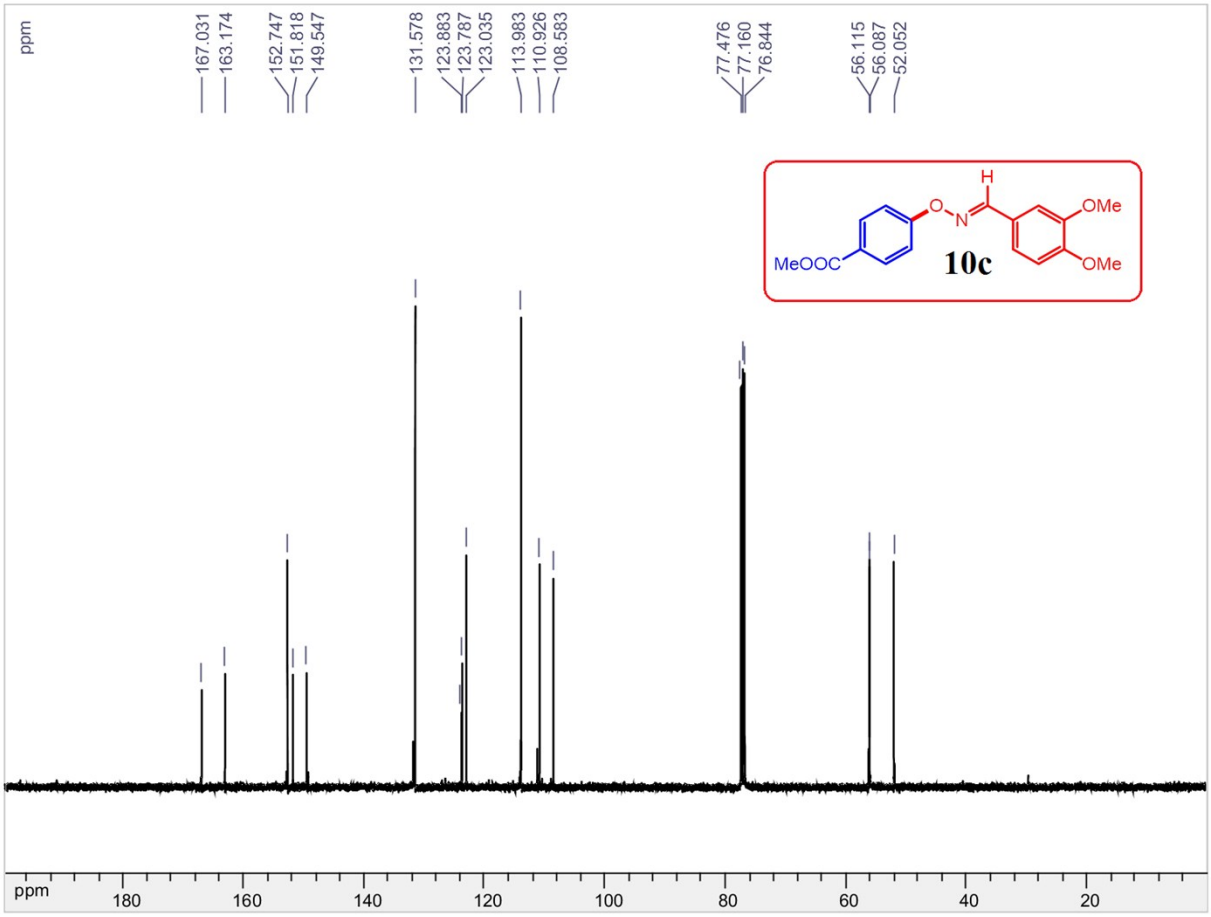

ppm
8.410
7.876
7.854
7.797
7.777
7.695
7.674
7.599
7.580
7.564
7.505
7.485
7.464
7.439
7.409
7.390
7.345
7.324
7.260
7.050
7.029
5.127
H
O
N
Ph
O
8c
O
7.86 (d, J= 8.7Hz)
0.9
2.4
2.2
2.0
ppm
9
8
7
6
5
4
3
2
1

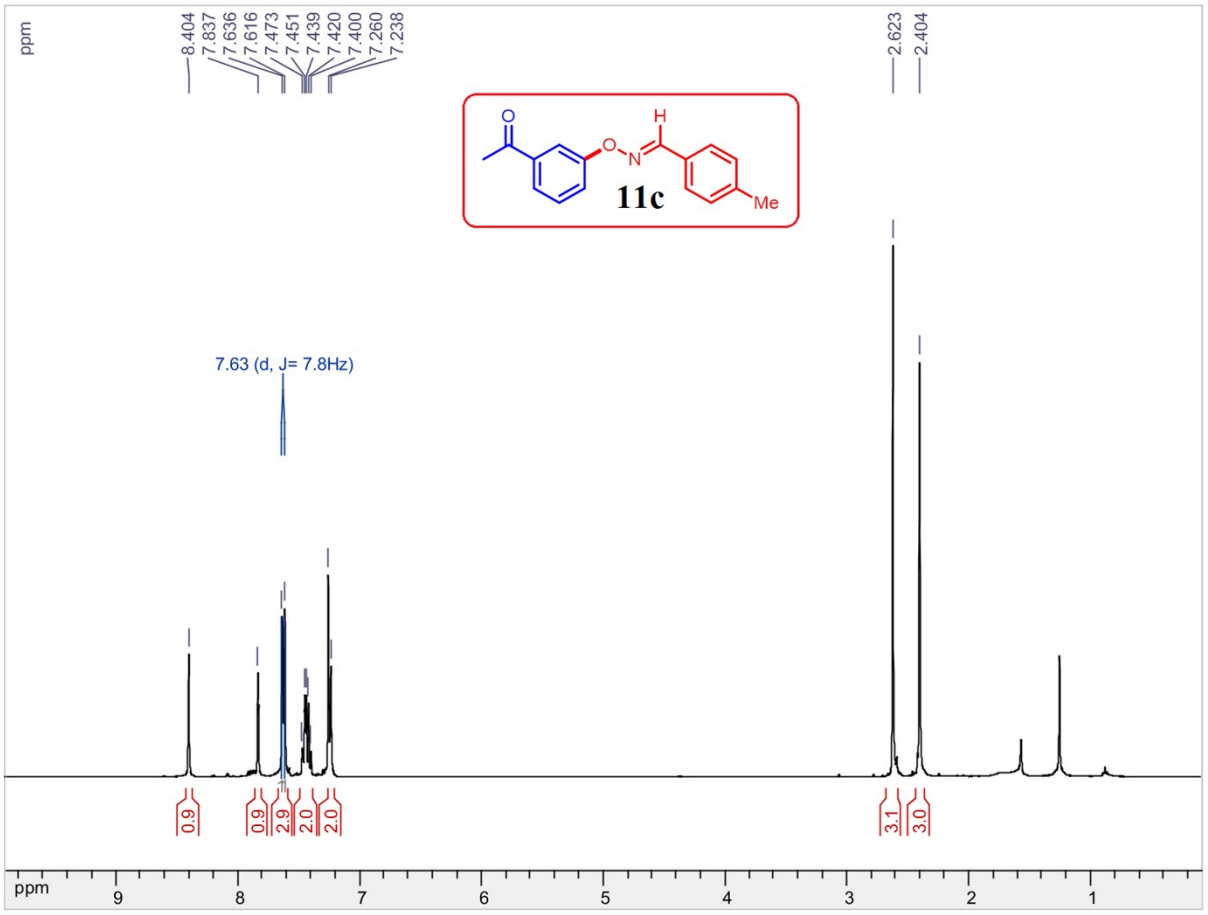

ppm
195.886
163.083
161.161
152.493
138.329
136.437
132.551
132.115
131.338
129.954
129.580
128.818
128.339
127.620
123.749
115.406
113.897
77.476
77.160
76.844
70.217
Ph
O
N
H
O
8c
ppm
180
160
140
120
100
80
60
40
20

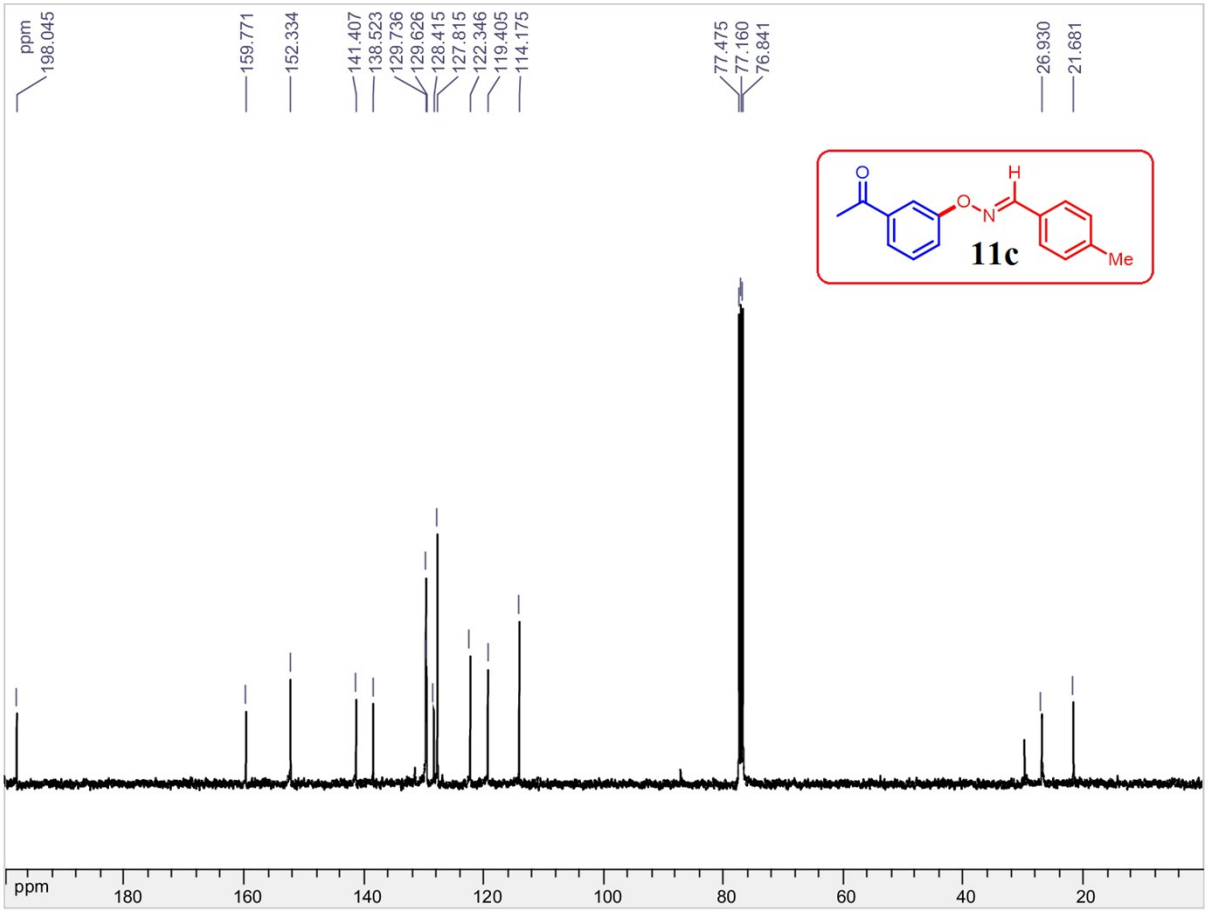

ppm
8.381
7.671
7.650
7.630
7.608
7.330
7.308
7.260
6.970
6.948
3.862
NC
O
N
H
OMe
9c
7.62 (d, J= 8.6Hz)
1.1
2.1
2.0
2.1
3.0
ppm
9
8
7
6
5
4
3
2
1

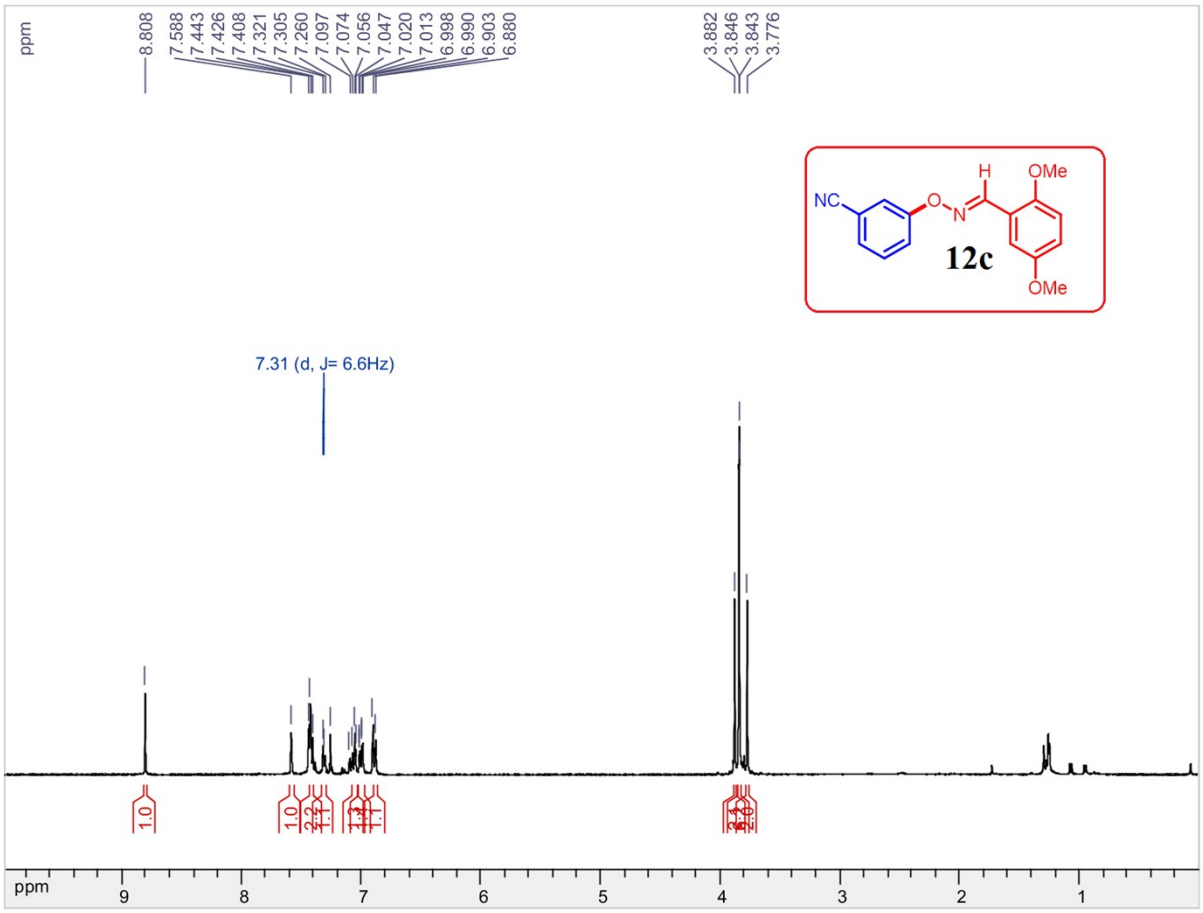

ppm
162.733
162.220
152.968
133.974
129.633
123.217
119.336
115.028
114.601
105.205
77.481
77.160
76.844
55.545
NC
O
N
H
OMe
9c
ppm
180
160
140
120
100
80
60
40
20
0

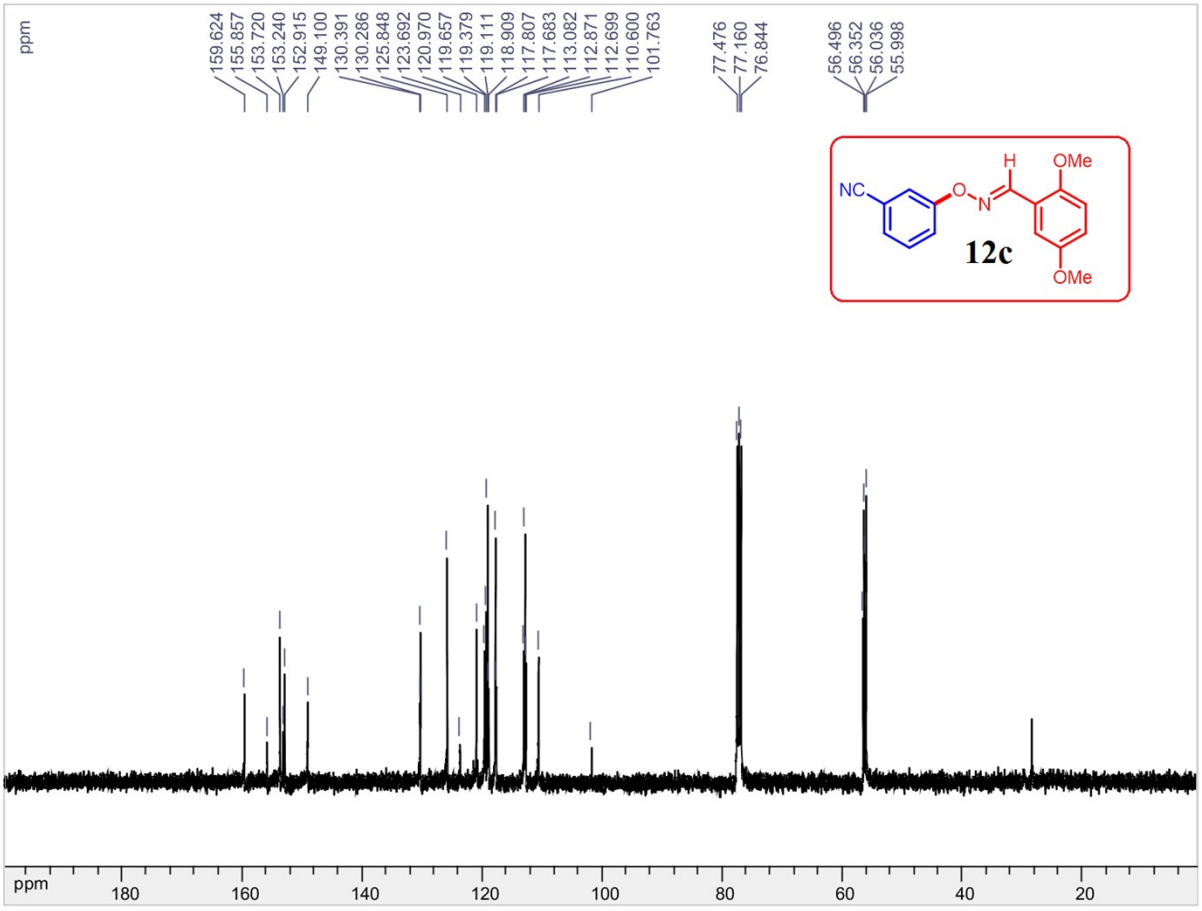

ppm
8.371
8.046
8.024
7.372
7.296
7.273
7.260
7.175
7.170
7.154
7.149
6.913
6.892
3.966
3.934
3.900
MeOOC
O
N
H
OMe
OMe
10c
8.04 (d, J= 8.7Hz)
1.1
1.9
1.0
9.0
ppm
9
8
7
6
5
4
3
2
1

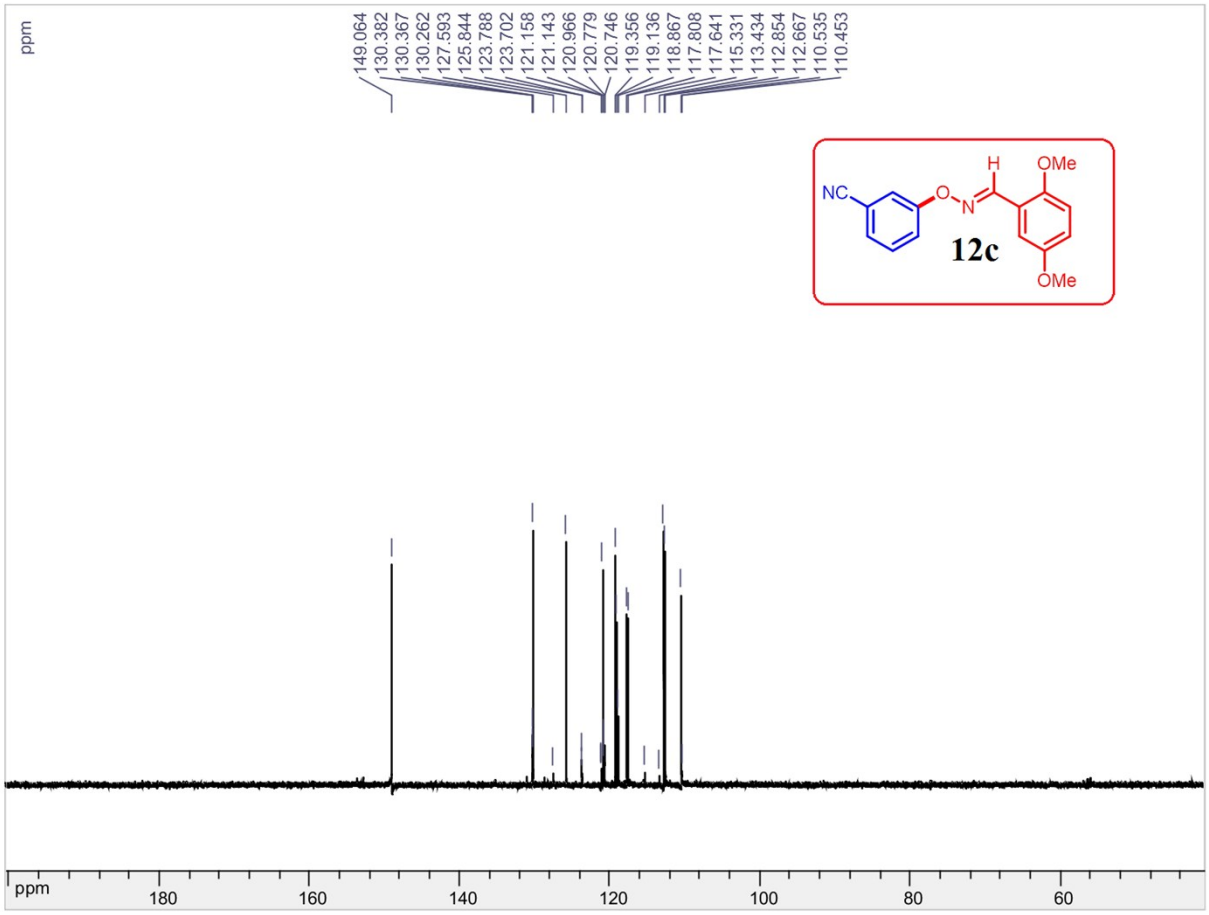

ppm
167.031
163.174
152.747
151.818
149.547
131.578
123.883
123.787
123.035
113.983
110.926
108.583
77.476
77.160
76.844
56.115
56.087
52.052
MeOOC
OMe
OMe
10c
ppm
180
160
140
120
100
80
60
40
20

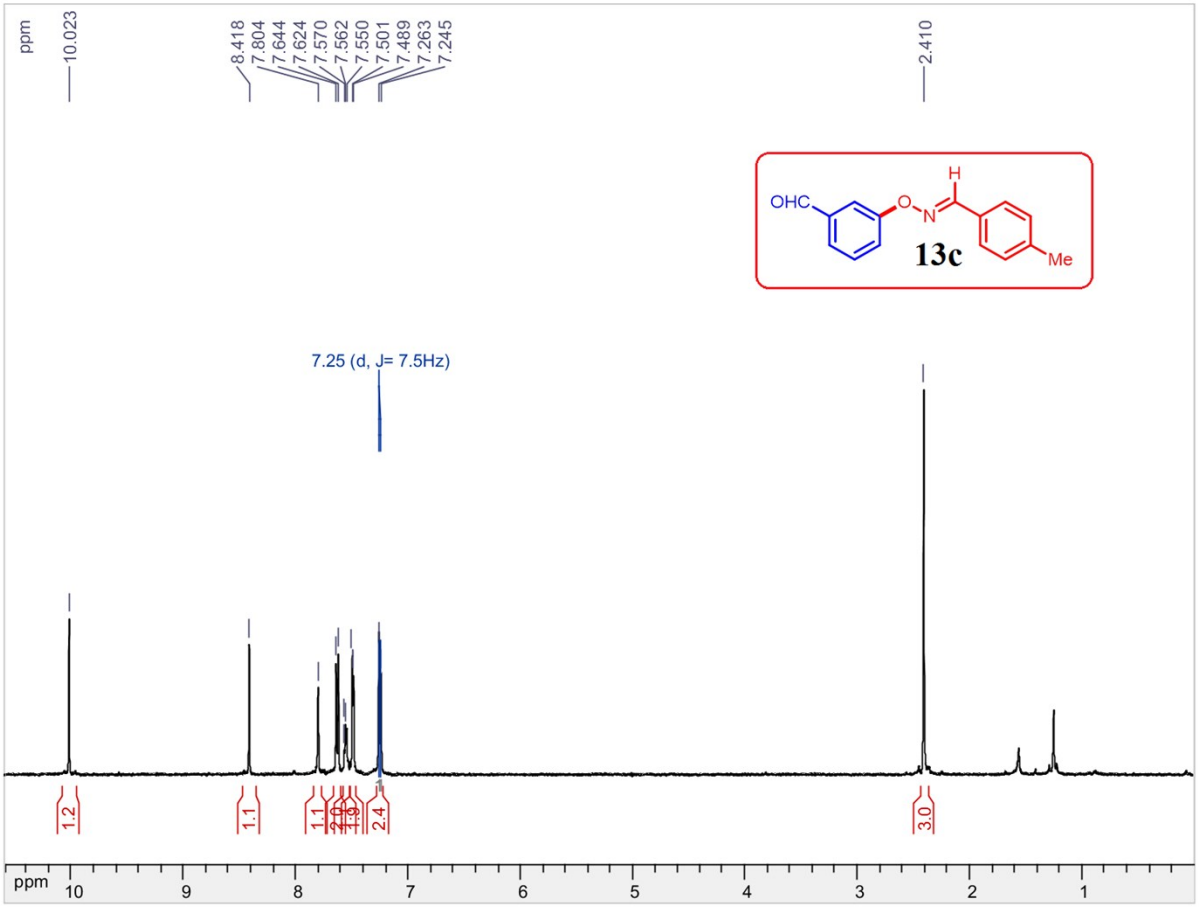

ppm
8.404
7.837
7.636
7.616
7.473
7.451
7.439
7.420
7.400
7.260
7.238
2.623
2.404
11c
Me
7.63 (d, J= 7.8Hz)
0.9
0.9
2.9
2.0
2.0
3.1
3.0
ppm
9
8
7
6
5
4
3
2
1

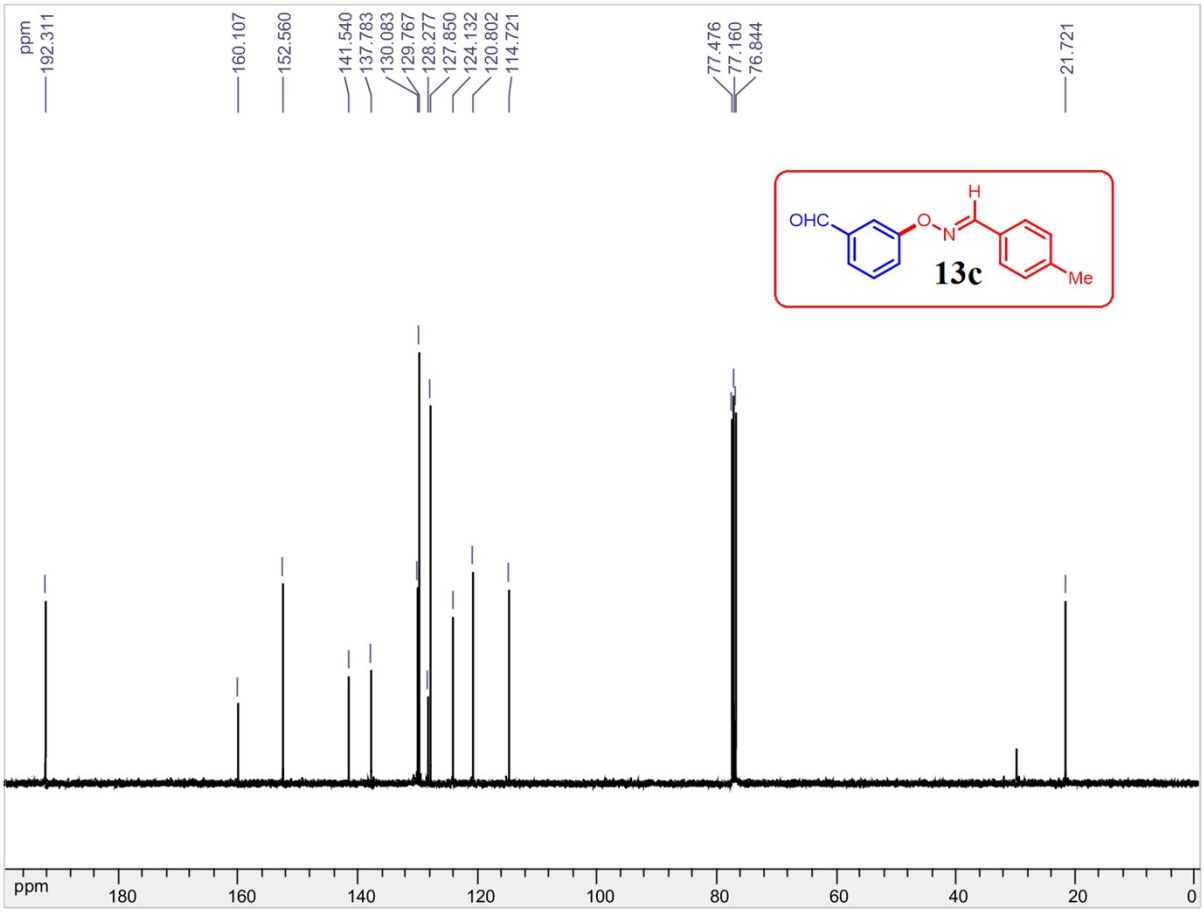

ppm
198.045
159.771
152.334
141.407
138.523
129.736
129.626
128.415
127.815
122.346
119.405
114.175
77.475
77.160
76.841
26.930
21.681
11c
Me
ppm
180
160
140
120
100
80
60
40
20

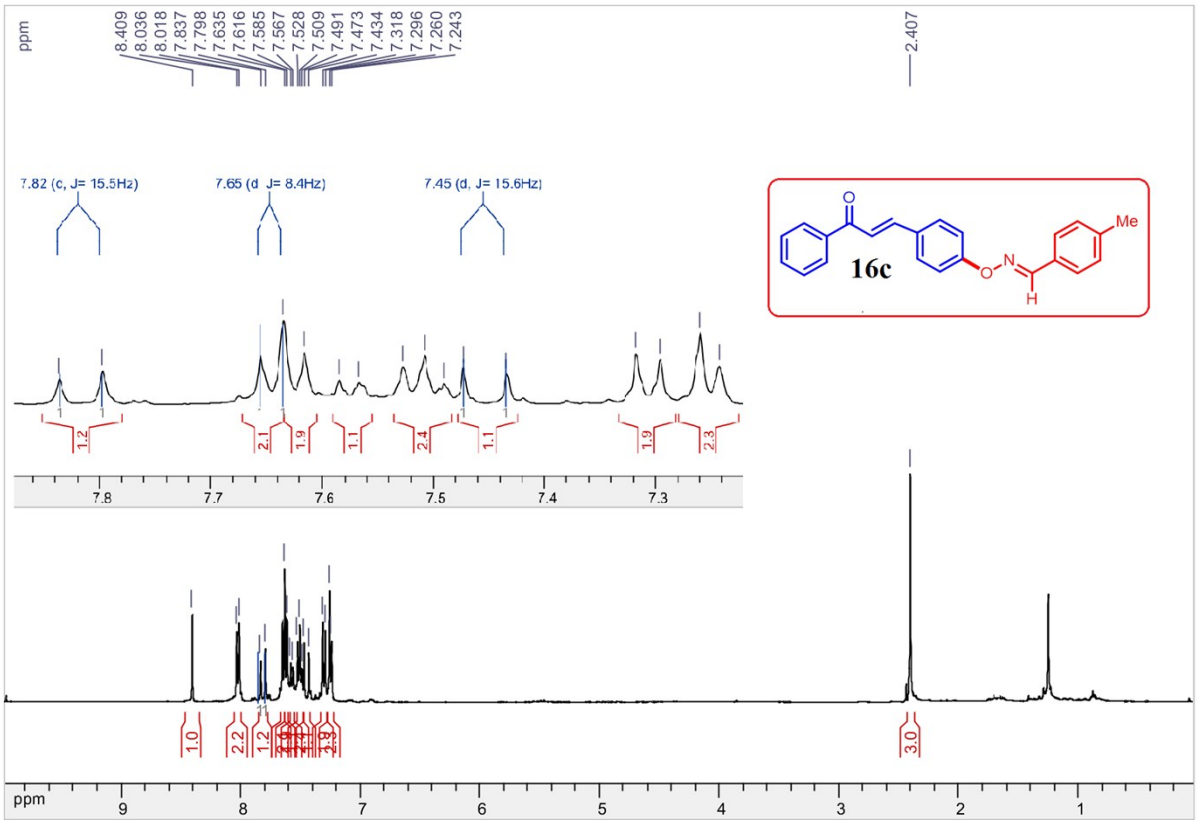

ppm
8.808
7.588
7.443
7.426
7.408
7.321
7.305
7.260
7.097
7.074
7.056
7.047
7.020
7.013
6.998
6.990
6.903
6.880
3.882
3.846
3.843
3.776
12c
NC
OMe
OMe
7.31 (d, J= 6.6Hz)
1.0
1.0
2.2
1.1
1.3
1.1
3.3
2.0
ppm
9
8
7
6
5
4
3
2
1

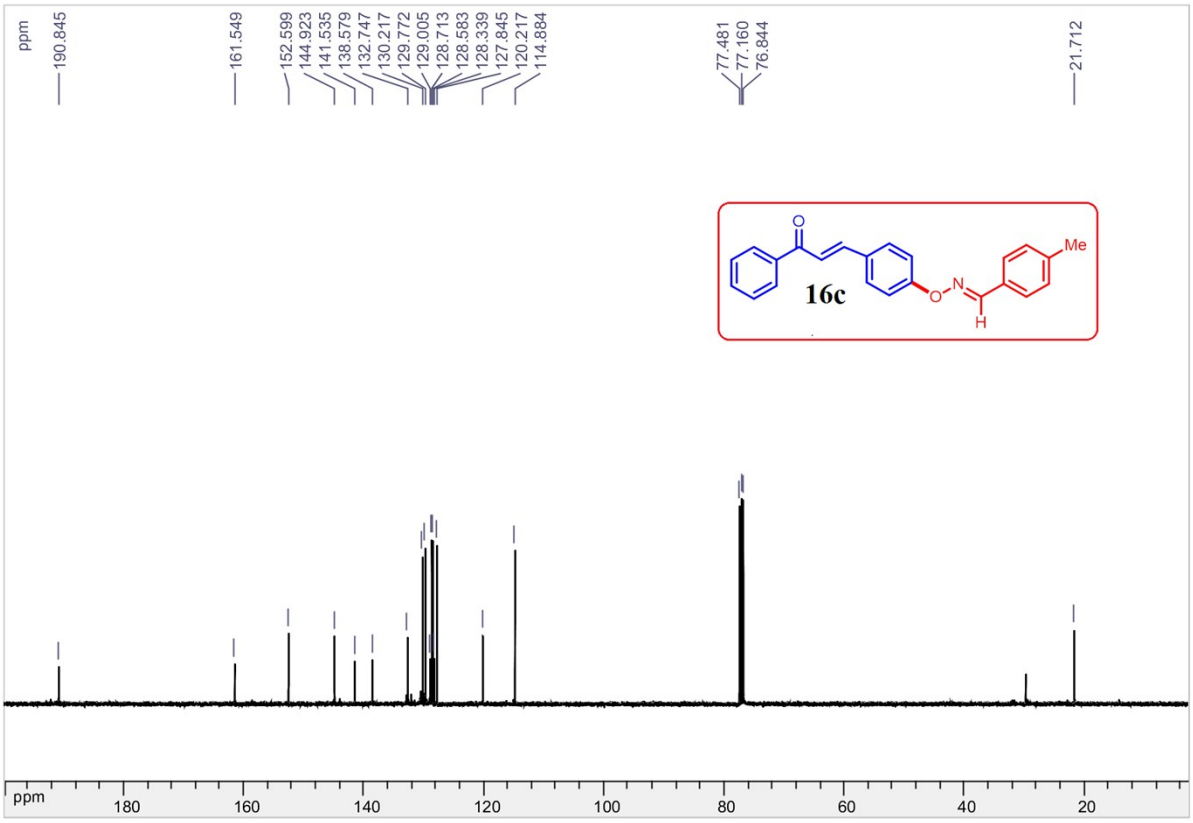

ppm
159.624
155.857
153.720
153.240
152.915
149.100
130.391
130.286
125.848
123.692
120.970
119.657
119.379
119.111
118.909
117.807
117.683
113.082
112.871
112.699
110.600
101.763
77.476
77.160
76.844
56.496
56.352
56.036
55.998
NC
O
N
H
OMe
OMe
12c
ppm
180
160
140
120
100
80
60
40
20

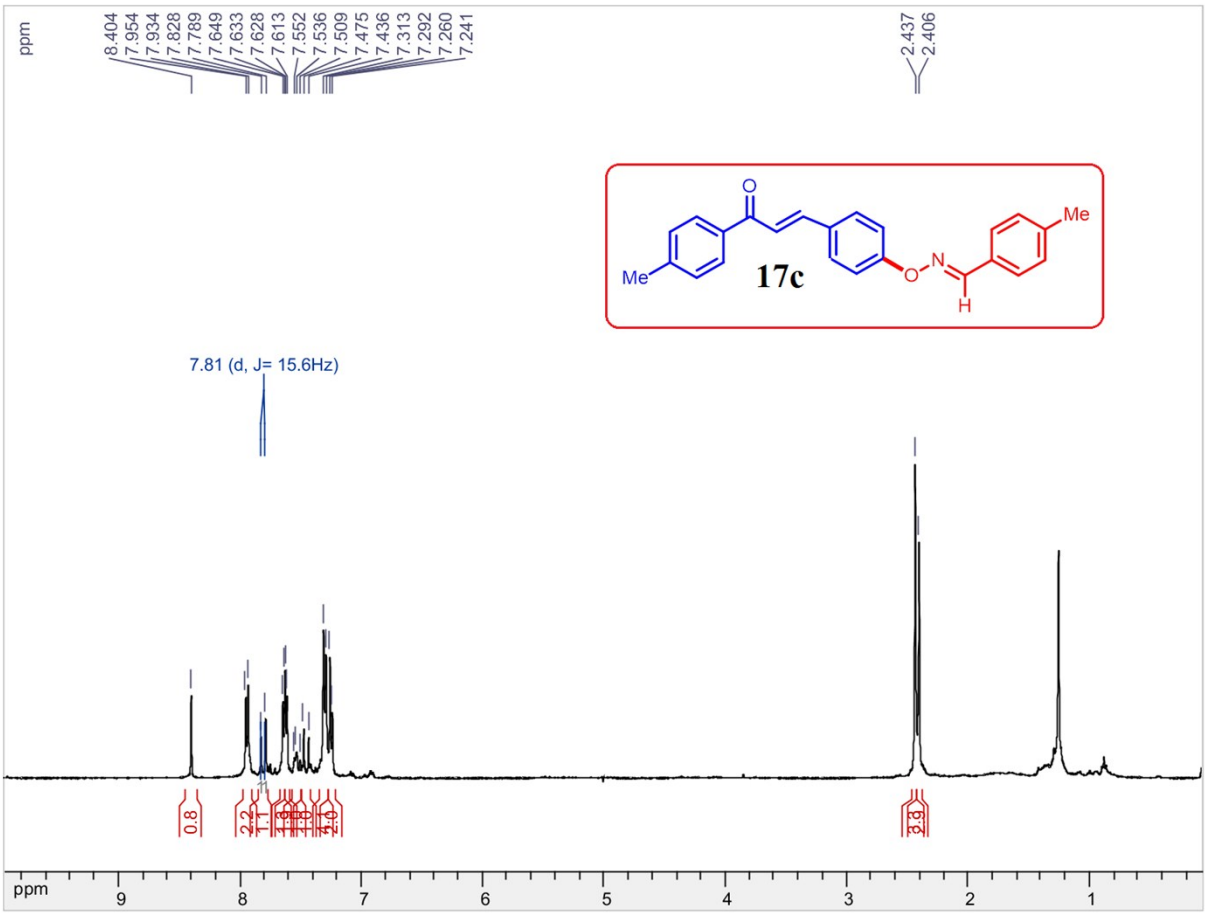

ppm
149.064
130.382
130.367
130.262
127.593
125.844
123.788
123.702
121.158
121.143
120.966
120.779
120.746
119.356
119.136
118.867
117.808
117.641
115.331
113.434
112.854
112.667
110.535
110.453
NC
O
N
H
OMe
OMe
12c
ppm
180
160
140
120
100
80
60

