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Supporting Information

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Direct Arylation of Thiazoles on Water

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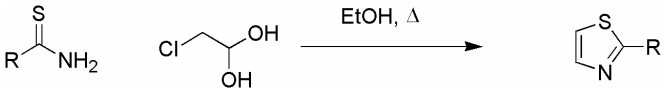
Part A: Experimental Procedures

General Methods

^{1}H, ^{13}C and ^{19}F NMR spectra were recorded on a Bruker 360 MHz instrument at 25 °C unless otherwise stated and are calibrated to residual solvent peaks ($CDCl_3$ 7.26 ppm and 77.0 ppm). The data is reported as chemical shift (ppm), then the interpretation of the peak with relevant coupling constants reported in Hertz. Infra-red spectra were recorded on a JASCO FT/IR-460 using sodium chloride disks or a PerkinElmer Spectrum One FT-IR Universal ATR sampling accessory instrument as a thin film. Melting point measurements were obtained from a Gallencamp apparatus and are reported uncorrected. Electrospray high resolution mass spectrometry was performed by the EPSRC National Mass Spectrometry Service Centre, Swansea, using a Finigan MAT 900 XTL double focusing mass spectrometer. FAB HRMS was carried out by the University of Edinburgh using a Kratos MS50 instrument, EI mass spectrometry was carried out on a JEOL GCmateII Samples were introduced either by Direct Heated Probe or via GC from an Agilent 6890 using a Chrompack CPSil5 low bleed MS column. The data is recorded as the ionization method followed by the calculated and measured masses. T.L.C. was performed on Merck $60F_{254}$ aluminium backed silica plates and visualized by UV light (both 254 nm and 365 nm). The compounds were purified by wet flash chromatography using Merck Kieselgel 60 (particle size 35-70) silica under a positive pressure. Acetonitrile and THF were dried and purified by passage through activated alumina columns using a solvent purification system from www.glasscontour.com. Cs_2CO_3 was stored under vacuum at 70 °C. $Pd(dppf)Cl_2$.DCM was purchased from Strem Chemicals, Inc. All other chemicals were purchased from a chemical supplier and used as received unless otherwise stated.

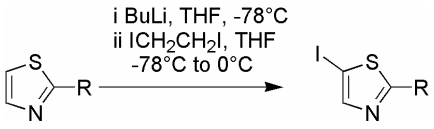
General procedures

General procedure A: Synthesis of 2-substituted thiazoles



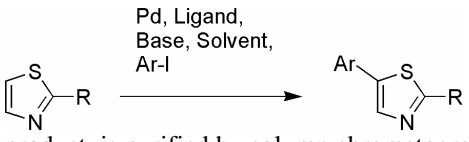
Thioamide (5 g, 1 equiv) was dissolved in ethanol (25 mL, 5 mLg^{-1}) and chloroacetaldehyde (monohydrate as 50% solution in water, 1.2 equiv) was added and the solution heated to reflux. After complete consumption of starting material is seen by tlc (approximately 2 hours), the ethanol is removed in vacuo to give a brown gum. This is partitioned between water (5 mLg^{-1}) and CH_2Cl_2 (5 mLg^{-1}), the aqueous phase re-extracted with CH_2Cl_2 (5 mLg^{-1}) and the organics washed with brine (sat. aq., 5 mLg^{-1}) then dried over $MgSO_4$ and concentrated to a brown solid or oil. Purification is achieved by column chromatography or reduced pressure distillation.

General procedure B: Iodination of 2-aryl thiazoles at C5



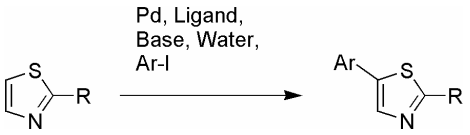
2-Arylthiazole (1 equiv) is dissolved in dry THF (15 mLg^{-1}) under N_2 and cooled to -78 °C by means of a dry ice/acetone bath. To this is added $^{n}BuLi$ (1.1 equiv) dropwise and the reaction left to stir for 5 min. 1,2-Diiodoethane (1.2 equiv) is dissolved in THF (15 mLg^{-1} of starting material) and added slowly to the solution, this is stirred at -78°C for 15 min then warmed to 0 °C and quenched by the addition of NH_4Cl (sat.aq., 15 mLg^{-1}) and diluted with Et_2O (15 mLg^{-1}). The phases are separated and the aqueous re-extracted with Et_2O (15 mLg^{-1}), the organics were washed with brine (sat. aq., 15 mLg^{-1}) and dried over $MgSO_4$ before concentrating in vacuo and purifying by column chromatography.

General procedure C: 5-Arylation with 2-arylthiazole and aryl halide in dry solvents



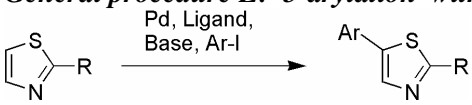
Ag_2CO_3 (2 equiv), $Pd(dppf)Cl_2$.DCM (5.0 mol %), PPh_3 (10.0 mol %) and aryl halide (1.2 equiv) were dissolved in dry solvent (4 mL) under N_2. 2-Arylthiazole (100 mg, 1 equiv) was added as a solution in dry solvent (1 mL), and the solution heated to 60 °C for 3 days. The reaction mixture is filtered through a pad of celite, washed with CH_2Cl_2 and acetone then concentrated in vacuo. The crude product is purified by column chromatography.

General procedure D: 5-arylation with 2-arylthiazole and aryl halide on water



Aryl halide (1.2 equiv), Ag_2CO_3 (2 equiv), $Pd(dppf)Cl_2.CH_2Cl_2$ (5.0 mol %), PPh_3 (10.0 mol %) and 2-arylthiazole (1 equiv, typical scale 100 mg) were combined[1] and then suspended in deionized water (5 mL) and the suspension heated to 60 °C for 24 hours. The reaction mixture is filtered through a pad of celite, washed with acetone (5 mL) and CH_2Cl_2 (5 mL) then carefully concentrated in vacuo.[2] CH_2Cl_2 (5 mL) and brine (5 mL) are added to the resultant solid and water mixture and the phases separated. The aqueous phase is re-extracted with CH_2Cl_2 (5 mL) and the organics concentrated. The crude product is purified by column chromatography.

General procedure E: 5-arylation with 2-arylthiazole and aryl halide neat



Ag_2CO_3 (2 equiv), $Pd(dppf)Cl_2.CH_2Cl_2$ (5.0 mol %), PPh_3 (10.0 mol %), aryl halide (2 equiv) and 2-arylthiazole (100 mg, 1 equiv) were combined, shaken to mix thoroughly and heated to 60 °C for 24 hours.[3] CH_2Cl_2 was added to suspend the reaction mixture which was filtered through a pad of celite, washed with CH_2Cl_2 and acetone then concentrated *in vacuo*. The crude product is purified by column chromatography.

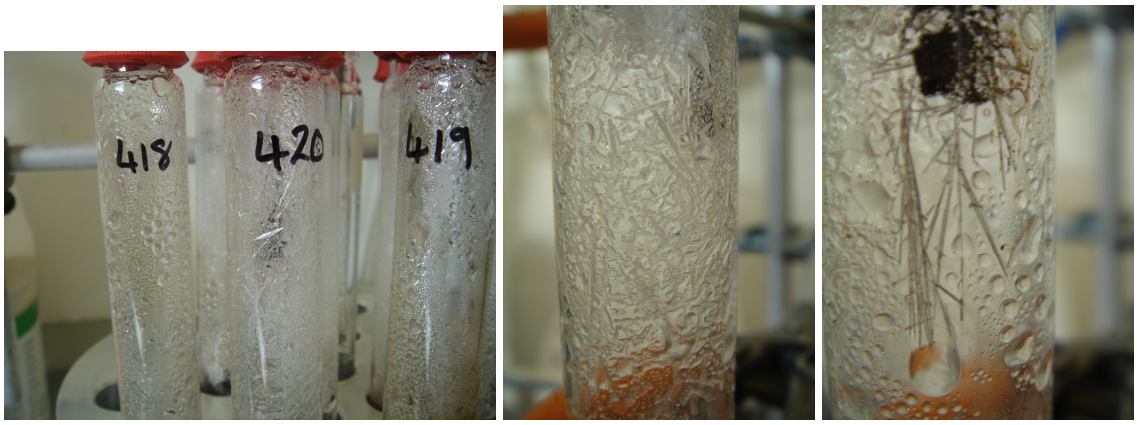


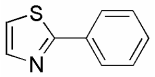
Figure 1 Crystals of product seen around the top of the reaction vessel interspersed with the water condensation.

[1] As 2-phenylthiazole is insoluble in water it is important to ensure that it is placed directly on the mixture of solids and not on the sides of the reaction vessel as the water will not "wash" it into the reaction as an organic solvent would.

[2] Some of the 2,5-diarylthiazole products azeotrope with water, hence it is important to remove only the CH_2Cl_2 and acetone by distillation and not the water also. During the reaction with some aryl halides, crystals of product can be seen to form at the top of the reaction vessel (see figure 1).

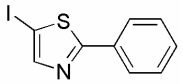
[3] The reaction is a melt for the first several hours and stirs well but as more product forms it begins to set into a solid cake.

2-Phenylthiazole **1**[4]



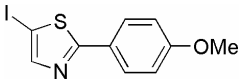
General procedure A using thiobenzamide (22.00 g, 0.160 mol). The title compound was obtained by reduced pressure distillation as a colorless oil (25.06, 96%). BP 82 °C at 0.4 mmHg; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.00-7.95 (2H, m), 7.86 (1H, d *J* = 3.3), 7.47-7.40 (3H, m), 7.31 (1H, d *J* = 3.3); ^{13}C NMR (90 MHz, $CDCl_3$) 168.38 (quat), 143.63 (CH), 133.52 (quat), 129.96 (CH), 128.93 (2 CH), 126.53 (2 CH), 118.80 (CH).

5-Iodo-2-phenylthiazole **2r**



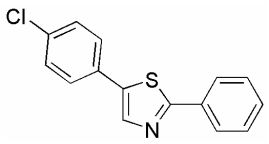
General procedure B using 2-phenylthiazole (**1**, 2.00 g, 12.400 mmol). The title compound was purified by column chromatography (0-10% EtOAc/iso-hexane) and obtained as a brown solid (2.68 g, 75%). MP ($CHCl_3$) 101 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 7.86-7.83 (3H, m), 7.42-7.38 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 173.24 (quat), 151.19 (CH), 132.68 (quat), 130.21 (CH), 128.82 (2CH), 126.17 (2CH), 70.12 (quat); IR (thin film, cm^{-1}) ν_{max} 3054, 2987, 1421, 1265, 896, 739, 705; HRMS (EI) calculated for $[C_9H_7INS]^+$ 286.9266, found 286.9259.

5-Iodo-2-(4-methoxyphenyl)thiazole **2s**



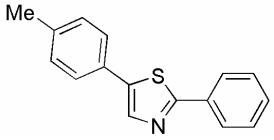
General procedure B using 2-anisylthiazole (**4a**, 300 mg, 1.569 mmol). Purification by column chromatography (0-10% EtOAc/iso-hexane) afforded the title compound as a yellow solid (333.6 mg, 67% yield). MP ($CHCl_3$) 105-106 °C; ^{1}H NMR (360 MHz, $CDCl_3$) 7.83-7.80 (3H, m), 6.97-6.93 (2H, m), 3.86 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$) 173.46 (quat), 161.42 (quat), 151.15 (CH), 127.91 (2CH), 126.00 (quat), 114.38 (2CH), 68.49 (quat), 55.42 (CH_3); IR (thin film cm^{-1}) ν_{max} 1607, 1475, 1410, 1257, 1177, 1110, 1034, 807, 666; HRMS (EI) calculated for $[C_{10}H_8INOS]^+$ 316.9372, found 316.9382.

5-(4-Chlorophenyl)-2-phenylthiazole **3a**



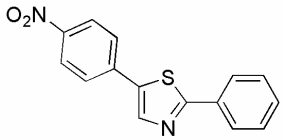
General procedure D using 2-phenylthiazole (**1**) (100 mg, 0.620 mmol) and iodochlorobenzene (**2a**, 177.5 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) gave the title compound as a yellow solid (159.7 mg, 95%). MP (Et_2O) 137 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 7.92 (1H, s), 7.90-7.87 (2H, m), 7.47-7.45 (2H, m), 7.39-737 (3H, m), 7.32-7.30 (2H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 167.49 (quat), 139.44 (CH), 137.94 (quat), 134.10 (quat), 133.45 (quat), 130.16 (CH), 129.88 (quat), 129.28 (2CH), 128.99 (2CH), 127.77 (2CH), 126.36 (2CH); IR (thin film, cm^{-1}) ν_{max} 3054, 2986, 1265, 1095, 896, 739, 705; HRMS (ES +ve) Calculated for $[C_{15}H_{10}{}^{35}ClNS+H]^+$ 272.0295, found 272.0293.

5-(4-Methylphenyl)-2-phenylthiazole **3b**[5]



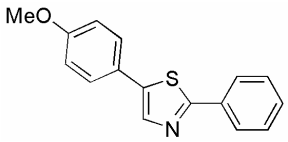
General procedure D using **1** (200 mg, 1.240 mmol) and iodotoluene (**2b**, 324.6 mg, 1.488 mmol). Purification by column chromatography (toluene) gave the title compound as a yellow oil (280.5 mg, 90%). ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 7.99-7.96 (3H, m), 7.51.7.42 (5H, m), 7.23-7.21 (2H, m), 2.39 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 166.53 (quat), 139.35 (quat), 138.62 (CH), 138.23 (quat), 133.65 (quat), 129.79 (CH), 129.68 (2CH), 128.85 (2CH), 128.44 (quat), 126.45 (2CH), 126.22 (2CH), 21.16 (CH_3).

5-(4-Nitrophenyl)-2-phenylthiazole **3c**



General procedure C using **1** (100 mg, 0.620 mmol) and 4-iodonitrobenzene (**2c**, 185.3 mg, 0.744 mmol). Purification by column chromatography (2% EtOAc/hexane) gave the title compound as a yellow solid (108.4 mg, 62% yield). MP ($CHCl_3$) 173 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.30-8.26 (2H, m), 8.16 (1H, s), 8.00-7.97 (2H, m), 7.76-7.73 (2H, m), 7.51-7.48 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 169.50 (quat), 147.11 (quat), 141.44 (CH), 137.78 (quat), 136.55 (quat), 133.10 (quat), 130.74 (CH), 129.13 (2CH), 126.88 (2CH), 126.58 (2CH), 124.56 (2CH); IR (thin film cm^{-1}) 3054, 2986, 1596, 1520, 1422, 1340, 1265, 896, 739, 706; HRMS (EI) calcd for $[C_{15}H_{10}N_2O_2S]^+$ 282.0463, found 282.0462.

5-(4-Methoxyphenyl)-2-phenylthiazole **3d**



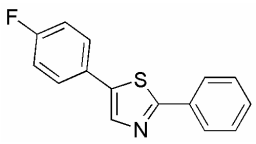
General procedure C using **1** (100 mg, 0.620 mmol) and 4-iodoanisole (**2d**, 174.1 mg, 0.744 mmol). Purification by column chromatography (2% EtOAc/hexane) gave the title compound as a colorless solid (129.2 mg, 78%). MP (EtOH) 85-87 °C. ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 7.90-7.86 (2H, m), 7.84 (1H, s), 7.48-7.44 (2H, m), 7.38-7.35 (3H, m), 6.90-6.86 (2H,m), 3.77 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 166.11 (quat), 159.65 (quat), 139.09 (quat), 138.05 (CH), 133.62 (quat), 129.70 (CH), 128.95 (2CH), 128.82 (2CH), 127.84 (2CH), 126.13 (quat), 114.40 (2CH), 55.25 (CH_3); IR (thin film

[4] M. Begtrup, L. B. L. Hansen, *Acta Chem. Scand.* **1992**, *46*, 372.

[5] a) M. D. Gheorghiu, I. Schiketanz, A. Schiketanz, A. T. Balaban, *Revue Roumaine de Chimie* **1990**, *35*, 339; b) I. Schiketanz, A. Stefanescu, M. C. Balaban, A. Schiketanz, M. D. Gheorghiu, A. T. Balaban, *Revue Roumaine de Chimie* **1987**, *32*, 1175.

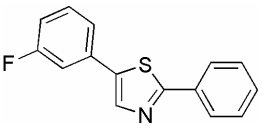
cm^{-1}) 3049, 2960, 2837, 1609, 1533, 1489, 1453, 1255, 1034, 827, 761, 738, 689, 631; HRMS (FAB) calcd for $[C_{16}H_{13}NOS+H]^+$ 268.0796, found 268.0795.

5-(4'-Fluorophenyl)-2-phenylthiazole **3e**



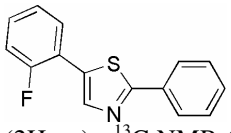
General procedure C using **1** (100 mg, 0.620 mmol) and 4-iodofluorobenzene (**2e**, 165.2 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) afforded the title compound as a colorless solid (140.9 mg, 89% yield). MP 124 °C (Et_2O); ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 7.97-7.94 (3H, m), 7.56-7.52 (2H, m), 7.45-7.42 (3H, m), 7.12-7.07 (2H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 167.01 (quat), 162.68 (quat, d J = 248.6), 138.92 (CH), 137.99 (quat), 133.37 (quat), 129.97 (CH), 128.87 (2CH), 128.20 (2CH, d J = 8.1), 127.43 (quat, d J = 3.5), 126.19 (2CH), 116.02 (2CH, d J = 21.9); ^{19}F NMR (235 MHz, $CDCl_3$) δ_F -114 (1F, s); IR (thin film, cm^{-1}) ν_{max} 3054, 2986, 1534, 1505, 1489, 1453, 1423, 1265, 1237, 1159, 896, 834, 739, 705; HRMS (ES +ve) calculated for $[C_{15}H_{10}FNS+H]^+$ 256.0591, found 256.0591.

5-(3-Fluorophenyl)-2-phenylthiazole **3f**



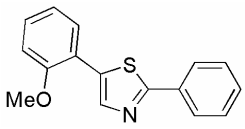
General procedure C using **1** (100 mg, 0.620 mmol) and 3-iodofluorobenzene (**2f**, 165.2 mg, 0.744 mmol). Purification by column chromatography (EtOAc/hexane 10-20%) afforded the title compound as a yellow solid (102.9 mg, 65% yield). MP (EtOH) 112-114 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.02 (1H, s), 7.98-7.95 (2H, m), 7.47-7.43 (3H, m), 7.38-7.35 (2H, m), 7.30 (1H, m), 7.03 (1H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 167.70 (quat), 163.00 (quat, d J = 246.9), 139.75 (CH), 137.82 (quat, d J = 2.6), 133.39 (quat, d J = 8.3), 133.38 (quat), 130.65 (CH, d J = 8.6), 130.19 (CH), 128.97 (2CH), 126.37 (2CH), 122.30 (CH, d J = 2.8), 115.05 (CH, d J = 21.2), 113.41 (CH, d J = 23.0); ^{19}F NMR (235 MHz, $CDCl_3$) -113.0 (1F, s); (IR (thin film, cm^{-1}) ν_{max} 3054, 2986, 2305, 1610, 1585, 1421, 1265, 896, 738; HRMS (EI) calculated for $[C_{15}H_{10}FNS]^+$ 255.0518, found 255.0509.

5-(2-Fluorophenyl)-2-phenylthiazole **3g**



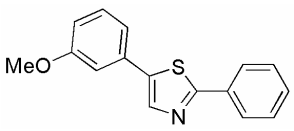
General procedure C using **1** (100 mg, 0.620 mmol) and 2-iodofluorobenzene (**2g**, 165.2 mg, 0.744 mmol). Purification by column chromatography (EtOAc/hexanes 10-20%) afforded the title compound as a yellow solid (93.4mg, 59%). MP (EtOH) 92-94 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.19 (1H, d J = 1.2), 8.01-7.98 (2H, m), 7.63 (1H, ddd J = 1.9, 7.6, 7.9), 7.49-7.43 (3H, m), 7.31 (1H, m), 7.22-7.15 (2H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 167.93 (quat, d J = 3.4), 158.90 (quat, d J = 250.5), 141.95 (CH, d J = 7.3), 133.44 (quat), 131.98 (quat, d J = 4.2), 130.09 (CH), 129.47 (CH, d J = 8.4), 128.94 (2CH), 128.89 (CH), 126.38 (2CH), 124.63 (CH, d J = 3.4), 119.41 (quat, d J = 13.6), 116.32 (CH, d J = 22.1); ^{19}F NMR (235 MHz, $CDCl_3$) -113.00 (1F, s); IR (thin film, cm^{-1}) ν_{max} 3054, 2986, 1422, 1264, 896, 748; HRMS (EI) calculated for $[C_{15}H_{10}FNS]^+$ 255.0518, found 255.0526.

5-(2'-Methoxyphenyl)-2-phenylthiazole **3h**



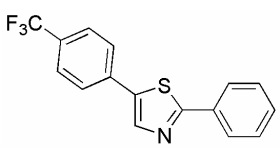
General procedure C using **1** (100 mg, 0.620 mmol) and 2-iodoanisole (**2h**, 174.1 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) afforded the title compound as a yellow solid (117.7 mg, 71%). MP ($CHCl_3$) 58-60 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.24 (1H, s), 8.03-8.00 (2H, m), 7.67 (1H, dd J = 1.7, 7.6), 7.46-7.41 (3H, m), 7.32 (1H, ddd J = 1.7, 7.6, 8.3), 7.02 (2H, ddd J = 1.3, 7.6, 15.1), 3.95 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 167.37 (quat), 155.37 (quat), 141.25 (CH), 134.15 (quat), 133.87 (quat), 129.63 (CH), 129.19 (CH), 128.82 (2CH), 128.33 (CH), 126.22 (2CH), 121.00 (CH), 120.41 (quat), 111.46 (CH), 55.51 (CH_3); IR (thin film, cm^{-1}) ν_{max} 3053, 1479, 1465, 1265, 1025, 982, 896, 740, 705; HRMS (EI) calculated for $[C_{16}H_{13}NOS]^+$ 267.0718, found 267.0728.

5-(3'-Methoxyphenyl)-2-phenylthiazole **3i**



General procedure C using **1**(100 mg, 0.620 mmol) and 3-iodoanisole (**2i**, 174.1 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) afforded the title compound (87.0 mg, 53%) as a colorless solid. MP ($CHCl_3$) 69-70 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.01 (1H, s), 7.99-7.96 (2H, m), 7.45-7.43 (3H, m), 7.33 (1H, t J = 7.9), 7.17 (1H, ddd J = 1.0, 1.7, 7.9), 7.13 (1H, dd J = 1.7, 2.3), 6.89 (1H, ddd J = 1.0, 2.6, 8.3), 3.86 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 167.12 (quat), 159.96 (quat), 139.27 (CH), 139.07 (quat), 133.57 (quat), 132.56 (quat), 130.09 (CH), 129.97 (CH), 128.91 (2CH), ,126.29 (2CH), 119.13 (CH), 113.63 (CH), 112.31 (CH), 55.29 (CH_3); IR (thin film, cm^{-1}) ν_{max} 3054, 2986, 1600, 1579, 1478, 1457, 1422, 1265, 1209, 1170, 896, 738, 705; HRMS (EI) calculated for $[C_{16}H_{13}NOS]^+$ 267.0718, found 267.0720.

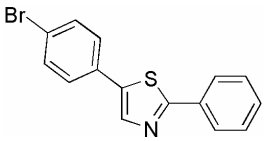
2-Phenyl-5-((4-trifluromethyl)phenyl)thiazole **3j**



General procedure C using **1** (100 mg, 0.620 mmol) and 4-iodobenzotrifluoride (**2j**, 203.2 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) gave the title compound as a colorless solid (117.4 mg, 62% yield). MP (Et_2O) 154 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.10 (1H, s), 8.01-7.97 (2H, m), 7.73-7.67 (4H, m), 7.51-7.46 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C

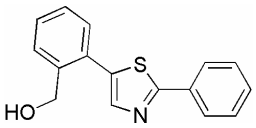
168.40 (quat), 140.36 (CH), 137.48 (quat), 134.88 (quat), 133.33 (quat), 130.41 (CH), 130.04 (quat, q J = 32.7), 129.05 (2CH), 126.71 (2CH), 126.47 (2CH), 126.12 (2CH, q J = 3.7), 123.93 (quat, q J = 272.0); ^{19}F NMR (235 MHz, $CDCl_3$) δ_F -63.9 (3F, s); IR (thin film, cm^{-1}) ν_{max} 3399, 1996, 1614, 1425, 1326, 1265, 1110, 1070, 896, 832, 739; HRMS (EI) Calculated for $[C_{16}F_3H_{10}NS]^+$ 305.0486, found 305.0498.

5-(4-Bromophenyl)-2-phenylthiazole **3k**



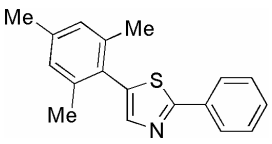
General procedure D using **1** (100 mg, 0.620 mmol) and 4-iodobromobenzene (**2k**, 210.5 mg, 0.744 mmol). Purification by column chromatography (10-20% EtOAc/hexane) gave the title compound as a pale yellow solid (196.0 mg, >99%). MP (EtOH) 146-148 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.99 (1H, s), 7.97-7.94 (2H, m), 7.55-7.51 (2H, m), 7.47-7.42 (5H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 167.50 (quat), 139.46 (CH), 137.94 (quat), 133.43 (quat), 132.20 (2CH), 130.31 (quat), 130.15 (CH), 128.98 (2CH), 127.99 (2CH), 126.35 (2CH), 122.16 (quat); IR (thin film cm^{-1}) 3076, 1525, 1478, 1449, 1426, 1398, 1163, 1070, 979, 822, 760, 686, 629; HRMS (EI) calculated for $[C_{15}H_{10}NS^{79}Br]^+$ 314.9717, found 314.9718.

2-Phenylthiazol-5-yl-2- benzyl alcohol **3l**



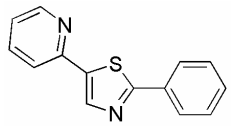
General procedure C using **1** (100 mg, 0.620 mmol) and 2-iodobenzylalcohol (**2l**, 174.1 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) gave the title compound as a yellow oil (107.8mg, 65% yield). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.94-7.91 (2H, m), 7.84 (1H, s), 7.60-7.57 (1H, m), 7.44-7.40 (4H, m), 7.38-7.30 (2H, m), 4.72 (2H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 168.39 (quat), 142.03 (CH), 138.82 (quat), 136.18 (quat), 133.26 (quat), 130.78 (CH), 130.04 (CH), 129.70 (quat), 128.98 (CH), 128.91 (2CH), 128.85 (CH), 127.83 (CH), 126.32 (2CH), 62.84 (CH_3); IR (thin film cm^{-1}) ν_{max} 3349, 1478, 1455, 1422, 1265, 982, 737, 703, 636; HRMS (EI) calculated for $[C_{16}H_{13}NOS]^+$ 267.0718, found 267.0728.

5-(2,4,6-Trimethylphenyl)-2-phenylthiazole **3m**



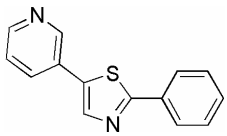
General procedure D using **1** (100 mg, 0.620 mmol) and 2,4,6-trimethyliodobenzene (**2m**, 183.1 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) afforded the title compound as a yellow oil (173.0 mg, >99%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.03-8.00 (2H, m), 7.58 (1H, s), 7.50-7.43 (3H, m), 6.99 (2H, s), 2.36 (3H, s), 2.20 (6H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 168.46 (quat), 142.22 (CH), 138.59 (quat), 138.38 (2 quat), 135.53 (quat), 133.72 (quat), 129.83 (CH), 128.91 (2CH), 128.31 (2CH), 126.81 (quat), 126.26 (2CH), 21.06 (CH_3), 20.78 ($2CH_3$); IR (thin film cm^{-1}) 2918, 1456, 978, 851, 761, 689, 635; HRMS (EI) calculated for $[C_{18}H_{17}NS]^+$ 279.1082, found 279.1080.

2-(2-Phenylthiazol-5-yl)pyridine **3n**



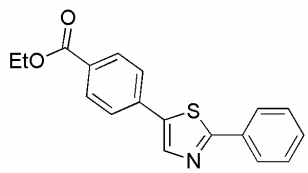
General procedure C using **1** (100 mg, 0.620 mmol) and 2-iodopyridine (**2n**, 152.6 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) gave the title compound as a colorless solid (84.3 mg, 57%). MP ($CHCl_3$) 99-101 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.59 (1H, m), 8.27 (1H, s), 8.01-7.99 (2H, m), 7.71-7.67 (2H, m), 7.48-7.43 (3H, m), 7.20 (1H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 169.27 (quat), 150.47 (quat), 149.78 (CH), 140.44 (quat), 140.01 (quat), 136.70 (CH), 133.48 (quat), 130.21 (CH), 128.93 (2CH), 126.38 (2CH), 122.47 (CH), 119.47 (CH); IR (thin film, cm^{-1}) ν_{max} 3053, 2984, 1584, 1466, 1450, 1434, 1420, 1265, 1162, 779, 738, 705; HRMS (ES +ve) Calculated for $[C_{14}H_{10}N_2S+H]^+$ 239.0637, found 239.0636.

3-(2-Phenylthiazol-5-yl)pyridine **3o**



General procedure D using **1** (100 mg, 0.620 mmol) and 3-iodopyridine (**2o**, 152.6 mg, 0.744 mmol). Purification by column chromatography (10-20% EtOAc/hexane) gave the title compound as a pale yellow solid (147.7 mg, >99%). MP (CH_2Cl_2) 90-91 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.87 (1H, d J = 2.3), 8.57 (1H, dd J = 1.6, 4.8), 8.06 (1H, s), 7.98-7.96 (2H, m), 7.87 (1H, ddd J = 1.6, 2.3, 7.9), 7.48-7.44 (3H, m), 7.35 (1H, ddd J = 0.7, 4.8, 7.9); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 168.15 (quat), 149.06 (CH), 147.30 (CH), 140.02 (CH), 135.07 (quat), 133.42 (CH), 133.14 (quat), 130.22 (CH), 128.89 (2CH), 127.49 (quat), 126.32 (2CH), 123.63 (CH); IR (thin film cm^{-1}) 1561, 1522, 1467, 1450, 1415 1150, 1022, 974, 958, 843, 803, 759, 705; HRMS (EI) calculated for $[C_{14}H_{10}N_2S]^+$ 238.0565, found 238.0558.

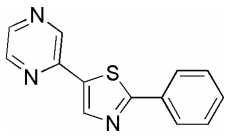
Ethyl 4-(2-phenylthiazol-5-yl)benzoate **3p**



General procedure C using **1** (100 mg, 0.620 mmol) and ethyl iodobenzene-4-carboxylate (**2p**, 205.4 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) gave the title compound as a colourless solid (101.7 mg 53%). MP ($CHCl_3$) 119-120 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.11-8.08 (3H, m), 8.00-7.97 (2H, m), 7.67-7.64 (2H, m), 7.49-7.45 (3H, m), 4.42 (2H, q J = 7.1), 1.44 (3H, t J = 7.1); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 168.08 (quat), 165.84 (quat), 140.21 (CH), 137.87 (quat), 135.42 (quat), 133.20 (quat), 130.22 (2CH and CH), 129.72 (quat), 128.89 (2CH), 126.29 (2CH), 126.05 (2CH), 61.01 (CH_2), 14.23 (CH_3); IR (thin film,

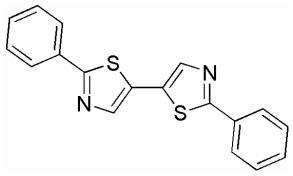
cm^{-1}) ν_{max} 3054, 2987, 1714, 1608, 1531, 1452, 1425, 1368, 1266, 1185, 1155, 1109, 1022, 981, 896, 851; HRMS (EI) calculated for $[C_{18}H_{15}NO_2S]^+$ 309.0824, found 309.0827.

(2-Phenylthiazol-5-yl)pyrazine **3q**



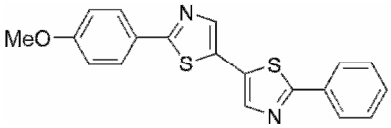
General procedure D using **1** (100 mg, 0.620 mmol) and iodopyrazine (**2q**, 153.2 mg, 0.744 mmol). Purification by column chromatography (10-50% EtOAc/hexane) afforded the title compound as a pale yellow solid (148.1 mg, >99%). MP ($CHCl_3$) 159-161 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.98 (1H, d *J* = 1.6), 8.53 (1H, dd *J* = 1.6, 2.6), 8.45 (1H, d *J* = 2.6), 8.36 (1H, s), 8.01-7.98 (2H, m), 7.47-7.43 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 170.51 (quat), 146.80 (quat), 144.25 (CH), 142.92 (CH), 141.66 (CH), 141.08 (CH), 136.56 (quat), 133.20 (quat), 130.61 (CH), 129.02 (2CH), 126.59 (2CH); IR (thin film cm^{-1}) 1526, 1469, 1449, 1418, 1406, 1316, 1167, 1011, 848, 754, 683, 633; HRMS (EI) calculated for $[C_{13}H_9N_3S]^+$ 239.0517, found 239.0514.

2-Phenyl-5-(2-phenylthiazol-5-yl)thiazole **3r**



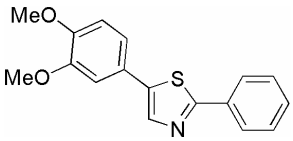
General procedure D using **1** (100 mg, 0.620 mmol) and 5-iodo-2-phenylthiazole (**2r**, 213.6 mg, 0.744 mmol). Purification by column chromatography (acetone/CH_2Cl_2 1-5%) afforded the title compound as a yellow solid (198.1 mg, >99%). MP ($CHCl_3$) 182 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 7.97-7.93 (6H, m), 7.48-7.44 (6H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 167.60 (2 quat), 141.12 (2CH), 133.11 (2 quat), 130.41 (2CH), 129.05 (4CH), 128.40(2 quat), 126.48 (4CH); IR (thin film, cm^{-1}) ν_{max} 3019, 2400, 1479, 1417, 1216, 1149, 975, 929, 770; HRMS (ES +ve) calculated for $[C_{18}H_{12}N_2S_2+H]^+$, 321.0515 found 321.0512.

2'-(4-Methoxyphenyl)-2-phenyl-[5,5']bithiazolyl **3s**



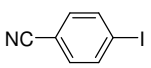
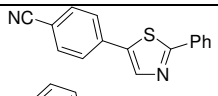
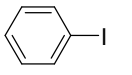
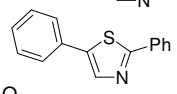
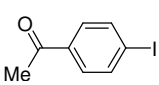
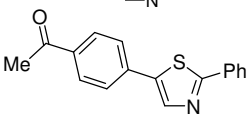
General procedure D using **1** (100 mg, 0.620 mmol) and 5-iodo-2-anisylthiazole (**2s**, 236.0 mg, 0.744 mmol). Purification by column chromatography (acetone/CH_2Cl_2 1-5%) afforded the title compound as a yellow solid (122.6 mg, 56%). MP ($CHCl_3$) 155-157 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.95-7.92 (2H, m), 7.89-7.86 (4H, m), 7.47-7.44 (3H, m), 6.98-6.94 (2H, m), 3.85 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 167.54 (quat), 167.27 (quat), 161.43 (quat), 140.92 (CH), 140.85 (CH), 133.15 (quat), 130.31 (CH), 129.01 (2CH), 128.61 (quat), 127.99 (2CH), 127.36 (quat), 126.43 (2CH), 126.03 (quat), 114.38 (2CH), 55.40 (CH_3); IR (thin film cm^{-1}) 1607, 1482, 1435, 1417, 1258, 1033, 846, 831, 763, 689, 629; HRMS (EI) calculated for $[C_{19}H_{14}N_2S_2O]^+$ 350.0548, found 350.0552.

2-Phenyl-5-(3,4-dimethoxy)thiazole **3t**

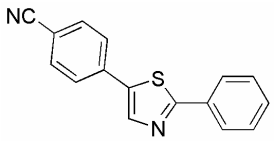


General procedure D using **1** (100 mg, 0.620 mmol) and 3,4-dimethyliodobenzene (**2t**, 196.5 mg, 0.744 mmol). Purification by column chromatography (10-20% EtOAc/hexane) afforded the title compound as a pale yellow solid (162.0 mg, 88%). MP ($CHCl_3$) 108-110 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.93-7.90 (2H, m), 7.88 (1H, s), 7.43-7.36 (3H, m), 7.10 (1H, m), 7.03 (1H, m), 6.82 (1H, m), 3.90 (3H, s), 3.89 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 166.01 (quat), 149.11 (quat), 149.03 (quat), 139.14 (quat), 138.08 (CH), 133.47 (quat), 129.63 (CH), 128.72 (2CH), 126.00 (2CH), 123.96 (quat), 119.24 (CH), 111.30 (CH), 109.51 (CH), 55.76 (CH_3), 55.72 (CH_3); IR (thin film cm^{-1}) 2937, 2836, 1533, 1507, 1491, 1455, 1256, 1238, 1145, 1026, 841, 763, 691629; HRMS (ES +ve) calculated for $[C_{17}H_{15}NO_2S+H]^+$ 298.0896, found 298.0893.

Examples not included in Table 1

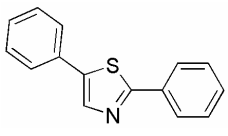
Entry	ArI	Product	Yield MeCN (%)	Yield H_2O (%)
1			88	98
2			79	87
3			94	97

4-(2-Phenylthiazol-5-yl)benzonitrile



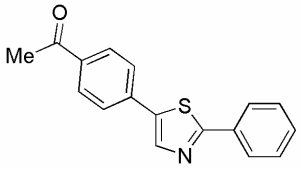
General procedure C using **1** (100 mg, 0.620 mmol) and iodobenzonitrile (205.2 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) afforded the title compound as a colorless solid (143.2 mg, 88%). MP (Et_2O) 183 °C; ^{1}H NMR (360 MHz, $CDCl_3$) δ_H 8.12 (1H, s), 7.99-7.96 (2H, m), 7.70 (4H, s), 7.49-7.47 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 168.94 (quat), 140.91 (CH), 136.93 (quat), 135.76 (quat), 133.08 (quat), 132.81 (2CH), 130.57 (quat), 129.04 (2CH), 126.77 (2CH), 126.46 (2CH), 118.43 (quat), 111.40 (quat); IR (thin film, cm^{-1}) ν_{max} 3055, 2223, 1996, 1601, 1532, 1488, 1449, 1422, 1265, 1168, 977, 896, 834, 737; HRMS (ES +ve) calculated for $[C_{16}H_{10}N_2S+H]^+$ 263.0637, found 263.0638.

2,5-Diphenylthiazole[6]



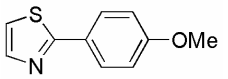
General procedure D using **1** (200 mg, 1.240 mmol) and iodobenzene (303.4 mg, 1.488 mmol). Purification by column chromatography (0.5% EtOAc/hexane) gave the title compound as a colorless oil (255.1 mg, 87%). ^{1}H NMR (360MHz, $CDCl_3$) δ_H 8.03 (1H, s), 8.00-7.97 (2H, m), 7.62-7.60 (2H, m), 7.47-7.32 (6H, m). ^{13}C NMR (90 MHz, $CDCl_3$) δ_C 166.95 (quat), 139.12 (quat), 139.02 (CH), 133.51 (quat), 131.21 (quat), 129.84 (CH), 128.94 (2CH), 128.81 (2CH), 128.12 (CH), 126.47 (2CH), 126.20 (2CH).

5-(4-Acetylphenyl)-2-phenylthiazole



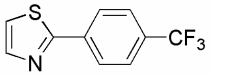
General procedure C using **1** (100 mg, 0.620 mmol) and 4-iodoacetophenone (183.1 mg, 0.744 mmol). Purification by column chromatography (CH_2Cl_2) gave the title compound as a yellow solid (162.8 mg, 94%). MP ($CHCl_3$) 147 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.17 (1H, s), 8.06-8.01 (4H, m), 7.74-7.72 (2H, m), 7.53-7.49 (3H, m), 2.67 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 196.98 (quat), 168.34 (quat), 140.43 (CH), 137.79 (quat), 136.28 (quat), 135.76 (quat), 133.26 (quat), 130.32 (CH), 129.13 (2CH), 128.97 (2CH), 126.38 (2CH), 126.35 (2CH), 26.51 (CH_3); IR (thin film cm^{-1}) ν_{max} 1681, 1603, 1420, 1265, 825, 738, 705, 590; HRMS (EI) calculated for $[C_{17}H_{13}NOS]^+$ 279.0718, found 279.0719.

2-(4-Methoxyphenyl)thiazole **4a**[7]



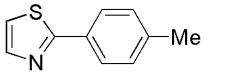
General procedure A using 4-methoxythiobenzamide (858.8 mg, 6.000 mmol). Purification by column chromatography (0-20% EtOAc/^{i}hexane) afforded the title compound as a colorless oil (791.7 mg, 81%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.92-7.88 (2H, m), 7.80 (1H, d J = 3.3), 7.25 (1H, d J = 3.3), 6.97-6.93 (2H, m), 3.85 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 168.28 (quat), 161.05 (quat), 143.34 (CH), 128.00 (2CH), 126.55 (quat), 117.83 (CH), 114.25 (2CH), 55.36 (CH_3).

2-(4-Trifluoromethylphenyl)thiazole **4b**



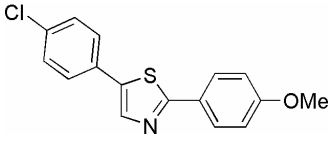
General procedure A using 4-trifluooromethylbenzamide (5.00 g, 24.40 mmol). Purification by column chromatography (0-20% EtOAc/^{i}hexane) afforded the title compound as a colorless oil (3.19 g, 91%). MP ($CHCl_3$) 74 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.00-7.98 (2H, m), 7.85 (1H, d J = 3.2), 7.63-7.61 (2H, m), 7.32 (1H, d J = 3.2); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 166.21 (quat), 143.98 (CH), 136.49 (quat), 131.33 (quat, q J = 36.7), 126.56 (2CH), 125.82 (2CH, q J = 3.7), 123.80 (quat, q J = 272.2), 119.75 (CH); ^{19}F NMR (235 MHz, $CDCl_3$) δ_F -64.0 (3F, s); IR (thin film cm^{-1}) 3122, 3054, 1616, 1485, 1421, 1326, 1265, 1170, 1129, 1109, 1067, 1019, 978, 848, 741, 706; HRMS (EI) calcd for $[C_{10}F_3H_6NS]^+$ 229.0173, found, 229.0180.

2-(4-Methylphenyl)thiazole **4c**[8]



General procedure A using 4-methylthiobenzamide (2.00 g, 13.22 mmol). Purification by column chromatography (0-20% EtOAc/^{i}hexane) afforded the title compound as a yellow oil (2.23 g, 91%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.88-7.84 (2H, m), 7.84 (1H, d J = 3.3), 7.29 (1H, d J = 3.3), 7.26-7.24 (2H, m), 2.40 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 168.58 (quat), 143.46 (CH), 140.19 (quat), 130.92 (quat), 129.60 (2CH), 126.46 (2CH), 118.30 (CH), 21.38 (CH_3).

5-(4-Chlorophenyl)-2-(methoxyphenyl)thiazole **5a**

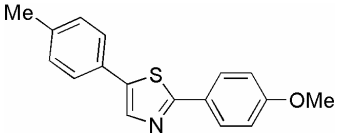


General procedure C with 2-anisylthiazole (**4a**) (100 mg, 0.523 mmol) and 4-iodochlorobenzene (**2a**, 149.6 mg, 0.627 mmol). Purification by column chromatography afforded the title compound as a yellow solid (154.6 mg, 98%). MP ($CHCl_3$) 150 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.92 (1H, s), 7.90-7.86 (2H, m), 7.51-7.47 (2H, m), 7.37-7.34

[6] K. J. Hodgetts, M. T. Kershaw, *Org. Lett.* **2002**, *4*, 1363.
[7] F. Bellina, S. Cauteruccio, R. Rossi, *Eur. J. Org.Chem.* **2006**, 1379.
[8] J. Jensen, N. Skjaerbaek, P. Vedso, *Synthesis* **2001**, 128.

