Electronic Supplementary Material (ESI) for Chemical Science.

Supplementary Information

Distal *meta*-C–H functionalization of α-substituted cinnamates

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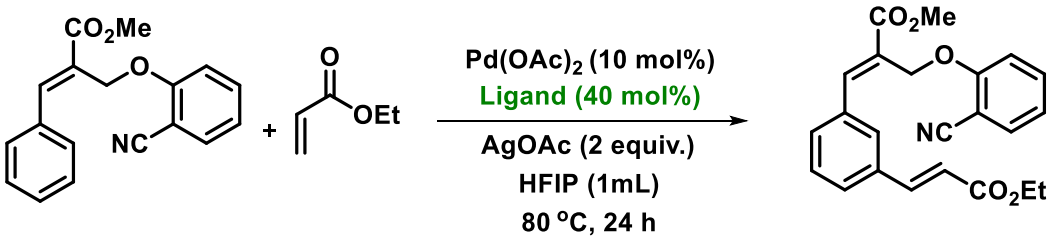
CONTENTS

1. General information:

Commercial reagents were used without further purification. For all compounds ^{1}H NMR (400 MHz, $CDCl_3$) and ^{13}C NMR (100 MHz, $CDCl_3$) spectra were recorded in deuterochloroform-d_3 ($CDCl_3$) on a Bruker 400 MHz spectrometer using tetramethylsilane (TMS, δ = 0) as an internal standard. Spin multiplicities are reported as singlet (s), broad singlet (bs), doublet (d), triplet (t), quartet (q), quintet (quint) and multiplet (m). Mass spectra were recorded on Agilent 1200 LC/MS-6110 mass spectrometry. Spectral data and copy of ^{1}H and ^{13}C NMR of all compounds **1a-s**, **2a-x**, **3a-x**, **4aa-af**, **5a-f**, **6a-r**, **8a-k**, **10a-v**, **12a-q**, **13a-d**, **14a-f**, **15a-d**, **16**, **17**, and **19** are listed below.

2. Optimization details for activation of remote *meta*-C-H bond

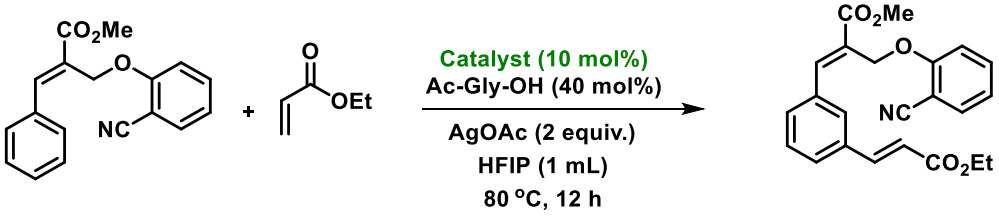
I. Ligand screening:



S.No	Ligand	Product
1.	Form-Gly-OH	20
2.	Boc-Gly-OH	10
3.	Ac-Gly-OH	68
4.	**Ac-Gly-OH**	**72**[a]
5.	Boc-Val-OH	-
6.	Ac-Val-OH	61
7.	Boc-Ala-OH	-
8.	Ac-Ala-OH	55
9.	Without Ligand	-
10.	Sarcosine	-
11.	2-Picoline	-

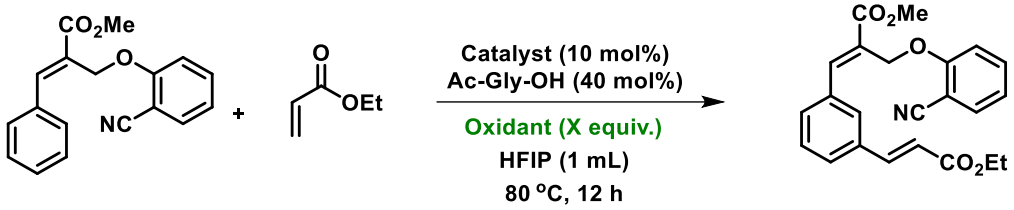
[a] Reaction carried out for 12 h

II. Catalyst loading:



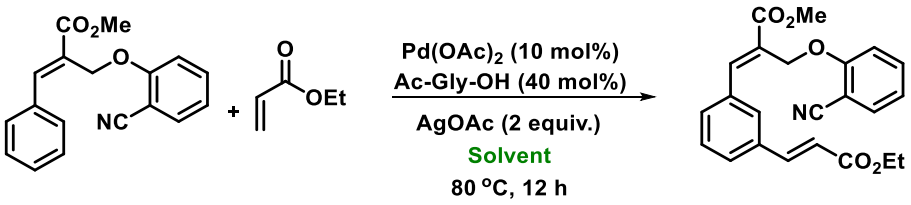
S. No.	Catalyst (mol %)	Product
1.	$PdCl_2$ (10)	-
2.	$Pd(TFA)_2$ (10)	30
3.	**$Pd(OAc)_2$ (10)**	**72**
4.	$Cu(OAc)_2$ (50)	-
5.	$Co(OAc)_2$ (50)	-
6.	$Mn(OAc)_2.4H_2O$ (50)	-
7.	$Ni(OAc)_2.4H_2O$ (50)	-
8.	$Rh_2(OAc)_4$ (5)	-

III. Oxidant screening:



S. No.	Oxidant (equiv.)	Product
1.	$Cu(OAc)_2$ (2)	33
2.	**AgOAc (2)**	**72**
3.	AgOAc (3)	70
4.	Ag_2CO_3 (2)	54
5.	$K_2S_2O_8$ (2)	-
6.	Benzoquinone (2)	Trace
7.	AgTFA (2)	35
8.	Ag_2O (2)	18
9.	$AgNO_3$ (2)	20
10.	O_2 (balloon)	23

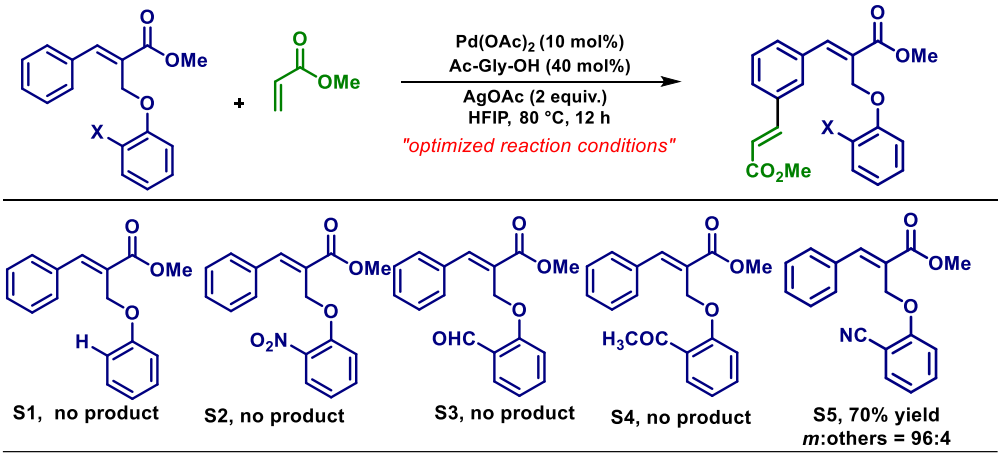
IV. Solvent screening:



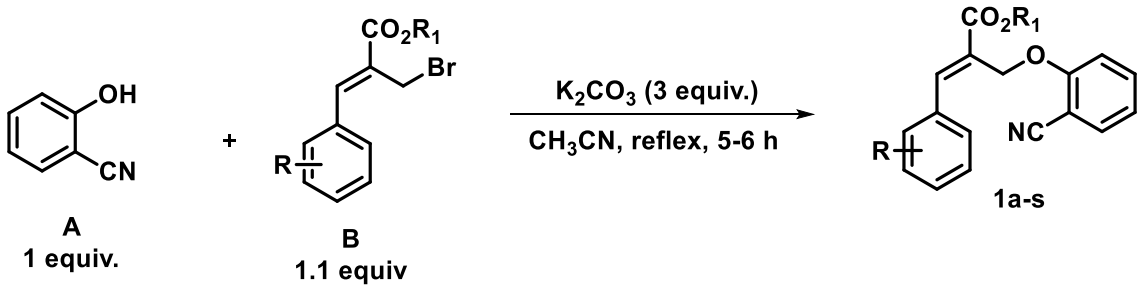
S. No.	Solvent	Product
1.	AcOH	Trace
2.	**HFIP**	**72**
3.	DCE:HFIP(4:1)	20
4.	TFE:HFIP(4:1)	50
5.	TFT:HFIP(4:1)	34
6.	t-AmOH	Trace
7.	t-BuOH	-
8.	HFIP:TFE:H_2O(1:1:1)	-
9.	HFIP:Dioxane:H_2O(1:1:1)	-
10.	Ethylene Glycol	-
11	TBHP	-
12.	HFIP:H_2O (4:1)	20
13.	HFIP:AcOH(4:1)	22
14.	TfOH	-
15.	Trifloro ethanol (TFE)	37
16.	Trifloro acetic acid (TFA)	21

3. Optimization of directing groups for *meta*-selective C−H olefination reaction

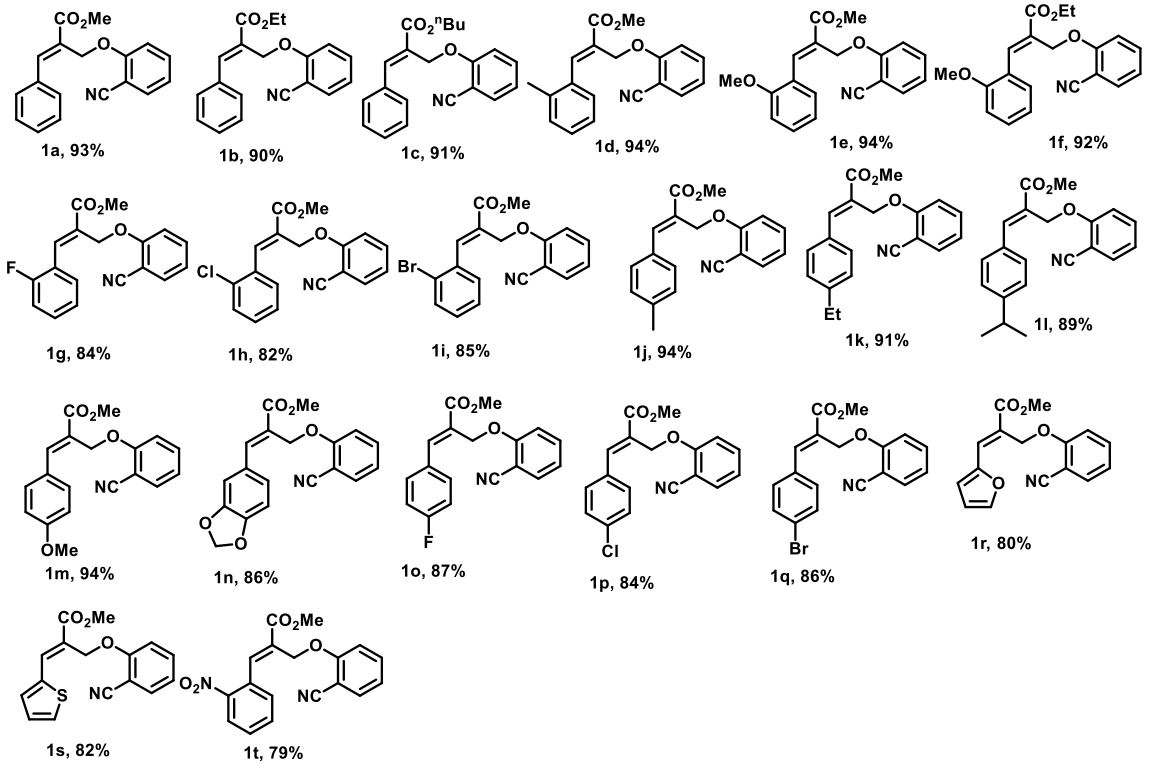
We initiated our attempts towards remote mono-*meta*-C−H olefination by investigating the potential of various directing group (DG) based scaffolds. To accomplish this, we synthesized the corresponding compound from the Baylis-Hillman bromo substrate and attached with various DGs, then we subjected them to the *meta*-C−H bond olefination reaction with methyl acrylate. The absence of DG on the scaffold **S,** we did not observe the coupled product. Further, the scaffolds **S2-4** containing -NO_2, -CHO and -$COCH_3$ as directing groups also failed to produce the desired coupled products. The olefinated product was successfully obtained in a 70% yield with high *meta*-selectivity (*m*:others, 96:4) when we subjected the scaffold **S5** with -CN as a directing group.



4. General procedure for the preparation of starting materials



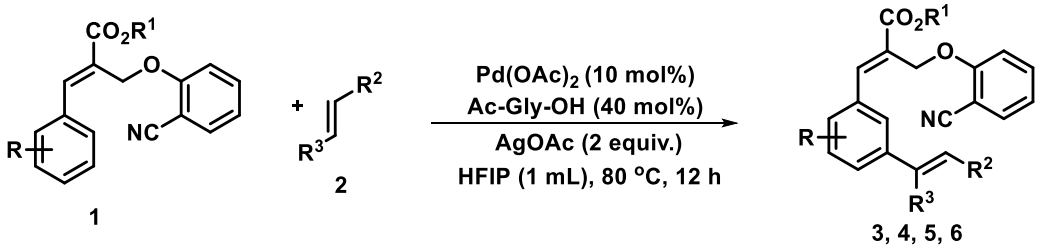
To a stirred solution of Baylis-Hillman bromo compound[1] (B, 1.1 equiv.) in acetonitrile (10 mL) in a round bottom flask was added 2-hydroxybenzonitrile (A, 3 mmol, 1 equiv.) and K_2CO_3 (3 equiv.). The reaction solution was reflux for 5 to 6 hours. After the completion of the reaction as indicated by the TLC, the acetonitrile (10 mL) was evaporated under reduced pressure. The reaction mixture was diluted with water (15 mL) and extracted with EtOAc (3 × 15 mL). The combined organic layer was dried over Na_2SO_4. The solvent was evaporated under reduced pressure and the crude solid thus obtained was crystallized (15% ethyl acetate/hexane) to provide **1a-s** as a white solid. All the starting materials are new and fully characterized using ^1H & ^{13}C NMR spectroscopy and mass spectrometry.



1. a) D. Basavaiah, G. Veeraraghavaiah *Chem. Soc. Rev.* **2012,** *41,* 68; b) D. Basavaiah, B. S. Reddy, S. S. Badsara *Chem. Rev.* **2010,** *110,* 5447; c) D. Basavaiah, M.Bakthadoss, S. Pandiaraju *Chem. Commun.* **1998,** 1639.

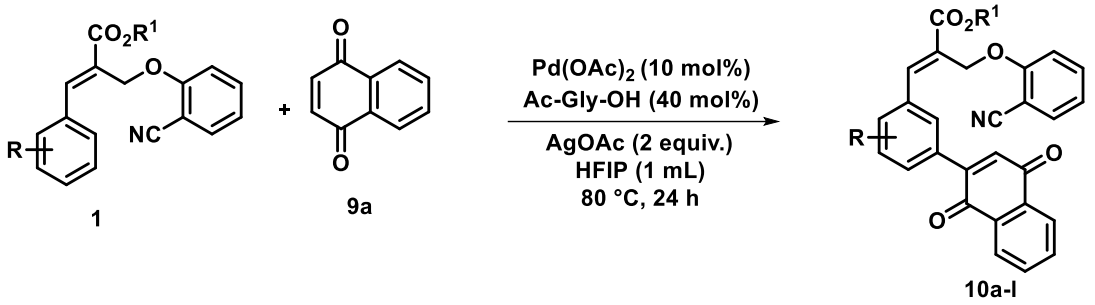
5. General experimental procedures

a) General procedure for the *meta*-C−H olefination of cinnamates



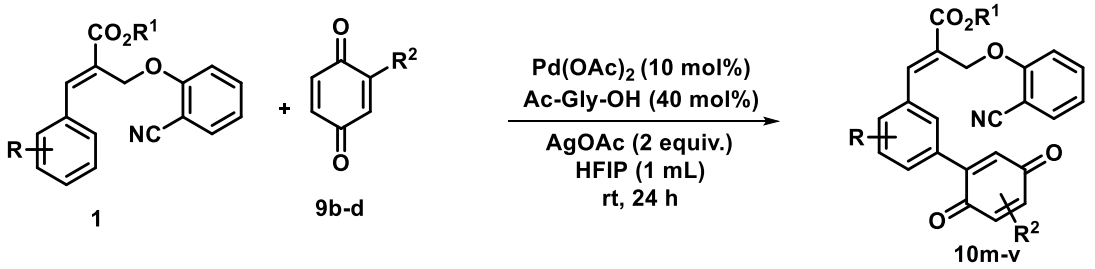
A clean, oven-dried reaction tube was charged with a magnetic stir-bar, $Pd(OAc)_2$ (10 mol%), Ac-Gly-OH (40 mol%), AgOAc (2 equiv.) and α-substituted cinnamate **1** (0.2 mmol, 1 equiv.) in 1,1,1,3,3,3-Hexafluoro-2-propanol (HFIP, 1mL). The alkene **2** (2 equiv.) was then added. The reaction mixture was stirred vigorously in a preheated oil bath at 80 °C for 12 h. After the completion, the reaction mixture was diluted with EtOAc and filtered through a celite pad. After the filtration, the solvent was evaporated and the crude mixture thus obtained was purified by column chromatography (ethyl acetate/hexane) using silica gel (100-200 mesh size) to afford the *meta*-coupled product (**3**, **4**, **5** and **6**).

b) General procedure for the *meta*-C−H olefination of cinnamates with naphthoquinone



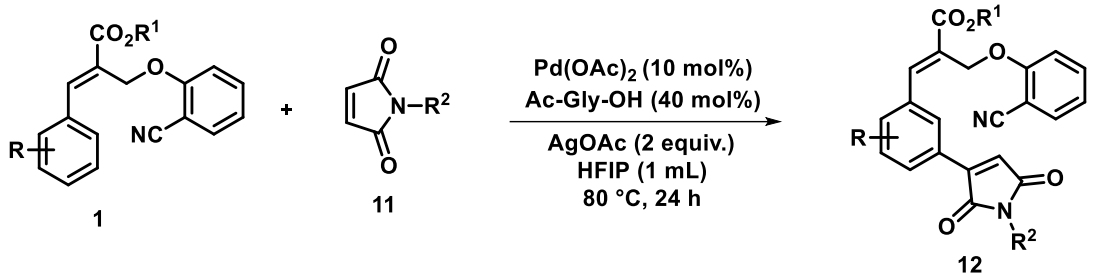
A clean, oven-dried reaction tube was charged with a magnetic stir-bar, $Pd(OAc)_2$ (10 mol%), Ac-Gly-OH (40 mol%), AgOAc (2 equiv.) and α-substituted cinnamate **1** (0.2 mmol, 1 equiv.) in 1,1,1,3,3,3-Hexafluoro-2-propanol (HFIP, 1mL). The naphthoquinone **9a** (2 equiv.) was then added. The reaction mixture was stirred vigorously in a preheated oil bath at 80 °C for 24 h. After the completion, the reaction mixture was diluted with EtOAc and filtered through a celite pad. After the filtration, the solvent was evaporated and the crude mixture thus obtained was purified by column chromatography (ethyl acetate/hexane) using silica gel (100-200 mesh size) to afford the *meta*-coupled product (**10a-l**).

c) General procedure for the *meta*-C−H olefination of cinnamates with benzoquinones



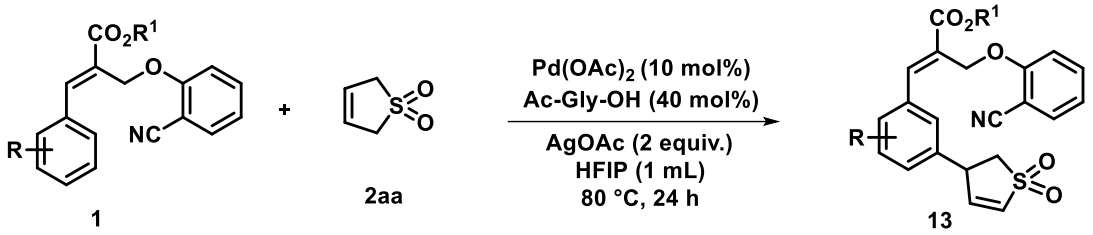
A clean, oven-dried reaction tube was charged with a magnetic stir-bar, $Pd(OAc)_2$ (10 mol%), Ac-Gly-OH (40 mol%), AgOAc (2 equiv.) and α-substituted cinnamate **1** (0.2 mmol, 1 equiv.) in 1,1,1,3,3,3-Hexafluoro-2-propanol (HFIP, 1mL). The benzoquinone (**9b-d**) (2 equiv.) was then added. The reaction mixture was stirred vigorously at room temperature for 24 h. After the completion, the reaction mixture was diluted with EtOAc and filtered through a celite pad. After the filtration, the solvent was evaporated and the crude mixture thus obtained was purified by column chromatography (ethyl acetate/hexane) using silica gel (100-200 mesh size) to afford the *meta*-coupled product (**10m-v**).

d) General procedure for the *meta*-C−H olefination of cinnamates with maleimides



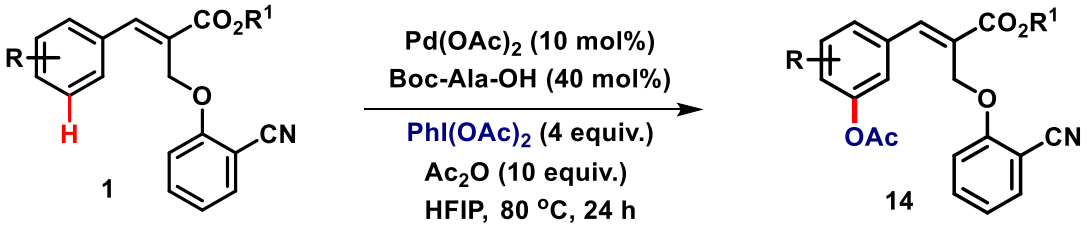
A clean, oven-dried reaction tube was charged with a magnetic stir-bar, $Pd(OAc)_2$ (10 mol%), Ac-Gly-OH (40 mol%), AgOAc (2 equiv.) and α-substituted cinnamate **1** (0.2 mmol, 1 equiv.) in 1,1,1,3,3,3-Hexafluoro-2-propanol (HFIP, 1mL). The maleimide **11** (2 equiv.) was then added. The reaction mixture was stirred vigorously in a preheated oil bath at 80 °C for 24 h. After the completion, the reaction mixture was diluted with EtOAc and filtered through a celite pad. After the filtration, the solvent was evaporated and the crude mixture thus obtained was purified by column chromatography (ethyl acetate/hexane) using silica gel (100-200 mesh size) to afford the *meta*-coupled product (**12**).

e) General procedure for the *meta*-C−H olefination of cinnamates with sulfolene



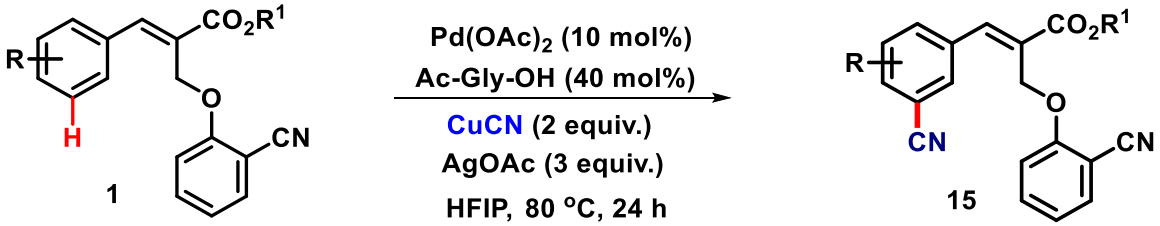
A clean, oven-dried reaction tube was charged with a magnetic stir-bar, $Pd(OAc)_2$ (10 mol%), Ac-Gly-OH (40 mol%), AgOAc (2 equiv.) and α-substituted cinnamate **1** (0.2 mmol, 1 equiv.) in 1,1,1,3,3,3-Hexafluoro-2-propanol (HFIP, 1mL). The sulfolene **2aa** (2 equiv.) was then added. The reaction mixture was stirred vigorously in a preheated oil bath at 80 °C for 24 h. After the completion, the reaction mixture was diluted with EtOAc and filtered through a celite pad. After the filtration, the solvent was evaporated and the crude mixture thus obtained was purified by column chromatography (ethyl acetate/hexane) using silica gel (100-200 mesh size) to afford the *meta*-coupled product (**13**).

f) General procedure for the *meta*-C–H acetoxylation of cinnamates



An clean oven-dried reaction tube was charged with a magnetic stir-bar, $Pd(OAc)_2$ (10 mol%), Boc-Ala-OH (40 mol%), $PhI(OAc)_2$ (4 equiv.), Ac_2O (10 equiv.) and α-substituted cinnamate **1** (0.2 mmol, 1 equiv.) in 1 mL of 1,1,1,3,3,3-Hexafluoro-2-propanol (HFIP). The reaction mixture was stirred vigorously in a preheated oil bath at 80 °C for 24 h. After the completion, the reaction mixture was diluted with EtOAc and filtered through a celite pad. After the filtration, the solvent was evaporated and the crude mixture thus obtained was purified by column chromatography (ethyl acetate/hexane) using silica gel (100-200 mesh size) to afford the *meta*-coupled product (**14**).

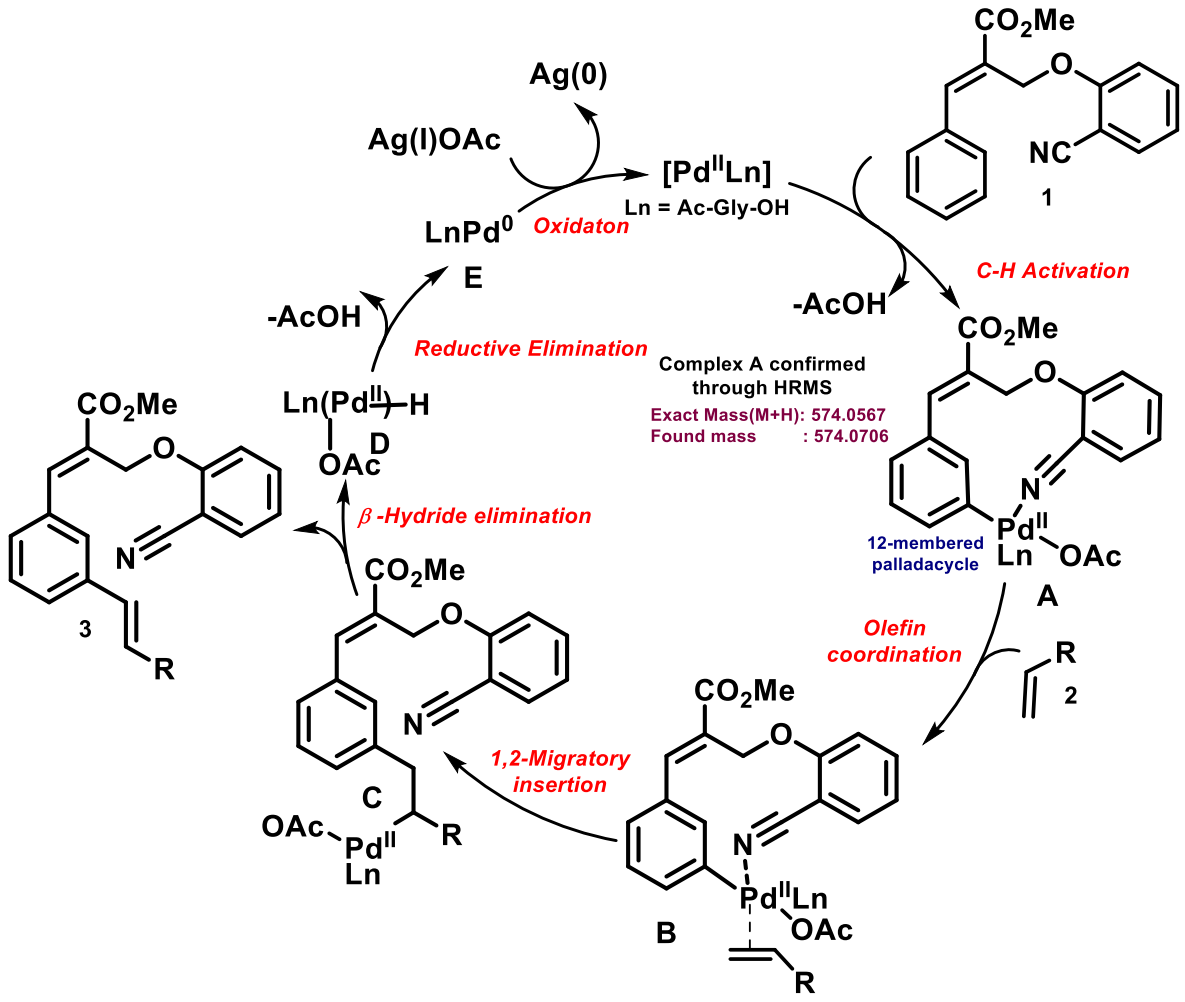
g) General procedure for *meta*-C–H cyanation of cinnamates



An clean oven-dried reaction tube was charged with magnetic stir-bar, $Pd(OAc)_2$ (10 mol%), Ac-Gly-OH (40 mol%), AgOAc (3 equiv.), CuCN (2 equiv.) and α-substituted cinnamate **1** (0.2 mmol, 1 equiv.) in 1 mL of 1,1,1,3,3,3-Hexafluoro-2- propanol (HFIP). The reaction mixture was stirred vigorously in a preheated oil bath at 80 °C for 24 h. After the completion, the reaction mixture was diluted with EtOAc and filtered through a celite pad. After the filtration, the solvent was evaporated and the crude mixture thus obtained was purified by column chromatography (ethyl acetate/hexane) using silica gel (100-200 mesh size) to afford the *meta*-coupled product (**15**).

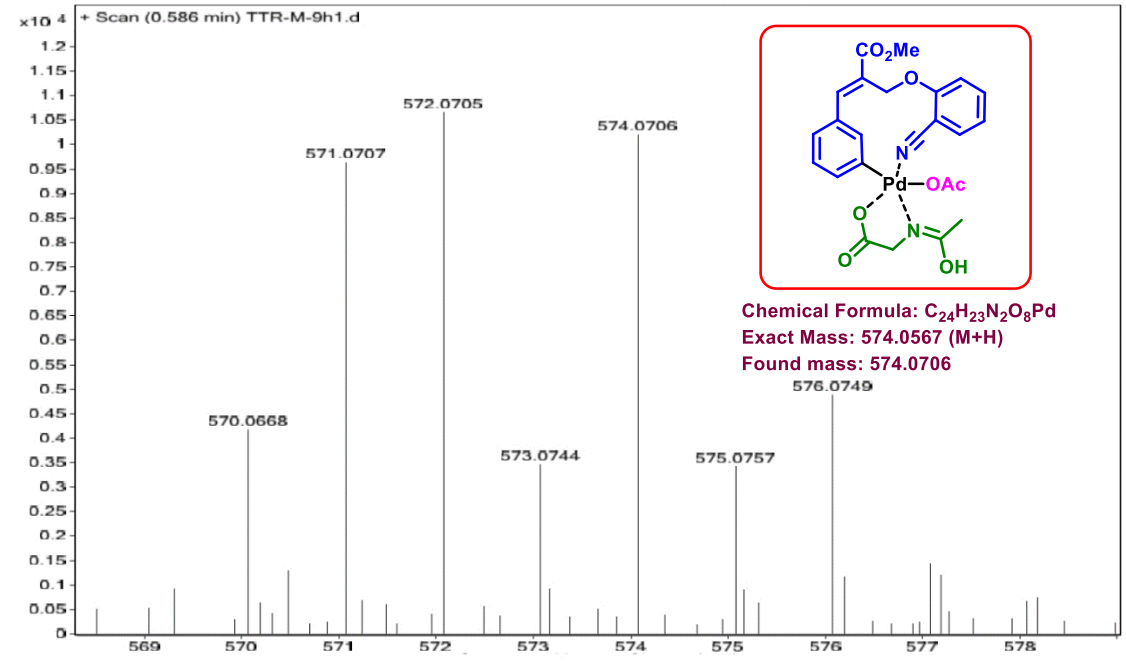
6. Plausible pathway for mono-*meta*-C-H olefination

A proposed mechanism is based on the previous reports. The linear nitrile directing group present in the substrate **1** coordinates with palladium(II) complex and forms a 12 membered palladacycle **A** *via* C−H activation upon the elimination of acetic acid. The palladacycle **A** was confirmed through mass spectrometry and it undergoes olefine coordination with an alkene coupling partner leading to a complex **B** which then undergoes 1,2-migratory insertion to form intermediate **C**. The intermediate **C** undergoes β-hydride elimination which produces the product **3** and complex **D**. The complex **D** undergoes reductive elimination to form Pd^0 species **E**. Finally, the Pd^0 species is reoxidised to Pd^{II} species using AgOAc thereby restarting the catalytic cycle



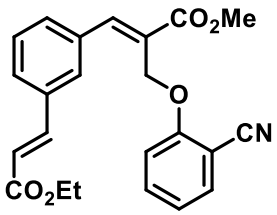
Detection of palladium complex I through mass spectrometry

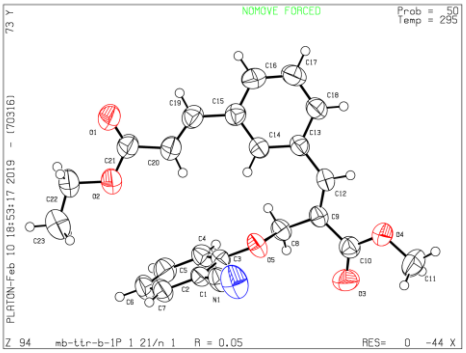
Sample Name	TTR-M-9h	**Position**		**Instrument Name**	Q-TOF	**User Name**	QTOF-PU\admin
Inj Vol	-1	**InjPosition**		**SampleType**	Sample	**IRM Calibration Status**	Success
Data Filename	TTR-M-9h1.d	**ACQ Method**	Pondicherry Universi	**Comment**	TTR-MB-681.9459	**Acquired Time**	2/13/2019 11:52:38 AM



7. X-ray crystallographic data of 3a, 4j and 12b

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (3a)

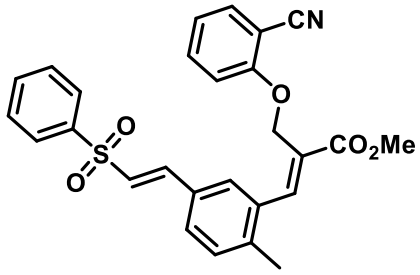


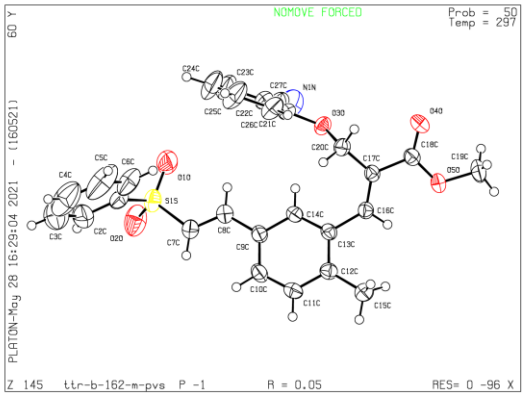


Crystal data and structure refinement for 3a

Identification code	TTR-B-19
Empirical formula	$C_{23}H_{21}NO_5$
Formula weight	391.42
Temperature/K	295(2)
Crystal system	monoclinic
Space group	$P2_1/n$
a/Å	7.7248(8)
b/Å	23.0566(19)
c/Å	12.1391(13)
α/°	90.00
β/°	103.515(9)
γ/°	90.00
Volume/Å^3	2102.2(4)
Z	7
ρ_{calc}mg/mm^3	1.217
μ/mm^{-1}	0.096
F(000)	798.0
Crystal size/mm^3	0.55 × 0.38 × 0.2
2Θ range for data collection	7.06 to 58.36°
Index ranges	$-10 \le h \le 8$, $-28 \le k \le 28$, $-12 \le l \le 16$
Reflections collected	15136
Independent reflections	4947[R(int) = 0.0283]
Data/restraints/parameters	4947/0/264
Goodness-of-fit on F^2	1.028
Final R indexes [I>=2σ (I)]	R_1 = 0.0501, wR_2 = 0.1153
Final R indexes [all data]	R_1 = 0.0884, wR_2 = 0.1362
Largest diff. peak/hole / e Å^{-3}	0.18/-0.15

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methyl-5-((*E*)-2 (phenylsulfonyl)vinyl) phenyl)acrylate (4j)

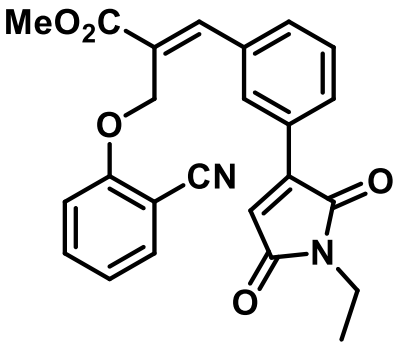


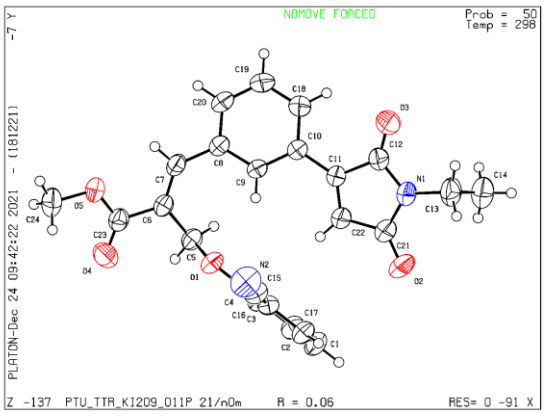


Crystal data and structure refinement for 4j

Identification code	TTR-B-162-M-PVS
Empirical formula	$C_{27}H_{23}NO_5S$
Formula weight	473.13
Temperature/K	297.00
Crystal system	triclinic
Space group	P-1
a/Å	8.2408(5)
b/Å	10.2565(5)
c/Å	15.3407(7)
α/°	88.527(4)
β/°	77.996(4)
γ/°	72.445(5)
Volume/Å^3	1208.25(10)
Z	2
ρ_{calc}g/cm^3	1.302
μ/mm^{-1}	0.172
F(000)	496.0
Crystal size/mm^3	0.64 × 0.58 × 0.36
Radiation	MoKα (λ = 0.71073)
2Θ range for data collection/°	8.16 to 58.12
Index ranges	$-10 \leq h \leq 9$, $-13 \leq k \leq 12$, $-19 \leq l \leq 20$
Reflections collected	13468
Independent reflections	5569 [R_{int} = 0.0307, R_{sigma} = 0.0414]
Data/restraints/parameters	5569/0/309
Goodness-of-fit on F^2	1.073
Final R indexes [I>=2σ (I)]	R_1 = 0.0492, wR_2 = 0.1219
Final R indexes [all data]	R_1 = 0.0765, wR_2 = 0.1351
Largest diff. peak/hole / e Å^{-3}	0.23/-0.35

