Supporting Information

BF_3-Etherate-Catalyzed Tandem Reaction of 2-Formylarylketones with Electron-rich Arenes/Heteroarenes: An Assembly of Isobenzofurans

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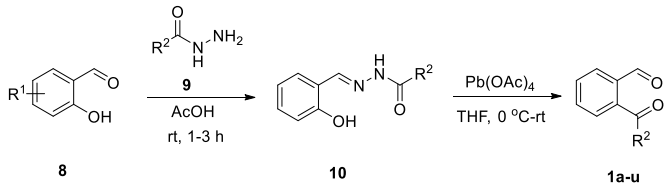
1.1 General Information and Method

^{1}H NMR (400 MHz) and ^{13}C NMR (100 MHz) spectra were recorded in $CDCl_3$/DMSO-d_6. Chemical shifts for protons and carbons are reported in ppm from tetramethylsilane and are referenced to the carbon resonance of the solvent. Data are reported as follows: chemical shift, multiplicity (s = singlet, br s = broad singlet, d = doublet, t = triplet, q = quartet, m = multiplet, dd = doublet of doublet), coupling constants in Hertz and integration. High-resolution mass spectra were recorded on electrospray mass spectrometer. TLC analysis was performed on commercially prepared $^{60}F254$ silica gel plates and visualized by either UV irradiation or by staining with I_2. All purchased chemicals were used as received. All melting points recorded are uncorrected.

1.2 General Procedure for the Synthesis of 2-formylarylketones[1-4] (1a-u)

General procedure: According to a modified procedure acetyl or acylhydrazine **9** (10 mmol) was added to a solution of the salicylaldehyde derivative **8** (10 mmol) in both Acetic acid (50mL) and the mixture was stirred at room temperature. The reaction was monitor by TLC (1-3 h). The mixture was poured into cold water. The resulting solid was filtered, washed with water, triturated with hexane filtered and dried under vacuum. The hydrazides **10** were essentially pure and use for further reaction. The $Pb(OAc)_4$ (2.44g, 5.5 mmol) was added in portions to a stirring solution of hydrazide **10** (5.0 mmol) in THF (25 mL). The mixture turned orange immediately with a mild evolution of N_2 gas. The mixture was stirred at rt for 2-3 h or monitored by TLC. The solid was filtered off by passing the mixture through a pad of celite and washed with EtOAc. The organic solvents were removed in vacuo, the crude washed with saturated aqueous $NaHCO_3$ and brine. The mixture was extracted with EtOAc (3 X 30 mL). The combined organic layers were dried over Na_2SO_4, filtered and evaporated. Pure product **1** was obtained by column chromatography.

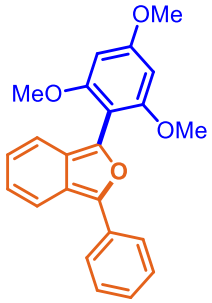


References: (1) P. K. Mishra., S. Verma., M. Kumar., A. Kumar, A. K. Verma *Chem. Commun.*, **2019,** *55,* 8278**. (**2)(a) Hansen, T. V.; Skattebøl, L. *Org. Synth*. **2005**, *82*, 64. (b) D. H. T. Phan, B. Kim, V. M. Dong, *J. Am. Chem. Soc. **2009**, 131, 15608–15609* .(3) Dimos, V.; Papapetrou, M.; Kotali, A. *Org. Prep. Proced. Int*., **1998**, 30, 177-181. (4*)* J. Jacq, C. Einhorn and J.Einhorn, *Org. Lett.* 2008, **17**, 3757

1.3 General Procedure for the Synthesis of 1,3-disubstituted Isobenzofurans 3, 4

To a stirred solution of 2-formylarylketones (**1a**) (1.0 mmol) and 1,3,5-trimethoxybenzene (**2a)** (1.0 mmol) in 2.0 mL of dry CH_2Cl_2 was added $BF_3.OEt_2$ (0.2 equiv) dropwise at 0 ^oC then the reaction was strirred at room temperature for 30 min. The progress of reaction was monitored by TLC. After completion of the reaction it was quenched with water and neutralized by saturated solution of sodium bicarbonate. The product was extracted by ethylacetate (3X30 mL) and dried over sodium sulphate. Evaporation of the solvent and purification of the organic residue on a silica gel column using ethyl acetate-petroleum ether (10:90) as eluent furnished the product (**3, 4**) as a yellow soilds.

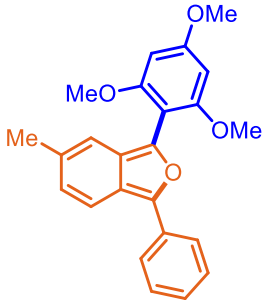
1-Phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3a).



The product was obtained as yellow solid (153 mg, 85%), mp: 148–149°C; ^1H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, J = 7.3 Hz, 2H), 7.79 (d, J = 9.2 Hz, 1H), 7.41 (t, J = 7.6 Hz, 2H), 7.26-7.21 (m, 2H), 6.94 (t, J = 7.3 Hz, 1H), 6.84 (t, J = 7.3 Hz, 1H), 6.23 (s, 2H), 3.85 (s, 3H), 3.75 (s, 6H); ^{13}C (100 MHz, $CDCl_3$) δ 162.31, 160.08, 143.76, 139.03, 132.58, 129.33, 128.84, 128.42, 128.10, 126.21, 124.84, 124.60, 124.47, 123.07, 121.42, 121.11, 119.71, 101.98, 91.10, 56.08, 55.56; HRMS (ESI) [M+H]+ Calcd for $C_{23}H_{21}O_4$, 361.1440, found 361.1412

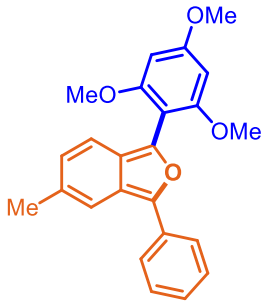
To a stirred solution of 2-formylarylketones (**1a-u**) (0.5 equiv) and electron-rich arene/heteroarenes (**2a-e)** (0.5 equiv) in 2.0 mL of dry CH_2Cl_2 was added $BF_3.OEt_2$ (0.2 equiv) dropwise at 0 ^oC then the reaction was continued for 30 min. The progress of reaction was monitored by TLC. After completion of the reaction it was quenched with water and neutralized by saturated solution of sodium bicarbonate. The product was extracted by ethylacetate (30 mL) and dried over sodium sulphate. Evaporation of the solvent and purification of the residue on a silica gel column using ethyl acetate-petroleum ether (10:90) as eluent furnished the product (**3, 4**) as a yellow soilds.

5-Methyl-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3b).



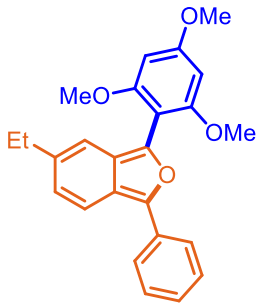
The product was obtained as yellow solid (164 mg, 88%), mp: 153–155 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, J = 7.8 Hz, 2H), 7.54 (s, 1H), 7.41 (t, J = 7.8 Hz, 2H), 7.20-7.16 (m, 2H), 6.70 (d, J = 8.7 Hz, 1H), 6.23 (s, 2H), 3.86 (s, 3H), 3.75 (s, 6H), 2.35 (s, 3H) ; ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.22, 160.06, 142.73, 138.92, 134.17, 132.80, 128.76, 126.39, 125.85, 124.42, 123.56, 121.53, 121.09, 117.23, 102.13, 91.12, 56.08, 55.56, 22.41; HRMS (ESI) $[M+H]^+$ Calcd for $C_{24}H_{23}O_4$, 375.1596, found 375.1615.

5-Methyl-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3c)



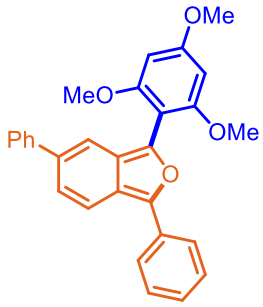
The product was obtained as yellow solid (162 mg, 87%), mp:151–152°C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (d, J = 7.8 Hz, 2H), 7.70 (d, J = 9.2 Hz, 1H), 7.38 (t, J = 7.6 Hz, 2H), 7.17 (t, J = 7.3 Hz, 1H), 6.97 (s, 1H), 6.78 (d, J = 8.7 Hz, 1H), 6.22 (s, 2H), 3.81 (s, 3H), 3.71 (s, 6H), 2.25 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.33, 160.24, 143.67, 138.01, 132.69, 132.26, 128.85, 128.30, 126.14, 125.01, 124.51, 120.30, 119.48, 118.73, 102.16, 91.18, 56.10, 55.55, 22.11; HRMS (ESI) $[M]^+$ Calcd for $C_{24}H_{23}O_4$, 375.1596, found 375.1608.

5-Ethyl-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3d)



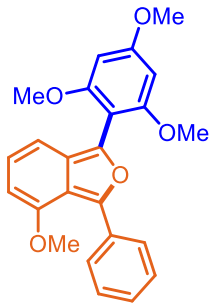
The product was obtained as yellow solid (163 mg, 84%), mp: 155–156 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (d, J = 8.2 Hz, 2H), 7.72 (d, J = 8.7 Hz, 1H), 7.41 (t, J = 7.8 Hz, 2H), 7.20 (t, J = 7.3 Hz, 1H), 6.98 (s, 1H), 6.83 (d, J = 9.2 Hz, 1H), 6.25 (s, 2H), 3.88 (s, 3H), 3.77 (s, 6H), 2.58 (q, J = 7.5 Hz, 2H), 1.22 (t, J = 7.6 Hz, 3H) ; ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.24, 161.67, 160.12, 143.60, 138.49, 138.18, 132.68, 128.81, 127.41, 126.07, 124.92, 124.49, 120.44, 119.55, 117.38, 102.24, 93.02, 91.18, 56.04, 55.40, 29.24, 15.01; HRMS (ESI) $[M+H]^+$ Calcd for $C_{26}H_{25}O_4$, 389.1753, found 389.1765.

1,5-Diphenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3e)



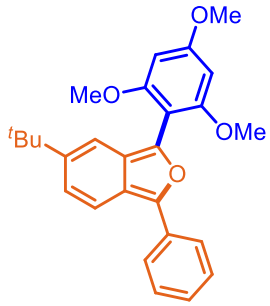
The product was obtained as a off-white solid (181 mg, 83%), mp: 152–153°C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93-7.87 (m, 3H), 7.62-7.60 (m, 2H), 7.46-7.39 (m, 5H), 7.33-7.22 (m, 3H), 6.27 (s, 2H), 3.89 (s, 3H), 3.78 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.32, 160.08, 143.81, 141.66, 139.68, 135.65, 132.40, 128.79, 128.68, 126.98, 126.26, 125.66, 124.91, 124.56, 120.22, 118.76, 101.85, 91.05, 56.07, 55.52; HRMS (ESI) $[M+H]^+$ Calcd for $C_{29}H_{25}O_4$, 437.1753, found 437.1741.

4-Methoxy-3-phenyl-1-(2,4,6-trimethoxyphenyl)Isobenzofuran (3f)



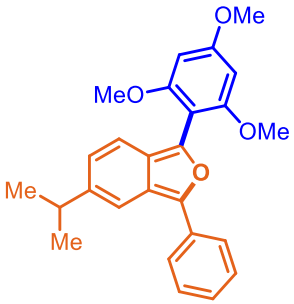
The product was obtained as yellow solid (163 mg, 84%), mp: 103–105 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, J = 7.3 Hz, 3H), 7.27 (t, J = 7.8 Hz, 2H), 7.12 (t, J = 7.3 Hz, 1H), 6.70 (d, J = 8.7 Hz, 1H), 6.61-6.65 (m, 1H), 6.10 (s, 2H), 6.02 (d, J = 6.9 Hz, 1H), 3.74 (s, 3H), 3.70 (s, 3H), 3.61 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.45, 160.07, 142.61, 139.58, 131.54, 131.04, 129.02, 125.57, 125.25, 124.53, 123.16, 121.53, 121.38, 119.36, 101.71, 90.97, 56.04, 55.56; HRMS (ESI) $[M+H]^+$ Calcd for $C_{24}H_{23}O_5$, 391.1545, found 391.1531.

5-(*tert*-Butyl)-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3g)



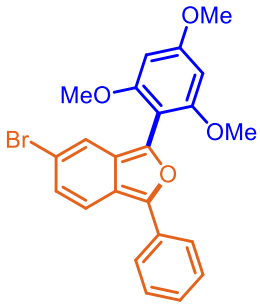
The product was obtained as yellow solid (168 mg, 81%), mp: 162–163 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 (d, J = 8.2 Hz, 2H), 7.75 (d, J = 9.1 Hz, 1H), 7.41 (t, J = 7.8 Hz, 2H), 7.22-7.18 (m, 1H), 7.12 (s, 1H), 7.08 (dd, J = 9.4, 1.6 Hz, 1H), 6.27 (s, 2H), 3.89 (s, 3H), 3.79 (s, 6H), 1.30 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.09, 159.91, 145.04, 143.45, 138.57, 132.68, 128.76, 125.98, 125.03, 124.55, 124.46, 120.02, 119.30, 114.88, 102.27, 91.12, 56.00, 55.56, 34.85, 30.76; HRMS (ESI) $[M+H]^+$ Calcd for $C_{27}H_{29}O_4$, 417.2066, found 417.2066.

5-Isopropyl-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3h)



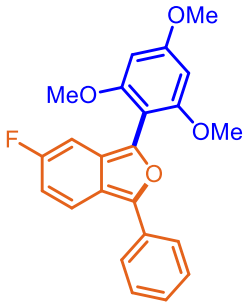
The product was obtained as yellow solid (181 mg, 90%), mp: 159–160 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (d, J = 8.2 Hz, 2H), 7.84 (d, J = 9.1 Hz, 1H), 7.50 (t, J = 7.8 Hz, 2H), 7.28 (t, J = 7.5 Hz, 1H), 7.12 (s, 1H), 6.98 (d, J = 9.1 Hz, 1H), 6.33 (s, 2H), 3.91 (s, 3H), 3.83 (s, 6H), 2.96-2.89 (m, 1H), 1.34 (d, J = 6.9 Hz, 6H) ; ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.31, 161.75, 160.11, 143.59, 143.05, 138.48, 132.74, 128.89, 126.41, 126.15, 124.79, 124.53, 120.65, 119.49, 116.02, 102.20, 93.08, 91.23, 56.03, 55.43, 34.28, 23.53; HRMS (ESI) $[M+H]^+$ Calcd for $C_{26}H_{27}O_4$, 403.1909, found 403.1923.

5-Bromo-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3i)



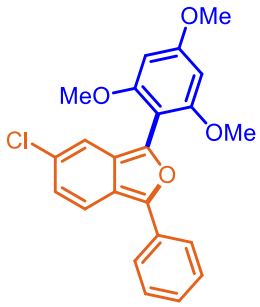
The product was obtained as yellow solid (188 mg, 86%), mp: 135–137 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, J = 7.8 Hz, 2H), 7.67 (d, J = 9.1 Hz, 1H), 7.41-7.44 (m, 3H), 7.23 (t, J = 8.7 Hz, 1H), 6.97 (d, J = 9.1 1H), 6.24 (s, 2H), 3.89 (s, 3H), 3.78 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.52, 160.01, 144.56, 138.59, 131.96, 128.87, 128.28, 126.72, 125.20, 124.76, 123.30, 121.44, 119.18, 116.94, 101.33, 91.06, 56.06, 55.58; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{23}H_{20}BrO_4$, 439.0545, found 439.0538.

5-Fluoro-1-phenyl-3-(2,4,6-trimethoxyphenyl)Isobenzofuran (3j)



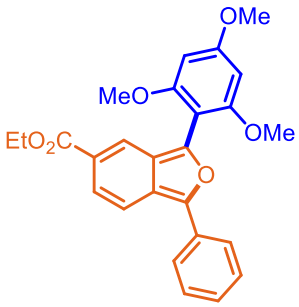
The product was obtained as yellow solid (155 mg, 82%), mp: 105–107 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, J = 7.8 Hz, 2H), 7.80-7.76 (m, 1H), 7.44-7.41 (m, 2H), 7.23 (t, J = 8.7 Hz, 1H), 6.80-6.74 (m, 2H), 6.24 (s, 2H), 3.89 (s, 3H), 3.79 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.16, 157.93, 156.72 (d, J = 242 Hz, 1C), 142.33, 136.39, 129.88, 126.70, 124.51, 122.61, 120.04 (d, J = 9.63 Hz, 1C), 116.91, 115.34 (d, J = 30.4 Hz, 1C), 100.29 (d, J = 23.1 Hz, 1C), 99.44, 88.90, 53.89, 53.40; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{23}H_{20}FO_4$, 379.1346, found 379.1344

5-Chloro-1-phenyl-3-(2,4,6-trimethoxyphenyl)Isobenzofuran (3k)



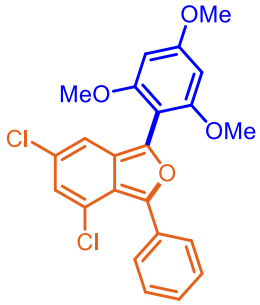
The product was obtained as yellow solid (167 mg, 85%), mp: 120–122 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, J = 7.3 Hz, 2H), 7.73 (d, J = 9.6 Hz, 1H), 7.43 (t, J = 7.8 Hz, 2H), 7.24 (t, J = 8.7 Hz, 2H), 6.85 (dd, J = 9.4, 1.6 Hz, 1H), 6.23 (s, 2H), 3.87 (s, 3H), 3.77 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.57, 161.66, 160.06, 144.54, 138.75, 132.01, 128.93, 128.69, 126.77, 126.27, 124.77, 124.56, 121.45, 119.70, 119.30, 101.34, 93.02, 91.07, 56.06, 55.56; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{23}H_{20}ClO_4$, 395.1050, found 395.1047.

Ethyl 1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran-5-carboxylate (3l)



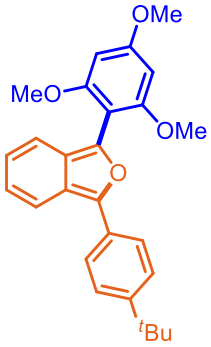
The product was obtained as yellow solid (173 mg, 80%), mp: 145–146 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (s, 1H), 7.88 (d, J = 8.2 Hz, 2H), 7.79 (d, J = 9.2 Hz, 1H), 7.50 (d, J = 9.2 Hz, 1H), 7.45-7.39 (m, 2H), 7.24 (t, J = 6.9 Hz, 1H), 6.25 (s, 2H), 4.34 (q, J = 7.0 Hz, 2H), 3.89 (s, 3H), 3.77 (s, 6H), 1.37 (t, J = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.96, 162.75, 160.15, 144.26, 142.61, 132.07, 128.89, 128.54, 126.96, 126.67, 126.51, 125.34, 124.70, 123.89, 123.65, 120.97, 119.67, 101.25, 91.06, 60.85, 56.01, 55.58, 14.50; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{26}H_{25}O_6$, 433.1651, found 433.1666.

4,6-Dichloro-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3m)



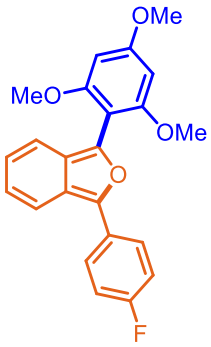
The product was obtained as yellow solid (169 mg, 79%), mp: 101–102 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.77-7.79 (m, 2H), 7.43 (t, J = 7.8 Hz, 2H), 7.36 (t, J = 7.3 Hz, 1H), 7.15 (t, J = 1.1 Hz, 1H), 6.89 (t, J = 1.1 Hz, 1H), 6.23 (s, 2H), 3.88 (s, 3H), 3.78 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.45, 159.72, 145.79, 139.59, 130.68, 129.92, 127.71, 127.45, 127.03, 126.12, 125.33, 124.50, 118.01, 117.39, 100.38, 90.60, 55.73, 55.26; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{23}H_{19}Cl_2O_4$, 429.0660, found 429.0608

1-(4-(*tert*-Butyl)phenyl)-3-(2,4,6-trimethoxyphenyl)Isobenzofuran (3n)



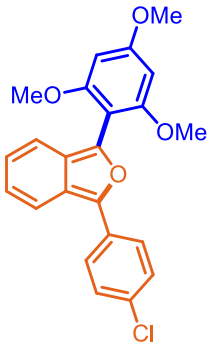
The product was obtained as yellow solid (181 mg, 87%), mp: 155–156 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.84 (d, J = 8.7 Hz, 2H), 7.79 (d, J = 8.7 Hz, 1H), 7.47 (d, J = 8.2 Hz, 2H), 7.26-7.24 (m, 1H), 6.95-6.92 (m, 1H), 6.84 (dd, J = 8.7, 6.0 Hz, 1H), 6.26 (s, 2H), 3.89 (s, 3H), 3.77 (s, 6H), 1.37 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 157.05, 154.94, 144.04, 138.93, 133.33, 124.76, 120.60, 119.29, 117.86, 116.19, 115.58, 114.73, 97.09, 86.03, 50.97, 50.45, 29.58, 26.12; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{27}H_{29}O_4$, 417.2066, found 417.2062.

1-(4-Fluorophenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3o)



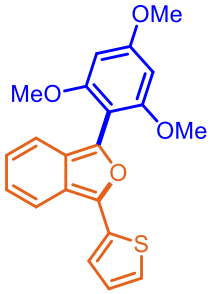
The product was obtained as yellow solid (157 mg, 83%), mp: 115–116 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.85-7.82 (m, 2H), 7.71 (d, J = 8.7 Hz, 1H), 7.25 (d, J = 9.2 Hz, 1H), 7.12 (t, J = 8.7 Hz, 2H), 6.96-6.92 (m, 1H), 6.84 (dd, J = 8.5, 6.6 Hz, 1H), 6.24 (s, 2H), 3.87 (s, 3H), 3.76 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.38, 161.43 (d, J = 242 Hz, 1C), 160.06, 142.91, 139.00, 128.95, 126.66, 126.19 (d, J = 7.7 Hz, 1C), 124.97, 124.39, 123.12, 121.43, 120.75, 119.38, 115.88 (d, J = 22.1 Hz, 1C), 101.80, 93.0, 91.05, 56.03, 55.54; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{23}H_{20}FO_4$, 379.1346, found 379.1344.

1-(4-Fluorophenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3p)



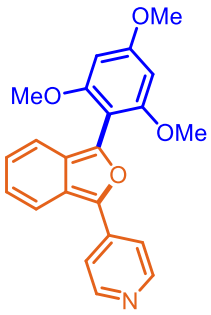
The product was obtained as yellow solid (169 mg, 86%), mp: 109–110 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.80 (d, J = 8.7 Hz, 2H), 7.72 (d, J = 9.2 Hz, 1H), 7.37 (d, J = 8.7 Hz, 2H), 7.24-7.26 (m, 1H), 6.94-6.98 (m, 1H), 6.82-6.86 (m,1H), 6.24 (s, 2H), 3.87 (s, 3H), 3.76 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.42, 160.05, 142.60, 139.53, 131.53, 131.03, 129.00, 125.56, 125.22, 124.51, 123.13, 121.52, 121.35, 119.35, 101.71, 90.96, 56.03, 55.56; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{23}H_{20}ClO_4$, 395.1050, found 395.1074

1-(Thiophen-2-yl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3q)



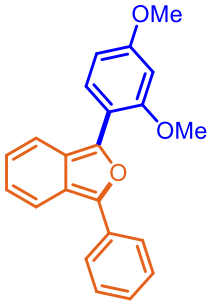
The product was obtained as green solid (155 mg, 85%), mp: 90–92 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.70 (d, J = 8.7 Hz, 1H), 7.42 (s, 1H), 7.23 (d, J = 7.8 Hz, 2H), 7.10 (d, J = 5.0 Hz, 1H), 6.94-6.98 (m, 1H), 6.86 (d, J = 6.0 Hz, 1H), 6.25 (s, 2H), 3.88 (s, 3H), 3.77 (s, 6H; ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.32, 160.10, 140.620, 138.50, 134.68, 127.67, 126.94, 124.72, 124.19, 123.35, 123.04, 121.36, 121.22, 120.59, 119.46, 101.90, 91.19, 56.10, 55.55; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{21}H_{19}O_4S$, 367.1004, found 367.1008.

4-(3-(2,4,6-Trimethoxyphenyl)isobenzofuran-1-yl)pyridine (3r)



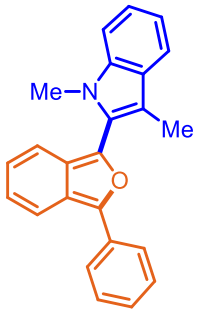
The product was obtained as brown solid (135 mg, 75%), mp: 177–178 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.50 (d, J = 4.6 Hz, 2H), 7.75 (d, J = 8.7 Hz, 1H), 7.65 (d, J = 4.6 Hz, 2H), 7.25 (d, J = 8.7 Hz, 1H), 6.99-7.04 (m, 1H), 6.82-6.86 (m, 1H), 6.18 (d, J = 1.8 Hz, 2H), 3.83 (s, 3H), 3.70 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.89, 160.22, 150.02, 142.41, 140.57, 138.94, 126.75, 125.04, 124.20, 123.45, 122.08, 119.08, 117.80, 101.24, 91.06, 56.09, 55.68; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{22}H_{20}NO_4$, 362.1392, found 362.1389.

1-(2,4-Dimethoxyphenyl)-3-phenylisobenzofuran (3s)



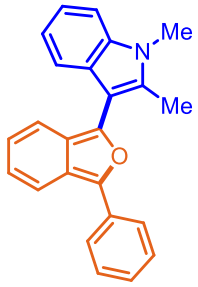
The product was obtained as yellow solid (132 mg, 80%), mp: 145–146 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (d, J = 8.2 Hz, 2H), 7.80 (d, J = 8.7 Hz, 1H), 7.66-7.61 (m, 2H), 7.45 (t, J = 7.8 Hz, 2H), 7.23-7.30 (m, 1H), 6.98 (dd, J = 8.9, 6.2 Hz, 1H), 6.90 (dd, J = 9.1, 6.4 Hz, 1H), 6.65-6.61 (m, 2H), 3.90 (s, 3H), 3.86 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.90, 157.31, 143.56, 142.37, 133.79, 132.18, 130.64, 129.61, 128.93, 128.29, 126.43, 125.05, 124.60, 123.40, 122.74, 121.95, 119.61, 114.11, 105.25, 99.19, 55.62; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{22}H_{19}O_3$, 331.1334, found 331.1344.

1,3-Dimethyl-2-(3-phenylisobenzofuran-1-yl)-1*H*-indole (3t)



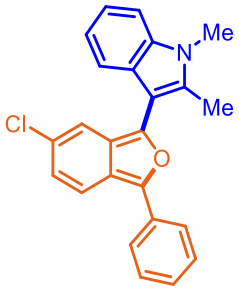
The product was obtained as reddish solid (138 mg, 82%), mp: 101–102 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96-7.88 (m, 3H), 7.67 (d, J = 7.8 Hz, 1H), 7.50 (t, J = 7.8 Hz, 2H), 7.40-7.30 (m, 4H), 7.21-7.16 (m, 1H), 7.09-7.00 (m, 2H), 3.80 (s, 3H), 2.42 (s, 3H); ^{13}C NMR (100 MHz,$CDCl_3$) δ 144.08, 136.78, 135.47, 130.32, 127.63, 127.00, 125.78, 125.68, 123.94, 123.85, 123.49, 123.30, 121.40, 119.65, 118.88, 118.53, 117.90, 110.96, 107.95, 30.04, 8.701; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{24}H_{20}NO$, 338.1545, found 338.1535.

1,2-Dimethyl-3-(3-phenylisobenzofuran-1-yl)-1*H*-indole (3u)



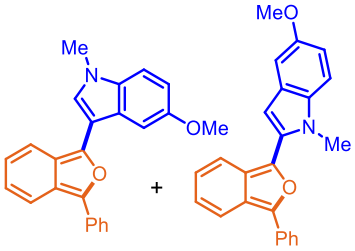
The product was obtained as reddish solid (131 mg, 78%), mp: 100–101 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96 (d, J = 8.2 Hz, 2H), 7.87 (d, J = 8.7 Hz, 1H), 7.82 (d, J = 7.8 Hz, 1H), 7.48 (t, J = 7.3 Hz, 3H), 7.37 (d, J = 8.2 Hz, 1H), 7.30-7.19 (m, 3H), 7.03 (dd, J = 9.2, 6.4 Hz, 1H), 6.91 (dd, J = 8.9, 6.2 Hz, 1H), 3.77 (s, 3H), 2.62 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 142.98, 141.99, 137.03, 135.85, 132.44, 128.97, 128.19, 126.70, 126.12, 125.23, 124.16, 123.06, 122.29, 121.74, 121.12, 120.38, 119.77, 109.11, 104.48, 29.91, 12.11; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{24}H_{20}NO$, 338.1545, found 338.1503.

3-(6-chloro-3-phenylisobenzofuran-1-yl)-1,2-dimethyl-1H-indole (3v)



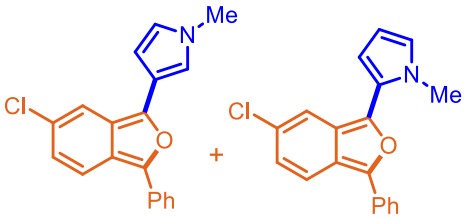
The product was obtained as reddish solid (165 mg, 89%), mp: 104–105 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, J = 7.6 Hz, 2H), 7.86 (d, J = 9.3 Hz, 1H), 7.74 (d, J = 7.6 Hz, 1H), 7.55 (t, J = 7.4 Hz, 2H), 7.37-7.43 (m, 4H), 7.25-7.29 (m, 1H), 7.01 (d, J = 9.2 Hz, 1H), 3.82 (s, 3H), 2.48 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 146.33, 138.28, 136.48, 131.22, 130.80, 129.21, 128.56, 128.37, 127.70, 126.99, 126.58, 125.44, 124.95, 123.10, 121.71, 119.48, 118.55, 112.79, 109.46, 31.50, 10.18; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{24}H_{19}NClO$, 372.1155, found 372.1141.

5-methoxy-1-methyl-3-(3-phenylisobenzofuran-1-yl)-1*H*-indole and 5-methoxy-1-methyl-2-(3-phenylisobenzofuran-1-yl)-1*H*-indole (3w+w')



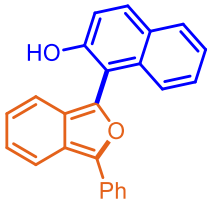
The product was obtained as reddish solid (146 mg, 83%) regio-isomer (55:45), mp: 110–112 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (d, J = 8.7 Hz, 1H), 7.46-7.57 (m, 8H), 7.30-7.33 (m, 1H), 7.24-7.27 (m, 1H), 7.13-7.19 (m, 3H), 6.99-7.01 (m, 1H), 6.89 (dd, J = 8.7, 2.7 Hz, 2H), 6.55 (s, 1H), 6.37 (s, 1H), 3.88 (s, 3H), 3.46 (s, 3H), 3.22 (s, 3H), 3.14 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.56, 152.98, 139.78, 138.58, 132.54, 132.31, 132.21, 130.54, 130.25, 129.05, 128.96, 128.39, 128.29, 127.88, 127.73, 126.90, 126.28, 125.59, 125.03, 124.87, 124.73, 123.16, 122.33, 122.16, 118.02, 115.50, 112.95, 111.95, 110.25, 108.29, 106.90, 102.02, 55.89, 55.33, 33.37, 32.48; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{24}H_{20}NO_2$, 354.1494, found 354.1495.

3-(6-Chloro-3-phenylisobenzofuran-1-yl)-1-methyl-1H-pyrrole and 2-(6-chloro-3-phenyliso benzofuran-1-yl)-1-methyl-1H-pyrrole (3x+x')



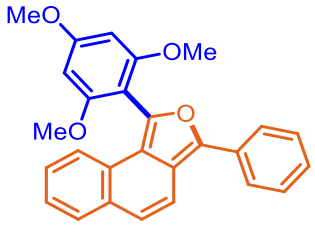
The product was obtained as reddish semi-solid (146 mg, 54%) regio-isomer (50:50); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.74 (d, J = 9.2 Hz, 1H), 7.56 (d, J = 2.1 Hz, 1H), 7.46-7.48 (m, 3H), 7.08 (dd, J = 9.1, 2.1 Hz, 1H), 7.04 (d, J = 3.3 Hz, 1H), 6.82 (t, J = 2.2 Hz, 1H), 6.29 (t, J = 3.3 Hz, 2H), 6.25 (q, J = 1.7 Hz, 1H), 3.23 (s, 3H), 3.18 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 137.54, 135.43, 134.00, 131.21, 130.55, 129.79, 129.62, 128.98, 128.89, 127.36, 127.30, 126.67, 126.35, 125.60, 123.28, 122.63, 122.38, 120.69, 111.60, 108.28, 106.93, 99.22, 33.52, 33.18; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{19}H_{15}ClNO$, 308.0842, found 308.0844.

1-(3-phenylisobenzofuran-1-yl)naphthalen-2-ol (3y)



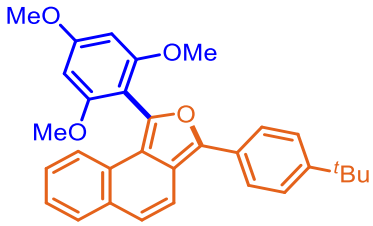
The product was obtained as reddish solid (146 mg, 68%), mp: 155–157 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.81-7.88 (m, 1H), 7.69-7.78 (m, 2H), 7.62 (d, J = 8.2 Hz, 2H), 7.38-7.58 (m, 5H), 7.33 (t, J = 7.0 Hz, 1H), 7.20-7.30 (m, 1H), 7.10-7.15 (m, 3H), 6.43 (brs, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 163.38, 153.76, 143.17, 139.13, 137.94, 134.78, 133.82, 131.25, 130.43, 130.33, 129.87, 129.35, 129.00, 128.93, 128.70, 127.89, 127.71, 126.56, 125.84, 124.09, 123.59, 119.29, 118.12, 109.72; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{24}H_{17}O_2$, 337.1229, found 337.1228.

3-Phenyl-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-*c*]furan (4a)



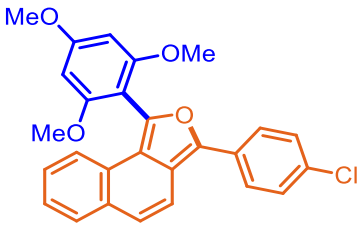
The product was obtained as reddish solid (176 mg, 86%), mp: 160–161 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91-7.89 (m, 2H), 7.68 (d, J = 9.2 Hz, 1H), 7.58 (dd, J = 8.0, 2.1 Hz, 2H), 7.44 (t, J = 7.8 Hz, 2H), 7.34-7.30 (m, 1H), 7.26 (t, J = 7.1 Hz, 2H), 7.19 (d, J = 9.2 Hz, 1H), 6.29 (s, 2H), 3.92 (s, 3H), 3.68 (s, 6H); ^{13}C NMR (100 MHz,$CDCl_3$) δ 162.86, 160.63, 144.70, 139.70, 132.10, 131.80, 128.63, 127.95, 127.84, 127.03, 126.63, 126.55, 125.73, 125.10, 123.74, 120.53, 119.31, 118.79, 102.81, 90.94, 55.92, 55.44; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{27}H_{23}O4$, 411.1596, found 411.1594.

3-(4-(tert-Butyl)phenyl)-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-c]furan (4b)



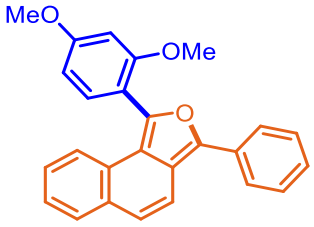
The product was obtained as reddish solid (195 mg, 84%), mp: 165–166 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 (d, J = 8.7 Hz, 2H), 7.67 (d, J = 9.2 Hz, 1H), 7.57 (q, J = 3.8 Hz, 2H), 7.47 (d, J = 8.7 Hz, 2H), 7.31 (t, J = 8.2 Hz, 1H), 7.22 (t, J = 7.0 Hz, 1H), 7.17 (d, J = 9.2 Hz, 1H), 6.29 (s, 2H), 3.92 (s, 3H), 3.68 (s, 6H), 1.36 (s, 9H); **^{13}**C NMR (100 MHz, $CDCl_3$) δ 162.92, 160.81, 149.72, 145.21, 139.23, 132.02, 130.0, 129.54, 128.04, 126.79, 126.69, 125.81, 125.69, 125.05, 123.91, 119.14, 92.98, 91.10, 56.07, 55.57, 34.72, 31.41 HRMS (ESI) $[M+H]^+$ Calcd for for $C_{31}H_{31}O_4$, 467.2222, found 467.2220.