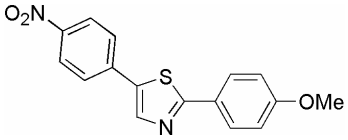
(2H, m), 6.97-6.93 (2H, m), 3.85 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 167.40 (quat), 161.22 (quat), 139.15 (CH), 136.91 (quat), 133.80 (quat), 130.02 (quat), 129.19 (2CH), 127.83 (2CH), 127.60 (2CH), 126.39 (quat), 114.30 (2CH), 55.37 (OCH_3); IR (thin film cm^{-1}) 3054, 1606, 1482, 1265, 1175, 1094, 896, 827, 743, 705; HRMS (EI) calculated for $[C_{16}H_{12}{}^{35}ClNOS]^+$ 301.0328, found 301.0315

2-(4-Methoxyphenyl)-5-(4-methylphenyl)thiazole **5b**[9]



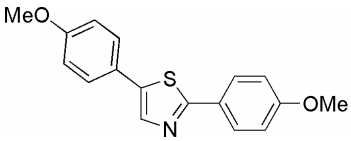
General procedure C using **4a** (100 mg, 0.523 mmol) and 4-iodotoluene (**2b**, 136.8 mg, 0.627 mmol). Purification by column chromatography (10-20% EtOAc/hexane) afforded the title compound as a yellow solid (141.2 mg, 96%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.89 (1H, s), 7.85-7.83 (2H, m), 7.53-7.49 (2H, m), 7.26-7.23 (2H, m), 6.95-6.91 (2H, m), 3.83 (3H, s), 2.39 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 166.62 (quat), 161.05 (quat), 138.43 (CH), 138.11 (quat), 129.72 (2CH), 128.68 (quat), 127.77 (2CH), 126.71 (quat), 126.44 (2CH), 114.29 (2CH), 55.40 (OCH_3), 21.22 (CH_3), one quaternary not found.

2-(4-Methoxyphenyl)-5-(4-nitrophenyl)thiazole **5c**



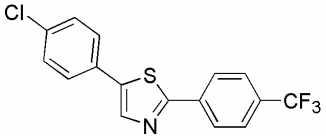
General procedure C using **4a** (100 mg, 0.523 mmol) and 4-iodonitrobenzene (**2c**, 156.2 mg, 0.627 mmol). Purification by column chromatography (10-50% EtOAc/hexane) afforded the title compound as a yellow solid (104.5 mg, 64%). MP ($CHCl_3$) 213 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.29-8.25 (2H, m), 8.11 (1H, s), 7.94-7.90 (2H, m), 7.75-7.71 (2H, m), 7.01-6.97 (2H, m), 3.88 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 169.46 (quat), 161.72 (quat), 146.92 (quat), 141.29 (CH), 137.99 (quat), 135.54 (quat), 128.14 (2CH), 126.68 (2CH), 126.03 (quat), 124.53 (2CH), 114.47 (2CH), 55.47 (OCH_3); IR (thin film cm^{-1}) 3056, 2986, 1596, 1520, 1422, 1340, 1265, 896, 739, 706; HRMS (EI) calculated for $[C_{16}H_{12}N_2O_3S]^+$ 312.0569, found 312.0574.

2,5-Di(4-methoxyphenyl)thiazole **5d**[9]



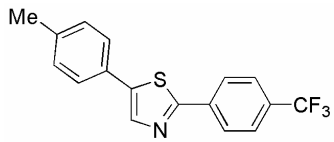
General procedure C using **4a** (100 mg, 0.523 mmol) and 4-iodoanisole (**2d**, 146.7 mg, 0.627 mmol). Purification by column chromatography (10-20% EtOAc/hexane) afforded the title compound as a yellow solid (113.5, 73% yield). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.91-7.87 (2H, m), 7.85 (1H, s), 7.53-7.49 (2H, m), 6.98-6.92 (4H, m), 3.86 (3H, s), 3.84 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 166.23 (quat), 161.01 (quat), 159.62 (quat), 138.22 (quat), 137.90 (CH), 127.85 (2CH), 127.72 (2CH), 126.74 (quat), 124.17 (quat), 114.48 (2CH), 114.29 (2CH), 55.40 (OCH_3), 55.38 (OCH_3).

5-(4-Chlorophenyl)-2-(4-trifluoromethylphenyl)thiazole **5e**



General procedure C using 2-(4-trifluoromethylphenyl)thiazole (**4b**) (100 mg, 0.436 mmol) and 4-iodochlorobenzene (**2a**, 124.8 mg, 0.524 mmol). Purification by column chromatography (0-4% CH_2Cl_2/acetone) afforded the title compound as a yellow solid (93.4 mg, 63%). MP ($CHCl_3$) 132 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.08-8.05 (2H, m), 8.03 (1H, s), 7.72-7.70 (2H, m), 7.55-7.53 (2H, m), 7.42-7.38 (2H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 165.39 (quat), 139.86 (CH), 139.25 (quat), 136.54 (quat), 134.58 (quat), 131.68 (quat, q J = 32.8), 129.48 (quat), 129.41 (2CH), 127.89 (2CH), 126.54 (2CH), 126.03 (2CH, q J = 3.6), 123.85 (quat, q, J = 272.2); ^{19}F NMR (250 MHz, $CDCl_3$), δ_F -64.0 (3F, s); IR (thin film cm^{-1}) 3054, 2986, 1412, 1326, 1265, 1067, 896, 741, 706; HRMS (EI) calculated for $[C_{16}F_3H_9{}^{35}ClNOS]^+$ 339.0096, found 339.0083.

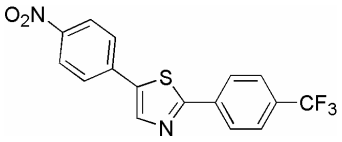
5-(4-Methylphenyl)-2-(4-trifluoromethylphenyl)thiazole **5f**



General procedure C using **4b** (100 mg, 0.436 mmol) and 4-iodotoluene (**2b**, 114.1 mg, 0.524 mmol). Purification by column chromatography (0-2% CH_2Cl_2/acetone) afforded the title compound as a yellow solid (44.6 mg, 32%). MP ($CHCl_3$) 179 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.08-8.06 (2H, m), 8.02 (1H, s), 7.72-7.69 (2H, m)7.52-7.49 (2H, m), 7.25-7.23 (2H, m), 7.40 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 164.55 (quat), 140.77 (quat), 139.15 (CH), 138.82 (quat), 136.83 (quat), 131.30 (quat, q J = 32.7), 129.87 (2CH), 128.13 (quat), 126.67 (2CH), 126.44 (2CH), 125.97 (2CH, q J = 3.7), 124.02 (quat, , J = 272.3), 21.26 (CH_3); ^{19}F NMR (250 MHz, $CDCl_3$), δ_F -64.0 (3F, s); IR (thin film cm^{-1}) 3054, 2986, 2253, 1421, 1325, 1265, 907, 728, 651; HRMS (EI) calculated for $[C_{17}F_3H_{12}NS]^+$ 319.0643, found 319.0643.

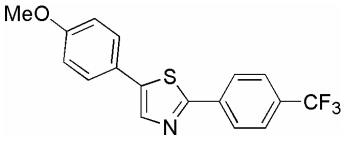
[9] A. Mori, A. Sekiguchi, K. Masui, T. Shimada, M. Horie, K. Osakada, M. Kawamoto, T. Ikeda, *J. Am. Chem. Soc.* **2003**, *125*, 1700.

5-(4-Nitrophenyl)-2-(4-trifluoromethylphenyl)thiazole **5g**



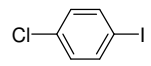
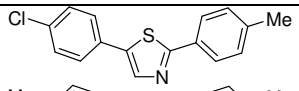
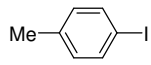
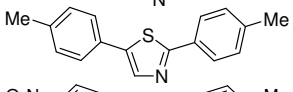
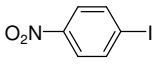
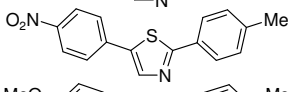
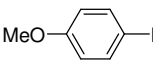
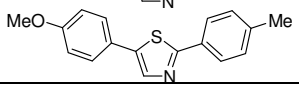
General procedure D using **4b** (100 mg, 0.436 mmol) and 4-iodonitrobenzene (**2c**, 130.4 mg, 0.524 mmol). Purification by column chromatography (0-10% CH_2Cl_2/acetone) afforded the title compound as a yellow solid (120.6 mg, 79%). MP (EtOH) 175-176 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.31-8.28 (2H, m), 8.20 (1H, s), 8.11-8.08 (2H, m), 7.78-7.72 (4H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 167.31 (quat), 147.36 (quat), 141.73 (CH), 137.57, 137.30, 136.14, 132.17 (quat, q J = 32.8), 127.06, 126.76, 126.13 (2CH, q J = 3.6), 124.60 (2CH), 123.74 (quat, J = 272.4),; ^{19}F NMR (235 MHz, $CDCl_3$), δ_F -64.0 (3F, s); IR (thin film cm^{-1}) 1594, 1521, 1340, 1322, 1133, 1110, 1065, 845, 751, 688, 631; HRMS (EI) calculated for $[C_{16}H_9N_2O_2F_3S]^+$ 350.0337, found, 350.0326.

5-(4-Methoxyphenyl)-2-(4-trifluoromethylphenyl)thiazole **5h**

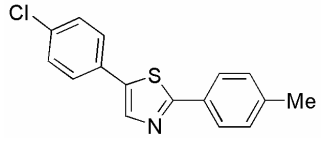


General procedure C using **4b** (100 mg, 0.436 mmol) and 4-iodoanisole (**2d**, 122.5 mg, 0.524 mmol). Purification by column chromatography (0-2% CH_2Cl_2/acetone) afforded the title compound as a yellow solid (108.1 mg, 74%). MP ($CHCl_3$) 160 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.07-8.04 (2H, m), 7.96 (1H, s), 7.71-7.69 (2H, m), 7.56-7.51 (2H, m), 6.98-6.94 (2H, m), 3.85 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 164.09 (quat), 160.04 (quat), 140.55 (quat), 138.60 (CH, TC4), 136.83 (quat), 131.31 (quat, q J = 32.7), 128.09 (2CH), 126.38 (2CH), 125.95 (2CH, q J = 3.8), 123.92 (quat, q J = 272.2), 123.55 (quat), 114.60 (2CH), 55.39 (CH_3); ^{19}F NMR (250 MHz, $CDCl_3$), δ_F -64.0 (3F, s); IR (thin film cm^{-1}) 3054, 2986, 1325, 1265, 1067, 896, 741, 706; HRMS (EI) calculated for $[C_{17}F_3H_{12}NOS]^+$ 335.0592, found 335.0588.

Examples not included in Table 2

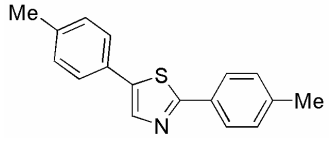
Entry	ArI	Product	Yield MeCN (%)	Yield H_2O (%)
1			85	np
2			93	np
3			69	91
4			77	np

5-(4-Chlorophenyl)-2-(4-methylphenyl)thiazole



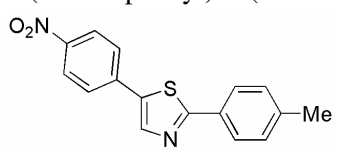
General procedure C using 2-(4-methylphenyl)thiazole (**4c**) (100 mg, 0.570 mmol) and 4-iodochlorobenzene (**2a**, 154.0 mg, 0.646 mmol). Purification by column chromatography (10-20% EtOAc/hexane) afforded the title compound as a yellow solid (138.6 mg, 85%). MP ($CHCl_3$) 151 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.95 (1H, s), 7.85-7.83 (2H, m), 7.51-7.47 (2H, m), 7.38-7.34 (2H, m), 7.25-7.23 (2H, m), 2.39 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 167.67 (quat), 140.44 (quat), 139.26 (CH), 137.38 (quat), 133.91 (quat), 130.80 (quat), 129.95 (quat), 129.64 (2CH), 129.20 (2CH), 127.66 (2CH), 126.25 (2CH), 21.41 (CH_3); IR (thin film cm^{-1}) 3054, 2986, 1483, 1421, 1265, 896, 828, 747, 705; HRMS (EI) calculated for $[C_{16}H_{12}{}^{35}ClNS]$ 285.0379, found, 285.0380.

2,5-Di(4-methylphenyl)thiazole



General procedure C using **4c** (100 mg, 0.570 mmol) and 4-iodotoluene (**2b**, 140.8 mg, 0.646 mmol). Purification by column chromatography (10-20% EtOAc/hexane) afforded the title compound as a yellow solid (146.6 mg, 97%). MP ($CHCl_3$) 144 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.96 (1H, s), 7.87-7.84 (2H, m), 7.50-7.48 (2H, m), 7.26-7.21 (4H, m), 2.40 (3H, s), 2.39 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 166.87 (quat), 140.12 (quat), 138.88 (quat), 138.52 (CH), 138.19 (quat), 131.08 (quat), 129.71 (2CH), 129.60 (2CH), 128.61 (quat), 126.48 (2CH), 126.20 (2CH), 21.40 (CH_3), 21.21 (CH_3); IR (thin film cm^{-1}) 3053, 2986, 1493, 1421, 1265, 896, 819, 741; HRMS (EI) calcd for $[C_{17}H_{15}NS]$ 265.0925, found, 265.0925.

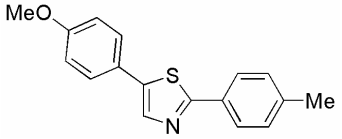
5-(4-Nitrophenyl)-2-(4-methylphenyl)thiazole



General procedure C using **4c** (100 mg, 0.570 mmol) and 4-iodonitrobenzene (**2c**, 170.5 mg, 0.646 mmol). Purification by column chromatography (10-50% EtOAc/hexane) afforded the

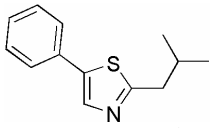
title compound as a yellow solid (67.6 mg, 40%). MP ($CHCl_3$) 173 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.28-8.24 (2H, m), 8.12 (1H, s), 7.88-7.83 (2H, m), 7.74-7.70 (2H, m), 7.28-7.26 (2H, m), 2.41 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 169.67 (quat), 146.94 (quat), 141.31 (CH), 141.18 (quat), 137.84 (quat), 135.98 (quat), 130.42 (quat), 129.76 (2CH), 126.72 (2CH), 126.45 (2CH), 124.49 (2CH), 21.47 (CH_3); IR (thin film cm^{-1}) 3055, 2986, 1598, 1519, 1434, 1347, 1328, 1264, 1109, 896, 840, 817, 738, 633; HRMS (EI) calculated for $[C_{16}H_{12}N_2O_2S]^+$ 296.0620, found 296.0620.

5-(4-Methoxyphenyl)-2-(4-methylphenyl)thiazole[10]



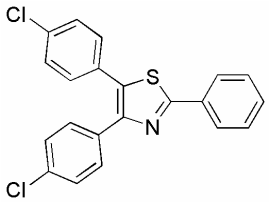
General procedure C using **4c** (100 mg, 0.570 mmol) and 4-iodoanisole (**2d**, 151.2 mg, 0.646 mmol). Purification by column chromatography (10-20% EtOAc/hexane) afforded the title compound as a yellow solid (123.7 mg, 77%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.89 (1H, s), 7.85-7.83 (2H, m), 7.53-7.49 (2H, m), 7.26-7.23 (2H, m), 6.95-6.91 (2H, m), 3.83 (3H, s), 2.39 (2H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 166.40 (quat), 159.62 (quat), 139.99 (quat), 138.62 (quat), 137.95 (CH), 131.07 (quat), 129.55 (2CH), 127.83 (2CH), 126.11 (2CH), 124.04 (quat), 114.43 (2CH), 55.29 (OCH_3), 21.36 (CH_3).

2-Isobutyl-5-phenylthiazole **6**[11]



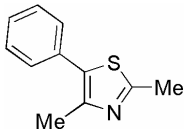
General procedure D using 2-isobutylthiazole (100 mg, 0.708 mmol, 1 equiv) and iodobenzene (173.3 mg, 0.850 mmol, 1.2 equiv). Purification by column chromatography (0-5% EtOAc/hexane) gave the title compound as a colorless oil (153.3mg, >99%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.82 (1H, s), 7.51 (1H, m), 7.37-7.33 (2H, m), 7.28 (1H, m), 2.86 (2H, d J = 7.2), 2.14 (1H, m), 1.01 (6H, d J = 6.6); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 169.46 (quat), 138.32 (quat), 137.44 (CH), 131.51 (CH), 128.85 (2CH), 127.79 (2CH), 126.41 (2CH), 42.39 (CH_2), 29.67 (CH), 22.17 ($2CH_3$).

4,5-Di(4-chlorophenyl)-2-phenylthiazole **7**[11]



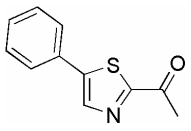
General procedure D using 4-(4-chlorophenyl)-2-phenylthiazole (100 mg, 0.368 mmol, 1 equiv) and iodochlorobenzene (105.3 mg, 0.442 mmol, 1.2 equiv). Purification by column chromatography (10% EtOAc/hexane) gave the title compound as a colourless solid (117.8 mg, 83%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.01-7.98 (2H, m), 7.55-7.51 (2H, m), 7.48-7.45 (3H, m), 7.35-7.29); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 166.04 (quat), 149.89 (quat), 134.45 (quat), 133.96 (quat), 133.30 (quat), 133.10 (quat), 131.95 (quat), 130.80 (2CH), 130.37 (2CH), 130.28 (CH), 130.27 (quat), 129.16 (2CH), 128.98 (2CH), 128.62 (2CH), 126.43 (2CH).

2,4-Dimethyl-5-phenylthiazole **8**



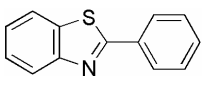
General procedure D using 2,4-dimethylthiazole (100 mg, 0.884 mmol, 1 equiv) and iodobenzene (216.3 mg, 1.060 mmol, 1.2 equiv). Purification by column chromatography (20% EtOAc/hexane) gave the title compound as a yellow oil (140.2 mg, 84%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.43-7.31 (5H, m), 2.70 (3H, s), 2.49 (3H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 163.02 (quat), 146.86 (quat), 132.17 (quat) 131.18 (quat), 128.94 (2CH), 128.46 (2CH), 127.27 (CH), 18.93 (CH_3), 15.89 (CH_3); IR (thin film cm^{-1}) 3057, 2922, 1601, 1494, 1438, 1377, 1250, 1180, 7589, 698; HRMS (FAB) calculated for $[C_{11}H_{11}NS+H]^+$ 190.0691, found 190.0690.

1-(5-Phenylthiazol-2-yl)ethanone **9**



General procedure D using 2-acetylthiazole (100 mg, 0.786 mmol, 1 equiv) and iodobenzene (192.5 mg, 0.944 mmol, 1.2 equiv). Purification by column chromatography (10% EtOAc/hexane) gave the title compound as a colorless solid (112.5 mg, 70%). MP ($CHCl_3$) 113-115 °C; ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.13 (1H, s), 7.64-7.62 (2H, m), 7.47-7.41 (3H, m), 2.72 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 191.69 (quat), 165.47 (quat), 147.10 (quat), 140.17 (CH), 130.47 (quat), 129.57 (CH), 129.32 (2CH), 127.19 (2CH), 25.67 (CH_3); IR (thin film cm^{-1}) 1681, 1450, 1421, 1406, 1261, 1056, 1019, 760, 687; HRMS (FAB) calculated for $[C_{11}H_9NOS+H]^+$ 204.0483, found 204.0481.

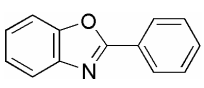
2-Phenylbenzothiazole **10**[12]



General procedure D using benzothiazole (100 mg,0.740 mmol, 1 equiv) and iodobenzene (181.1 mg, 0.888 mmol, 1.2 equiv). Purification by column chromatography (10% EtOAc/hexane) gave the title compound as a colorless solid (156.2 mg, >99%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.12-8.09 (3H, m), 7.89 (1H, m), 7.52-7.48 (4H, m), 7.38 (1H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 167.96 (quat), 154.05 (quat), 134.97 (quat), 133.52 (quat), 130.87 (CH), 128.92 (2CH), 127.46 (2CH), 126.22 (CH), 125.09 (CH), 123.14 (CH), 121.53 (CH).

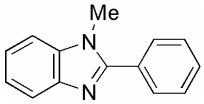
[10] Z. Kaleta, B. T. Makowski, T. Soos, R. Dembinski, *Org. Lett.* **2006**, *8*, 1625.
[11] A. Yokooji, T. Okazawa, T. Satoh, M. Miura, M. Nomura, *Tetrahedron* **2003**, *59*, 5685.
[12] G. Evindar, R. A. Batey, *J. Org. Chem.* **2006**, *71*, 1802.

2-Phenylbenzoxazole **11**[12]



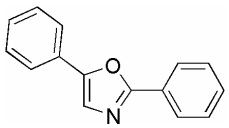
General procedure D using benzoxazole (100 mg, 0.839 mmol, 1 equiv) and iodobenzene (205.5 mg, 1.007 mmol, 1.2 equiv). Purification by column chromatography (20% EtOAc/hexane) gave the title compound as a colorless solid (130.2 mg ,79%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.26-8.23 (2H, m), 7.78 (1H, m), 7.55 (1H, m), 7.49-7.47 (3H, m), 7.33-7.31 (2H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 162.85 (quat), 150.60 (quat), 141.98 (quat), 131.34 (CH), 128.74 (2CH), 127.46 (2CH), 127.02 (quat), 124.94 (CH), 124.42 (CH), 119.87 (CH), 110.44 (CH).

N-Methyl-2-phenylbenzimidazole **12**[13]



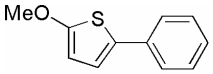
General procedure D using N-methylbenzimidazole (100 mg, 0.757 mmol, 1 equiv) and iodobenzene (185.2 mg, 0.908 mmol, 1.2 equiv). Purification by column chromatography (50% EtOAc/hexane) gave the title compound as a colorless solid (156.9 mg, >99%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.83 (1H, m), 7.72-7.69 (2H, m), 7.49-7.44 (3H, m), 7.32-7.29 (3H, m), 3.74 (3H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 153.43 (quat), 142.62 (quat), 136.29 (quat), 129.87 (quat), 129.46 (CH), 129.14 (2CH), 128.40 (2CH), 122.50 (CH), 122.16 (CH), 119.46 (CH), 109.45 (CH), 31.37 (CH_3).

2,5-Diphenyloxazole **13**[14]



General procedure D using 2-phenyloxazole (100 mg, 0.689 mmol, 1 equiv) and iodobenzene (168.6 mg, 0.827 mmol, 1.2 equiv). Purification by column chromatography (CH_2Cl_2) gave the title compound as a colorless solid (140.2 mg, 92%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 8.13-8.11 (2H, m), 7.74-7.72 (2H, m), 7.52-7.43 (6H, m), 7.35 (1H, m); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 161.13 (quat), 151.24 (quat), 130.31 (CH), 128.92 (2CH), 128.80 (2CH), 128.42 (CH), 128.00 (quat), 127.43 (quat), 126.26 (2CH), 124.18 (2CH), 123.43 (CH).

2-Methoxy-5-phenylthiophene **14**[15]



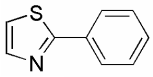
General procedure D using 2-methoxythiophene (100 mg, 0.876 mmol, 1 equiv) and iodobenzene (214.4 mg, 1.051 mmol, 1.2 equiv). Purification by column chromatography (5% EtOAc/hexane) gave the title compound as a colorless oil (136.0 mg, 82%). ^{1}H NMR (360 MHz, $CDCl_3$), δ_H 7.55-7.53 (2H, m), 7.40-7.35 (2H, m), 7.26 (1H, m), 7.00 (1H, d J = 4.0), 6.22 (1H, d J = 4.0), 3.94 (1H, s); ^{13}C NMR (90 MHz, $CDCl_3$), δ_C 165.88 (quat), 134.65 (quat) 130.13 (quat), 128.73 (2CH), 126.51 (CH), 124.76 (2CH), 120.48 (CH), 104.66 (CH), 60.08 (CH_3).

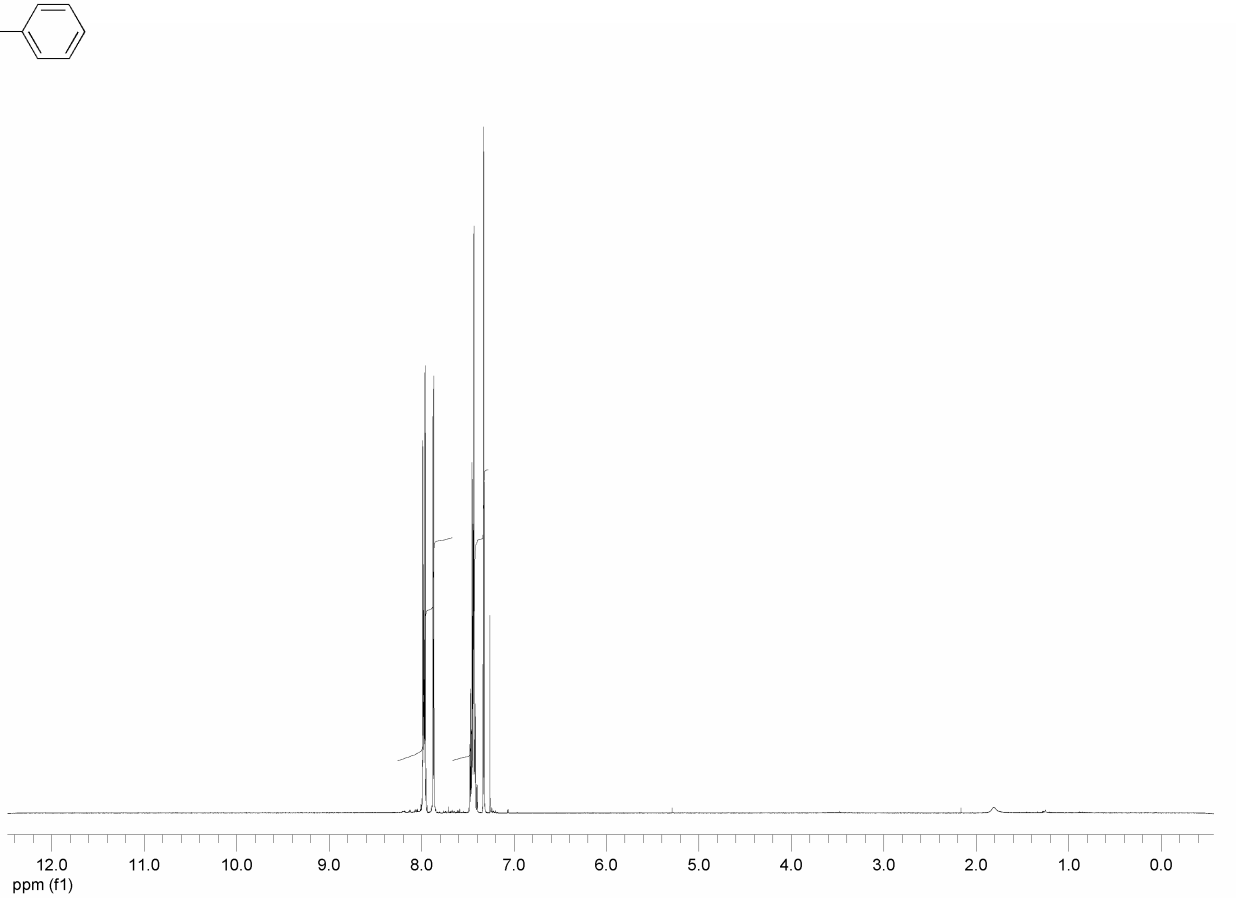
[13] D. B. Ramachary, G. B. Reddy, *Org. Biomol. Chem.* **2006**, *4*, 4463.
[14] A. C. Giddens, H. I. M. Boshoff, S. G. Franzblau, C. E. Barry, B. R. Copp, *Tetrahedron Lett.* **2005**, *46*, 7355.
[15] O. Bayh, H. Awad, F. Mongin, C. Hoarau, F. Trecourt, G. Queguiner, F. Marsais, F. Blanco, B. Abarca, R. Ballesteros, *Tetrahedron* **2005**, *61*, 4779.

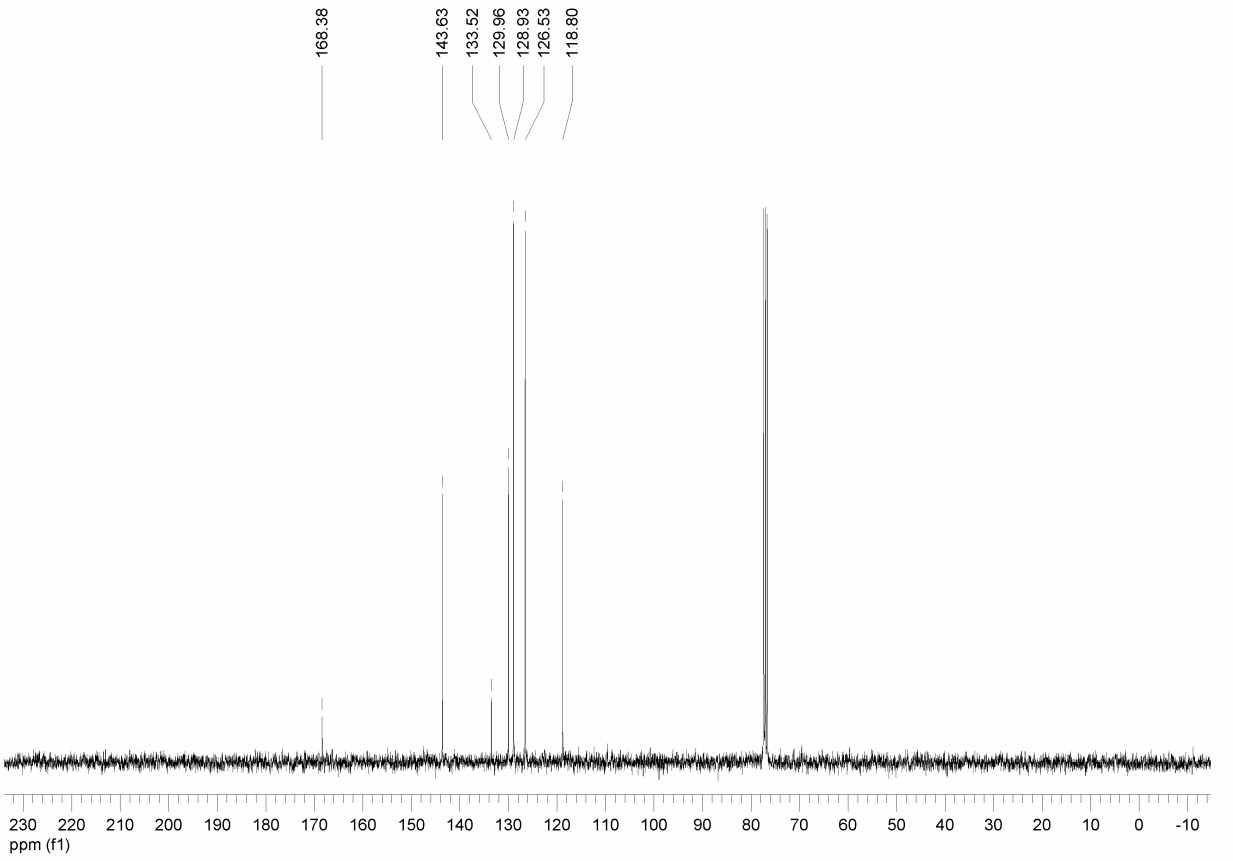
Part B

Spectroscopic data

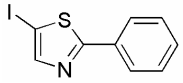
2-Phenylthiazole **1**

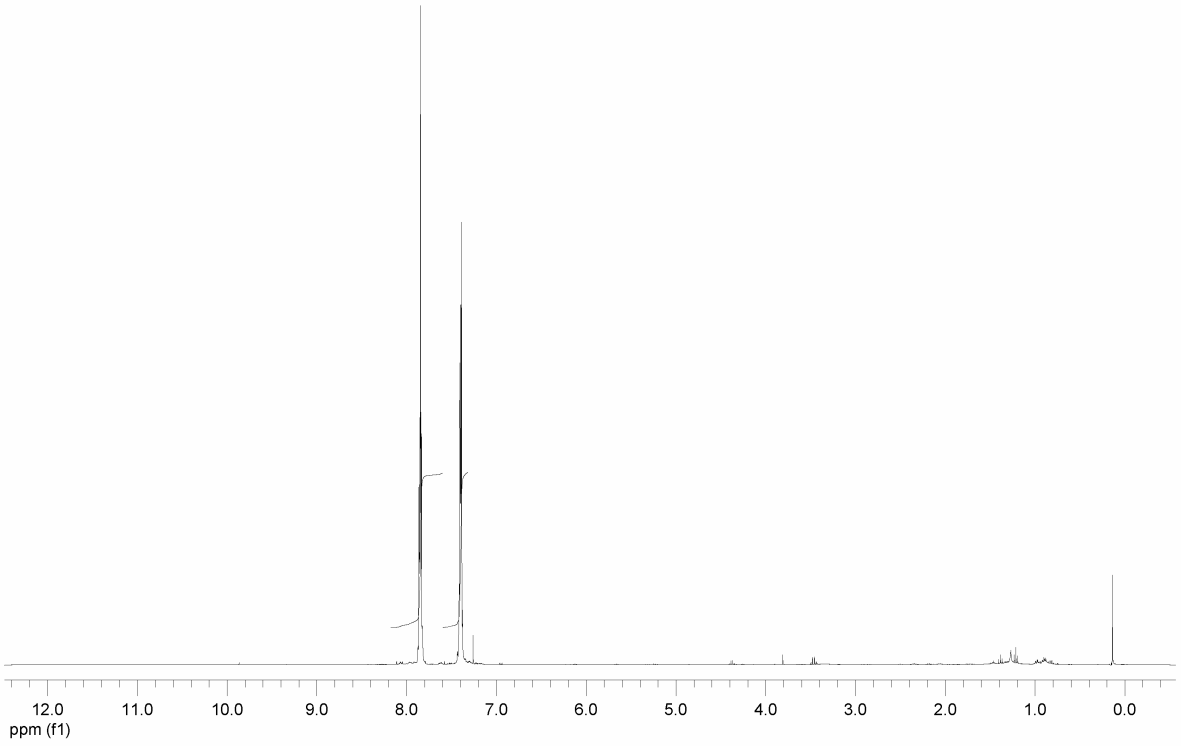


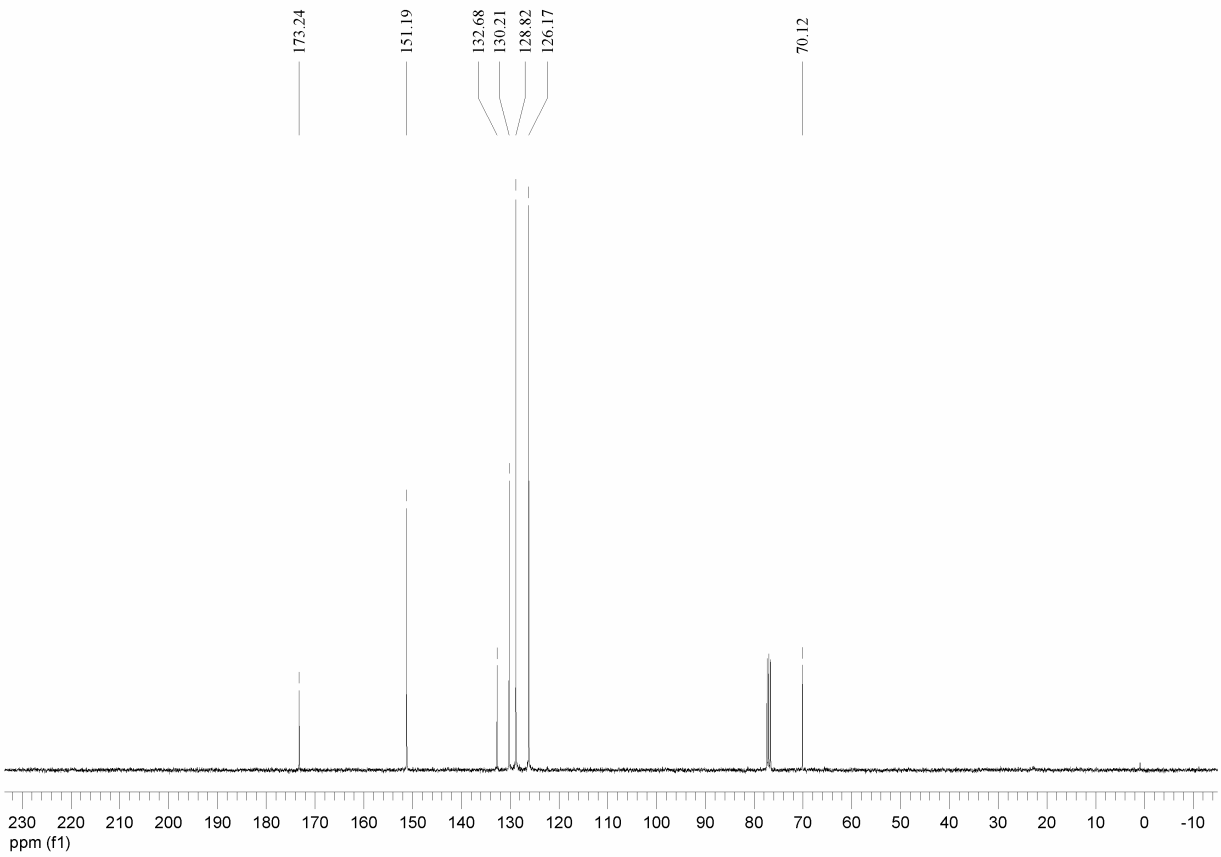




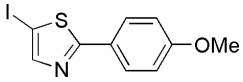
5-Iodo-2-phenylthiazole **2r**

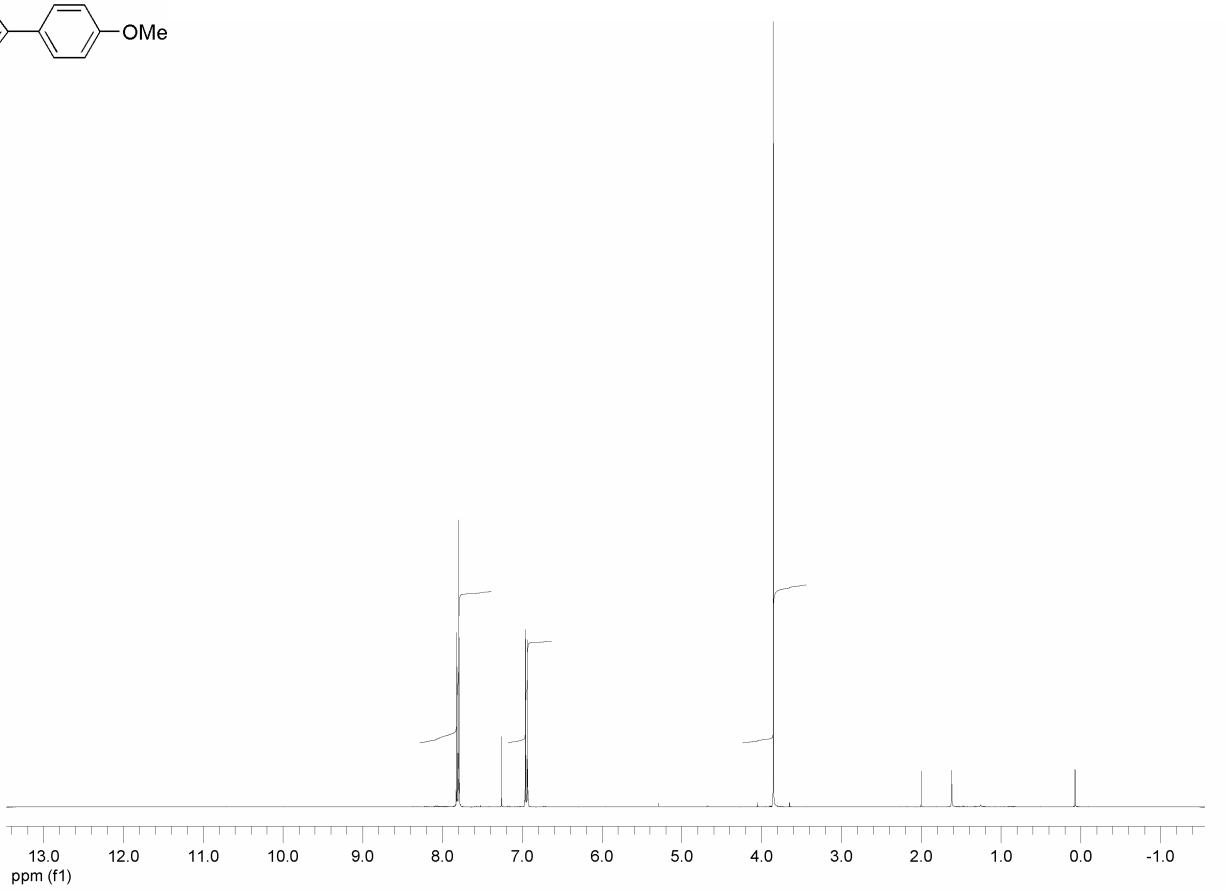


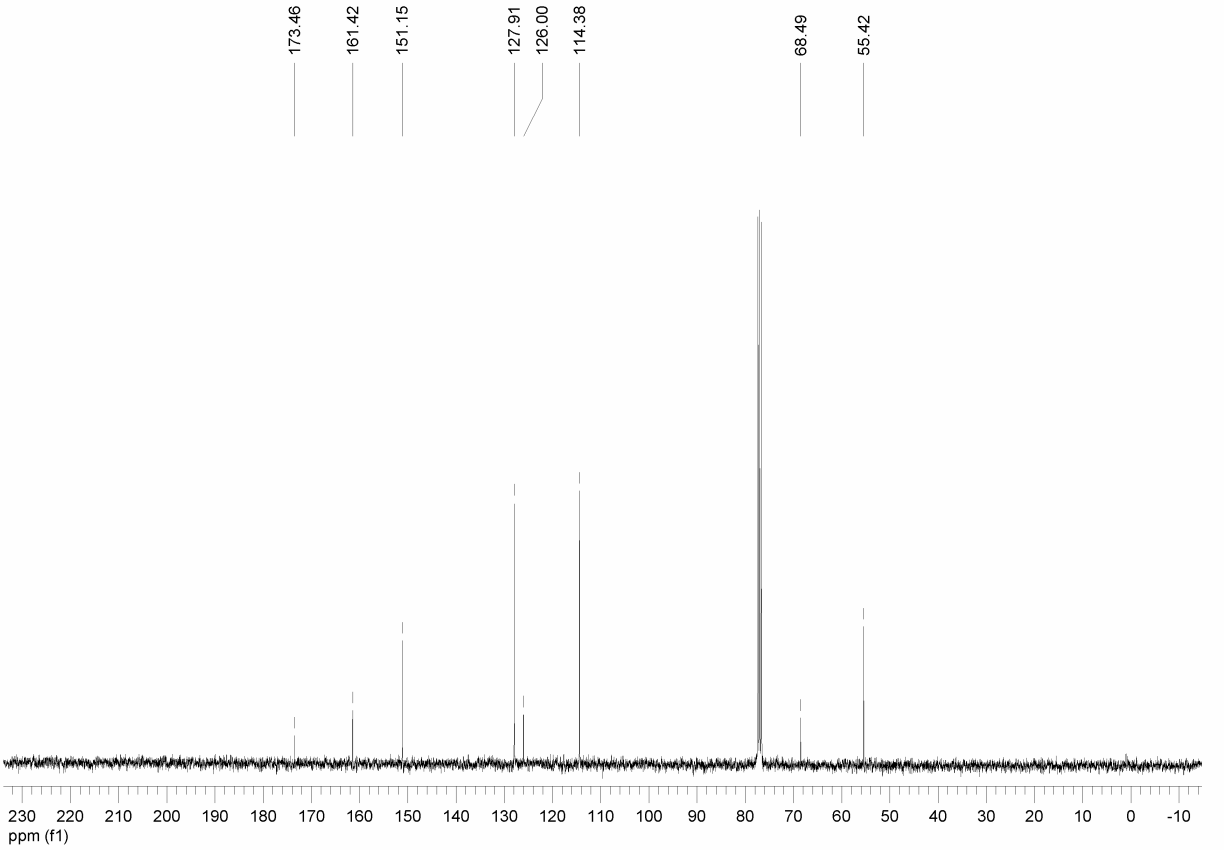




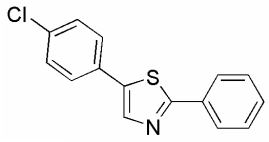
5-Iodo-2-(4-methoxyphenyl)thiazole **2s**

