Electronic Supplementary Information

Acid/Halide Co-Mediated Transesterification of Unactivated Carboxylic Esters with O-H Nucleophiles

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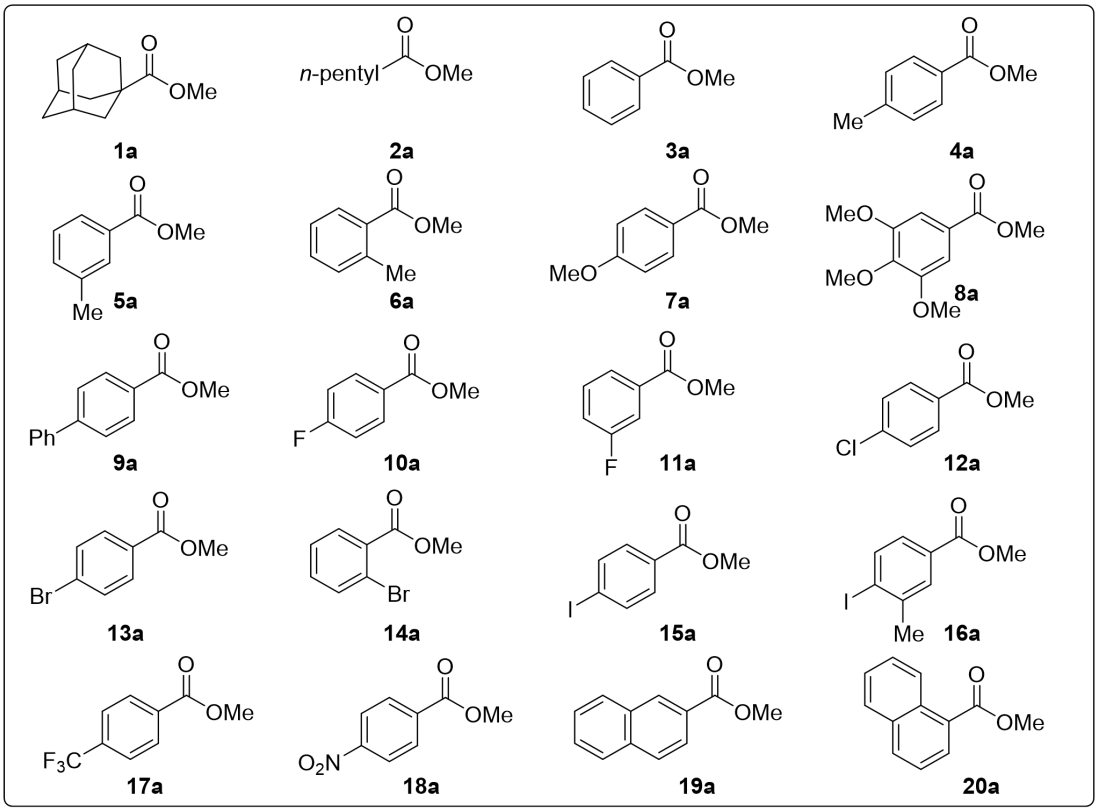
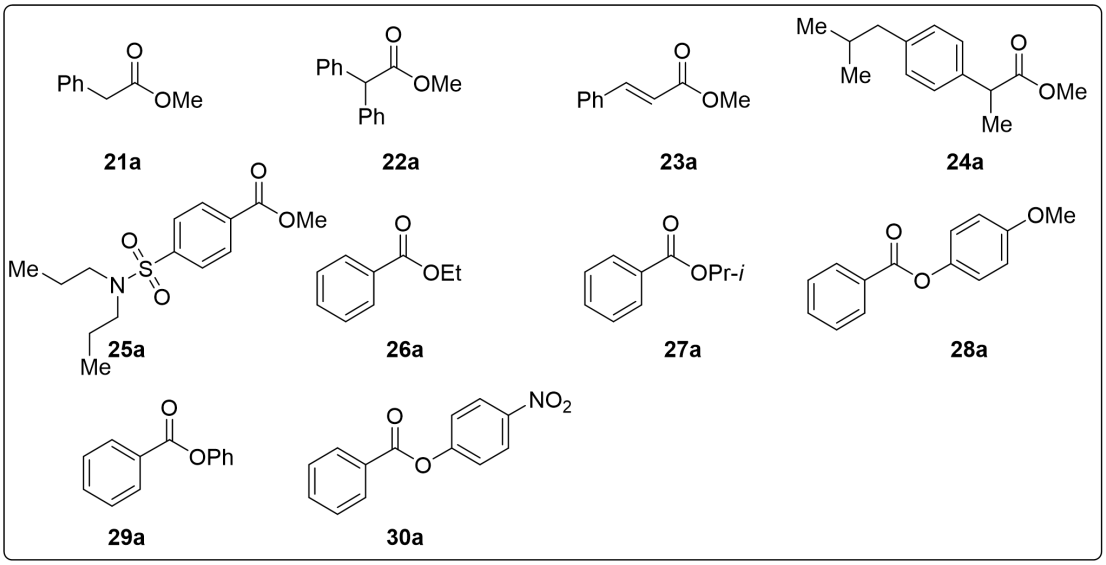
1. General information

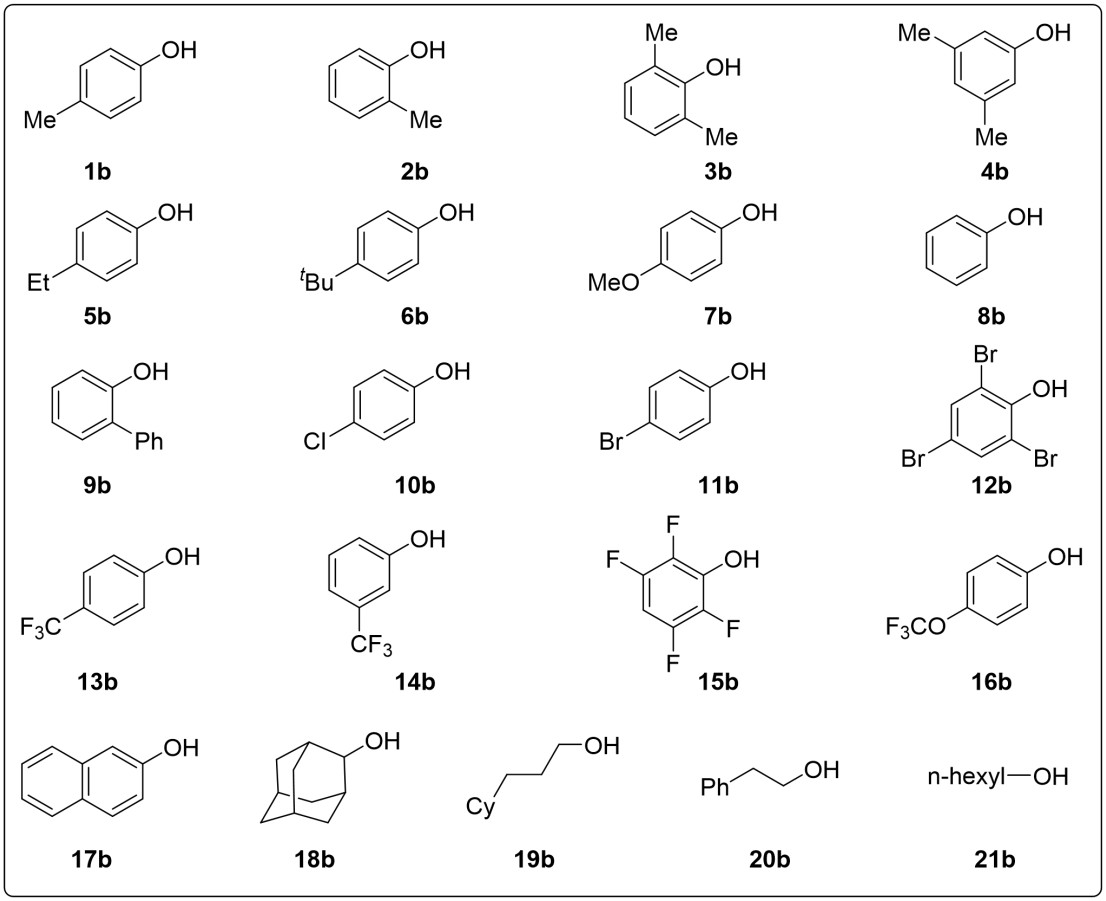
All starting materials reported in the manuscript have been previously described in literature or prepared by the method reported previously. Esters were prepared by standard methods. The reactions were carried out in Schlenk tubes of 25 mL under N_2 atmosphere. All heating and stirring were conducted on the IKA (Model: RCT B S025). Reagents were used as received unless otherwise noted, and solvents were purified according to standard operation procedure. Column chromatography was performed using Silica Gel 60 (300–400 mesh). The reactions were monitored by GC and GC-MS. GC-MS results were recorded on GC-MS QP2010, and GC analysis was performed on GC 2010 plus. The ^{1}H, and ^{13}C NMR spectra were recorded on a Brucker ADVANCE III spectrometer at 400 MHz, and 100 MHz respectively, and chemical shifts were reported in parts per million (ppm) with deuterated chloroform as solvent. The electron ionization (EI) method was used as the ionization method for the HRMS measurement, and the mass analyzer type is TOF for EI. All solvents and reagents were purchased from Energy Chemical, Alfa Aesar, and Aladdin.

2. Experimental procedure



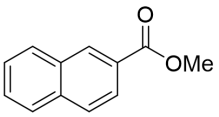


Scheme S1. Ester substrates

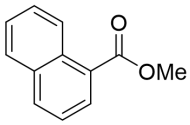


Scheme S2. OH nucleophiles

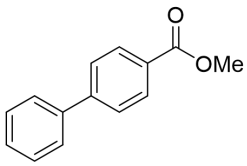
2.1 Preparation of the starting materials



I



II



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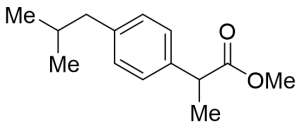

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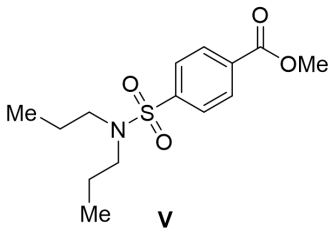
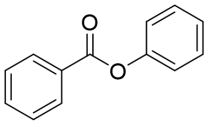
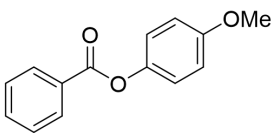


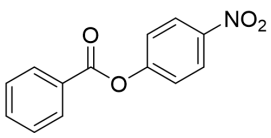
V



VI

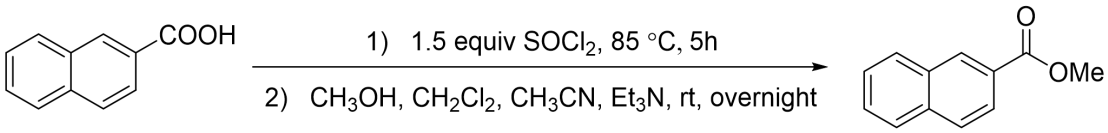


VII



VIII

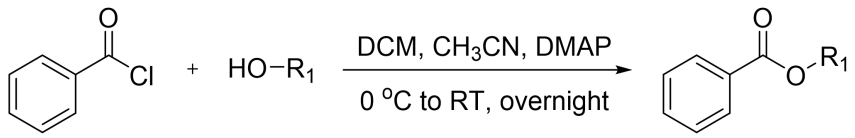
Representative procedure for the synthesis of ester substrates I-V (synthesis of ester I is used as an example).



1) A 100 mL round-bottom flask was charged with 2-naphthic acid (10.0 mmol). Then thionyl chloride (15.0 mmol, 1.5 equiv) was added dropwise to the reaction mixture and stirred at 85 ℃ for 5 h. After cooling down to room temperature, the resulting mixture was concentrated under reduced pressure to afford acid chloride quantitatively which was used directly without further purification for the next step.

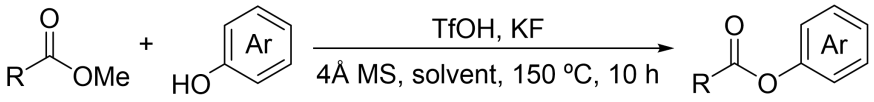
2) Methanol (20.0 mL) added to an oven-dried round-bottom flask (100.0 mL), which was equipped a stirring bar and ice bath. Dissolved acyl chloride (10.0 mmol) in CH_2Cl_2 (0.5 ml), which was added dropwise to the flask at 0 ℃. Then the base triethylamine (3 drops), solvent acetonitrile (10.0 ml) was added and the reaction mixture was stirred at room temperature overnight. After completion of the reaction, the reaction mixture was washed with HCl (1.0 M, 15 mL), brine (20 mL × 3), dried over anhydrous $NaSO_4$, and concentrated under *vacuo*. The crude product was purified by column chromatography over silica gel (300-400 mesh) using petroleum ether : ethyl acetate (100： 1) as eluent to give analytical product.

Procedure for the synthesis of ester substrates (VI-VIII) come as follows:



Dissolved benzoyl chloride (10.0 mmol) in CH_2Cl_2 (10 ml), which was added dropwise to a rapidly stirred solution of the corresponding alcohol (1.2 equiv) and DMAP (1.0 equiv) in 20.0 mL of CH_3CN at 0 ℃. Then the reaction mixture was stirred at room temperature overnight. After completion of the reaction, the reaction mixture was washed with HCl (1.0 M, 15 mL), brine (20 mL × 3), dried over anhydrous Na_2SO_4, and concentrated under *vacuo*. The crude product was purified by column chromatography over silica gel (300-400 mesh) using petroleum ether : ethyl acetate (100： 1) as eluent to give analytical product **VI-VIII**.

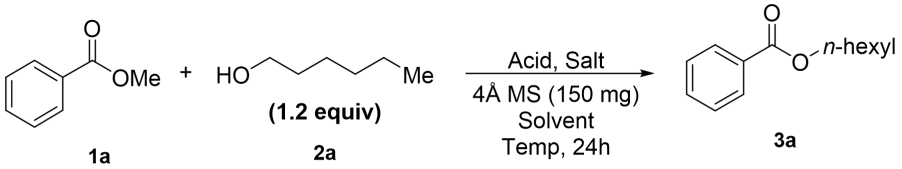
2.2 General experimental procedure for the synthesis of aromatic esters.



a **b** **c**

An oven dried 25 mL Schlenk tube with 4Å MS (90 mg) were charged with ester **a** (0.2 mmol), phenol **b** (0.4 mmol, 2.0 equiv.) and KF (0.2 mmol, 1.0 equiv.). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and solvent (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion of the reaction, the reaction mixture was concentrated under vacuum. The desired product was isolated by column chromatography over silica gel (300-400 mesh) using petroleum ether as eluent. The crude product was purified by PTLC eluting with petroleum ether.

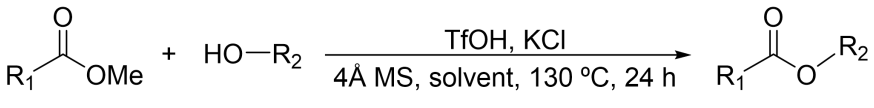
2.3 General experimental procedure for the synthesis of alkyl esters.



1a 2a 3a

entry	acid	salt	solvent	yield (%)[f]
1	TfOH	---	Cy	63
2	TfOH	KF	Cy	50
3	TfOH	KCl	Cy	94
4	TfOH	KBr	Cy	90
5	TfOH	KI	Cy	81
6	TfOH	NaCl	Cy	61
7	Benzenesulfonic acid	KCl	Cy	8
8	TFA	KCl	Cy	N.D.
9	PivOH	KCl	Cy	N.D.
10	Methanesolfonic acid	KCl	Cy	Trace
11	---	KCl	Cy	N.D.
12	---	---	Cy	N.D.
13	TfOH	KCl	Hexane	58
14	TfOH	KCl	toluene	40
15	TfOH	KCl	*p*-xylene	46
16	TfOH	KCl	PhOMe	37
17	TfOH	KCl	dioxane	N.D.
19	TfOH	KCl	THF	N.D.
20	TfOH	KCl	MeCN	N.D.
21	TfOH	KCl	DMF	N.D.
22	TfOH	KCl	DMSO	N.D.
23[b]	TfOH	KCl	Cy	90
24[c]	TfOH	KCl	Cy	90
25[d]	TfOH	KCl	Cy	72
26[e]	TfOH	KCl	Cy	68

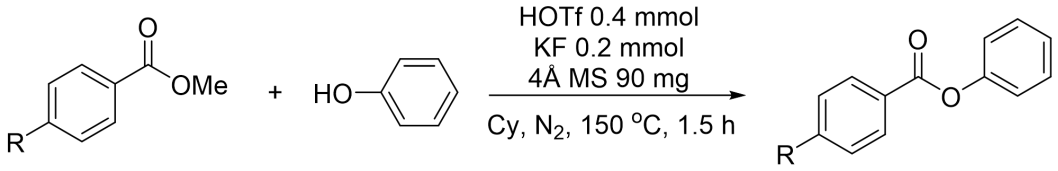
[a] Reaction conditions: a mixture of **1a** (0.2 mmol), **2a** (0.24 mmol, 1.2 equiv), acid (0.14 mmol, 0.7 equiv), and salt (0.2 mmol) in a solvent (2 mL) was heated at 130 °C for 24 h under N_2; [b] acid (0.8 mmol, 0.4 equiv); [c] 90 °C; [d] 1 h; [e] no 4Å MS; [f] GC yield using tridecane as an internal standard.



a **b** **c**

An oven dried 25 mL Schlenk tube with 4Å MS (150 mg) were charged with ester **a** (0.2 mmol), alcohol **b** (0.24 mmol, 1.2 equiv.) and KCl (0.2 mmol, 1.0 equiv.). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and solvent (2 mL) were added. The reaction mixture was heated at 130 ^oC for 24 hours. After completion of the reaction, the reaction mixture was concentrated under vacuum. The desired product was isolated by column chromatography over silica gel (300-400 mesh) using petroleum ether as eluent. The crude product was purified by PTLC eluting with petroleum ether.

2.4 Substituent effect at benzene ring of ester.

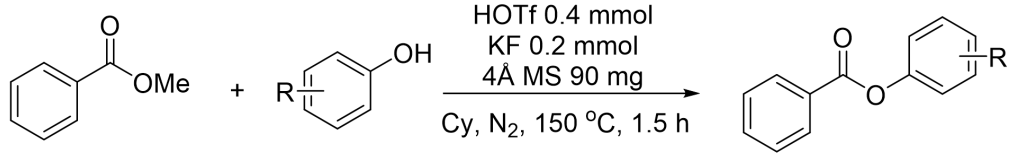


0.2 mmol **a** + 2 equiv **8b** → **c**

R	OMe	Me	H	F	Cl	CF_3
Yield	46.5%	34.5%	27%	21%	15%	10.5%

A typical experimental procedure (taking the reaction of methyl 4-methoxybenzoate **7a** with phenol **8b** as an example): An oven dried 25 mL Schlenk tube with 4Å MS (90 mg) was charged with methyl 4-methoxybenzoate **7a** (0.2 mmol), phenol **8b** (2 equiv) and KF (1 equiv). Subsequently, HOTf (2 equiv) and cyclohexane (2 mL) was added under N_2. The reaction mixture was allowed to react at 150 °C for 1.5 h. After completion of the reaction, the reaction mixture was cooled down to room temperature, and yields were measured by GC using tridecane as an internal standard.

2.5 Substituent effect at benzene ring of phenols.

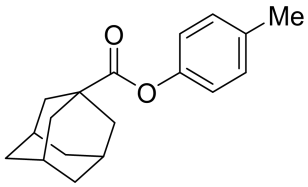


0.2 mmol **3a** + 2 equiv **b** → **c**

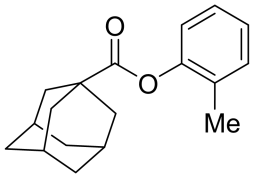
R	OMe	^{t}Bu	Me	H	Cl	CF_3
Yield	14%	18%	20%	27%	35%	42%

A typical experimental procedure (taking the reaction of methyl benzoate **3a** with 4-methoxyphenol **7b** as an example): An oven dried 25 mL Schlenk tube with 4Å MS (90 mg) was charged with methyl benzoate **3a** (0.2 mmol), 4-methoxyphenol **7b** (2 equiv) and KF (1 equiv). Subsequently, HOTf (2 equiv) and cyclohexane (2 mL) was added under N_2. The reaction mixture was allowed to react at 150 °C for 1.5 h. After completion of the reaction, the reaction mixture was cooled down to room temperature, and yields were determined by GC using tridecane as an internal standard.

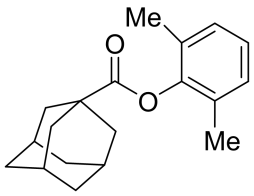
3. Characterization data of the products



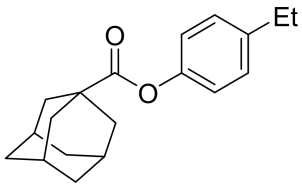
***p*-tolyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (1c).** The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), *p*-cresol (43.2 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **1c** in 93% isolated yield (50.2 mg); white solid; mp 104-105 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.15 (d, J = 8.0 Hz, 2H), 6.91 (d, J = 8.8 Hz, 2H), 2.33 (s, 3H), 2.08-2.04 (m, 9H), 1.80-1.73 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.4, 148.8, 135.0, 129.8, 121.2, 40.9, 38.7, 36.4, 27.9, 20.8. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{18}H_{22}O_2$ 271.1693; Found 271.1693.



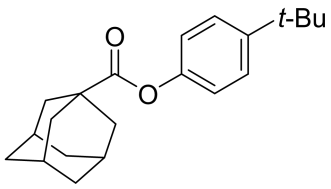
***o*-tolyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (2c).** The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), *o*-cresol (26.0 mg, 0.24 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **2c** in 95% isolated yield (51.5 mg); white solid; mp 78-79 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.22-7.17 (m, 2H), 7.12 (dd, J_1 = J_2 = 7.6 Hz, 1H), 6.95 (d, J = 8.0 Hz, 1H), 2.16 (s, 3H), 2.09 (b, 9H), 1.81-1.75 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 175.8, 149.5, 131.0, 130.1, 126.8, 125.7, 121.8, 41.1, 38.9, 36.4, 27.9, 16.2. MS (EI): m/z = 270.1. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{18}H_{22}O_2$ 271.1693; Found 271.1692.



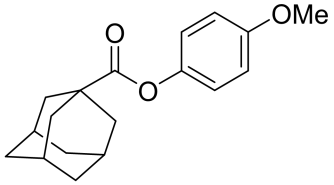
2,6-dimethylphenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (3c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 2,6-dimethylphenol (36.6 mg, 0.3 mmol) and KF (17.4 mg, 0.3 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **3c** in 87% isolated yield (49.5 mg); white solid; mp 81-82 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.06-7.01 (m, 3H), 2.12 (b, 15H), 1.78 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 175.1, 148.1, 130.1, 128.5, 125.5, 41.3, 39.0, 36.5, 28.0, 16.3. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{19}H_{24}O_2$ 285.1849; Found 285.1849.



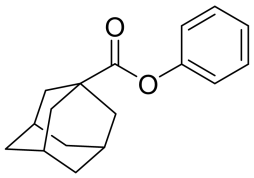
4-ethylphenyl (3r,5r,7r)-adamantane-1-carboxylate (4c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 4-ethylphenol (36.6 mg, 0.3 mmol) and KF (17.4 mg, 0.3 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **4c** in 93% isolated yield (52,8 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.17 (d, J = 8.4 Hz, 2H), 6.94 (d, J = 8.4 Hz, 2H), 2.63 (q, J = 7.6 Hz, 2H), 2.08-2.05 (m, 9H), 1.80-1.73 (m, 6H), 1.22 (t, J = 7.6 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.4, 149.0, 141.4, 128.6, 121.2, 41.0, 38.8, 36.5, 28.3, 27.9, 15.6. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{19}H_{24}O_2$ 285.1849; Found 285.1849.



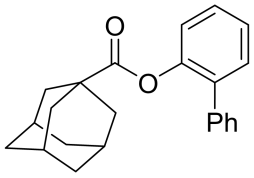
4-(tert-butyl)phenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (5c). [1] The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 4-(*tert*-butyl)phenol (60.1 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **5c** in 73% isolated yield (45.5 mg); white solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.36 (d, *J* = 8.8 Hz, 2H), 6.96 (d, *J* = 8.4 Hz, 2H), 2.08-2.05 (m, 9H), 1.80-1.73 (m, 6H), 1.31 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.3, 148.7, 148.2, 126.2, 120.8, 41.0, 38.7, 36.4, 34.4, 31.4, 27.9. GC-MS (EI): m/z = 312.1 ($[M + H]^+$, 2), 165.1 (11), 135.1 (100), 79 (10), 135 (100), 107 (6), 93 (8), 79 (10), 67 (3), 55 (2). This compound is known.



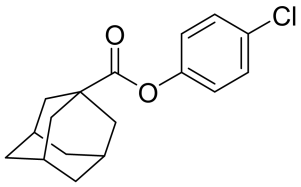
4-methoxyphenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (6c).[2] The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 4-methoxyphenol (37.2 mg, 0.3 mmol) and KF (17.4 mg, 0.3 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **6c** in 84% isolated yield (48.1 mg); white solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 6.95 (d, *J* = 8.0 Hz, 2H), 6.87 (d, *J* = 8.0 Hz, 2H), 3.79, (s, 3H), 2.08-2.04 (m, 9H), 1.80-1.32 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.5, 157.0, 144.5, 122.2, 114.3, 55.6, 40.9, 38.8, 36.4, 27.9. GC-MS (EI): m/z = 287 ($[M + H]^+$, 1), 286 (M^+, 6), 258 (5), 163 (4), 135 (100), 124 (5), 107 (9), 93 (13), 79 (13), 67 (5), 55 (3). This compound is known.



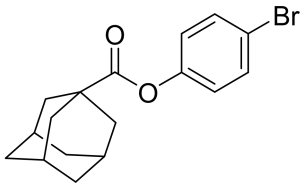
phenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (8c).[1] The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), phenol (28.2 mg, 0.3 mmol) and KF (17.4 mg, 0.3 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **8c** in 69% isolated yield (35.3 mg); white solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.36 (dd, $J_1 = J_2 = 8.0$ Hz, 2H), 7.20 (t, $J = 7.6$ Hz, 1H), 7.04 (d, $J = 8.0$ Hz, 2H), 2.08-2.06 (m, 9H), 1.80-1.74 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.2, 151.1, 129.3, 125.5, 121.6, 41.0, 38.8, 36.5, 27.9. GC-MS (EI): m/z = 256 (M^+, 2), 228 (1), 163 (24), 135 (100), 107 (10), 93 (17), 79 (18), 77 (7), 67 (6), 55 (3). This compound is known.



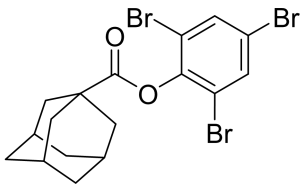
[1,1'-biphenyl]-2-yl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (9c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 2-phenylphenol (68.1 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **9c** in 80% isolated yield (53.1 mg); white solid; mp 108-109 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.39-7.32 (m, 7H), 7.29-7.28 (m, 1H), 7.07-7.05 (m, 1H), 1.97 (b, 3H), 1.80 (b, 6H), 1.72-1.63 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 176.0, 148.1, 137.5, 135.2, 130.8, 129.2, 128.4, 128.0, 127.3, 126.0, 122.8, 40.8, 38.5, 36.4, 27.8. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{23}H_{24}O_2$ 333.1849; Found 333.1849.



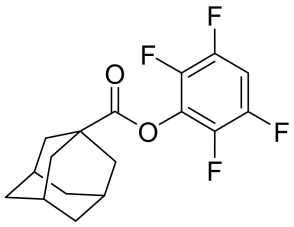
4-chlorophenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (10c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 4-chlorophenol (38.5 mg, 0.3 mmol) and KF (15.1 mg, 0.26 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **10c** in 76% isolated yield (44.0 mg); white solid; mp 79-80 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32 (d, *J* = 8.8 Hz, 2H), 6.98 (d, *J* = 8.4 Hz, 2H), 2.08-2.04 (m, 9H), 1.80-1.73 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 175.9, 149.6, 130.8, 129.3, 122.9, 41.0, 38.7, 36.4, 27.8. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{17}H_{19}ClO_2$ 291.1146; Found 291.1146.



4-bromophenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (11c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 4-bromophenol (51.9 mg, 0.3 mmol) and KF (15.1 mg, 0.26 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **11c** in 80% isolated yield (53.4 mg); white solid; mp 104-105 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.47 (d, *J* = 8.8 Hz, 2H), 6.93 (d, *J* = 8.8 Hz, 2H), 2.08-2.03 (m, 9H), 1.80-1.73 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 175.9, 150.1, 132.3, 123.4, 118.5, 41.0, 38.7, 36.4, 27.8. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{17}H_{19}BrO_2$ 335.0641; Found 335.0641.

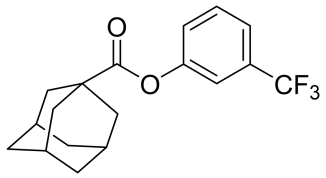


2,4,6-tribromophenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (12c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 2,4,6-tribromophenol (132.3 mg, 0.4 mmol) and KF (5.8 mg, 0.1 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **12c** in 65% isolated yield (63.6 mg); white solid; mp 108-109 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (s, 2H), 2.15-2.10 (m, 9H), 1.82-1.75 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.3, 145.9, 134.8, 119.4, 118.5, 41.5, 38.8, 36.4, 27.8. HRMS (APCI-TOF) m/z: $[M + K]^+$ Calcd for $C_{17}H_{17}Br_3O_2$ 582.8410; Found 582.8410.

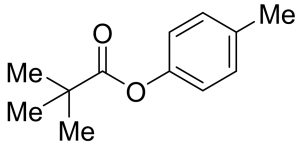


2,3,5,6-tetrafluorophenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (13c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 2,3,5,6-tetrafluorophenol (66.4 mg, 0.4 mmol) and KF (5.8 mg, 0.1 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **13c** in 60% isolated yield (39.3 mg); white solid; mp 71-72 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.00-6.92 (m, 1H), 2.10 (b, 9H), 1.82-1.75 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 173.5, 146.0 (dddd, J_1 = 4.2 Hz, J_2 = J_3 = 12.1, Hz, J_4 = 246.4 Hz), 140.6 (dddd, J_1 = 2.2 Hz, J_2 = 4.6 Hz, J_3 = 15.2 Hz, J_4 = 248.2 Hz), 130.2 (dddd, J_1 = J_2 = 3.7 Hz, J_3 = J_4 = 18.0 Hz), 102.8 (tb, J = 22.9 Hz), 41.4, 38.6, 36.2, 27.7; ^{19}F NMR (376 MHz, $CDCl_3$): δ

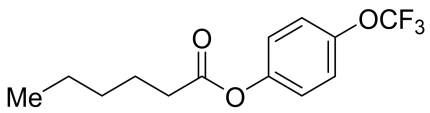
-139.43 (dd, J_1 = 9.8 Hz, J_2 = 21.8 Hz), -153.73 (dd, J_1 = 9.8 Hz, J_2 = 21.4 Hz). HRMS (ESI-TOF) m/z: $[M - H]^-$ Calcd for $C_{17}H_{16}F_4O_2$ 327.1014; Found 327.1036.



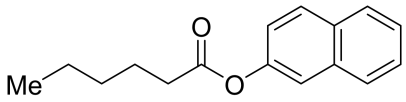
3-**(trifluoromethyl) phenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (14c).** The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 3-trifluoromethylphenol (64.8 mg, 0.4 mmol) and KF (15.1 mg, 0.26 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **14c** in 65% isolated yield (42.1 mg); white solid; mp 90-91 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.51-7.46 (m, 2H), 7.32 (b, 1H), 7.26-7.24 (m, 1H), 2.10-2.06 (m, 9H), 1.81-1.74 (m, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 175.8, 151.2, 131.8 (q, J = 32.7 Hz), 129.8, 125.2, 123.6 (q, J = 270.8 Hz), 122.3 (q, J = 3.7 Hz), 118.9 (q, J = 3.8 Hz), 41.1, 38.7, 36.4, 27.8; ^{19}F NMR (376 MHz, $CDCl_3$): δ -62.65. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{18}H_{19}F_3O_2$ 325.1410; Found 325.1410.



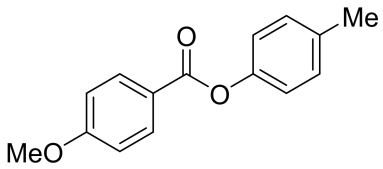
***p*-tolyl pivalate (15c).**[2] The title compound was prepared according to the general procedure: methyl pivalate (23.2 mg, 0.2 mmol), *p*-cresol (43.2 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **15c** in 67% isolated yield (25.8 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.16 (d, J = 8.2 Hz, 2H), 6.97 – 6.88 (m, 2H), 2.33 (s, 3H), 1.35 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.30 (s), 148.88 (s), 135.16 (s), 129.86 (s), 121.16 (s), 39.04 (s), 27.18 (s), 20.88 (s). This compound is known.



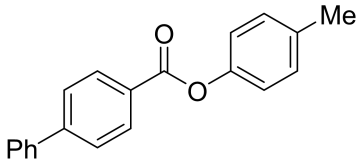
4-(trifluoromethoxy) phenyl hexanoate (16c). The title compound was prepared according to the general procedure: methyl hexanoate (26.0 mg, 0.2 mmol), *p*-trifluoromethoxy phenol (71.2 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **16c** in 65% isolated yield (35.9 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.22 (d, J = 8.4 Hz, 2H), 7.11 (d, J = 8.8 Hz, 2H), 2.56 (t, J = 7.6 Hz, 2H), 1.79-1.72 (m, 2H), 1.42-1.37 (m, 4H), 0.93 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.0, 149.0, 146.5, 122.9, 122.0, 120.4 (q, J = 255.8 Hz), 34.3, 31.2, 24.5, 22.3, 13.9; ^{19}F NMR (376 MHz, $CDCl_3$): δ -58.14. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{13}H_{15}F_3O_3$ 277.1046; Found 277.1046.



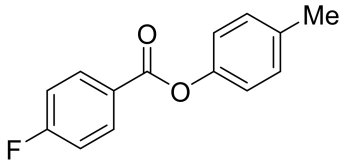
naphthalen-2-yl hexanoate (17c).[3] The title compound was prepared according to the general procedure: methyl hexanoate (26.0 mg, 0.2 mmol), 2-naphthol (57.7 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **17c** in 83% isolated yield (40.1 mg); white solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.85-7.82 (m, 2H), 7.80-7.78 (m, 1H), 7.55 (d, J = 2.0 Hz, 1H), 7.50-7.43 (m, 2H), 7.22 (dd, J_1 = 2.4 Hz, J_2 = 8.8 Hz, 1H), 2.61 (t, J = 7.6 Hz, 2H), 1.84-1.76 (m, 2H), 1.46-1.37 (m, 4H), 0.95 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.5, 148.4, 133.8, 131.4, 129.3, 127.7, 127.6, 126.5, 125.6, 121.2, 118.5, 34.4, 31.3, 24.7, 22.3, 13.9. GC-MS (EI): m/z = 243 ($[M + H]^+$, 1), 242 (7), 144 (100), 127 (3), 115 (15), 99 (2), 89 (2), 71 (4), 63 (1), 55 (3). This compound is known.



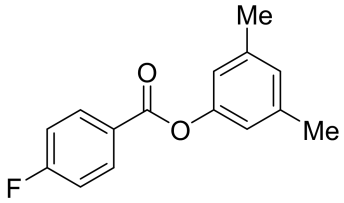
***p*-tolyl 4-methoxybenzoate (18c).**[4] The title compound was prepared according to the general procedure: methyl anisate (33.2 mg, 0.2 mmol), *p*-cresol (43.2 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **18c** in 81% isolated yield (39.2 mg); white solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.14 (d, *J* = 8.4 Hz, 2H), 7.20 (d, *J* = 8.0 Hz, 2H), 7.07 (d, *J* = 8.0 Hz, 2H), 6.96 (d, *J* = 8.8 Hz, 2H), 3.87 (s, 3H), 2.36 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.0, 163.8, 148.8, 135.2, 132.2, 129.9, 121.9, 121.4, 113.7, 55.4, 20.8. GC-MS (EI): m/z = 242 (M^+, 4), 135 (100), 107 (9), 92 (8), 77 (16), 64 (5), 51 (2). This compound is known.



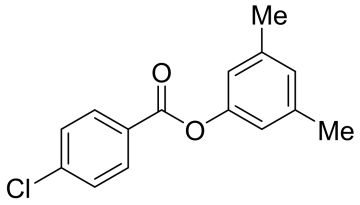
***p*-tolyl [1,1'-biphenyl]-4-carboxylate (19c).** The title compound was prepared according to the general procedure: methyl [1,1'-biphenyl]-4-carboxylate (42.4 mg, 0.2 mmol), *p*-cresol (43.2 mg, 0.4 mmol) and KF (15.1 mg, 0.26 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **19c** in 77% isolated yield (44.3 mg); white solid; mp 128-129 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.26 (d, *J* = 8.0 Hz, 2H), 7.72 (d, *J* = 8.4 Hz, 2H), 7.65 (d, *J* = 8.4 Hz, 2H), 7.50-7.39 (m, 3H), 7.24-7.10 (m, 4H), 2.38 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.3, 148.7, 146.2, 139.9, 135.5, 130.7, 130.0, 129.0, 128.4, 128.3, 127.3, 127.2, 121.4, 20.9. HRMS (APCI-TOF) m/z: [M + H]$^+$ Calcd for $C_{20}H_{16}O_2$ 289.1223; Found 289.1223.



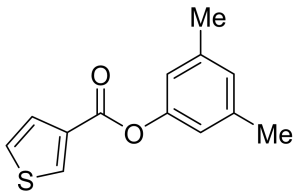
***p*-tolyl 4-fluorobenzoate (20c).**[5] The title compound was prepared according to the general procedure: methyl 4-fluorobenzoate (30.8 mg, 0.2 mmol), *p*-cresol (43.2 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **20c** in 50% isolated yield (23.0 mg); white solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.22 (dd, J_1 = 5.2 Hz, J_2 = 8.4 Hz, 2H), 7.23-7.16 (m, 4H), 7.08 (d, J = 8.4 Hz, 2H), 2.37 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.1 (d, J = 253.6 Hz), 164.4, 148.6, 135.6, 132.7 (d, J = 9.4 Hz), 130.0, 125.9 (d, J = 2.8 Hz), 121.3, 115.7 (d, J = 22.1 Hz), 20.9; ^{19}F NMR (376 MHz, $CDCl_3$): δ -104.65. GC-MS (EI): m/z = 231 ($[M + H]^+$, 1), 230 (M^+, 9), 123 (100), 95 (31), 75 (8), 69 (1), 51 (2). This compound is known.



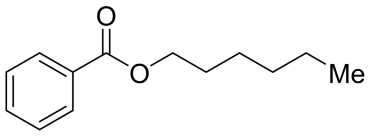
3,5-dimethylphenyl 4-fluorobenzoate (21c). The title compound was prepared according to the general procedure: methyl 4-fluorobenzoate (30.8 mg, 0.2 mmol), 3,5-dimethylphenol (48.9 mg, 0.4 mmol) and KF (15.2 mg, 0.26 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.6 mmol, 3.0 equiv.) and hexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **21c** in 60% isolated yield (29.3 mg); white solid; mp 34-35 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.22-8.19 (m, 2H), 7.20-7.15 (m, 2H), 6.91-6.78 (m, 3H), 2.34 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.1 (d, J = 253.4 Hz), 164.4, 150.7, 139.4, 132.7 (d, J = 9.3 Hz), 127.7, 126.0 (d, J = 3.0 Hz), 119.2, 115.7 (d, J = 22.0 Hz), 21.2; ^{19}F NMR (376 MHz, $CDCl_3$): δ -104.70. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{15}H_{13}FO_2$ 245.0972; Found 245.0972.



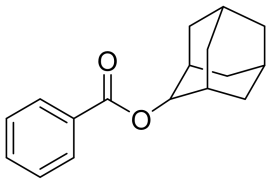
3,5-dimethylphenyl 4-chlorobenzoate (22c). The title compound was prepared according to the general procedure: methyl 4-chlorobenzoate (34.1 mg, 0.2 mmol), 3,5-dimethylphenol (48.9 mg, 0.4 mmol) and KF (15.2 mg, 0.26 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.6 mmol, 3.0 equiv.) and hexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **22c** in 65% isolated yield (33.9 mg); white solid; mp 93-94 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.12 (d, J = 8.4 Hz, 2H), 7.48 (d, J = 8.4 Hz, 2H), 6.91 (s, 1H), 6.82 (s, 2H), 2.34 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 164.6, 150.6, 140.0, 139.4, 131.5, 128.9, 128.2, 127.8, 119.1, 21.2. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{15}H_{13}ClO_2$ 261.0677; Found 261.0677.



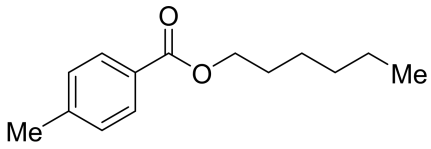
3,5-dimethylphenyl thiophene-3-carboxylate (23c). The title compound was prepared according to the general procedure: methyl thiophene-3-carboxylate (28.4 mg, 0.2 mmol), 3,5-dimethylphenol (48.9 mg, 0.4 mmol) and KCl (19.4 mg, 0.26 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 140 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **23c** in 56% isolated yield (26.0 mg); white solid; mp 58-59 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.28 (dd, J_1 = 1.2 Hz, J_2 = 3.2 Hz, 1H), 7.65 (dd, J_1 = 1.2 Hz, J_2 = 5.2 Hz, 1H), 7.37 (dd, J_1 = 2.8 Hz, J_2 = 4.8 Hz, 1H), 6.90 (s, 1H), 6.81 (s, 2H), 2.38 (s, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 161.3, 150.6, 139.3, 133.8, 133.1, 128.2, 127.6, 126.2, 119.2, 21.2. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{13}H_{12}O_2S$ 233.0631; Found 233.0631.



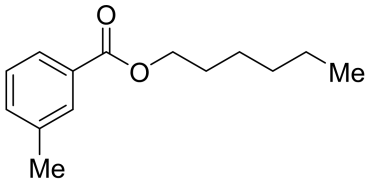
hexyl benzoate (24c).[6] The title compound was prepared according to the general procedure: methyl benzoate (27.2 mg, 0.2 mmol), 1-hexanol (24.5 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **24c** in 90% isolated yield (37.1 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.05 (d, J = 7.2 Hz, 2H), 7.55 (t, J = 7.6 Hz, 1H), 7.43 (dd, $J_1 = J_2$ = 7.6 Hz, 2H), 4.32 (t, J = 6.8 Hz, 2H), 1.80-1.73 (m, 2H), 1.48-1.41 (m, 2H), 1.36-1.32 (m, 4H), 0.90 (t, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.6, 132.7, 130.5, 129.5, 128.3, 65.1, 31.4, 28.6, 25.7, 22.5, 14.0. GC-MS (EI): m/z = 206 (M^+, 1). 123 (100), 105 (92), 84 (14), 77 (42), 69 (12), 56 (25), 51 (9). This compound is known.



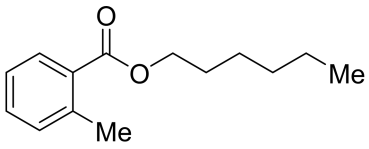
(1r,3r,5r,7r)-adamantan-2-yl benzoate (25c).[16] The title compound was prepared according to the general procedure: methyl benzoate (27.2 mg, 0.2 mmol), (1r,3r,5r,7r)-adamantan-2-ol (36.5 mg, 0.24 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **25c** in 71% isolated yield (36.4 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.12–8.07 (m, 2H), 7.56 (t, J = 7.4 Hz, 1H), 7.45 (t, J = 7.6 Hz, 2H), 5.19 (s, 1H), 2.17 (d, J = 15.0 Hz, 4H), 1.94–1.81 (m, 6H), 1.78 (s, 2H), 1.64 (d, J = 11.5 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.86 (s), 132.72 (s), 131.16 (s), 129.57 (s), 128.33 (s), 37.42 (s), 36.38 (s), 32.07 (s), 27.36 (s), 27.05 (s). This compound is known.



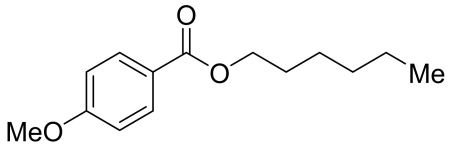
hexyl 4-methylbenzoate (27c).[6] The title compound was prepared according to the general procedure: methyl 4-methylbenzoate (30.0 mg, 0.2 mmol), 1-hexanol (24.5 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **27c** in 83% isolated yield (36.5 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.93 (d, J = 8.4 Hz, 2H), 7.23 (d, J = 7.6 Hz, 2H), 4.29 (t, J = 6.4 Hz, 2H), 2.40 (s, 1H), 1.79-1.72 (m, 2H), 1.48-1.40 (m, 2H), 1.36-1.31 (m, 4H), 0.90 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.8, 143.4, 129.5, 129.0, 127.8, 64.9, 31.4, 28.7, 25.7, 22.5, 21.6, 14.0. GC-MS (EI): m/z = 220 (M^+, 2), 137 (82), 136 (72), 119 (100), 107 (1), 91 (53), 84 (6), 77 (2), 65 (19), 56 (13). This compound is known.



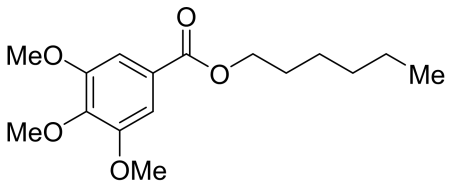
hexyl 3-methylbenzoate (28c).[6] The title compound was prepared according to the general procedure: methyl 3-methylbenzoate (30.0 mg, 0.2 mmol), 1-hexanol (40.9 mg, 0.4 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **28c** in 98% isolated yield (43.1 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.85-7.83 (m, 2H), 7.37-7.30 (m, 2H), 4.30 (t, J = 6.8 Hz, 2H), 2.40 (s, 3H), 1.80-1.73 (m, 2H), 1.48-1.41 (m, 2H), 1.36-1.32 (m, 4H), 0.90 (t, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.8, 138.0, 133.5, 130.4, 130.0, 128.2, 126.6, 65.0, 31.4, 28.7, 25.7, 22.5, 21.2, 14.0. GC-MS (EI): m/z = 220 (M^+, 5), 149 (1), 137 (81), 136 (88), 119 (100), 93 (16), 92 (16), 91 (65), 84 (8), 77 (2), 69 (7), 65 (18), 56 (18), 55 (10). This compound is known.