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-ethyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12b)



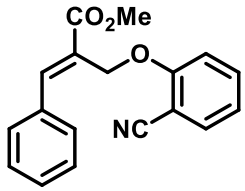


Crystal data and structure refinement for 12b

Empirical formula	$C_{24}H_{20}N_2O_5$
Formula weight	416.1372
Temperature/K	298(2)
Crystal system	monoclinic
Space group	$P2_1/n$
a/Å	10.811(3)
b/Å	8.0573(19)
c/Å	24.254(5)
α/°	90.00
β/°	92.718(7)
γ/°	90.00
Volume/Å^3	2110.3(8)
Z	4
ρ_{calc}mg/mm^3	1.217
μ/mm^{-1}	0.096
F(000)	798.0
Crystal size/mm^3	0.55 × 0.38 × 0.2
2Θ range for data collection	2.03 to 30.10°
Index ranges	-15<=h<=14, 11<=k<=11, -34<=l<=33
Reflections collected	32482
Independent reflections	6135 [R(int) = 0.0391]
Data/restraints/parameters	6135 / 0 / 282
Goodness-of-fit on F^2	1.028
Final R indexes [I>=2σ (I)]	3956 data; R1 = 0.0563, wR2 = 0.1282
Final R indexes [all data]	R_1 = 0.0884, wR_2 =0.1362 R 0.0962, wR2 = 0.1554
Largest diff. peak/hole / e Å^{-3}	0.303/ -0.301

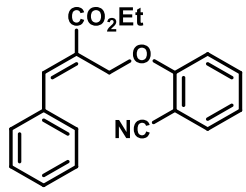
8. Spectroscopic data of the products

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-phenylacrylate (1a)



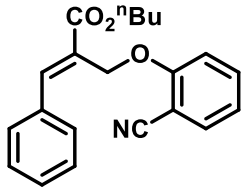
White solid, Yield (93%), M.P (110 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.67 – 7.46 (m, 4H), 7.46 – 7.33 (m, 3H), 7.12 – 6.95 (m, 2H), 4.96 (s, 2H), 3.87 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.45, 160.38, 146.81, 134.42, 134.32, 134.01, 129.93, 129.79, 128.93, 126.34, 121.44, 116.46, 113.51, 102.85, 64.21, 52.56. HRMS (ESI): calc. for [($C_{18}H_{15}NO_3$)] (M+H) 294.1132, measured 294.1136

Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-phenylacrylate (1b)



White solid, Yield (90%), M.P (102 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.58 (d, *J* = 7.7 Hz, 1H), 7.52 (dd, *J* = 9.4, 4.3 Hz, 3H), 7.41 (dd, *J* = 8.2, 2.3 Hz, 3H), 7.11 – 7.00 (m, 2H), 4.97 (s, 2H), 4.32 (q, *J* = 7.1 Hz, 2H), 1.35 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.98, 160.46, 146.45, 134.41, 134.00, 129.85, 129.79, 128.92, 126.69, 121.40, 116.49, 113.56, 102.84, 64.25, 61.54, 14.39. HRMS (ESI): calc. for [($C_{19}H_{17}NO_3$)] (M+H) 308.1189, measured 308.1287

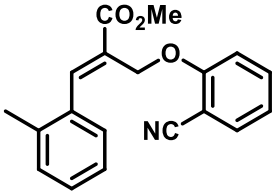
Butyl (*E*)-2-((2-cyanophenoxy) methyl)-3-phenyl acrylate (1c)



White solid, Yield (91%), M.P (97 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.58 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.55 – 7.48 (m, 3H), 7.45 – 7.37 (m, 3H), 7.05 (ddd, *J* = 10.8, 8.4, 4.6 Hz, 2H), 4.96 (s, 2H), 4.26 (t, *J* = 6.6 Hz, 2H), 1.69 (dd, *J* = 14.8, 6.9 Hz, 2H), 1.54 – 1.30 (m, 2H), 0.94 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.01, 160.40, 146.45, 134.40, 134.36, 133.98, 129.83, 129.77, 128.89, 126.63, 121.35, 116.45, 113.41, 102.73,

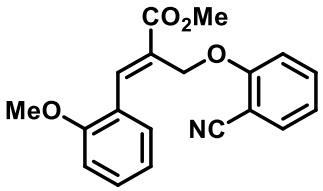
65.38, 64.20, 30.76, 19.31, 13.84. HRMS (ESI): calc. for [($C_{21}H_{21}NO_3$)] (M+Na) 358.1419, measured 358.1419.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(o-tolyl) acrylate (1d)



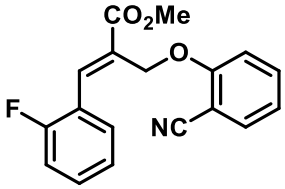
White solid, Yield (94%), M.P (92 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.16 (s, 1H), 7.55 (d, *J* = 7.5 Hz, 1H), 7.50 – 7.38 (m, 2H), 7.31 – 7.16 (m, 4H), 7.03 – 6.92 (m, 2H), 4.86 (s, 2H), 3.88 (s, 3H), 2.32 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.15, 160.35, 145.61, 137.21, 134.29, 133.90, 133.59, 130.26, 129.65, 129.18, 127.19, 126.23, 121.29, 116.41, 113.33, 102.71, 64.30, 52.49, 20.07. HRMS (ESI): calc. for [($C_{19}H_{18}NO_3$)] (M+H) 308.1287, measured 308.1289.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(2-methoxyphenyl) acrylate (1e)



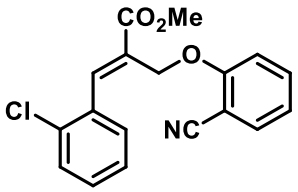
White solid, Yield (96%), M.P (112 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.26 (s, 1H), 7.60 – 7.46 (m, 3H), 7.37 (t, *J* = 7.7 Hz, 1H), 7.03 (dd, *J* = 17.2, 8.3 Hz, 2H), 6.94 (dd, *J* = 18.6, 7.9 Hz, 2H), 4.92 (s, 2H), 3.86 (d, *J* = 2.5 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.44, 160.49, 157.92, 142.77, 134.37, 133.93, 131.55, 130.63, 126.11, 123.46, 121.29, 120.88, 116.52, 113.50, 110.61, 102.74, 64.77, 55.65, 52.42. HRMS (ESI): calc. for [($C_{19}H_{17}NO_4$)] (M+Na) 346.1055, measured 346.1053.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-fluorophenyl)acrylate (1f)



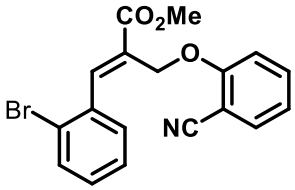
White solid, Yield (84%), M.P (102 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 7.63 – 7.48 (m, 3H), 7.40 (dd, *J* = 10.5, 4.6 Hz, 1H), 7.21 – 7.00 (m, 4H), 4.94 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.55, 160.64, 150.24, 146.15, 134.35, 133.83, 131.42, 121.44, 121.07, 118.76, 116.44, 113.38, 112.76, 102.58, 64.00, 52.47. HRMS (ESI): calc. for [($C_{18}H_{14}FNO_3$)] (M+H) 312.1036, measured 312.1016.

Methyl (*E*)-3-(2-chlorophenyl)-2-((2-cyanophenoxy) methyl) acrylate (1g)



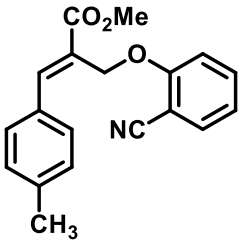
White solid, Yield (82%), M.P (104 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.18 (s, 1H), 7.63 – 7.40 (m, 4H), 7.29 (dd, *J* = 17.1, 9.2 Hz, 2H), 7.03 (dd, *J* = 7.7, 5.5 Hz, 2H), 4.86 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.84, 160.25, 143.44, 134.44, 134.34, 133.93, 132.94, 130.93, 129.72, 128.18, 127.26, 121.55, 116.41, 113.55, 102.78, 64.42, 52.68. HRMS (ESI): calc. for [($C_{18}H_{14}ClNO_3$)] (M+H) 328.0740, measured 328.0741.

Methyl (*E*)-3-(2-bromophenyl)-2-((2-cyanophenoxy)methyl)acrylate (1h)



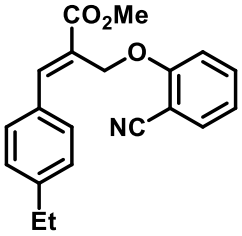
White solid, Yield (85%), M.P (115 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 7.66 – 7.50 (m, 4H), 7.36-7.31 (m, 1H), 7.23 (dd, *J* = 7.7, 1.5 Hz, 1H), 7.06 – 7.01 (m, 2H), 4.84 (s, 2H), 3.81 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.81, 160.24, 145.51, 134.81, 134.44, 133.93, 132.88, 131.00, 127.95, 127.85, 124.20, 121.54, 116.42, 113.54, 102.78, 64.39, 52.70. HRMS (ESI): calc. for [($C_{18}H_{14}BrNO_3$)] (M+H) 372.0235, measured 372.0247.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(p-tolyl) acrylate (1i)



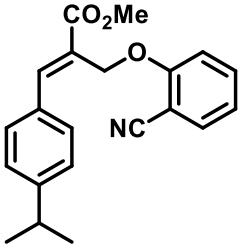
White solid, Yield (94%), M.P (96 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.60 – 7.49 (m, 2H), 7.42 (d, *J* = 8.1 Hz, 2H), 7.22 (d, *J* = 8.0 Hz, 2H), 7.12 – 6.99 (m, 2H), 4.97 (s, 2H), 3.86 (s, 3H), 2.37 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.72, 160.42, 147.10, 140.47, 134.48, 134.00, 131.45, 129.98, 129.69, 125.25, 121.40, 116.50, 113.53, 102.74, 64.29, 52.55, 21.54. HRMS (ESI): calc. for [($C_{19}H_{17}NO_3$)] (M+H) 308.1287, measured 308.1314.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-ethylphenyl) acrylate (1j)



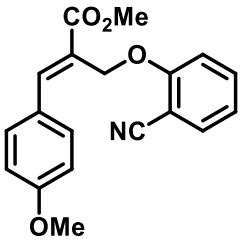
White solid, Yield (91%), M.P (95 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.61 – 7.50 (m, 2H), 7.46 (d, *J* = 8.1 Hz, 2H), 7.26 (t, *J* = 5.8 Hz, 2H), 7.12 (d, *J* = 8.5 Hz, 1H), 7.05 (t, *J* = 7.6 Hz, 1H), 4.99 (s, 2H), 3.87 (s, 3H), 2.67 (q, *J* = 7.6 Hz, 2H), 1.24 (t, *J* = 7.6 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.61, 160.41, 146.99, 146.65, 134.41, 133.96, 131.69, 130.06, 128.48, 125.28, 121.36, 116.47, 113.53, 102.79, 64.29, 52.46, 28.84, 15.37. HRMS (ESI): calc. for [($C_{20}H_{19}NO_3$)] (M+H) 322.1443, measured 322.1448.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-isopropylphenyl) acrylate (1k)



White solid, Yield (89%), M.P (91 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.59 – 7.42 (m, 5H), 7.24 (d, *J* = 0.7 Hz, 1H), 7.09 (d, *J* = 8.5 Hz, 1H), 7.02 (td, *J* = 7.6, 0.9 Hz, 1H), 4.96 (s, 2H), 3.84 (s, 3H), 2.97 – 2.83 (m, 1H), 1.24 (s, 3H), 1.22 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.51, 160.31, 151.15, 146.86, 134.37, 133.85, 131.73, 130.01, 126.98, 125.18, 121.29, 116.39, 113.43, 102.64, 64.20, 52.36, 34.04, 23.76. HRMS (ESI): calc. for [($C_{21}H_{23}NO_3$)] (M+H) 336.1600, measured 336.1593.

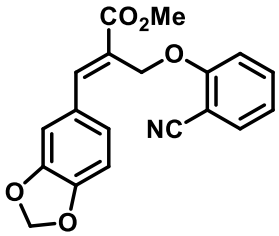
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-methoxyphenyl) acrylate (1l)



White solid, Yield (94%), M.P (109 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) 8.04 (s, 1H), 7.63 – 7.46 (m, 3H), 7.15 (d, *J* = 8.4 Hz, 2H), 7.04 (t, *J* = 7.5 Hz, 2H), 6.93 (d, *J* = 8.4 Hz, 2H), 5.00 (s, 2H), 3.85 (s, 3H), 3.82 (s, 3H).^{13}C NMR (100 MHz, $CDCl_3$) δ 167.78, 161.22, 160.40, 146.82, 134.44, 133.93, 131.97, 126.79, 123.70, 121.36, 116.49, 114.42, 113.59, 102.75,

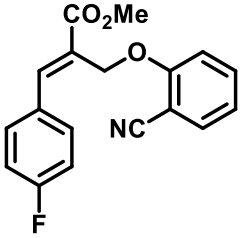
64.34, 55.45, 52.40. HRMS (ESI): calc. for [($C_{19}H_{17}NO_4$)] (M+H) 324.1236, measured 324.1245.

Methyl (*E*)-3-(benzo[d][1,3]dioxol-5-yl)-2-((2-cyanophenoxy) methyl) acrylate (1m)



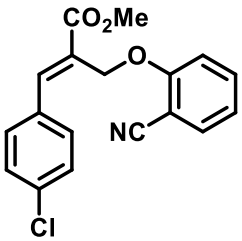
White solid, Yield (86%), M.P (121 ^{o}C), ^{1}H NMR (400 MHz, CDCl3) δ 7.99 (s, 1H), 7.62 – 7.50 (m, 2H), 7.14 (d, J = 8.5 Hz, 1H), 7.10 – 7.01 (m, 3H), 6.84 (d, J = 8.5 Hz, 1H), 6.00 (s, 2H), 4.99 (s, 2H), 3.84 (s, 3H).^{13}C NMR (100 MHz, $CDCl_3$) δ 167.66, 160.33, 149.40, 148.31, 146.73, 134.44, 133.99, 128.30, 125.57, 124.31, 121.45, 116.47, 113.57, 109.74, 108.82, 102.81, 101.70, 64.16, 52.50. HRMS (ESI): calc. for [($C_{19}H_{15}NO_5$)] (M+Na) 360.0848, measured 360.0845.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-fluorophenyl) acrylate (1n)



White solid, Yield (87%), M.P (102 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (s, 1H), 7.59 – 7.49 (m, 4H), 7.14 – 7.00 (m, 4H), 4.94 (s, 2H), 3.85 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.29, 164.90, 162.40, 160.21, 145.71, 134.48, 133.93, 131.99, 131.91, 130.38, 130.35, 125.97, 125.96, 121.57, 116.41, 116.19, 115.98, 113.56, 102.76, 64.07, 52.55. HRMS (ESI): calc. for [($C_{18}H_{14}FNO_3$)] (M+Na) 334.0855, measured 334.0852.

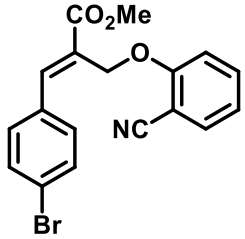
Methyl (*E*)-3-(4-chlorophenyl)-2-((2-cyanophenoxy) methyl) acrylate (1o)



White solid, Yield (84%), M.P (99 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (s, 1H), 7.61 – 7.42 (m, 4H), 7.38 (d, *J* = 8.4 Hz, 2H), 7.14 – 7.01 (m, 2H), 4.92 (s, 2H), 3.86 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.20, 160.21, 145.54, 136.17, 134.50, 133.99, 132.68, 131.12,

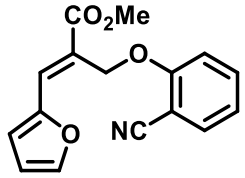
129.23, 126.78, 121.64, 116.41, 113.59, 102.85, 64.06, 52.65. HRMS (ESI): calc. for [($C_{18}H_{14}ClNO_3$)] (M+Na) 350.0560, measured 350.0541.

Methyl (*E*)-3-(4-bromophenyl)-2-((2-cyanophenoxy)methyl)acrylate (1p)



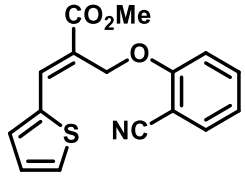
White solid, Yield (86%), M.P (121 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (s, 1H), 7.63 – 7.51 (m, 4H), 7.40 (d, *J* = 8.4 Hz, 2H), 7.12 – 7.00 (m, 2H), 4.92 (s, 2H), 3.86 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.19, 160.21, 145.62, 134.50, 134.01, 133.13, 132.20, 131.31, 126.88, 124.56, 121.66, 116.41, 113.58, 102.86, 64.06, 52.68. HRMS (ESI): calc. for [($C_{18}H_{14}BrNO_3$)] (M+H) 372.0235, measured 372.0239.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(furan-2-yl)acrylate (1q)



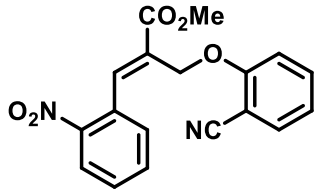
White solid, Yield (80%), M.P (196 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.69 (s, 1H), 7.52 (dd, *J* = 9.6, 3.7 Hz, 3H), 7.17 (d, *J* = 8.9 Hz, 1H), 6.99 (t, *J* = 7.6 Hz, 1H), 6.85 (d, *J* = 3.4 Hz, 1H), 6.53 – 6.50 (m, 1H), 5.26 (s, 2H), 3.83 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.55, 160.64, 150.24, 146.15, 134.35, 133.83, 131.42, 121.44, 121.07, 118.76, 116.44, 113.38, 112.76, 102.58, 77.48, 77.16, 76.84, 64.00, 52.47. HRMS (ESI): calc. for [($C_{16}H_{13}NO_4$)] (M+Na) 284.0923 measured 284.0930.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(thiophen-2-yl) acrylate (1r)



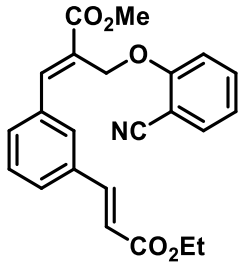
White solid, Yield (82%), M.P: 196^{o}C, ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.17 (s, 1H), 7.56 (dd, *J* = 10.4, 6.2 Hz, 3H), 7.44 (d, *J* = 3.4 Hz, 1H), 7.19 (d, *J* = 8.8 Hz, 1H), 7.15 – 7.10 (m, 1H), 7.04 (t, *J* = 7.6 Hz, 1H), 5.16 (s, 2H), 3.86 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.51, 160.31, 138.86, 136.97, 134.43, 134.12, 134.09, 132.04, 128.15, 121.93, 121.26, 116.43, 113.06, 102.59, 63.65, 52.55. HRMS (ESI): calc. for [($C_{16}H_{13}NO_3S$)] (M+Na) 322.0514, measured 322.0509.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(2-nitrophenyl) acrylate (1t)



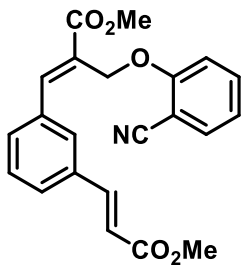
White solid, Yield (79%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (s, 1H), 8.18 (d, *J* = 8.1 Hz, 1H), 7.71 (d, *J* = 7.0 Hz, 2H), 7.52 (dt, *J* = 18.3, 7.5 Hz, 3H), 7.01 (t, *J* = 7.4 Hz, 2H), 4.79 (s, 1H), 3.88 (s, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.39, 159.99, 147.13, 143.37, 134.45, 134.32, 133.76, 131.77, 130.41, 130.27, 127.57, 125.03, 121.67, 116.32, 113.55, 102.57, 64.33, 52.71. HRMS (ESI): calc. for [($C_{18}H_{14}N_2O_5$)] (M+H) 338.0903, measured 338.1004

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl)acrylate (3a)



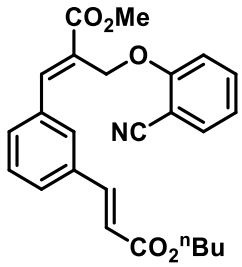
White solid; Yield (72%), M.P (106 ^{o}C); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.64 – 7.58 (m, 3H), 7.55 – 7.50 (m, 3H), 7.43 (t, *J* = 7.7 Hz, 1H), 7.09 – 7.00 (m, 2H), 6.32 (d, *J* = 16.1 Hz, 1H), 4.94 (s, 2H), 4.24 (q, *J* = 7.1 Hz, 2H), 3.88 (s, 3H), 1.32 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.20, 166.82, 160.13, 145.95, 143.68, 135.17, 135.02, 134.50, 134.10, 131.25, 129.57, 129.34, 129.05, 127.25, 121.61, 119.43, 116.38, 113.37, 102.80, 63.97, 60.72, 52.69, 14.43. HRMS (ESI): calc. for [($C_{23}H_{21}NO_5$)] (M+H) 392.1500, measured 392.1502.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)acrylate (3b)



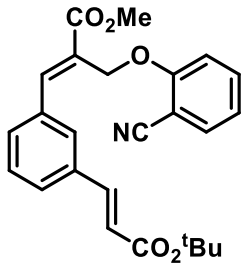
White solid; Yield (70%), M.P (104 ^{o}C); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.64 – 7.58 (m, 3H), 7.55 – 7.50 (m, 3H), 7.43 (t, J = 7.7 Hz, 1H), 7.06 (dd, J = 14.5, 7.9 Hz, 2H), 6.33 (d, J = 16.1 Hz, 1H), 4.94 (s, 2H), 3.87 (s, 3H), 3.78 (s, 3H).^{13}C NMR (100 MHz, $CDCl_3$) δ 167.21, 167.16, 160.12, 145.88, 143.94, 135.07, 135.03, 134.48, 134.08, 131.29, 129.57, 129.34, 129.05, 127.29, 121.59, 118.95, 116.38, 113.38, 102.79, 63.97, 52.67, 51.88. HRMS (ESI): calc. for [($C_{22}H_{19}NO_5$)] (M+H) 378.1300, measured 378.1350.

Methyl (*E*)-3-(3-((*E*)-3-butoxy-3-oxoprop-1-en-1-yl)phenyl)-2-((2 cyanophenoxy)methyl) acrylate (3c)



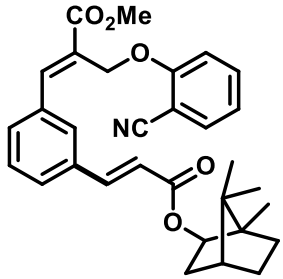
Colorless liquid; Yield (66%),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.68 – 7.48 (m, 7H), 7.43 (t, *J* = 7.7 Hz, 1H), 7.15 – 7.02 (m, 2H), 6.33 (d, *J* = 16.0 Hz, 1H), 4.93 (s, 2H), 4.18 (t, *J* = 4.6 Hz, 2H), 3.88 (s, 3H), 1.69 – 0.98 (m, 4H), 0.96 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.21, 166.94, 160.15, 145.98, 143.66, 135.20, 135.04, 134.50, 134.12, 131.25, 130.20, 129.59, 129.37, 129.07, 127.23, 121.61, 119.47, 116.40, 113.37, 64.67, 63.98, 52.71, 30.88, 23.92, 19.33, 13.91. HRMS (ESI): calc. for [($C_{25}H_{25}NO_5$)] (M+H) 420.1811 measured 420.1813.

Methyl (*E*)-3-(3-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl) phenyl)-2-((2cyanophenoxy) methyl) acrylate (3d)



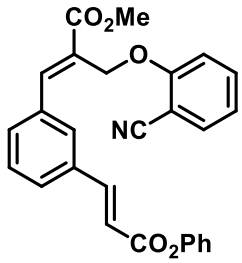
Colorless liquid; Yield (69%),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.63 – 7.38 (m, 7H), 7.18 – 6.96 (m, 2H), 6.27 (d, *J* = 16.0 Hz, 1H), 4.94 (s, 2H), 3.88 (s, 3H), 1.51 (s, 9H) ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.23, 166.14, 160.16, 146.04, 142.64, 135.38, 134.97, 134.49, 134.08, 130.98, 129.52, 129.24, 129.03, 127.17, 121.58, 121.35, 116.38, 113.36, 102.79, 80.83, 63.97, 52.68, 28.30. HRMS (ESI): calc. for [($C_{25}H_{25}NO_5$)] (M+H) 420.1811, measured 420.1812.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-oxo-3-(((1*R*,2*R*,4*R*)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)oxy)prop-1-en-1-yl)phenyl) acrylate (3e)



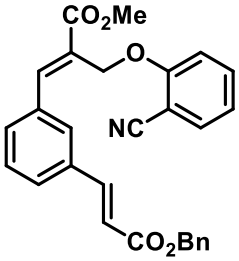
Colorless liquid; Yield (74%),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.60 – 7.36 (m, 7H), 7.10 – 6.96 (m, 2H), 6.34 (d, *J* = 16.0 Hz, 1H), 4.93 (s, 2H), 4.76 (dt, *J* = 8.8, 4.4 Hz, 1H), 3.86 (s, 3H), 1.75 (t, *J* = 4.1 Hz, 3H), 1.62 – 1.52 (m, 1H), 1.25 – 1.04 (m, 3H), 1.01 (s, 3H), 0.86 (s, 3H), 0.85 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.17, 166.39, 160.11, 145.89, 143.39, 135.15, 134.95, 134.47, 133.99, 133.13, 131.10, 129.50, 129.25, 129.09, 127.19, 121.57, 120.38, 119.92, 116.28, 113.32, 102.65, 81.43, 63.91, 52.62, 48.97, 47.04, 45.13, 38.89, 33.80, 27.12, 20.20, 20.08, 11.56. HRMS (ESI): calc. for [($C_{31}H_{33}NO_5$)] (M+Na) 522.2256, measured 522.2254.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-oxo-3-phenoxyprop-1-en-1-yl)phenyl) acrylate (3f)



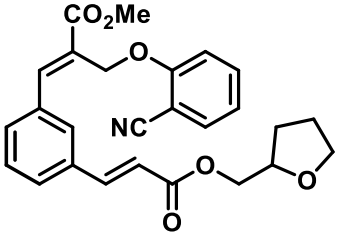
White solid; Yield (78%), M.P (114 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.72 (d, *J* = 16.0 Hz, 1H), 7.62 (s, 1H), 7.57 – 7.28 (m, 7H), 7.26 – 6.89 (m, 6H), 6.42 (d, *J* = 16.0 Hz, 1H), 4.88 (s, 2H), 3.81 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.14, 165.16, 160.03, 150.78, 145.83, 145.60, 135.09, 134.82, 134.51, 134.38, 134.10, 131.71, 129.65, 129.61, 129.54, 129.12, 127.32, 125.93, 121.65, 118.41, 116.36, 113.32, 102.71, 63.92, 52.68. HRMS (ESI): calc. for [($C_{27}H_{21}NO_5$)] (M+H) 440.1498, measured 440.1494.

Methyl (*E*)-3-(3-((*E*)-3-(benzyloxy)-3-oxoprop-1-en-1-yl) phenyl)-2- ((2-cyanophenoxy) methyl) acrylate (3g)



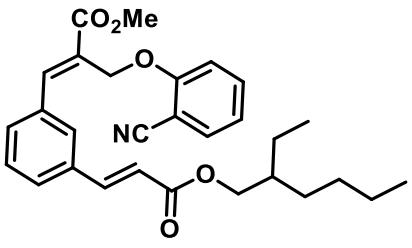
Colorless liquid; Yield (71%),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.69 – 7.36 (m, 13H), 7.05 (d, *J* = 9.0 Hz, 1H), 6.96 (d, *J* = 7.6 Hz, 1H), 6.35 (d, *J* = 16.0 Hz, 1H), 5.22 (s, 2H), 4.92 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.20, 166.63, 160.03, 145.97, 144.28, 136.04, 135.04, 134.47, 134.13, 133.04, 131.42, 129.80, 129.59, 129.54, 128.94, 128.92, 128.74, 128.50, 128.46, 127.25, 121.60, 120.84, 118.97, 113.23, 102.67, 66.61, 63.92, 52.71. HRMS (ESI): calc. for [($C_{28}H_{23}NO_5$)] (M+H) 454.1649, measured 454.1654.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-oxo-3-((tetrahydrofuran-2-yl)methoxy)prop-1-en-1-yl)phenyl) acrylate (3h)



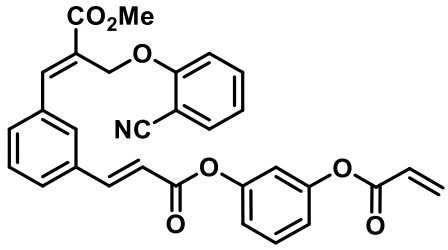
Colorless liquid; Yield (73%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.95 (s, 1H), 7.68 (d, *J* = 16.0 Hz, 1H), 7.56 – 7.31 (m, 6H), 6.48 (d, *J* = 16.0 Hz, 1H), 4.91 (s, 2H), 4.28 (dd, *J* = 10.9, 3.1 Hz, 1H), 4.21 – 4.11 (m, 2H), 3.94 – 3.87 (m, 1H), 3.84 (s, 3H), 3.81 (dd, *J* = 10.8, 4.4 Hz, 1H), 3.67 (s, 1H), 2.06 – 1.87 (m, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.72, 167.16, 166.69, 144.62, 144.20, 135.03, 135.01, 130.92, 130.38, 129.44, 129.17, 129.12, 128.96, 128.85, 128.45, 128.25, 127.79, 119.04, 76.66, 68.58, 66.80, 59.25, 52.52, 28.11, 25.79, 21.02. HRMS (ESI): calc. for [($C_{26}H_{25}NO_6$)] (M+H) 448.1760, measured 448.1745.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)phenyl) acrylate (3i)



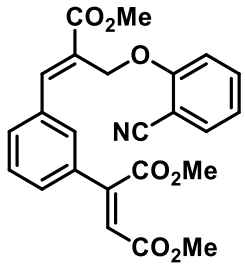
Colorless liquid; Yield (83%),[1]H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.64 – 7.50 (m, 6H), 7.43 (t, *J* = 7.7 Hz, 1H), 7.09 – 7.02 (m, 2H), 6.36 (d, *J* = 16.0 Hz, 1H), 4.95 (s, 2H), 4.10 (dd, *J* = 5.7, 4.3 Hz, 2H), 3.87 (s, 3H), 1.64 – 1.60 (m, 1H), 1.42 – 1.23 (m, 9H), 0.94 – 0.88 (m, 7H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.18, 167.03, 160.17, 145.88, 143.62, 135.21, 135.04, 134.45, 134.04, 131.18, 129.55, 129.33, 129.07, 127.32, 121.61, 119.52, 116.31, 113.45, 102.86, 67.22, 64.02, 52.66, 38.99, 30.56, 29.09, 23.96, 23.10, 14.18, 11.14. HRMS (ESI): calc. for [($C_{29}H_{33}NO_5$)] (M+H) 476.2437, measured 476.2434.

Methyl (*E*)-3-(3-((*E*)-3-(3-(acryloyloxy) phenoxy)-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (3j)



Colorless liquid; Yield (60%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.79 (d, *J* = 16.0 Hz, 1H), 7.70 (s, 1H), 7.67 – 7.30 (m, 6H), 7.15 – 6.92 (m, 5H), 6.62 (dd, *J* = 17.3, 1.2 Hz, 1H), 6.47 (d, *J* = 16.0 Hz, 1H), 6.32 (dd, *J* = 17.3, 10.4 Hz, 1H), 6.03 (dd, *J* = 10.4, 1.2 Hz, 1H), 4.96 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.14, 164.71, 164.27, 160.03, 151.25, 151.13, 145.99, 145.84, 135.13, 134.75, 134.53, 134.16, 133.11, 131.84, 129.87, 129.68, 129.15, 127.81, 127.36, 121.68, 119.17, 119.08, 118.10, 116.38, 115.56, 113.30, 102.73, 63.92, 52.71. HRMS (ESI): calc. for [($C_{30}H_{23}NO_7$)] (M+H) 510.1553, measured 510.1554.

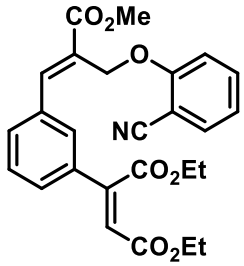
Dimethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (3k)



Colorless liquid; Yield (81%),[1]H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.61 – 7.43 (m, 4H), 7.38 (s, 1H), 7.17 – 6.95 (m, 3H), 4.93 (s, 3H), 3.85 (s, 3H), 3.74 (s, 3H), 3.56 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.06, 165.32, 164.49, 160.12, 145.26, 142.39, 134.40, 134.29, 133.98, 133.85, 132.52, 131.77, 130.73, 130.30, 129.61, 127.30, 121.50, 116.27,

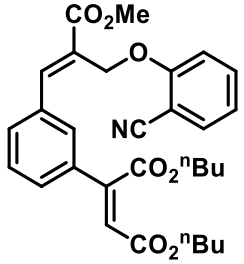
113.61, 102.72, 63.97, 53.18, 52.60, 52.06. HRMS (ESI): calc. for [($C_{24}H_{21}NO_7$)] (M+H) 436.1396, measured 436.1391.

Diethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (3l)



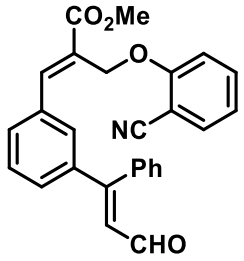
Colorless liquid; Yield (82%),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.57 – 7.47 (m, 3H), 7.43 – 7.38 (m, 2H), 7.26 (s, 1H), 7.07 (d, *J* = 8.5 Hz, 1H), 7.02 (t, *J* = 7.8 Hz, 1H), 6.98 (s, 1H), 4.97 (s, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 4.01 (q, *J* = 7.1 Hz, 2H), 3.86 (s, 3H), 1.26 (t, *J* = 7.1 Hz, 3H), 1.07 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.35, 165.95, 165.05, 160.37, 146.25, 143.63, 138.81, 134.66, 134.31, 133.89, 133.79, 130.46, 130.35, 129.59, 129.39, 128.36, 126.95, 126.55, 121.34, 116.39, 113.65, 102.80, 64.14, 62.18, 61.04, 52.58, 14.19, 13.98. HRMS (ESI): calc. for [($C_{26}H_{25}NO_7$)] (M+H) 464.1709, measured 464.1718.

Dibutyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (3m)



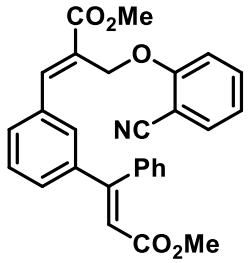
Colorless liquid; Yield (86%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.58 – 7.35 (m, 6H), 7.11 – 7.01 (m, 2H), 6.99 (s, 1H), 4.97 (s, 2H), 4.14 (t, *J* = 6.6 Hz, 2H), 3.96 (t, *J* = 6.6 Hz, 2H), 3.87 (s, 3H), 1.64 – 1.57 (m, 2H), 1.45 – 1.38 (m, 2H), 1.33 (dd, *J* = 15.0, 7.5 Hz, 2H), 1.22 – 1.13 (m, 2H), 0.90 (t, *J* = 7.4 Hz, 3H), 0.83 (t, *J* = 7.3 Hz, 3H).^{13}C NMR (100 MHz, $CDCl_3$) δ 167.34, 166.02, 165.23, 160.37, 146.20, 143.47, 134.75, 134.30, 133.89, 133.81, 130.46, 130.32, 129.71, 129.53, 129.40, 128.37, 126.96, 121.35, 116.38, 113.65, 102.82, 66.01, 64.99, 64.13, 52.57, 30.54, 30.42, 19.20, 19.05, 13.76, 13.73. HRMS (ESI): calc. for [($C_{30}H_{33}NO_7$)] (M+H) 520.2335, measured 520.2342.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-oxo-1-phenylprop-1-en-1-yl) phenyl) acrylate (3n)



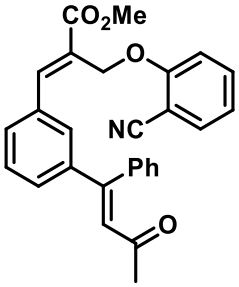
Yellow liquid; Yield (66%), (E/Z = 9/1), ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.46 (d, *J* = 7.9 Hz, 1H), 8.04 (s, 1H), 7.65 – 7.30 (m, 11H), 7.25 – 7.20 (m, 2H), 7.06 (td, *J* = 7.6, 0.8 Hz, 1H), 6.99 (d, *J* = 8.5 Hz, 1H), 6.49 (d, *J* = 7.9 Hz, 1H), 4.87 (s, 2H), 3.85 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 193.36, 167.12, 161.44, 160.05, 145.69, 140.62, 136.20, 134.74, 134.43, 134.13, 131.70, 130.66, 130.01, 129.78, 129.76, 129.39, 128.51, 127.93, 127.08, 121.51, 116.29, 113.01, 102.70, 63.72, 52.70. HRMS (ESI): calc. for [($C_{27}H_{21}NO_4$)] (M+H) 424.1549, measured 424.1529.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl) phenyl) acrylate (3o)



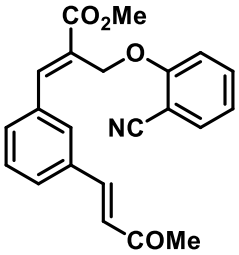
Yellow liquid; Yield (63%), ^{1}H NMR (400 MHz, CDCl3) δ 8.03 (s, 1H), 7.58 – 7.50 (m, 3H), 7.39 – 7.27 (m, 6H), 7.14 – 7.11 (m, 2H), 7.06 – 6.97 (m, 2H), 6.28 (s, 1H), 4.86 (s, 2H), 3.84 (s, 3H), 3.58 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.16, 166.23, 160.13, 156.16, 145.88, 141.59, 138.31, 130.70, 130.63, 129.59, 129.54, 129.12, 129.01, 128.55, 128.45, 128.30, 128.04, 126.91, 121.38, 117.75, 113.11, 102.76, 63.80, 52.60, 51.40. HRMS (ESI): calc. for [($C_{28}H_{23}NO_5$)] (M+H) 454.1654, measured 454.1617.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-oxo-1-phenylbut-1-en-1-yl) phenyl) acrylate (3p)



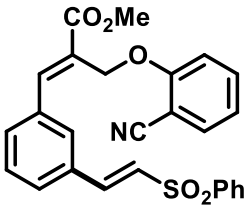
Yellow liquid; Yield (68%),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.59 – 7.48 (m, 4H), 7.42 – 7.28 (m, 6H), 7.12 (dd, *J* = 6.4, 3.1 Hz, 2H), 7.06 – 6.98 (m, 3H), 6.46 (s, 1H), 4.86 (s, 2H), 3.84 (s, 3H), 1.83 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 200.09, 167.07, 160.02, 152.85, 145.89, 141.53, 138.36, 134.43, 134.35, 133.93, 130.63, 129.58, 129.50, 129.41, 129.02, 128.93, 128.47, 128.26, 126.77, 121.37, 116.21, 112.98, 102.56, 63.70, 52.52, 30.29. HRMS (ESI): calc. for [($C_{28}H_{23}NO_4$)] (M+H) 438.1705, measured 438.1695.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (3q)



Colorless solid; Yield (60%), M.P (106 ^{o}C); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.74 (s, 1H), 7.66 – 7.37 (m, 6H), 7.15 (d, *J* = 8.4 Hz, 1H), 7.06 (td, *J* = 7.6, 0.8 Hz, 1H), 6.63 (d, *J* = 16.3 Hz, 1H), 4.95 (s, 2H), 3.88 (s, 3H), 2.33 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 198.44, 167.21, 160.20, 146.13, 142.57, 135.28, 135.08, 134.58, 134.01, 131.60, 129.59, 129.39, 129.36, 127.96, 127.28, 121.67, 116.50, 113.56, 102.75, 63.99, 52.70, 27.83. HRMS (ESI): calc. for [($C_{22}H_{19}NO_4$)] (M+H) 362.1400, measured 362.1433.