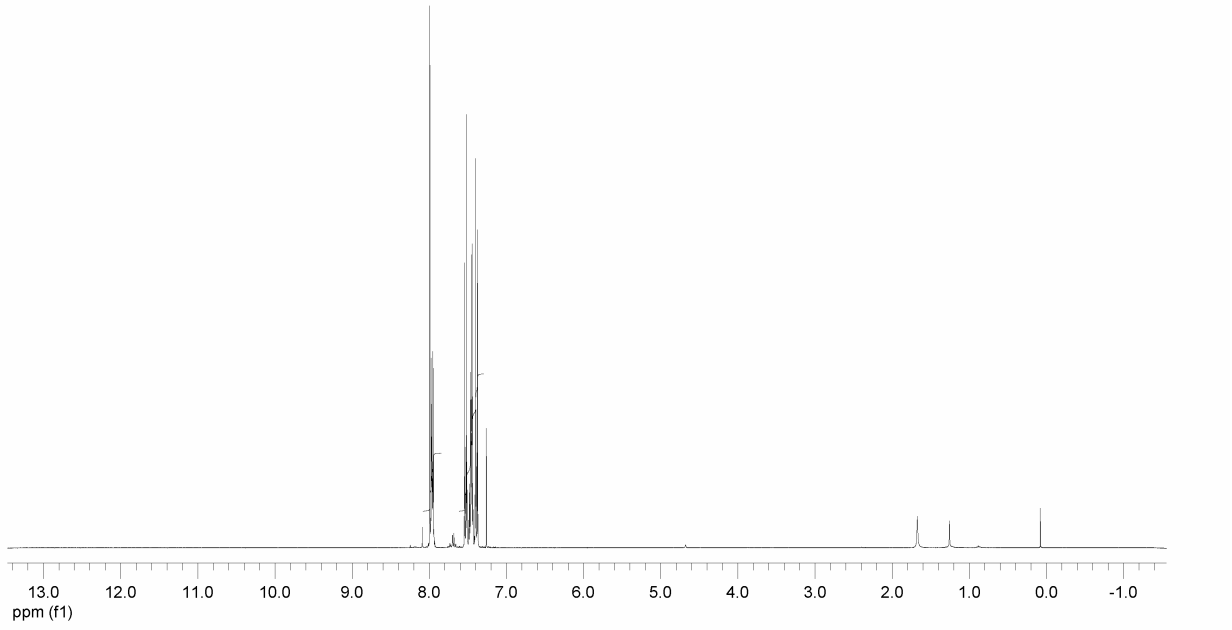


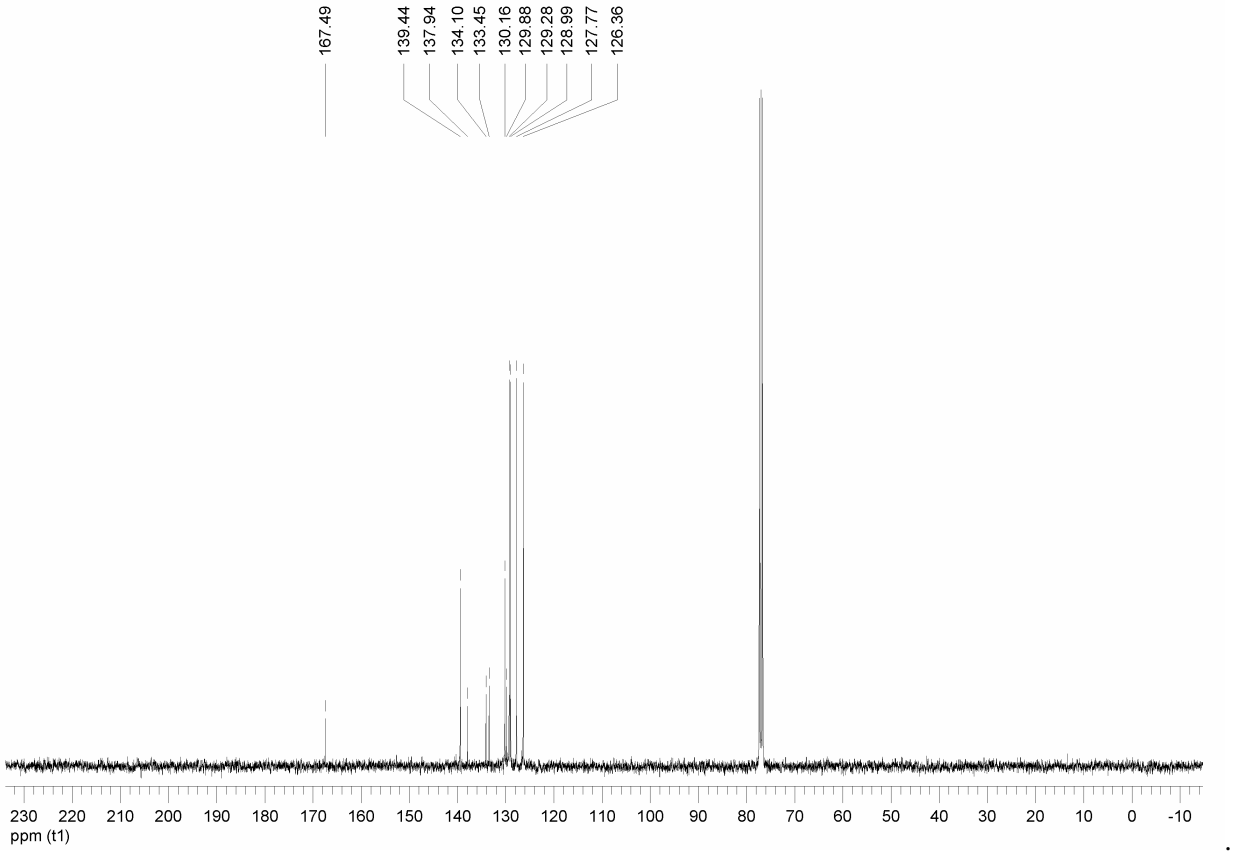




5-(4-Chlorophenyl)-2-phenylthiazole **3a**







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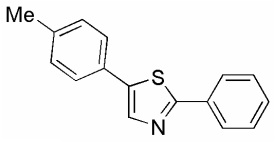
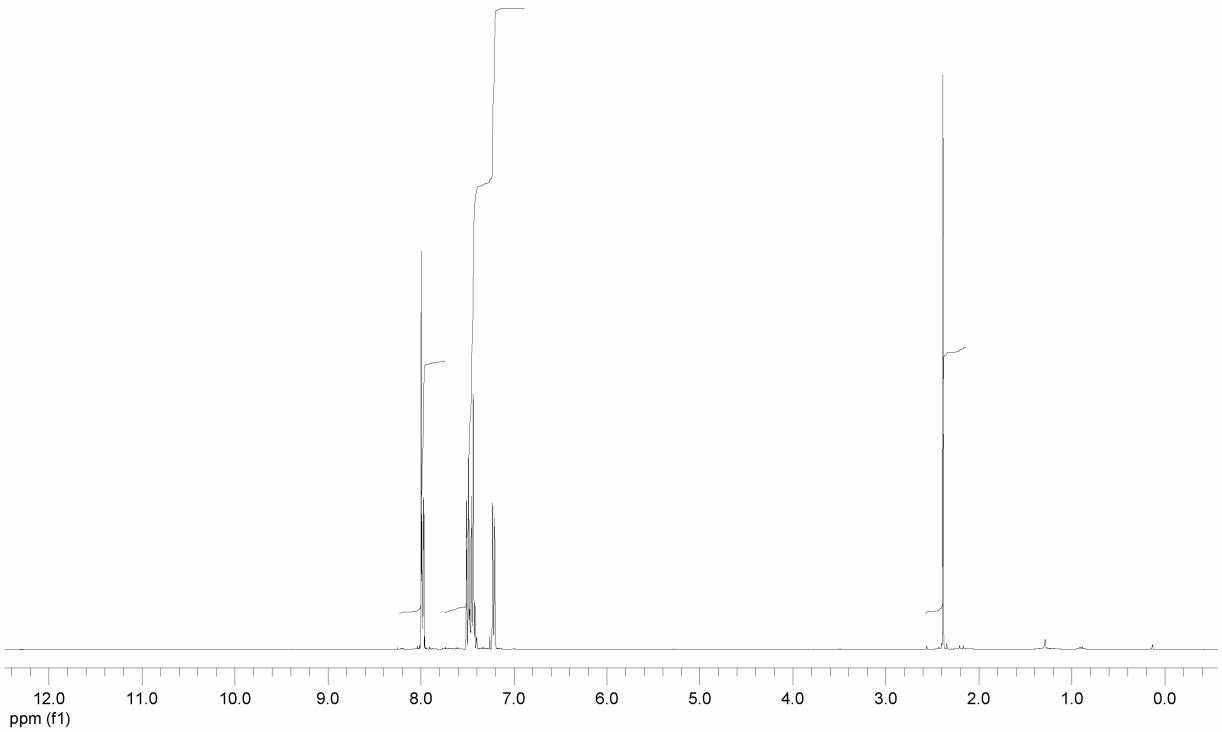
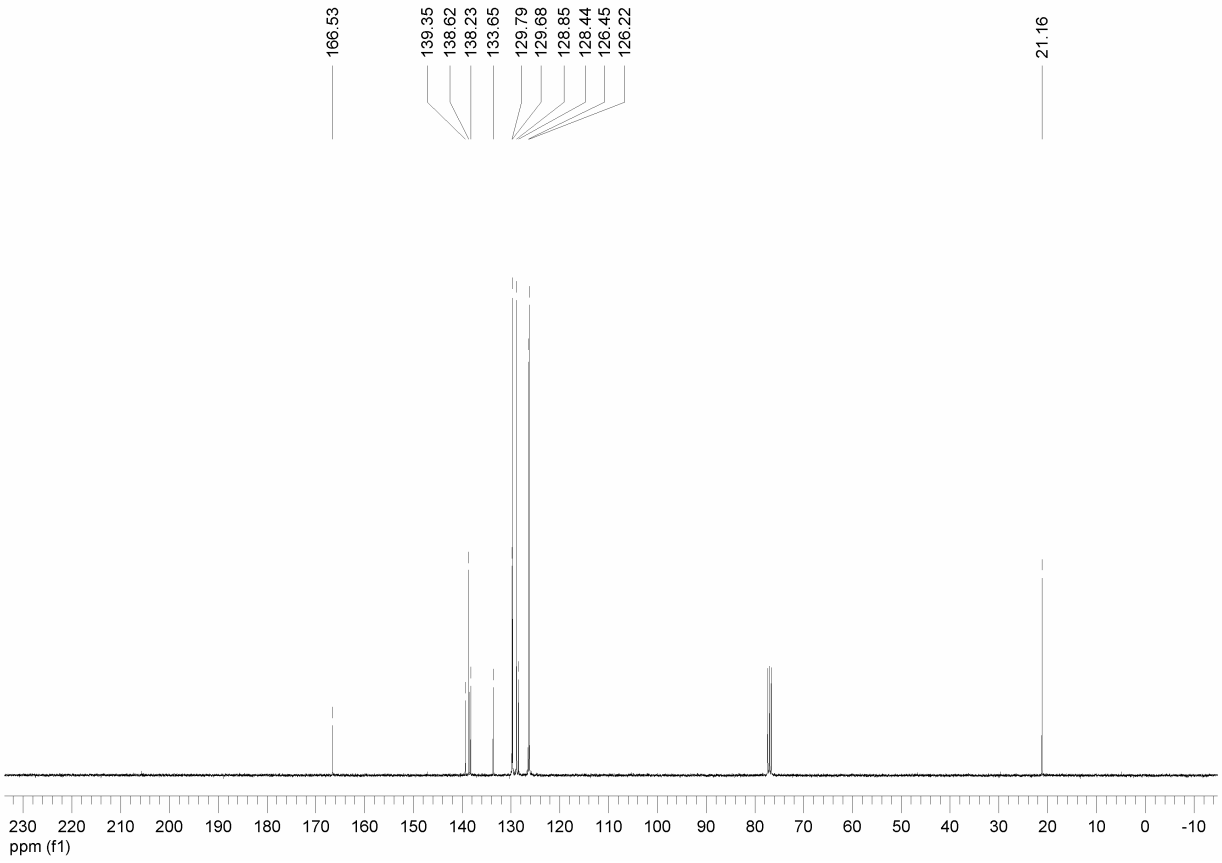
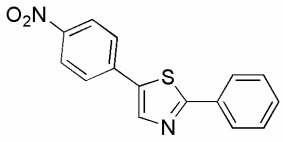
5-(4-Methylphenyl)-2-phenylthiazole **3b**

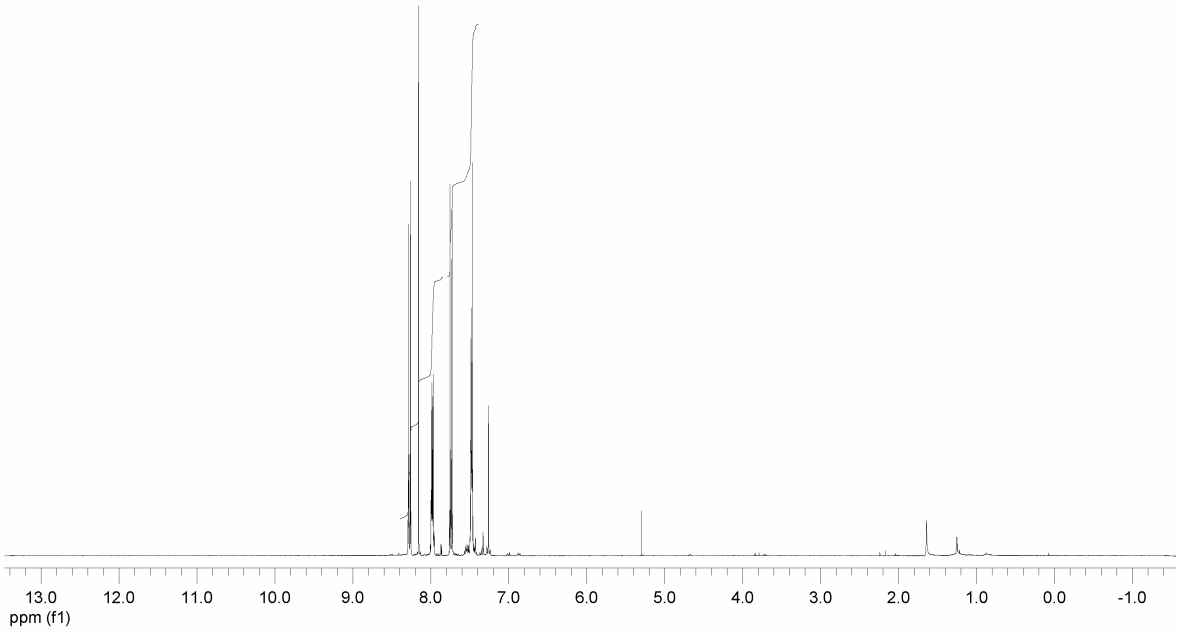


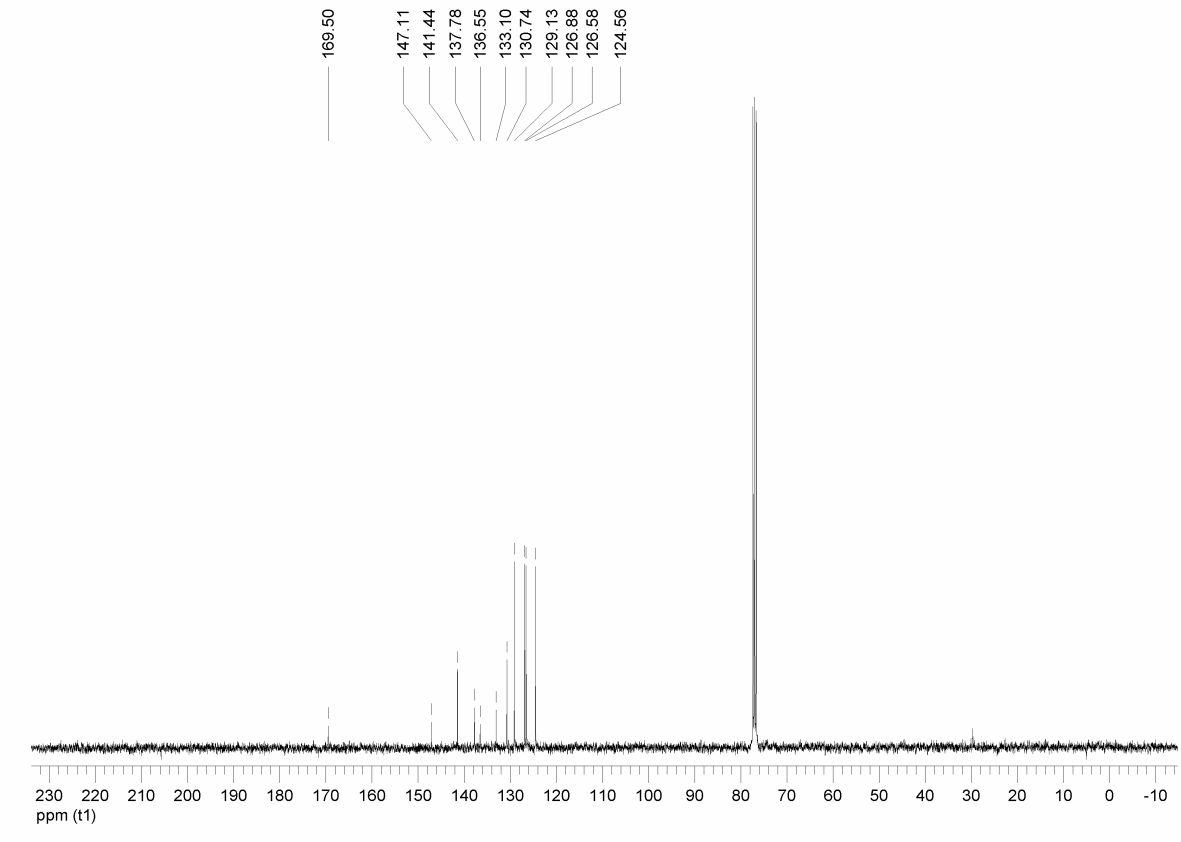




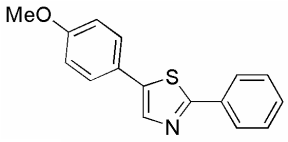
5-(4-Nitrophenyl)-2-phenylthiazole **3c**

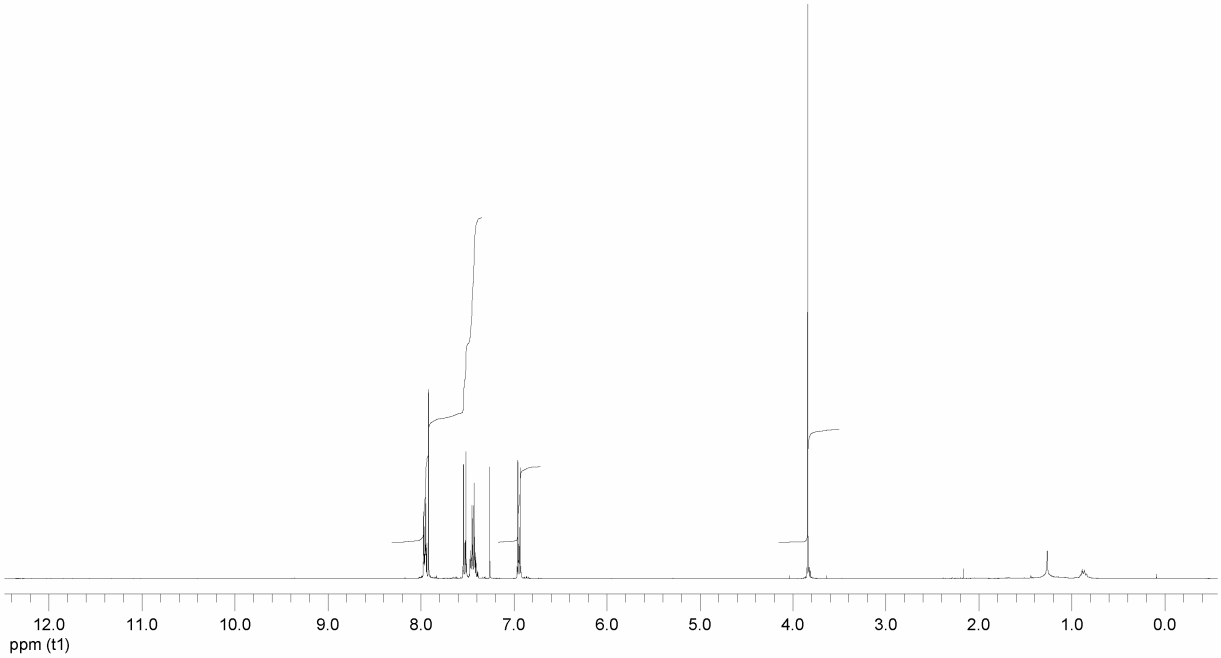


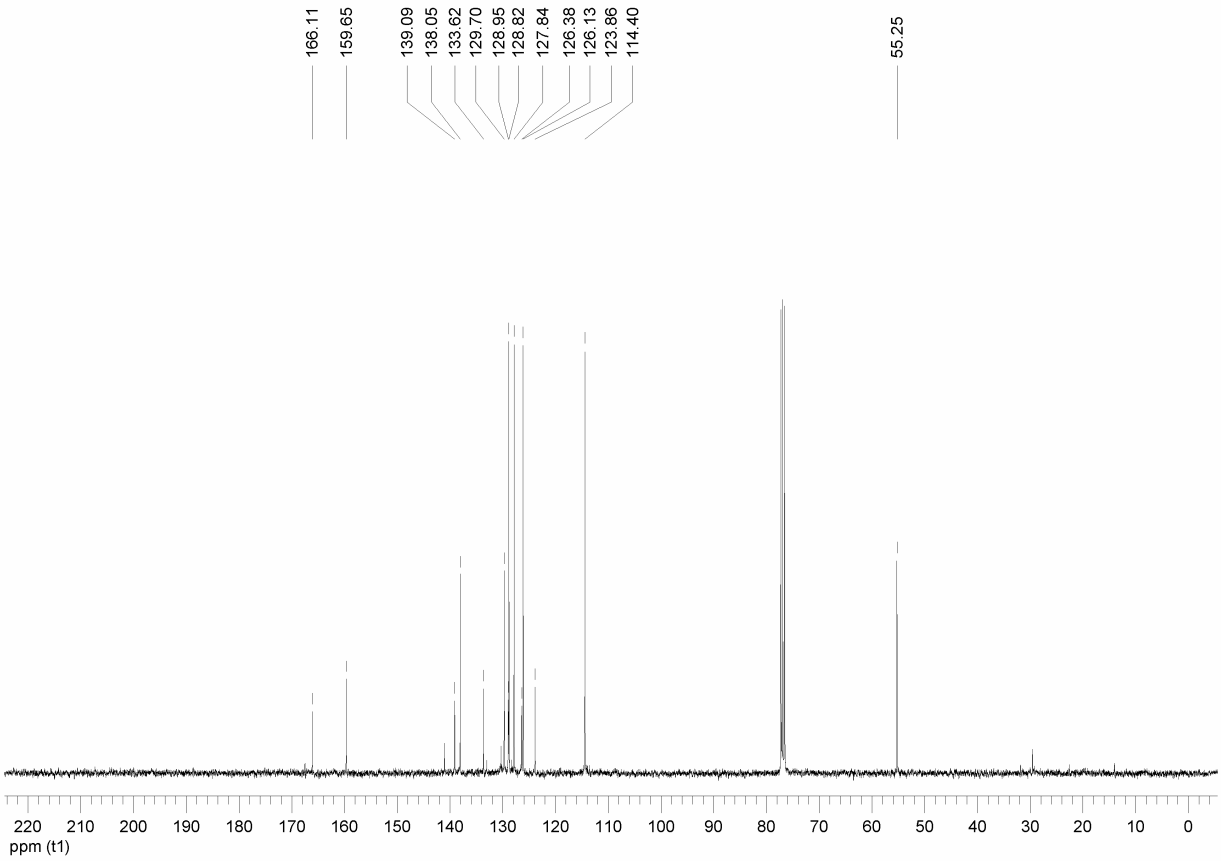




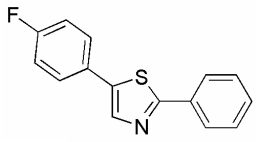
5-(4-Methoxyphenyl)-2-phenylthiazole **3d**

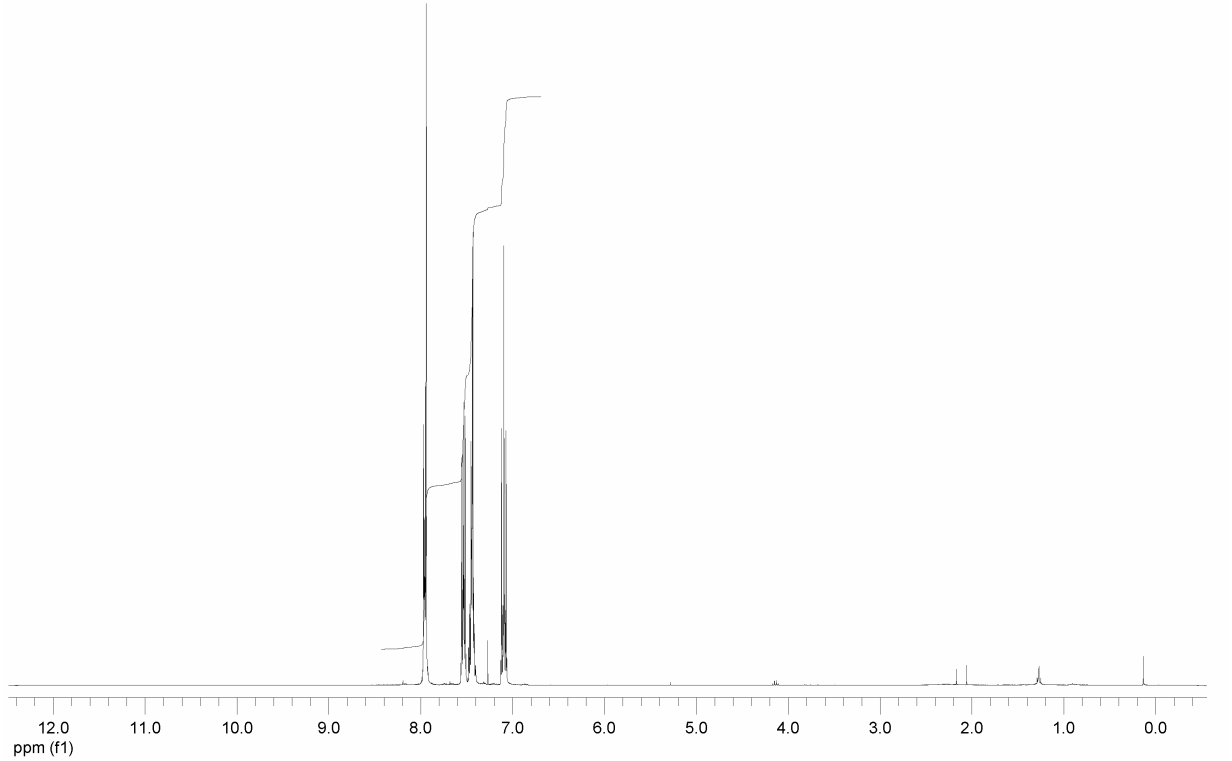


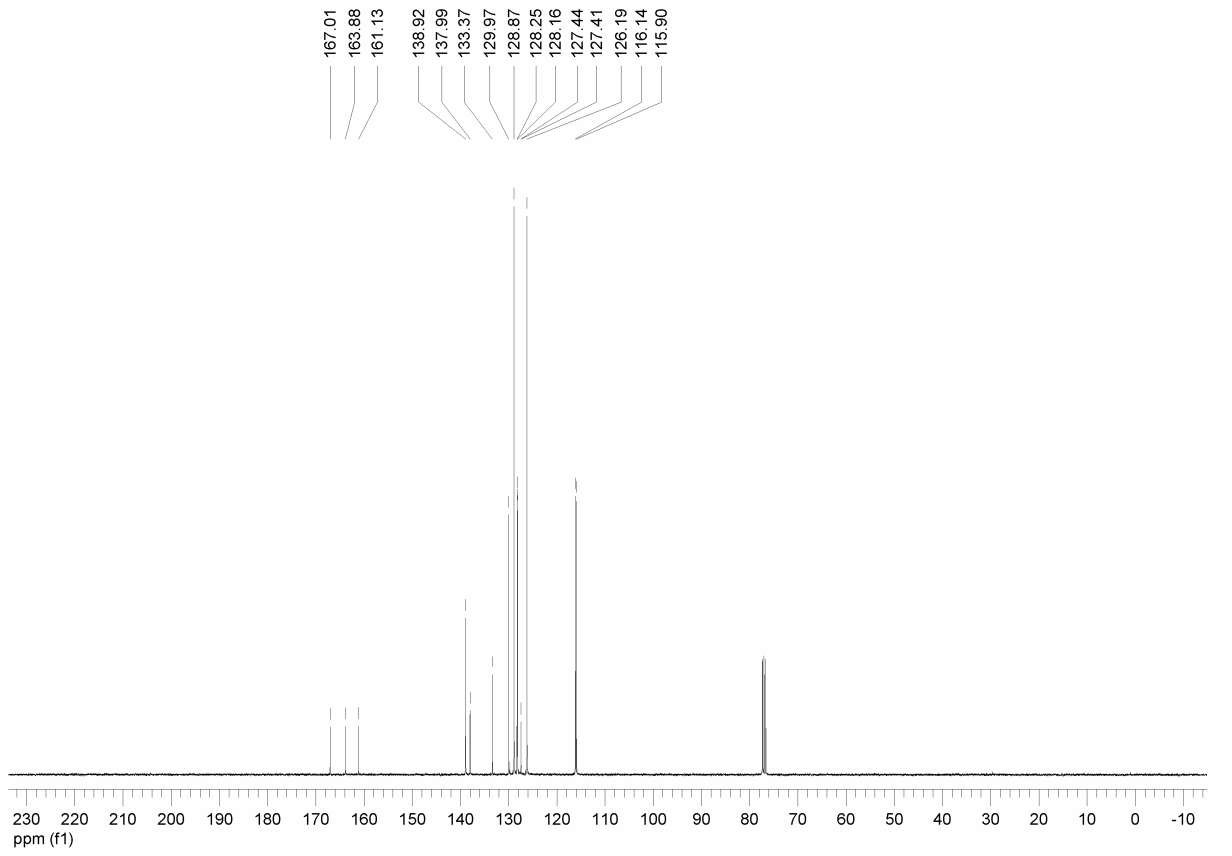




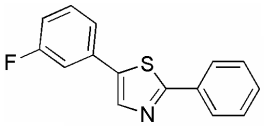
5-(4’-Fluorophenyl)-2-phenylthiazole **3e**

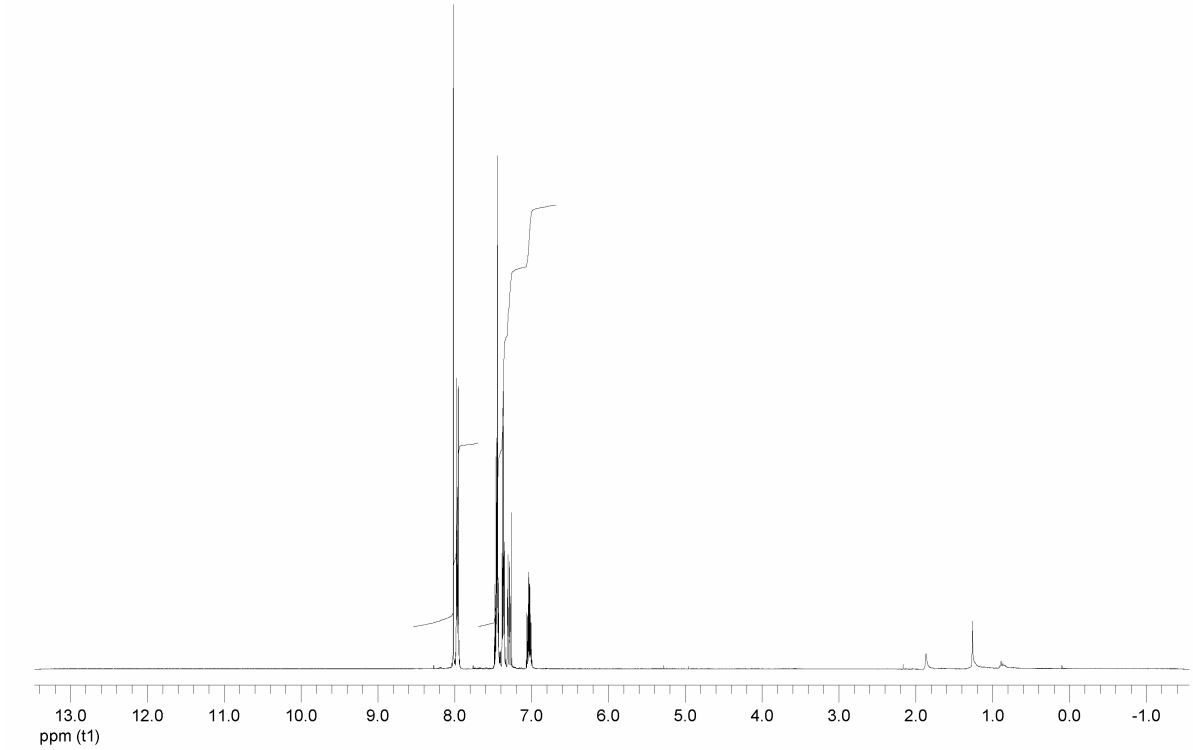


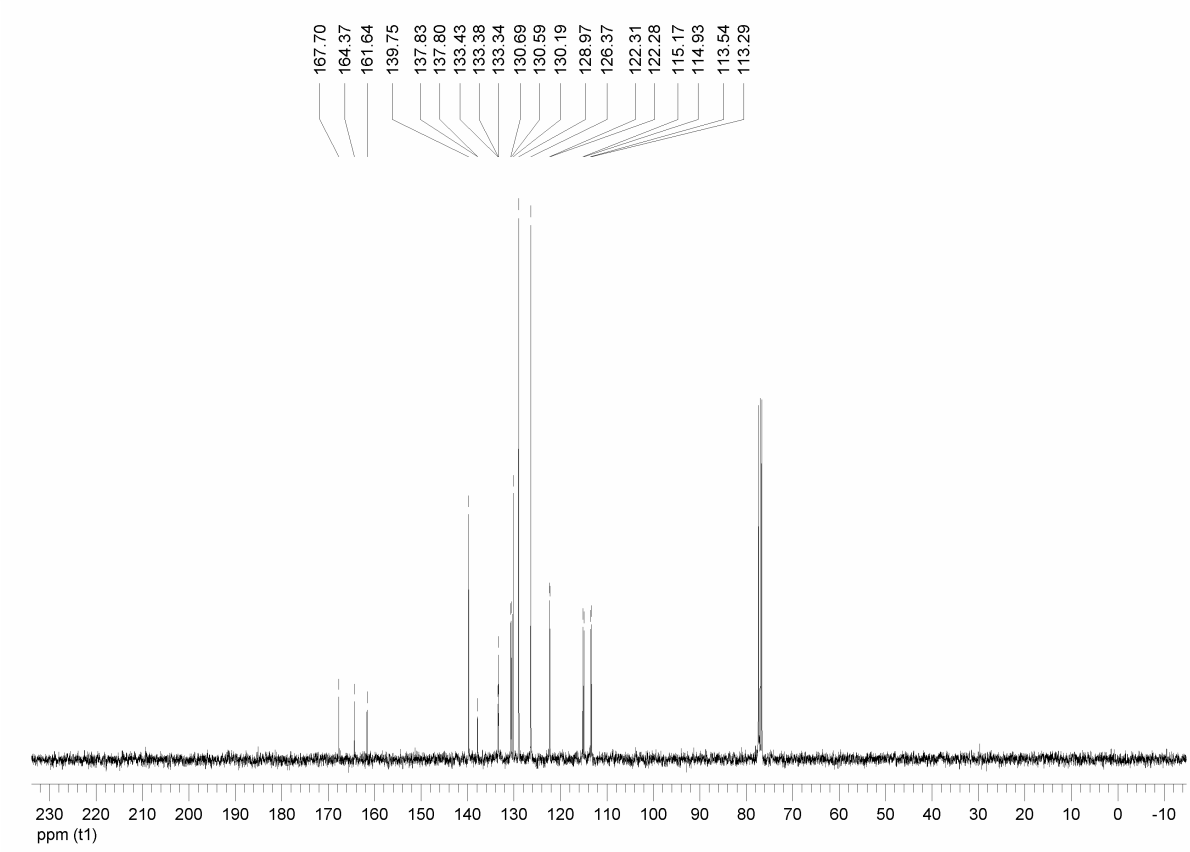




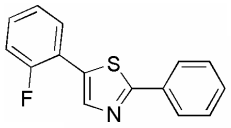
5-(3-Fluorophenyl)-2-phenylthiazole **3f**

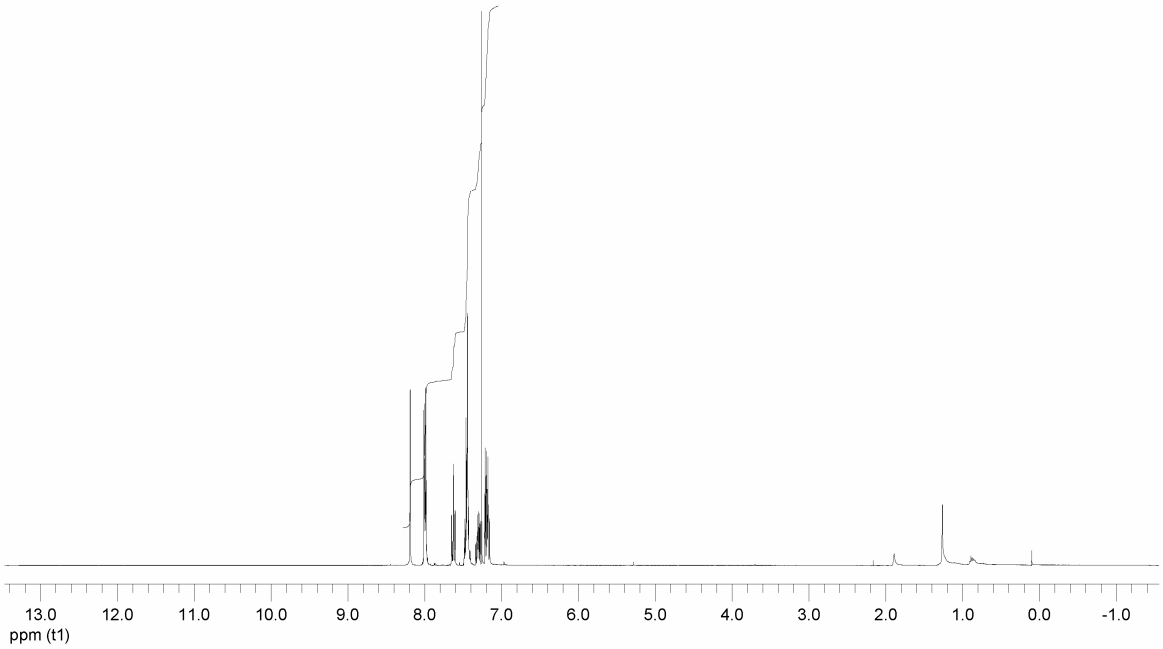


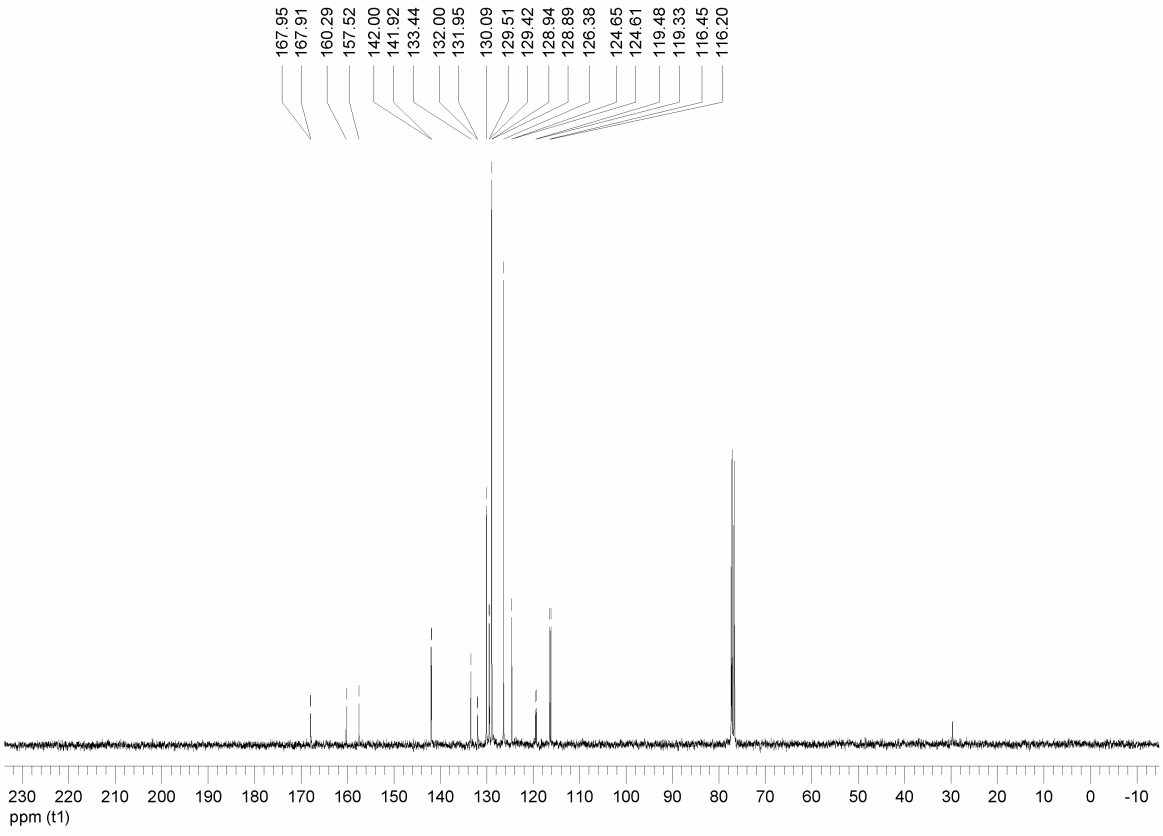




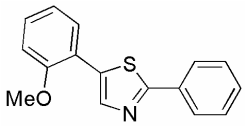
5-(2-Fluorophenyl)-2-phenylthiazole **3g**

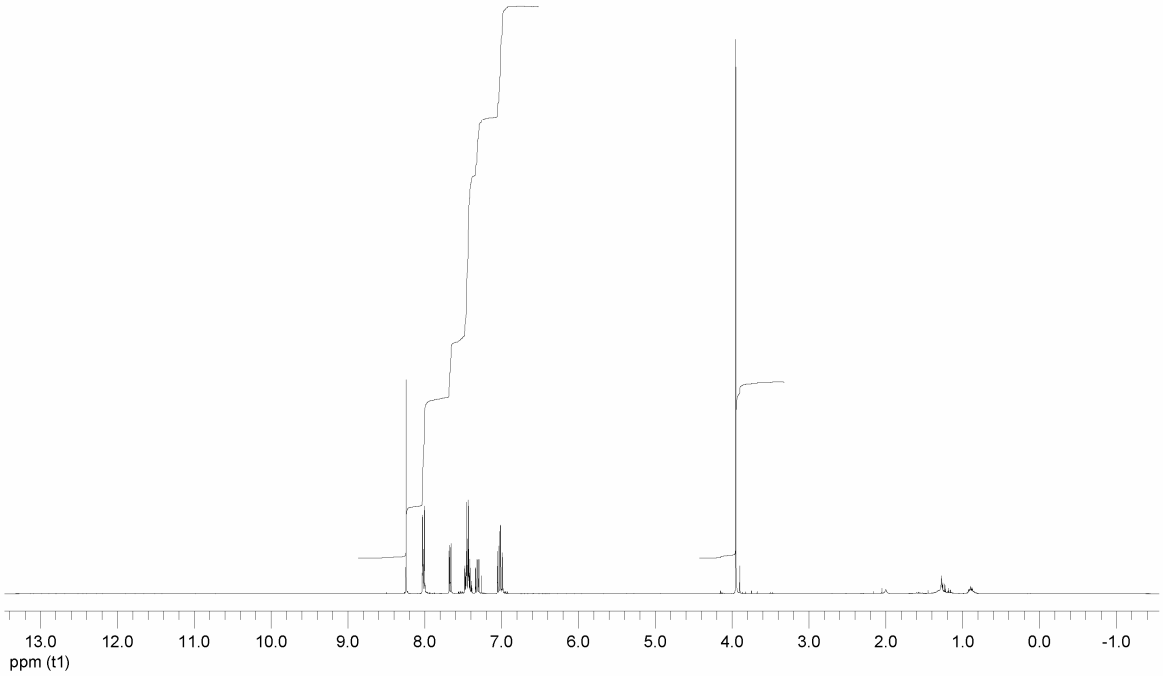


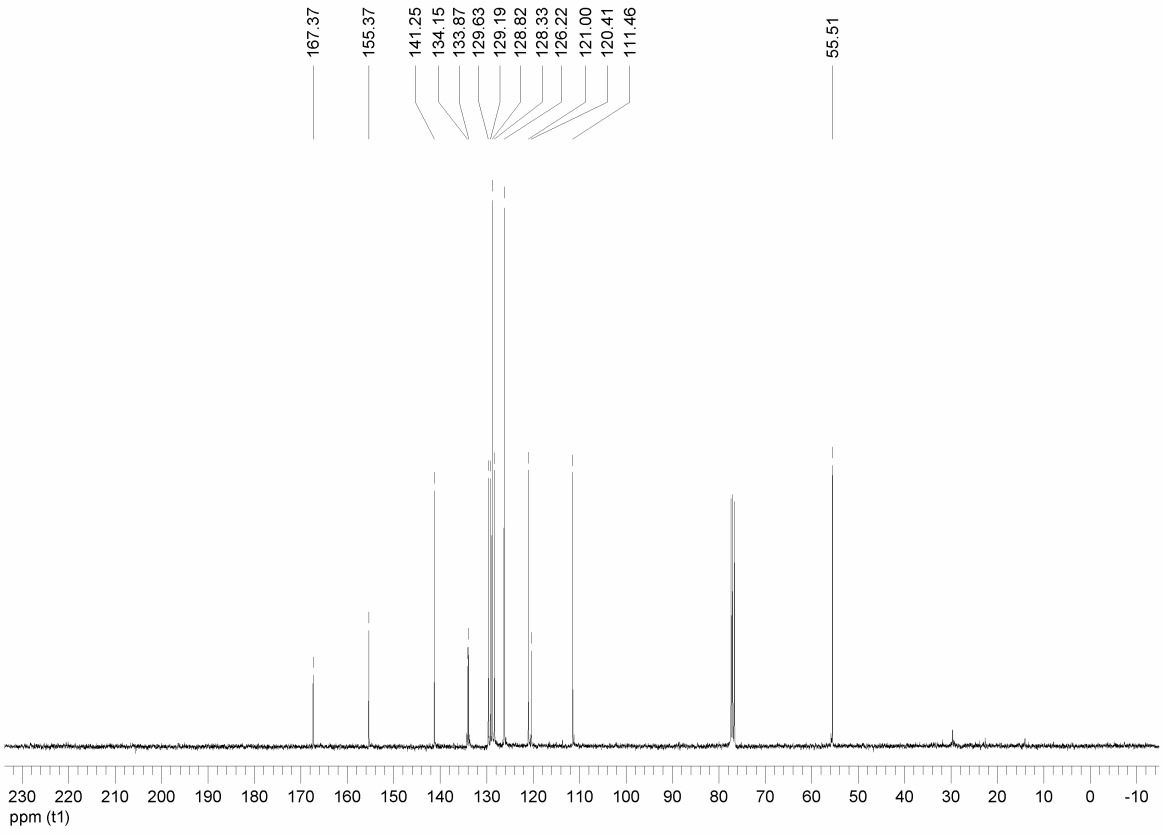




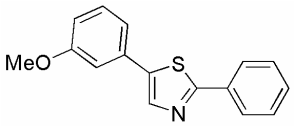
5-(2’-Methoxyphenyl)-2-phenylthiazole **3h**