3-(4-Chlorophenyl)-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-c]furan (4c)



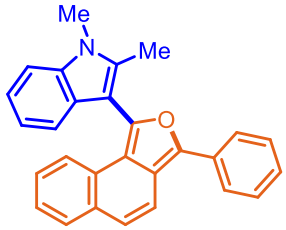
The product was obtained as off-white solid (195 mg, 88%), mp: 160–162 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 (d, J = 8.7 Hz, 2H), 7.61 (t, J = 9.4 Hz, 3H), 7.40 (d, J = 8.7 Hz, 2H), 7.35 (t, J = 6.9 Hz, 1H), 7.26 (t, J = 7.1 Hz, 1H), 7.21 (d, J = 9.1 Hz, 1H), 6.30 (s, 2H), 3.92 (s, 3H), 3.69 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 163.13, 160.76, 143.73, 140.27, 132.19, 131.87, 130.75, 128.99, 128.20, 127.90, 127.67, 126.96, 126.30, 126.03, 123.89, 120.79, 119.79, 118.54, 102.70, 92.99, 91.02, 56.04, 55.59; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{27}H_{22}ClO_4$, 445.1207, found 445.1210.

1-(2,4-Dimethoxyphenyl)-3-phenylnaphtho[1,2-*c*]furan (4d)



The product was obtained as off-white solid (148 mg, 78%), mp: 159–160 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.90 (d, J = 8.2 Hz, 2H), 7.65-7.69 (m, 2H), 7.59 (d, J = 7.1 Hz, 1H), 7.52 (d, J = 8.4 Hz, 1H), 7.44 (t, J = 7.8 Hz, 2H), 7.39-7.32 (m, 1H), 7.27 (t, J = 7.4 Hz, 2H), 7.23-7.19 (m, 2H), 6.65 (s, 1H), 3.90 (s, 3H), 3.72 (s, 3H); ^{13}C NMR (100 MHz,$CDCl_3$) δ 162.16, 159.29, 144.66, 143.21, 132.98, 132.08, 131.98, 130.25, 128.88, 128.24, 127.70, 127.46, 126.95, 126.71, 126.14, 125.29, 124.26, 119.62, 118.78, 104.97, 99.19, 55.67, 55.64; HRMS (ESI) $[M+H]^+$ Calcd for $C_{27}H_{22}ClO4$, 445.1207, found 445.1210.

1,2-Dimethyl-3-(3-phenylnaphtho[1,2-c]furan-1-yl)-1*H*-indole (4e)

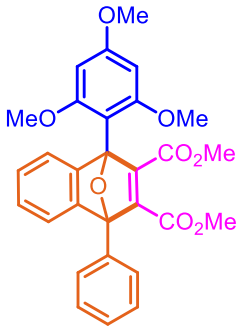


The product was obtained as off-white solid (143 mg, 74%), mp: 145–146 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, J = 7.3 Hz, 2H), 7.74 (t, J = 9.2 Hz, 2H), 7.62 (d, J = 7.3 Hz, 1H), 7.48-7.40 (m, 4H), 7.35-7.20 (m, 5H), 7.11 (t, J = 7.6 Hz, 1H), 3.83 (s, 3H), 2.45 (s, 3H); ^{13}C NMR (100 MHz,$CDCl_3$) δ 144.58, 141.90, 137.56, 137.07, 132.00, 128.92, 128.24, 127.76, 127.48, 127.18, 126.94, 126.86, 126.03, 125.09, 124.36, 121.63, 120.36, 120.04, 119.64, 118.86, 109.15, 104.99, 30.03, 12.04; HRMS (ESI) $[M+H]^+$ Calcd for $C_{28}H_{22}NO$, 388.1701, found 388.1684.

Synthesis Utility of 1,3-Diarylisobenzofurns:

Dimethyl acetylenedicarboxylate (**5**, 0.3 mmol) was dissolved in dichloromethane (5 mL) under a nitrogen atmosphere. Then freshly prepared solution of isobenzofuran derivatives (**3,** 0.3 mmol) was added drop wise and stirred for 12 h at 50 °C. After completion of the reaction, solvent remove in vacuum and the crude product was purified by column chromatography on silica gel (Hexane/ethyl acetate 7:3). A white solid of cyclo-adduct **6a-d** product was obtained.

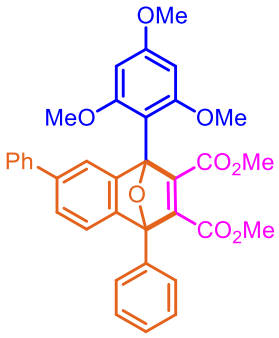
Dimethyl 1-phenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6a)



The product was obtained as white solid (128 mg, 85%), mp: 190–192 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.76-7.74 (m, 2H), 7.47-7.40 (m, 5H), 7.24 (s, 1H), 7.07-7.05 (m, 1H), 6.20 (s, 2H), 3.84 (s, 3H), 3.66

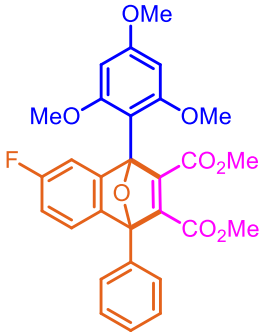
(t, J = 2.5 Hz, 12H); ^{13}C NMR (100 MHz,$CDCl_3$) δ 165.62, 164.03, 162.50, 160.96, 154.78, 151.91, 150.90, 148.11, 133.80, 128.91, 128.63, 128.34, 124.94, 124.31, 123.06, 121.75, 102.64, 93.72, 91.71, 90.95, 55.48, 55.42, 52.12, 51.59; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{29}H_{27}O_8$, 503.1706, found 503.1707.

Dimethyl 1,6-diphenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6b)



The product was obtained as white solid (142 mg, 82%), mp: 188–189 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.76 (d, J = 6.9 Hz, 2H), 7.57 (d, J = 7.3 Hz, 2H), 7.50-7.36 (m, 7H), 7.32-7.25 (m, 2H), 6.19 (s, 2H), 3.84 (s, 3H), 3.66 (d, J = 7.3 Hz, 9H), 3.63 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.67, 163.92, 162.54, 160.98, 154.67, 152.78, 150.86, 147.22, 141.40, 138.20, 133.73, 128.97, 128.74, 128.66, 128.38, 127.29, 127.20, 123.40, 122.15, 121.90, 102.60, 93.70, 91.70, 91.00, 55.53, 55.43, 52.19, 51.62; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{35}H_{31}O_8$, 579.2019, found 579.2031.

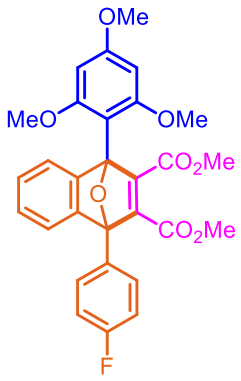
Dimethyl 6-fluoro-1-phenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene -2,3-dicarboxylate (6c)



The product was obtained as white solid (109 mg, 70%), mp: 175–176 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.68 (d, J = 8.0 Hz, 2H), 7.38-7.42 (m, 3H), 7.31 (dd, J = 8.0, 4.7 Hz, 1H), 6.94 (dd, J = 8.3, 2.3 Hz,

1H), 6.67-6.72 (m, 1H), 6.16 (s, 2H), 3.83 (s, 3H), 3.65-3.63 (m, 12H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 164.39, 162.71, 161.52, 159.72, 159.63 (d, J = 243 Hz, 1C), 154.05, 153.97, 153.11, 150.05, 142.40, 132.26, 127.92, 127.57, 127.13, 121.23 (d, J = 8.6 Hz, 1C), 110.58 (d, J = 26.0 Hz, 1C), 109.21, 100.95 (d, J = 22.1 Hz, 1C), 92.44, 90.50, 54.33, 51.08, 50.54.; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{29}H_{26}FO_8$, 521.1612, found 521.1609.

Dimethyl 1-(4-fluorophenyl)-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxy naphthalene-2,3-dicarboxylate (6d)

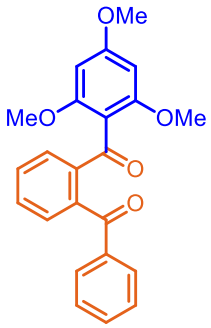


The product was obtained as white solid (112 mg, 72%), mp: 178–179 °C; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.72-7.75 (m, 2H), 7.40-7.42 (m, 1H), 7.22-7.24 (m, 1H), 7.10-7.15 (m, 2H), 7.03-7.06 (m, 2H), 6.18 (s, 2H), 3.84 (s, 3H), 3.64-3.67 (m, 12H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.49, 164.71, 159.31 (d, J = 247 Hz, 1C), 156.55, 140.77, 133.41, 129.76, 129.62, 129.38 (d, J = 8.7 Hz, 1C), 128.38, 128.17, 128.13, 124.88, 114.02 (d, J = 9.6 Hz, 1C), 113.80 (d, J = 10.6 Hz, 1C), 105.95, 89.73, 56.04, 54.84, 54.27, 51.16, 50.74; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{29}H_{26}FO_8$, 521.1612, found 521.1609.

Synthesis of 1,2-diaroylarenes (7a-b):

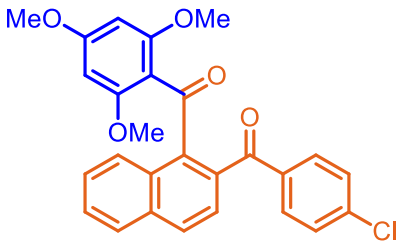
To a solution of isobenzofurans **3a, 4c (**0.3 mmol) in DCM (5 mL) was added *m*-CPBA (0.5 mmol), and the reaction mixture was stirred at room temperature for 15 min. then reaction mixture was poured into a saturated $NaHCO_3$ solution, and the resulting mixture was extracted with DCM (3X50 mL). The combined organic layer extracts and washed with water (2X30 mL) and dried over Na_2SO_4. The crude product was purified by column chromatography (silica gel, 20% EA/hexane) afforded 1,2-diaroylarenes **7a-b** in good yields.

(2-Benzoylphenyl)(2,4,6-trimethoxyphenyl)methanone (7a)



The product was obtained as white solid (99 mg, 88%): mp 145–146 °C: ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.26 (s, 1H), 7.90 (dd, J = 12.4, 8.2 Hz, 2H), 7.48-7.56 (m, 4H), 7.24-7.36 (m, 3H), 5.76 (s, 2H), 3.73 (s, 3H), 3.29 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 196.01, 192.90, 165.07, 161.76, 140.42, 139.34, 135.52, 134.49, 131.34, 130.32, 129.86, 128.41, 128.12, 127.70, 127.22, 126.88, 124.19, 113.21, 90.37, 55.78, 55.43; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{23}H_{21}O_5$, 377.1389, found 377.1396

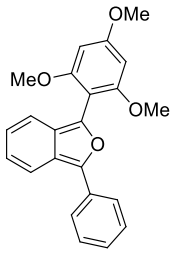
(1-(4-Chlorobenzoyl)naphthalen-2-yl)(2,4,6-trimethoxyphenyl)methanone (7b)



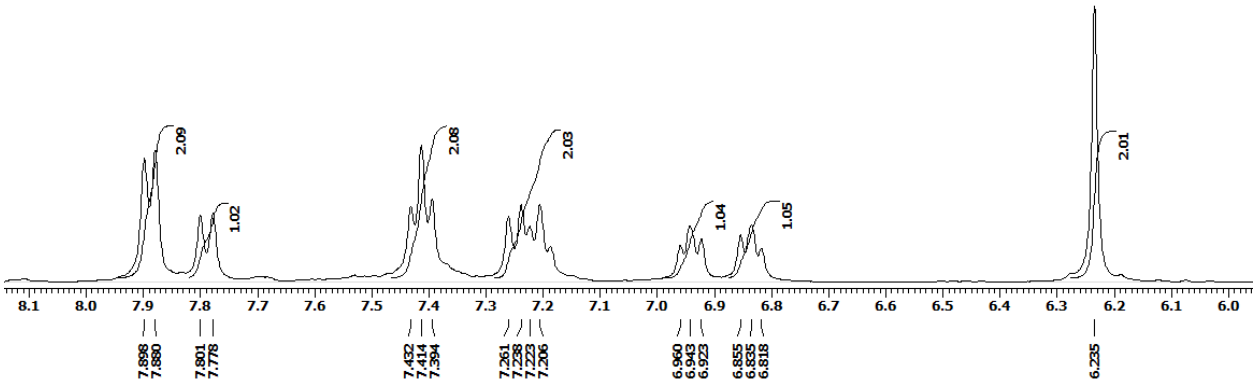
The product was obtained as white solid (117 mg, 85%): mp 148–149 °C: ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.63 (t, J = 6.4 Hz, 3H), 7.50-7.52 (m, 1H), 7.37-7.44 (m, 2H), 7.32 (d, J = 7.3 Hz, 1H), 7.26 (t, J = 7.6 Hz, 2H), 5.92 (s, 2H), 3.71 (s, 3H), 3.49 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 197.84, 193.25, 163.36, 159.63, 141.09, 138.64, 137.29, 132.64, 132.27, 130.73, 129.53, 129.31, 128.29, 128.05, 110.38, 90.49, 55.71, 55.52; HRMS (ESI) $[M+H]^+$ Calcd for for $C_{27}H_{22}ClO_5$, 461.1156, found 461.1174

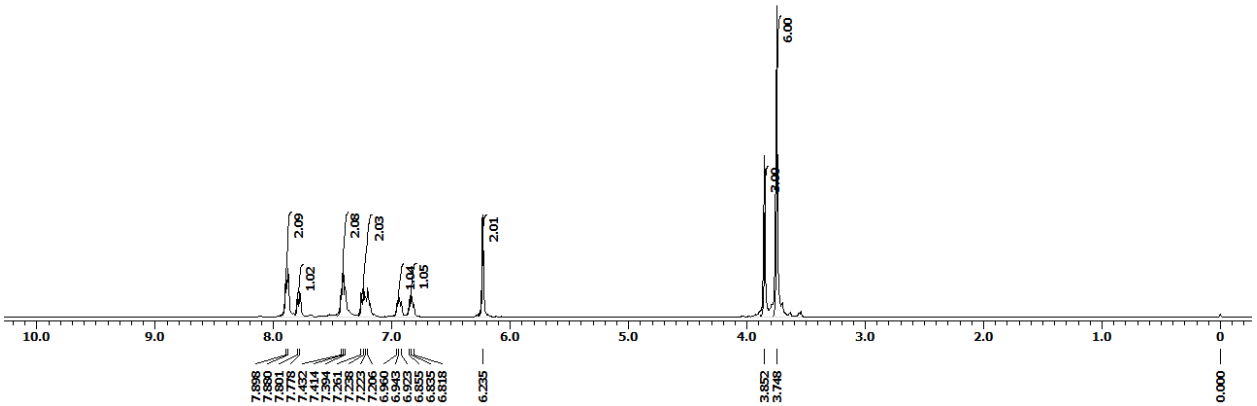
Copies of ^{1}H and ^{13}C NMR

^{1}H NMR

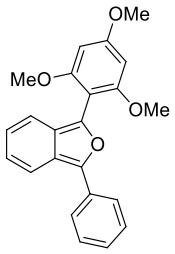


1-Phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3a)

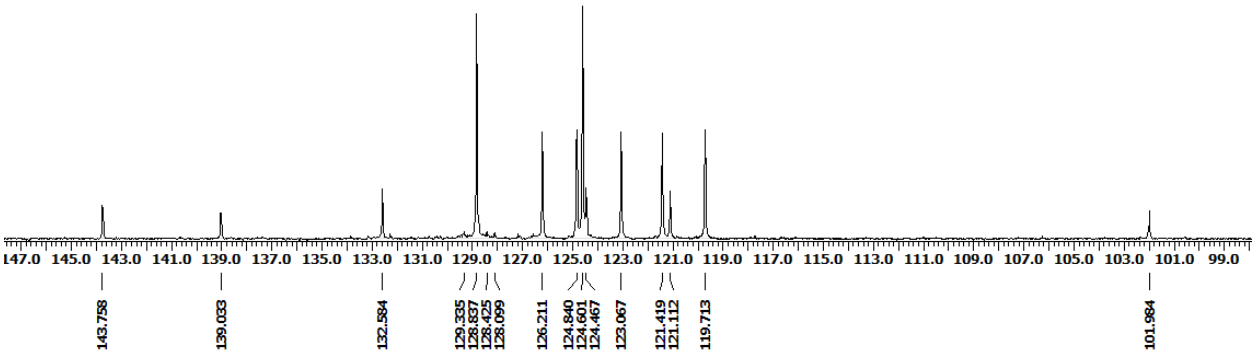


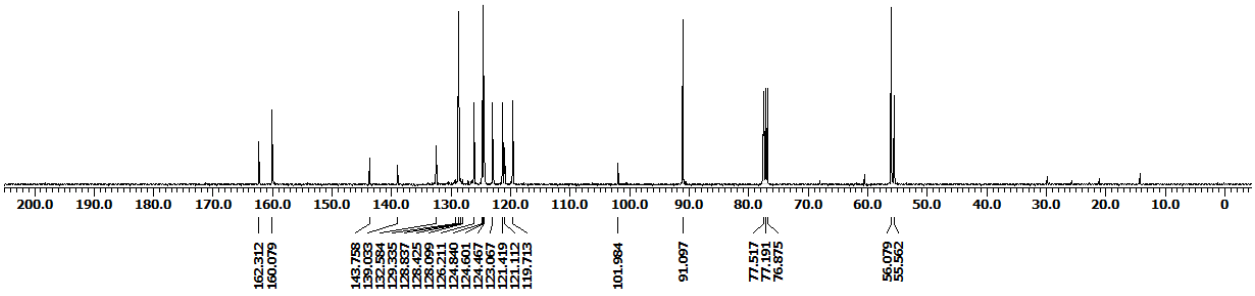


^{13}C NMR

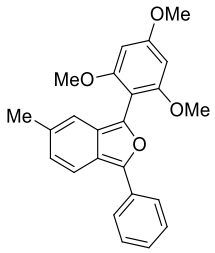


1-Phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3a)

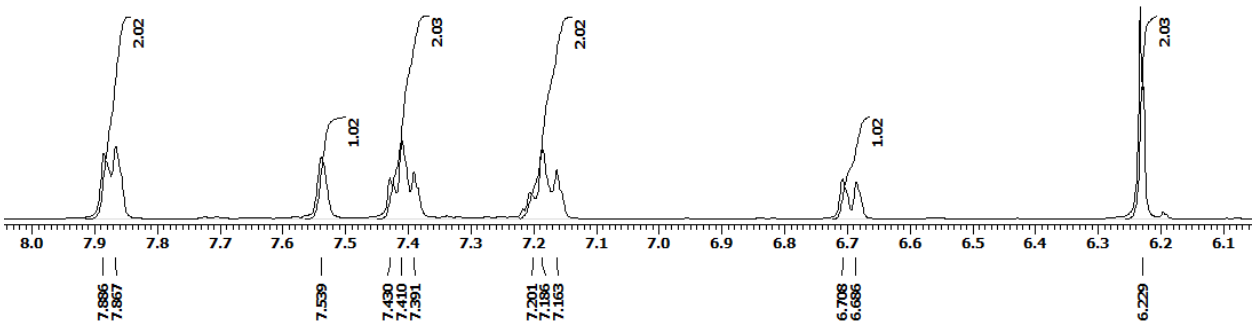


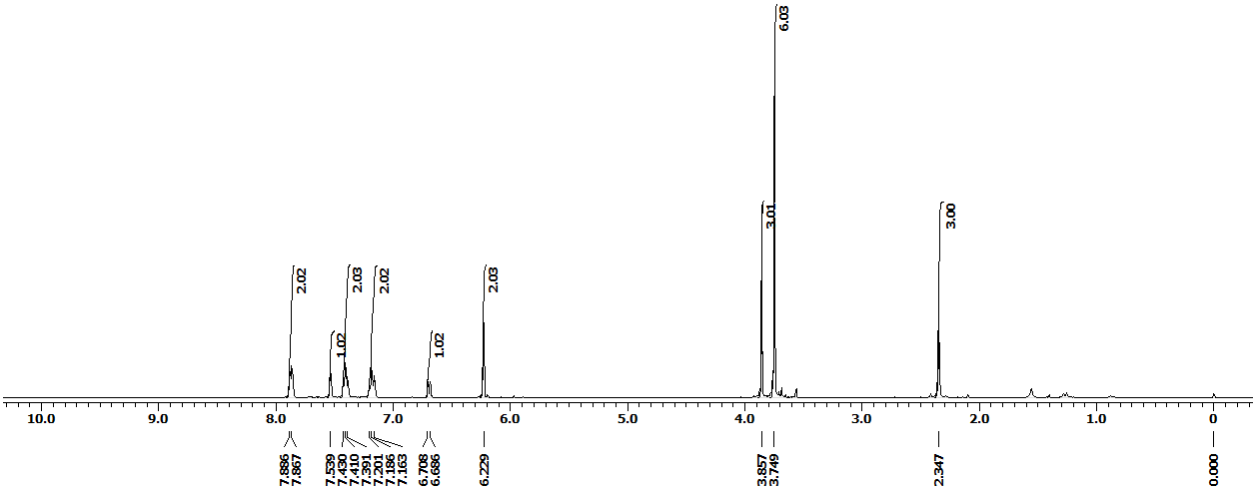


^{1}H NMR

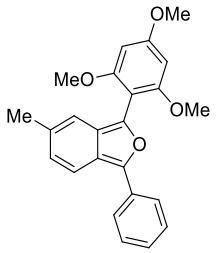


5-Methyl-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3b)

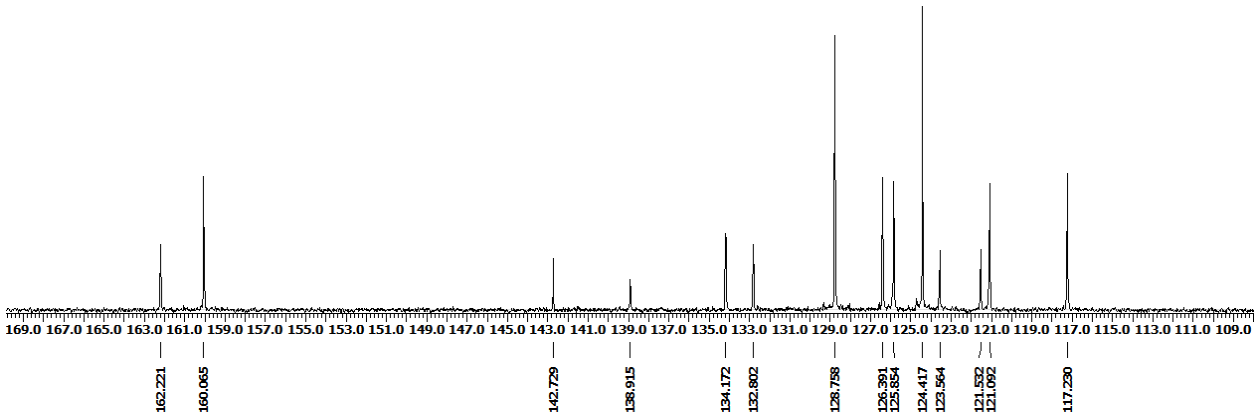


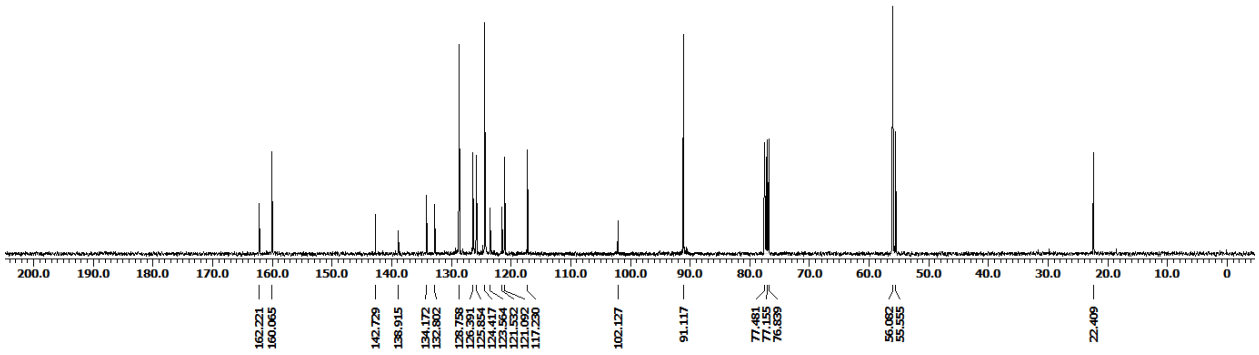


^{13}C NMR

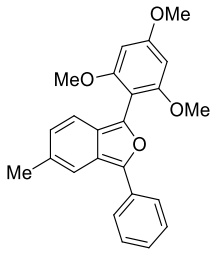


5-Methyl-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3b)

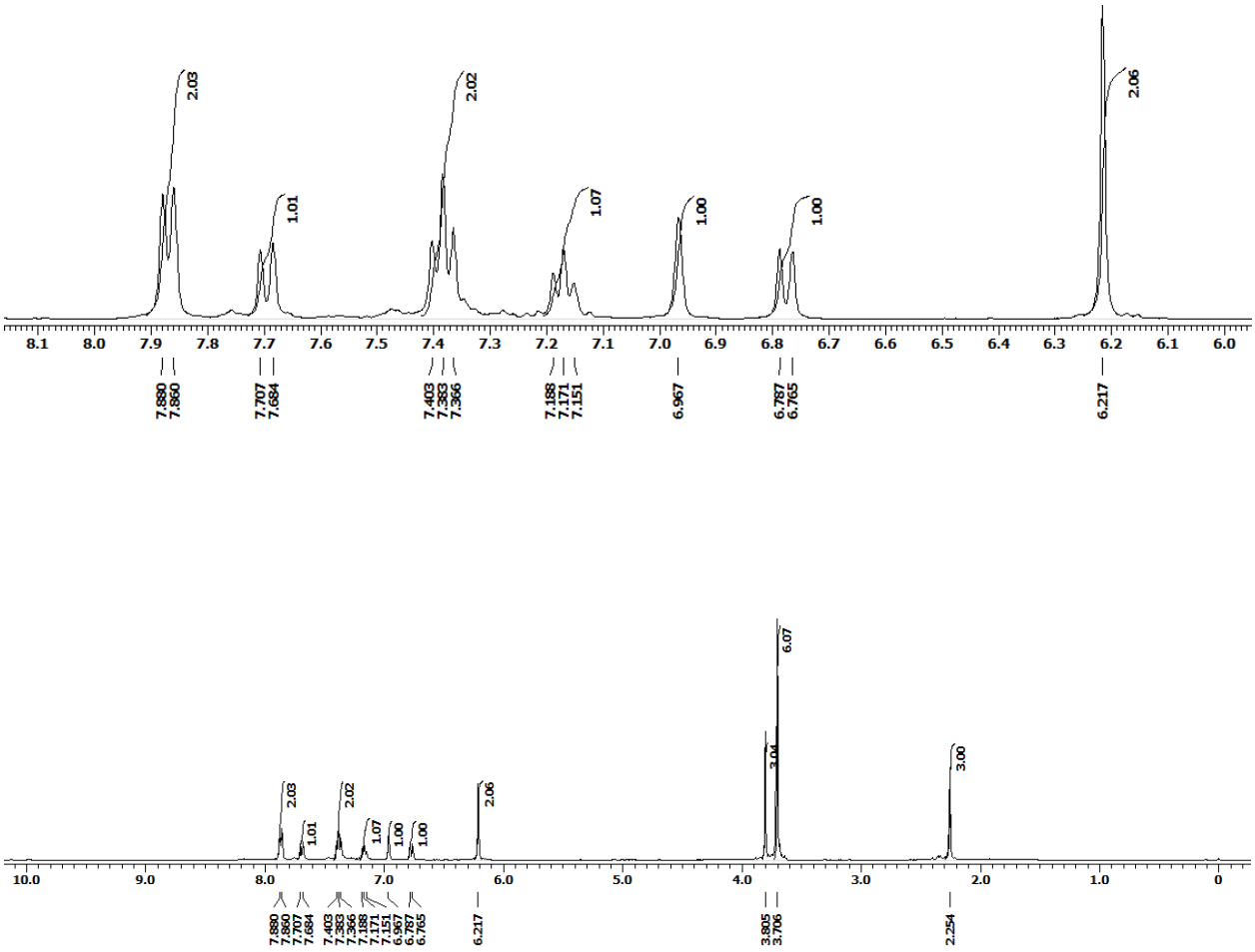




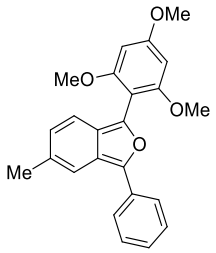
^{1}H NMR



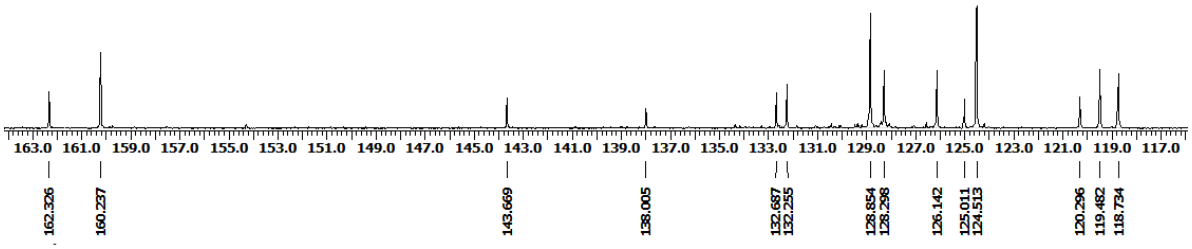
5-methyl-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3c)

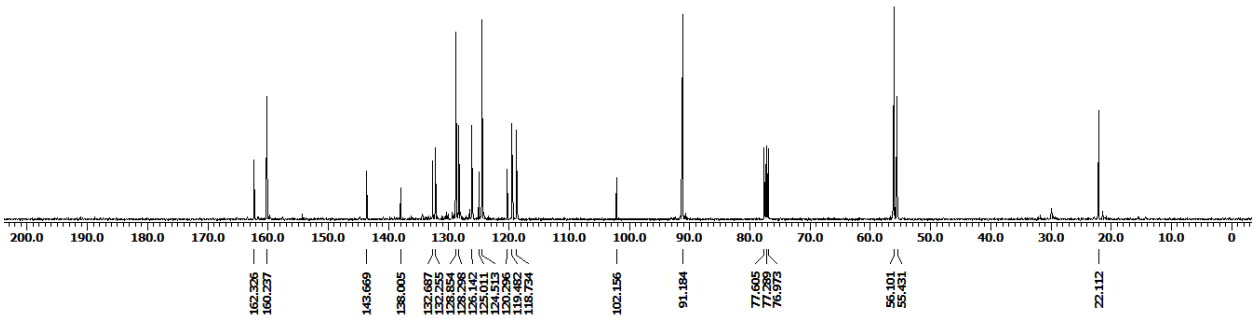


^{13}C NMR

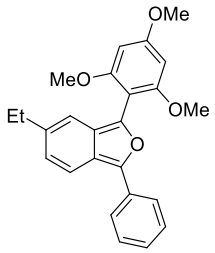


5-methyl-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3c)

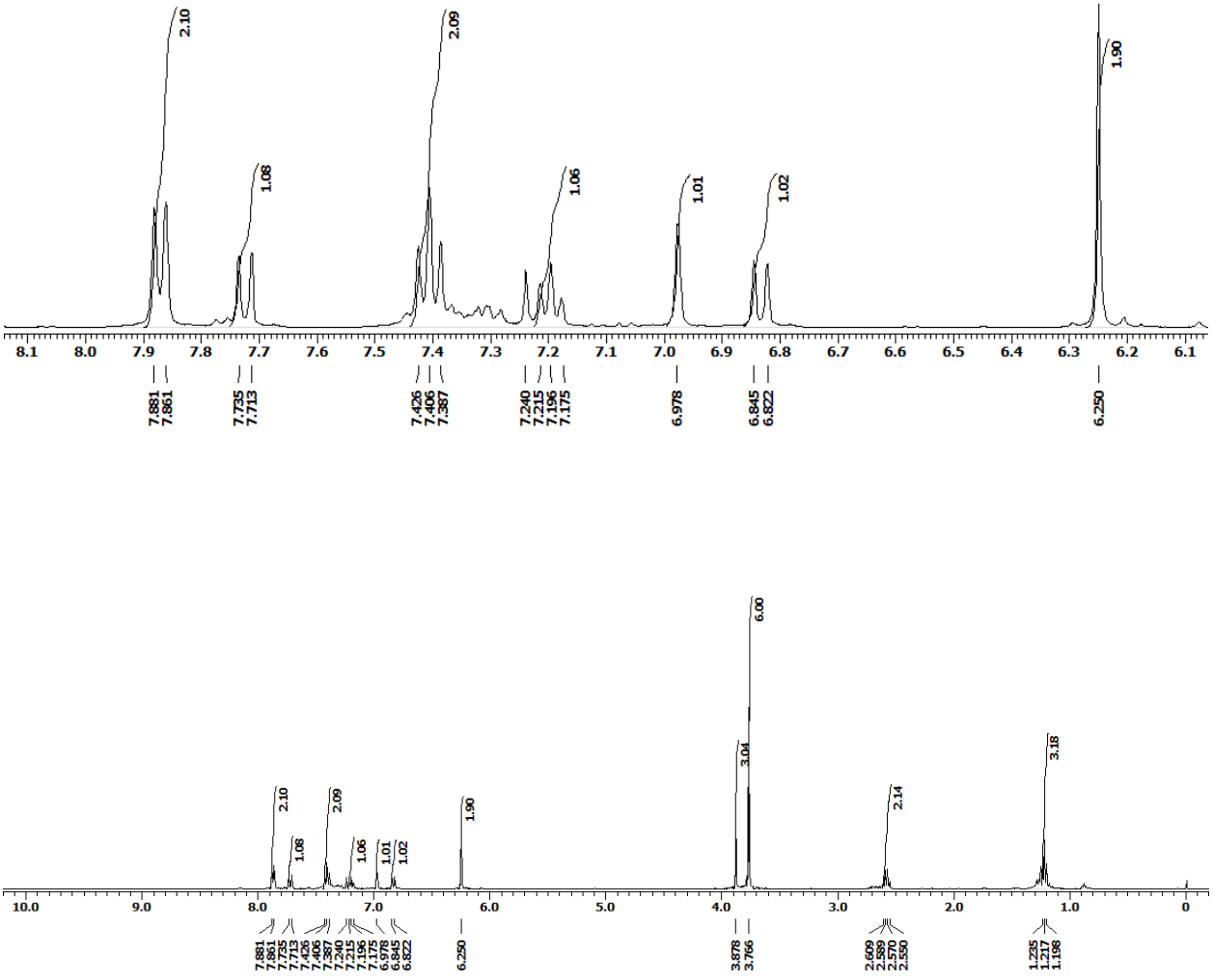




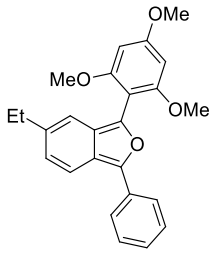
^{1}H NMR



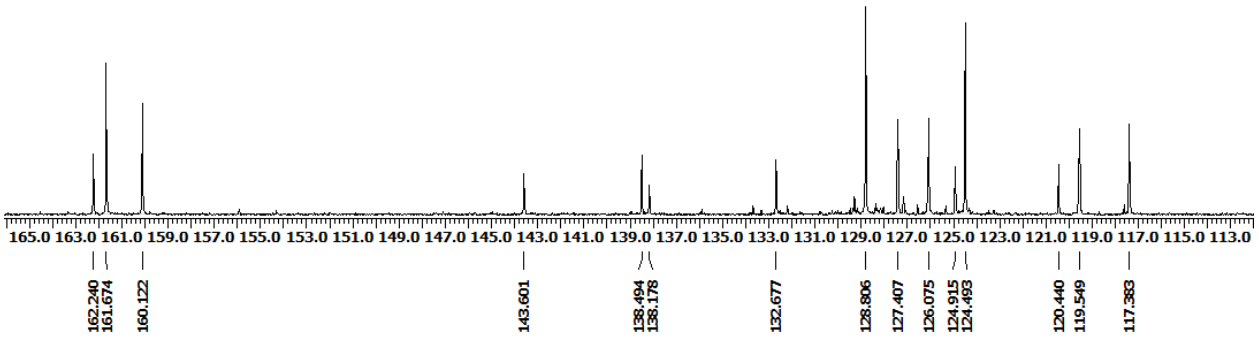
5-Ethyl-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3d)