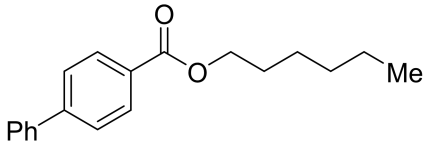
hexyl 2-methylbenzoate (29c).[6] The title compound was prepared according to the general procedure: methyl 2-methylbenzoate (30.0 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **29c** in 75% isolated yield (33.0 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.91 (dd, J_1 = 1.6 Hz, J_2 = 8.4 Hz, 1H), 7.41-7.37 (m, 1H), 7.25-7.23 (m, 2H), 4.29 (t, J = 6.4 Hz, 2H), 2.60 (s, 3H), 1.79-1.72 (m, 2H), 1.48-1.41 (m, 2H), 1.36-1.32 (m, 4H), 0.904 (t, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 167.8, 140.0, 131.8, 131.6, 130.5, 123.0, 125.6, 64.9, 31.4, 28.7, 25.8, 22.5, 21.7, 14.0. GC-MS (EI): m/z = 221 ([M + H$^+$], 2), 220 (M$^+$, 15), 137 (40), 136 (80), 119 (65), 118 (100), 107 (1), 91 (48), 90 (11), 84 (5), 69 (4), 65 (17), 56 (8), 55 (7). This compound is known.



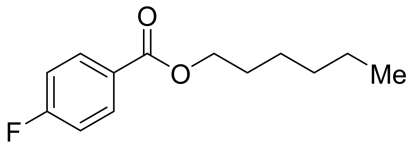
hexyl 4-methoxybenzoate (30c).[6] The title compound was prepared according to the general procedure: methyl 4-methoxybenzoate (33.2 mg, 0.2 mmol), 1-hexanol (24.5 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **30c** in 85% isolated yield (40.1 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.00 (d, J = 9.2 Hz, 2H), 6.92 (d, J = 8.8 Hz, 2H), 4.28 (t, J = 6.8 Hz, 2H), 3.86 (s, 3H), 1.78-1.71 (m, 2H), 1.47-1.40 (m, 2H), 1.36-1.32 (m, 4H), 0.90 (t, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.4, 163.2, 131.5, 123.0, 113.5, 64.8, 55.4, 31.5, 28.7, 25.7, 22.5, 14.0. GC-MS (EI): m/z = 237 ([M + H]$^+$, 1), 236 (M$^+$, 3), 152 (100), 135 (65), 107 (9), 92 (9), 77 (15), 64 (4), 55 (4). This compound is known.



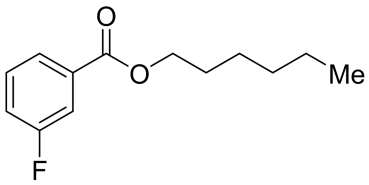
hexyl 3,4,5-trimethoxybenzoate (31c).[7] The title compound was prepared according to the general procedure: methyl 3,4,5-trimethoxybenzoate (45.2 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **31c** in 80% isolated yield (47.3 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.31 (s, 2H), 4.31 (t, *J* = 6.8 Hz, 2H), 3.91 (b, 9H), 1.81-1.74 (m, 2H), 1.44 (b, 2H), 1.35-1.34 (m, 4H), 0.92-0.89 (m, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.1, 152.7, 141.9, 125.4, 106.6, 65.1, 60.7, 56.0, 31.3, 28.5, 25.5, 22.4, 13.8. GC-MS (EI): m/z = 297 ($[M + H]^+$, 9), 296 (M^+ 52), 225 (2), 212 (100), 197 (30), 195 (28), 169 (5), 154 (4), 93 (7), 77 (3), 55 (4). This compound is known.



hexyl [1,1'-biphenyl]-4-carboxylate (32c). The title compound was prepared according to the general procedure: methyl [1,1'-biphenyl]-4-carboxylate (42.4 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **32c** in 93% isolated yield (52.5 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.11 (d, *J* = 8.0 Hz, 2H), 7.66 (d, *J* = 8.4 Hz, 2H), 7.62 (d, *J* = 7.2 Hz, 2H), 7.46 (dd, $J_1 = J_2$ = 7.2 Hz, 2H), 7.39 (t, *J* = 7.2 Hz, 1H), 4.34 (t, *J* = 6.8 Hz, 3H), 1.82-1.74 (m, 2H), 1.50-1.42 (m, 2H), 1.37-1.34 (m, 4H), 0.91 (t, *J* = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.6, 145.5, 140.0, 130.0, 129.2, 128.9, 128.1, 127.2, 127.0, 65.1, 31.5, 28.7, 25.7, 22.6, 14.0. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{19}H_{22}O_2$ 283.1693; Found 283.1693.

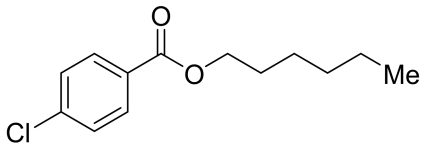


hexyl 4-fluorobenzoate (33c).[6] The title compound was prepared according to the general procedure: methyl 4-fluorobenzoate (30.8 mg, 0.2 mmol), 1-hexanol (24.5 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **33c** in 86% isolated yield (38.5 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.06 (dd, J_1 = 5.6 Hz, J_2 = 9.2 Hz, 2H), 7.11 (dd, $J_1 = J_2$ = 8.8 Hz, 2H), 4.30 (t, J = 6.4 Hz, 2H), 1.79-1.72 (m, 2H), 1.47-1.40 (m, 2H), 1.36-1.32 (m, 4H), 0.90 (t, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.7, 165.6 (d, J = 252.0 Hz), 132.0 (d, J = 9.3 Hz), 126.7 (d, J = 2.9 Hz), 115.4 (d, J = 22.0 Hz), 65.3, 31.4, 28.6, 25.7, 22.5, 14.0; ^{19}F NMR (376 MHz, $CDCl_3$): δ -106.07. GC-MS (EI): m/z = 224 (M^+, 1), 141 (62), 140 (15), 123 (100), 95 (38), 84 (27), 75 (12), 69 (17), 56 (38), 55 (15). This compound is known.

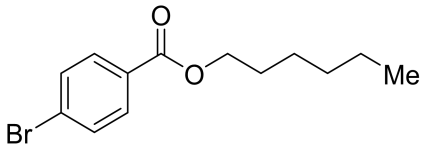


hexyl 3-fluorobenzoate (34c). The title compound was prepared according to the general procedure: methyl 3-fluorobenzoate (30.8 mg, 0.2 mmol), 1-hexanol (40.9 mg, 0.4 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **34c** in 85% isolated yield (38.1 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.85-7.82 (m, 1H), 7.74-7.70 (m, 1H), 7.44-7.39 (m, 1H), 7.28-7.23 (m, 1H), 4.32 (t, J = 6.8 Hz, 2H), 1.80-1.73 (m, 2H), 1.48-1.40 (m, 2H), 1.36-1.32 (m, 4H), 0.91 (t, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.5 (d, J = 3.0 Hz), 162.5 (d, J = 245.5 Hz), 132.7 (d, J = 7.3 Hz), 129.9 (d, J = 7.8 Hz), 125.2 (d, J = 2.9 Hz), 119.8 (d, J = 21.2 Hz), 1 16.4 (d, J = 22.7 Hz), 65.5, 31.4, 28.6, 25.6, 22.5, 14.0; ^{19}F NMR (376 MHz,

$CDCl_3$): δ -112.51. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{13}H_{17}FO_2$ 225.1285; Found 225.1286.

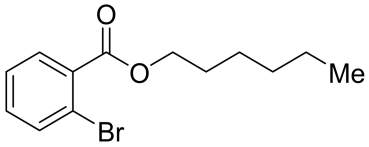


hexyl 4-chlorobenzoate (35c).[6] The title compound was prepared according to the general procedure: methyl 4-chlorobenzoate (34.1 mg, 0.2 mmol), 1-hexanol (40.9 mg, 0.4 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **35c** in 90% isolated yield (43.2 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.97 (d, *J* = 8.8 Hz, 2H), 7.40 (d, *J* = 8.4 Hz, 2H), 4.31 (t, *J* = 6.4 Hz, 2H), 1.79-1.72 (m, 2H), 1.47-1.40 (m, 2H), 1.36-1.31 (m, 4H), 0.90 (t, *J* = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.7, 139.1, 130.8, 128.9, 128.6, 65.3, 31.4, 28.6, 25.6, 22.5, 13.9. GC-MS (EI): m/z = 240 (M^+, 2), 159 (25), 158 (22), 157 (^{37}Cl, 74), 156 (52), 141 (^{37}Cl, 32), 139 (^{35}Cl, 100), 113 (^{37}Cl, 19), 111 (^{35}Cl, 41), 84 (52), 75 (20), 69 (29), 56 (74), 55 (26). This compound is known.

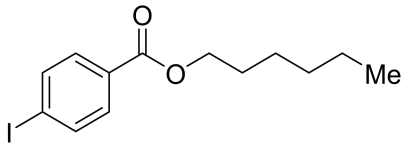


hexyl 4-bromobenzoate (36c).[6] The title compound was prepared according to the general procedure: methyl 4-bromobenzoate (43.0 mg, 0.2 mmol), 1-hexanol (40.9 mg, 0.4 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **36c** in 89% isolated yield (50.5 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.90 (d, *J* = 8.8 Hz, 2H), 7.58 (d, *J* = 8.8 Hz, 2H), 4.31 (t, *J* = 6.8 Hz, 2H), 1.79-1.72 (m, 2H), 1.47-1.40 (m, 2H), 1.36-1.32 (m, 4H), 0.90 (t, *J* = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.0, 131.6, 131.1, 129.40 127.9, 65.4, 31.4, 28.6, 25.7, 22.5, 14.0. GC-MS (EI): m/z = 286 (M^+, ^{81}Br, 2), 284 (M^+, ^{79}Br, 2), 202 (^{81}Br, 72), 201 (^{81}Br,

81), 200 (^{79}Br, 81), 199 (^{79}Br, 78), 184 (^{81}Br, 97), 182 (^{79}Br, 100), 157 (^{81}Br, 41), 155 (^{79}Br, 36), 104 (10), 84 (79), 77 (11), 76 (39), 69 (42), 56 (97), 55 (37). This compound is known.

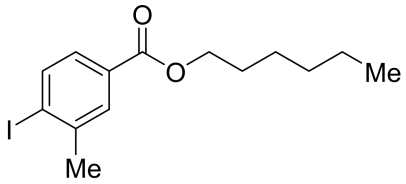


hexyl 2-bromobenzoate (37c).[8] The title compound was prepared according to the general procedure: methyl 2-bromobenzoate (43.0 mg, 0.2 mmol), 1-hexanol (40.9 mg, 0.4 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **37c** in 80% isolated yield (45.4 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.77 (dd, J_1 = 2.0 Hz, J_2 = 7.6 Hz, 1H), 7.65 (dd, J_1 = 1.6 Hz, J_2 = 7.6 Hz, 1H), 7.38-7.29 (m, 2H), 4.34 (t, J = 6.8 Hz, 2H), 1.80-1.73 (m, 2H), 1.49-1.41 (m, 2H), 1.36-1.31 (m, 4H), 0.90 (t, J = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.3, 134.2, 132.6, 132.3, 131.1, 127.1, 121.5, 65.8, 31.4, 28.5, 25.6, 22.5, 14.0. GC-MS (EI): m/z = 286 (M^+, ^{81}Br, 3), 284 (M^+, ^{79}Br, 3), 202 (^{81}Br, 97), 201 (^{81}Br, 63), 200 (^{79}Br, 100), 199 (^{79}Br, 57), 184 (^{81}Br, 84), 182 (^{79}Br, 88), 156 (^{81}Br, 23), 154 (^{79}Br, 10), 84 (18), 76 (8), 76 (23), 75 (17), 69 (18), 56 (42), 55 (24). This compound is known.

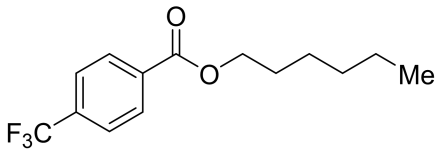


hexyl 4-iodobenzoate (38c).[9] The title compound was prepared according to the general procedure: methyl 4-iodobenzoate (52.4 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **38c** in 85% isolated yield (56.4 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.80 (d, J = 8.8 Hz, 2H), 7.74 (d, J = 8.4 Hz, 2H), 4.30 (t, J = 6.8 Hz, 2H), 1.79-1.72 (m, 2H), 1.46-1.39 (m, 2H), 1.36-1.31 (m, 4H), 0.90 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.2, 137.7, 131.0, 130.0, 100.6, 65.4, 31.5,

28.6, 25.7, 22.6, 14.0. GC-MS (EI): m/z = 332 (M^+, 6), 248 (31), 247 (100), 230 (50), 202 (17), 121 (5), 104 (9), 84 (10), 76 (29), 56 (20), 55 (11). This compound is known.

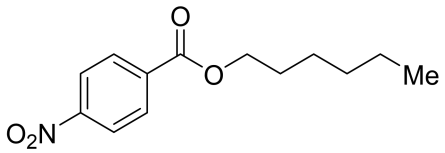


hexyl 4-iodo-3-methylbenzoate (39c). The title compound was prepared according to the general procedure: methyl 3-iodo-4-methylbenzoate (55.2 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **39c** in 86% isolated yield (59.5 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.90-7.87 (m, 2H), 7.50 (dd, J_1 = 1.6 Hz, J_2 = 8.0 Hz, 1H), 4.30 (t, J = 6.8 Hz, 2H), 2.47 (s, 3H), 1.79-1.72 (m, 2H), 1.46-1.39 (m, 2H), 1.36-1.31 (m, 4H), 0.90 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.3, 141.7, 139.1, 130.5, 130.2, 128.0, 107.2, 65.3, 31.4, 28.6, 28.0, 25.6, 22.5, 14.0. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{14}H_{19}IO_2$ 347.0503; Found 347.0503.

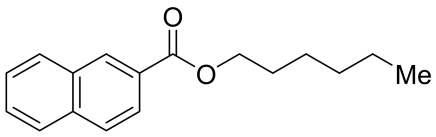


hexyl 4-(trifluoromethyl) benzoate (40c).[6] The title compound was prepared according to the general procedure: methyl 4-trifluoromethylbenzoate (40.8 mg, 0.2 mmol), 1-hexanol (24.5 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **40c** in 87% isolated yield (47.6 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.16 (d, J = 8.0 Hz, 2H), 7.70 (d, J = 8.4 Hz, 2H), 4.35 (t, J = 6.4 Hz, 2H), 1.82-1.75 (m, 2H), 1.48-1.41 (m, 2H), 1.37-1.32 (m, 4H), 0.91 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.4, 134.3 (q, J = 32.4 Hz), 133.7, 129.9, 125.3 (q, J = 3.7 Hz), 123.6 (q, J = 270.9 Hz), 65.7, 31.4, 28.6

25.6, 22.5, 14.0; ^{19}F NMR (376 MHz, $CDCl_3$): δ -63.09. GC-MS (EI): m/z = 256 ([M + H]$^+$ - F, 1), 255 (M^+ - F, 8), 191 (41), 173 (100), 145 (56), 144 (2), 125 (7), 95 (9), 84 (64), 69 (35), 56 (84), 55 (29). This compound is known.

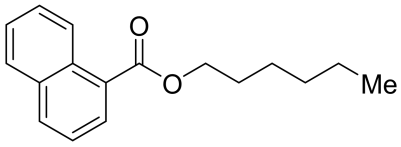


hexyl 4-nitrobenzoate (41c).[6] The title compound was prepared according to the general procedure: methyl 4-nitrobenzoate (36.2 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **41c** in 77% isolated yield (38.6 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.29 (d, J = 9.2 Hz, 2H), 8.21 (d, J = 8.8 Hz, 2H), 4.37 (t, J = 6.8 Hz, 2H), 1.83-1.76 (m, 2H), 1.49-1.42 (m, 2H), 1.37-1.34 (m, 4H), 0.91 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 164.7, 150.4, 135.9, 130.6, 123.5, 66.1, 31.4, 28.5, 25.6, 22.5, 14.0. MS (EI): m/z = 235 ([M^+ - O], 1), 221 (1), 169 (13), 168 (24), 151 (17), 150 (62), 120 (19), 104 (36), 92 (20), 84 (54), 83 (25), 76 (32), 75 (10), 69 (43), 65 (11), 56 (100), 55 (43), 50 (10). This compound is known.

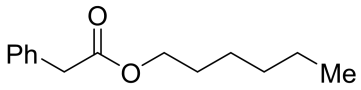


hexyl 2-naphthoate (42c).[6] The title compound was prepared according to the general procedure: methyl 2-naphthoate (37.2 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **42c** in 83% isolated yield (42.5 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.60 (s, 1H), 8.07 (dd, J_1 = 2.0 Hz, J_2 = 8.8 Hz, 1H), 7.96 (d, J = 8.0 Hz, 1H), 7.88 (d, J = 8.4 Hz, 2H), 7.60-7.52 (m, 2H), 4.38 (t, J = 6.8 Hz, 2H), 1.85-1.78 (m, 2H), 1.52-1.45 (m, 2H), 1.39-1.35 (m, 4H), 0.92 (t, J = 6.8 Hz, 3H); ^{13}C

NMR (100 MHz, $CDCl_3$): δ 166.8, 135.5, 132.5, 130.9, 129.3, 128.1, 128.1, 127.8, 127.7, 126.6, 125.3, 65.3, 31.5, 28.7, 25.7, 22.6, 14.0. GC-MS (EI): m/z = 257 ($[M + H]^+$, 3), 256 (17), 172 (100), 155 (40), 127 (38), 101 (2), 77 (4), 55 (3). This compound is known.

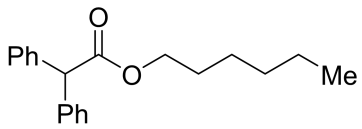


hexyl 1-naphthoate (43c).[10] The title compound was prepared according to the general procedure: methyl 1-naphthoate (37.2 mg, 0.2 mmol), 1-hexanol (24.5 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **43c** in 87% isolated yield (44.6 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.90 (d, J = 8.8 Hz, 1H), 8.18 (dd, J_1 = 1.2 Hz, J_2 = 7.2 Hz, 1H), 8.02 (d, J = 8.0 Hz, 1H), 7.88, (d, J = 7.6 Hz, 1H), 7.63-7.59 (m, 1H), 7.55-7.48 (m, 2H), 4.41 (t, J = 6.8 Hz, 2H), 1.86-1.79 (m, 2H), 1.53-1.46 (m, 2H), 1.40-1.33 (m, 4H), 0.92 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 167.7, 133.8, 133.2, 131.3, 130.0, 128.5, 127.6, 127.5, 126.1, 125.8, 124.5, 65.3, 31.5, 28.7, 25.8, 22. 6, 14.0. GC-MS (EI): m/z = 257 ($[M + H]^+$, 3), 256 (17), 172 (100), 155 (45), 144 (1), 127 (44), 101 (2), 77 (5), 55 (3). This compound is known.

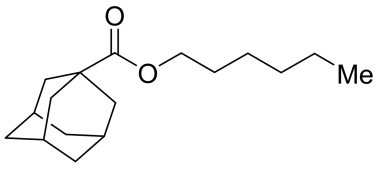


hexyl 2-phenylacetate (44c).[11] The title compound was prepared according to the general procedure: methyl 2-phenylacetate (30.0 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **44c** in 93% isolated yield (40.9 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.34-7.23 (m, 5H), 4.08 (t, J = 6.8 Hz, 2H), 3.60 (s, 2H), 1.63-1.56 (m, 2H), 1.33-1.24 (m, 6H), 0.87 (t, J = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 171.6, 134.2, 129.2, 128.5, 127.0, 65.0, 41.4, 31.3, 28.4, 25.4, 22.4, 13.9.

GC-MS (EI): m/z = 220 (M^+, 3), 137 (23), 136 (49), 129 (28), 119 (6), 92 (41), 91 (100), 85 (7), 65 (16), 57 (20), 51 (2). This compound is known.

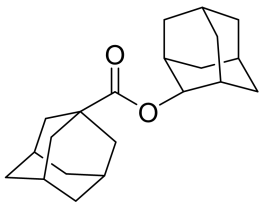


hexyl 2,2-diphenylacetate (45c).[12] The title compound was prepared according to the general procedure: methyl 2,2-diphenylacetate (45.2 mg, 0.2 mmol), 1-hexanol (40.9 mg, 0.4 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **45c** in 80% isolated yield (47.4 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.32-7.30 (m, 8H), 7.28-7.22 (m, 2H), 5.01 (s, 1H), 4.14 (t, *J* = 6.8 Hz, 2H), 1.64-1.57 (m, 2H), 1.30-1.24 (m, 6H), 0.85 (t, *J* = 6.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 172.5, 138.8, 128.6, 128.5, 127.2, 65.3, 57.2, 31.3, 28.4, 25.4, 22.4, 13.9. GC-MS (EI): m/z = 297 ($[M + H]^+$, 1), 296 (M^+, 5), 168 (16), 167 (100), 165 (15), 152 (9), 85 (1), 57 (2). This compound is known.

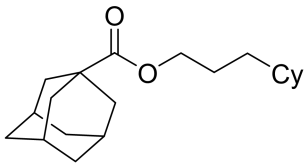


hexyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (46c).[13] The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 1-hexanol (24.5 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **46c** in 85% isolated yield (44.9 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.04 (t, *J* = 6.8 Hz, 2H), 2.01 (b, 3H), 1.88 (d, *J* = 3.2 Hz, 6H), 1.75-1.68 (m, 6H), 1.64-1.57 (m, 2H), 1.37-1.28 (m, 6H), 0.89 (t, *J* = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.8, 64.2, 40.7, 38.9, 36.6, 31.4, 28.6, 28.0, 25.6, 22.5, 14.0. GC-MS (EI): m/z = 181 (100), 163 (1), 135 (99), 121 (4),

107 (12), 93 (18), 84 (6), 79 (19), 67 (6), 55 (7). This compound is known.

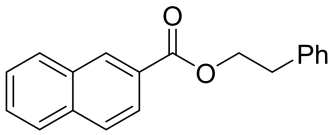


(1*R*,3*R*,5*R*,7*R*)-adamantan-2-yl (3*R*,5*R*,7*R*)-adamantane-1-carboxylate (47c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 2-adamantanol (60.9 mg, 0.4 mmol) and KF (11.6 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (90 mg). After charging N_2 for three times, TfOH (0.4 mmol, 2.0 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 150 °C for 10 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **47c** in 70% isolated yield (43.9 mg); white solid; mp 261-263 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.88 (t, *J* = 2.8 Hz, 1H), 2.02 (b, 5H), 1.96 (b, 2H), 1.92 (b, 6H), 1.86-1.83 (m, 4H), 1.78 (b, 2H), 1.73 (b, 8H), 1.57 (b, 1H), 1.54 (b, 1H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 177.0, 76.0, 40.9, 39.0, 37.4, 36.6, 36.3, 31.9, 31.8, 28.0, 27.3, 27.0. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{21}H_{30}O_2$ 315.2319; Found 315.2319.

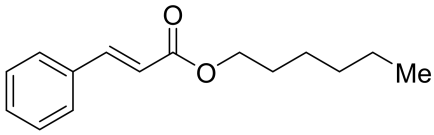


3-cyclohexylpropyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (48c). The title compound was prepared according to the general procedure: adamantan-1-carboxylic acid methyl ester (38.9 mg, 0.2 mmol), 3-cyclohexyl-1-propanol (34.1 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **48c** in 84% isolated yield (51.2 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.95 (t, *J* = 6.8 Hz, 2H), 1.94 (b, 3H), 1.81 (d, *J* = 2.8 Hz, 6H), 1.68-1.60 (m, 9H), 1.57-1.53 (m, 4H), 1.18-1.10 (m, 6H), 0.85-0.76 (m, 2H); ^{13}C NMR (100

MHz, $CDCl_3$): δ 177.8, 64.5, 40.7, 38.9, 37.3, 36.5, 33.6, 33.3, 28.0, 26.6, 26.3, 26.0. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{20}H_{32}O_2$ 305.2475; Found 305.2475.

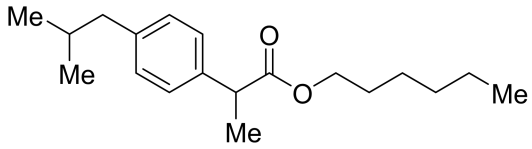


phenethyl 2-naphthoate (49c).[14] The title compound was prepared according to the general procedure: methyl 2-naphthoate (37.2 mg, 0.2 mmol), phenethyl alcohol (29.3 mg, 0.24 mmol) and KCl (14.9 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **49c** in 80% isolated yield (44.1 mg); white solid; mp 68-69 °C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 8.57 (s, 1H), 8.03 (d, *J* = 8.8 Hz, 1H), 7.94 (d, *J* = 8.0 Hz, 1H), 7.86 (d, *J* = 8.4 Hz, 2H), 7.60-7.51 (m, 2H), 7.36-7.31 (m, 4H), 7.26-7.24 (m, 1H), 4.59 (t, *J* = 7.2 Hz, 2H), 3.13 (t, *J* = 7.2 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 166.6, 137.9, 135.5, 132.4, 131.0, 129.3, 129.0, 128.5, 128.2, 128.1, 127.7, 127.5, 126.6, 125.2, 65.6, 35.3. MS (EI): m/z = 276 (M^+, 3), 173 (13), 172 (100), 155 (41), 127 (46), 104 (36), 91 (2), 77 (8). This compound is known.

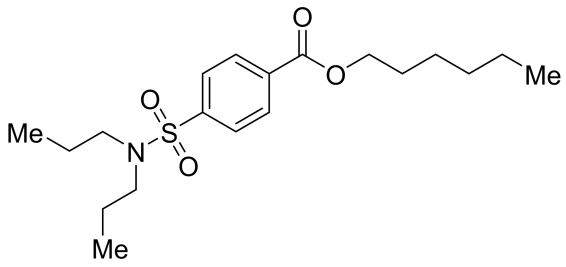


hexyl cinnamate (50c).[6] The title compound was prepared according to the general procedure: methyl cinnamate (32.4 mg, 0.2 mmol), 1-hexanol (40.9 mg, 0.4 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **50c** in 90% isolated yield (41.7 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.69 (d, *J* = 16.0 Hz, 1H), 7.54-7.52 (m, 2H), 7.39-7.37 (m, 3H), 6.45 (d, *J* = 16.4 Hz, 1H), 4.20 (t, *J* = 6.8 Hz, 2H), 1.74-1.67 (m, 2H), 1.44-1.31 (m, 6H), 0.90 (t, *J* = 6.8 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 167.1, 144.5, 134.4, 130.2, 128.8, 128.0, 118.2, 64.7, 31.4, 28.6, 25.6, 22.5, 14.0. GC-MS (EI): m/z = 233 ($[M + H]^+$, 2), 232 (M^+,

11), 189 (13), 149 (26), 148 (89), 147 (67), 132 (11), 131 (100), 104 (13), 103 (57), 102 (11), 77 (34), 56 (11), 55 (10). This compound is known.



hexyl 2-(4-isobutylphenyl) propanoate (51c).[15] The title compound was prepared according to the general procedure: methyl 2-(4-isobutylphenyl) propanoate (44.1 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **51c** in 83% isolated yield (48.1 mg); colorless liquid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 7.20 (d, *J* = 8.0 Hz, 2H), 7.08 (d, *J* = 8.0 Hz, 2H), 4.05 (t, *J* = 6.4 Hz, 2H), 3.68 (q, *J* = 7.2 Hz, 1H), 2.44 (d, *J* = 7.2 Hz, 2H), 1.89-1.79 (m, 1H), 1.59-1.52 (m, 2H), 1.48 (d, *J* = 7.2 Hz, 3H), 1.28-1.24 (m, 6H), 0.89 (d, *J* = 6.4 Hz, 6H), 0.85 (t, *J* = 6.4 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 174.8, 140.4, 137.9, 129.2, 127.1, 64.8, 45.2, 45.0, 31.3, 30.2, 28.5, 25.4, 22.5, 22.4, 18.4, 13.9. GC-MS (EI): m/z = 291 ([M + H]$^+$, 2), 290 (9), 206 (8), 162 (15), 161 (100), 119 (19), 117 (10), 105 (6), 91 (10), 83 (3), 57 (9), 55 (6). This compound is known.



hexyl 4-(*N*,*N*-dipropylsulfamoyl) benzoate (52c). The title compound was prepared according to the general procedure: methyl 4-(*N*,*N*-dipropylsulfamoyl) benzoate (59.8 mg, 0.2 mmol), 1-hexanol (30.6 mg, 0.3 mmol) and KBr (23.8 mg, 0.2 mmol) were added to a 25 mL Schlenk tube with 4Å MS (150 mg). After charging N_2 for three times, TfOH (0.14 mmol, 0.7 equiv.) and cyclohexane (2 mL) were added. The reaction mixture was heated at 130 °C for 24 hours. After completion, the reaction mixture was concentrated under vacuum. The crude product was purified by PTLC eluting with petroleum ether to afford analytically pure **52c** in 80% isolated yield (59.1 mg); colorless liquid. ^{1}H NMR (400 MHz,

$CDCl_3$): δ 8.16 (d, *J* = 8.4 Hz, 2H), 7.88 (d, *J* = 8.4 Hz, 2H), 4.35 (t, *J* = 6.4 Hz, 2H), 3.10 (t, *J* = 7.6 Hz, 4H), 1.82-1.75 (m, 2H), 1.60-1.50 (m, 4H), 1.48-1.41 (m, 2H), 1.37-1.32 (m, 4H), 0.93-0.85 (m, 9H); ^{13}C NMR (100 MHz, $CDCl_3$): δ 165.4, 144.1, 133.8, 130.4, 127.0, 65.8, 49.9, 31.4, 28.6, 25.7, 22.6, 22.0, 14.0, 11.2. HRMS (APCI-TOF) m/z: $[M + H]^+$ Calcd for $C_{19}H_{31}O_4SN$ 370.2047; Found 370.2047.

4. Reference

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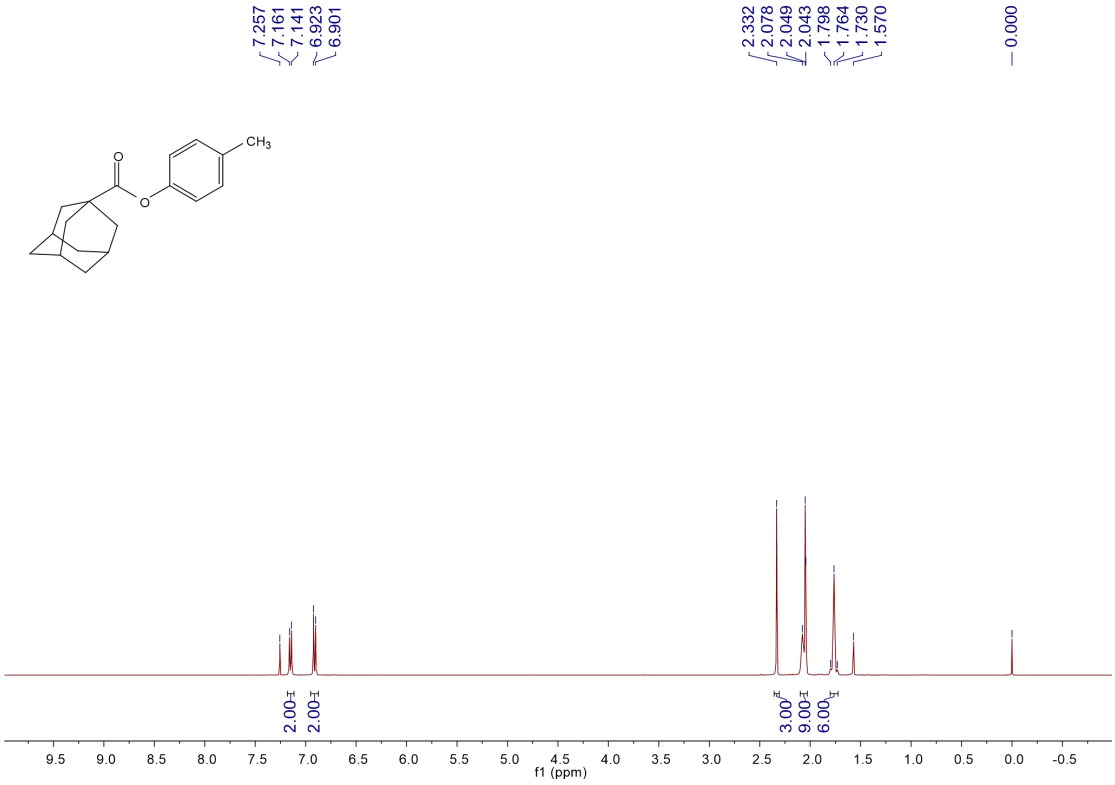
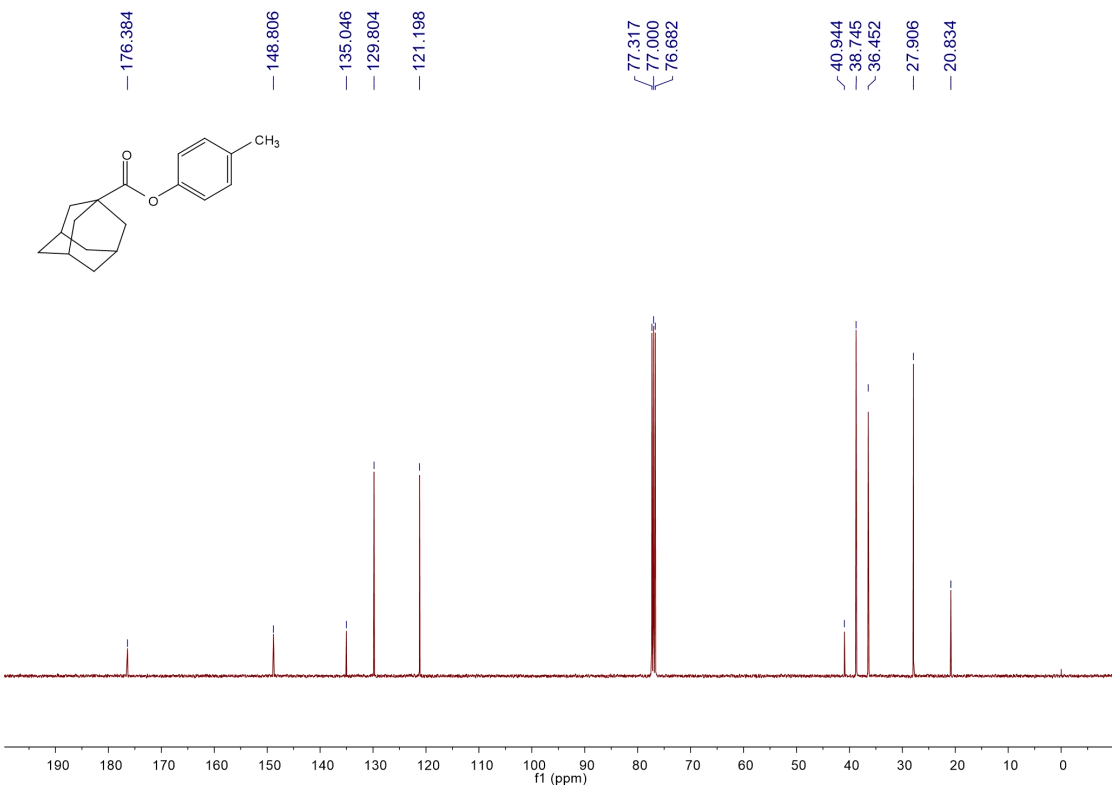
5. Copies of ^{1}H, ^{13}C and ^{19}F NMR Spectra of the Products

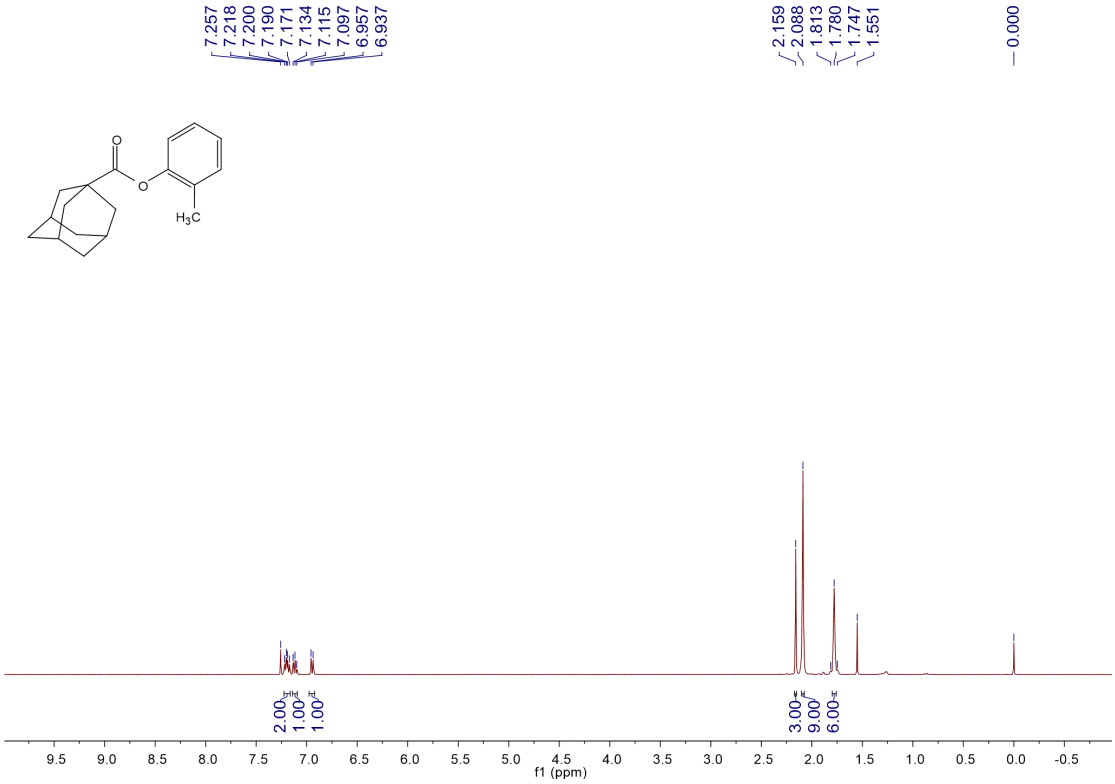
^{1}H NMR Spectrum of ***p*-tolyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (1c)**



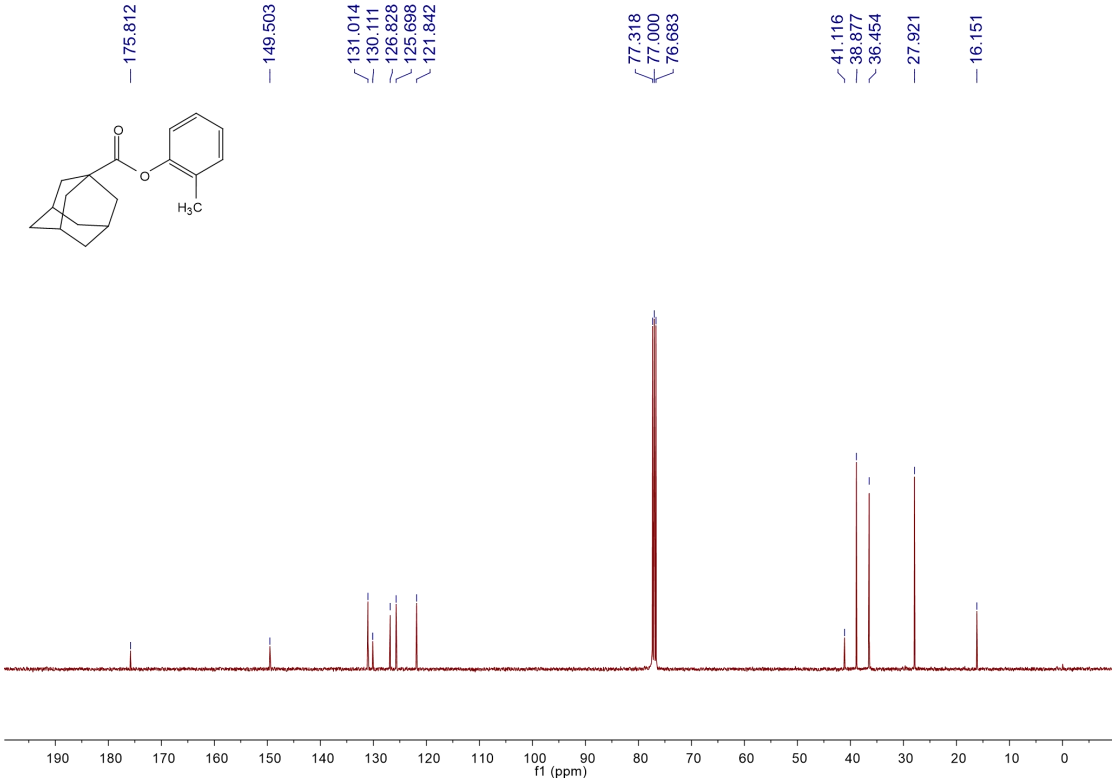
^{13}C NMR Spectrum of ***p*-tolyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (1c)**



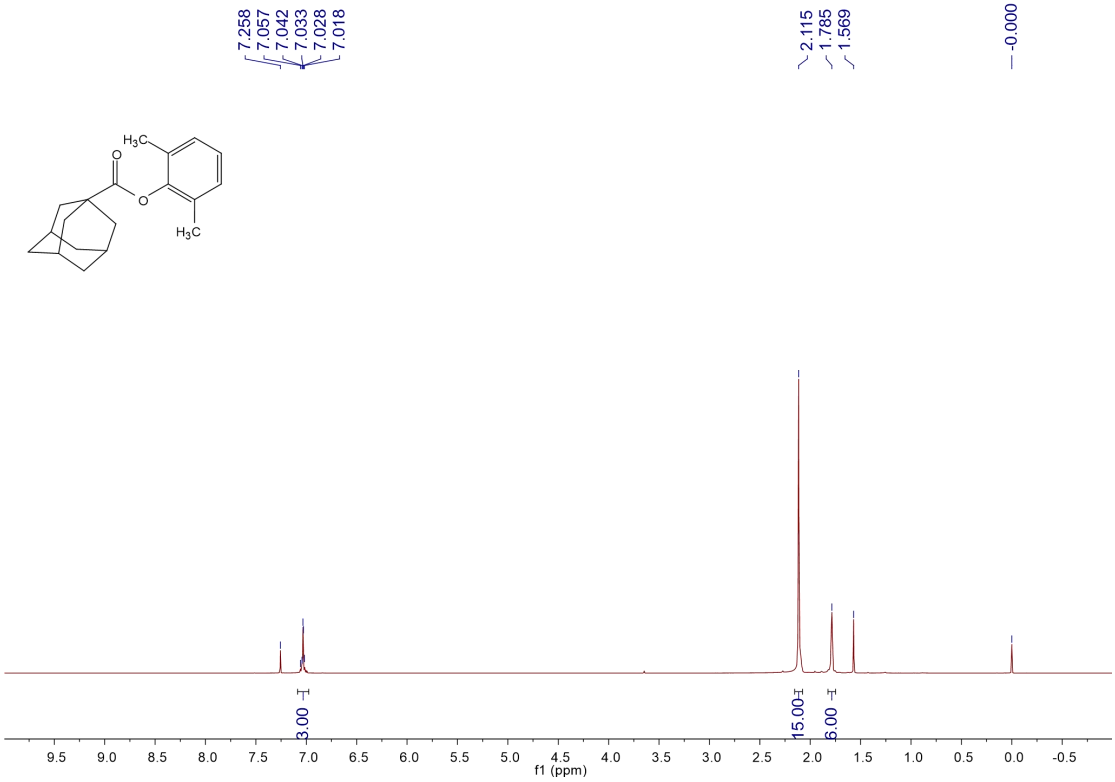
[1]H NMR Spectrum of ***o*-tolyl (3r,5r,7r)-adamantane-1-carboxylate (2c)**



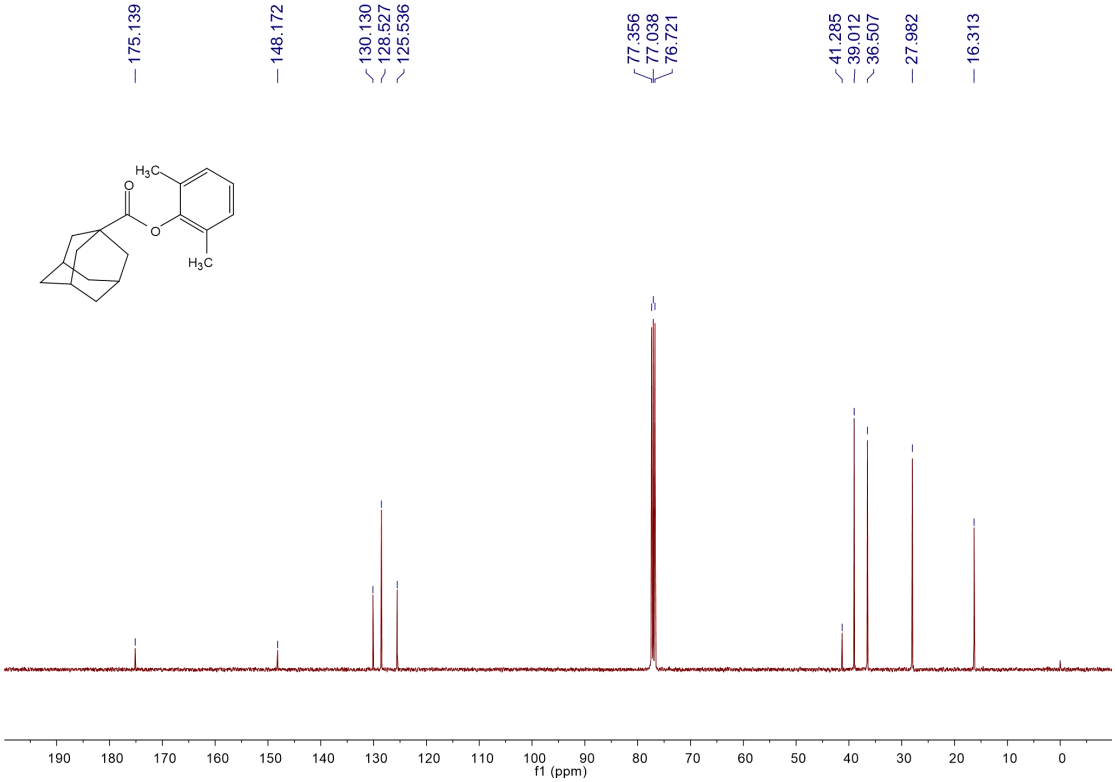
[13]C NMR Spectrum of ***o*-tolyl (3r,5r,7r)-adamantane-1-carboxylate (2c)**