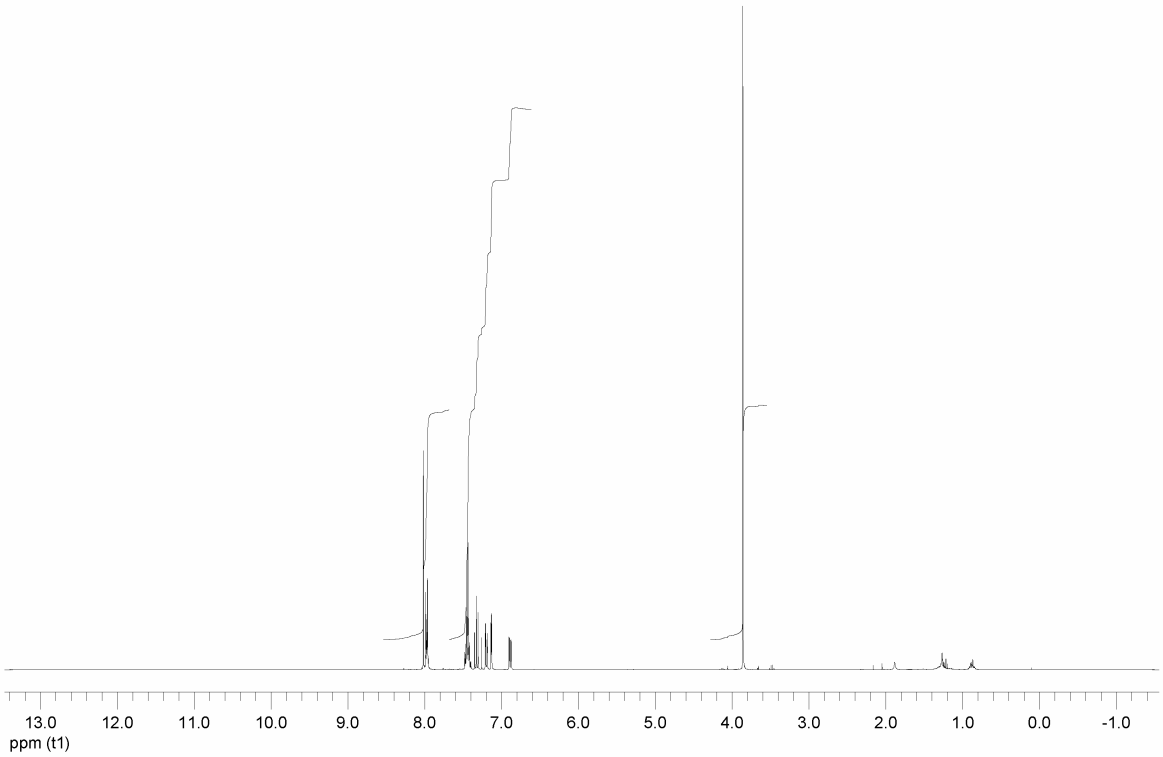


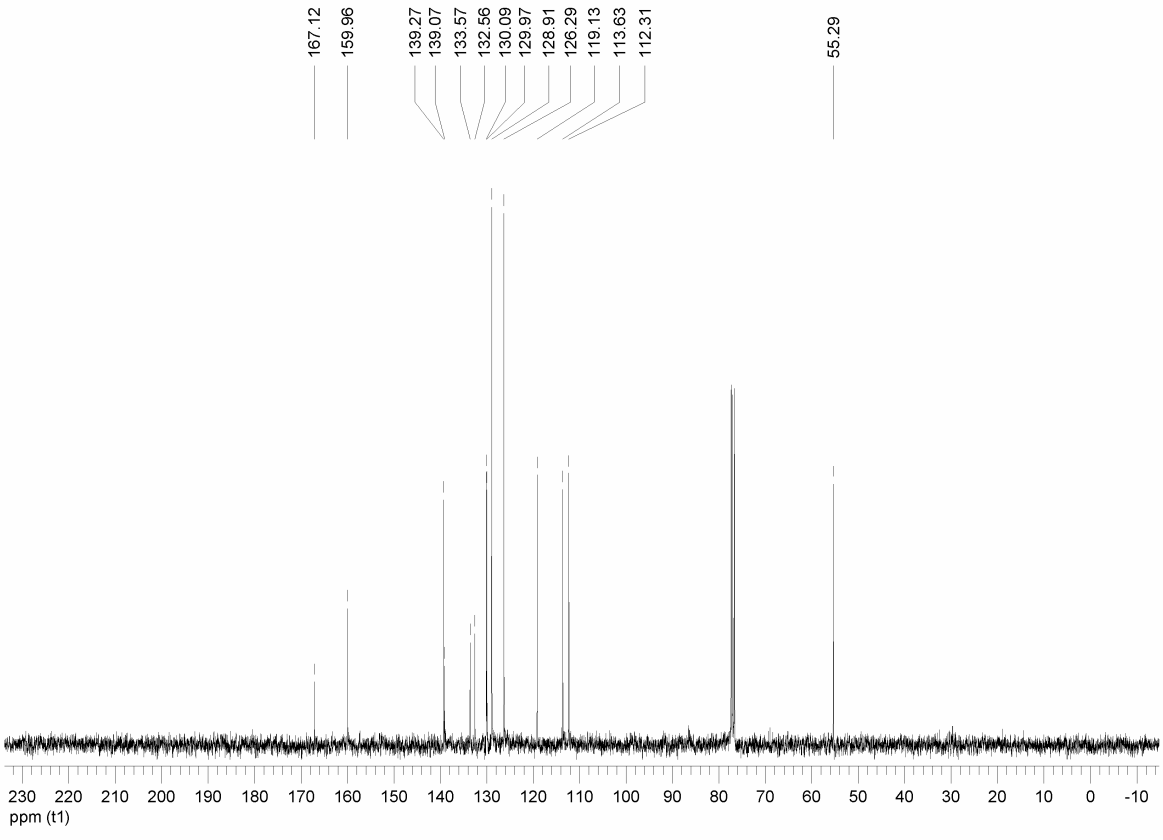




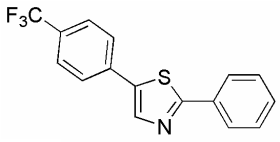
5-(3’-Methoxyphenyl)-2-phenylthiazole **3i**

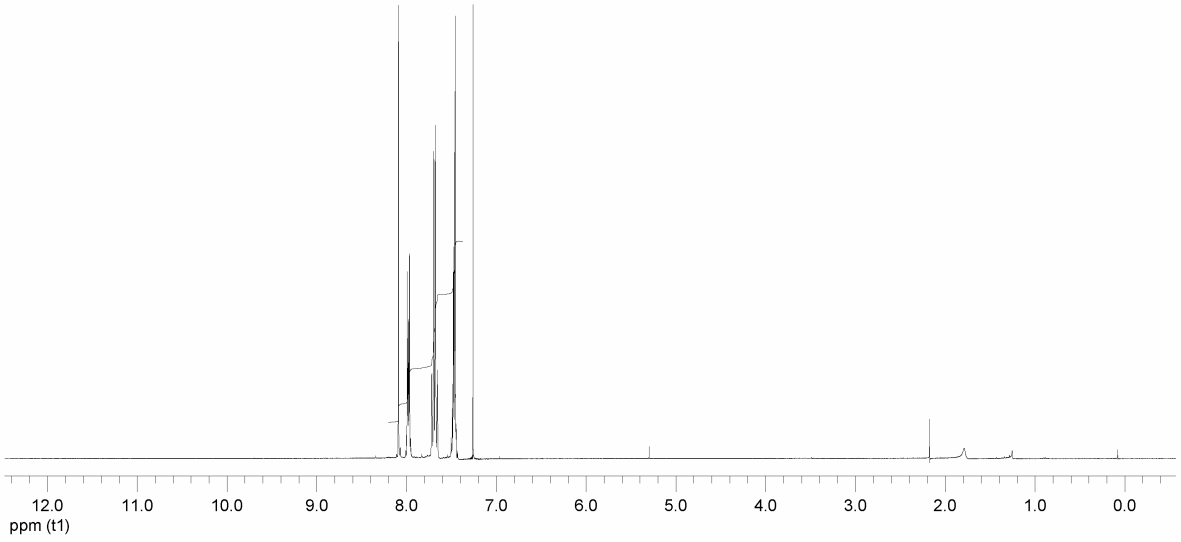


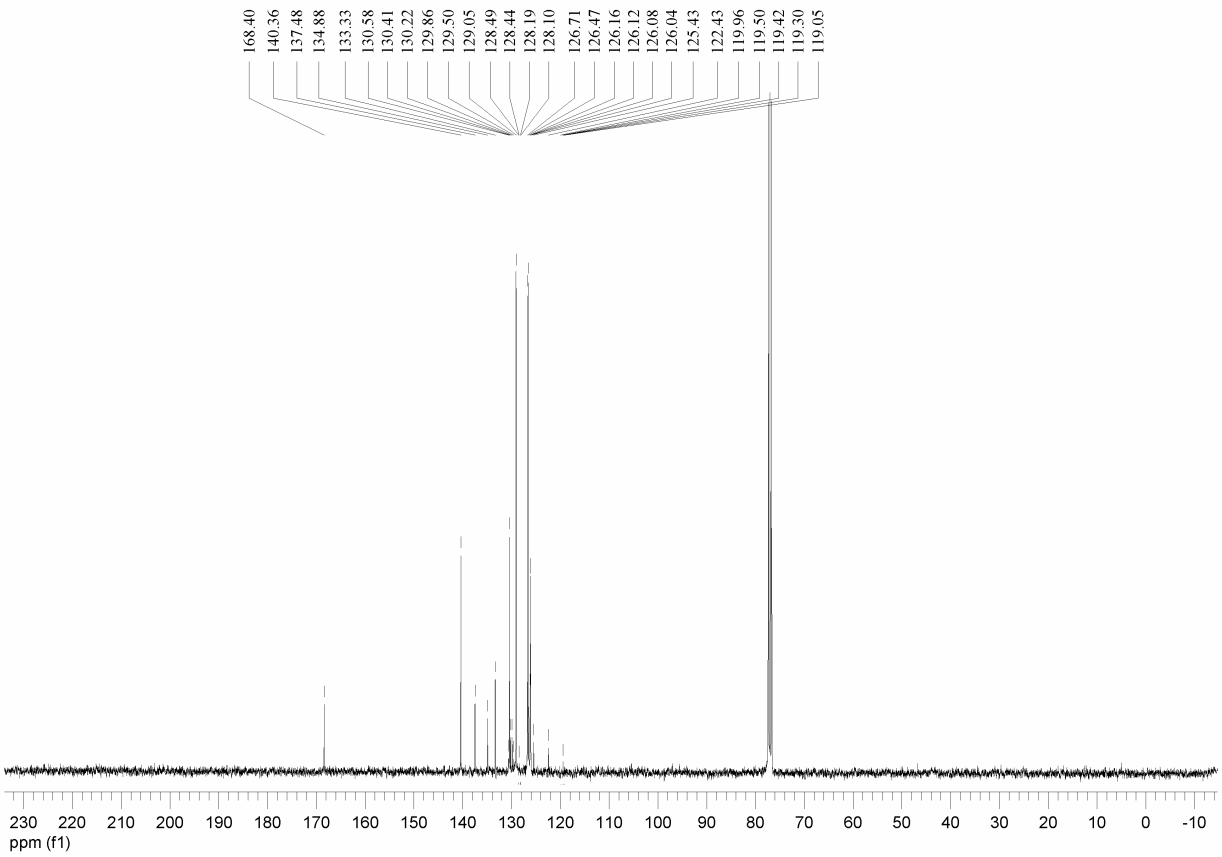




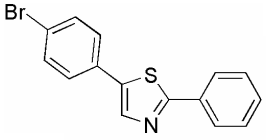
2-Phenyl-5-((4-trifluoromethyl)phenyl)thiazole **3j**

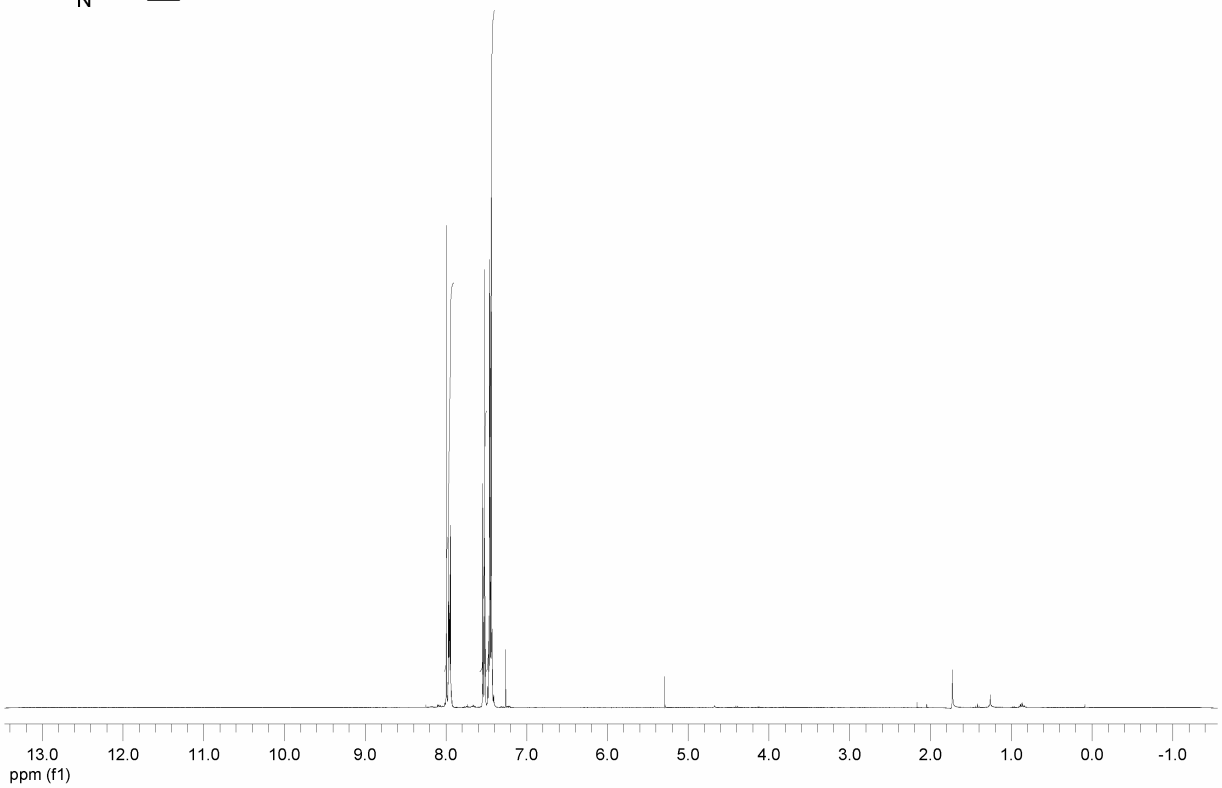


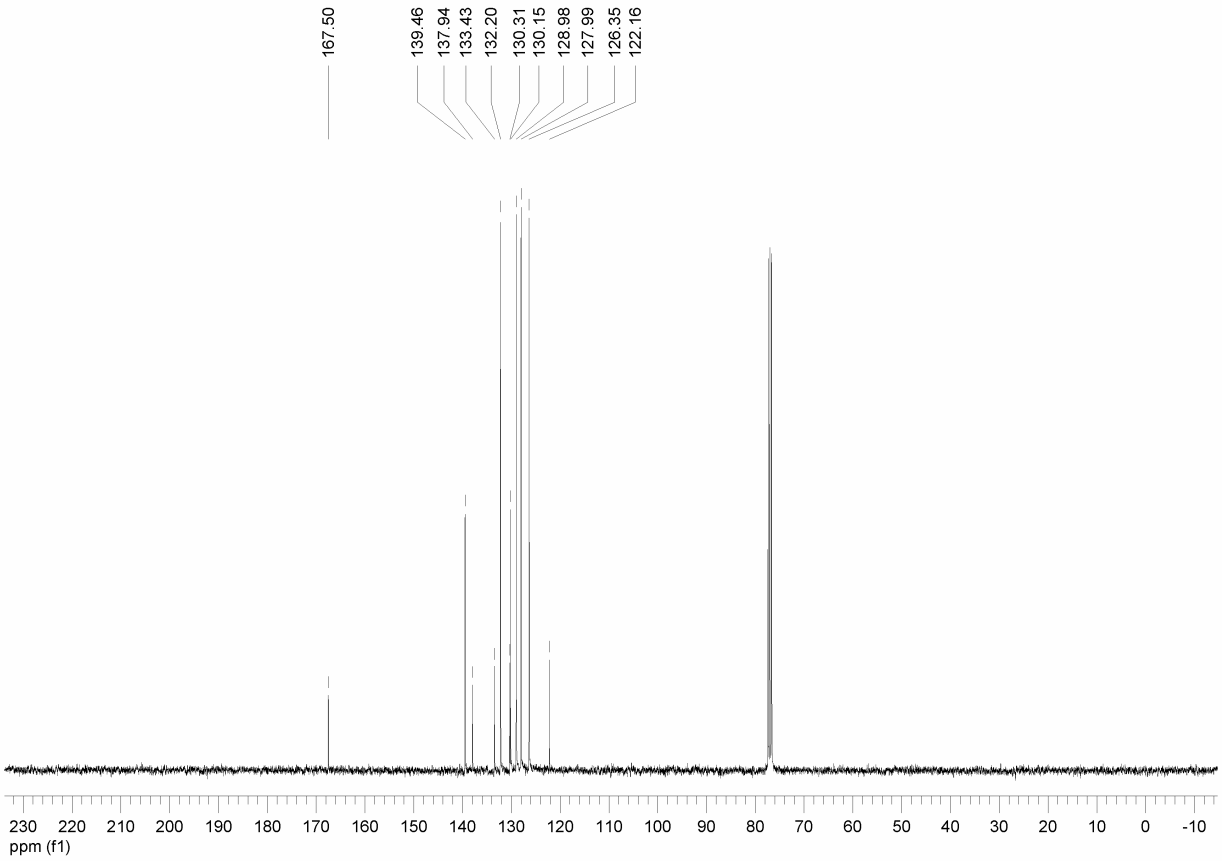




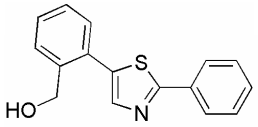
5-(4-bromophenyl)-2-phenylthiazole **3k**

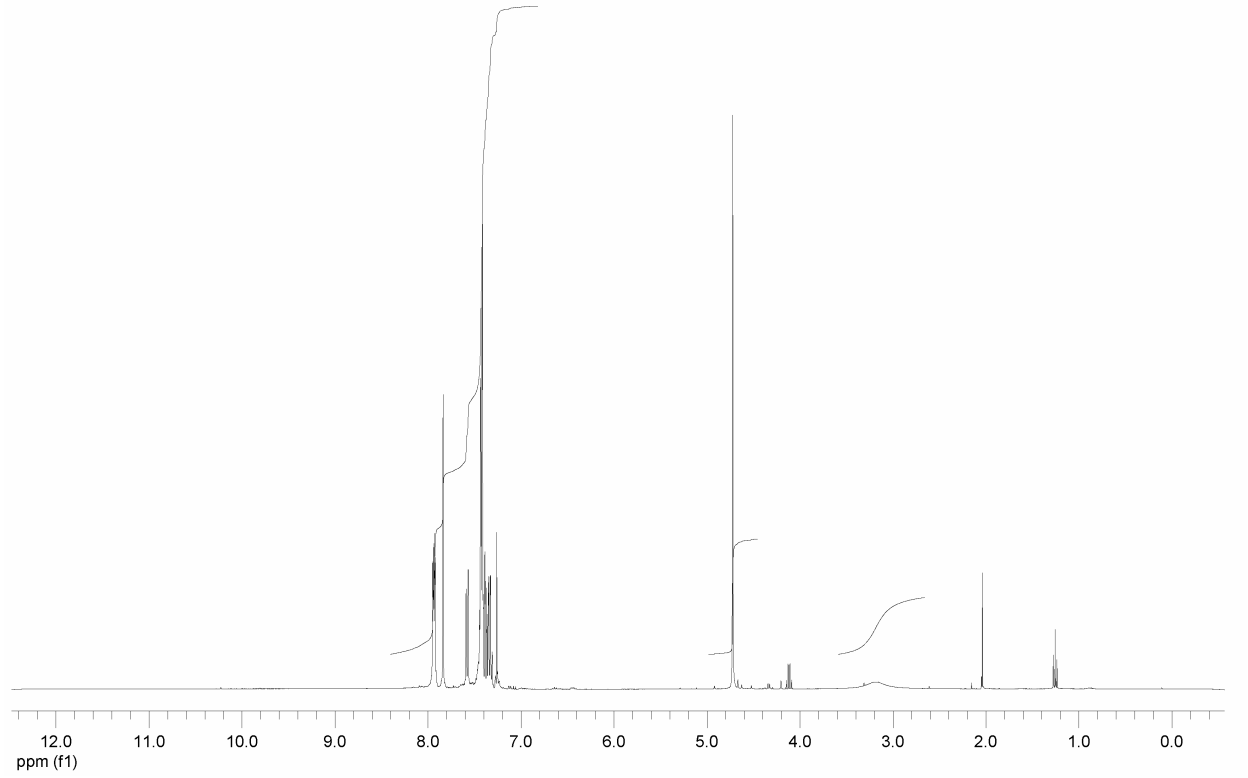


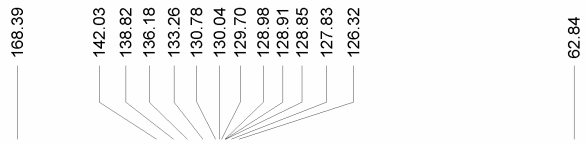


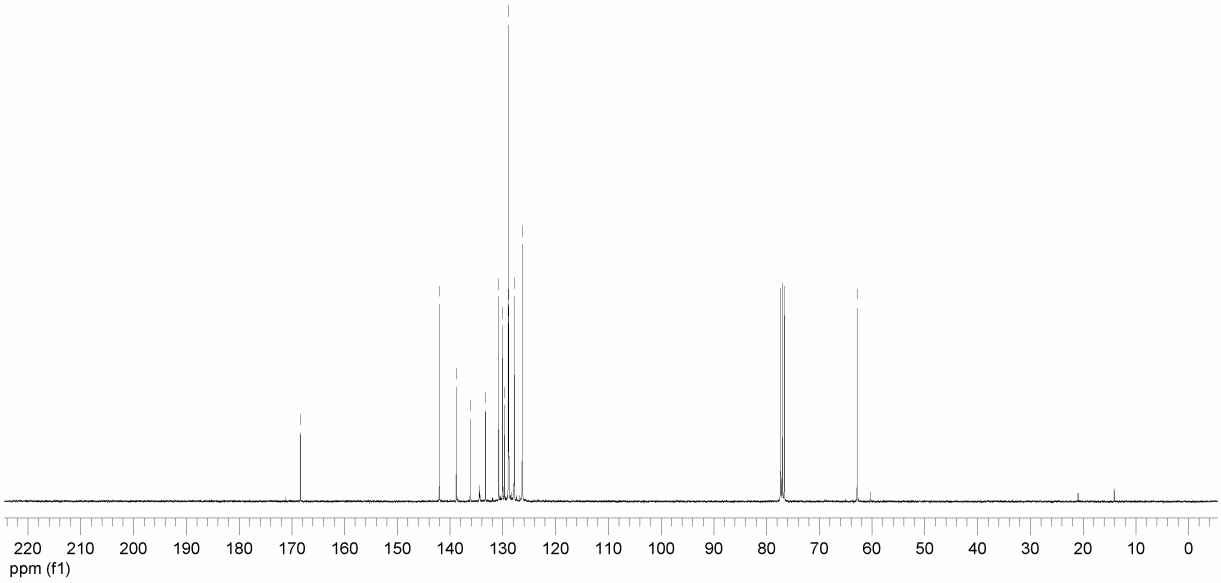


2-Phenylthiazol-5-yl-2'- benzyl alcohol **3l**

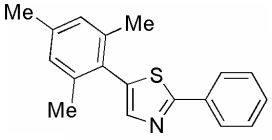


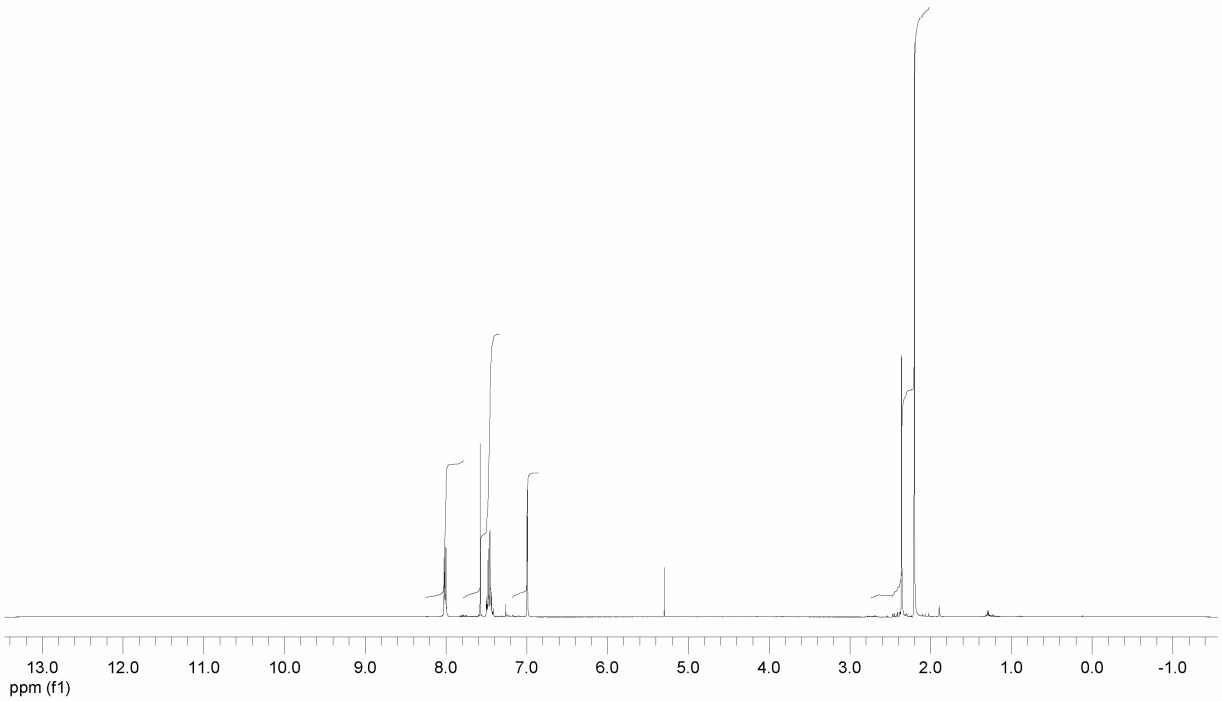


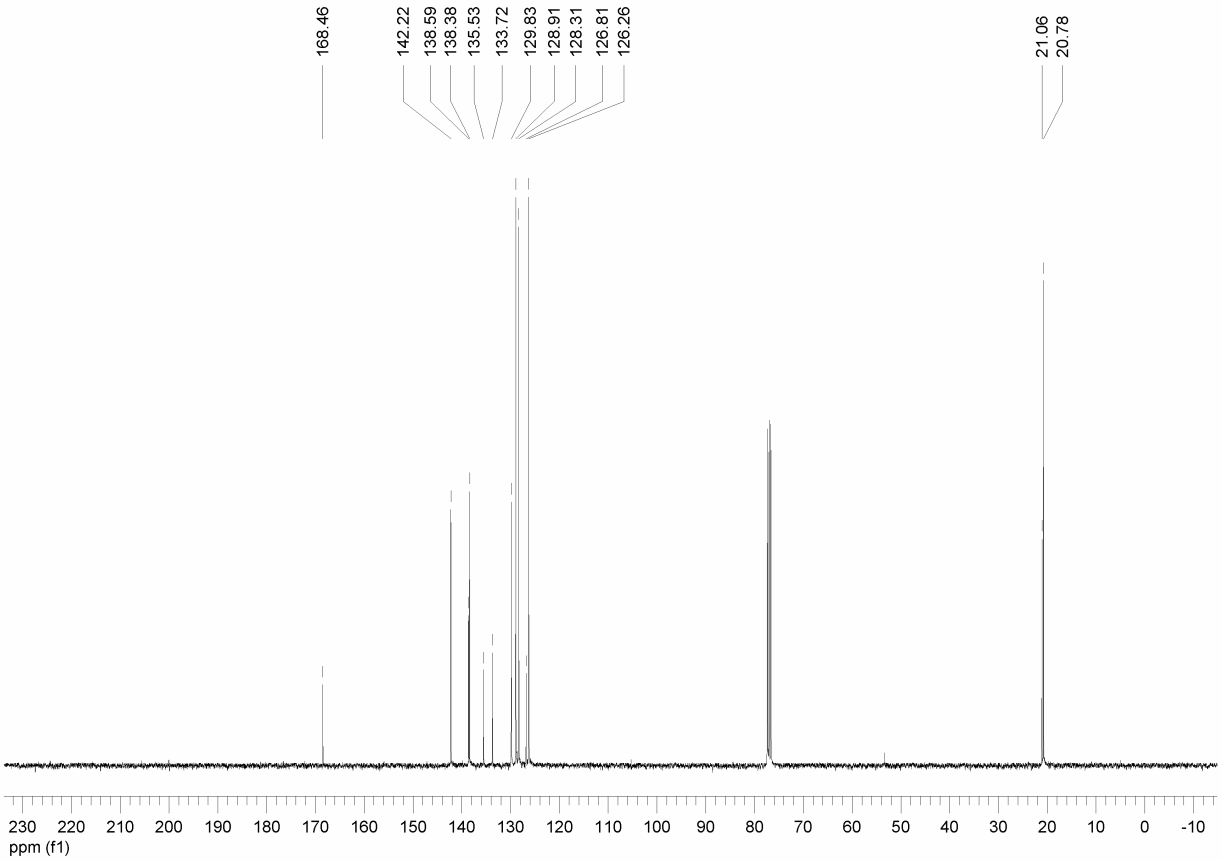




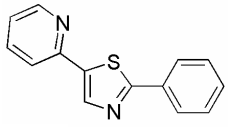
5-(2,4,6-Trimethylphenyl)-2-phenylthiazole **3m**