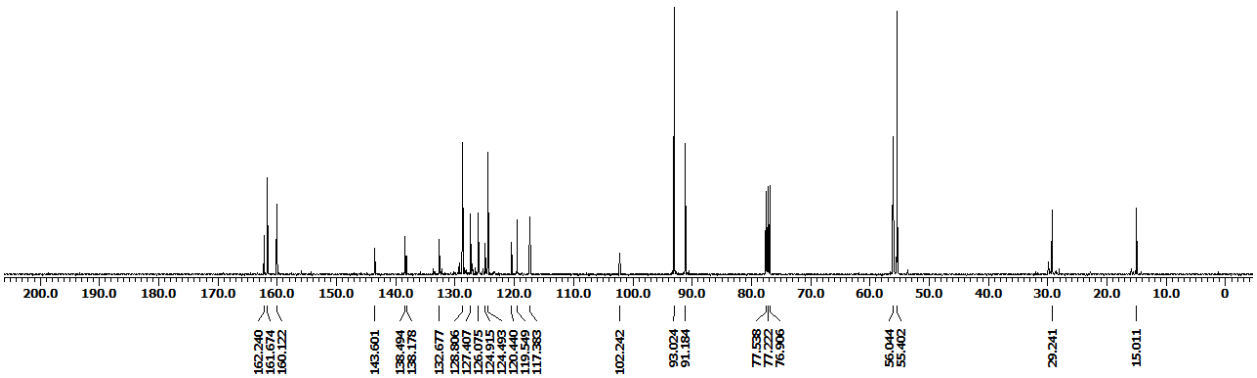


^{13}C NMR

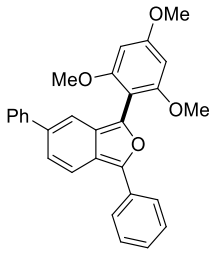


5-Ethyl-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3d)

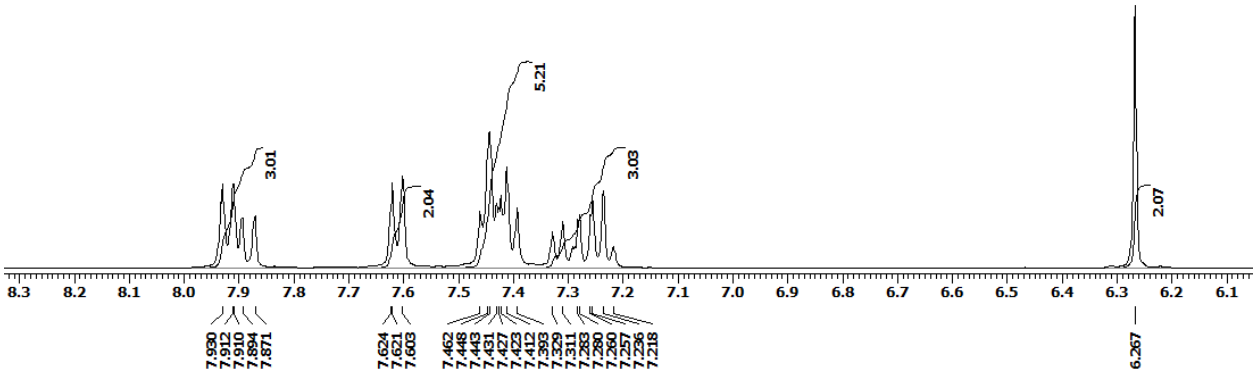


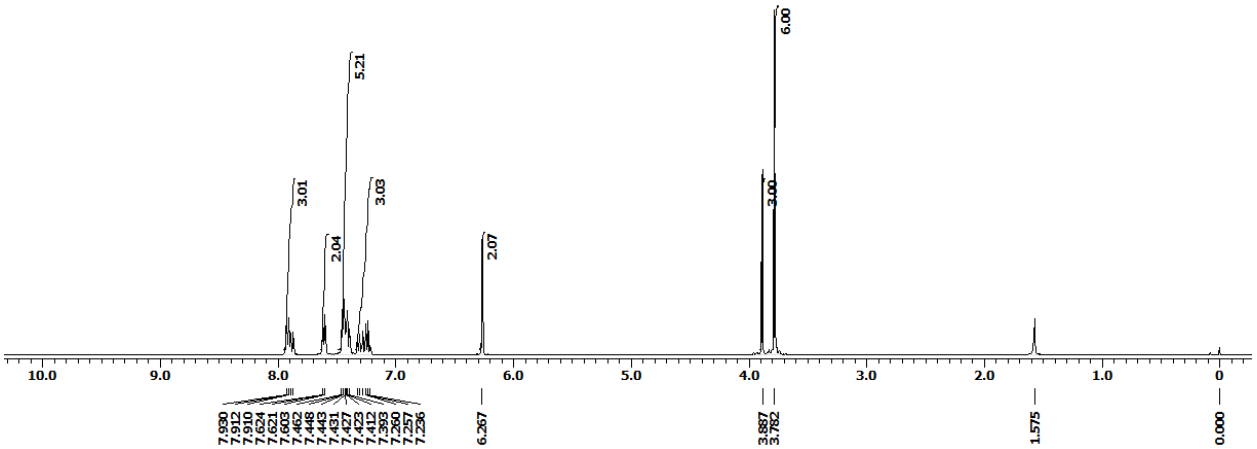


^{1}H NMR

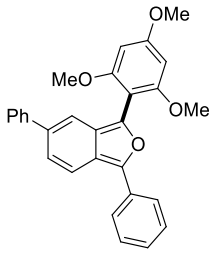


1,5-Diphenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3e)

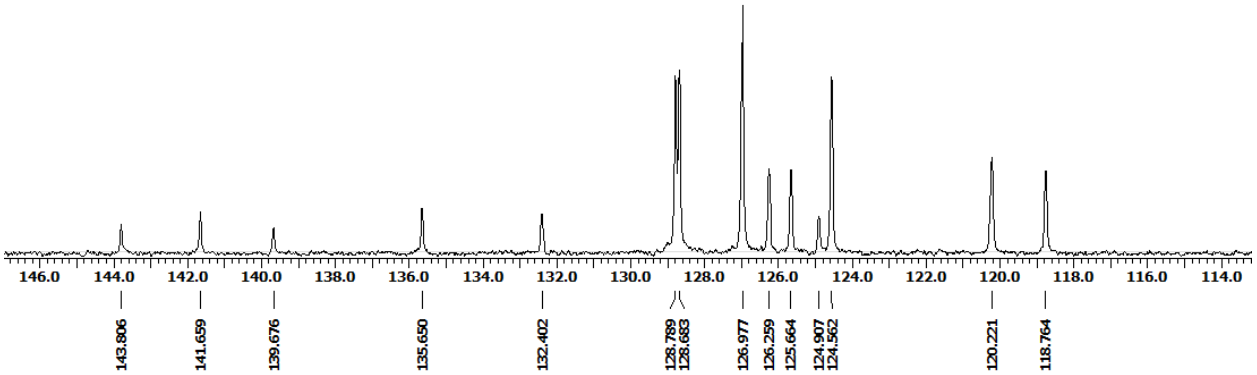


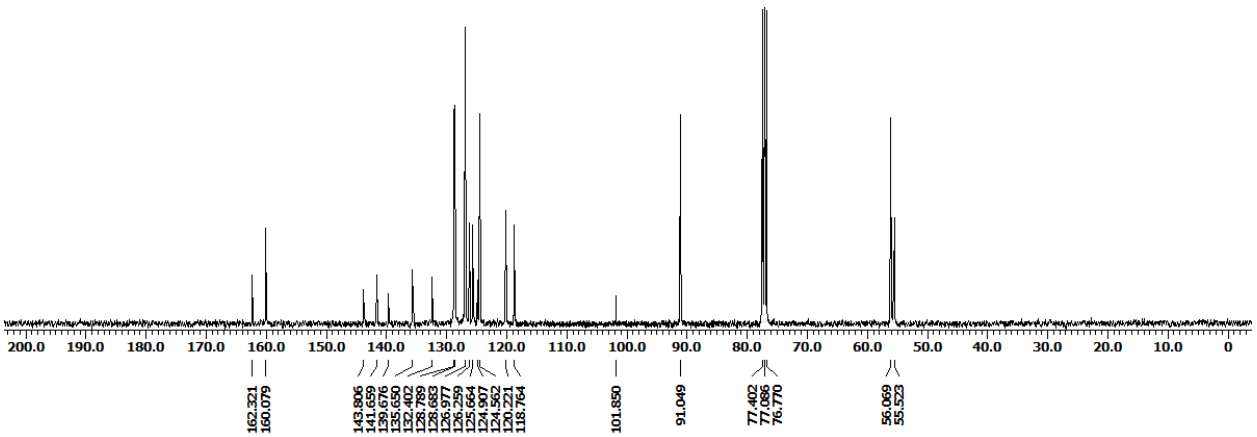


^{13}C NMR

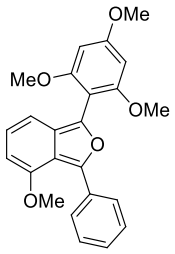


1,5-Diphenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3e)

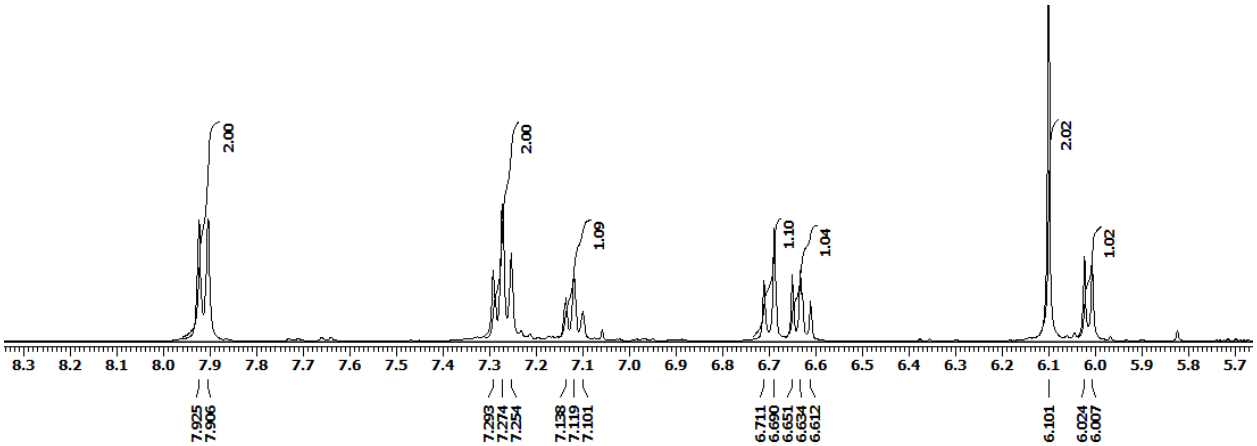


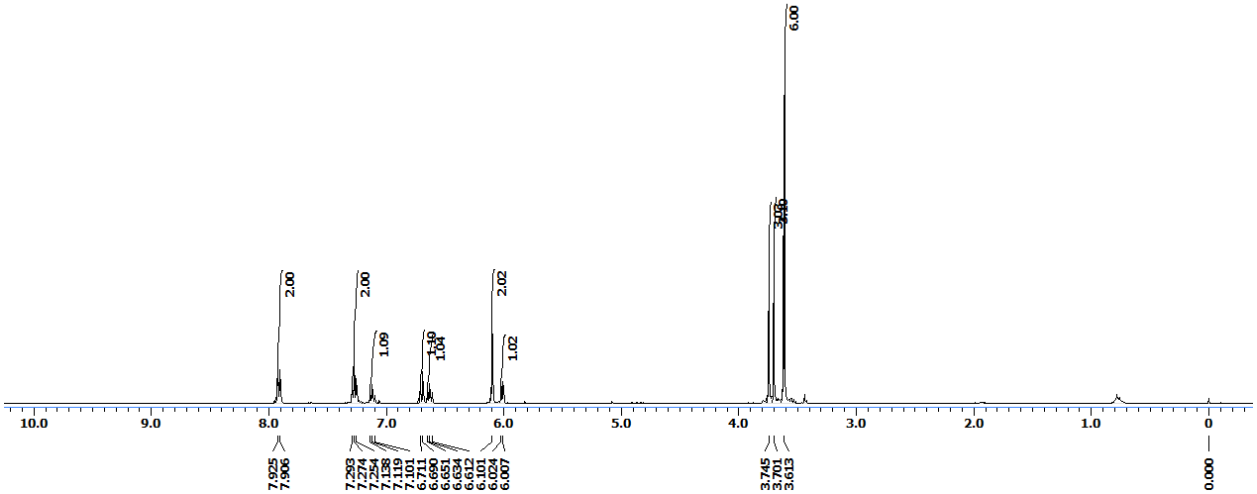


^{1}H NMR

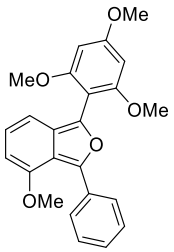


4-Methoxy-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzo*f*uran (3f)

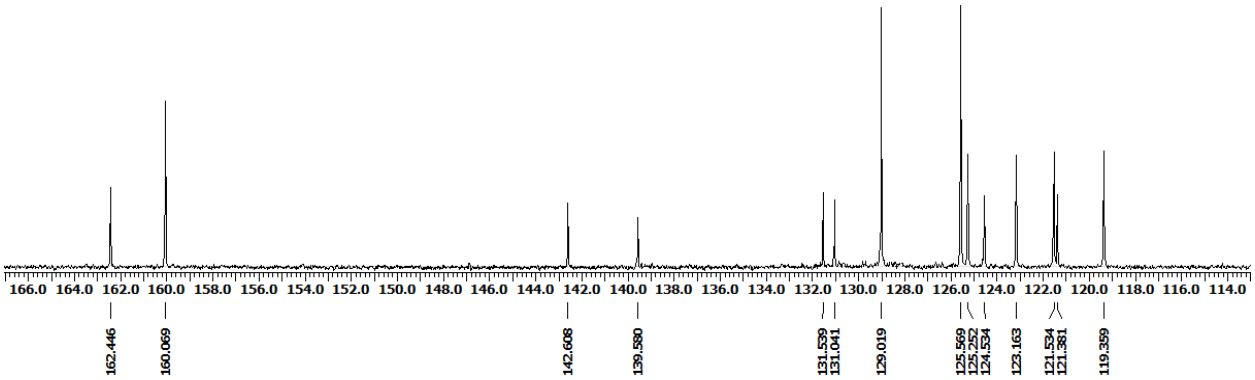


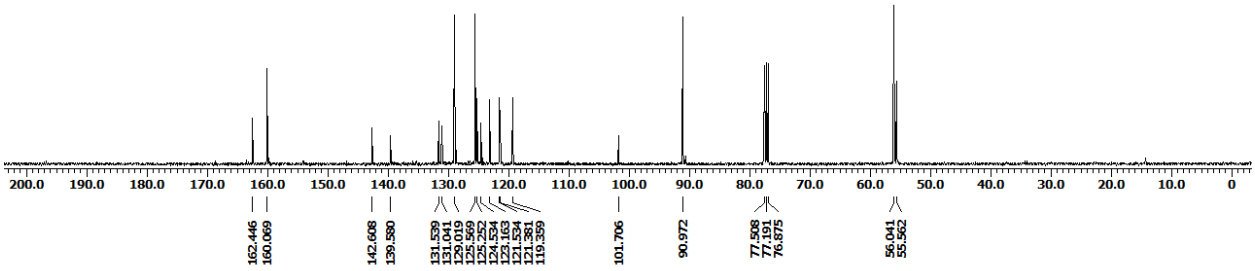


^{13}C NMR

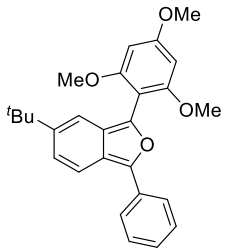


4-Methoxy-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzo*f*uran (3f)

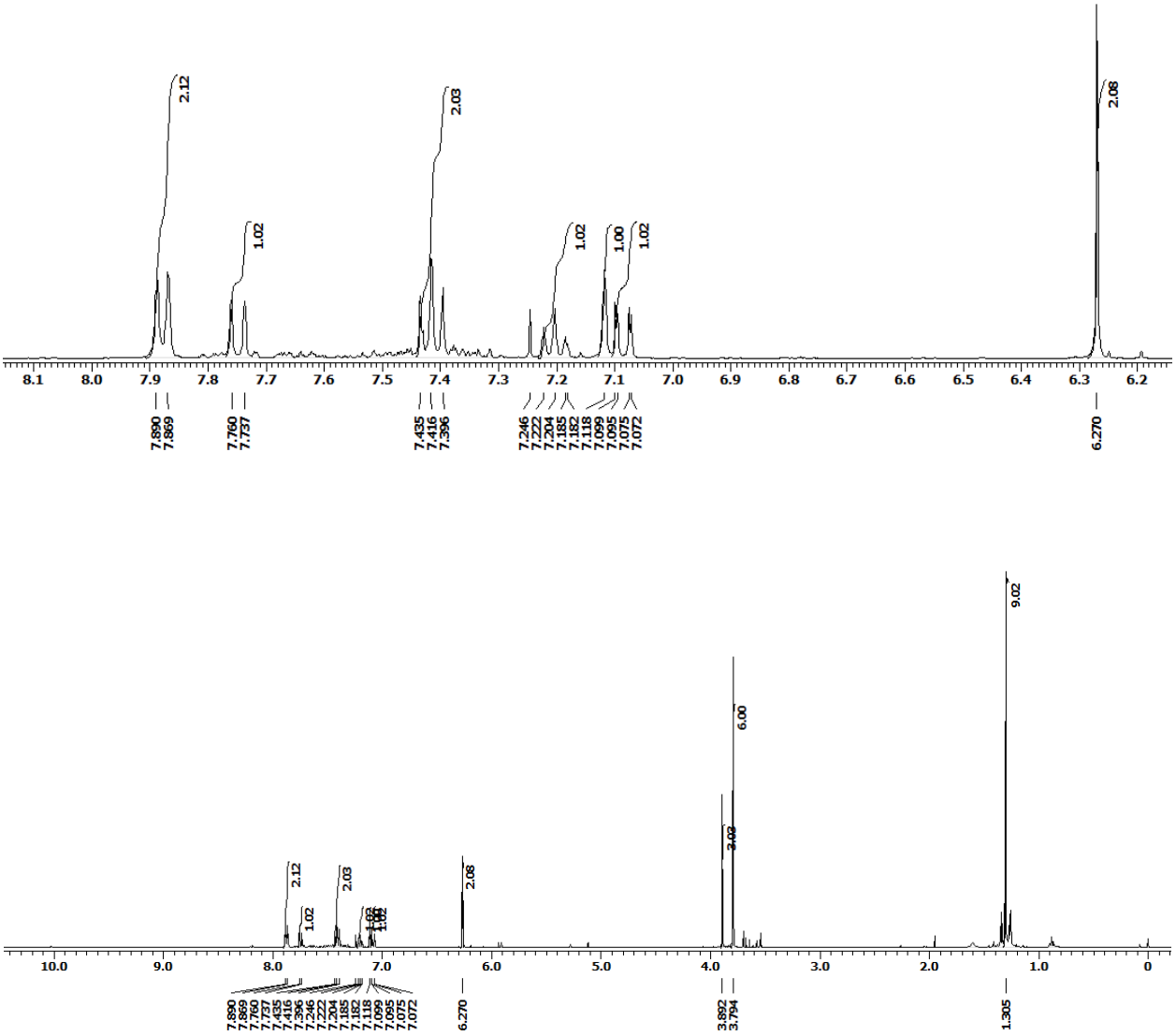




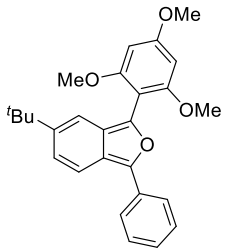
^{1}H NMR



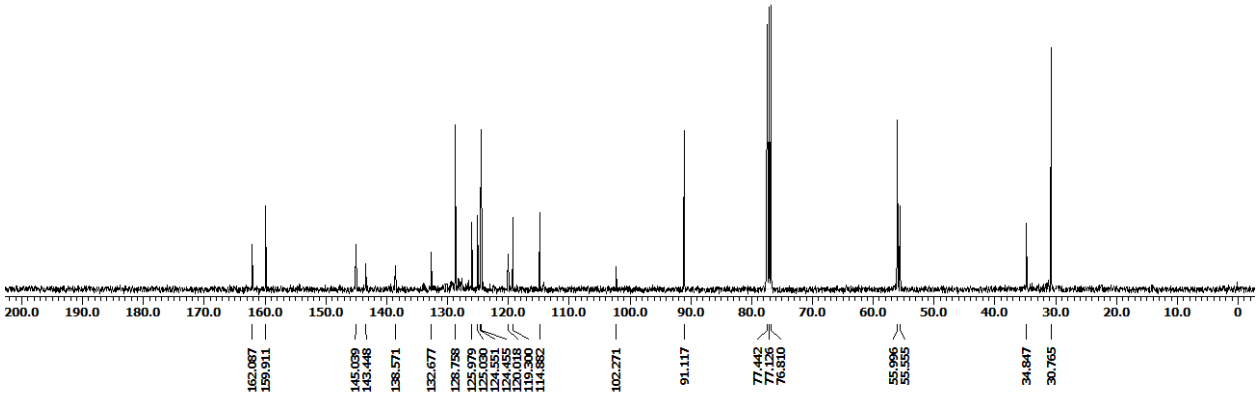
5-(tert-Butyl)-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3g)



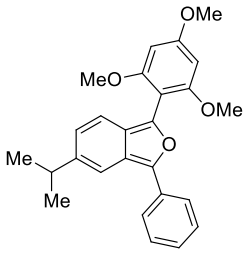
^{13}C NMR



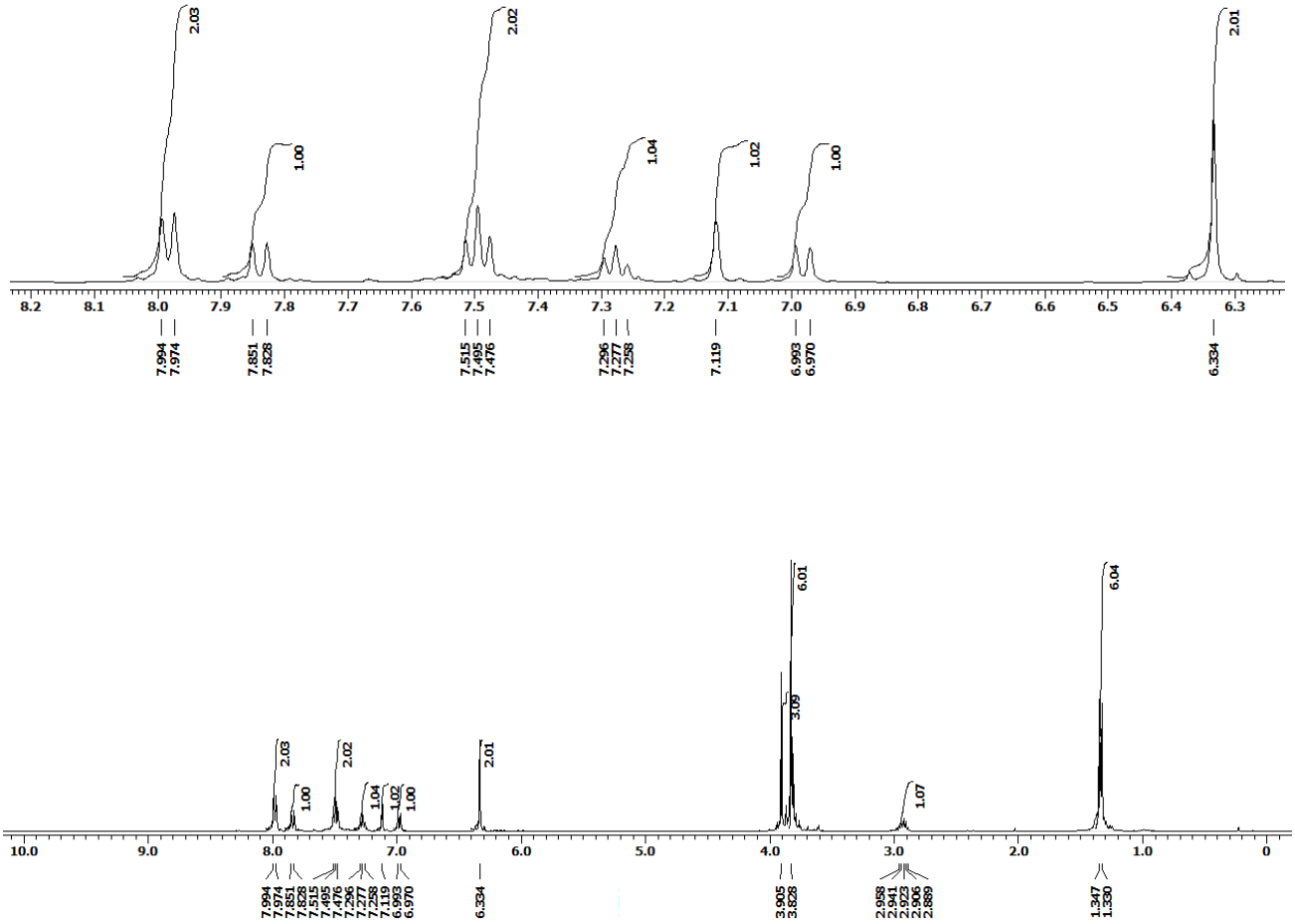
5-(tert-Butyl)-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3g)



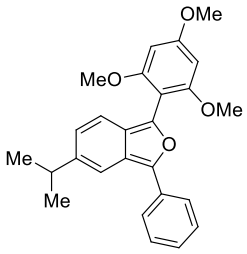
^{1}H NMR



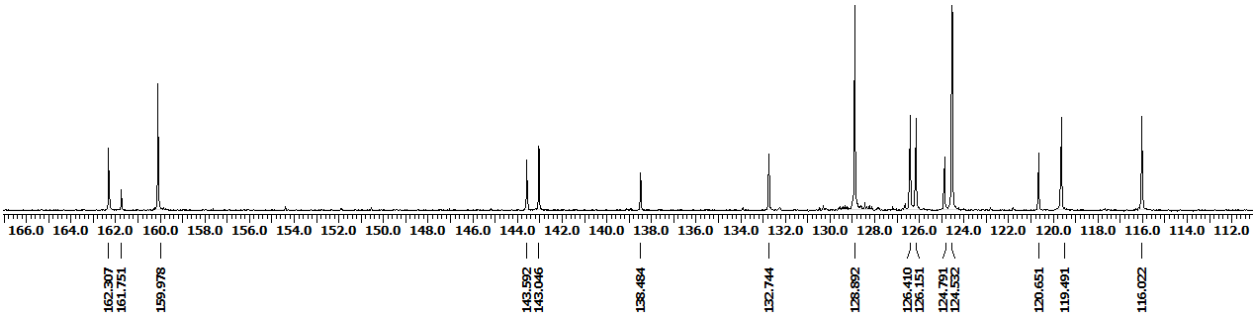
5-Isopropyl-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3h)

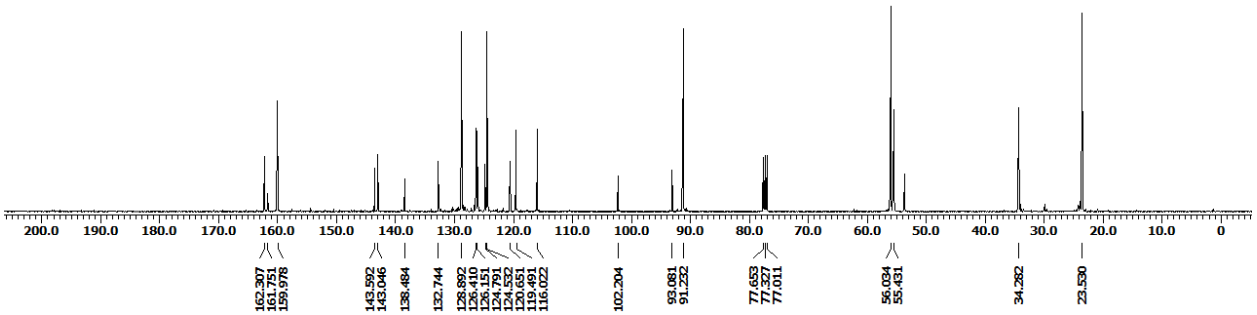


^{13}C NMR

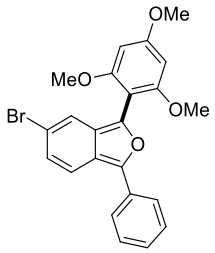


5-Isopropyl-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3h)

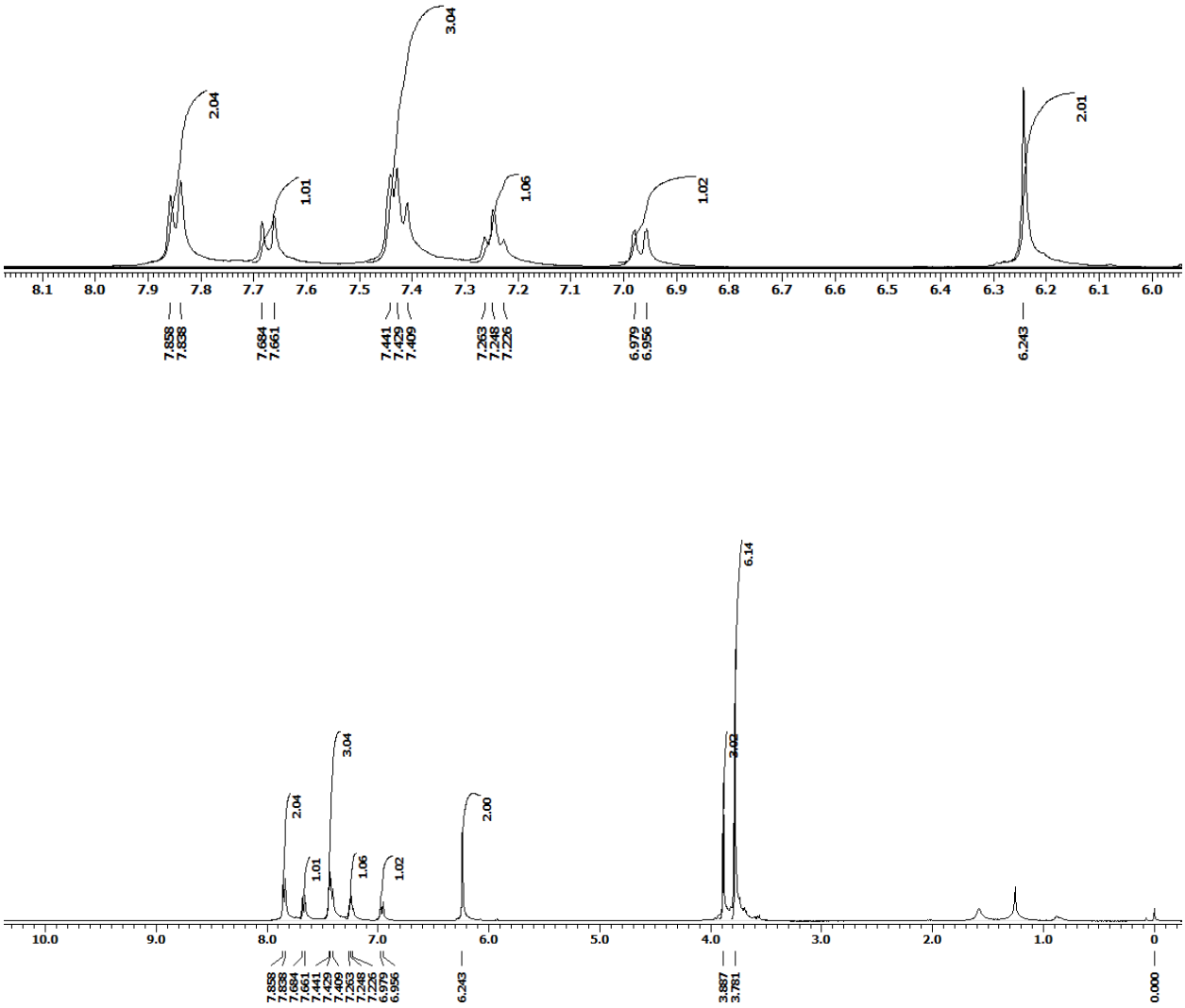




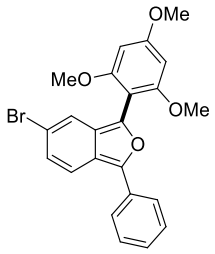
^{1}H NMR



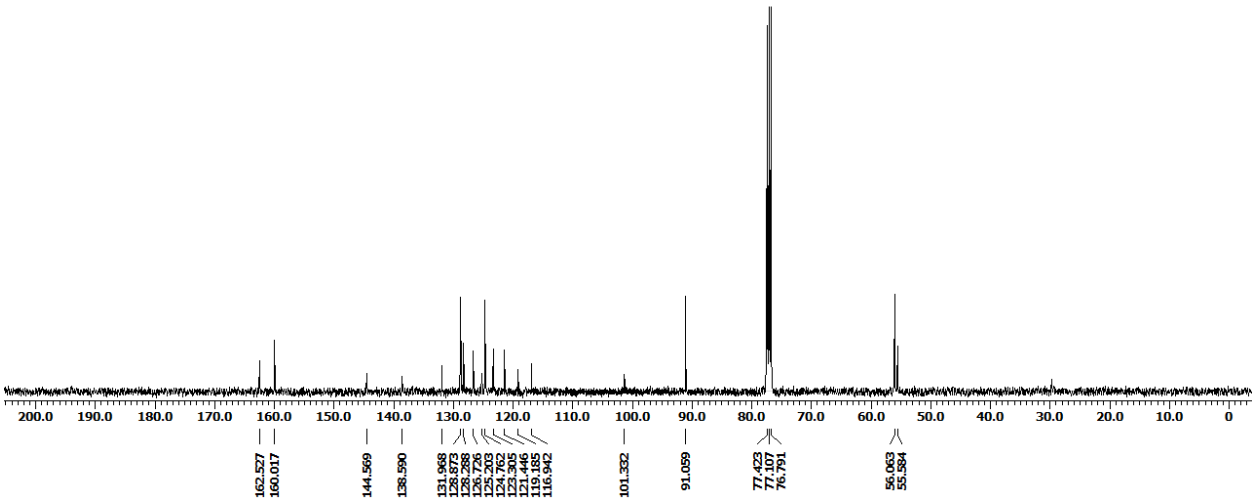
5-Bromo-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3i)



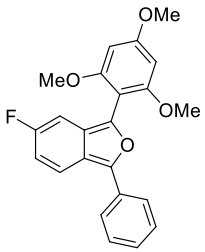
^{13}C NMR



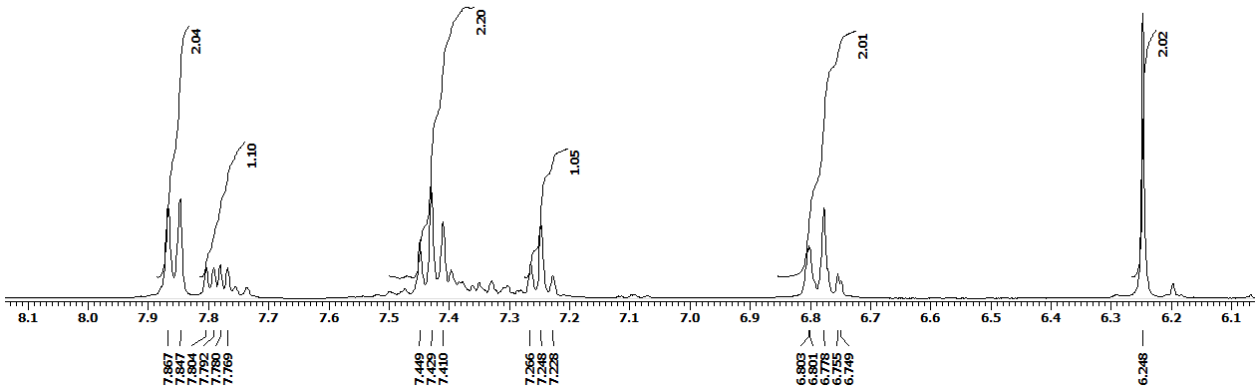
5-Bromo-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3i)