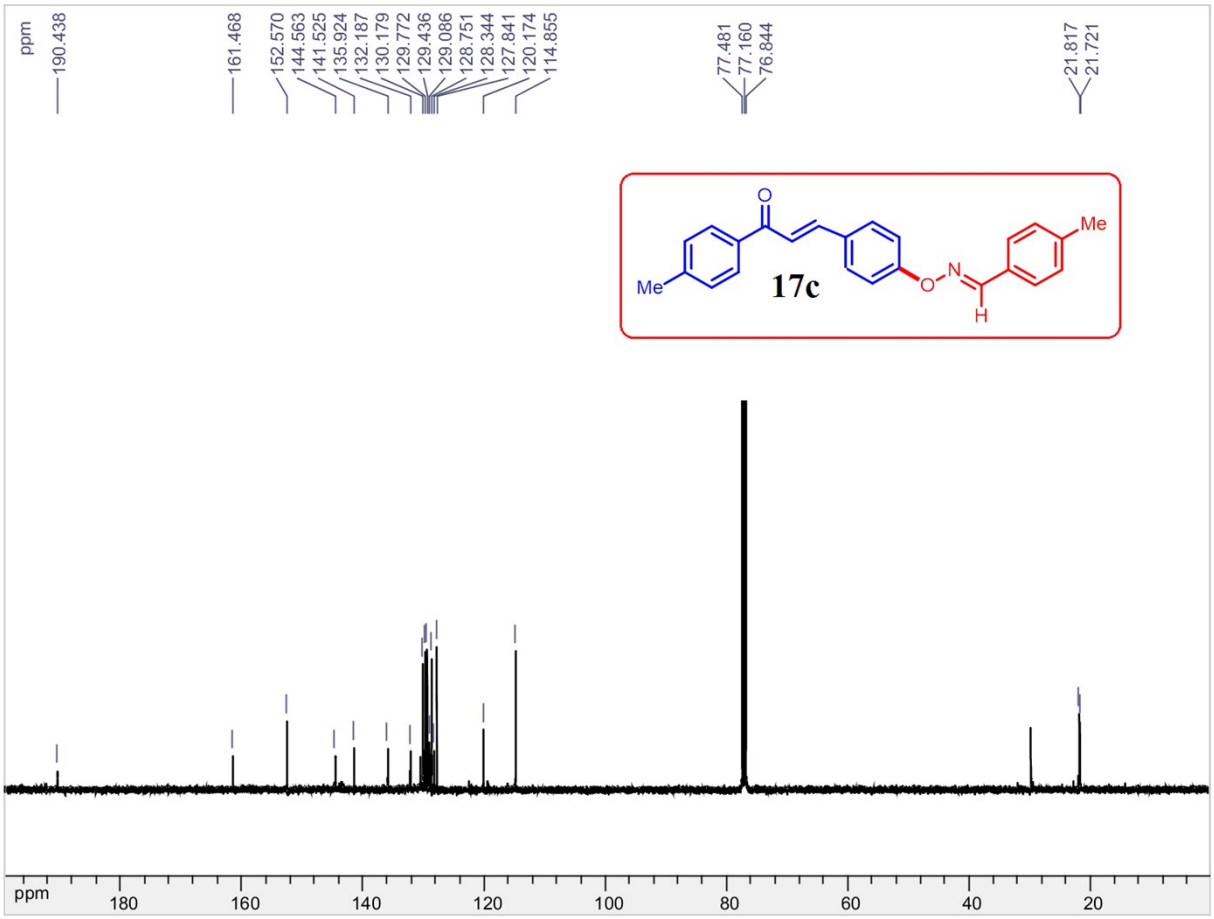

ppm
10.023
8.418
7.804
7.644
7.624
7.570
7.562
7.550
7.501
7.489
7.263
7.245
2.410
OHC
H
O
N
Me
13c
7.25 (d, J= 7.5Hz)
1.2
1.1
1.1
2.0
1.9
2.4
3.0
ppm
10
9
8
7
6
5
4
3
2
1

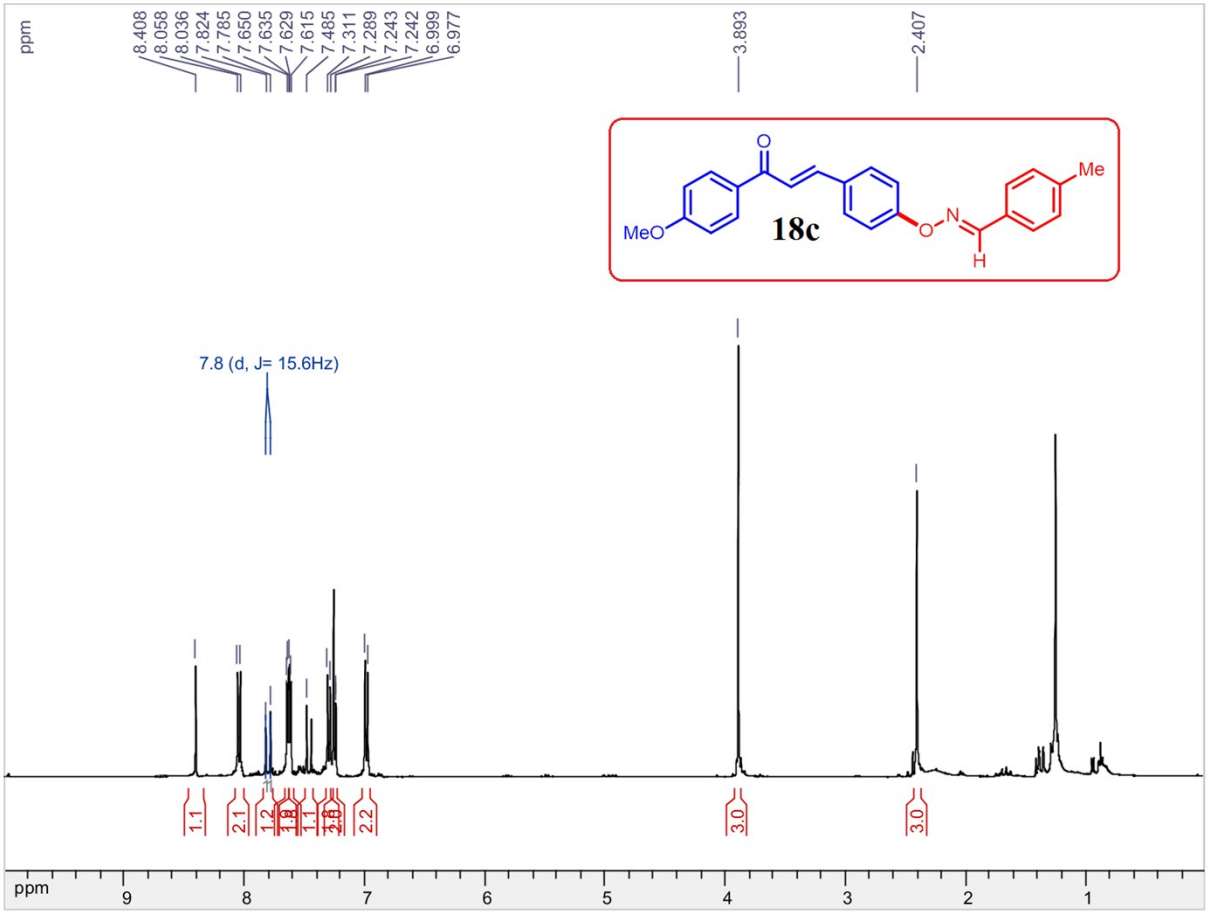

ppm
192.311
160.107
152.560
141.540
137.783
130.083
129.767
128.277
127.850
124.132
120.802
114.721
77.476
77.160
76.844
21.721
OHC
H
O
N
Me
13c
ppm
180
160
140
120
100
80
60
40
20
0

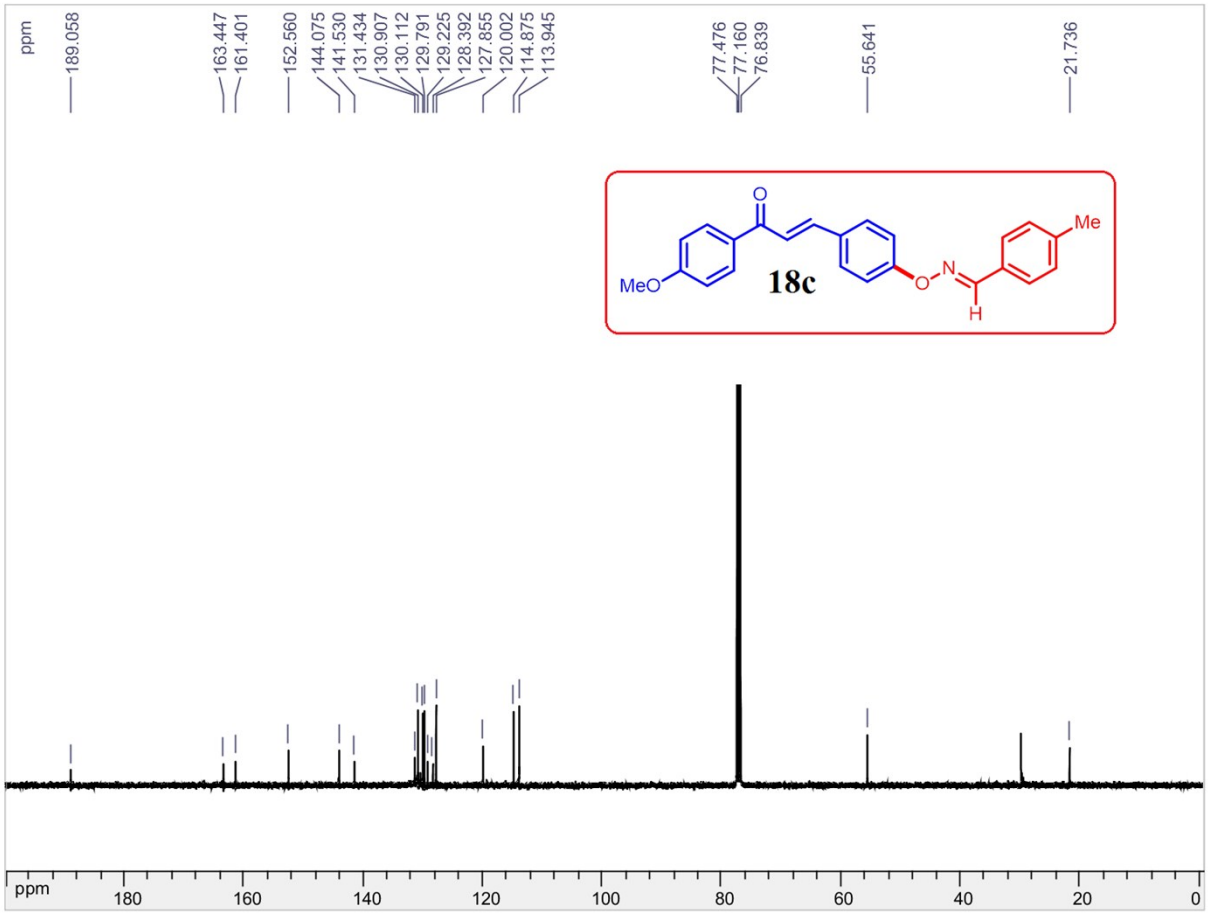

ppm
8.409
8.036
8.018
7.837
7.798
7.635
7.616
7.585
7.567
7.528
7.509
7.491
7.473
7.434
7.318
7.296
7.260
7.243
2.407
7.82 (c, J= 15.5Hz)
7.65 (d, J= 8.4Hz)
7.45 (d, J= 15.6Hz)
16c
Me
O
N
H
1.2
2.1
1.9
1.1
2.4
1.1
1.9
2.3
1.0
2.2
1.2
3.0
ppm

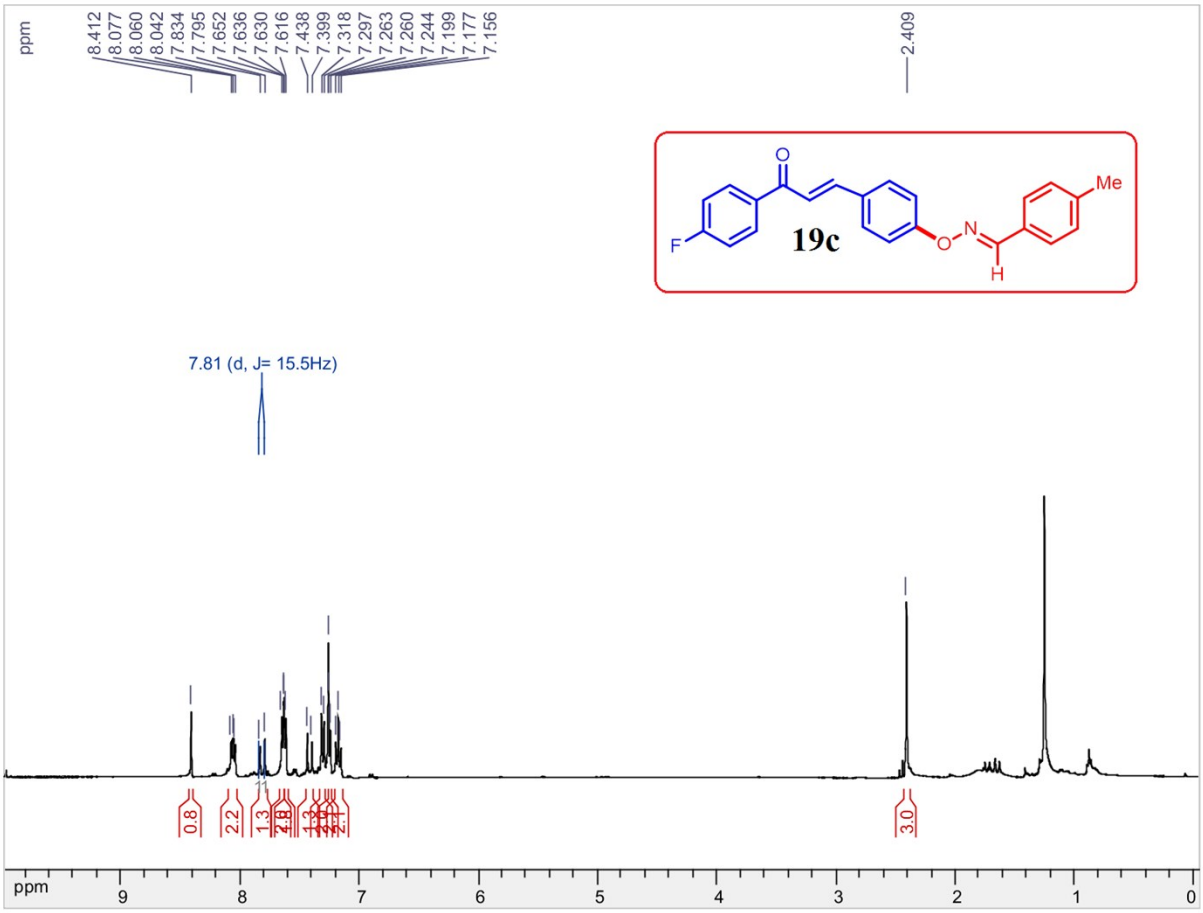

ppm
190.845
161.549
152.599
144.923
141.535
138.579
132.747
130.217
129.772
129.005
128.713
128.583
128.339
127.845
120.217
114.884
77.481
77.160
76.844
21.712
16c
Me
O
N
H
ppm

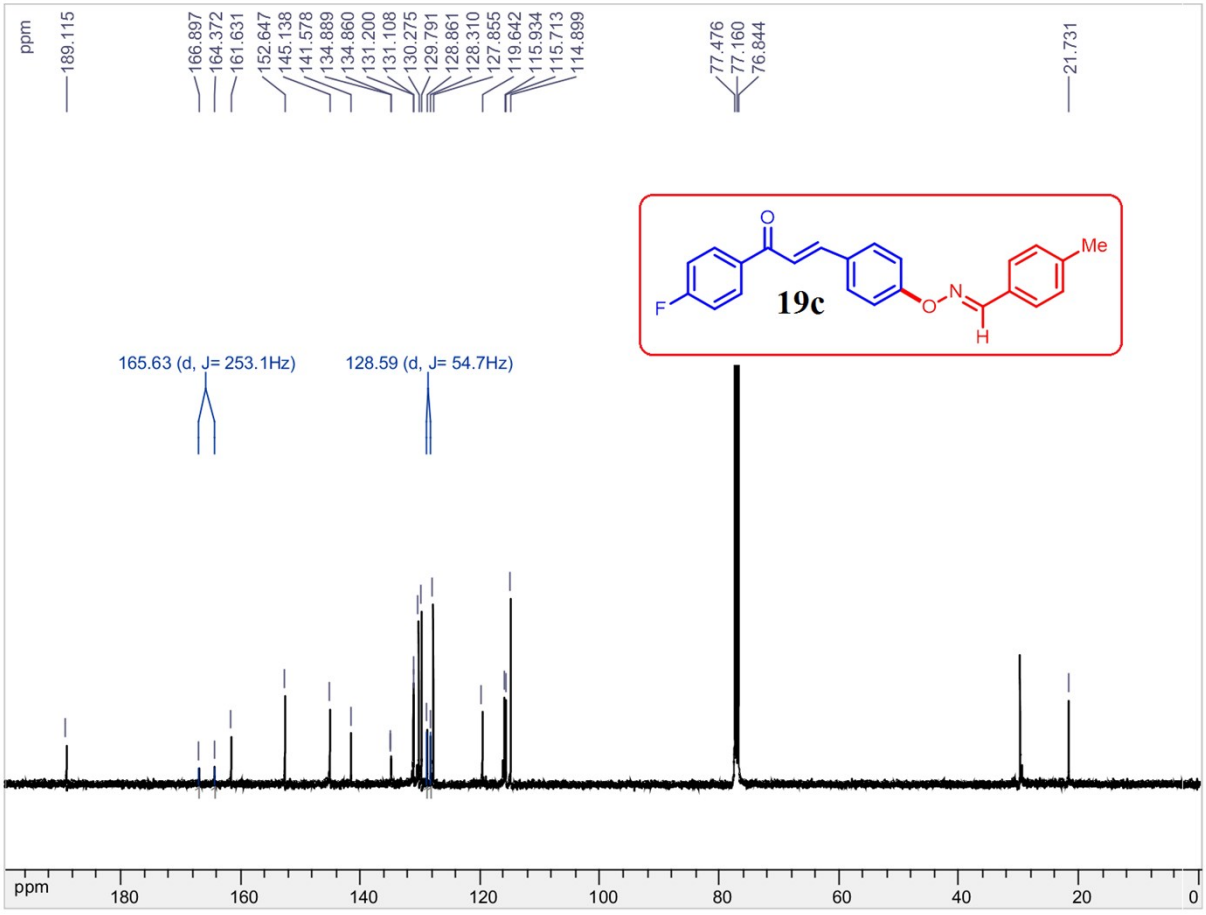

ppm
8.404
7.954
7.934
7.828
7.789
7.649
7.633
7.628
7.613
7.552
7.536
7.509
7.475
7.436
7.313
7.292
7.260
7.241
2.437
2.406
Me
Me
O
N
H
17c
7.81 (d, J= 15.6Hz)
0.8
2.2
1.1
2.0
3.3
ppm
9
8
7
6
5
4
3
2
1

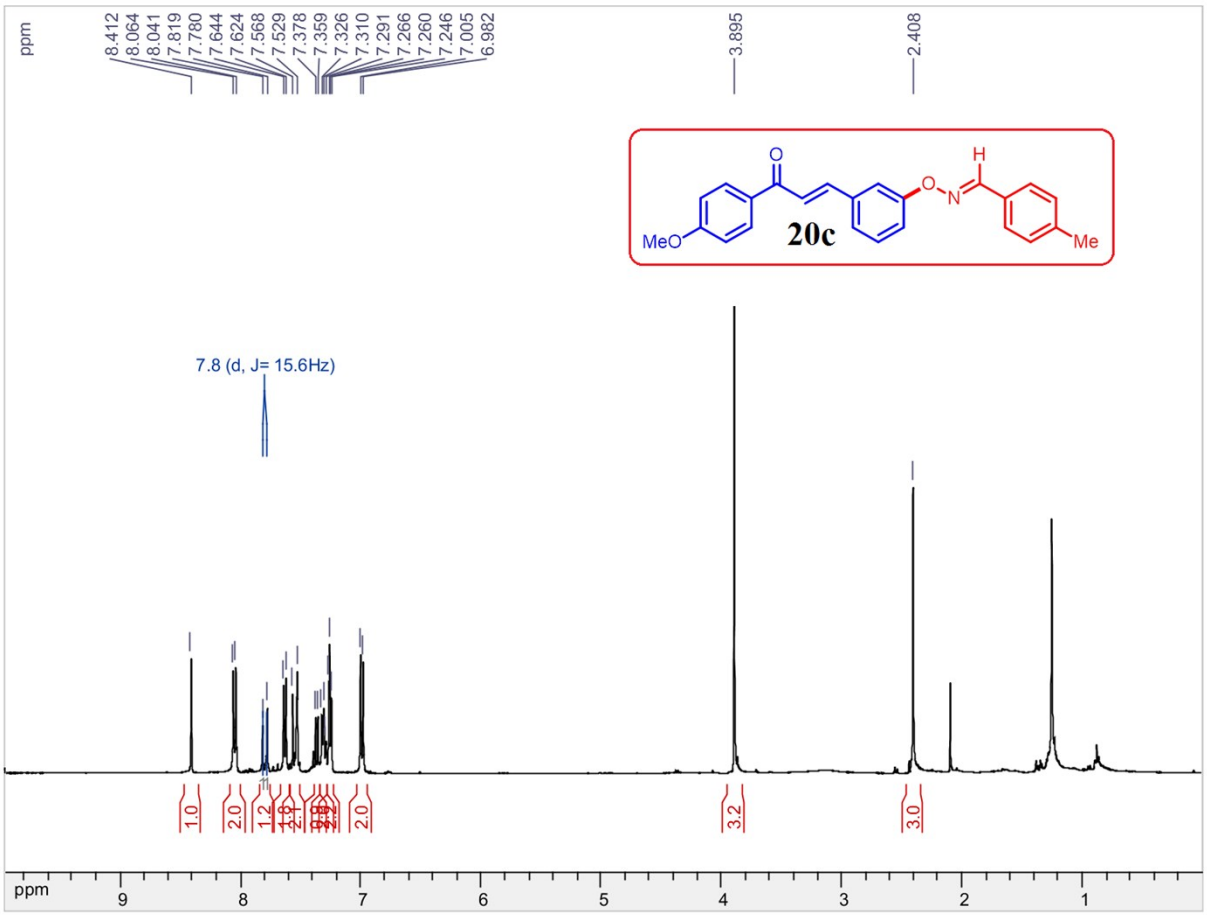

ppm
190.438
161.468
152.570
144.563
141.525
135.924
132.187
130.179
129.772
129.436
129.086
128.751
128.344
127.841
120.174
114.855
77.481
77.160
76.844
21.817
21.721
Me
Me
O
N
H
17c
ppm
180
160
140
120
100
80
60
40
20

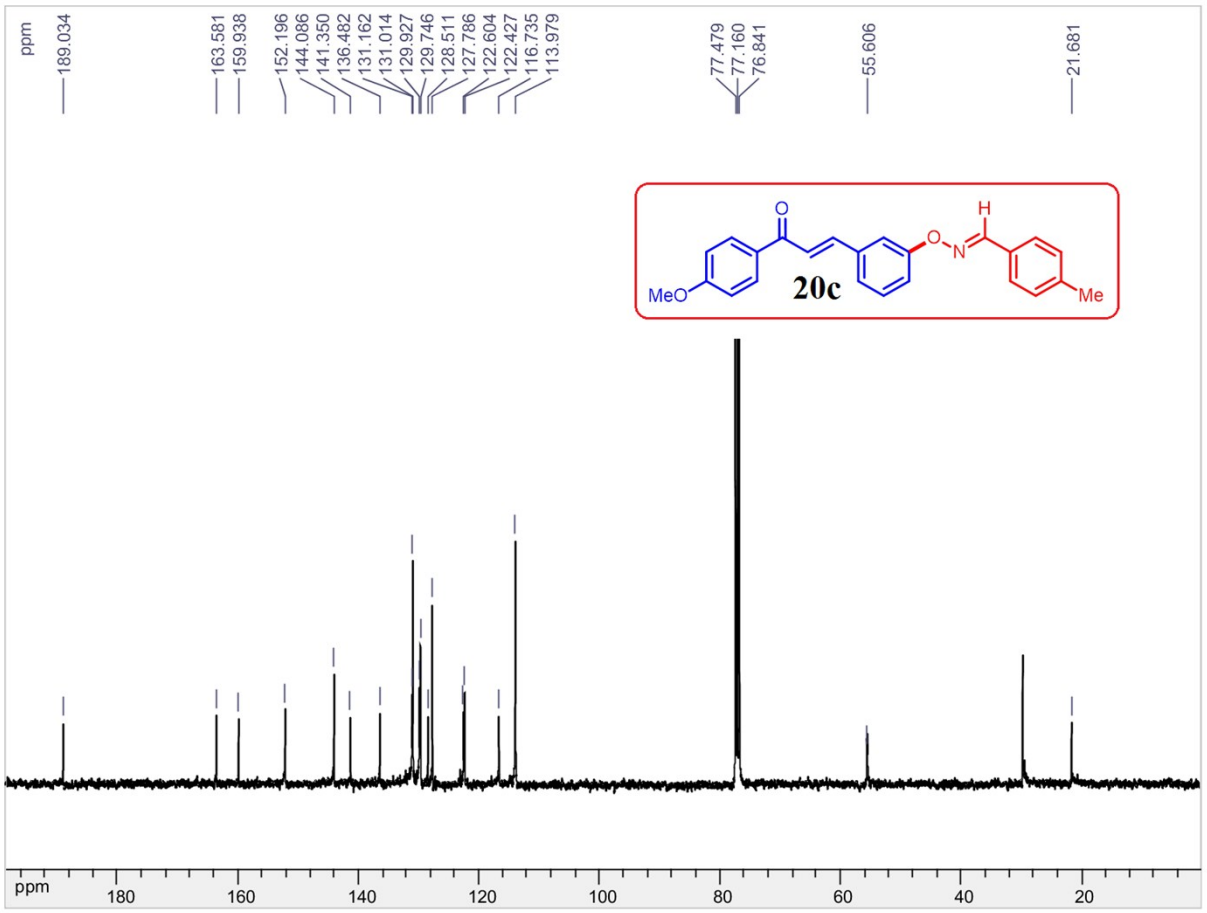

ppm
8.408
8.058
8.036
7.824
7.785
7.650
7.635
7.629
7.615
7.485
7.311
7.289
7.243
7.242
6.999
6.977
3.893
2.407
MeO
18c
Me
O
N
H
7.8 (d, J= 15.6Hz)
1.1
2.1
1.2
1.8
1.1
2.0
2.2
3.0
3.0
ppm
9
8
7
6
5
4
3
2
1

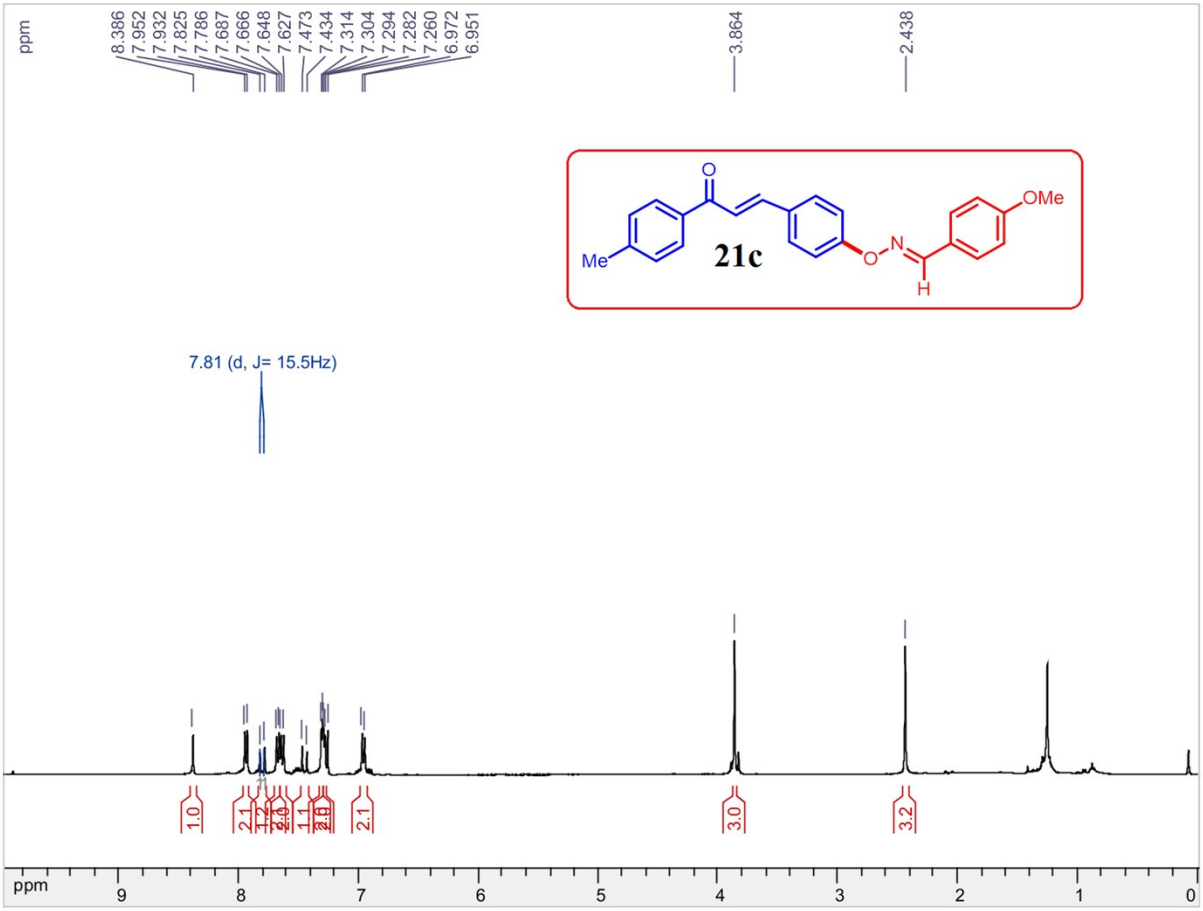

ppm
189.058
163.447
161.401
152.560
144.075
141.530
131.434
130.907
130.112
129.791
129.225
128.392
127.855
120.002
114.875
113.945
77.476
77.160
76.839
55.641
21.736
MeO
18c
Me
O
N
H
ppm
180
160
140
120
100
80
60
40
20
0

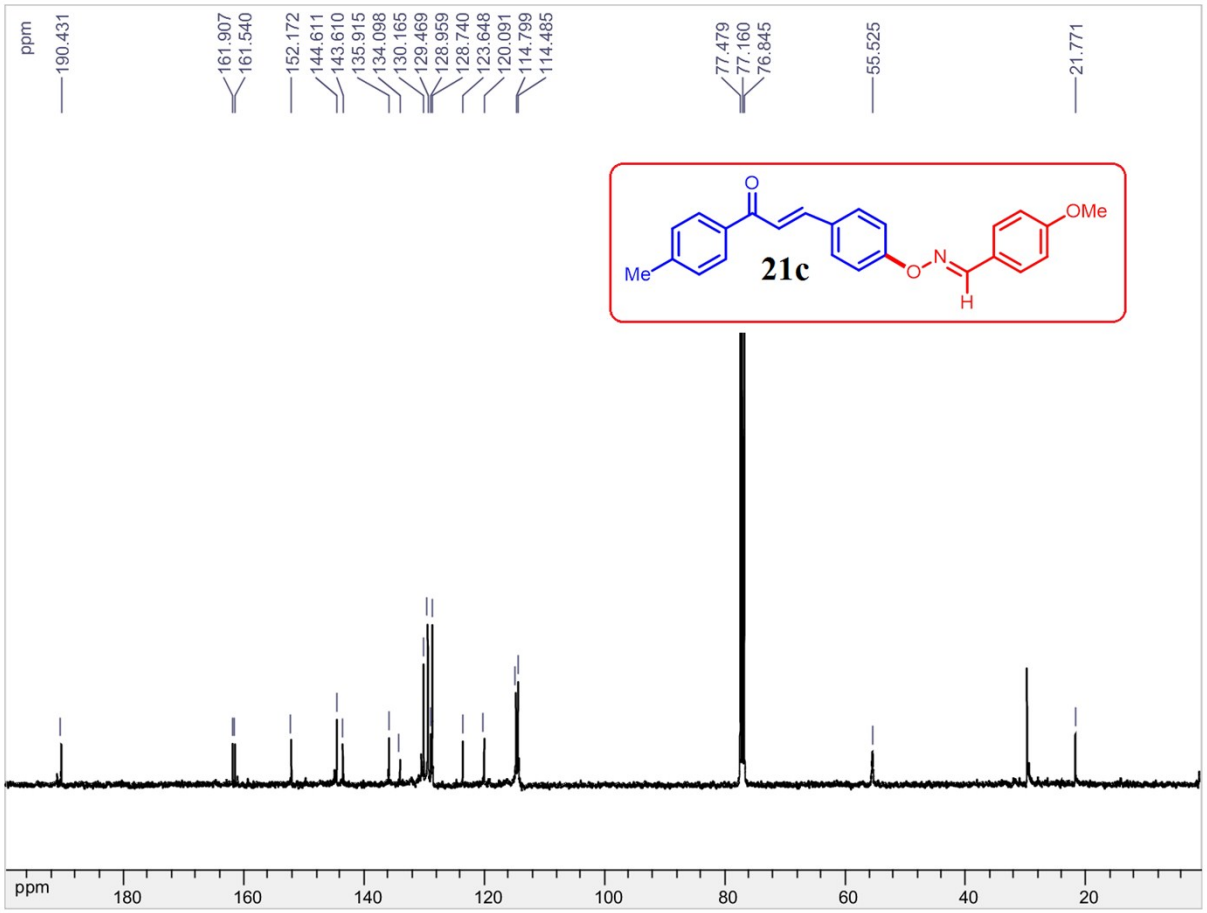

ppm
8.412
8.077
8.060
8.042
7.834
7.795
7.652
7.636
7.630
7.616
7.438
7.399
7.318
7.297
7.263
7.260
7.244
7.199
7.177
7.156
2.409
19c
7.81 (d, J= 15.5Hz)
0.8
2.2
1.3
2.8
3.0
ppm
9
8
7
6
5
4
3
2
1
0

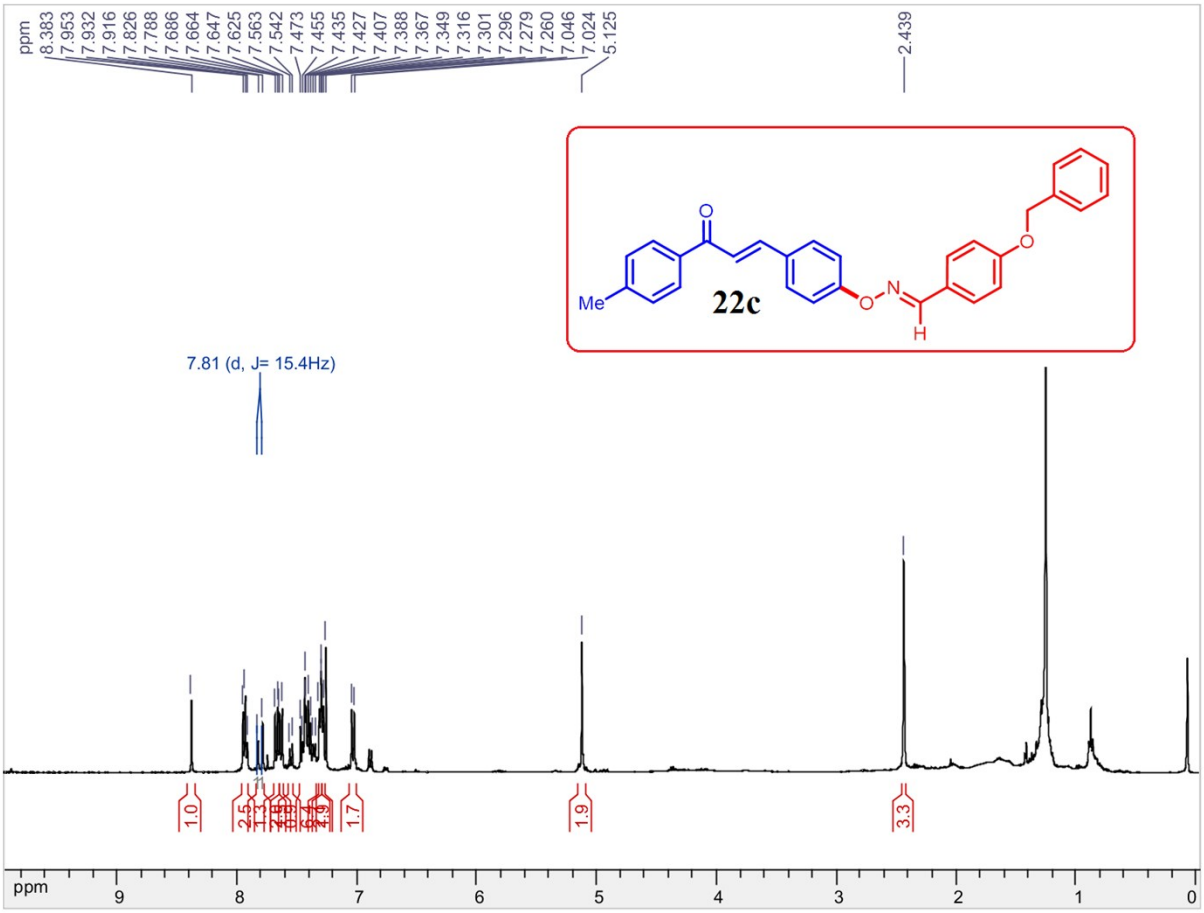

ppm
189.115
166.897
164.372
161.631
152.647
145.138
141.578
134.889
134.860
131.200
131.108
130.275
129.791
128.861
128.310
127.855
119.642
115.934
115.713
114.899
77.476
77.160
76.844
21.731
19c
165.63 (d, J= 253.1Hz)
128.59 (d, J= 54.7Hz)
ppm
180
160
140
120
100
80
60
40
20
0

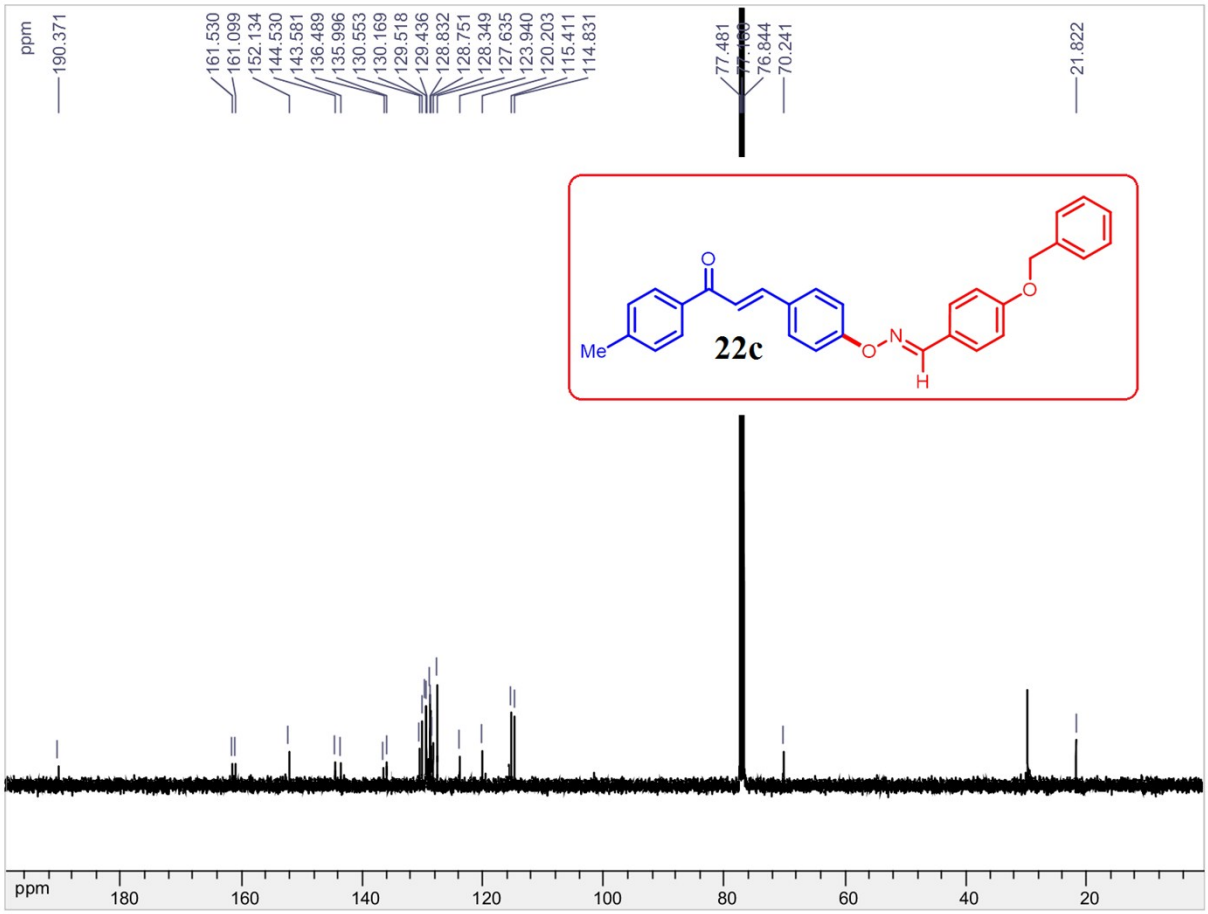

ppm
8.412
8.064
8.041
7.819
7.780
7.644
7.624
7.568
7.529
7.378
7.359
7.326
7.310
7.291
7.266
7.260
7.246
7.005
6.982
3.895
2.408
MeO
20c
Me
7.8 (d, J= 15.6Hz)
1.0
2.0
1.2
2.0
2.0
3.2
3.0
ppm
9
8
7
6
5
4
3
2
1