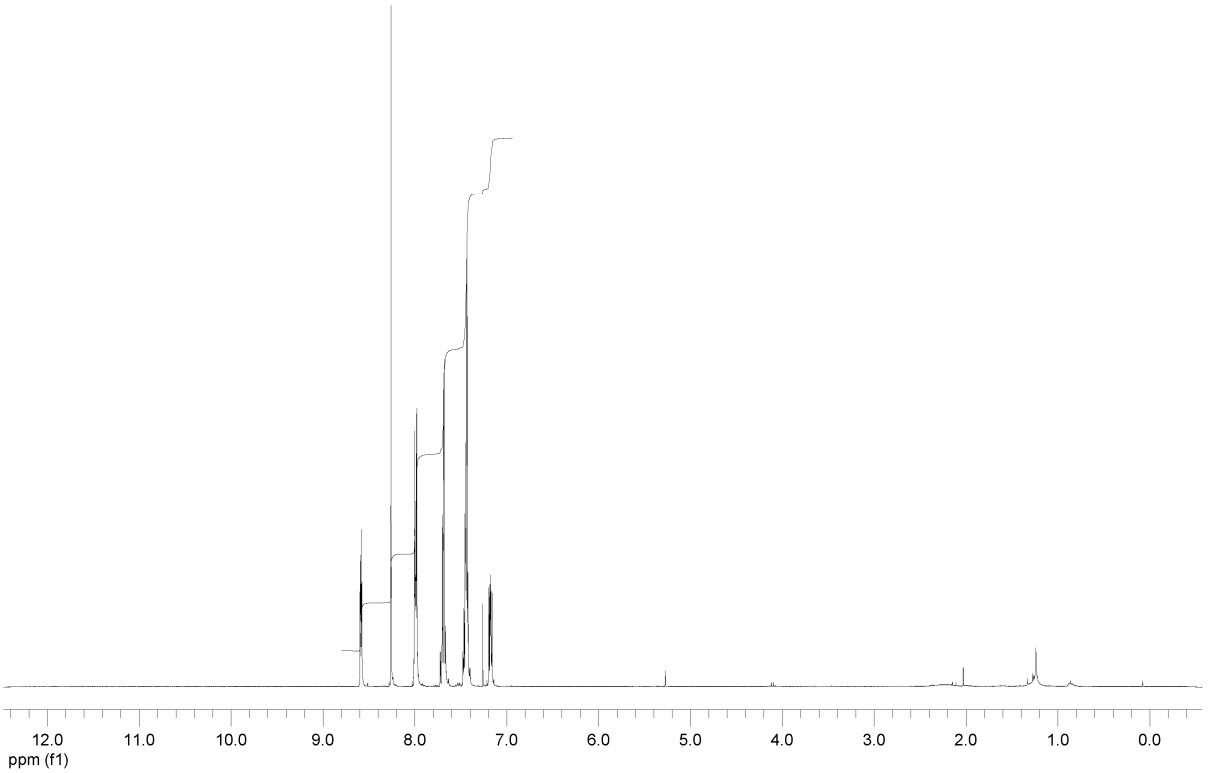


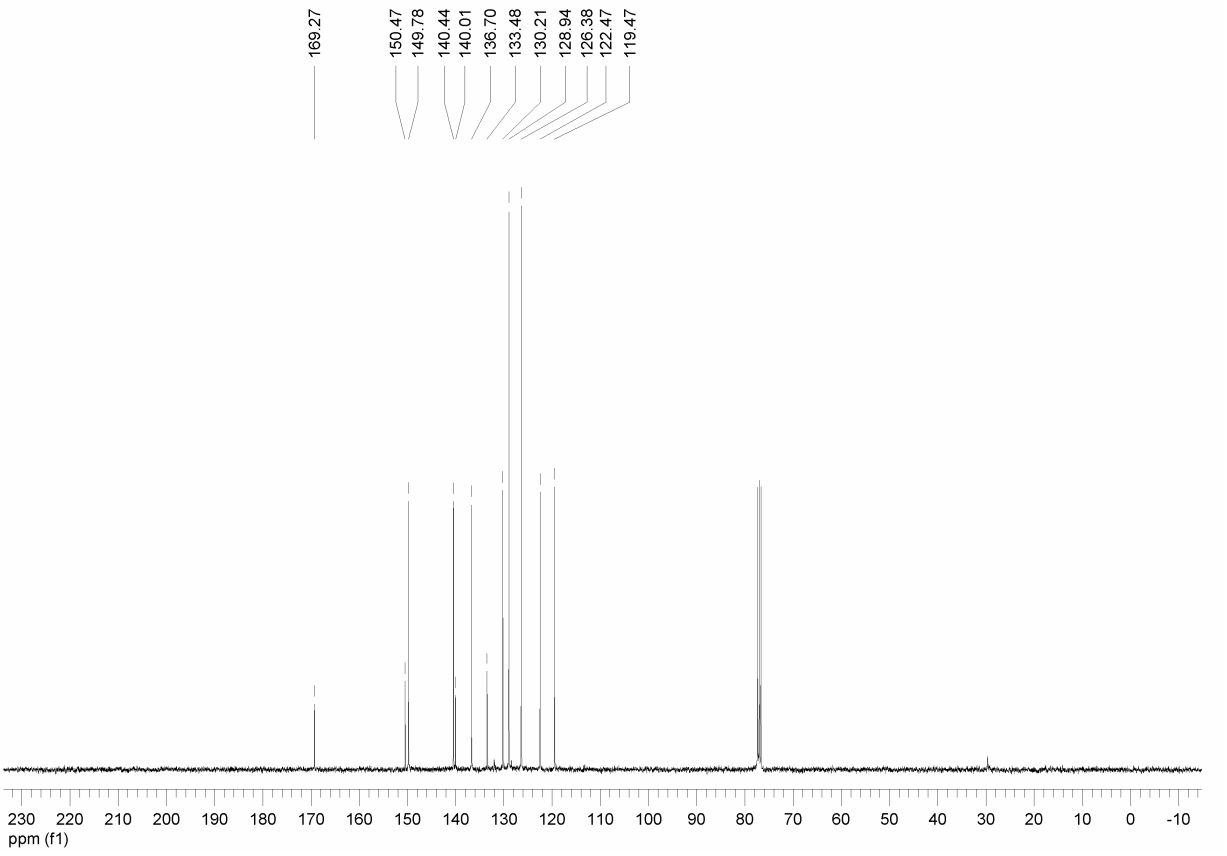




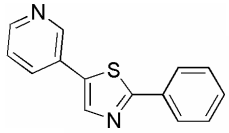
2-(2-Phenylthiazol-5-yl)pyridine **3n**

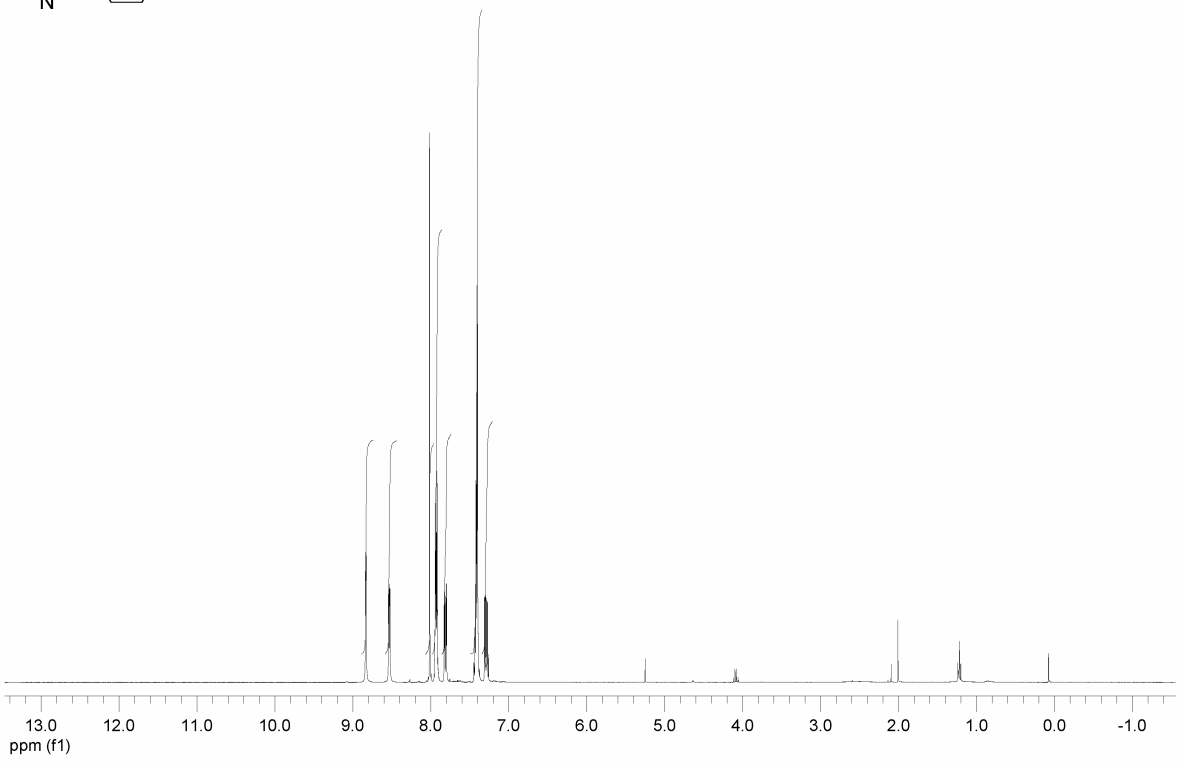


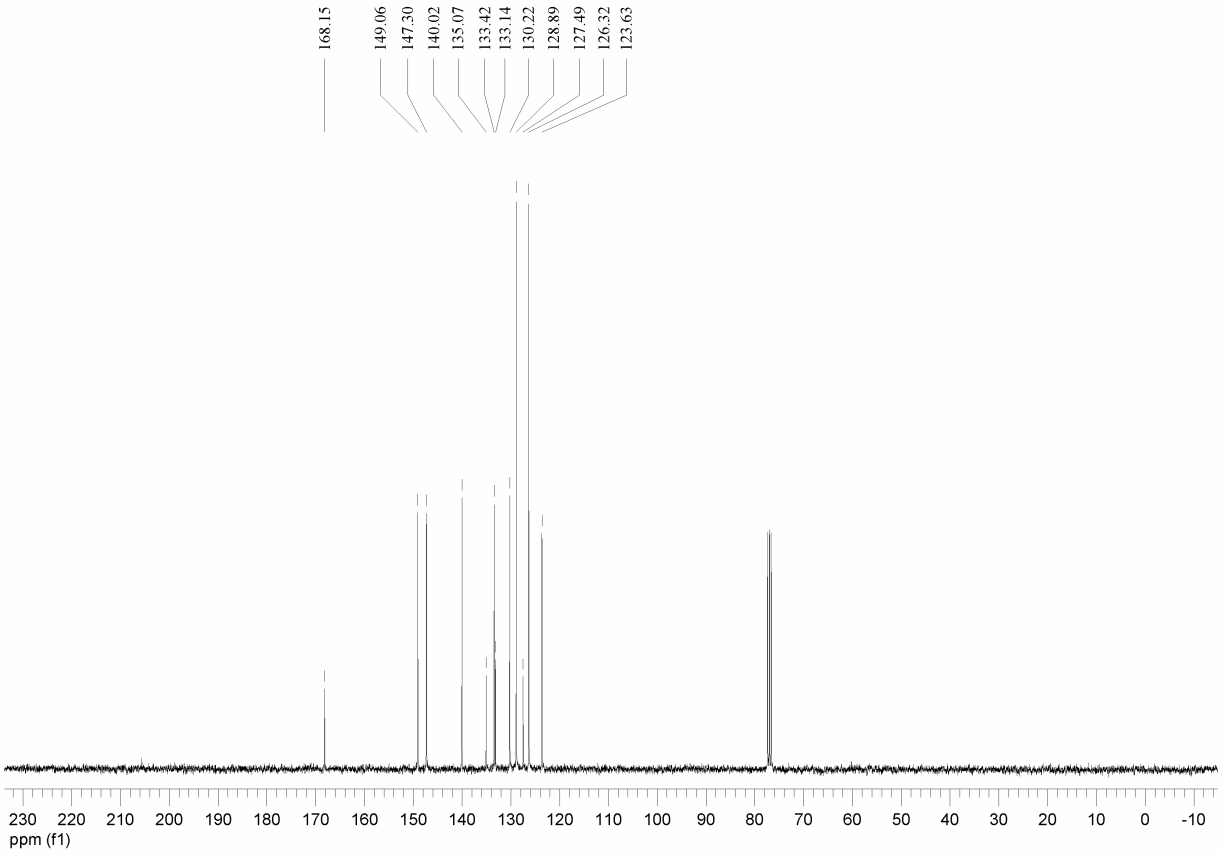




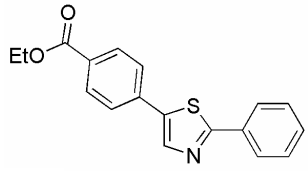
3-(2-Phenylthiazol-5-yl)pyridine **3o**

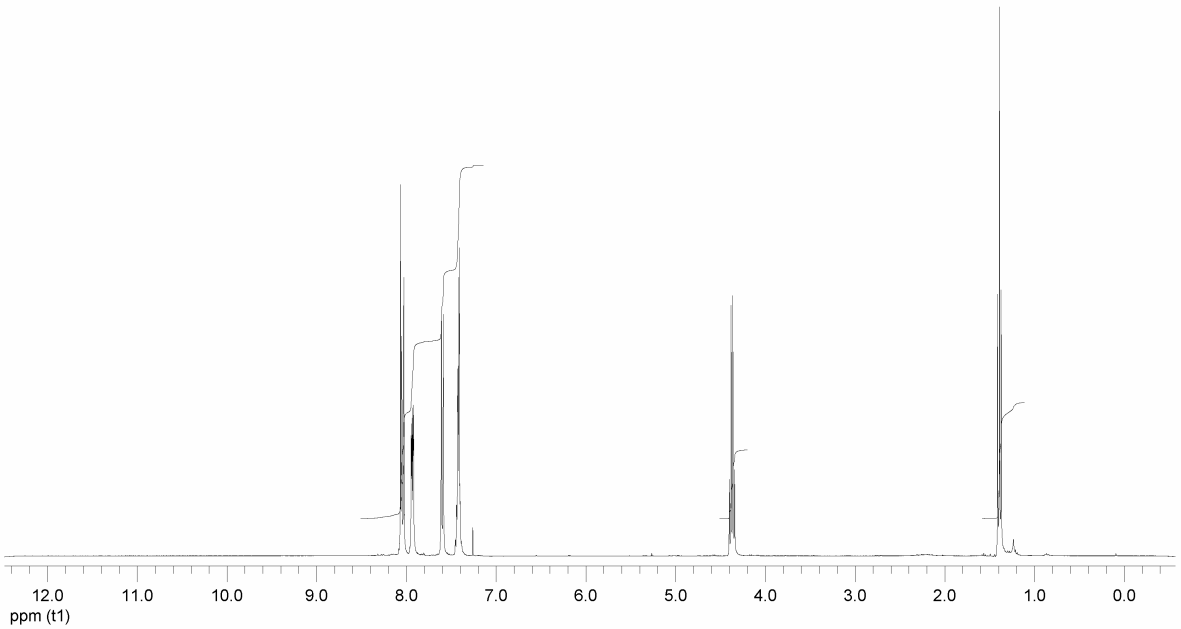


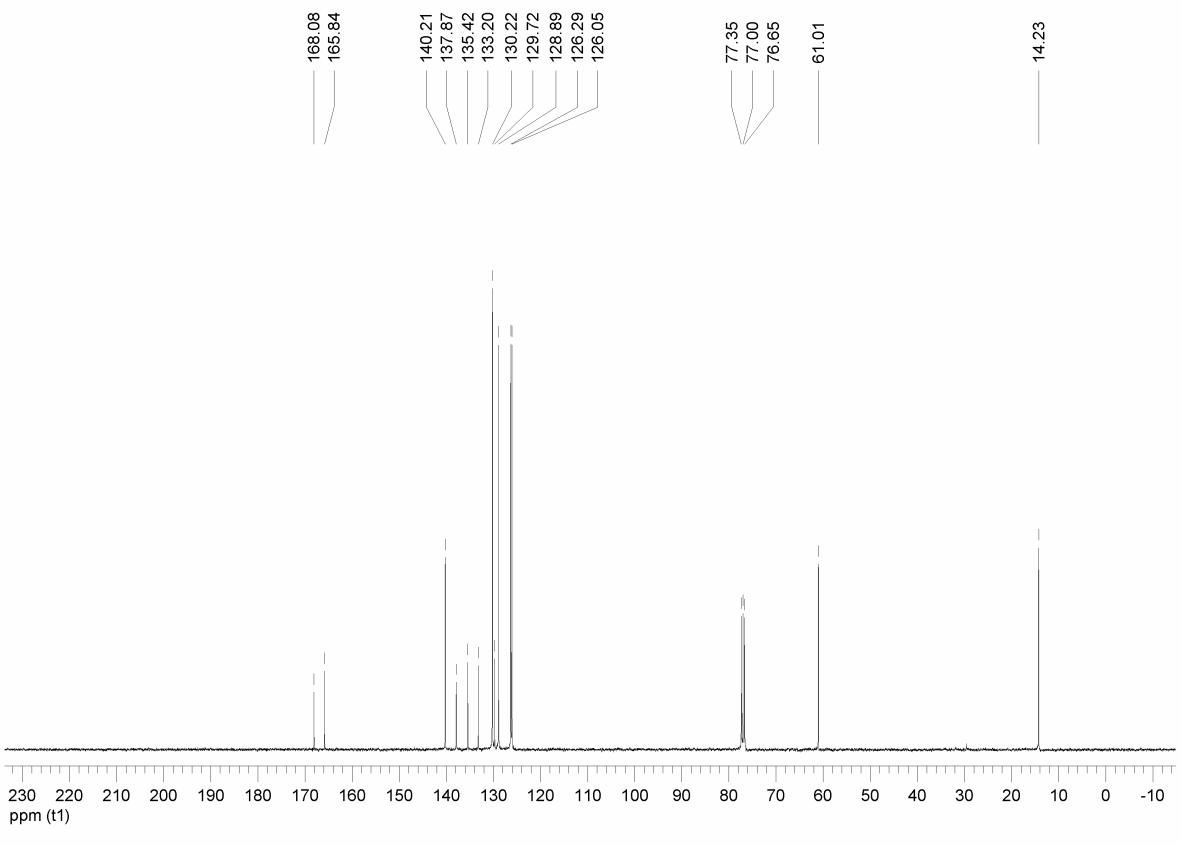




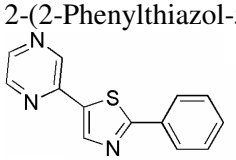
Ethyl 4-(2-phenylthiazol-5-yl)benzoate **3p**

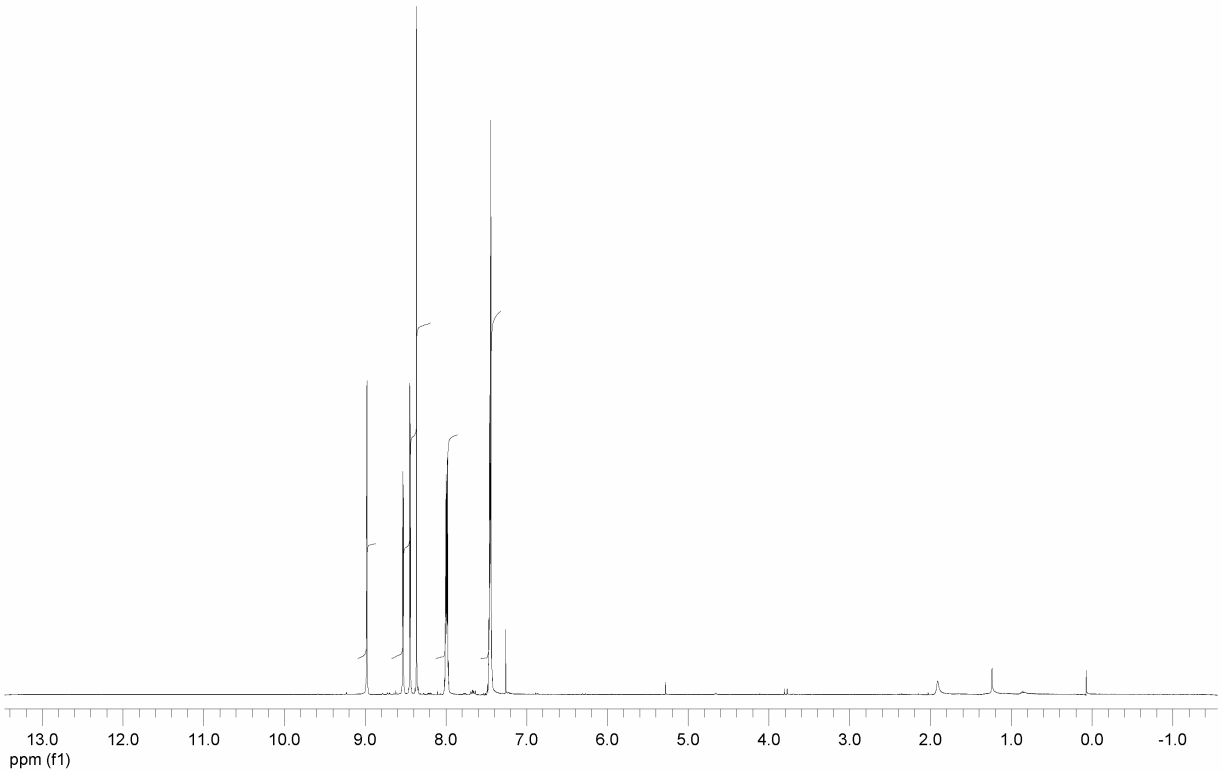


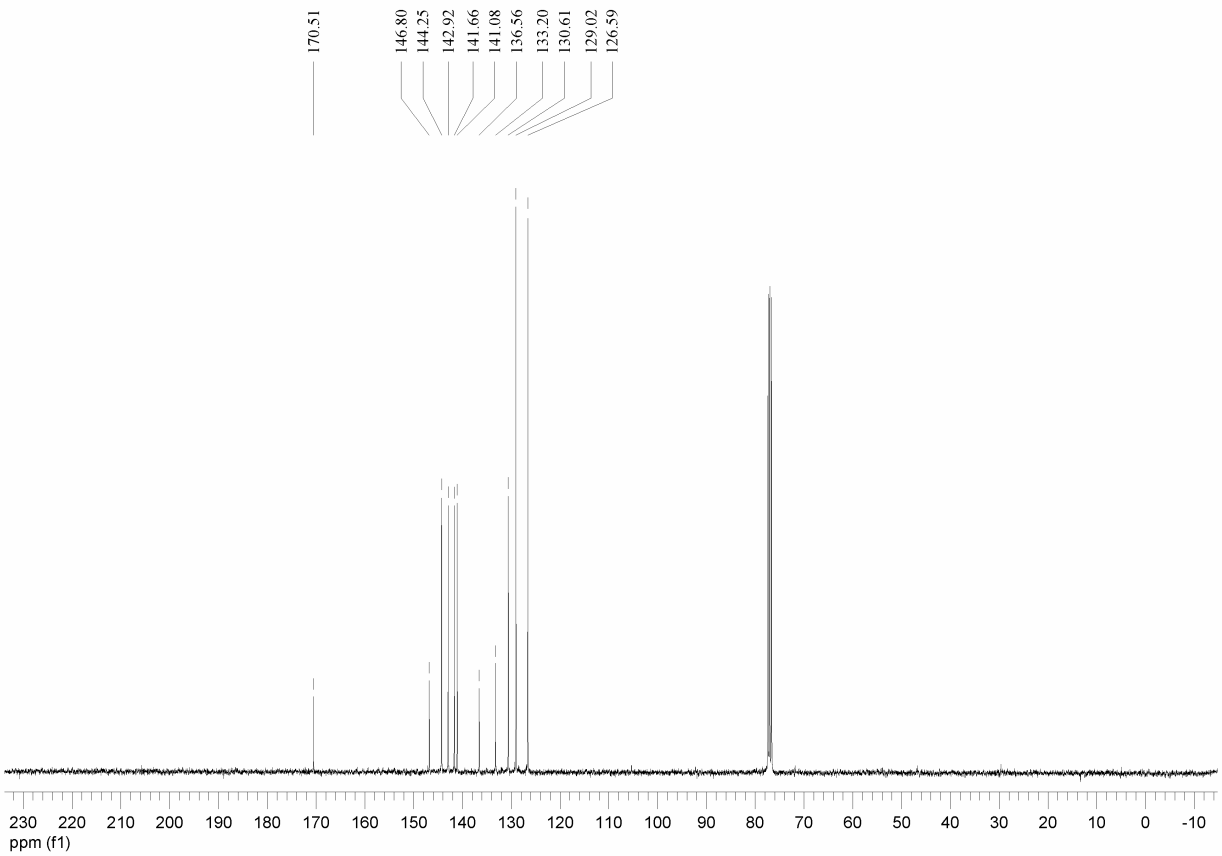




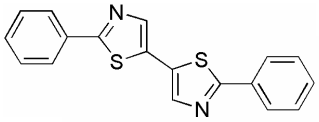
2-(2-Phenylthiazol-5-yl)pyrazine **3q**

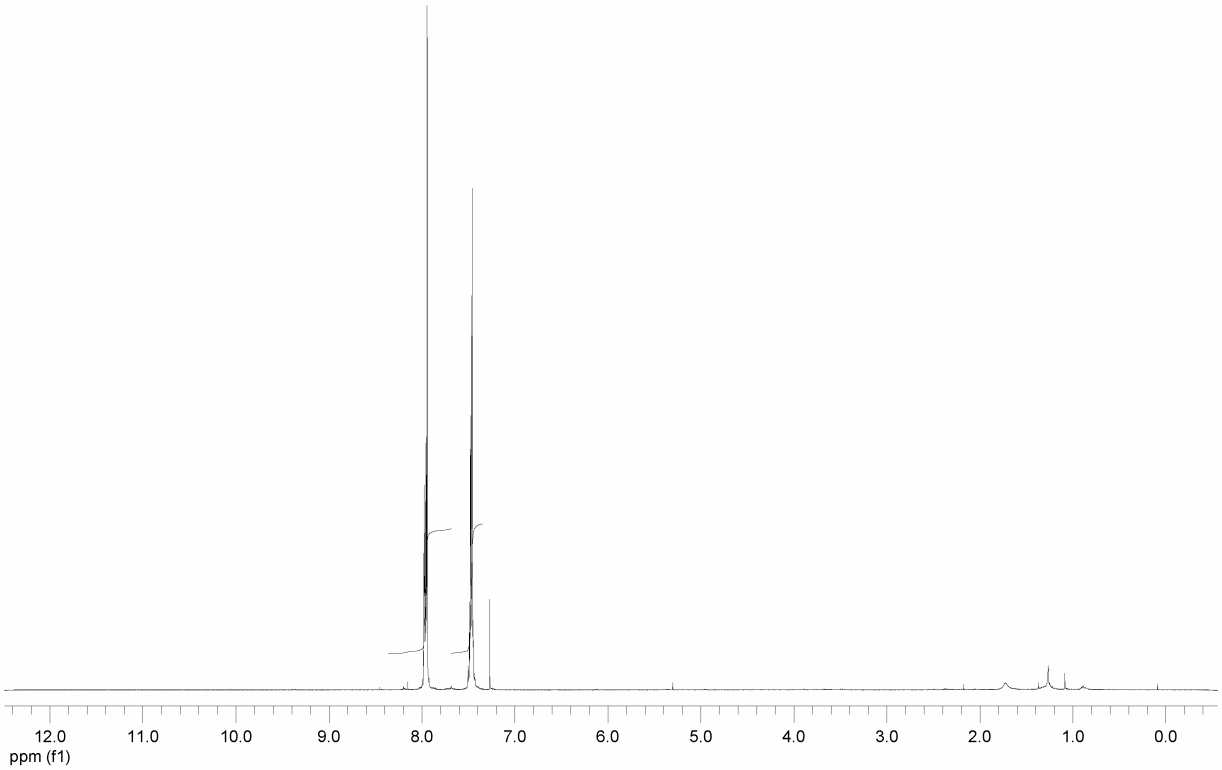


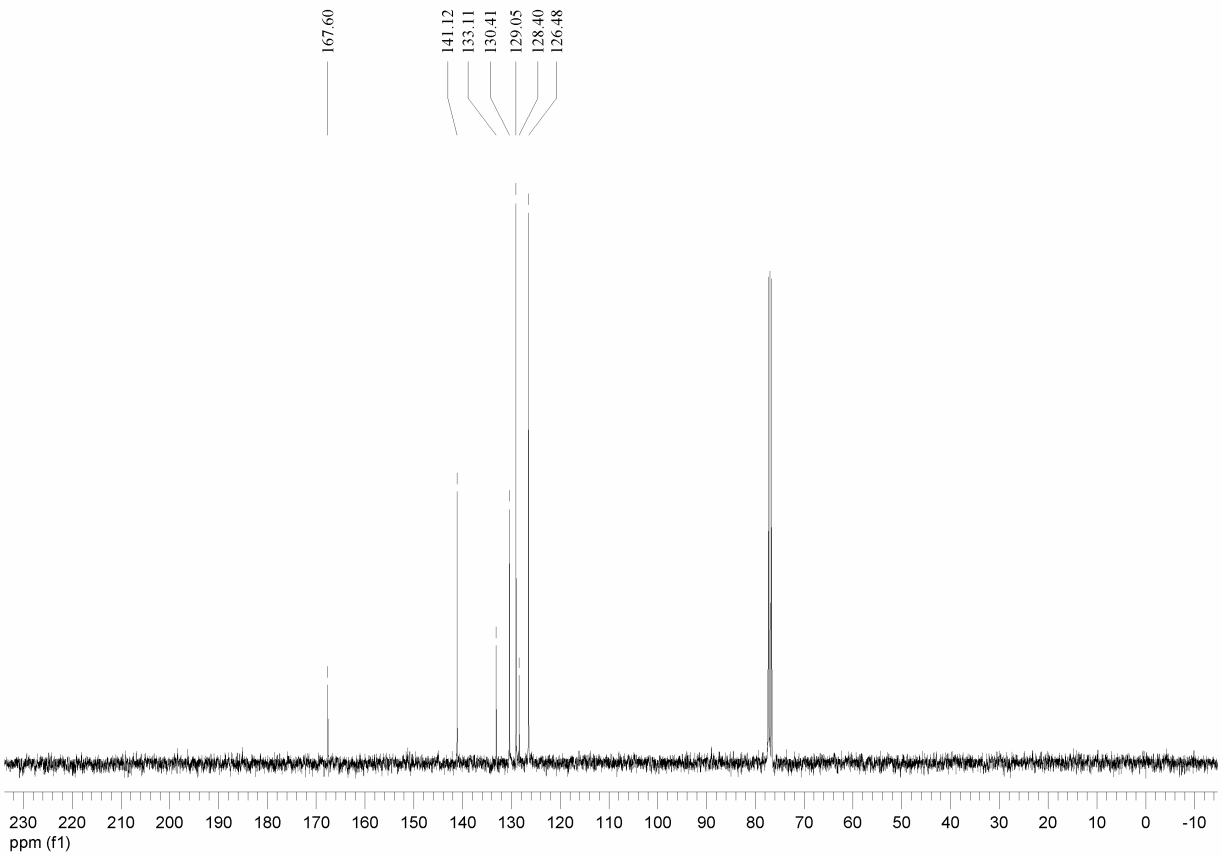




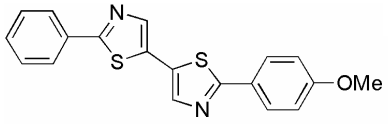
2,2'-Diphenyl-[5,5']bithiazolyl **3r**

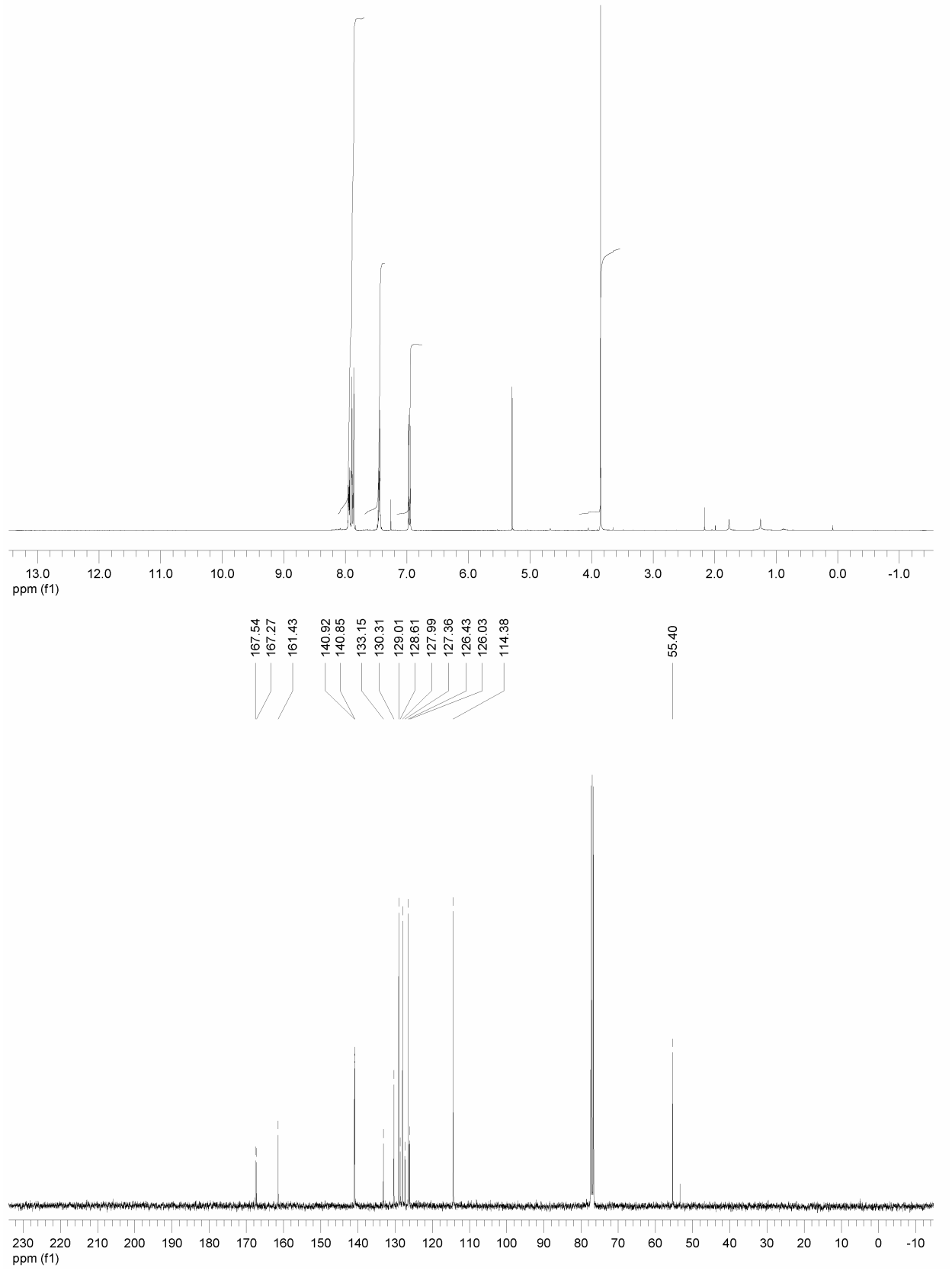




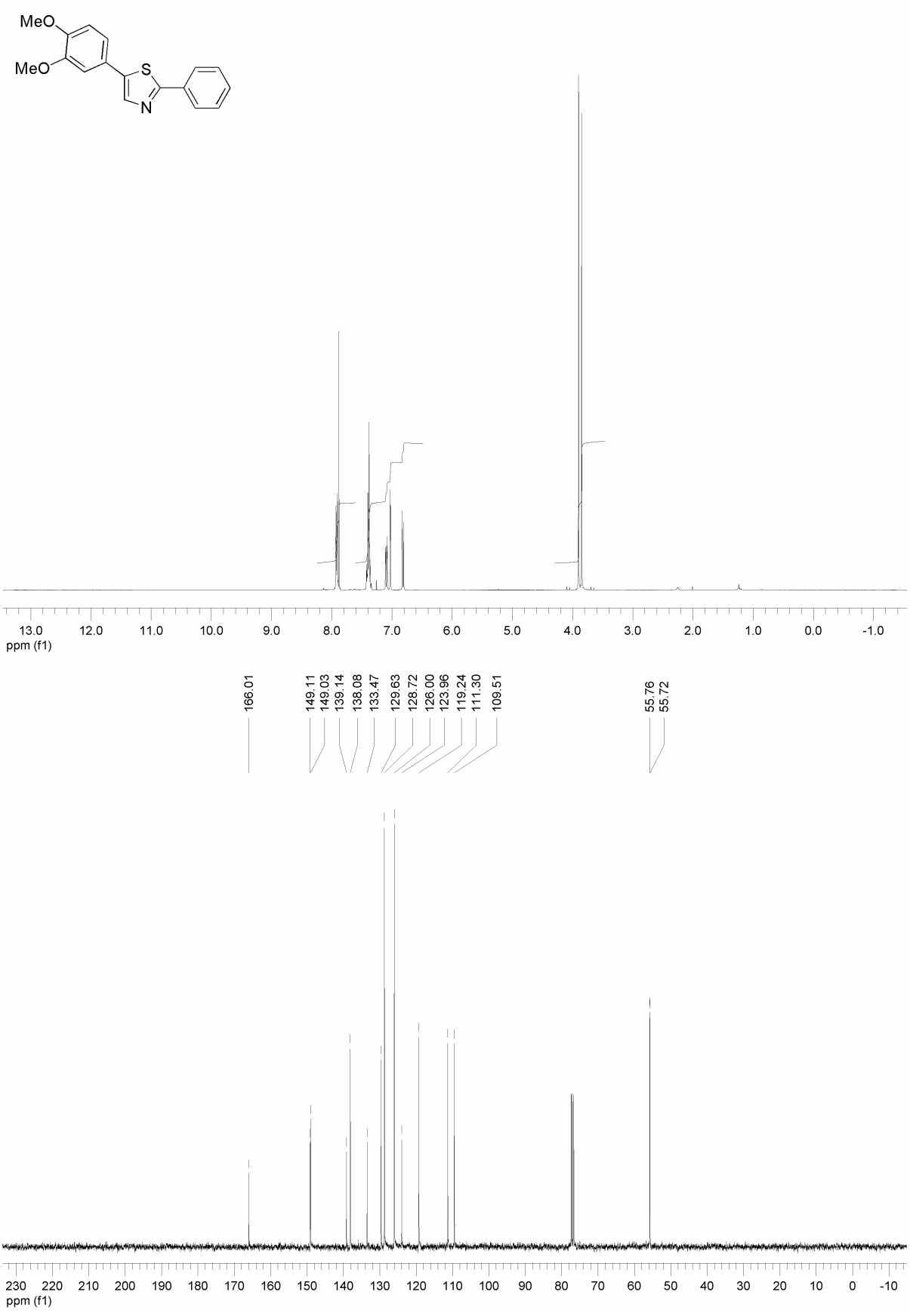


2'-(4-Methoxyphenyl)-2-phenyl-[5,5']bithiazolyl **3s**

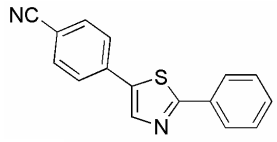


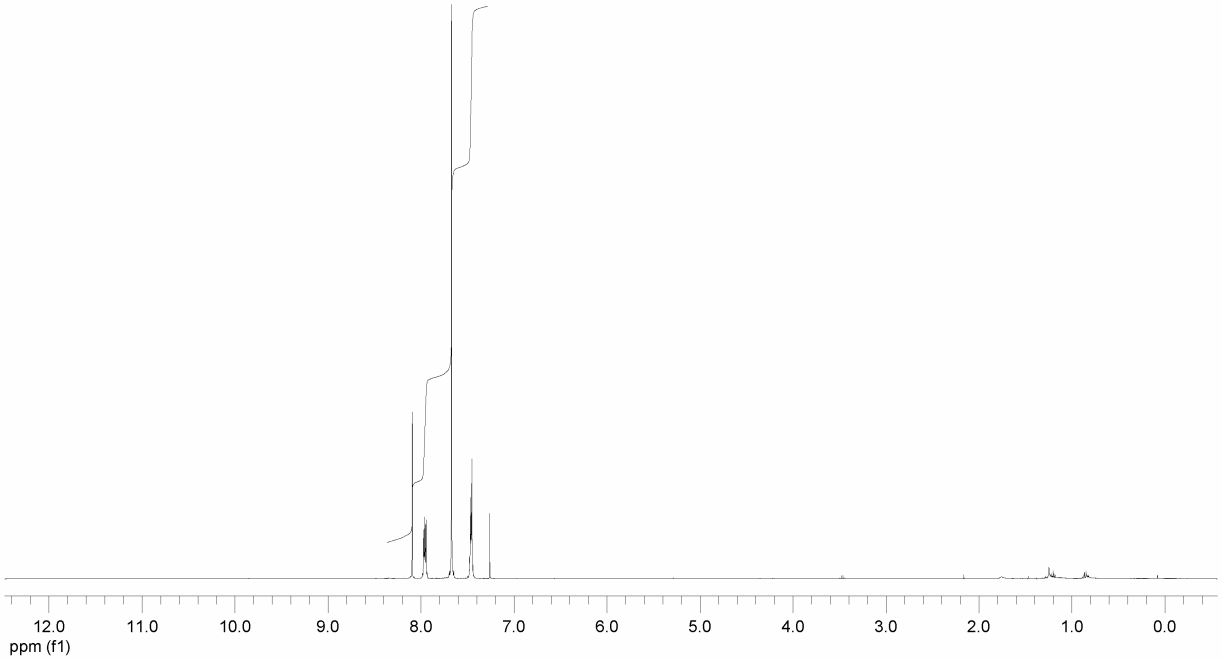


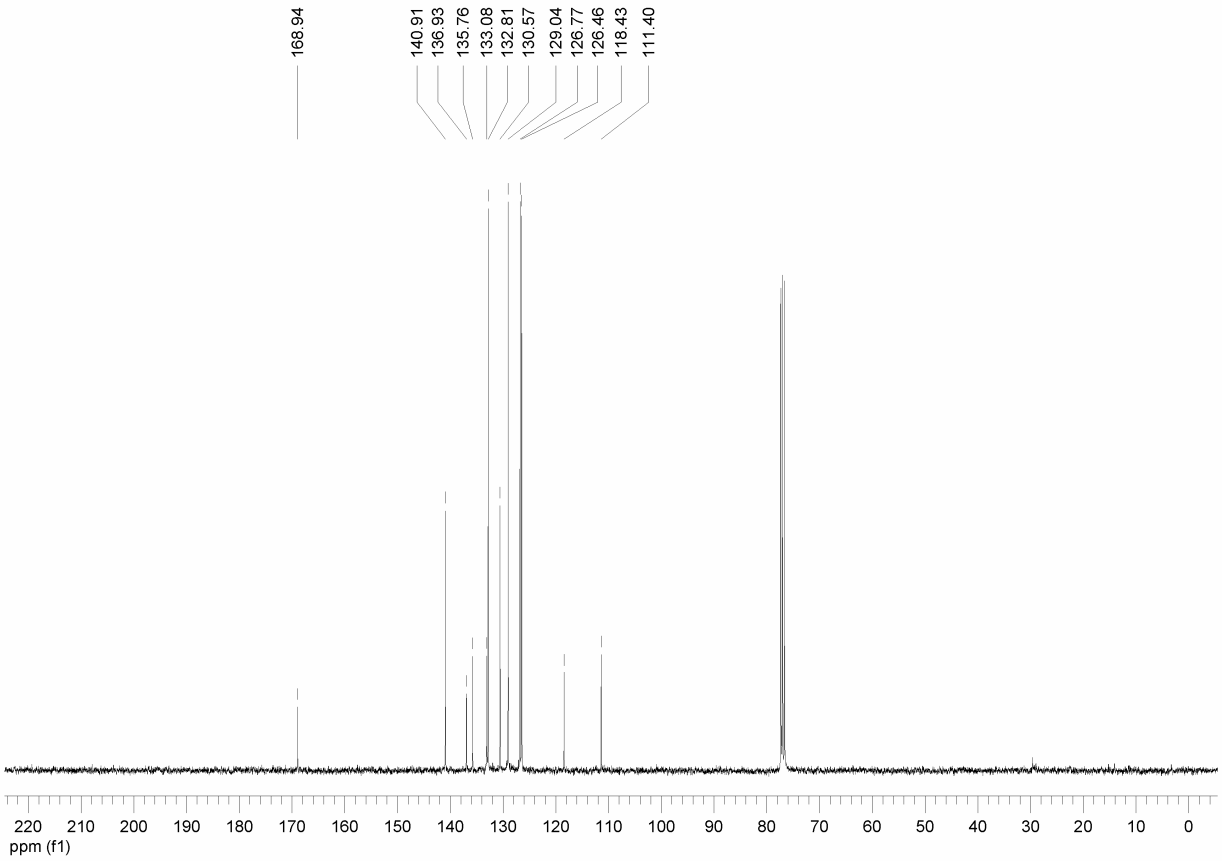
2-Phenyl-5-(3,4-dimethoxy)thiazole **3t**