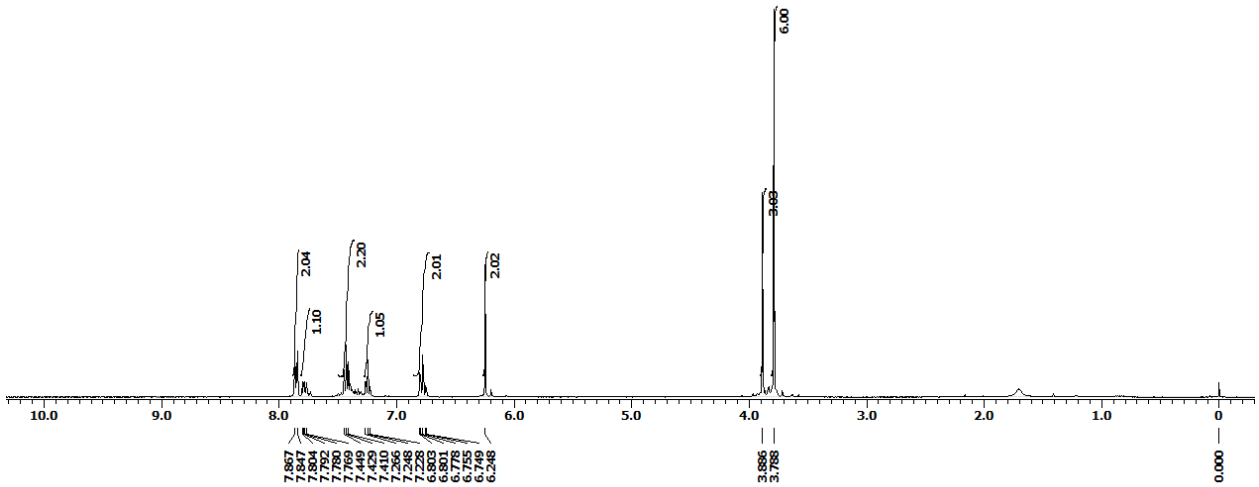


^{1}H NMR

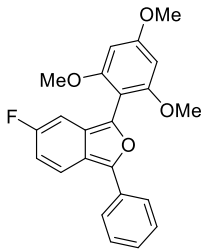


5-Fluoro-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3j)

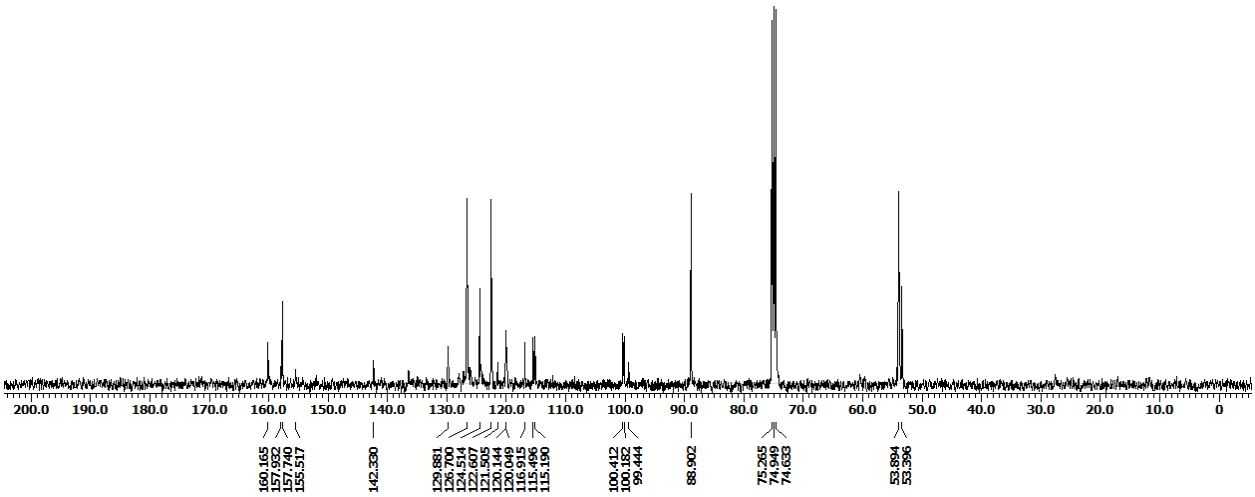




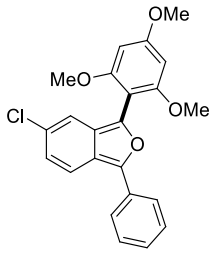
^{13}C NMR



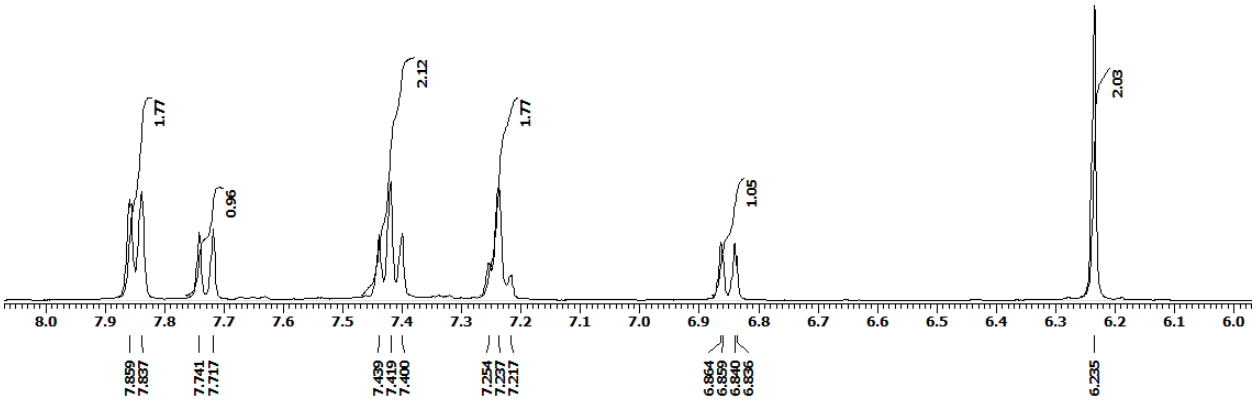
5-Fluoro-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3j)

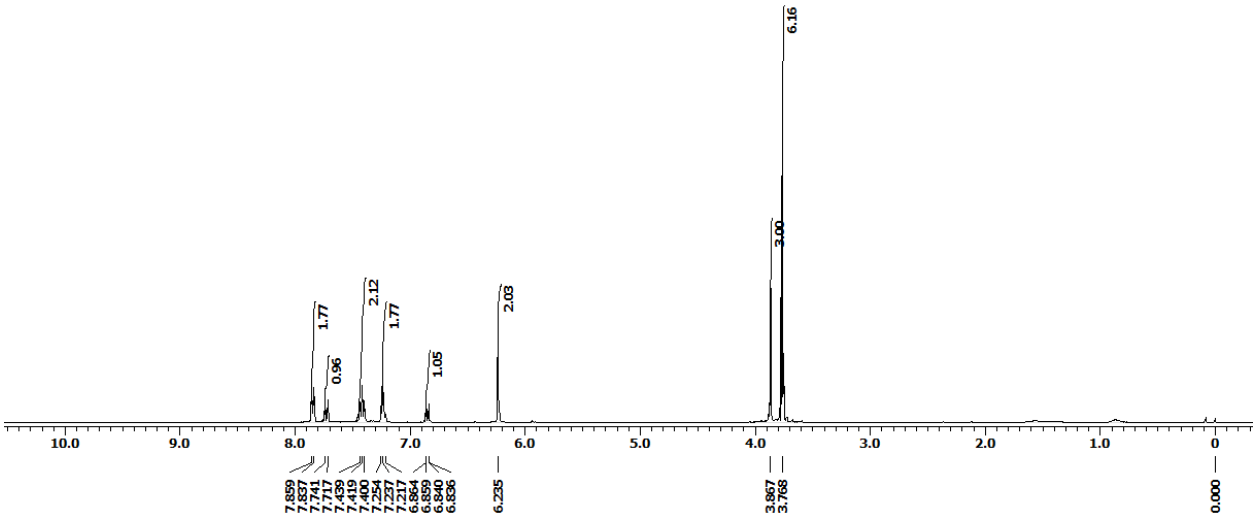


^{1}H NMR

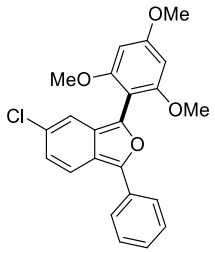


5-Chloro-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3k)

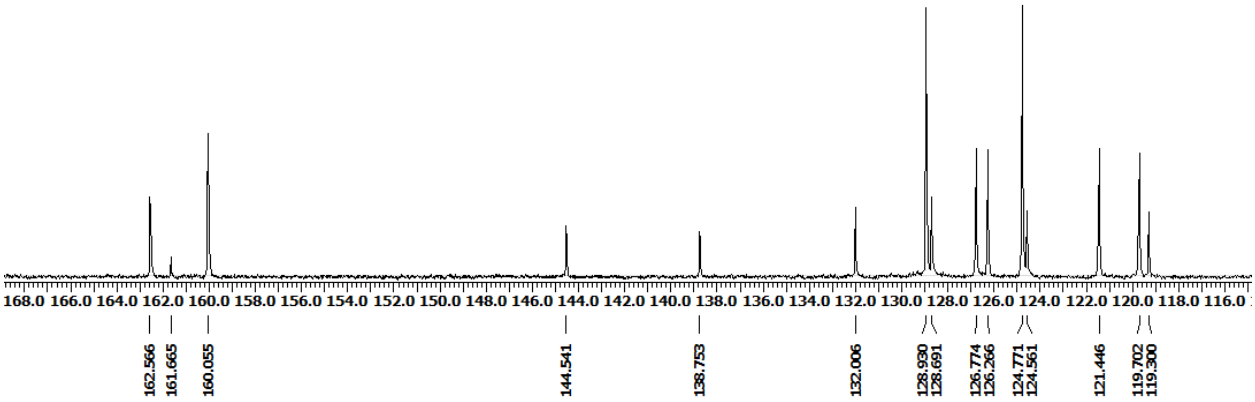


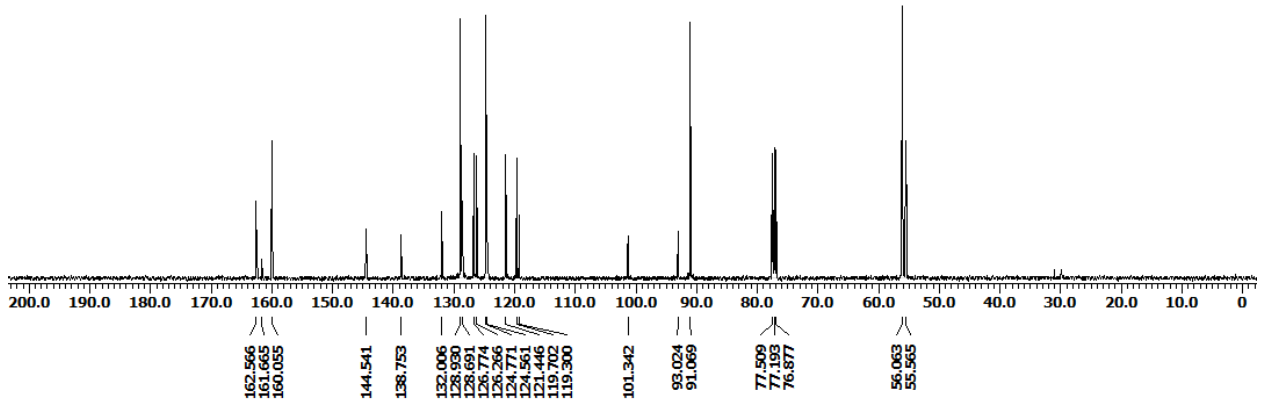


^{13}C NMR

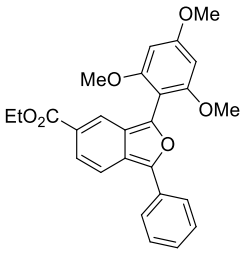


5-Chloro-1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3k)

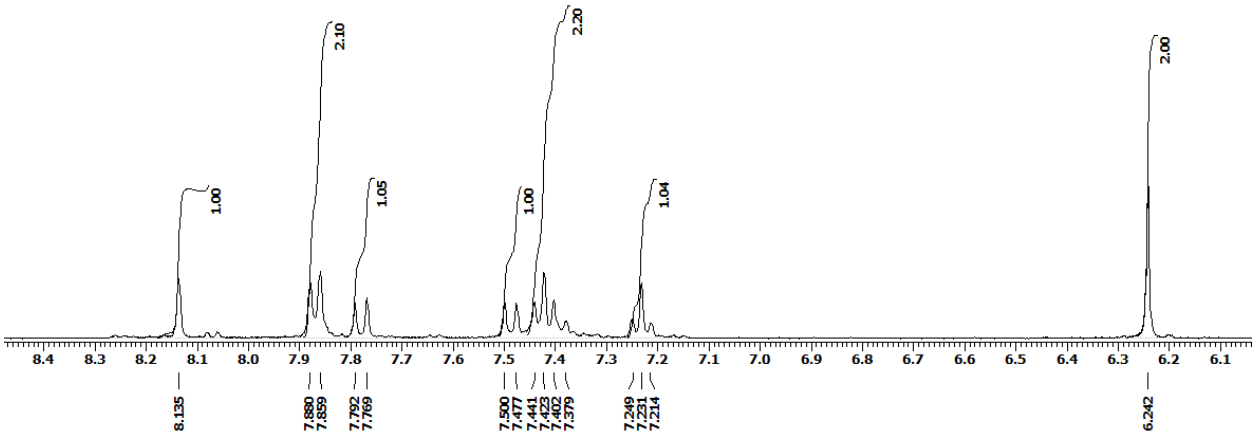


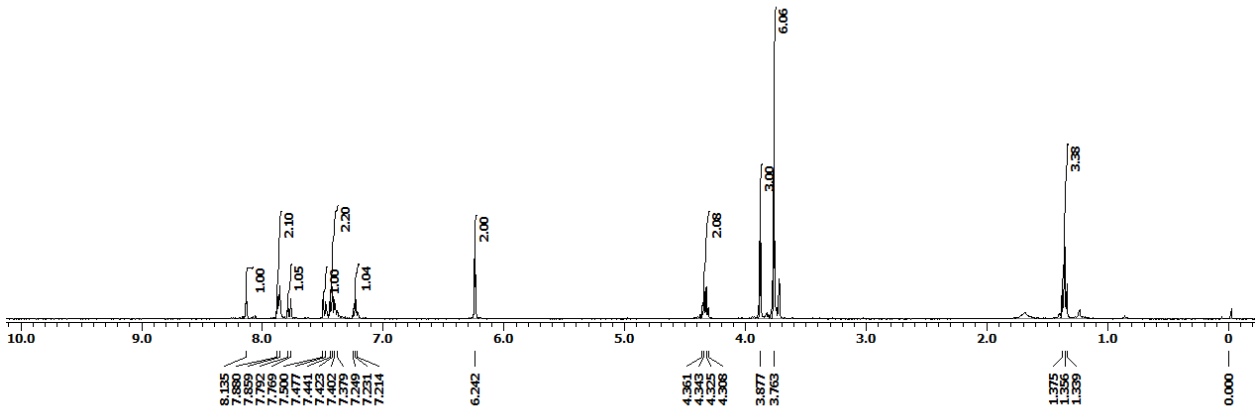


^{1}H NMR

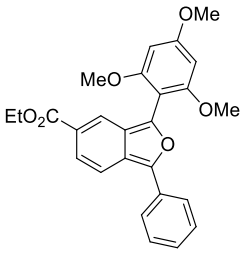


Ethyl 1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran-5-carboxylate (3l)

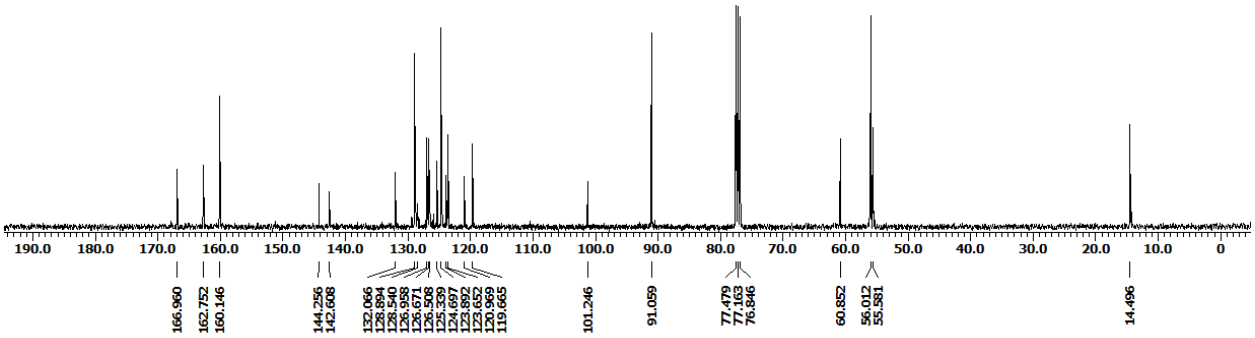




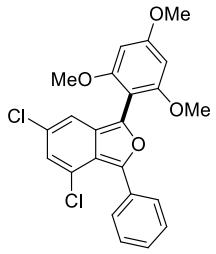
^{13}C NMR



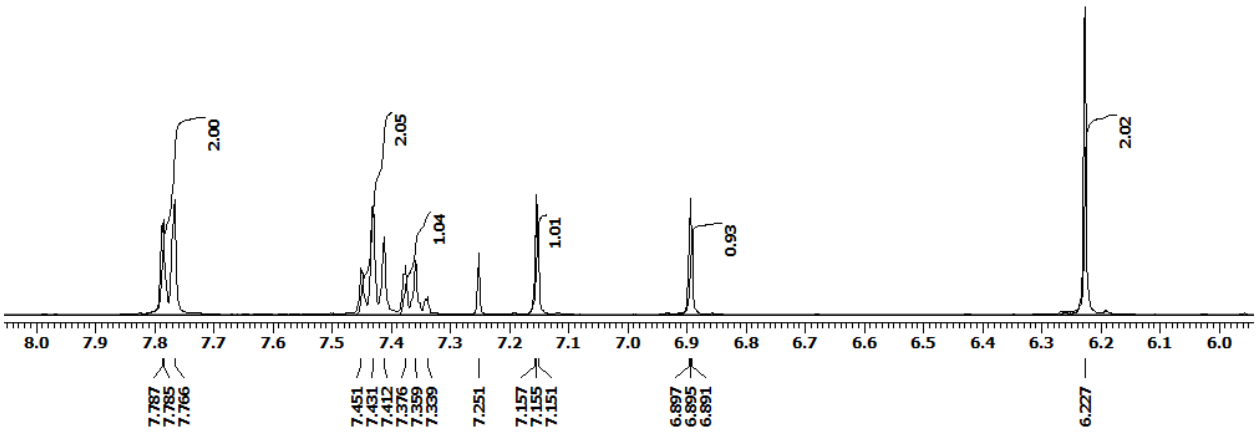
Ethyl 1-phenyl-3-(2,4,6-trimethoxyphenyl)isobenzofuran-5-carboxylate (3l)

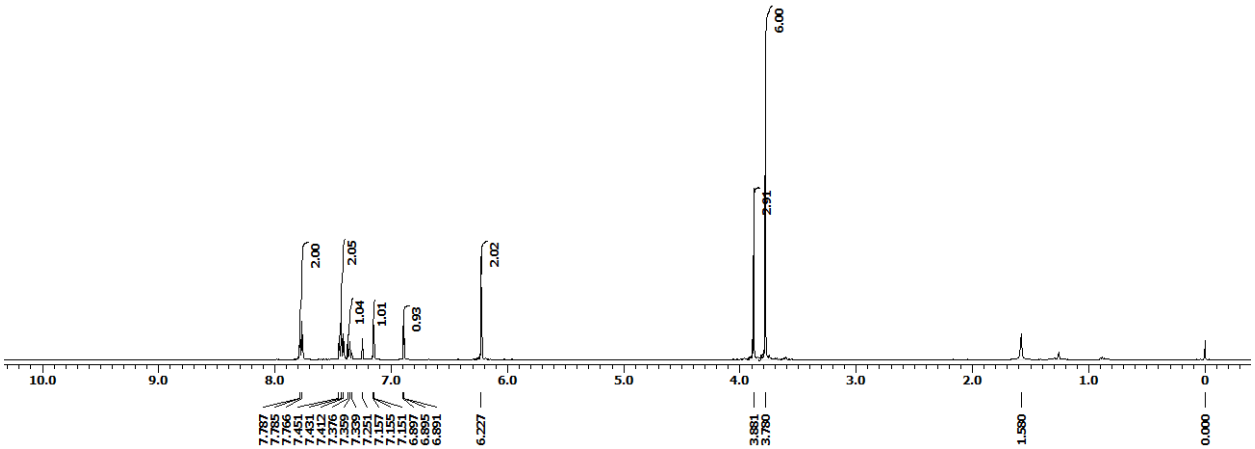


^{1}H NMR

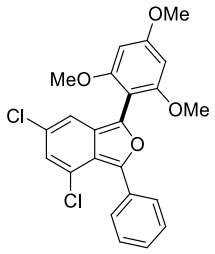


4,6-Dichloro-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3m)

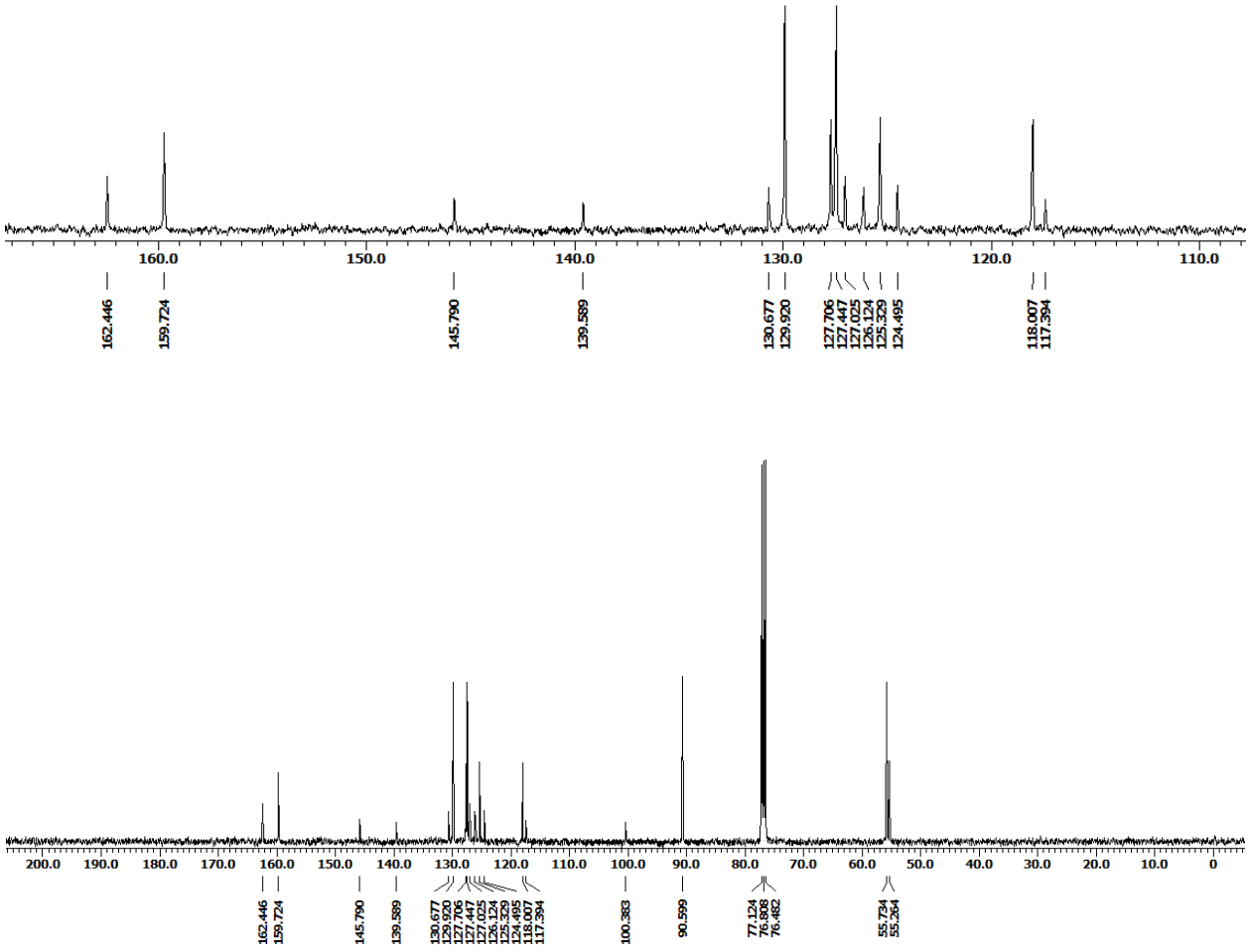




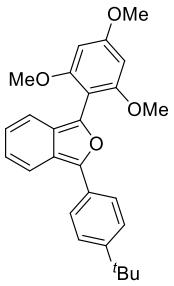
^{13}C NMR



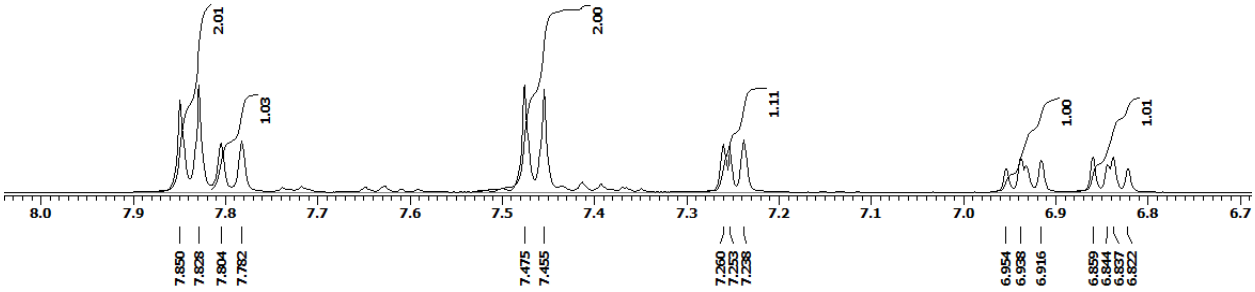
4,6-Dichloro-3-phenyl-1-(2,4,6-trimethoxyphenyl)isobenzofuran (3m)

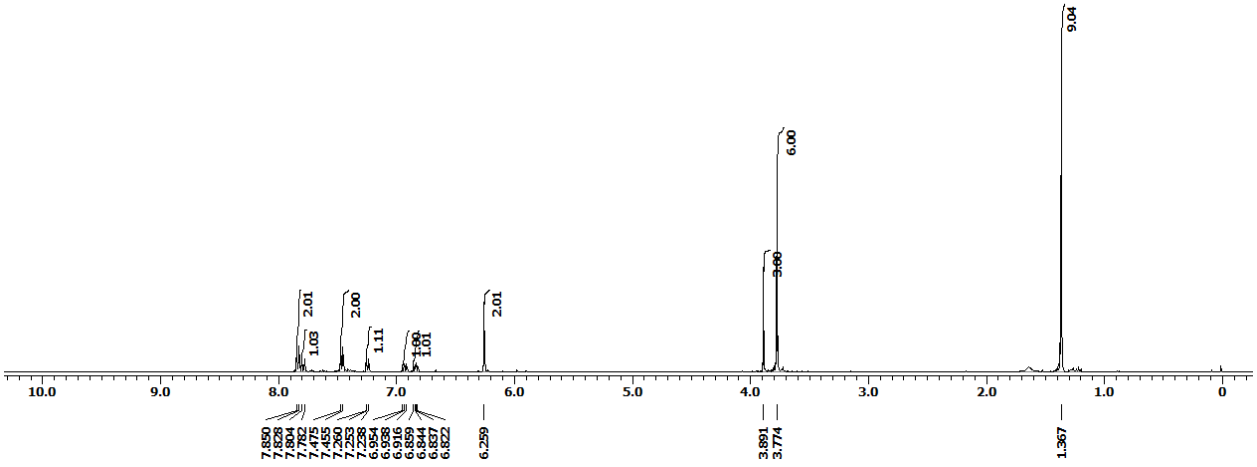


^{1}H NMR

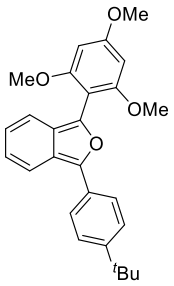


1-(4-(*tert*-Butyl)phenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3n)

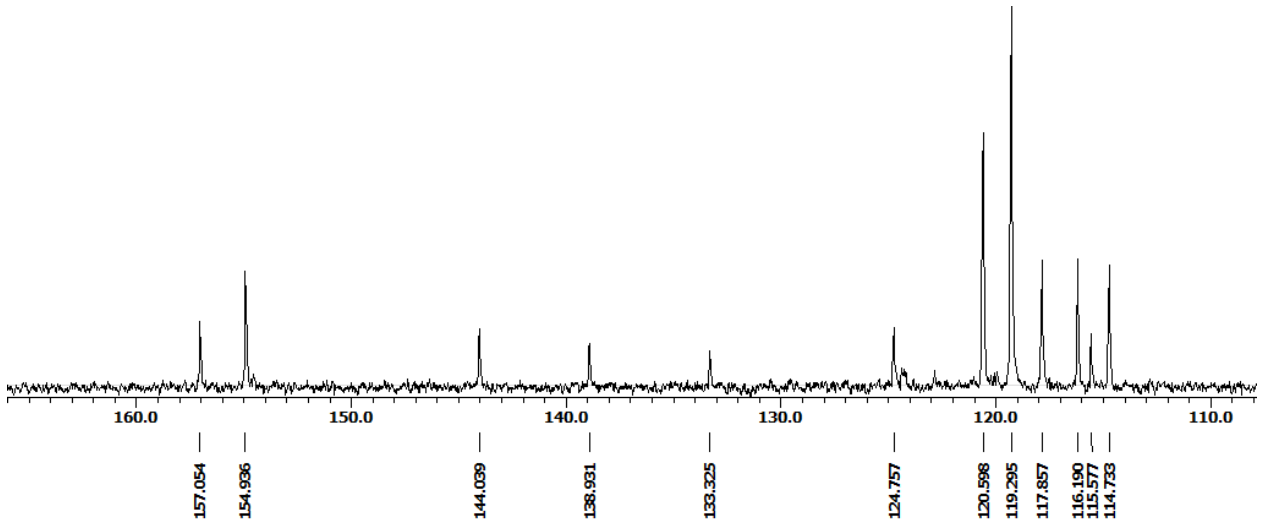


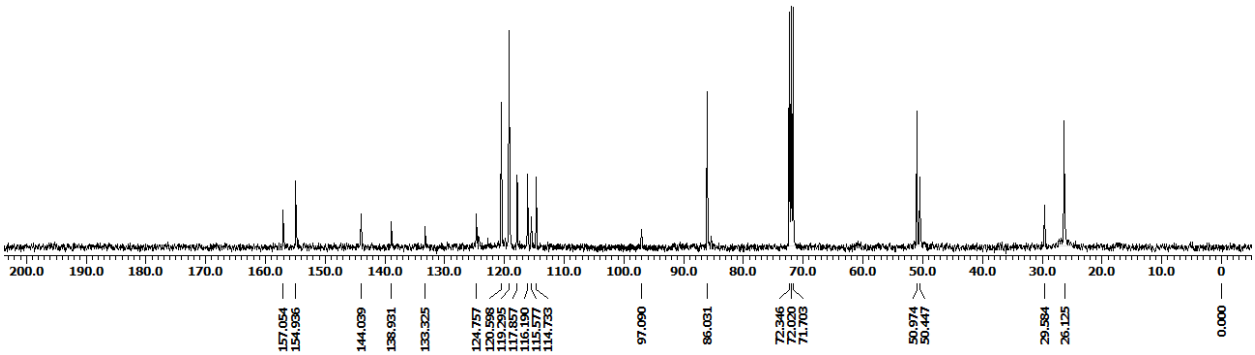


^{13}C NMR

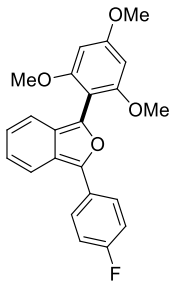


1-(4-(*tert*-Butyl)phenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3n)

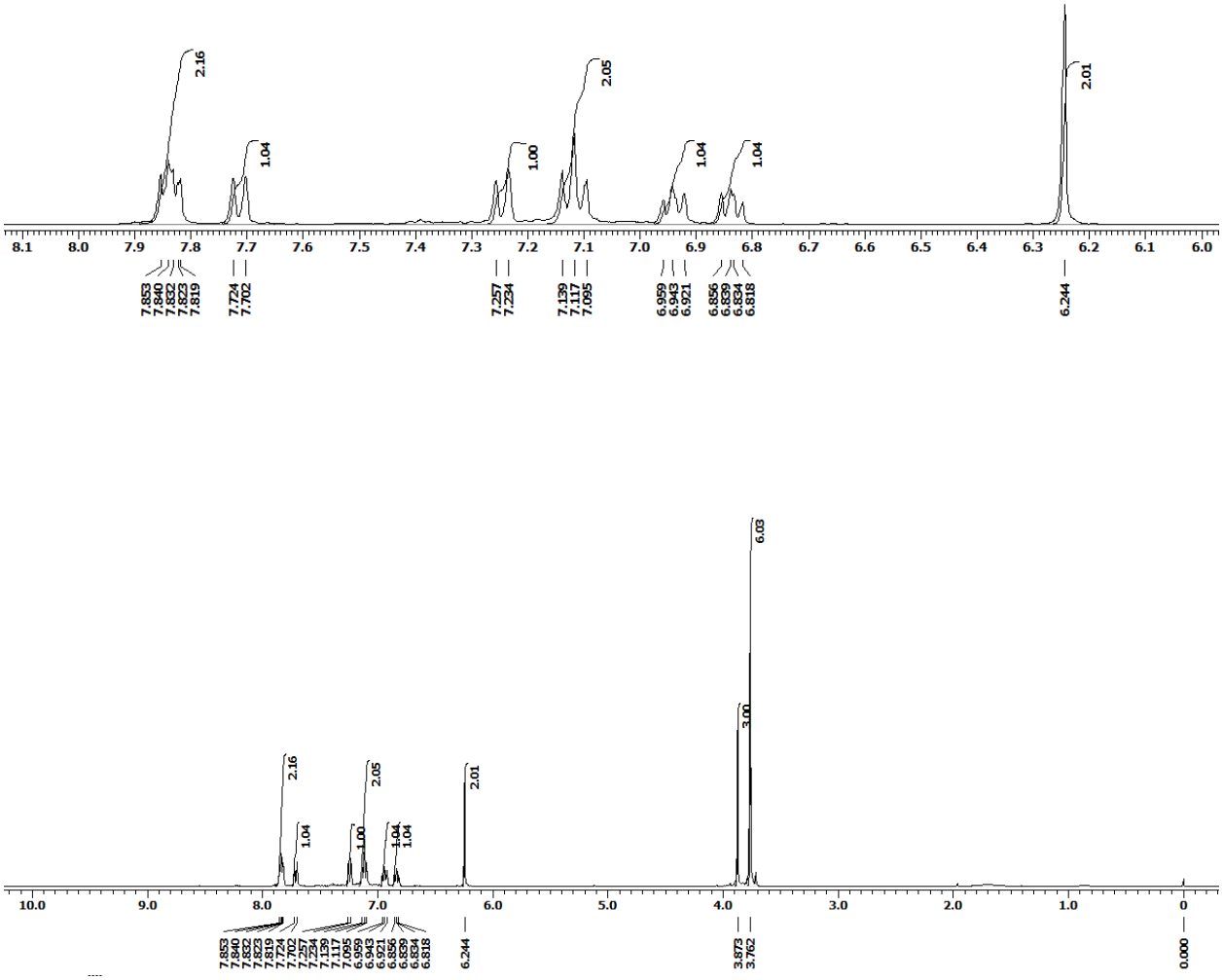




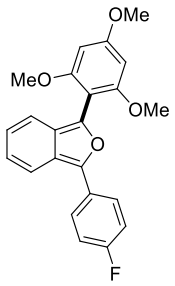
^{1}H NMR



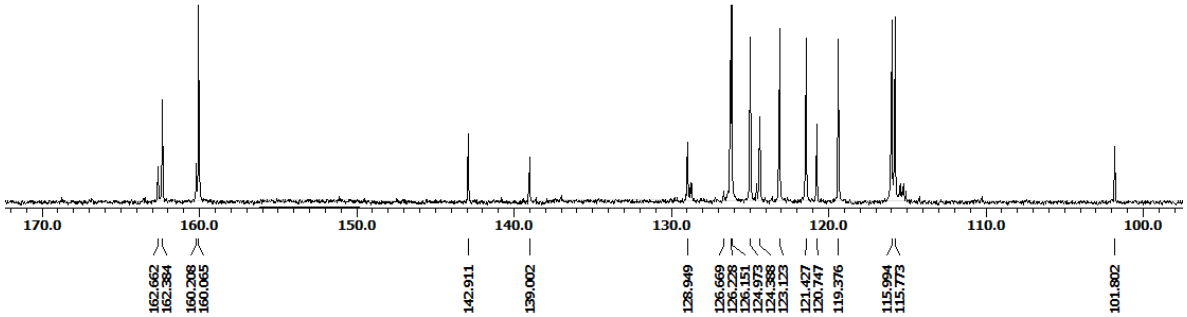
1-(4-Fluorophenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3o)