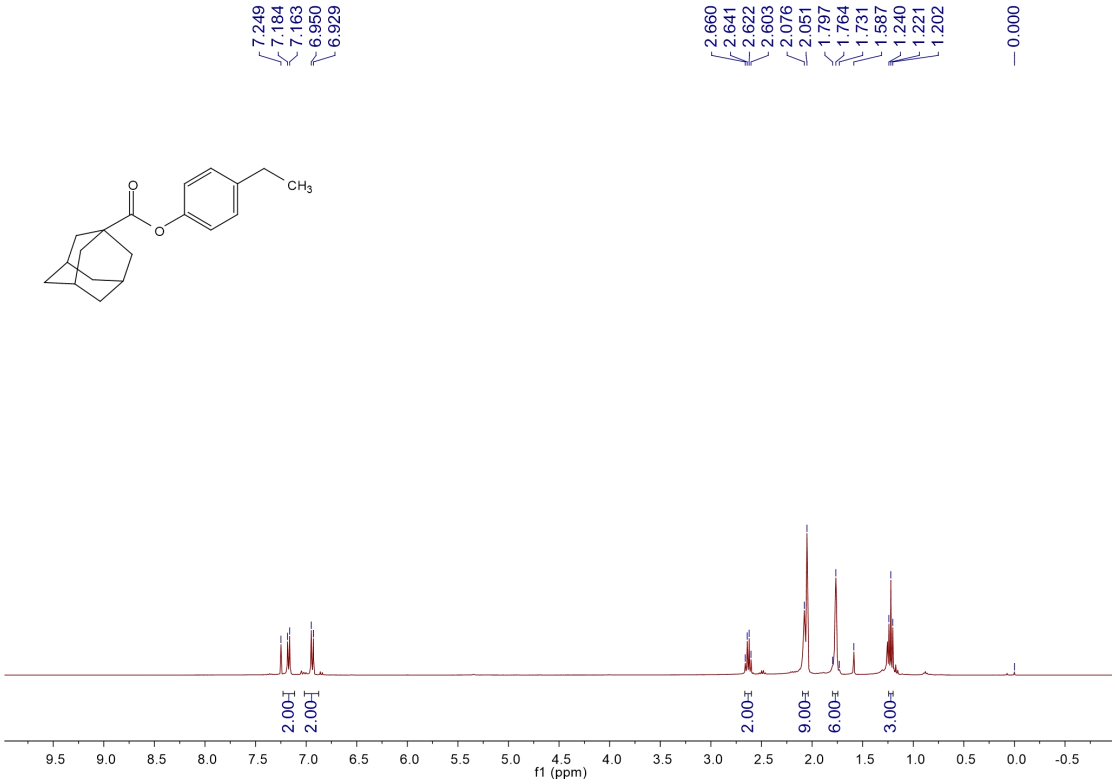
^{1}H NMR Spectrum of **2,6-dimethylphenyl (3*r*, 5*r*, 7*r*)-adamantane-1-carboxylate (3c)**



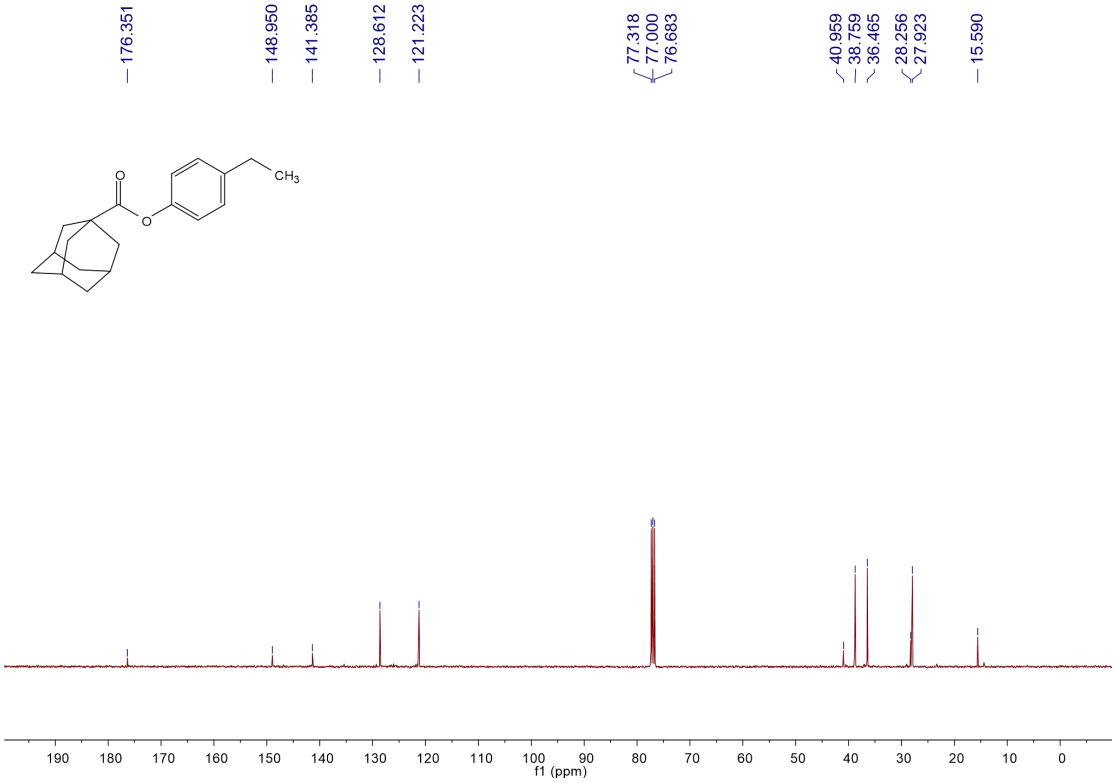
^{13}C NMR Spectrum of **2,6-dimethylphenyl (3*r*, 5*r*, 7*r*)-adamantane-1-carboxylate (3c)**



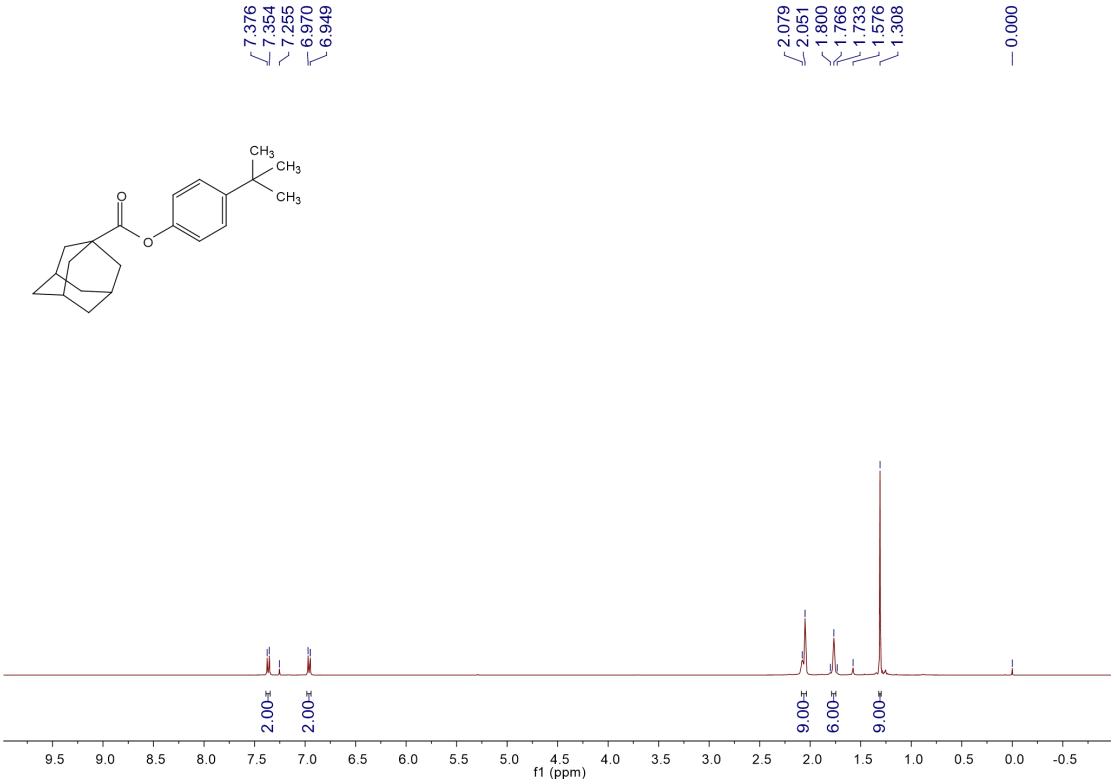
^{1}H NMR Spectrum of **4-ethylphenyl (3r,5r,7r)-adamantane-1-carboxylate (4c)**



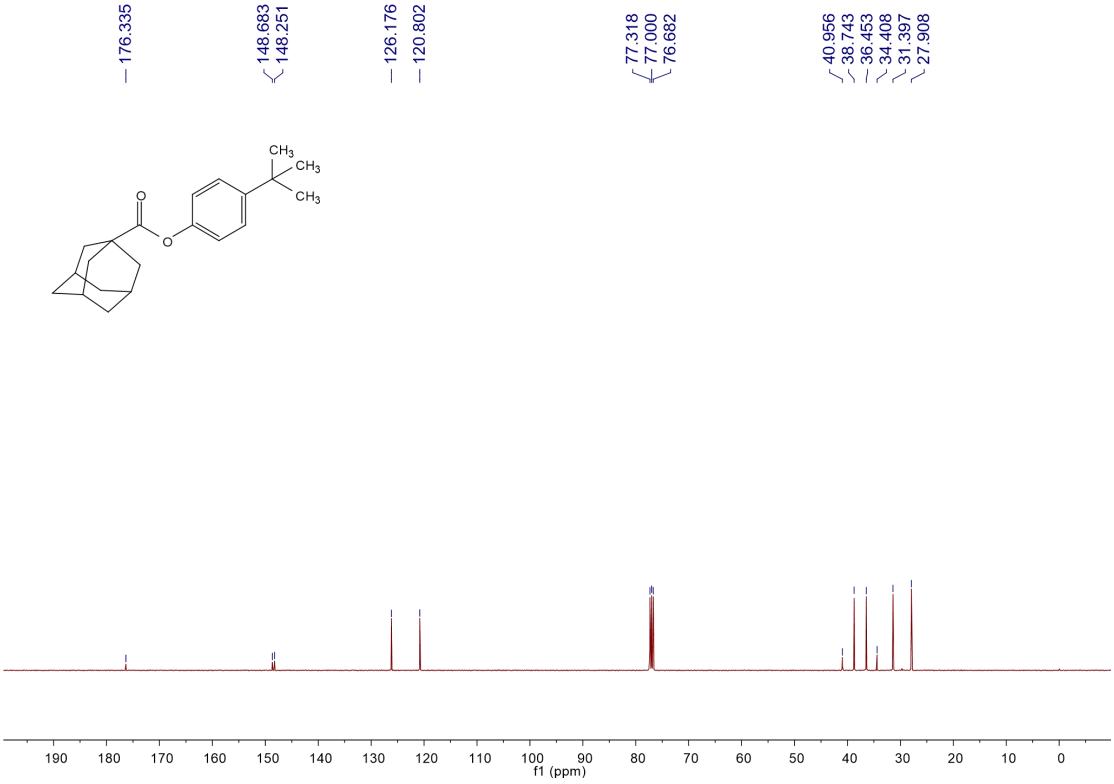
^{13}C NMR Spectrum of **4-ethylphenyl (3r,5r,7r)-adamantane-1-carboxylate (4c)**



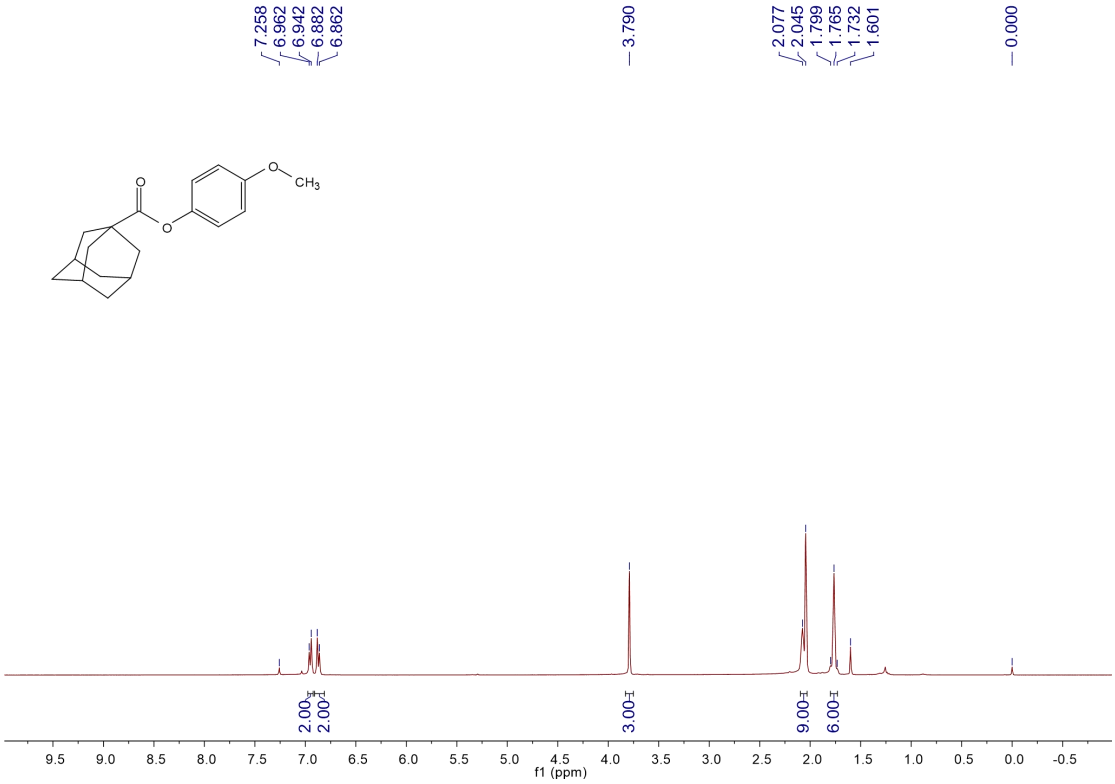
^{1}H NMR Spectrum of **4-(tert-butyl)phenyl (3r,5r,7r)-adamantane-1-carboxylate (5c)**



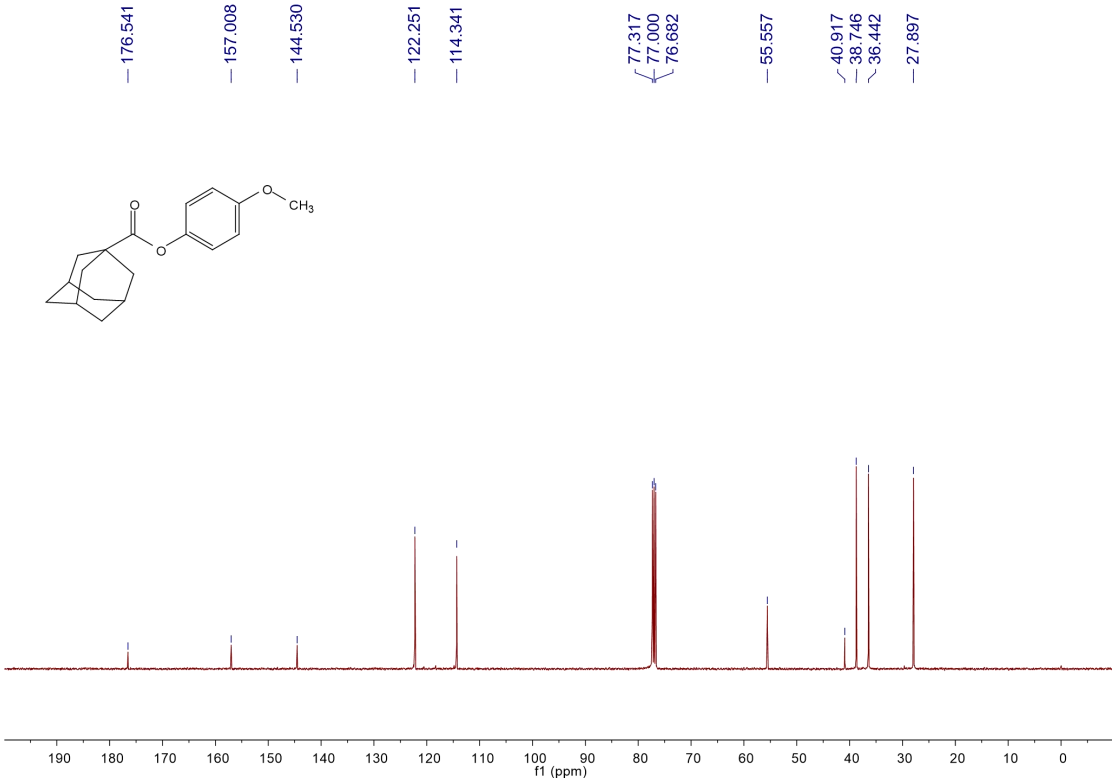
^{13}C NMR Spectrum of **4-(tert-butyl)phenyl (3r,5r,7r)-adamantane-1-carboxylate (5c)**



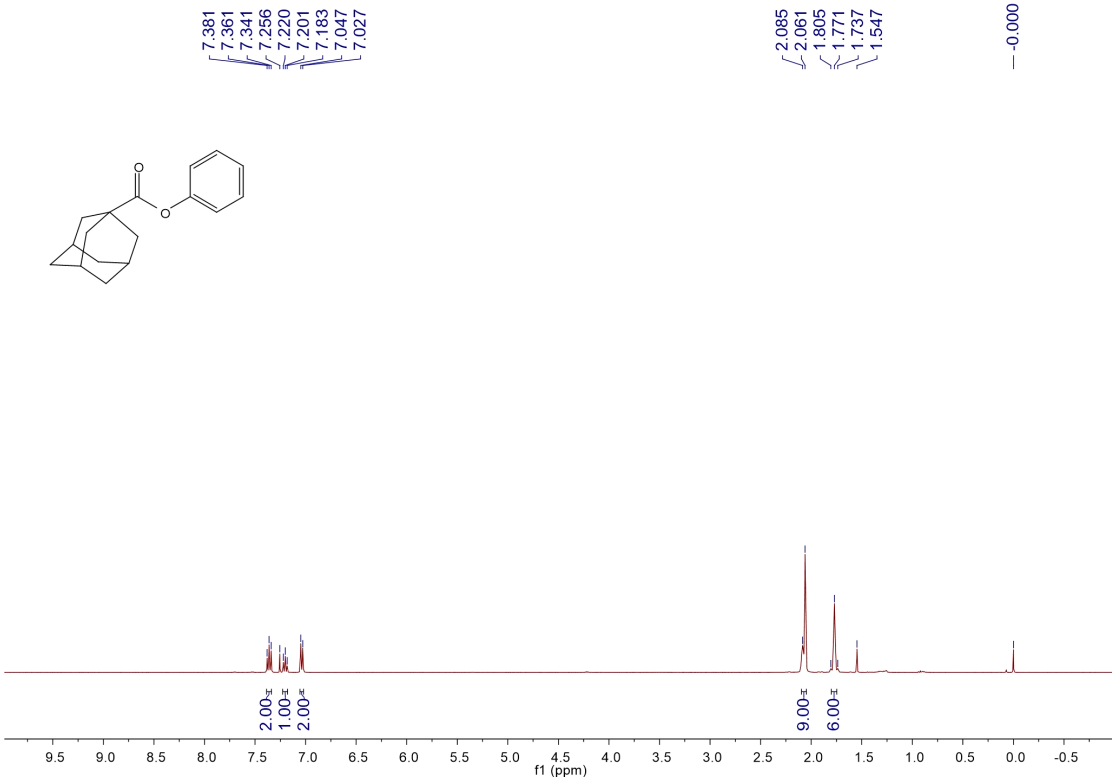
^{1}H NMR Spectrum of **4-methoxyphenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (6c)**



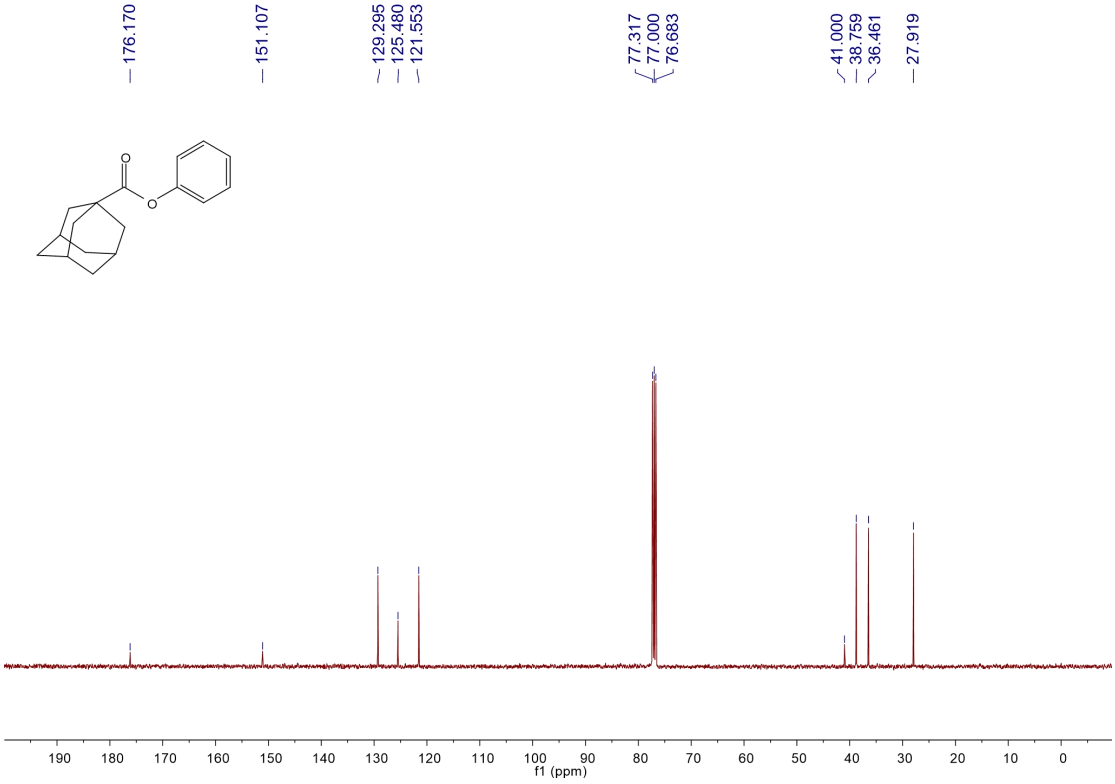
^{13}C NMR Spectrum of **4-methoxyphenyl (3*r*,5*r*,7*r*)-adamantane-1-carboxylate (6c)**



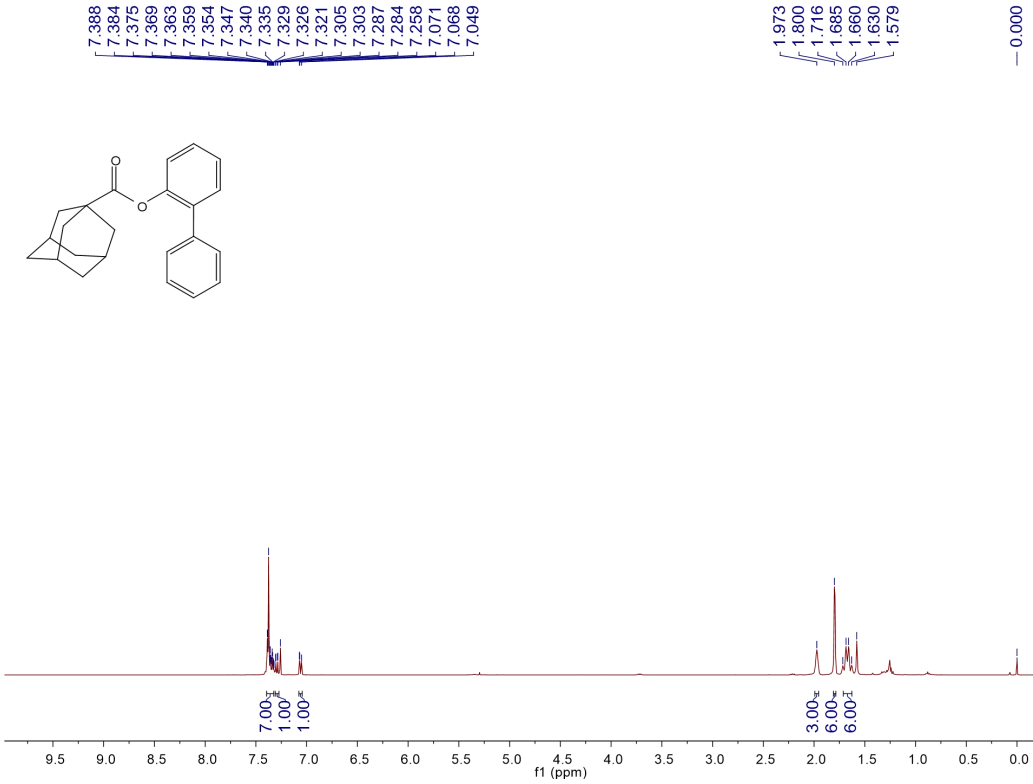
^{1}H NMR Spectrum of **phenyl (3r,5r,7r)-adamantane-1-carboxylate (8c)**



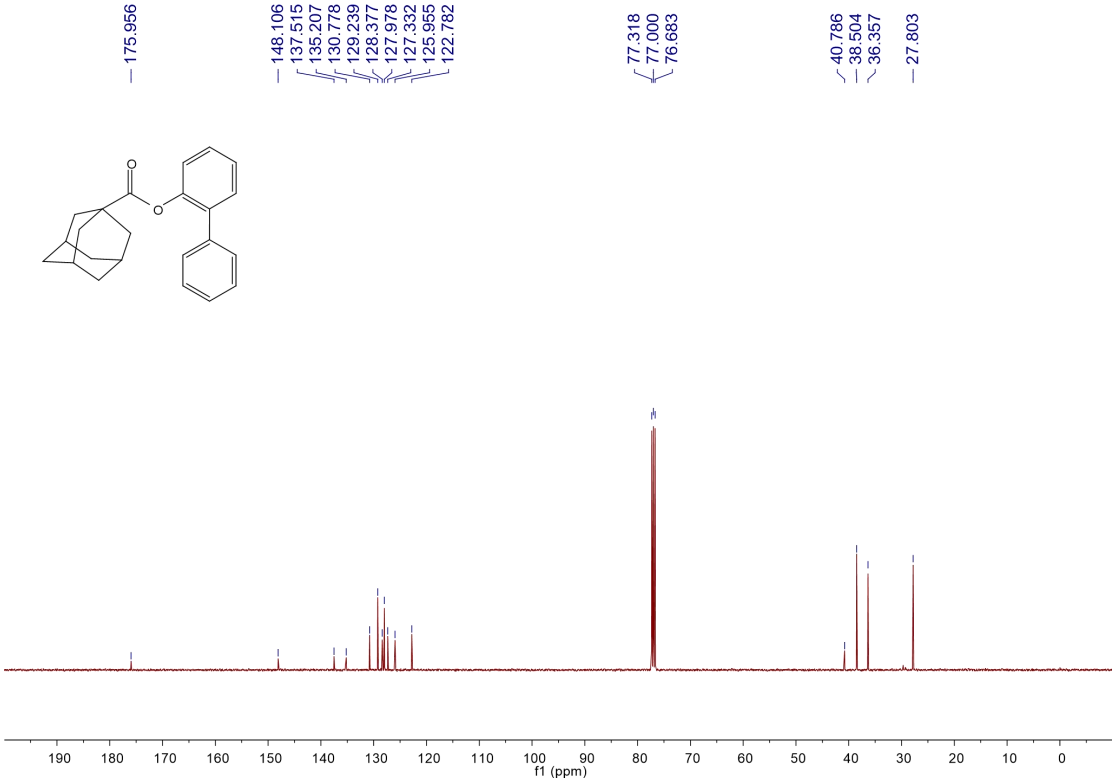
^{13}C NMR Spectrum of **phenyl (3r,5r,7r)-adamantane-1-carboxylate (8c)**



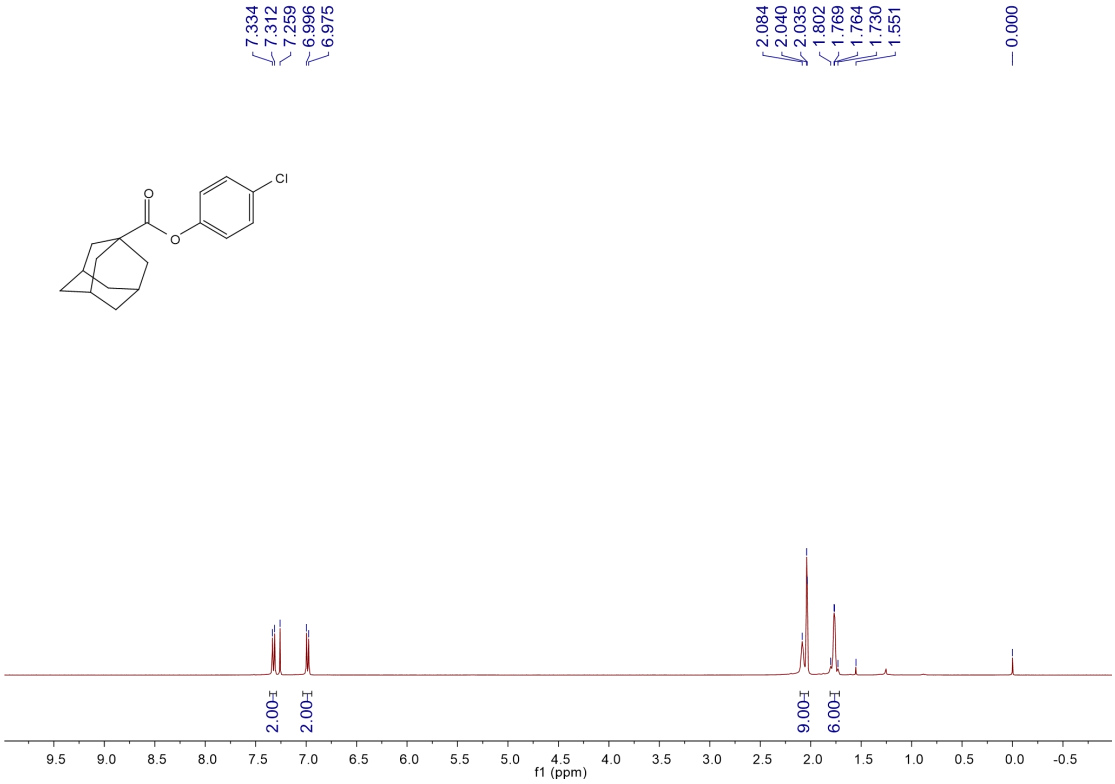
^{1}H NMR Spectrum of **[1,1'-biphenyl]-2-yl (3r,5r,7r)-adamantane-1-carboxylate (9c)**



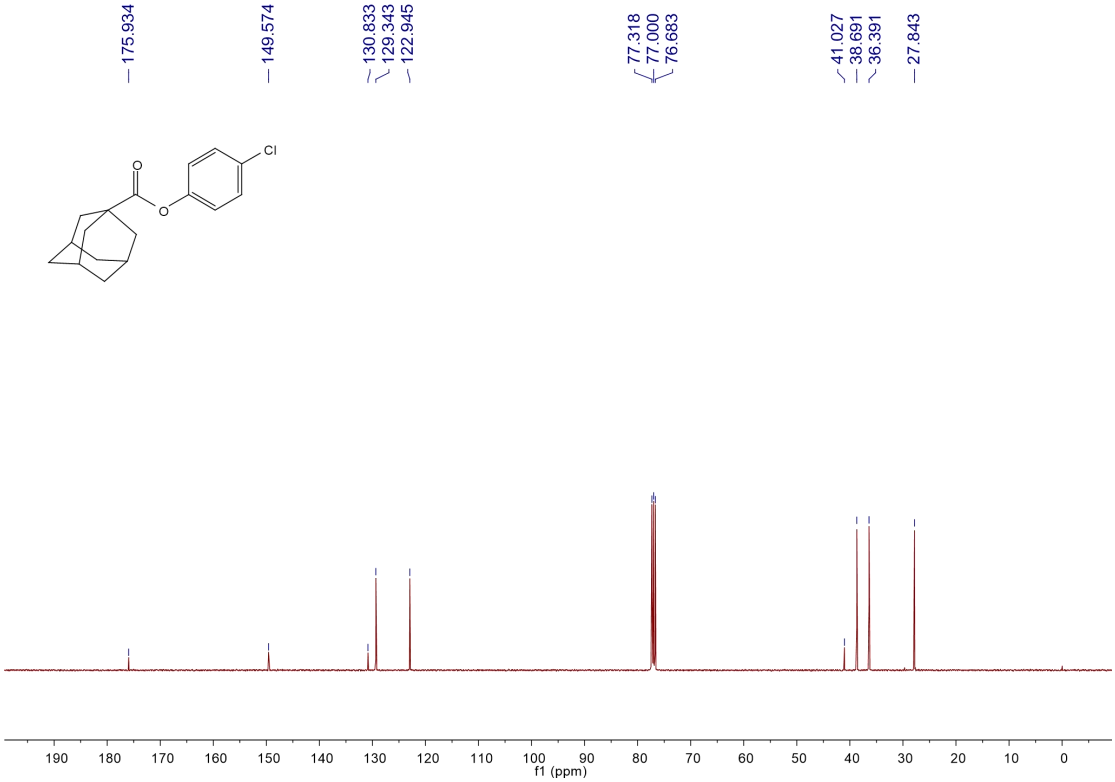
^{13}C NMR Spectrum of **[1,1'-biphenyl]-2-yl (3r,5r,7r)-adamantane-1-carboxylate (9c)**



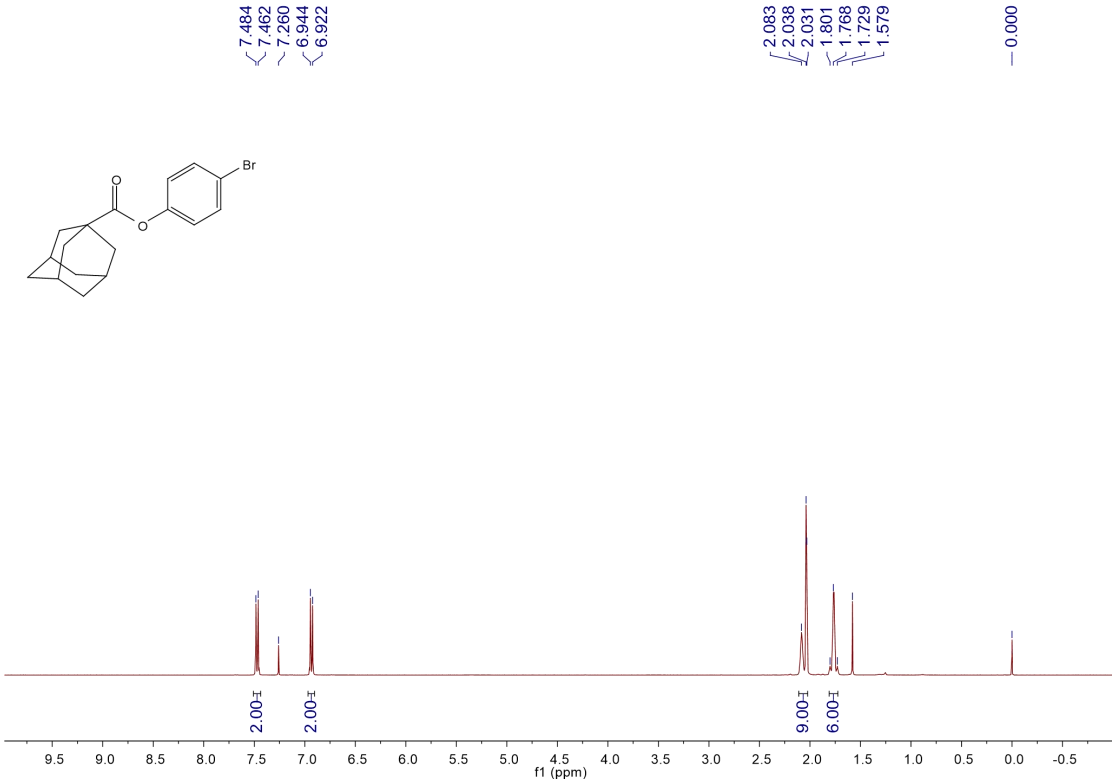
^{1}H NMR Spectrum of **4-chlorophenyl (3r,5r,7r)-adamantane-1-carboxylate (10c)**



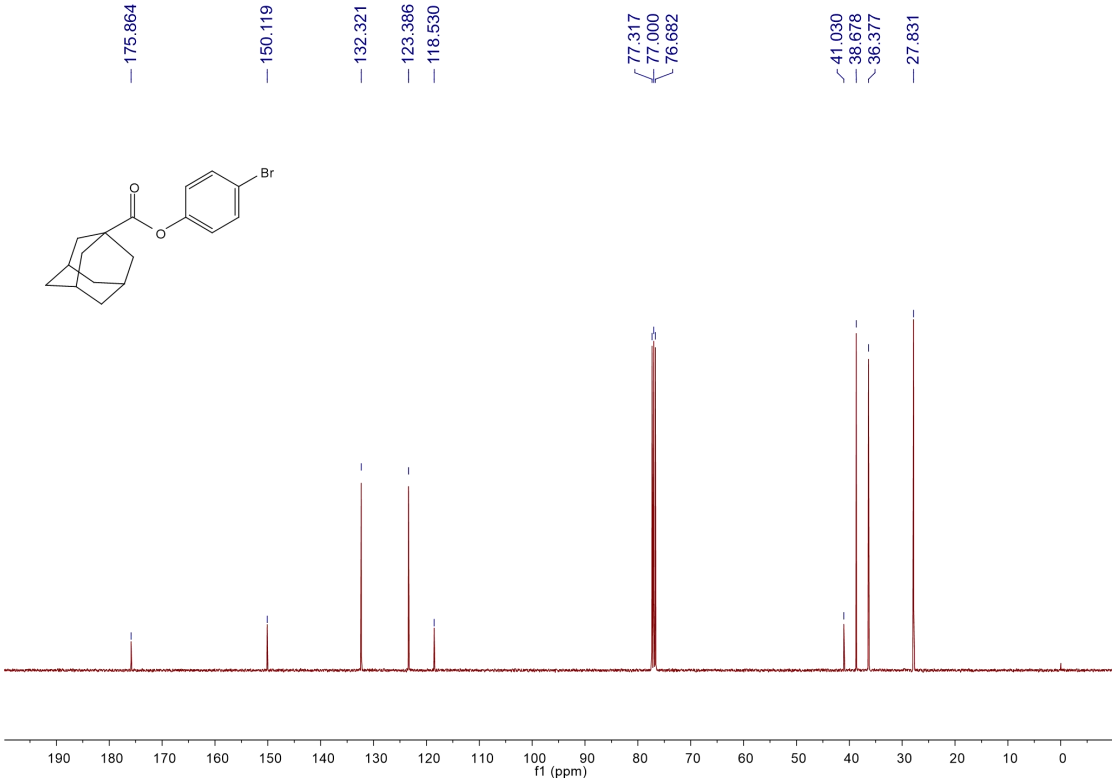
^{13}C NMR Spectrum of **4-chlorophenyl (3r,5r,7r)-adamantane-1-carboxylate (10c)**



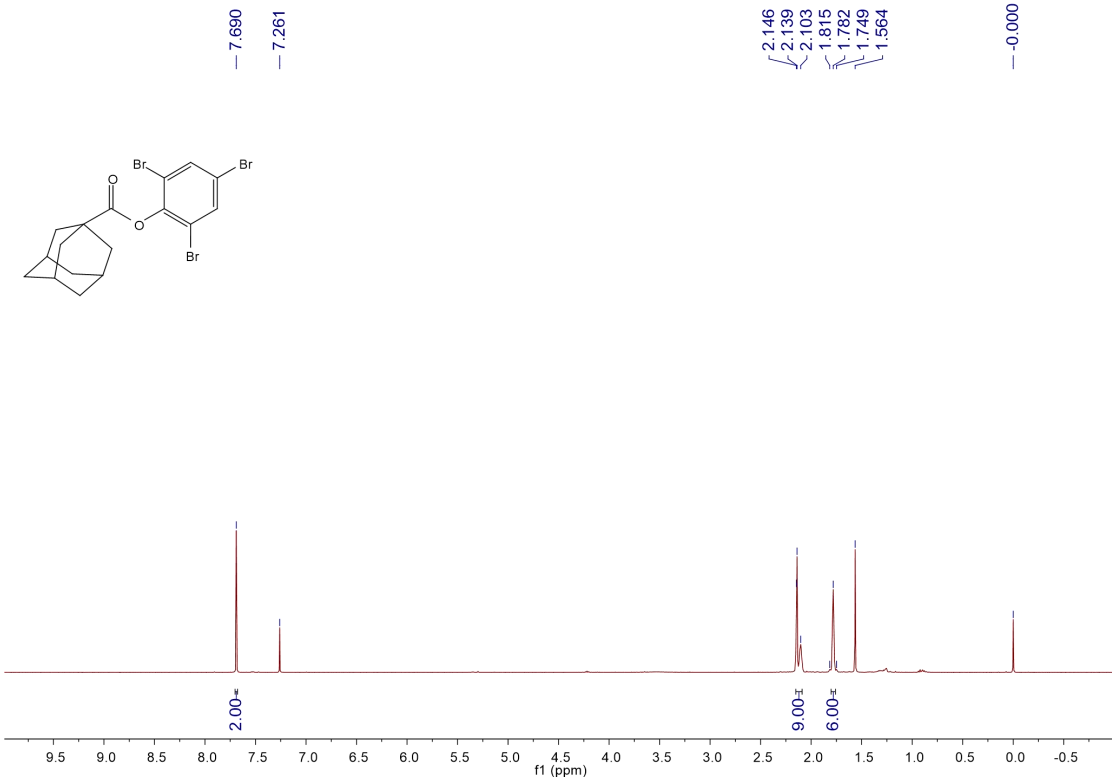
^{1}H NMR Spectrum of **4-bromophenyl (3r,5r,7r)-adamantane-1-carboxylate (11c)**



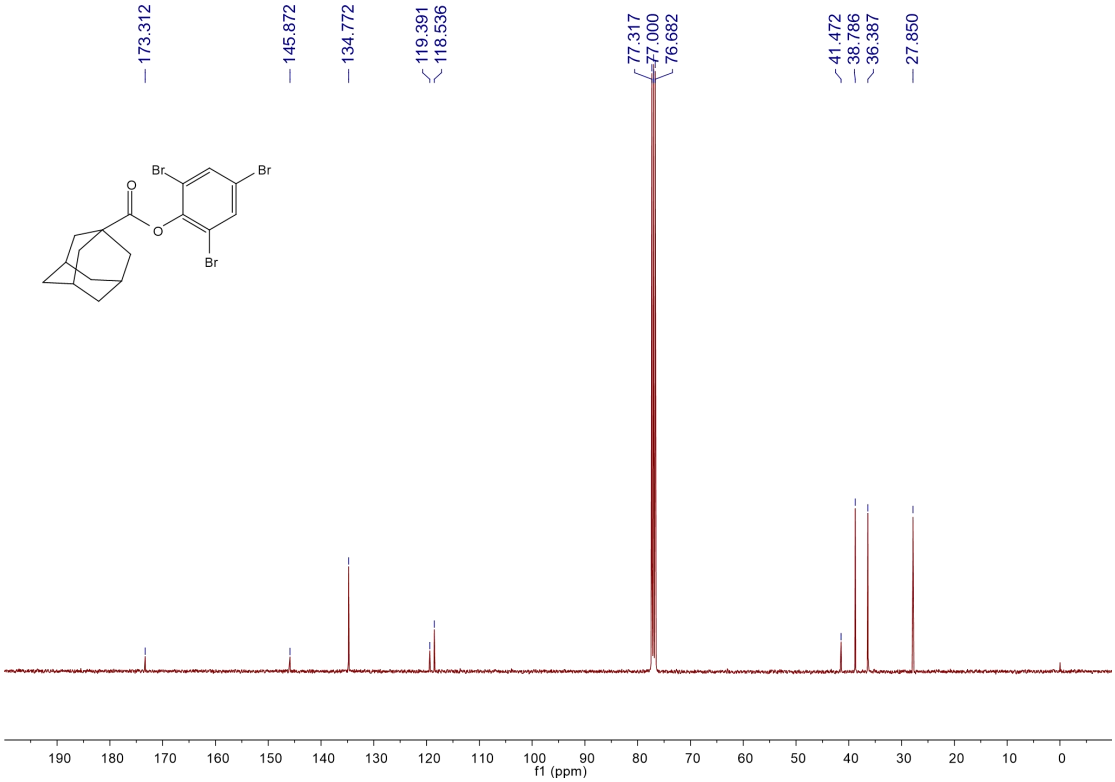
^{13}C NMR Spectrum of **4-bromophenyl (3r,5r,7r)-adamantane-1-carboxylate (11c)**



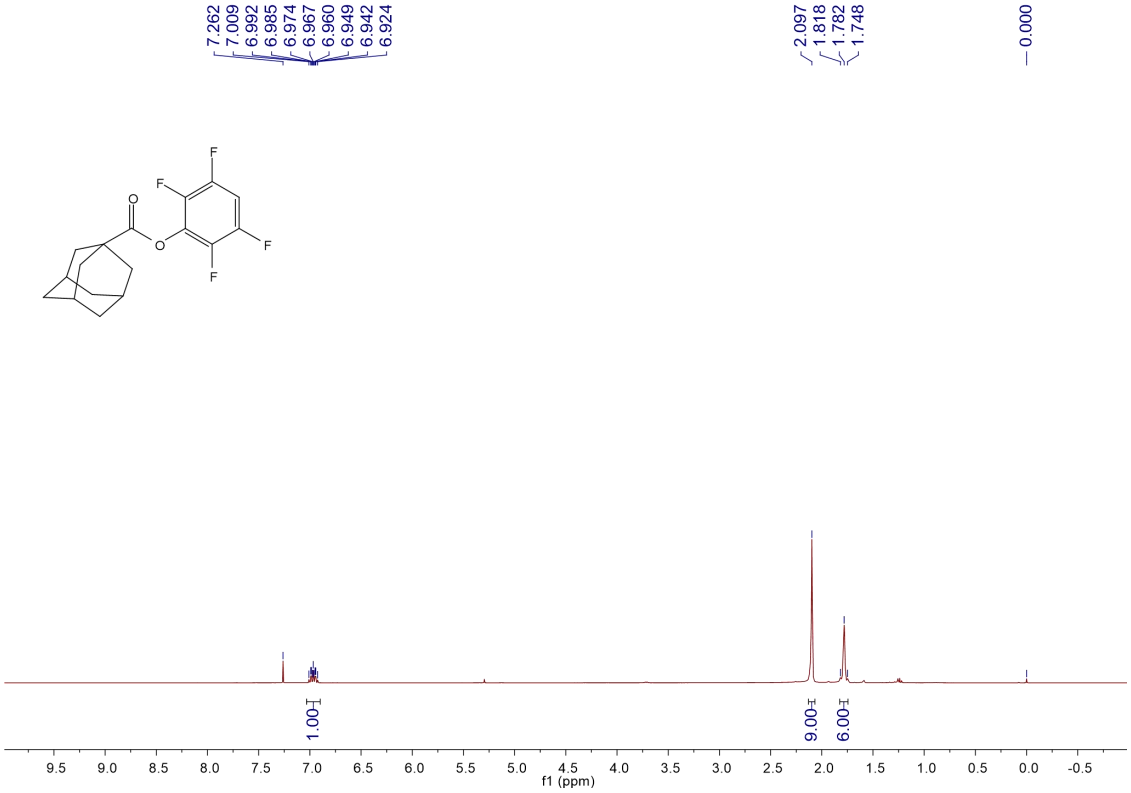
^{1}H NMR Spectrum of **2,4,6-tribromophenyl (3r,5r,7r)-adamantane-1-carboxylate (12c)**