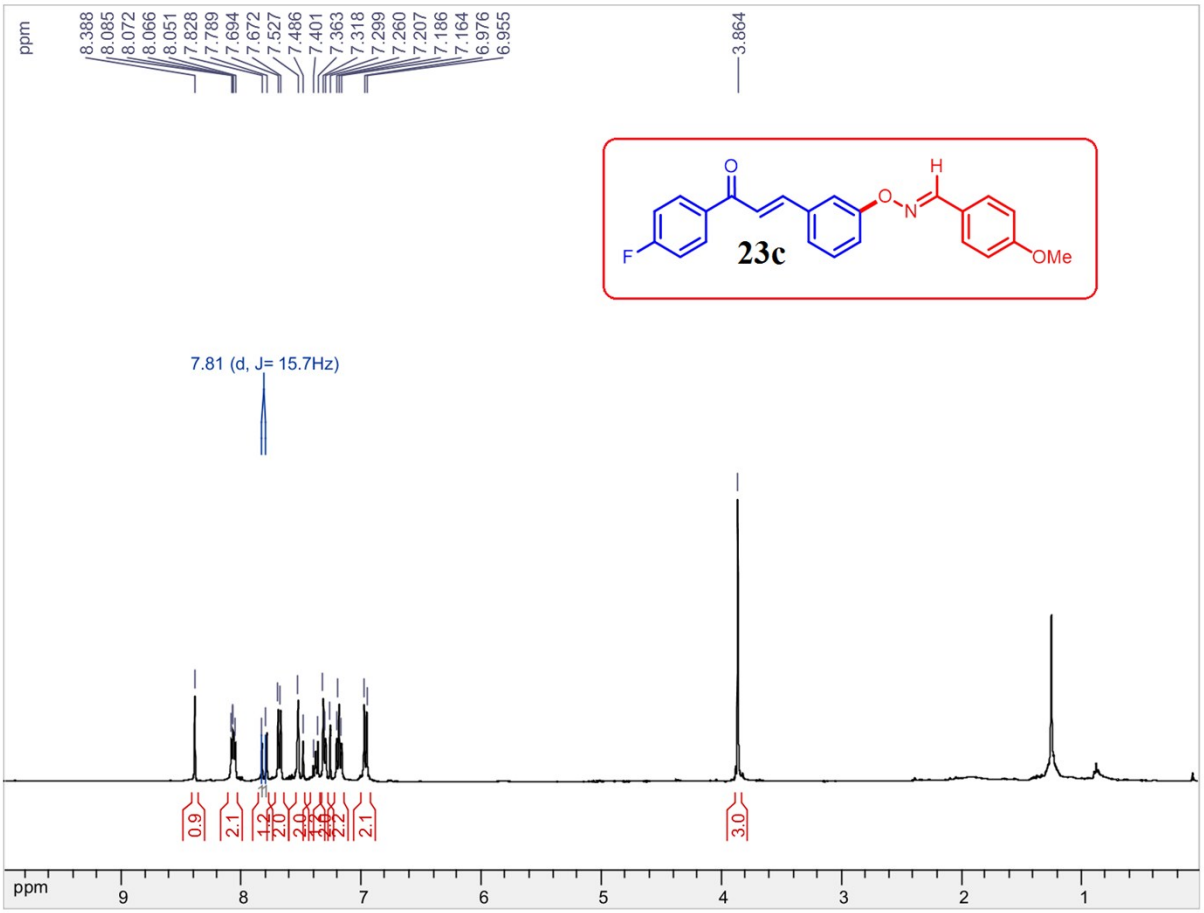

ppm
189.034
163.581
159.938
152.196
144.086
141.350
136.482
131.162
131.014
129.927
129.746
128.511
127.786
122.604
122.427
116.735
113.979
77.479
77.160
76.841
55.606
21.681
MeO
20c
Me
ppm
180
160
140
120
100
80
60
40
20

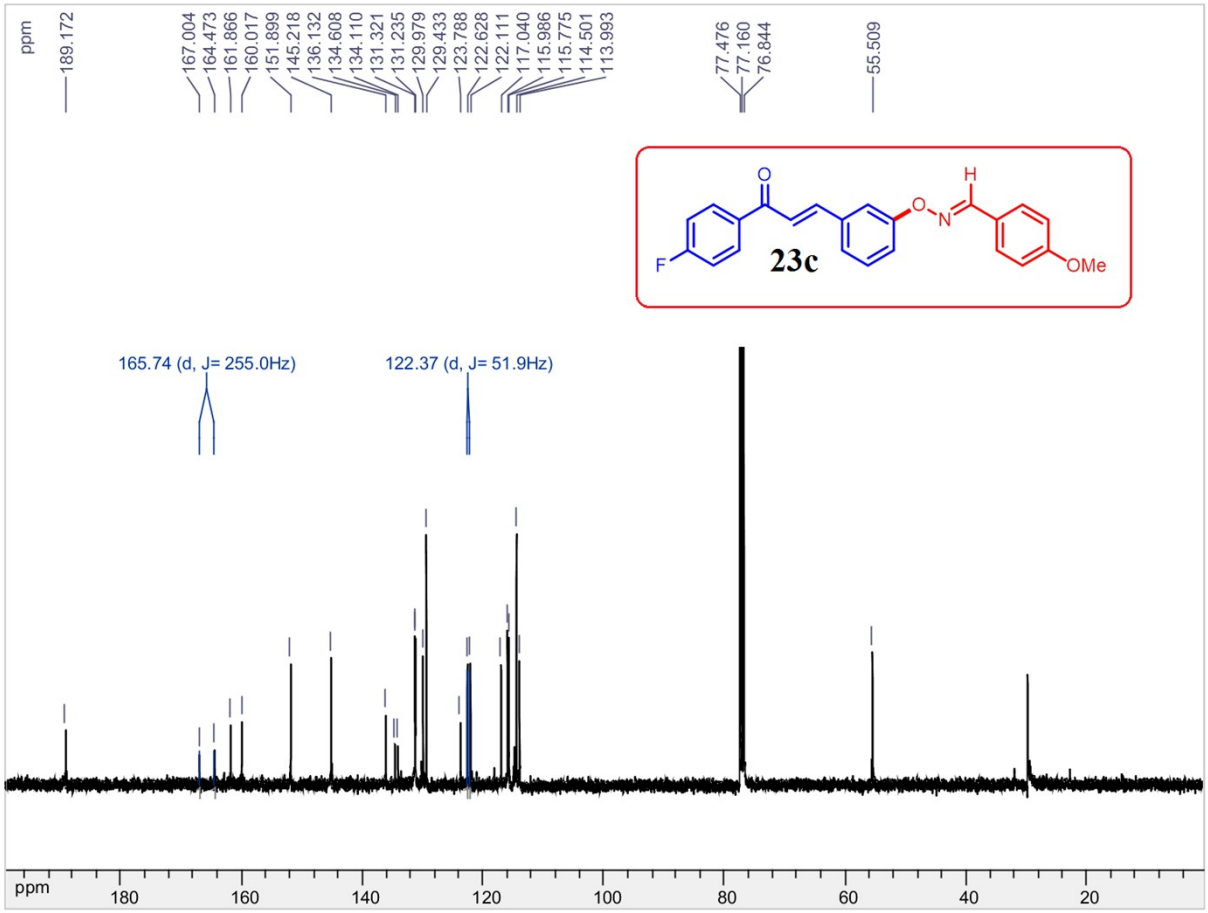

ppm
8.386
7.952
7.932
7.825
7.786
7.687
7.666
7.648
7.627
7.473
7.434
7.314
7.304
7.294
7.282
7.260
6.972
6.951
3.864
2.438
21c
Me
OMe
7.81 (d, J= 15.5Hz)
1.0
3.0
3.2
ppm

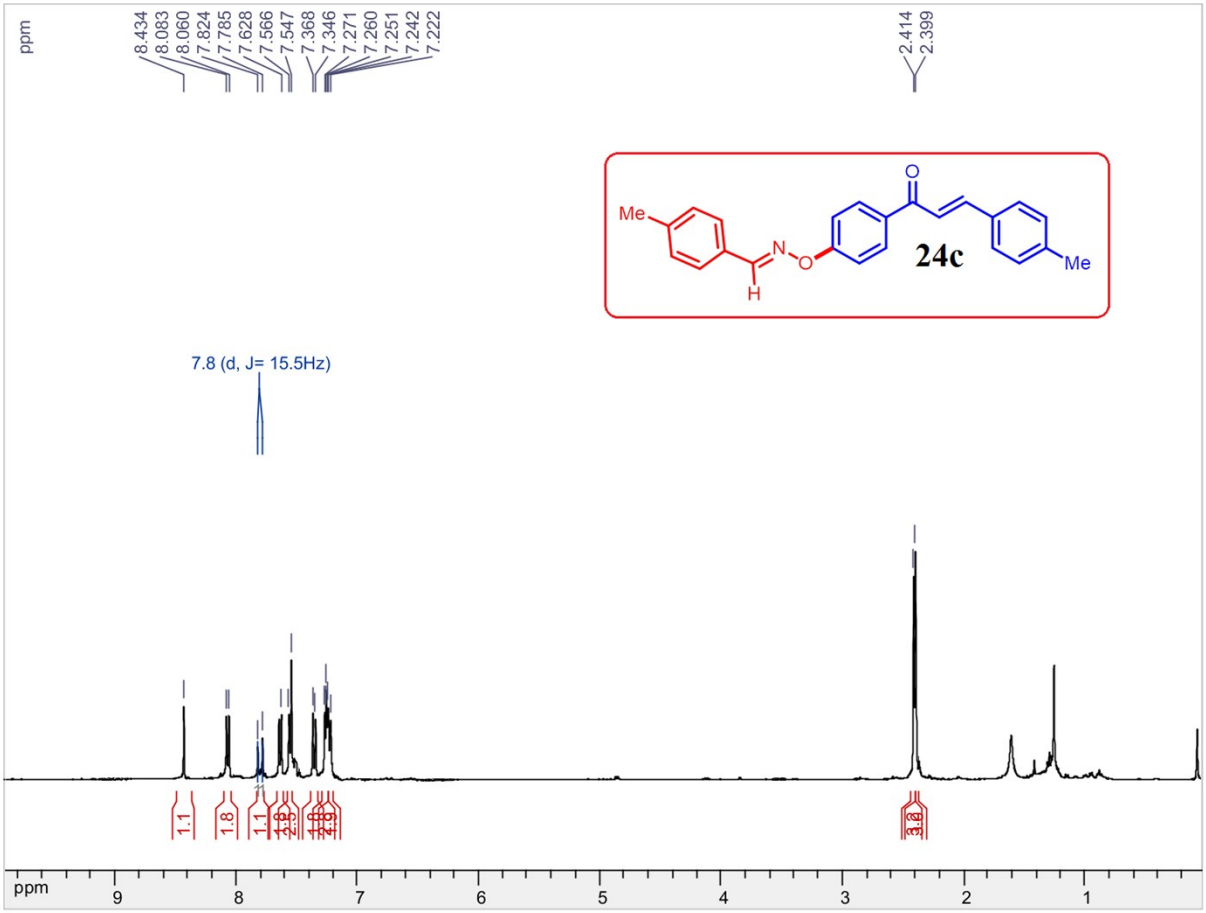

ppm
190.431
161.907
161.540
152.172
144.611
143.610
135.915
134.098
130.165
129.469
128.959
128.740
123.648
120.091
114.799
114.485
77.479
77.160
76.845
55.525
21.771
21c
Me
OMe
ppm

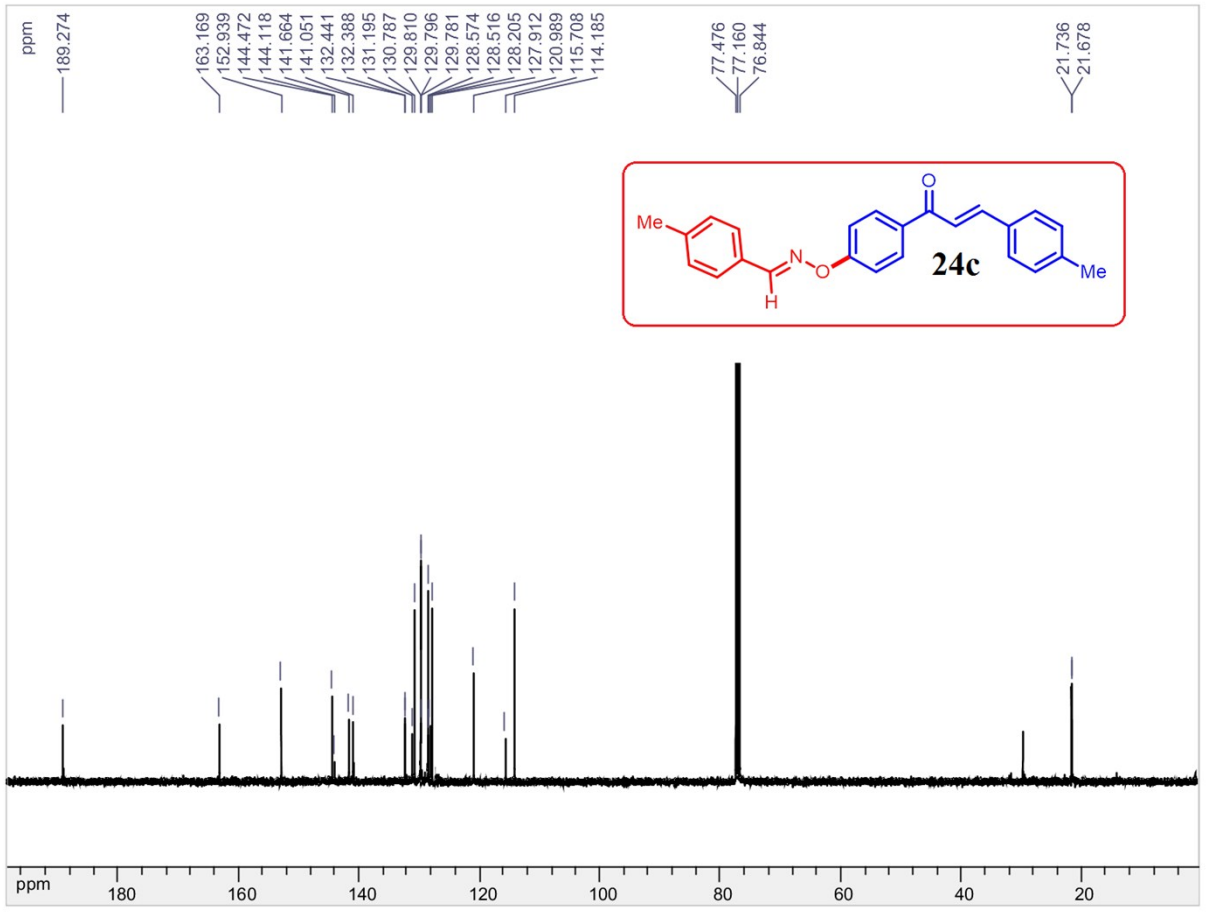

ppm
8.383
7.953
7.932
7.916
7.826
7.788
7.686
7.664
7.647
7.625
7.563
7.542
7.473
7.455
7.435
7.427
7.407
7.388
7.367
7.349
7.316
7.301
7.296
7.279
7.260
7.046
7.024
5.125
2.439
Me
22c
O
N
H
7.81 (d, J= 15.4Hz)
1.0
1.9
3.3
ppm
9
8
7
6
5
4
3
2
1
0

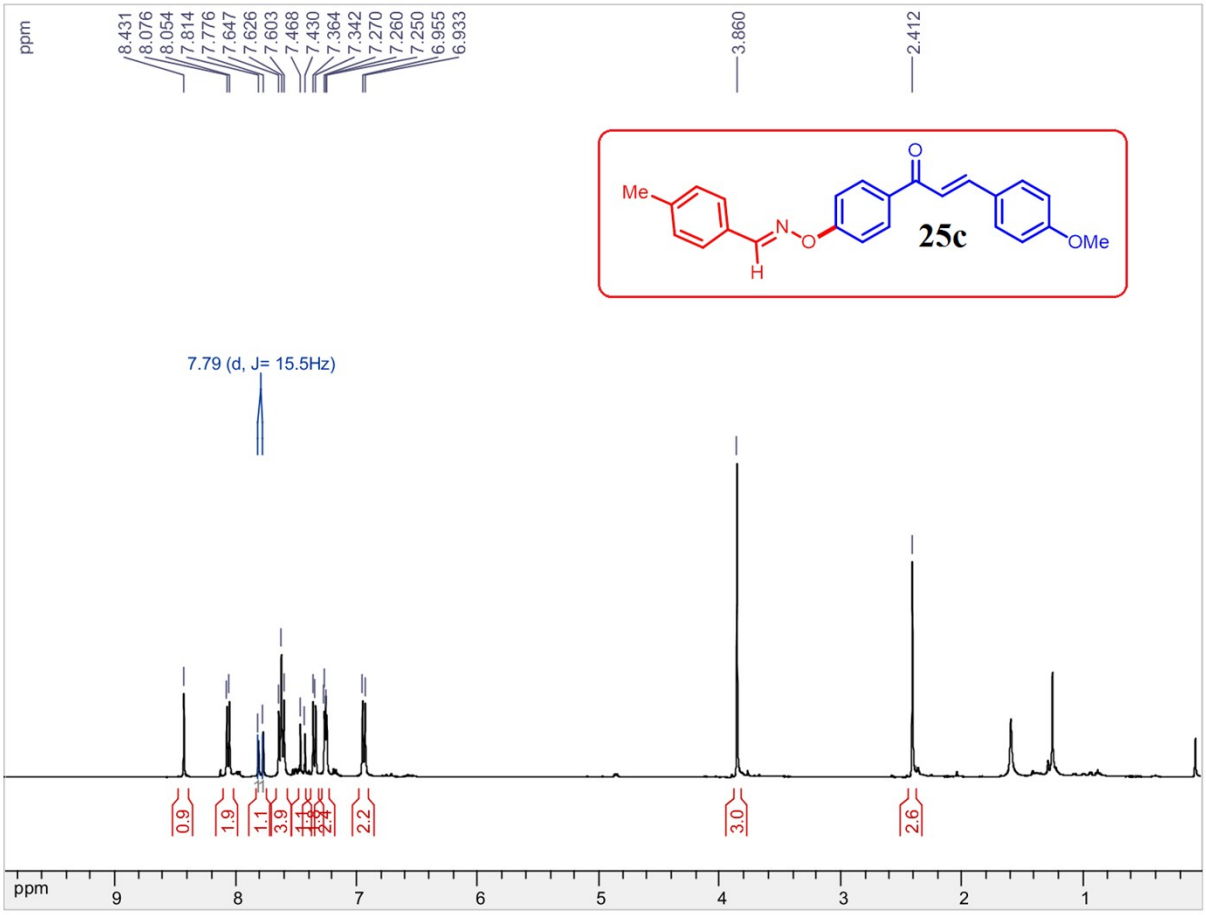

ppm
190.371
161.530
161.099
152.134
144.530
143.581
136.489
135.996
130.553
130.169
129.518
129.436
128.832
128.751
128.349
127.635
123.940
120.203
115.411
114.831
77.481
77.160
76.844
70.241
21.822
Me
22c
O
N
H
ppm
180
160
140
120
100
80
60
40
20

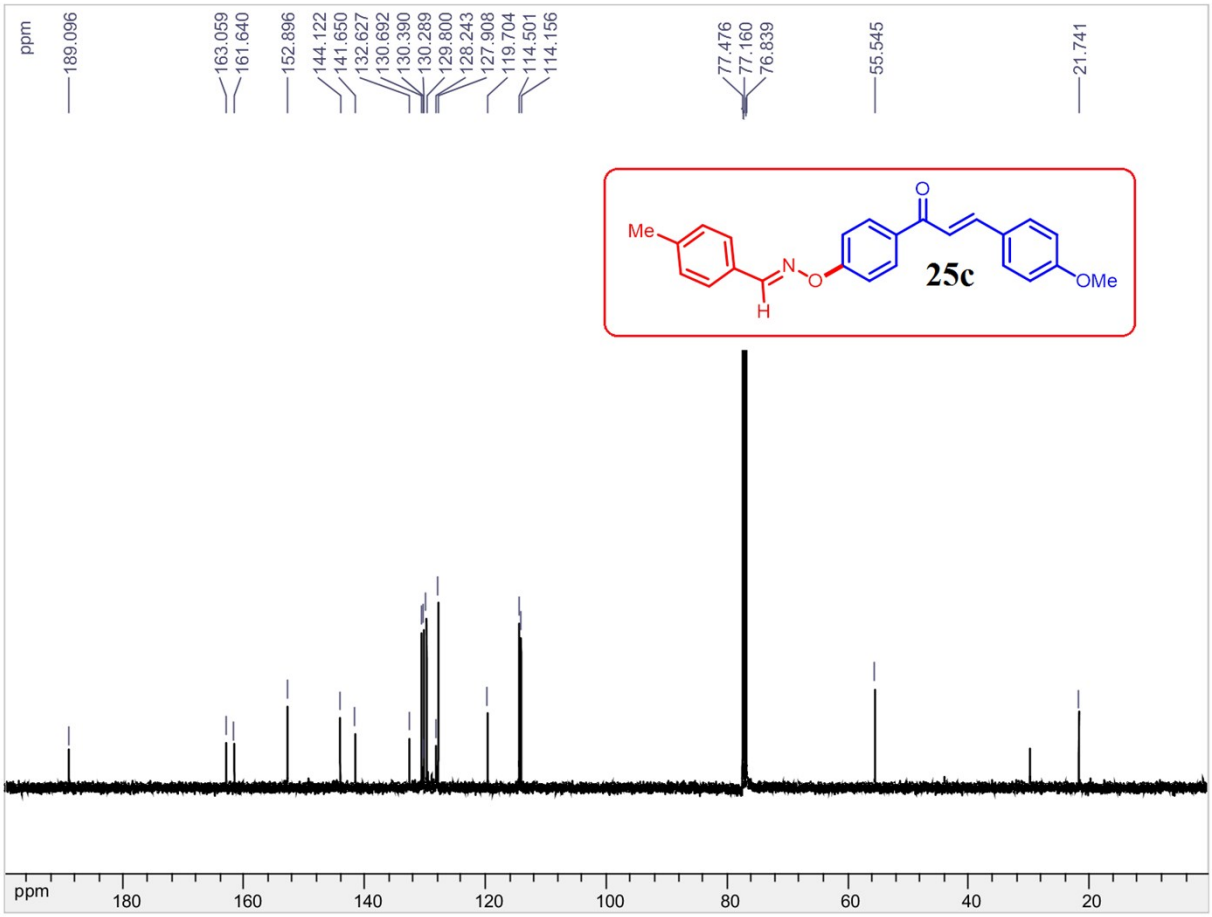

ppm
8.388
8.085
8.072
8.066
8.051
7.828
7.789
7.694
7.672
7.527
7.486
7.401
7.363
7.318
7.299
7.260
7.207
7.186
7.164
6.976
6.955
3.864
23c
F
O
N
H
OMe
7.81 (d, J= 15.7Hz)
0.9
2.1
1.2
2.0
2.2
2.1
3.0
ppm
9
8
7
6
5
4
3
2
1

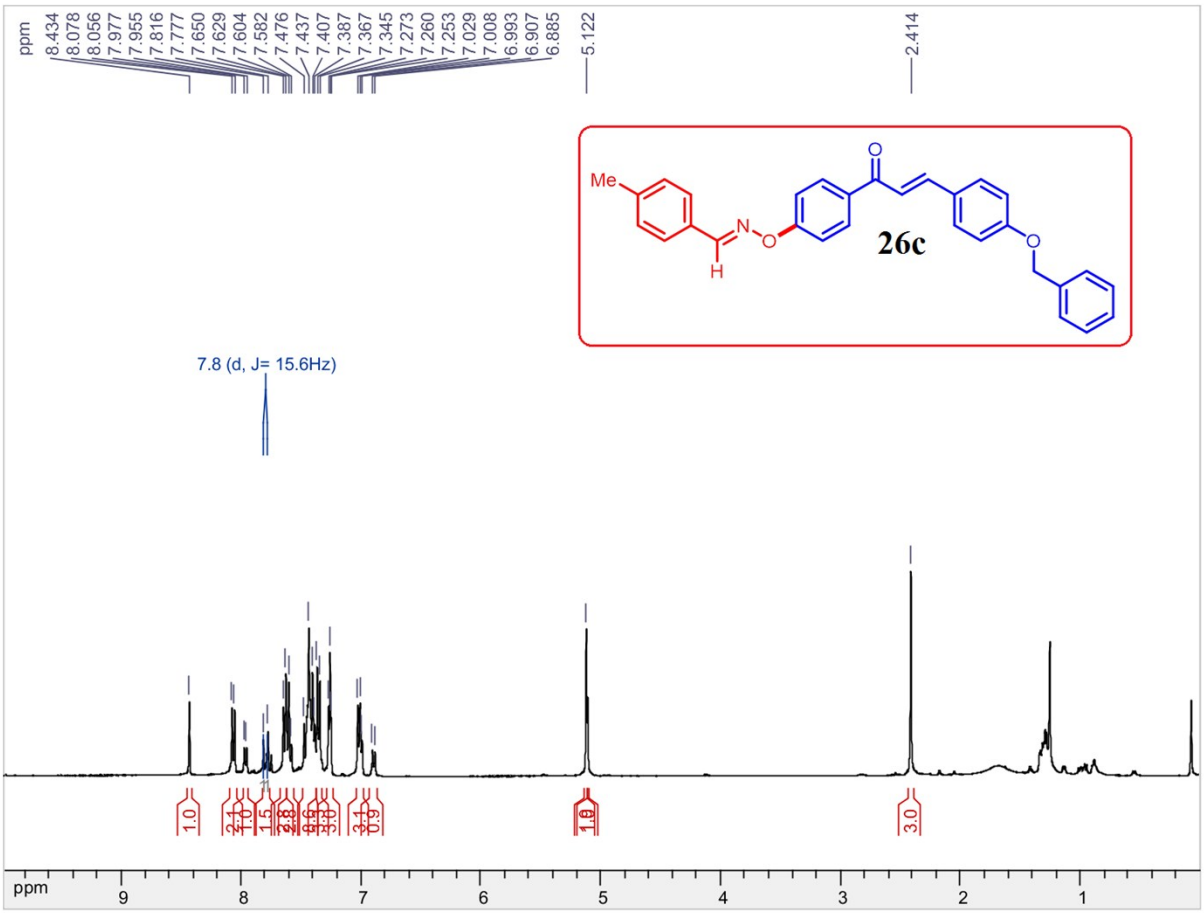

ppm
189.172
167.004
164.473
161.866
160.017
151.899
145.218
136.132
134.608
134.110
131.321
131.235
129.979
129.433
123.788
122.628
122.111
117.040
115.986
115.775
114.501
113.993
77.476
77.160
76.844
55.509
23c
F
O
N
H
OMe
165.74 (d, J= 255.0Hz)
122.37 (d, J= 51.9Hz)
ppm
180
160
140
120
100
80
60
40
20

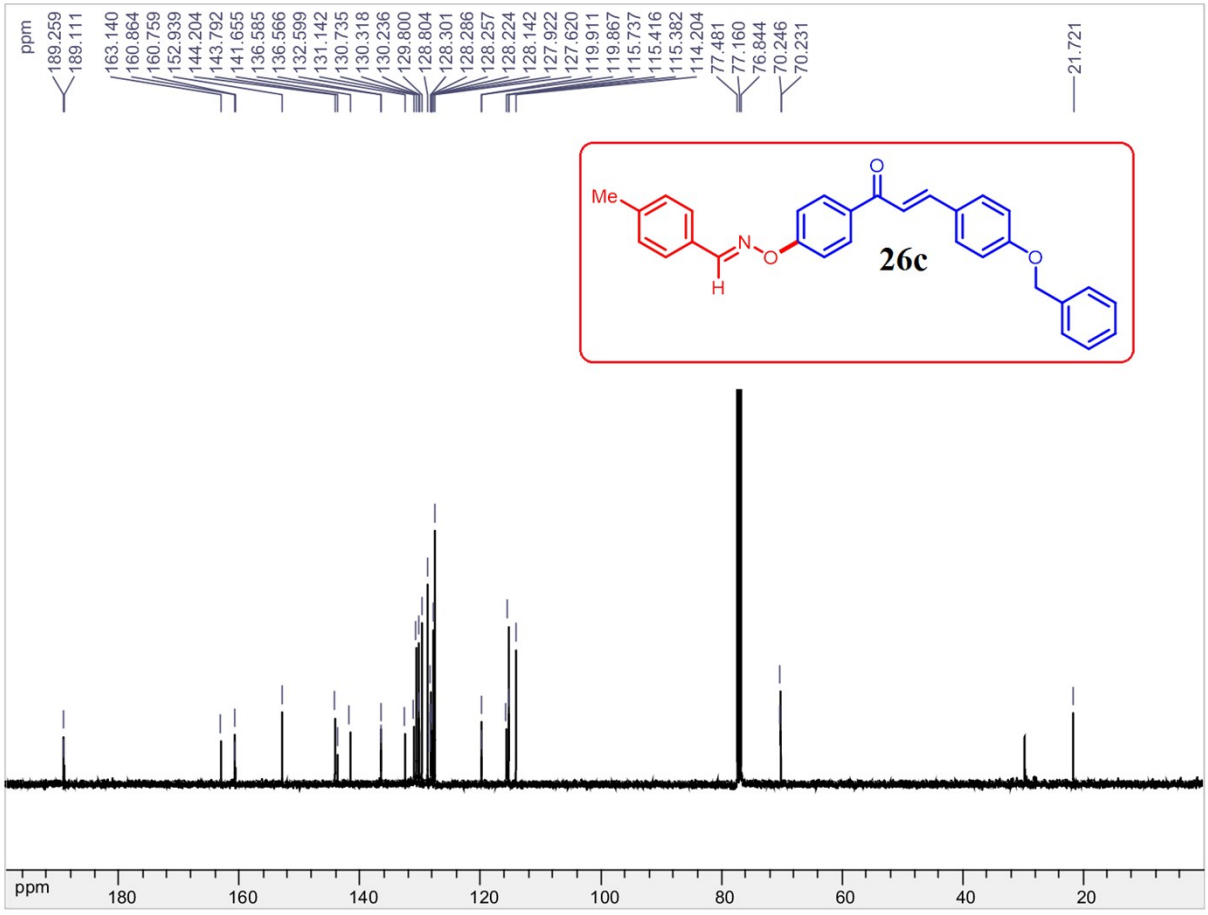

ppm
8.434
8.083
8.060
7.824
7.785
7.628
7.566
7.547
7.368
7.346
7.271
7.260
7.251
7.242
7.222
2.414
2.399
Me
N
O
H
O
Me
24c
7.8 (d, J= 15.5Hz)
1.1
1.8
1.1
3.8
ppm
9
8
7
6
5
4
3
2
1

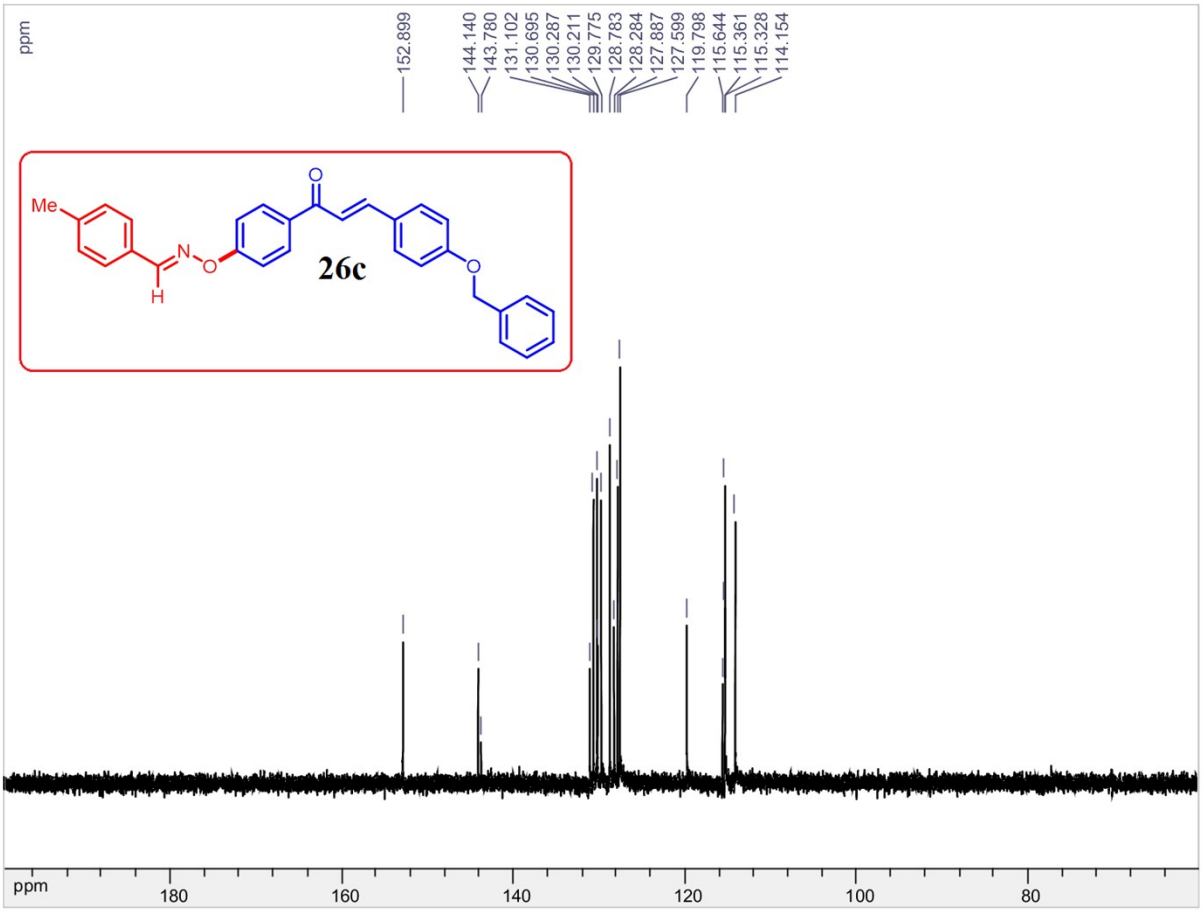

ppm
189.274
163.169
152.939
144.472
144.118
141.664
141.051
132.441
132.388
131.195
130.787
129.810
129.796
129.781
128.574
128.516
128.205
127.912
120.989
115.708
114.185
77.476
77.160
76.844
21.736
21.678
Me
N
O
H
O
Me
24c
ppm
180
160
140
120
100
80
60
40
20

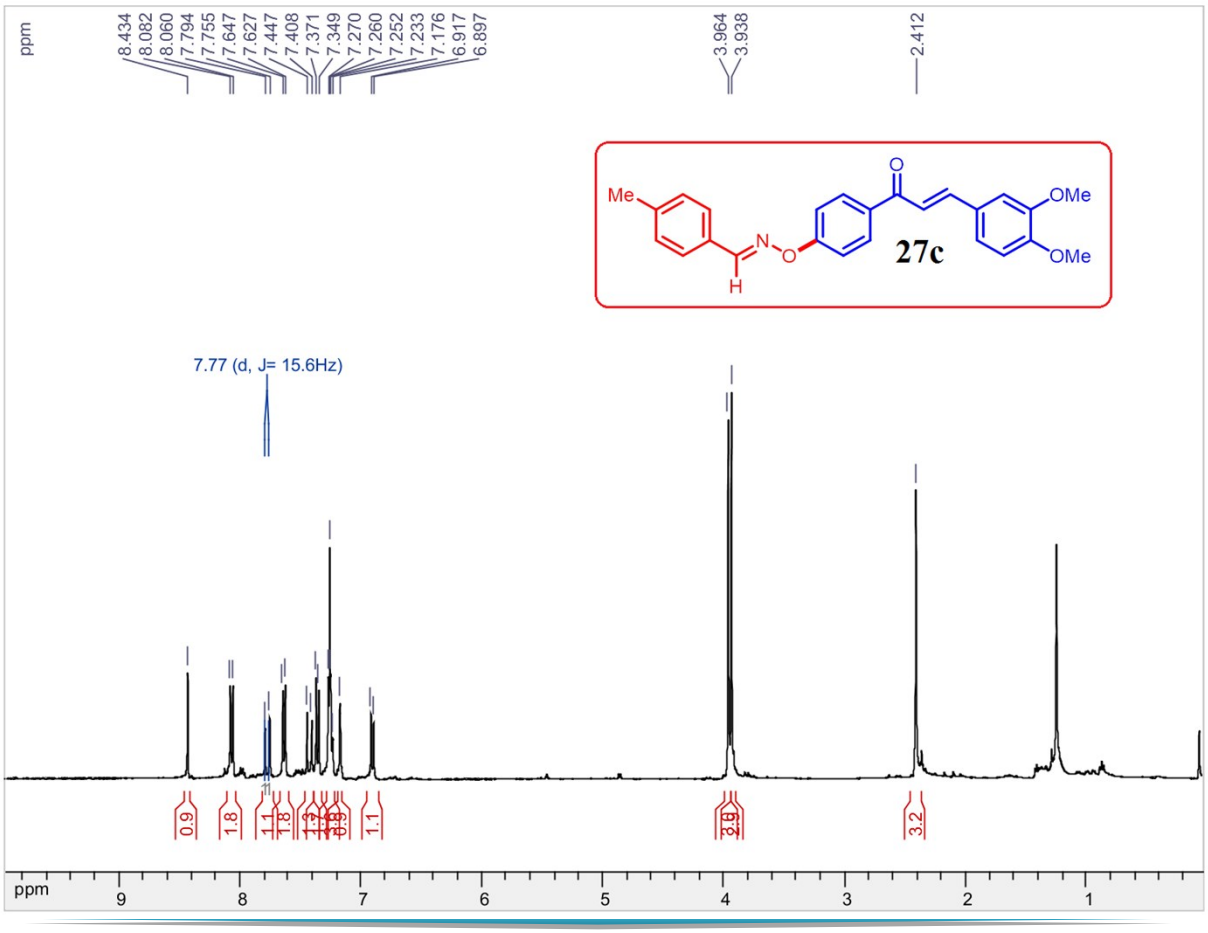

ppm
8.431
8.076
8.054
7.814
7.776
7.647
7.626
7.603
7.468
7.430
7.364
7.342
7.270
7.260
7.250
6.955
6.933
3.860
2.412
Me
N
O
H
O
OMe
25c
7.79 (d, J= 15.5Hz)
0.9
1.9
1.1
3.9
3.0
2.6
2.2
ppm
9
8
7
6
5
4
3
2
1