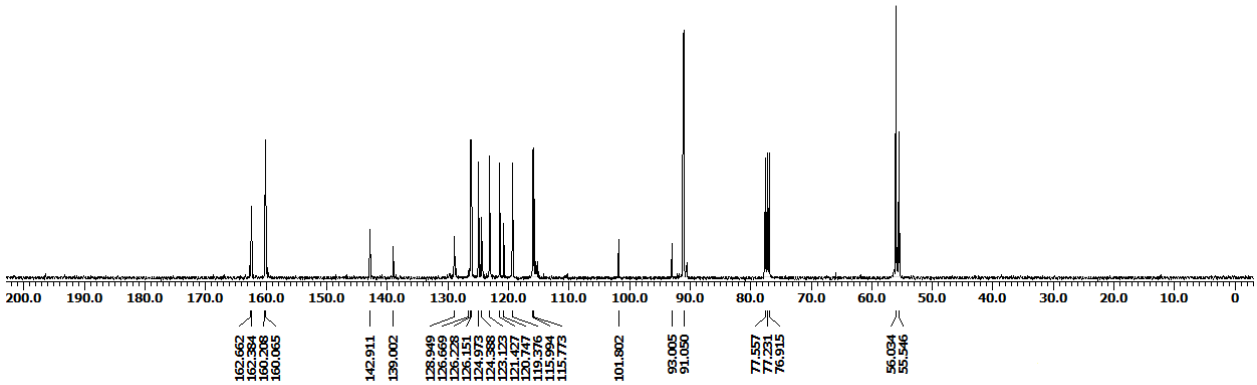


^{13}C NMR

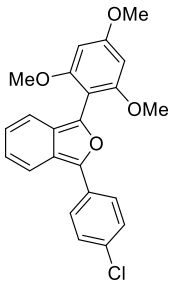


1-(4-Fluorophenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3o)

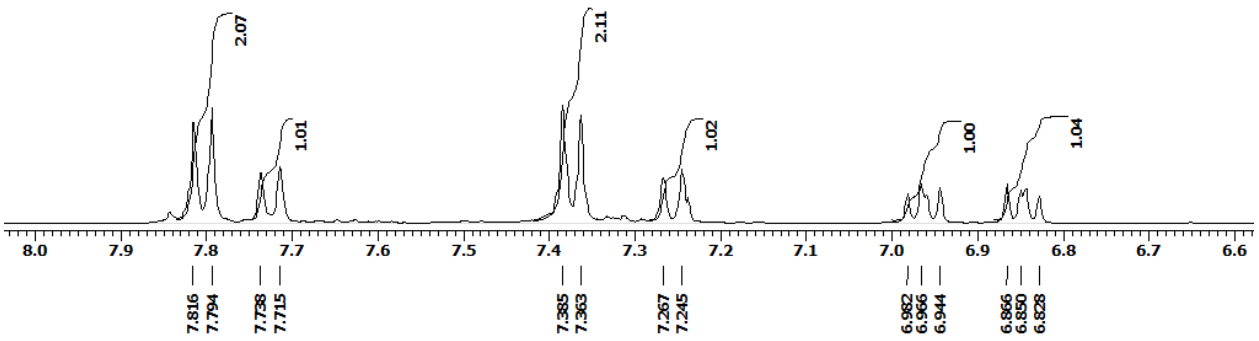


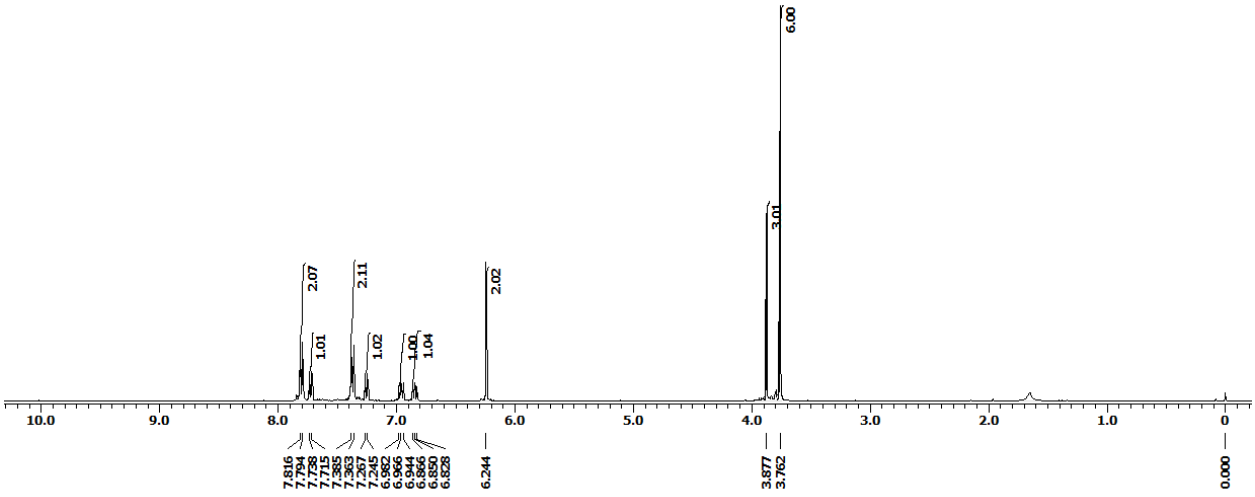


^{1}H NMR

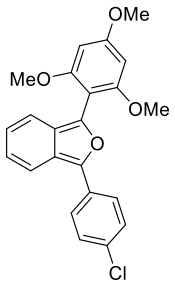


1-(4-chlorophenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3p)

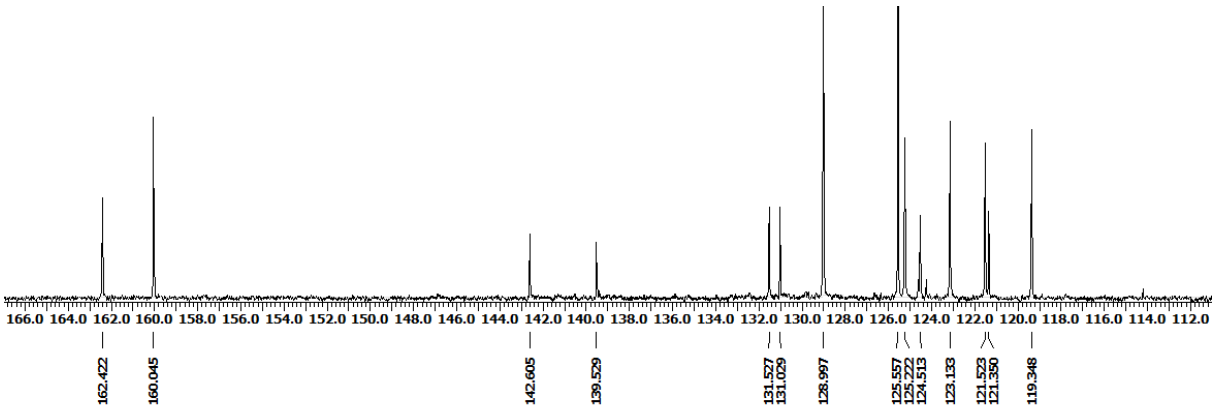


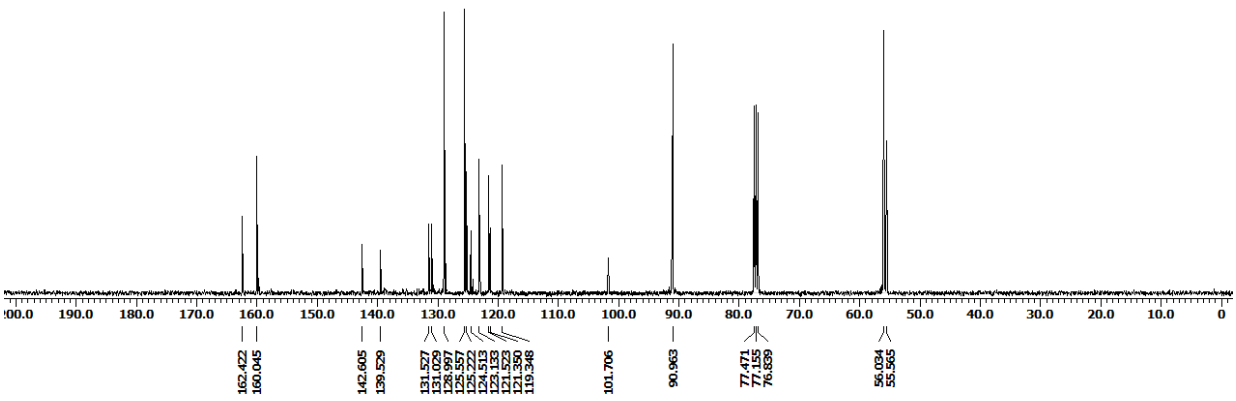


^{13}C NMR

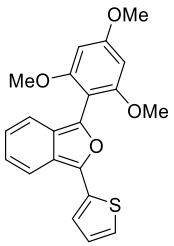


1-(4-chlorophenyl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3p)

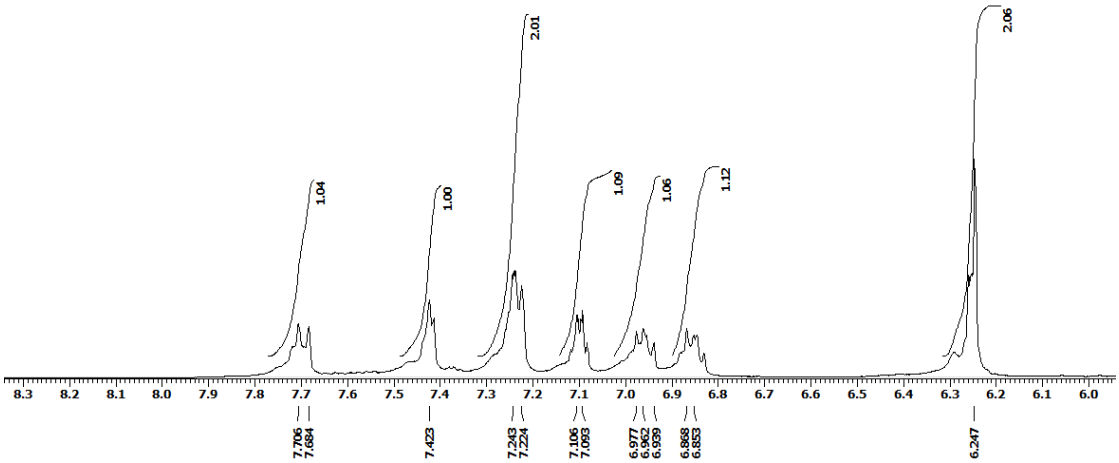


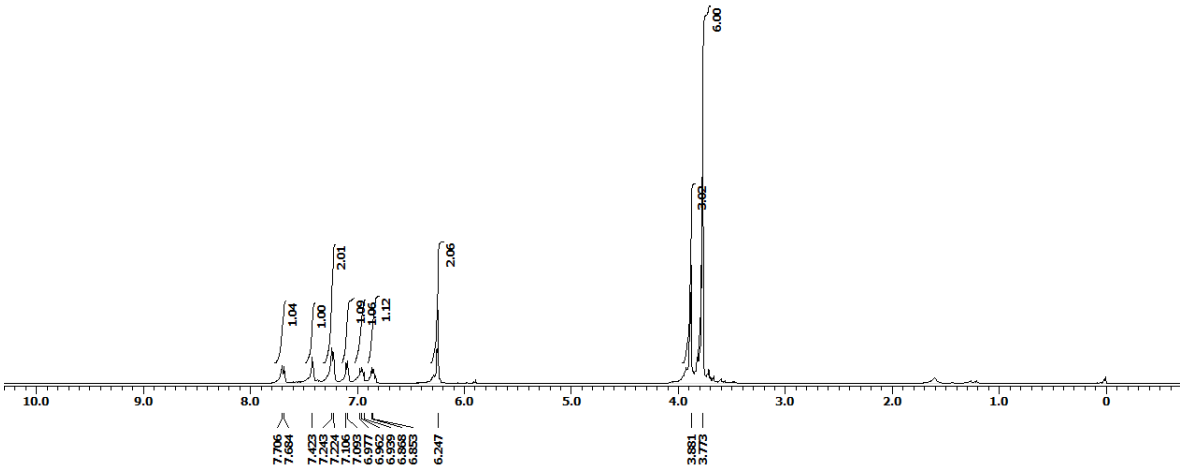


^{1}H NMR

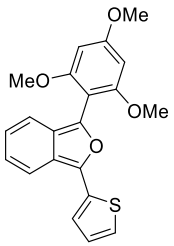


1-(Thiophen-2-yl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3q)

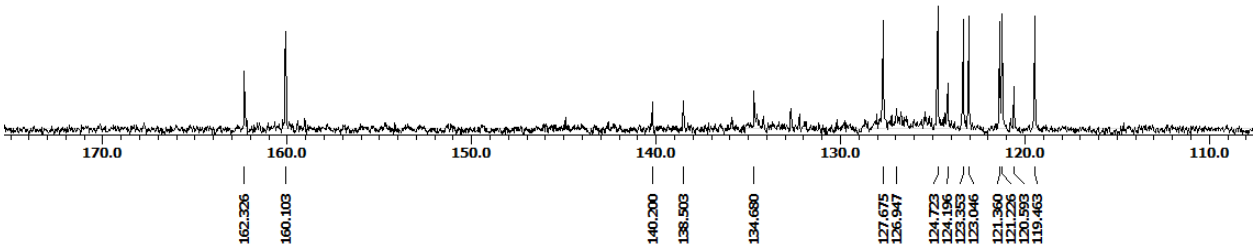


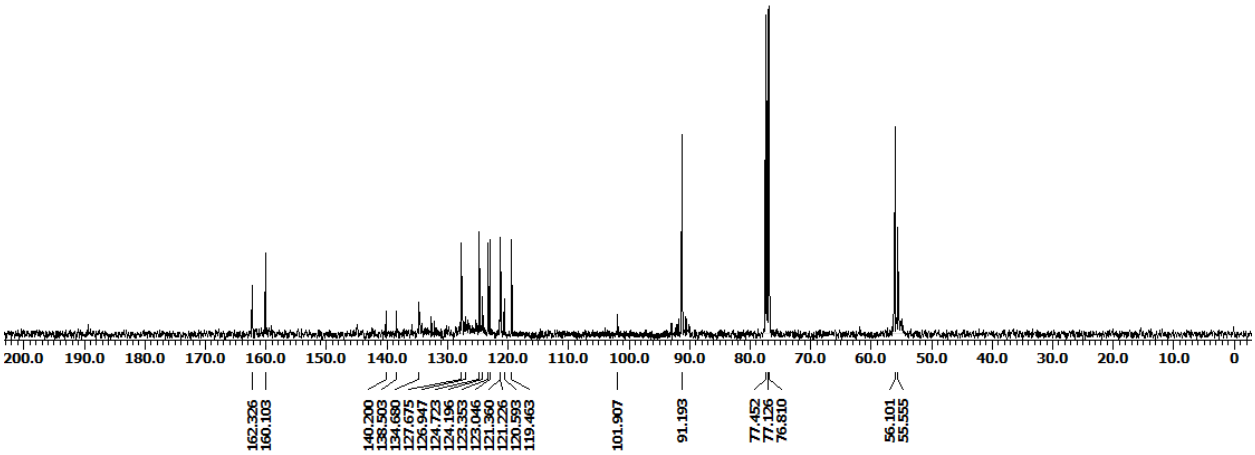


^{13}C NMR

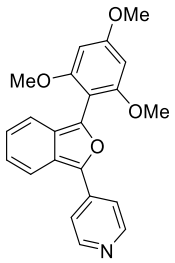


1-(Thiophen-2-yl)-3-(2,4,6-trimethoxyphenyl)isobenzofuran (3q)

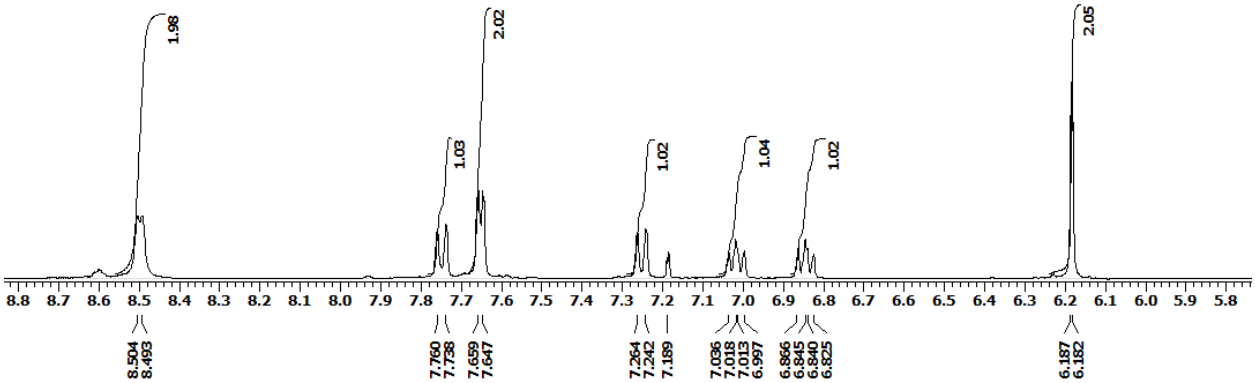


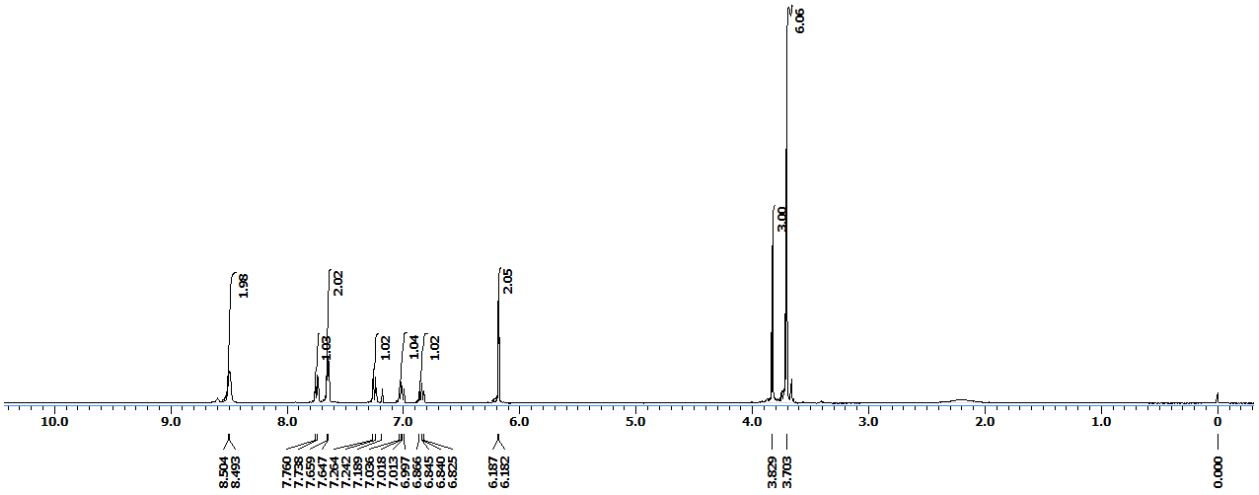


^{1}H NMR

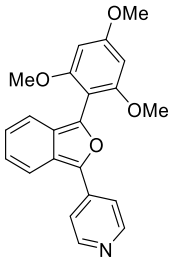


4-(3-(2,4,6-Trimethoxyphenyl)isobenzofuran-1-yl)pyridine (3r)

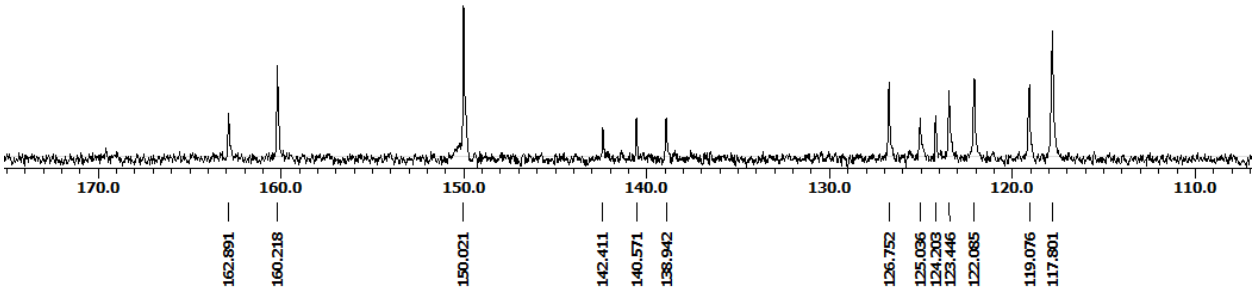


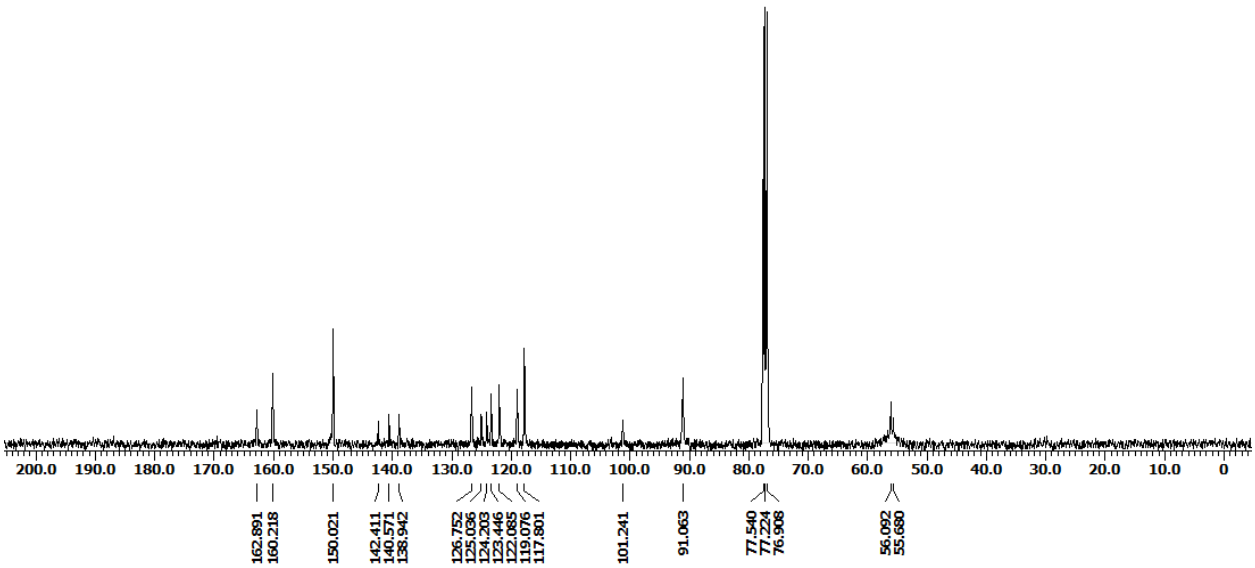


^{13}C NMR

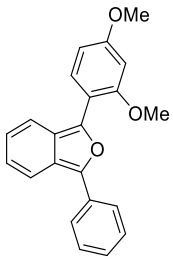


4-(3-(2,4,6-Trimethoxyphenyl)isobenzofuran-1-yl)pyridine (3r)

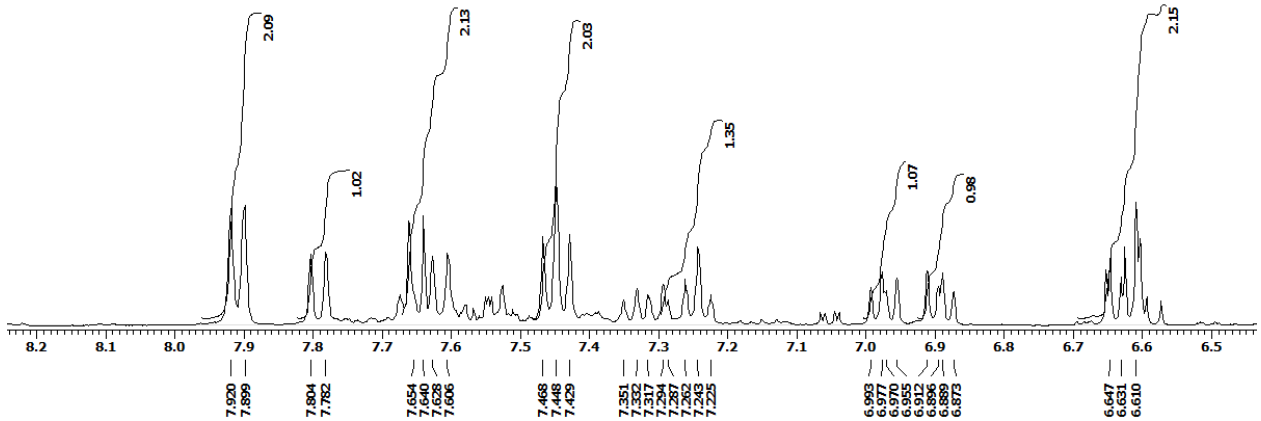


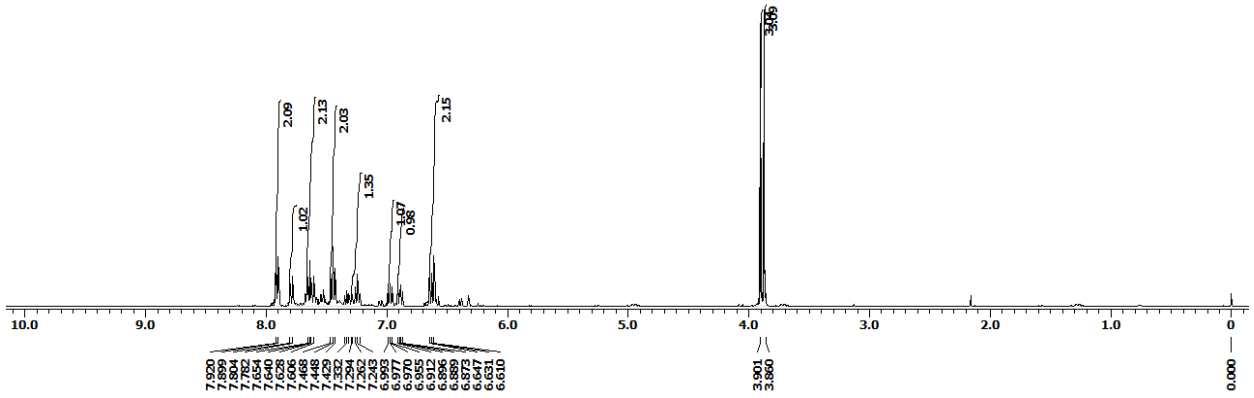


^{1}H NMR

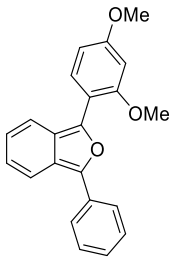


1-(2,4-Dimethoxyphenyl)-3-phenylisobenzofuran (3s)

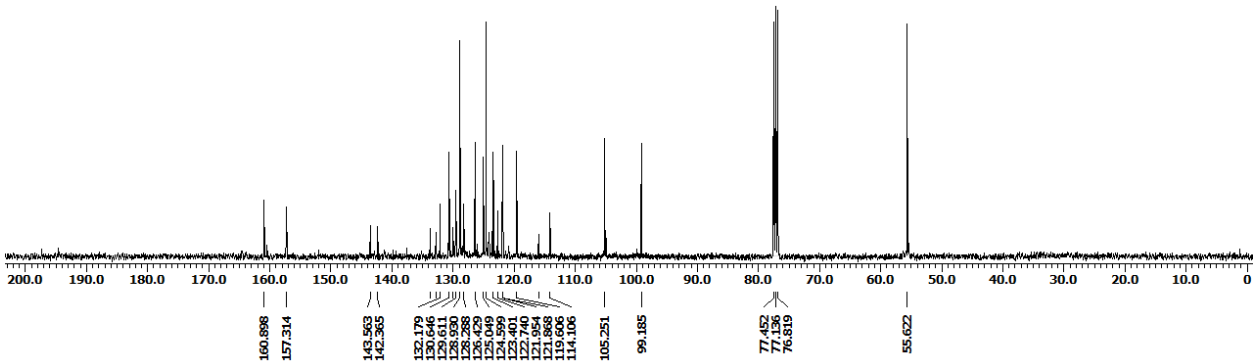




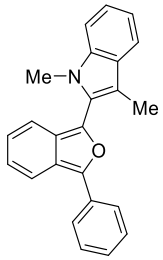
^{13}C NMR



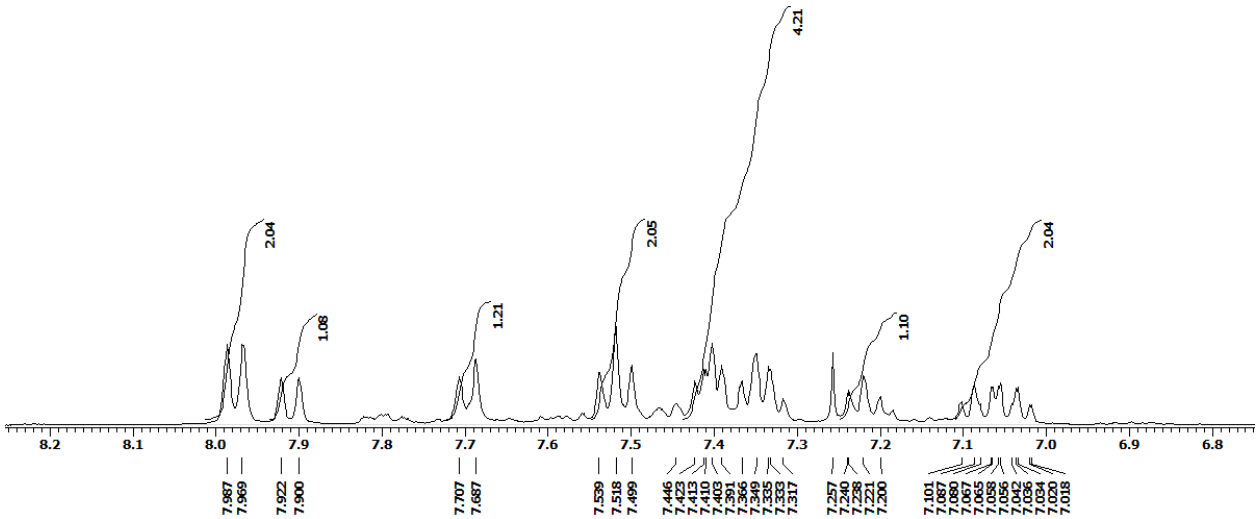
1-(2,4-Dimethoxyphenyl)-3-phenylisobenzofuran (3s)

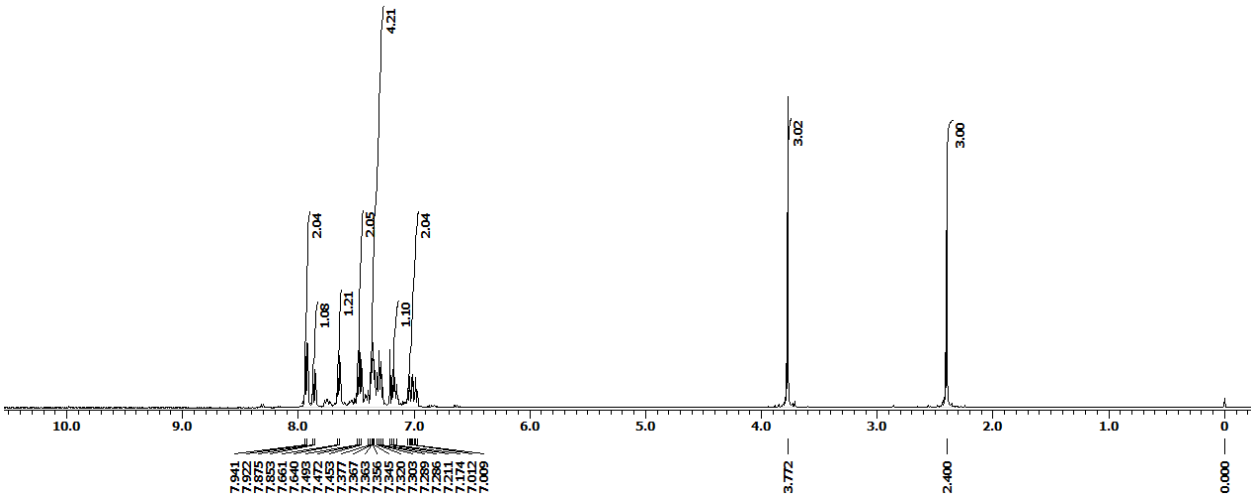


^{1}H NMR

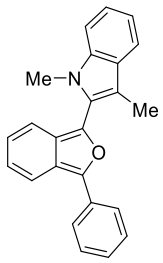


1,3-Dimethyl-2-(3-phenylisobenzofuran-1-yl)-1*H*-indole (3t)

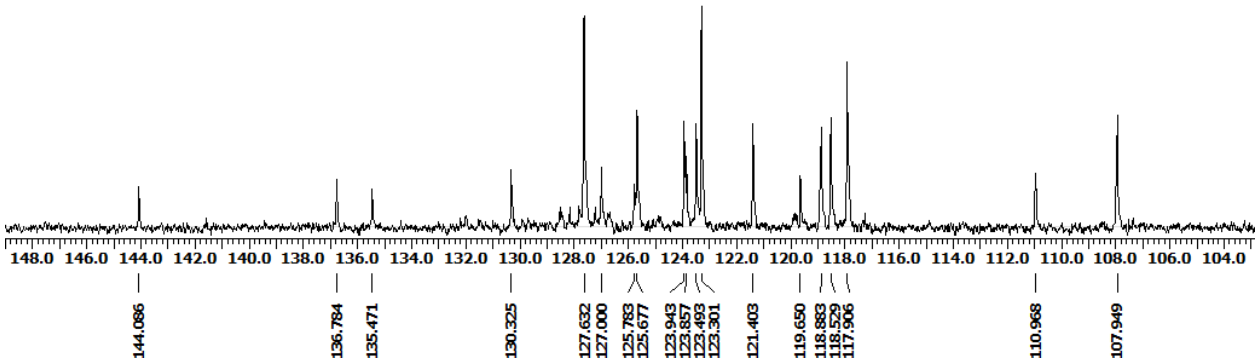


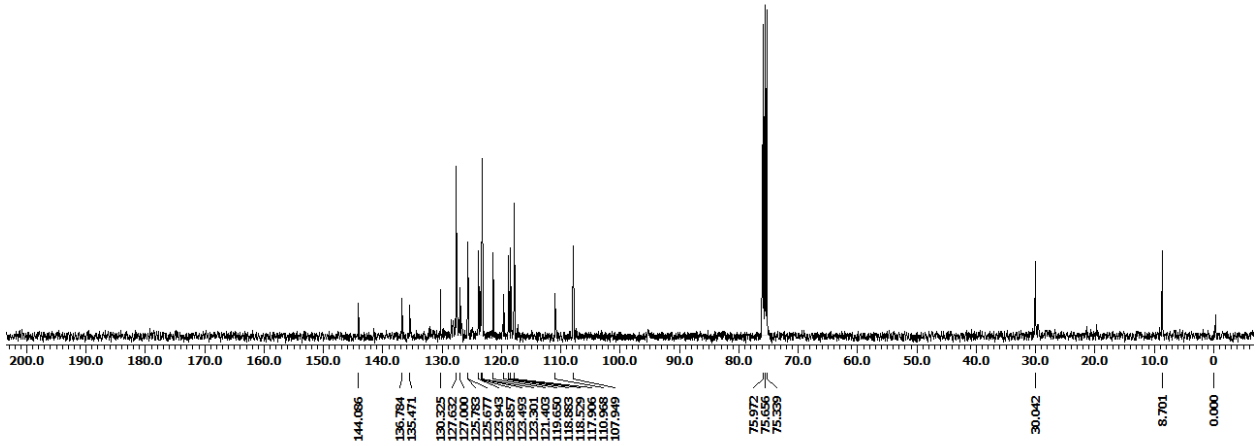


^{13}C NMR

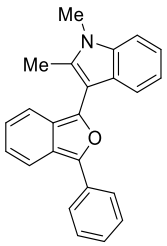


1,3-Dimethyl-2-(3-phenylisobenzofuran-1-yl)-1*H*-indole (3t)