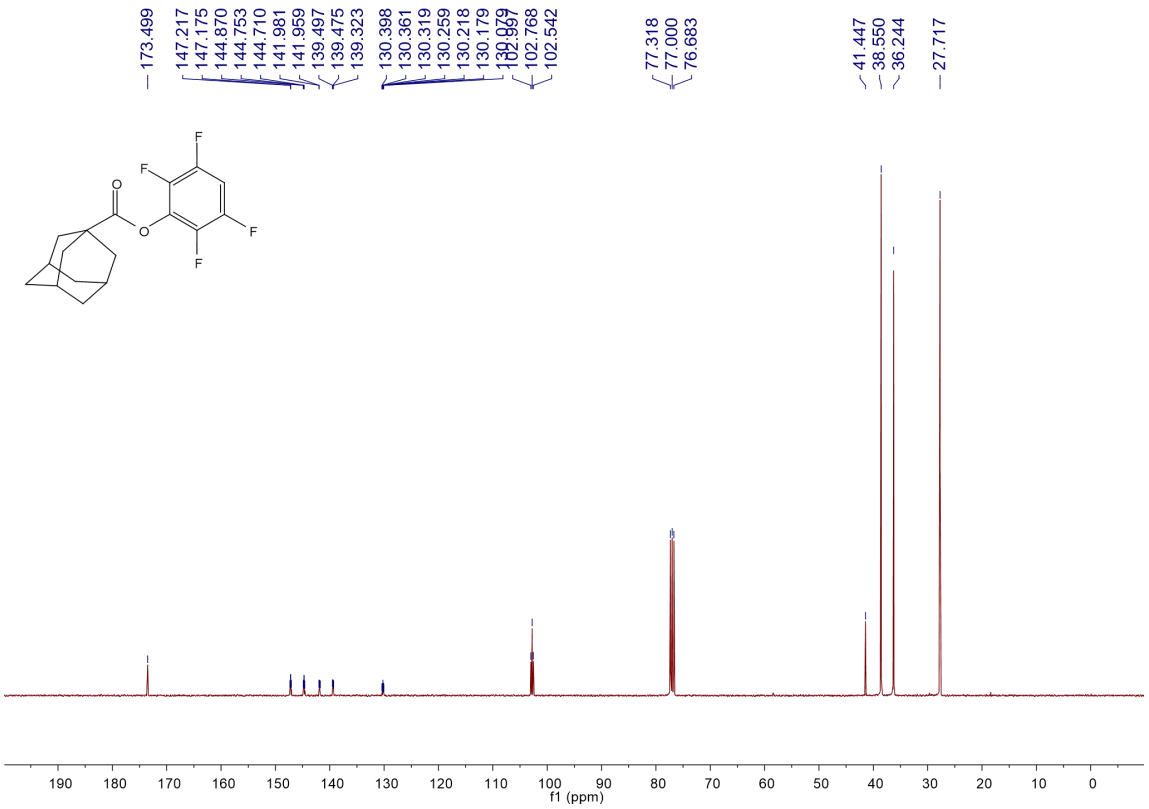
^{13}C NMR Spectrum of **2,4,6-tribromophenyl (3r,5r,7r)-adamantane-1-carboxylate (12c)**



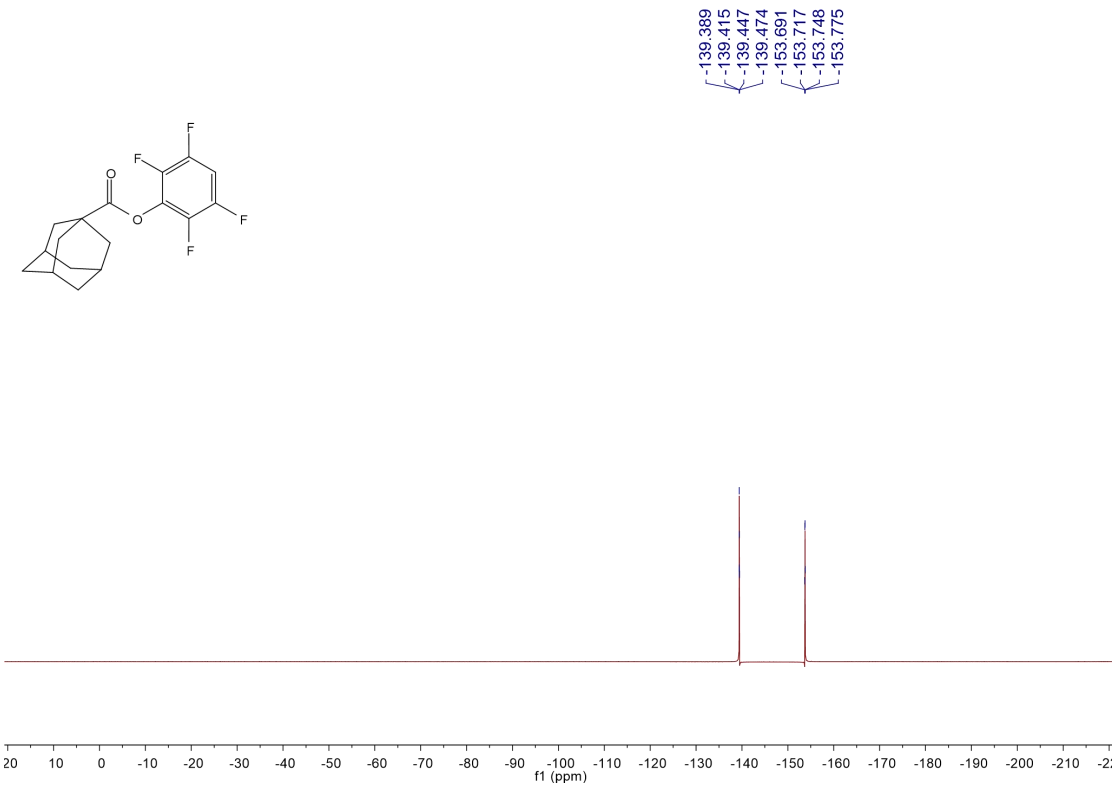
^{1}H NMR Spectrum of **ww2,3,5,6-tetrafluorophenyl (3r,5r,7r)-adamantane-1-carboxylate (13c)**



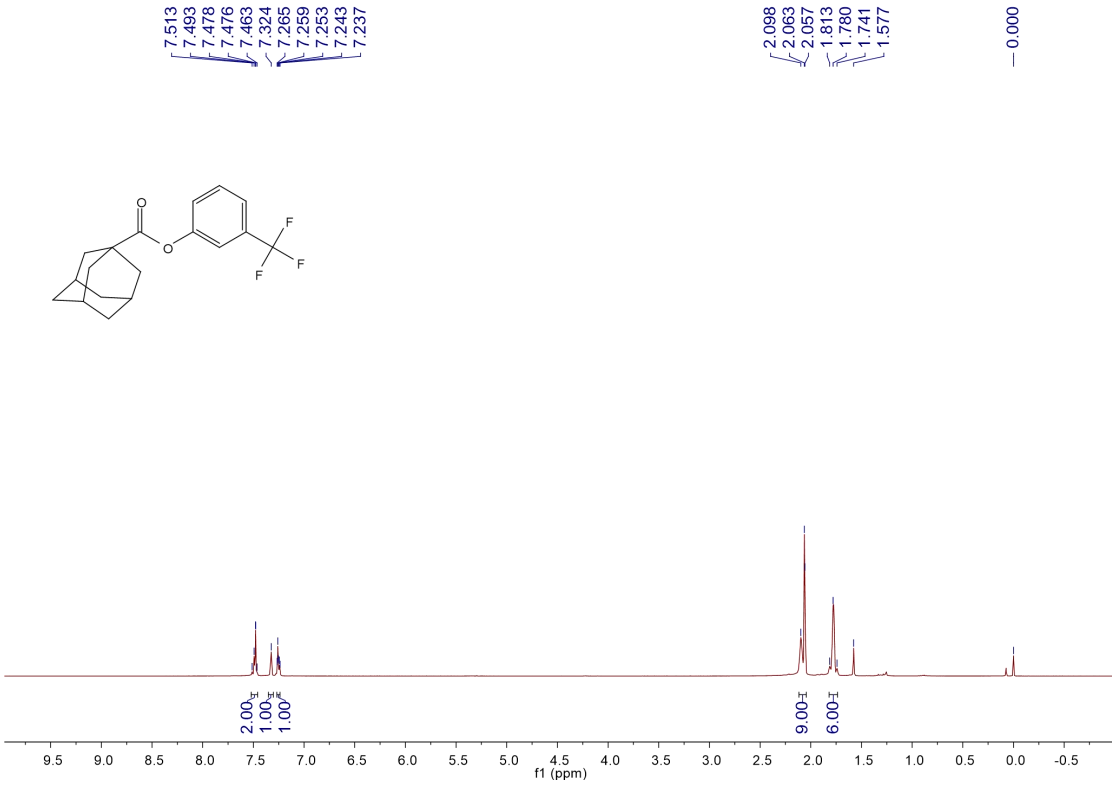
^{13}C NMR Spectrum of **2,3,5,6-tetrafluorophenyl (3r,5r,7r)-adamantane-1-carboxylate (13c)**



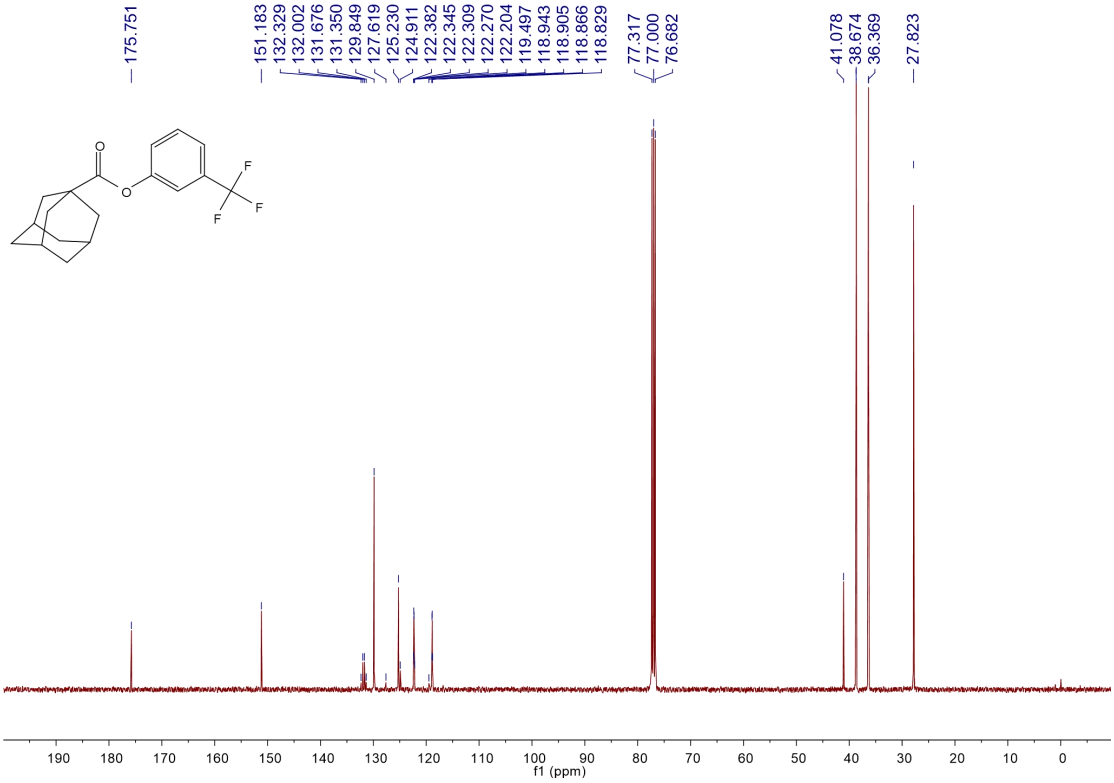
^{19}F NMR Spectrum of **2,3,5,6-tetrafluorophenyl (3r,5r,7r)-adamantane-1-carboxylate (13c)**



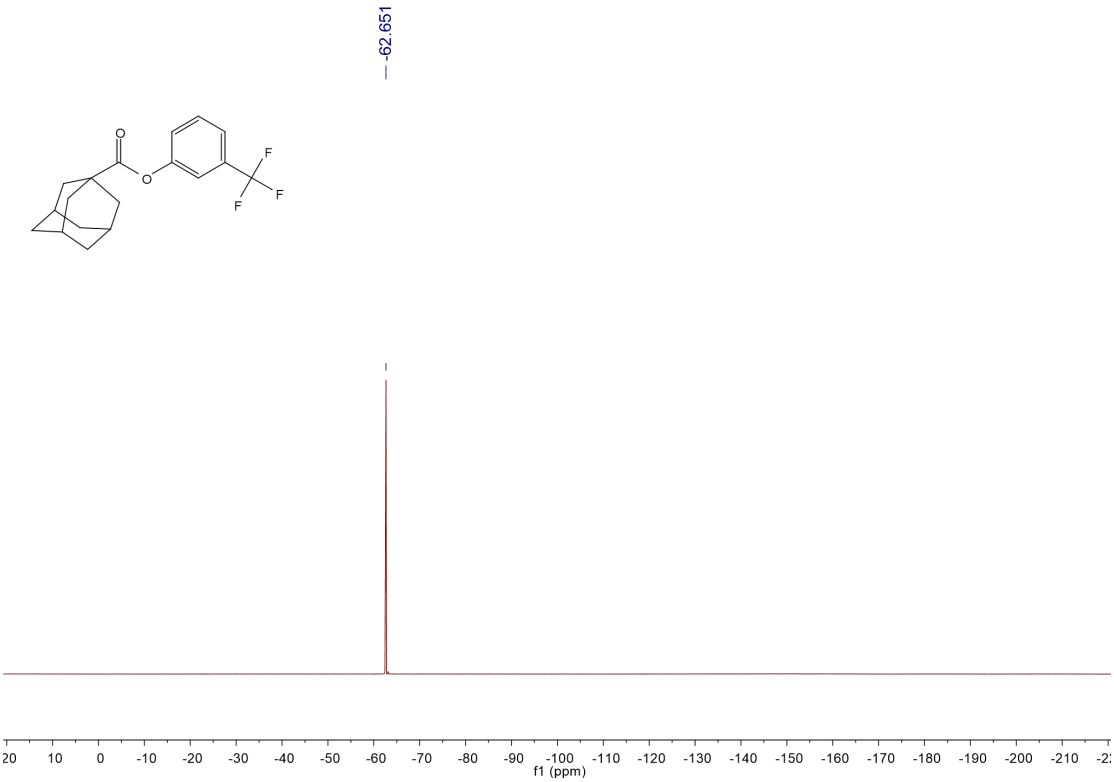
^{1}H NMR Spectrum of **3-(trifluoromethyl) phenyl (3r,5r,7r)-adamantane-1-carboxylate (14c)**



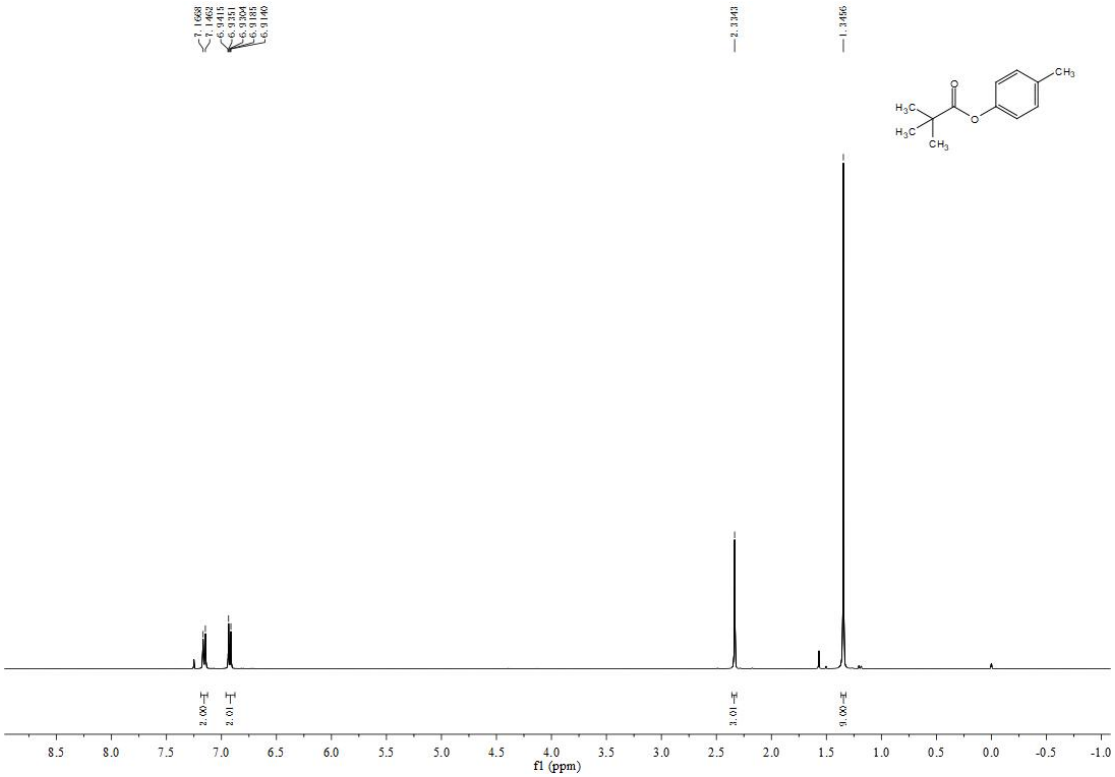
^{13}C NMR Spectrum of **3-(trifluoromethyl) phenyl (3r,5r,7r)-adamantane-1-carboxylate (14c)**



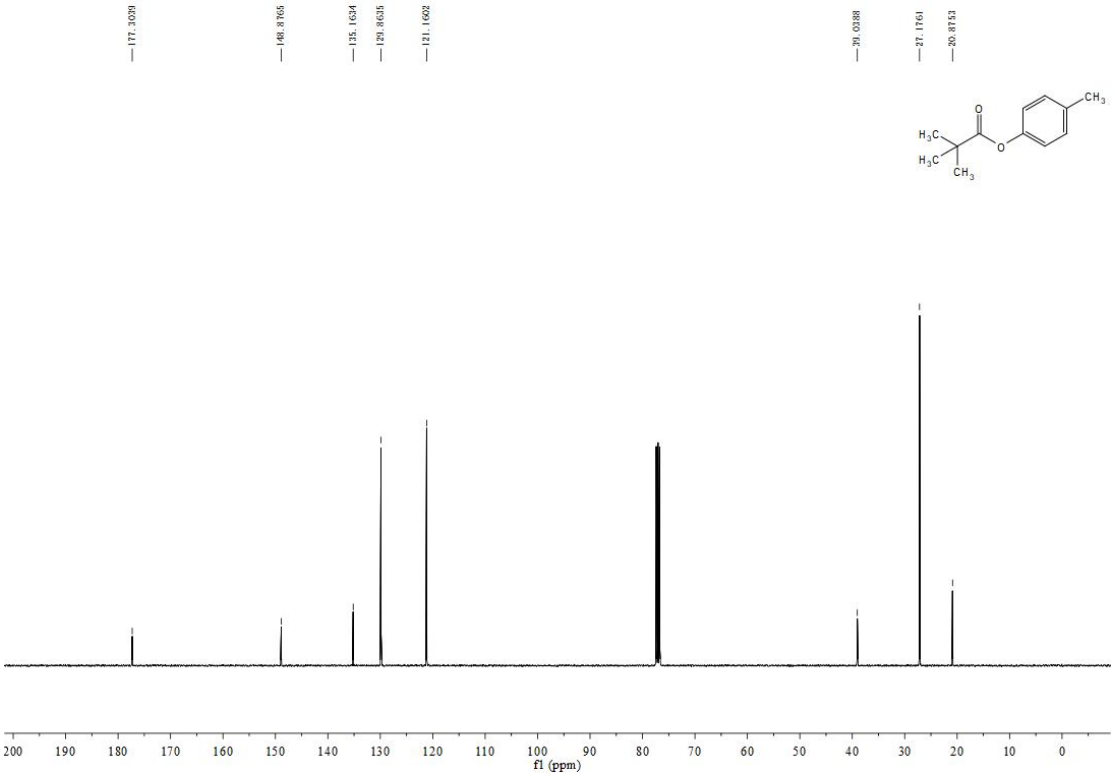
^{19}F NMR Spectrum of **3-(trifluoromethyl) phenyl (3r,5r,7r)-adamantane-1-carboxylate (14c)**



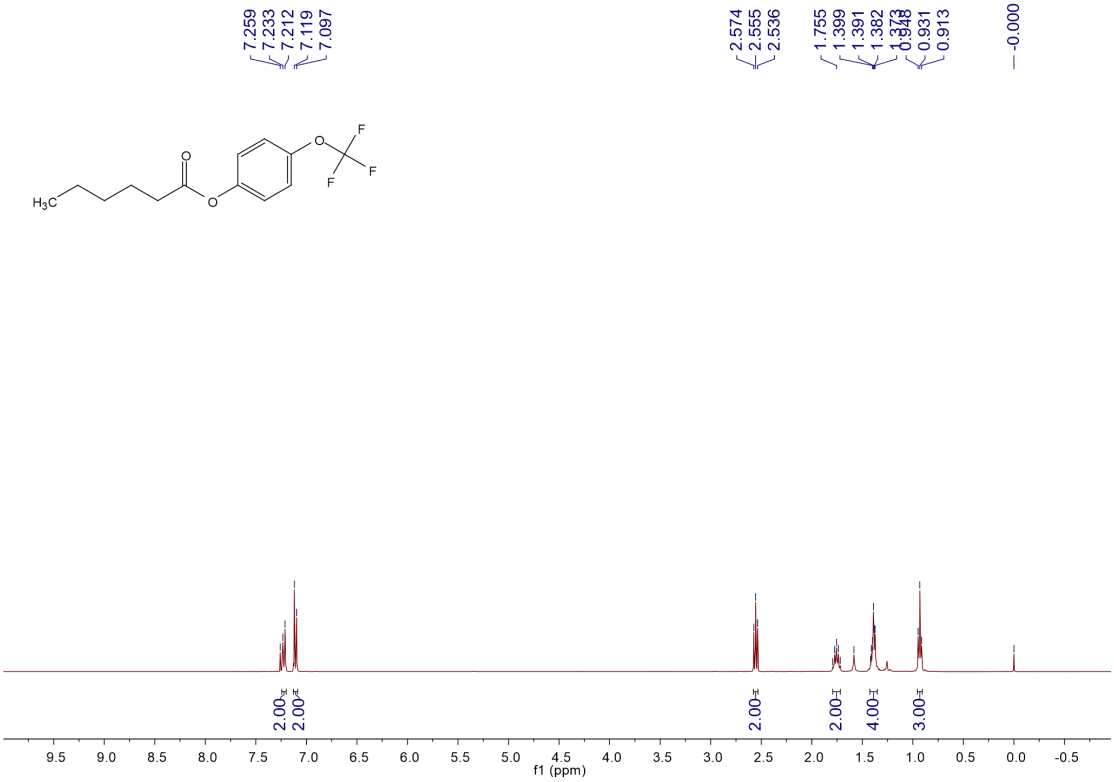
^{1}H NMR Spectrum of ***p*-tolyl pivalate (15c)**



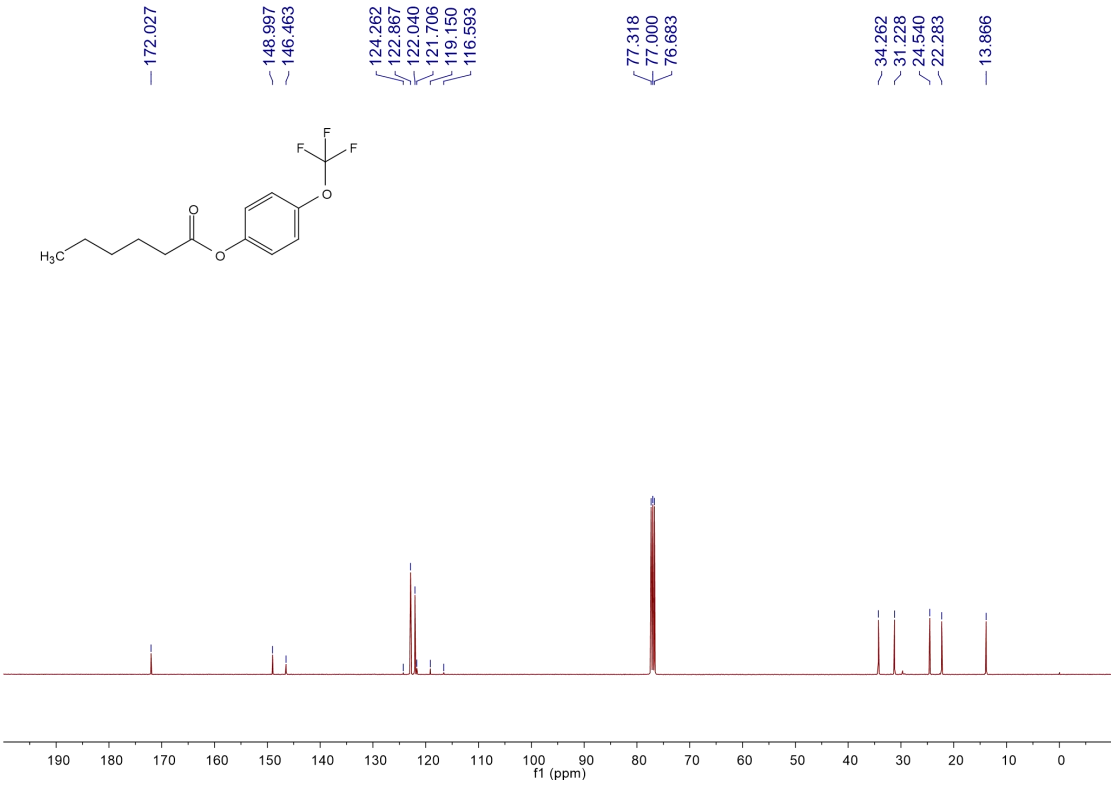
^{13}C NMR Spectrum of ***p*-tolyl pivalate (15c)**



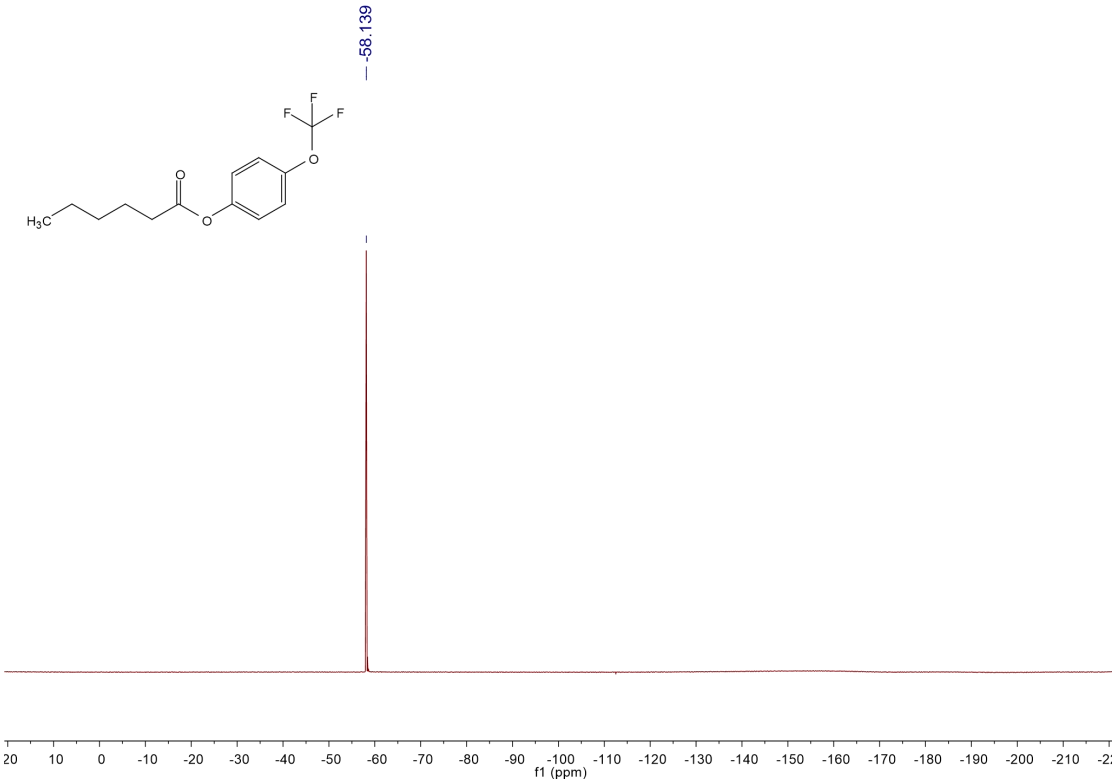
^{1}H NMR Spectrum of **4-(trifluoromethoxy)phenyl hexanoate (16c)**



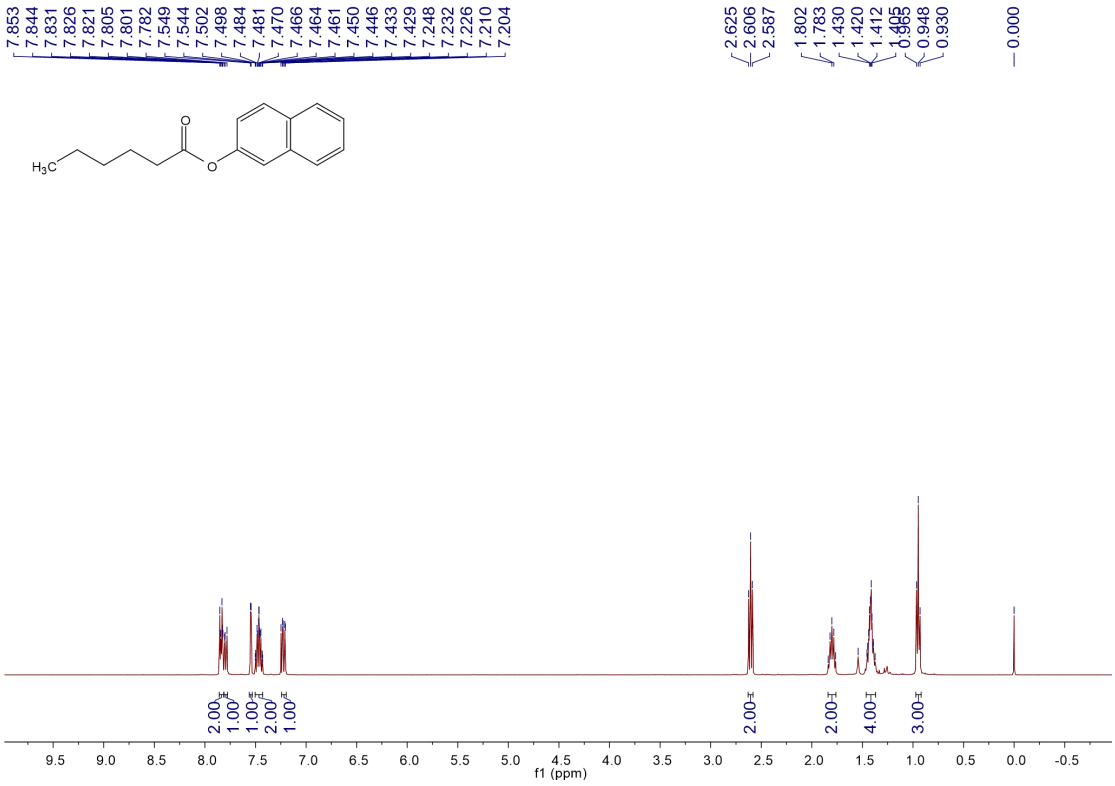
^{13}C NMR Spectrum of **4-(trifluoromethoxy)phenyl hexanoate (16c)**



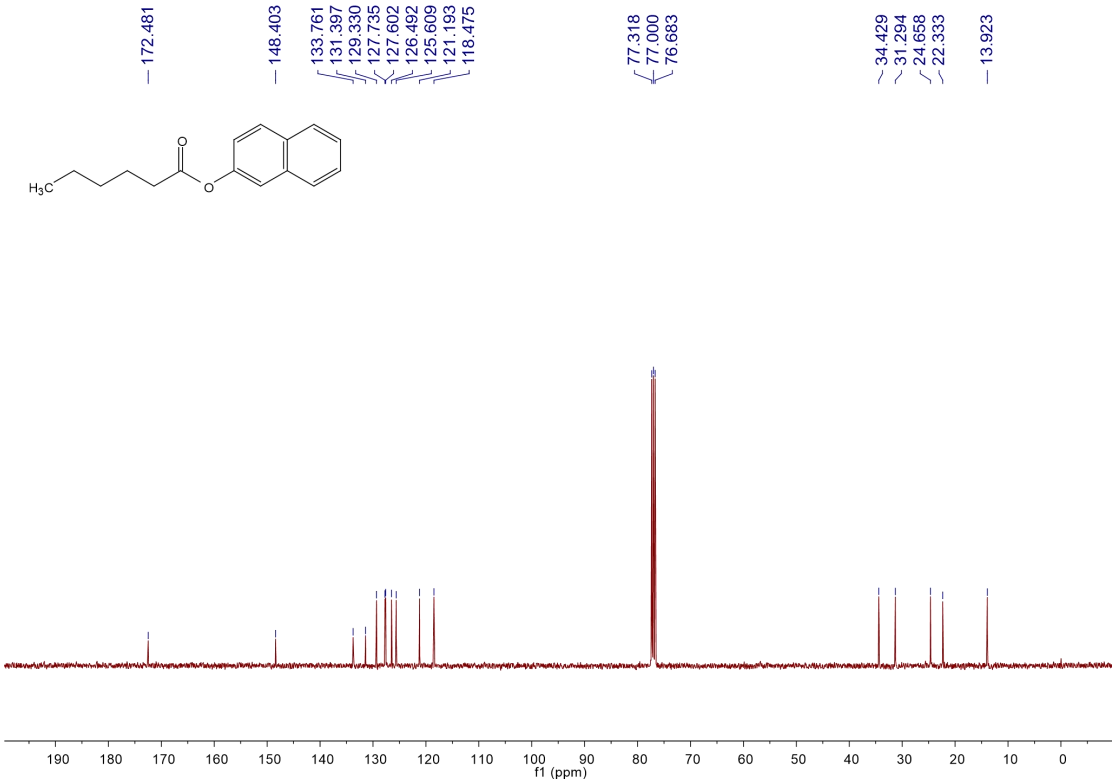
^{19}F NMR Spectrum of **4-(trifluoromethoxy)phenyl hexanoate (16c)**



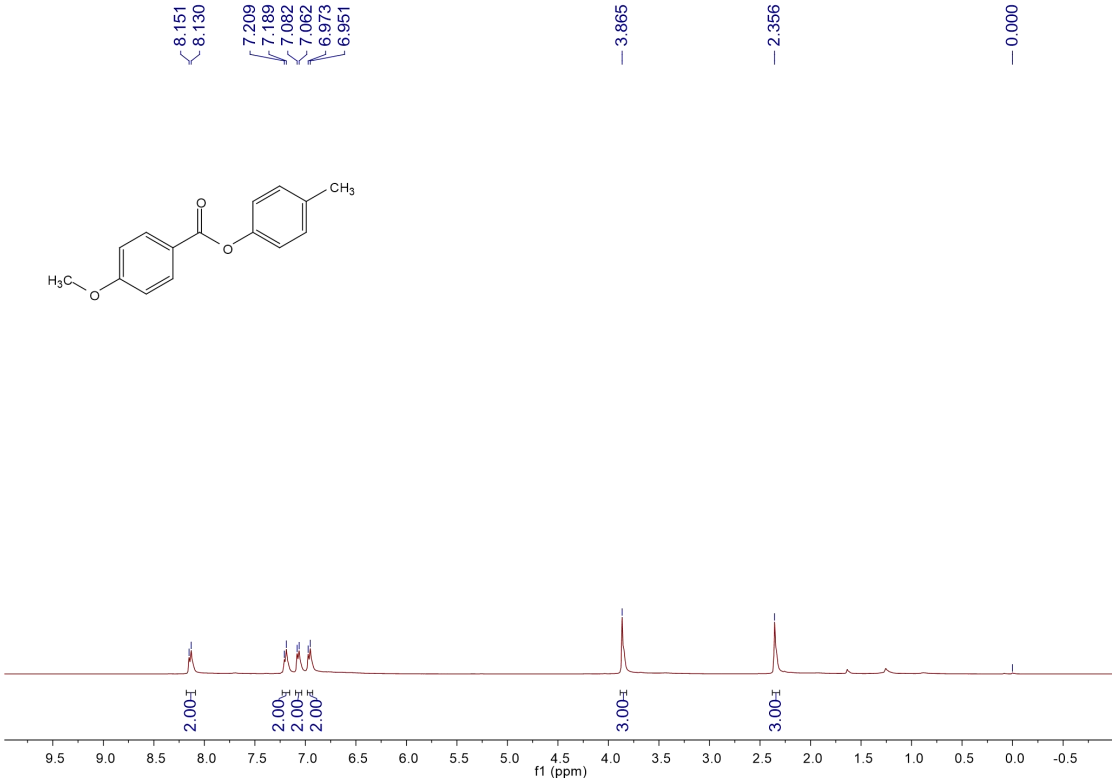
^{1}H NMR Spectrum of **naphthalen-2-yl hexanoate (17c)**



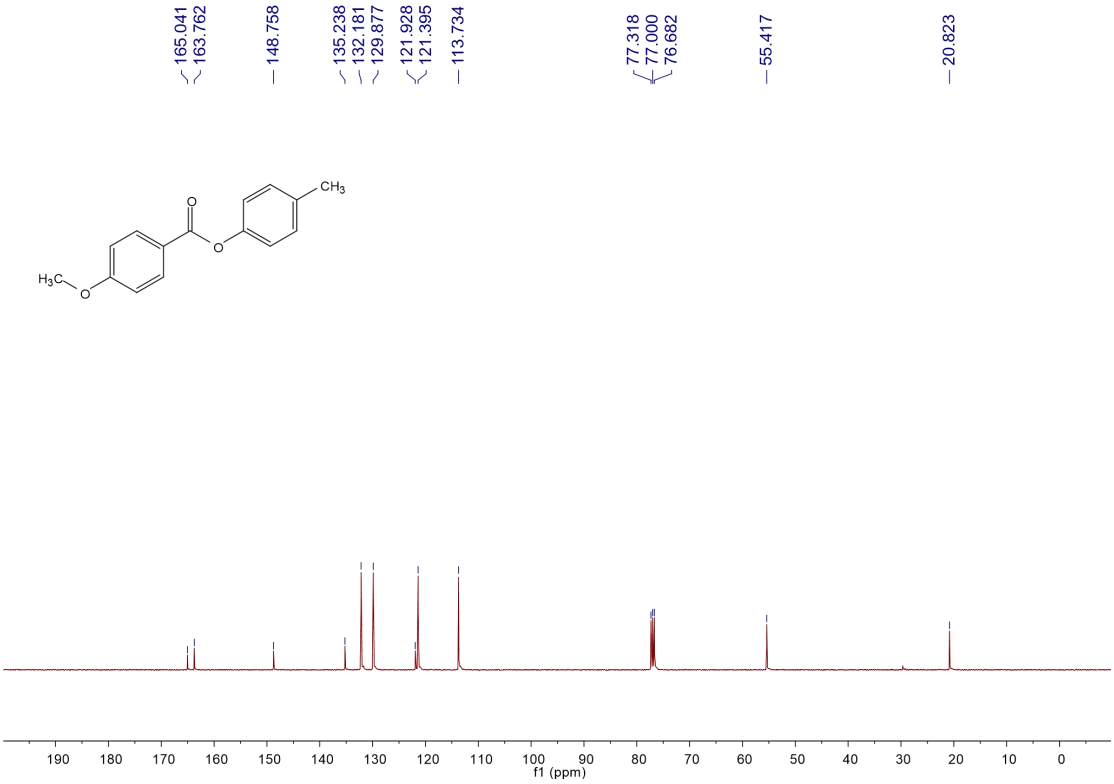
^{13}C NMR Spectrum of **naphthalen-2-yl hexanoate (17c)**



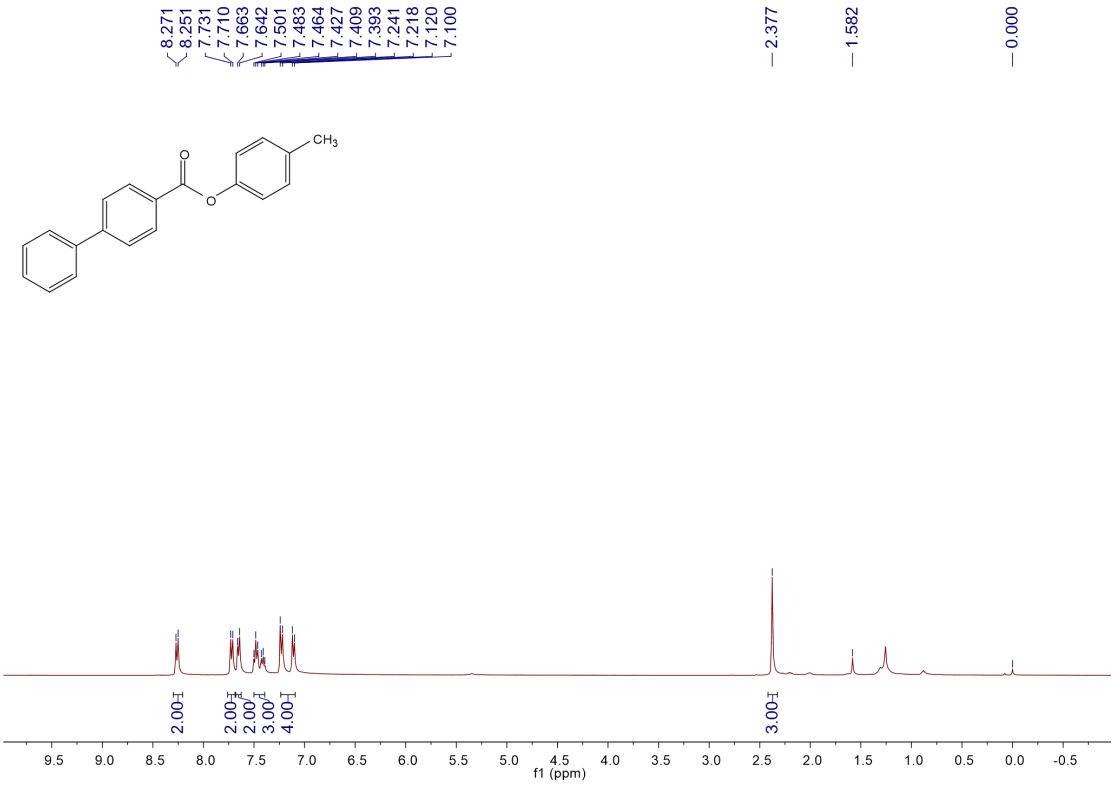
^{1}H NMR Spectrum of ***p*-tolyl 4-methoxybenzoate (18c)**



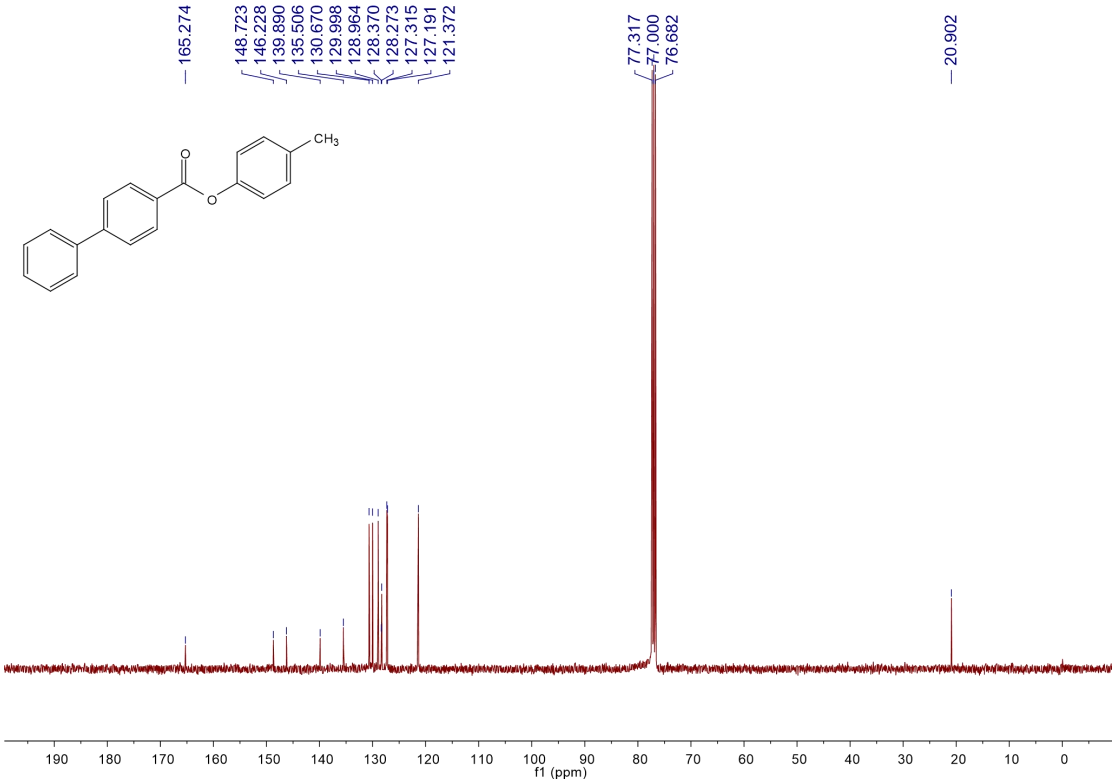
^{13}C NMR Spectrum of ***p*-tolyl 4-methoxybenzoate (18c)**



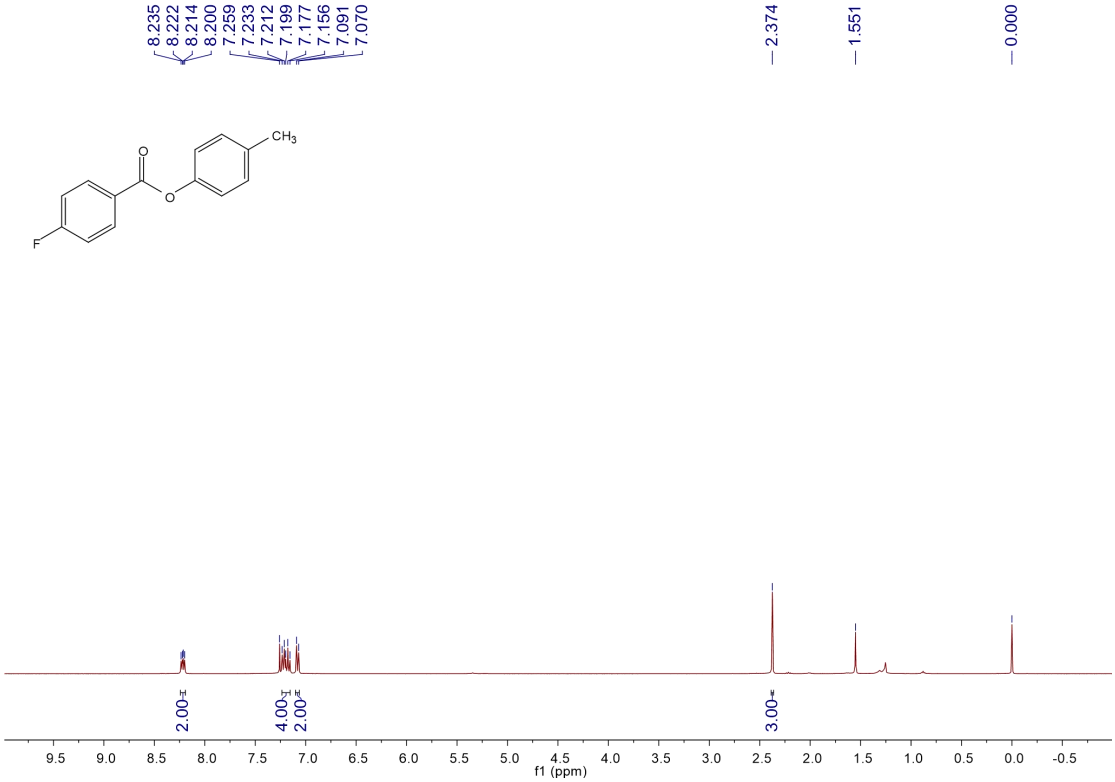
^{1}H NMR Spectrum of ***p*-tolyl [1,1'-biphenyl]-4-carboxylate (19c)**