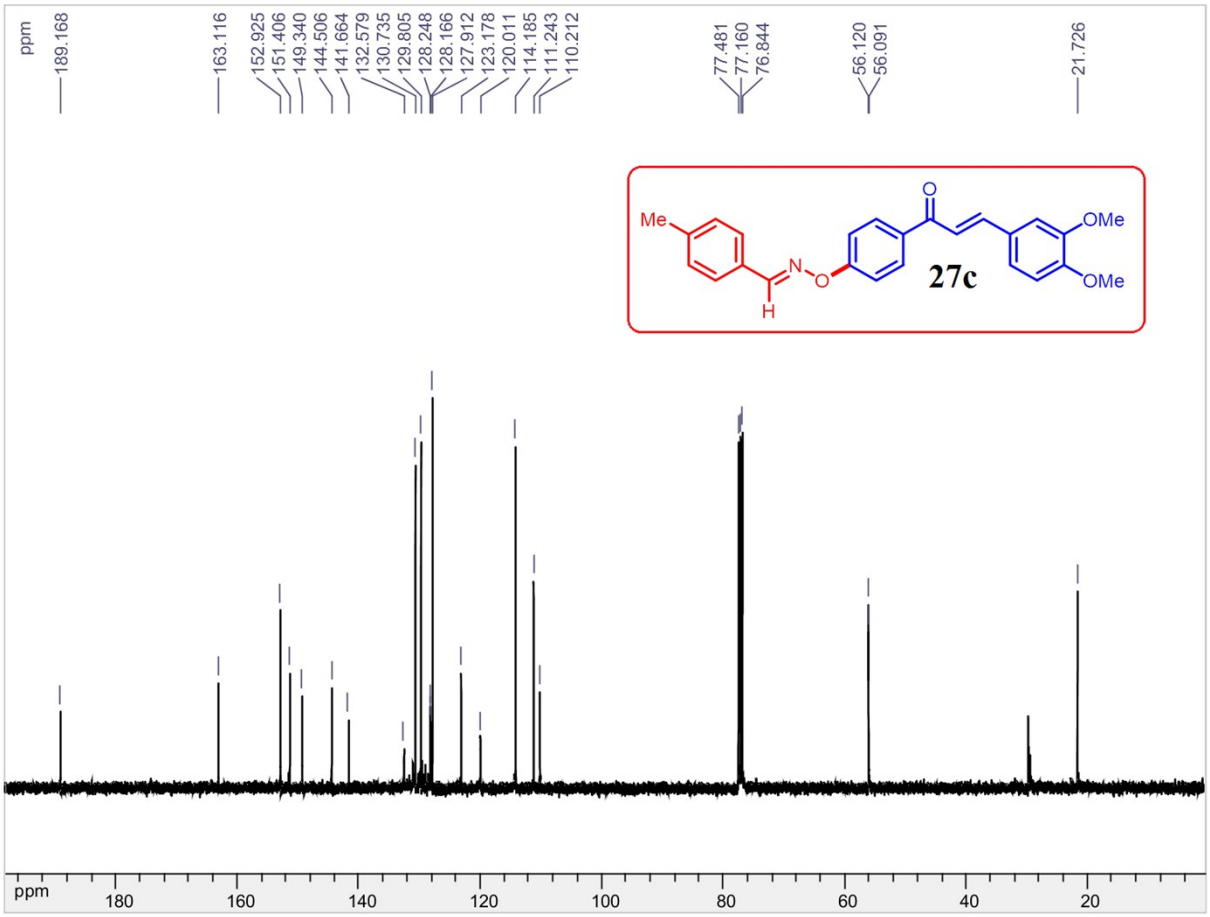

ppm
189.096
163.059
161.640
152.896
144.122
141.650
132.627
130.692
130.390
130.289
129.800
128.243
127.908
119.704
114.501
114.156
77.476
77.160
76.839
55.545
21.741
Me
N
O
H
O
OMe
25c
ppm
180
160
140
120
100
80
60
40
20

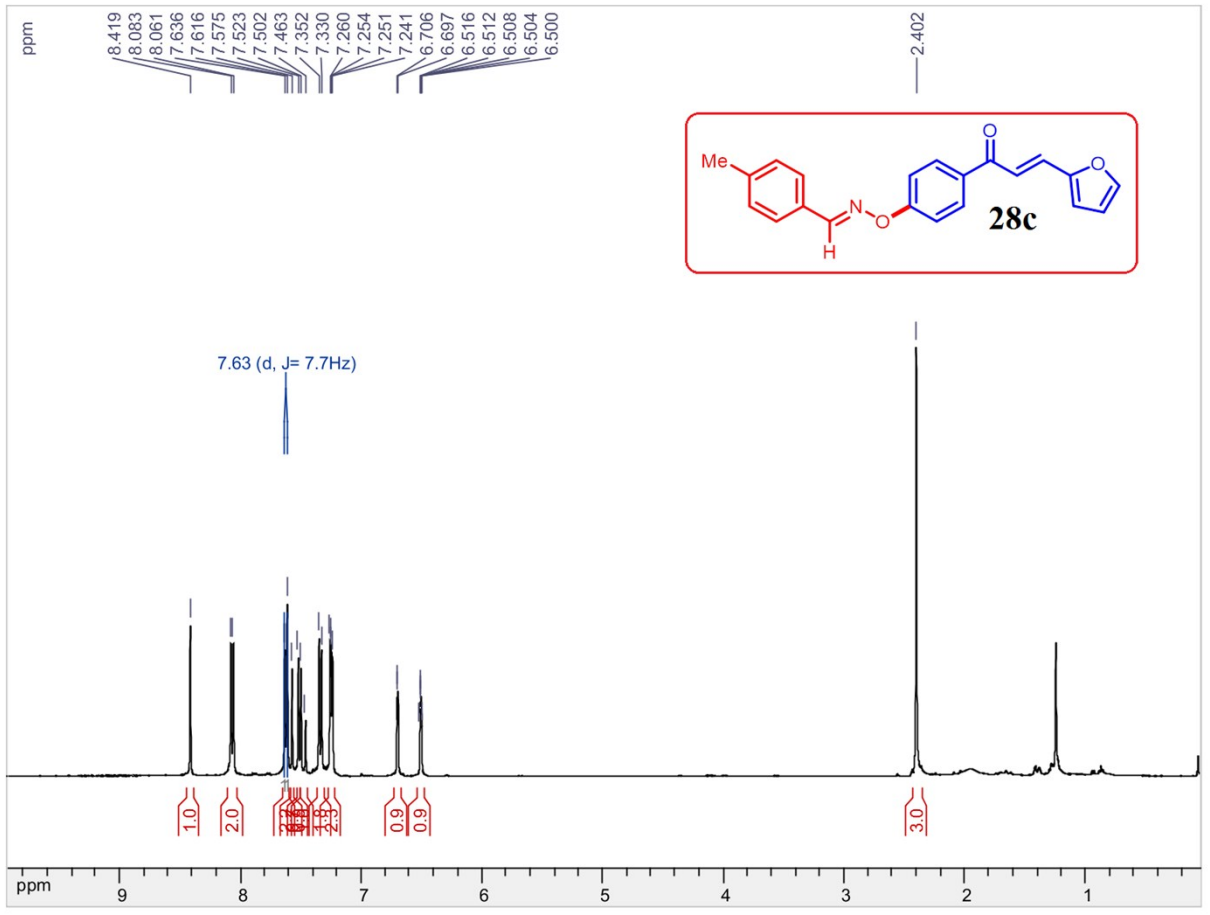

ppm
8.434
8.078
8.056
7.977
7.955
7.816
7.777
7.650
7.629
7.604
7.582
7.476
7.437
7.407
7.387
7.367
7.345
7.273
7.260
7.253
7.029
7.008
6.993
6.907
6.885
5.122
2.414
Me
N
O
H
O
O
26c
7.8 (d, J= 15.6Hz)
1.0
1.0
3.0
ppm
9
8
7
6
5
4
3
2
1

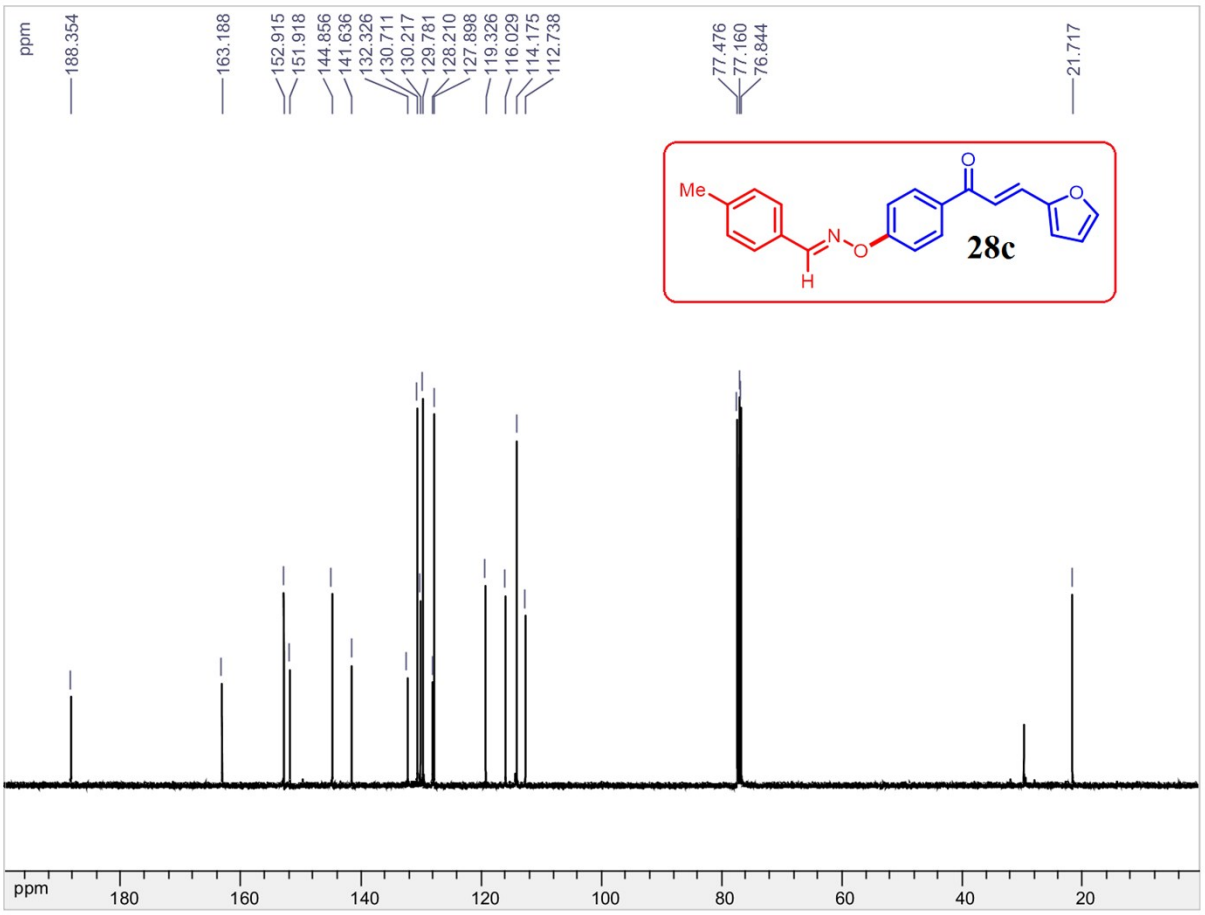

ppm
189.259
189.111
163.140
160.864
160.759
152.939
144.204
143.792
141.655
136.585
136.566
132.599
131.142
130.735
130.318
130.236
129.800
128.804
128.301
128.286
128.257
128.224
128.142
127.922
127.620
119.911
119.867
115.737
115.416
115.382
114.204
77.481
77.160
76.844
70.246
70.231
21.721
Me
N
O
H
O
O
26c
ppm
180
160
140
120
100
80
60
40
20

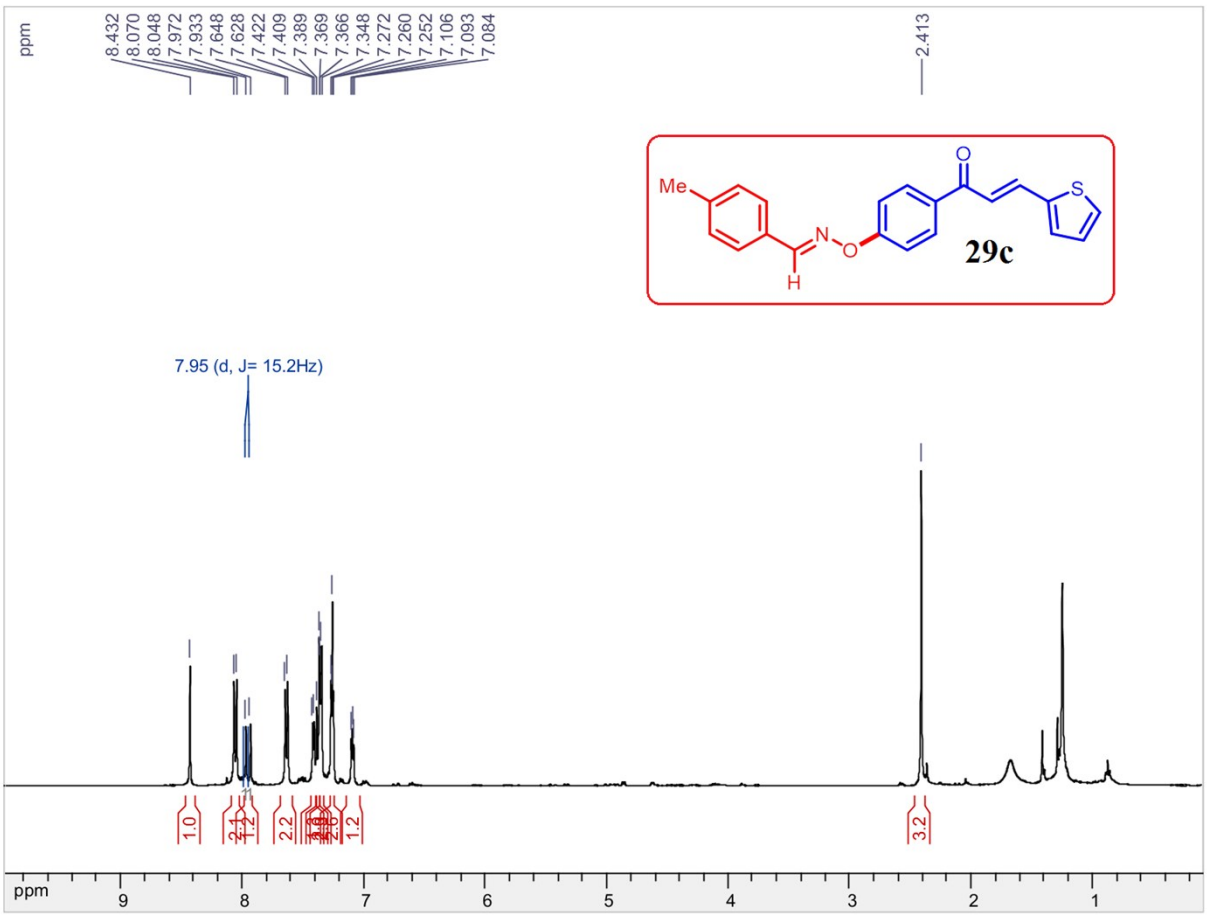

ppm
152.899
144.140
143.780
131.102
130.695
130.287
130.211
129.775
128.783
128.284
127.887
127.599
119.798
115.644
115.361
115.328
114.154
Me
N
O
H
O
O
26c
ppm
180
160
140
120
100
80

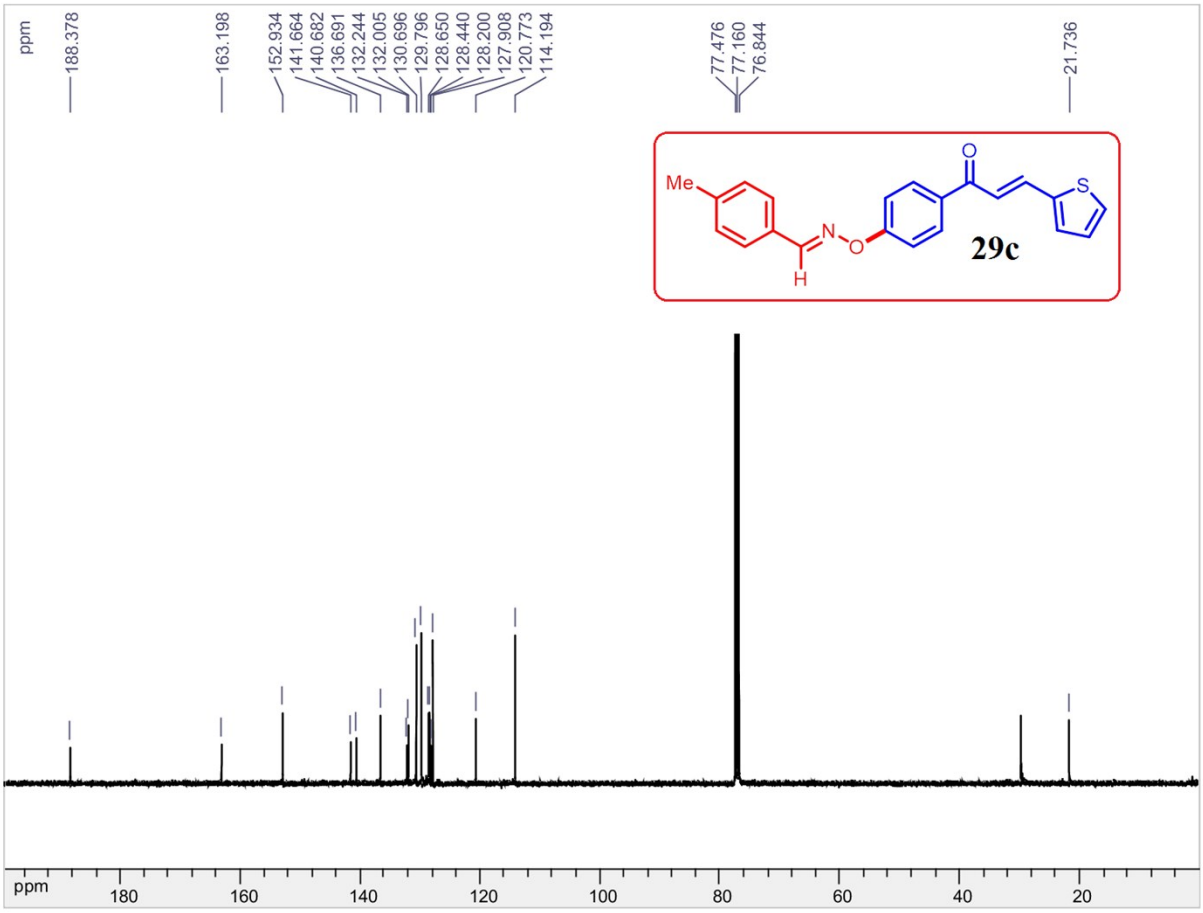

ppm
8.434
8.082
8.060
7.794
7.755
7.647
7.627
7.447
7.408
7.371
7.349
7.270
7.260
7.252
7.233
7.176
6.917
6.897
3.964
3.938
2.412
Me
N
O
H
O
OMe
OMe
27c
7.77 (d, J= 15.6Hz)
0.9
1.8
1.1
1.8
1.1
3.2
ppm
9
8
7
6
5
4
3
2
1

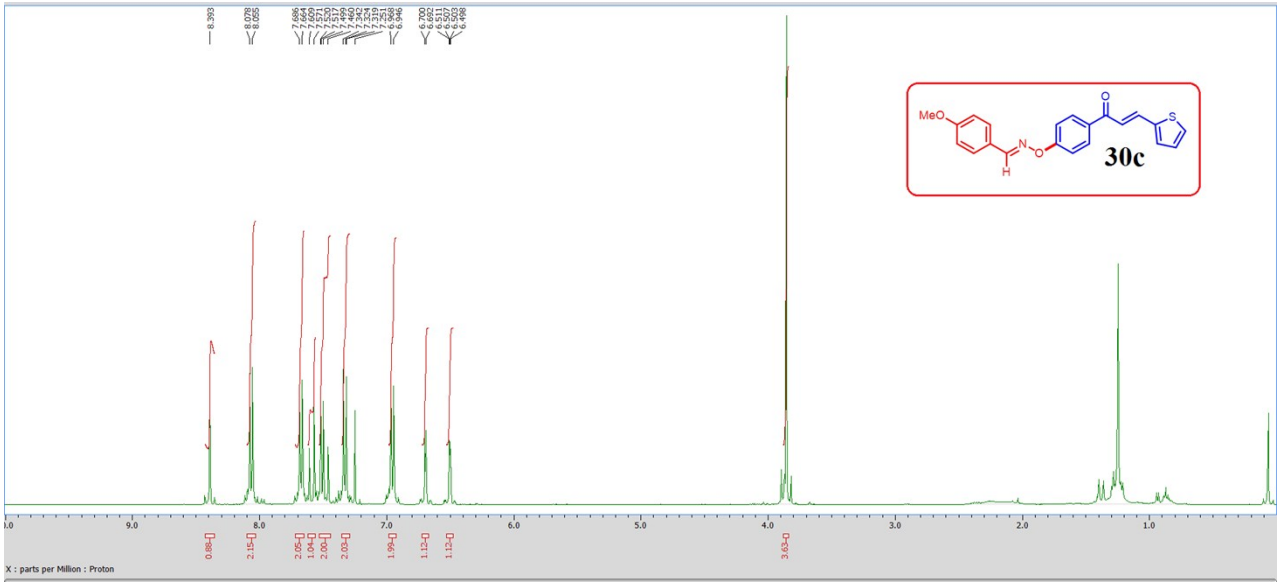

ppm
189.168
163.116
152.925
151.406
149.340
144.506
141.664
132.579
130.735
129.805
128.248
128.166
127.912
123.178
120.011
114.185
111.243
110.212
77.481
77.160
76.844
56.120
56.091
21.726
Me
N
O
H
O
OMe
OMe
27c
ppm
180
160
140
120
100
80
60
40
20

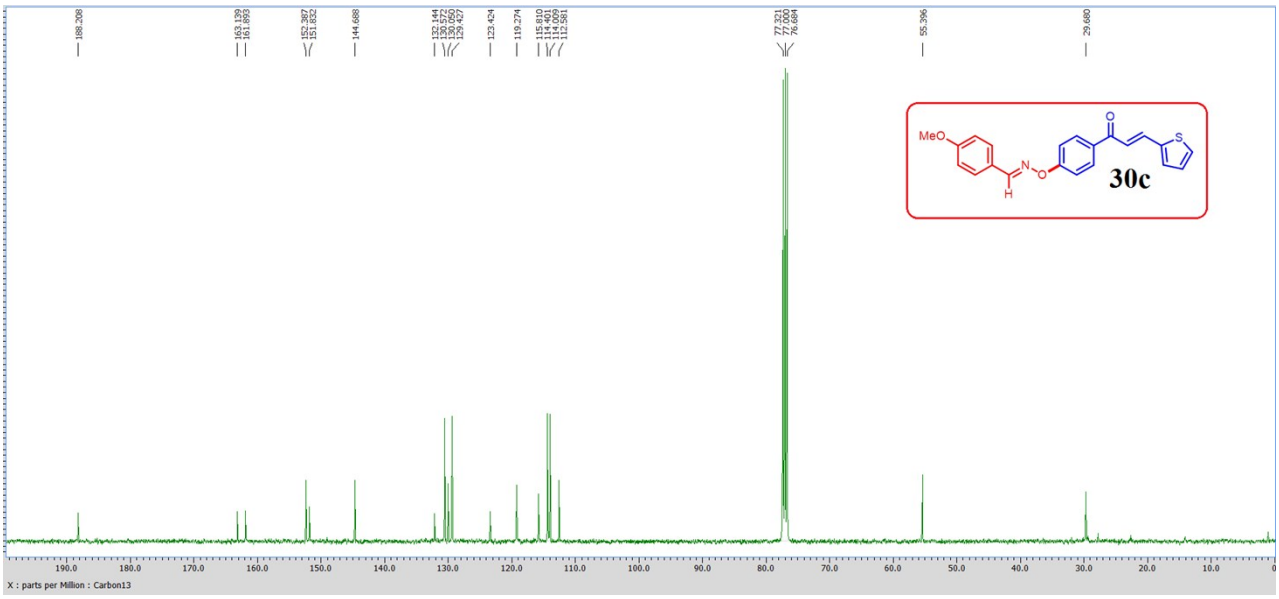

ppm
8.419
8.083
8.061
7.636
7.616
7.575
7.523
7.502
7.463
7.352
7.330
7.260
7.254
7.251
7.241
6.706
6.697
6.516
6.512
6.508
6.504
6.500
2.402
Me
N
O
H
O
O
28c
7.63 (d, J= 7.7Hz)
1.0
2.0
0.9
0.9
3.0
ppm
9
8
7
6
5
4
3
2
1

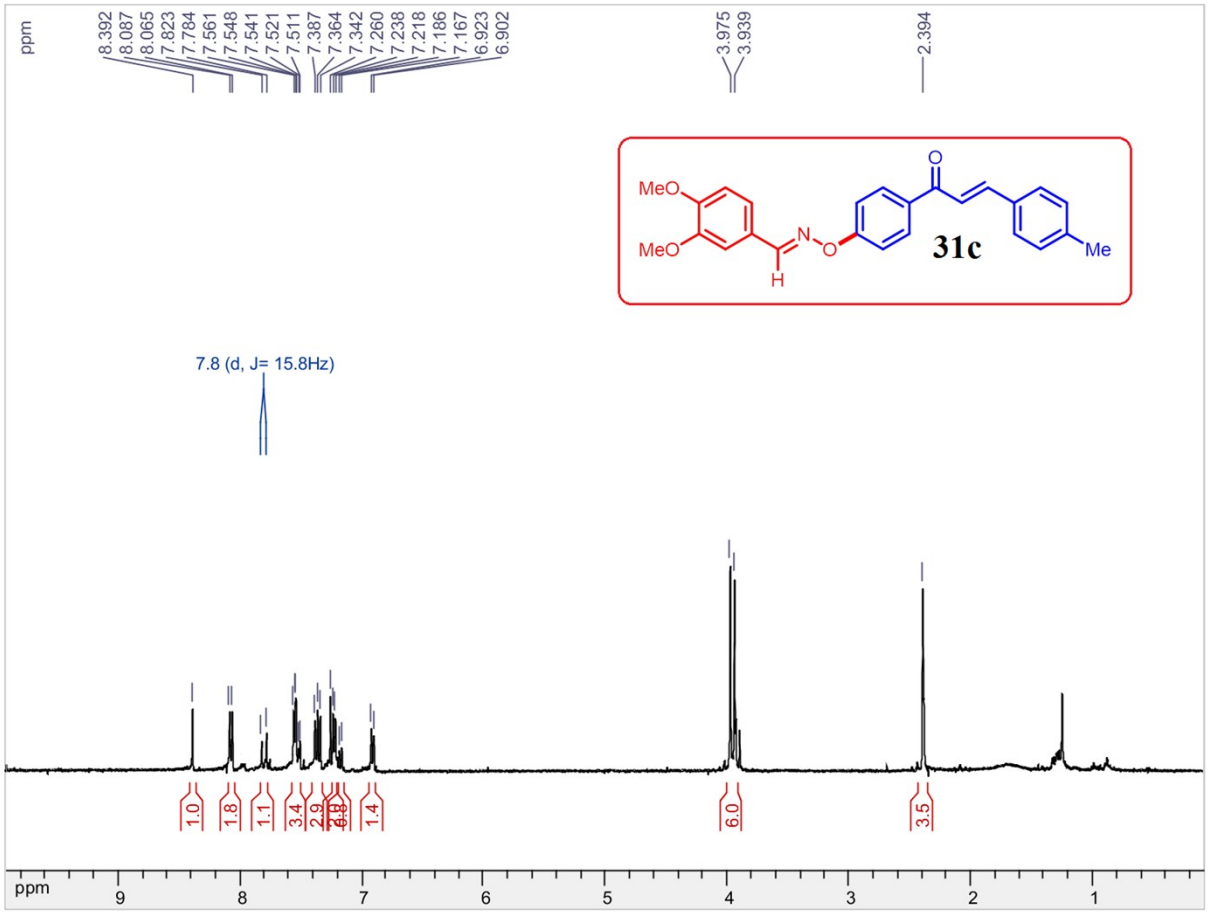

ppm
188.354
163.188
152.915
151.918
144.856
141.636
132.326
130.711
130.217
129.781
128.210
127.898
119.326
116.029
114.175
112.738
77.476
77.160
76.844
21.717
Me
N
O
H
O
O
28c
ppm
180
160
140
120
100
80
60
40
20

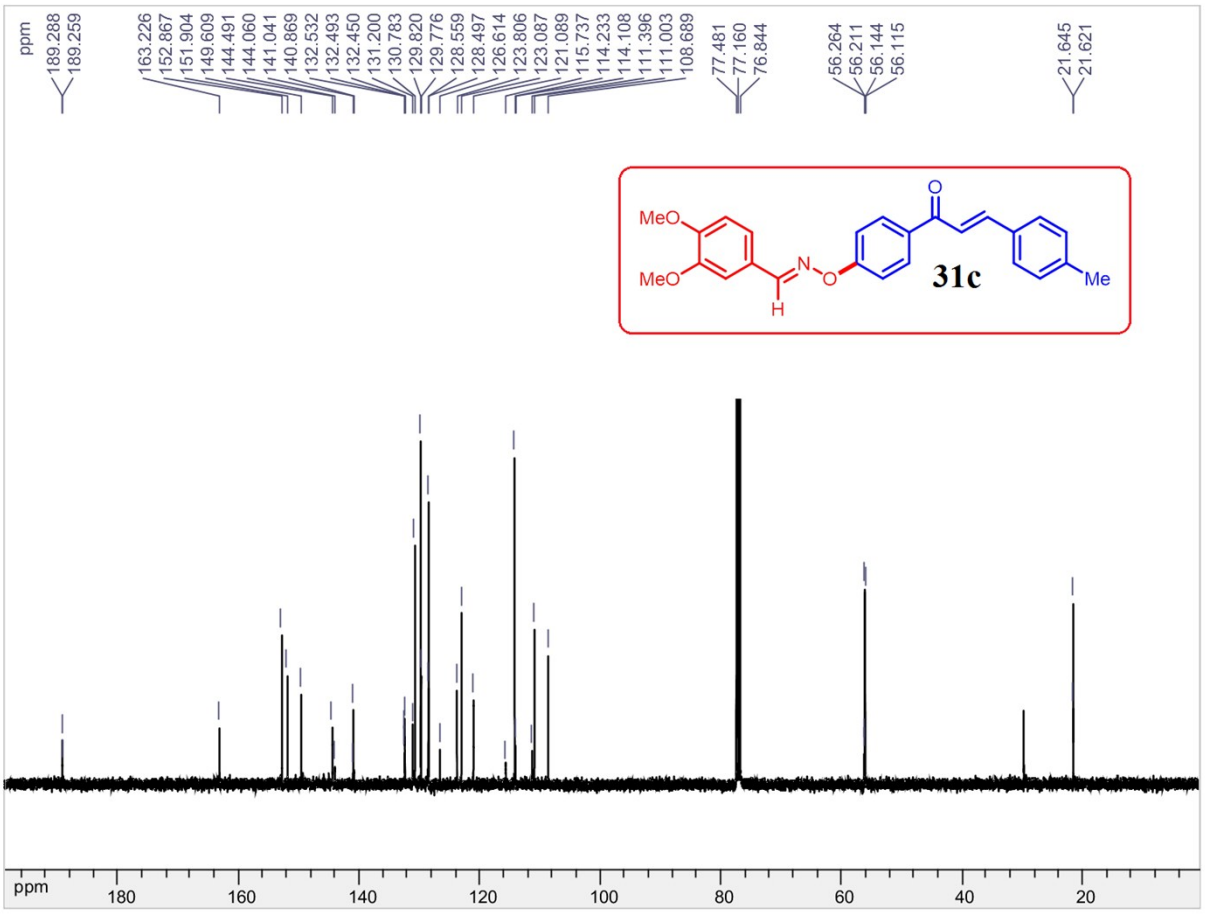

ppm
8.432
8.070
8.048
7.972
7.933
7.648
7.628
7.422
7.409
7.389
7.369
7.366
7.348
7.272
7.260
7.252
7.106
7.093
7.084
2.413
Me
N
O
H
O
S
29c
7.95 (d, J= 15.2Hz)
1.0
2.1
1.2
2.2
1.2
3.2
ppm
9
8
7
6
5
4
3
2
1

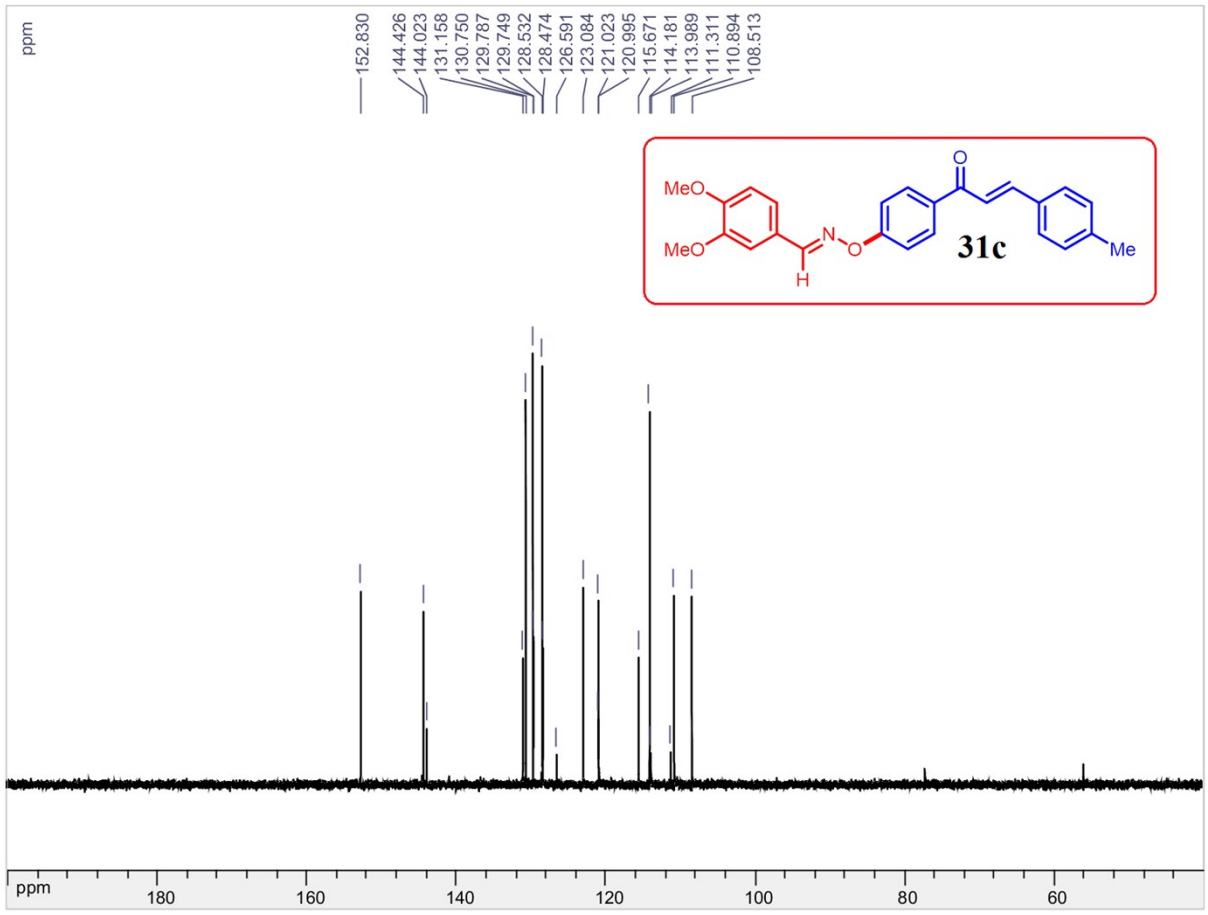

ppm
188.378
163.198
152.934
141.664
140.682
136.691
132.244
132.005
130.696
129.796
128.650
128.440
128.200
127.908
120.773
114.194
77.476
77.160
76.844
21.736
Me
N
O
H
O
S
29c
ppm
180
160
140
120
100
80
60
40
20

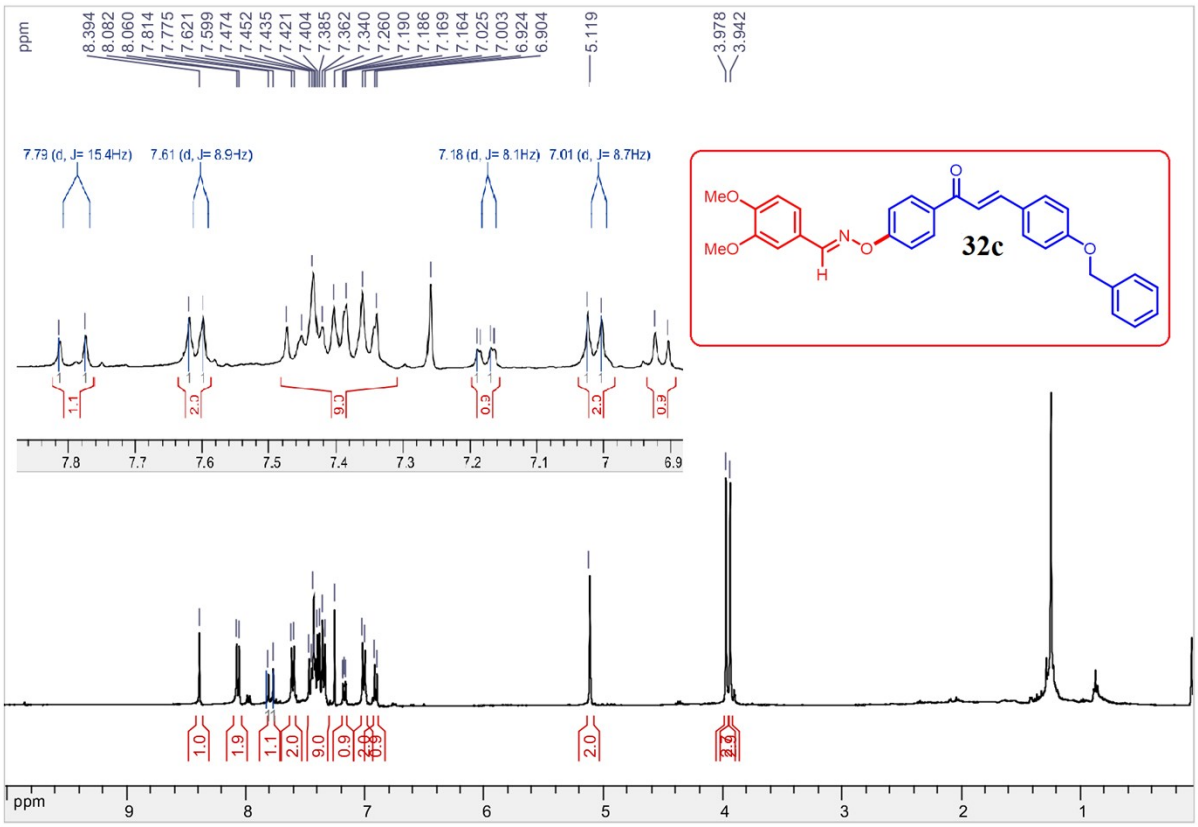

8.393
8.078
8.055
7.666
7.645
7.609
7.571
7.550
7.517
7.499
7.440
7.374
7.331
7.251
6.946
6.700
6.682
6.511
6.507
6.503
6.498
MeO
N
O
H
O
S
30c
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.88
2.14
2.05
1.04
2.04
2.03
1.96
1.12
1.12
3.83
X : parts per Million : Proton