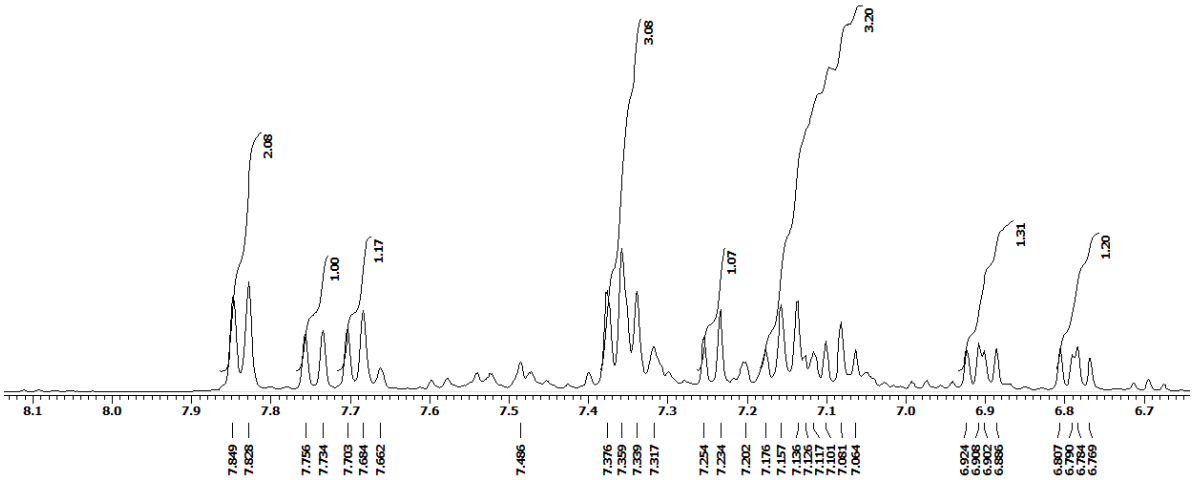


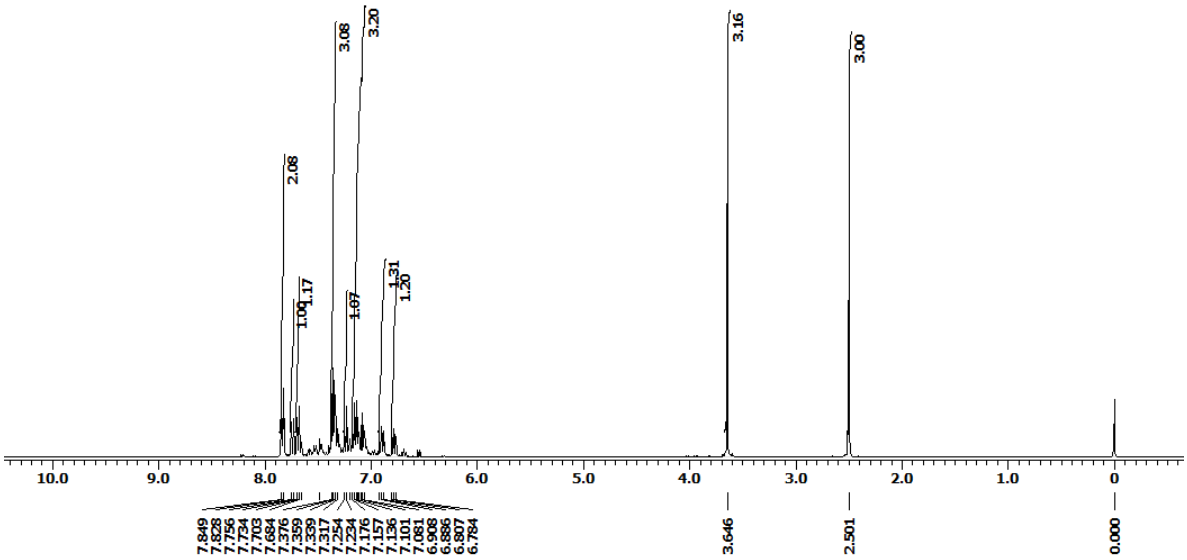


^{1}H NMR

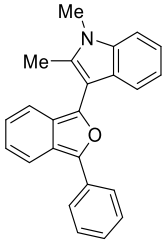


1,2-Dimethyl-3-(3-phenylisobenzofuran-1-yl)-1H-indole (3u)

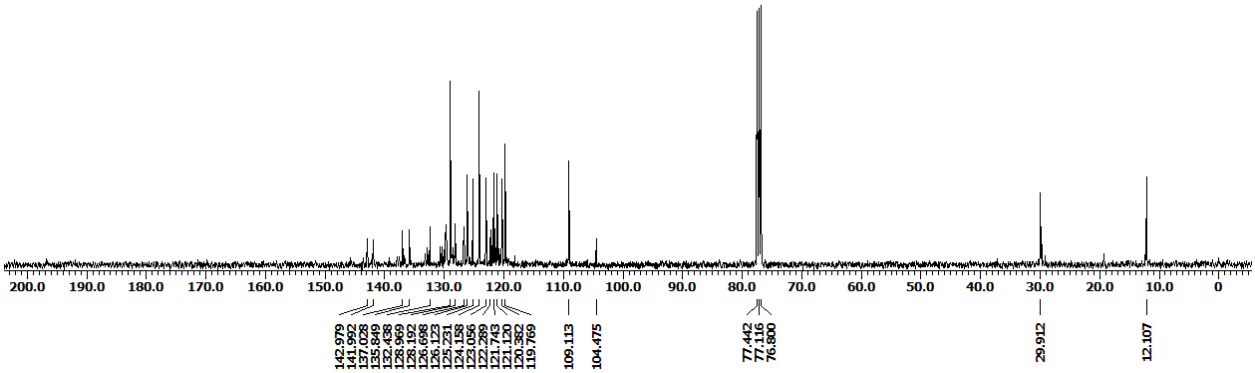




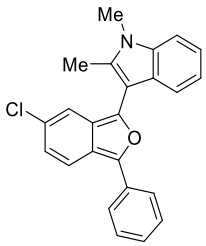
^{13}C NMR



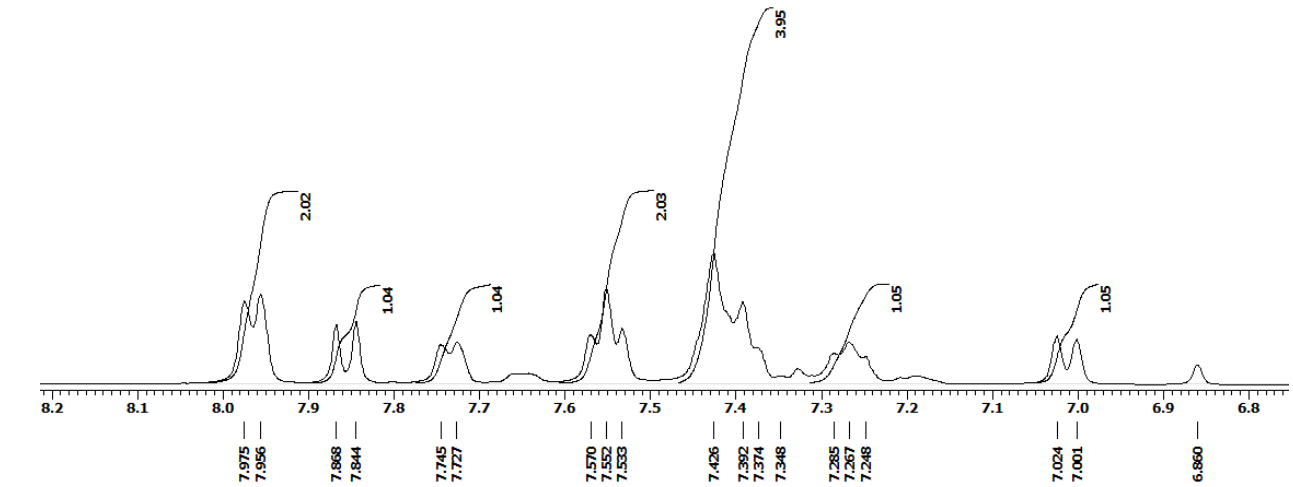
1,2-Dimethyl-3-(3-phenylisobenzofuran-1-yl)-1H-indole (3u)

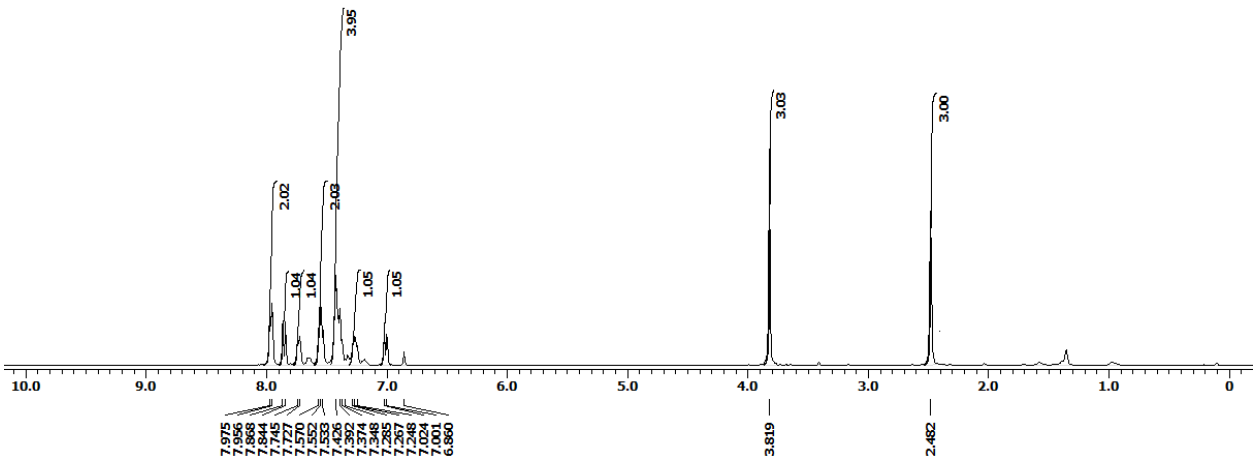


^{1}H NMR

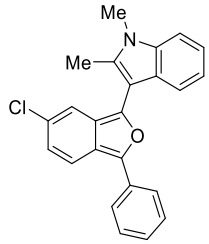


3-(6-Chloro-3-phenylisobenzofuran-1-yl)-1,2-dimethyl-1H-indole (3v)

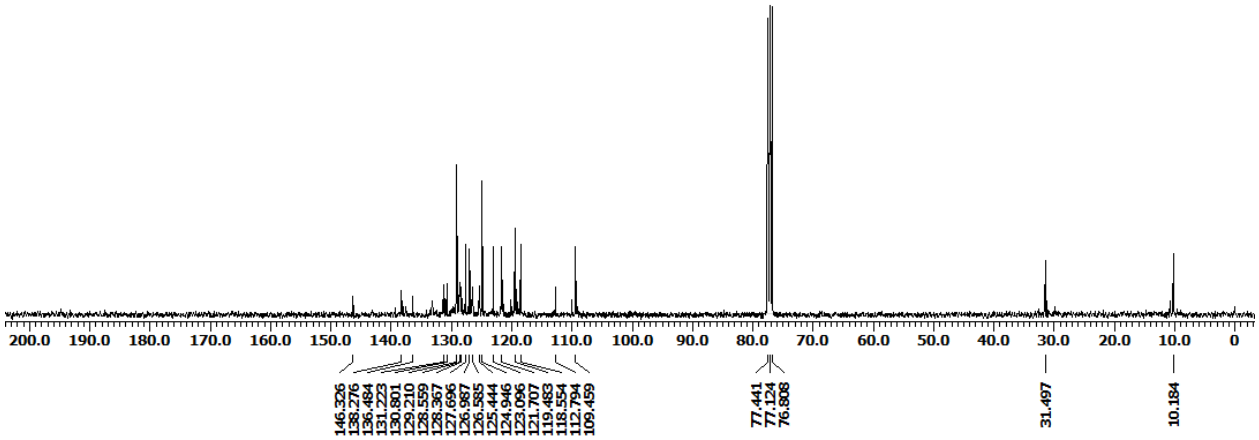




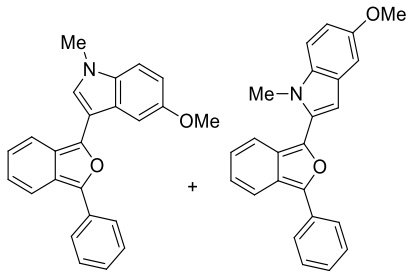
^{13}C NMR



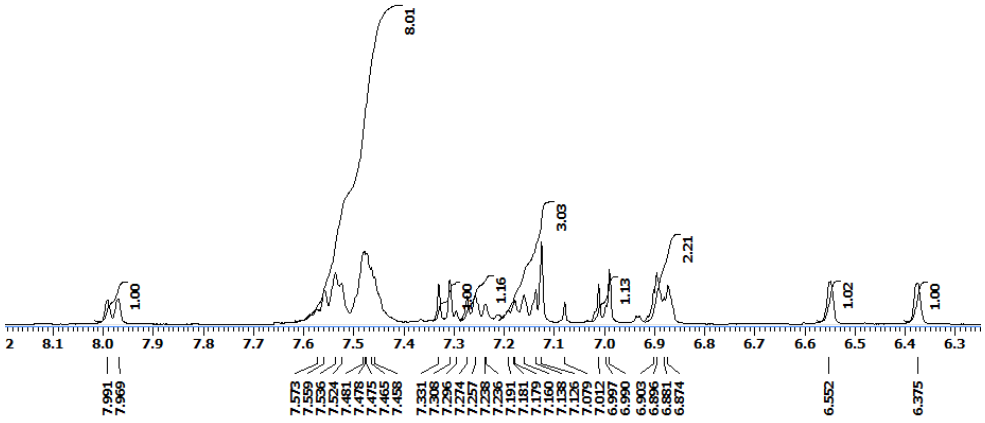
3-(6-Chloro-3-phenylisobenzofuran-1-yl)-1,2-dimethyl-1H-indole (3v)

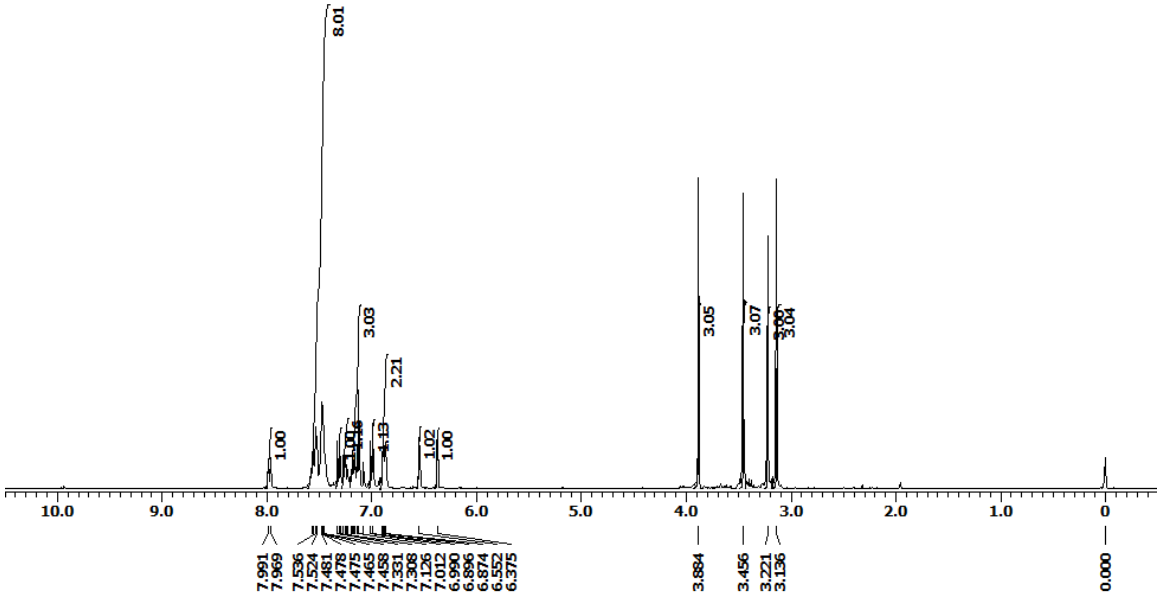


^{1}H NMR

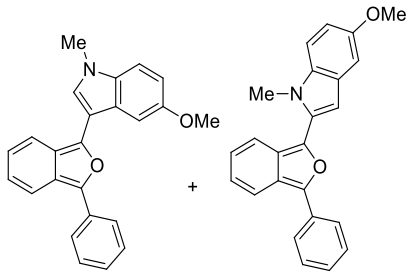


5-Methoxy-1-methyl-3-(3-phenylisobenzofuran-1-yl)-1H-indole and 5-methoxy-1-methyl-2-(3-phenylisobenzofuran-1-yl)-1H-indole (3w+3w')

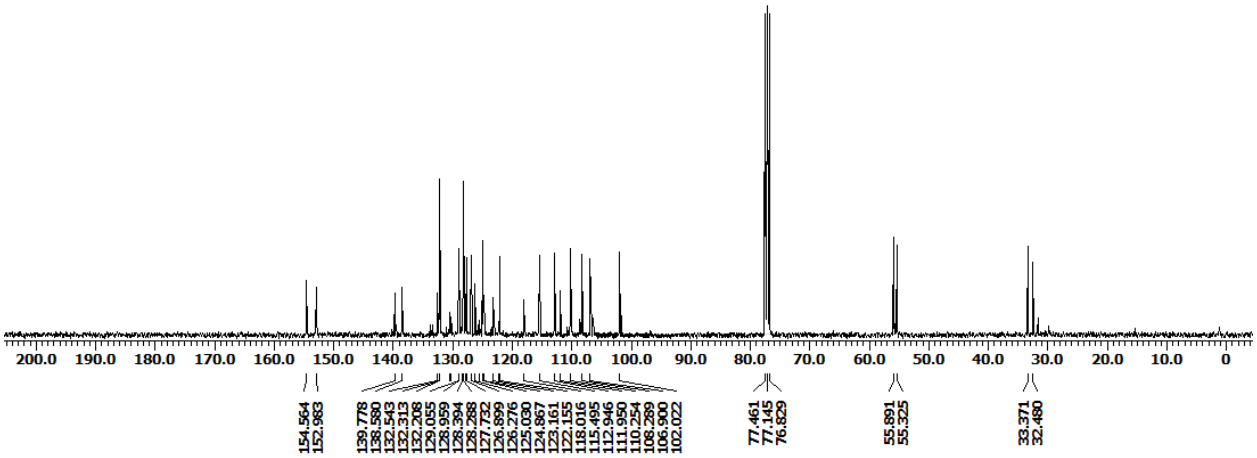




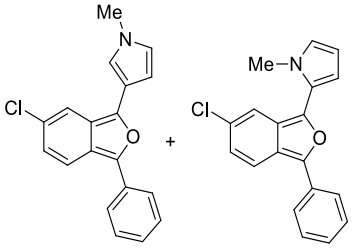
^{13}C NMR



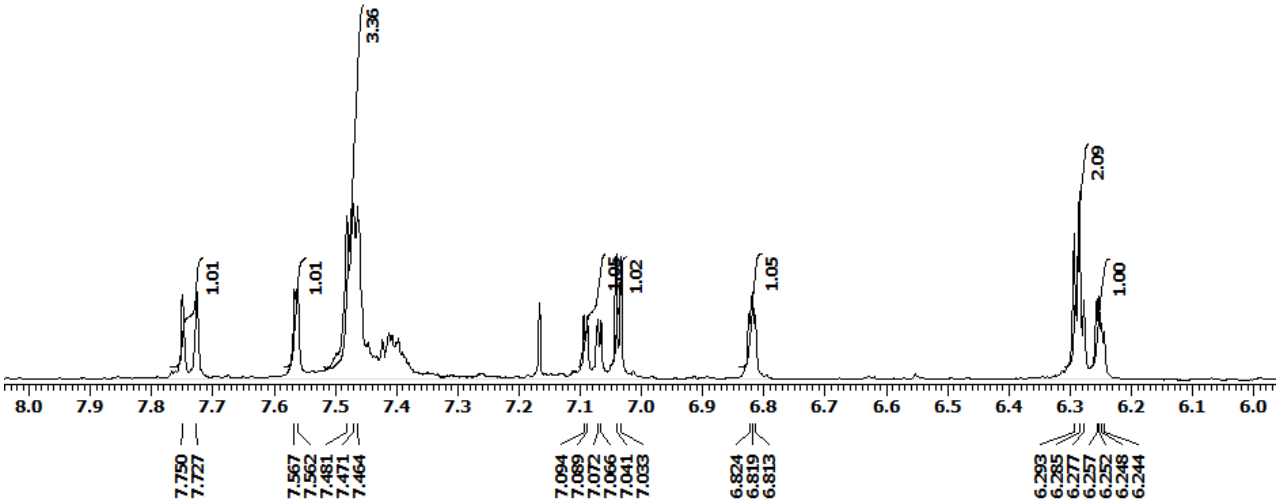
5-Methoxy-1-methyl-3-(3-phenylisobenzofuran-1-yl)-1H-indole and 5-methoxy-1-methyl-2-(3-phenylisobenzofuran-1-yl)-1H-indole (3w+3w')

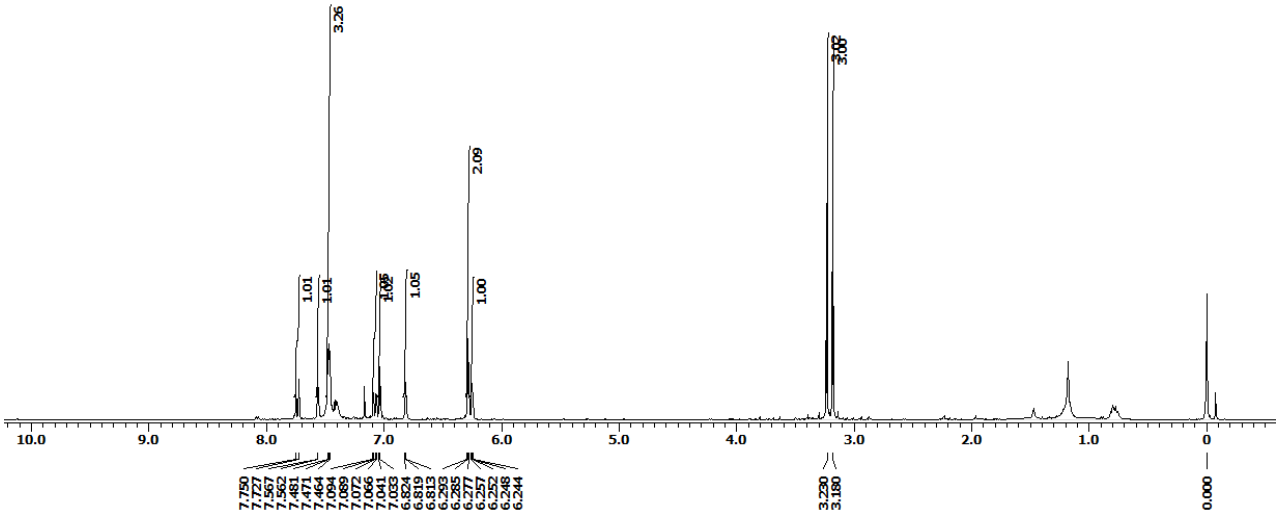


^{1}H NMR

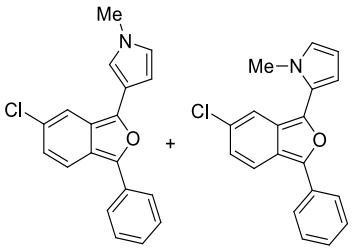


2-(6-Chloro-3-phenylisobenzofuran-1-yl)-1-methyl-1H-pyrrole compound with 3-(6-chloro-3-phenylisobenzofuran-1-yl)-1-methyl-1H-pyrrole (3x+3x')

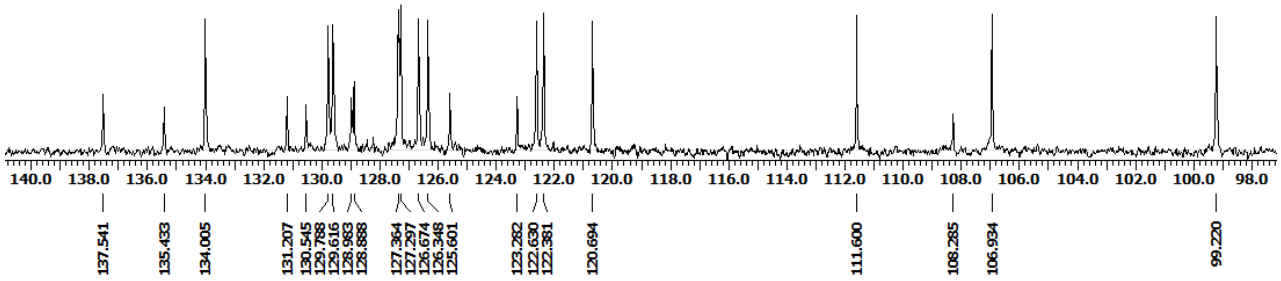


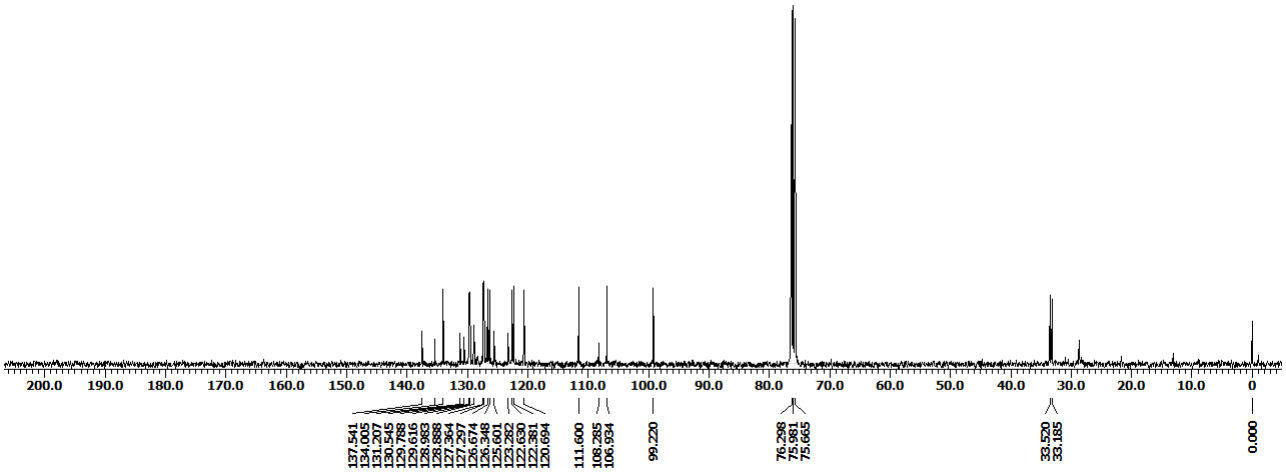


^{13}C NMR

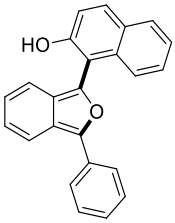


2-(6-Chloro-3-phenylisobenzofuran-1-yl)-1-methyl-1H-pyrrole compound with 3-(6-chloro-3-phenylisobenzofuran-1-yl)-1-methyl-1H-pyrrole (3x+3x')

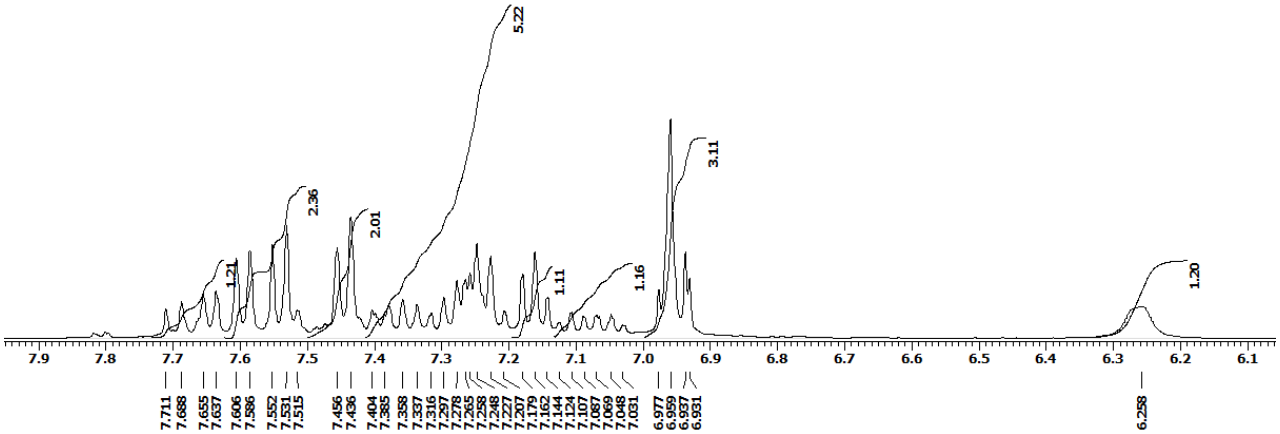


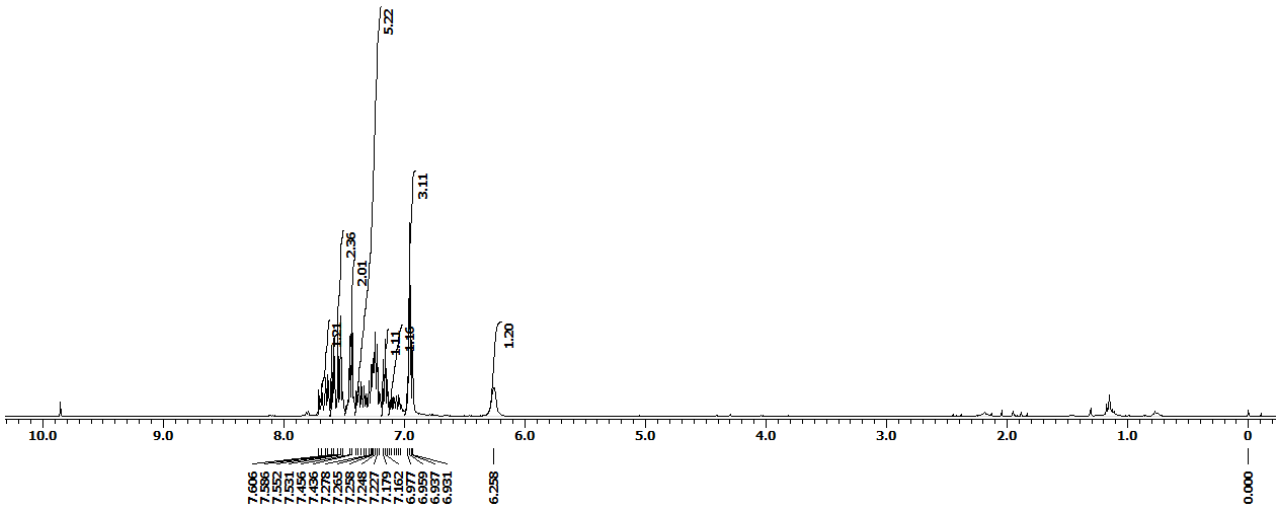


^{1}H NMR

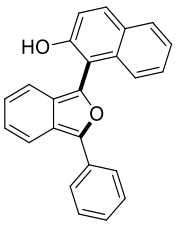


1-(3-Phenylisobenzofuran-1-yl)naphthalen-2-ol (3y)

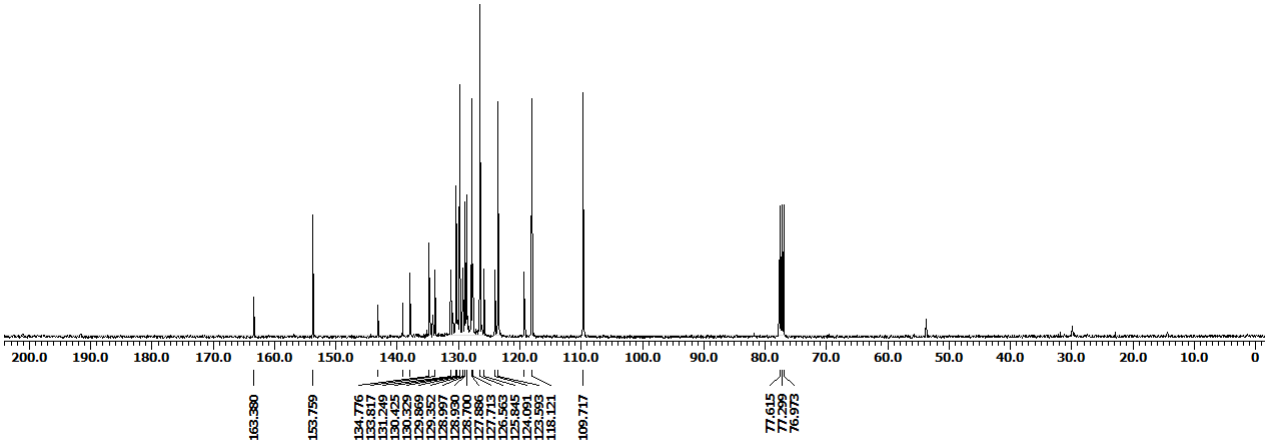




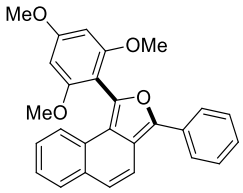
^{13}C NMR



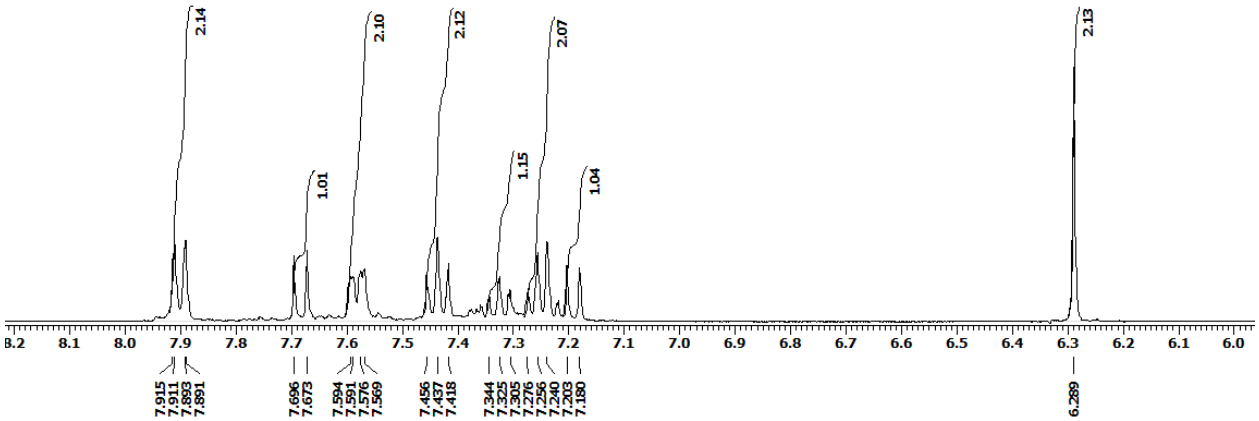
1-(3-Phenylisobenzofuran-1-yl)naphthalen-2-ol (3y)