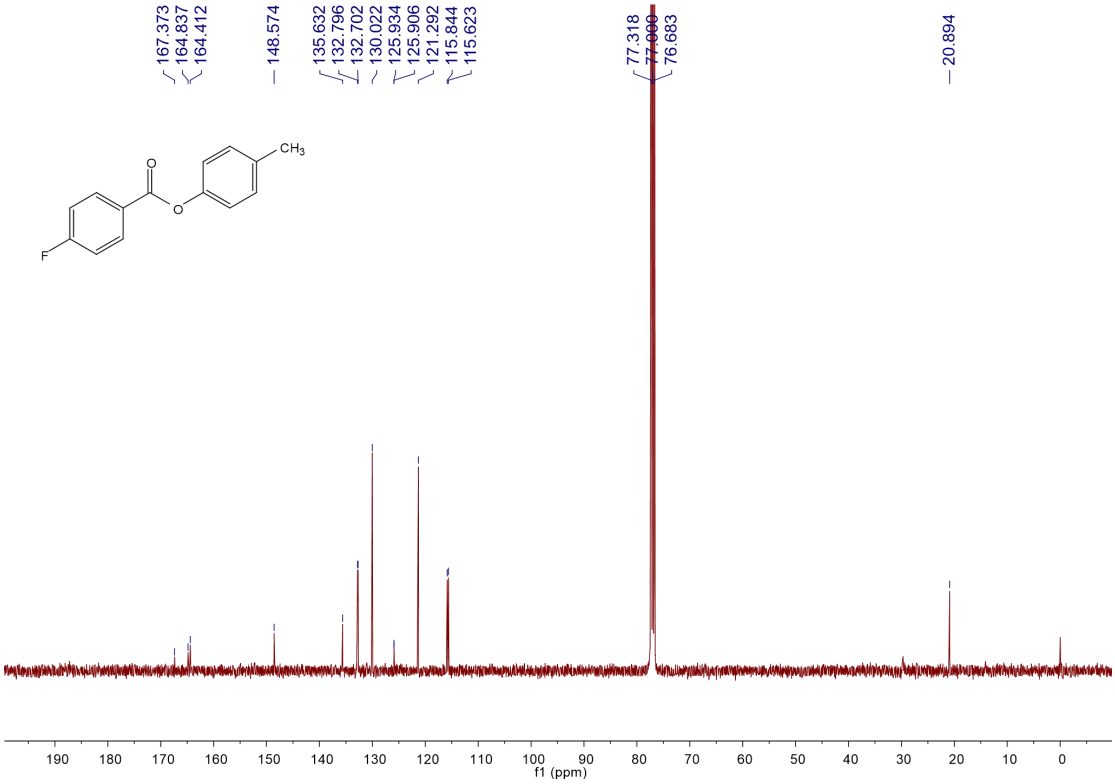
^{13}C NMR Spectrum of ***p*-tolyl [1,1'-biphenyl]-4-carboxylate (19c)**



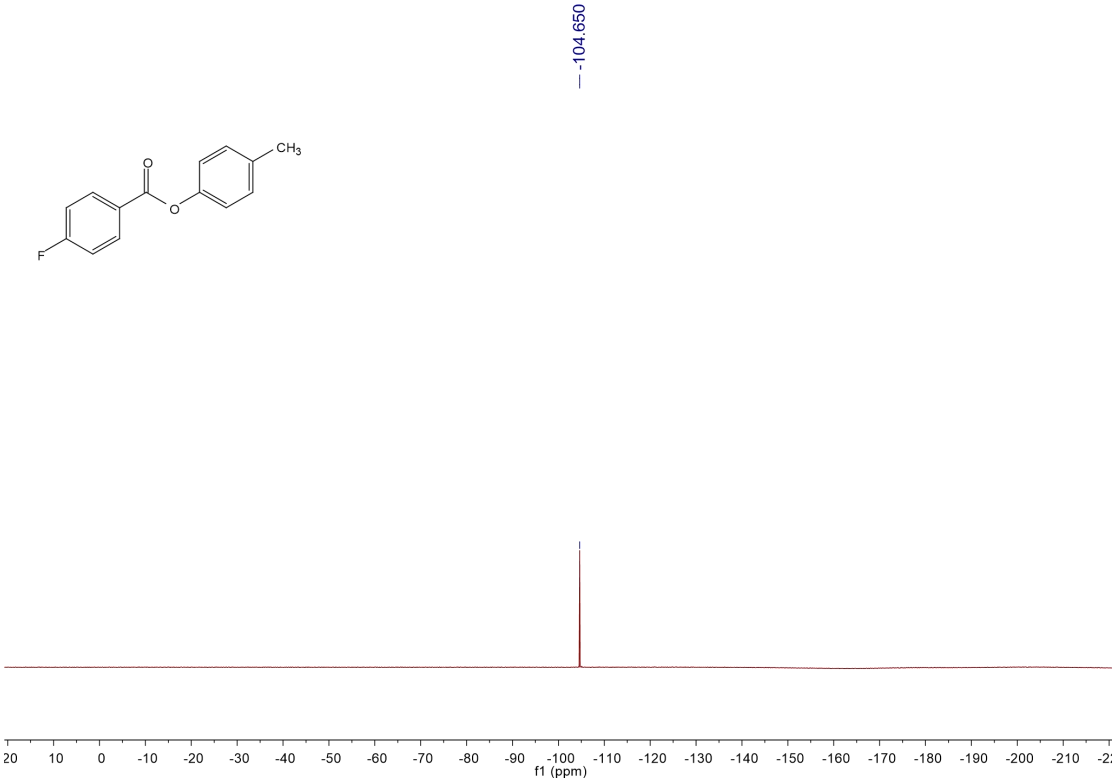
^{1}H NMR Spectrum of ***p*-tolyl 4-fluorobenzoate (20c)**



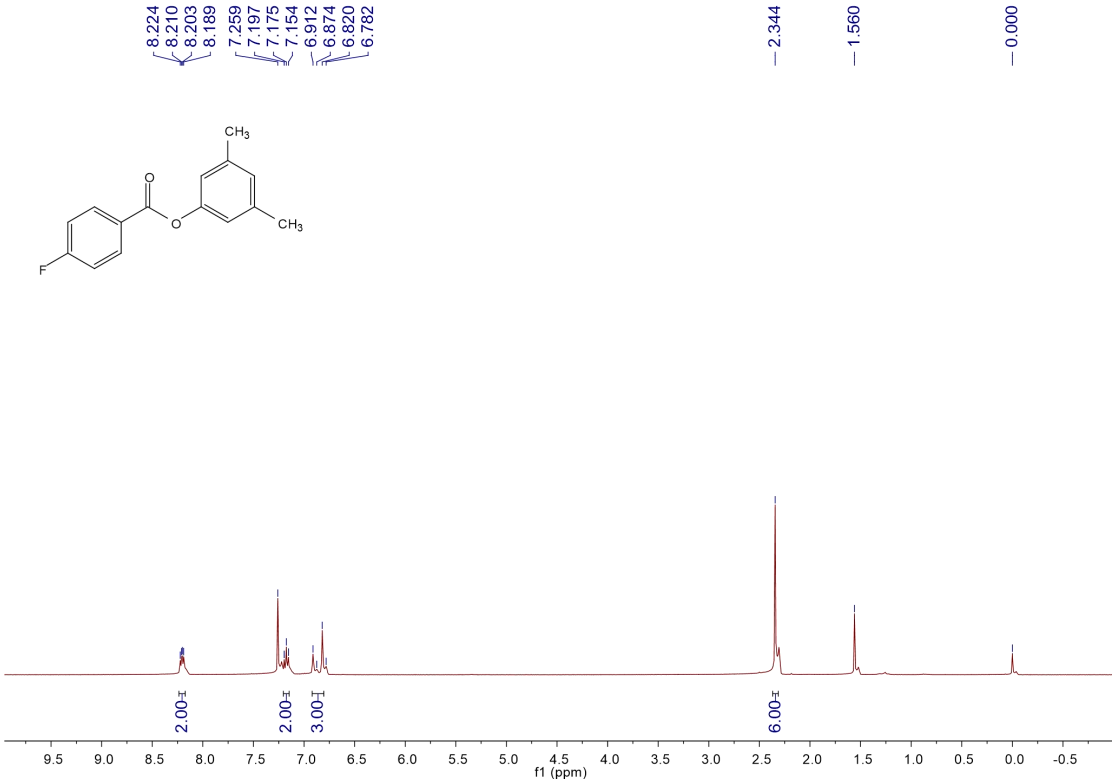
^{13}CNMR Spectrum of ***p*-tolyl 4-fluorobenzoate (20c)**



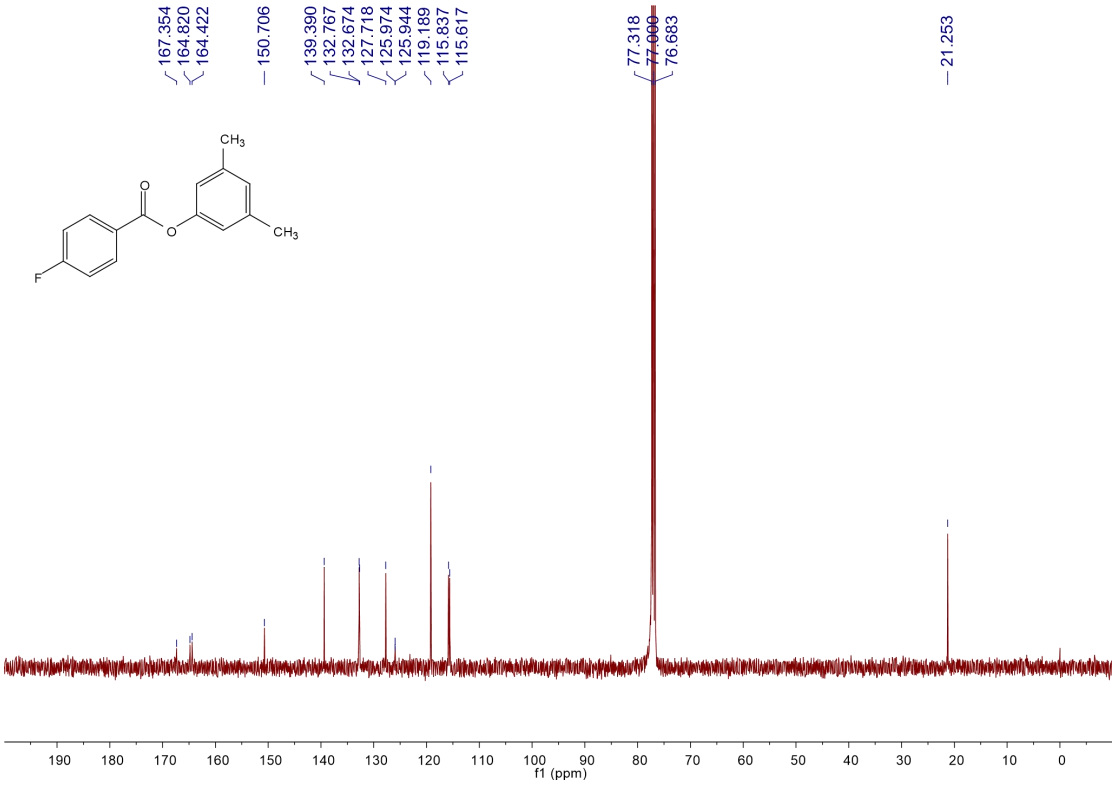
^{19}CNMR Spectrum of ***p*-tolyl 4-fluorobenzoate (20c)**



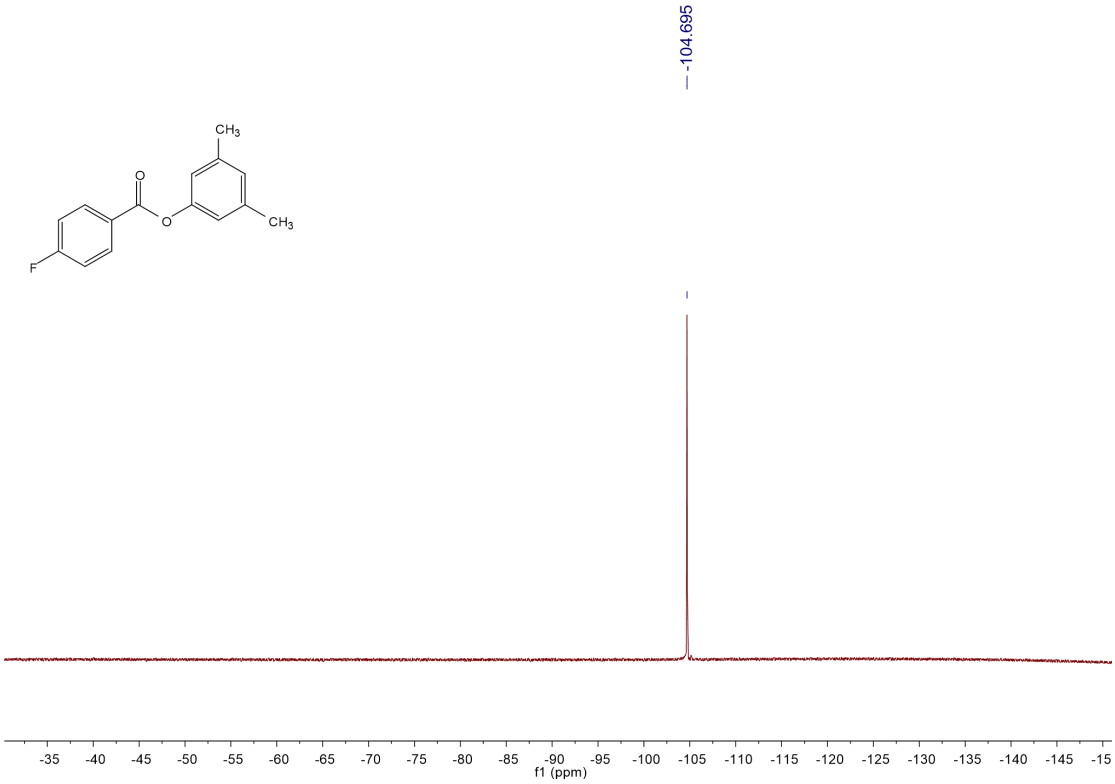
^{1}H NMR Spectrum of **3,5-dimethylphenyl 4-fluorobenzoate (21c)**



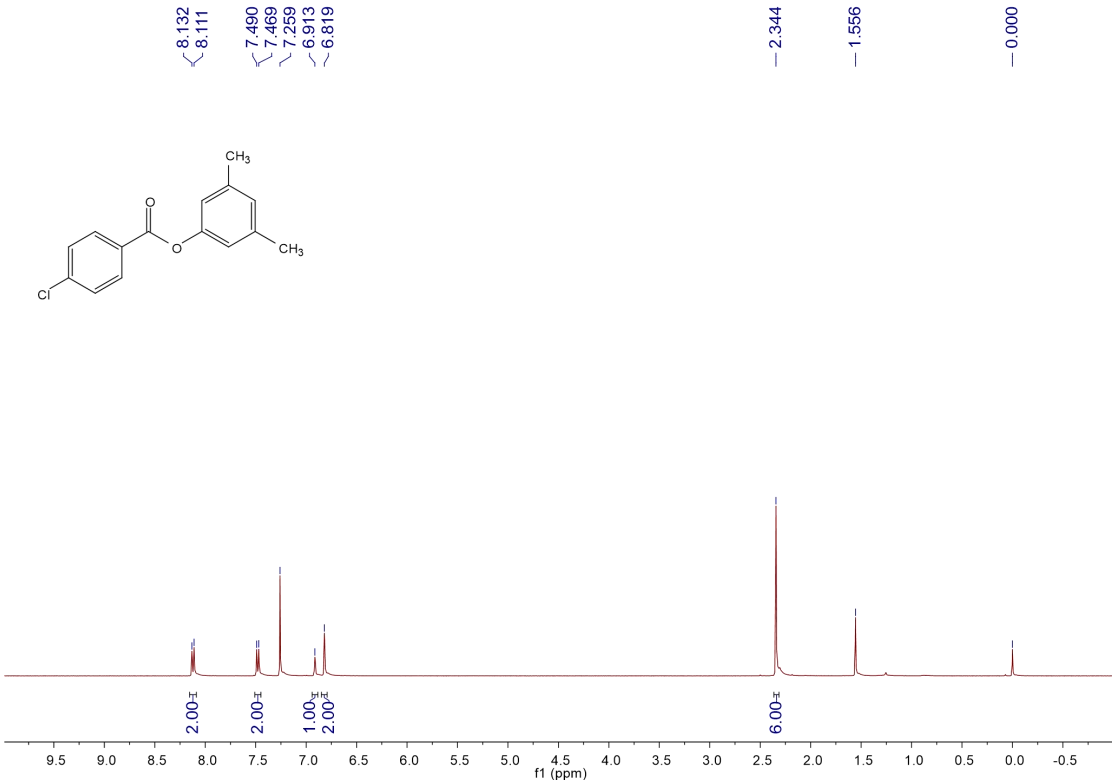
^{13}C NMR Spectrum of **3,5-dimethylphenyl 4-fluorobenzoate (21c)**



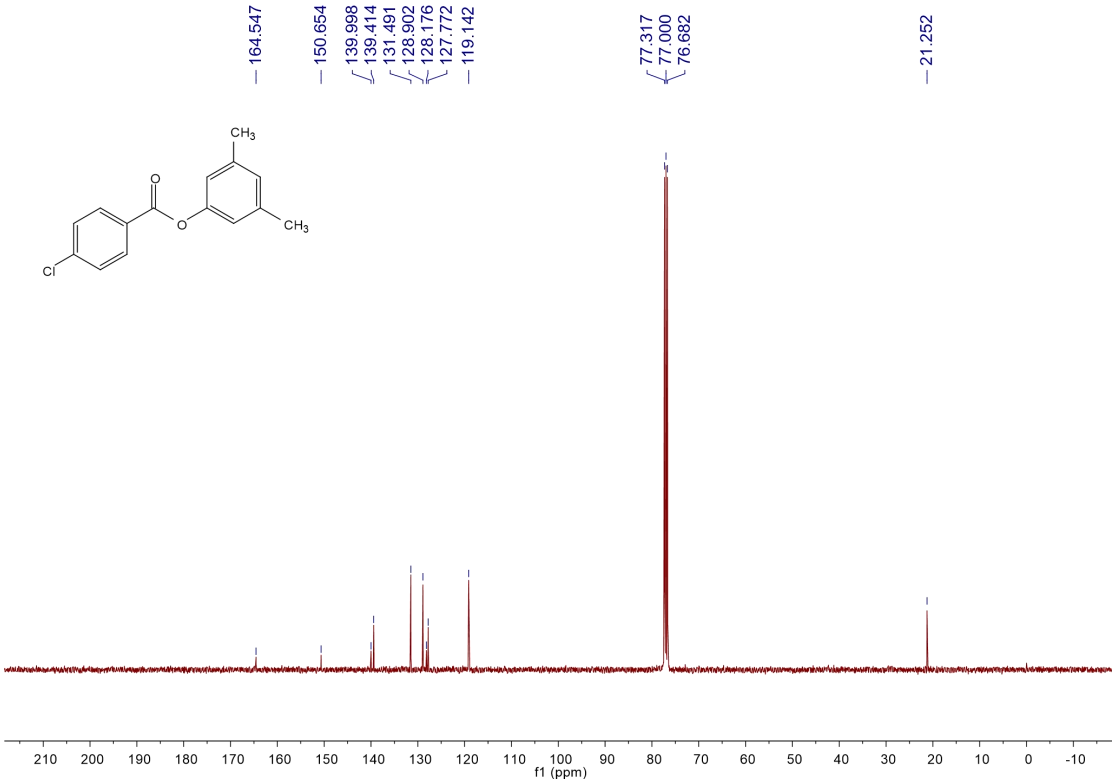
^{19}F NMR Spectrum of **3,5-dimethylphenyl 4-fluorobenzoate (21c)**



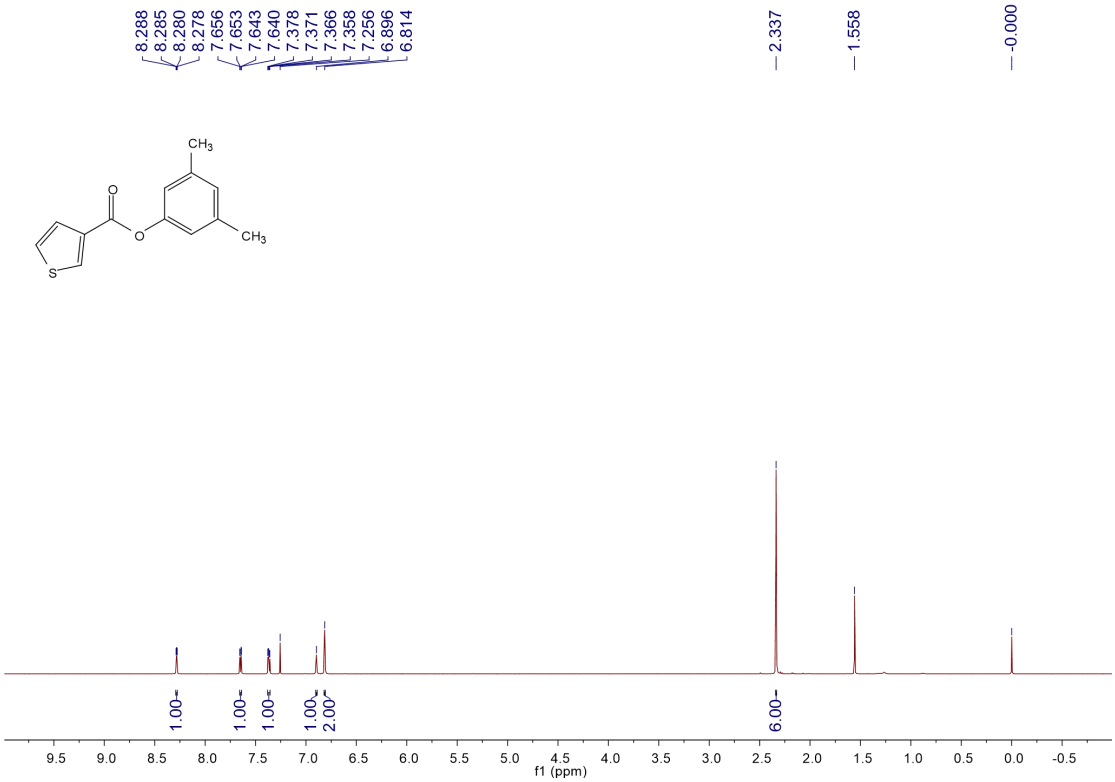
^{1}H NMR Spectrum of **3,5-dimethylphenyl 4-chlorobenzoate (22c)**



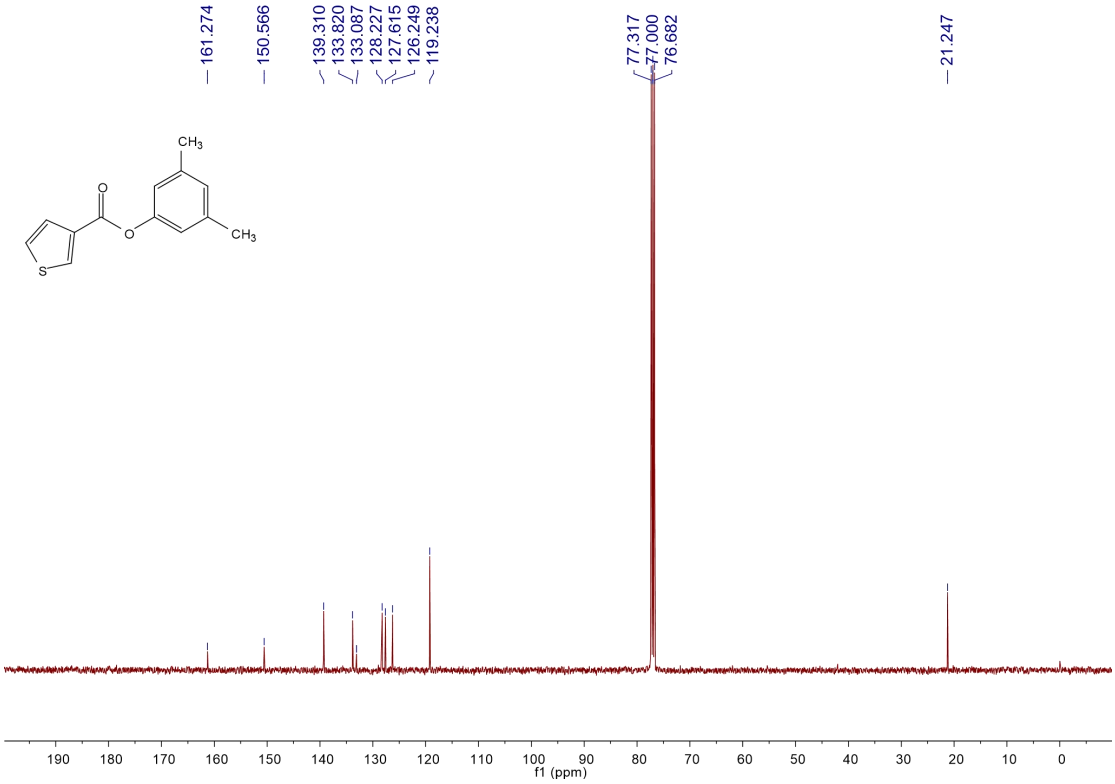
^{13}C NMR Spectrum of **3,5-dimethylphenyl 4-chlorobenzoate (22c)**



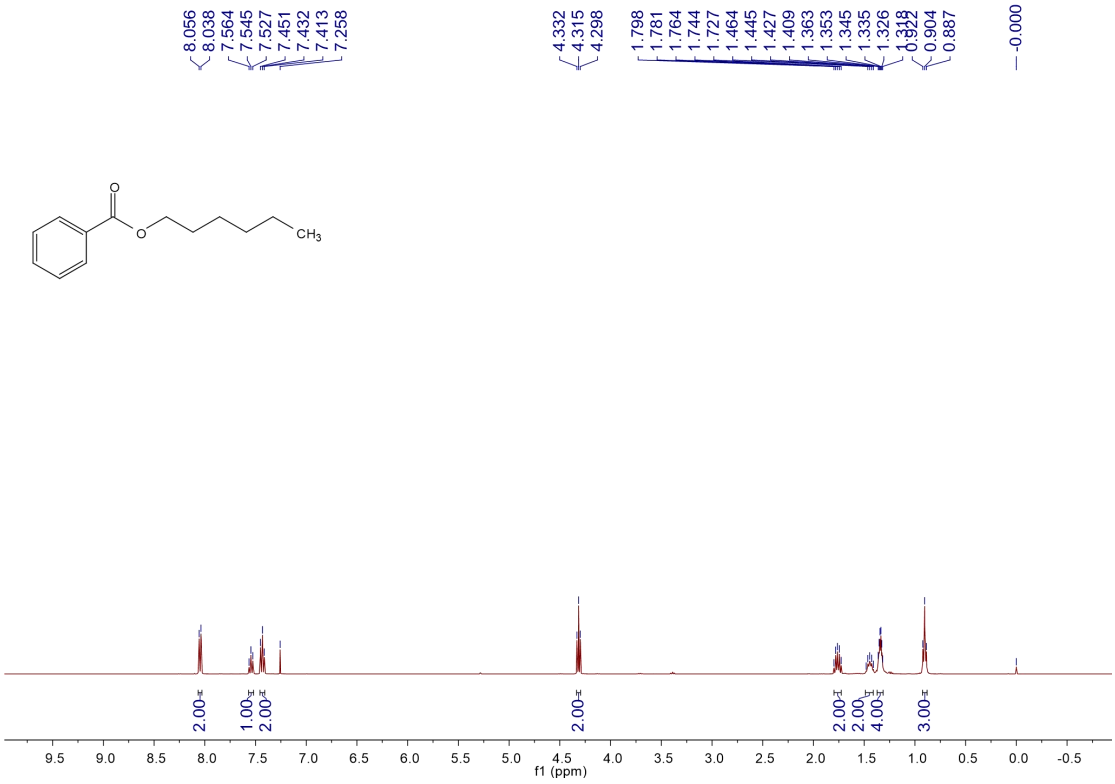
^{1}H NMR Spectrum of **3,5-dimethylphenyl thiophene-3-carboxylate (23c)**



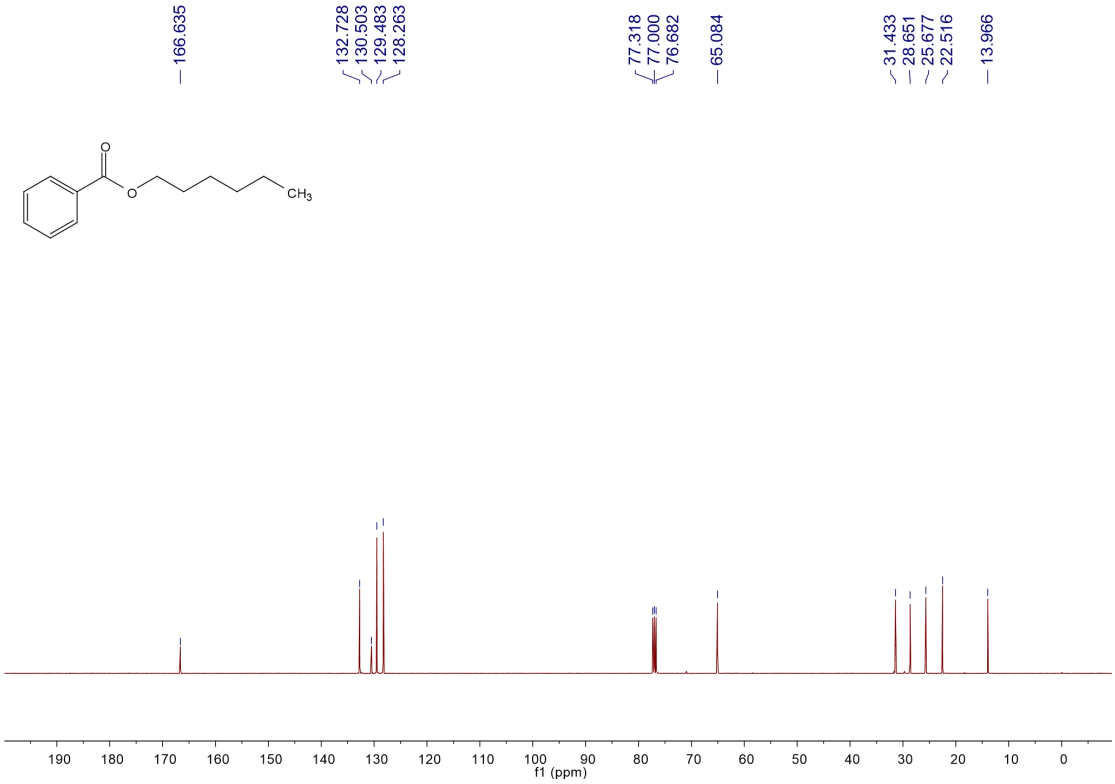
^{13}C NMR Spectrum of **3,5-dimethylphenyl thiophene-3-carboxylate (23c)**



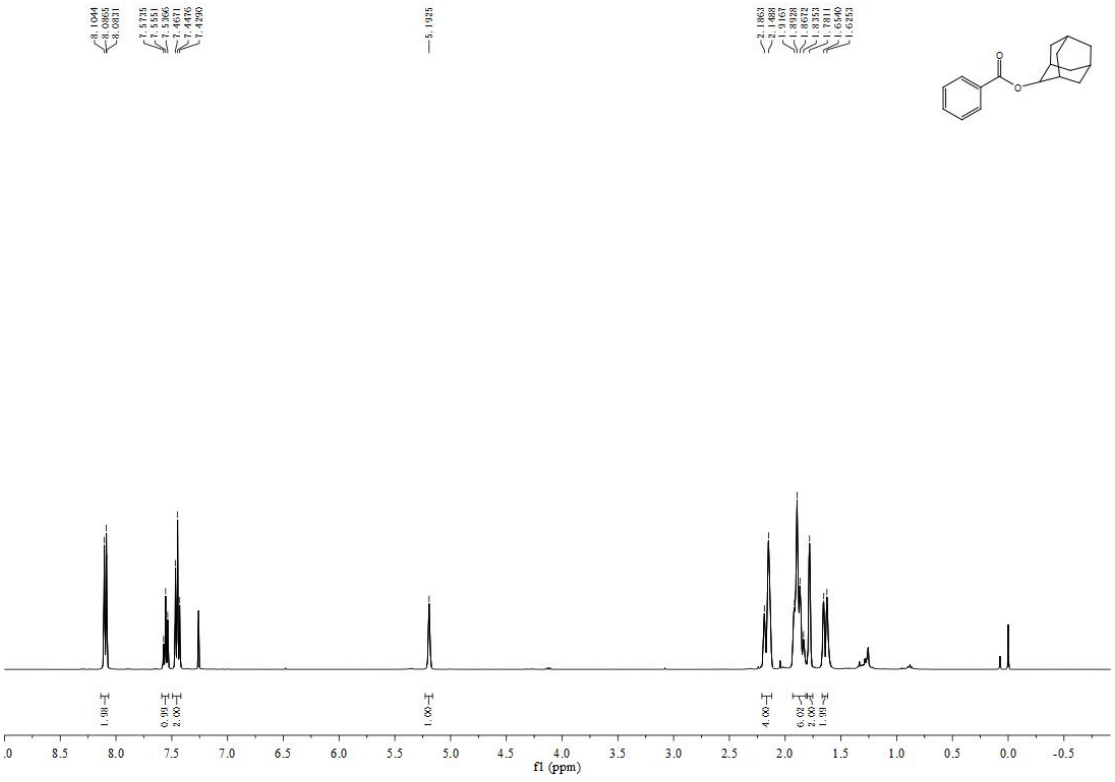
^{1}H NMR Spectrum of **hexyl benzoate (24c)**



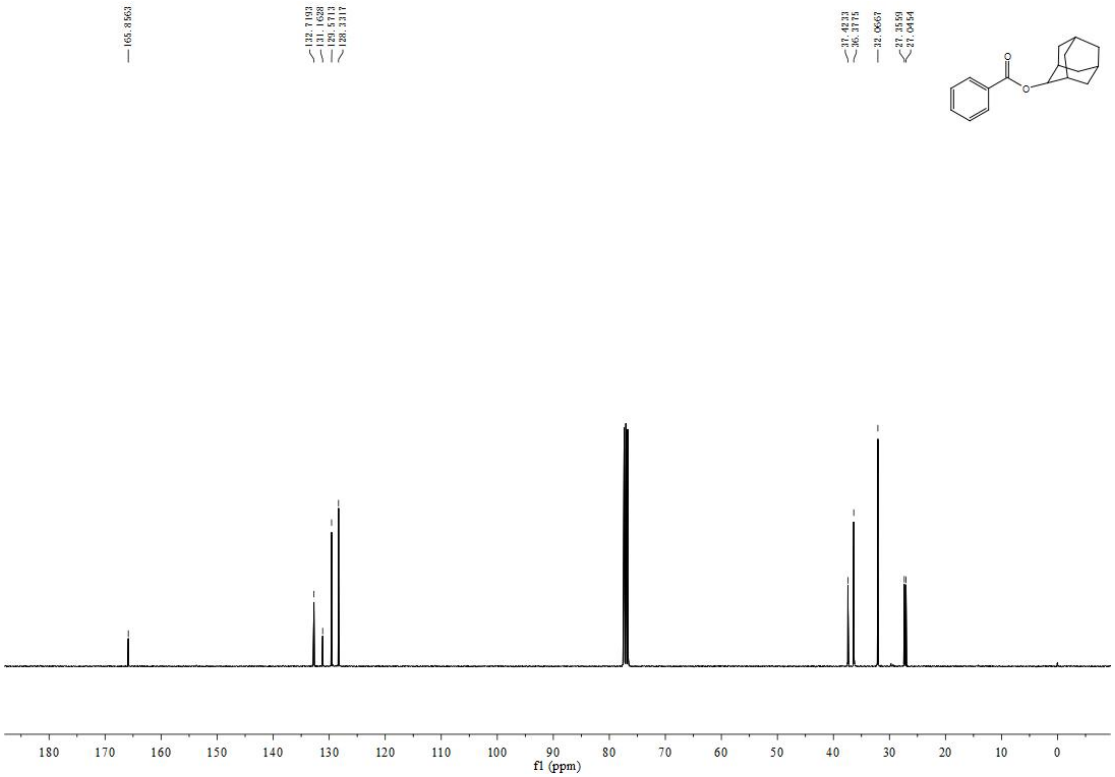
^{13}C NMR Spectrum of **hexyl benzoate (24c)**



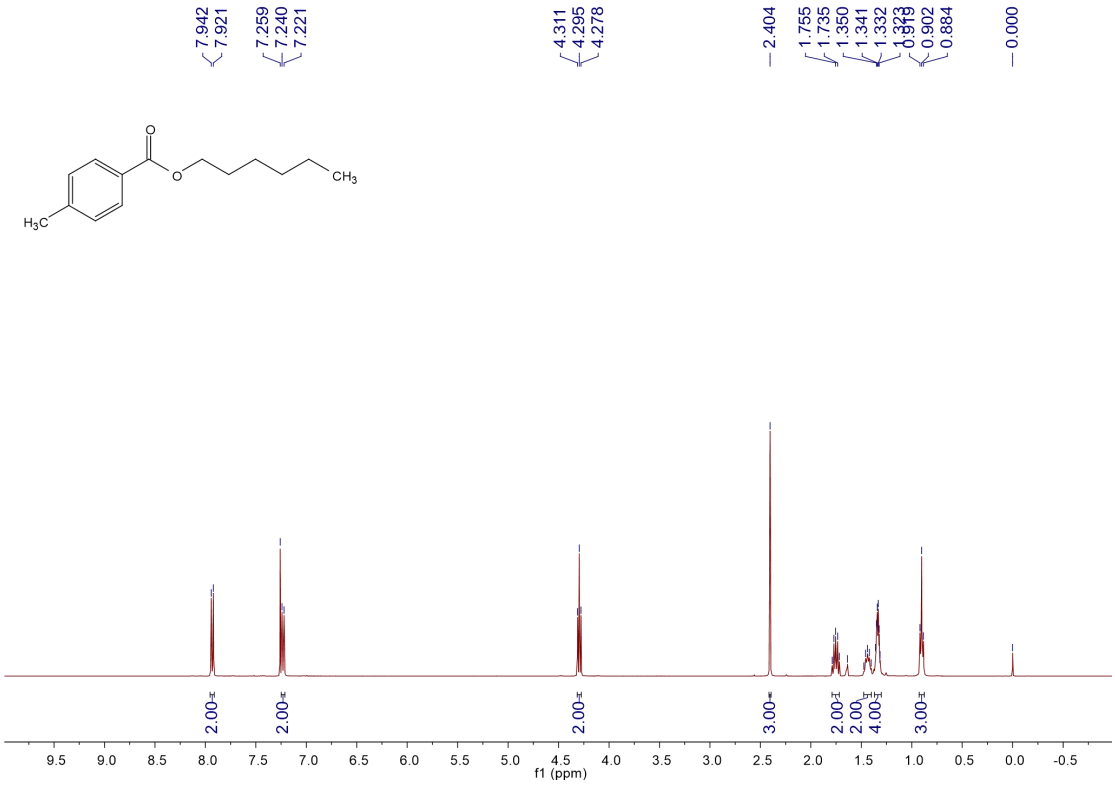
^{1}H NMR Spectrum of **(1r,3r,5r,7r)-adamantan-2-yl benzoate (25c)**



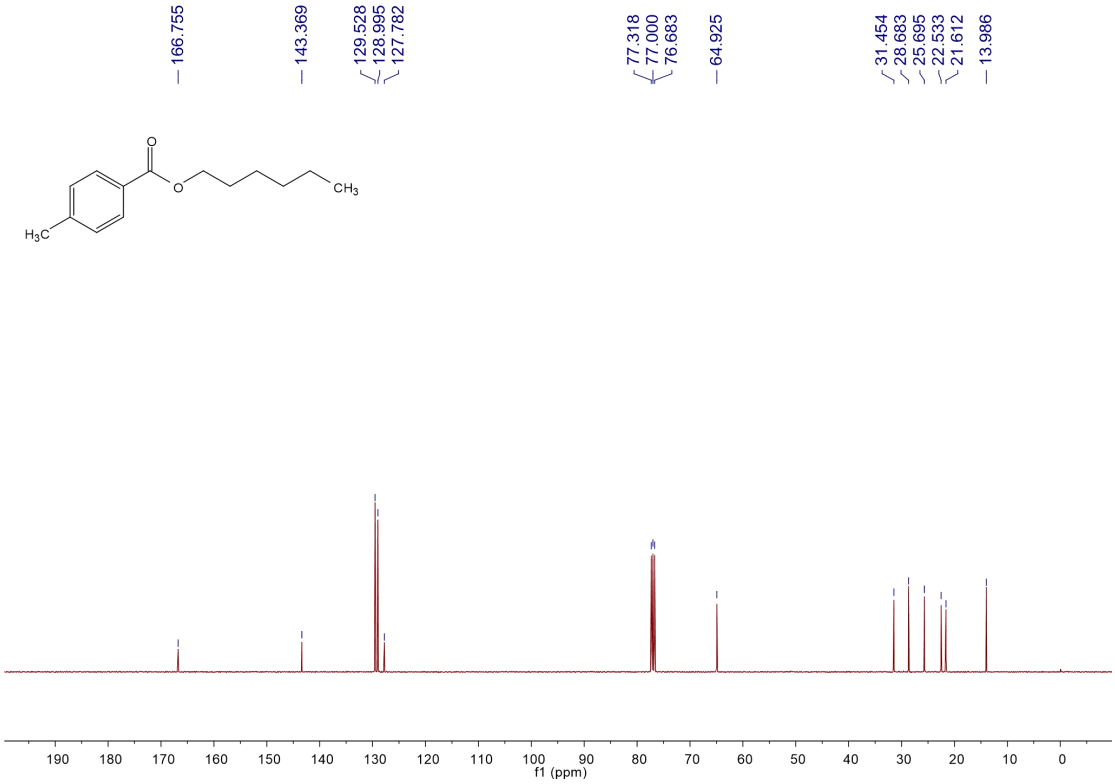
^{13}C NMR Spectrum of **(1r,3r,5r,7r)-adamantan-2-yl benzoate (25c)**



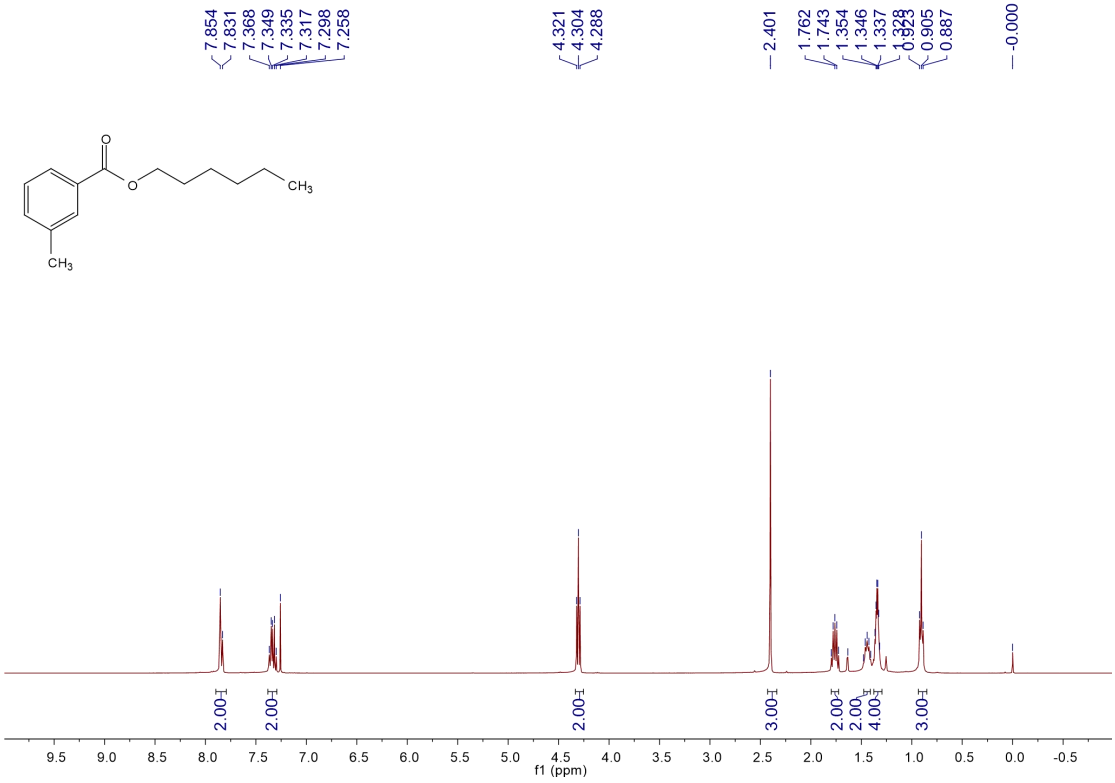
^{1}H NMR Spectrum of **hexyl 4-methylbenzoate (27c)**