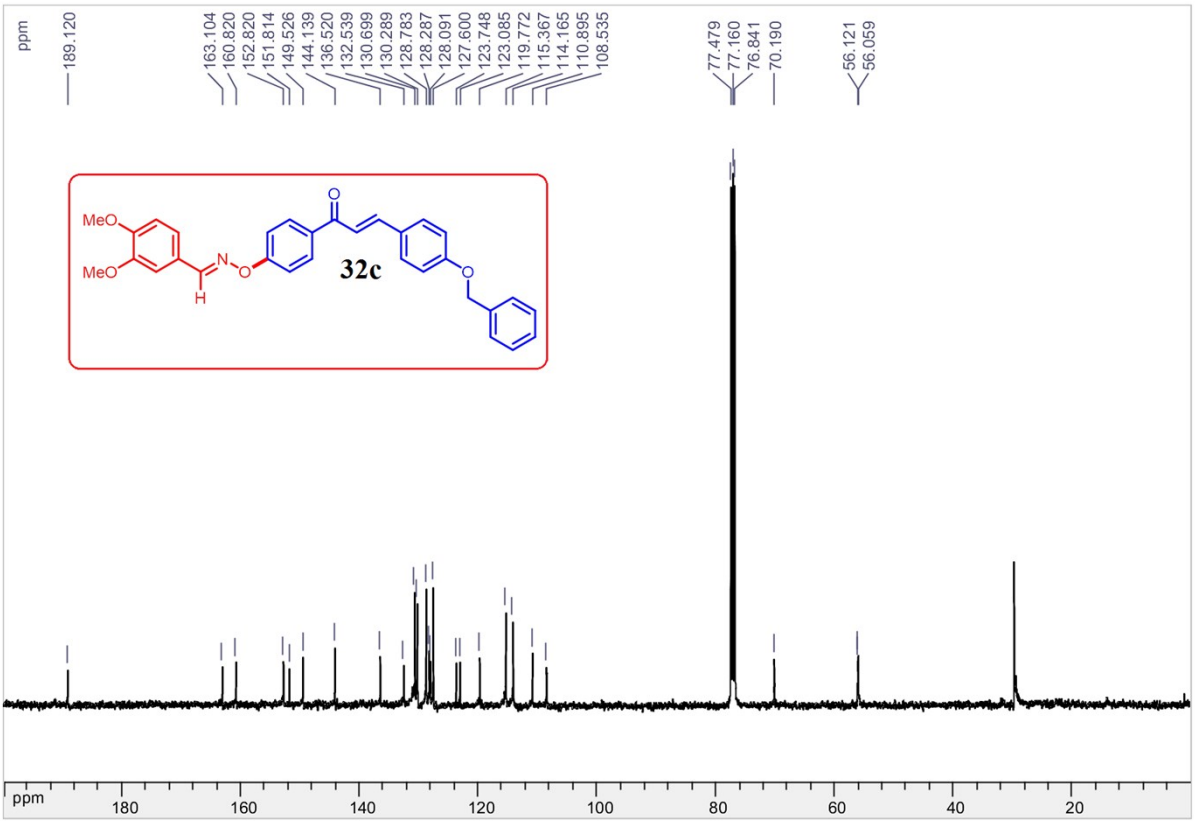

MeO
30c
X : parts per Million : Carbon13

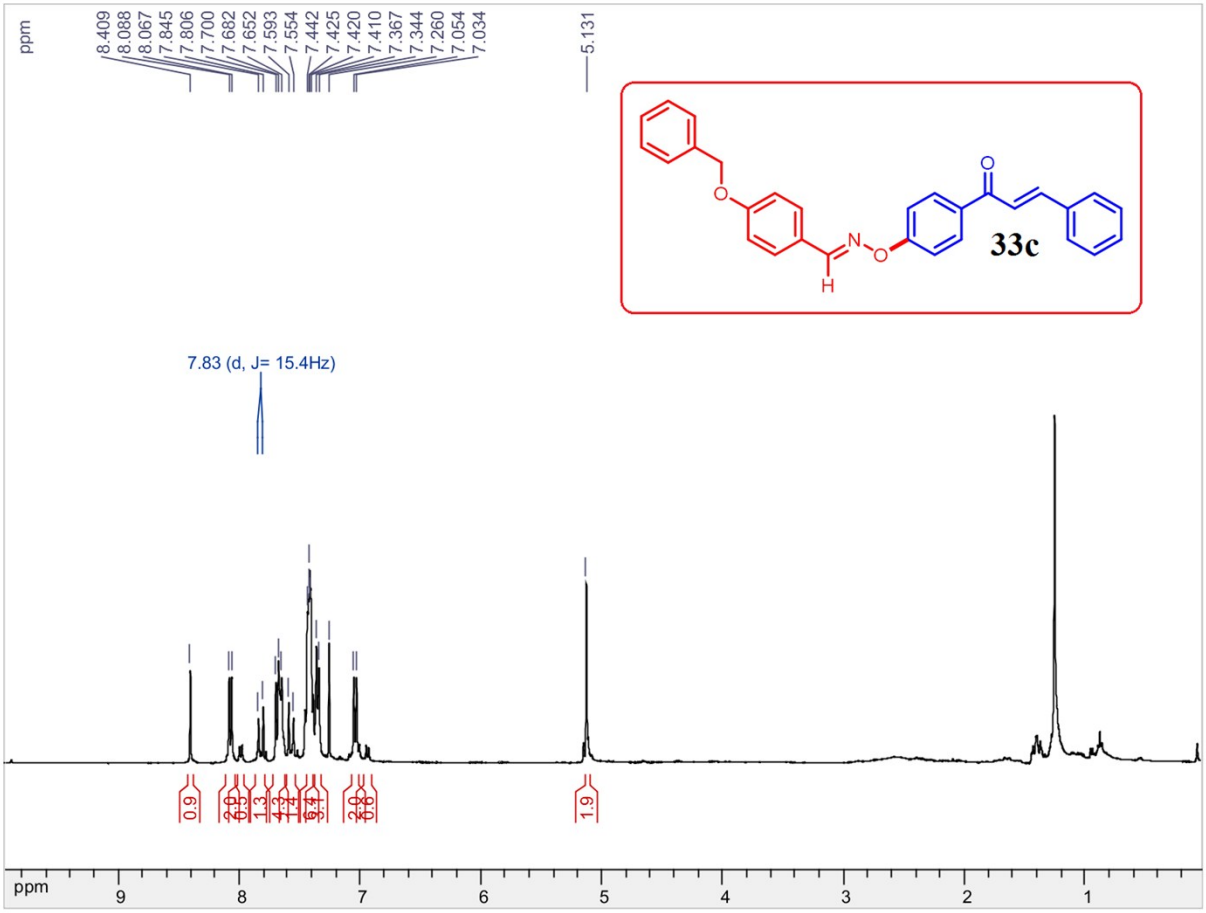

ppm
MeO
MeO
31c
Me
7.8 (d, J= 15.8Hz)
ppm

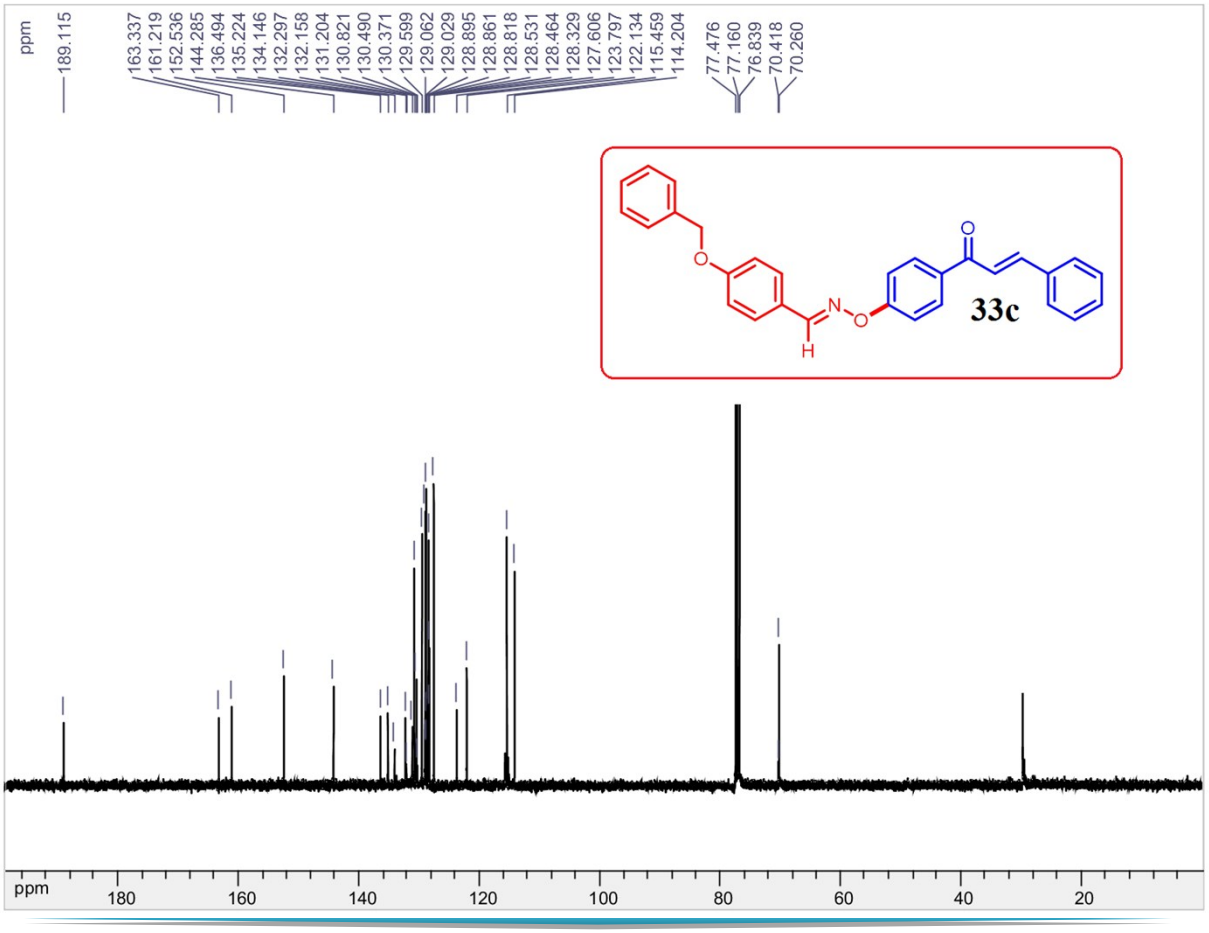

ppm
189.288
189.259
163.226
152.867
151.904
149.609
144.491
144.060
141.041
140.869
132.532
132.493
132.450
131.200
130.783
129.820
129.776
128.559
128.497
126.614
123.806
123.087
121.089
115.737
114.233
114.108
111.396
111.003
108.689
77.481
77.160
76.844
56.264
56.211
56.144
56.115
21.645
21.621
MeO
MeO
N
O
H
O
Me
31c
ppm
180
160
140
120
100
80
60
40
20

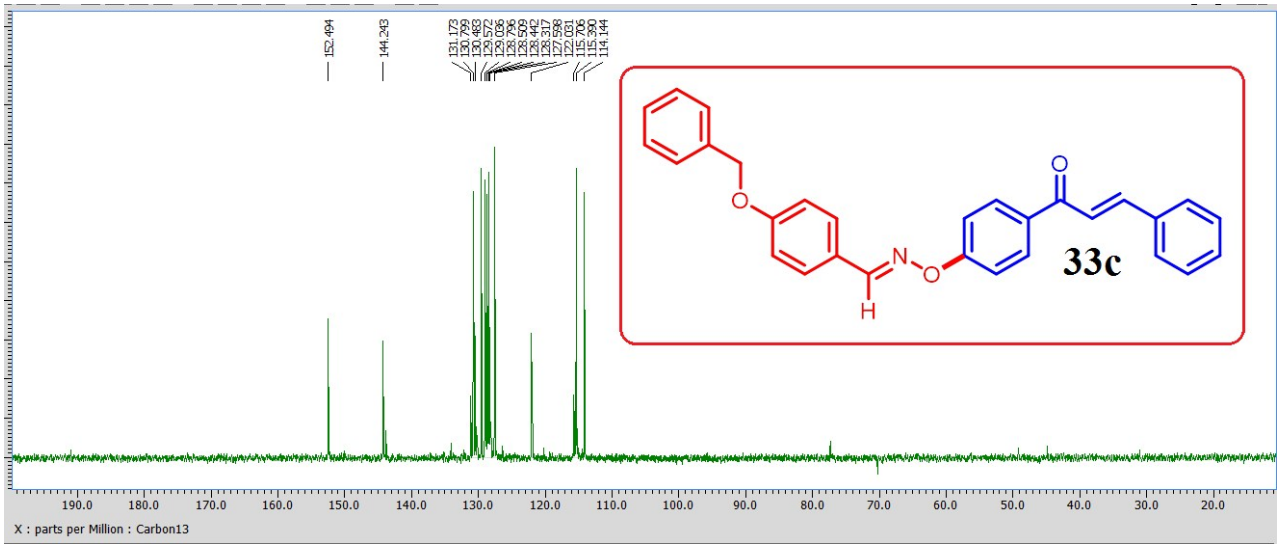

ppm
152.830
144.426
144.023
131.158
130.750
129.787
129.749
128.532
128.474
126.591
123.084
121.023
120.995
115.671
114.181
113.989
111.311
110.894
108.513
MeO
MeO
N
O
H
O
Me
31c
ppm
180
160
140
120
100
80
60

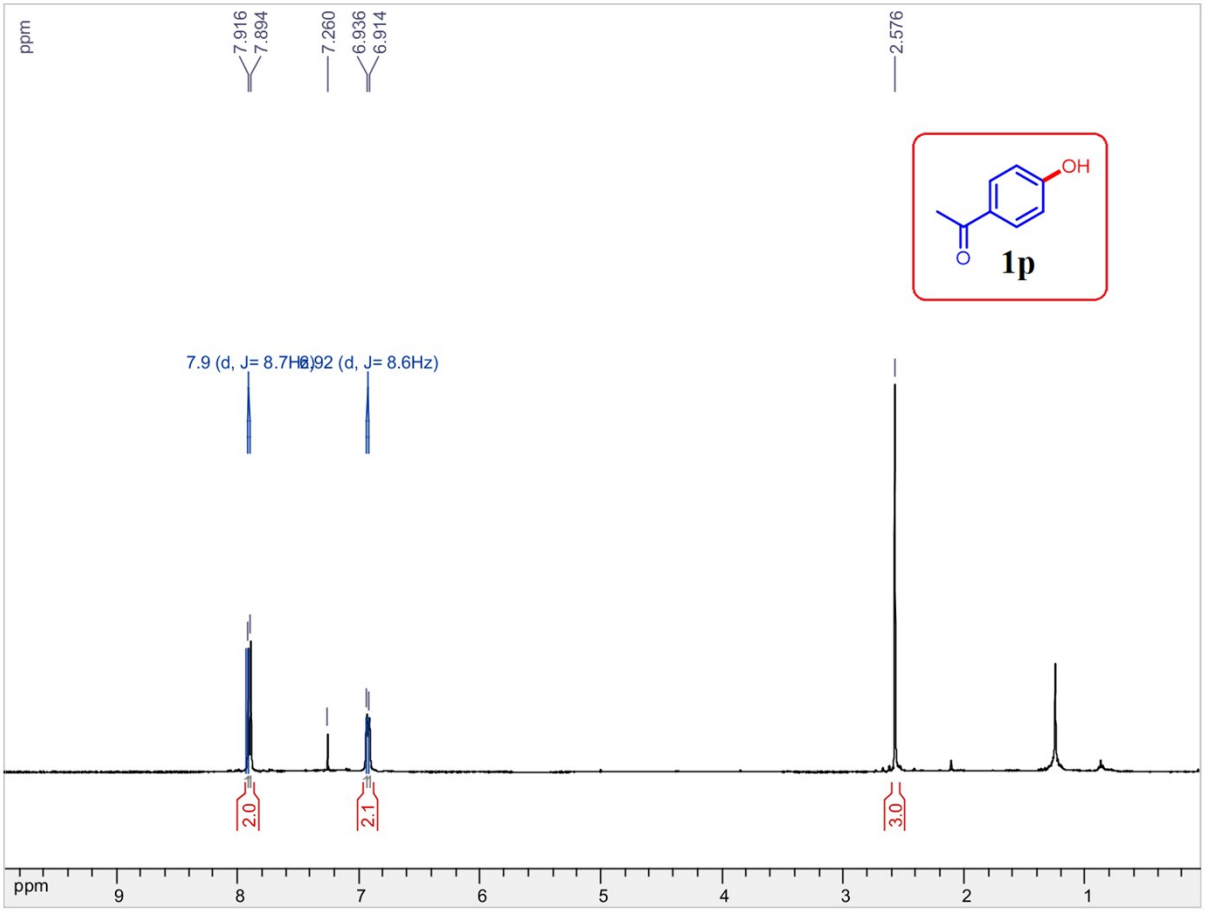

ppm
8.394
8.082
8.060
7.814
7.775
7.621
7.599
7.474
7.452
7.435
7.421
7.404
7.385
7.362
7.340
7.260
7.190
7.186
7.169
7.164
7.025
7.003
6.924
6.904
5.119
3.978
3.942
7.79 (d, J= 15.4Hz)
7.61 (d, J= 8.9Hz)
7.18 (d, J= 8.1Hz)
7.01 (d, J= 8.7Hz)
MeO
MeO
N
O
H
O
O
32c
1.1
2.0
9.0
0.9
2.0
0.9
1.0
1.9
1.1
2.0
9.0
0.9
2.0
0.9
2.0
3.0
ppm

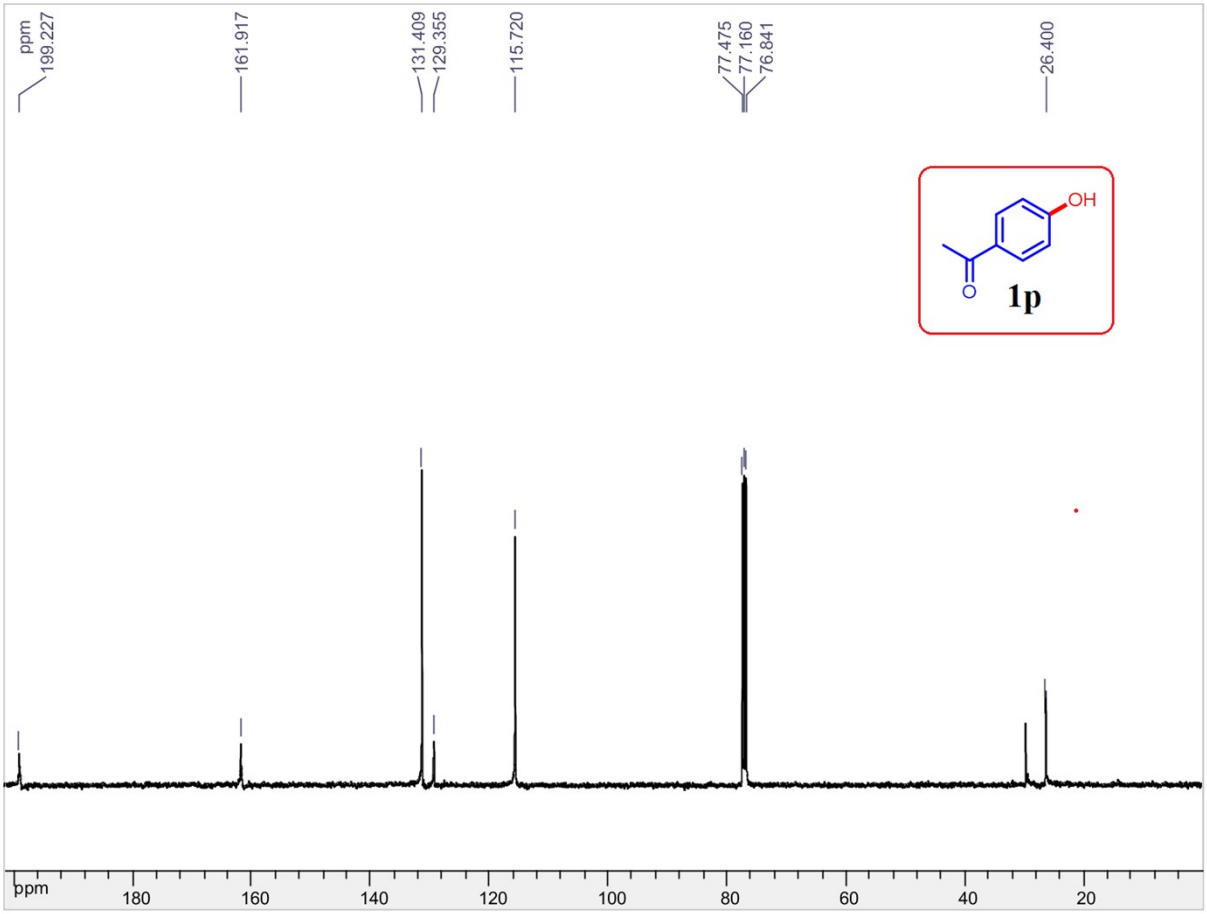

ppm
189.120
163.104
160.820
152.820
151.814
149.526
144.139
136.520
132.539
130.699
130.289
128.783
128.287
128.091
127.600
123.748
123.085
119.772
115.367
114.165
110.895
108.535
77.479
77.160
76.841
70.190
56.121
56.059
MeO
MeO
N
O
H
O
O
32c
ppm

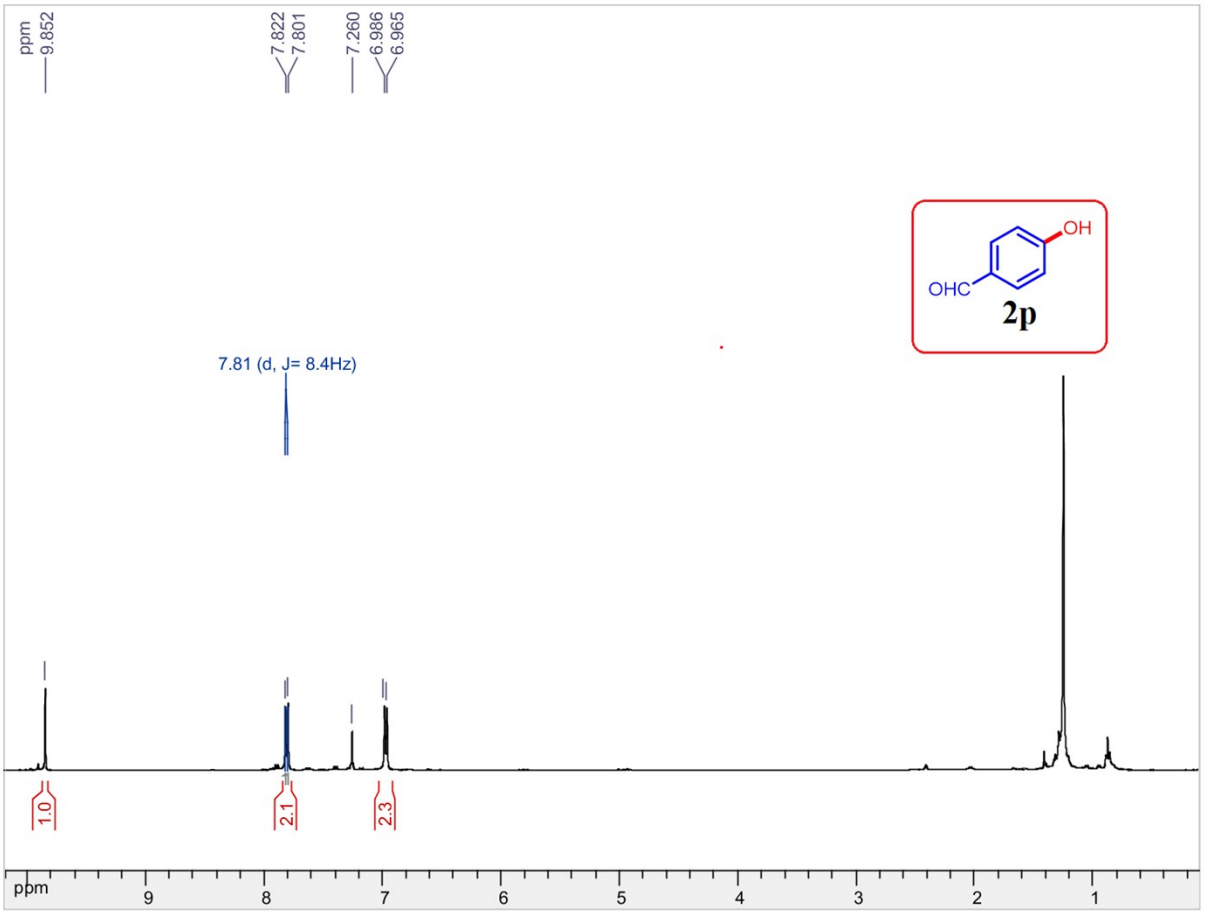

ppm
8.409
8.088
8.067
7.845
7.806
7.700
7.682
7.652
7.593
7.554
7.442
7.425
7.420
7.410
7.367
7.344
7.260
7.054
7.034
5.131
33c
7.83 (d, J= 15.4Hz)
0.9
1.9
ppm
9
8
7
6
5
4
3
2
1

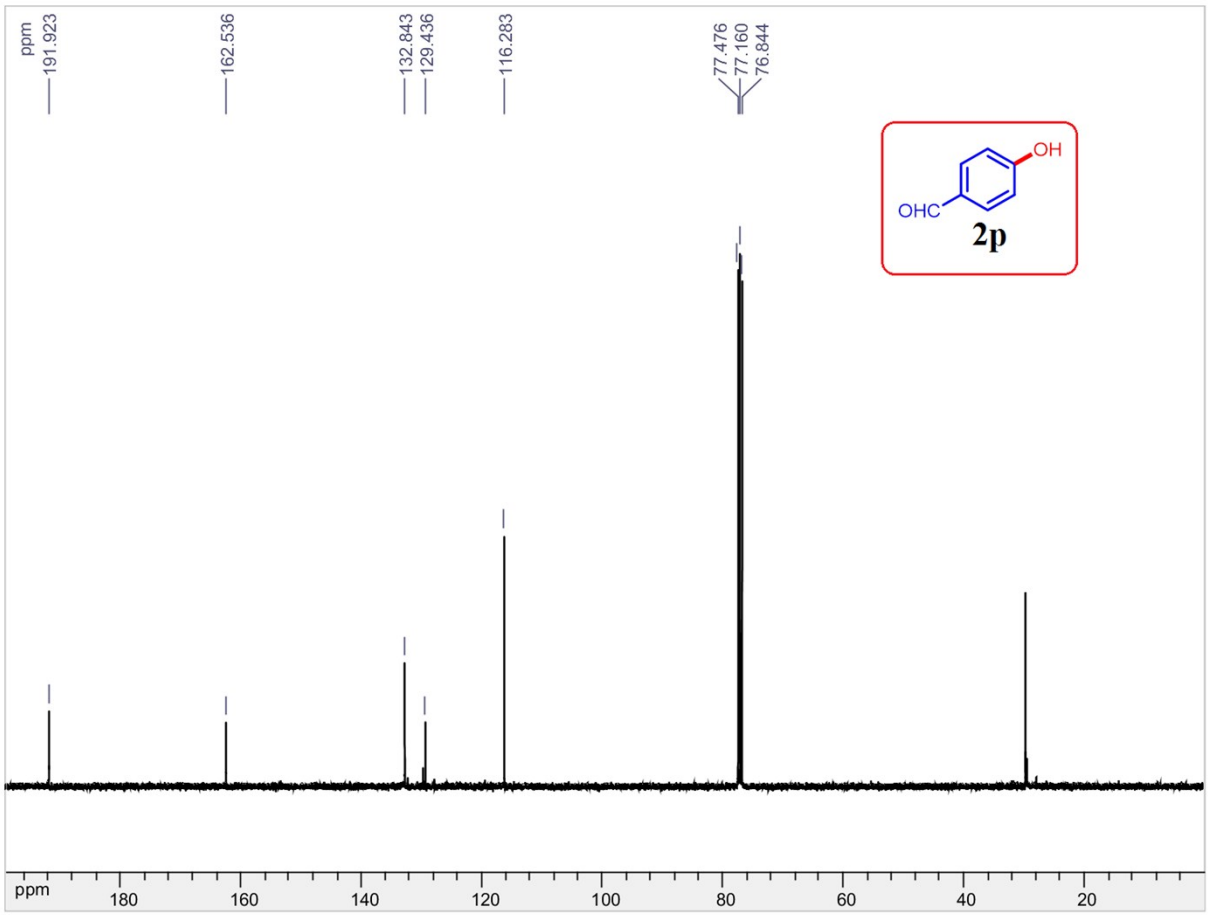

ppm
189.115
163.337
161.219
152.536
144.285
136.494
135.224
134.146
132.297
132.158
131.204
130.821
130.490
130.371
129.599
129.062
129.029
128.895
128.861
128.818
128.531
128.464
128.329
127.606
123.797
122.134
115.459
114.204
77.476
77.160
76.839
70.418
70.260
33c
ppm
180
160
140
120
100
80
60
40
20

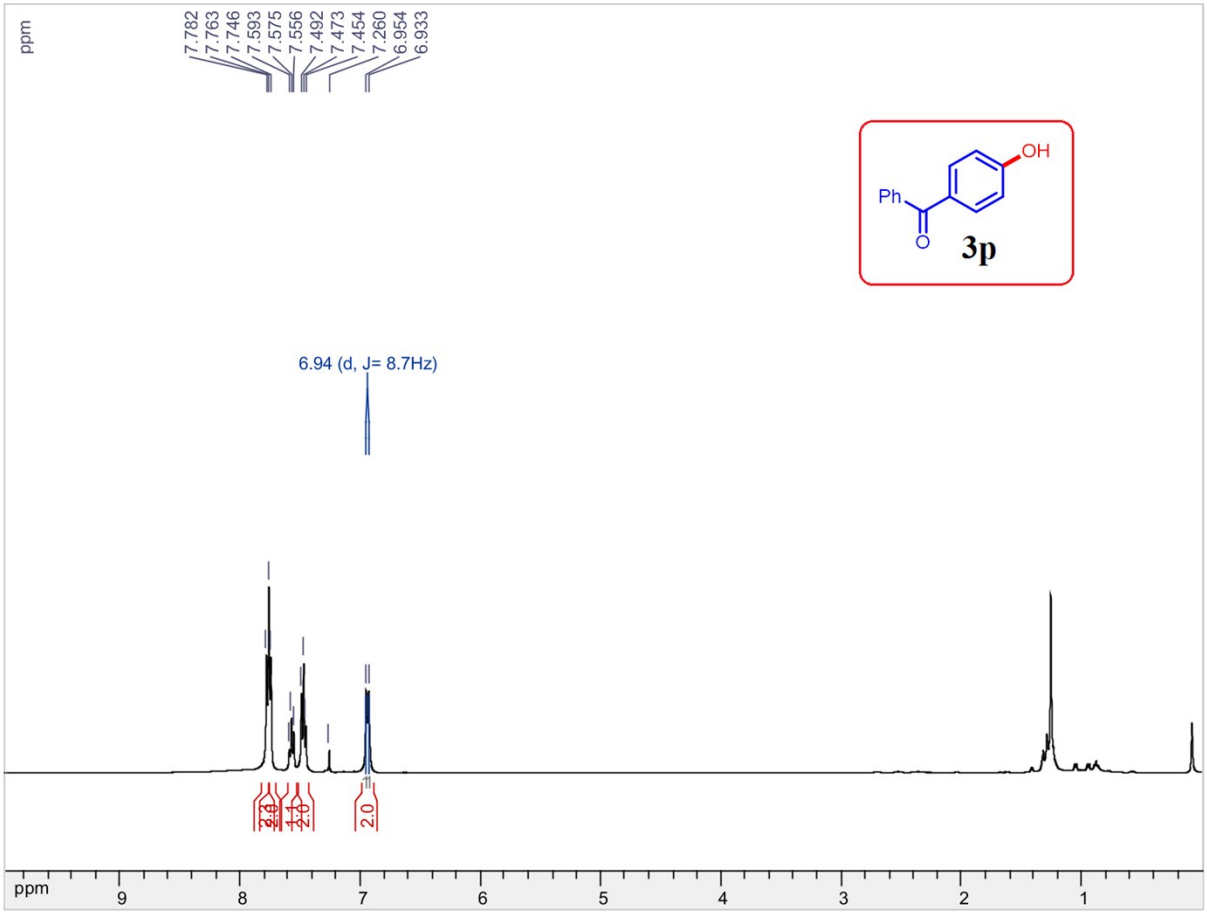

152.494
144.243
131.173
130.799
130.483
130.157
129.026
128.796
128.509
128.442
128.337
127.598
122.031
115.706
115.390
114.144
O
N
O
H
O
33c
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
X : parts per Million : Carbon13

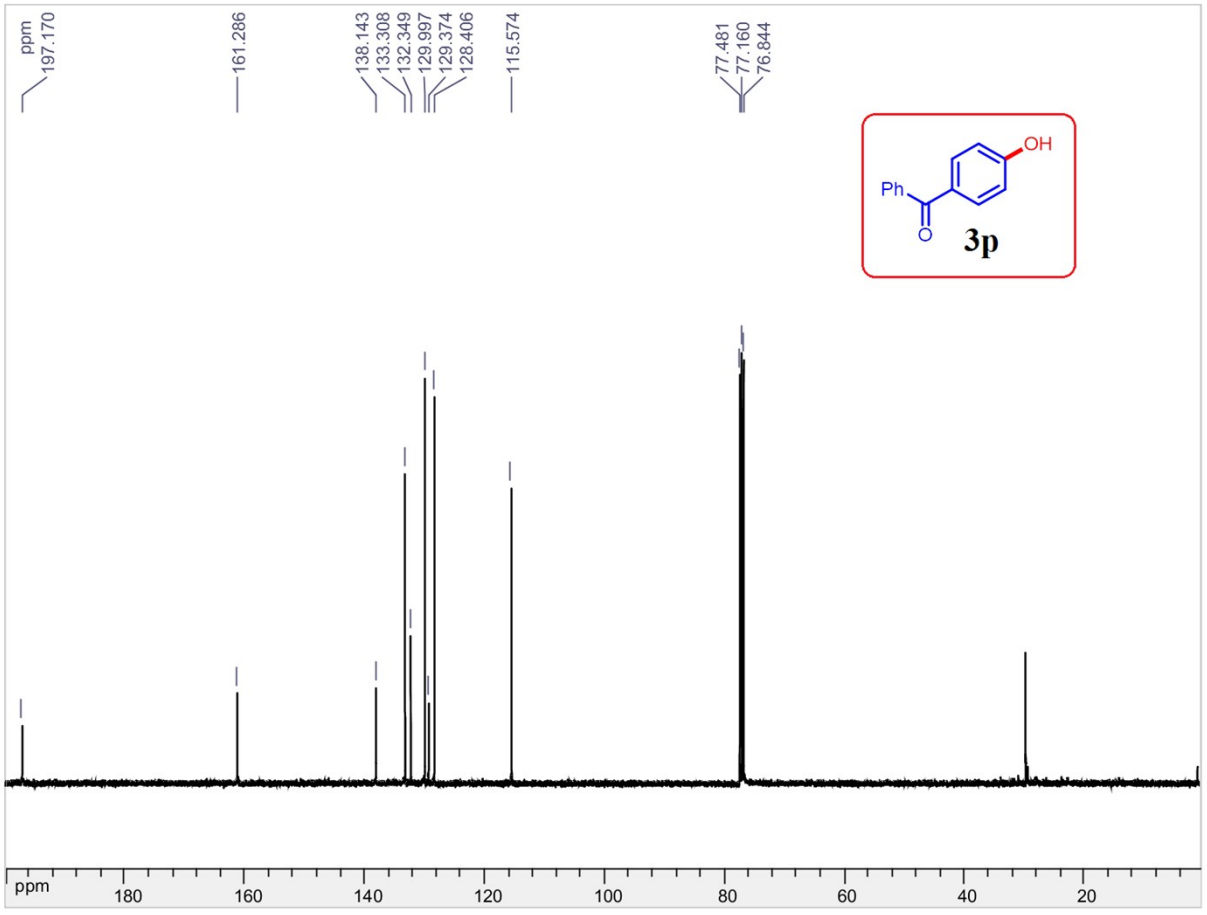

ppm
7.916
7.894
7.260
6.936
6.914
2.576
OH
O
1p
7.9 (d, J= 8.7Hz)
6.92 (d, J= 8.6Hz)
2.0
2.1
3.0
ppm
9
8
7
6
5
4
3
2
1

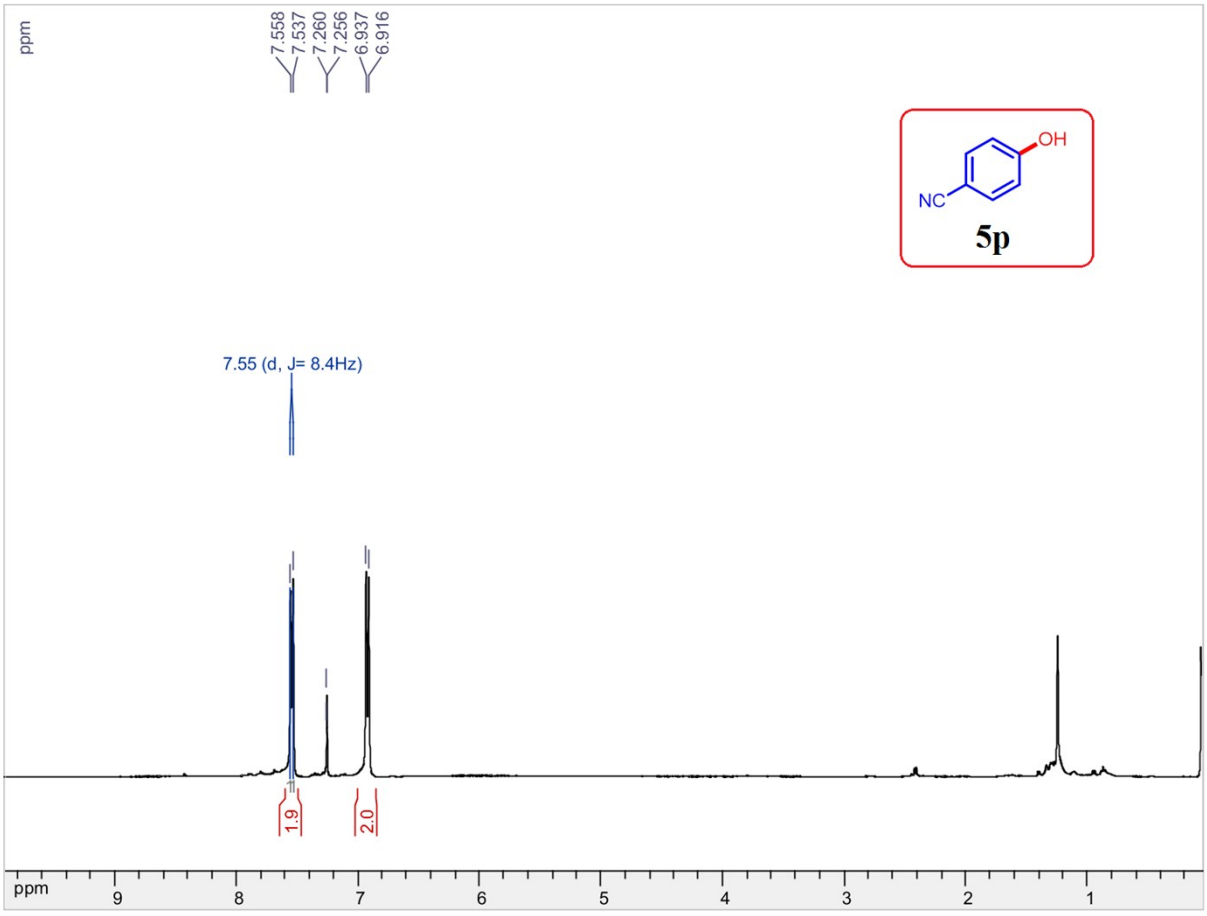

ppm
199.227
161.917
131.409
129.355
115.720
77.475
77.160
76.841
26.400
OH
O
1p
ppm
180
160
140
120
100
80
60
40
20

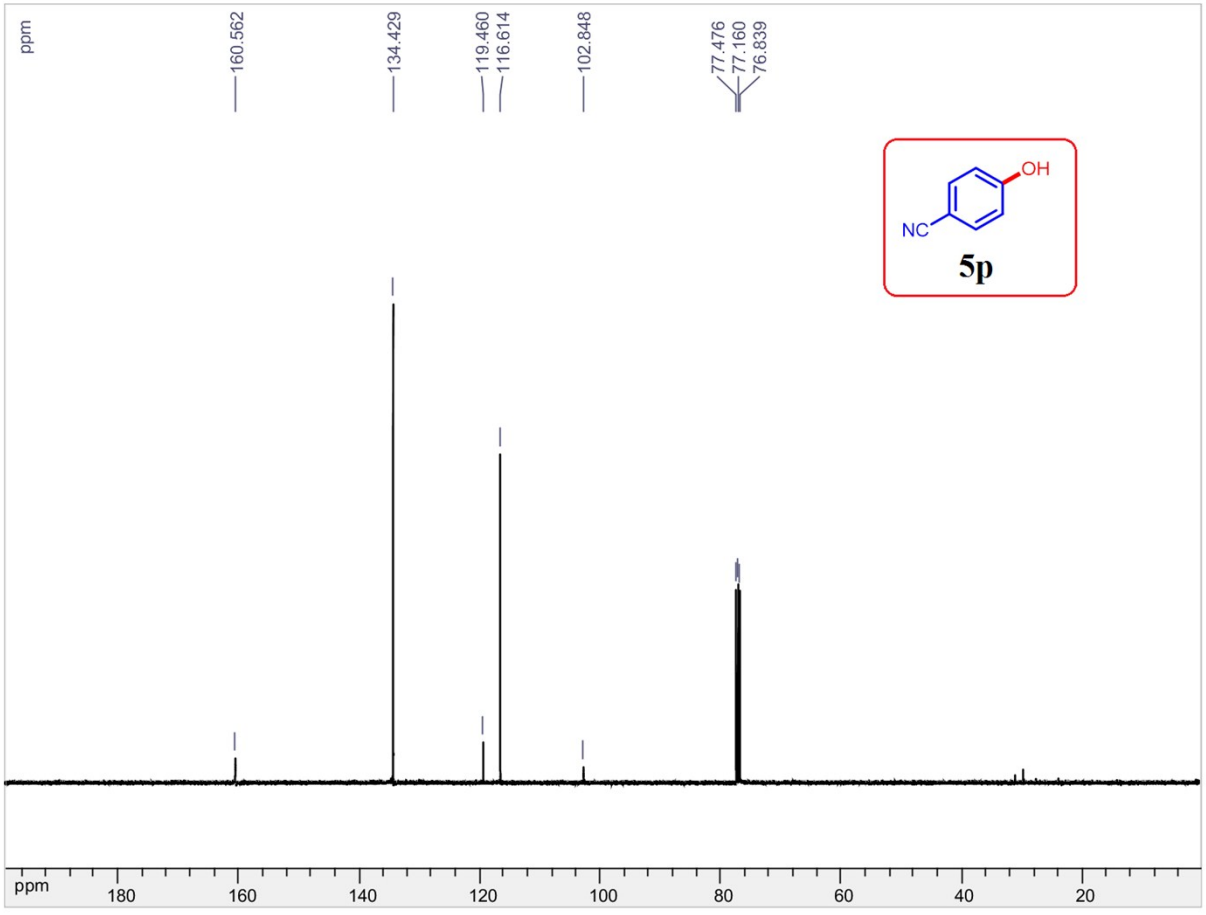

ppm
9.852
7.822
7.801
7.260
6.986
6.965
OH
OHC
2p
7.81 (d, J= 8.4Hz)
1.0
2.1
2.3
ppm
9
8
7
6
5
4
3
2
1