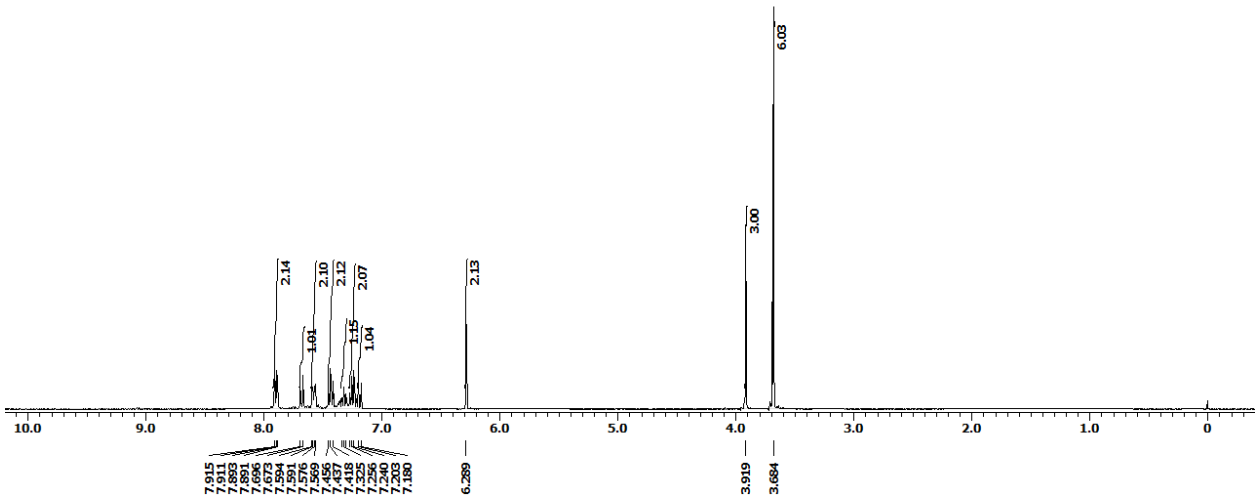


^{1}H NMR

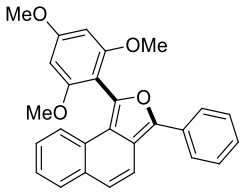


3-Phenyl-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-*c*]furan (4a)

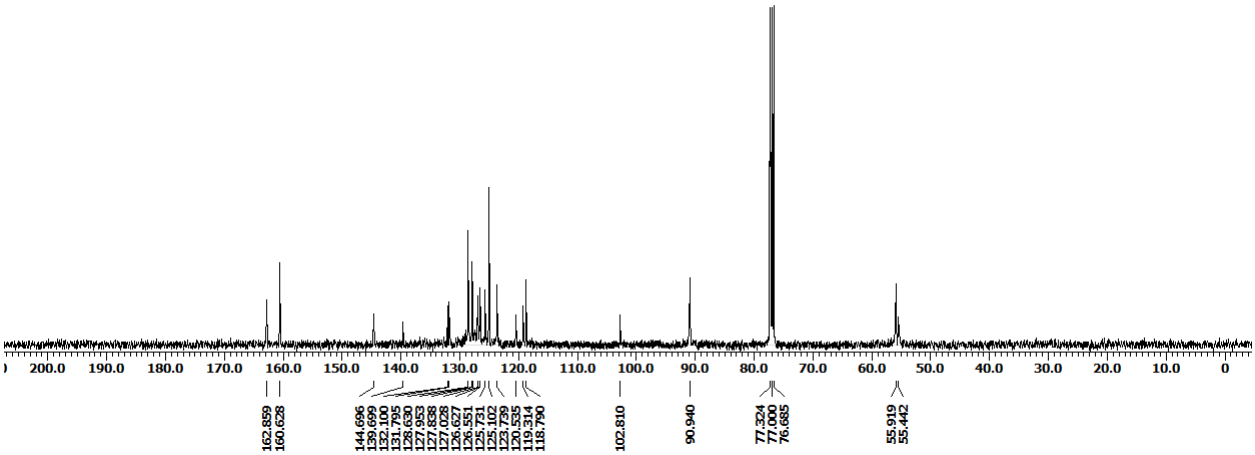




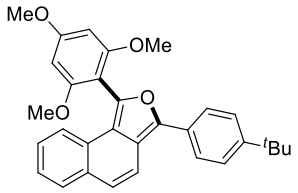
^{13}C NMR



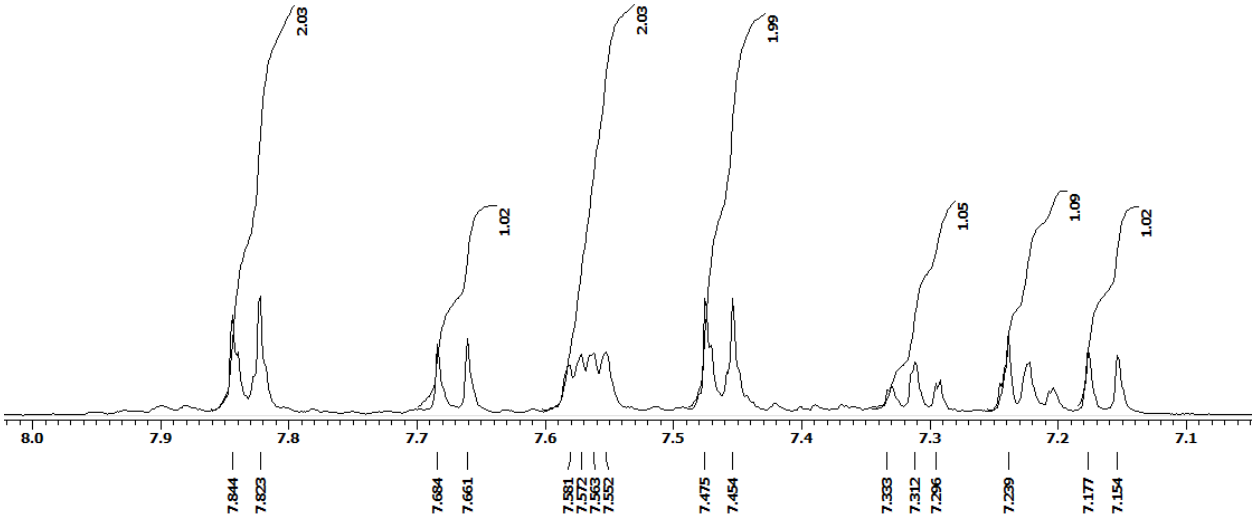
3-Phenyl-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-*c*]furan (4a)

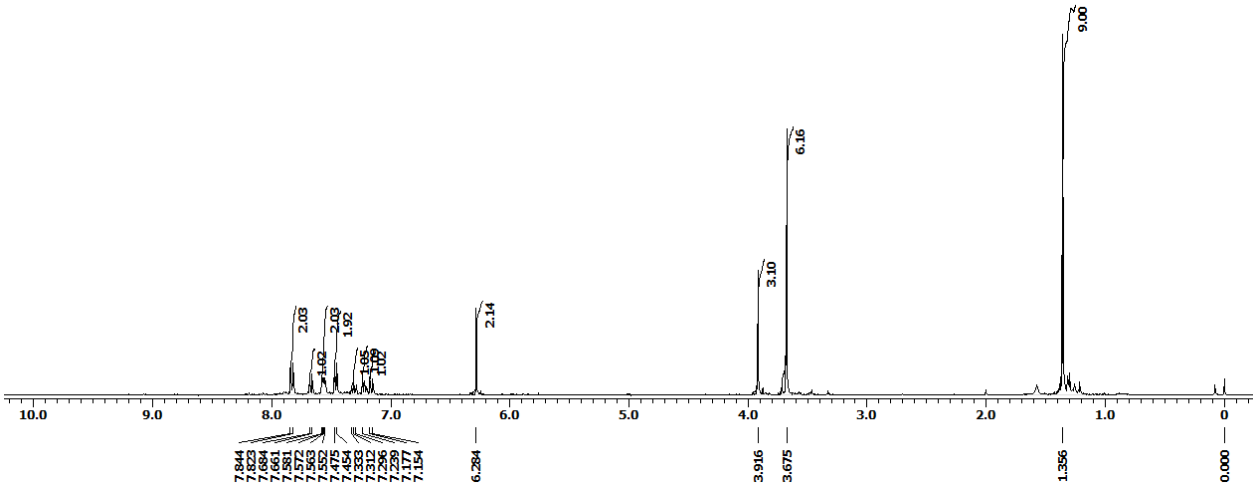


^{1}H NMR

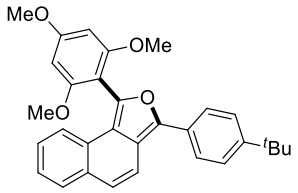


3-(4-(tert-butyl)phenyl)-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-c]furan (4b)

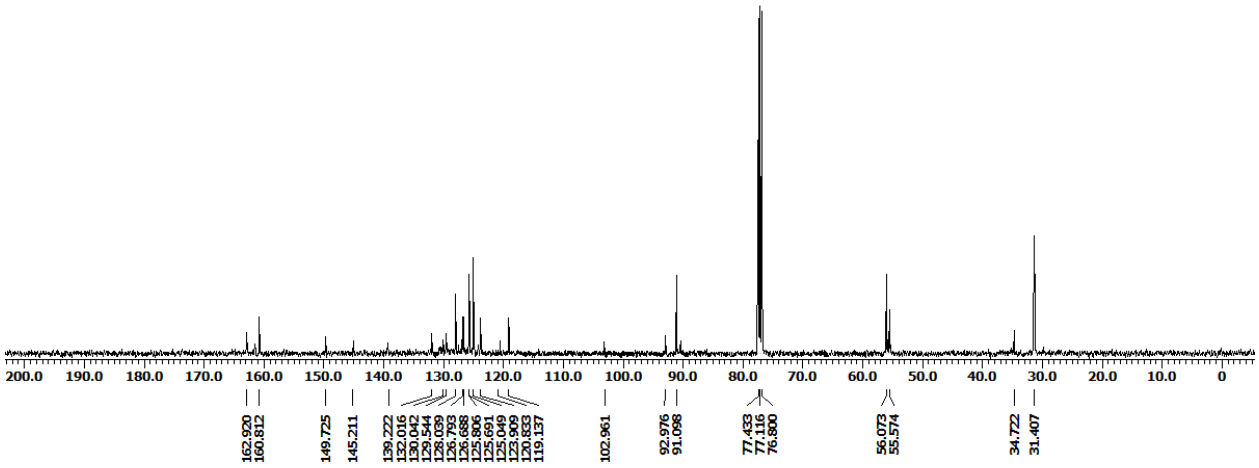




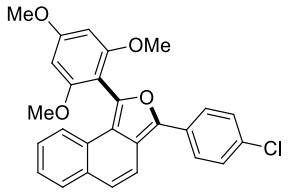
^{13}C NMR



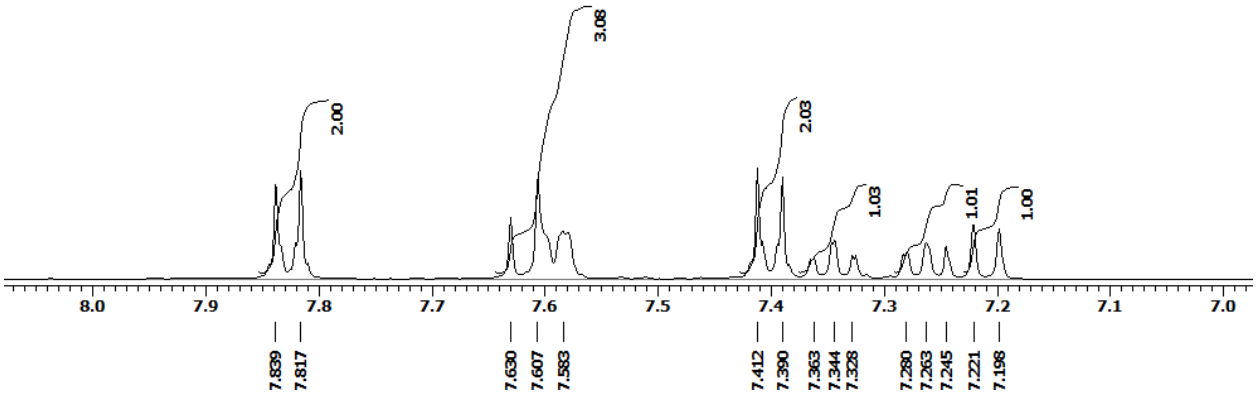
3-(4-(tert-butyl)phenyl)-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-c]furan (4b)

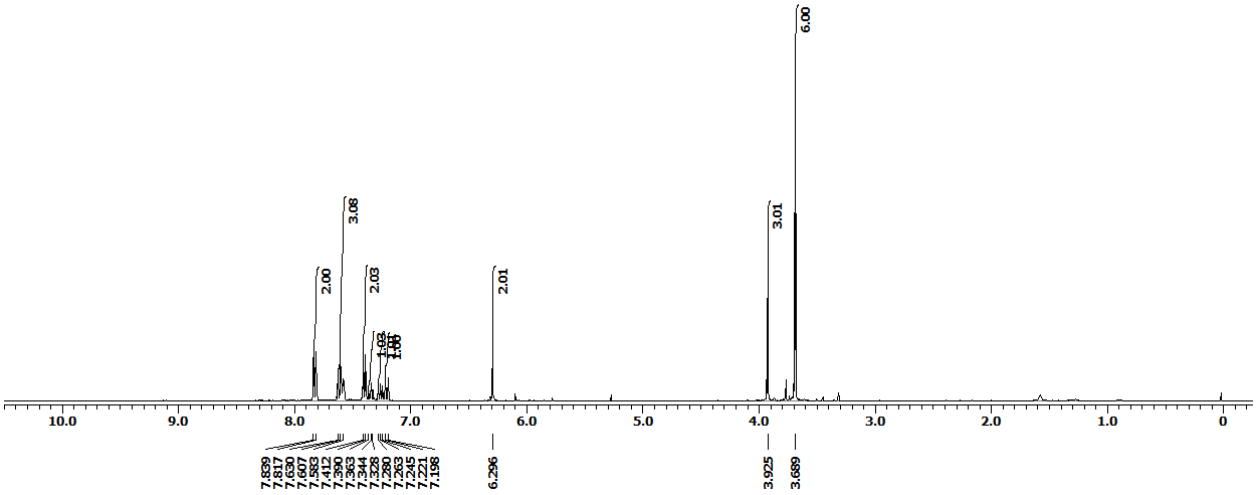


^{1}H NMR

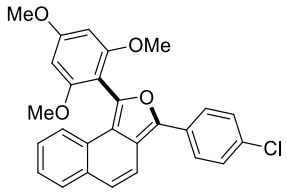


3-(4-Chlorophenyl)-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-*c*]furan (4c)

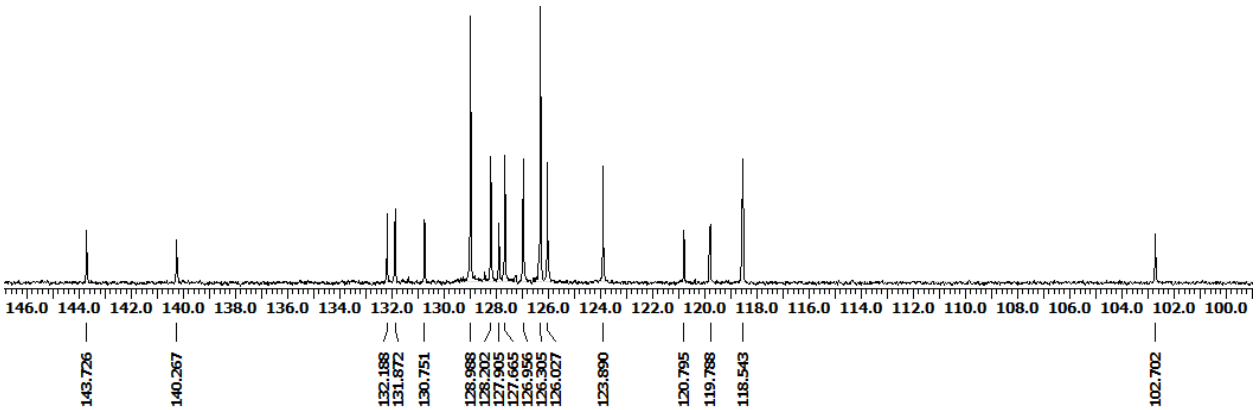


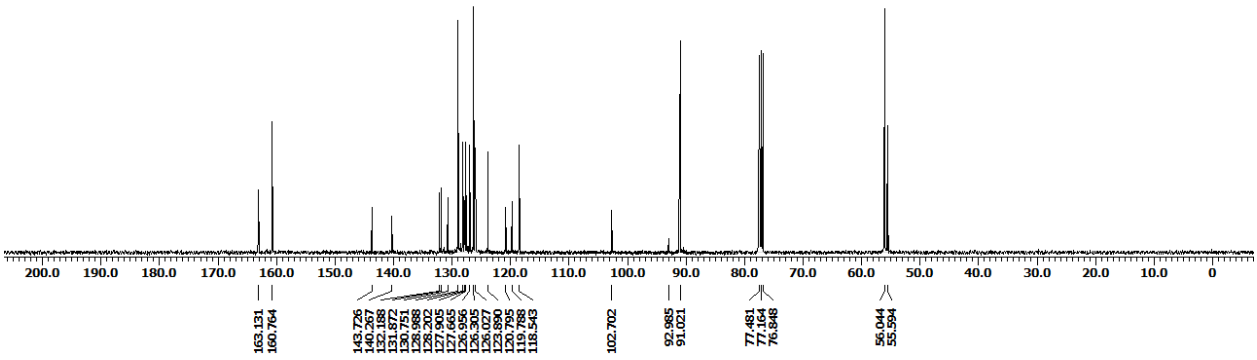


^{13}C NMR

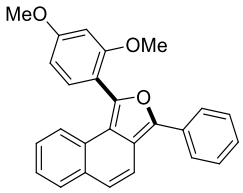


3-(4-Chlorophenyl)-1-(2,4,6-trimethoxyphenyl)naphtho[1,2-*c*]furan (4c)

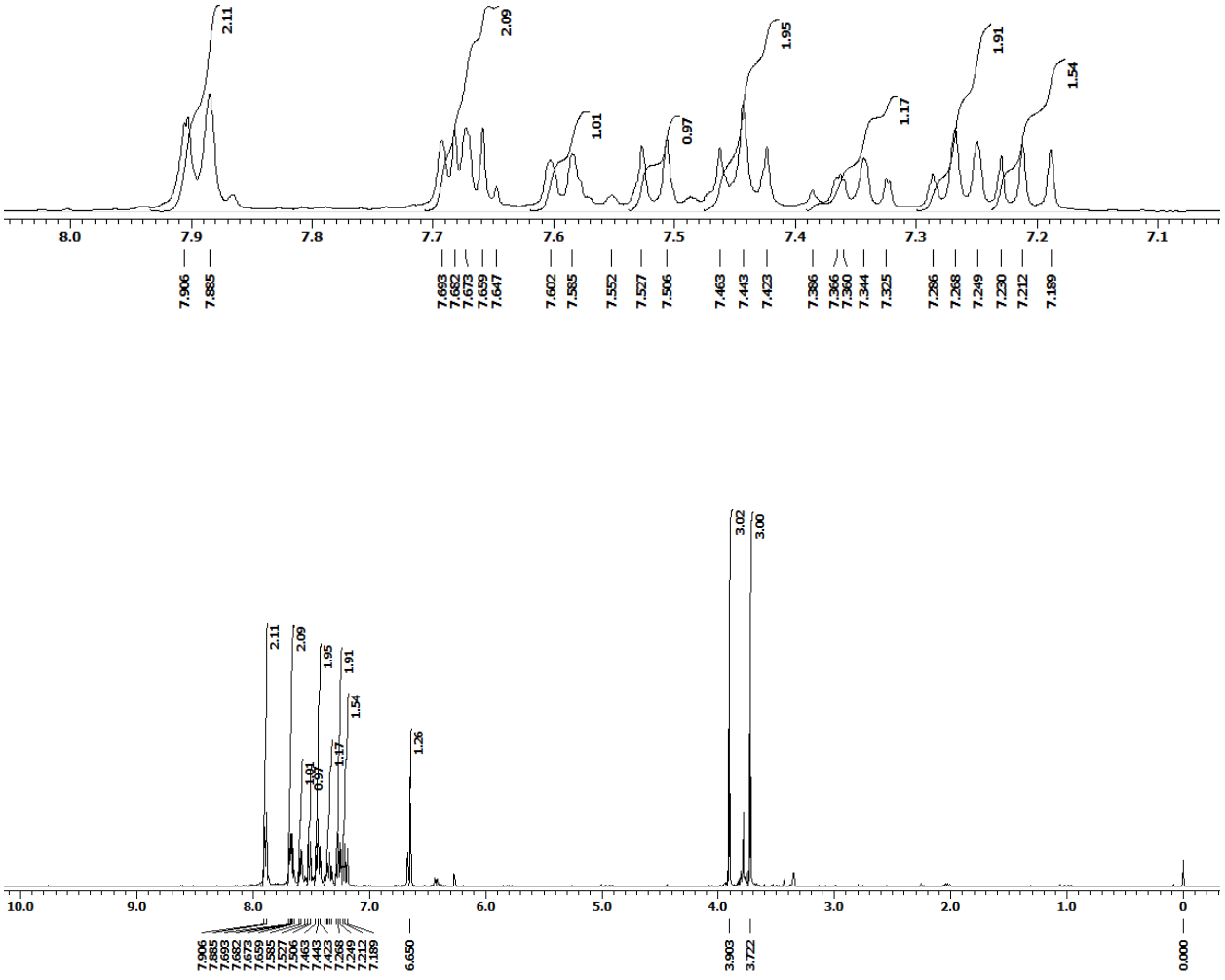




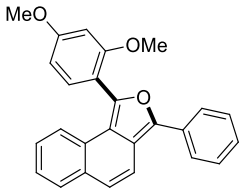
^{1}H NMR



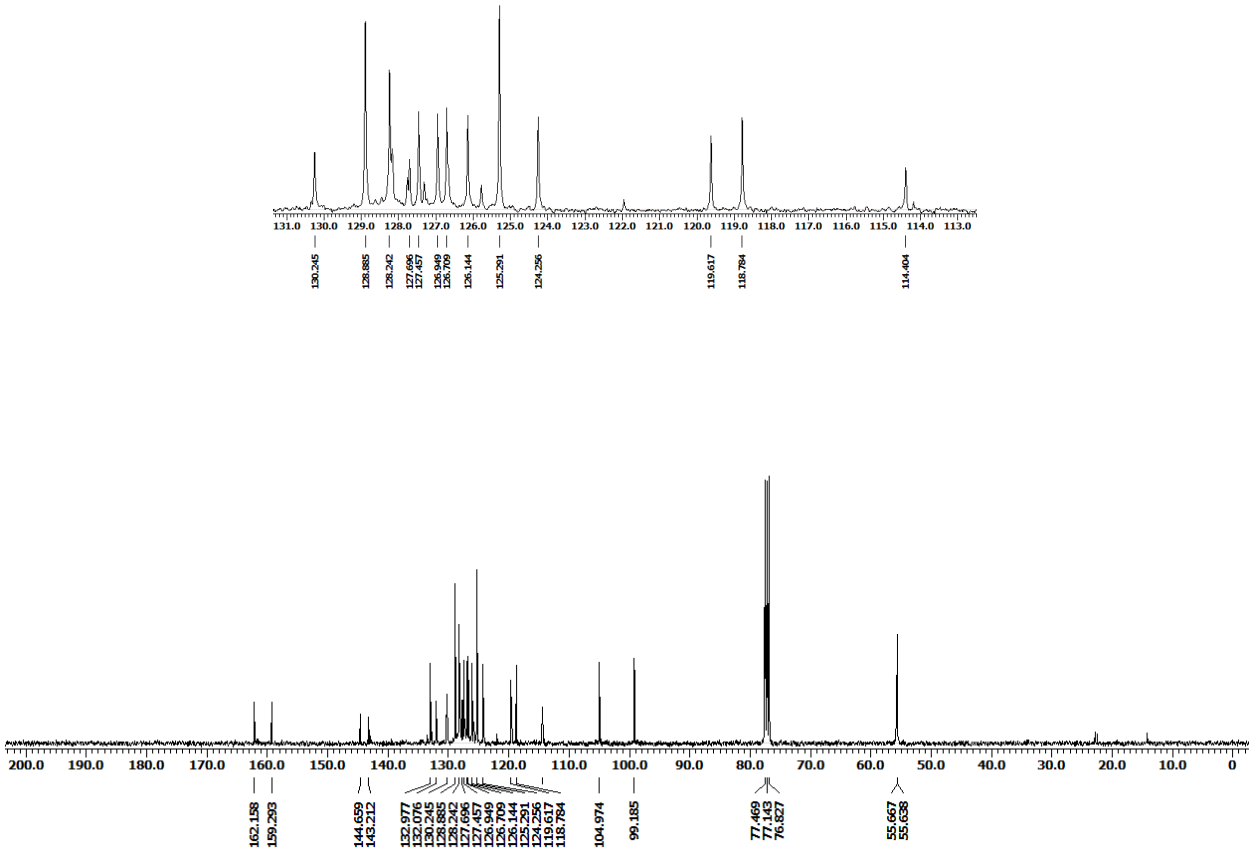
1-(2,4-Dimethoxyphenyl)-3-phenylnaphtho[1,2-*c*]furan (4d)



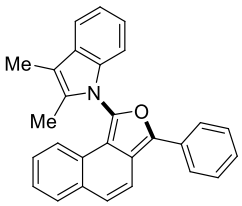
^{13}C NMR



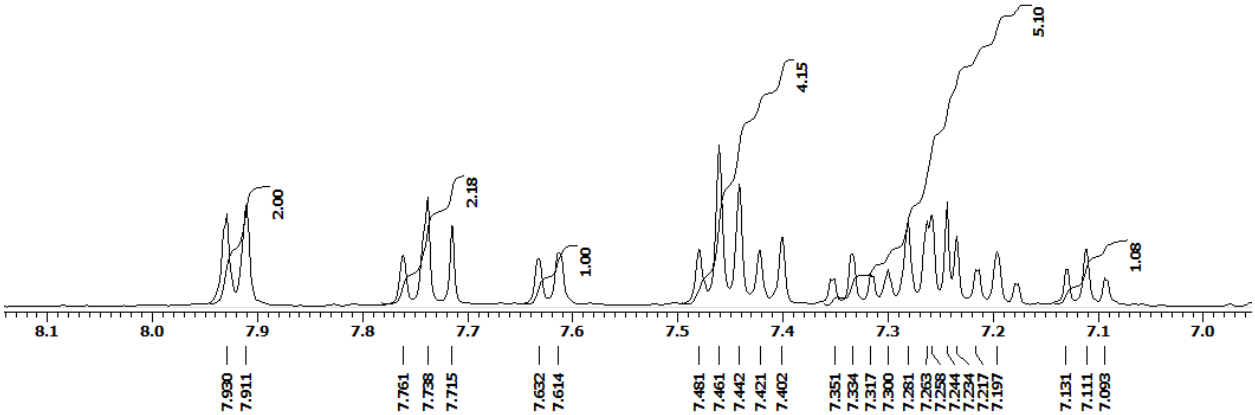
1-(2,4-Dimethoxyphenyl)-3-phenylnaphtho[1,2-*c*]furan (4d)

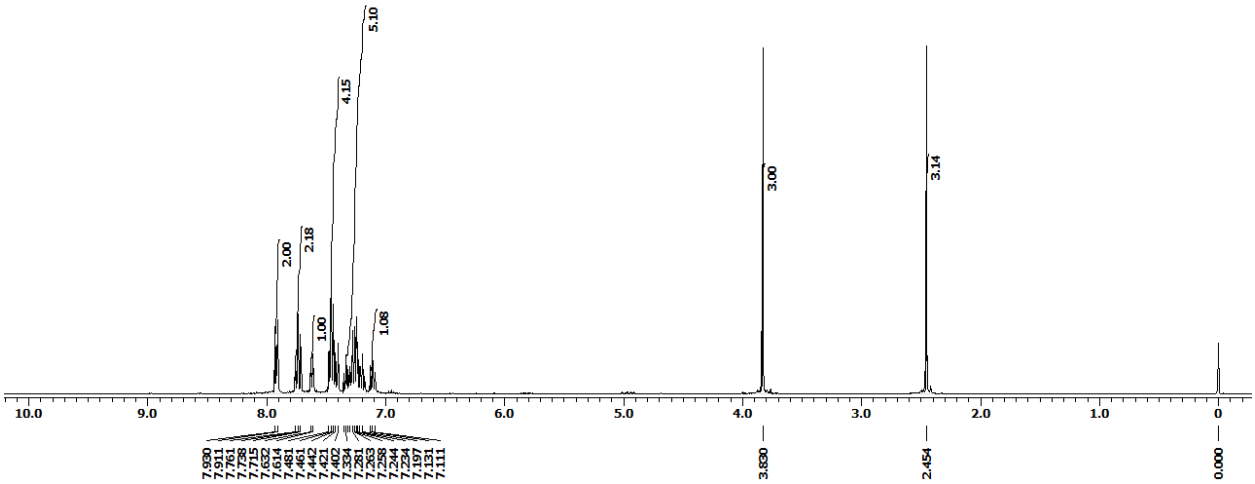


^{1}H NMR

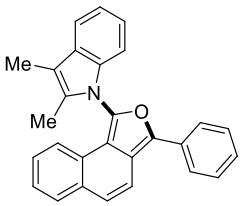


2,3-dimethyl-1-(3-phenylnaphtho[1,2-c]furan-1-yl)-1H-indole (4e)

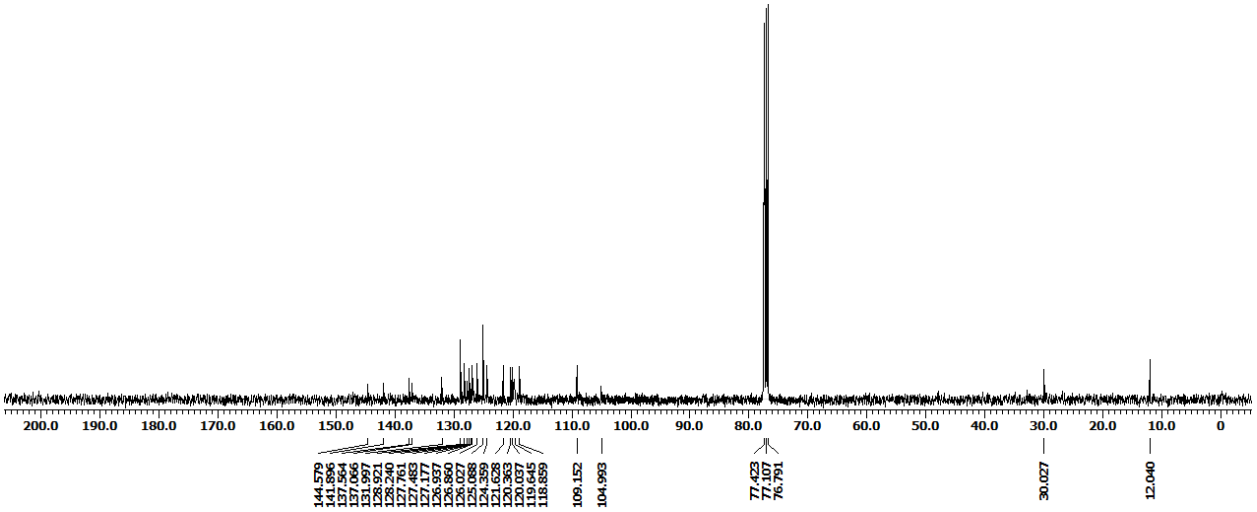




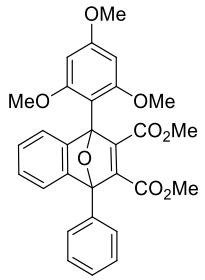
^{13}C NMR



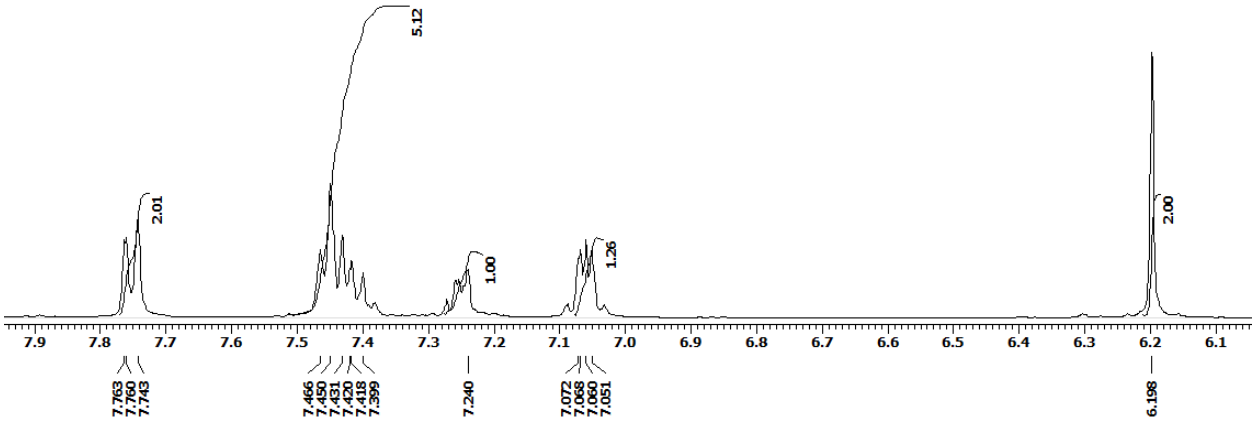
2,3-dimethyl-1-(3-phenylnaphtho[1,2-c]furan-1-yl)-1H-indole (4e)

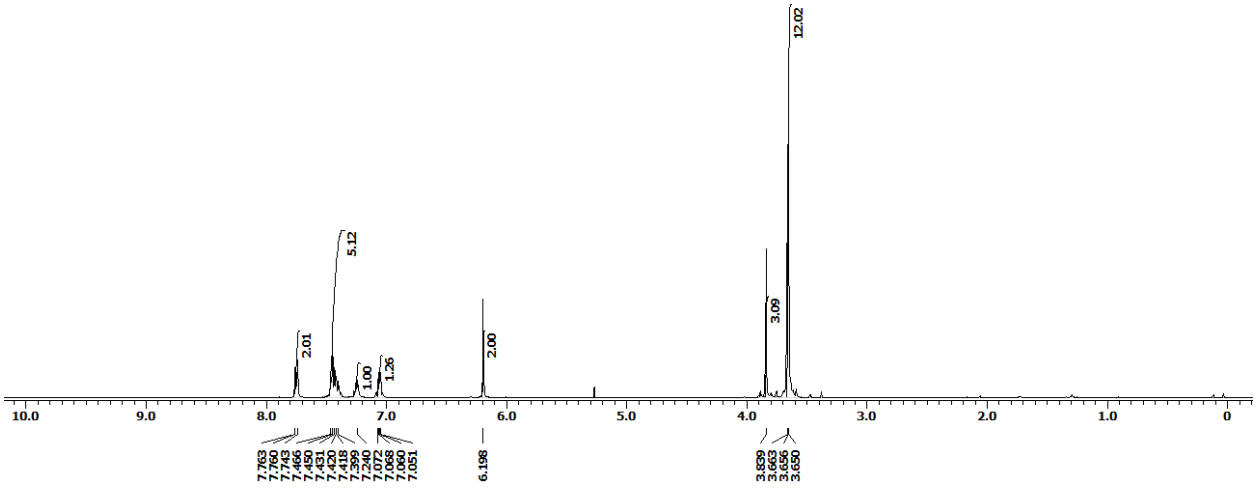


^{1}H NMR

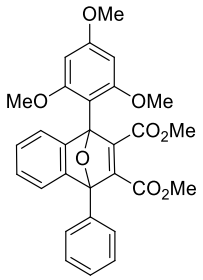


Dimethyl 1-phenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6a)

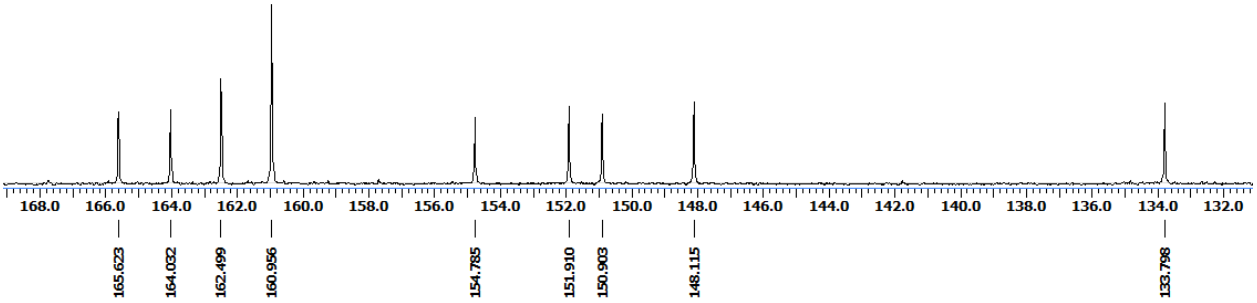


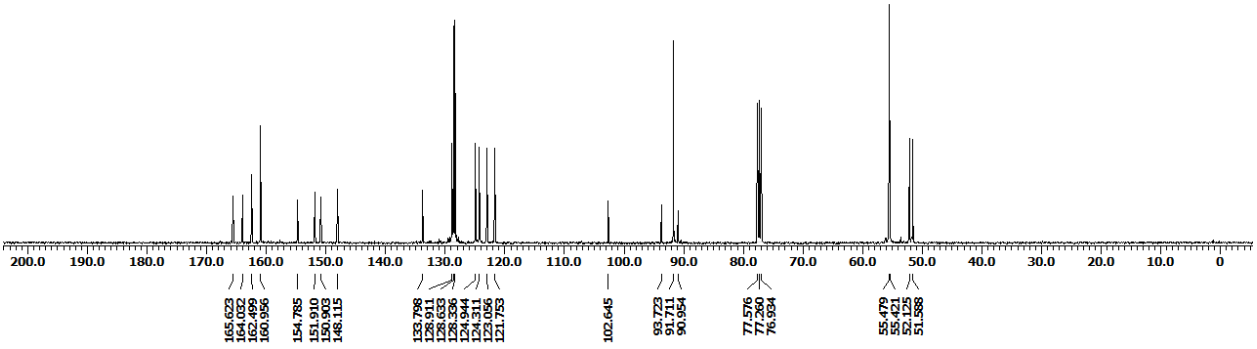


^{13}C NMR

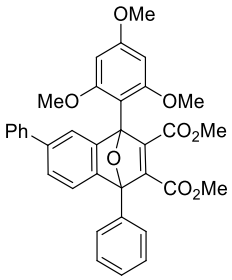


Dimethyl 1-phenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6a)