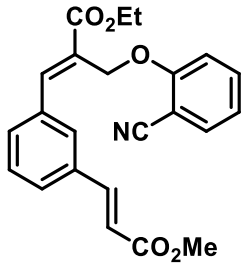
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-2-(phenylsulfonyl)vinyl)phenyl) acrylate (3r)



White solid; Yield (64%), M.P (114 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.96 – 7.89 (m, 2H), 7.66 – 7.60 (m, 3H), 7.57 – 7.43 (m, 8H), 7.18 – 7.15 (m, 1H), 7.10 – 7.03 (m, 2H), 6.80 (d, *J* = 15.5 Hz, 1H), 4.92 (s, 2H), 3.87 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ

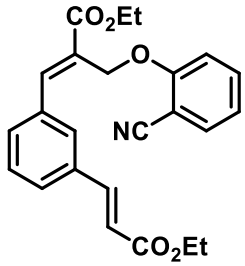
167.05, 160.02, 145.56, 141.61, 140.54, 135.28, 134.57, 134.11, 133.62, 133.17, 132.20, 130.01, 129.77, 129.48, 129.23, 129.17, 128.53, 128.36, 127.87, 127.63, 125.43, 121.77, 116.42, 113.37, 102.69, 63.83, 52.74. HRMS (ESI): calc. for [($C_{26}H_{21}NO_5S$)] (M+H) 460.1219, measured 460.1239.

Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)acrylate (4a)



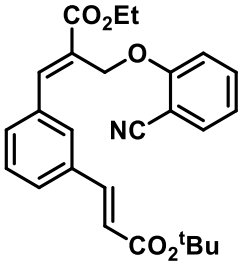
Pale yellow liquid; Yield (71%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.69 – 7.38 (m, 7H), 7.059 – 7.02 (m, 2H), 6.35 (d, *J* = 16.1 Hz, 1H), 4.95 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 3.78 (s, 3H), 1.35 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.29, 166.73, 160.22, 145.54, 144.03, 135.13, 135.07, 134.48, 134.08, 131.32, 129.57, 129.29, 129.10, 127.64, 121.57, 118.94, 116.42, 113.44, 102.80, 64.01, 61.71, 51.91, 14.38. HRMS (ESI): calc. for [($C_{23}H_{21}NO_5$)] (M+H) 392.1498, measured 392.1501.

Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl) phenyl) acrylate (4b)



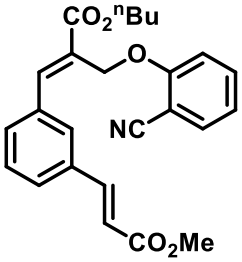
Yellow liquid; Yield (73%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.67 – 7.49 (m, 6H), 7.43 (t, *J* = 7.7 Hz, 1H), 7.13 – 7.00 (m, 2H), 6.33 (d, *J* = 16.1 Hz, 1H), 4.95 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 4.24 (q, *J* = 7.1 Hz, 2H), 1.34 (dt, *J* = 13.5, 7.1 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.86, 166.73, 160.21, 145.59, 143.74, 135.15, 135.11, 134.48, 134.09, 131.25, 129.56, 129.27, 129.09, 127.59, 121.57, 119.40, 116.41, 113.41, 102.79, 64.00, 61.71, 60.74, 14.43, 14.39. HRMS (ESI): calc. for [($C_{24}H_{23}NO_5$)] (M+H) 406.1654, measured 406.1625.

Ethyl (*E*)-3-(3-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (4c)



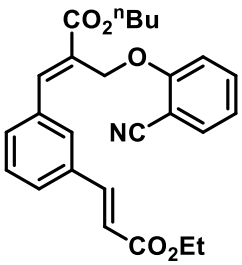
Brown liquid; Yield (67%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.60-7.50 (m ,6H), 7.42 (t, *J* = 7.7 Hz, 1H), 7.10 – 7.01 (m, 2H), 6.28 (d, *J* = 16.1 Hz, 1H), 4.94 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 1.51 (s, 9H), 1.35 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.77, 166.21, 160.22, 145.68, 142.71, 135.33, 135.04, 134.49, 134.05, 130.99, 129.89, 129.50, 129.17, 129.04, 128.58, 127.48, 126.70, 121.53, 121.29, 116.39, 113.39, 102.73, 80.86, 63.98, 61.69, 28.29, 14.37. HRMS (ESI): calc. for [($C_{26}H_{27}NO_5$)] (M+H) 434.1967, measured 434.1963.

Butyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (4d)



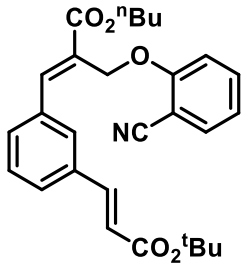
Yellow solid; Yield (71%), M.P (78 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.66 – 7.42 (m, 6H), 7.44 (t, *J* = 7.7 Hz, 2H), 6.35 (d, *J* = 16.1 Hz, 1H), 4.94 (s, 2H),), 4.27 (t, *J* = 6.6 Hz, 2H), 3.78 (s, 3H), 1.78 – 1.63 (m, 2H), 1.41 (dd, *J* = 15.0, 7.4 Hz, 2H), 1.30 – 1.18 (m, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.29, 166.77, 160.20, 145.53, 144.03, 135.11, 135.04, 134.48, 134.07, 131.31, 129.56, 129.27, 129.10, 127.63, 121.54, 118.91, 116.38, 113.35, 102.74, 65.56, 64.00, 51.90, 30.77, 19.33, 13.84. HRMS (ESI): calc. for [($C_{25}H_{25}NO_5$)] (M+H) 420.1811, measured 420.1808.

Butyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (4e)



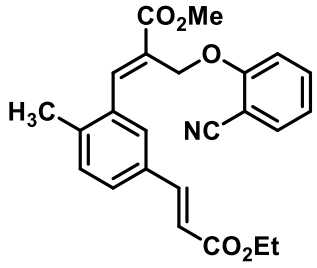
White solid; Yield (74%), M.P (96 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.68 – 7.49 (m, 6H), 7.45 (dd, *J* = 21.0, 13.3 Hz, 1H), 7.09 – 7.01 (m, 2H), 6.34 (d, *J* = 16.0 Hz, 1H), 4.94 (s, 2H), 4.30 – 4.19 (m, 4H), 1.69 (dd, *J* = 14.7, 6.9 Hz, 2H), 1.42 (dd, *J* = 15.2, 7.4 Hz, 2H), 1.32 (t, *J* = 7.1 Hz, 3H), 0.94 (t, *J* = 7.4 Hz, 3H).^{13}C NMR (100 MHz, $CDCl_3$) δ 166.82, 166.77, 160.20, 145.56, 143.71, 135.14, 135.10, 134.47, 134.09, 131.25, 129.55, 129.25, 129.09, 127.60, 121.54, 119.40, 116.38, 113.33, 102.76, 65.55, 64.00, 60.71, 30.78, 19.34, 14.42, 13.85. HRMS (ESI): calc. for [($C_{26}H_{27}NO_5$)] (M+H) 434.1967, measured 434.1970.

Butyl (*E*)-3-(3-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2cyanophenoxy) methyl)acrylate (4f)



Colorless gummy liquid; Yield (68%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.64 – 7.48 (m, 6H), 7.41 (t, *J* = 7.7 Hz, 1H), 7.14 – 6.99 (m, 2H), 6.34 – 6.17 (m, 1H), 4.93 (s, 2H), 4.26 (t, *J* = 6.4 Hz, 2H), 1.70 (dd, *J* = 14.5, 7.4 Hz, 2H), 1.51 (s, 9H), 1.41 (dd, *J* = 15.0, 7.5 Hz, 2H), 0.94 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.73, 166.06, 160.18, 145.60, 142.62, 135.32, 135.01, 134.43, 134.02, 130.95, 129.90, 129.46, 129.13, 129.00, 127.49, 121.48, 121.30, 116.34, 113.30, 102.73, 80.74, 65.49, 63.97, 30.76, 28.26, 19.31, 13.83. HRMS (ESI): calc. for [($C_{28}H_{31}NO_5$)] (M+H) 462.2280, measured 462.2285.

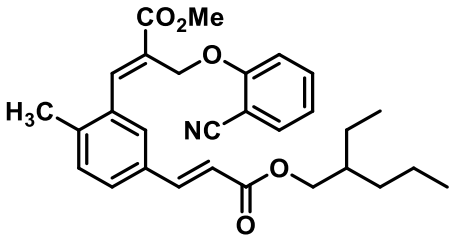
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-2-methylphenyl)acrylate (4g)



Yellow solid; Yield (68%), M.P (118 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 7.59 - 7.40(m, 6H), 7.24 (d, *J* = 8 Hz, 1H), 7.03 – 6.89 (m, 1H), 6.92 (d, *J* = 8.4 Hz, 1H), 6.21 (d, *J* = 16.0 Hz, 1H), 4.84 (s, 2H), 4.21 (q, *J* = 7.1 Hz, 2H), 3.89 (s, 3H), 2.33 (s, 3H), 1.31 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.95, 166.91, 160.03, 144.80, 143.68, 139.61,

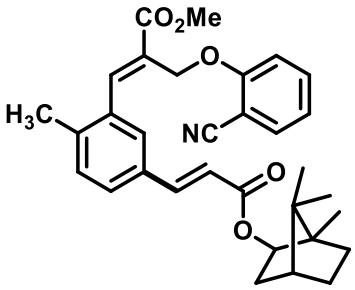
134.37, 134.31, 134.10, 132.64, 130.96, 129.20, 128.38, 128.09, 121.43, 118.34, 116.32, 113.01, 102.68, 63.96, 60.54, 52.65, 20.14, 14.45; HRMS (ESI): calc. for [($C_{24}H_{23}NO_5$] (M+H) 406.1654, measured 406.1619.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methylphenyl)acrylate (4h)



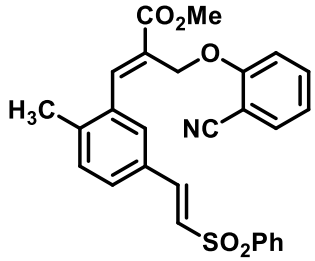
Colorless liquid; Yield (73%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.17 (s, 1H), 8.01 (d, *J* = 15.8 Hz, 1H), 7.62 – 7.37 (m, 7H), 7.29 – 6.93 (m, 4H), 6.35 (d, *J* = 15.8 Hz, 1H), 4.81 (s, 2H), 4.14 – 4.06 (m, 2H), 3.89 (s, 5H), 2.34 (d, *J* = 4.5 Hz, 5H), 1.41- 0.89 (m, 29H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.13, 166.91, 160.32, 145.78, 144.81, 143.67, 142.04, 136.08, 134.83, 134.55, 134.35, 133.96, 130.95, 130.81, 129.25, 128.16, 127.76, 126.50, 121.43, 120.94, 118.38, 116.39, 113.36, 113.01, 102.80, 96.25, 67.29, 67.00, 64.22, 63.94, 52.63, 38.98, 30.65, 30.50, 29.82, 29.10, 24.02, 23.89, 23.13, 20.15, 16.54, 14.20, 11.20, 11.14, 1.16, 0.13; HRMS (ESI): calc. for [($C_{30}H_{35}NO_5$] (M+H), 476.2437 measured 476.2515.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methyl-5-((*E*)-3-oxo-3-(((1*R*,2*R*,4*R*)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)oxy)prop-1-en-1-yl)phenyl)acrylate (4i)



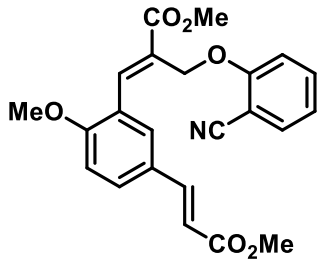
Colorless liquid; Yield (75%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.56- 7.41 (m, 5H), 7.24 (d, *J* = 7.9 Hz, 1H), 7.00 (t, *J* = 7.6 Hz, 1H), 6.91 (d, *J* = 8.5 Hz, 1H), 6.25 (d, *J* = 16.0 Hz, 1H), 4.83 (s, 2H), 4.74 (dd, *J* = 7.6, 3.8 Hz, 1H), 3.88 (s, 3H), 2.33 (s, 3H), 1.88 – 1.64 (m, 5H), 1.64 – 1.49 (m, 1H), 1.32 – 1.04 (m, 3H), 1.00 (s, 3H), 0.84 (d, *J* = 1.8 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.87, 166.52, 160.05, 144.81, 143.40, 139.50, 134.33, 134.30, 134.03, 132.64, 130.91, 129.14, 128.36, 128.05, 121.40, 118.83, 116.25, 112.89, 102.56, 81.22, 63.88, 52.64, 48.95, 47.07, 45.14, 38.93, 33.84, 27.16, 20.25, 20.15, 11.62. HRMS (ESI): calc. for [($C_{32}H_{35}NO_5$] (M+H) 514.2593, measured 514.2515.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methyl-5-((*E*)-2-(phenylsulfonyl)vinyl) phenyl) acrylate (4j)



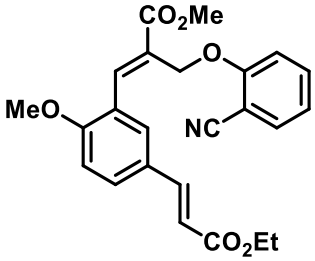
Yellow solid; Yield (54%), M.P (113 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.92 – 7.85 (m, 2H), 7.64 – 7.44 (m, 7H), 7.35 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.24 (d, *J* = 8.0 Hz, 1H), 7.01 (t, *J* = 7.5 Hz, 1H), 6.94 (d, *J* = 8.5 Hz, 1H), 6.74 (d, *J* = 15.4 Hz, 1H), 4.79 (s, 2H), 3.87 (s, 3H), 2.32 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.72, 159.84, 144.62, 141.60, 140.66, 134.53, 134.46, 134.09, 133.41, 131.06, 130.51, 130.11, 129.35, 128.40, 128.23, 127.76, 127.24, 121.57, 116.46, 112.87, 102.29, 63.76, 52.66, 20.19. HRMS (ESI): calc. for [($C_{27}H_{23}NO_5S$] (M+H) 474.1375, measured 474.1366.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)acrylate (4k)



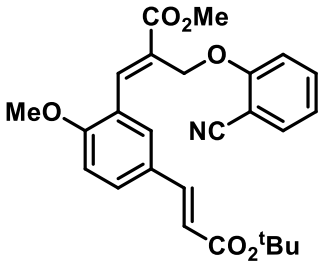
White solid; Yield (81%), M.P (99 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.20 (s, 1H), 7.66 – 7.45 (m, 5H), 7.03 (t, *J* = 8.3 Hz, 2H), 6.92 (d, *J* = 8.6 Hz, 1H), 6.08 (d, *J* = 16.0 Hz, 1H), 4.91 (s, 2H), 3.90 (s, 3H), 3.87 (s, 3H), 3.73 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.55, 167.16, 160.06, 159.43, 143.77, 141.87, 134.44, 134.15, 131.89, 129.76, 127.29, 127.11, 124.10, 121.42, 116.39, 113.07, 110.98, 102.64, 64.35, 55.98, 52.58, 51.68. HRMS (ESI): calc. for [($C_{23}H_{21}NO_6$)] (M+H) 408.1472, measured 408.1447.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-2-methoxyphenyl) acrylate (4l)



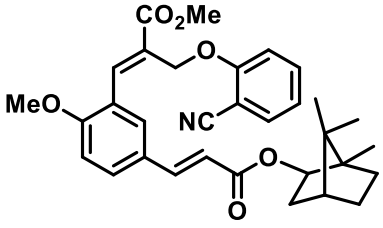
White solid; Yield (80%), M.P (150 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.21 (s, 1H), 7.70 – 7.41 (m, 5H), 7.03 (dd, *J* = 11.8, 4.3 Hz, 2H), 6.92 (d, *J* = 8.6 Hz, 1H), 6.06 (d, *J* = 16.0 Hz, 1H), 4.91 (s, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 3.91 (s, 3H), 3.88 (s, 3H), 1.30 (t, *J* = 8 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.47, 167.13, 160.07, 159.51, 146.13, 138.96, 134.49, 134.02, 133.33, 130.64, 126.79, 124.57, 123.83, 121.47, 119.65, 116.38, 113.29, 111.62, 102.59, 64.02, 60.43, 55.81, 52.47, 14.39. HRMS (ESI): calc. for [($C_{24}H_{23}NO_6$)] (M+H) 422.1604, measured 422.1631.

Methyl (*E*)-3-(5-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)-2-((2cyanophenoxy) methyl) acrylate (4m)



Colorless liquid; Yield (79%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.20 (s, 1H), 7.62 -7.39 (m, 5H), 7.03 - 6.89 (m, 3H), 6.02 (d, *J* = 16.0 Hz, 1H), 4.89 (s, 2H), 3.89 (s, 3H), 3.86 (s, 3H), 1.48 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.15, 166.44, 160.03, 159.16, 142.44, 142.03, 134.42, 134.07, 131.67, 129.65, 127.51, 126.95, 123.97, 121.34, 118.73, 116.33, 112.97, 110.93, 102.55, 80.35, 64.26, 55.92, 52.53, 28.30; HRMS (ESI): calc. for [($C_{26}H_{27}NO_6$)] (M+H) 450.1917, measured 450.1920.

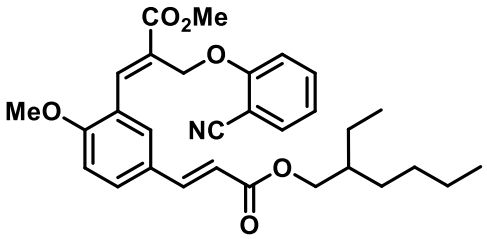
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-((7, 7-dimethyl bicyclo [2.2.1] heptan-2-yl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)acrylate (4n)



White color solid; Yield (87%), M.P. (88 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.18 (s, 1H), 7.63 (d, *J* = 1.2 Hz, 1H), 7.57 -7.43 (m, 4H), 7.06 - 6.96 (m, 2H), 6.91 (d, *J* = 8.6 Hz, 1H),

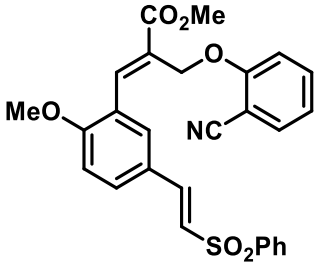
6.12 (d, *J* = 16.0 Hz, 1H), 4.89 (s, 2H), 4.71 (dd, *J* = *7.4*, 3.0 Hz, 1H), 3.89 (s, 3H), 3.86 (s, 3H), 1.84 -1.66 (m, 4H), 1.58 - 1.52 (m, 1H), 1.16 - 1.07 (m, 3H), 0.98 (s, 3H), 0.84 (s, 3H). 0.82 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.08, 166.65, 160.07, 159.28, 143.20, 141.88, 134.37, 134.03, 131.71, 129.77, 127.36, 127.01, 124.01, 121.37, 117.34, 116.26, 112.90, 110.95, 102.49, 81.10, 64.24, 55.93, 52.50, 48.92, 47.03, 45.14, 38.92, 33.83, 27.15, 20.23, 20.14, 11.59; HRMS (ESI): calc. for [($C_{32}H_{35}NO_6$)] (M+H) 530.2543, measured 530.2504.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)acrylate (4o)



White solid; Yield (91%), M.P (92 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.19 (s, 1H), 7.65 (d, *J* = 1.9 Hz, 1H), 7.59 -7.43 (m, 4H), 7.01 (dd, *J* = 8.1, 5.2 Hz, 2H), 6.91 (d, *J* = 8.6 Hz, 1H), 6.10 (d, *J* = 16.0 Hz, 1H), 4.90 (s, 2H), 4.04 (d, *J* = 6.3 Hz, 2H), 3.89 (s, 3H), 3.86 (s, 3H), 1.51 - 1.17 (m, 8H), 1.00 - 0.80 (m, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.36, 167.12, 160.02, 159.33, 143.46, 141.90, 134.39, 134.01, 131.89, 129.65, 127.30, 126.99, 124.02, 121.36, 116.78, 116.27, 112.97, 110.94, 102.52, 66.84, 64.25, 55.93, 52.52, 38.89, 30.43, 29.03, 23.82, 23.07, 14.18, 11.08; HRMS (ESI): calc. for [($C_{30}H_{35}NO_6$)] (M+H) 506.2543, measured 506.2549.

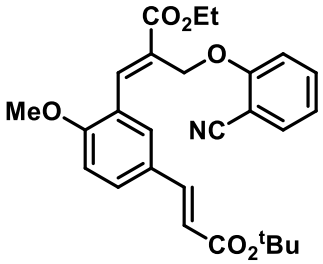
Methyl(*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*E*)-2(phenylsulfonyl) vinyl) phenyl)acrylate (4p)



Yellow solid; Yield (72%), M.P (165 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.16 (s, 1H), 7.94 – 7.82 (m, 2H), 7.65 (d, *J* = 1.7 Hz, 1H), 7.60 – 7.40 (m, 6H), 7.07 – 6.97 (m, 2H), 6.91 (d, *J* = 8.6 Hz, 1H), 6.56 (d, *J* = 15.4 Hz, 1H), 4.86 (s, 2H), 3.89 (s, 3H), 3.85 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.00, 160.01, 159.88, 141.78, 141.59, 140.97, 134.54, 134.13, 133.30, 132.94, 129.86, 129.32, 127.70, 127.28, 125.64, 125.23, 124.36, 121.63, 116.49, 112.99,

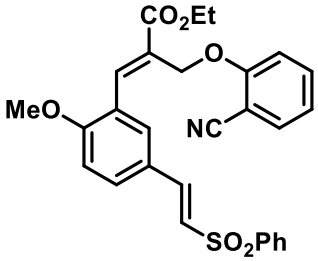
111.04, 102.32, 64.14, 56.04, 52.59. HRMS (ESI): calc. for [($C_{27}H_{23}NO_6S$)] (M+H) 490.1324, measured 490.1332.

Ethyl (*E*)-3-(5-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)-2-((2-cyanophenoxy)methyl)acrylate (4q)



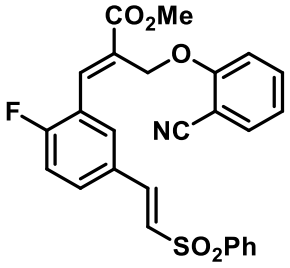
Yellow liquid; Yield (82%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.18 (s, 1H), 7.65 – 7.38 (m, 6H), 7.02 (dd, *J* = 11.5, 4.4 Hz, 2H), 6.91 (d, *J* = 8.6 Hz, 1H), 6.04 (d, *J* = 16.0 Hz, 1H), 4.90 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 3.90 (s, 3H), 1.48 (s, 9H), 1.38 – 1.35 (m, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.71, 166.51, 160.13, 159.16, 142.51, 141.68, 134.40, 134.08, 131.55, 129.77, 127.53, 127.38, 124.10, 121.30, 118.74, 116.37, 113.01, 110.93, 102.57, 80.40, 64.32, 61.55, 55.93, 28.33, 14.40. HRMS (ESI): calc. for [($C_{27}H_{29}NO_6$)] (M+H) 464.2073, measured 464.2054.

Ethyl(*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*E*)-2-(phenylsulfonyl) vinyl) phenyl)acrylate (4r)



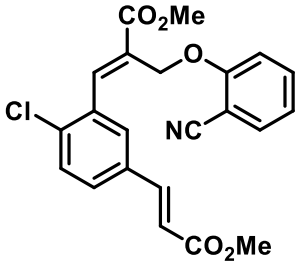
White solid; Yield (72%), M.P (140 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (s, 1H), 7.93 – 7.80 (m, 2H), 7.67 – 7.43 (m, 7H), 7.02 (d, *J* = 8.0 Hz, 1H), 6.91 (d, *J* = 8.6 Hz, 1H), 6.62 – 6.52 (m, 1H), 4.86 (s, 2H), 4.30 (q, *J* = 7.1 Hz, 2H), 3.89 (s, 3H), 1.33 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.49, 159.97, 159.93, 141.61, 141.41, 140.95, 134.50, 134.07, 133.27, 132.82, 129.89, 129.58, 129.30, 128.06, 127.67, 127.63, 125.58, 125.17, 124.43, 121.54, 116.49, 112.99, 111.02, 102.27, 64.15, 61.55, 56.01, 14.33; HRMS (ESI): calc. for [($C_{28}H_{25}NO_6S$)] (M+H) 504.1481, measured 504.1491.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-fluoro-5-((*E*)-2-(phenylsulfonyl)vinyl) phenyl)acrylate (4s)



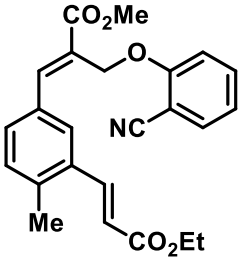
White solid; Yield (45%), M.P (1389 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.89 (dd, *J* = 8.4, 1.3 Hz, 2H), 7.74 (dd, *J* = 7.1, 2.4 Hz, 1H), 7.64 – 7.49 (m, 8H), 7.18 – 7.11 (m, 1H), 7.10 – 7.01 (m, 2H), 6.69 (d, *J* = 15.4 Hz, 1H), 4.91 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.52, 159.71, 142.78, 140.46, 138.36, 138.08, 135.50, 134.62, 134.50, 134.15, 133.65, 133.60, 131.28, 129.45, 128.71, 127.89, 123.92, 121.87, 116.39, 116.08, 113.06, 102.42, 63.8, 52.87. HRMS (ESI): calc. for [($C_{26}H_{20}FNO_5S$)] (M+H) 478.1124, measured 478.1138.

Methyl (*E*)-3-(2-chloro-5-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy)methyl)acrylate (4t)



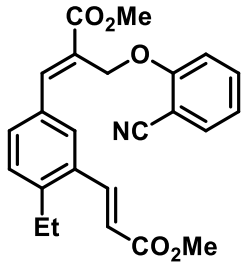
White solid; Yield (67%), M.P (169 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.16 (s, 1H), 8.11 (d, *J* = 16.0 Hz, 1H), 7.65 – 7.50 (m, 4H), 7.33 (t, *J* = 7.8 Hz, 1H), 7.04 (dd, *J* = 8.0, 2.2 Hz, 2H), 6.43 (d, *J* = 16.0 Hz, 1H), 4.84 (s, 2H), 3.89 (s, 3H), 3.83 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.86, 166.68, 160.20, 143.34, 140.37, 134.47, 134.34, 133.94, 133.73, 132.25, 128.72, 128.64, 127.38, 121.68, 121.62, 116.40, 113.63, 102.85, 64.42, 52.77, 52.09; HRMS (ESI): calc. for [($C_{22}H_{18}ClNO_5$)] (M+H) 412.0952, measured 412.0961.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-4-methylphenyl)acrylate (4u)



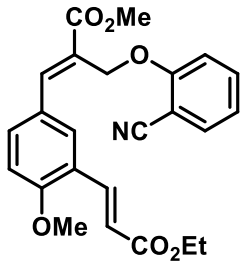
Colorless liquid; Yield (71%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.89 (d, *J* = 8 Hz, 1H), 7.65 – 7.41 (m, 6H), 7.09 – 6.94 (m, 4H), 6.16 (d, *J* = 15.9 Hz, 1H), 4.95 (s, 2H), 4.23 (q, *J* = 7.1 Hz, 2H), 3.87 (s, 3H), 2.43 (s, 3H), 1.32 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.45, 167.02, 160.11, 158.74, 146.40, 141.55, 139.80, 134.66, 134.56, 134.16, 134.07, 133.05, 132.50, 131.52, 131.14, 127.81, 126.19, 121.51, 120.91, 120.27, 116.60, 113.17, 102.64, 63.97, 60.75, 52.67, 19.88, 14.45; HRMS (ESI): calc. for [($C_{24}H_{23}NO_5$)] (M+H) 406.1654, measured 406.1663.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-ethyl-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)acrylate (4v)



White solid; Yield (69%), M.P (95 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.93 (d, *J* = 15.9 Hz, 1H), 7.66 – 7.37 (m, 8H), 7.28 (s, 1H), 7.11 – 6.89 (m, 4H), 6.17 (d, *J* = 15.8 Hz, 1H), 4.95 (s, 2H), 3.87 (s, 3H), 3.77 (s, 3H), 2.77 (q, *J* = 7.6 Hz, 2H), 1.20 (t, *J* = 7.6 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.42, 167.33, 160.10, 158.89, 146.32, 145.83, 141.60, 134.53, 134.13, 133.37, 133.08, 132.46, 131.41, 129.95, 128.02, 126.21, 121.46, 120.73, 120.01, 116.54, 116.38, 113.17, 102.66, 63.97, 52.63, 51.84, 26.40, 15.60; HRMS (ESI): calc. for [($C_{24}H_{23}NO_5$)] (M+H) 406.1654, measured 406.1664.

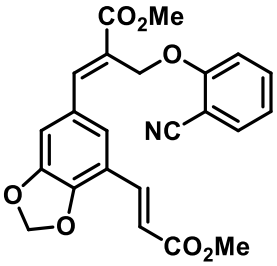
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl)acrylate (4w)



White solid; Yield (81%), M.P (97 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.87 (d, *J* = 16.2 Hz, 1H), 7.63 – 7.48 (m, 4H), 7.12 (d, *J* = 8.5 Hz, 1H), 7.04 (dd, *J* = 11.1, 4.0 Hz, 1H), 6.94 (d, *J* = 8.5 Hz, 1H), 6.31 (d, *J* = 16.2 Hz, 1H), 4.96 (s, 2H), 4.20 (q, *J* = 7.1 Hz, 2H), 3.88 (s, 3H), 3.84 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.47, 167.13, 160.07, 159.51, 146.13, 138.96, 134.49, 134.02, 133.33, 130.64, 126.79, 124.57,

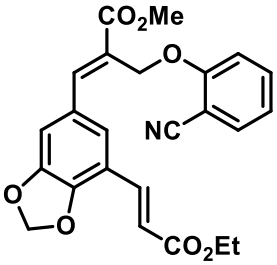
123.83, 121.47, 119.65, 116.38, 113.29, 111.62, 102.59, 64.02, 60.43, 55.81, 52.47, 14.39; HRMS (ESI): calc. for [($C_{24}H_{23}NO_6$)] (M+H) 422.1604, measured 422.1594.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(7-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) benzo[d][1,3]dioxol-5-yl)acrylate (4x)



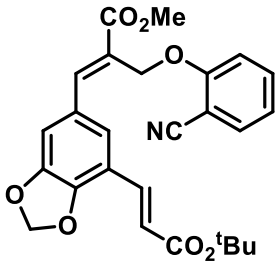
Brown solid; Yield (82%), M.P (115 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96 (s, 1H), 7.68 – 7.45 (m, 4H), 7.26 – 6.98 (m, 5H), 6.55 (d, *J* = 16.1 Hz, 1H), 6.10 (s, 2H), 4.98 (s, 2H), 3.85 (s, 3H), 3.77 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.41, 167.38, 160.11, 148.89, 148.15, 145.93, 138.41, 134.48, 134.05, 128.51, 125.79, 125.30, 121.57, 121.48, 117.34, 116.40, 113.46, 110.48, 102.77, 102.46, 63.90, 52.59, 51.87; HRMS (ESI): calc. for [($C_{23}H_{19}NO_7$)] (M+H) 422.1240, measured 422.1243.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(7-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl) benzo [d][1,3]dioxol-5-yl)acrylate (4y)



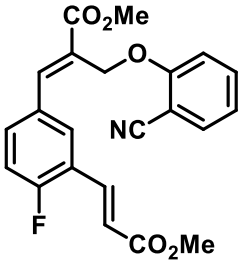
White r solid; Yield (79%), M.P (87 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96 (s, 1H), 7.55-7.49 (m, 3H), 7.14 – 7.02 (m, 4H), 6.54 (d, *J* = 16.1 Hz, 1H), 6.10 (s, 2H), 4.98 (s, 2H), 4.23 (q, *J* = 7.2 Hz, 2H), 3.84 (s, 3H), 1.31 (t, *J* = 9.4,Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.40, 166.93, 160.08, 148.86, 148.11, 145.96, 138.12, 134.47, 134.03, 128.47, 125.80, 125.23, 121.95, 121.55, 117.39, 116.38, 113.42, 110.41, 102.73, 102.44, 63.87, 60.67, 52.58, 14.39; HRMS (ESI): calc. for [($C_{24}H_{21}NO_7$)] (M+H) 436.1396, measured 436.1420.

Methyl (*E*)-3-(7-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl) benzo[d][1,3]dioxol-5-yl)-2-((2-cyanophenoxy)methyl)acrylate (4z)



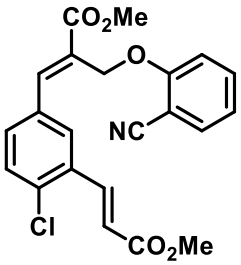
White solid; Yield (78%), M.P (114 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (s, 1H), 7.62 – 7.51 (m, 2H), 7.44 (d, *J* = 16.1 Hz, 1H), 7.15 – 7.03 (m, 4H), 6.50 (d, *J* = 16.1 Hz, 1H), 6.11 (s, 2H), 4.99 (s, 2H), 3.86 (s, 3H), 1.51 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.46, 166.26, 160.13, 148.85, 148.03, 146.10, 137.13, 134.48, 134.05, 128.46, 125.88, 125.14, 123.94, 121.54, 117.62, 113.41, 110.20, 102.76, 102.39, 80.77, 63.87, 52.60, 28.29; HRMS (ESI): calc. for [($C_{26}H_{26}NO_7$)] (M+Na) 486.1529, measured 486.1513.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-fluoro-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)acrylate (4aa)



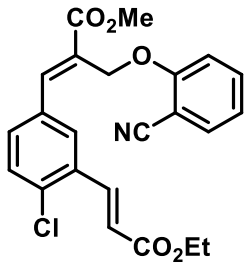
White solid; Yield (68%), M.P (137 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.75 (d, *J* = 16.2 Hz, 1H), 7.68 (dd, *J* = 6.9, 2.1 Hz, 1H), 7.65 – 7.46 (m, 6H), 7.21 – 7.02 (m, 6H), 6.39 (d, *J* = 16.2 Hz, 1H), 4.94 (s, 2H), 3.88 (s, H), 3.79 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.38, 167.11, 167.00, 160.69, 160.30, 160.01, 145.80, 145.07, 136.57, 134.56, 134.50, 134.14, 134.02, 133.18, 133.09, 132.05, 131.97, 130.91, 130.52, 126.98, 126.05, 123.09, 121.74, 121.62, 121.47, 117.21, 116.98, 116.45, 116.36, 116.28, 116.06, 113.64, 113.38, 102.91, 102.82, 96.25, 64.15, 63.86, 52.74, 52.63, 51.98; HRMS (ESI): calc. for [($C_{22}H_{18}FNO_5$)] (M+H) 396.1247, measured 396.1259.

Methyl (*E*)-3-(4-chloro-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy)methyl) acrylate (4ab)



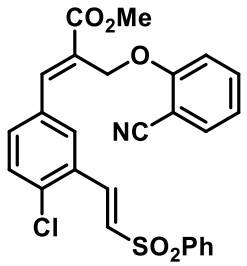
White solid; Yield (67%), M.P (117 ^{o}C) ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 8.01 (d, *J* = 16.1 Hz, 1H), 7.72 (s, 1H), 7.61 – 7.44 (m, 5H), 7.09 – 7.04 (m, 2H), 7.01 – 6.92 (m, 2H), 6.24 (d, *J* = 16.0 Hz, 1H), 4.92 (s, 2H), 3.88 (s, 3H), 3.78 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.08, 166.83, 159.92, 158.75, 145.05, 139.98, 136.53, 134.68, 134.64, 134.18, 133.38, 133.30, 133.06, 131.98, 130.84, 128.78, 127.52, 121.74, 121.38, 120.92, 116.62, 113.20, 102.66, 99.88, 63.75, 52.82, 52.05. HRMS (ESI): calc. for [($C_{22}H_{18}ClNO_5$)] (M+H) 412.0952, measured 412.0962.

Methyl (*E*)-3-(4-chloro-3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (4ac)



White solid; Yield (70%), M.P(123 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 8.00 (d, *J* = 16.0 Hz, 1H), 7.73 (d, *J* = 1.2 Hz, 1H), 7.61 – 7.47 (m, 4H), 7.10 – 7.05 (m, 2H), 6.23 (d, *J* = 16.0 Hz, 1H), 4.92 (s, 2H), 4.24 (q, *J* = 7.1 Hz, 2H), 3.88 (s, 3H), 1.33 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.95, 166.24, 159.89, 144.99, 139.57, 136.45, 134.55, 134.16, 133.36, 133.35, 131.86, 130.80, 128.75, 127.48, 121.86, 121.71, 116.28, 113.16, 102.71, 63.72, 60.82, 52.75, 14.41; HRMS (ESI): calc. for [($C_{23}H_{20}ClNO_5$)] (M+H) 426.1108, measured 426.1096.

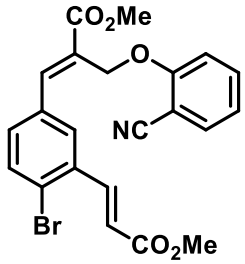
Methyl (*E*)-3-(4-chloro-3-((*E*)-2-(phenylsulfonyl) vinyl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (4ad)



White solid; Yield (54%), M.P(110 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.99 (s, 1H), 7.91 – 7.84 (m, 1H), 7.71 – 7.42 (m, 4H), 7.13 – 6.99 (m, 1H), 6.79 (dd, *J* = 15.4, 1.7 Hz, 1H), 6.46 (d, *J* = 16.5 Hz, 1H), 6.04 (d, *J* = 9.8 Hz, 1H), 4.87 (s, 2H), 3.85 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.78, 159.77, 144.56, 140.14, 137.53, 136.79, 134.61, 134.18, 133.73, 133.56, 132.72, 131.35, 131.01, 129.60, 129.50, 129.12, 128.10, 127.98, 127.87,

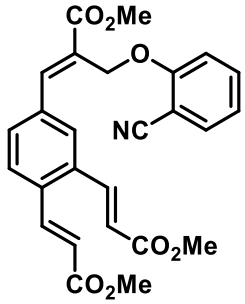
121.86, 116.35, 113.14, 102.52, 63.55, 52.76. HRMS (ESI): calc. for [($C_{26}H_{20}ClNO_5S$)] (M+H) 494.0829, measured 494.0911.