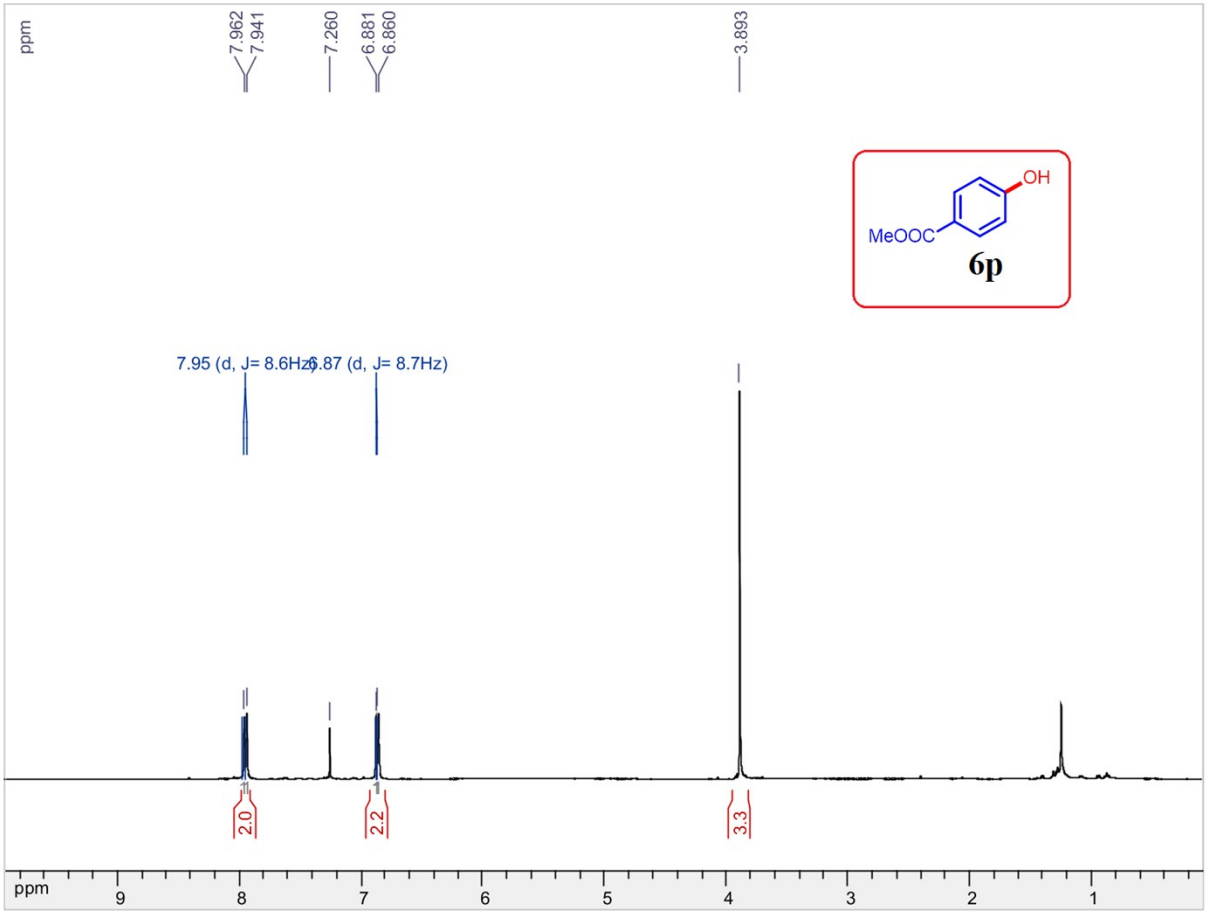

ppm
191.923
162.536
132.843
129.436
116.283
77.476
77.160
76.844
OH
OHC
2p
ppm
180
160
140
120
100
80
60
40
20

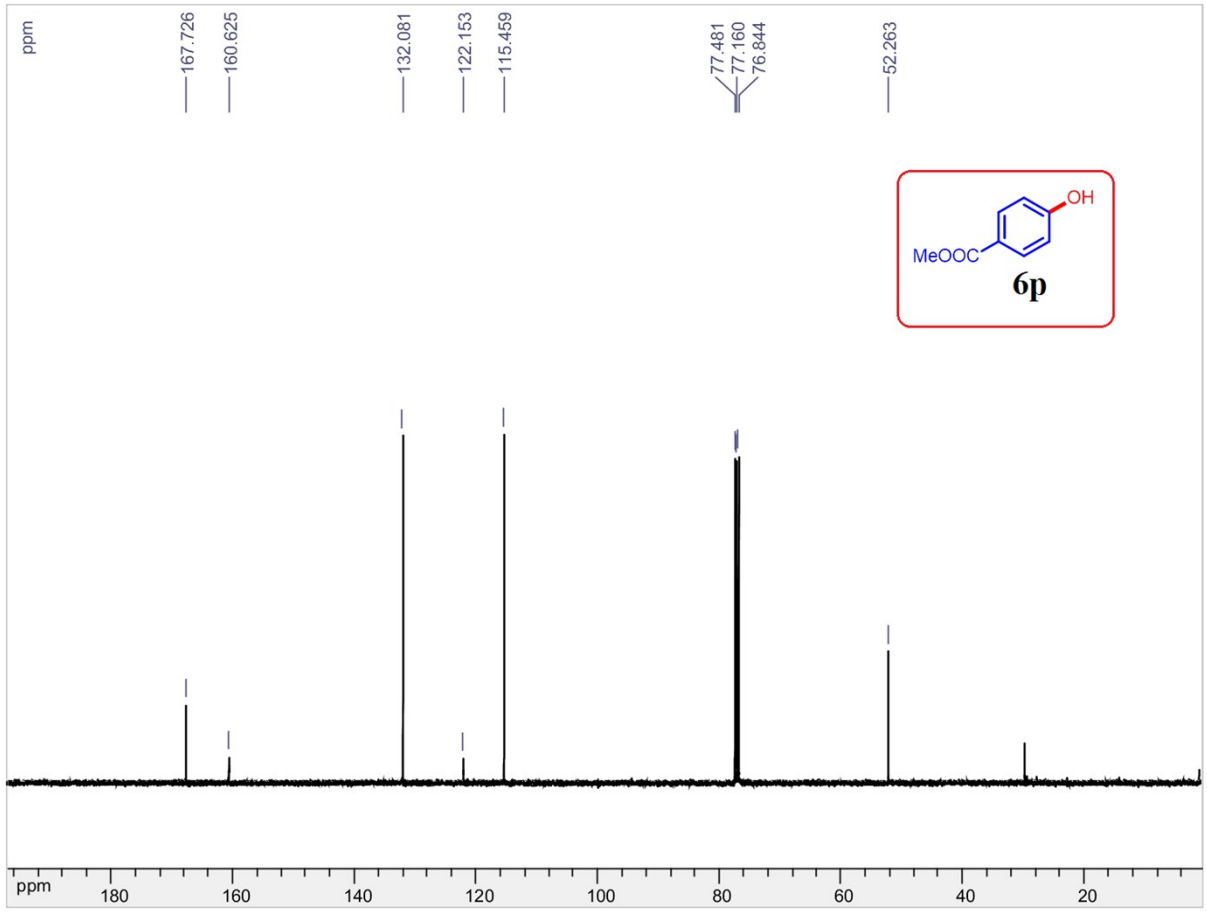

ppm
7.782
7.763
7.746
7.593
7.575
7.556
7.492
7.473
7.454
7.260
6.954
6.933
OH
Ph
O
3p
6.94 (d, J= 8.7Hz)
2.0
2.0
ppm
9
8
7
6
5
4
3
2
1

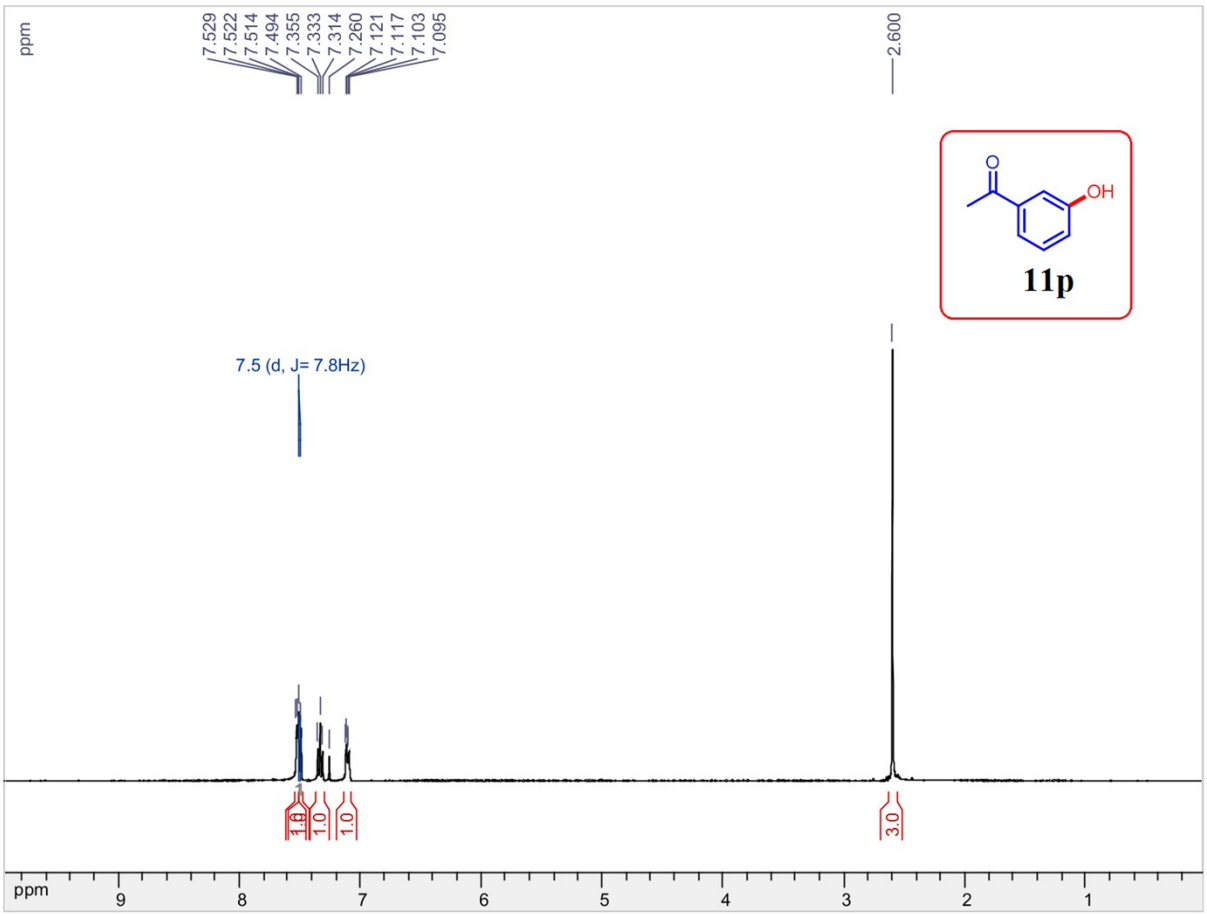

ppm
197.170
161.286
138.143
133.308
132.349
129.997
129.374
128.406
115.574
77.481
77.160
76.844
OH
Ph
O
3p
ppm
180
160
140
120
100
80
60
40
20

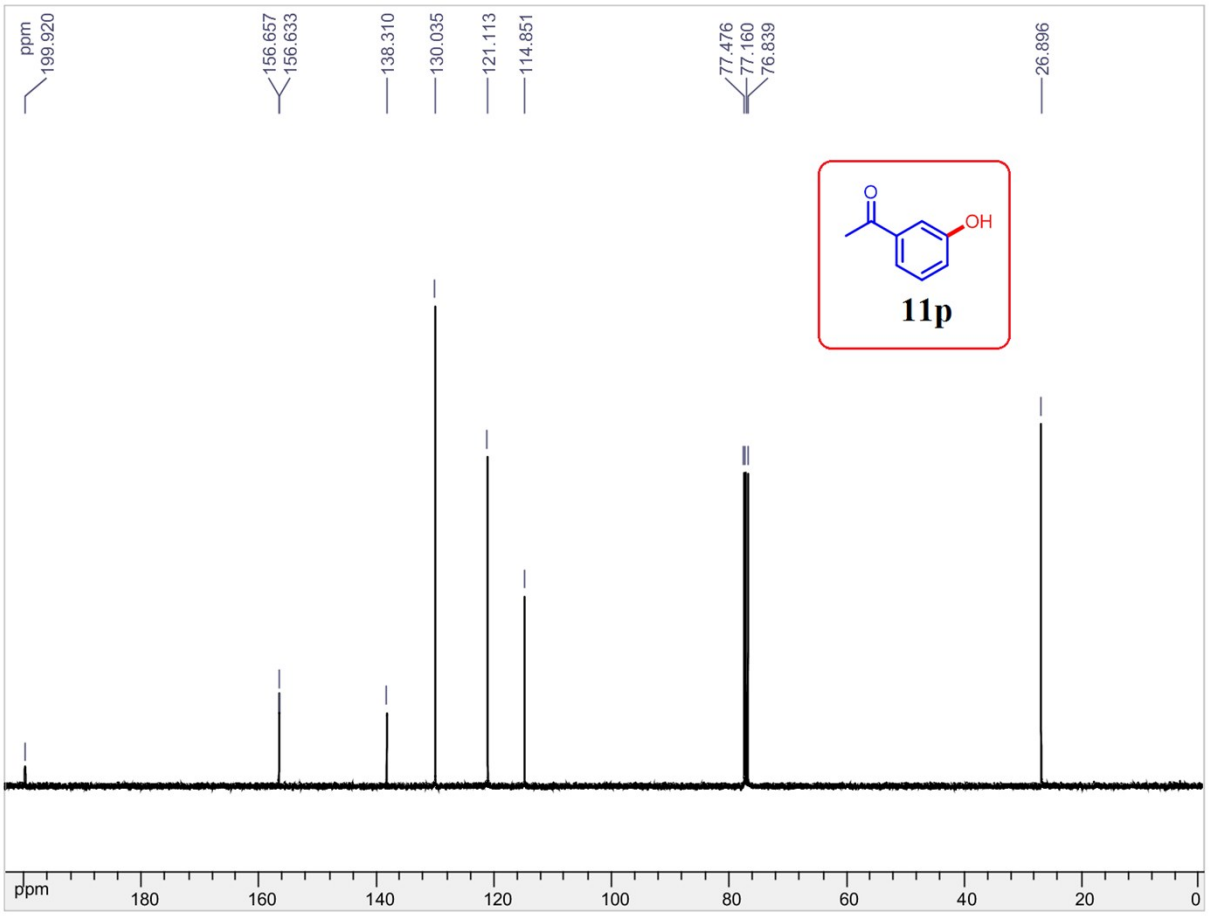

ppm
7.558
7.537
7.260
7.256
6.937
6.916
OH
NC
5p
7.55 (d, J= 8.4Hz)
1.9
2.0
ppm
9
8
7
6
5
4
3
2
1

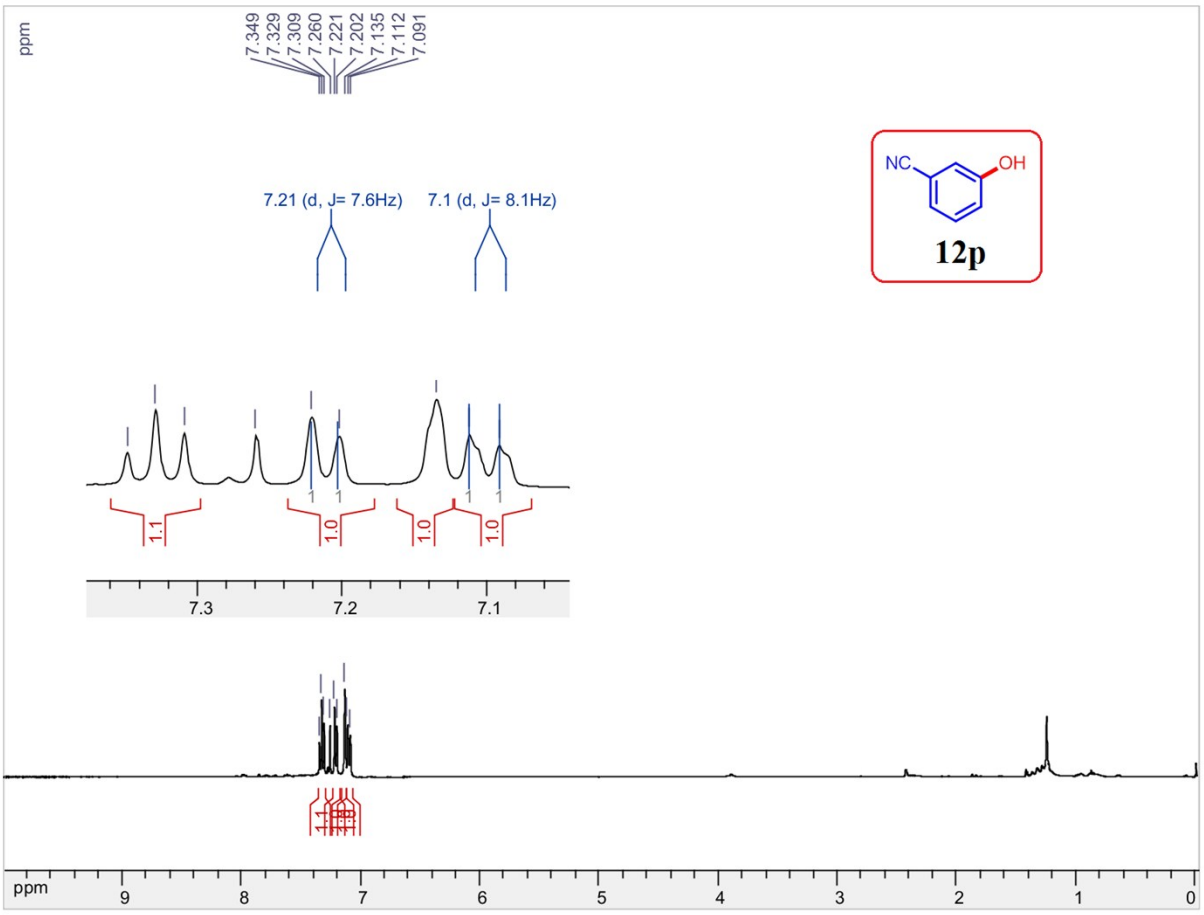

ppm
160.562
134.429
119.460
116.614
102.848
77.476
77.160
76.839
OH
NC
5p
ppm
180
160
140
120
100
80
60
40
20

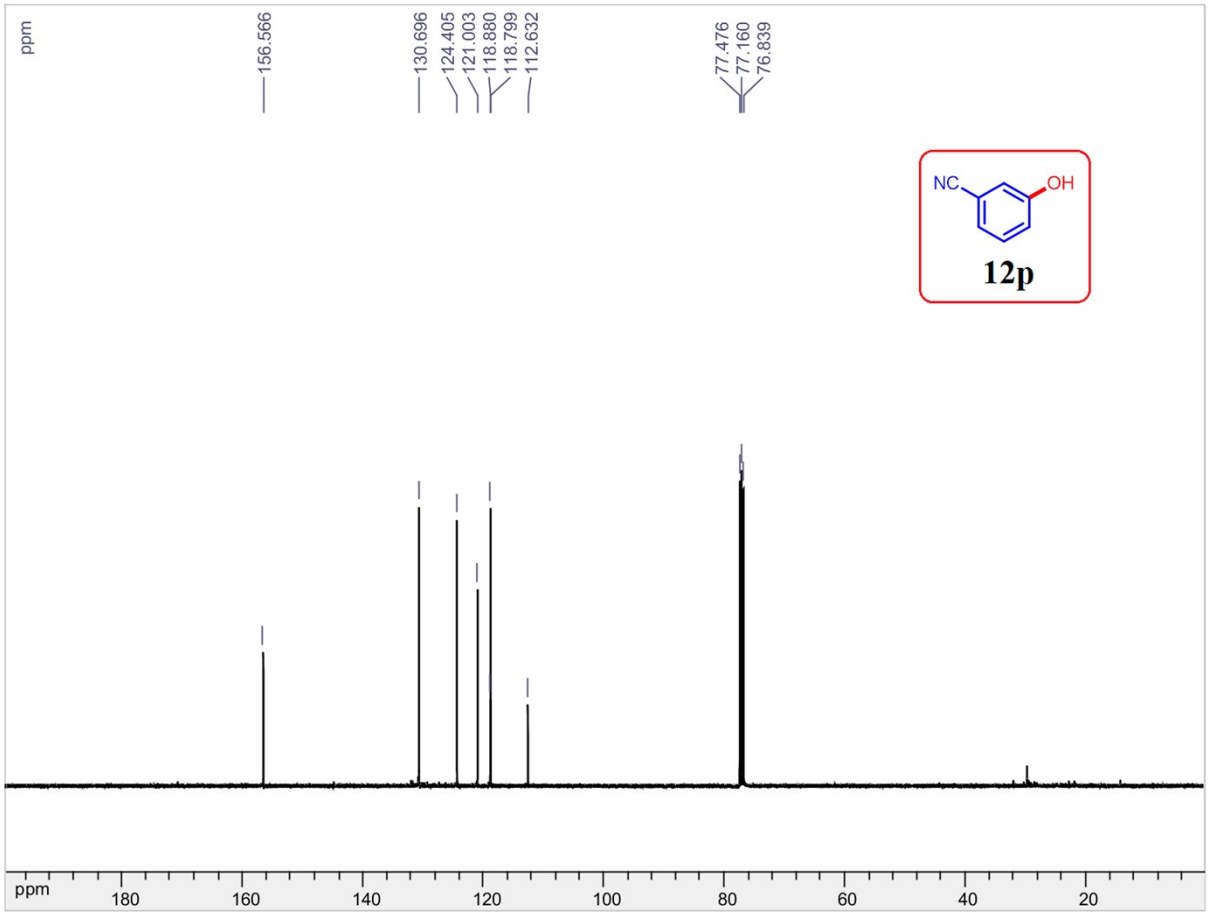

ppm
7.962
7.941
7.260
6.881
6.860
3.893
OH
MeOOC
6p
7.95 (d, J= 8.6Hz)
6.87 (d, J= 8.7Hz)
2.0
2.2
3.3
ppm
9
8
7
6
5
4
3
2
1

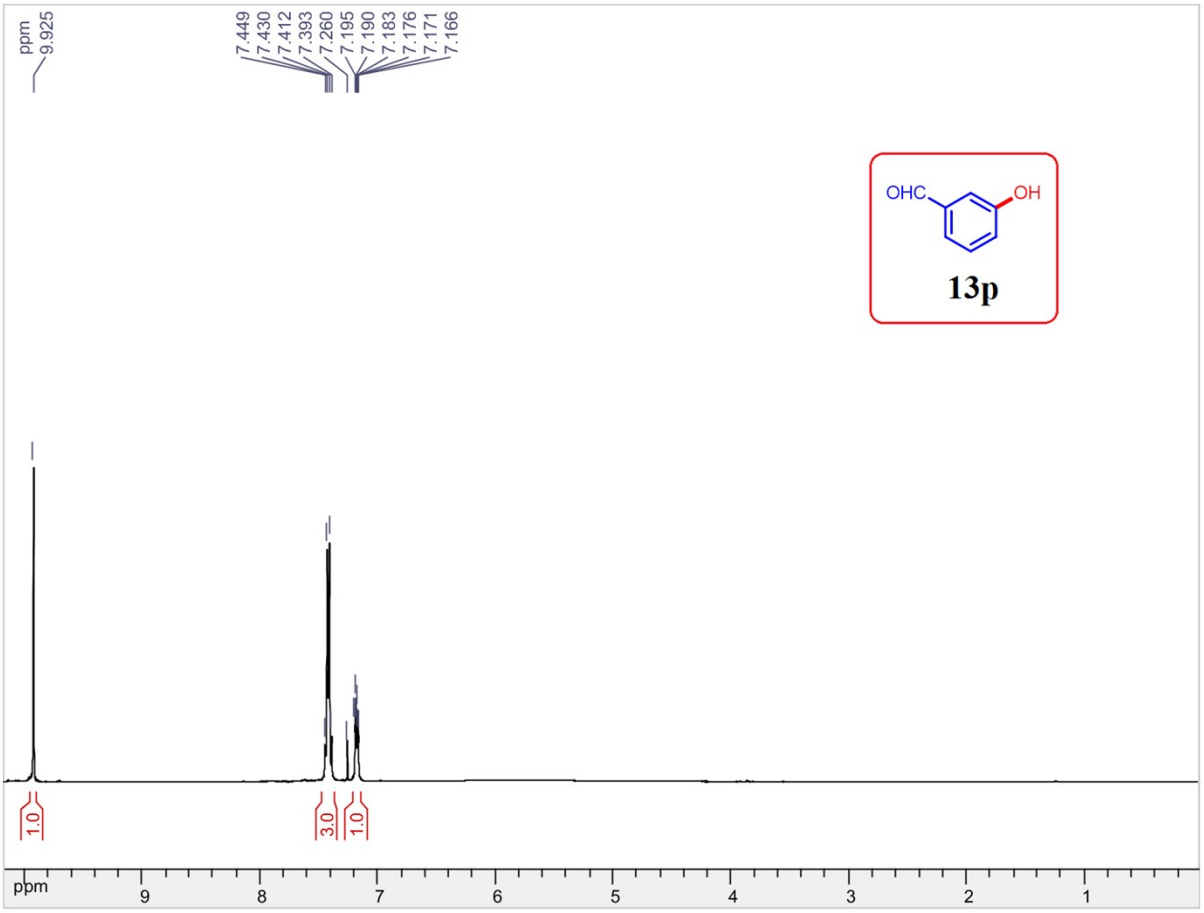

ppm
167.726
160.625
132.081
122.153
115.459
77.481
77.160
76.844
52.263
OH
MeOOC
6p
ppm
180
160
140
120
100
80
60
40
20

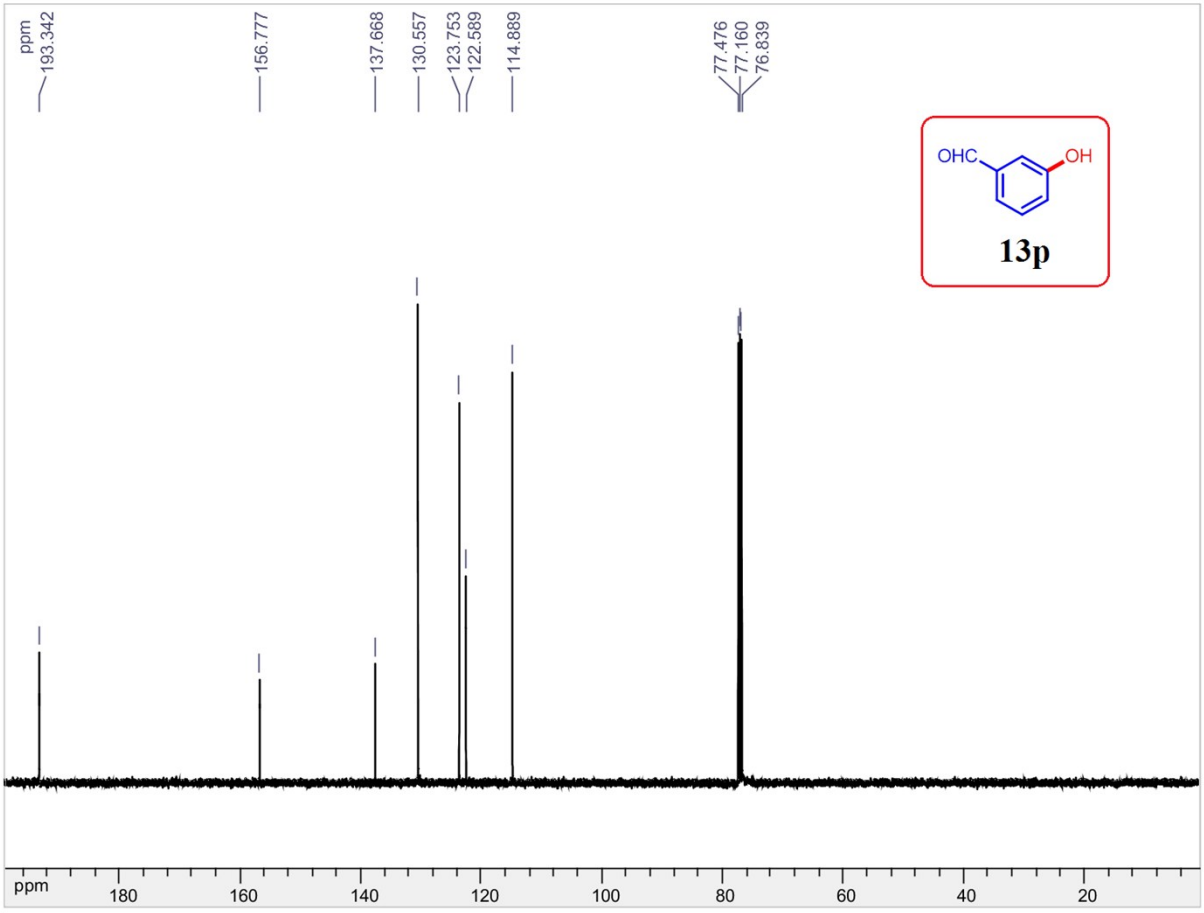

ppm
7.529
7.522
7.514
7.494
7.355
7.333
7.314
7.260
7.121
7.117
7.103
7.095
2.600
OH
11p
7.5 (d, J= 7.8Hz)
1.0
1.0
1.0
3.0
ppm
9
8
7
6
5
4
3
2
1

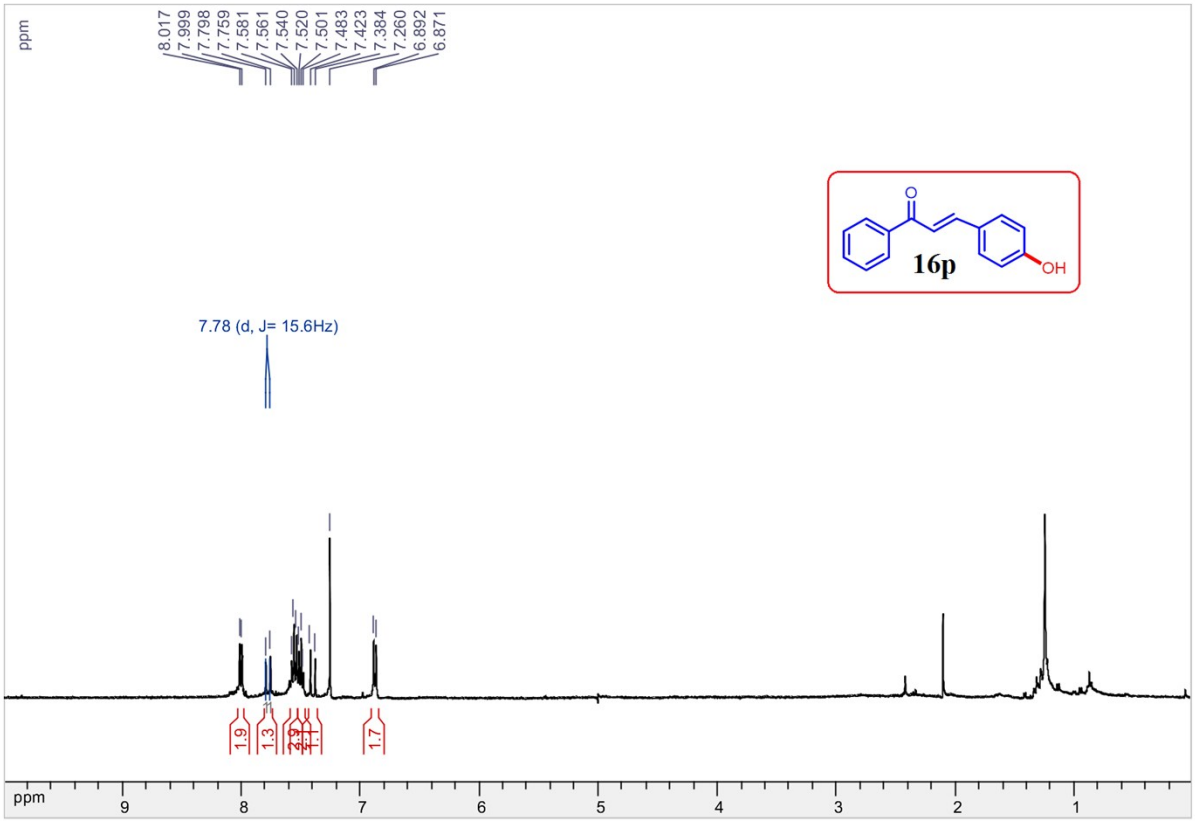

ppm
199.920
156.657
156.633
138.310
130.035
121.113
114.851
77.476
77.160
76.839
26.896
OH
11p
ppm
180
160
140
120
100
80
60
40
20
0

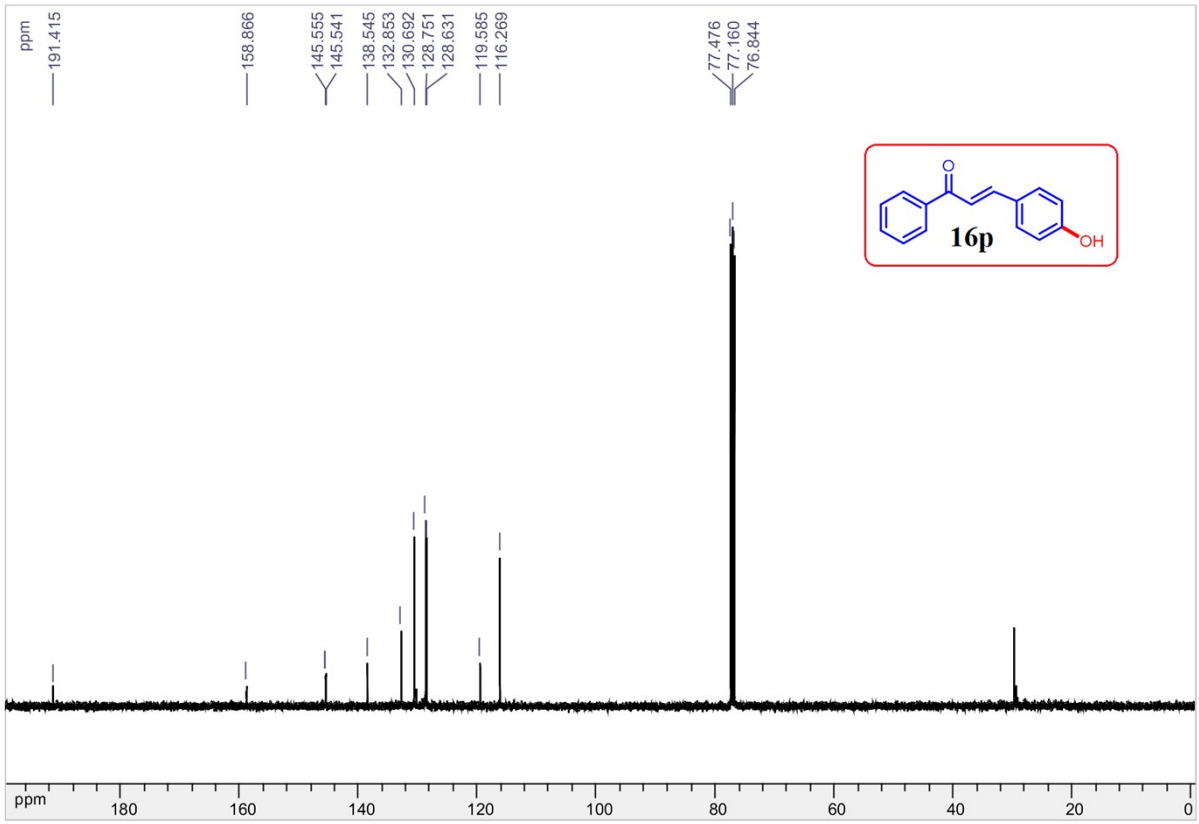

ppm
7.349
7.329
7.309
7.260
7.221
7.202
7.135
7.112
7.091
7.21 (d, J= 7.6Hz)
7.1 (d, J= 8.1Hz)
NC
OH
12p
1.1
1.0
1.0
1.0
7.3
7.2
7.1
ppm
9
8
7
6
5
4
3
2
1
0

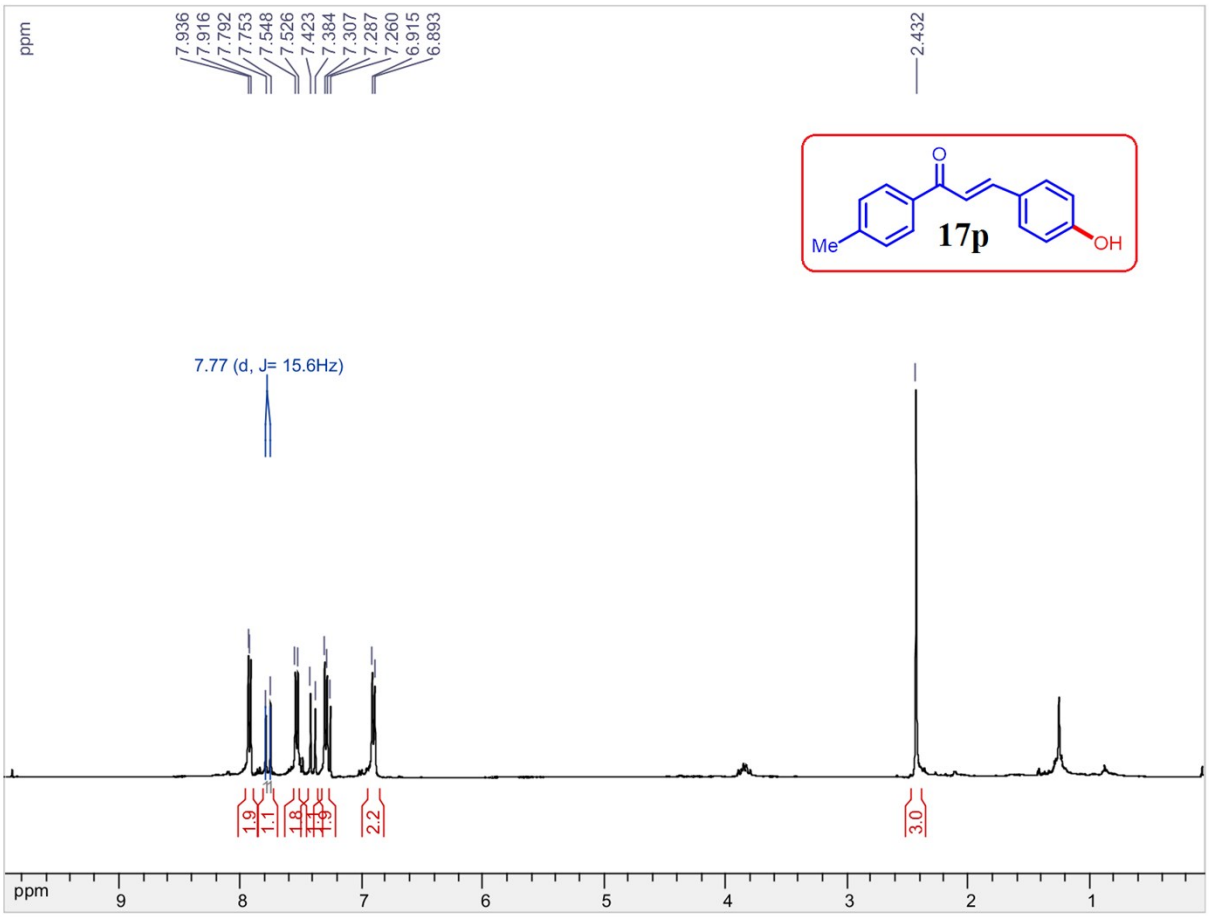

ppm
156.566
130.696
124.405
121.003
118.880
118.799
112.632
77.476
77.160
76.839
NC
OH
12p
ppm
180
160
140
120
100
80
60
40
20