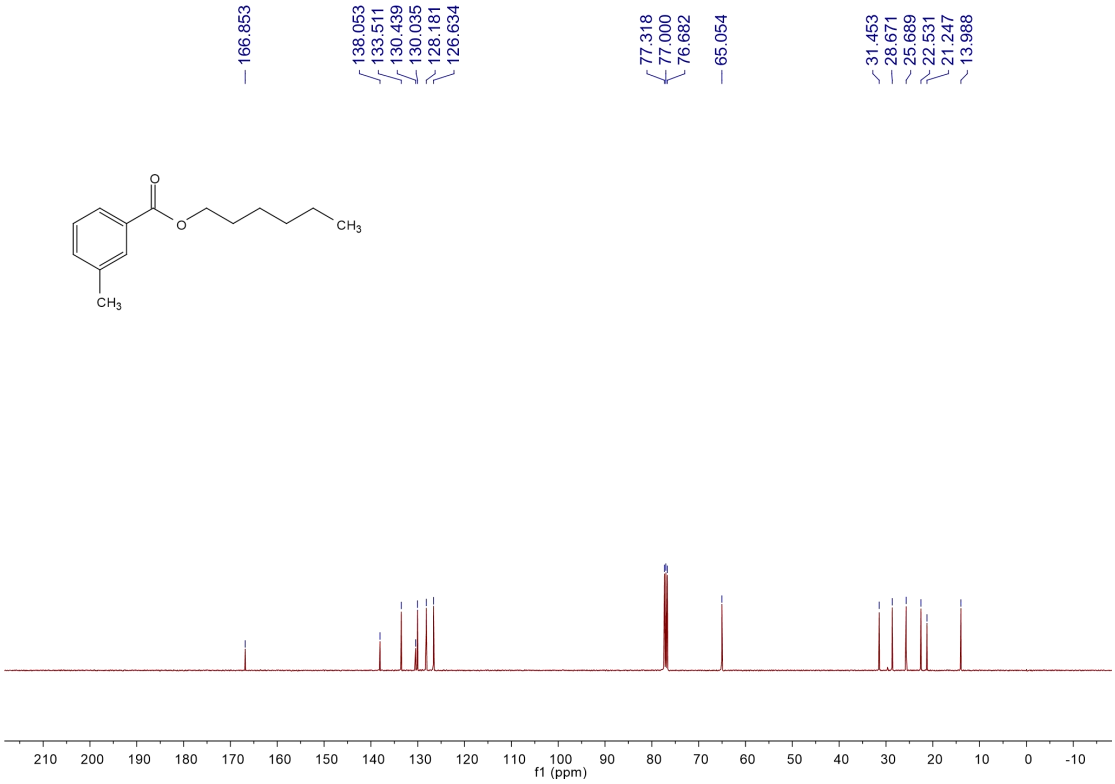
^{13}C NMR Spectrum of **hexyl 4-methylbenzoate (27c)**



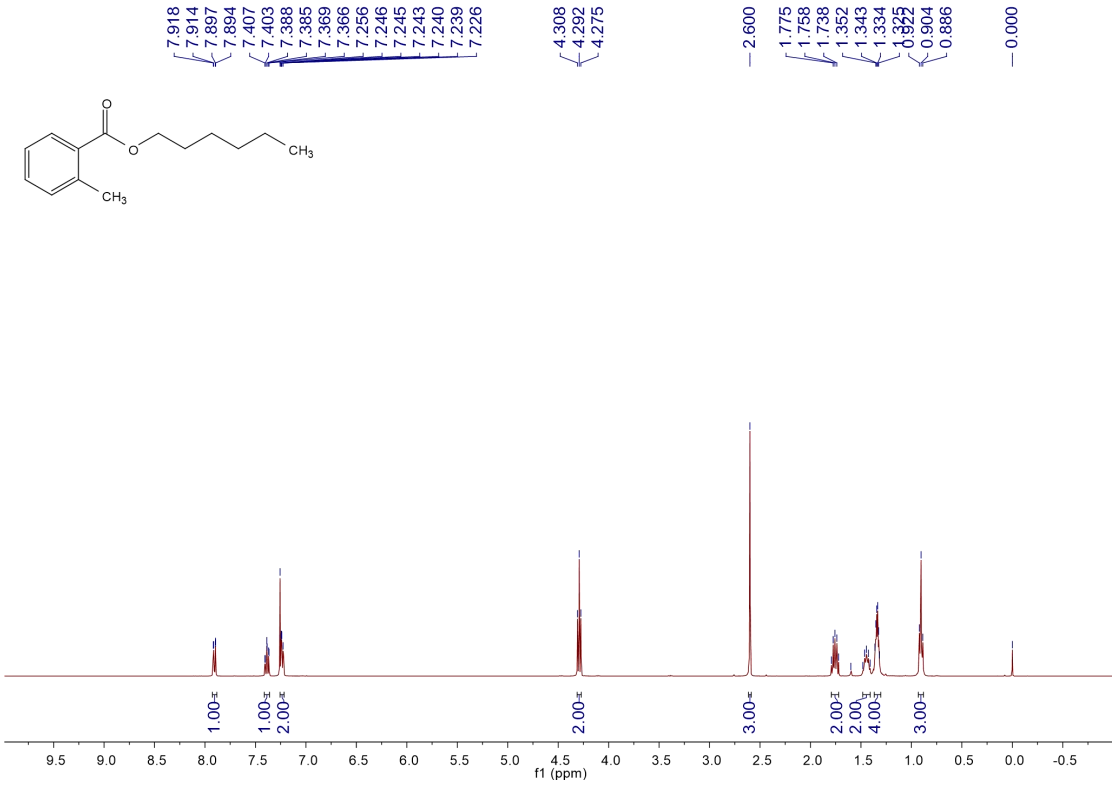
^{1}H NMR Spectrum of **hexyl 3-methylbenzoate (28c)**



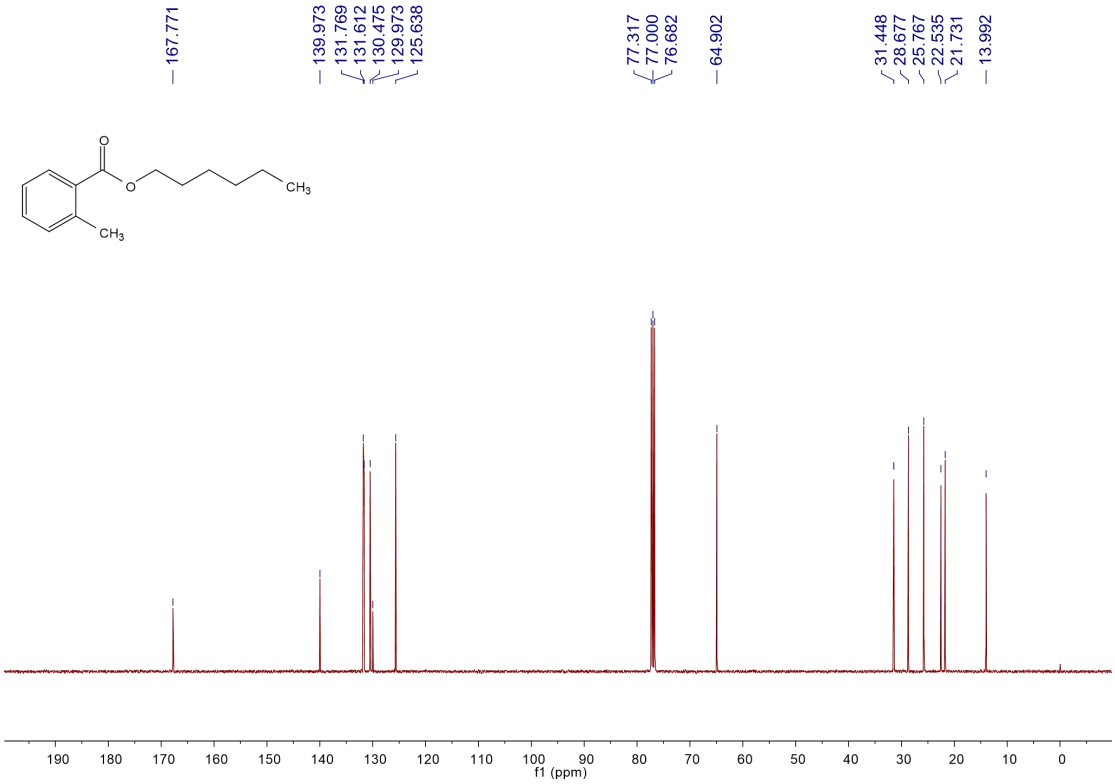
^{13}C NMR Spectrum of **hexyl 3-methylbenzoate (28c)**



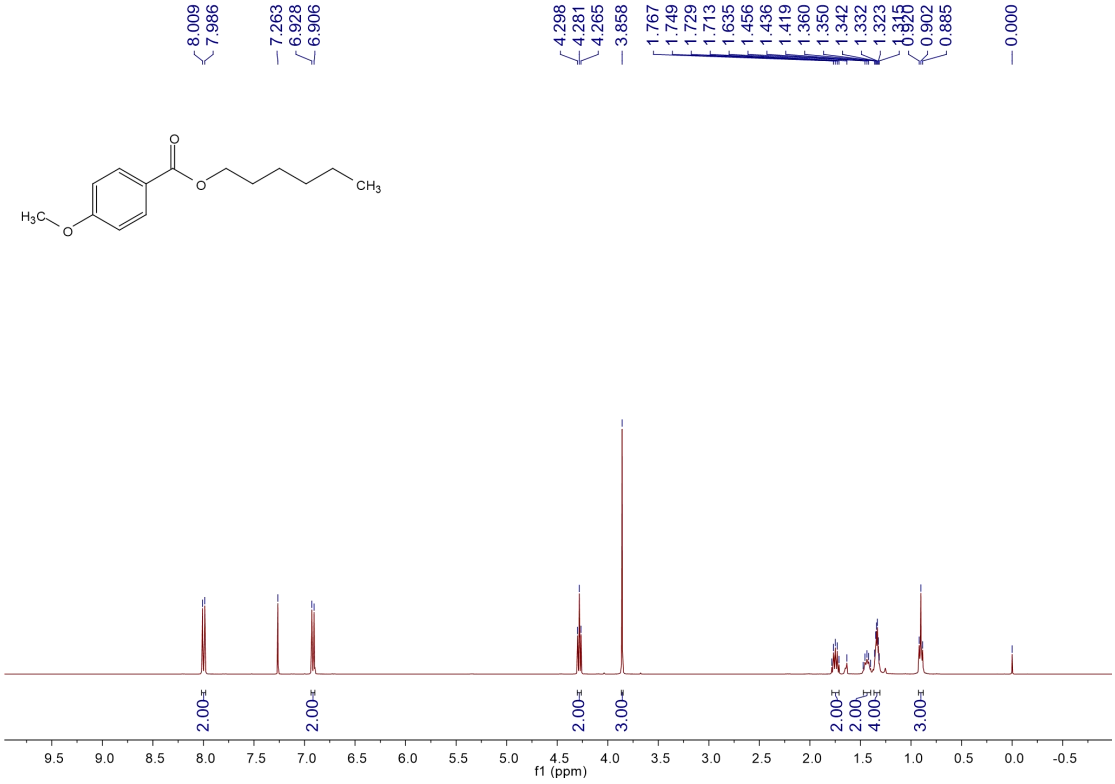
^{1}H NMR Spectrum of **hexyl 2-methylbenzoate (29c)**



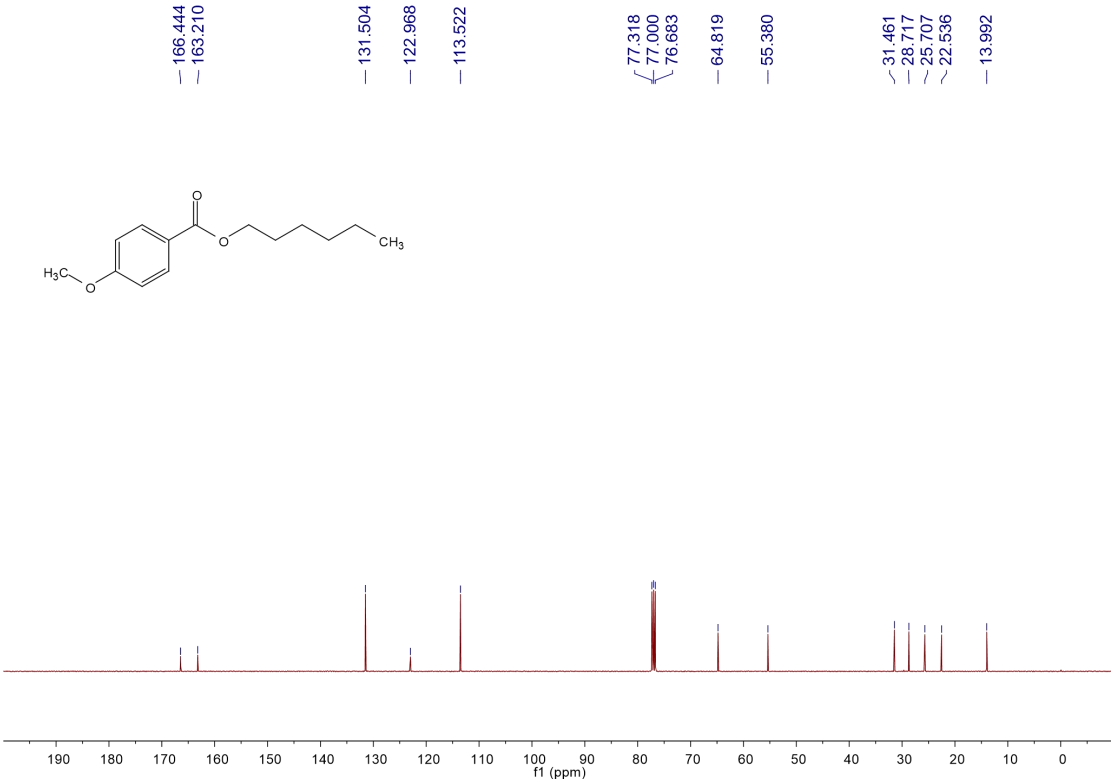
^{13}C NMR Spectrum of **hexyl 2-methylbenzoate (29c)**



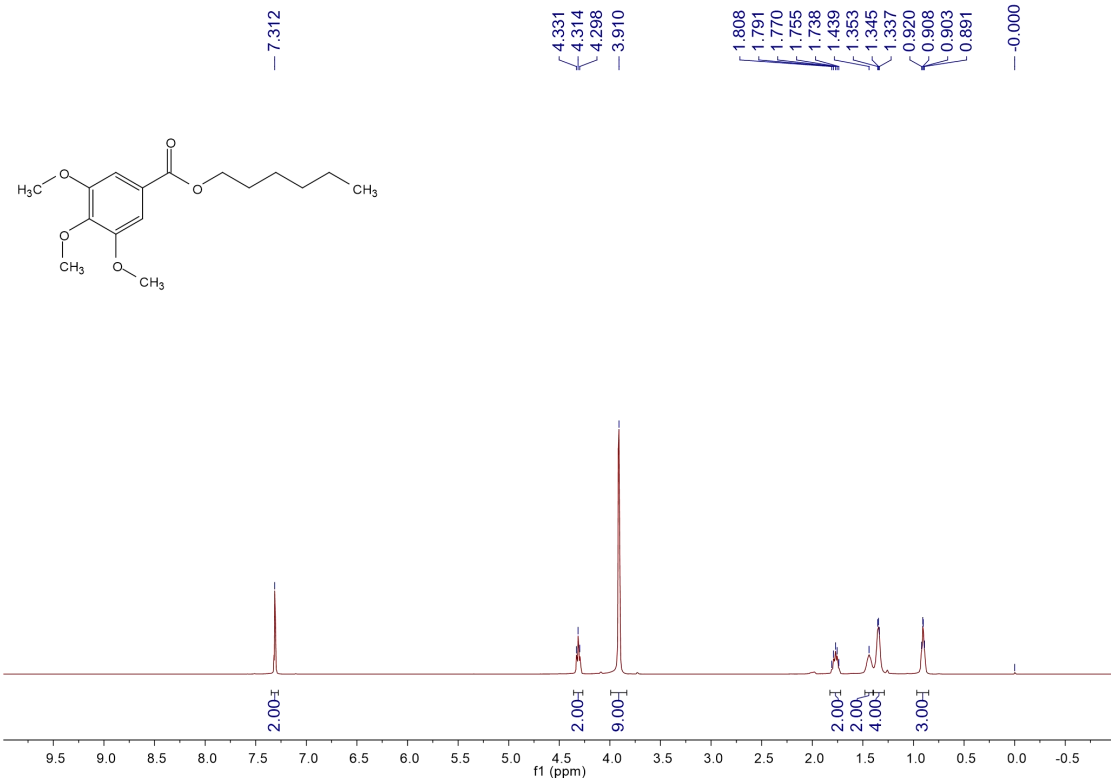
^{1}H NMR Spectrum of **hexyl 4-methoxybenzoate (30c)**



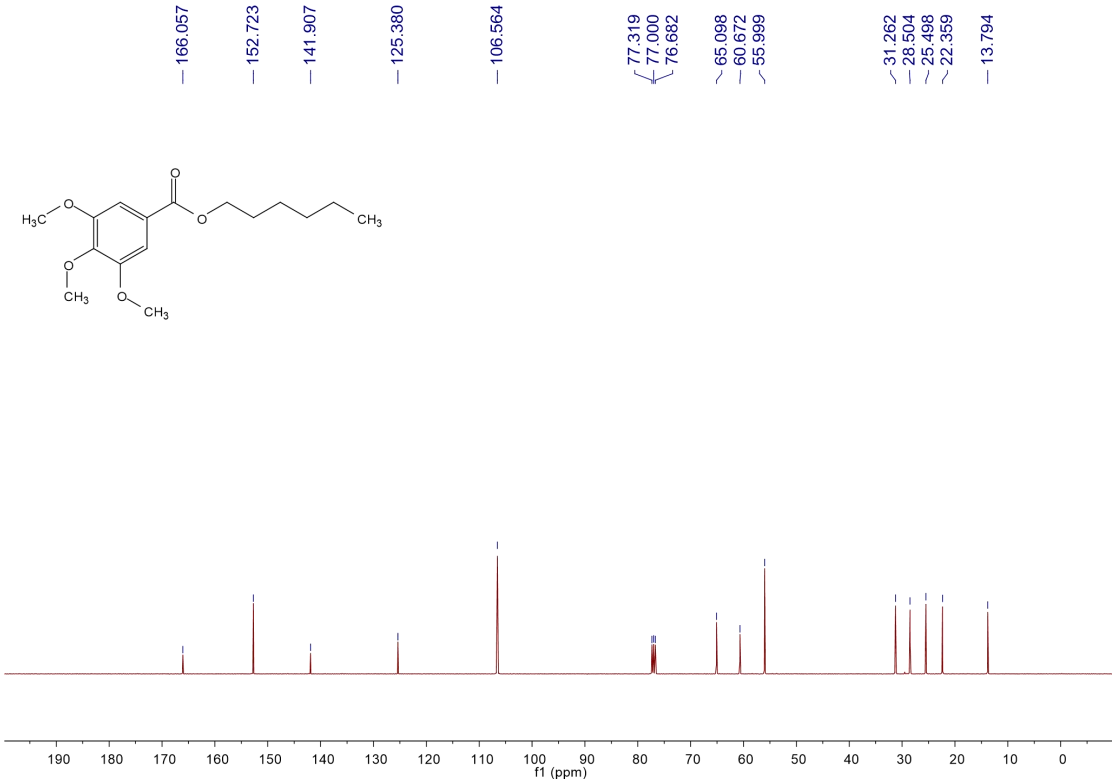
^{13}C NMR Spectrum of **hexyl 4-methoxybenzoate (30c)**



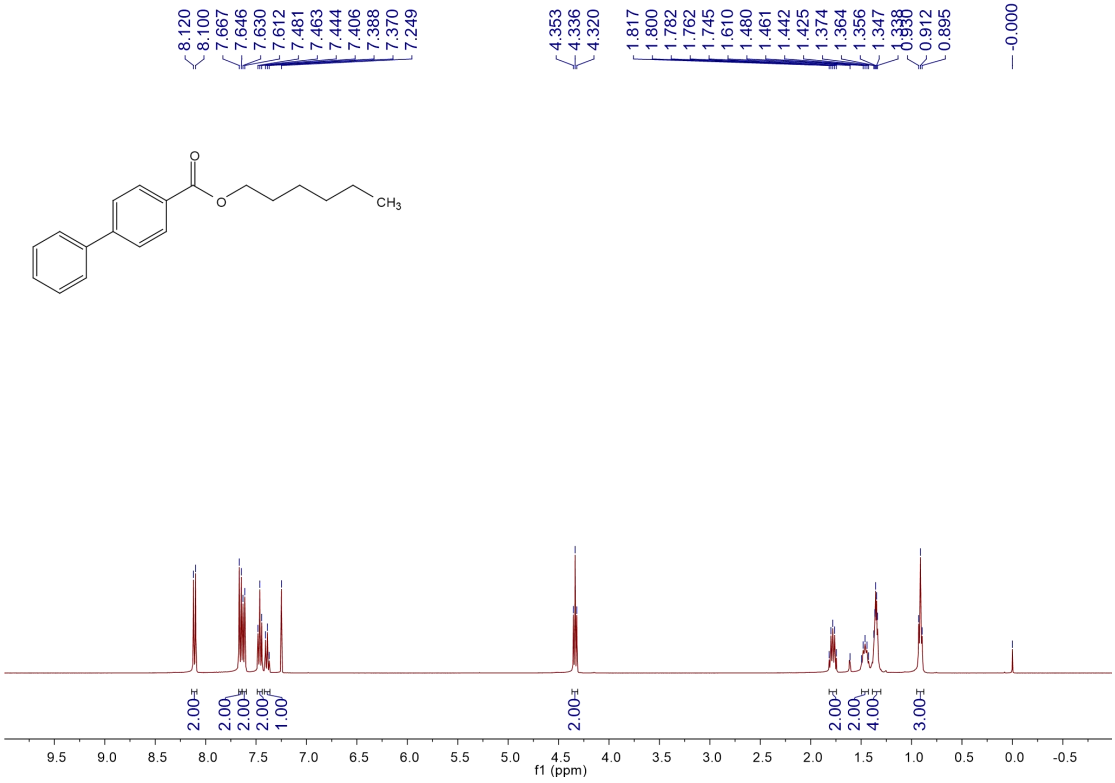
^{1}H NMR Spectrum of **hexyl 3,4,5-trimethoxybenzoate (31c)**



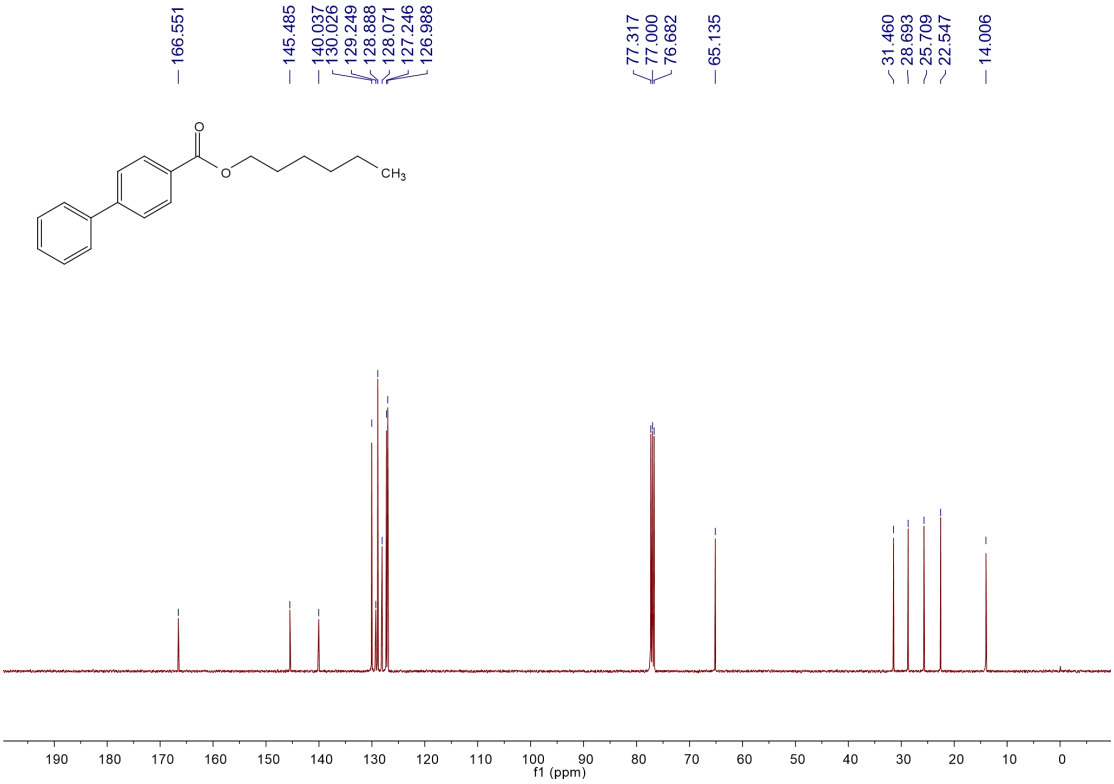
^{13}C NMR Spectrum of **hexyl 3,4,5-trimethoxybenzoate (31c)**



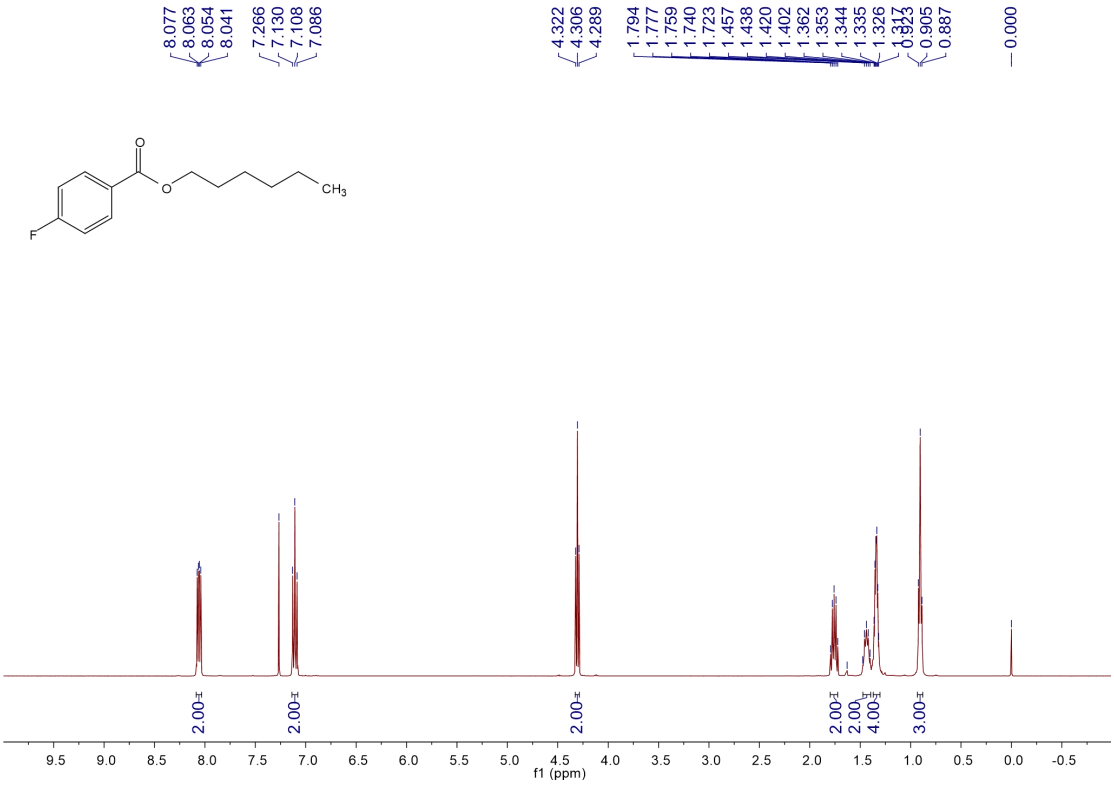
^{1}H NMR Spectrum of **hexyl [1,1'-biphenyl]-4-carboxylate (32c)**



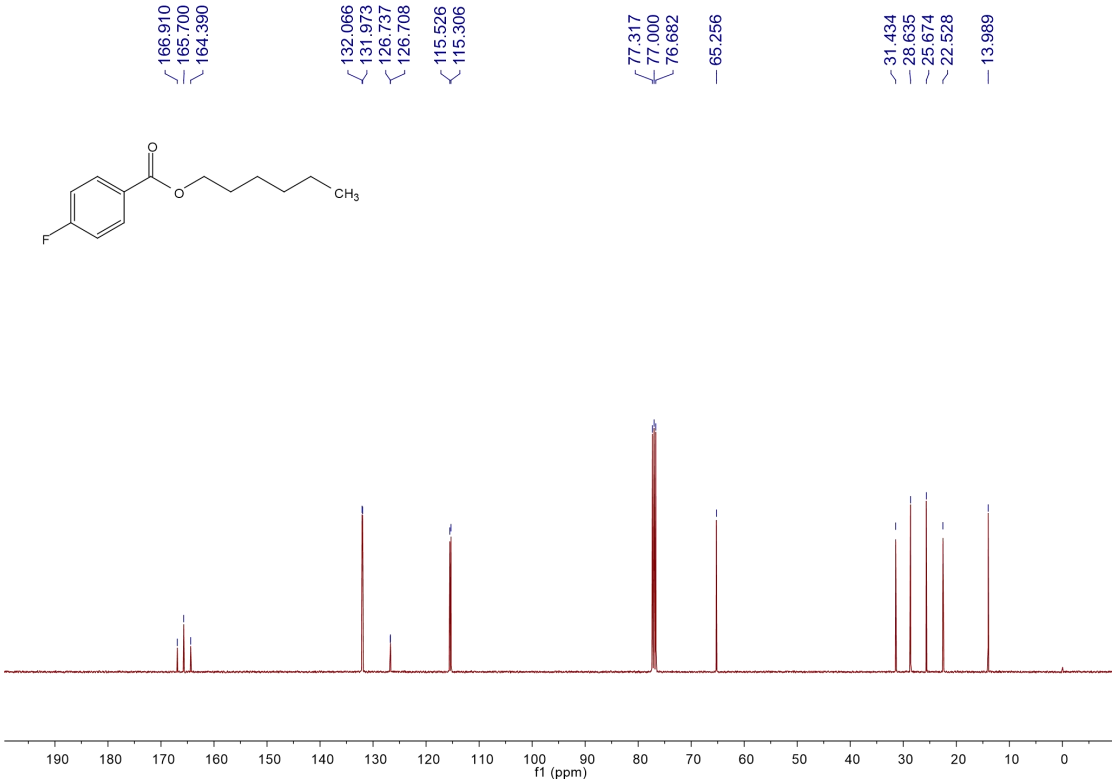
^{13}C NMR Spectrum of **hexyl [1,1'-biphenyl]-4-carboxylate (32c)**



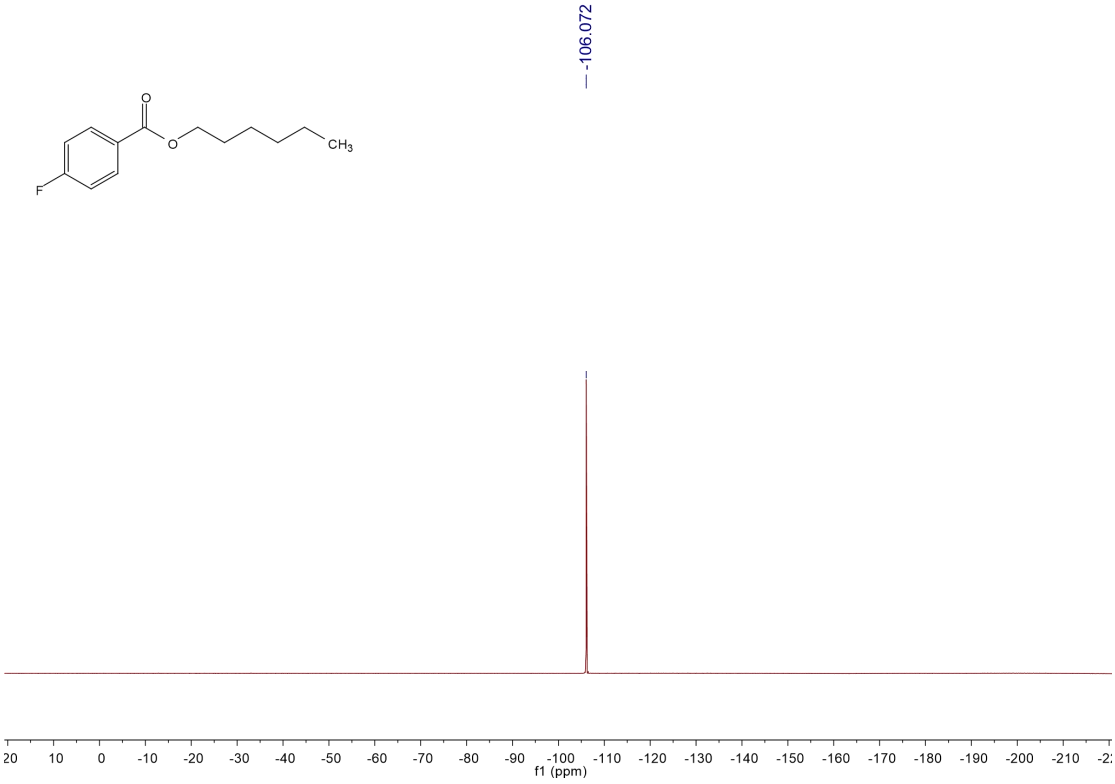
^{1}H NMR Spectrum of **hexyl 4-fluorobenzoate (33c)**



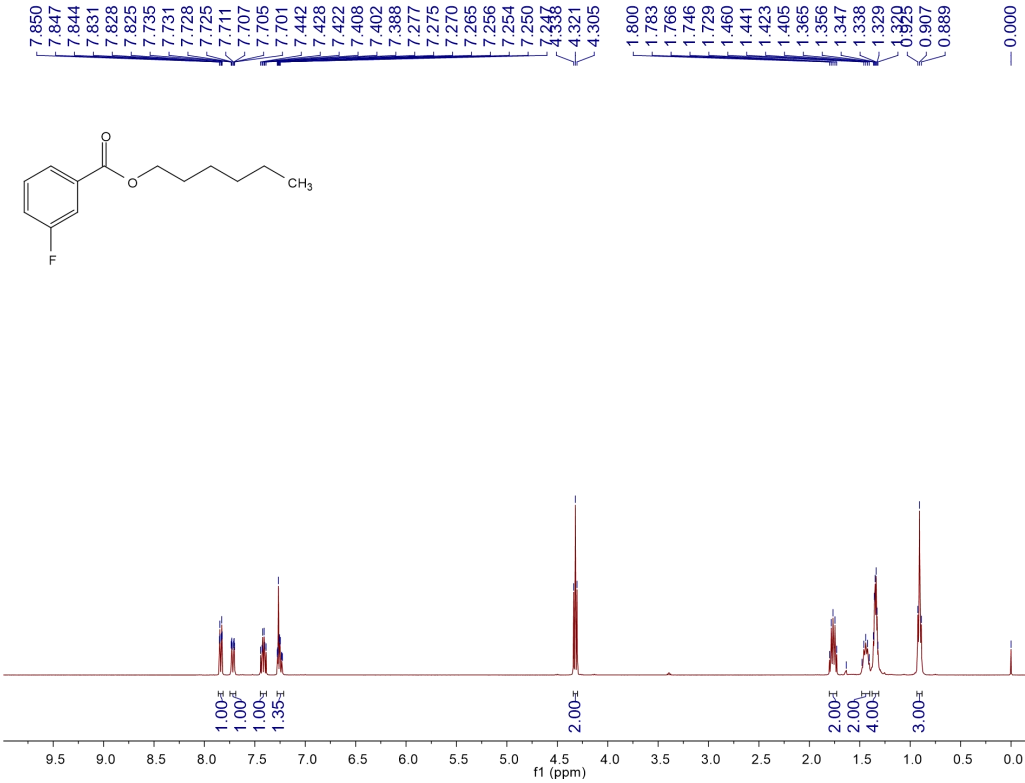
^{13}C NMR Spectrum of **hexyl 4-fluorobenzoate (33c)**



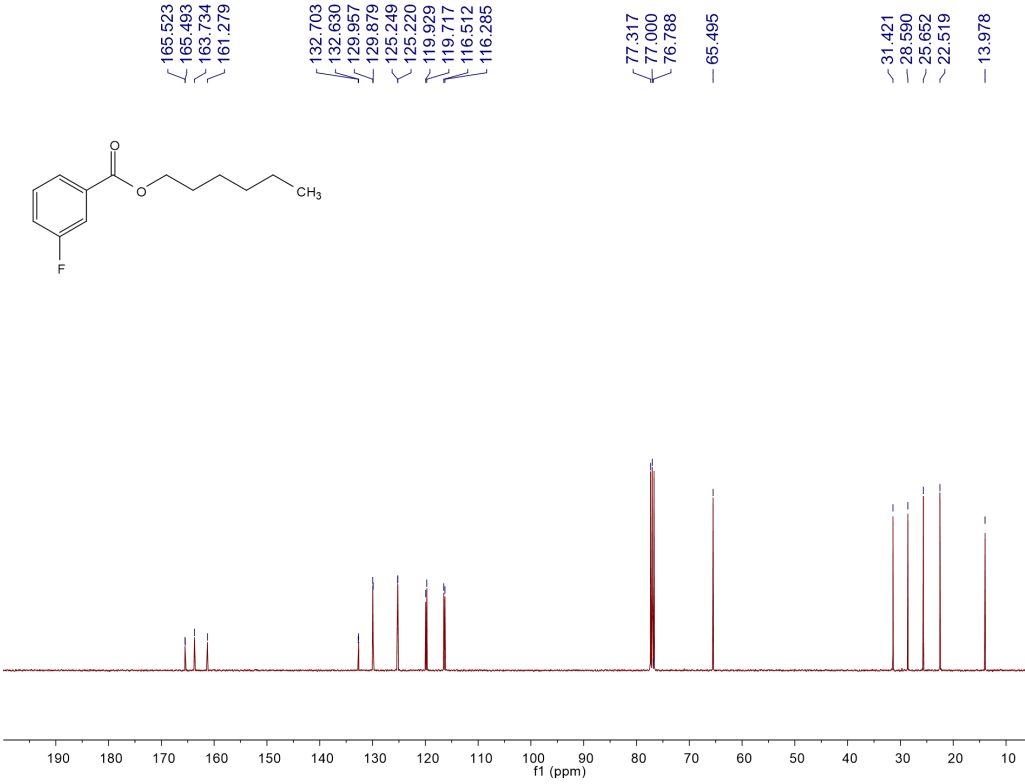
^{19}F NMR Spectrum of **hexyl 4-fluorobenzoate (33c)**



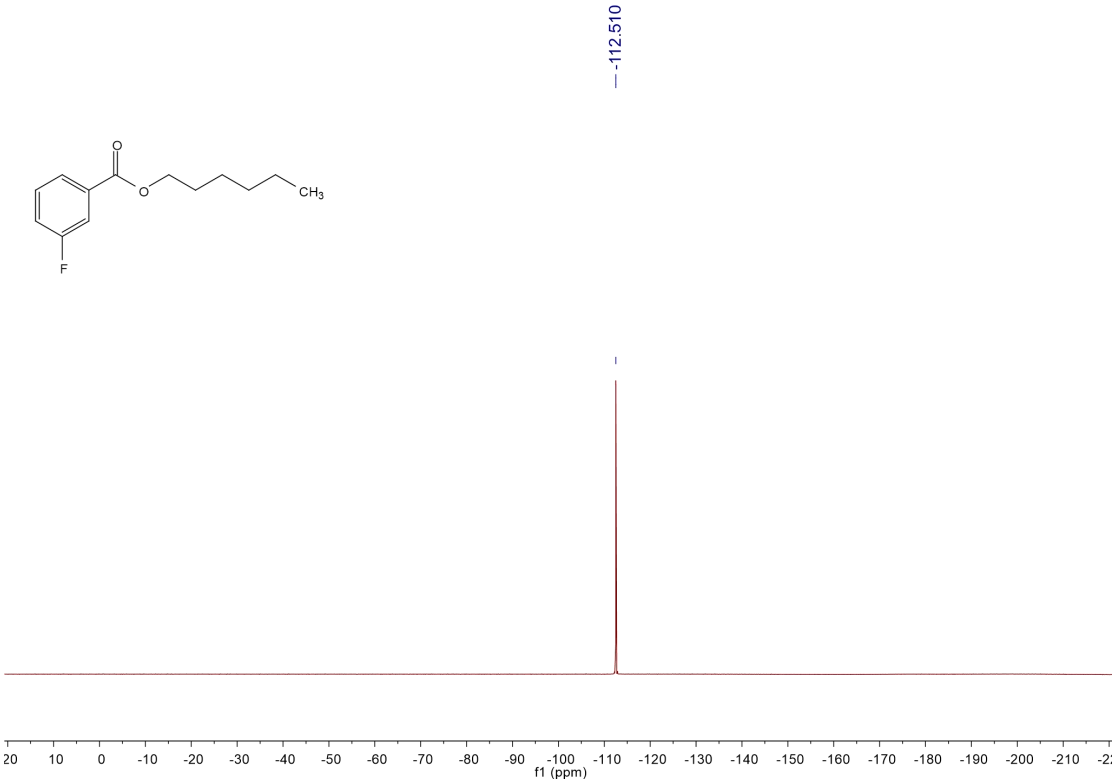
^{11}H NMR Spectrum of **hexyl 3-fluorobenzoate (34c)**



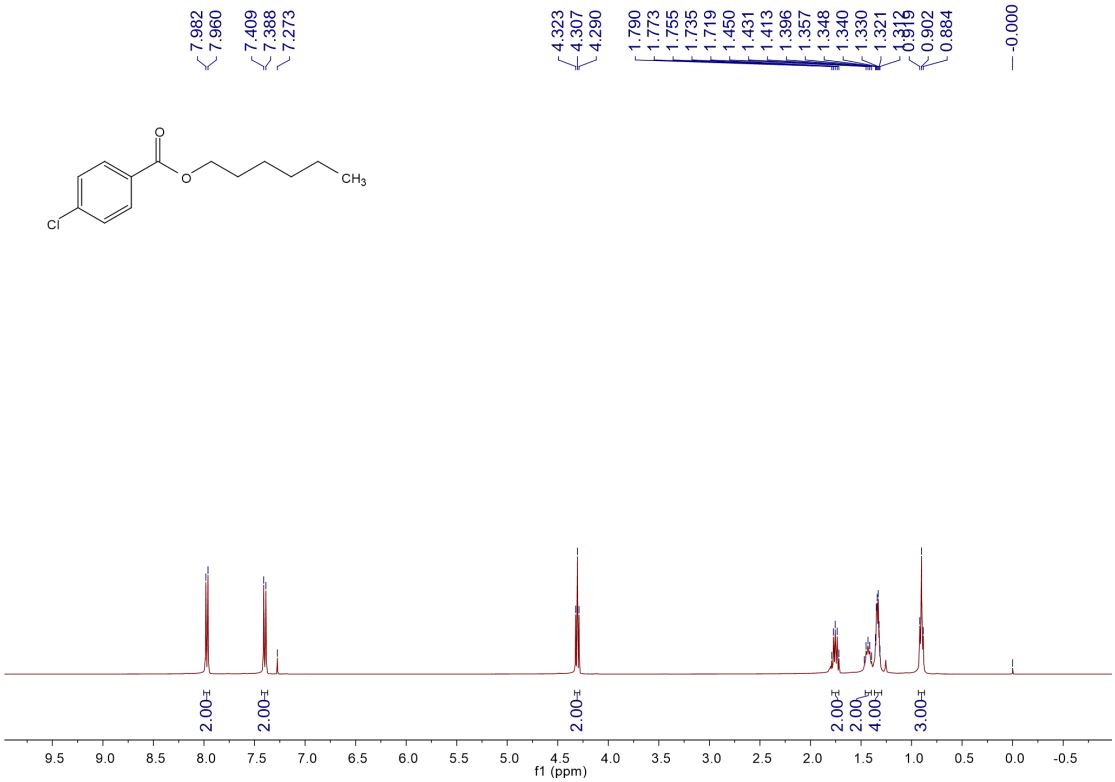
^{13}C NMR Spectrum of **hexyl 3-fluorobenzoate (34c)**



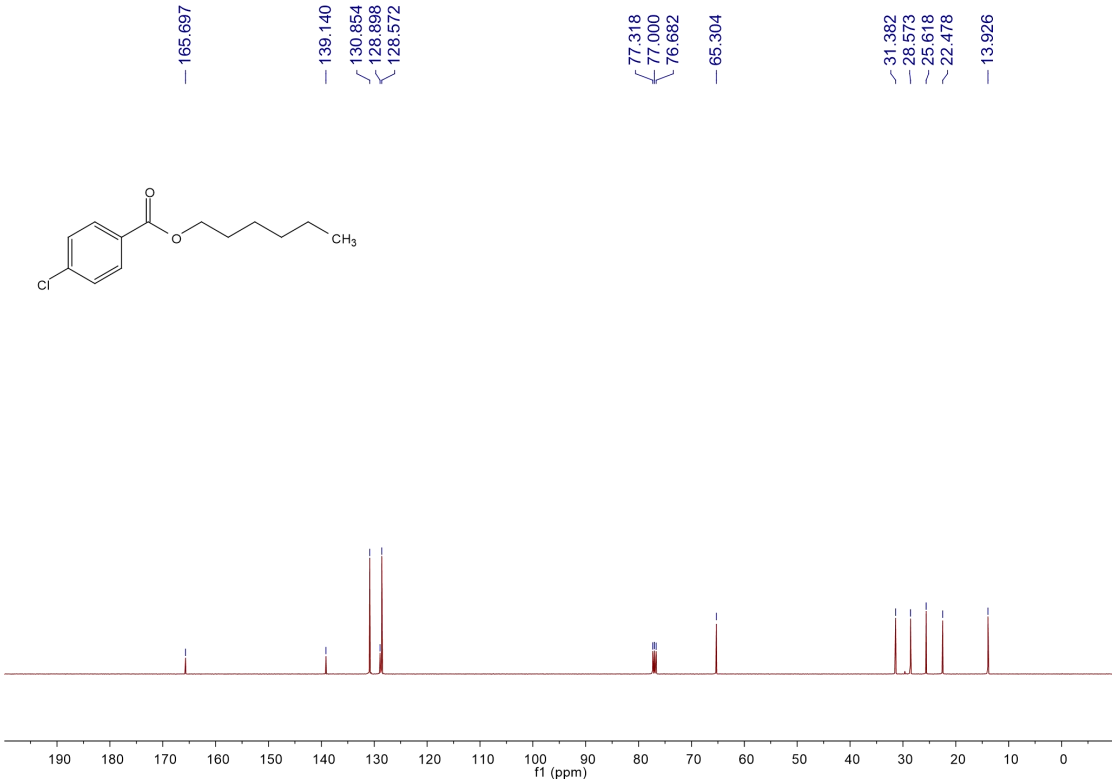
^{19}F NMR Spectrum of **hexyl 3-fluorobenzoate (34c)**