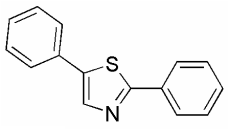
4-(2-Phenylthiazol-5-yl)benzonitrile

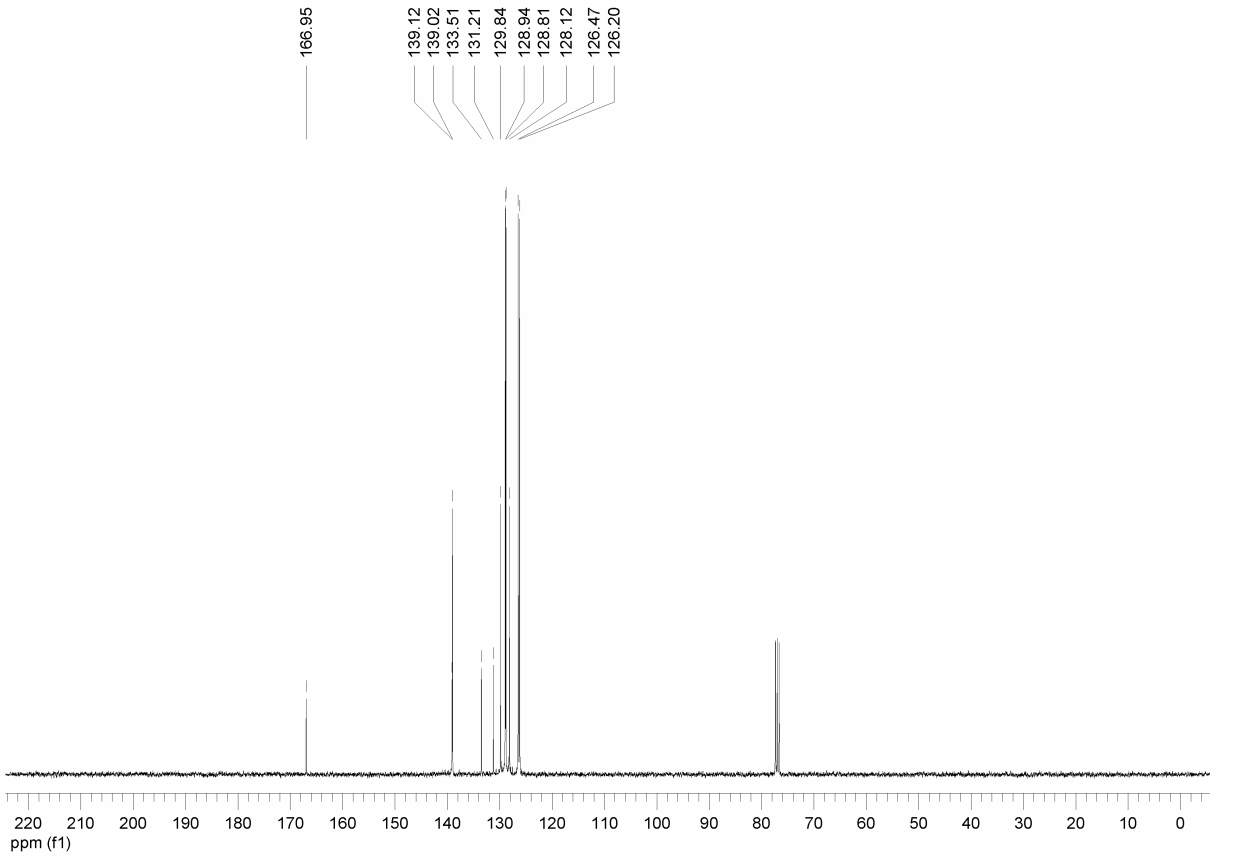




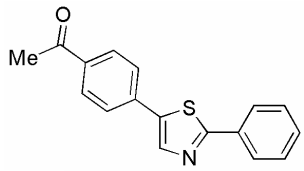


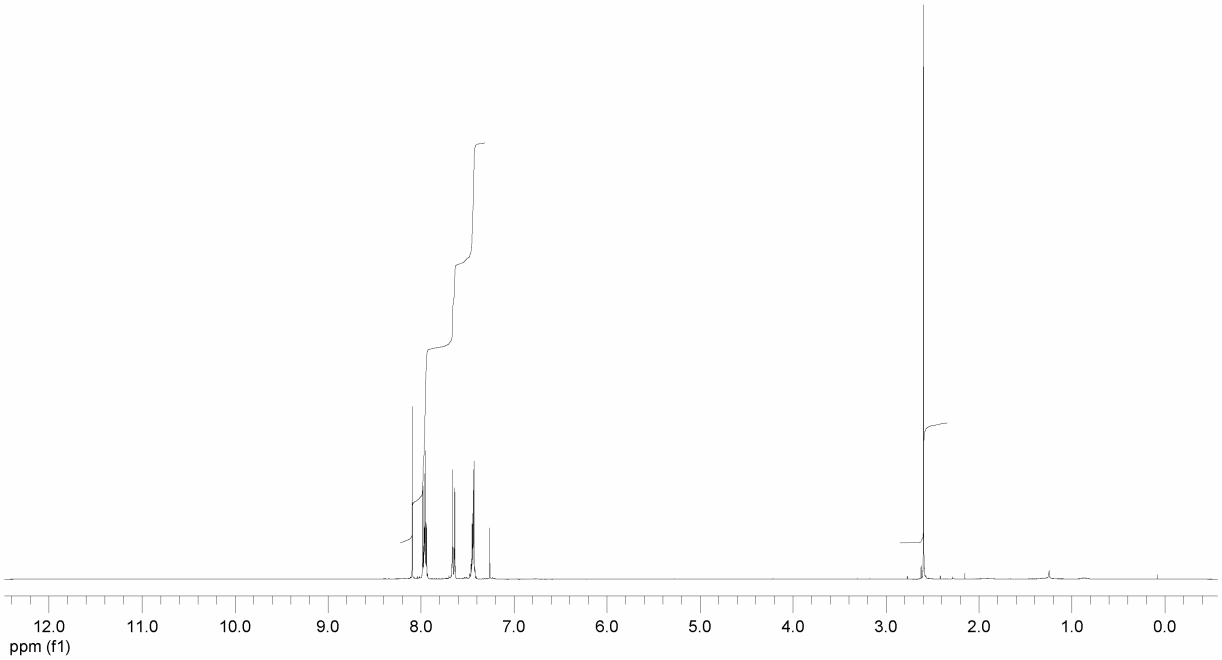
2,5-Diphenylthiazole

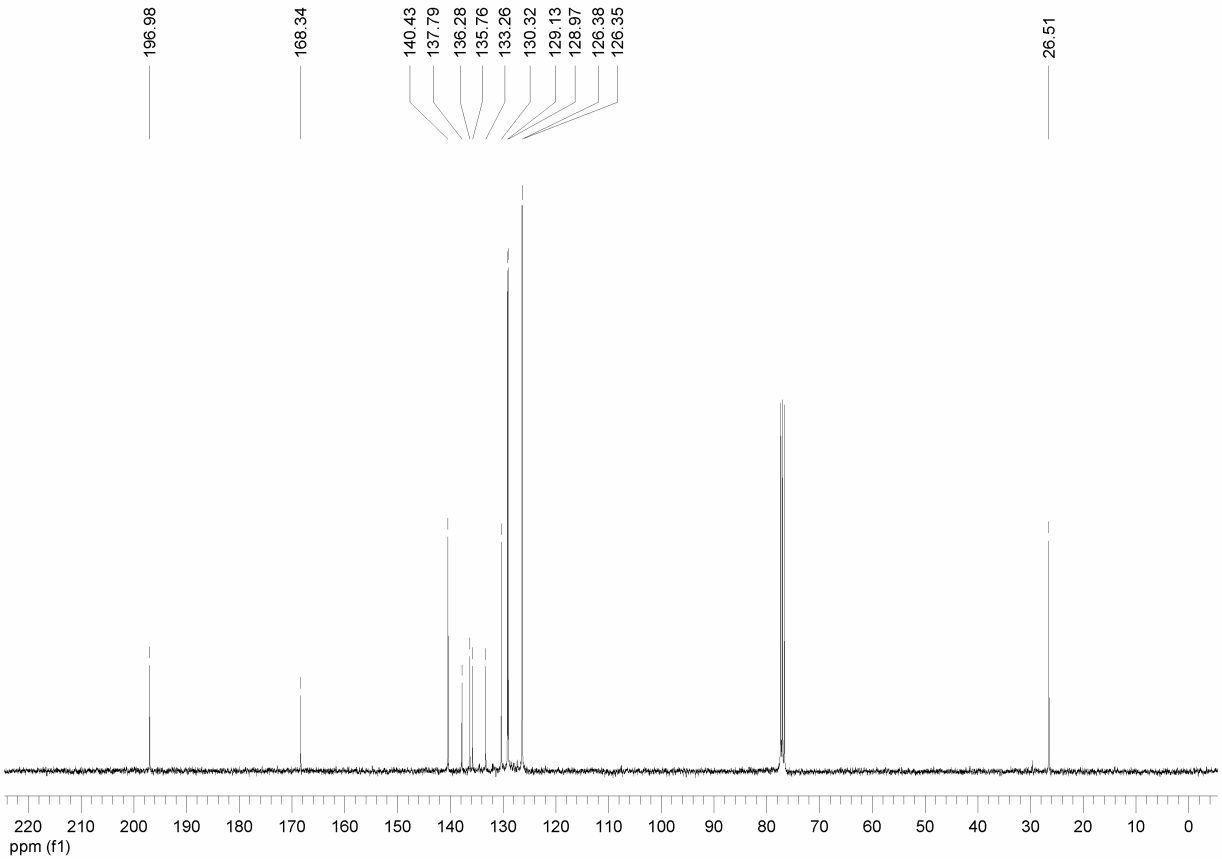




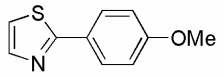
5-(4-Acetylphenyl)-2-phenylthiazole

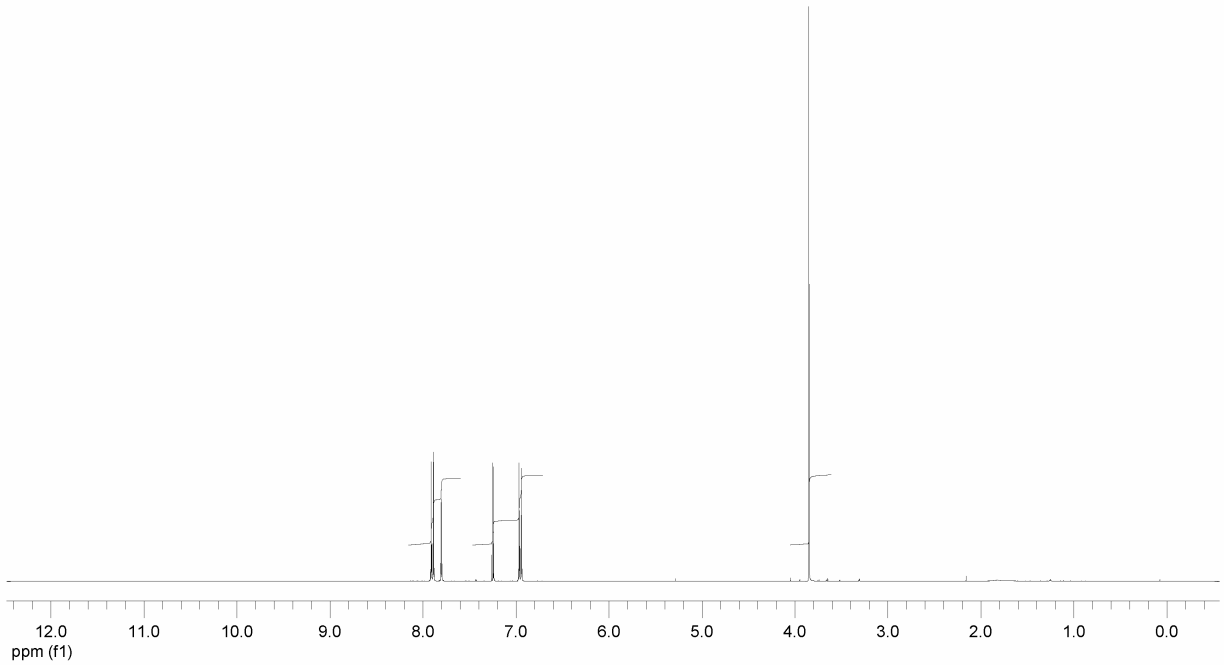


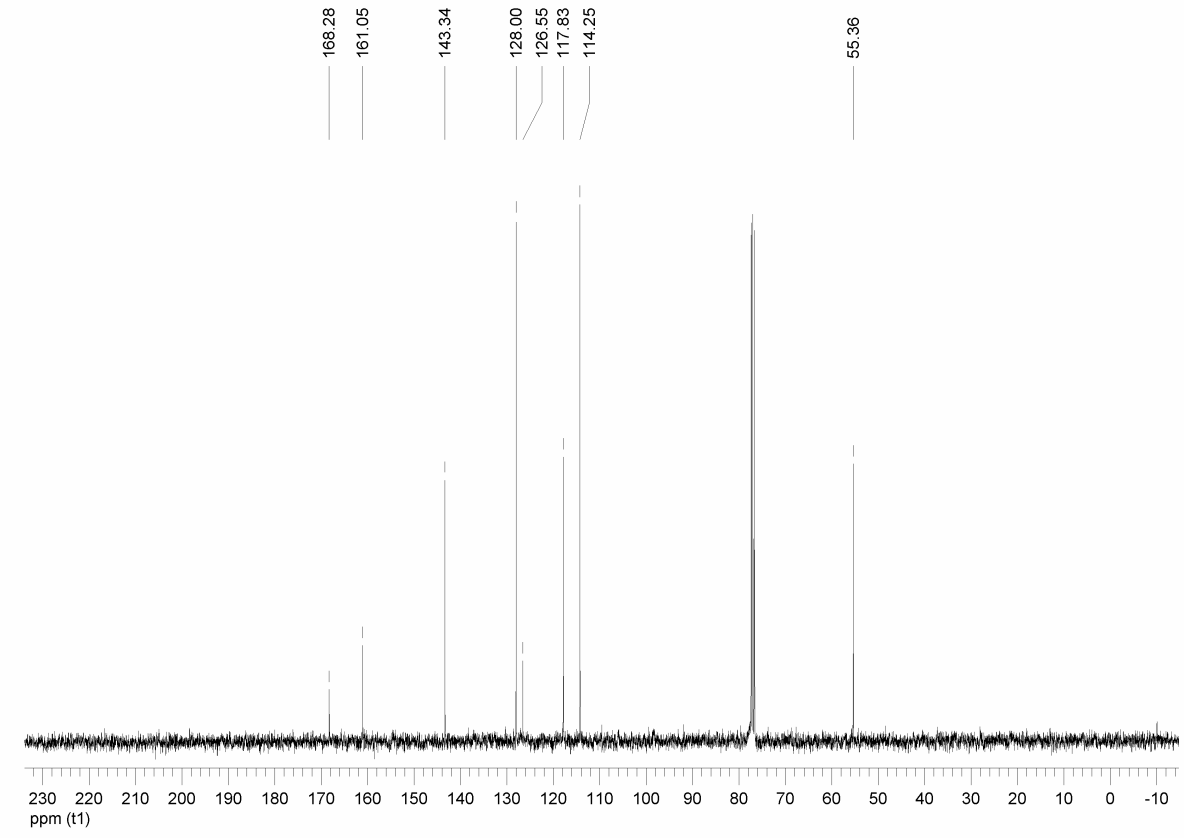




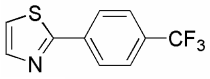
2-(4-Methoxyphenyl)thiazole **4a**

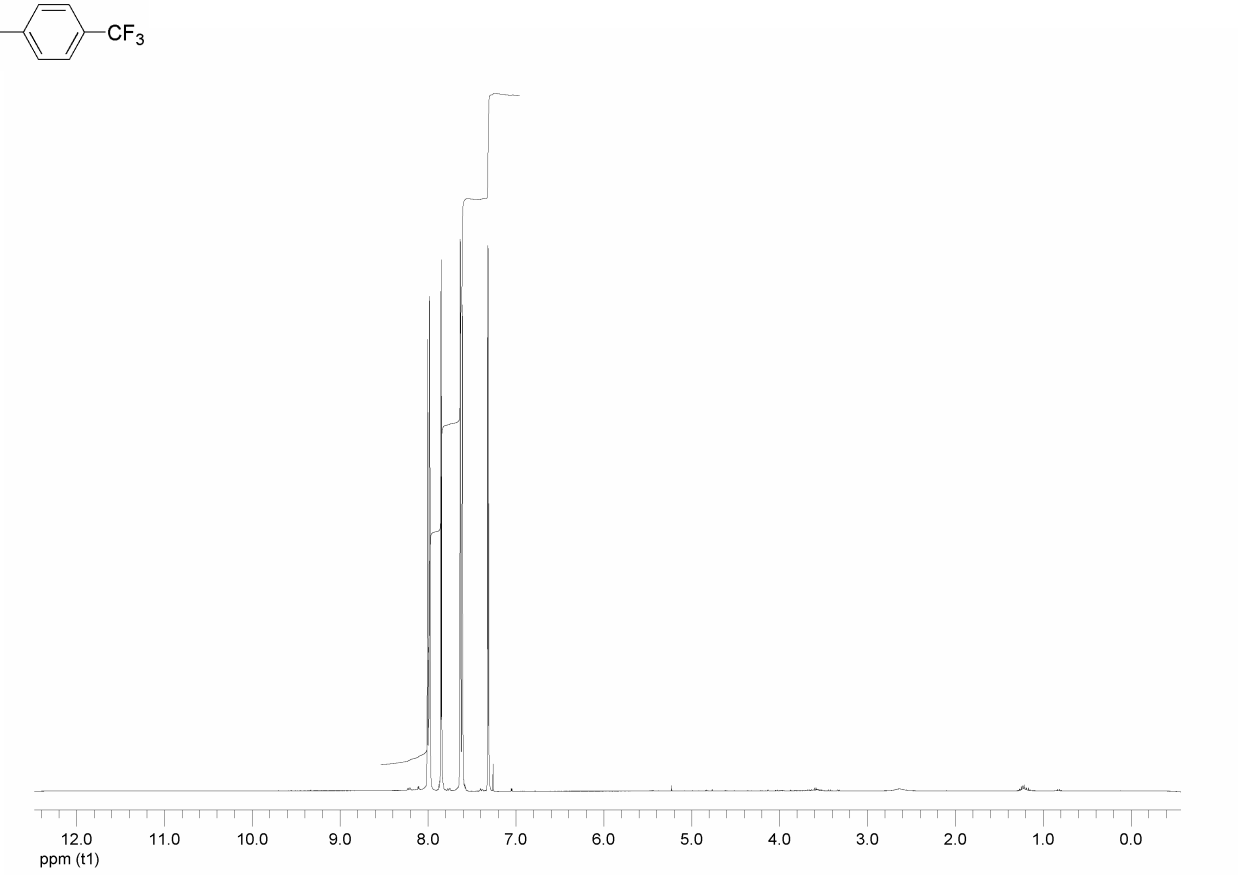


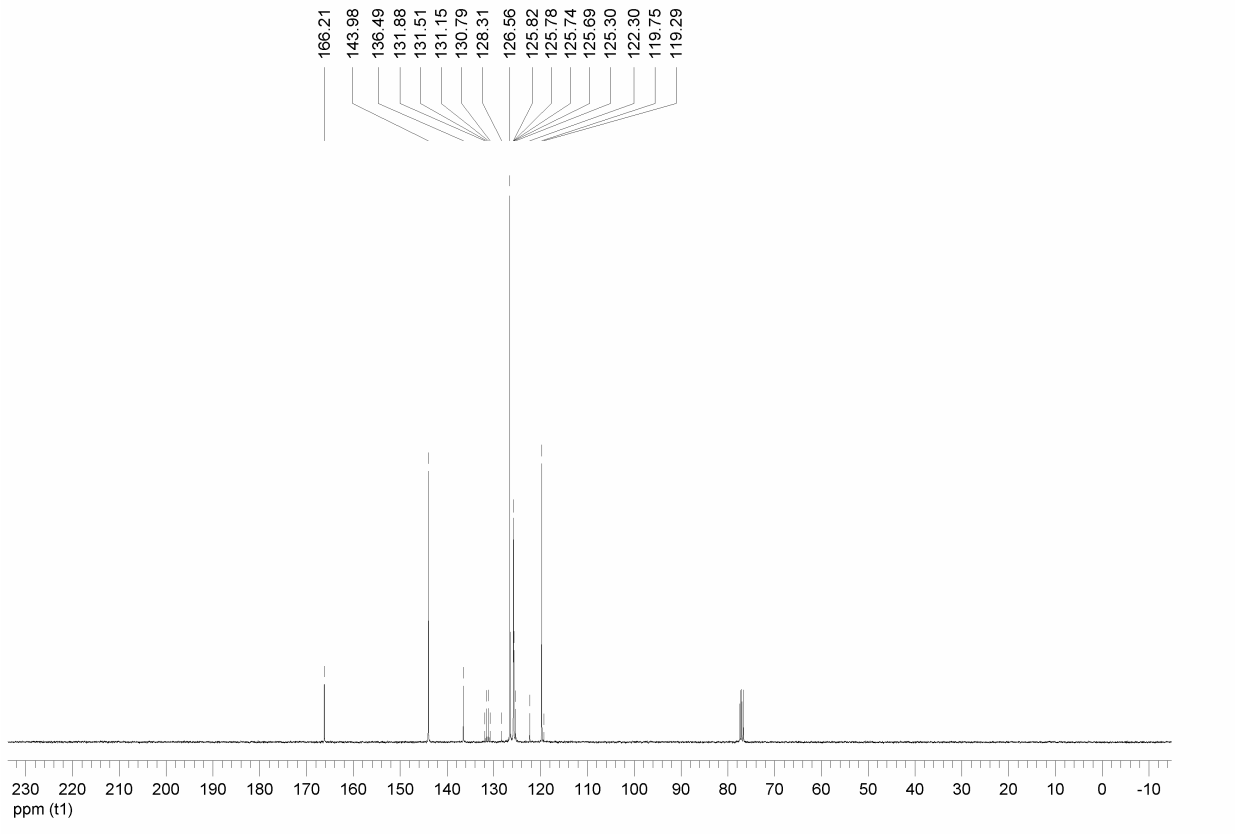




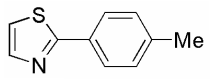
2-(4-Trifluoromethylphenyl)thiazole **4b**

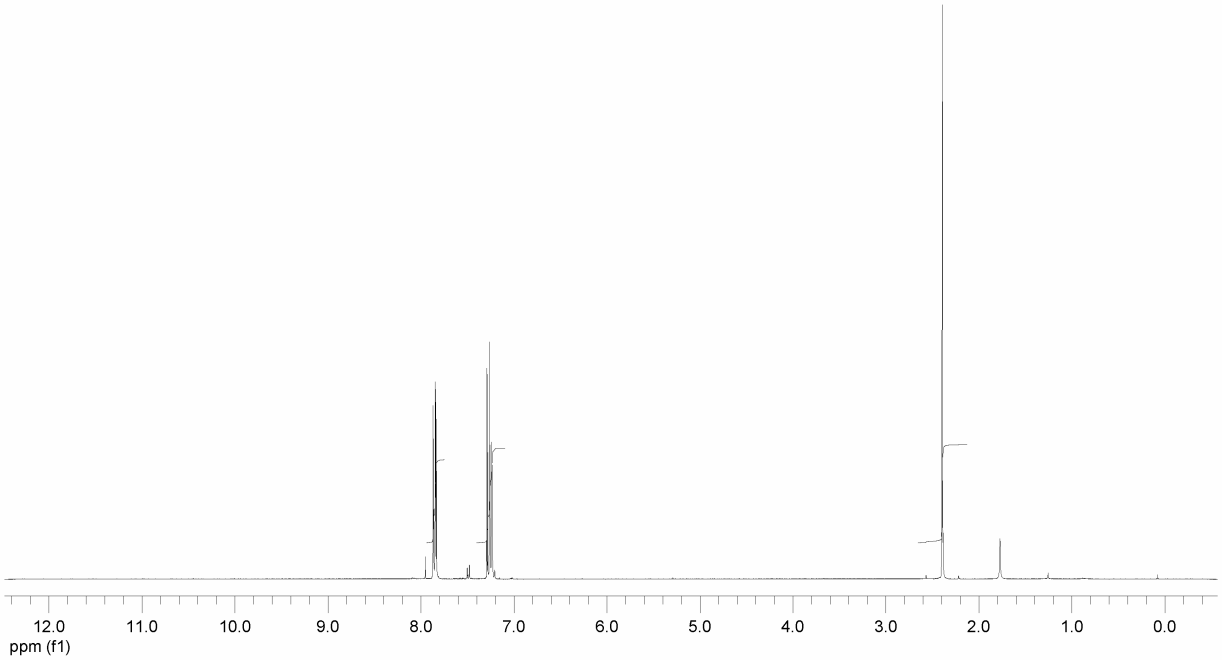


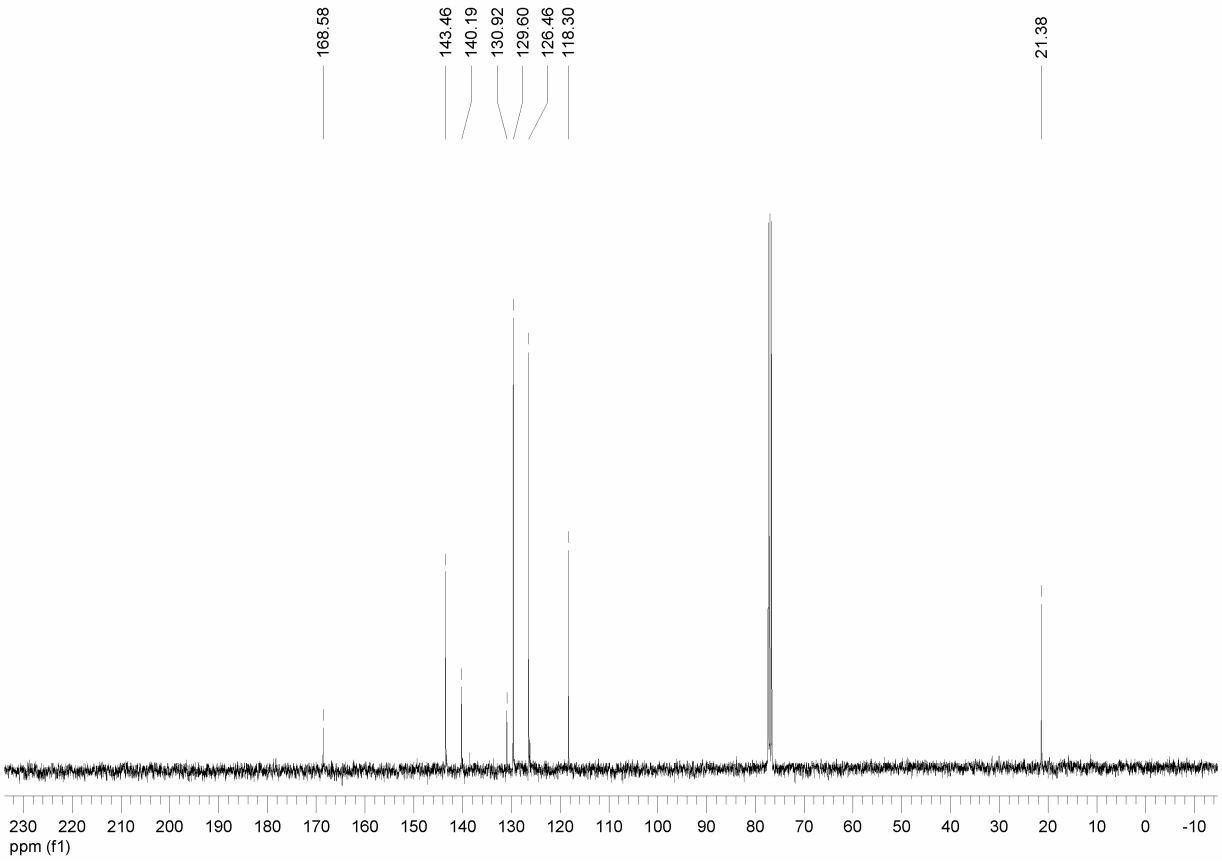




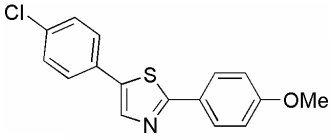
2-(4-Methylphenyl)thiazole **4c**

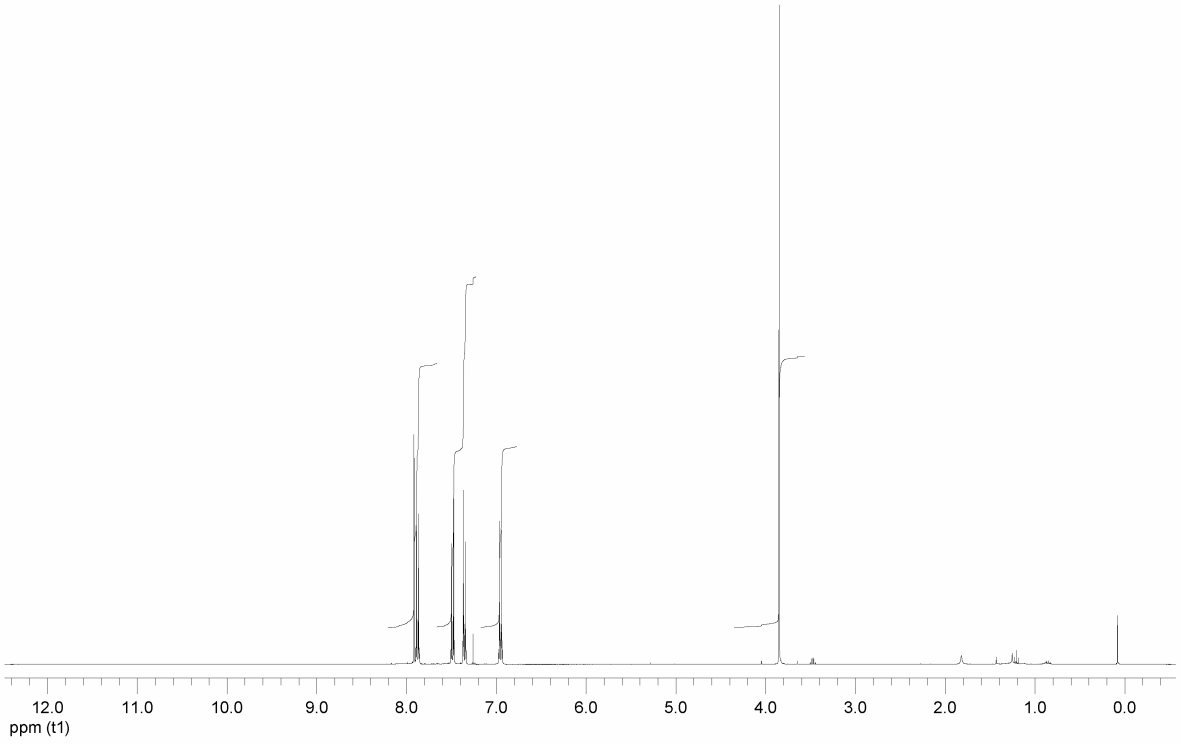


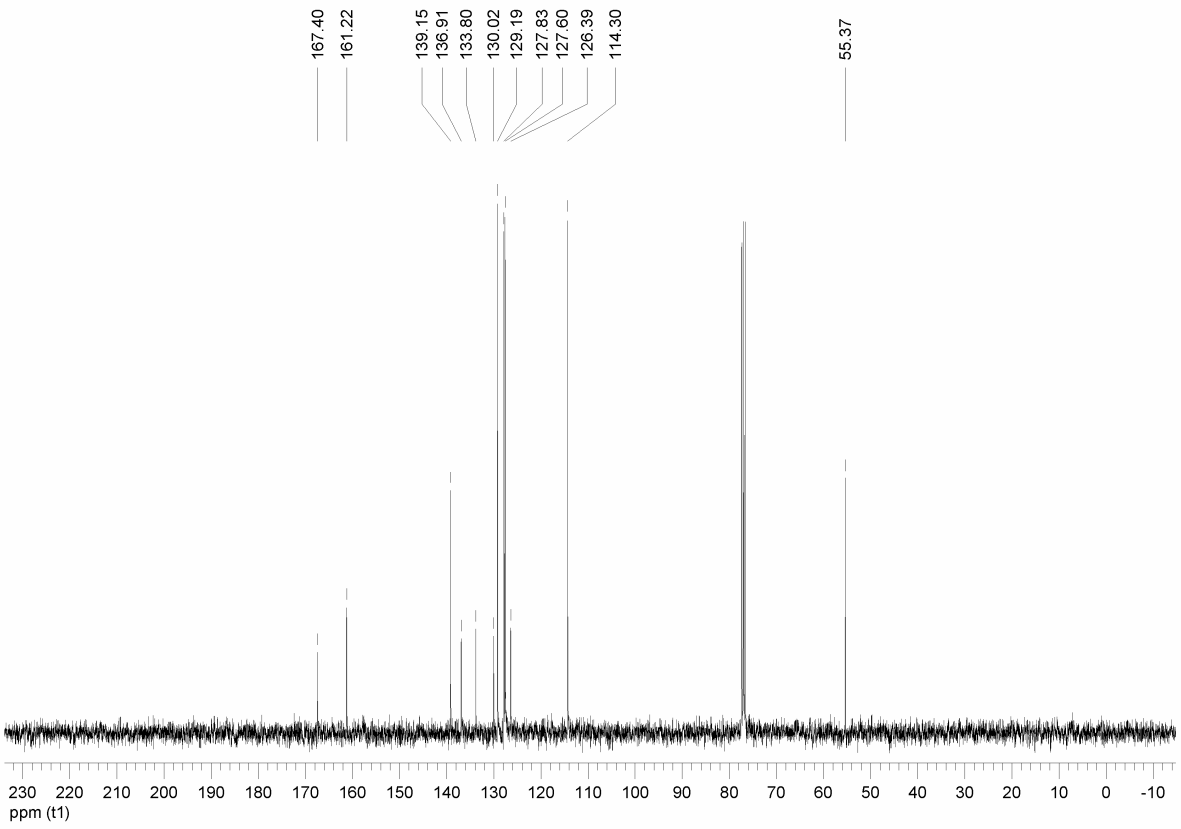




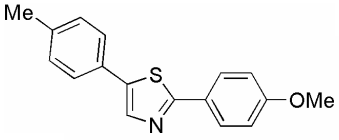
5-(4-Chlorophenyl)-2-(methoxyphenyl)thiazole **5a**

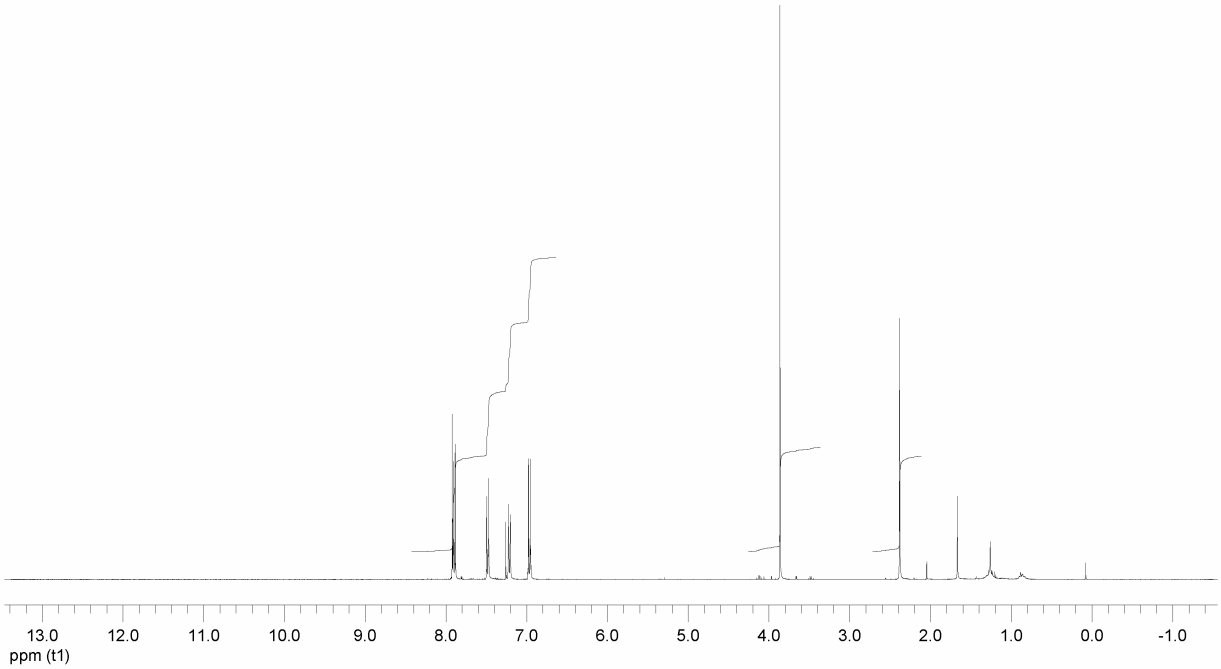


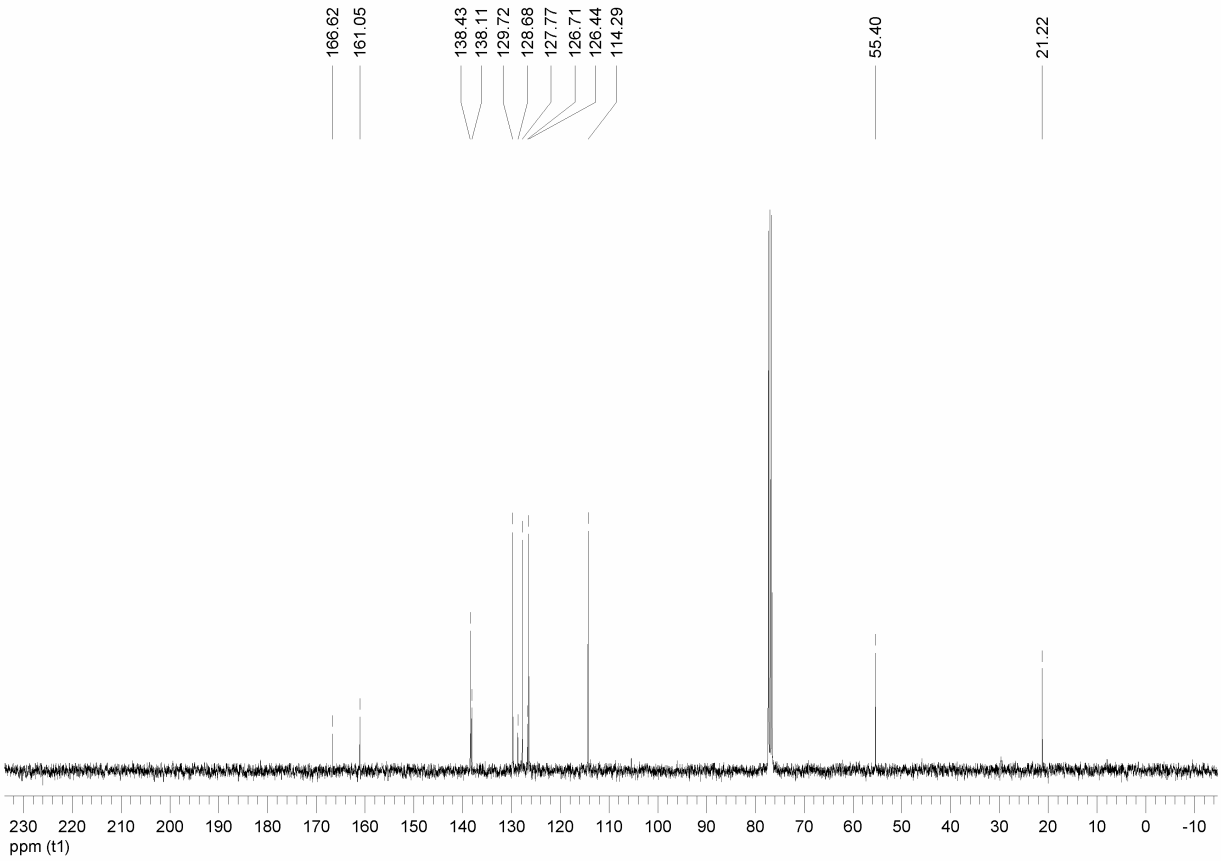




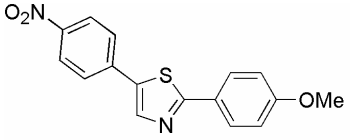
2-(4-Methoxyphenyl)-5-(4-methylphenyl)thiazole **5b**

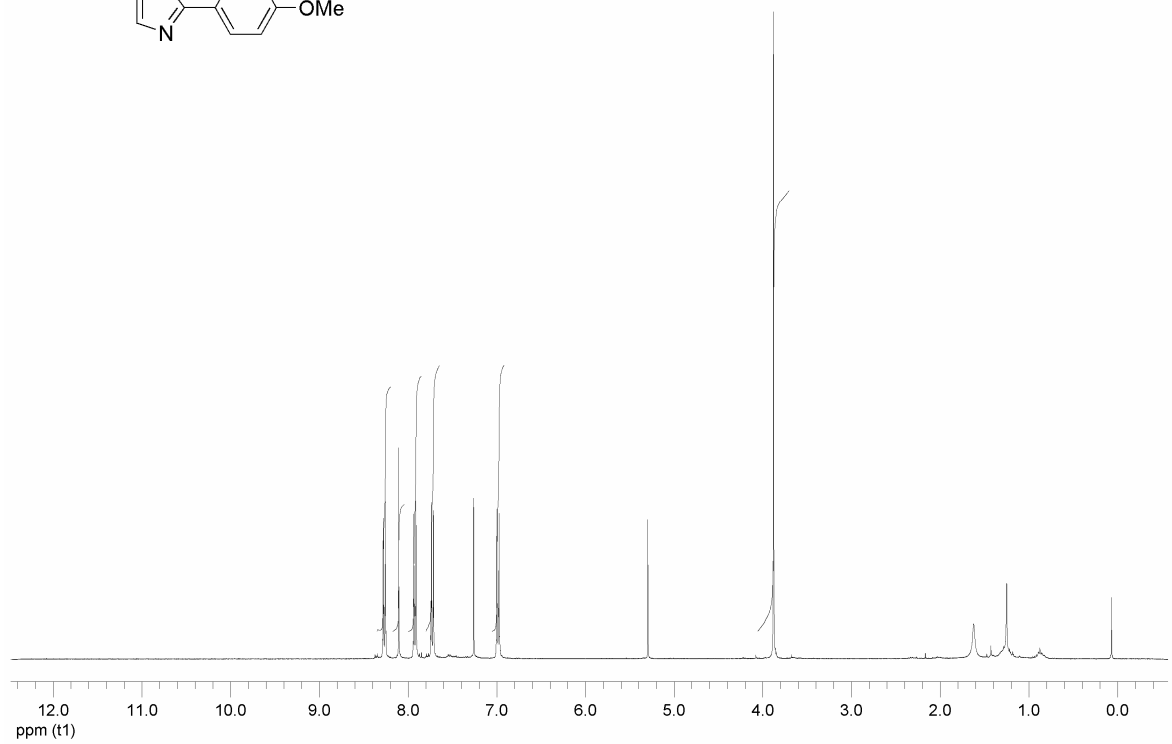


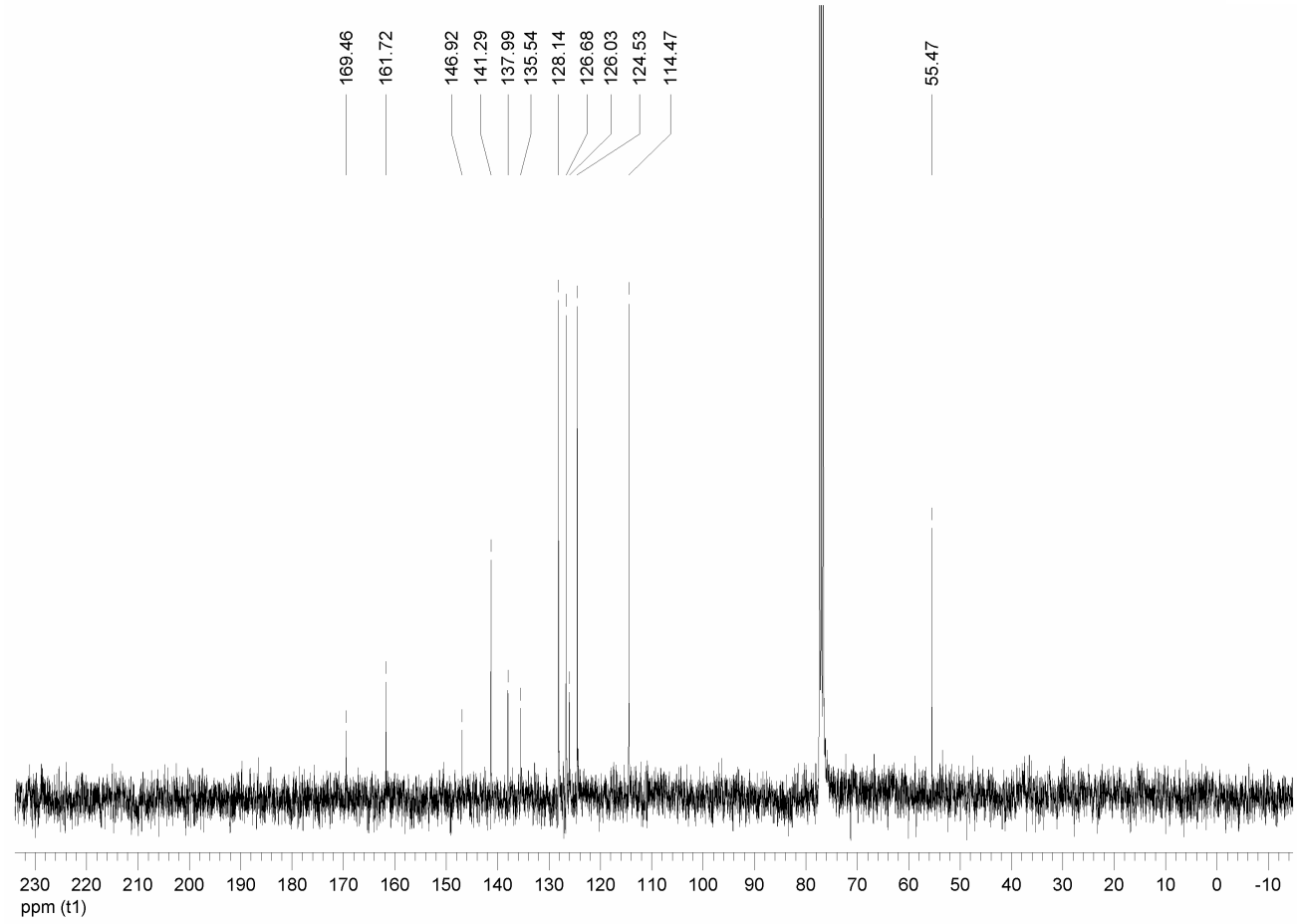




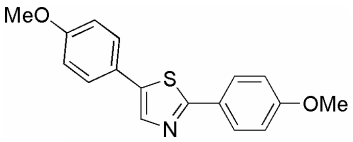
2-(4-Methoxyphenyl)-5-(4-nitrophenyl)thiazole **5c**

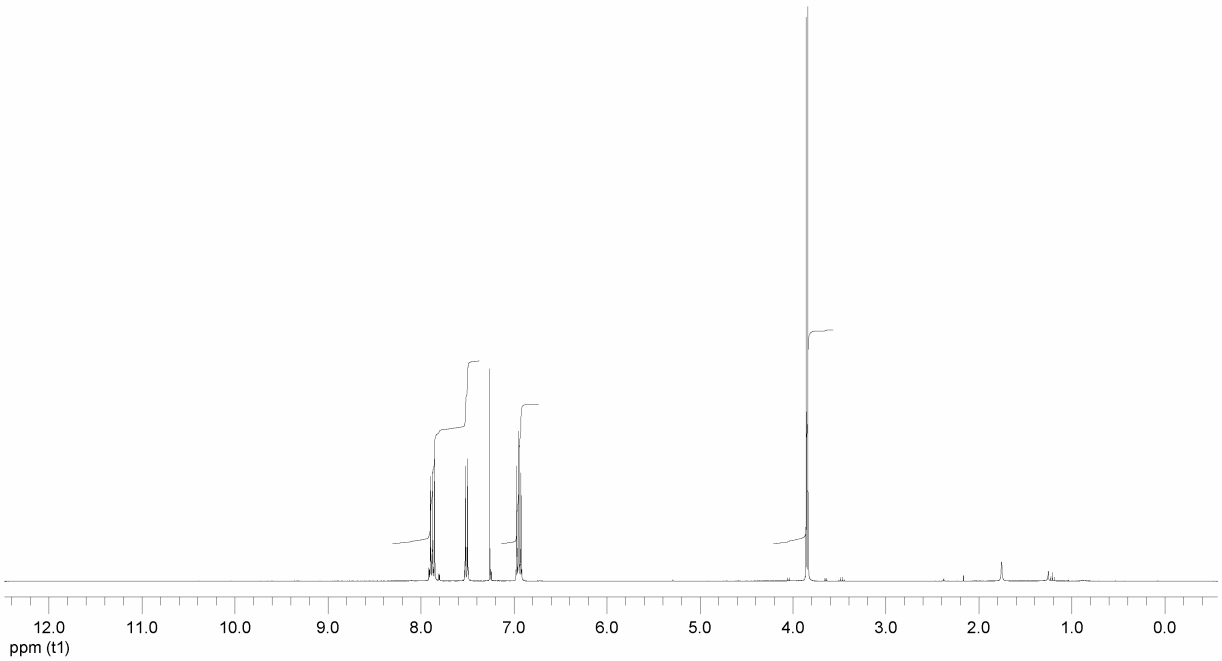


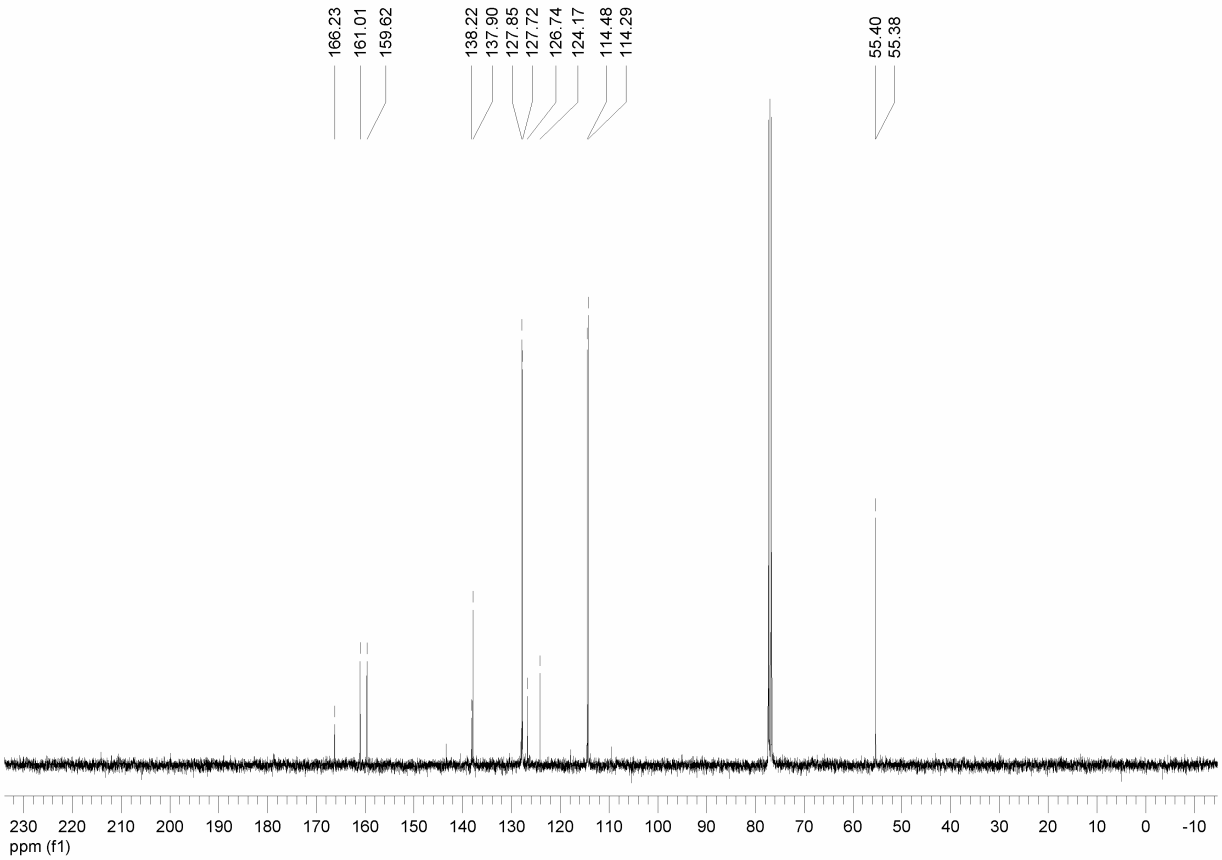




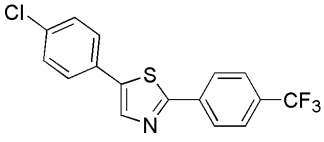
2,5-di(4-Methoxyphenyl)thiazole **5d**

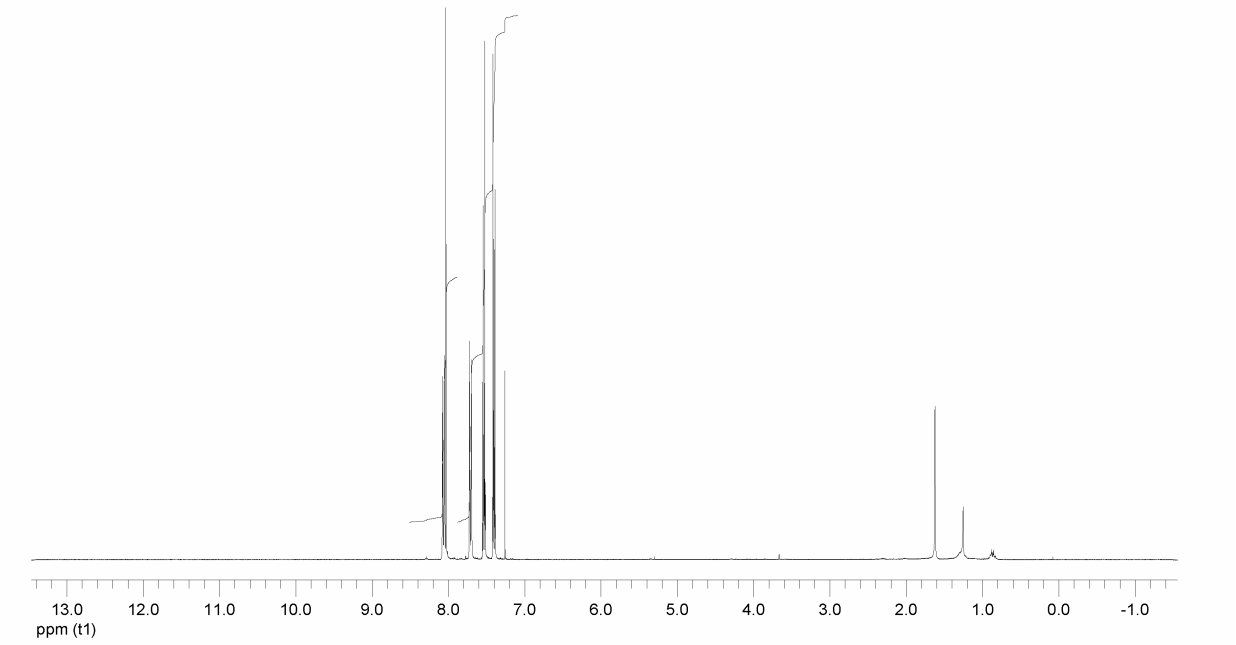


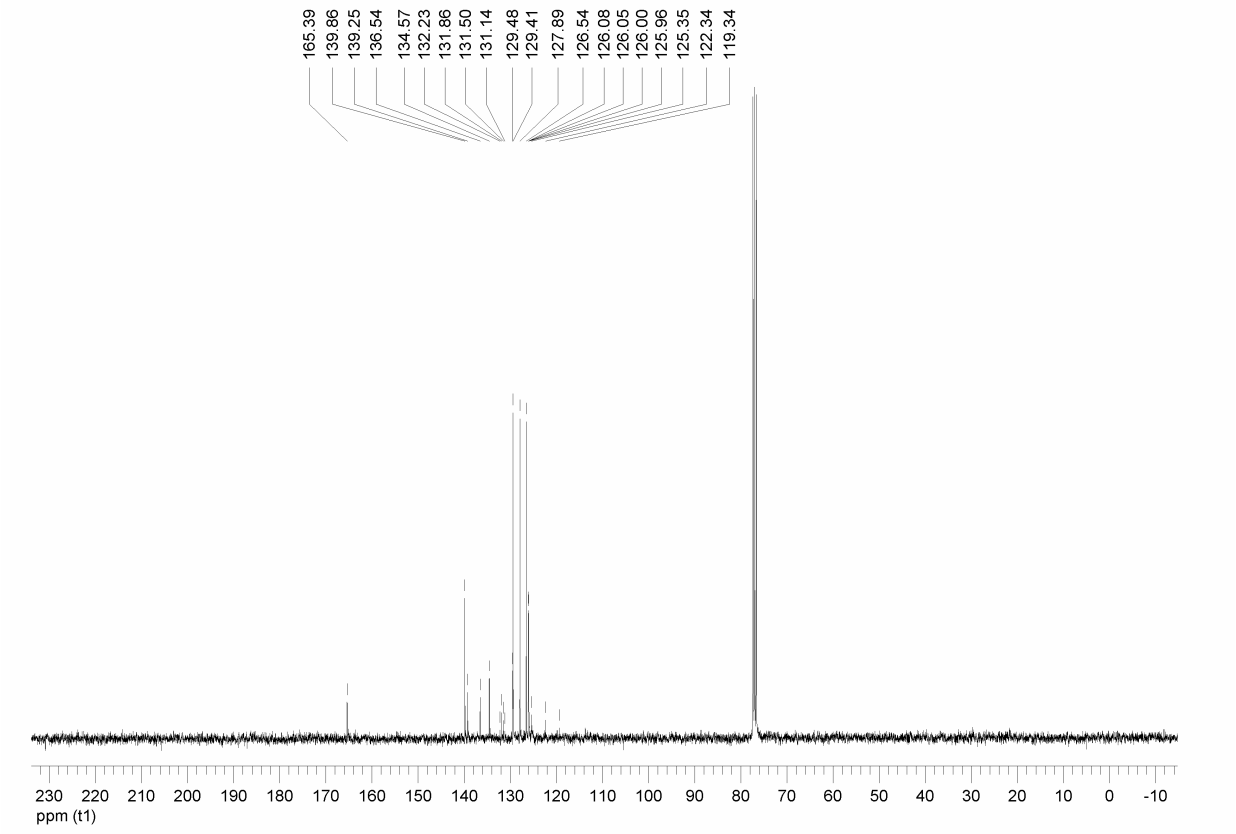




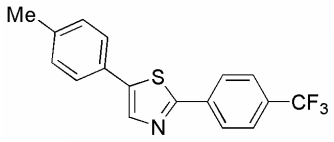
5-(4-Chlorophenyl)-2-(4-trifluoromethylphenyl)thiazole **5e**