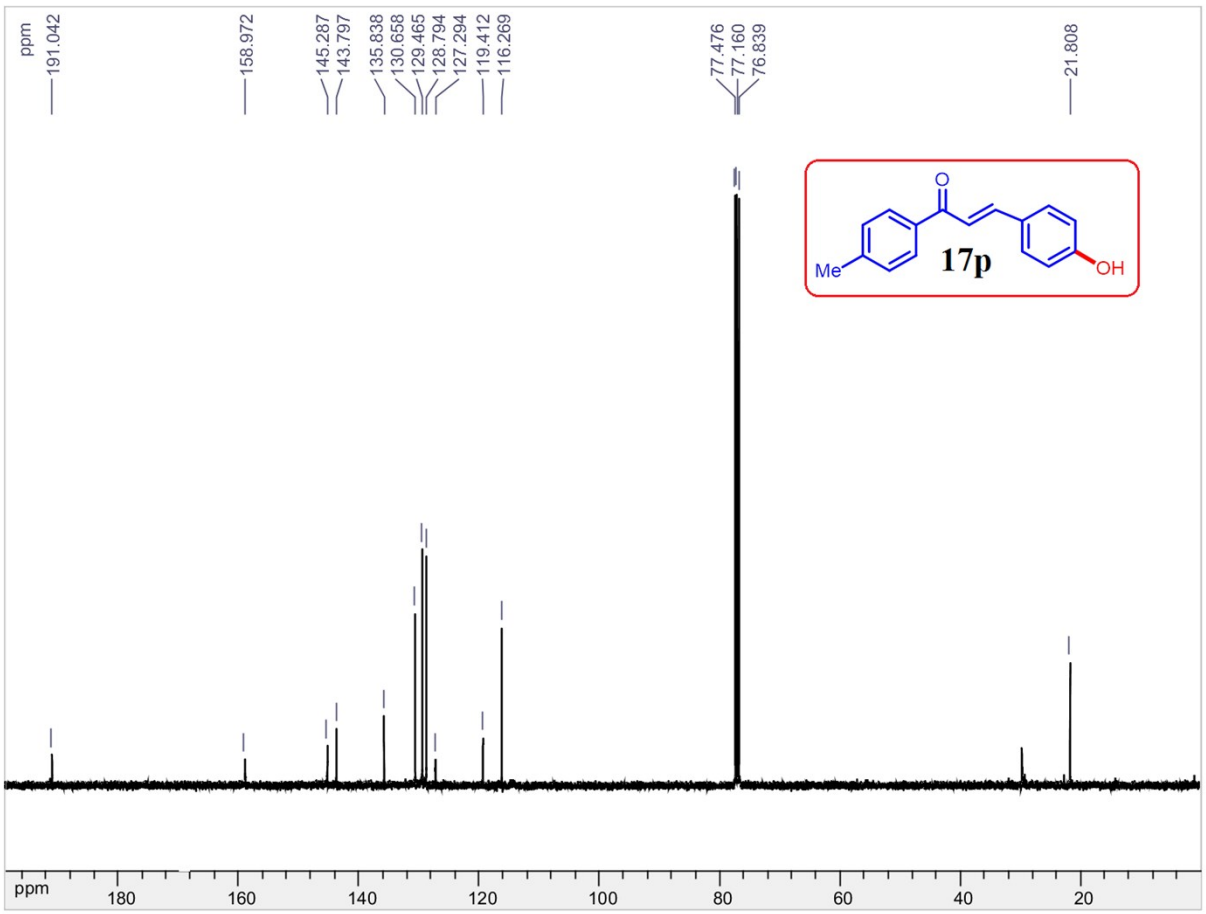

ppm
9.925
7.449
7.430
7.412
7.393
7.260
7.195
7.190
7.183
7.176
7.171
7.166
OHC
OH
13p
1.0
3.0
1.0
ppm
9
8
7
6
5
4
3
2
1

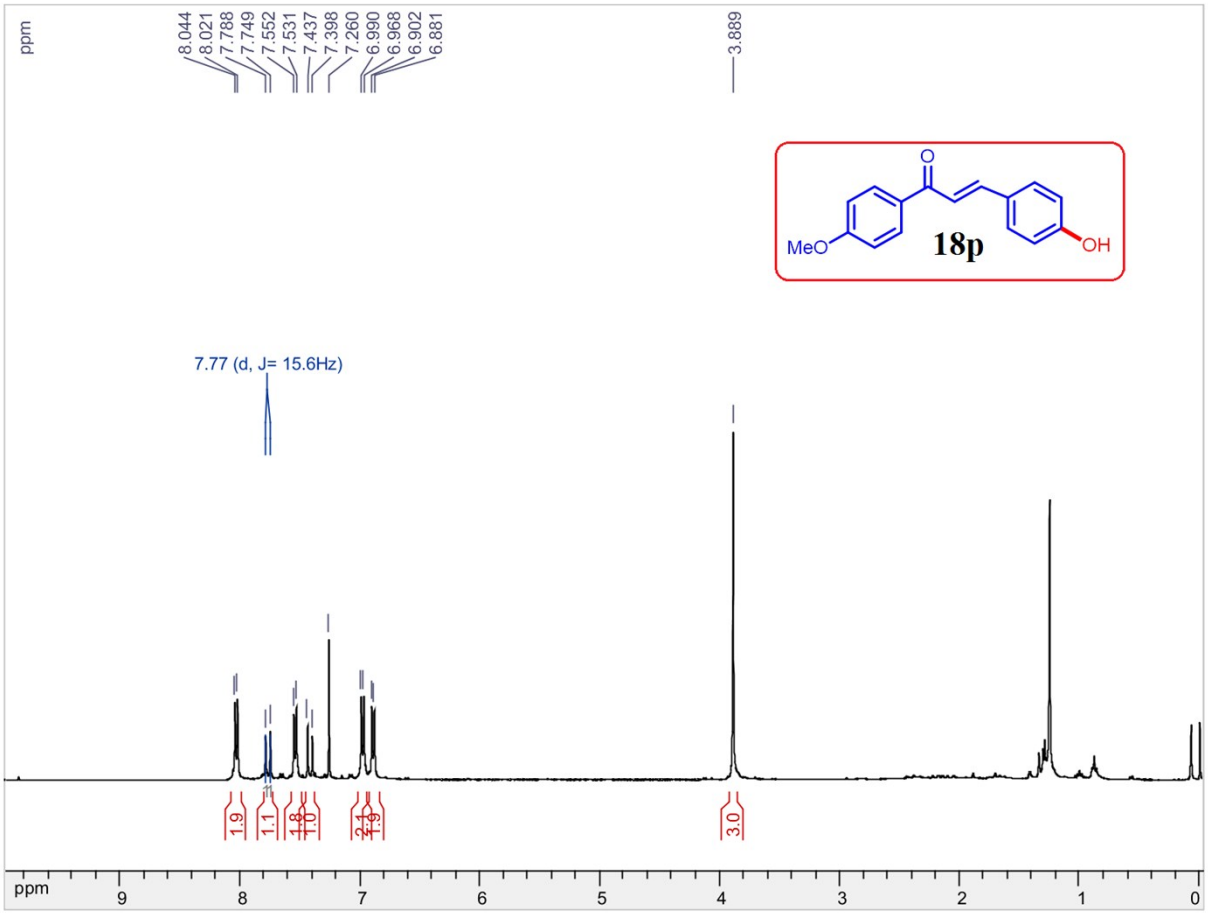

ppm
193.342
156.777
137.668
130.557
123.753
122.589
114.889
77.476
77.160
76.839
OHC
OH
13p
ppm
180
160
140
120
100
80
60
40
20

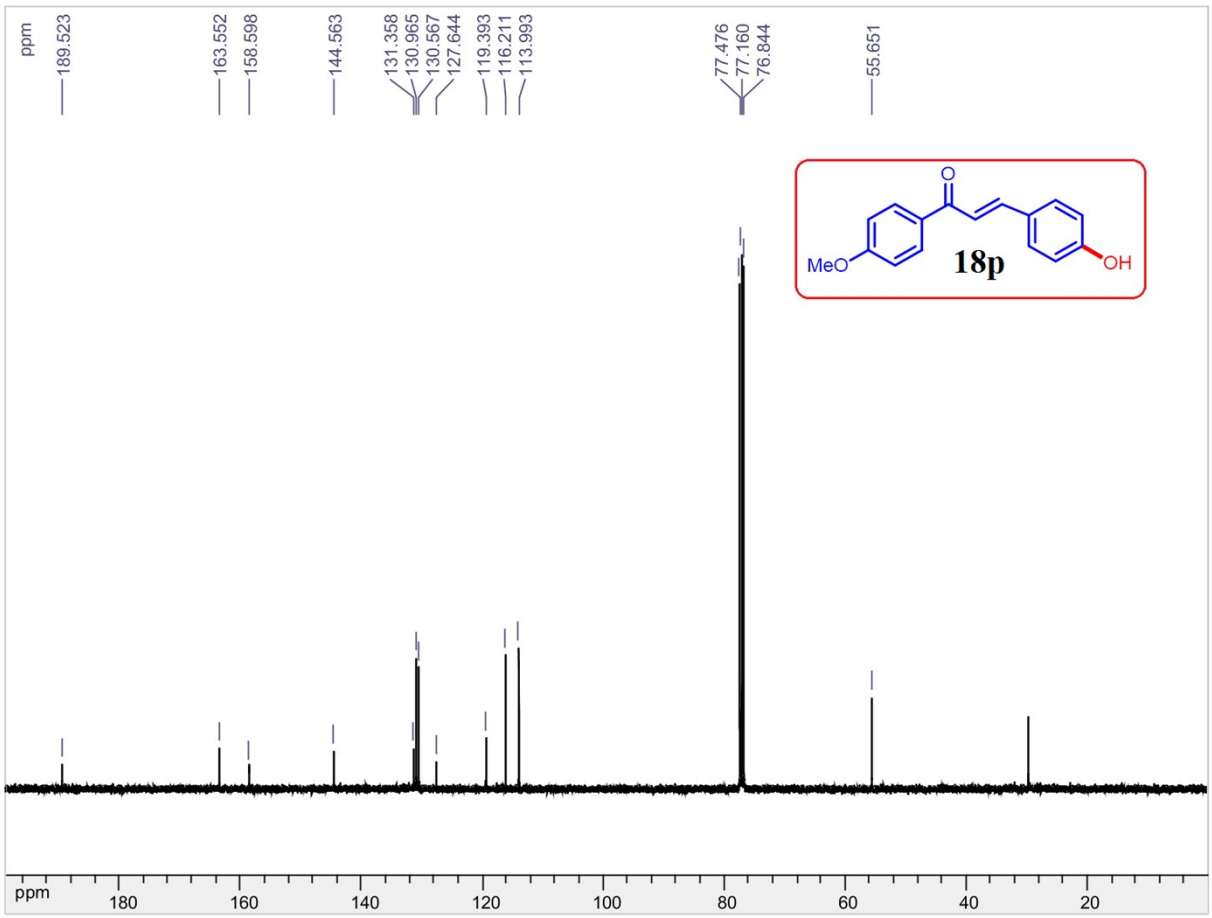

ppm
8.017
7.999
7.798
7.759
7.581
7.561
7.540
7.520
7.501
7.483
7.423
7.384
7.260
6.892
6.871
16p
OH
7.78 (d, J= 15.6Hz)
1.9
1.3
2.9
2.1
1.1
1.7
ppm
9
8
7
6
5
4
3
2
1

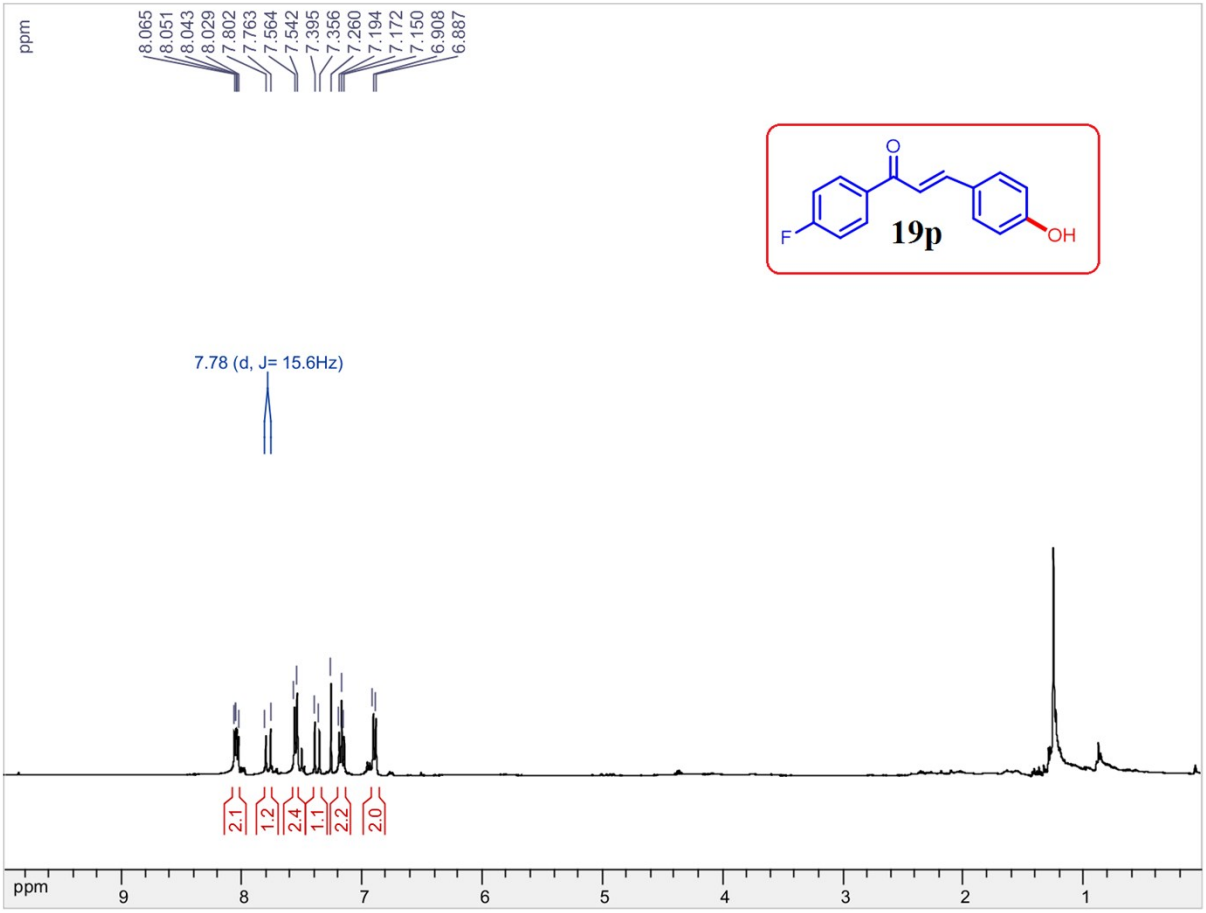

ppm
191.415
158.866
145.555
145.541
138.545
132.853
130.692
128.751
128.631
119.585
116.269
77.476
77.160
76.844
16p
OH
ppm
180
160
140
120
100
80
60
40
20
0

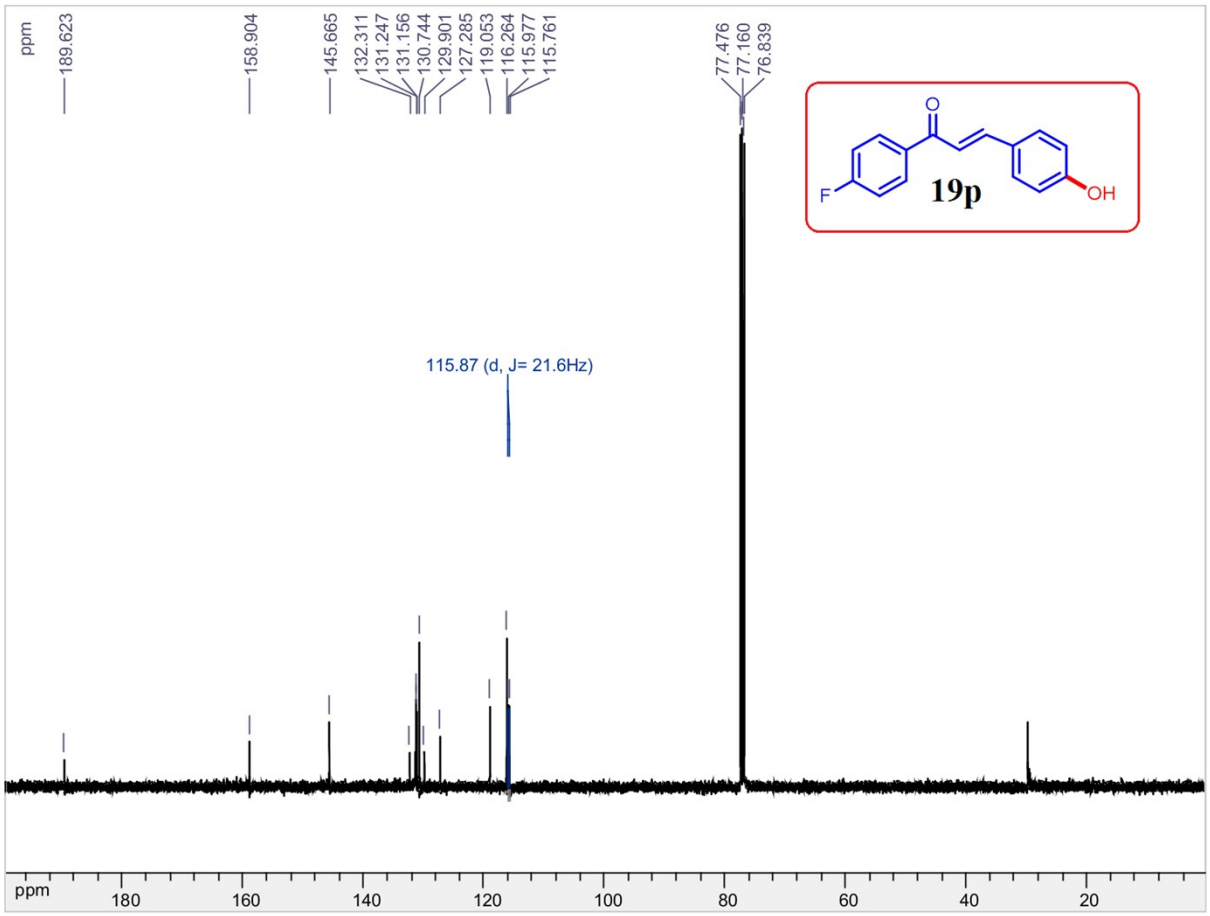

ppm
7.936
7.916
7.792
7.753
7.548
7.526
7.423
7.384
7.307
7.287
7.260
6.915
6.893
2.432
Me
17p
OH
7.77 (d, J= 15.6Hz)
1.9
1.1
1.8
1.9
2.2
3.0
ppm
9
8
7
6
5
4
3
2
1

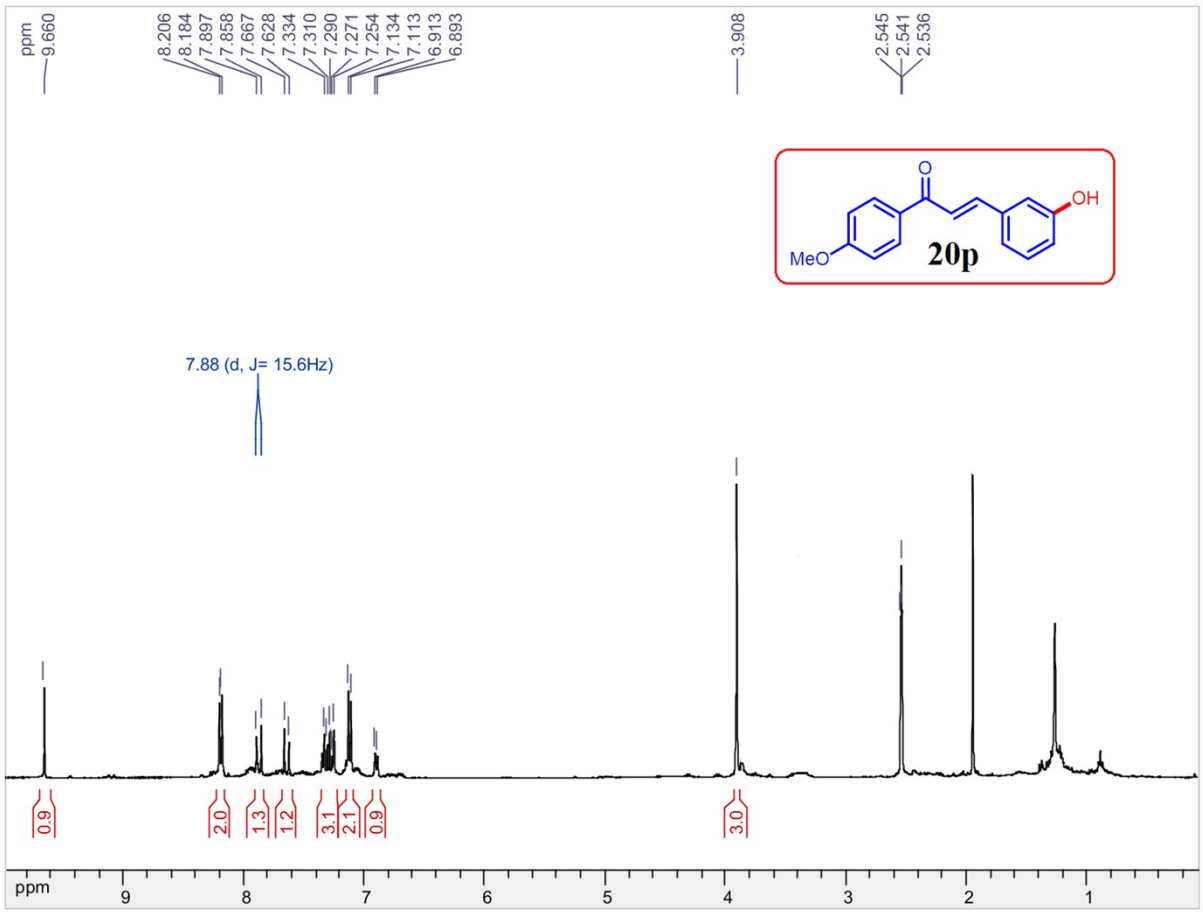

ppm
191.042
158.972
145.287
143.797
135.838
130.658
129.465
128.794
127.294
119.412
116.269
77.476
77.160
76.839
21.808
Me
17p
OH
ppm
180
160
140
120
100
80
60
40
20

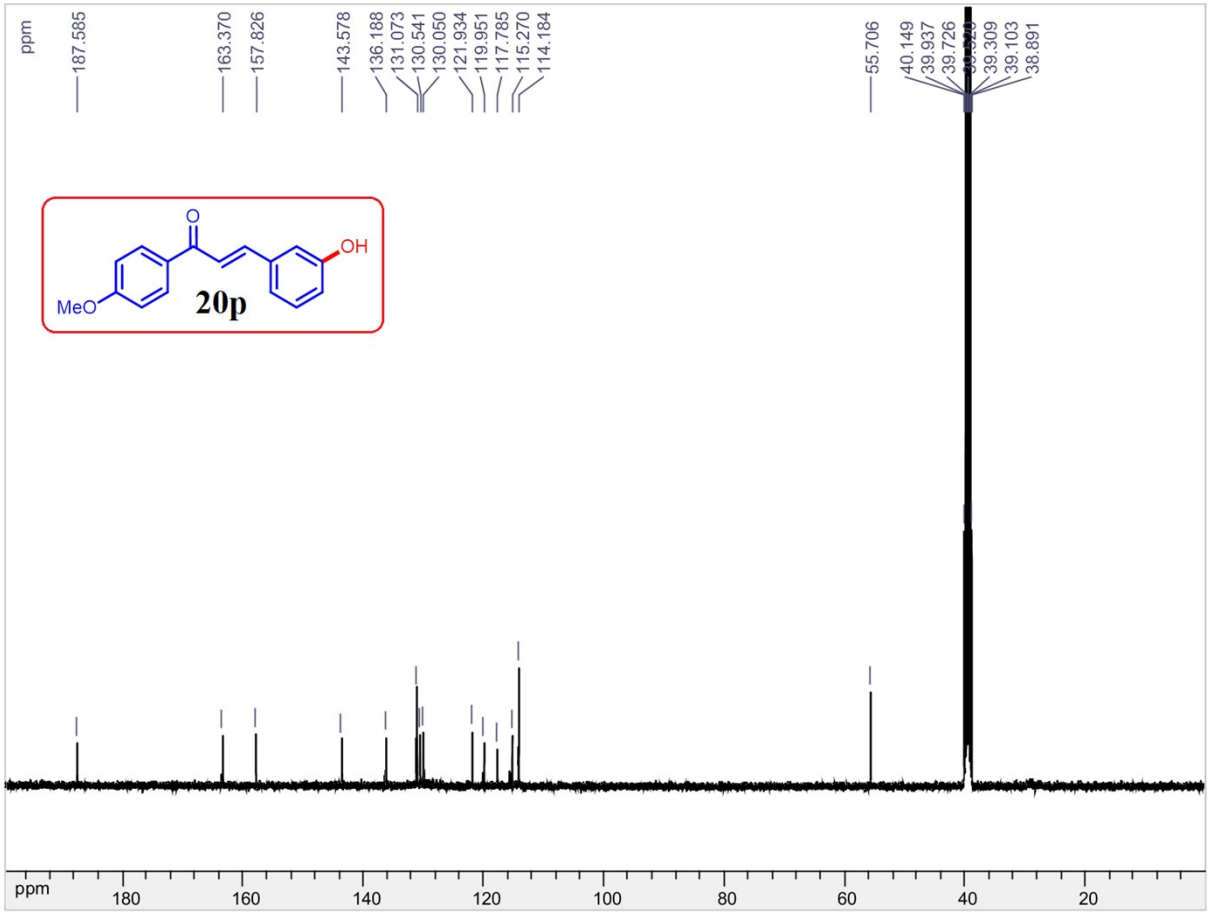

ppm
8.044
8.021
7.788
7.749
7.552
7.531
7.437
7.398
7.260
6.990
6.968
6.902
6.881
3.889
MeO
18p
OH
7.77 (d, J= 15.6Hz)
1.9
1.1
1.8
1.0
2.1
1.9
3.0
ppm
9
8
7
6
5
4
3
2
1
0

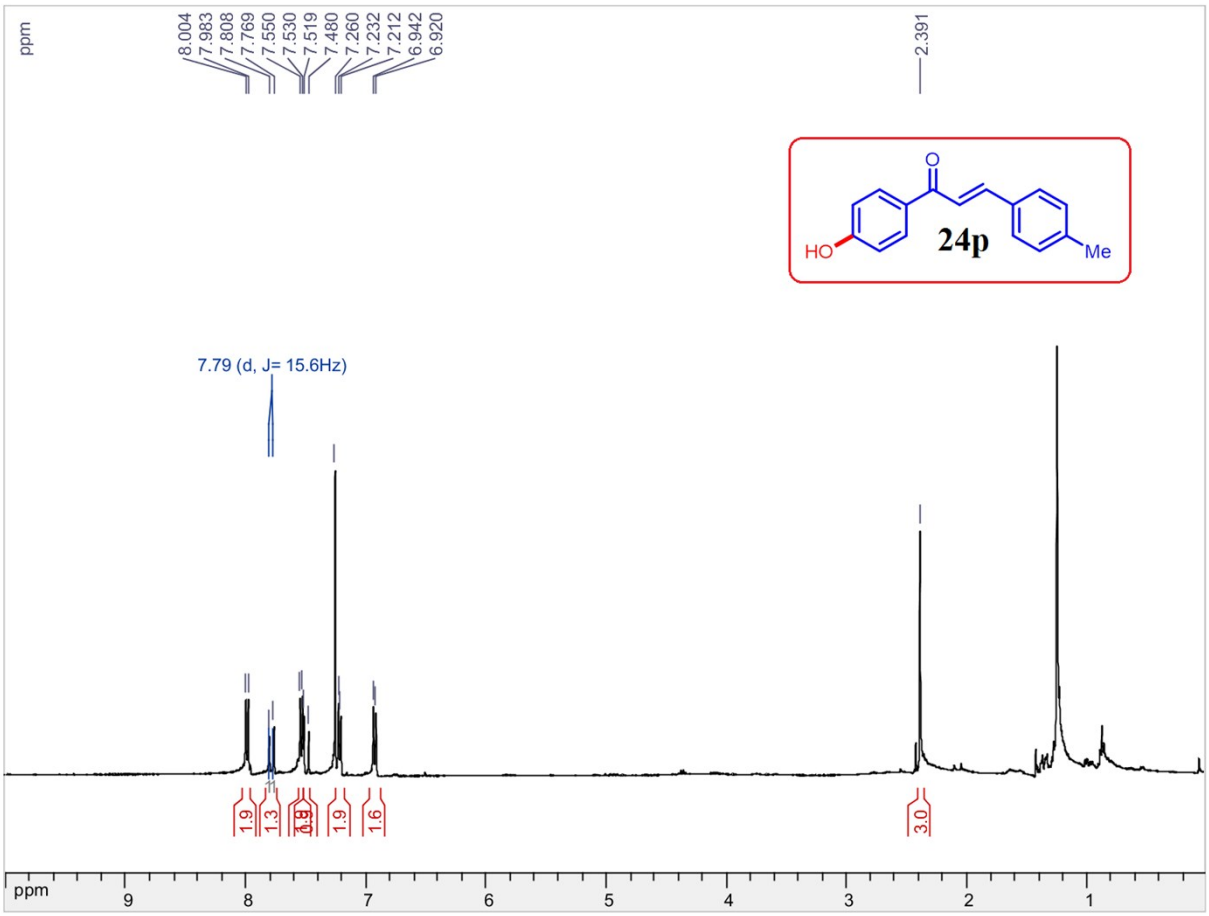

ppm
189.523
163.552
158.598
144.563
131.358
130.965
130.567
127.644
119.393
116.211
113.993
77.476
77.160
76.844
55.651
MeO
18p
OH
ppm
180
160
140
120
100
80
60
40
20

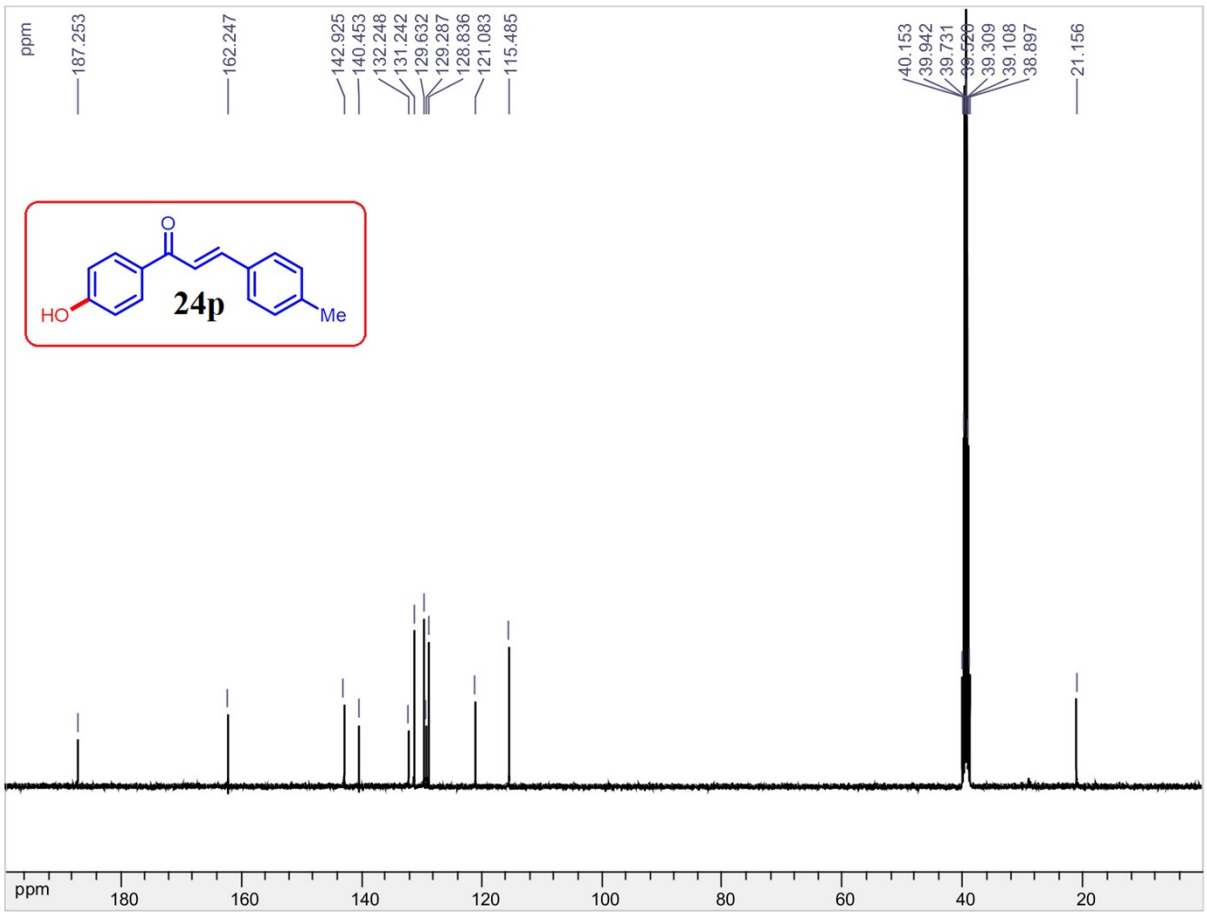

ppm
8.065
8.051
8.043
8.029
7.802
7.763
7.564
7.542
7.395
7.356
7.260
7.194
7.172
7.150
6.908
6.887
19p
7.78 (d, J= 15.6Hz)
2.1
1.2
2.4
1.1
2.2
2.0
ppm
9
8
7
6
5
4
3
2
1

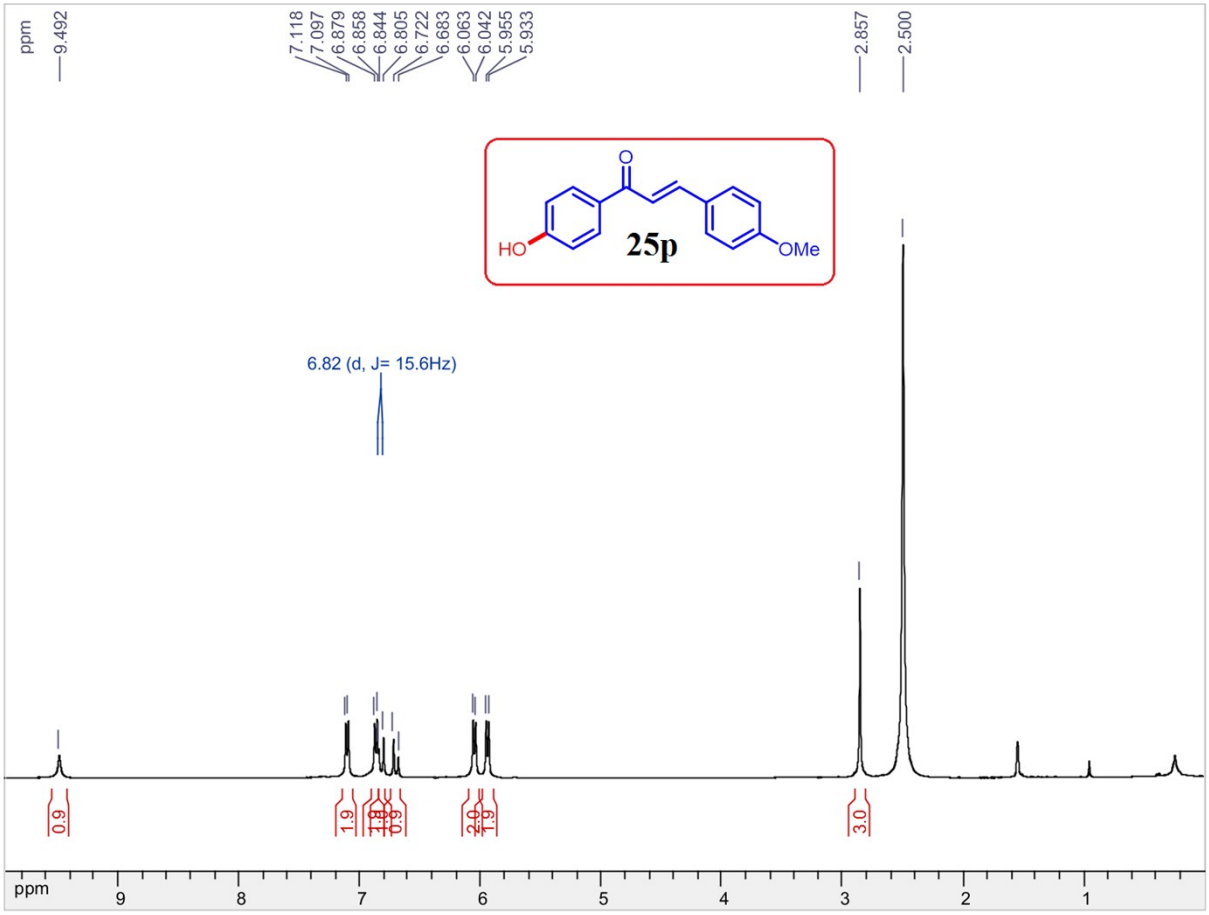

ppm
189.623
158.904
145.665
132.311
131.247
131.156
130.744
129.901
127.285
119.053
116.264
115.977
115.761
77.476
77.160
76.839
19p
115.87 (d, J= 21.6Hz)
ppm
180
160
140
120
100
80
60
40
20

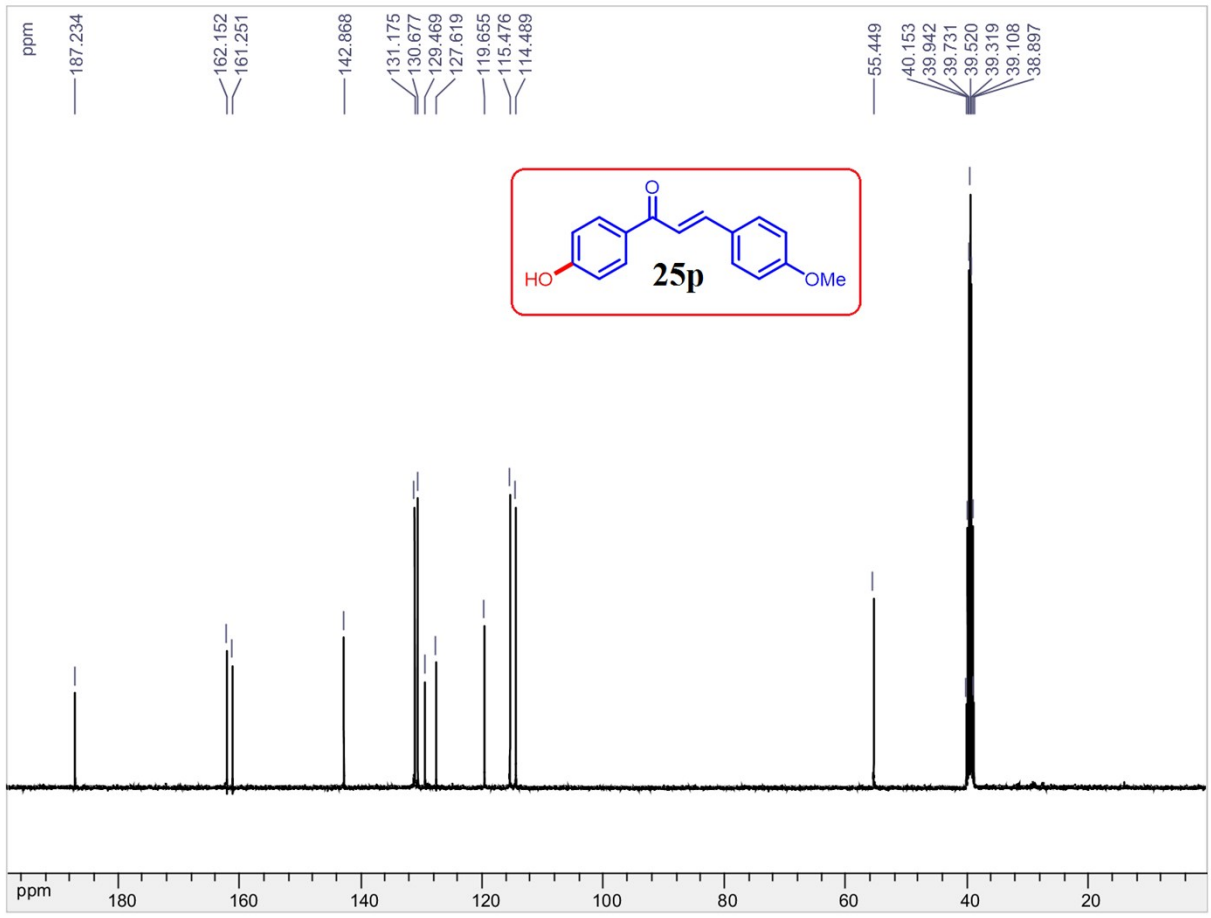

ppm
9.660
8.206
8.184
7.897
7.858
7.667
7.628
7.334
7.310
7.290
7.271
7.254
7.134
7.113
6.913
6.893
3.908
2.545
2.541
2.536
MeO
OH
20p
7.88 (d, J= 15.6Hz)
0.9
2.0
1.3
1.2
3.1
2.1
0.9
3.0
ppm
9
8
7
6
5
4
3
2
1