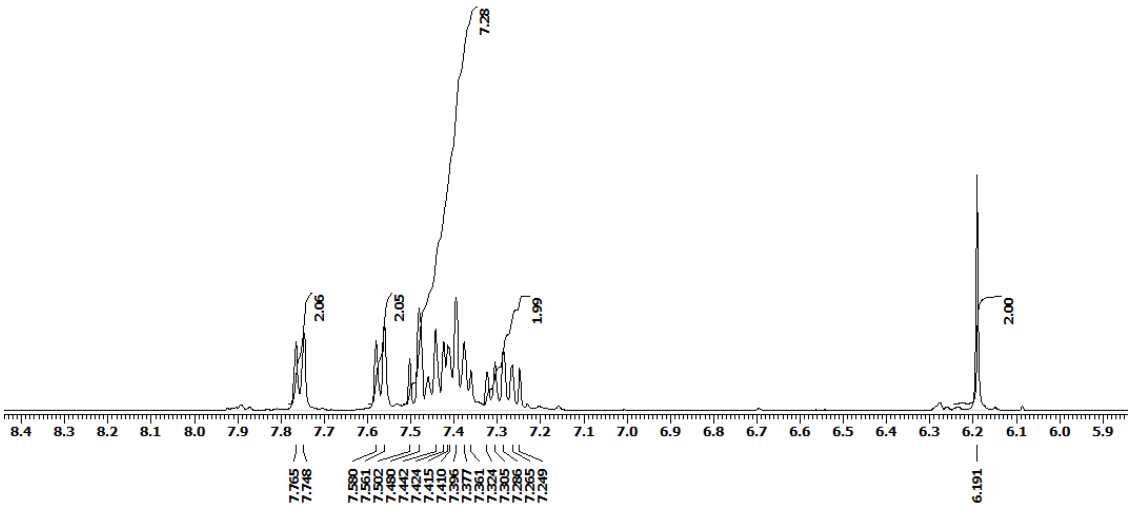


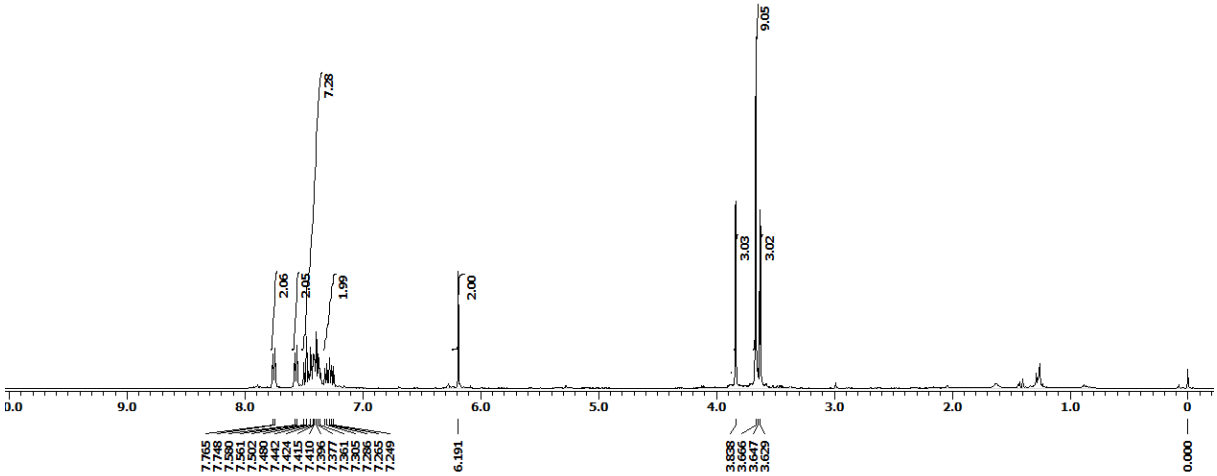


^{1}H NMR

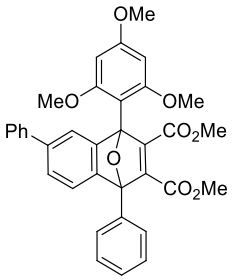


Dimethyl 1,6-diphenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6b)

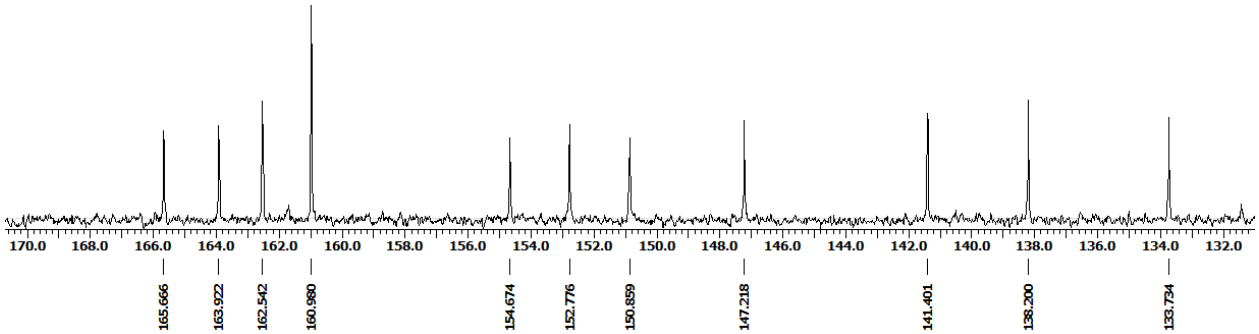


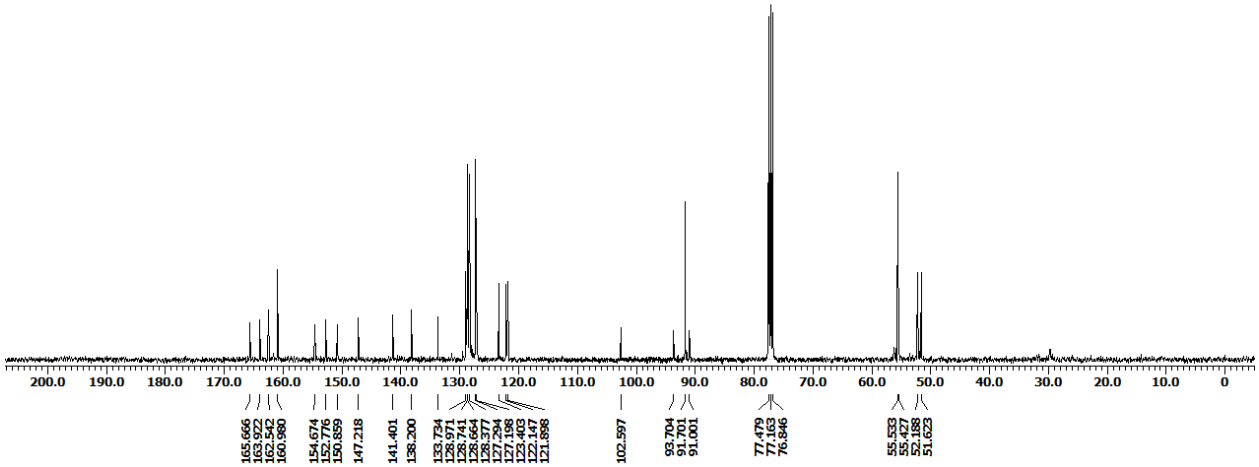


^{13}C NMR

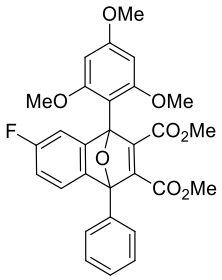


Dimethyl 1,6-diphenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6b)

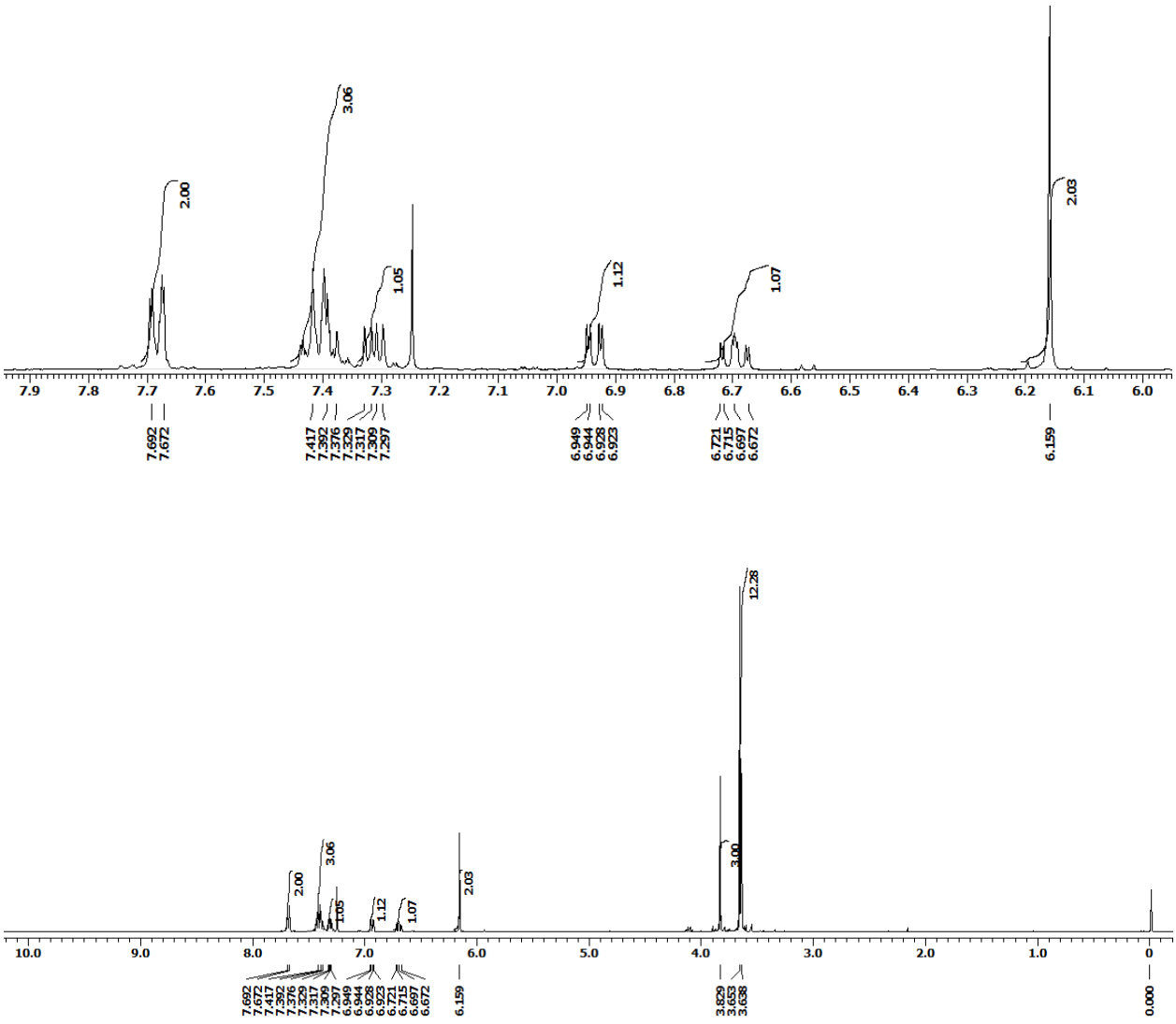




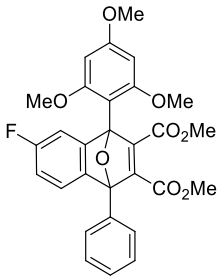
^{1}H NMR



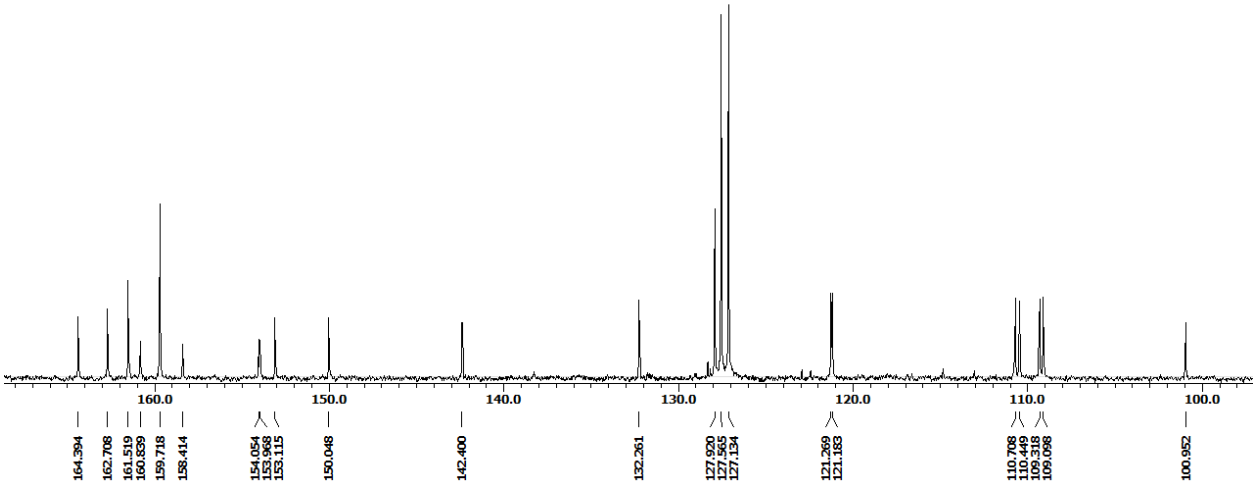
Dimethyl 6-fluoro-1-phenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6c)

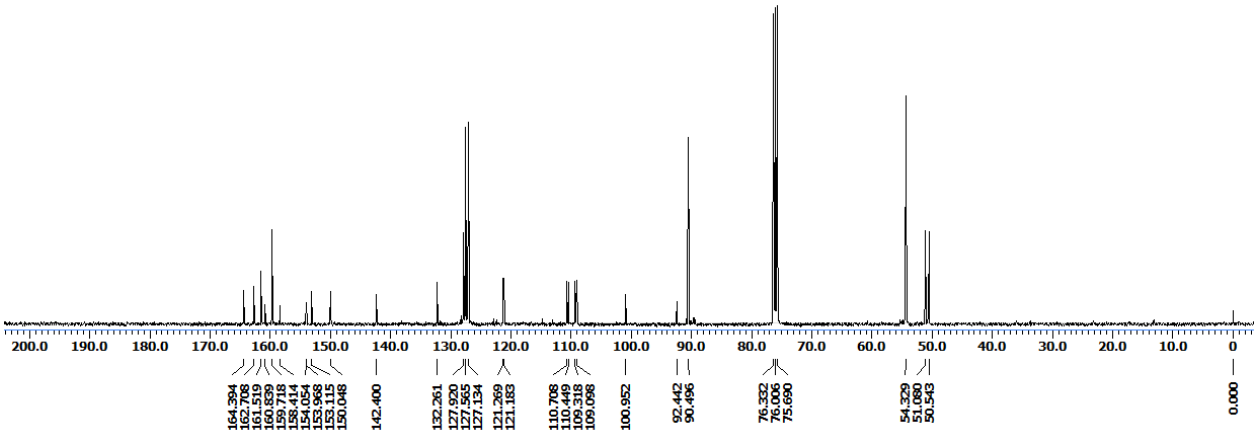


^{13}C NMR

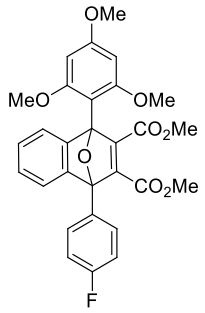


Dimethyl 6-fluoro-1-phenyl-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6c)

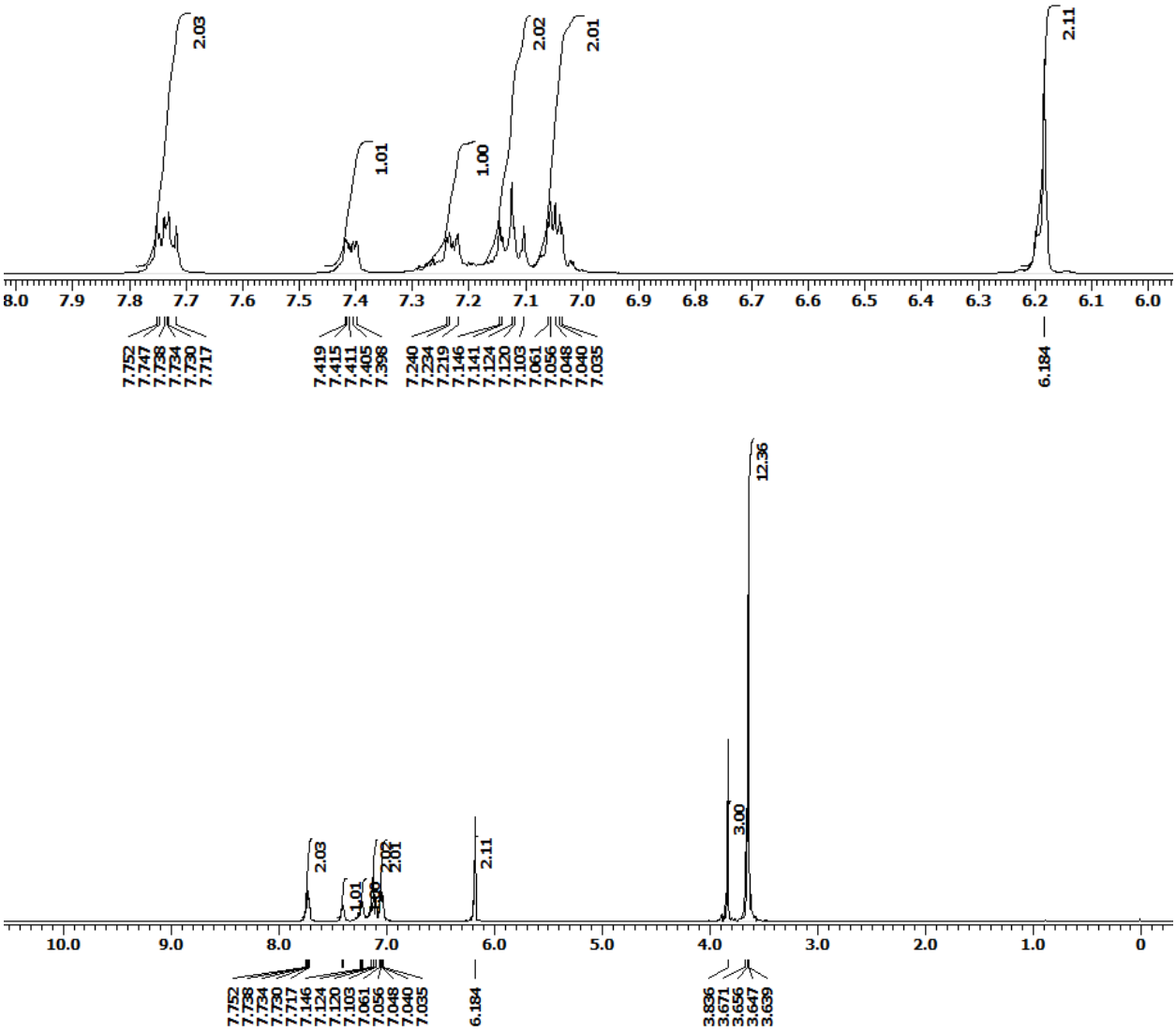




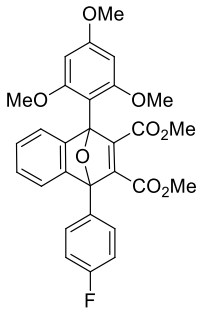
^{1}H NMR



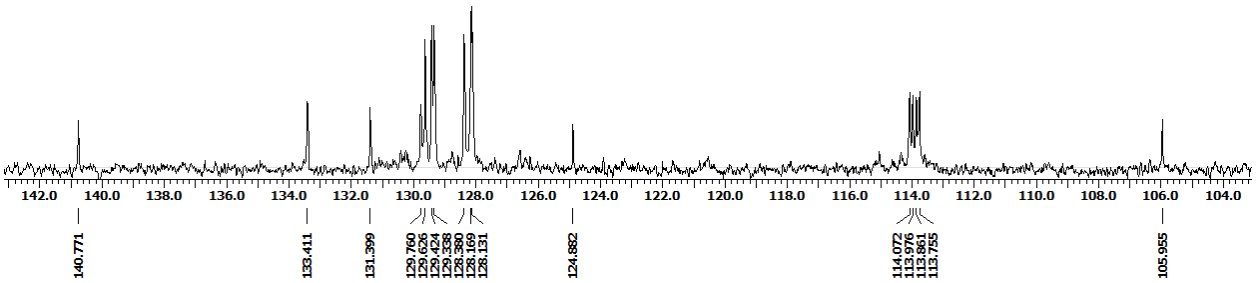
Dimethyl 1-(4-fluorophenyl)-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6d)

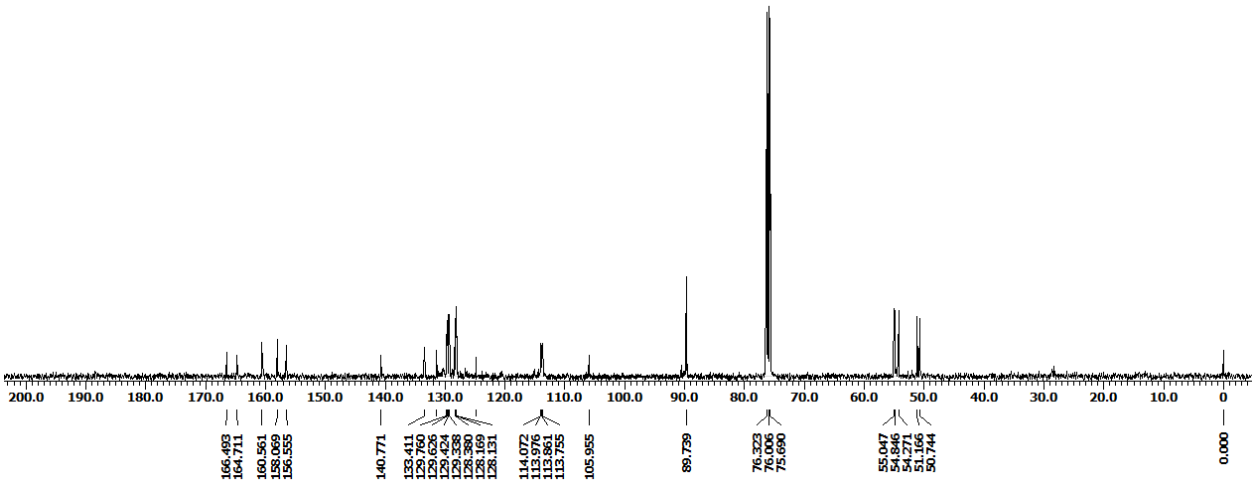


^{13}C NMR

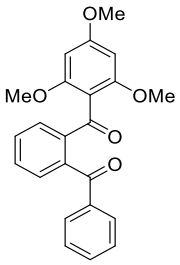


Dimethyl 1-(4-fluorophenyl)-4-(2,4,6-trimethoxyphenyl)-1,4-dihydro-1,4-epoxynaphthalene-2,3-dicarboxylate (6d)

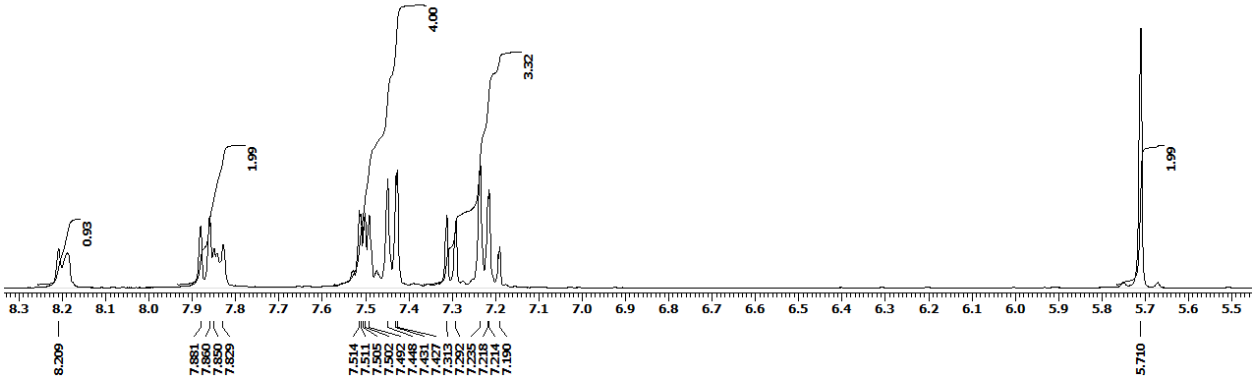


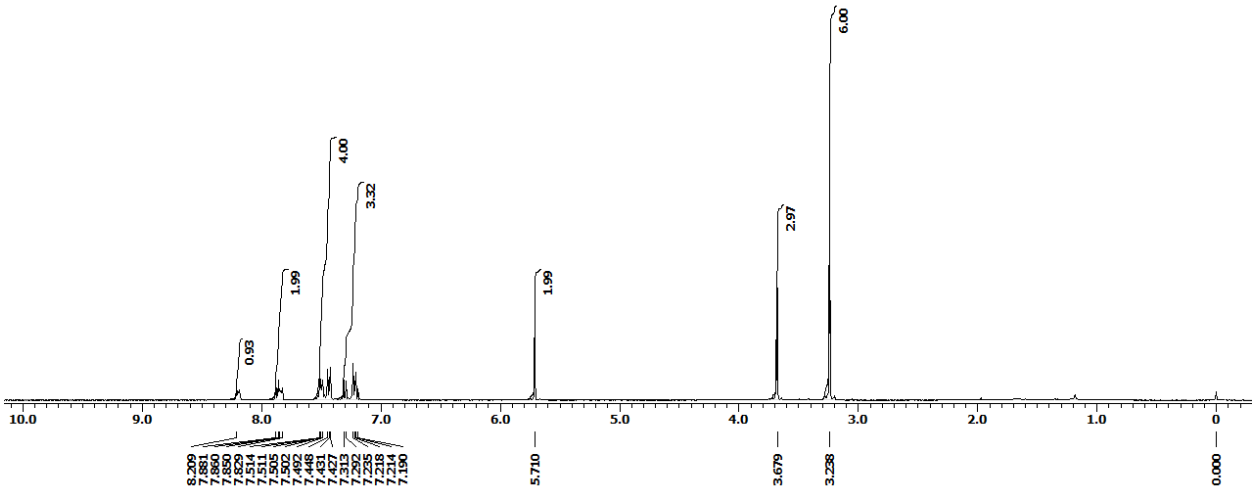


^{1}H NMR

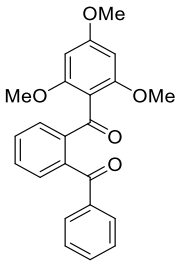


(2-benzoylphenyl)(2,4,6-trimethoxyphenyl)methanone (7a)

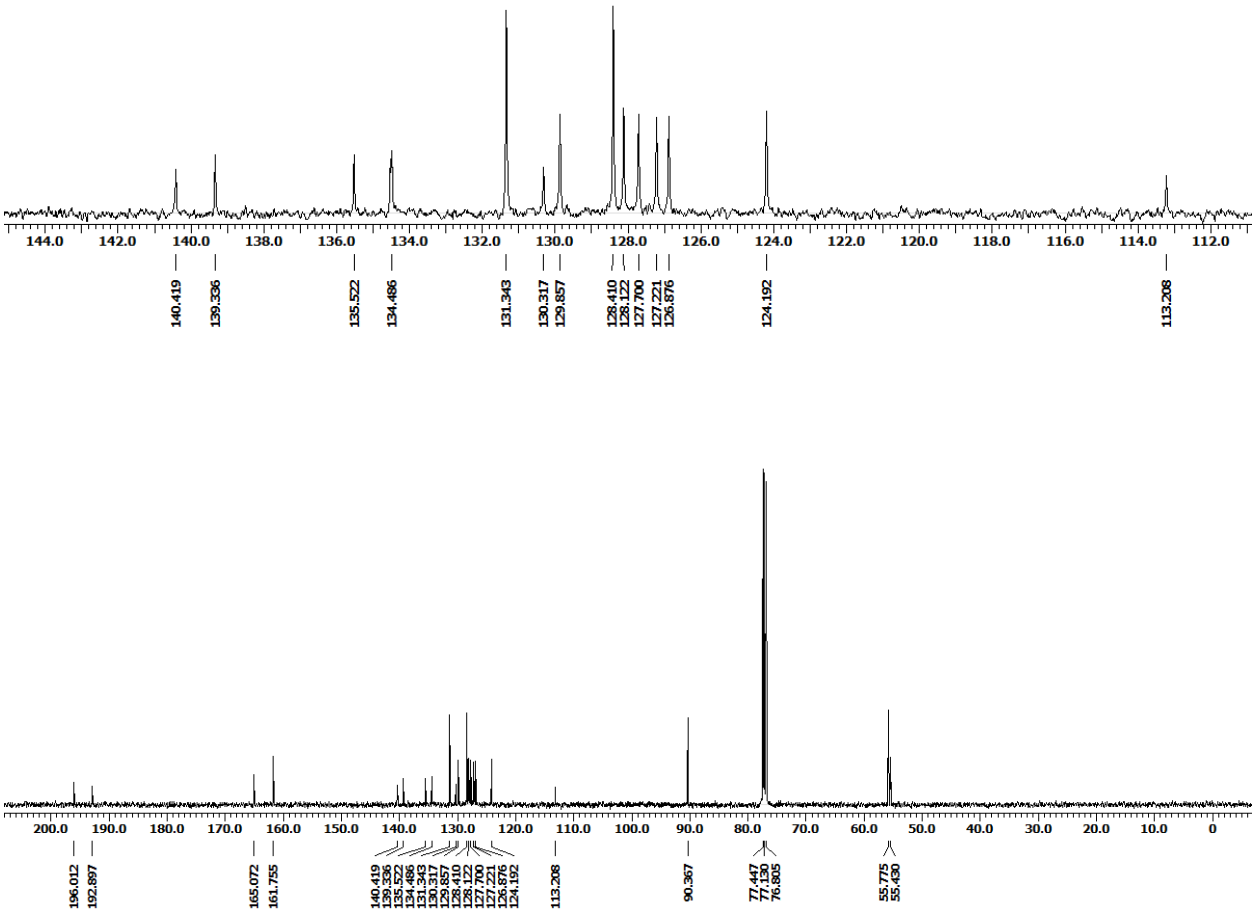




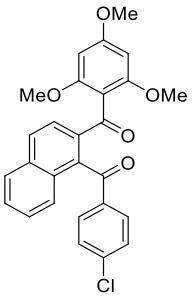
^{13}C NMR



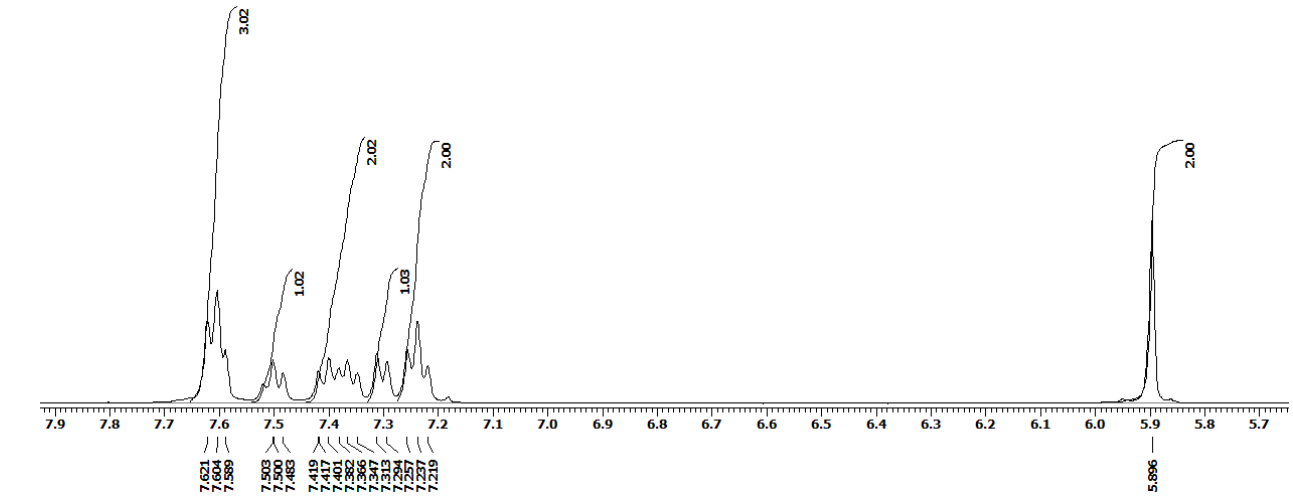
(2-benzoylphenyl)(2,4,6-trimethoxyphenyl)methanone (7a)

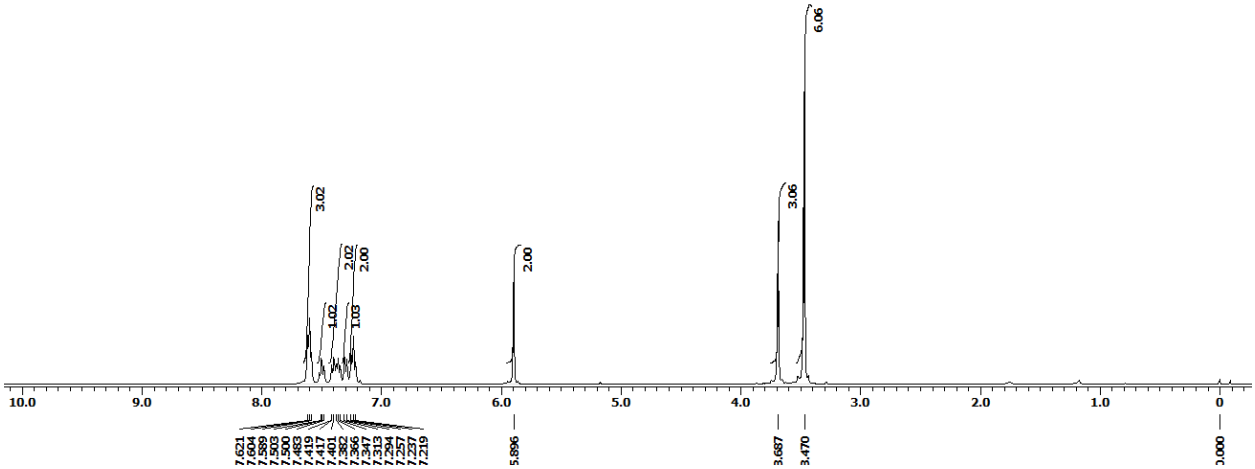


^{1}H NMR

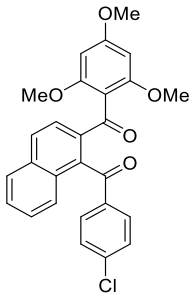


(1-(4-chlorobenzoyl)naphthalen-2-yl)(2,4,6-trimethoxyphenyl)methanone (7b)





^{13}C NMR



(1-(4-chlorobenzoyl)naphthalen-2-yl)(2,4,6-trimethoxyphenyl)methanone (7b)