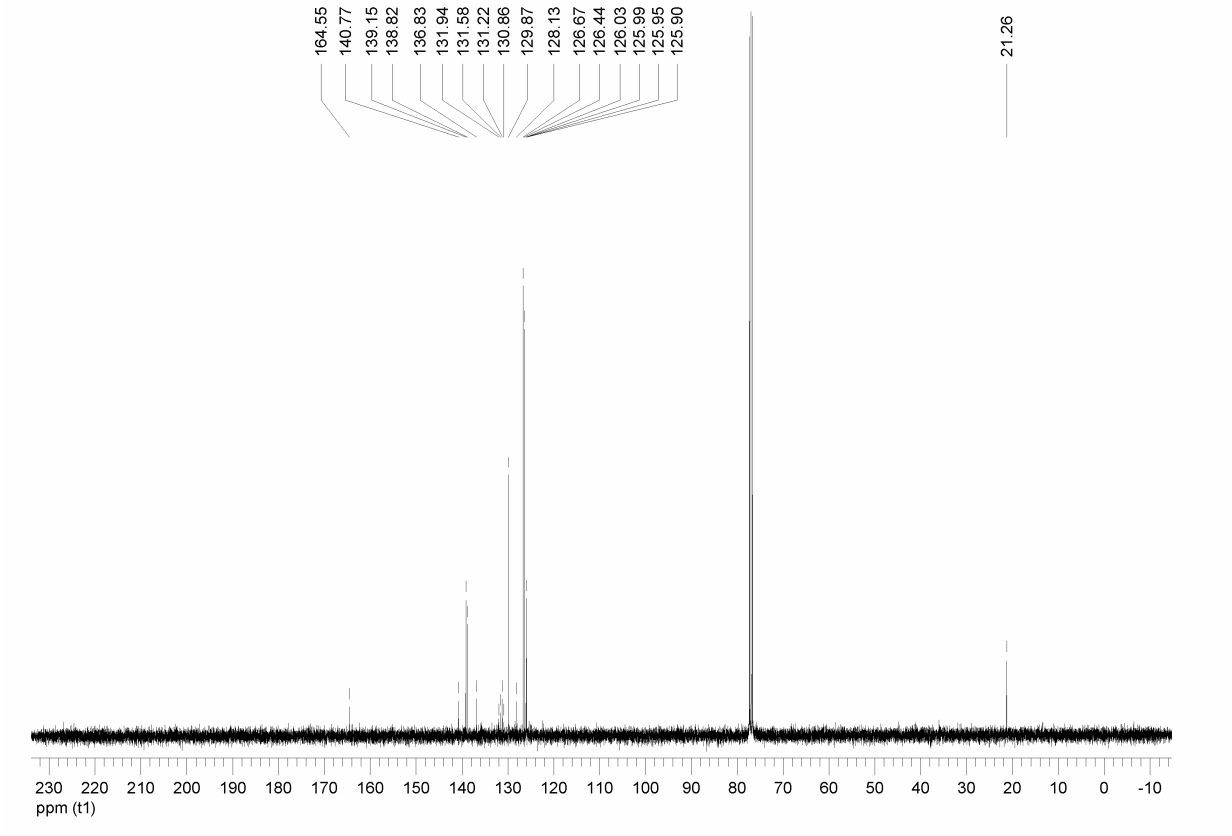




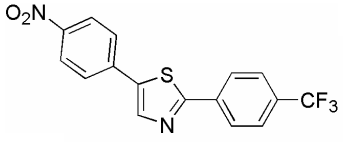


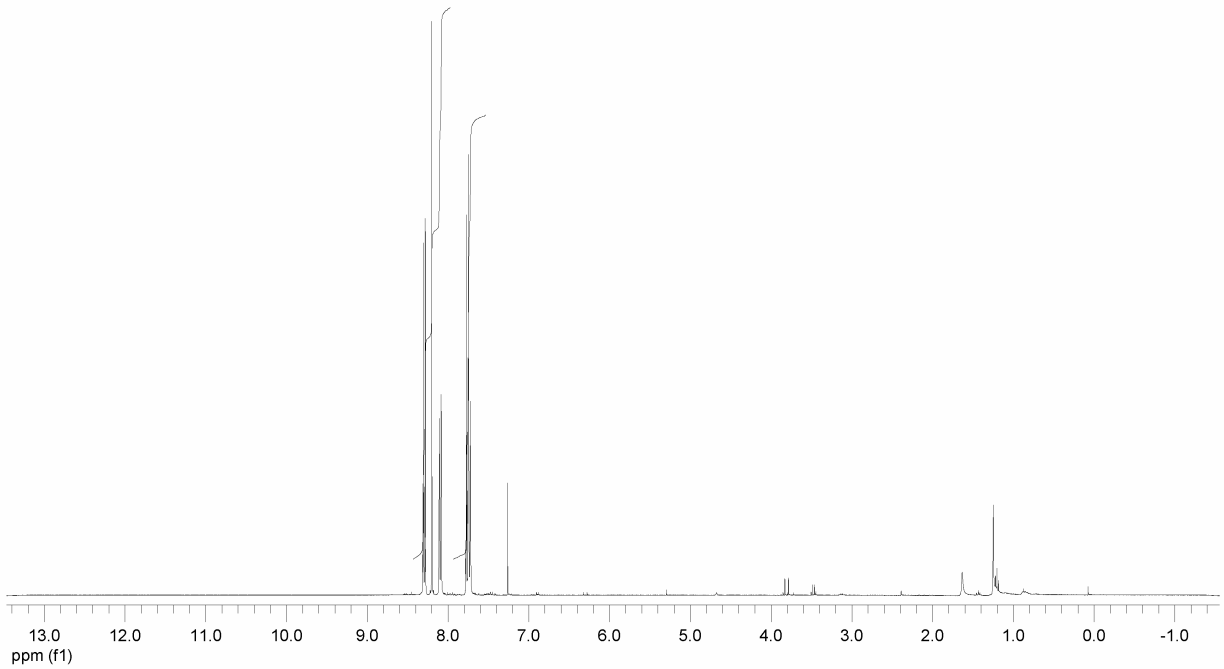
5-(4-Methylphenyl)-2-(4-trifluoromethylphenyl)thiazole **5f**

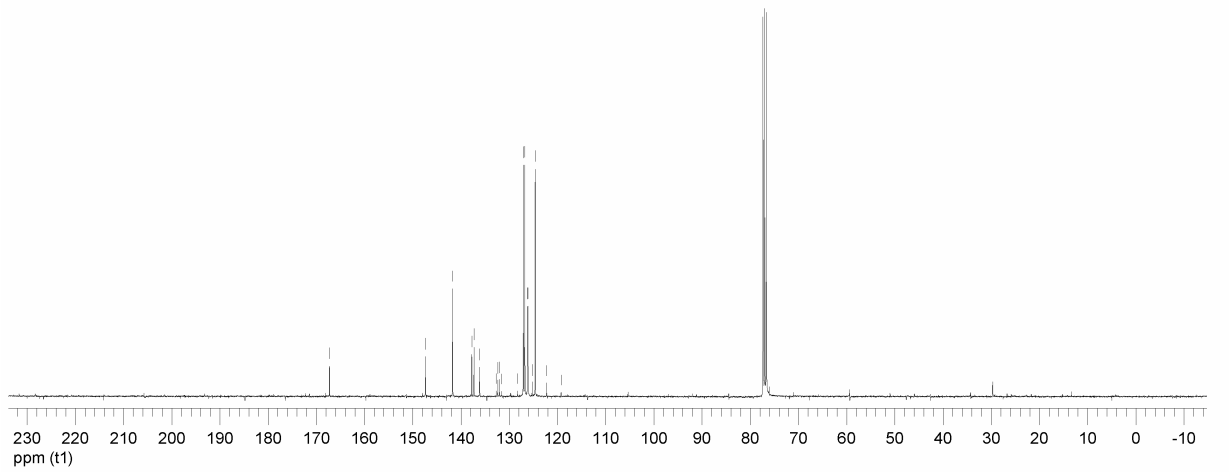




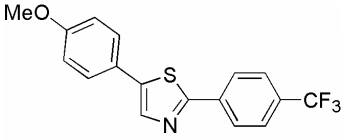
5-(4-Nitrophenyl)-2-(4-trifluoromethylphenyl)thiazole **5g**

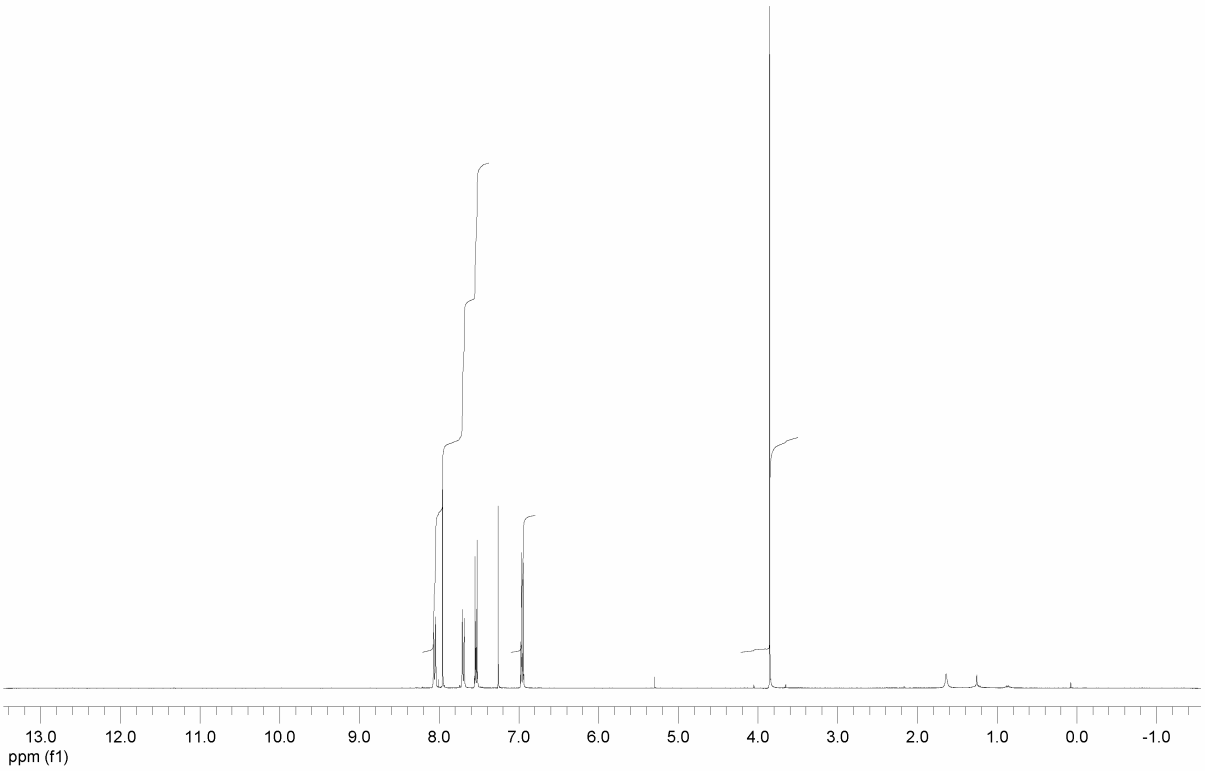


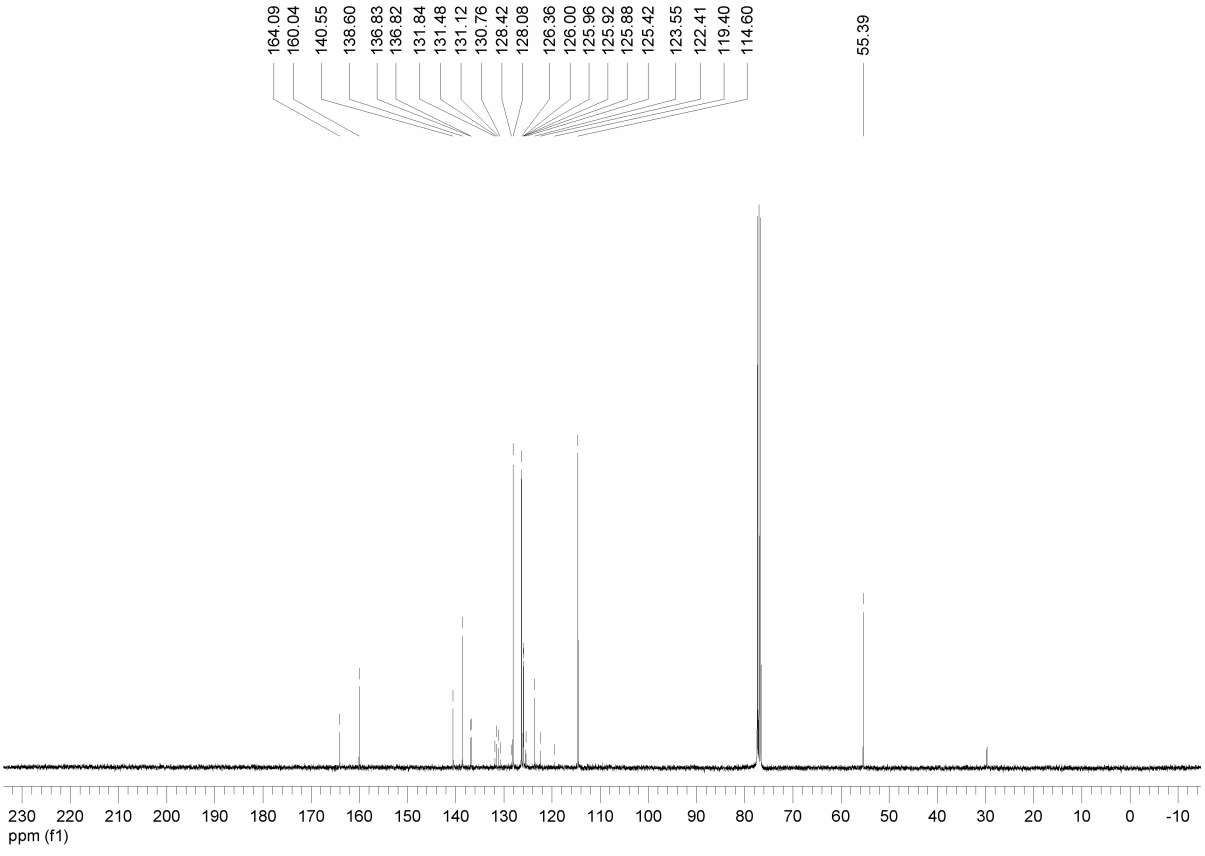




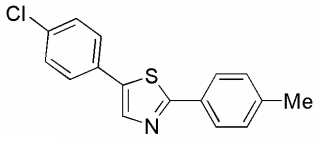
5-(4-Methoxyphenyl)-2-(4-trifluoromethylphenyl)thiazole **5h**

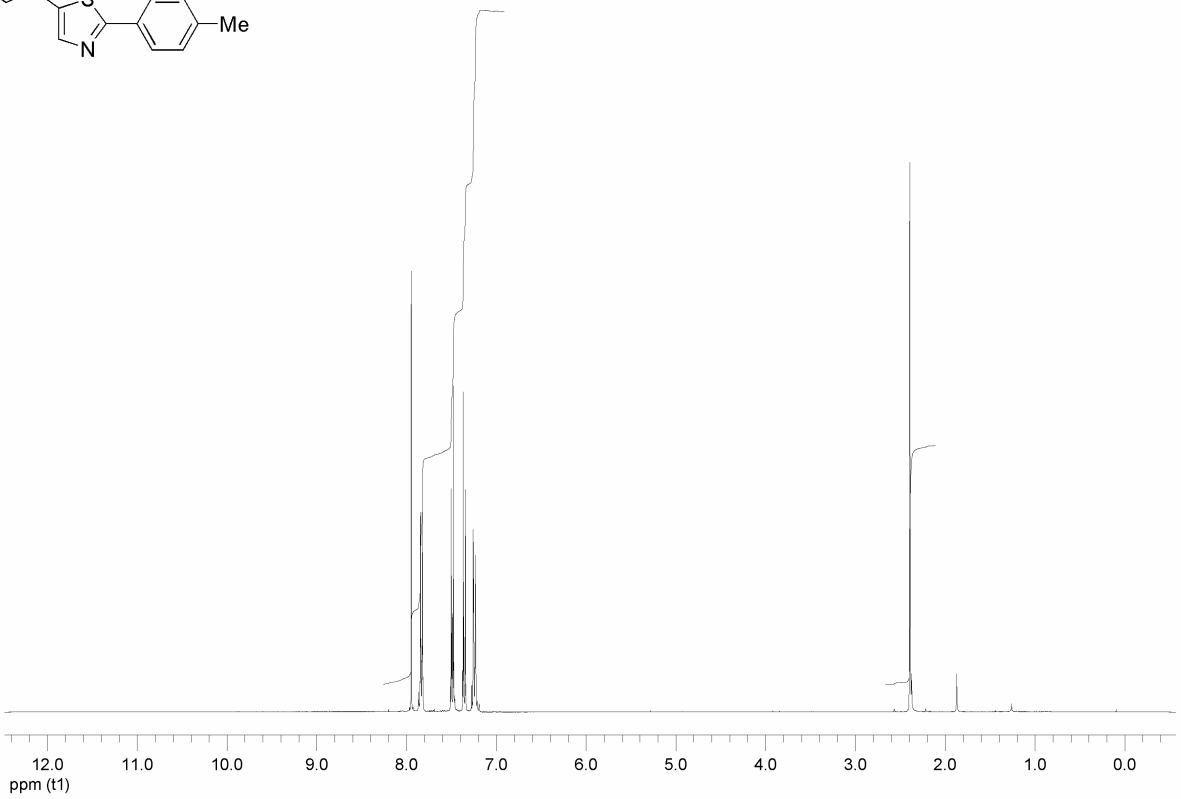


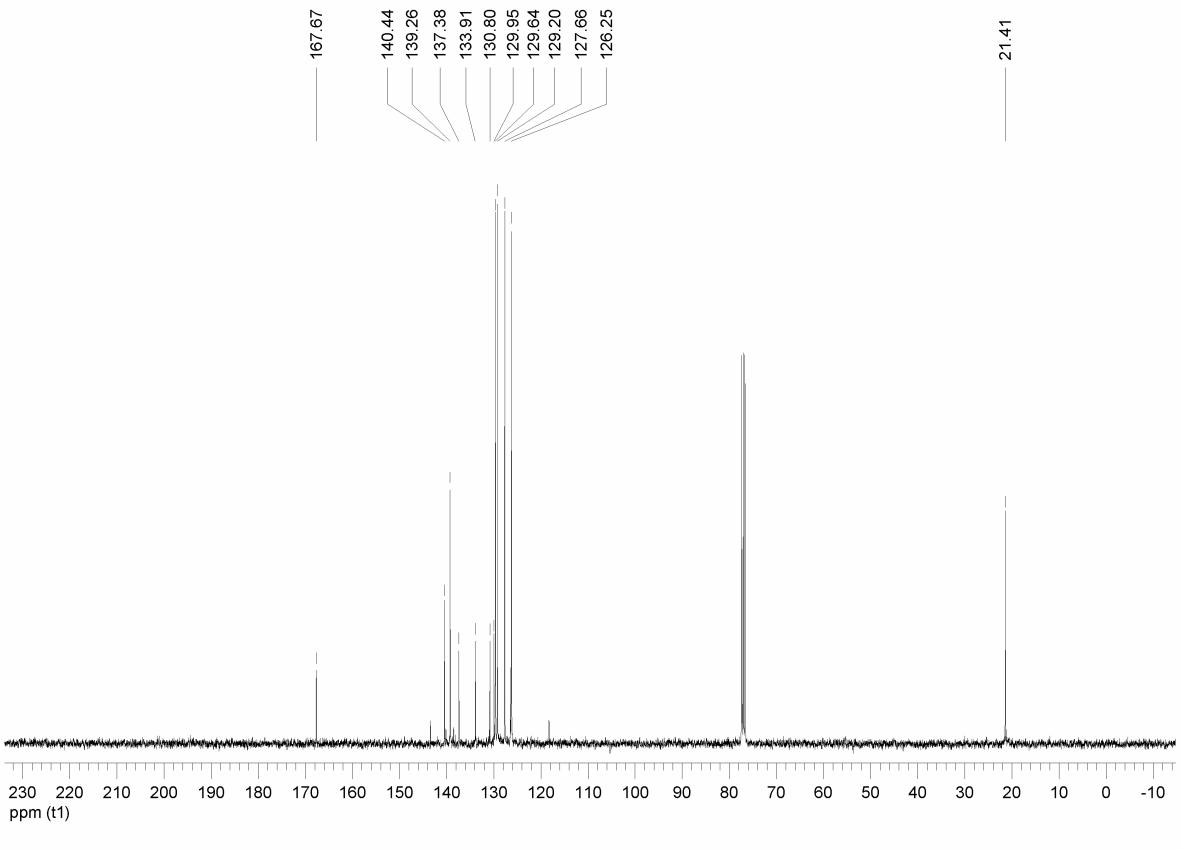




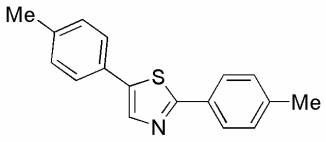
5-(4-Chlorophenyl)-2-(4-methylphenyl)thiazole

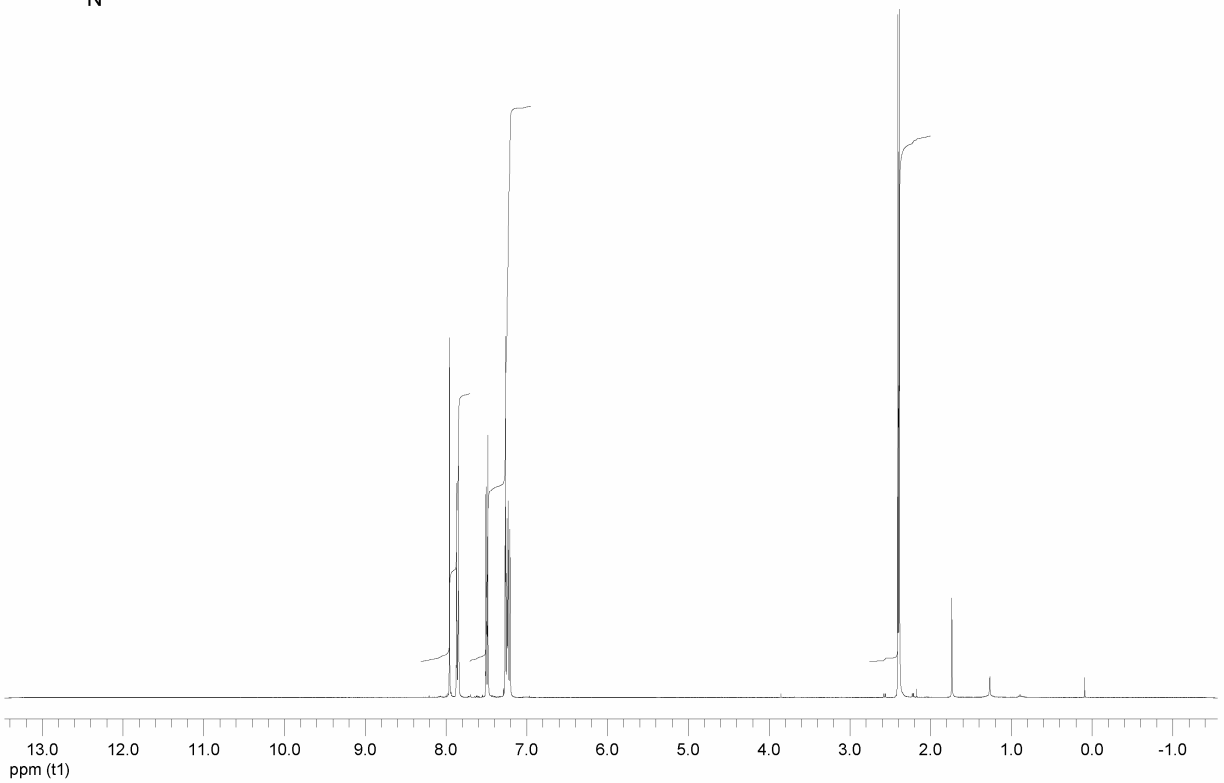


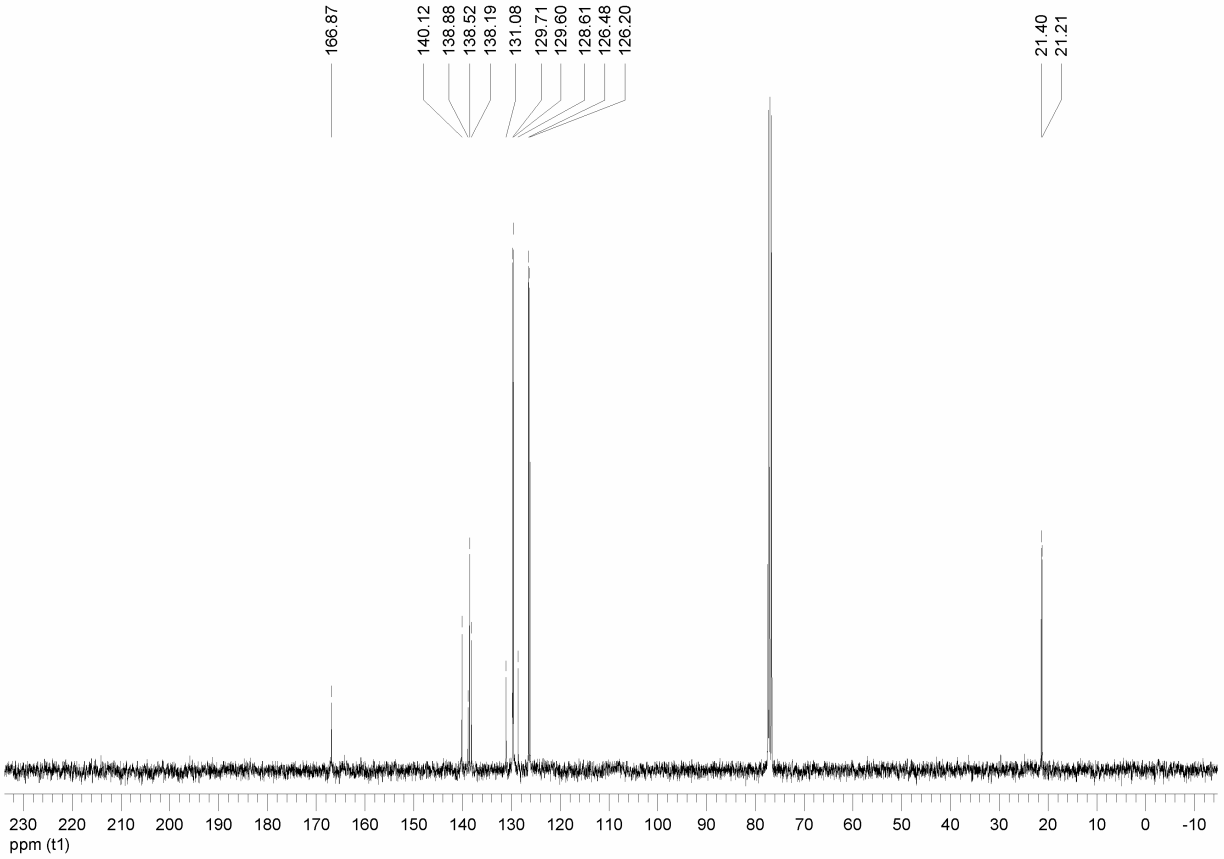




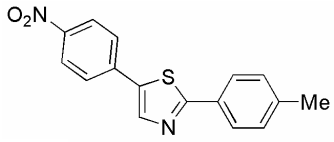
2,5-Di(4-methylphenyl)thiazole



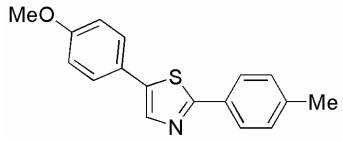


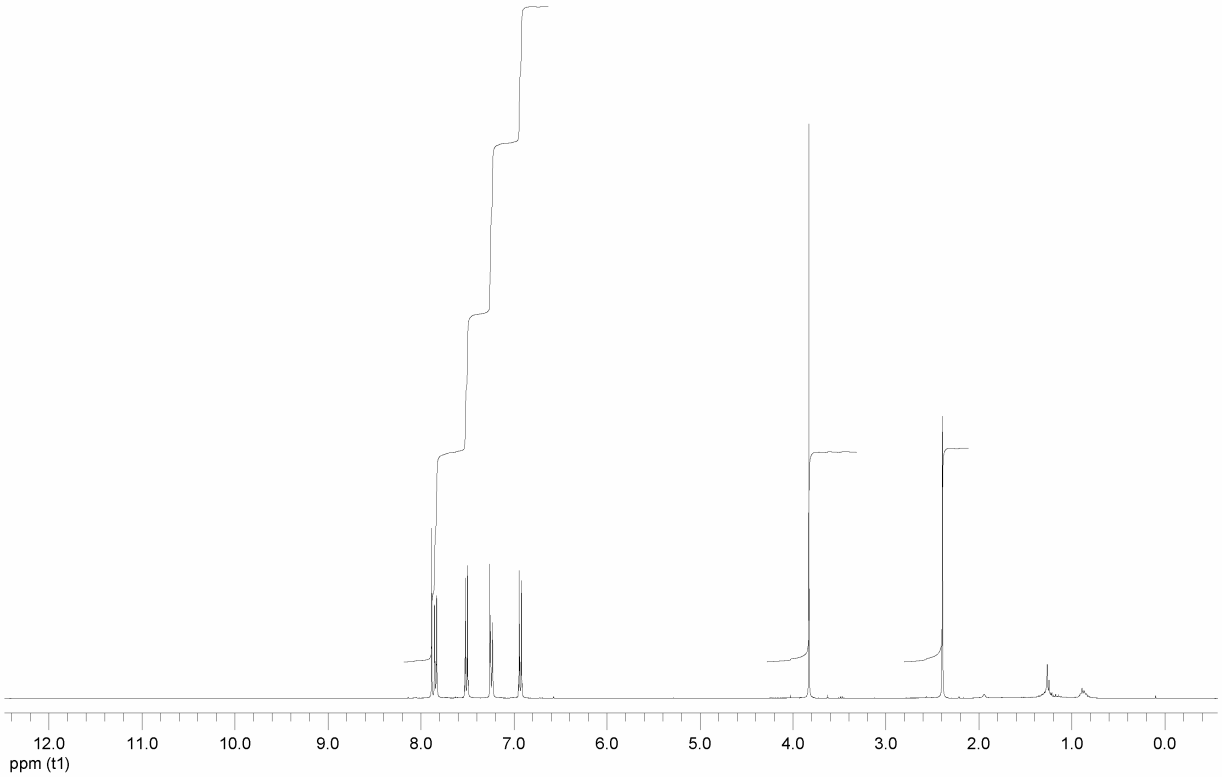


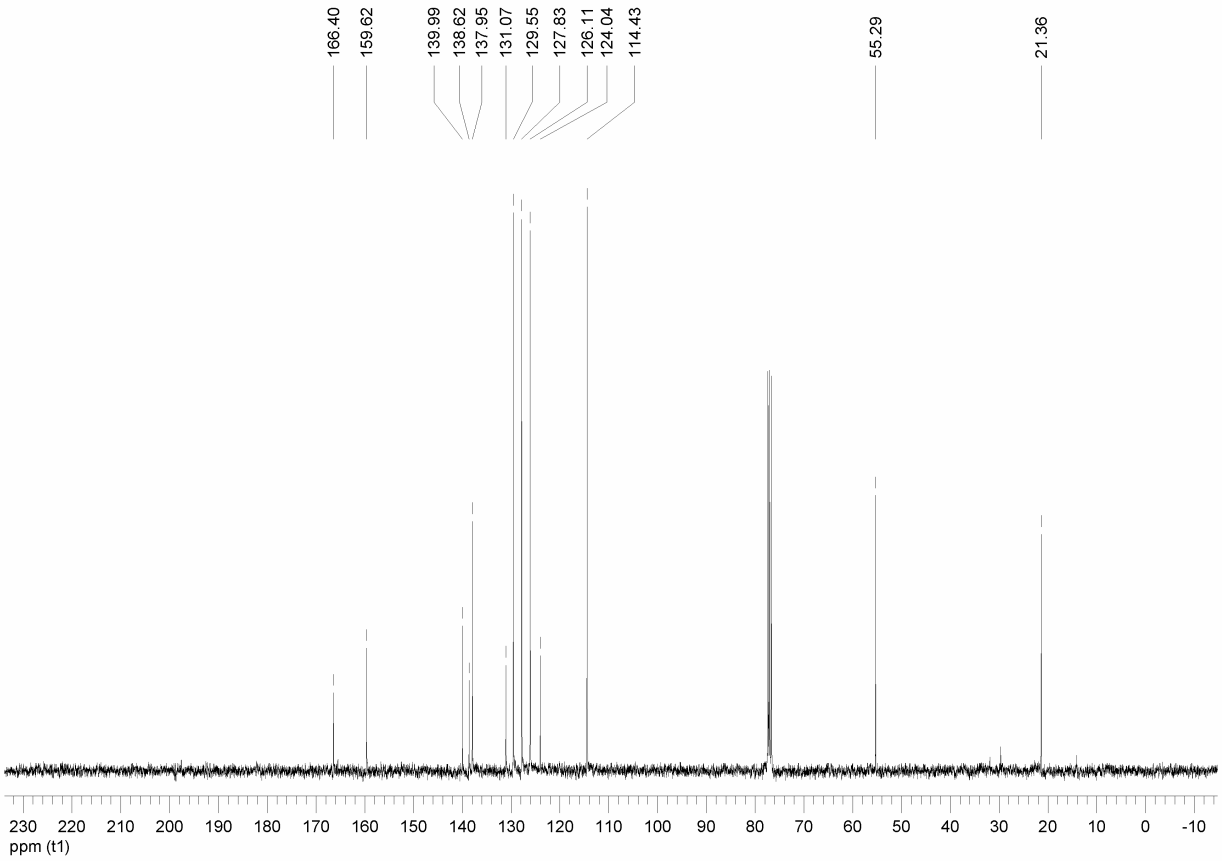
5-(4-Nitrophenyl)-2-(4-methylphenyl)thiazole



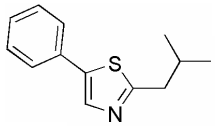
5-(4-Methoxyphenyl)-2-(4-methylphenyl)thiazole