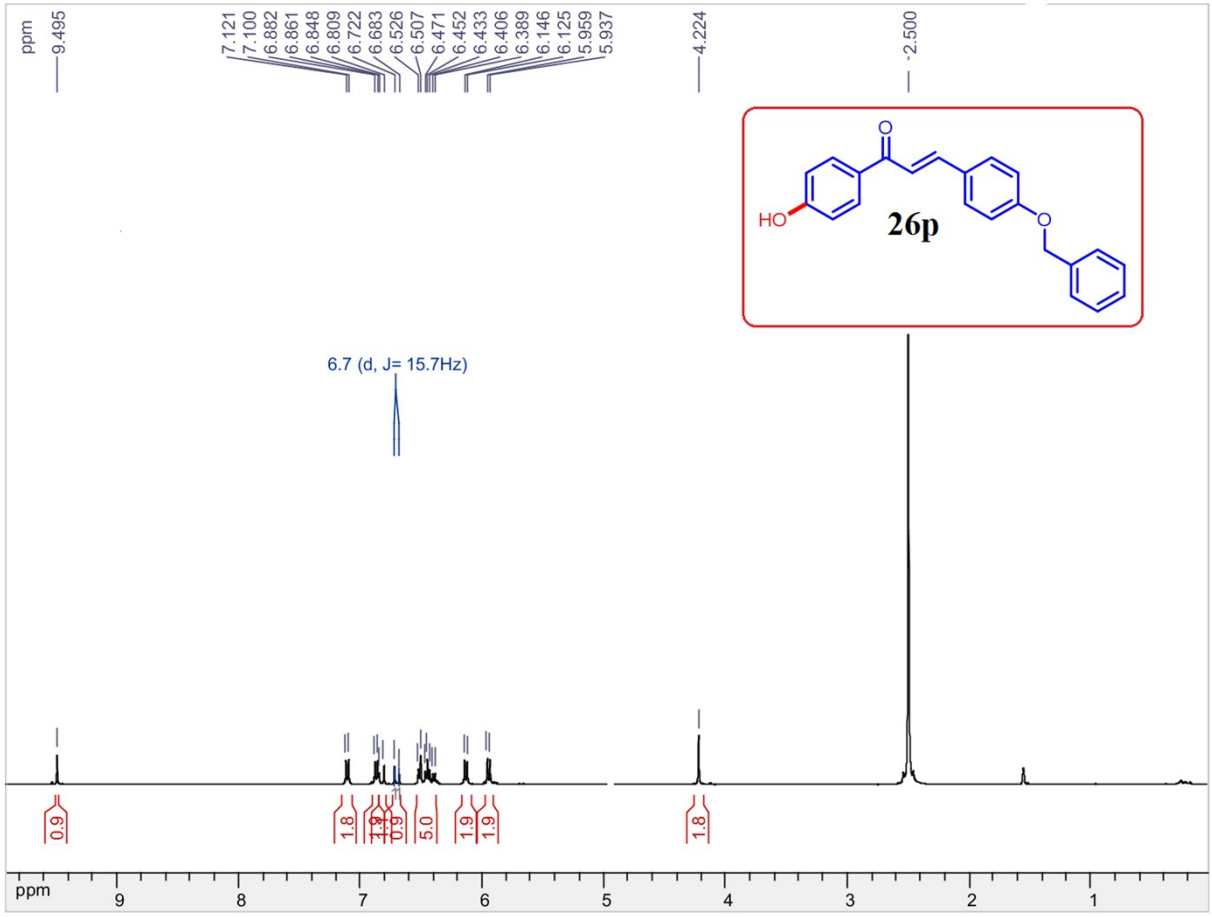

ppm
187.585
163.370
157.826
143.578
136.188
131.073
130.541
130.050
121.934
119.951
117.785
115.270
114.184
55.706
40.149
39.937
39.726
39.309
39.103
38.891
MeO
OH
20p
ppm
180
160
140
120
100
80
60
40
20

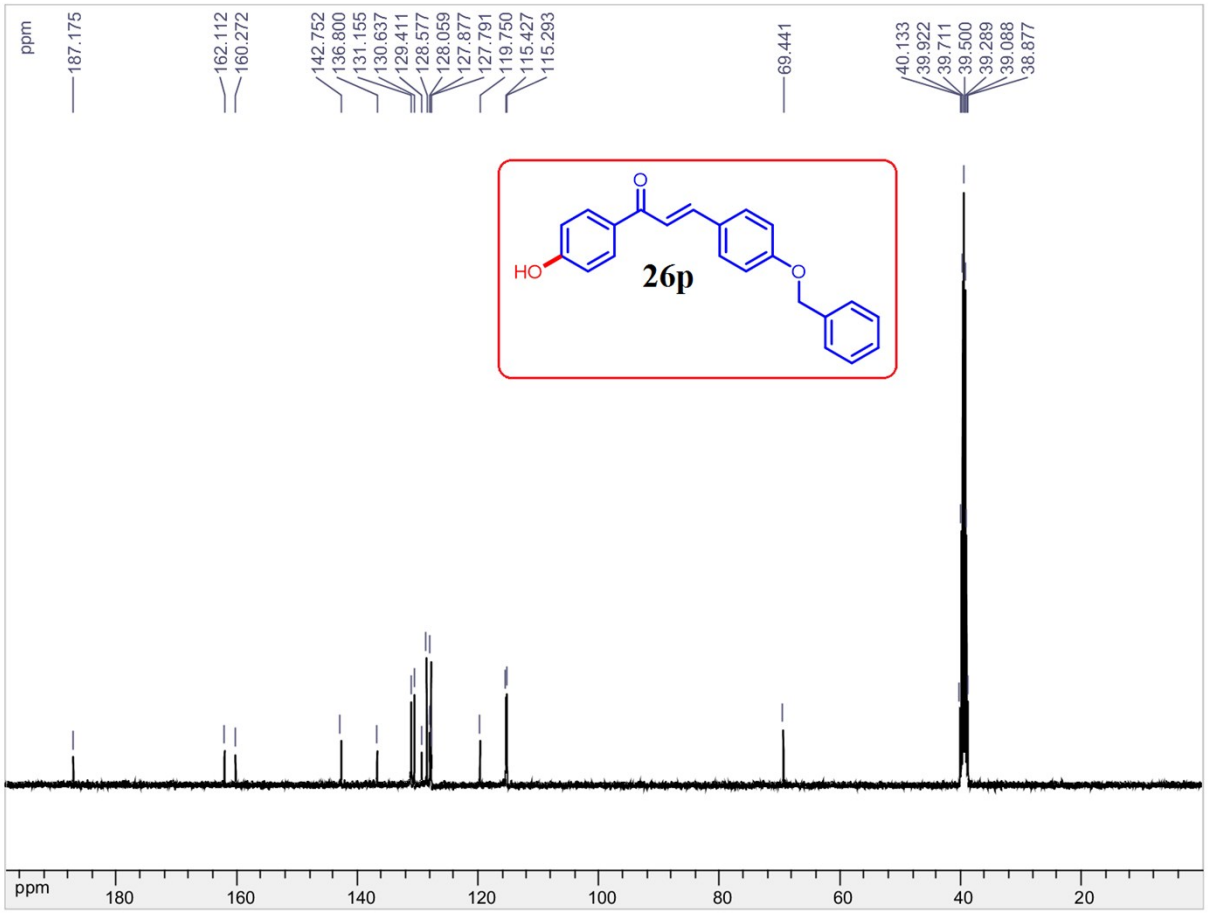

ppm
8.004
7.983
7.808
7.769
7.550
7.530
7.519
7.480
7.260
7.232
7.212
6.942
6.920
2.391
HO
24p
Me
7.79 (d, J= 15.6Hz)
1.9
1.3
1.9
1.6
3.0
ppm
9
8
7
6
5
4
3
2
1

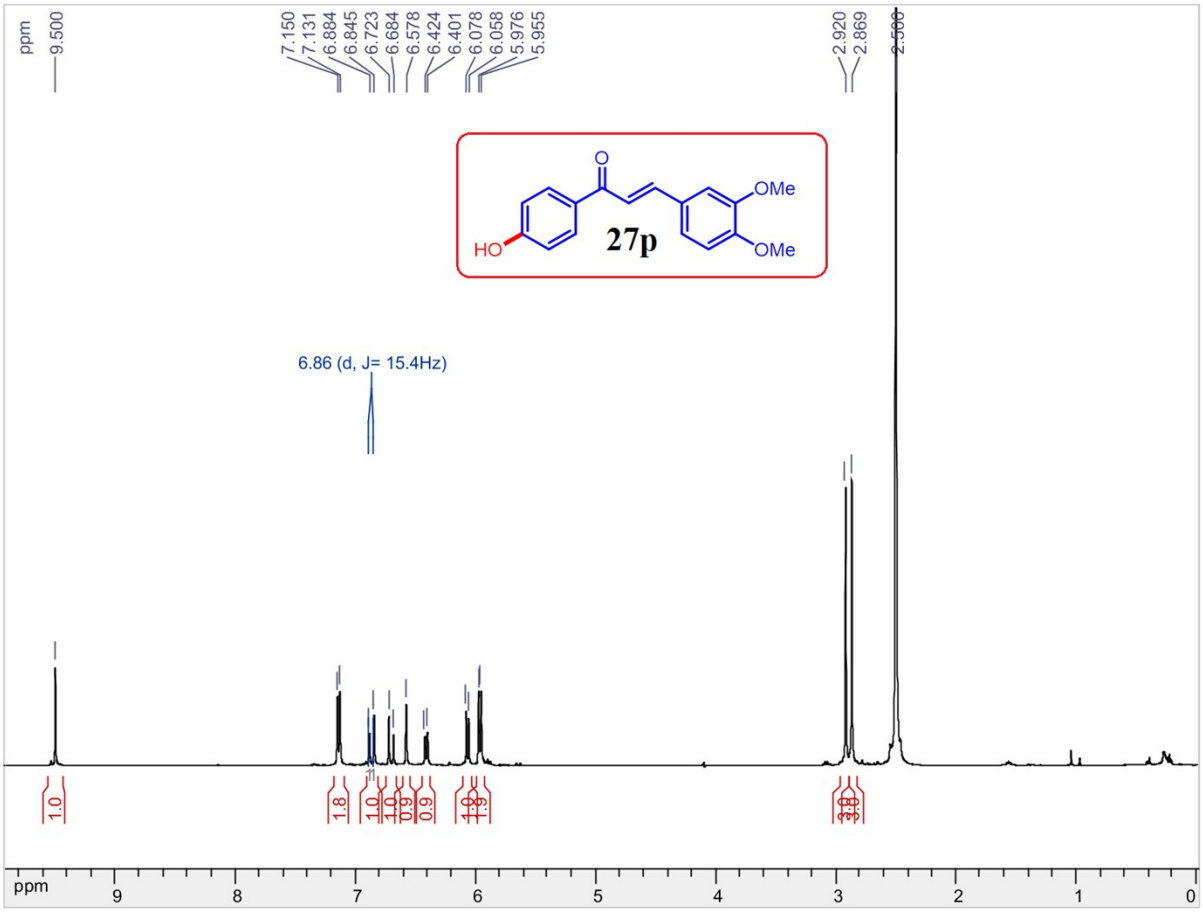

ppm
187.253
162.247
142.925
140.453
132.248
131.242
129.632
129.287
128.836
121.083
115.485
40.153
39.942
39.731
39.520
39.309
39.108
38.897
21.156
HO
24p
Me
ppm
180
160
140
120
100
80
60
40
20

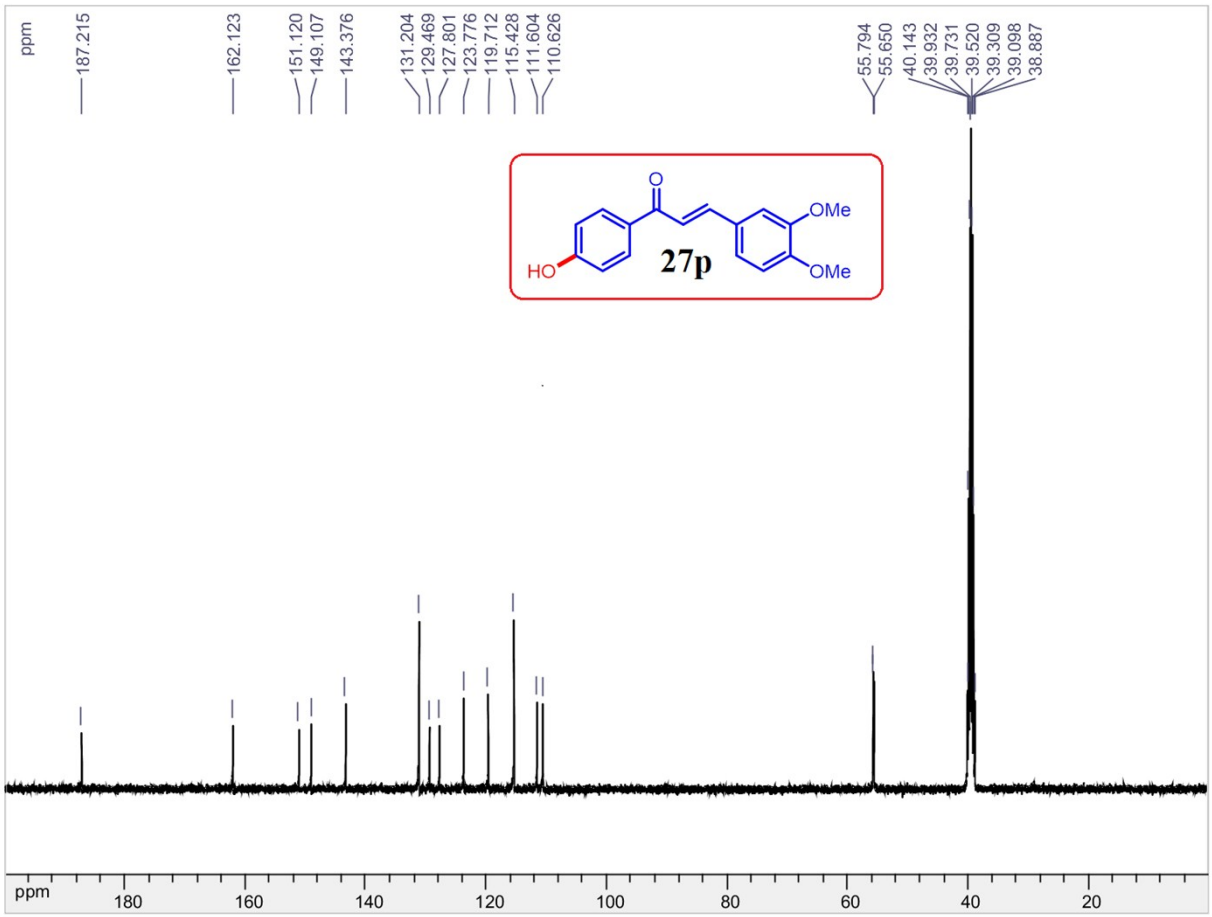

ppm
9.492
7.118
7.097
6.879
6.858
6.844
6.805
6.722
6.683
6.063
6.042
5.955
5.933
2.857
2.500
HO
25p
OMe
6.82 (d, J= 15.6Hz)
0.9
1.9
1.8
1.9
2.0
1.9
3.0
ppm
9
8
7
6
5
4
3
2
1

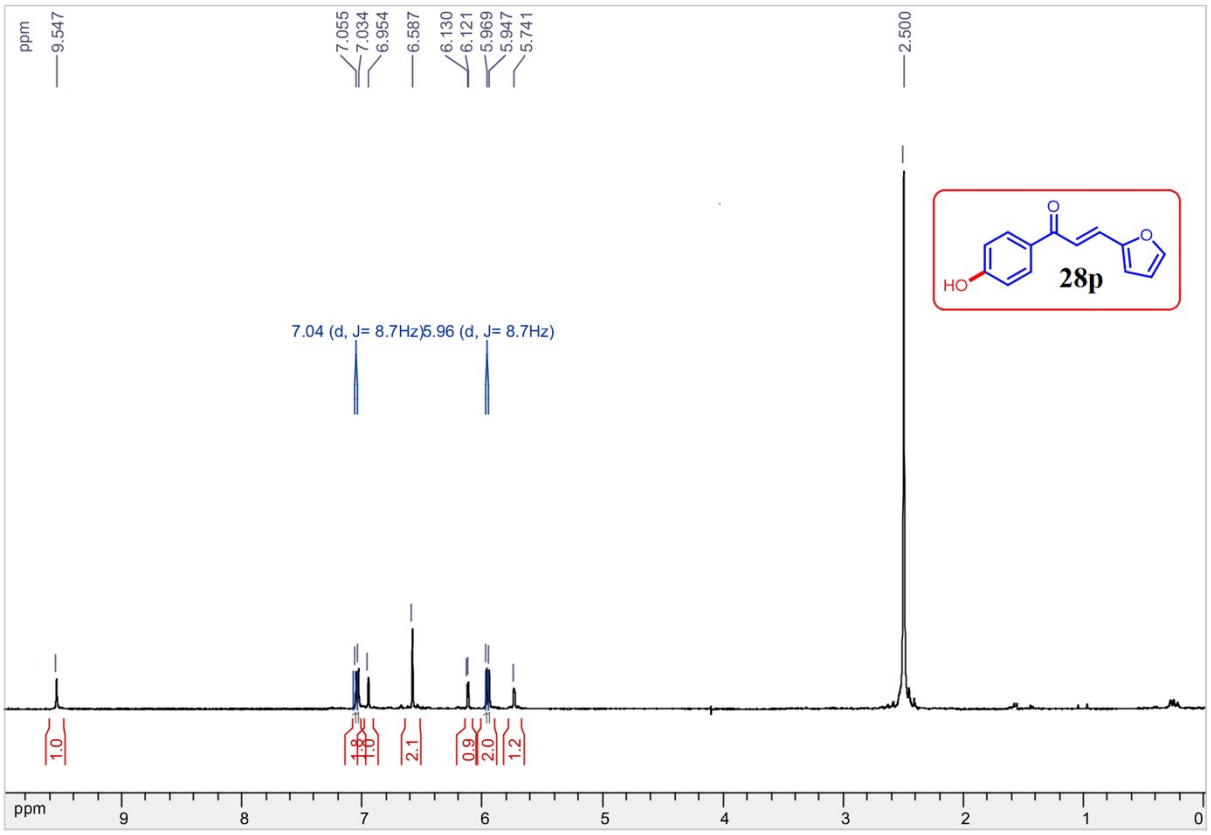

ppm
187.234
162.152
161.251
142.868
131.175
130.677
129.469
127.619
119.655
115.476
114.489
55.449
40.153
39.942
39.731
39.520
39.319
39.108
38.897
HO
25p
OMe
ppm
180
160
140
120
100
80
60
40
20

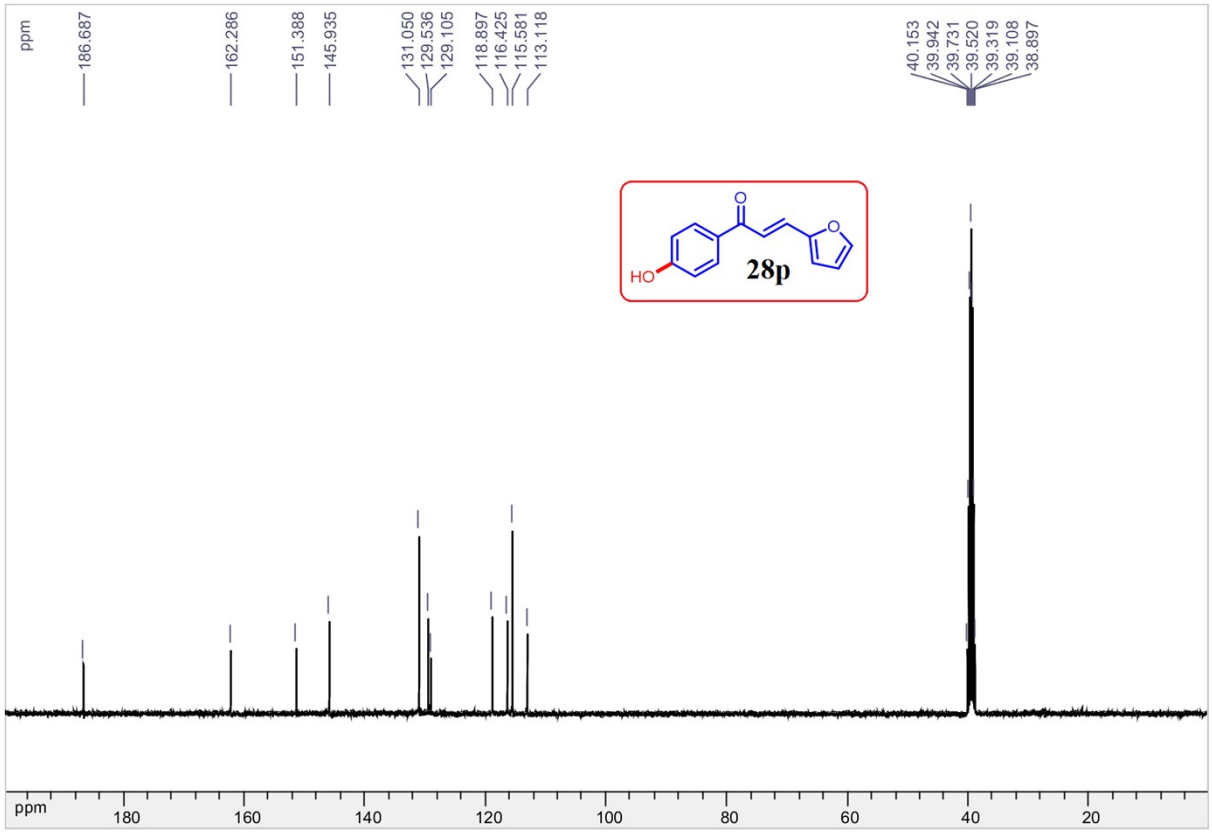

ppm
9.495
7.121
7.100
6.882
6.861
6.848
6.809
6.722
6.683
6.526
6.507
6.471
6.452
6.433
6.406
6.389
6.146
6.125
5.959
5.937
4.224
2.500
HO
O
O
26p
6.7 (d, J= 15.7Hz)
0.9
1.8
1.8
0.9
5.0
1.9
1.9
1.8
ppm
9
8
7
6
5
4
3
2
1

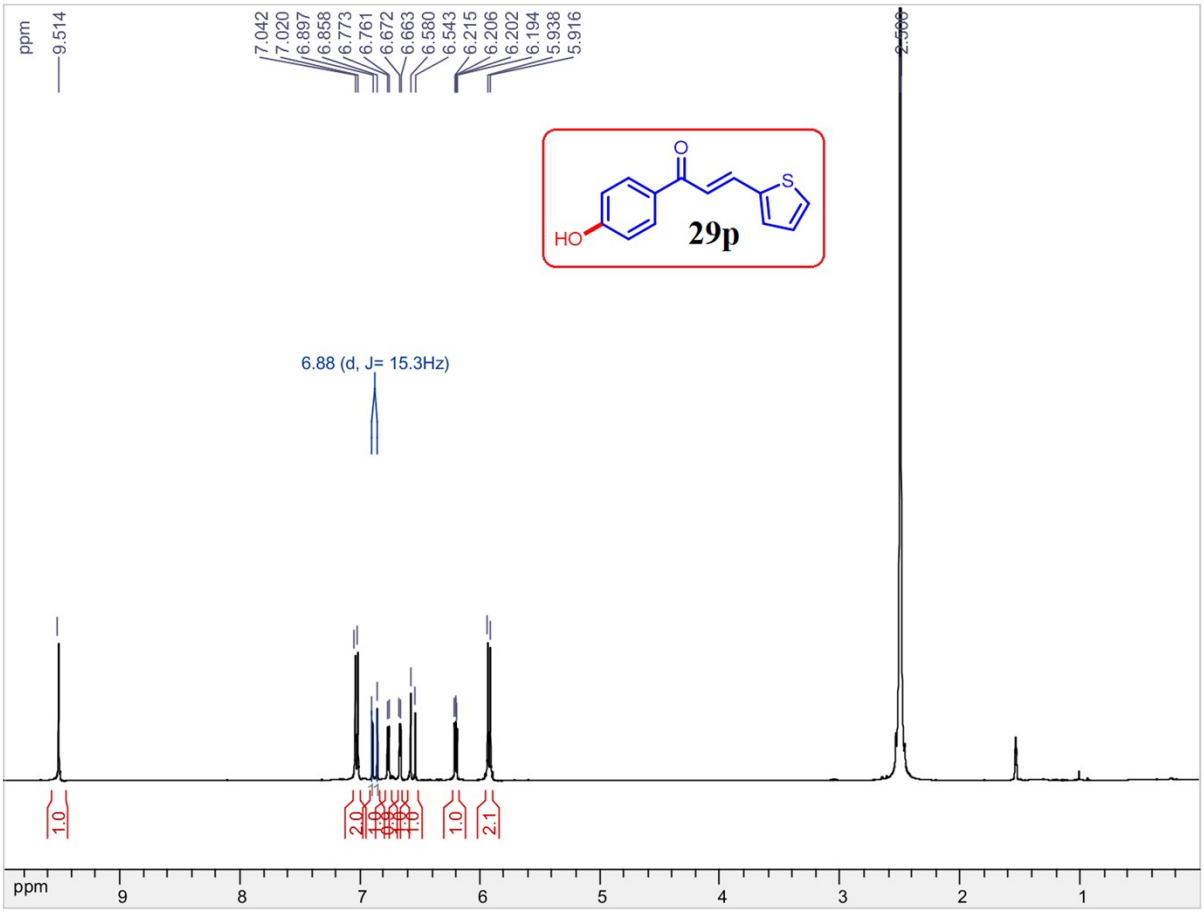

ppm
187.175
162.112
160.272
142.752
136.800
131.155
130.637
129.411
128.577
128.059
127.877
127.791
119.750
115.427
115.293
69.441
40.133
39.922
39.711
39.500
39.289
39.088
38.877
HO
O
O
26p
ppm
180
160
140
120
100
80
60
40
20

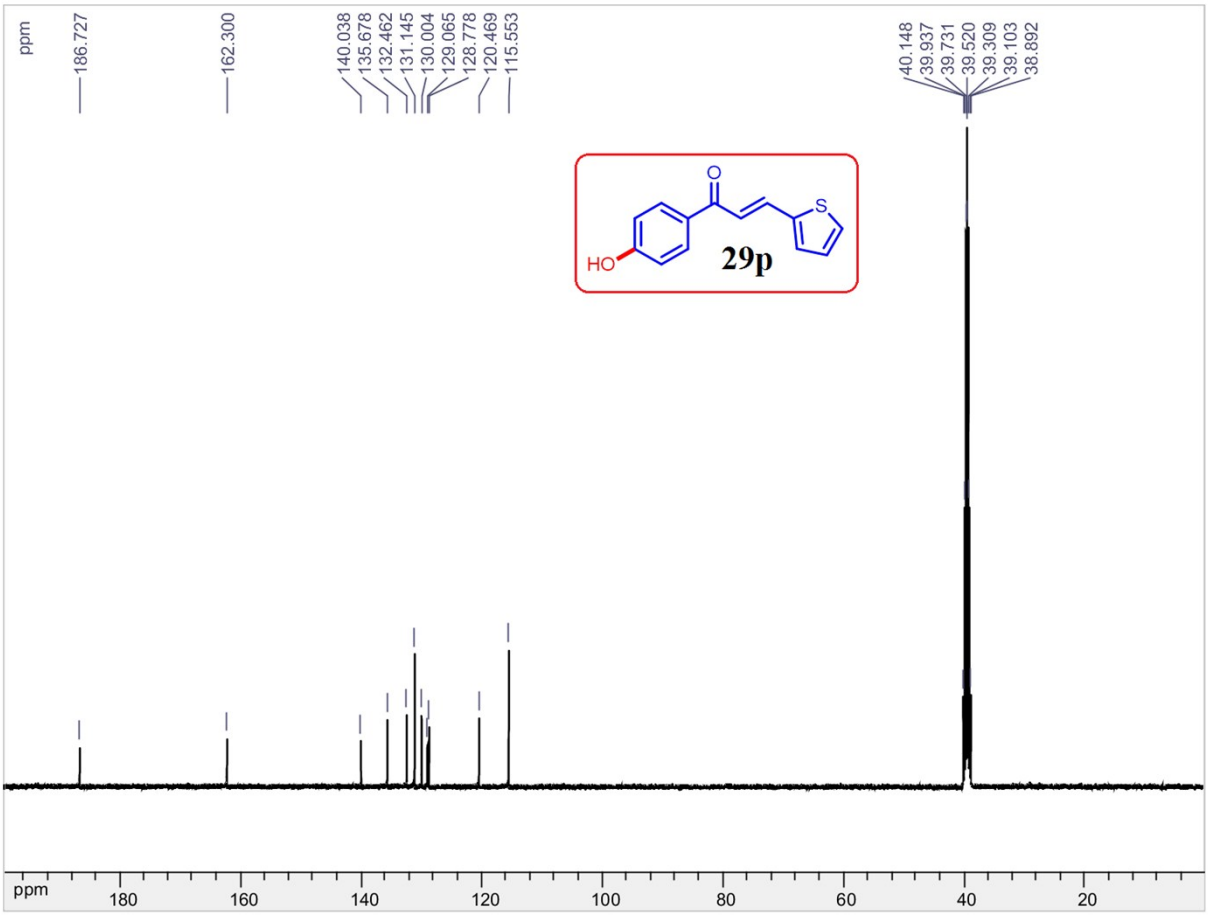

ppm
9.500
7.150
7.131
6.884
6.845
6.723
6.684
6.578
6.424
6.401
6.078
6.058
5.976
5.955
2.920
2.869
2.500
HO
OMe
OMe
27p
6.86 (d, J= 15.4Hz)
1.0
1.8
1.0
1.0
0.9
0.9
1.9
1.9
3.0
3.0
ppm
9
8
7
6
5
4
3
2
1
0

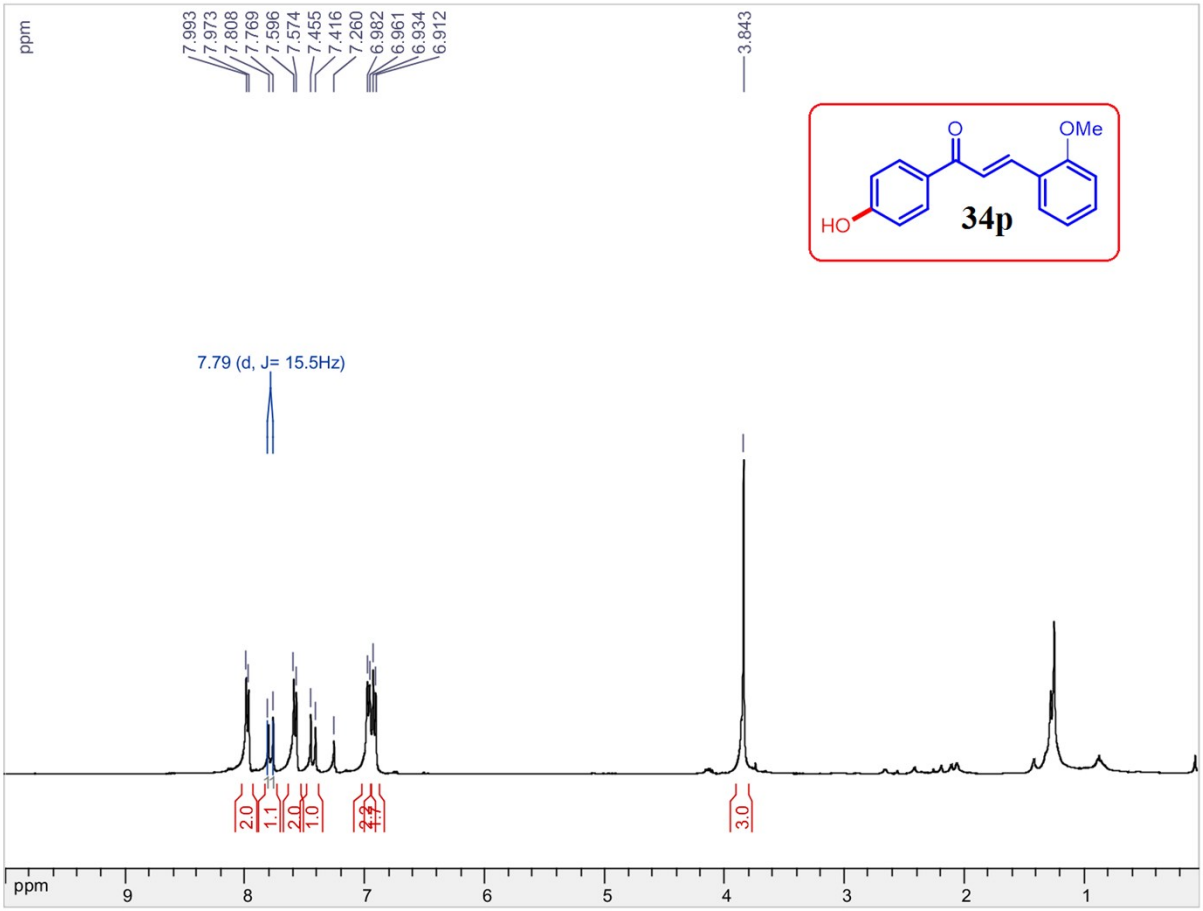

ppm
187.215
162.123
151.120
149.107
143.376
131.204
129.469
127.801
123.776
119.712
115.428
111.604
110.626
55.794
55.650
40.143
39.932
39.731
39.520
39.309
39.098
38.887
HO
OMe
OMe
27p
ppm
180
160
140
120
100
80
60
40
20

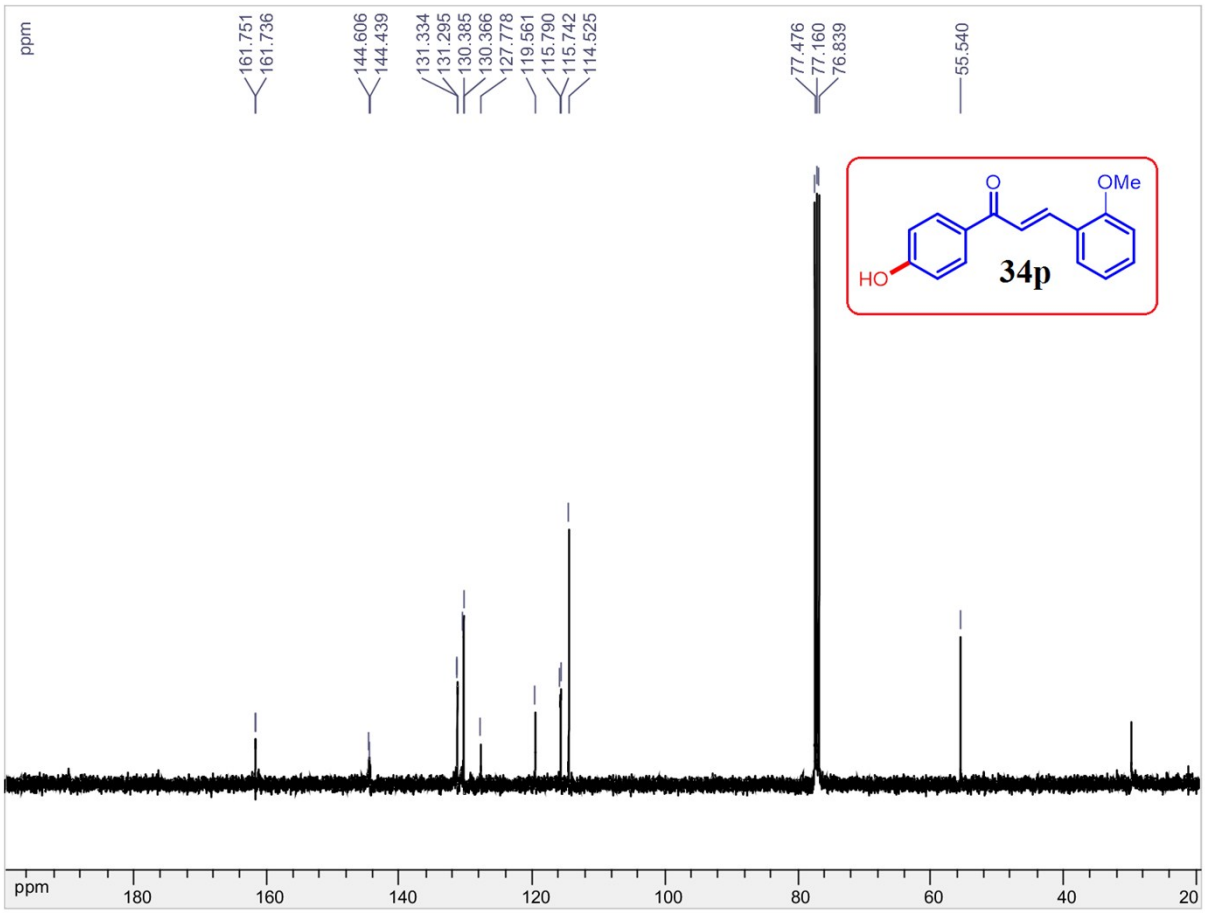

ppm
9.547
7.055
7.034
6.954
6.587
6.130
6.121
5.969
5.947
5.741
2.500
7.04 (d, J= 8.7Hz)
5.96 (d, J= 8.7Hz)
HO
28p
1.0
1.8
1.0
2.1
0.9
2.0
1.2
ppm
9
8
7
6
5
4
3
2
1
0


ppm
186.687
162.286
151.388
145.935
131.050
129.536
129.105
118.897
116.425
115.581
113.118
40.153
39.942
39.731
39.520
39.319
39.108
38.897
HO
28p
ppm
180
160
140
120
100
80
60
40
20


ppm
9.514
7.042
7.020
6.897
6.858
6.773
6.761
6.672
6.663
6.580
6.543
6.215
6.206
6.202
6.194
5.938
5.916
2.500
HO
O
S
29p
6.88 (d, J= 15.3Hz)
1.0
2.0
1.0
2.1
ppm
9
8
7
6
5
4
3
2
1


ppm
186.727
162.300
140.038
135.678
132.462
131.145
130.004
129.065
128.778
120.469
115.553
40.148
39.937
39.731
39.520
39.309
39.103
38.892
HO
O
S
29p
ppm
180
160
140
120
100
80
60
40
20


ppm
7.993
7.973
7.808
7.769
7.596
7.574
7.455
7.416
7.260
6.982
6.961
6.934
6.912
3.843
OMe
O
HO
34p
7.79 (d, J= 15.5Hz)
2.0
1.1
2.0
1.0
3.0
ppm
9
8
7
6
5
4
3
2
1


ppm
161.751
161.736
144.606
144.439
131.334
131.295
130.385
130.366
127.778
119.561
115.790
115.742
114.525
77.476
77.160
76.839
55.540
OMe
O
HO
34p
ppm
180
160
140
120
100
80
60
40
20