Methyl (*E*)-3-(4-bromo-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl) acrylate (4ae)



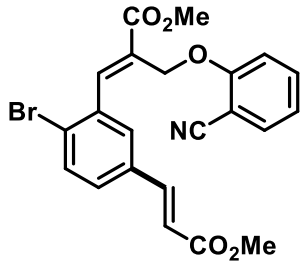
White solid; Yield (43%), M.P (152 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (s, 1H), 7.96 (d, *J* = 16.0 Hz, 1H), 7.67 (dd, *J* = 13.1, 5.2 Hz, 2H), 7.61 – 7.50 (m, 2H), 7.39 (dd, *J* = 8.3, 2.0 Hz, 1H), 7.09 – 7.06 (m, 2H), 6.19 (d, *J* = 16.0 Hz, 1H), 4.91 (s, 2H), 3.87 (s, 3H), 3.77 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.93, 166.55, 159.88, 144.97, 142.39, 135.15, 134.55, 134.14, 134.08, 133.98, 131.97, 128.78, 127.61, 126.91, 121.70, 121.57, 116.28, 113.18, 102.73, 63.73, 52.75, 51.96. HRMS (ESI): calc. for [($C_{22}H_{18}BrNO_5$)] (M+H) 456.0447, measured 456.0408.

Dimethyl 3,3'-(4-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-1,2-phenylene)(2*E*,2'*E*) diacrylate (4ae')



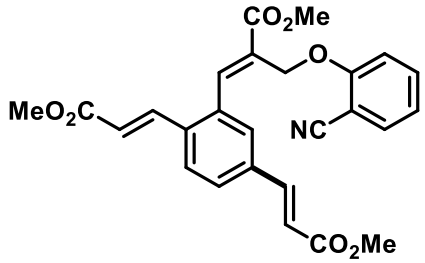
White solid; Yield (27%), M.P(183 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 – 8.00 (m, 3H), 7.67 (s, 2H), 7.63 – 7.51 (m, 2H), 7.27 (s, 1H), 7.10 – 7.03 (m, 2H), 6.18 (d, *J* = 15.9 Hz, 2H), 4.91 (s, 2H), 3.89 (s, 3H), 3.79 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.74, 166.41, 159.57, 144.49, 142.78, 136.87, 134.62, 134.32, 134.03, 129.60, 128.73, 128.27, 122.48, 121.73, 116.18, 112.72, 102.59, 63.40, 52.87, 52.08. HRMS (ESI): calc. for [($C_{26}H_{23}NO_7$)] (M+H) 462.1553, measured 462.1574.

Methyl (*E*)-3-(2-bromo-5-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (4af)



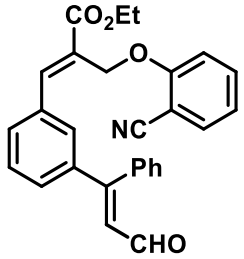
White solid; Yield (38%), M.P (146 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (d, *J* = 16.9 Hz, 1H), 7.6 – 7.48 (m, 4H), 7.38 (t, *J* = 7.7 Hz, 1H), 7.04 (dd, *J* = 11.1, 4.5 Hz, 2H), 6.39 (d, *J* = 15.9 Hz, 1H), 4.83 (s, 2H), 3.90 (s, 3H), 3.83 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.78, 166.67, 160.20, 145.56, 143.08, 136.42, 135.70, 134.47, 133.95, 132.17, 128.60, 128.34, 128.05, 126.40, 121.82, 121.66, 113.60, 102.84, 64.39, 52.79, 52.11. HRMS (ESI): calc. for [($C_{22}H_{18}BrNO_5$)] (M+H) 456.0447, measured 456.0417.

Dimethyl 3,3'-(2-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-1,4-phenylene)(2*E*,2'*E*)-diacrylate.



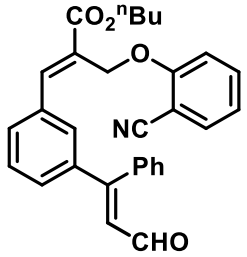
White solid; Yield (23%), M.P (162 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 8.06 (d, *J* = 15.9 Hz, 1H), 7.70 – 7.47 (m, 6H), 7.05 – 6.97 (m, 2H), 6.41 (d, *J* = 15.9 Hz, 1H), 6.33 (d, *J* = 16.0 Hz, 1H), 4.84 (s, 2H), 3.91 (s, 3H), 3.84 (s, 3H), 3.78 (s, 3H). ^{13}C NMR (100 MHz, CDCl3) δ 166.80, 166.52, 166.42, 159.81, 144.76, 142.47, 142.18, 137.11, 136.46, 134.49, 134.38, 134.09, 130.22, 129.05, 127.90, 127.61, 122.60, 121.69, 120.39, 116.27, 113.06, 102.67, 77.48, 77.16, 76.84, 63.95, 52.89, 52.20, 52.01. HRMS (ESI): calc. for [($C_{26}H_{23}NO_7$)] (M+Na) 484.1372, measured 484.1366.

Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-oxo-1-phenylprop-1-en-1-yl)phenyl) acrylate (5a)



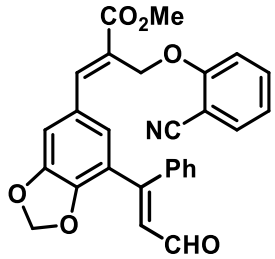
Brown gummy liquid; Yield (63%), (*E/Z* = 82/18), ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.46 (d, *J* = 7.9 Hz, 1H), 8.02 (s, 1H), 7.65 – 7.28 (m,6H), 7.22 (dd, *J* = 7.7, 1.7 Hz, 8H), 7.12 – 6.98 (m, 5H), 6.50 (d, *J* = 7.9 Hz, 1H), 4.87 (s, 2H), 4.30 (q, *J* = 7.1 Hz, 3H), 1.33 (t, *J* = 7.1 Hz, 4H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 193.39, 166.65, 161.52, 160.15, 145.28, 140.59, 136.24, 134.85, 134.41, 134.10, 131.69, 130.79, 130.67, 129.98, 129.75, 129.71, 129.37, 128.82, 128.66, 128.52, 127.93, 127.49, 121.48, 116.58, 113.12, 102.73, 77.48, 77.16, 76.85, 63.80, 61.70, 14.36. HRMS (ESI): calc. for [($C_{28}H_{23}NO_4$)] (M+H) 438.1705, measured 438.1709.

Butyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-oxo-1-phenylprop-1-en-1-yl)phenyl) acrylate (5b)



Yellow liquid; yield (68%), (*E/Z* = 79/21), ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.46 (d, J = 7.9 Hz, 1H), 8.03 (s, 1H), 7.42 (m, 12H), 7.10 – 6.97 (m, 3H), 6.50 (d, J = 7.9 Hz, 1H), 4.87 (s, 2H), 4.25 (t, *J* = 6.5 Hz, 3H), 1.73 – 1.61 (m, 3H), 1.44 – 1.34 (m, 3H), 0.92 (t, J = 7.4 Hz, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 193.41, 166.69, 161.58, 160.11, 145.27, 140.55, 136.20, 134.82, 134.44, 134.39, 134.07, 131.71, 130.77, 130.63, 129.94, 129.73, 129.69, 129.34, 128.79, 128.63, 128.49, 127.88, 127.47, 121.44, 116.24, 113.01, 102.65, 65.53, 63.79, 30.72, 19.28, 13.81. HRMS (ESI): calc. for [($C_{30}H_{27}NO_4$)] (M+H) 466.2018, measured 466.2032.

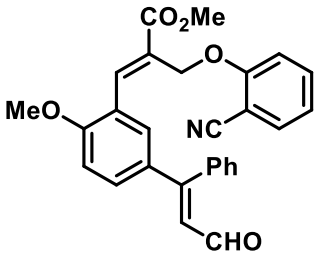
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(7-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl) benzo[d][1,3]dioxol-5-yl)acrylate (5c)



Brown solid; Yield (71%), M.P (99 ^{o}C), (*E/Z* = 75/25), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.82 (s, 1H), 7.59 – 7.47 (m, 4H), 7.42 – 7.28 (m, 7H), 7.22 (dd, *J* = 6.2, 3.2 Hz, 3H), 7.11 (d, *J* = 1.2 Hz, 1H), 7.05 (dd, *J* = 13.2, 5.7 Hz, 2H), 6.99 (d, *J* = 8.5 Hz, 1H), 6.88 (dd, *J* = 8.7, 4.4 Hz, 1H), 6.66 (d, *J* = 0.9 Hz, 1H), 6.11 (s, 2H), 4.85 (s, 2H), 3.79 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 193.94, 167.26, 160.05, 155.84, 148.91, 147.94, 145.46, 135.35, 134.42, 134.32, 133.94, 130.71, 130.31, 130.21, 129.49, 129.01, 128.85, 128.49, 128.42, 128.36,

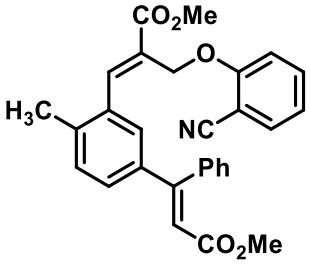
128.18, 128.04, 126.37, 125.09, 121.67, 121.37, 116.22, 113.10, 110.92, 102.67, 102.28, 63.63, 52.50, 29.75; HRMS (ESI): calc. for [($C_{28}H_{21}NO_6$)] (M+H) 468.1447, measured 468.1446.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl)phenyl)acrylate (5d)



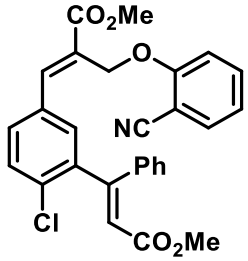
Yellow solid; Yield (68%), M.P (165 ^{o}C), (*E/Z* = 84/16), ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.32 (d, *J* = 7.9 Hz, 1H), 8.16 (s, 1H), 7.59 – 7.31 (m, 5H), 7.24 – 6.91 (m, 9H), 6.86 (d, *J* = 8.5 Hz, 1H), 6.34 (d, *J* = 7.9 Hz, 1H), 4.78 (s, 2H), 3.92 (s, 3H), 3.83 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 193.30, 167.05, 161.34, 160.02, 159.76, 141.16, 136.41, 134.23, 134.19, 132.32, 131.70, 131.06, 130.42, 129.47, 128.67, 128.29, 126.86, 126.32, 123.72, 121.24, 112.56, 110.91, 102.60, 64.02, 56.04, 52.53. HRMS (ESI): calc. for [($C_{28}H_{23}NO_5$)] (M+H) 454.1654, measured 454.1683.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl)-2-methylphenyl) acrylate (5e)



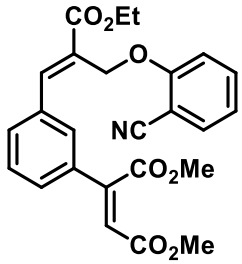
White solid; Yield (69%), M.P (92^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.49 – 7.35 (m, 2H), 7.20 – 7.12 (m, 6H), 7.01 – 6.88 (m, 3H), 6.73 (d, *J* = 8.5 Hz, 1H), 6.11 (s, 1H), 4.65 (s, 2H), 3.78 (s, 3H), 3.47 (s, 3H), 2.26 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.87, 166.26, 160.03, 156.23, 144.42, 138.95, 138.89, 138.46, 134.20, 133.97, 133.71, 130.55, 129.25, 128.89, 128.81, 128.25, 127.91, 127.73, 121.17, 116.78, 116.16, 112.64, 102.64, 63.74, 52.55, 51.27, 19.92; HRMS (ESI): calc. for [($C_{29}H_{25}NO_5$)] (M+H) 468.1811, measured 468.1814.

Methyl (*E*)-3-(4-chloro-3-((*E*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl) phenyl) -2-((2-cyanophenoxy)methyl)acrylate (5f)



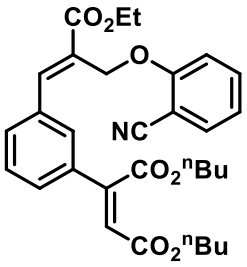
Yellow solid; Yield (62%), M.P (117 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.57 – 7.41 (m, 5H), 7.36 (d, *J* = 2.1 Hz, 1H), 7.26 – 7.22 (m, 3H), 7.15 (dd, *J* = 7.9, 1.7 Hz, 2H), 7.04- 7.00 (m, 2H), 6.03 (s, 1H), 4.87 (s, 2H), 3.85 (s, 3H), 3.63 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.97, 166.07, 159.93, 153.17, 144.87, 141.24, 137.56, 134.58, 134.46, 134.35, 133.99, 132.92, 132.13, 130.88, 130.62, 128.92, 128.74, 128.71, 127.82, 127.40, 127.24, 121.69, 121.55, 116.20, 113.15, 102.67, 63.74, 52.68, 51.55; HRMS (ESI): calc. for [($C_{28}H_{22}ClNO_5$)] (M+H) 488.1265, measured 488.1181.

Dimethyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (6a)



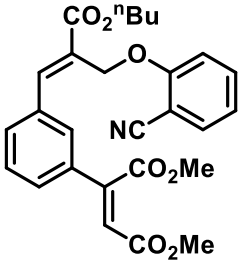
White solid; Yield (77%), M.P.(107 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 7.49 -(m, 6H), 7.08 (d, *J* = 8.4 Hz, 1H), 7.03 (d, *J* = 8 Hz, Hz, 1H), 7.00 (s, 1H), 4.97 (s, 2H), 4.32 (q, *J* = 7.1 Hz, 2H), 3.74 (s, 3H), 3.57 (s, 3H), 1.34 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.87, 166.41, 165.30, 160.42, 145.92, 143.92, 134.39, 134.29, 133.98, 133.90, 130.35, 130.15, 129.73, 129.13, 128.40, 127.32, 121.33, 116.42, 113.66, 102.76, 64.14, 61.57, 53.12, 52.02, 14.37. HRMS (ESI): calc. for [($C_{25}H_{23}NO_7$)] (M+Na) 472.1372, measured 472.1402.

Dibutyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (6b)



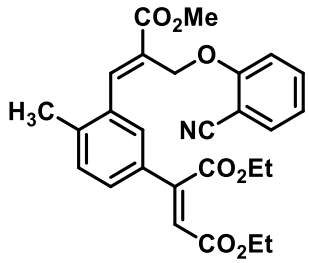
White solid; Yield (80%), M.P.(131 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.61 – 7.35 (m, 7H), 7.09 (d, *J* = 8.5 Hz, 1H), 7.05 – 6.97 (m, 3H), 4.98 (s, 2H), 4.32 (q, *J* = 7.1 Hz, 3H), 4.15 (dd, *J* = 7.6, 5.6 Hz, 3H), 3.96 (t, *J* = 6.6 Hz, 3H), 1.66 – 1.57 (m, 2H), 1.43 – 1.14 (m, 9H), 0.90 (t, *J* = 7.4 Hz, 3H), 0.83 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.82, 166.01, 165.22, 160.41, 145.79, 143.46, 134.71, 134.26, 133.87, 133.85, 130.42, 130.21, 129.67, 129.49, 129.37, 128.33, 127.28, 121.28, 116.37, 113.64, 102.76, 65.97, 65.00, 64.95, 64.13, 61.51, 30.52, 30.39, 19.17, 19.03, 14.34, 13.73, 13.70. HRMS (ESI): calc. for [($C_{31}H_{35}NO_7$)] (M+H) 534.2492, measured 534.2523.

Dimethyl 2-(3-((*E*)-3-butoxy-2-((2-cyanophenoxy) methyl)-3-oxoprop-1-en-1-yl)phenyl) maleate (6c)



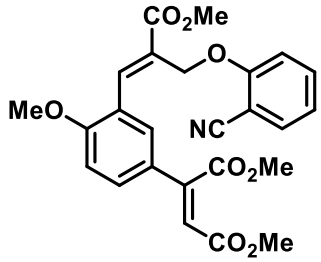
Colorless liquid; Yield (76%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.60 – 7.36 (m, 5H), 7.25 (d, *J* = 9.2 Hz, 1H), 7.08 (d, *J* = 8.5 Hz, 1H), 7.03 (d, *J* = Hz, 1H), 6.99 (s, 1H), 4.97 (s, 2H), 4.26 (t, *J* = 8 Hz, 2H), 3.74 (s, 3H), 3.57 (s, 3H), 1.72 – 1.38 (m, 4H), 0.93 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.43, 165.33, 160.44, 145.96, 143.95, 134.41, 134.31, 133.92, 130.35, 130.17, 129.76, 129.15, 128.42, 127.35, 121.32, 116.40, 113.61, 102.76, 65.46, 64.18, 53.13, 52.03, 30.80, 19.34, 13.86, 1.15. HRMS (ESI): calc. for [($C_{27}H_{27}NO_7$)] (M+H) 478.1866, measured 478.1872.

Dimethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methylphenyl)maleate (6d)



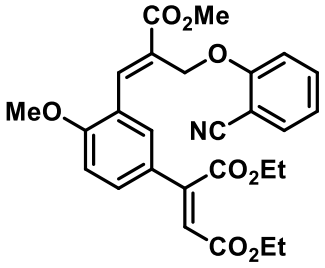
Colorless liquid; Yield (83%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 7.57 – 7.35 (m, 4H), 7.20 (dd, *J* = 13.6, 7.7 Hz, 2H), 7.13 (dd, *J* = 7.8, 1.5 Hz, 1H), 6.96 (dt, *J* = 7.3, 3.4 Hz, 3H), 6.90 (s, 1H), 4.90 (s, 2H), 4.11 (q, *J* = 7.1 Hz, 2H), 3.95 (dd, *J* = 14.3, 7.1 Hz, 2H), 3.86 (s, 4H), 2.32 (s, 3H), 1.21 (t, *J* = 7.1 Hz, 3H), 1.08 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.14, 166.02, 164.93, 160.38, 144.98, 144.15, 137.63, 135.26, 134.37, 134.08, 133.89, 133.68, 132.94, 131.77, 130.06, 129.97, 129.72, 128.61, 127.84, 121.03, 116.35, 113.56, 113.33, 102.59, 64.07, 62.03, 60.85, 52.53, 19.98, 14.15, 14.02. HRMS (ESI): calc. for [($C_{27}H_{27}NO_7$)] (M+H) 478.1866, measured 478.1830.

Dimethyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl) maleate (6e)



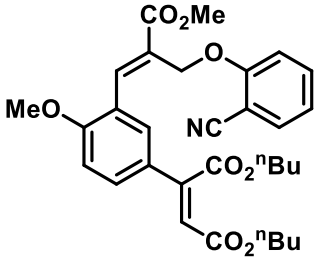
Colorless liquid; Yield (85%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.23 (s, 1H), 7.55 – 7.40 (m, 1H), 7.29 – 7.23 (m, 3H), 7.08 (d, *J* = 8.4 Hz, 1H), 6.98 (td, *J* = 7.6, 0.8 Hz, 1H), 6.93 – 6.85 (m, 2H), 4.95 (s, 2H), 3.89 (s, 3H), 3.85 (s, 3H), 3.66 (s, 3H), 3.52 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.36, 166.65, 165.37, 160.50, 158.13, 144.02, 142.35, 134.12, 133.78, 132.26, 131.89, 128.00, 126.76, 125.85, 122.82, 121.07, 116.39, 113.63, 109.84, 102.62, 64.49, 55.73, 52.97, 52.45, 51.86. HRMS (ESI): calc. for [($C_{25}H_{23}NO_8$)] (M+Na) 488.1321, measured 488.1346.

Diethyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl)maleate (6f)



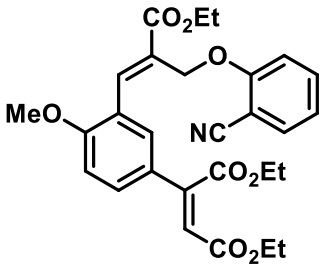
Colorless liquid; Yield (89%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 (s, 1H), 7.52 (dd, *J* = 7.7, 1.5 Hz, 1H), 7.45 (dd, *J* = 12.5, 5.2 Hz, 1H), 7.40 (d, *J* = 1.9 Hz, 1H), 7.29 – 7.21 (m, $CDCl_3$ merged 3H), 7.06 (d, *J* = 8.5 Hz, 1H), 6.97 (t, *J* = 7.5 Hz, 1H), 6.90 (d, *J* = 8.6 Hz, 1H), 6.87 (s, 1H), 4.95 (s, 2H), 4.09 (q, *J* = 7.1 Hz, 2H), 3.96 (q, *J* = 7.1 Hz, 2H), 3.88 (s, 3H), 3.85 (s, 3H), 1.21 (t, *J* = 7.1 Hz, 3H), 1.10 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.35, 166.20, 165.07, 160.50, 158.05, 143.82, 142.16, 134.09, 133.68, 132.31, 131.90, 128.14, 126.76, 126.05, 122.68, 120.98, 116.36, 113.64, 109.77, 102.58, 61.97, 60.81, 55.71, 52.40, 14.14, 14.05; HRMS (ESI): calc. for [($C_{27}H_{27}NO_8$)] (M+H) 494.1815, measured 494.1813.

Dibutyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl)maleate (6g)



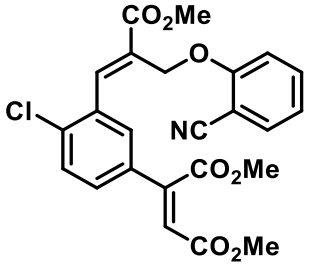
Colorless liquid; Yield (87%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.21 (s, 1H), 7.55 – 7.37 (m, 3H), 7.25 (dd, *J* = 7.9, 2.7 Hz, 1H), 7.06 (d, *J* = 8.5 Hz, 1H), 6.97 (t, *J* = 7.6 Hz, 1H), 6.89 (d, *J* = 8.0 Hz 1H), 6.87 (s, 1H), 4.96 (s, 2H), 4.03 (t, *J* = 6.7 Hz, 2H), 3.92 (d, *J* = 6.6 Hz, 2H), 3.88 (s, 3H), 3.85 (s, 3H), 1.58 (dd, *J* = 14.4, 7.3 Hz, 2H), 1.43 (dd, *J* = 14.7, 6.9 Hz, 2H), 1.31 (dd, *J* = 15.0, 7.5 Hz, 2H), 1.23 – 1.16 (m, 2H), 0.89 (t, *J* = 7.4 Hz, 3H), 0.83 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.37, 166.30, 165.30, 160.56, 158.07, 143.66, 142.11, 134.09, 133.72, 132.29, 131.94, 128.22, 126.84, 126.21, 122.73, 121.00, 116.40, 113.70, 109.79, 102.65, 65.85, 64.80, 64.53, 55.74, 52.43, 30.55, 30.51, 19.20, 19.10, 13.79, 13.75; HRMS (ESI): calc. for [($C_{31}H_{35}NO_8$)] (M+H) 550.2441, measured 550.2472.

Diethyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-ethoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl) maleate (6h)



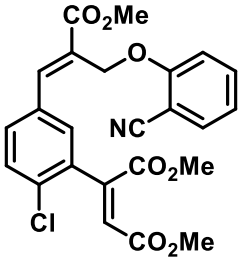
Yellow solid; Yield (83%), M.P (107 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.21 (s, 1H), 7.55 – 7.38 (m, 3H), 7.30 – 7.23 (m, $CDCl_3$ merged 2H), 7.07 (d, *J* = 8.5 Hz, 1H), 6.98 (td, *J* = 7.6, 0.6 Hz, 1H), 6.94 – 6.87 (m, 2H), 4.97 (s, 2H), 4.31 (q, *J* = 7.1 Hz, 2H), 4.11 (q, *J* = 7.1 Hz, 2H), 3.98 (q, *J* = 7.1 Hz, 2H), 3.89 (s, 3H), 1.34 (t, *J* = 7.1 Hz, 3H), 1.23 (t, *J* = 7.1 Hz, 3H), 1.11 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.84, 166.20, 165.07, 160.54, 158.01, 143.82, 141.81, 134.07, 133.66, 132.21, 131.90, 128.11, 127.12, 126.03, 122.76, 120.91, 116.36, 113.60, 109.75, 102.52, 64.50, 61.95, 61.32, 60.79, 55.69, 14.34, 14.13, 14.03. HRMS (ESI): calc. for [($C_{28}H_{29}NO_8$)] (M+H) 508.1971, measured 508.1957.

Dimethyl 2-(4-chloro-3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)maleate (6i)



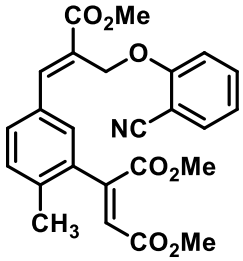
Colorless liquid; Yield (69%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.18 (s, 1H), 7.64 (dd, *J* = 7.7, 1.0 Hz, 1H), 7.59 – 7.41 (m, 5H), 7.33 (t, *J* = 7.7 Hz, 1H), 7.19 (ddd, *J* = 10.3, 7.9, 1.7 Hz, 2H), 7.13 (s, 1H), 7.08 – 6.97 (m, 3H), 6.95 (s, 1H), 4.88 (s, 2H), 3.88 (s, 4H), 3.80 (s, 3H), 3.62 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.78, 165.90, 165.57, 164.90, 164.71, 160.24, 143.37, 143.22, 142.62, 134.58, 134.48, 134.18, 133.92, 133.75, 133.22, 132.79, 132.72, 132.37, 131.81, 131.42, 131.16, 131.02, 130.38, 129.13, 128.70, 128.45, 126.82, 121.56, 121.29, 116.45, 116.30, 113.62, 102.78, 102.60, 64.38, 64.08, 53.30, 53.10, 52.70, 52.20, 51.95. HRMS (ESI): calc. for [($C_{24}H_{20}ClNO_7$)] (M+H) 470.1007, measured 470.1012.

Dimethyl 2-(2-chloro-5-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl) maleate (6j)



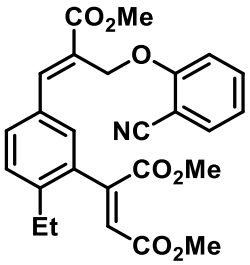
Yellow liquid; Yield (72%),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.58 – 7.36 (m, 5H), 7.21 – 6.92 (m, 3H), 4.93 (s, 2H), 3.85 (s, 3H), 3.74 (s, 3H), 3.56 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.06, 165.32, 164.49, 160.12, 145.26, 142.39, 134.40, 134.29, 133.98, 133.85, 132.52, 131.77, 130.73, 130.30, 129.61, 127.30, 121.50, 116.27, 113.61, 102.72, 63.97, 53.18, 52.60, 52.06; HRMS (ESI): calc. for [($C_{24}H_{20}ClNO_7$)] (M+H) 470.1007, measured 470.0998.

Dimethyl 2-(5-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl) -2-methylphenyl) maleate (6k)



Colourless liquid; Yield (64%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.58 – 7.42 (m, 3H), 7.30 – 7.16 (m, 1H), 7.09 – 6.95 (m, 4H), 4.95 (s, 2H), 3.86 (s, 3H), 3.74 (s, 3H), 3.56 (s, 3H), 2.17 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.59, 166.24, 164.96, 160.35, 158.66, 146.71, 144.48, 138.20, 134.68, 134.61, 134.32, 133.95, 133.92, 133.01, 131.55, 130.41, 130.16, 129.77, 129.68, 125.96, 121.36, 120.95, 116.60, 113.62, 102.76, 64.28, 53.16, 52.56, 52.04, 29.83; HRMS (ESI): calc. for [($C_{25}H_{23}NO_7$)] (M+H) 450.1553, measured 450.1548.

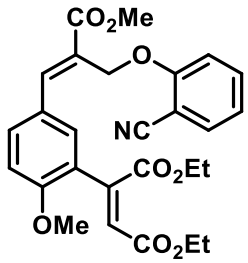
Dimethyl 2-(5-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-ethylphenyl) maleate (6l)



Colorless gummy liquid; Yield (73%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 7.59 – 7.45 (m, 3H), 7.31 (d, *J* = 8.0 Hz, 1H), 7.20 (d, *J* = 1.8 Hz, 1H), 7.09 – 7.00 (m, 3H), 4.95 (d,

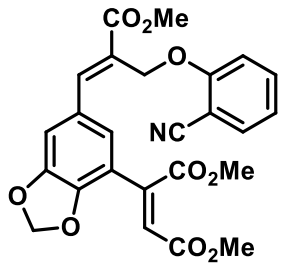
J = 21.2 Hz, 2H), 3.85 (s, 3H), 3.72 (s, 3H), 3.54 (s, 3H), 2.51 – 2.41 (m, 2H), 1.11 (t, *J* = 7.6 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.52, 166.42, 164.89, 160.32, 146.69, 144.54, 143.86, 134.26, 134.02, 133.93, 131.49, 130.36, 129.93, 129.76, 128.55, 125.94, 121.32, 116.40, 113.57, 102.75, 64.26, 53.13, 52.52, 51.97, 26.38, 14.44. HRMS (ESI): calc. for [($C_{26}H_{25}NO_7$)] (M+H) 464.1700, measured 464.1696.

Diethyl 2-(5-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-methoxyphenyl) maleate (6m)



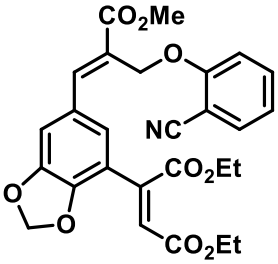
Colorless liquid; Yield (73%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.64 – 7.45 (m, 3H), 7.32 (d, *J* = 2.1 Hz, 1H), 7.13 (d, *J* = 8.5 Hz, 1H), 7.01 (t, *J* = 7.4 Hz, 1H), 6.93 (t, *J* = 4.3 Hz, 2H), 5.00 (s, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 4.00 (q, *J* = 7.1 Hz, 2H), 3.83 (s, 3H), 3.78 (s, 3H), 1.23 (t, *J* = 7.1 Hz, 3H), 1.08 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.69, 166.08, 164.85, 160.39, 158.29, 146.44, 141.64, 134.30, 133.84, 132.91, 132.22, 129.31, 126.24, 124.40, 124.03, 121.26, 116.42, 113.70, 110.87, 102.72, 64.30, 61.83, 60.79, 55.82, 52.41, 14.16, 13.99; HRMS (ESI): calc. for [($C_{27}H_{27}NO_8$)] (M+H) 494.1815, measured 494.1746.

Dimethyl 2-(6-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)benzo [d][1,3] dioxol-4-yl) maleate (6n)



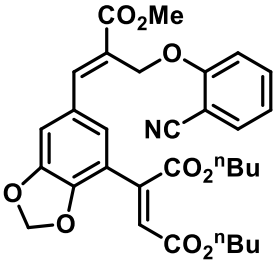
Yellow liquid; Yield (79%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (s, 1H), 7.57 – 7.50 (m, 2H), 7.15 (d,*J* = 9.0, Hz, 1H), 7.06 – 6.96 (m, 4H), 5.99 (s, 2H), 5.00 (s, 2H), 3.84 (s, 3H), 3.76 (s, 3H), 3.64 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.56, 165.66, 164.86, 160.30, 148.05, 147.16, 146.45, 138.14, 134.32, 133.89, 130.49, 127.68, 126.32, 124.95, 121.33, 116.39, 115.60, 113.61, 109.80, 102.71, 101.98, 64.06, 53.18, 52.50, 52.13; HRMS (ESI): calc. for [($C_{25}H_{21}NO_9$)] (M+Na) 502.1114, measured 502.1102.

Diethyl 2-(6-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl) benzo[d][1,3]dioxol-4-yl)maleate (6o)



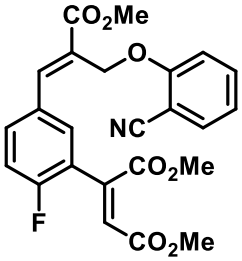
White color solid; Yield (83%), M.P (83 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98 (s, 1H), 7.59 – 7.46 (m, 2H), 7.13 (d, *J* = 8.5 Hz, 1H), 7.03 (td, *J* = 12.0, 4.7 Hz, 3H), 6.95 (d, *J* = 0.9 Hz, 1H), 6.23 (s, 1H), 5.98 (s, 2H), 5.00 (s, 2H), 4.23 (dd, *J* = 16.7, 7.1 Hz, 2H), 4.07 (q, *J* = 7.1 Hz, 2H), 3.84 (s, 3H), 1.29 (t, *J* = 7.2 Hz, 3H), 1.15 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.60, 165.21, 164.61, 160.35, 148.04, 147.19, 146.42, 138.02, 134.33, 133.90, 130.78, 129.93, 127.63, 126.54, 124.95, 121.32, 116.40, 115.94, 113.66, 109.68, 102.78, 101.91, 64.10, 62.26, 61.13, 52.51, 14.19, 14.07; HRMS (ESI): calc. for [($C_{27}H_{25}NO_9$)] (M+H) 508.1608, measured 508.1616.

Dibutyl 2-(6-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)benzo [d][1,3]dioxol-4-yl) maleate (6p)



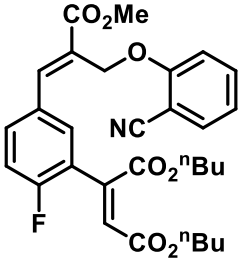
Yellow Color solid; Yield (80%), M.P (106 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (s, 1H), 7.57 – 7.50 (m, 2H), 7.14 (d, *J* = 8.5 Hz, 1H), 7.08 – 6.95 (m, 4H), 5.98 (s, 2H), 5.00 (s, 2H), 4.15 (t, *J* = 6.6 Hz, 2H), 4.02 (t, *J* = 6.6 Hz, 2H), 3.85 (s, 3H),1.64-1.21(m, 8H), 0.92 (t, *J* = 7.1 Hz, 3H), 0.86 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.58, 165.28, 164.77, 160.34, 148.04, 147.14, 146.40, 137.89, 134.32, 133.90, 130.83, 127.64, 126.56, 124.92, 121.32, 116.39, 116.02, 113.63, 109.61, 102.76, 101.93, 66.11, 65.08, 64.08, 52.51, 30.54, 30.50, 19.18, 19.10, 13.75. HRMS (ESI): calc. for [($C_{31}H_{33}NO_9$)] (M+H) 564.2234, measured 564.2266.

Dimethyl 2-(5-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-fluorophenyl) maleate (6q)



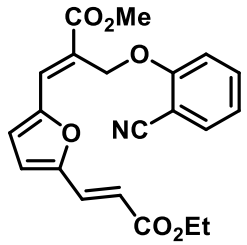
Yellow liquid; Yield (71%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.59 – 7.47 (m, 3H), 7.42 (dd, *J* = 6.8, 2.2 Hz, 1H), 7.16 – 7.07 (m, 3H), 7.03 (td, *J* = 7.6, 0.6 Hz, 1H), 4.96 (s, 2H), 3.85 (s, 3H), 3.74 (s, 3H), 3.60 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.27, 165.52, 164.67, 160.26, 159.17, 145.45, 138.46, 134.33, 133.89, 132.85, 132.81, 132.22, 132.13, 130.93, 129.97, 129.93, 126.63, 122.55, 122.38, 121.48, 116.35, 116.09, 115.87, 113.69, 64.04, 53.23, 52.61, 52.13; HRMS (ESI): calc. for [($C_{24}H_{20}FNO_7$)] (M+H) 454.1302, measured 454.1311.

Dibutyl 2-(5-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-fluorophenyl) maleate (6r)



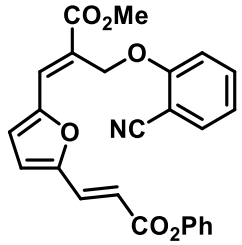
Yellow solid; Yield (70%), M.P (117 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.59 – 7.46 (m, 3H), 7.39 (dd, *J* = 6.8, 2.1 Hz, 1H), 7.19 – 6.97 (m, 4H), 4.95 (s, 2H), 4.14 (t, *J* = 6.6 Hz, 2H), 3.98 (t, *J* = 6.6 Hz, 2H), 3.85 (s, 3H), 1.60 (dd, *J* = 14.4, 7.3 Hz, 2H), 1.45 (dt, *J* = 14.6, 6.7 Hz, 2H), 1.31 (dd, *J* = 15.0, 7.5 Hz, 2H), 1.22 (dd, *J* = 15.2, 7.6 Hz, 2H), 0.87 (dt, *J* = 17.6, 7.4 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.26, 165.15, 164.52, 161.73, 160.27, 159.22, 145.38, 138.21, 134.33, 133.87, 132.94, 132.90, 131.99, 131.90, 131.21, 129.88, 129.85, 126.59, 122.92, 122.75, 121.45, 116.34, 116.02, 115.80, 113.68, 102.79, 66.15, 65.10, 64.04, 52.60, 30.48, 30.42, 19.12, 19.06, 13.73. HRMS (ESI): calc. for [($C_{30}H_{32}FNO_7$)] (M+H) 538.2241, measured 538.2232.

Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-ethoxy-3-oxoprop-1-en-1-yl) furan-2-yl)acrylate (8a)



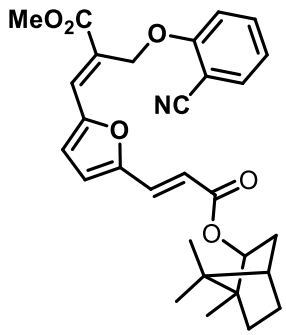
Yellow solid; yield (87%), M.P (87^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.69 (s, 1H), 7.69 – 7.53 (m, 2H), 7.30 (s, 1H), 7.21 (d, *J* = 8.4 Hz, 1H), 7.03 (t, *J* = 7.5 Hz, 1H), 6.90 (d, *J* = 3.5 Hz, 1H), 6.70 (d, *J* = 3.5 Hz, 1H), 5.89 (d, *J* = 15.8 Hz, 1H), 5.28 (s, 2H), 4.19 (q, *J* = 7.1 Hz, 2H), 3.87 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.26, 166.44, 160.84, 153.90, 151.84, 134.60, 134.11, 130.66, 129.88, 123.47, 121.36, 120.81, 118.48, 116.93, 116.26, 113.09, 102.48, 63.98, 60.72, 52.69, 14.39; HRMS (ESI): calc. for [($C_{21}H_{19}NO_6$)] (M+H) 382.1291, measured 382.1303.

Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-oxo-3-phenoxyprop-1-en-1-yl)furan-2-yl) acrylate (8b)



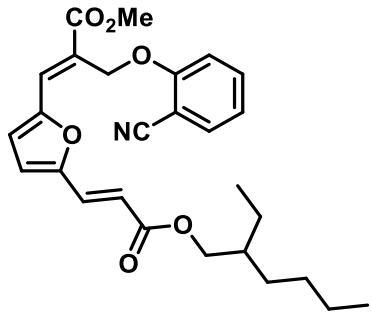
Yellow solid; Yield (85%), M.P (70 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.71 (s, 1H), 7.62 – 7.50 (m, 2H), 7.46 – 7.37 (m, 3H), 7.23 (d, *J* = 8.3 Hz, 2H), 7.09 (d, *J* = 7.7 Hz, 2H), 7.01 (t, *J* = 7.6 Hz, 1H), 6.92 (d, *J* = 3.6 Hz, 1H), 6.76 (d, *J* = 3.6 Hz, 1H), 6.03 (d, *J* = 15.7 Hz, 1H), 5.30 (s, 2H), 3.88 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.18, 164.84, 160.82, 153.57, 152.26, 150.70, 134.69, 134.13, 131.45, 130.58, 129.56, 125.97, 123.84, 121.55, 121.42, 120.90, 117.84, 117.23, 116.28, 113.00, 102.35, 63.93, 52.74; HRMS (ESI): calc. for [($C_{25}H_{19}NO_6$)] (M+H) 430.1291, measured 430.1282.

Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-((7,7-dimethylbicyclo [2.2.1] heptan-2-yl)oxy)-3-oxoprop-1-en-1-yl)furan-2-yl)acrylate (8c)



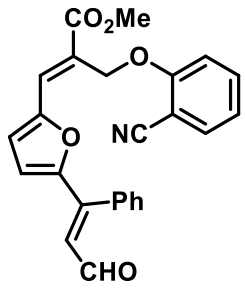
Yellow solid; Yield (92%), M.P (114 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.68 (s, 1H), 7.61 – 7.46 (m, 2H), 7.27 – 7.15 (m, 2H), 7.01 (t, *J* = 7.5 Hz, 1H), 6.90 (d, *J* = 3.5 Hz, 1H), 6.69 (d, *J* = 3.5 Hz, 1H), 5.95 (d, *J* = 15.8 Hz, 1H), 5.26 (s, 2H), 4.73 (dd, *J* = 7.5, 2.9 Hz, 1H), 3.85 (s, 3H), 1.84 – 1.50 (m, 6H), 1.19 – 1.05 (d, *J* = 3.5 Hz, 2H), 0.98 (s, 3H), 0.84 (s, 3H), 0.83 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.20, 165.93, 160.72, 153.86, 151.76, 134.58, 134.04, 130.67, 129.58, 123.36, 121.37, 120.74, 118.93, 116.91, 116.26, 112.98, 102.43, 81.42, 63.93, 52.67, 49.01, 47.04, 45.12, 38.83, 33.79, 27.13, 20.22, 20.17, 11.57; HRMS (ESI): calc. for [($C_{29}H_{31}NO_6$)] (M+H) 490.2230, measured 490.2229.

Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-((2-ethylhexyl) oxy)-3-oxoprop-1-en-1-yl)furan-2-yl) acrylate (8d)



White solid; Yield (96%), M.P. (91 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.68 (s, 1H), 7.61 – 7.47 (m, 2H), 7.30 – 7.21 (m, $CDCl_3$ merged 2H), 7.20 (d, *J* = 8.5 Hz, 1H), 7.01 (t, *J* = 7.6 Hz, 1H), 6.90 (d, *J* = 3.6 Hz, 1H), 6.69 (d, *J* = 3.6 Hz, 1H), 5.92 (d, *J* = 15.8 Hz, 1H), 5.27 (s, 2H), 4.04 (t, *J* = 5.6 Hz, 2H), 3.85 (s, 3H), 1.43 – 1.18 (m, 4H), 0.90 (t, *J* = 7.4 Hz, 10H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.18, 166.60, 160.74, 153.84, 151.79, 134.52, 134.05, 130.63, 129.82, 123.37, 121.29, 120.78, 118.37, 116.98, 116.23, 112.99, 102.42, 67.13, 63.91, 52.65, 38.87, 30.43, 29.01, 23.81, 23.07, 14.16, 11.07; HRMS (ESI): calc. for [($C_{27}H_{31}NO_6$)] (M+H) 466.2230, measured 466.2210.

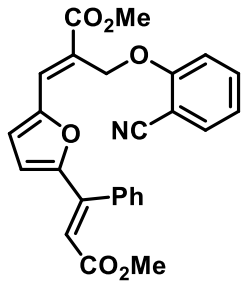
Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl)furan-2-yl) acrylate (8e)



Yellow solid; Yield (88%), M.P (146 ^{o}C), (E/Z = 86/14), ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.34 (d, *J* = 8.2 Hz, 1H), 7.75 (s, 1H), 7.56 – 7.28 (m, 9H), 7.20 (d, *J* = 8.4 Hz, 1H), 7.03 – 6.85

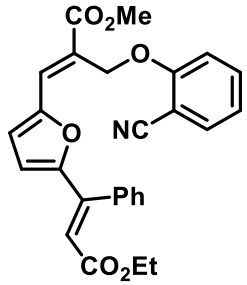
(m, 6H), 6.90 (d, *J* = 3.7 Hz, 1H), 6.46 (d, *J* = 3.7 Hz, 1H), 6.30 (d, *J* = 8.2 Hz, 1H), 5.30 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 193.02, 167.24, 160.85, 158.76, 155.93, 152.84, 148.29, 135.00, 134.70, 133.99, 133.05, 130.54, 130.30, 129.96, 128.68, 124.39, 124.04, 121.53, 121.00, 120.92, 119.06, 116.66, 113.17, 99.85, 52.86. HRMS (ESI): calc. for [($C_{25}H_{20}NO_5$)] (M+H) 414.1341, measured 414.1354.

Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl) furan-2-yl) acrylate (8f)



Brown red solid; Yield (82%), M.P (187 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.70 (s, 1H), 7.61 – 7.48 (m, 3H), 7.44 – 7.34 (m, 3H), 7.4 – 7.19 (m, 2H), 7.01 (td, *J* = 7.6, 0.8 Hz, 1H), 6.83 (d, *J* = 3.7 Hz, 1H), 6.25 – 6.14 (m, 1H), 6.15 (s, 1H), 5.29 (s, 2H), 3.87 (s, 3H), 3.50 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.26, 165.84, 160.79, 156.84, 151.64, 143.90, 135.30, 134.59, 134.11, 130.80, 128.74, 128.65, 128.08, 123.21, 121.07, 120.77, 117.38, 116.35, 114.53, 112.96, 102.36, 63.86, 52.69, 51.26; HRMS (ESI): calc. for [($C_{26}H_{21}NO_6$)] (M+H) 444.1447, measured 444.1465.

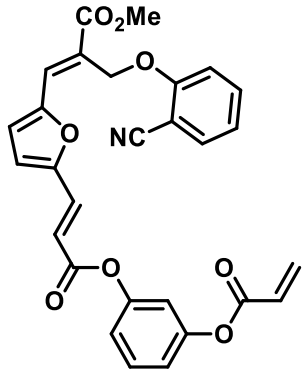
Ethyl (*E*)-3-(5-((*E*) -2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)furan-2-yl)-3-phenylacrylate (8g)



Yellow solid; Yield (77%), M.P(162 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.70 (s, 1H), 7.62 – 7.50 (m, 2H), 7.41 – 7.33 (m, 3H), 7.24 – 7.18 (m, 3H), 7.04 – 6.96 (m, 1H), 6.83 (d, *J* = 3.7 Hz, 1H), 6.20 (d, *J* = 3.7 Hz, 1H), 6.15 (s, 1H), 5.29 (s, 2H), 3.94 (q, *J* = 7.1 Hz, 2H), 3.87 (s, 3H), 1.05 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.28, 165.55, 160.84, 156.93, 151.63, 143.43, 135.63, 134.61, 134.10, 130.82, 128.79, 128.56, 128.07, 123.19, 121.19,

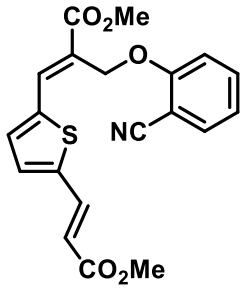
120.76, 117.24, 116.36, 115.29, 113.02, 102.46, 63.93, 60.11, 52.69, 14.11. HRMS (ESI): calc. for [($C_{27}H_{23}NO_6$)] (M+H) 458.1604, measured 458.1623.

Methyl (*E*) -3-(5-((*E*) -3-(3-(acryloyloxy) phenoxy)-3-oxoprop-1-en-1-yl) furan-2-yl)-2-((2-cyanophenoxy)methyl)acrylate (8h)



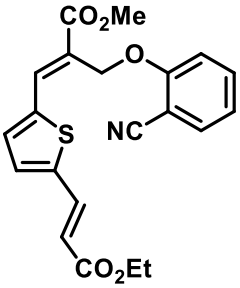
White solid; Yield (66%), M.P (174 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.71 (s, 1H), 7.65 – 7.51 (m, 1H), 7.48 – 7.31 (m, 2H), 7.22 (d, *J* = 8.5 Hz, 2H), 7.09 – 6.95 (m, 4H), 6.93 (t, *J* = 3.0 Hz, 1H), 6.77 (d, *J* = 3.6 Hz, 1H), 6.61 (dd, *J* = 17.3, 1.2 Hz, 1H), 6.31 (dd, *J* = 17.3, 10.4 Hz, 1H), 6.07 – 5.91 (m, 2H), 5.29 (s, 2H), 3.88 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.17, 164.41, 164.26, 160.82, 153.49, 152.37, 151.15, 134.71, 134.18, 133.13, 131.75, 130.57, 129.89, 127.81, 123.97, 121.47, 120.90, 119.09, 119.05, 118.09, 118.05, 116.86, 116.28, 115.47, 112.98, 102.38, 63.93, 52.76; HRMS (ESI): calc. for [($C_{28}H_{21}NO_8$)] (M+H) 500.1345, measured 500.1365.

Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-methoxy-3-oxoprop-1-en-1-yl) thiophen-2-yl)acrylate (8i)



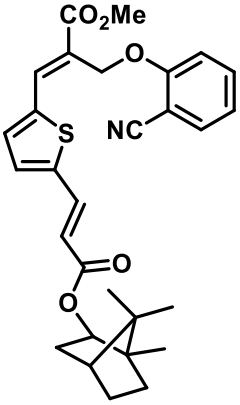
Yellow solid; Yield (91%), M.P (124 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.68 (d, *J* = 15.8 Hz, 1H), 7.62 – 7.52 (m, 2H), 7.37 (d, *J* = 3.9 Hz, 1H), 7.24 (d, *J* = 3.9 Hz, 1H), 7.18 (dd, *J* = 9.0, 0.7 Hz, 1H), 7.06 (d, *J* = 0.7 Hz, 1H), 6.22 (d, *J* = 15.8 Hz, 1H), 5.15 (s, 2H), 3.85 (s, 3H), 3.77 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.15, 166.88, 160.16, 144.91, 139.10, 137.92, 136.36, 134.71, 134.51, 134.13, 131.20, 123.78, 121.53, 118.79, 116.38, 113.17, 102.66, 63.54, 52.71, 51.96; HRMS (ESI): calc. for [($C_{20}H_{17}NO_5S$)] (M+H) 384.0906, measured 384.0870.

Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-ethoxy-3-oxoprop-1-en-1-yl) thiophen-2-yl)acrylate (8j)



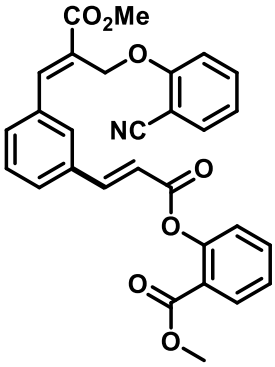
Yellow solid; Yield (90%), M.P (130 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.67 (d, *J* = 15.7 Hz, 1H), 7.57 (td, *J* = 6.3, 3.1 Hz, 2H), 7.37 (d, *J* = 3.9 Hz, 1H), 7.21 (dd, *J* = 21.6, 6.4 Hz, 2H), 7.06 (t, *J* = 7.6 Hz, 1H), 6.21 (d, *J* = 15.8 Hz, 1H), 5.15 (s, 2H), 4.23 (q, *J* = 7.1 Hz, 2H), 3.85 (s, 3H), 1.30 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.20, 166.48, 160.17, 145.01, 139.03, 137.97, 136.13, 134.72, 134.53, 134.16, 131.14, 123.69, 121.52, 119.28, 116.41, 113.11, 102.64, 63.50, 60.87, 52.74, 14.39. HRMS (ESI): calc. for [($C_{21}H_{19}NO_5S$)] (M+H) 398.1062, measured 398.1052.

Methyl (*E*) -2-((2-cyanophenoxy)methyl)-3-(5-((*E*) -3-oxo-3-(((1R,2R,4R)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)oxy)prop-1-en-1-yl)thiophen-2-yl)acrylate (8k)



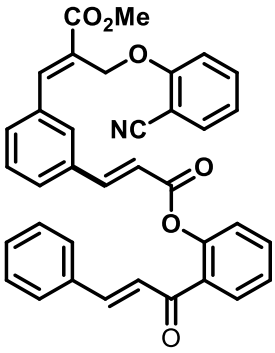
Yellow solid; Yield (91%), M.P (152 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.65 – 7.50 (m, 2H), 7.37 (d, *J* = 3.9 Hz, 1H), 7.21 (dd, *J* = 17.0, 6.2 Hz, 1H), 7.06 (t, *J* = 7.6 Hz, 1H), 6.16 (d, *J* = 15.7 Hz, 1H), 5.16 (s, 2H), 4.76 (dd, *J* = 7.3, 4.0 Hz, 1H), 3.86 (s, 3H), 1.90 – 1.65 (m, 6H), 1.63 – 1.51 (m, 2H), 1.02 (s, 3H), 0.86 (s, 3H), 0.85 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.19, 165.98, 160.19, 145.11, 138.91, 137.94, 135.72, 134.68, 134.49, 134.12, 131.07, 123.70, 121.51, 119.93, 116.38, 113.23, 102.70, 81.51, 63.57, 52.72, 49.03, 47.09, 45.15, 38.90, 33.82, 27.15, 20.24, 20.12, 11.61. HRMS (ESI): calc. for [($C_{29}H_{31}NO_5S$)] (M+H) 506.2001, measured 506.1960.

Methyl 2-(((*E*)-3-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)acryloyl)oxy)benzoate (3s)



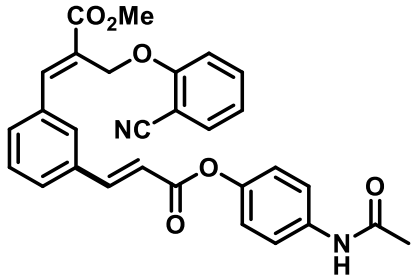
Yellow liquid; Yield (65%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 8.03 (dd, *J* = 7.9, 1.4 Hz, 1H), 7.83 (d, *J* = 16.0 Hz, 1H), 7.69 (s, 1H), 7.62 – 7.45 (m, 6H), 7.33 (t, *J* = 7.6 Hz, 1H), 7.16 (d, *J* = 8.1 Hz, 1H), 7.09 (d, *J* = 8.4 Hz, 1H), 7.02 (t, *J* = 7.6 Hz, 1H), 6.58 (d, *J* = 16.0 Hz, 1H), 4.96 (s, 2H), 3.88 (s, 3H), 3.81 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.11, 165.17, 165.12, 160.07, 150.57, 145.81, 145.75, 135.07, 134.86, 134.47, 134.08, 133.95, 131.89, 131.67, 129.63, 129.54, 129.37, 127.35, 126.16, 123.91, 123.52, 121.63, 118.18, 116.35, 113.37, 102.77, 63.95, 52.66, 52.34. HRMS (ESI): calc. for [($C_{29}H_{23}NO_7$)] (M+H) 498.1553, measured 498.1518.

Methyl (*E*)-3-(3-((*E*)-3-(2-cinnamoylphenoxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (3t)



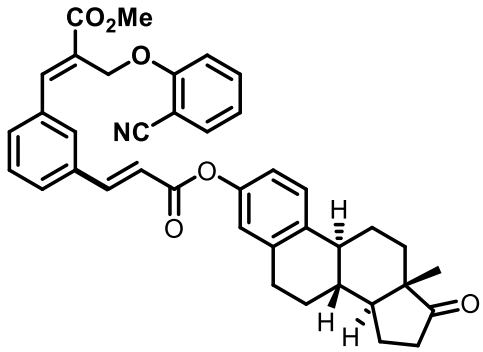
Yellow liquid; Yield (58%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.74 – 7.70 (m, 2H), 7.59 – 7.51 (m, 10H), 7.43 – 7.31 (m, 5H), 7.16 (d, *J* = 16.0 Hz, 2H), 7.10 – 6.99 (m, 3H), 6.43 (d, *J* = 16.0 Hz, 1H), 4.92 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 191.77, 167.12, 164.82, 160.06, 148.77, 146.25, 145.71, 145.42, 134.98, 134.64, 134.61, 134.49, 134.08, 132.62, 132.54, 131.67, 130.74, 130.03, 129.70, 129.56, 129.50, 129.33, 129.03, 128.56, 128.28, 127.34, 126.22, 125.71, 123.53, 121.67, 117.88, 116.37, 113.38, 102.77, 63.92, 52.68. HRMS (ESI): calc. for [($C_{36}H_{27}NO_6$)] (M+H) 570.1917, measured 570.1875.

Methyl (*E*)-3-(3-((*E*)-3-(4-acetamidophenoxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (3u)



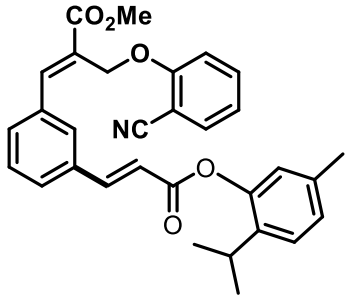
White solid, Yield (60%), M.P (121 ^{o}C) , ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.80 (t, *J* = 11.2 Hz, 1H), 7.70 (s, NH), 7.63 – 7.43 (m, 7H), 7.13 – 7.01 (m, 4H), 6.49 (d, *J* = 12.0 Hz, 1H), 4.96 (s, 2H), 3.88 (s, 3H), 2.14 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.89, 167.15, 165.42, 160.03, 146.76, 145.86, 145.74, 135.95, 135.06, 134.76, 134.59, 134.09, 131.76, 129.65, 129.14, 127.26, 121.93, 121.67, 121.00, 118.26, 116.44, 113.29, 102.58, 63.90, 52.69, 24.44. HRMS (ESI): calc. for [($C_{29}H_{24}N_2O_6$)] (M+H) 497.1713, measured 497.1743.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-(((8R,9S,13S,14S)-13-methyl-17-oxo-7,8,9,11,12,13,14,15,16,17-decahydro-6H-cyclopenta[a]phenanthren-3-yl)oxy)-3-oxoprop-1-en-1-yl)phenyl)acrylate (3v)



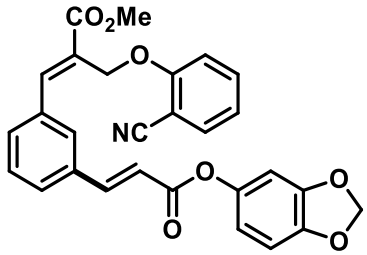
Colourless liquid, Yield (54%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.78 (d, *J* = 16.0 Hz, 1H), 7.70 (s, 1H), 7.61 – 7.44 (m, 5H), 7.32 (d, *J* = 8.4 Hz, 1H), 7.10 (d, *J* = 8.4 Hz, 1H), 7.04 (td, *J* = 7.6, 0.7 Hz, 1H), 6.94 – 6.86 (m, 2H), 6.49 (d, *J* = 16.0 Hz, 1H), 4.96 (s, 2H), 3.89 (s, 3H), 3.06 – 2.76 (m, 3H), 2.63 – 2.29 (m, 4H), 2.21 – 1.96 (m, 3H), 1.75 – 1.44 (m, 7H), 0.92 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.14, 165.45, 160.08, 148.70, 145.84, 145.47, 138.15, 137.53, 135.13, 134.91, 134.50, 134.15, 131.69, 129.67, 129.60, 129.14, 127.37, 126.55, 121.70, 121.66, 118.86, 118.54, 116.37, 113.36, 102.81, 63.97, 52.70, 50.55, 48.08, 44.29, 38.13, 35.99, 31.67, 29.55, 26.47, 25.88, 21.71, 13.96. HRMS (ESI): calc. for [($C_{39}H_{37}NO_6$)] (M+H) 616.2699, measured 616.2704

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-(2-isopropyl-5-methylphenoxy)-3-oxoprop-1-en-1-yl)phenyl)acrylate (3w)



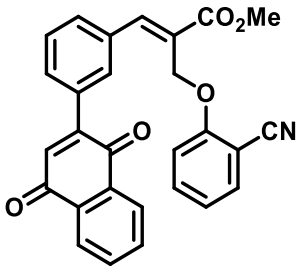
Yellow liquid, Yield (69%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 7.81 (d, *J* = 16.0 Hz, 1H), 7.72 (s, 1H), 7.60 – 7.48 (m, 5H), 7.23 (d, *J* = 7.9 Hz, 1H), 7.11 (d, *J* = 8.4 Hz, 1H), 7.06 – 7.03 (m, 1H), 6.86 (d, *J* = 1.0 Hz, 1H), 6.56 (d, *J* = 16.0 Hz, 1H), 4.97 (s, 2H), 3.89 (s, 3H), 3.04 – 2.96 (m, 1H), 2.33 (s, 3H), 1.20 (d, *J* = 6.9 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.12, 165.50, 160.02, 147.91, 145.83, 145.51, 137.19, 136.67, 135.06, 134.82, 134.48, 134.07, 131.67, 129.64, 129.14, 127.28, 126.55, 122.78, 121.61, 120.38, 118.34, 116.33, 113.26, 102.66, 63.88, 52.67, 27.17, 23.16, 20.94. HRMS (ESI): calc. for [($C_{31}H_{29}NO_5$)] (M+H) 496.2124, measured 496.2123.

Methyl (*E*)-3-(3-((*E*)-3-(benzo[d][1,3]dioxol-5-yloxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (3x)



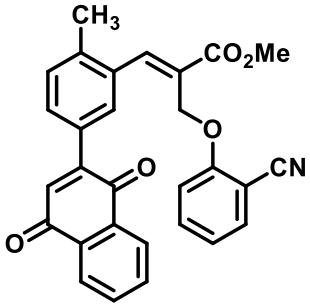
Brown liquid, Yield (51%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.77 (d, *J* = 16.0 Hz, 1H), 7.69 (s, 1H), 7.59 – 7.46 (m, 5H), 7.10 – 7.01 (m, 2H), 6.79 (d, *J* = 8.4 Hz, 1H), 6.65 (d, *J* = 2.3 Hz, 1H), 6.58 (dd, *J* = 8.4, 2.3 Hz, 1H), 6.46 (d, *J* = 16.0 Hz, 1H), 5.98 (s, 2H), 4.95 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.10, 165.41, 160.02, 148.08, 145.80, 145.61, 145.43, 145.06, 135.08, 134.79, 134.49, 134.10, 131.71, 129.63, 129.59, 129.11, 127.31, 121.62, 118.23, 116.35, 113.99, 113.31, 108.07, 103.82, 102.71, 101.80, 63.91, 52.67. HRMS (ESI): calc. for [($C_{28}H_{21}NO_7$)] (M+H) 484.1396, measured 484.1385.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)acrylate (10a)



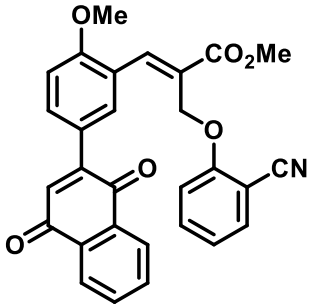
Yellow solid, Yield (77%), M.P (75 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 8.09 – 8.07 (m, 1H), 8.00 – 7.95 (m, 1H), 7.76 – 7.73 (m, 3H), 7.62-7.49 (m, 6H), 7.17 (d, J = 8.5 Hz, 1H), 7.04 – 6.98 (m, 2H), 5.03 (s, 1H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.90, 184.12, 167.19, 160.23, 147.29, 145.92, 135.50, 134.42, 134.40, 134.01, 133.95, 133.88, 132.30, 132.08, 131.17, 130.88, 130.52, 129.11, 127.23, 127.03, 126.09, 121.37, 116.37, 113.50, 102.64, 63.92, 52.63. HRMS (ESI): calc. for [($C_{28}H_{19}NO_5$)] (M+H) 450.1341, measured 450.1363.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-2-methylphenyl) acrylate (10b)



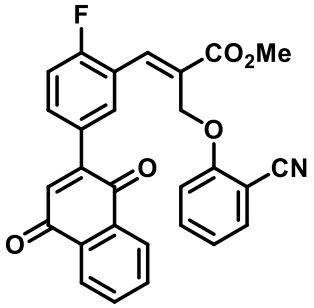
Yellow solid, Yield (74%), M.P (94 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.18 (s, 1H), 8.09 – 8.06 (m, 1H), 7.91 – 7.88 (m, 1H), 7.76 – 7.70 (m, 2H), 7.62 (d, *J* = 1.3 Hz, 1H), 7.53 – 7.44 (m, 3H), 7.33 (d, *J* = 7.9 Hz, 1H), 7.08 (d, *J* = 8.5 Hz, 1H), 6.97 (t, *J* = 7.6 Hz, 1H), 6.91 (s, 1H), 5.00 (s, 2H), 3.90 (s, 3H), 2.39 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$): δ 184.97, 184.24, 167.04, 160.30, 147.35, 144.60, 139.52, 134.87, 134.31, 133.91, 133.86, 133.83, 133.64, 132.40, 132.16, 131.31, 130.63, 130.56, 130.25, 128.06, 126.98, 126.04, 121.13, 116.35, 113.24, 102.55, 63.91, 52.64, 20.08. HRMS (ESI): calc. for [($C_{29}H_{21}NO_5$)] (M+H) 464.1498, measured 464.1487.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-2-methoxyphenyl)acrylate (10c)



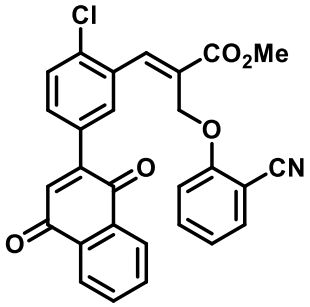
Yellow liquid, Yield (80%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.27 (s, 1H), 8.09 – 8.04 (m, 1H), 7.86 – 7.83 (m, 1H), 7.79 – 7.67 (m, 3H), 7.61 (dd, *J* = 8.6, 2.3 Hz, 1H), 7.57 – 7.47 (m, 3H), 7.17 (d, *J* = 8.4 Hz, 1H), 7.05 – 6.97 (m, 2H), 6.89 (s, 1H), 5.06 (s, 2H), 3.94 (s, 3H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.97, 184.51, 167.31, 160.44, 159.44, 146.96, 141.77, 134.35, 134.13, 133.91, 133.87, 133.71, 132.59, 132.55, 132.34, 132.28, 127.09, 126.99, 126.03, 125.86, 123.60, 121.13, 116.40, 113.40, 110.76, 102.65, 64.32, 56.00, 52.55. HRMS (ESI): calc. for [($C_{29}H_{29}NO_6$)] (M+H) 480.1447, measured 480.1437.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-2-fluorophenyl)acrylate (10d)



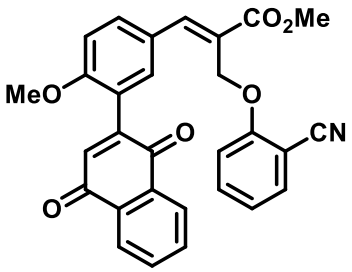
Yellow solid, Yield (66%), M.P (104 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.16 (s, 1H), 8.07 – 8.04 (m, 1H), 7.85 – 7.70 (m, 5H), 7.98- 7.46 (m, 4H), 7.46 (dd, *J* = 7.7, 1.6 Hz, 1H), 7.23 – 6.99 (m, 5H), 6.93 (s, 1H), 5.07 (s, 2H), 3.89 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.70, 183.98, 166.70, 162.88, 160.07, 146.25, 138.22, 135.22, 134.40, 134.00, 133.85, 133.80, 132.61, 132.18, 132.05, 129.82, 128.98, 126.94, 126.06, 122.50, 122.36, 121.33, 116.22, 115.92, 113.34, 102.49, 63.87, 52.72. HRMS (ESI): calc. for [($C_{28}H_{18}FNO_5$)] (M+H) 468.1247, measured 468.1241.

Methyl (*E*)-3-(2-chloro-5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (10e)



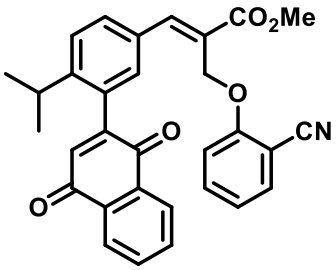
Yellow solid, Yield (69%), M.P (96 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.21 (s, 1H), 8.07 (dd, *J* = 7.4, 1.5 Hz, 1H), 7.87 – 7.68 (m, 4H), 7.55 – 7.45 (m, 5H), 7.15 (d, *J* = 8.5 Hz, 1H), 7.00 (t, *J* = 7.6 Hz, 1H), 6.92 (s, 1H), 5.01 (s, 2H), 3.90 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.71, 183.84, 166.71, 160.15, 146.34, 142.57, 136.20, 135.47, 134.43, 134.08, 133.95, 132.92, 132.37, 132.25, 131.40, 129.92, 128.94, 127.30, 127.01, 126.16, 121.32, 116.30, 113.32, 102.53, 63.89, 52.80, 29.81. HRMS (ESI): calc. for [($C_{28}H_{18}ClNO_5$)] (M+H) 484.0952, measured 484.0961.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-4-methoxyphenyl)acrylate (10f)



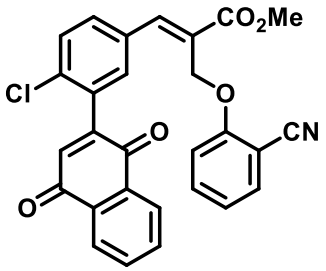
Yellow solid, Yield (72%), M.P (67 ^{o} C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 – 8.06 (m, 2H), 8.03 – 7.99 (m, 1H), 7.79 – 7.65 (m, 4H), 7.55 – 7.45 (m, 4H), 7.19 (d, *J* = 8.5 Hz, 1H), 7.05 – 6.99 (m, 2H), 6.97 (d, *J* = 1.9 Hz, 2H), 5.03 (s, 2H), 3.85 (s, 3H), 3.81 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 185.09, 183.47, 167.58, 160.24, 158.75, 146.66, 146.19, 137.20, 134.44, 133.86, 133.81, 133.78, 133.22, 132.80, 132.42, 132.15, 126.99, 126.73, 126.13, 124.76, 123.55, 121.36, 116.40, 113.64, 111.63, 102.65, 64.21, 56.04, 52.51. HRMS (ESI): calc. for [($C_{29}H_{21}NO_5$)] (M+H) 480.1447, measured 480.1472.

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-4-isopropylphenyl)acrylate (10g)



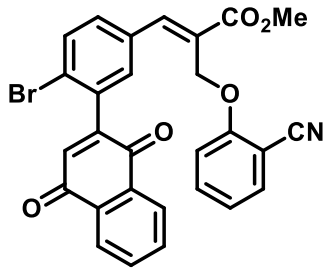
Yellow liquid, Yield (68%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 – 8.11 (m, 1H), 8.08 (s, 1H), 8.06 – 8.03 (m, 1H), 7.79 – 7.76 (m, 3H), 7.59 -5.39 (m, 5H), 7.30 (d, *J* = 1.8 Hz, 1H), 7.11(d, *J* = 8 Hz, 1H), 6.93 – 6.89 (m, 1H), 6.85 (s, 1H), 4.97 (s, 2H), 3.85 (s, 3H) 2.74 (dt, *J* = 13.3, 6.7 Hz, 1H), 1.18 (d, *J* = 5.6 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.85, 184.35, 167.38, 160.13, 149.89, 149.40, 146.27, 137.15, 134.85, 134.39, 134.06, 133.99, 133.80, 133.13, 132.24, 132.08, 131.82, 130.99, 130.60, 127.11, 126.40, 126.31, 126.27, 121.35, 116.28, 113.52, 102.62, 64.20, 55.40, 52.57, 31.48. HRMS (ESI): calc. for [($C_{31}H_{25}NO_5$)] (M+H) 492.1811, measured 492.1838.

Methyl (*E*)-3-(4-chloro-3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (10h)



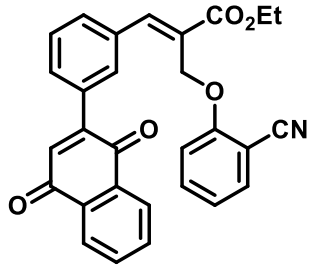
Yellow solid, Yield (66%), M.P (72 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.25 – 7.99 (m, 4H), 7.80 – 7.72 (m, 3H), 7.65 – 7.40 (m, 5H), 7.15 (d, *J* = 8.5 Hz, 1H), 7.01 – 6.96 (m, 1H), 6.94 (s, 1H), 4.96 (s, 2H), 3.86 (s, 3H), 3.75 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.65, 183.05, 166.98, 160.01, 146.98, 144.91, 137.78, 137.65, 135.99, 134.92, 134.48, 134.12, 133.83, 133.53, 133.00, 132.13, 132.04, 131.60, 131.13, 130.44, 129.68, 127.69, 127.11, 126.32, 121.75, 121.60, 116.25, 113.63, 102.69, 63.95, 52.71. HRMS (ESI): calc. for [($C_{28}H_{18}ClNO_5$)] (M+H) 484.0952, measured 484.0948.

Methyl (*E*)-3-(4-bromo-3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (10i)



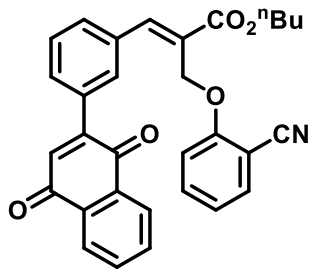
Yellow solid, Yield (69%), M.P (71 ^{o} C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 – 7.99 (m, 4H), 7.79 – 7.68 (m, 4H), 7.59 – 7.38 (m, 8H), 7.15 – 7.02 (m, 3H), 6.98 – 6.93 (m, 2H), 6.91 (s, 1H), 4.95 (s, 2H), 4.92 (s, 1H), 3.86 (s, 3H). 3.85 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.66, 182.99, 167.14, 166.95, 160.22, 160.02, 148.53, 145.49, 144.89, 138.76, 137.56, 135.76, 134.80, 134.45, 134.09, 134.06, 134.02, 133.94, 133.80, 133.61, 133.58, 133.13, 132.17, 132.08, 131.78, 131.54, 131.29, 127.86, 127.11, 126.97, 126.49, 126.32, 124.62, 124.51, 121.63, 116.33, 116.19, 113.71, 102.93, 102.77, 64.02, 52.68. HRMS (ESI): calc. for [($C_{28}H_{18}BrNO_5$)] (M+H) 528.0447, measured 528.0438.

Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl) acrylate (10j)



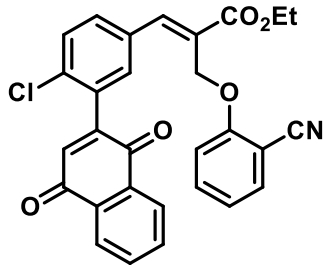
Yellow solid, Yield (73%), M.P (124 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 8.11 – 8.07 (m, 1H), 8.02 – 7.98 (m, 1H), 7.79 – 7.73 (m, 3H), 7.64 – 7.50 (m, 5H), 7.17 (d, *J* = 8.4 Hz, 1H), 7.03 – 6.99 (m, 2H), 5.04 (s, 2H), 4.34 (q, *J* = 7.1 Hz, 2H), 1.36 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.96, 184.21, 166.75, 160.36, 147.41, 145.54, 135.58, 134.58, 134.40, 134.03, 134.00, 133.98, 133.91, 132.41, 132.18, 131.18, 130.91, 130.48, 129.13, 127.70, 127.09, 126.15, 121.38, 116.39, 113.63, 102.78, 64.04, 61.65, 14.39. HRMS (ESI): calc. for [($C_{29}H_{21}NO_5$)] (M+H) 464.1498, measured 464.1499.

Butyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl) phenyl)acrylate (10k)



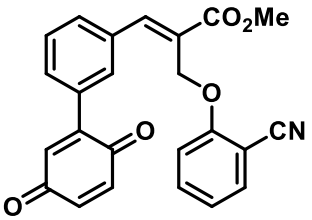
Yellow solid, Yield (72%), M.P (99 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.46 (s, 1H), 8.45 – 8.41 (m, 1H), 8.36 – 8.32 (m, 1H), 8.12 – 8.06 (m, 3H), 7.97 (d, *J* = 7.8 Hz, 1H), 7.92 – 7.84 (m, 4H), 7.51 (d, *J* = 8.4 Hz, 1H), 7.40 – 7.33 (m, 2H), 5.37 (s, 2H), 4.62 (t, *J* = 6.6 Hz, 2H), 2.10 – 2.00 (m, 2H), 1.77 (dd, *J* = 15.0, 7.5 Hz, 2H), 1.29 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.97, 184.20, 166.81, 160.32, 147.39, 145.57, 135.56, 134.54, 134.42, 133.96, 133.91, 132.36, 132.14, 131.18, 130.91, 130.47, 129.12, 127.63, 127.08, 126.14, 121.34, 116.40, 113.49, 102.66, 65.52, 63.99, 30.78, 19.34, 13.86. HRMS (ESI): calc. for [($C_{31}H_{25}NO_5$)] (M+H) 492.1811, measured 492.1837.

Ethyl (*E*)-3-(4-chloro-3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (10l)



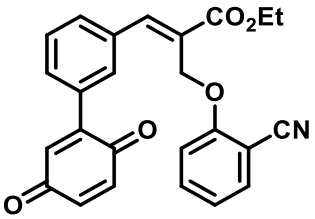
Yellow solid, Yield (68%), M.P (123 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 (d, *J* = 6.7 Hz, 1H), 8.05 (d, *J* = 10.0 Hz, 2H), 7.83 – 7.74 (m, 2H), 7.57 – 7.51 (m, 4H), 7.45 (d, *J* = 7.6 Hz, 1H), 7.16 (d, *J* = 8.5 Hz, 1H), 6.98 (d, *J* = 7.9 Hz, 1H), 6.96 (s, 1H), 4.97 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 1.35 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 184.72, 183.11, 166.55, 160.14, 147.08, 144.58, 137.84, 134.89, 134.48, 134.14, 134.10, 133.86, 133.57, 133.15, 132.18, 132.11, 132.08, 131.62, 130.47, 128.08, 127.16, 126.38, 121.60, 116.30, 113.72, 102.78, 64.02, 61.78, 14.38. HRMS (ESI): calc. for [($C_{29}H_{20}ClNO_5$)] (M+K) 536.0667, measured 536.0606.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10m)



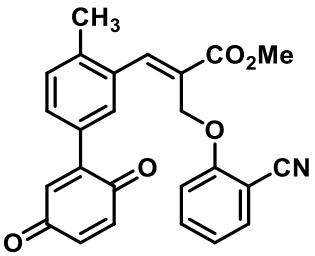
Yellow solid, Yield (66%), M.P (99 °C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.65 (s, 1H), 7.59 – 7.48 (m, 5H), 7.15 (d, *J* = 8.3 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 1H), 6.79 (s, 3H), 5.01 (s, 2H), 3.87 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.36, 186.36, 167.22, 160.25, 145.79, 145.28, 137.03, 136.39, 134.57, 134.45, 133.91, 133.37, 133.09, 131.30, 130.59, 130.43, 129.16, 127.40, 121.54, 116.37, 113.67, 102.81, 64.03, 52.64. HRMS (ESI): calc. for [($C_{24}H_{17}NO_5$)] (M+H) 400.1185, measured 400.1173.

Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10n)



Yellow liquid, Yield (64%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.66 (s, 1H), 7.61 – 7.48 (m, 5H), 7.16 (d, *J* = 8.4 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 1H), 6.80 (d, *J* = 1.0 Hz, 3H), 5.01 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 1.35 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.42, 186.41, 166.75, 160.29, 145.47, 145.30, 137.05, 136.40, 134.64, 134.45, 133.90, 133.32, 133.09, 131.30, 130.60, 130.37, 129.16, 127.68, 121.49, 116.42, 113.64, 102.73, 64.00, 61.68, 14.37. HRMS (ESI): calc. for [($C_{25}H_{19}NO_5$)] (M+H) 414.1341, measured 414.1331.