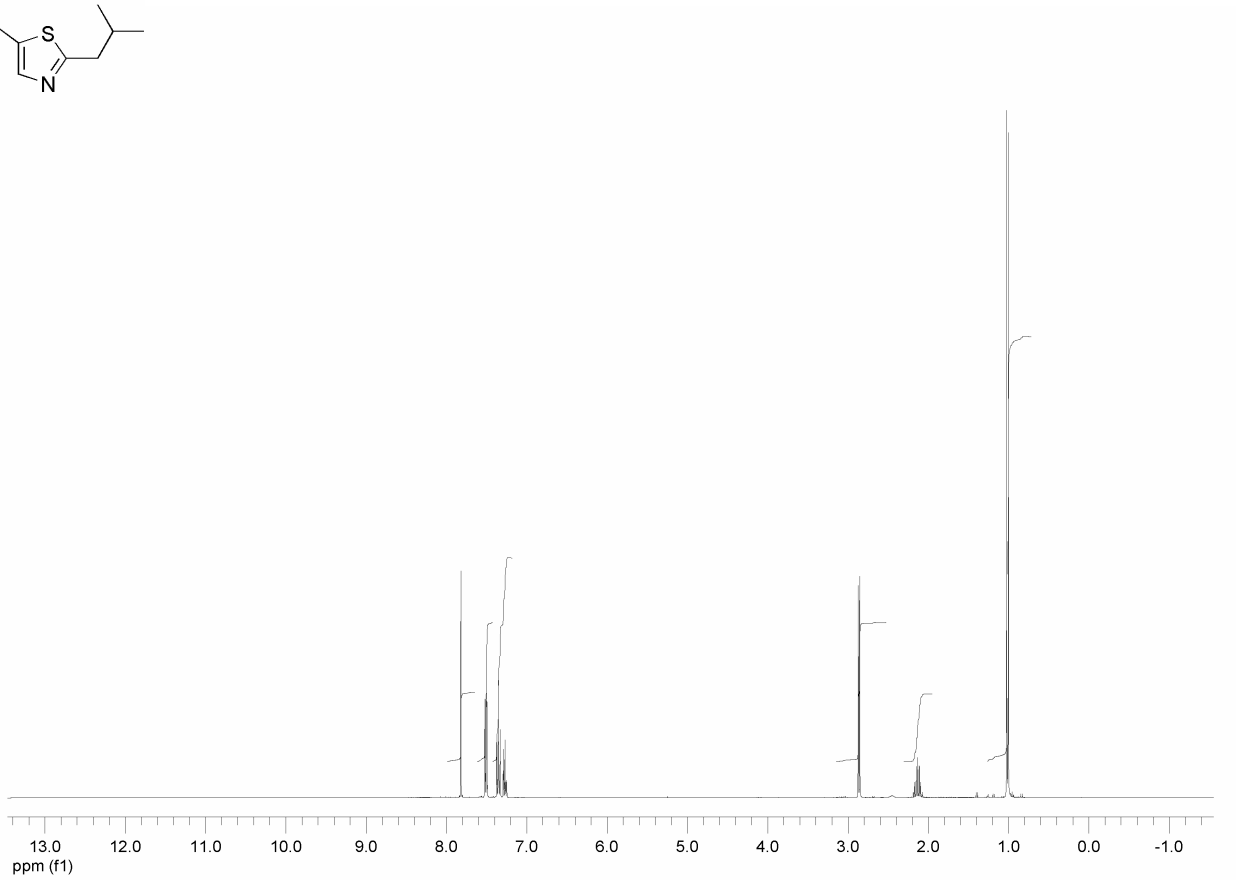


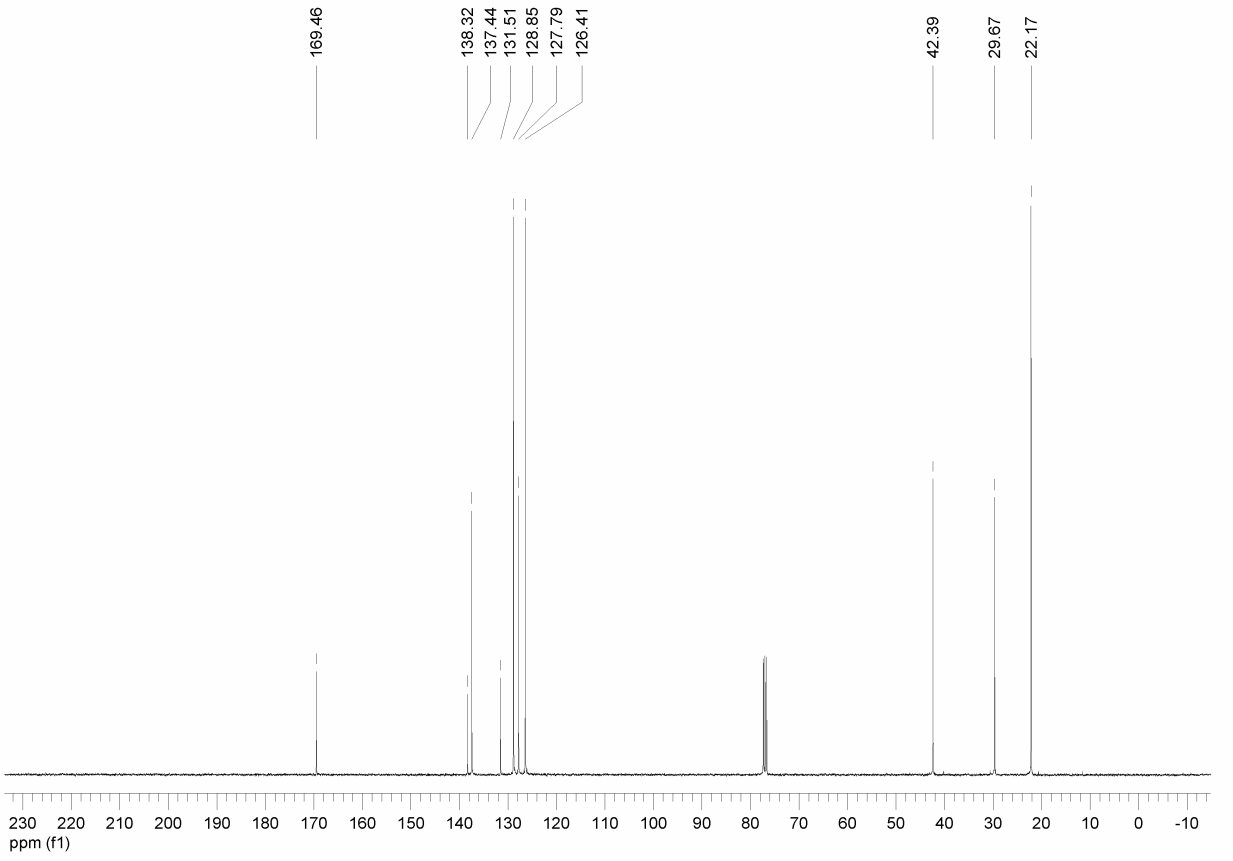




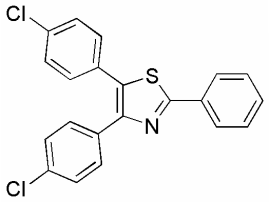
2-Isobutyl-5-phenylthiazole **6**

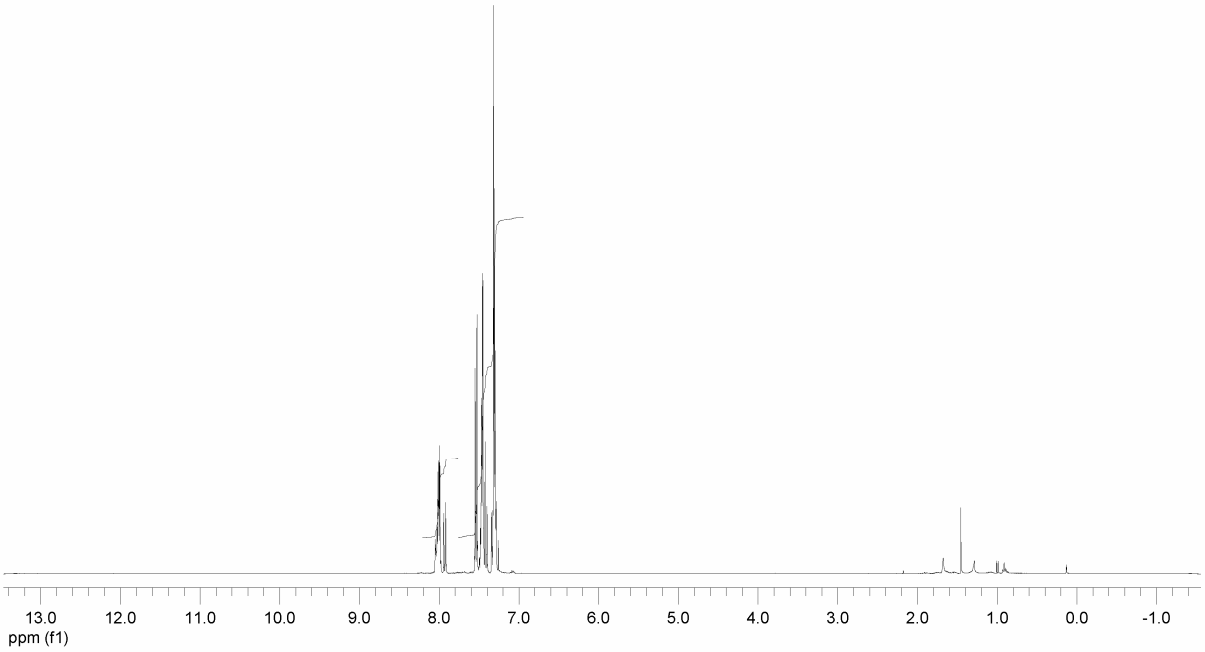


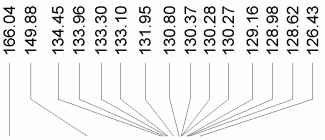


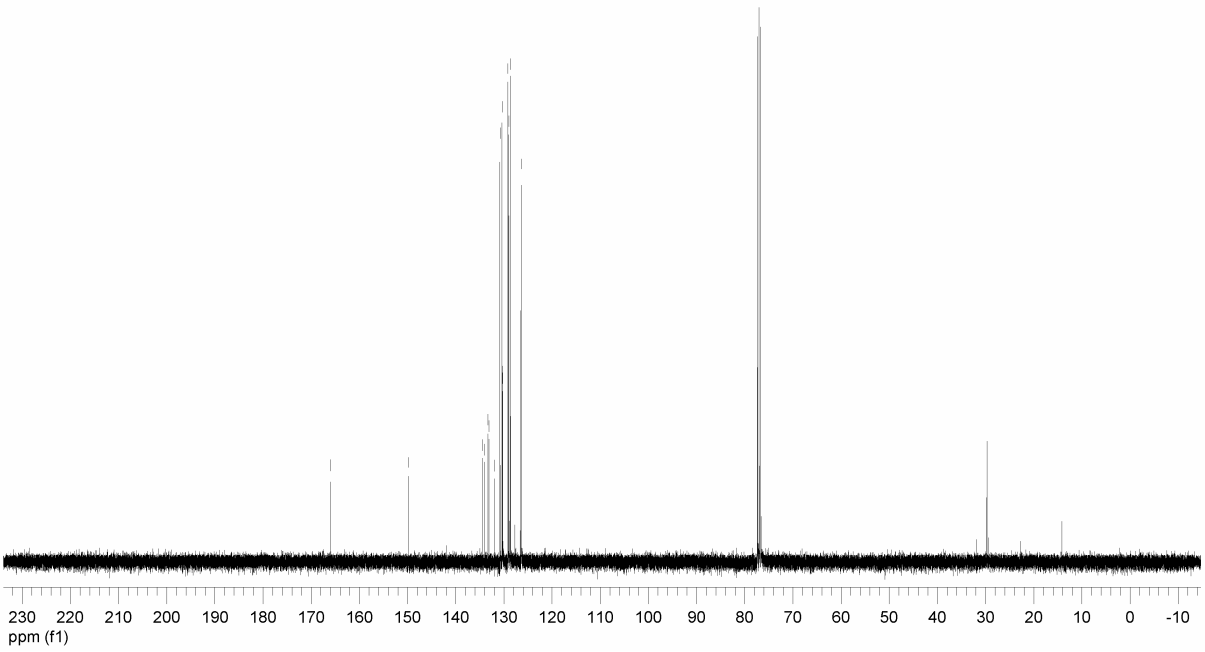


4,5-Di(4-chlorophenyl)-2-phenylthiazole **7**

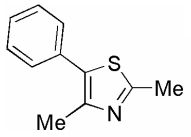


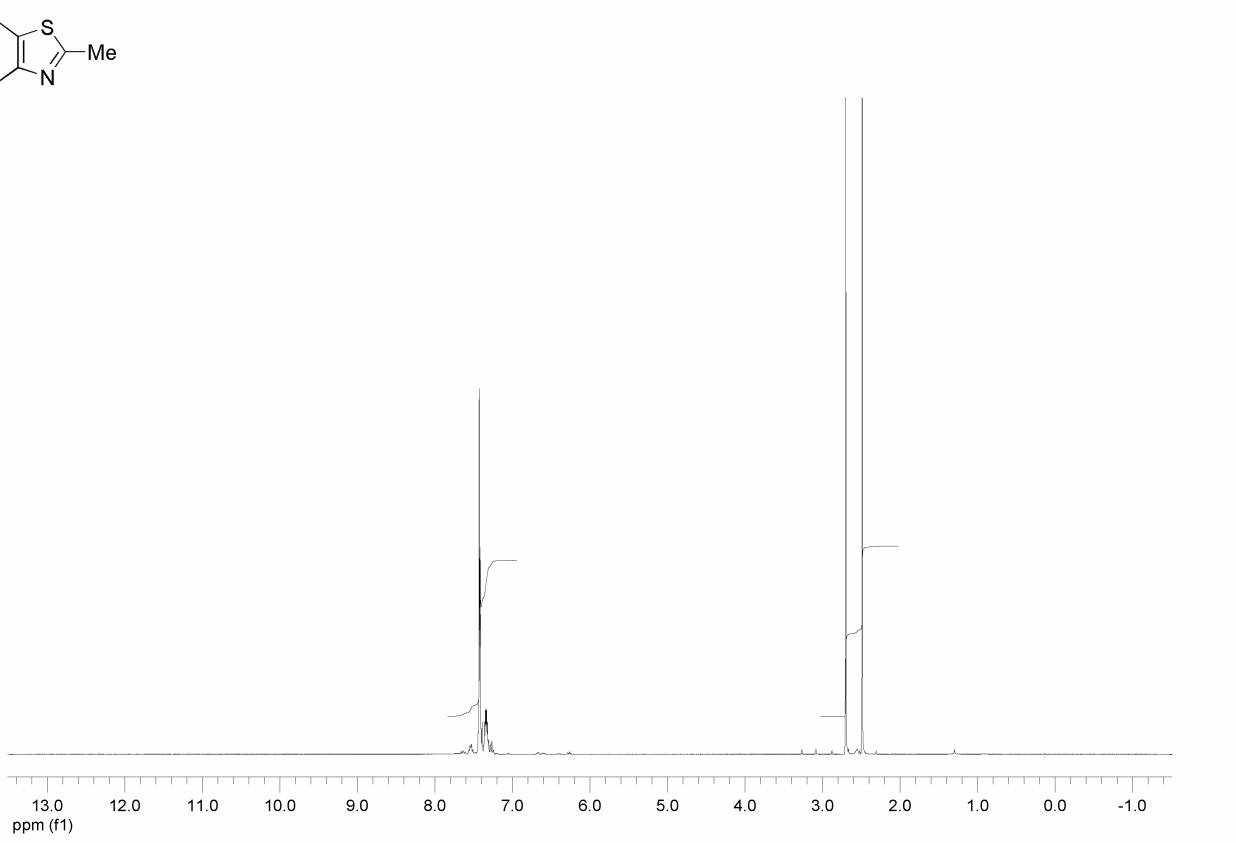


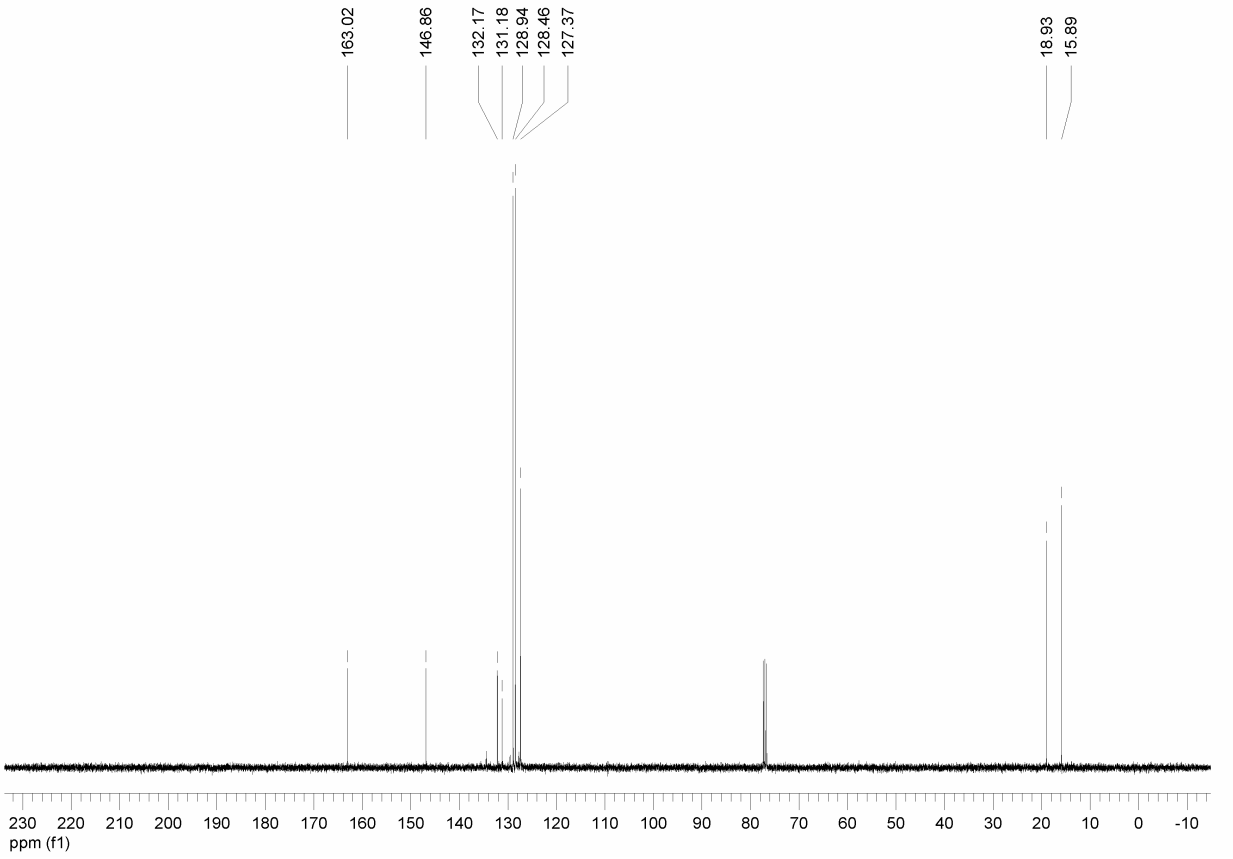




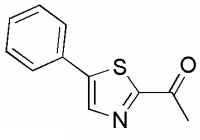
2,4-Dimethyl-5-phenylthiazole **8**

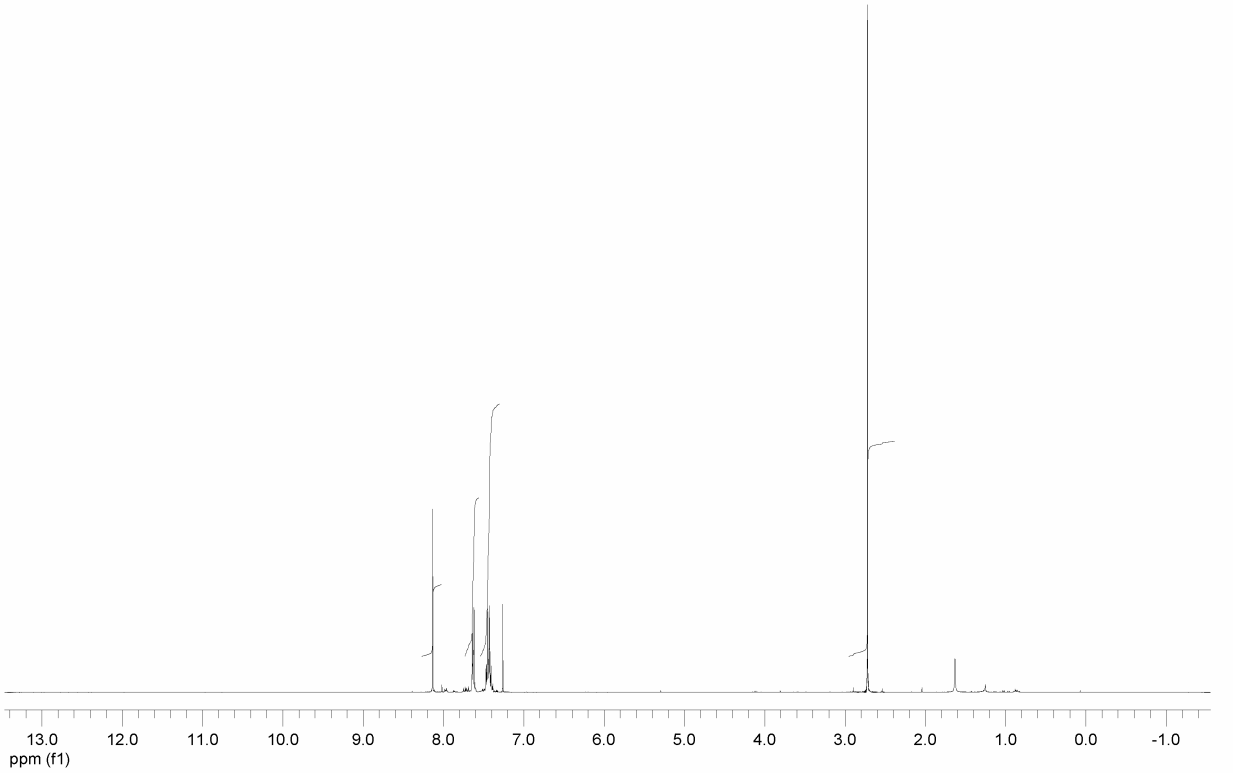


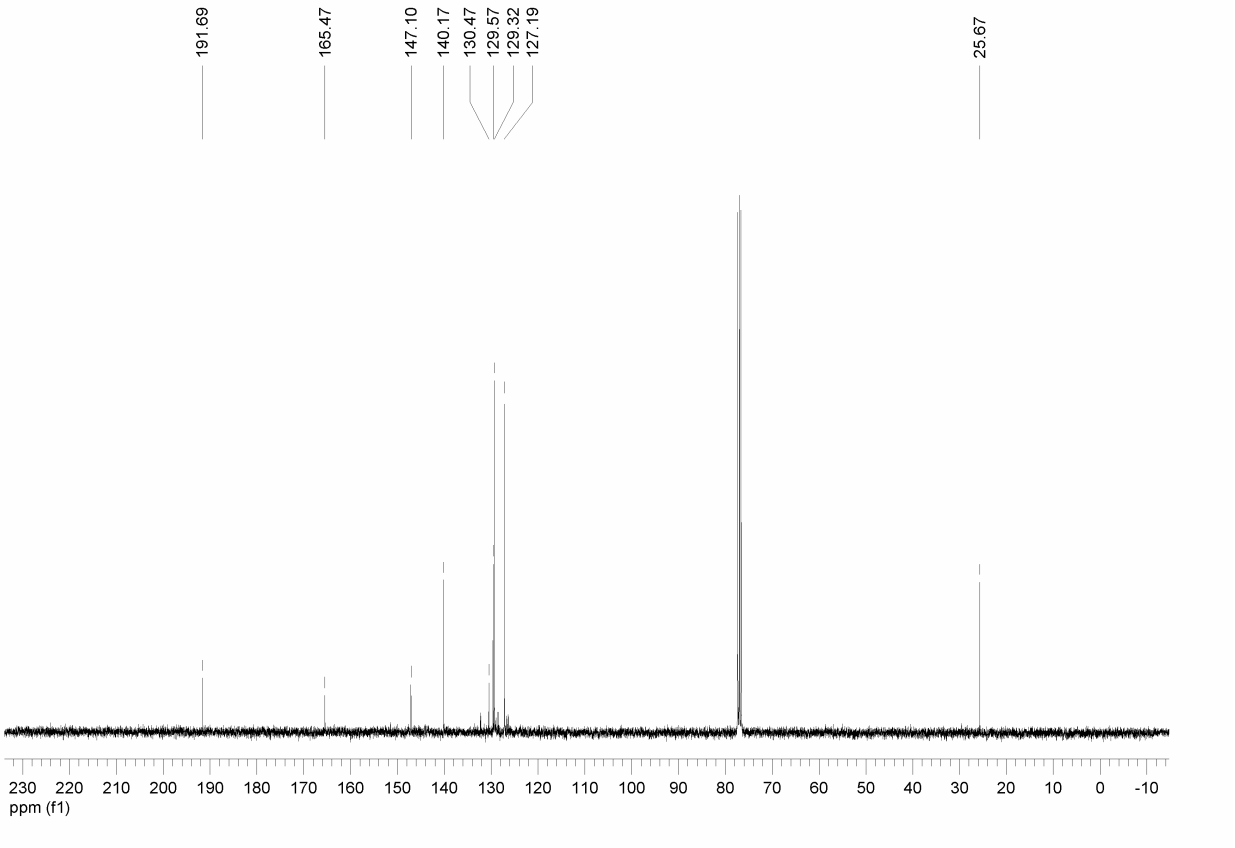




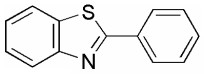
1-(5-Phenylthiazol-2-yl)ethanone **9**

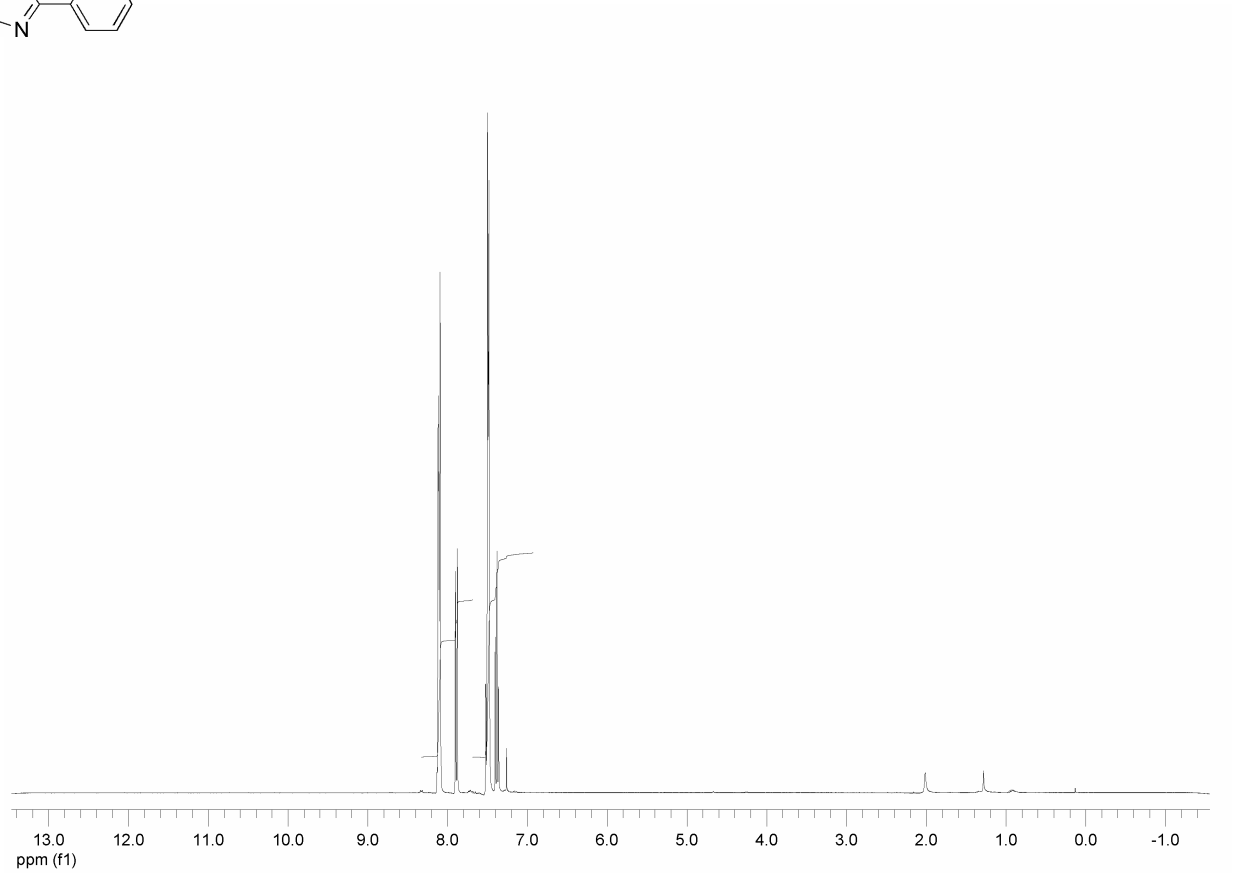


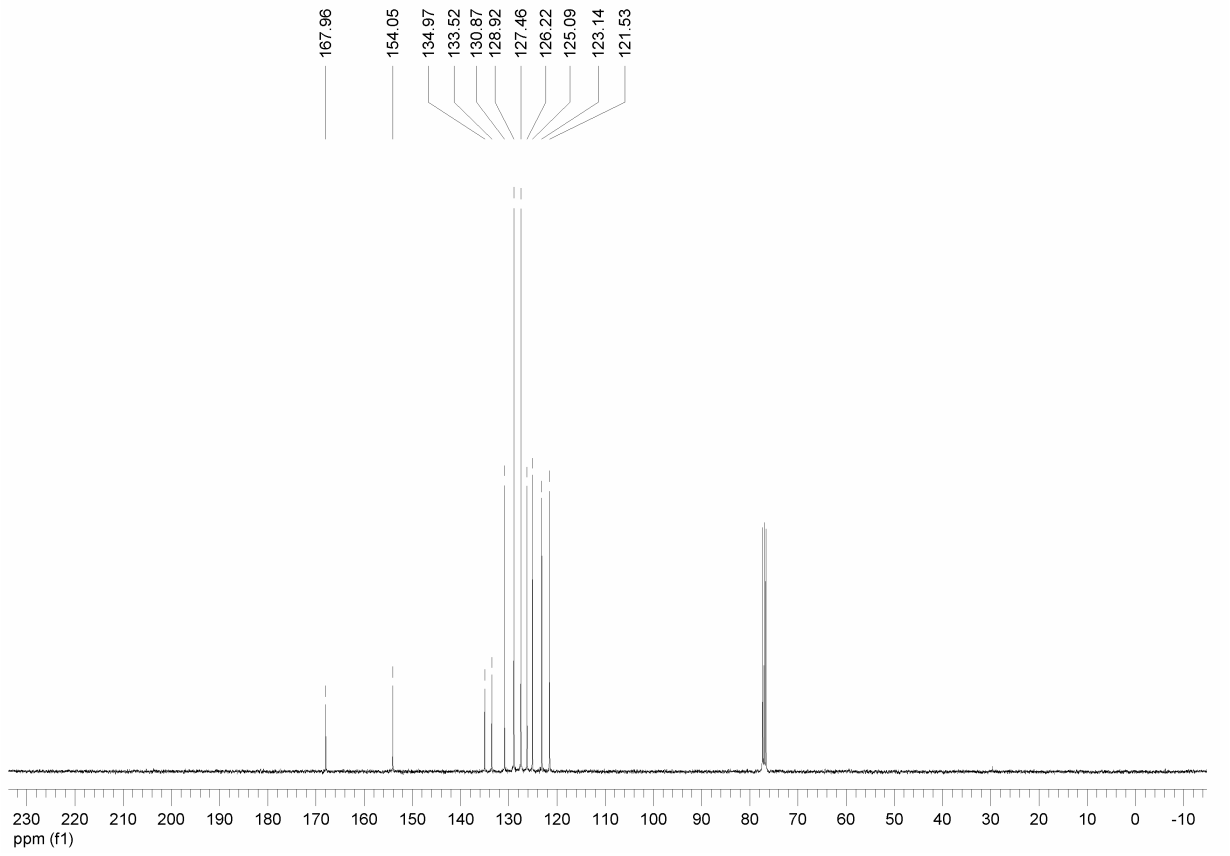




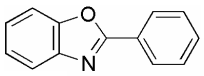
2-Phenylbenzothiazole **10**

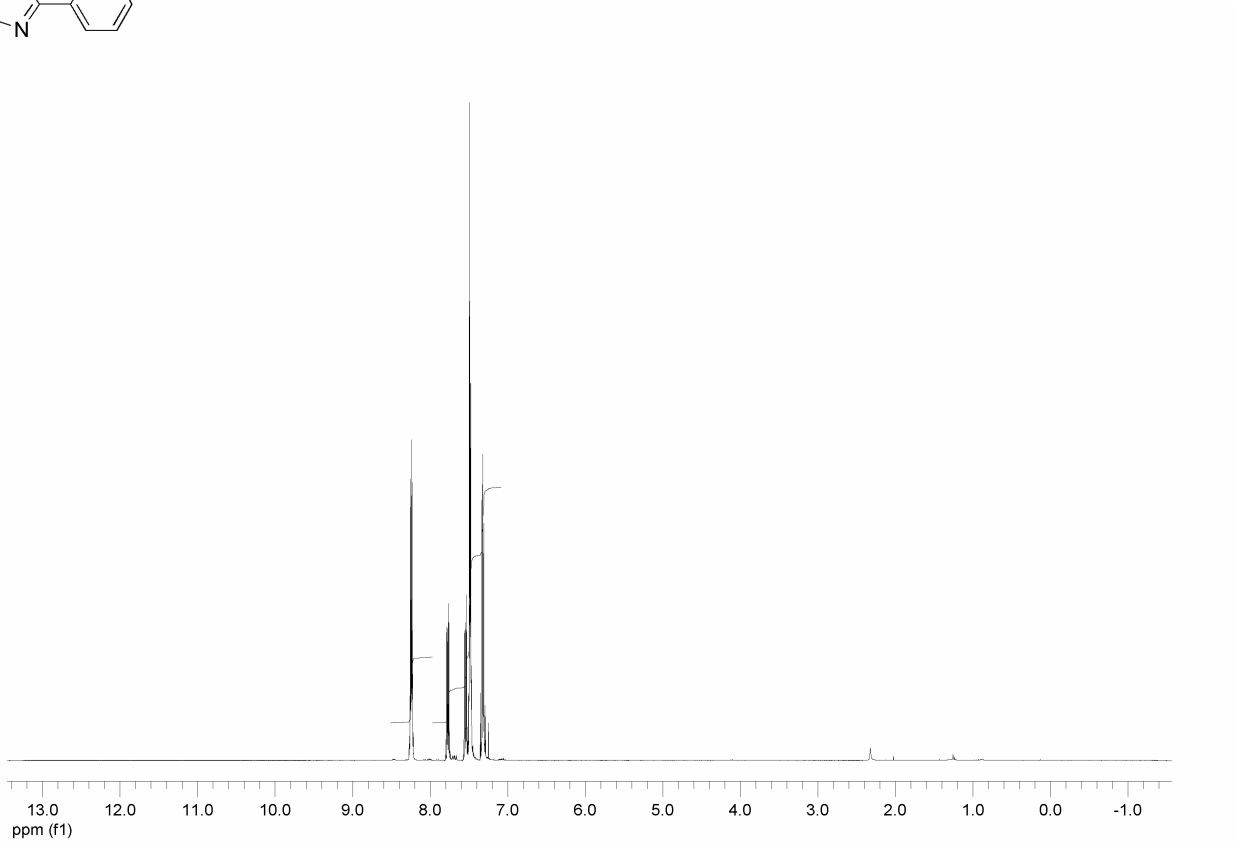


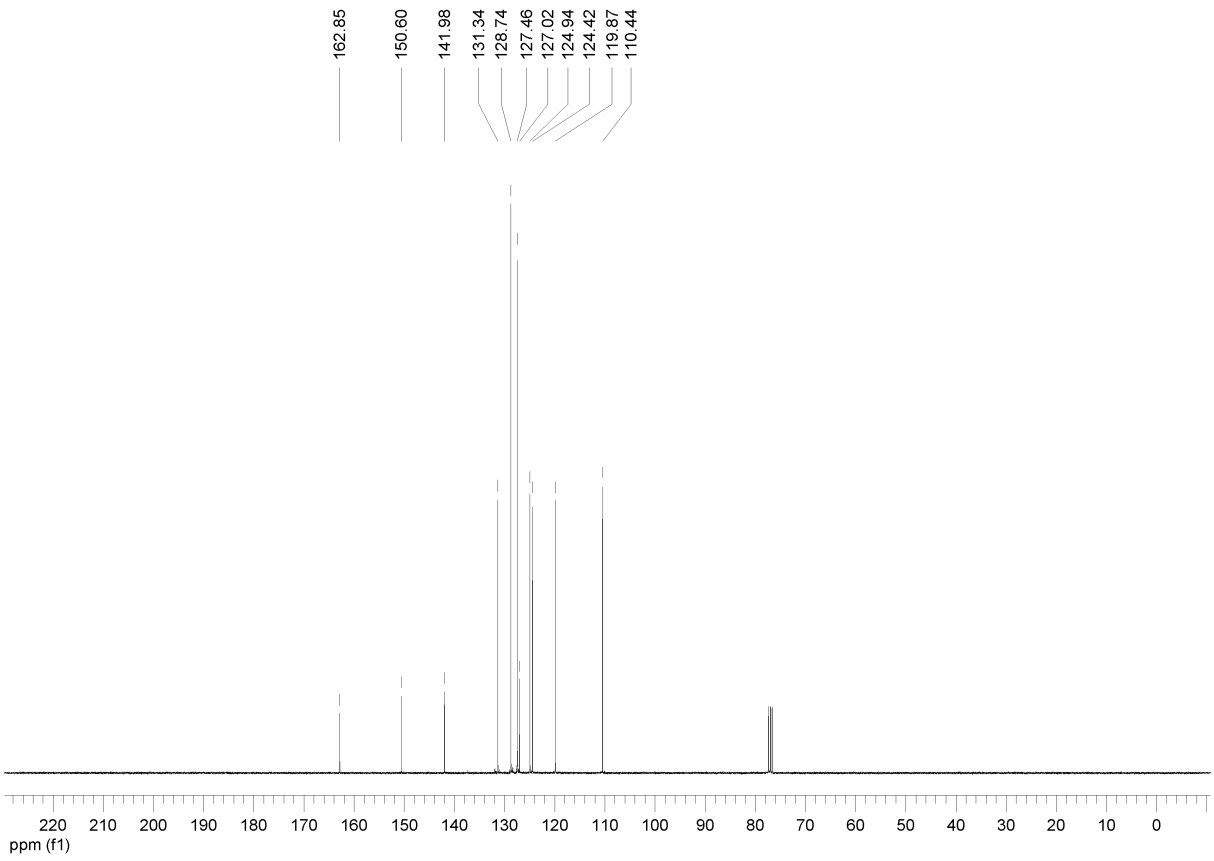




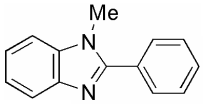
2-Phenylbenzoxazole **11**

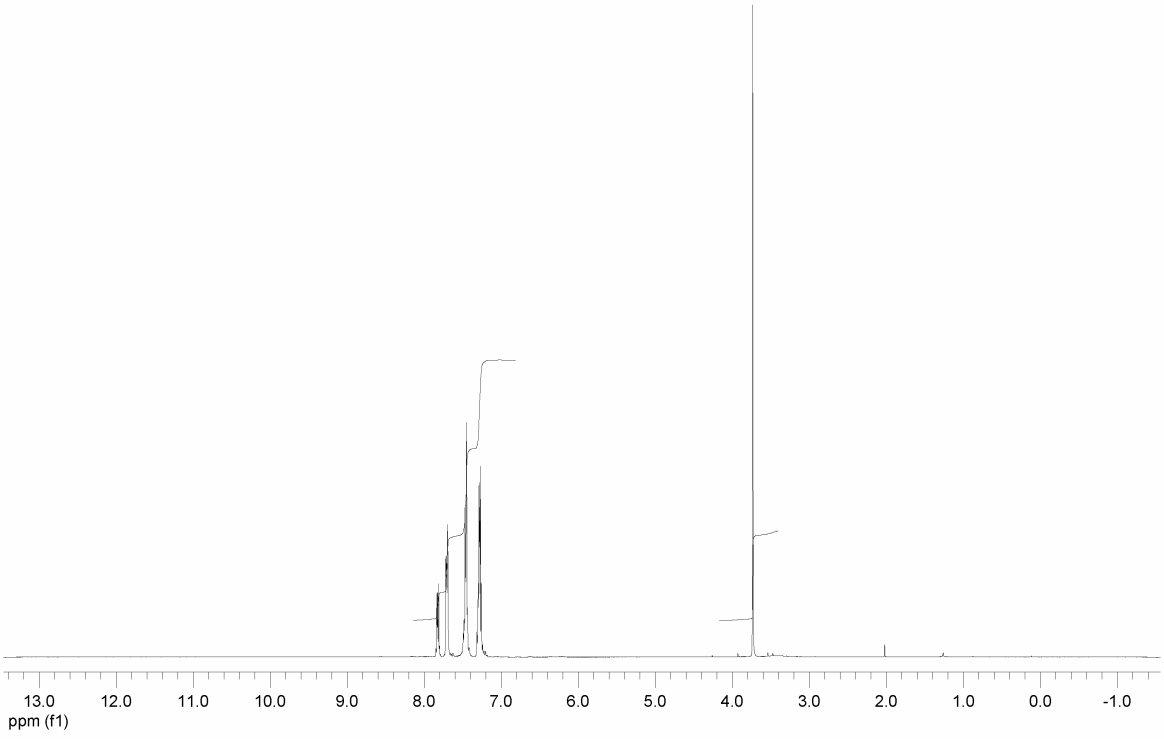


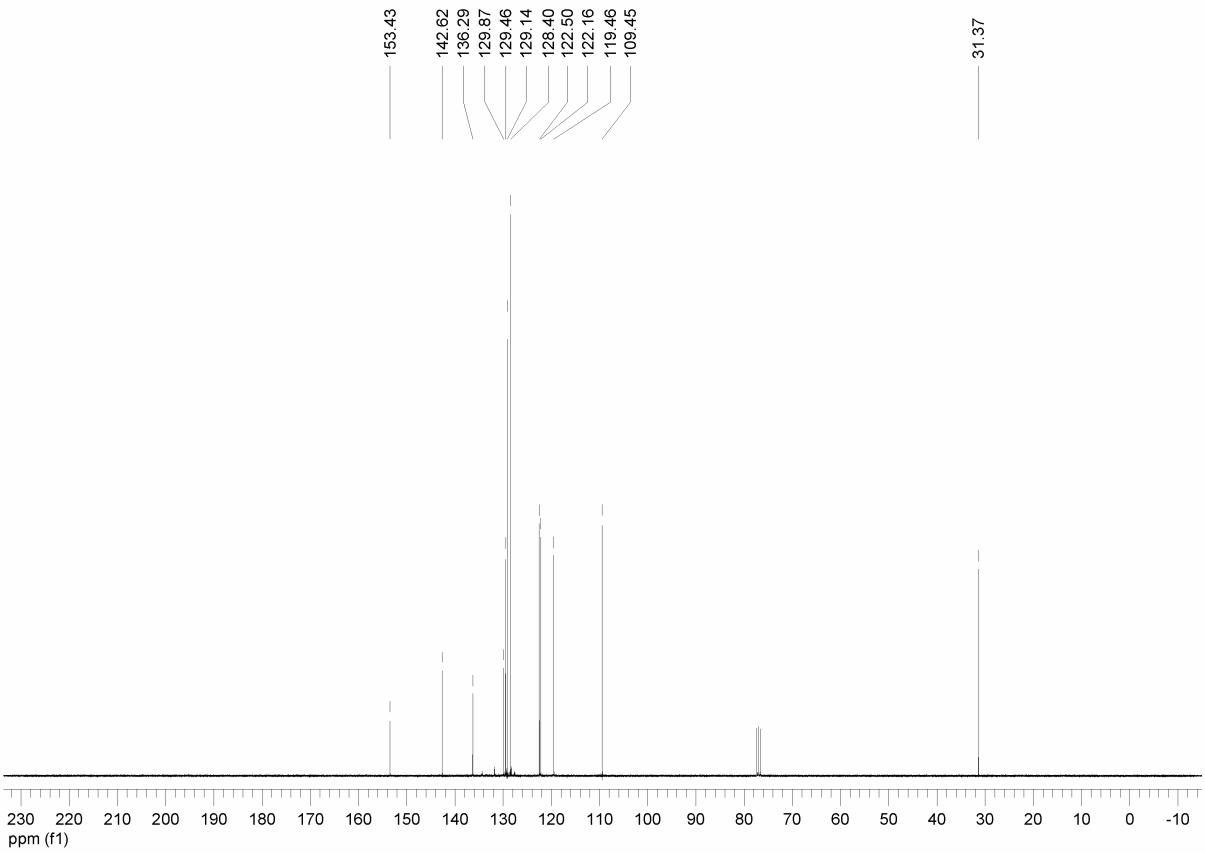




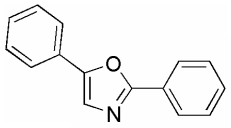
N-Methyl-2-phenylbenzimidazole **12**

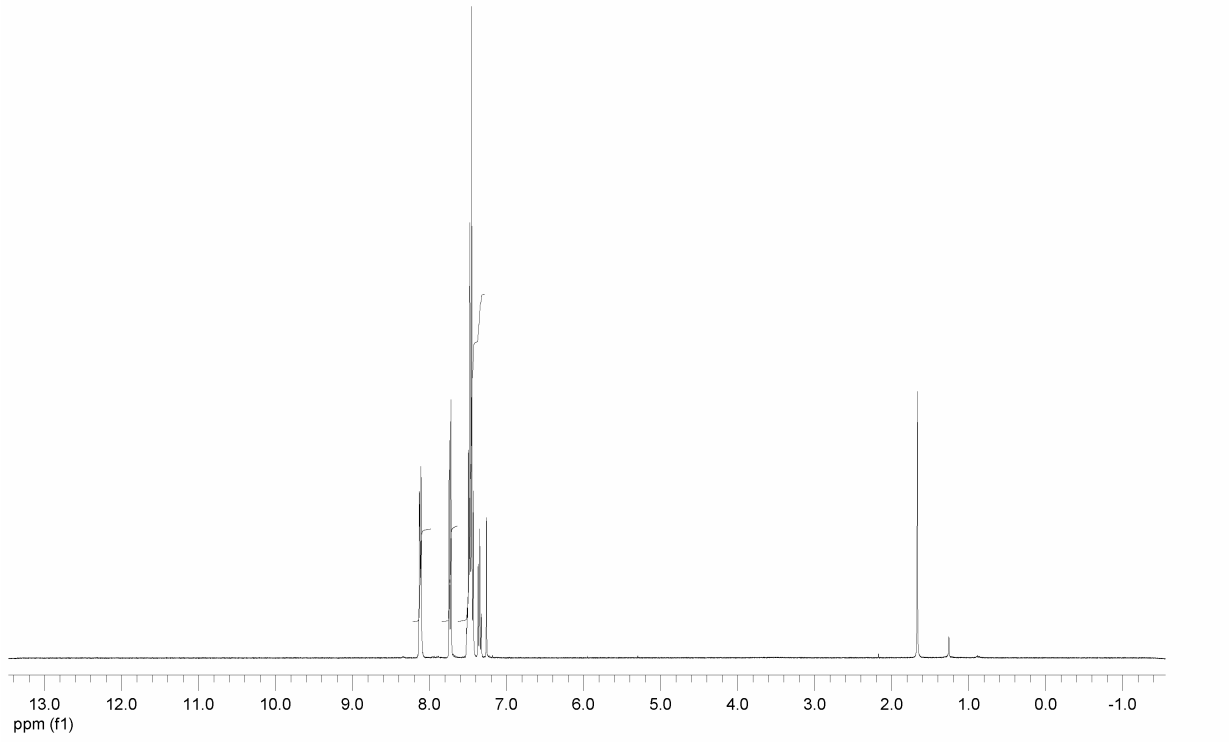


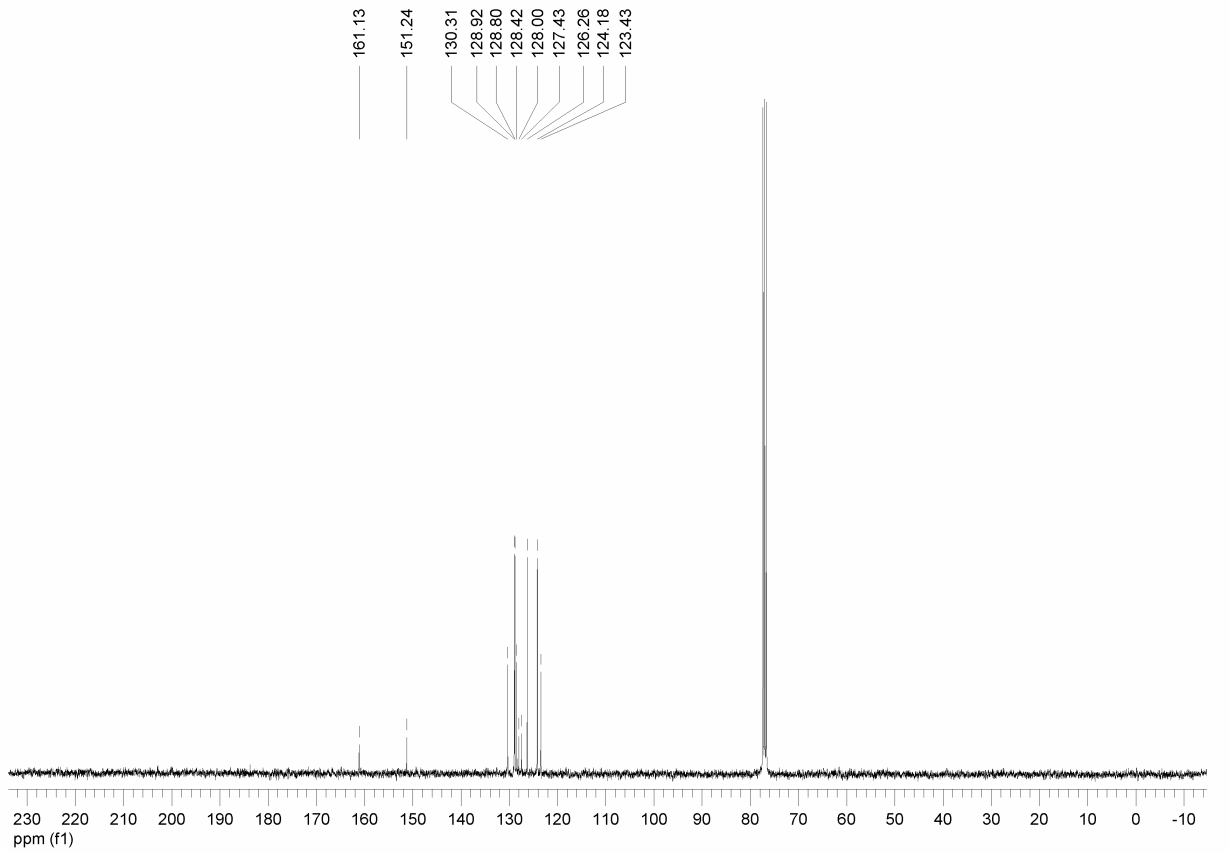




2,5-Diphenyloxazole **13**







2-Methoxy-5-phenylthiophene **14**