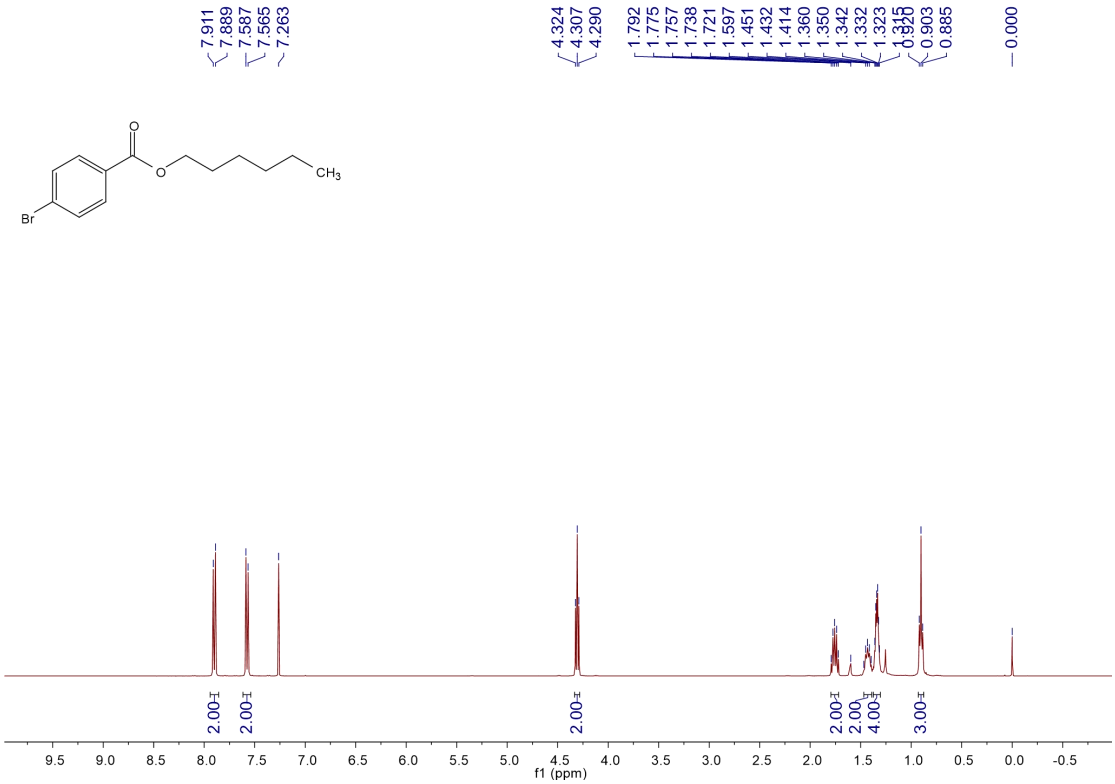
^{1}H NMR Spectrum of **hexyl 4-chlorobenzoate (35c)**



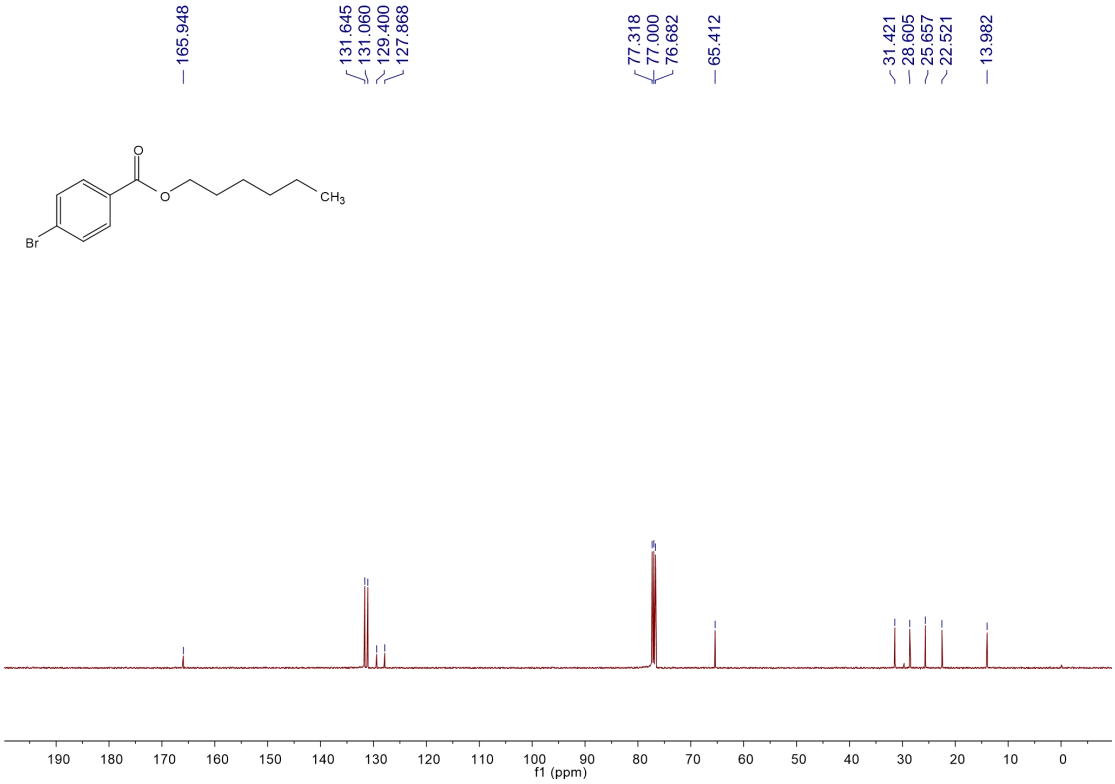
^{13}C NMR Spectrum of **hexyl 4-chlorobenzoate (35c)**



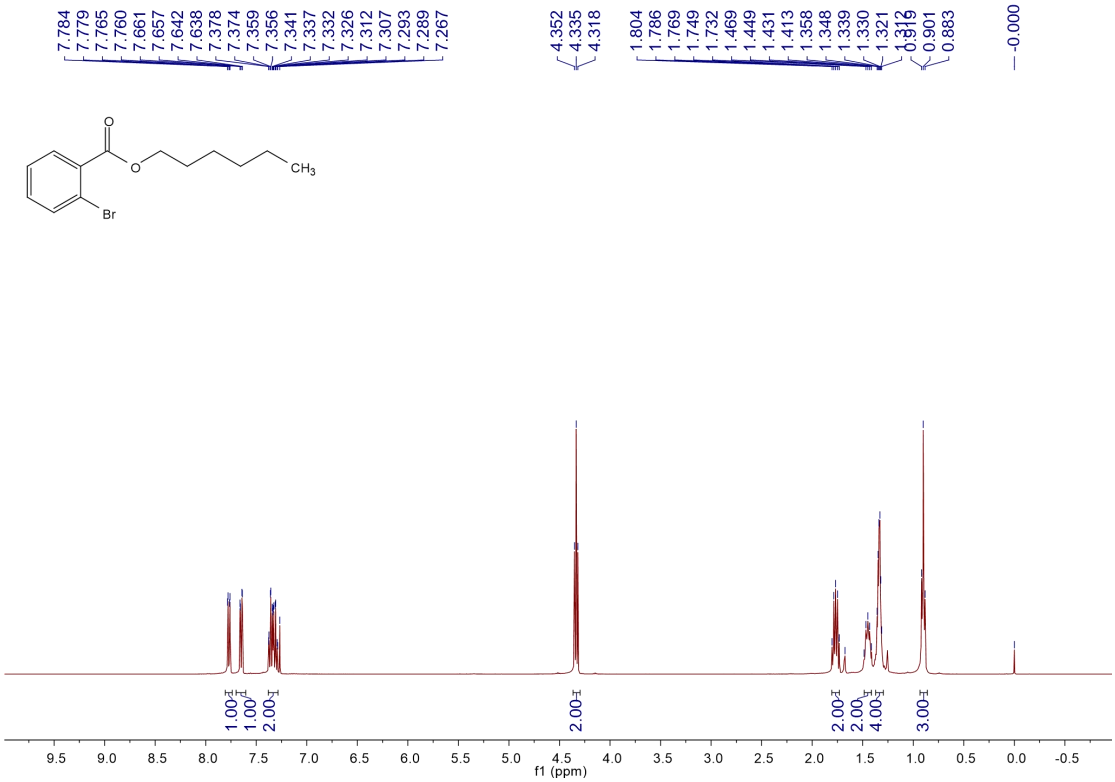
^{1}H NMR Spectrum of **hexyl 4-bromobenzoate (36c)**



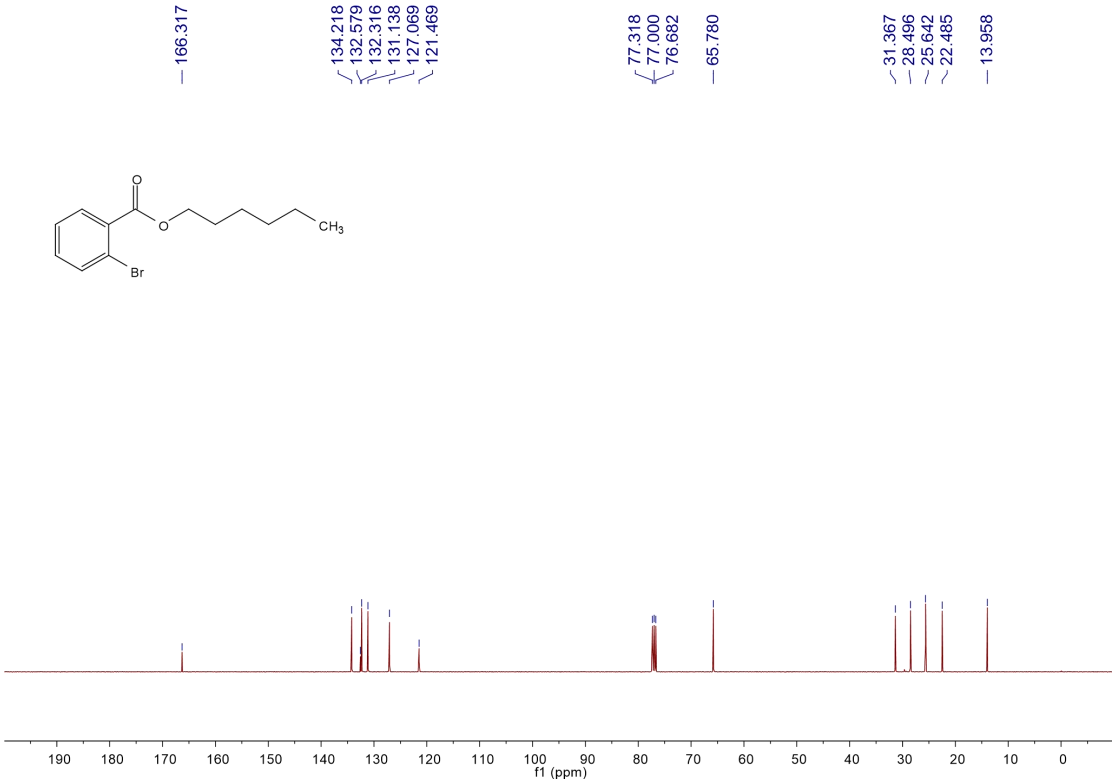
^{13}C NMR Spectrum of **hexyl 4-bromobenzoate (36c)**



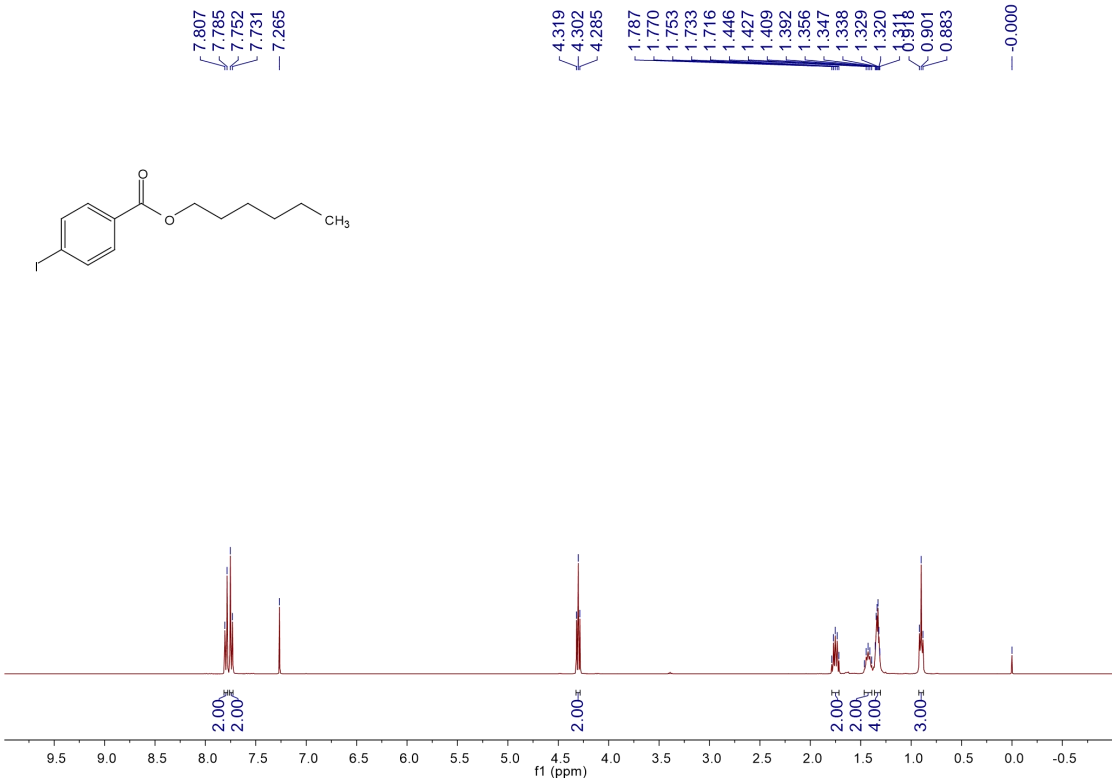
^{1}H NMR Spectrum of **hexyl 2-bromobenzoate (37c)**



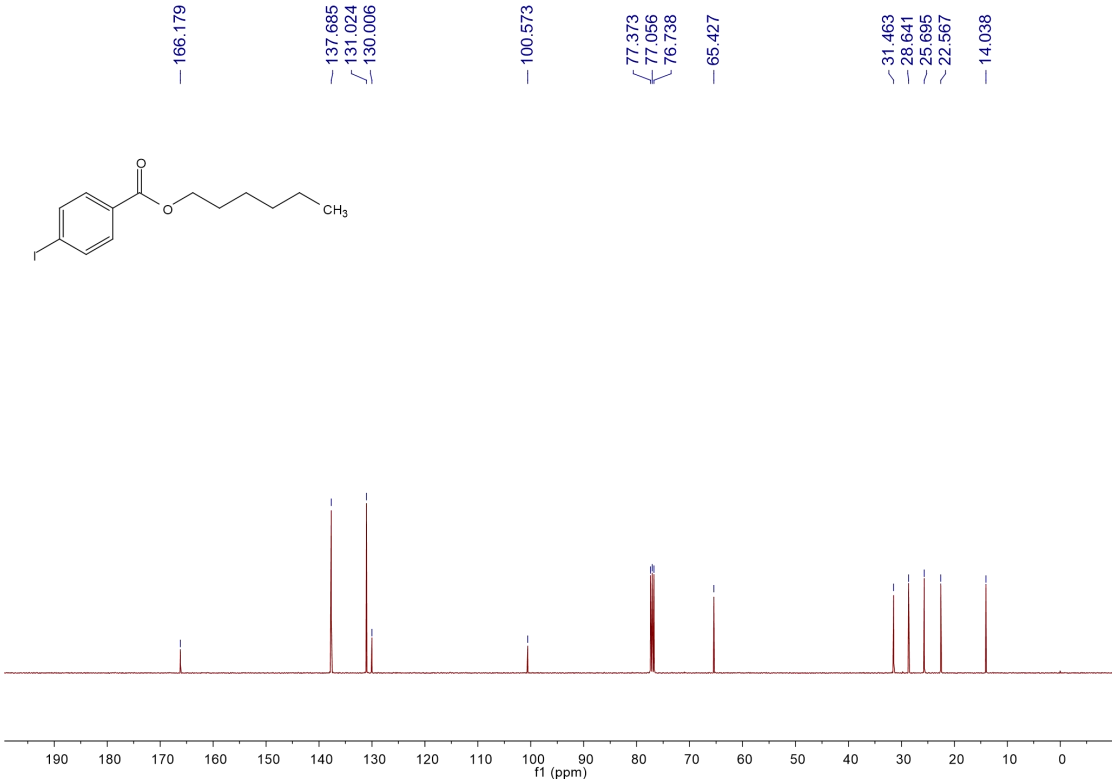
^{13}C NMR Spectrum of **hexyl 2-bromobenzoate (37c)**



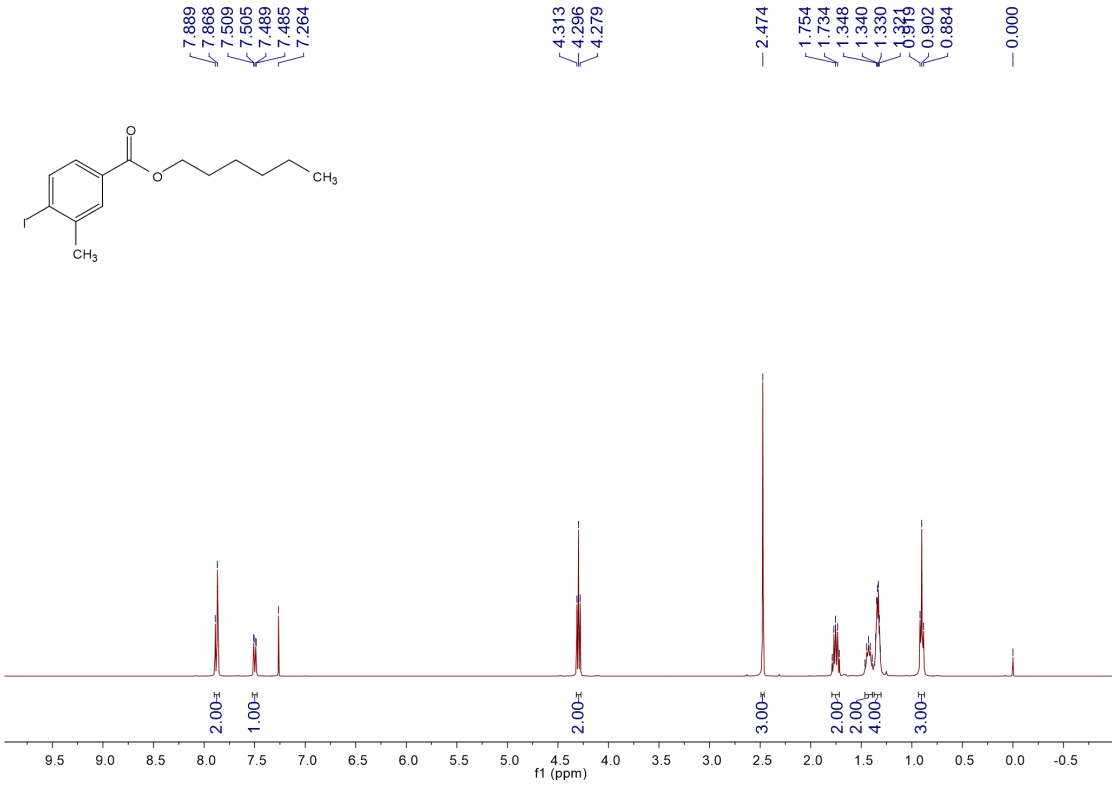
^{1}H NMR Spectrum of **hexyl 4-iodobenzoate (38c)**



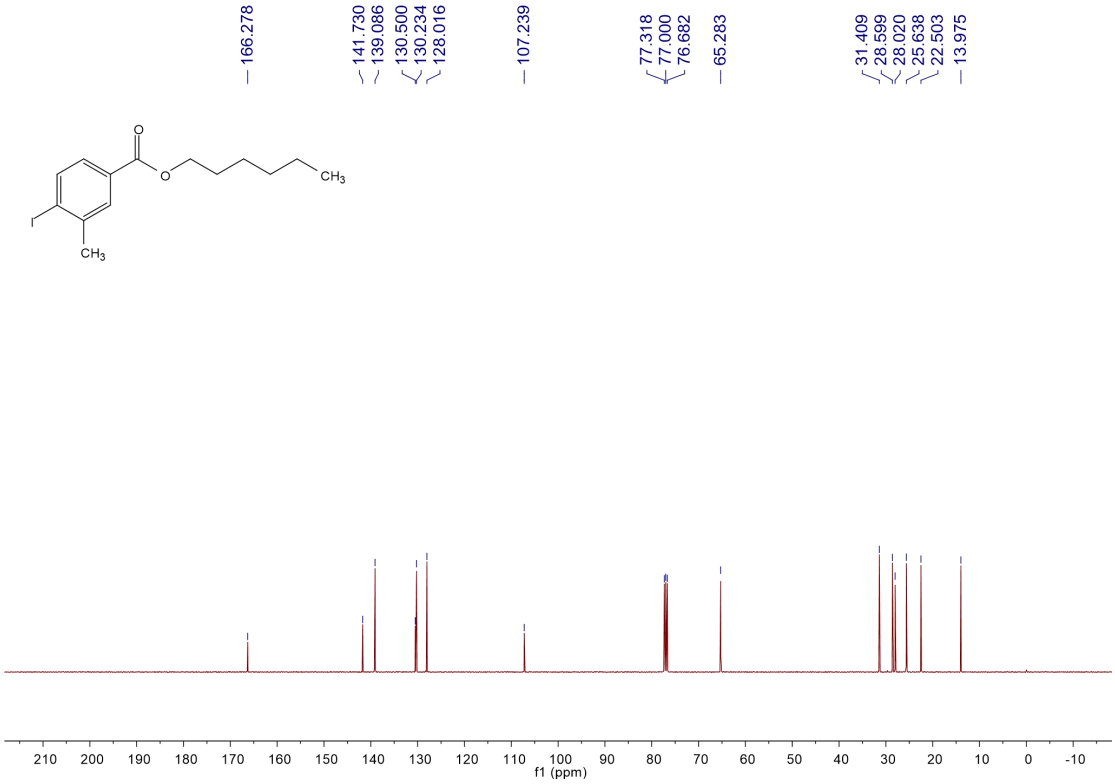
^{13}C NMR Spectrum of **hexyl 4-iodobenzoate (38c)**



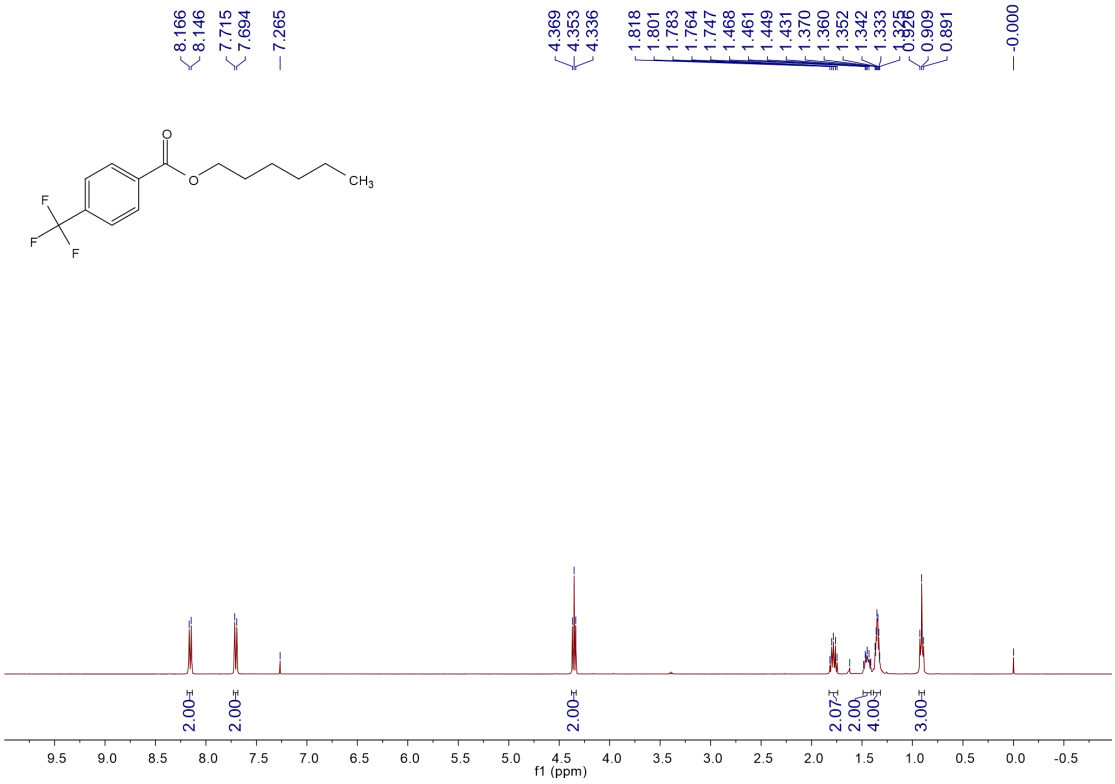
^{1}H NMR Spectrum of **hexyl 4-iodo-3-methylbenzoate (39c)**



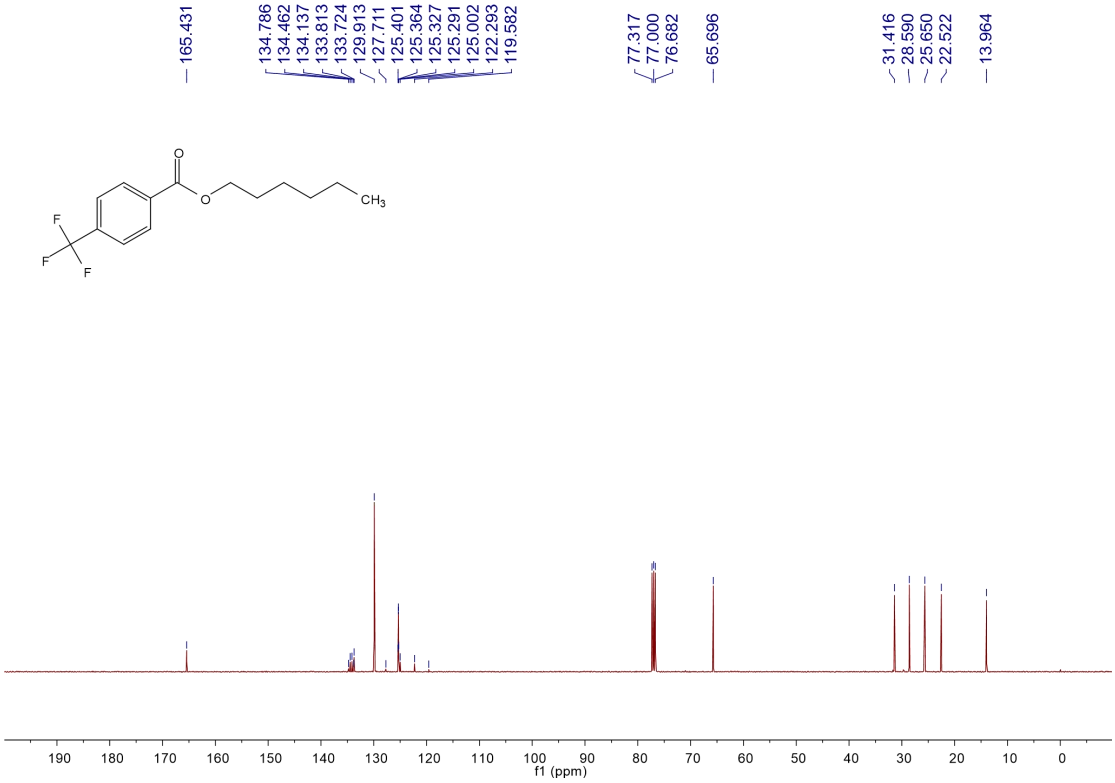
^{13}C NMR Spectrum of **hexyl 4-iodo-3-methylbenzoate (39c)**



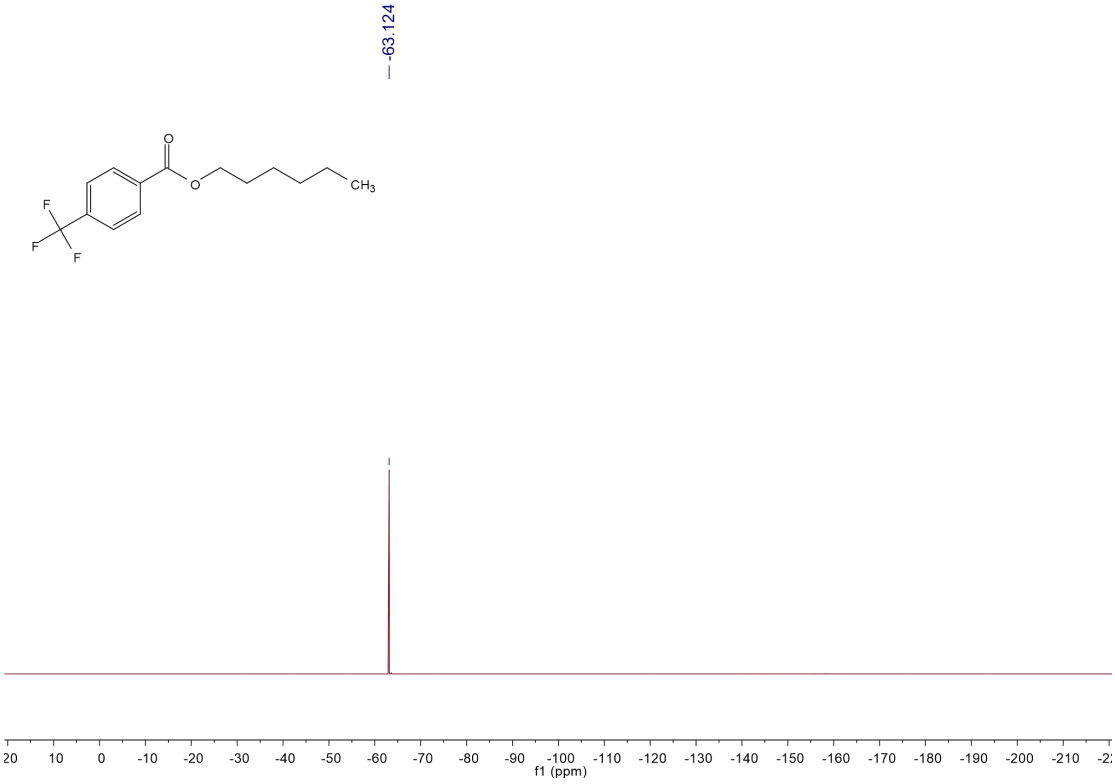
^{1}H NMR Spectrum of **hexyl 4-(trifluoromethyl) benzoate (40c)**



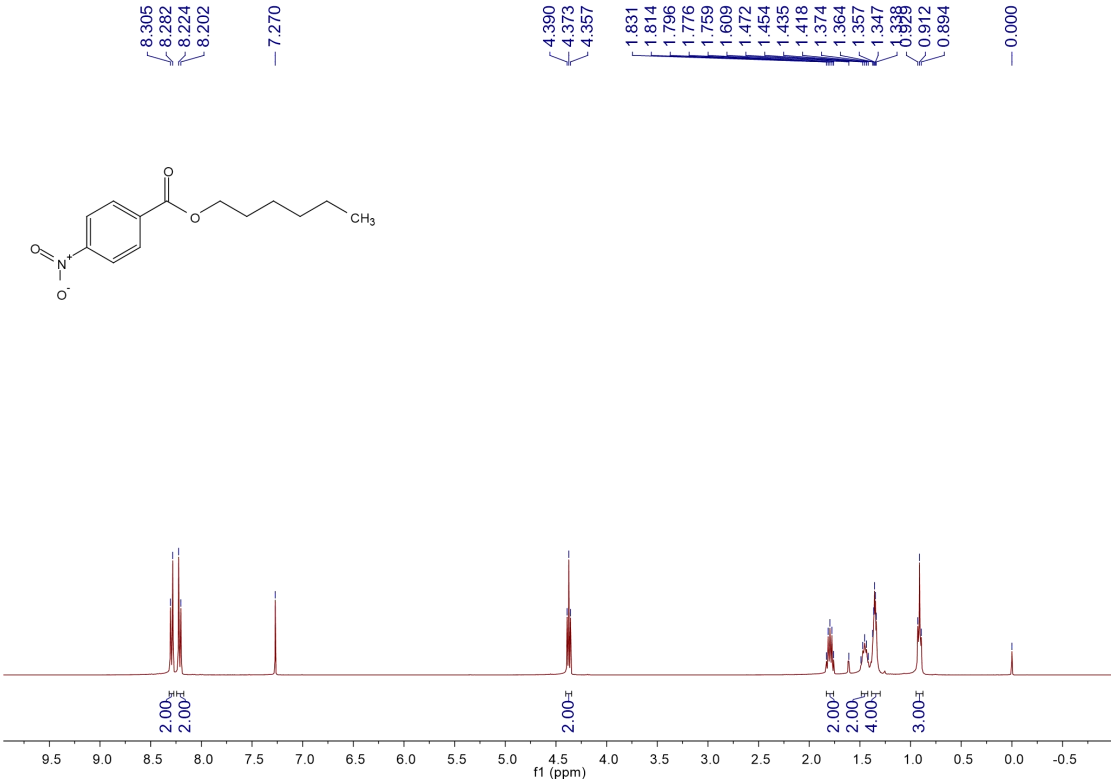
^{13}C NMR Spectrum of **hexyl 4-(trifluoromethyl) benzoate (40c)**



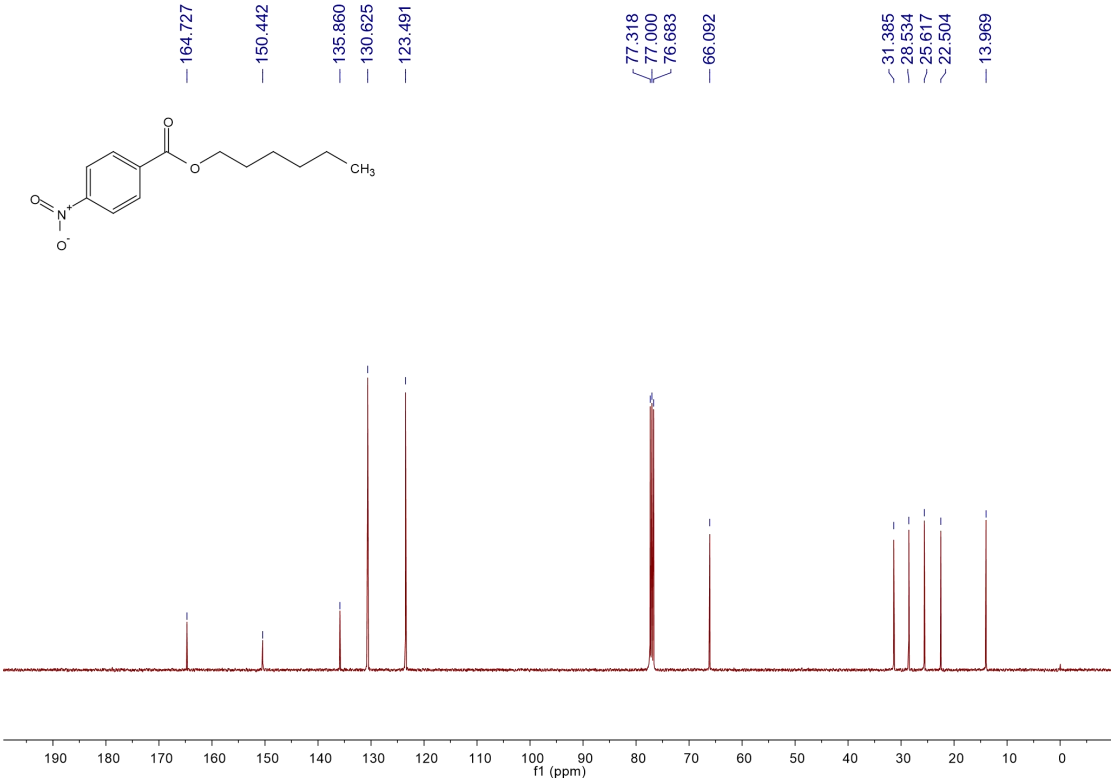
^{19}F NMR Spectrum of **hexyl 4-(trifluoromethyl) benzoate (40c)**



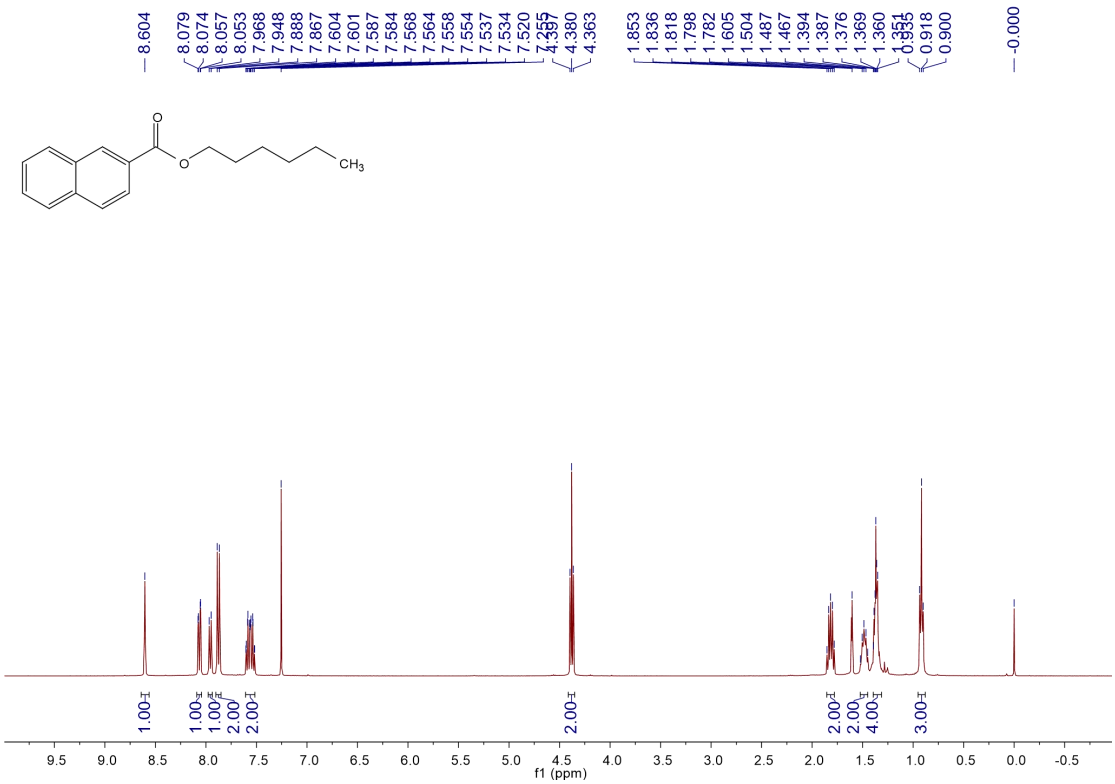
^{1}H NMR Spectrum of **hexyl 4-nitrobenzoate (41c)**



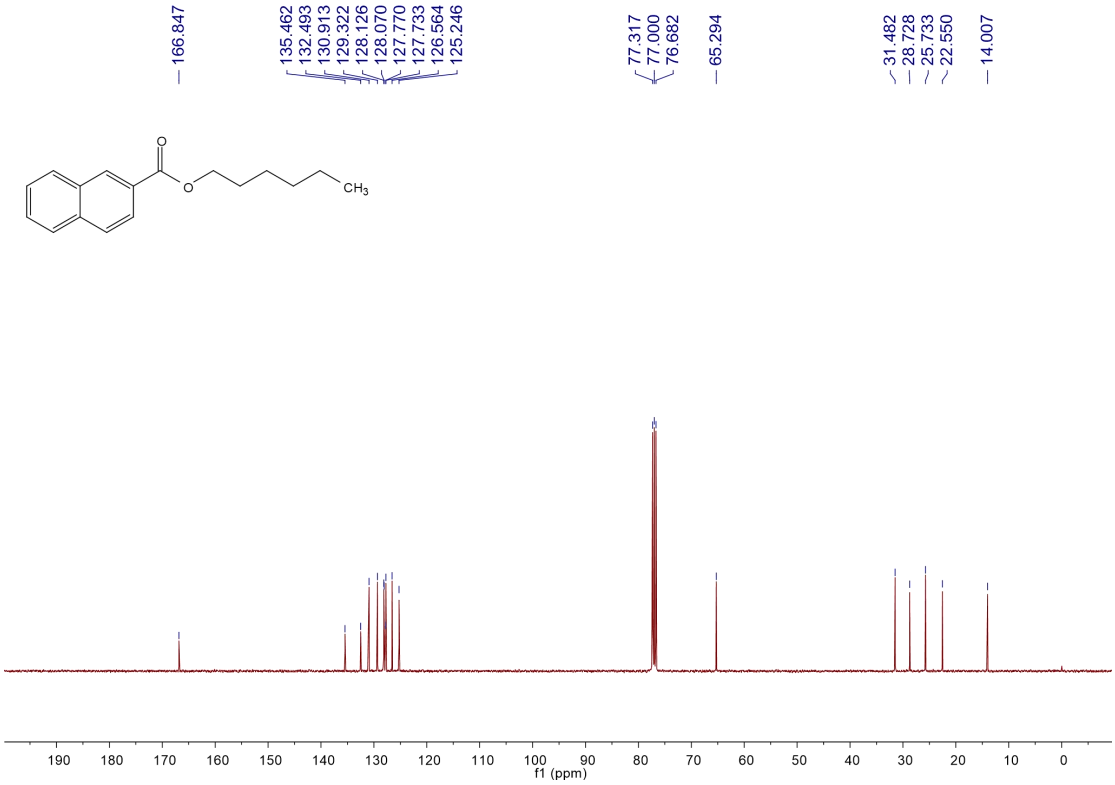
^{13}C NMR Spectrum of **hexyl 4-nitrobenzoate (41c)**



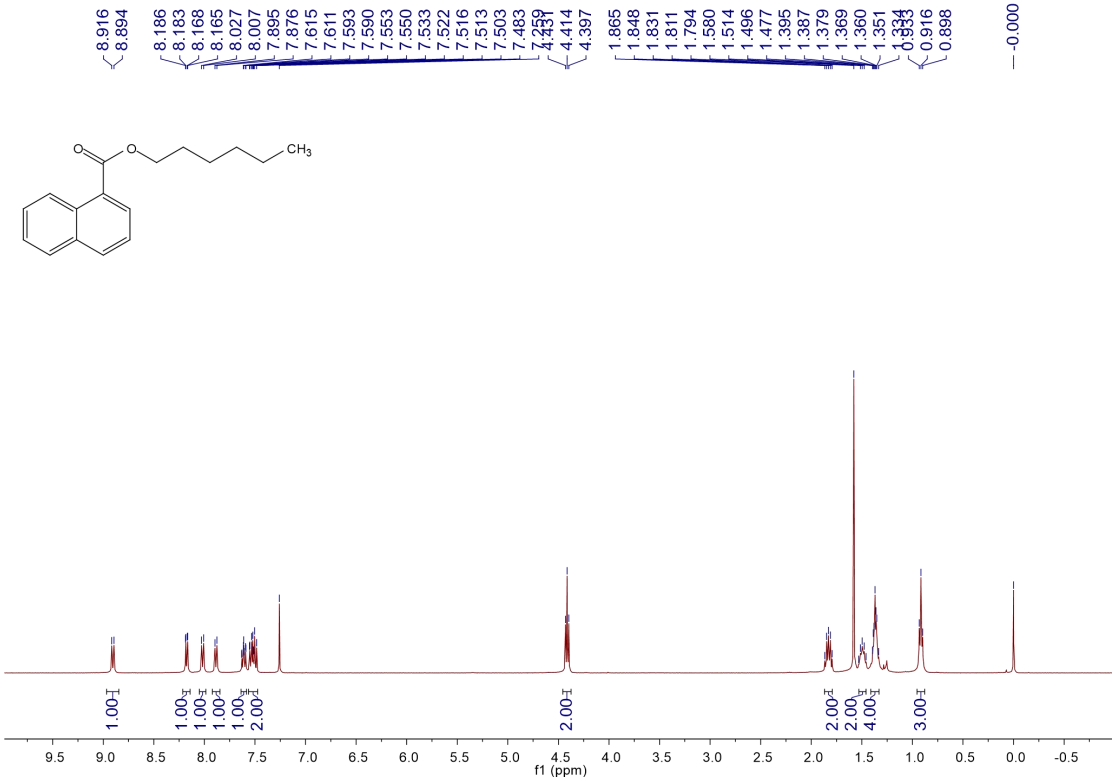
^{1}H NMR Spectrum of **hexyl 2-naphthoate (42c)**



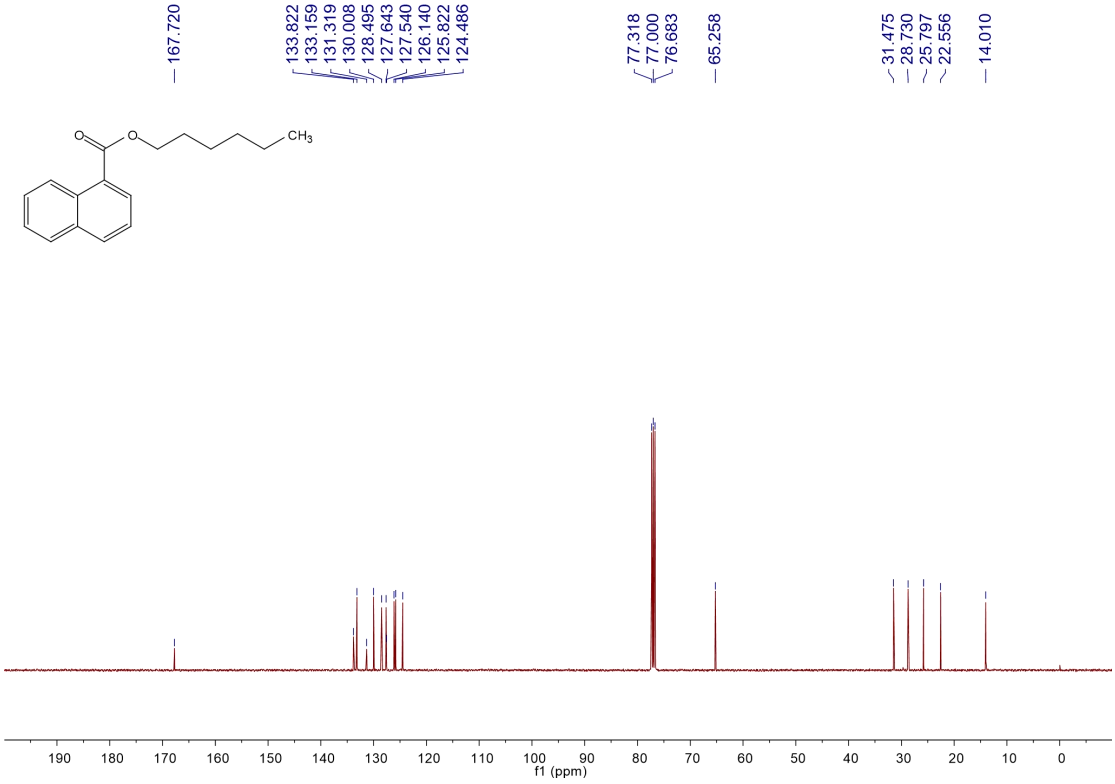
^{13}C NMR Spectrum of **hexyl 2-naphthoate (42c)**