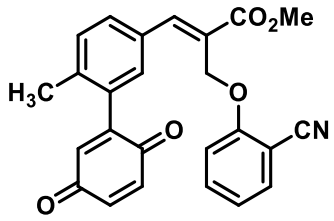
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10o)



Yellow liquid, Yield (71%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.48 - 7.42 (m, 3H), 7.33 (d, *J* = 7.9 Hz, 1H), 7.26 – 7.22 (m, 1H), 7.02 – 6.93 (m, 2H), 6.70 (d, *J* = 3.5 Hz, 2H), 6.63 (s, 1H), 4.90 (s, 2H), 3.84 (s, 3H), 2.31 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.42,

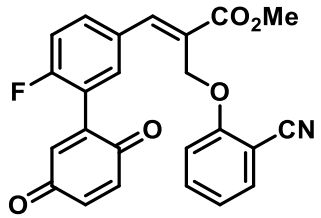
186.50, 167.00, 160.21, 145.26, 144.53, 139.56, 136.97, 136.32, 134.34, 133.88, 133.79, 132.42, 130.68, 130.57, 130.22, 130.18, 128.11, 121.33, 116.35, 113.27, 102.59, 63.94, 52.62, 20.02. HRMS (ESI): calc. for [($C_{25}H_{19}NO_5$)] (M+H) 414.1341, measured 414.1331.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(6-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10p)



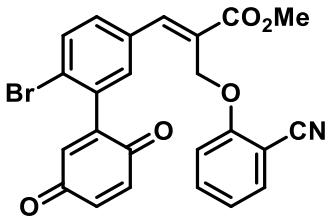
Yellow liquid, Yield (75%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.54 – 7.29 (m, 5H), 7.14 (d, *J* = 8.9 Hz, 1H), 7.01 (t, *J* = 7.5 Hz, 1H), 6.80 (d, *J* = 2.2 Hz, 2H), 6.63 (d, *J* = 1.8 Hz, 1H), 4.96 (s, 2H), 3.85 (s, 3H), 2.18 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.40, 186.03, 167.34, 160.17, 147.38, 146.15, 138.51, 136.80, 136.46, 134.83, 134.47, 133.85, 133.68, 131.99, 131.05, 130.79, 130.71, 126.42, 121.52, 113.70, 102.70, 64.17, 52.56, 20.35. HRMS (ESI): calc. for [($C_{25}H_{19}NO_5$)] (M+H) 414.1341, measured 414.1331.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(6-fluoro-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10q)



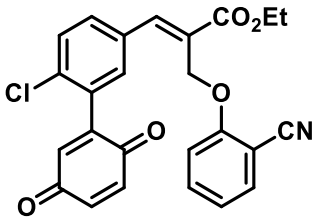
Yellow solid, Yield (61%), M.P (128 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.61 – 7.52 (m, 4H), 7.23 – 7.18 (m, 2H), 7.06 – 7.02 (m, 1H), 6.82 (d, *J* = 4.1 Hz, 3H), 4.99 (s, 2H), 3.87 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.02, 185.01, 167.15, 162.07, 160.14, 159.53, 144.97, 141.43, 136.90, 136.46, 135.51, 135.48, 134.54, 133.87, 133.40, 133.31, 133.02, 132.99, 130.62, 130.58, 127.07, 121.70, 121.53, 121.38, 116.96, 116.74, 116.37, 113.78, 102.79, 63.96, 52.70. HRMS (ESI): calc. for [($C_{24}H_{16}FNO_5$)] (M+H) 418.1091, measured 418.1078.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(6-bromo-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10r)



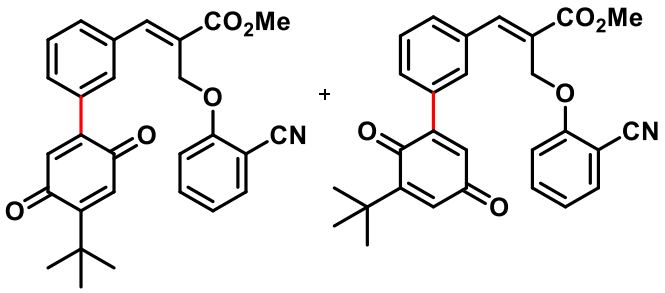
Yellow liquid, Yield (55%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.70 (d, *J* = 8.7 Hz, 1H), 7.53 (d, *J* = 7.9 Hz, 2H), 7.44 (d, *J* = 7.3 Hz, 2H), 7.16 (d, *J* = 8.3 Hz, 1H), 7.04 (t, *J* = 7.6 Hz, 1H), 6.83 (s, 2H), 6.71 (s, 1H), 4.94 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.16, 185.02, 167.02, 160.06, 146.67, 144.97, 136.81, 136.63, 135.25, 135.18, 134.58, 133.92, 133.70, 133.65, 131.78, 127.88, 124.64, 121.79, 116.32, 113.79, 102.82, 96.26, 64.00, 52.79. HRMS (ESI): calc. for [($C_{24}H_{16}BrNO_5$)] (M+H) 478.0290, measured 478.0280.

Ethyl (*E*)-3-(6-chloro-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)-2-((2-cyano phenoxy)methyl)acrylate (10s)



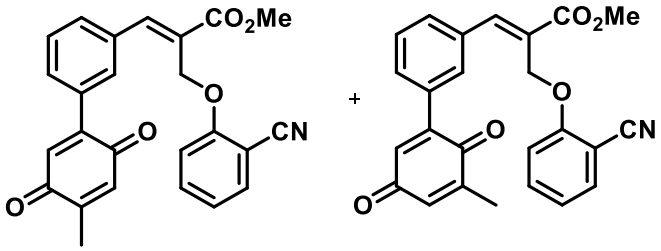
Yellow solid, Yield (65%), M.P (99 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.55 – 7.47 (m, 6H), 7.39-7.34 (m, 1H), 7.17 (d, *J* = 8.5 Hz, 1H), 7.03 (t, *J* = 7.5 Hz, 1H), 6.82 (s, 2H), 6.74 (s, 1H), 4.95 (s, 2H), 4.32 (q, *J* = 7.0 Hz, 2H), 1.34 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.11, 185.04, 166.52, 160.10, 145.11, 144.51, 136.80, 136.54, 135.46, 134.79, 134.53, 133.85, 133.16, 132.92, 131.96, 131.79, 130.42, 128.06, 121.71, 116.32, 113.79, 102.74, 63.96, 61.78, 14.35. HRMS (ESI): calc. for [($C_{25}H_{18}ClNO_5$)] (M+H) 448.0952, measured 448.1014.

Methyl (*E*)-3-(6'-(tert-butyl)-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)-2-((2-cyanophenoxy)methyl)acrylate (10t)



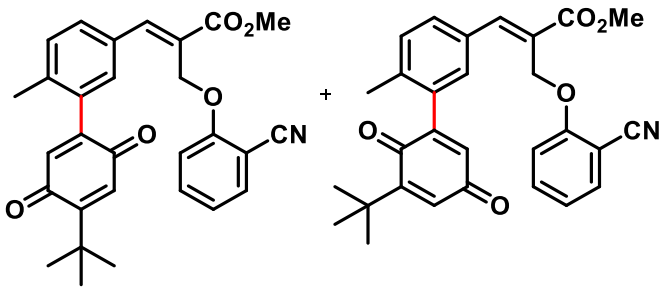
Yellow liquid, Yield (65%), (a:b = 76:24), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 7.59 – 7.42 (m, 8H), 7.15 – 7.13 (m, 1H), 7.04- 7.00 (m, 1H), 6.70 (d, *J* = 2.6 Hz, 1H), 6.62 (d, *J* = 2.6 Hz, 1H), 5.01 (s, 1H), 3.86 (s, 3H), 1.22 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 188.07, 186.49, 167.19, 160.29, 156.27, 147.01, 145.72, 134.43, 134.33, 134.10, 133.93, 131.98, 131.64, 130.96, 130.70, 130.52, 129.01, 127.29, 121.44, 116.36, 113.45, 102.63, 64.03, 52.61, 35.64, 29.31. HRMS (ESI): calc. for [($C_{28}H_{25}NO_5$)] (M+H) 456.1811, measured 456.1814.

Methyl (E)-2-((2-cyanophenoxy)methyl)-3-(6'-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10u)



Yellow liquid, Yield (68%), (a:b = 54:46), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 8.10 (s, 1H), 7.65 – 7.46 (m, 15H), 7.20 – 7.12 (m, 2H), 7.05 – 7.01 (m, 3H), 6.77 (s, 1H), 6.72 (d, J = 2.6 Hz, 1H), 6.64 – 6.62 (m, 2H), 5.01 (s, 2H), 5.0 (s, 2H), 3.87 (s, 6H), 2.08 (d, *J* = 1.5 Hz, 3H), 2.01 (d, *J* = 1.5 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.89, 187.40, 186.80, 186.61, 167.24, 160.27, 160.22, 146.19, 145.96, 145.88, 145.45, 145.11, 134.49, 134.45, 134.38, 133.93, 133.88, 133.75, 133.71, 133.33, 133.09, 131.14, 130.68, 130.63, 130.51, 130.32, 129.10, 127.27, 127.22, 121.48, 121.44, 116.43, 113.57, 113.53, 102.72, 102.66, 63.94, 52.65, 16.33, 15.58. HRMS (ESI): calc. for [($C_{25}H_{19}NO_5$)] (M+H) 414.1341, measured 414.1328.

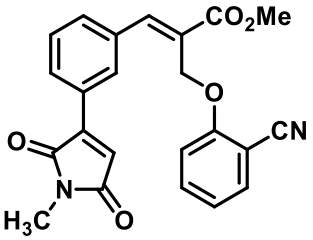
Methyl (E)-3-(6'-(tert-butyl)-6-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)-2-((2-cyanophenoxy)methyl)acrylate (10v)



Yellow liquid, Yield (55%), (a:b = 51:49), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 2H), 7.53 – 7.46 (m, 8H), 7.30 (d, *J* = 9.6 Hz, 5H), 7.11 (d, *J* = 8.6 Hz, 2H), 7.02 (t, *J* = 7.6 Hz, 2H), 6.64 (d, *J* = 2.6 Hz, 1H), 6.60 (s, 1H), 6.55 (d, *J* = 2.6 Hz, 1H), 6.53 (s, 1H), 4.96 (d, *J* = 1.8

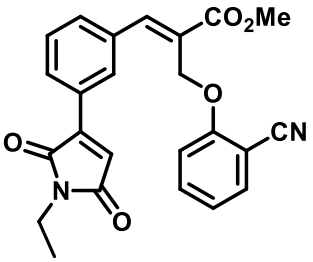
Hz, 4H), 3.86 (s, 7H), 2.20 (s, 3H), 2.16 (s, 3H), 1.32 (s, 8H), 1.27 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 188.19, 187.59, 187.12, 186.39, 167.40, 167.37, 160.18, 156.41, 156.04, 149.29, 146.29, 146.19, 145.80, 139.54, 138.70, 138.46, 136.81, 134.63, 134.46, 134.25, 133.95, 133.89, 133.41, 133.32, 132.00, 131.93, 131.77, 131.56, 131.05, 130.96, 130.84, 130.63, 130.45, 129.47, 126.34, 126.25, 123.31, 121.51, 119.20, 116.36, 113.55, 113.51, 102.69, 102.65, 64.18, 52.61, 35.64, 35.30, 29.29, 29.26, 20.48. HRMS (ESI): calc. for [($C_{29}H_{27}NO_5$)] (M+H) 470.1967, measured 470.1988.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12a)



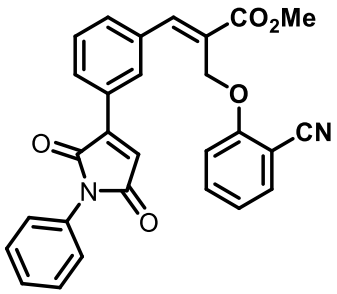
Pale yellow solid, Yield (62%), M.P (132 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 8.02 (s, 1H), 7.92 (d, *J* = 7.8 Hz, 1H), 7.64 – 7.48 (m, 4H), 7.11 (d, *J* = 8.4 Hz, 1H), 7.07 – 7.03 (m, 1H), 6.62 (s, 1H), 4.98 (s, 2H), 3.87 (s, 3H), 3.03 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.55, 170.17, 167.13, 160.15, 145.53, 143.27, 134.99, 134.46, 134.00, 132.18, 129.80, 129.67, 129.60, 129.42, 127.48, 124.91, 121.60, 116.41, 113.42, 102.78, 63.84, 52.70, 23.98. HRMS (ESI): calc. for [($C_{23}H_{18}N_2O_5$)] (M+H) 403.1294, measured 403.1281.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-ethyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12b)



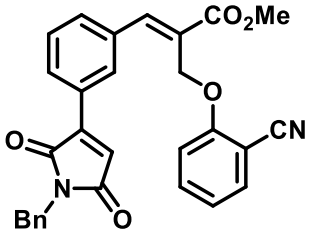
Pale yellow solid, Yield (60%), M.P (134 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 8.03 (s, 1H), 7.91 (d, *J* = 7.7 Hz, 1H), 7.62-48 (m, 4H), 7.15 – 7.00 (m, 2H), 6.60 (s, 1H), 4.98 (s, 2H), 3.87 (s, 3H), 3.57 (q, *J* = 6.9 Hz, 2H), 1.18 (t, *J* = 7.0 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.32, 169.98, 167.11, 160.13, 145.53, 143.02, 134.93, 134.44, 133.96, 132.13, 129.79, 129.68, 129.55, 129.45, 127.40, 124.88, 121.55, 116.39, 113.37, 102.72, 63.78, 52.67, 33.04, 13.97. HRMS (ESI): calc. for [($C_{24}H_{21}N_2O_5$)] (M+H) 417.1450, measured 417.1457.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(2,5-dioxo-1-phenyl-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12c)



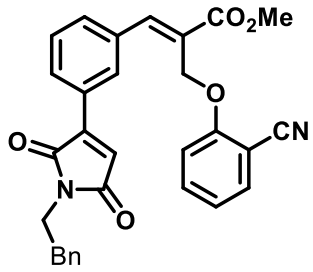
Yellow solid, Yield (64%), M.P (131 ^{o}C),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.12 (d, *J* = 5.3 Hz, 2H), 7.97 (d, *J* = 7.8 Hz, 1H), 7.65 (d, *J* = 7.8 Hz, 1H), 7.56 – 7.44 (m, 5H), 7.39 – 7.32 (m, 3H), 7.13 (d, *J* = 8.4 Hz, 1H), 7.05 – 7.01 (m,1H), 6.78 (s, 1H), 5.01 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.23, 168.89, 167.13, 160.15, 145.45, 143.07, 135.03, 134.45, 133.97, 132.55, 131.50, 129.99, 129.92, 129.67, 129.26, 129.15, 127.97, 127.51, 126.22, 125.04, 121.56, 116.46, 113.40, 102.76, 63.78, 52.71. HRMS (ESI): calc. for [($C_{28}H_{20}N_2O_5$)] (M+H) 465.1450, measured 465.1450.

Methyl (*E*)-3-(3-(1-benzyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (12d)



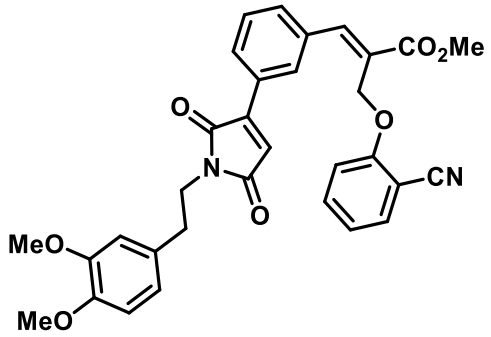
Yellow solid, Yield (67%), M.P (137 ^{o}C),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 8.04 (s, 1H), 7.90 (d, *J* = 7.9 Hz, 1H), 7.62 – 7.49 (m, 4H), 7.32 – 7.27 (m, 5H), 7.10 (d, *J* = 8.5 Hz, 1H), 7.04 – 7.01 (m, 1H), 6.63 (s, 1H), 4.98 (s, 2H), 4.67 (s, 2H), 3.87 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.12, 169.69, 167.08, 160.13, 145.45, 143.03, 136.31, 134.94, 134.40, 133.94, 132.21, 129.77, 129.68, 129.54, 129.32, 128.75, 128.56, 127.92, 127.44, 124.81, 121.52, 116.38, 113.34, 102.68, 63.77, 52.66, 41.67. HRMS (ESI): calc. for [($C_{29}H_{22}N_2O_5$)] (M+H) 479.1607, measured 479.1603.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(2,5-dioxo-1-phenethyl-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12e)



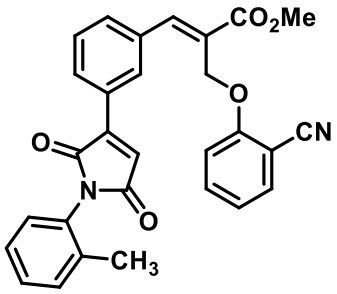
Yellow solid, Yield (70%), M.P (113 ^{o}C),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 8.03 (s, 1H), 7.89 (d, *J* = 7.9 Hz, 1H), 7.64 – 7.49 (m, 4H), 7.34 – 7.27 (m, 2H), 7.25 – 7.19 (m, 3H), 7.12 (d, *J* = 8.4 Hz, 1H), 7.07 – 7.03 (m, 1H), 6.59 (s, 1H), 5.00 (s, 2H), 3.89 (s, 3H), 3.79 – 3.73 (m, 2H), 2.92 – 2.86 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.28, 169.87, 167.14, 160.19, 145.54, 142.99, 138.04, 134.99, 134.45, 134.01, 132.23, 129.80, 129.72, 129.59, 129.42, 128.93, 128.69, 127.46, 126.78, 124.81, 121.59, 116.42, 113.40, 102.80, 63.82, 52.71, 39.42, 34.64. HRMS (ESI): calc. for [($C_{30}H_{24}N_2O_5$)] (M+H) 493.1763, measured 493.1753.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-(3,4-dimethoxyphenethyl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12f)



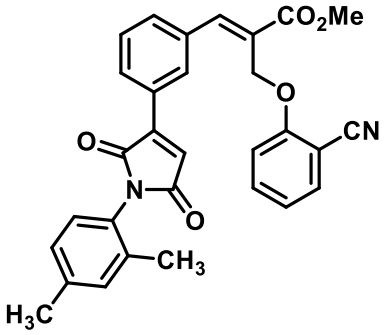
Yellow solid, Yield (54%), M.P (114 ^{o}C),^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (s, 1H), 8.03 (s, 1H), 7.90 (d, *J* = 7.9 Hz, 1H), 7.64 – 7.49 (m, 4H), 7.13 (d, *J* = 8.4 Hz, 1H), 7.06 (dd, *J* = 7.6, 0.8 Hz, 1H), 6.77 (dd, *J* = 14.7, 5.1 Hz, 2H), 6.73 (s, 1H), 6.59 (s, 1H). 5.00 (s, 2H), 3.89 (s, 3H), 3.86 (s, 3H), 3.85 (s, 3H), 3.76 (t, *J* = 4 Hz, 2H), 2.85(t, *J* = 8 Hz, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.35, 169.93, 167.14, 160.22, 149.09, 147.93, 145.52, 143.04, 135.05, 134.44, 134.01, 132.23, 130.56, 129.80, 129.72, 129.62, 129.44, 127.56, 124.84, 121.62, 120.99, 116.41, 113.50, 112.14, 111.48, 102.89, 63.89, 56.03, 52.70, 39.50, 34.18. HRMS (ESI): calc. for [($C_{32}H_{28}N_2O_7$)] (M+H) 553.1975, measured 553.1892.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(2,5-dioxo-1-(o-tolyl)-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12g)



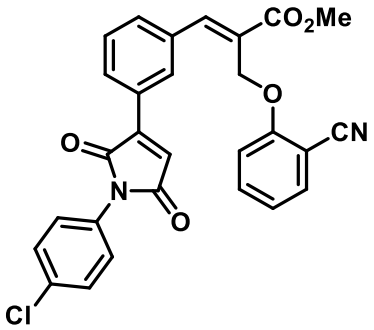
Yellow gummy liquid, Yield (67%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.13 (s, 1H), 8.11 (s, 1H), 7.99 (d, *J* = 7.9 Hz, 1H), 7.65 (d, *J* = 7.8 Hz, 1H), 7.56 – 7.52 (m, 4H), 7.33 (d, *J* = 1.4 Hz, 2H), 7.13 – 7.11 (m, 2H), 7.02 (t, *J* = 7.6 Hz, 1H), 6.80 (s, 1H), 5.02 (s, 2H), 3.88 (s, 3H), 2.16 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.95, 167.59, 165.73, 158.73, 144.02, 141.91, 135.28, 133.65, 133.02, 132.55, 131.09, 129.80, 128.95, 128.58, 128.49, 128.26, 128.06, 127.94, 127.43, 126.16, 125.51, 123.72, 120.19, 115.01, 112.05, 101.38, 62.41, 51.29, 16.68. HRMS (ESI): calc. for [($C_{29}H_{22}N_2O_5$)] (M+H) 479.1607, measured 479.1557.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-(2,4-dimethylphenyl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12h)



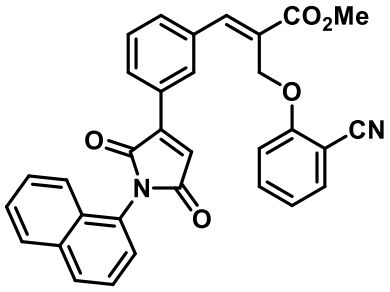
Yellow solid, Yield (75%), M.P (131 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 2H), 7.99 (d, *J* = 7.8 Hz, 1H), 7.66 – 7.64 (m, 1H), 7.56 – 7.49 (m, 3H), 7.14 – 7.00 (m, 5H), 6.79 (s, 1H), 5.01 (s, 2H), 3.88 (s, 3H), 2.36 (s, 3H), 2.12 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.53, 169.18, 167.13, 162.85, 145.43, 143.90, 139.48, 136.30, 135.05, 134.43, 133.98, 132.42, 131.94, 130.00, 129.88, 129.66, 129.42, 128.57, 127.67, 127.65, 127.59, 125.12, 121.61, 118.53, 113.49, 102.82, 63.85, 52.69, 21.27, 17.98. HRMS (ESI): calc. for [($C_{30}H_{24}N_2O_5$)] (M+H) 493.1763, measured 493.1753.

Methyl (*E*)-3-(3-(1-(4-chlorophenyl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (12i)



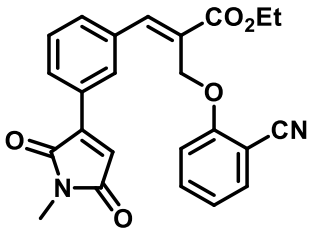
Yellow solid, Yield (68%), M.P (164 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.15 (s, 1H), 8.12 (s, 1H), 7.95 (d, *J* = 7.9 Hz, 1H), 7.66 (d, *J* = 7.7 Hz, 1H), 7.57 – 7.51 (m, 3H), 7.43 (d, *J* = 8.8 Hz, 2H), 7.30 (d, *J* = 8.8 Hz, 2H), 7.14 (d, *J* = 8.4 Hz, 1H), 7.06 – 7.02 (m, 1H), 6.79 (s, 1H), 5.02 (s, 2H), 3.89 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.97, 168.58, 167.14, 160.19, 145.45, 143.29, 135.11, 134.48, 133.99, 133.63, 132.75, 130.08, 130.00, 129.94, 129.72, 129.35, 129.13, 127.58, 127.29, 125.07, 121.59, 116.48, 113.45, 102.80, 63.79, 52.76. HRMS (ESI): calc. for [($C_{28}H_{19}ClN_2O_5$)] (M+H) 499.1061, measured 499.1032.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-(naphthalen-1-yl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12j)



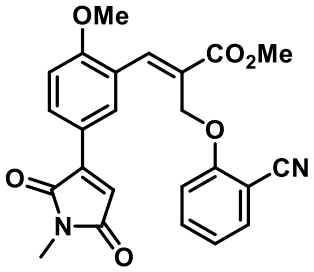
Yellow liquid , Yield (72%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.18 (s, 1H), 8.12 (s, 1H), 8.02 (d, *J* = 7.9 Hz, 1H), 7.97 – 7.92 (m, 2H), 7.67 (d, *J* = 7.8 Hz, 1H), 7.58 – 7.53 (m, 5H), 7.46 (d, *J* = 8 Hz, 2H), 7.38 (dd, *J* = 7.3, 1.0 Hz, 1H), 7.12 (s, 1H), 6.95 (t, *J* = 7.6 Hz, 1H), 6.90 (s, 1H), 5.02 (s, 2H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.81, 169.43, 167.17, 160.14, 145.44, 143.47, 135.08, 134.54, 134.41, 133.92, 132.63, 130.50, 130.08, 130.00, 129.98, 129.70, 129.34, 128.66, 127.96, 127.57, 127.10, 126.66, 125.46, 125.20, 122.52, 121.55, 116.12, 113.43, 102.72, 63.80, 52.71. HRMS (ESI): calc. for [($C_{32}H_{22}N_2O_5$)] (M+H) 515.1607, measured 515.15583.

Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12k)



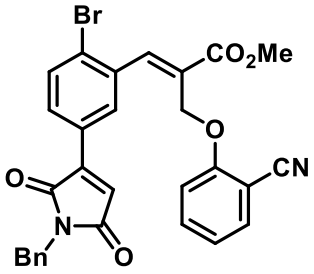
Light yellow solid, Yield (59%), M.P (138 °C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (s, 1H), 8.03 (s, 1H), 7.92 (d, *J* = 7.9 Hz, 1H), 7.63 (d, *J* = 7.8 Hz, 1H), 7.59 – 7.48 (m, 3H), 7.12 (d, *J* = 8.5 Hz, 1H), 7.04 (t, *J* = 7.6 Hz, 1H), 6.64 (s, 1H), 4.99 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 3.03 (s, 3H), 1.36 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.58, 170.20, 166.65, 160.21, 145.16, 143.30, 135.08, 134.44, 133.98, 132.18, 129.72, 129.67, 129.58, 129.39, 127.82, 124.90, 121.56, 116.43, 113.46, 102.76, 63.86, 61.72, 23.99, 14.37. HRMS (ESI): calc. for [($C_{24}H_{20}N_2O_5$)] (M+H) 417.1450, measured 417.1441.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12l)



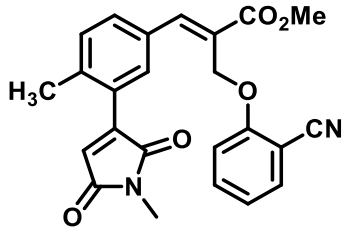
Yellow solid, Yield (78%), M.P (176 °C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (s, 1H), 8.00 (dd, *J* = 8.7, 2.2 Hz, 1H), 7.88 (d, *J* = 1.6 Hz, 1H), 7.51 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.50 – 7.40 (m, 1H), 7.00 – 6.91 (m, 3H), 6.26 (s, 1H), 4.90 (s, 2H), 3.86 (s, 3H), 3.81 (s, 3H), 2.91 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.92, 170.48, 167.13, 160.13, 159.97, 142.92, 141.25, 134.40, 134.05, 132.28, 130.76, 127.25, 124.19, 122.15, 121.63, 121.44, 116.46, 113.06, 111.02, 102.61, 64.16, 56.04, 52.61, 23.85. HRMS (ESI): calc. for [($C_{24}H_{20}N_2O_6$)] (M+H) 433.1400, measured 433.1386.

Methyl (*E*)-3-(5-(1-benzyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)-2-bromophenyl)-2-((2-cyanophenoxy)methyl)acrylate (12m)



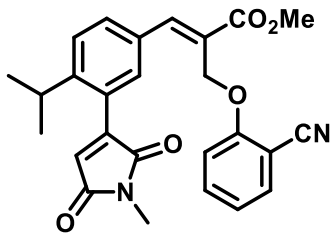
Off white solid, Yield (52%), M.P (175 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 1H), 8.01 (s, 1H), 7.80 (dd, *J* = 8.4, 1.6 Hz, 1H), 7.70 (d, *J* = 8.4 Hz, 1H), 7.57 – 7.44 (m, 2H), 7.31 – 7.27 (m, 5H), 6.99 (t, *J* = 8.8 Hz, 2H), 6.60 (s, 1H), 4.91 (s, 2H), 4.63 (s, 2H), 3.90 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.89, 169.48, 166.55, 159.97, 144.06, 142.17, 136.27, 135.57, 134.40, 133.99, 133.63, 130.69, 130.62, 128.97, 128.81, 128.69, 128.40, 128.01, 127.33, 125.18, 121.55, 116.40, 113.06, 102.62, 63.84, 52.87, 41.78. HRMS (ESI): calc. for [($C_{24}H_{20}N_2O_6$)] (M+H) 433.1400, measured 433.1386.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-methyl-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12n)



White solid, Yield (68%), M.P (140 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.67 (d, *J* = 1.3 Hz, 1H), 7.55 – 7.49 (m, 3H), 7.34 (d, *J* = 8.0 Hz, 1H), 7.17 (d, *J* = 9.0 Hz, 1H), 7.03 (t, *J* = 7.6 Hz, 1H), 6.55 (s, 1H), 5.02 (s, 2H), 3.87 (s, 3H), 3.01 (s, 3H), 2.38 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.64, 170.44, 167.39, 160.31, 145.78, 144.68, 139.44, 134.43, 133.82, 132.09, 131.68, 131.62, 131.56, 128.80, 128.74, 126.57, 121.42, 116.45, 113.73, 102.75, 64.01, 52.63, 24.12, 20.94. HRMS (ESI): calc. for [($C_{24}H_{20}N_2O_5$)] (M+H) 417.1450, measured 417.1406.

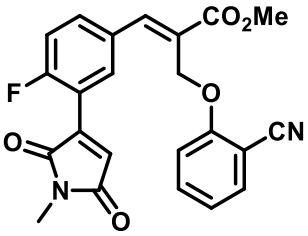
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-isopropyl-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12o)



Yellow liquid, Yield (51%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.58 – 7.45 (m, 5H), 7.18 (dd, *J* = 9.1, 0.8 Hz, 1H), 7.05 – 7.01 (m, 1H), 6.50 (s, 1H), 5.01 (s, 2H), 3.87 (s, 3H), 3.02 (s, 3H), 2.97 (dt, *J* = 13.8, 6.9 Hz, 1H), 1.23 (d, *J* = 6.8 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.83, 170.35, 167.39, 160.28, 150.16, 145.86, 145.72, 134.44, 133.85, 131.87, 131.85, 131.30, 129.04, 127.85, 126.82, 126.55, 121.44, 116.42, 113.73, 102.75, 64.07,

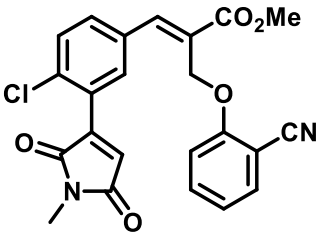
52.63, 30.69, 24.21, 24.14. HRMS (ESI): calc. for [($C_{26}H_{24}N_2O_5$)] (M+H) 445.1763, measured 445.1693.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-fluoro-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12p)



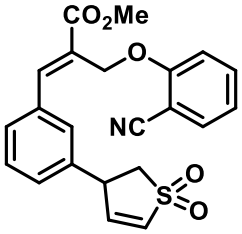
Pale yellow solid, Yield (49%), M.P (154 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.47 (d, *J* = 6.6 Hz, 2H), 8.05 (s, 1H), 7.61 – 7.48 (m, 3H), 7.20 (d, *J* = 8.5 Hz, 1H), 7.03 – 6.99 (m, 1H), 6.98 (d, *J* = 2.8 Hz, 2H), 5.15 (s, 2H), 3.89 (s, 3H), 3.02 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.06, 170.03, 167.02, 160.18, 143.44, 136.28, 134.73, 134.70, 134.37, 133.66, 131.00, 130.96, 129.94, 129.82, 128.03, 121.38, 118.51, 118.38, 116.47, 113.56, 102.78, 63.31, 52.84, 24.12. HRMS (ESI): calc. for [($C_{23}H_{18}FN_2O_5$)] (M+Na) 443.1019, measured 443.1000.

Methyl (*E*)-3-(4-chloro-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (12q)



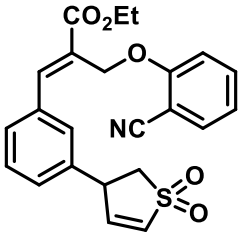
Yellow solid, Yield (54%), M.P (119 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.90 – 7.87 (m, 1H), 7.58 – 7.52 (m, 4H), 7.21 – 7.18 (m, 1H), 7.06 – 7.02 (m, 1H), 6.96 (s, 1H), 5.03 (s, 2H), 3.88 (s, 3H), 3.01 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 170.22, 170.17, 133.03, 127.70, 167.07, 160.21, 144.43, 141.06, 135.58, 134.48, 133.78, 132.93, 132.34, 131.17, 130.39, 127.82, 121.59, 116.42, 113.79, 102.80, 63.76, 52.79, 24.18. HRMS (ESI): calc. for [($C_{23}H_{17}ClN_2O_5$)] (M+H) 437.0904, measured 437.0893.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,1-dioxido-2,3-dihydrothiophen-3-yl)phenyl)acrylate (13a)



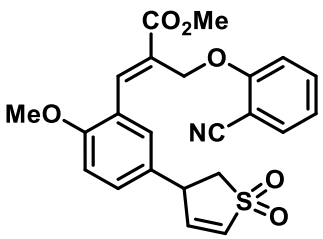
Yellow liquid; Yield (77%),[1]H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.60 – 7.52 (m, 2H), 7.46 – 7.40 (m, 2H), 7.30 – 7.27 (m, 1H), 7.16 (d, *J* = 8.5 Hz, 1H), 7.06 (td, *J* = 7.6, 0.8 Hz, 1H), 6.71 (dd, *J* = 6.6, 3.0 Hz, 1H), 6.63 (dd, *J* = 6.6, 2.3 Hz, 1H), 4.98 (s, 2H), 4.63 – 4.29 (m, 1H), 3.87 (s, 3H), 3.66 (dd, *J* = 13.9, 8.9 Hz, 1H), 3.10 (dd, *J* = 13.9, 4.4 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.22, 160.17, 145.87, 141.48, 139.90, 135.34, 134.62, 133.92, 132.13, 130.01, 129.89, 128.75, 128.56, 127.05, 121.65, 116.50, 113.65, 102.60, 63.89, 55.74, 52.69, 44.67. HRMS (ESI): calc. for [($C_{22}H_{19}NO_5S$)] (M+H) 410.1062, measured 410.1063.

Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,1-dioxido-2,3-dihydrothiophen-3-yl)phenyl) acrylate (13b)



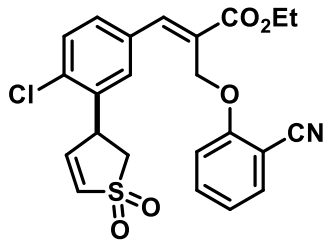
White solid, Yield (74%), M.P (151 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.59 – 7.51 (m, 3H), 7.48 – 7.41 (m, 2H), 7.31 – 7.27 (m, 1H), 7.18 (d, *J* = 8.4 Hz, 1H), 7.08 – 7.04 (m, 1H), 6.72 (dd, *J* = 6.6, 3.0 Hz, 1H), 6.65 (dd, *J* = 6.6, 2.3 Hz, 1H), 4.99 (s, 2H), 4.44 – 4.37 (m, 1H), 4.33 (q, *J* = 7.1 Hz, 2H), 3.67 (dd, *J* = 13.9, 8.9 Hz, 1H), 3.12 (dd, *J* = 13.9, 4.4 Hz, 1H), 1.36 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.71, 160.22, 145.48, 141.53, 139.86, 135.40, 134.58, 133.88, 132.08, 131.50, 129.96, 129.83, 128.65, 128.53, 127.38, 121.59, 116.50, 113.67, 102.57, 63.91, 61.68, 55.73, 44.66, 14.33. HRMS (ESI): calc. for [($C_{23}H_{21}NO_5S$)] (M+H) 424.1219, measured 424.1220.

Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-(1,1-dioxido-2,3-dihydrothiophen-3-yl)-2-methoxyphenyl)acrylate (13c)



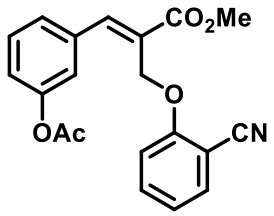
White solid, Yield (81%), M.P (165 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.20 (s, 1H), 7.56-7.51 (m, 2H), 7.48 (s, 1H), 7.24 (dd, *J* = 8.6, 2.3 Hz, 1H), 7.16 (d, *J* = 8.4 Hz, 1H), 7.04 (t, *J* = 7.6 Hz, 1H), 6.90 (d, *J* = 8.6 Hz, 1H), 6.64 (dd, *J* = 6.6, 3.0 Hz, 1H), 6.54 (dd, *J* = 6.6, 1.2 Hz, 1H), 4.95 (s, 2H), 4.33 (dd, *J* = 4.7, 2.4 Hz, 1H), 3.86 (s, 3H), 3.84 (s, 3H), 3.56 (dd, *J* = 13.8, 8.8 Hz, 1H), 2.98 (dd, *J* = 13.8, 4.2 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.31, 160.30, 157.70, 141.98, 141.89, 134.64, 133.88, 131.78, 131.41, 130.13, 129.82, 126.68, 124.12, 121.59, 116.63, 113.73, 111.59, 102.50, 64.53, 55.92, 52.58, 43.94. HRMS (ESI): calc. for [($C_{23}H_{21}NO_6S$)] (M+H) 440.1168, measured 440.1138.

Ethyl (*E*)-3-(4-chloro-3-(1,1-dioxido-2,3-dihydrothiophen-3-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (13d)



White color solid; Yield (73%), M.P (160 ^{o}C), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (s, 1H), 7.47 (dd, *J* = 12.6, 4.4 Hz, 2H), 7.37 (q, *J* = 8.4 Hz, 2H), 7.29 (s, 1H), 7.05 (s, 1H), 6.97 (t, *J* = 7.6 Hz, 1H), 6.66 (dd, *J* = 6.7, 3.2 Hz, 1H), 6.38 – 6.31 (m, 1H), 4.87 (dd, *J* = 62.5, 10.5 Hz, 2H), 4.73 – 4.65 (m, 1H), 4.22 (q, *J* = 7.1 Hz, 2H), 3.63 (dd, *J* = 13.3, 8.4 Hz, 1H), 2.93 (dd, *J* = 13.8, 4.0 Hz, 1H), 1.25 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.54, 160.12, 143.97, 139.91, 137.38, 135.25, 134.75, 134.07, 133.90, 133.56, 131.31, 130.61, 129.06, 127.74, 121.64, 116.45, 113.59, 102.44, 63.51, 61.83, 54.48, 41.41, 14.38. HRMS (ESI): calc. for [($C_{23}H_{20}ClNO_5S$)] (M+H) 458.0829, measured 458.0831.

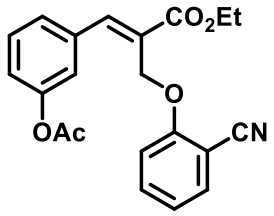
Methyl (*E*)-3-(3-acetoxyphenyl)-2-((2-cyanophenoxy)methyl) acrylate (14a)



Colourless liquid, Yield (58%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (s, 1H), 7.60 – 7.50 (m, 2H), 7.44 – 7.30 (m, 3H), 7.13 – 7.11 (m, 2H), 7.06 –7.02 (m 1H), 4.96 (s, 2H), 3.87 (s, 3H), 2.26 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.50, 167.23, 160.30, 150.94, 145.72, 135.64, 134.48, 133.86, 129.96, 127.36, 127.17, 123.06, 123.02, 121.52, 116.45, 113.78, 102.85,

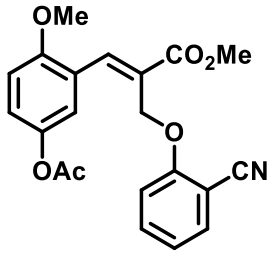
64.11, 52.66, 21.18. HRMS (ESI): calc. for [($C_{20}H_{17}NO_5$)] (M+H) 352.1185, measured 352.1218.

Ethyl (*E*)-3-(3-acetoxyphenyl)-2-((2-cyanophenoxy)methyl)acrylate (14b)



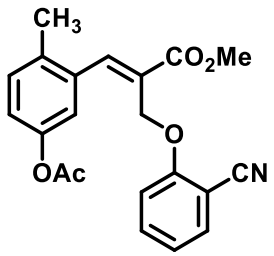
Colourless liquid, Yield (56%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (s, 1H), 7.58 – 7.32 (m, 7H), 7.43 – 7.37 (m, 2H), 7.33 (d, *J* = 8.8 Hz, 2H), 7.16 – 7.01 (m, 3H), 4.96 (s, 2H), 4.32 (q, *J* = 7.1 Hz, 2H), 2.25 (s, 3H), 1.35 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.49, 166.76, 160.39, 150.97, 145.33, 135.75, 134.44, 133.85, 131.14, 129.93, 129.77, 128.96, 127.73, 127.16, 123.02, 122.97, 122.20, 121.49, 116.44, 113.86, 102.89, 64.16, 61.65, 21.16, 14.36. HRMS (ESI): calc. for [($C_{21}H_{19}NO_5$)] (M+H) 366.1341, measured 366.1331.

Methyl (*E*)-3-(5-acetoxy-2-methoxyphenyl)-2-((2-cyanophenoxy)methyl) acrylate (14c)



Colourless liquid, Yield (62%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.20 (s, 1H), 7.56 – 7.49 (m, 2H), 7.34 (d, *J* = 2.7 Hz, 1H), 7.14 (d, *J* = 8.5 Hz, 1H), 7.09 – 7.00 (m, 2H), 6.88 (d, *J* = 8.9 Hz, 1H), 4.93 (s, 2H), 3.86 (s, 3H), 3.86 (s, 3H), 2.18 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.94, 167.31, 160.43, 155.58, 144.00, 141.95, 134.43, 133.70, 131.26, 127.05, 124.10, 122.14, 121.36, 116.50, 115.52, 113.94, 111.09, 105.72, 102.80, 64.60, 56.06, 52.52, 21.01. HRMS (ESI): calc. for [($C_{21}H_{19}NO_6$)] (M+H) 382.1291, measured 382.1271.

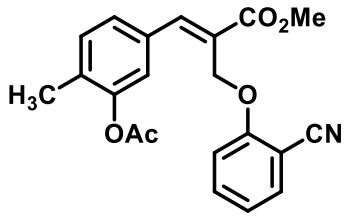
Methyl (*E*)-3-(5-acetoxy-2-methylphenyl)-2-((2-cyanophenoxy)methyl) acrylate (14d)



Colorless liquid, Yield (59%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.11 (s, 1H), 7.55 (d, *J* = 7.6 Hz, 1H), 7.49 (t, *J* = 8.0 Hz, 1H), 7.22 (d, *J* = 8.8 Hz, 2H), 7.04 – 6.98 (m, 3H), 4.87 (s, 2H),

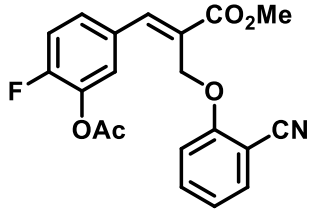
3.88 (s, 3H), 2.30 (s, 3H), 2.19 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.72, 167.06, 160.34, 148.75, 144.71, 134.79, 134.50, 134.41, 133.74, 131.21, 128.09, 122.73, 122.63, 121.38, 116.49, 113.71, 102.76, 64.14, 52.64, 21.08, 19.53, HRMS (ESI): calc. for [($C_{21}H_{19}NO_6$)] (M+H) 366.1338, measured 366.1348.

Methyl (*E*)-3-(3-acetoxy-4-methylphenyl)-2-((2 cyanophenoxy)methyl) acrylate (14e)



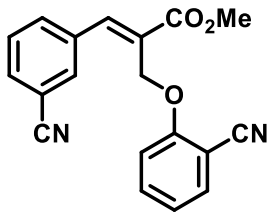
Colourless liquid, Yield (60%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (s, 1H), 7.58 – 7.51 (m, 3H), 7.29 – 7.28 (m, 2H), 7.14 (d, *J* = 8.5 Hz, 1H), 7.05 – 7.01 (m, 1H), 4.96 (s, 2H), 3.86 (s, 3H), 2.26 (s, 3H), 2.20 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.25, 167.40, 160.36, 149.58, 145.97, 134.47, 133.83, 133.22, 132.52, 131.63, 127.52, 126.51, 123.46, 121.47, 116.45, 113.89, 102.88, 64.25, 52.56, 20.84, 16.28. HRMS (ESI): calc. for [($C_{21}H_{19}NO_5$)] (M+H) 366.1341, measured 366.1331.

Methyl (*E*)-3-(3-acetoxy-4-fluorophenyl)-2-((2-cyanophenoxy)methyl) acrylate (14f)



Colourless liquid, Yield (56%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (s, 1H), 7.58 – 7.52 (m, 2H), 7.43 – 7.37 (m, 2H), 7.22 – 7.14 (m, 2H), 7.07 – 7.03 (m, 1H), 4.94 (s, 2H), 3.86 (s, 3H), 2.30 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.41, 167.18, 160.24, 156.32, 153.79, 144.98, 138.49, 138.36, 134.53, 133.87, 131.03, 130.99, 128.92, 128.84, 127.05, 125.57, 121.69, 117.45, 117.26, 116.41, 113.92, 102.94, 64.10, 52.69, 20.58. HRMS (ESI): calc. for [($C_{20}H_{16}FNO_5$)] (M+H) 370.1097, measured 370.1082.

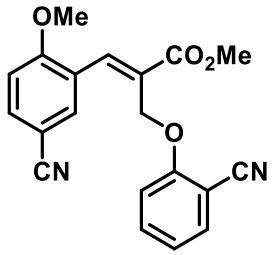
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-cyanophenyl)acrylate (15a)



Colourless liquid; Yield (45%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96 (s, 1H), 7.66 (d, *J* = 8 Hz 1H), 7.66 (t, *J* = 1.6 Hz, 1H), 7.62-6.59 (m, 1H), 7.53 – 7.45 (m, 3H), 7.04-6.98 (m, 1H), 4.86

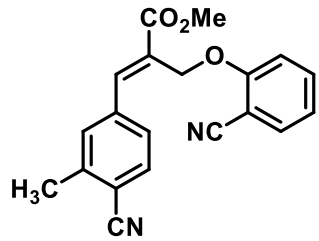
(s, 2H), 3.82 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.73, 160.02, 143.82, 135.55, 134.53, 134.08, 133.73, 133.02, 133.0, 130.00, 128.85, 121.96, 113.66, 113.35, 103.02, 63.86, 52.87. HRMS (ESI): calc. for [($C_{19}H_{14}N_2O_3$)] (M+H) 319.1083, measured 319.1065.

Methyl (*E*)-3-(5-cyano-2-methoxyphenyl)-2-((2-cyanophenoxy)methyl)acrylate (15b)



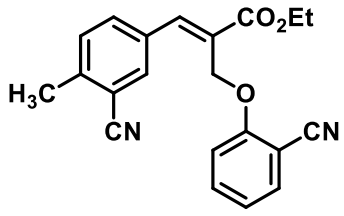
Pale yellow liquid; Yield (51%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (s, 1H), 7.68 – 7.65 (m, 2H), 7.58-7.49 (m, *3*1H), 7.06 – 6.97 (m, 3H), 4.90 (s, 2H), 3.93 (s, 3H), 3.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.71, 160.81, 159.93, 139.72, 135.55, 134.40, 134.08, 133.82, 128.52, 124.79, 121.71, 118.52, 116.19, 113.24, 111.49, 104.44, 102.74, 64.24, 56.21, 52.71. HRMS (ESI): calc. for [($C_{20}H_{16}N_2O_4$)] (M+H) 349.1188, measured 349.1187.

Methyl (*E*)-3-(4-cyano-3-methylphenyl)-2-((2-cyanophenoxy)methyl)acrylate (15c)



Colourless liquid; Yield (48%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (s, 1H), 7.75 – 7.66 (m, 1H), 7.62 – 7.51 (m, 3H), 7.39 (d, *J* = 8.1 Hz, 1H), 7.12-7.04 (m, 2H), 4.93 (s, 3H), 3.87 (s, 3H), 2.56 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.92, 161.02, 144.07, 143.63, 134.52, 134.06, 133.68, 133.59, 132.67, 131.12, 128.82, 128.52, 127.89, 121.87, 118.66, 117.47, 116.31, 113.68, 113.66, 102.95, 63.89, 52.79. HRMS (ESI): calc. for [($C_{20}H_{16}N_2O_3$)] (M+H) 333.1239, measured 333.1253.

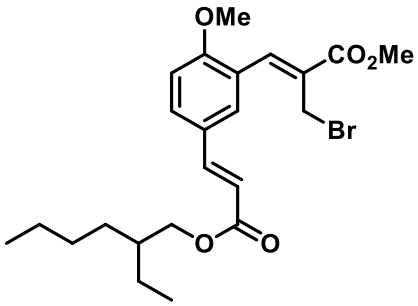
Ethyl (E)-3-(3-cyano-4-methylphenyl)-2-((2-cyanophenoxy)methyl)acrylate (15d)



White solid; Yield (49%), M.P. (95 ^{o}C) ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (s, 1H), 7.74 (dd, *J* = 8.1, 1.8 Hz, 1H), 7.69 (d, *J* = 1.6 Hz, 1H), 7.60 – 7.52 (m, 2H), 7.40 (d, *J* = 8.1 Hz, 1H),

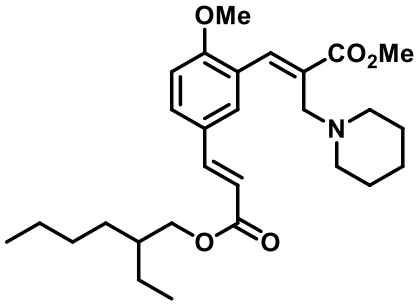
7.12 (d, *J* = 8.4 Hz, 1H), 7.09 – 7.03 (m, 1H), 4.94 (s, 2H), 4.33 (q, *J* = 7.1 Hz, 2H), 2.57 (s, 3H), 1.35 (t, *J* = 7.1 Hz, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 166.44, 160.13, 143.73, 143.56, 134.51, 134.05, 133.69, 133.60, 132.76, 131.11, 128.22, 121.83, 117.51, 113.70, 113.66, 102.96, 63.93, 61.85, 20.58, 14.37. HRMS (ESI): calc. for [($C_{21}H_{18}N_2O_3$)] (M+H) 347.1396, measured 347.1396.

Methyl (*Z*)-2-(bromomethyl)-3-(5-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)acrylate (16)



Colourless liquid; Yield (74%),^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (s, 1H), 7.94 (d, *J* = 2.0 Hz, 1H), 7.66 (d, *J* = 16.0 Hz, 1H), 7.55 (dd, *J* = 8.6, 2.1 Hz, 1H), 6.94 (d, *J* = 8.6 Hz, 1H), 6.42 (d, *J* = 16.0 Hz, 1H), 4.34 (s, 2H), 4.12 (d, *J* = 5.6 Hz, 2H), 3.90 (s, 3H), 3.89 (s, 3H), 1.67 – 1.64 (m, 2H), 1.43 – 1.32 (m, 6H), 0.95-0.90 (m, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.46, 166.59, 159.52, 143.51, 138.28, 131.70, 129.49, 128.95, 127.49, 124.18, 117.34, 111.07, 96.27, 67.19, 55.97, 52.61, 39.02, 30.66, 29.12, 27.06, 24.04, 23.13, 14.20, 11.19. HRMS (ESI): calc. for [($C_{23}H_{31}BrO_5$)] (M+H) 467.1433, measured 467.1460.

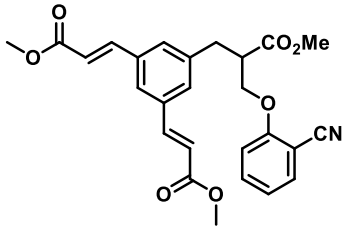
Methyl (*E*)-3-(5-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)-2-(piperidin-1-ylmethyl)acrylate (17)



Colourless liquid; Yield (87%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.35 (s, 1H), 8.07 (s, 1H), 7.63 (d, *J* = 15.9 Hz, 1H), 7.48 (dd, *J* = 8.5, 2.1 Hz, 1H), 6.89 (d, *J* = 8.6 Hz, 1H), 6.40 (d, *J* = 15.9 Hz, 1H), 4.26 – 3.99 (m, 2H), 3.88 (s, 3H), 3.8 (s, 3H), 3.39 – 3.35 (m, 2H), 2.49 (s, 4H), 1.68 – 1.57 (m, 5H), 1.47 – 1.25 (m, 9H), 0.91 (t, *J* = 7.3 Hz, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 167.66, 159.31, 144.17, 136.92, 131.72, 127.33, 125.00, 116.67, 110.55, 66.87,

55.90, 53.85, 52.35, 39.04, 30.58, 29.82, 29.12, 25.83, 23.93, 23.12, 14.19, 11.16. HRMS (ESI): calc. for [($C_{28}H_{41}NO_5$)] (M+H) 458.2906, measured 458.2891.

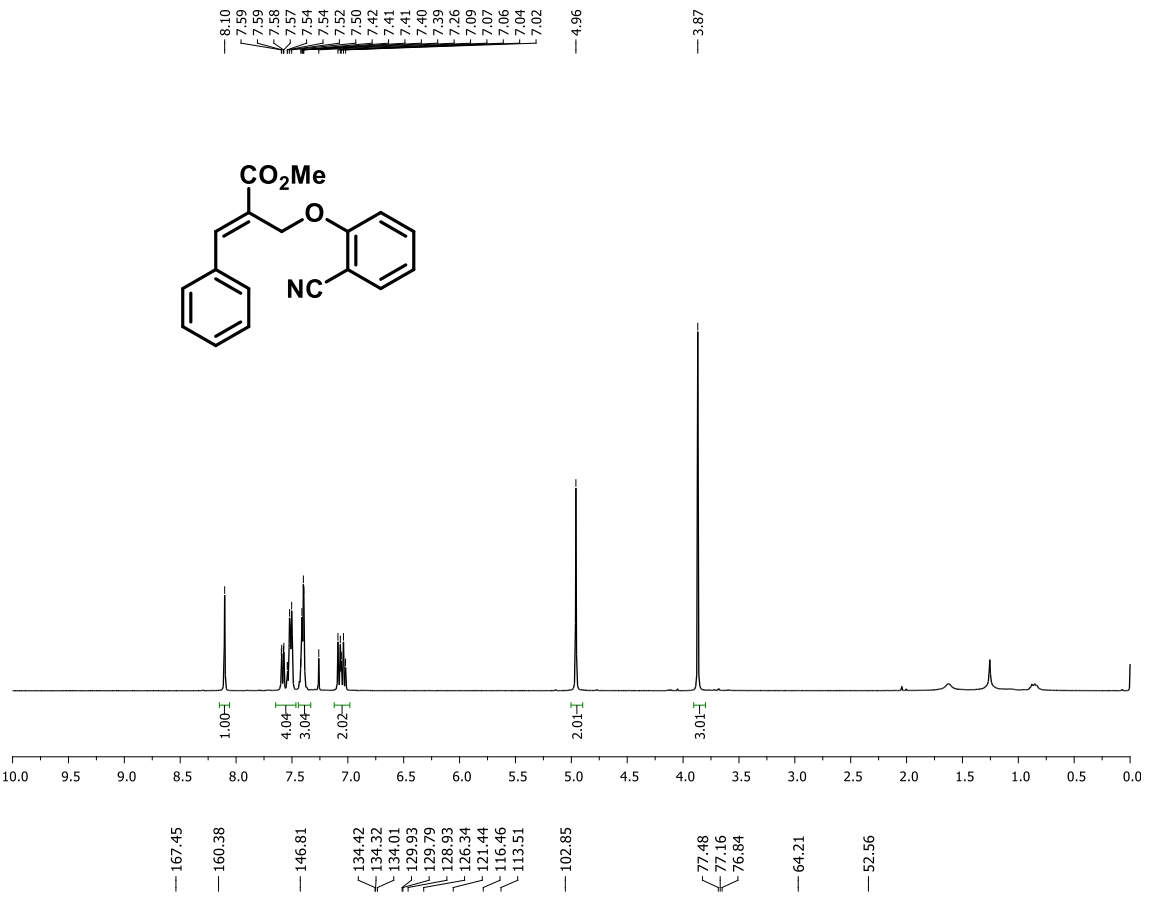
Dimethyl 3,3'-(5-(2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxopropyl)-1,3-phenylene) (2*E*,2'*E*)-diacrylate (19)

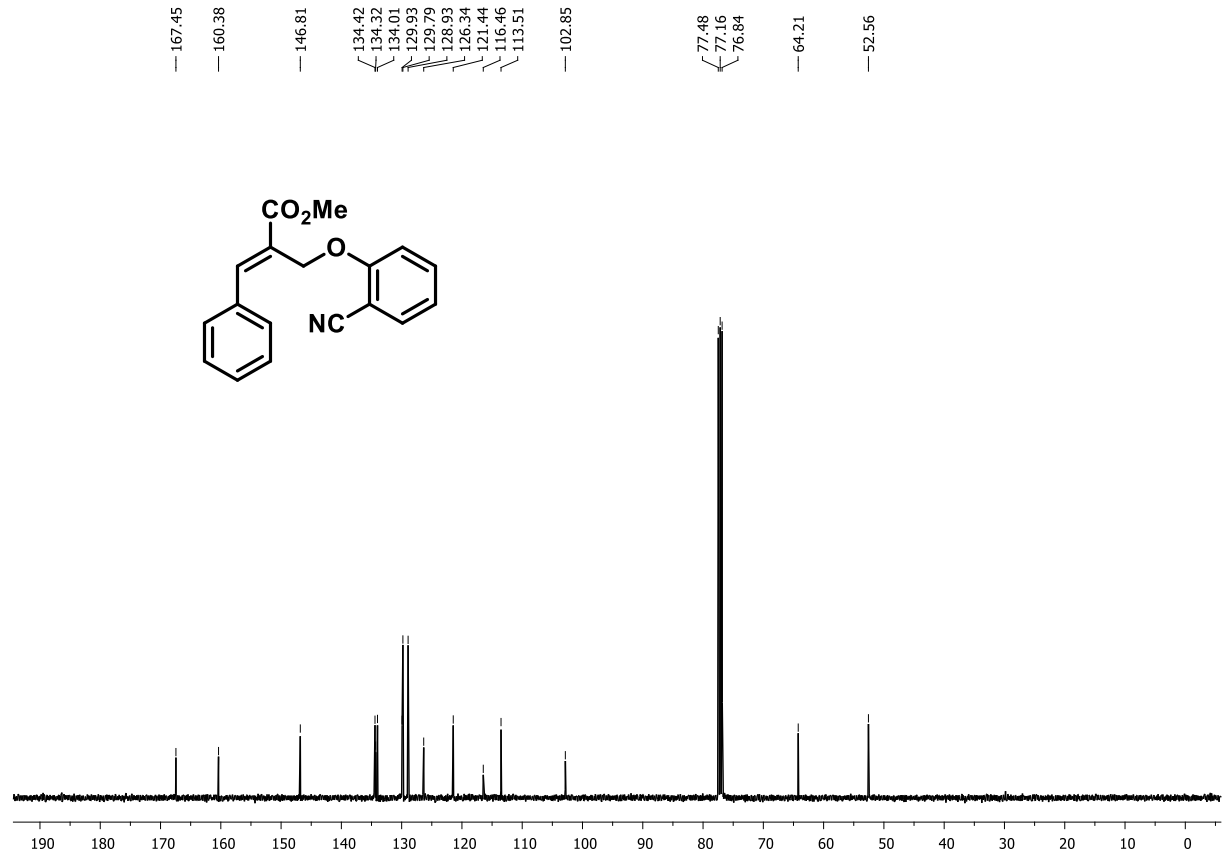


Colorless liquid; Yield (53%), ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.61 (d, *J* = 16.1 Hz, 2H), 7.58 – 7.55 (m, 1H), 7.52 – 7.47 (m, 2H), 7.37 (d, *J* = 1.4 Hz, 2H), 7.03 (td, *J* = 7.6, 0.8 Hz, 1H), 6.91 (d, *J* = 8.3 Hz, 1H), 6.40 (d, *J* = 16.0 Hz, 2H), 4.23 – 4.15 (m, 2H), 3.79 (s, 6H), 3.70 (s, 3H), 3.24 (dd, *J* = 12.7, 5.8 Hz, 1H), 3.19 – 3.10 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.72, 167.20, 159.94, 143.76, 139.64, 135.51, 134.51, 133.93, 130.23, 126.35, 121.60, 119.11, 116.18, 112.54, 102.43, 67.84, 52.39, 51.94, 46.52, 33.93, HRMS (ESI): calc. for [($C_{26}H_{25}NO_7$)] (M+H) 464.1709.1338, measured 464.1711.

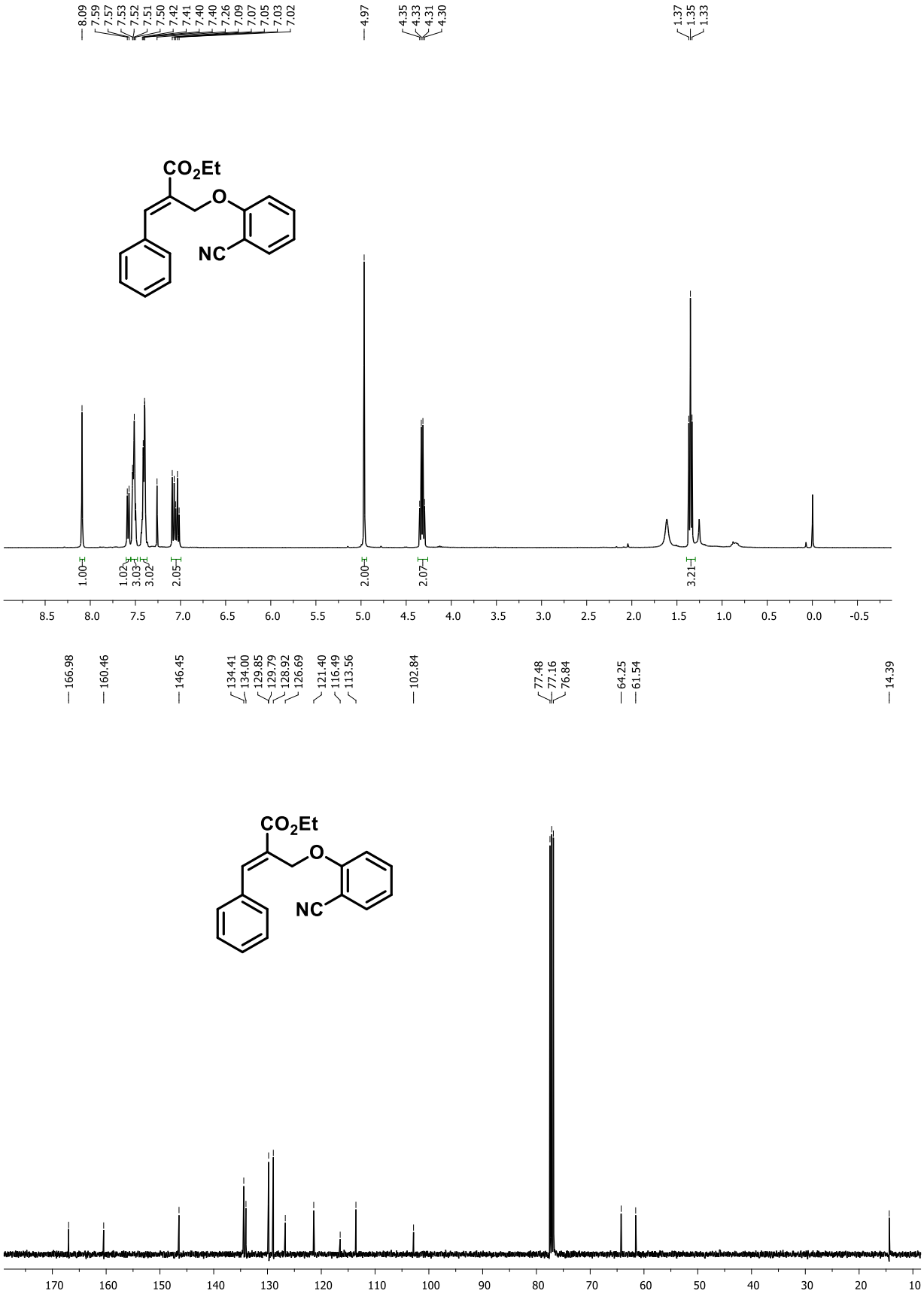
9. Copies of ^{1}H and ^{13}C NMR spectra of the products

Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-phenylacrylate (3a)

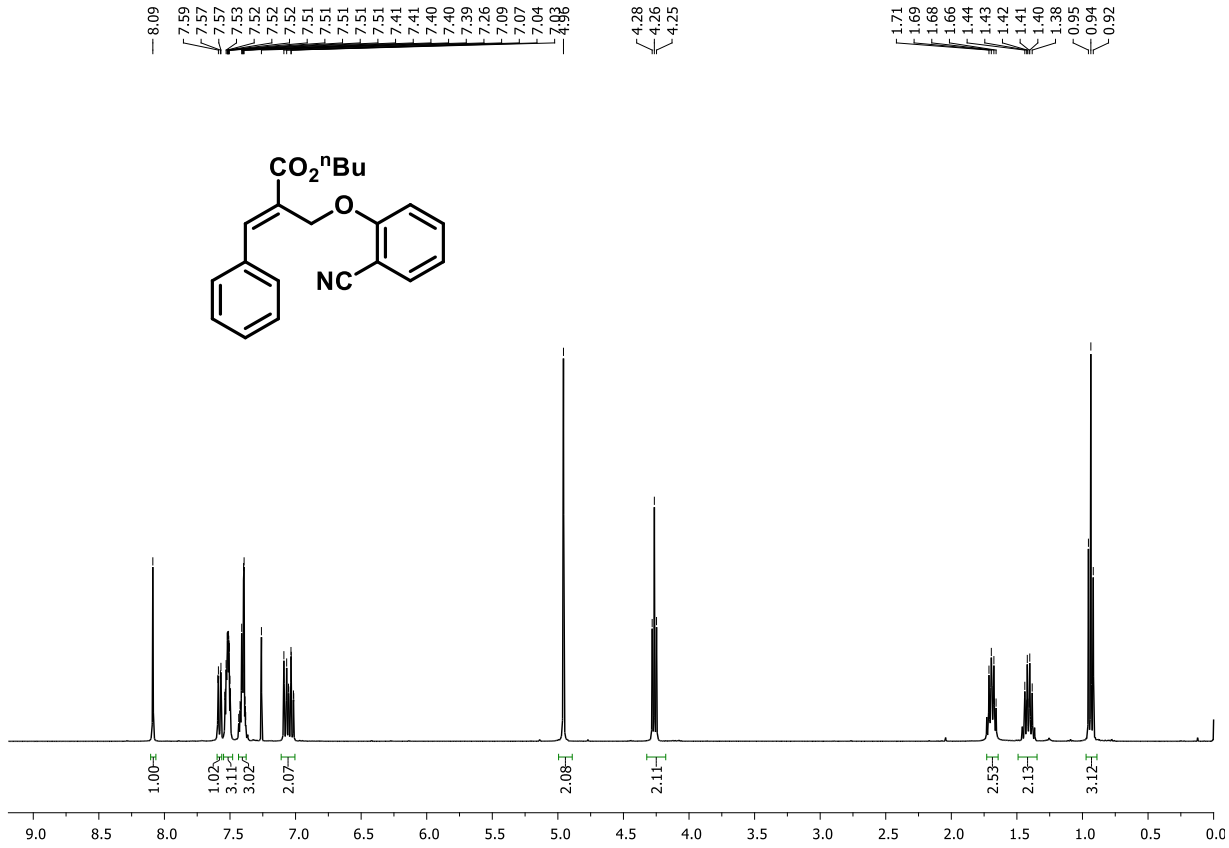


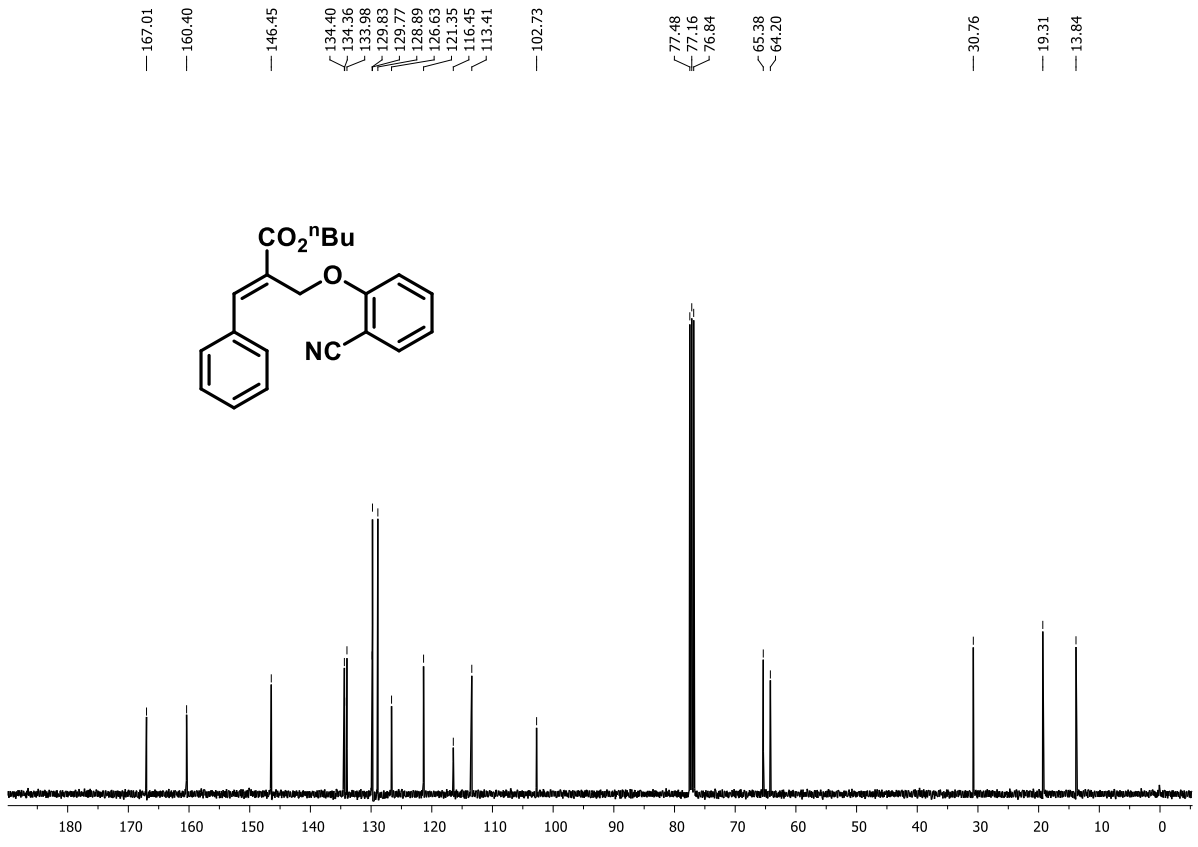


Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-phenylacrylate (1b)

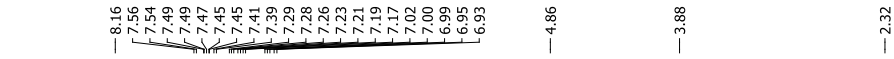


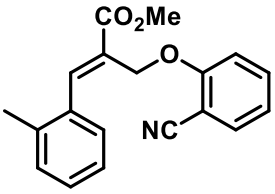
Butyl (*E*)-2-((2-cyanophenoxy) methyl)-3-phenyl acrylate (1c)

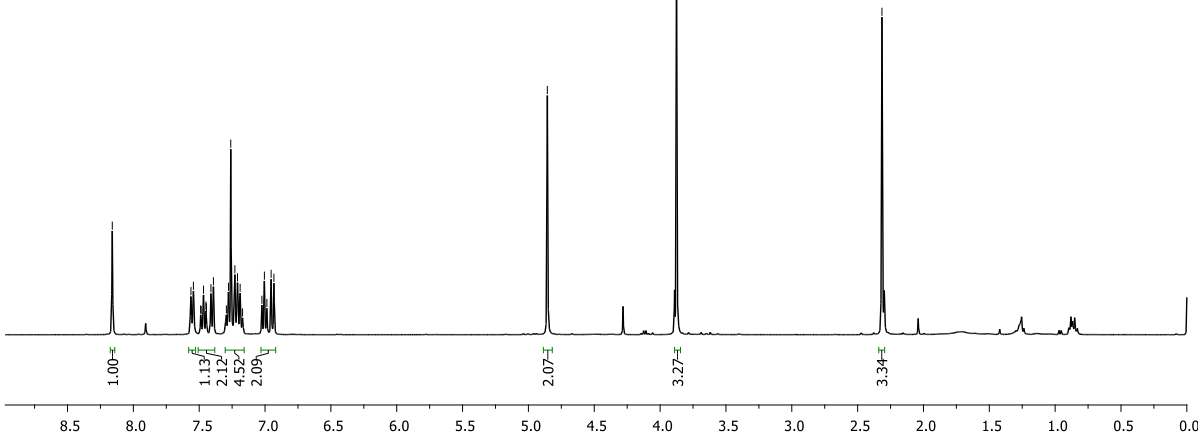


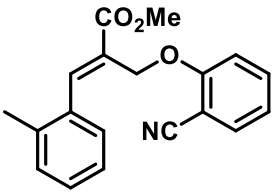


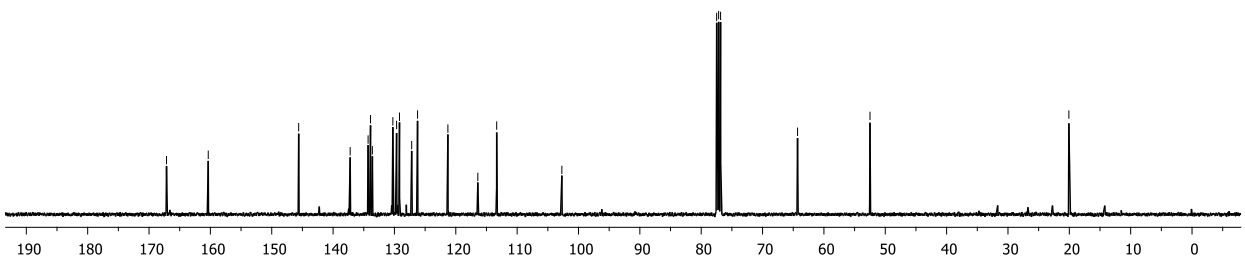
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(o-tolyl) acrylate (1d)