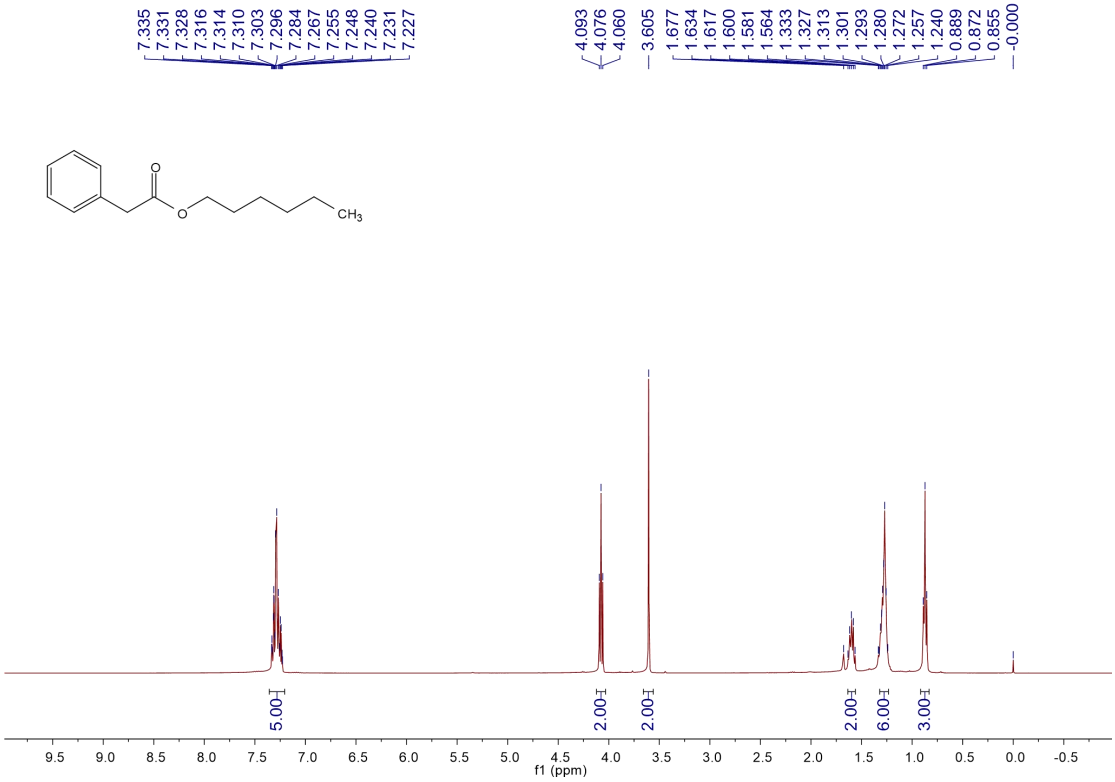
^{1}H NMR Spectrum of **hexyl 1-naphthoate (43c)**



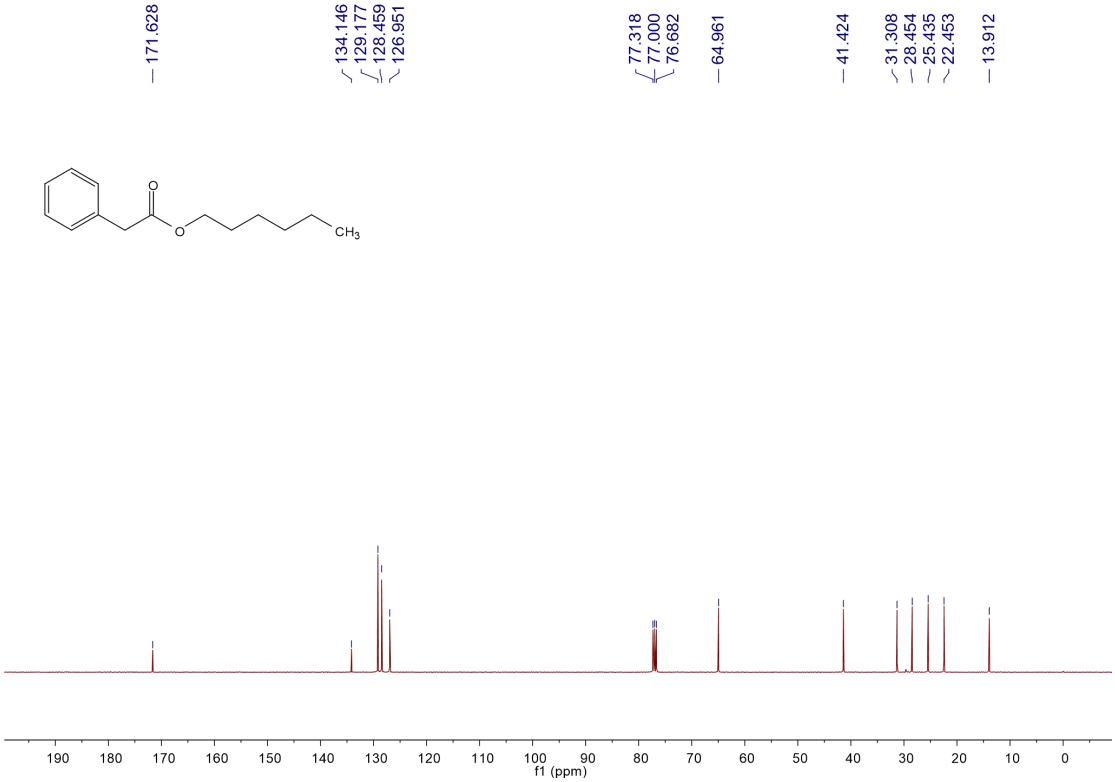
^{13}C NMR Spectrum of **hexyl 1-naphthoate (43c)**



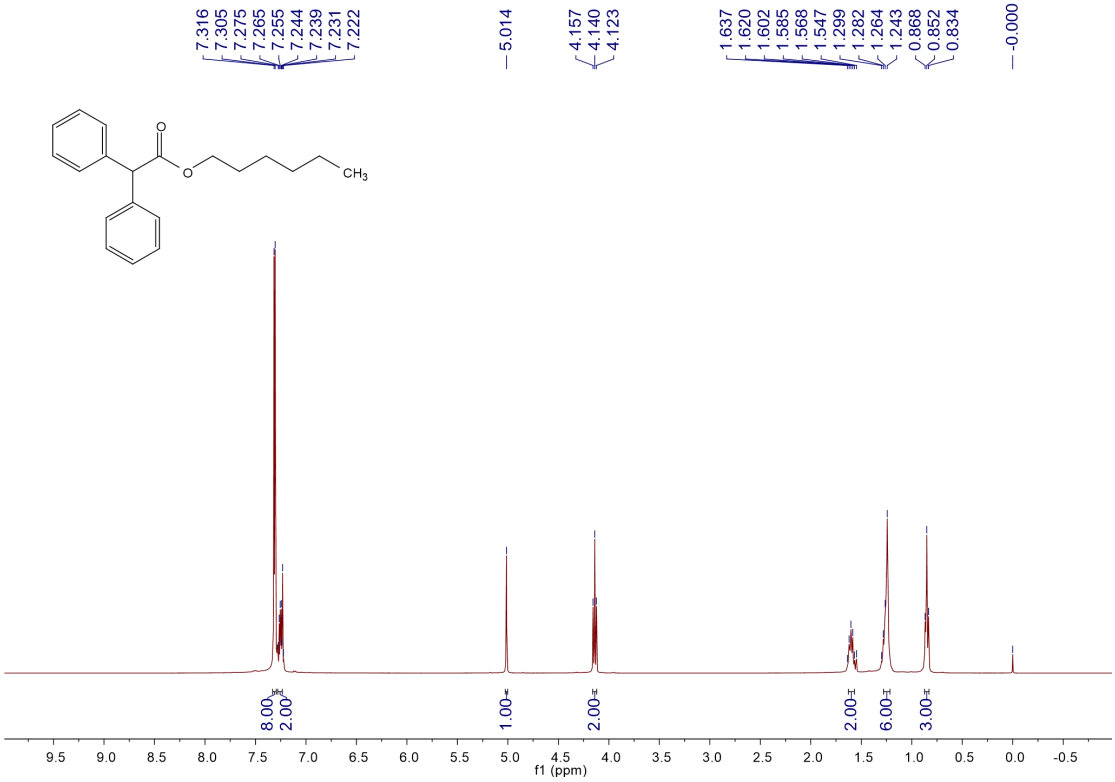
^{1}H NMR Spectrum of **hexyl 2-phenylacetate (44c)**



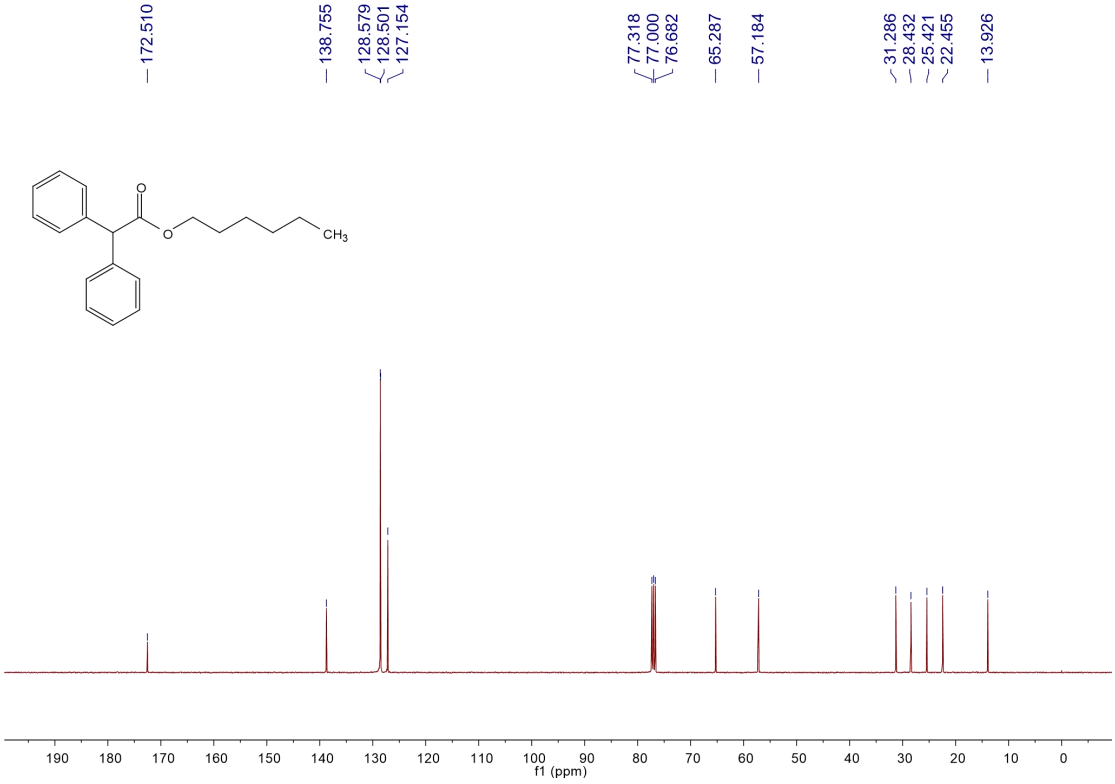
^{13}C NMR Spectrum of **hexyl 2-phenylacetate (44c)**



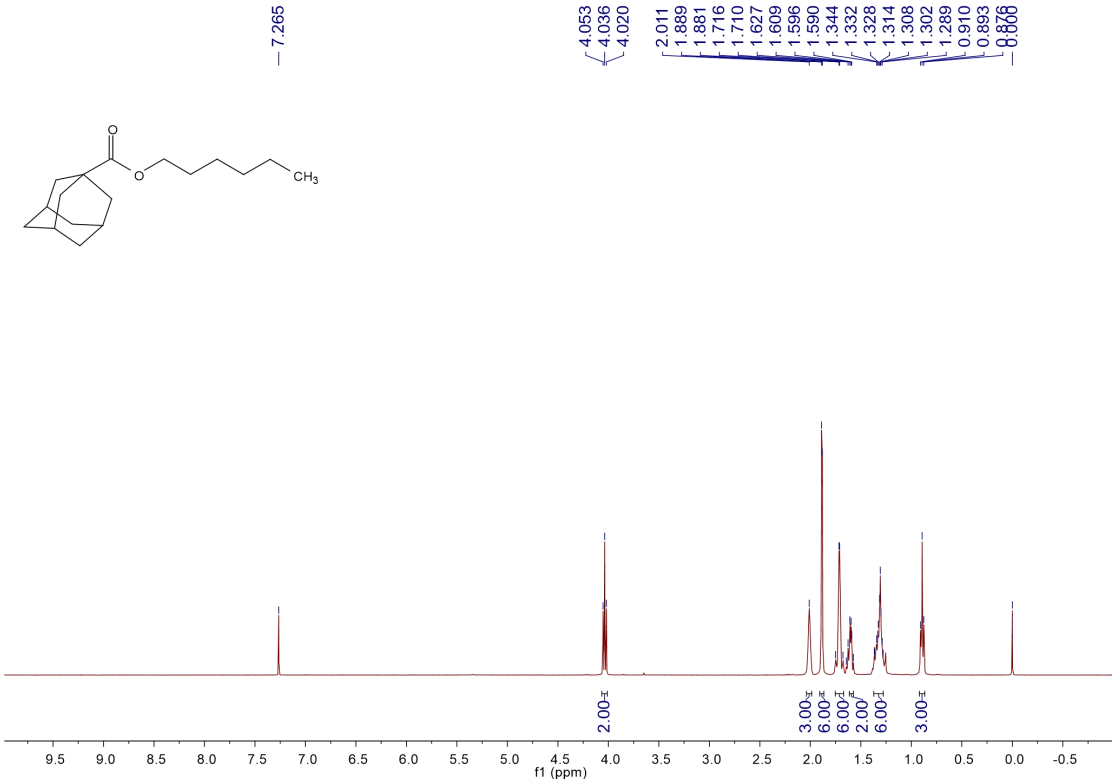
^{1}H NMR Spectrum of **hexyl 2,2-diphenylacetate (45c)**



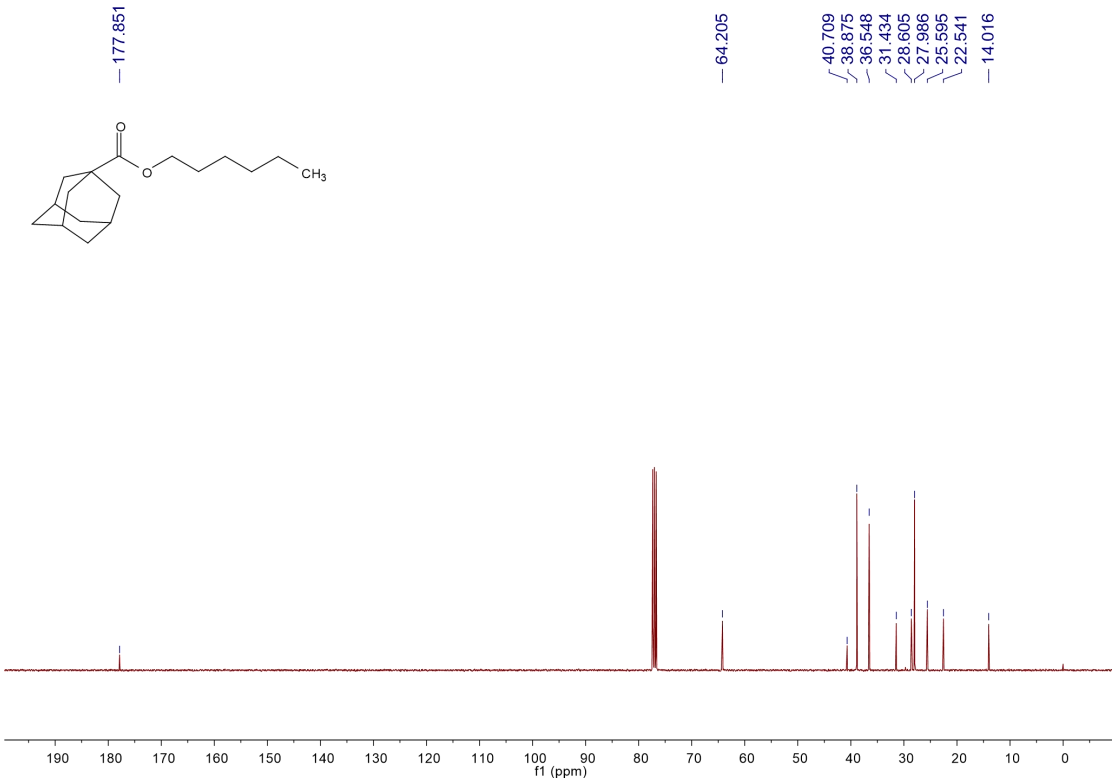
^{13}C NMR Spectrum of **hexyl 2,2-diphenylacetate (45c)**



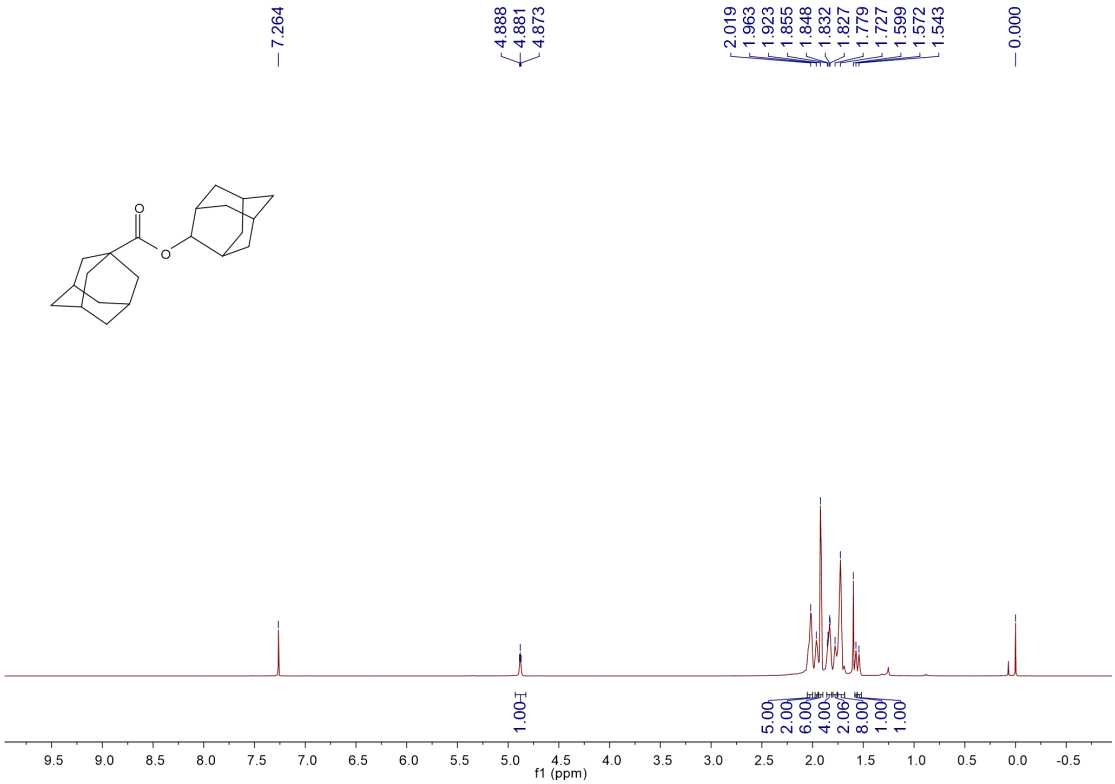
^{1}H NMR Spectrum of **hexyl (3r,5r,7r)-adamantane-1-carboxylate (46c)**



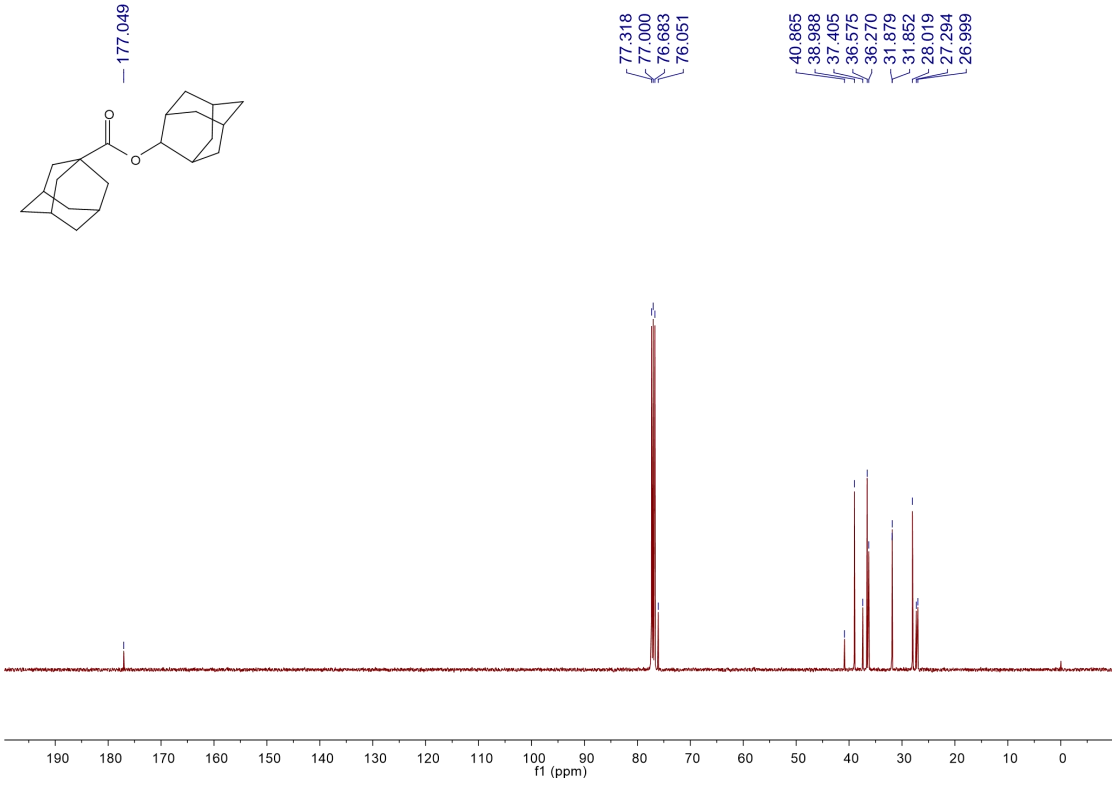
^{13}C NMR Spectrum of **hexyl (3r,5r,7r)-adamantane-1-carboxylate (46c)**



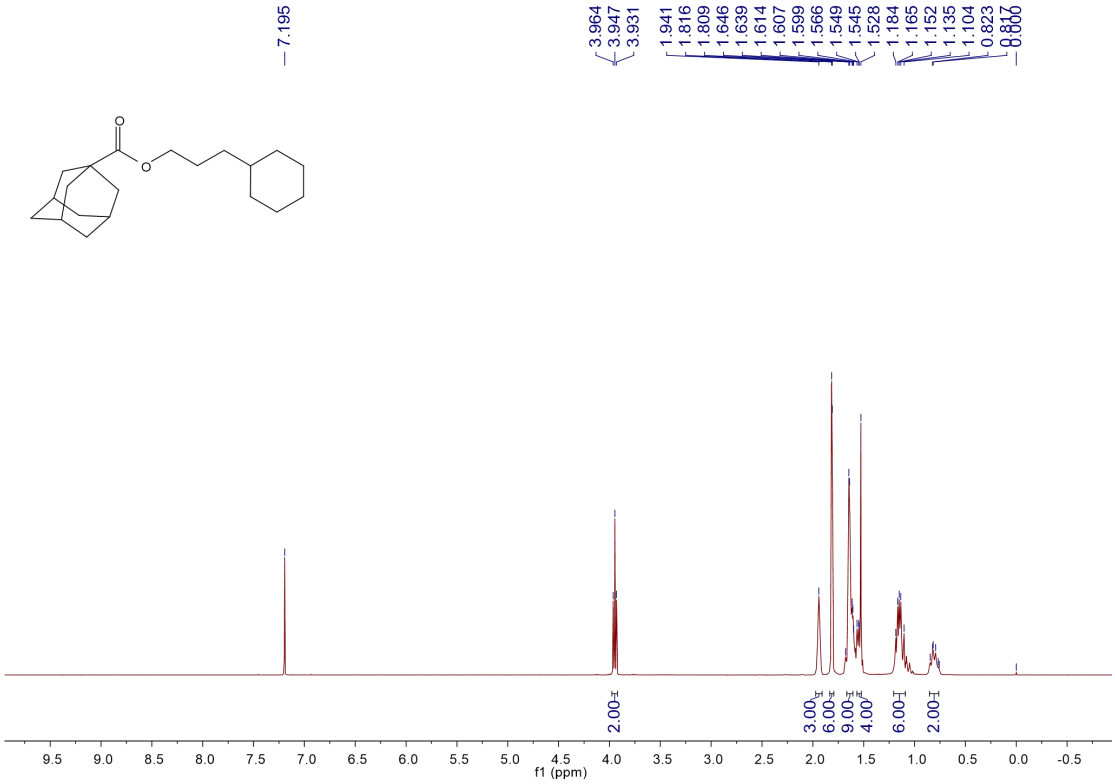
H NMR Spectrum of **(1R,3R,5R,7R)-adamantan-2-yl (3R,5R,7R)-adamantane-1-carboxylate (47c)**



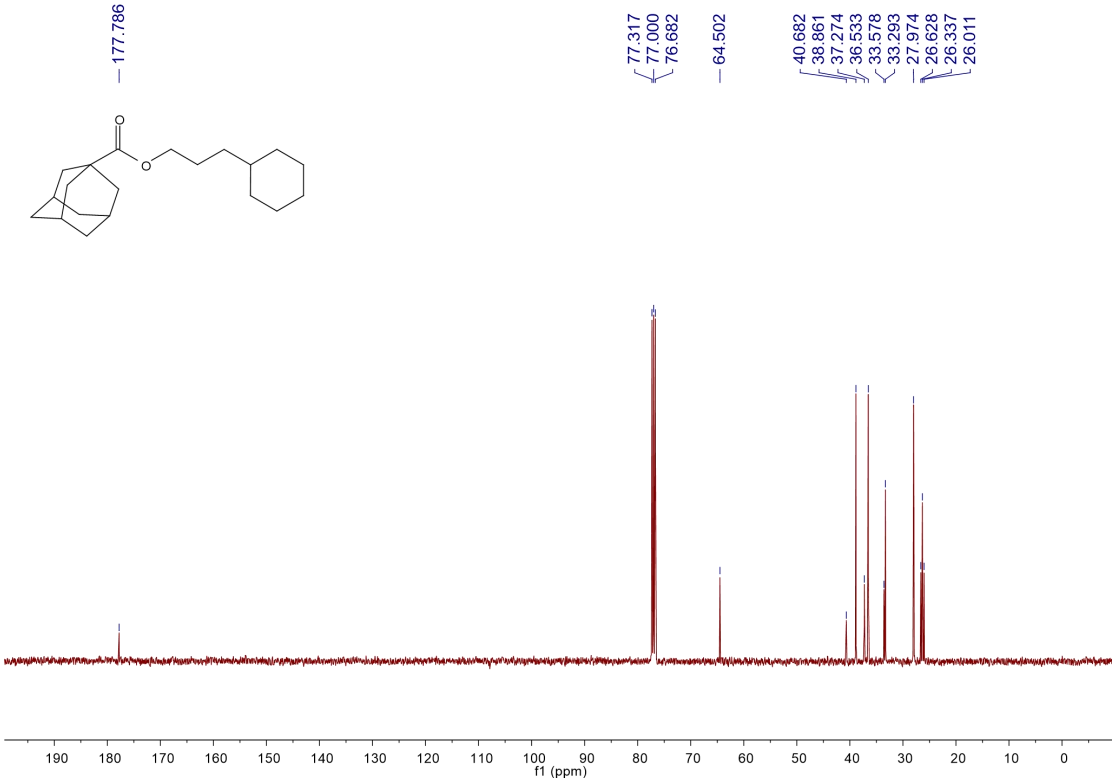
^{13}C NMR Spectrum of **(1R,3R,5R,7R)-adamantan-2-yl (3R,5R,7R)-adamantane-1-carboxylate (47)**



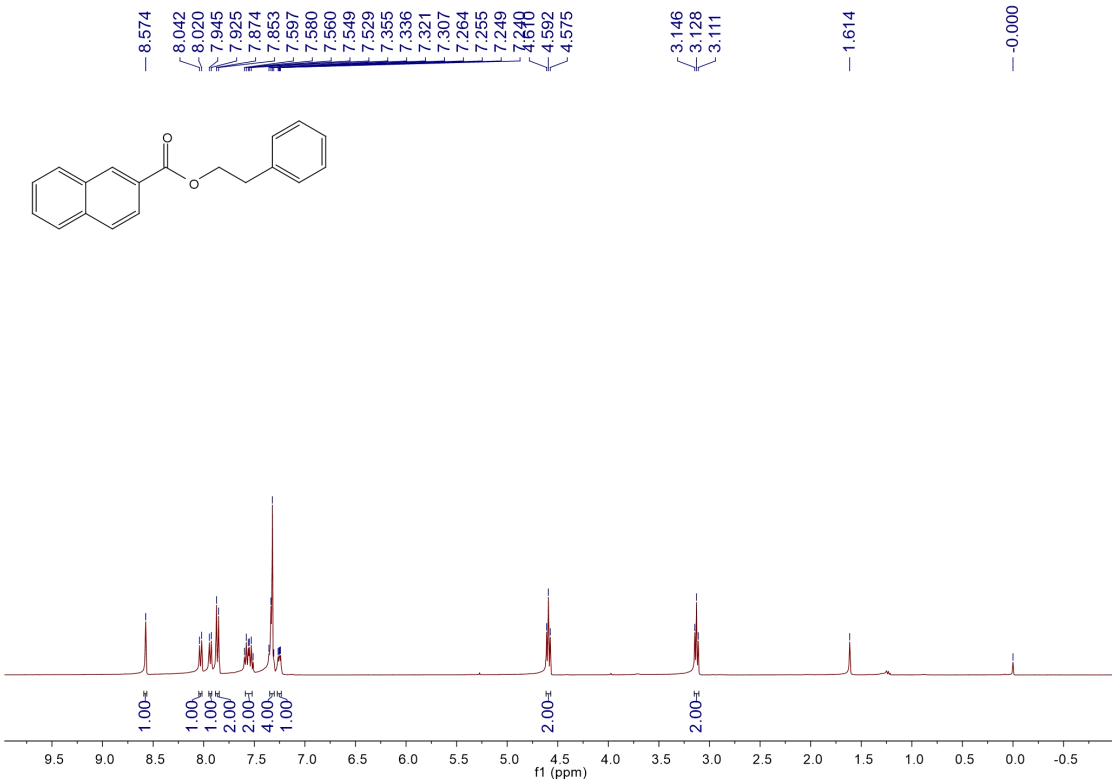
^{1}H NMR Spectrum of **3-cyclohexylpropyl (3r,5r,7r)-adamantane-1-carboxylate (48c)**



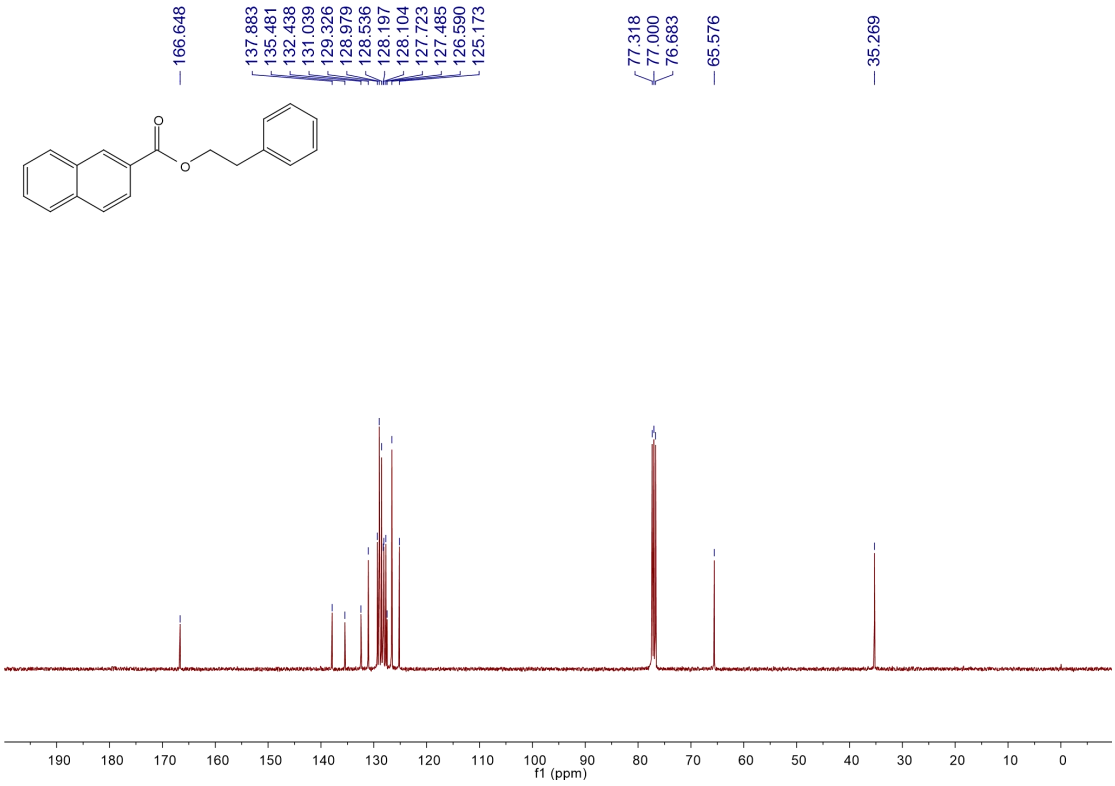
^{13}C NMR Spectrum of **3-cyclohexylpropyl (3r,5r,7r)-adamantane-1-carboxylate (48c)**



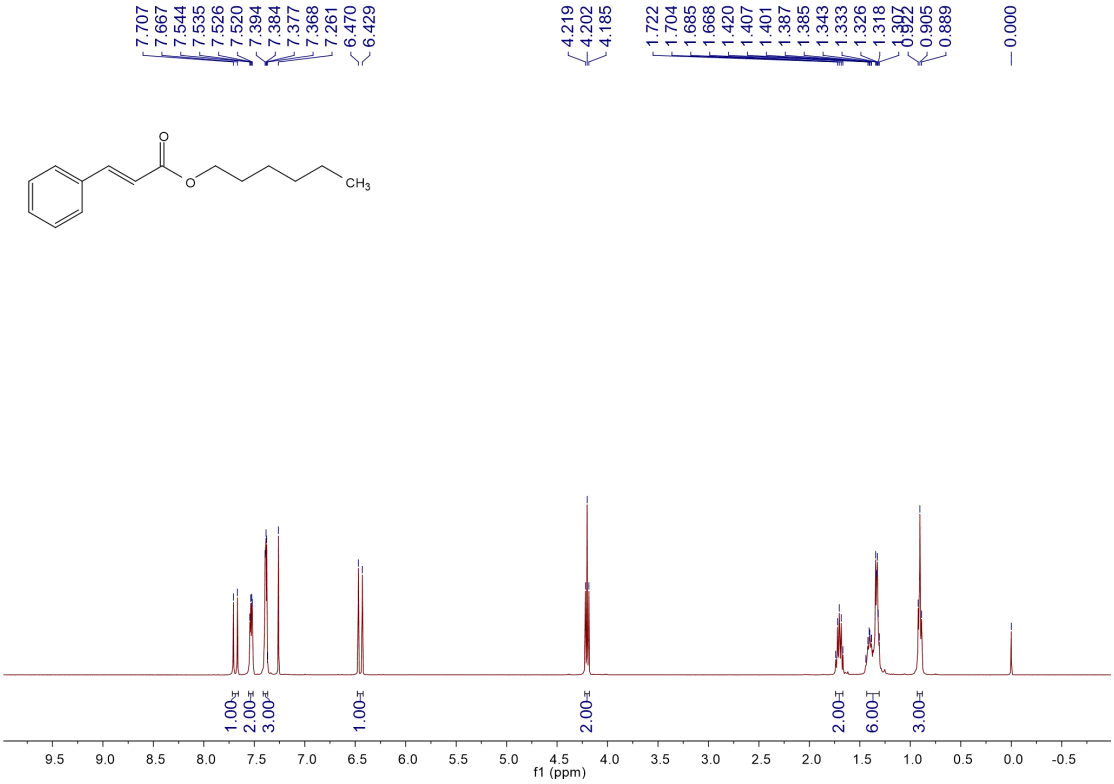
^{1}H NMR Spectrum of **phenethyl 2-naphthoate (49c)**



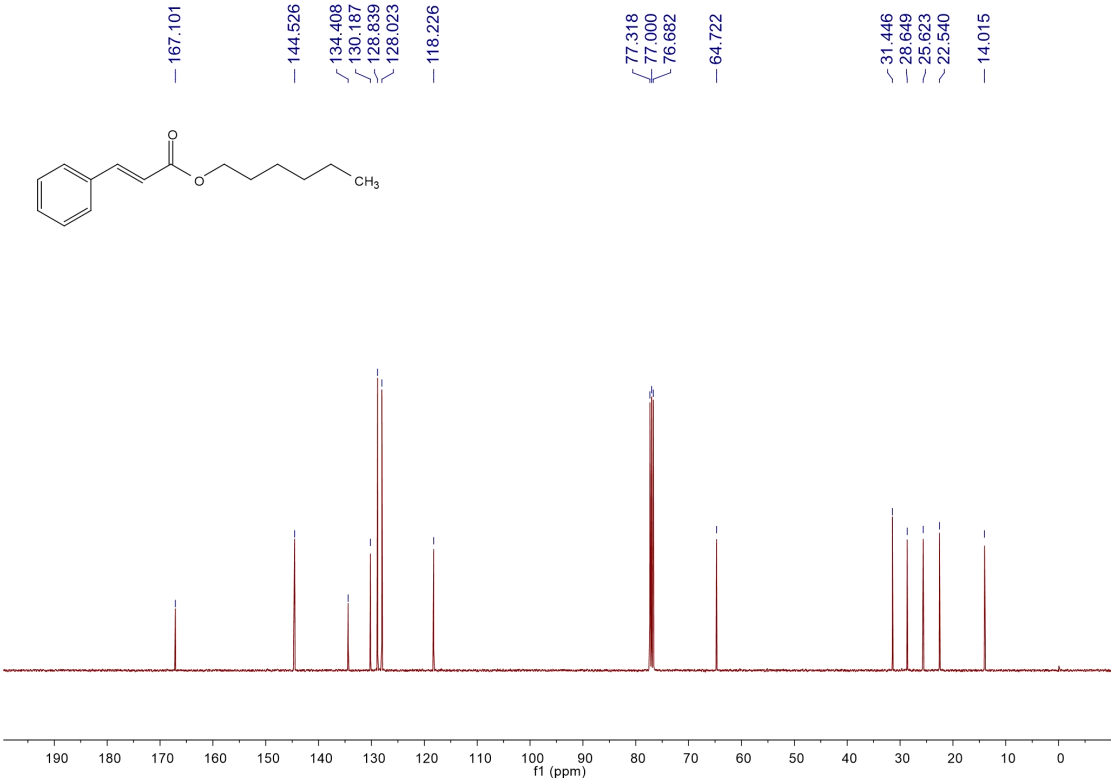
^{13}C NMR Spectrum of **phenethyl 2-naphthoate (49c)**



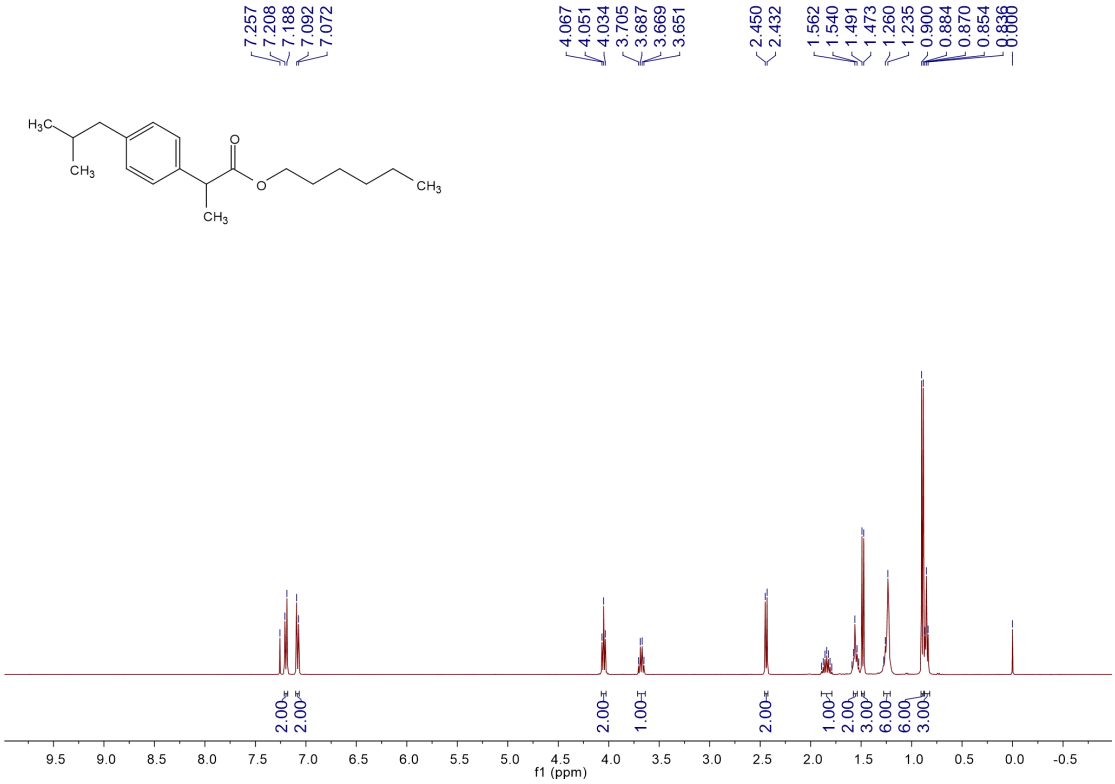
^{1}H NMR Spectrum of **hexyl cinnamate (50c)**



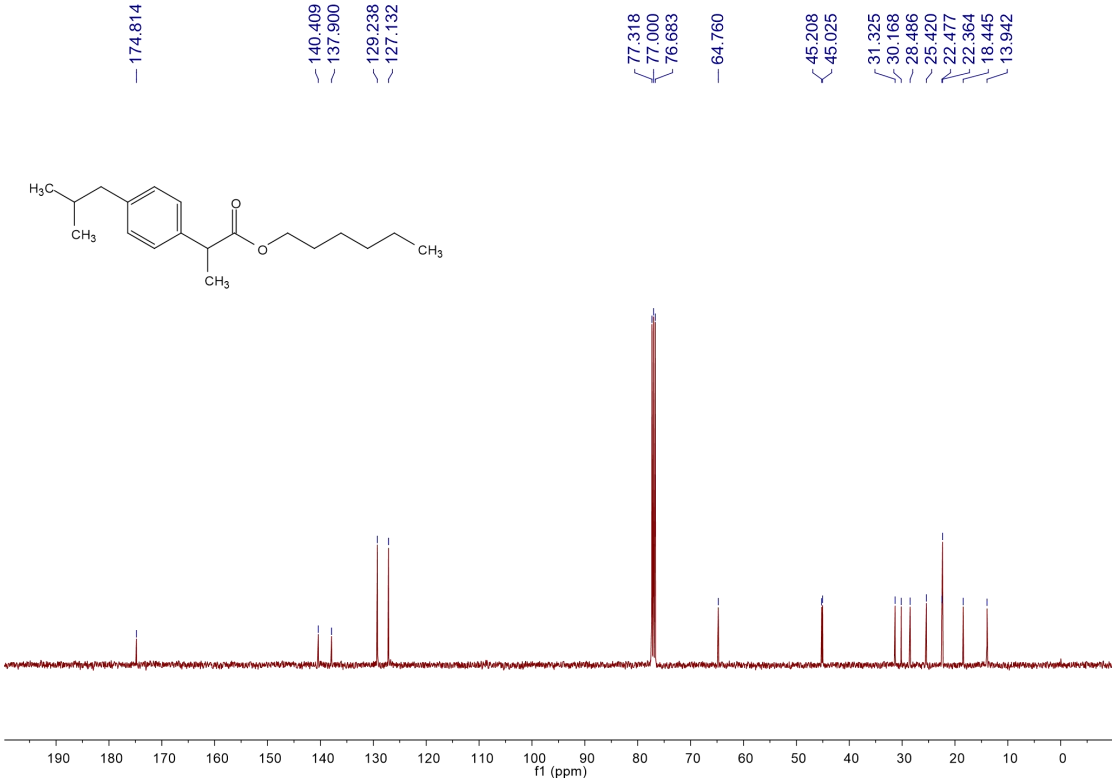
^{13}C NMR Spectrum of **hexyl cinnamate (50c)**



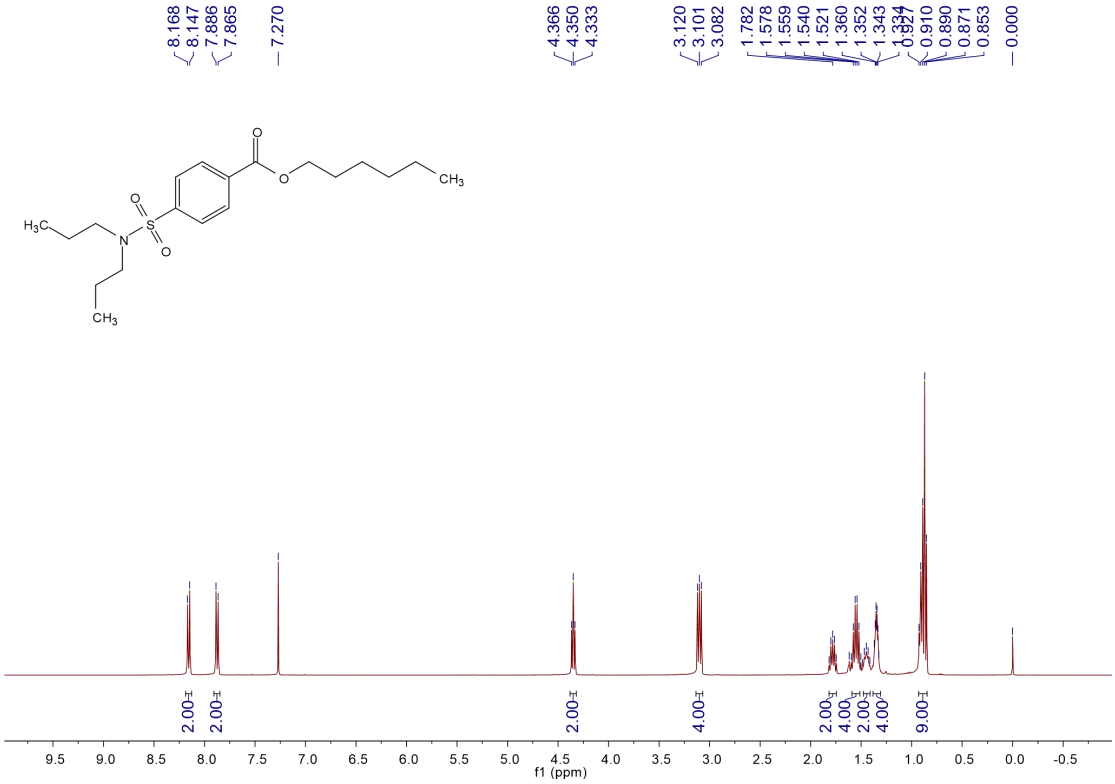
^{1}H NMR Spectrum of **hexyl 2-(4-isobutylphenyl)propanoate (51c)**



^{13}C NMR Spectrum of **hexyl 2-(4-isobutylphenyl)propanoate (51c)**



^{1}H NMR Spectrum of **hexyl 4- (N,N-dipropylsulfamoyl) benzoate (52c)**



^{13}C NMR Spectrum of **hexyl 4- (N,N-dipropylsulfamoyl) benzoate (52c)**