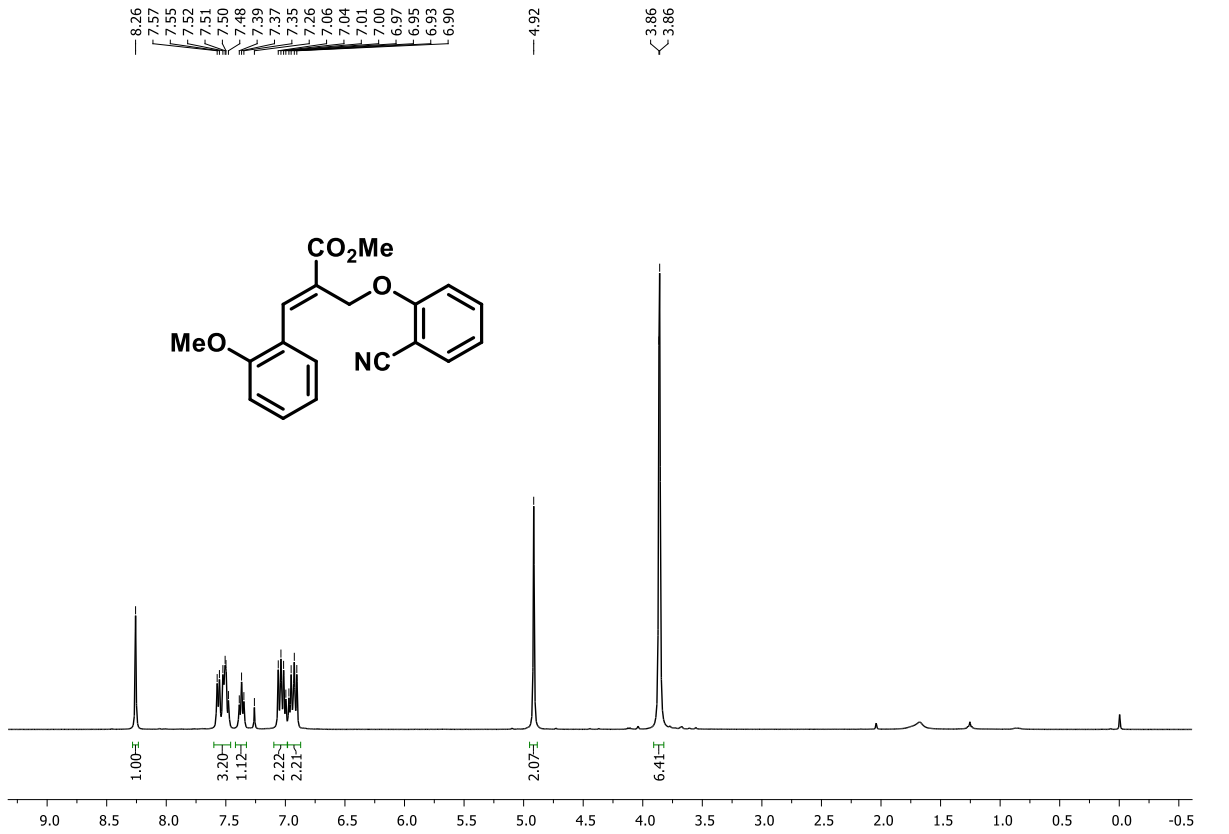


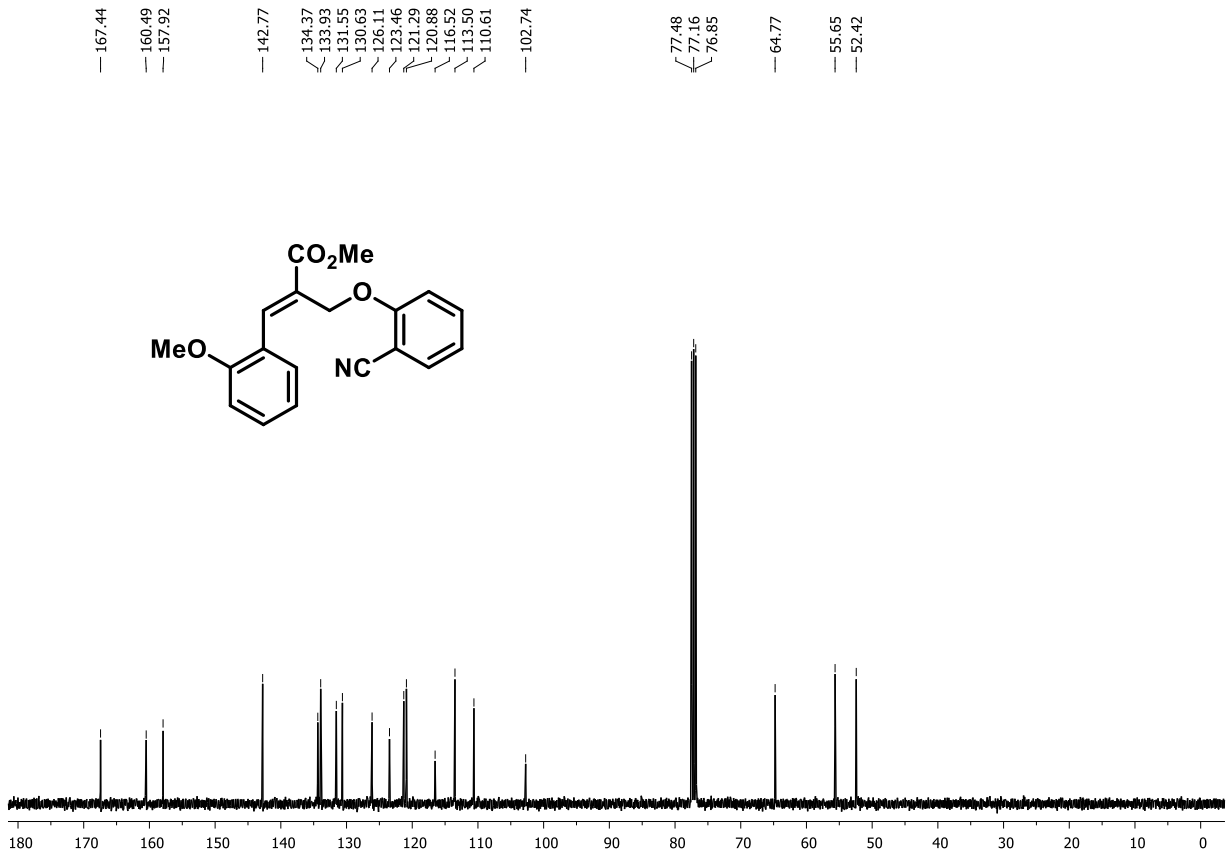




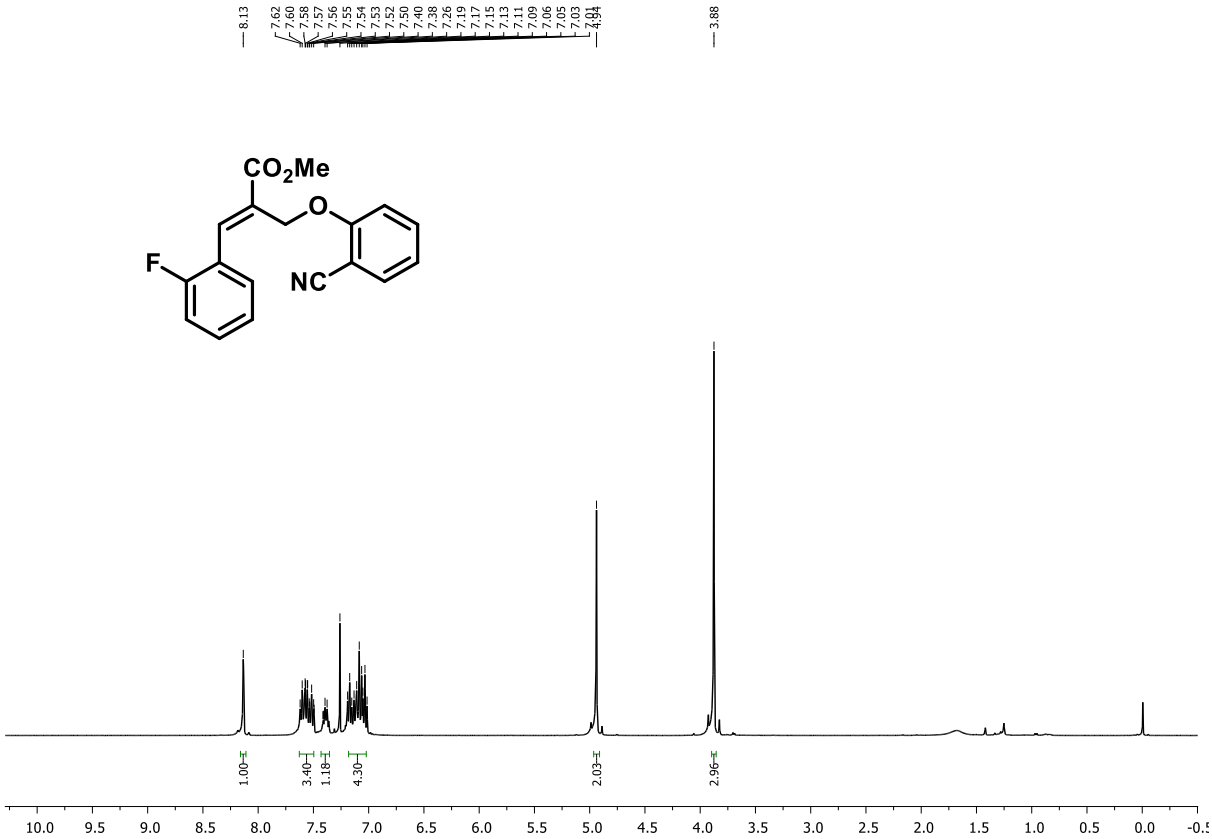


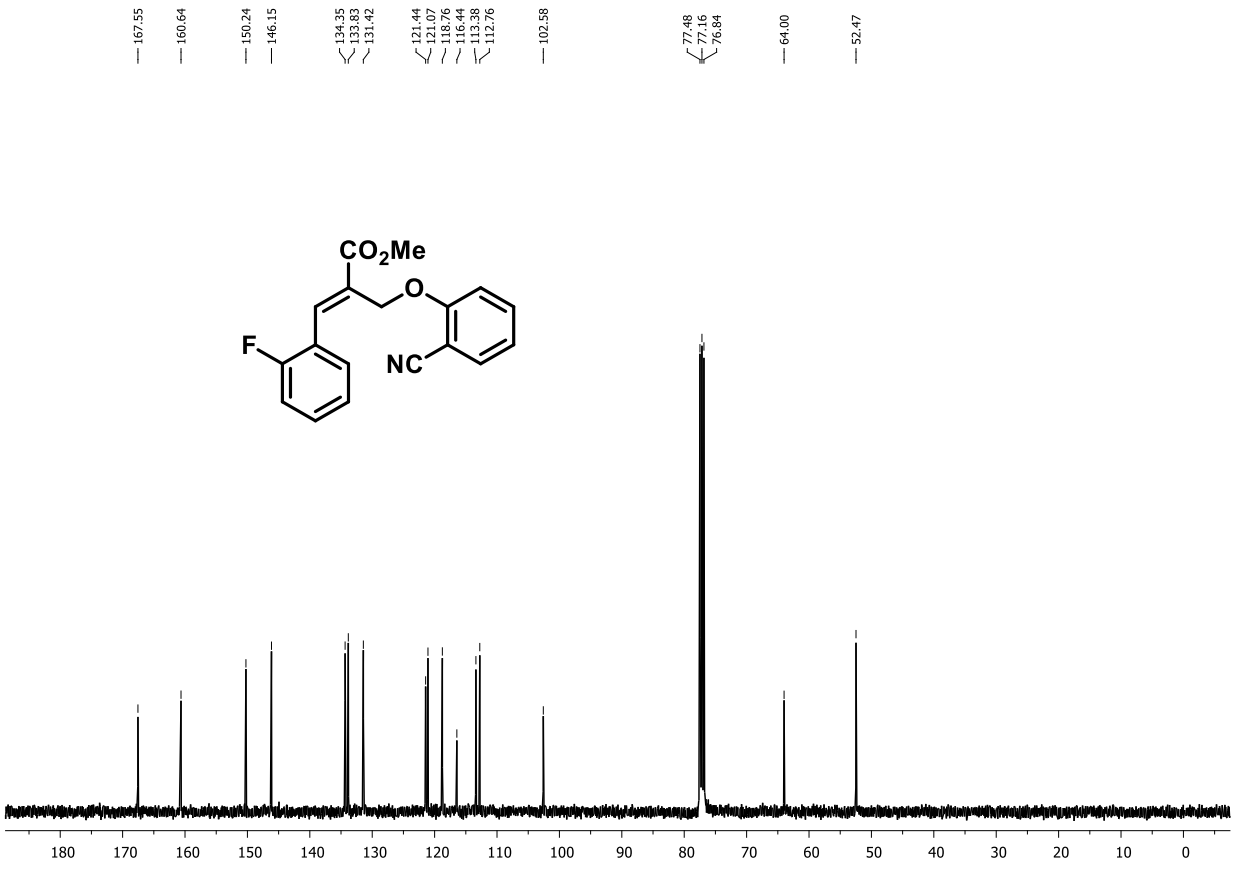
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(2-methoxyphenyl) acrylate (1e)



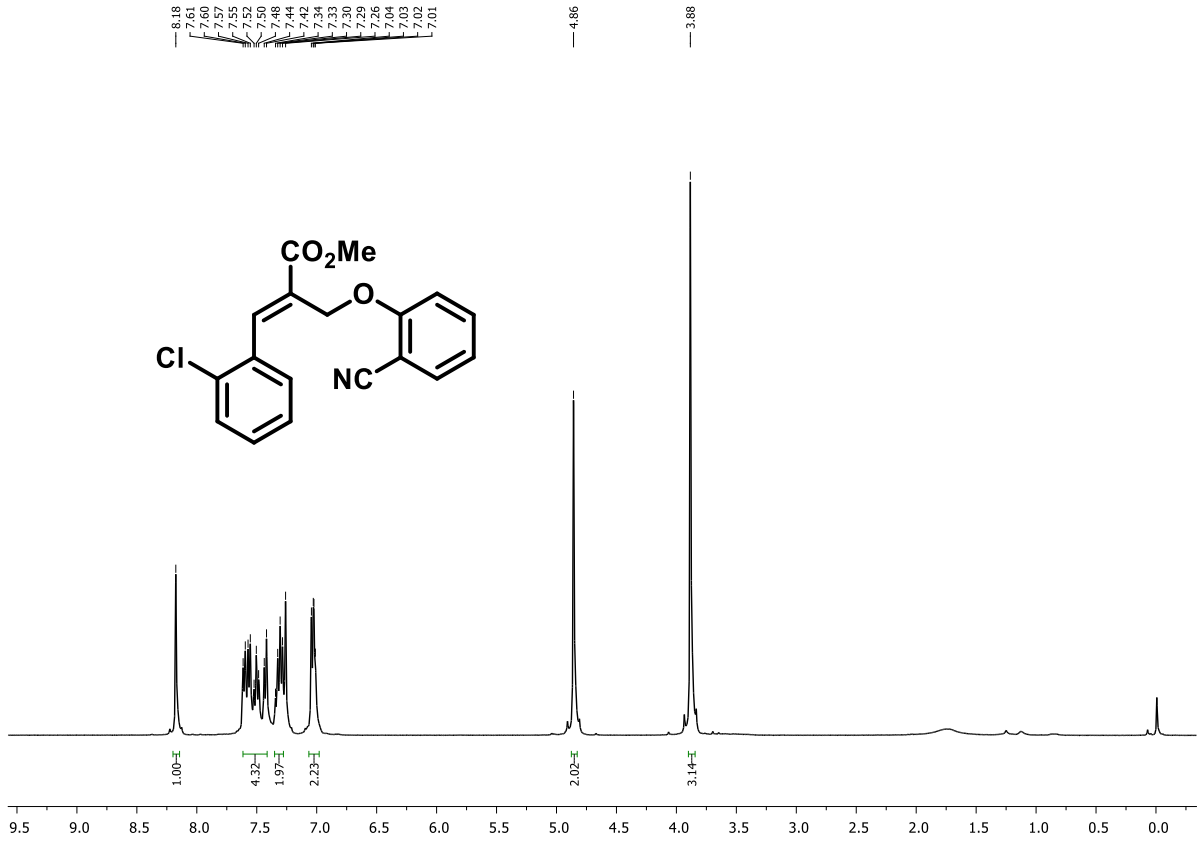


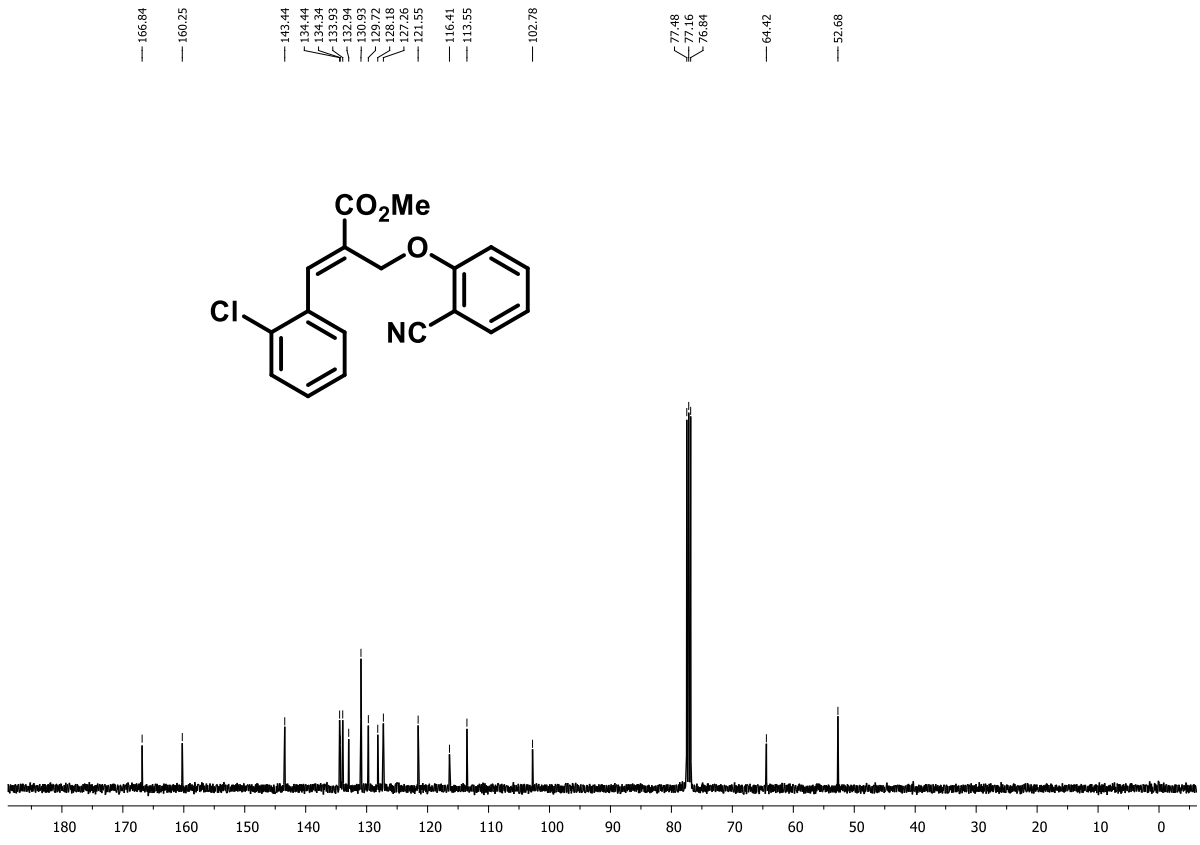
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(2-fluorophenyl) acrylate (1f)



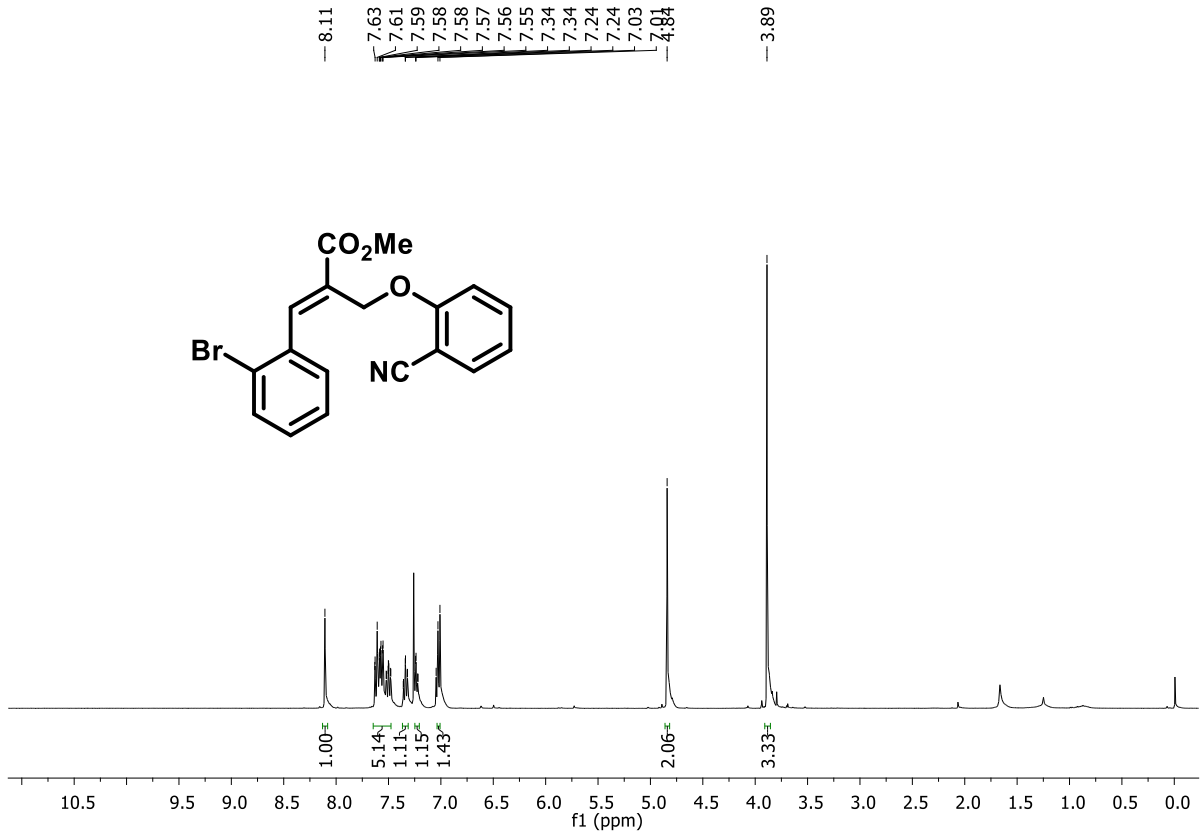


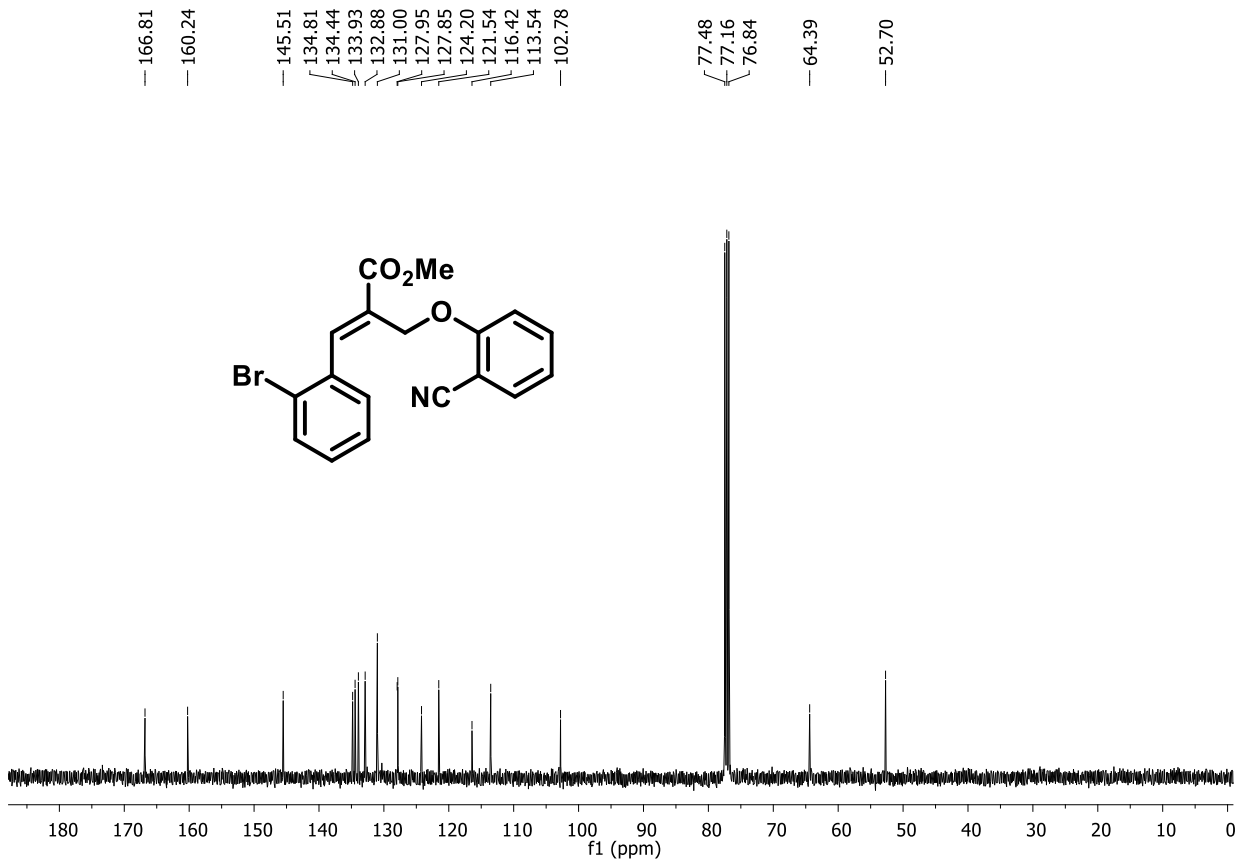
Methyl (*E*)-3-(2-chlorophenyl)-2-((2-cyanophenoxy)methyl)acrylate (1g)



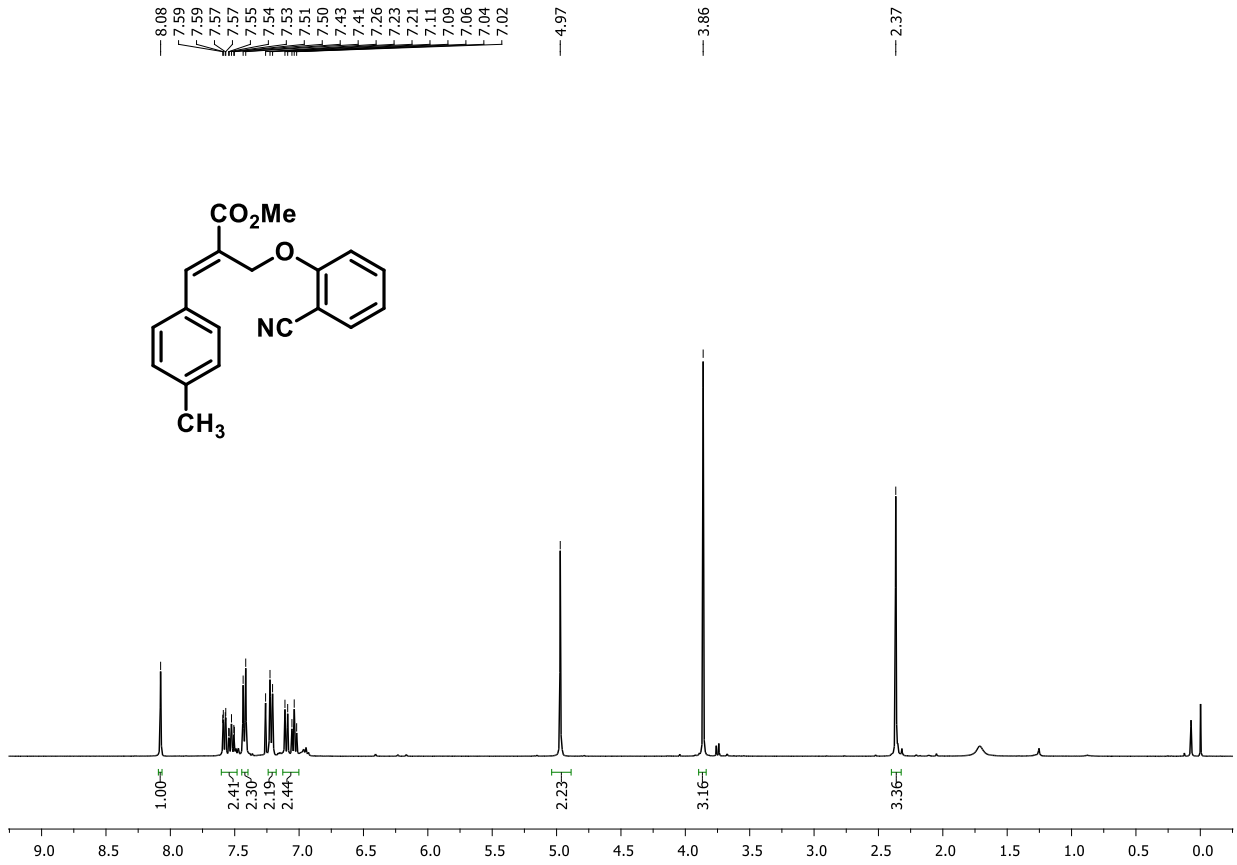


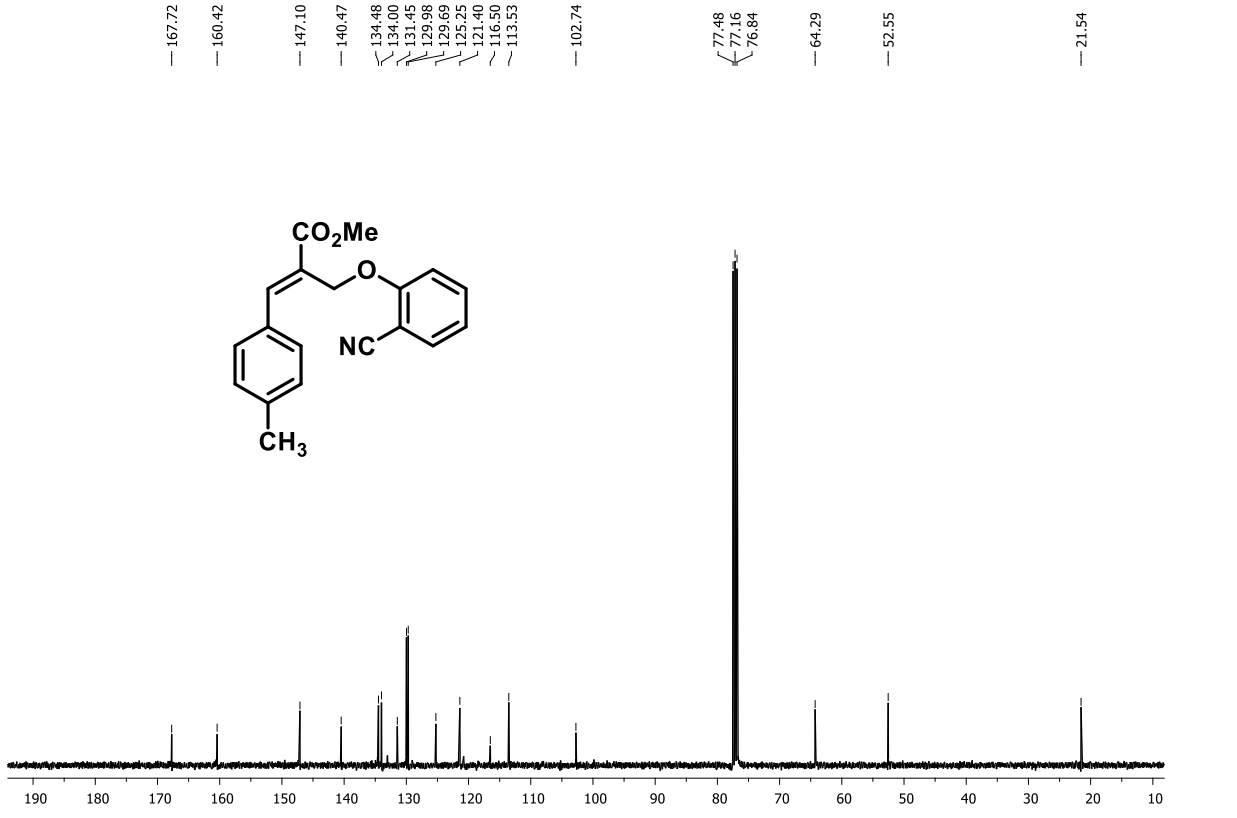
Methyl (*E*)-3-(2-bromophenyl)-2-((2-cyanophenoxy)methyl)acrylate (1i)



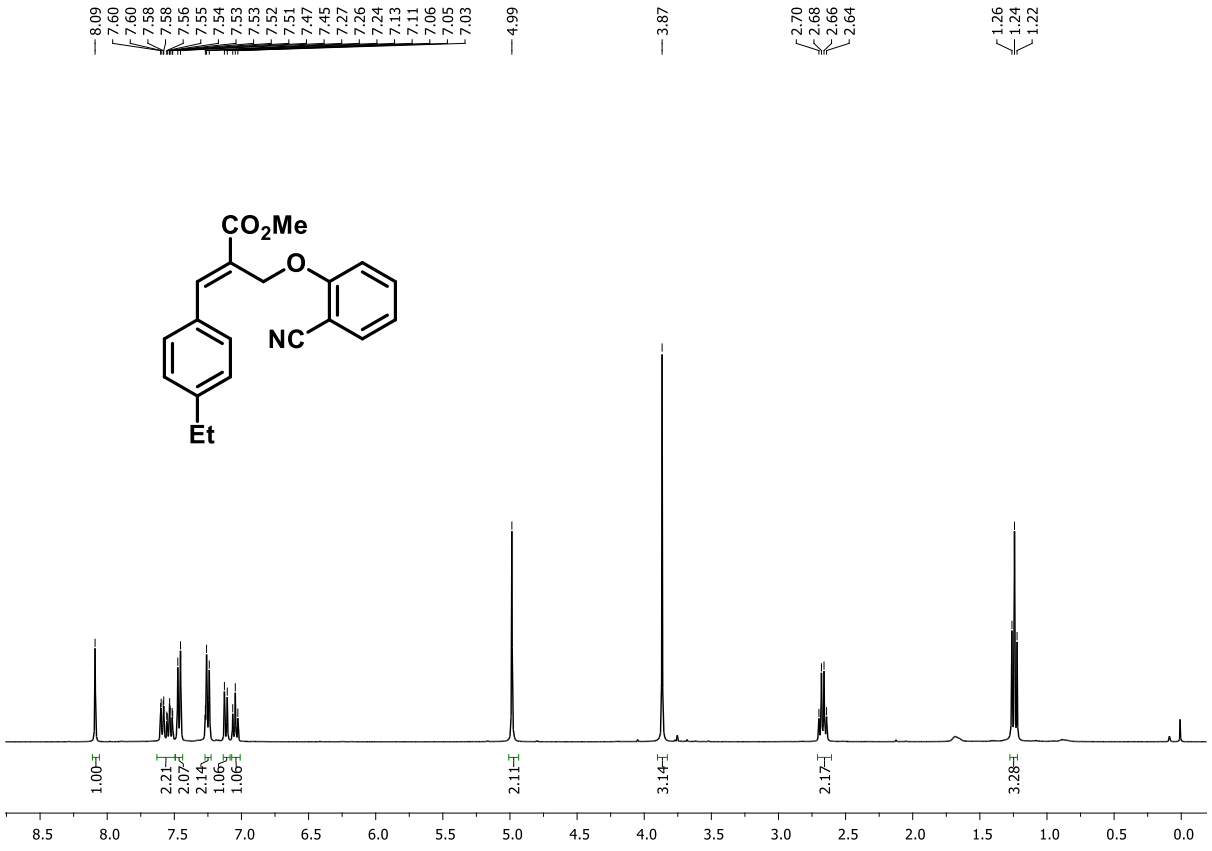


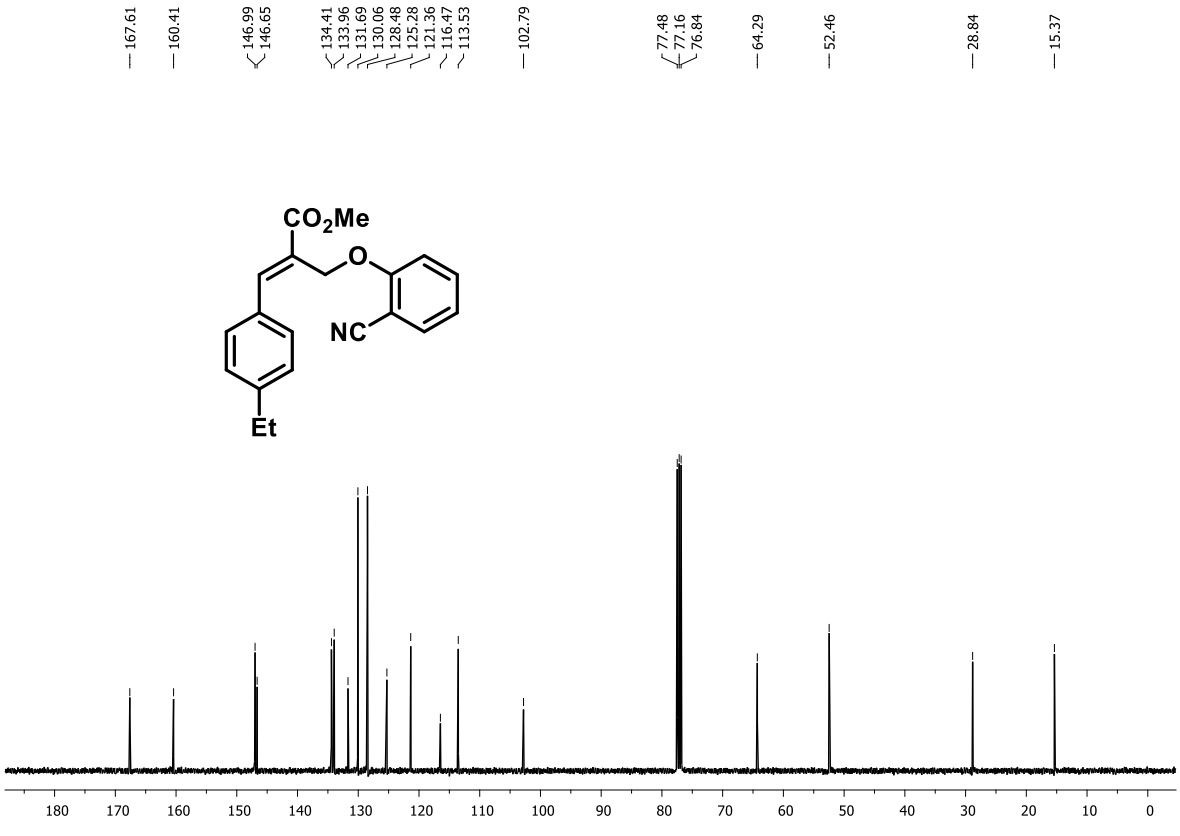
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(p-tolyl) acrylate (1j)



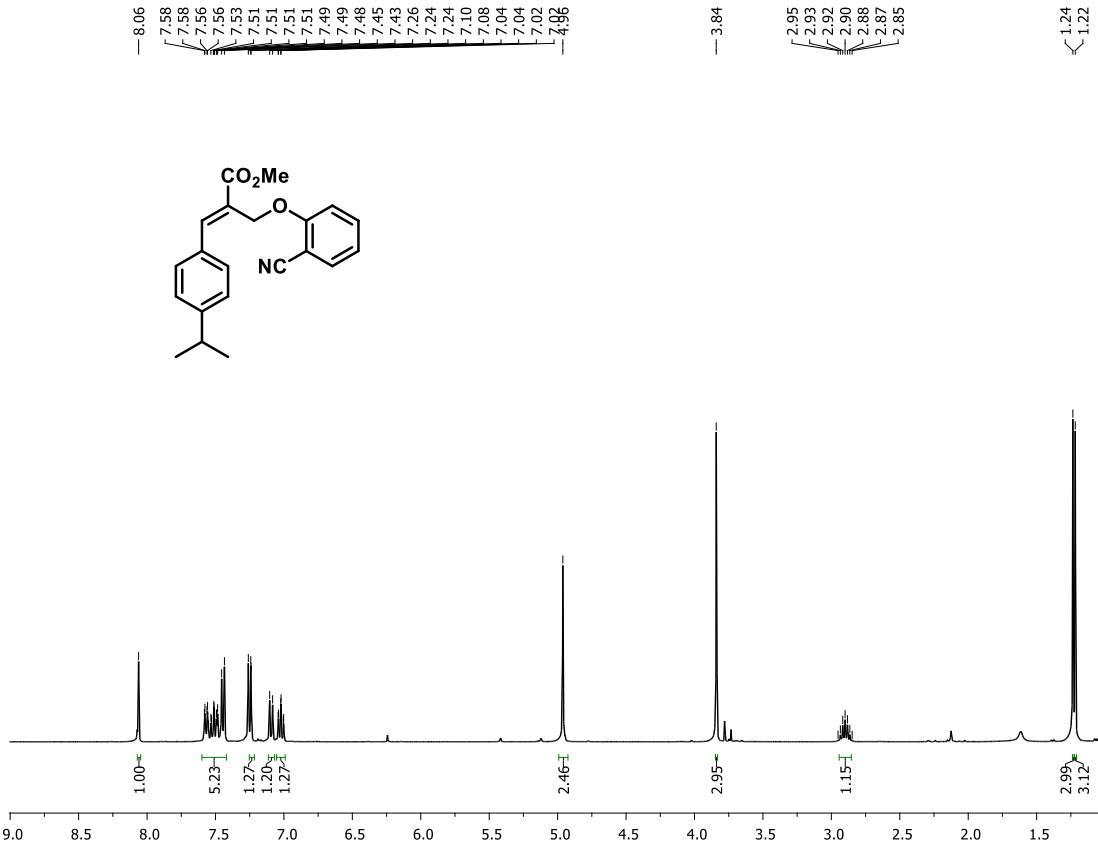


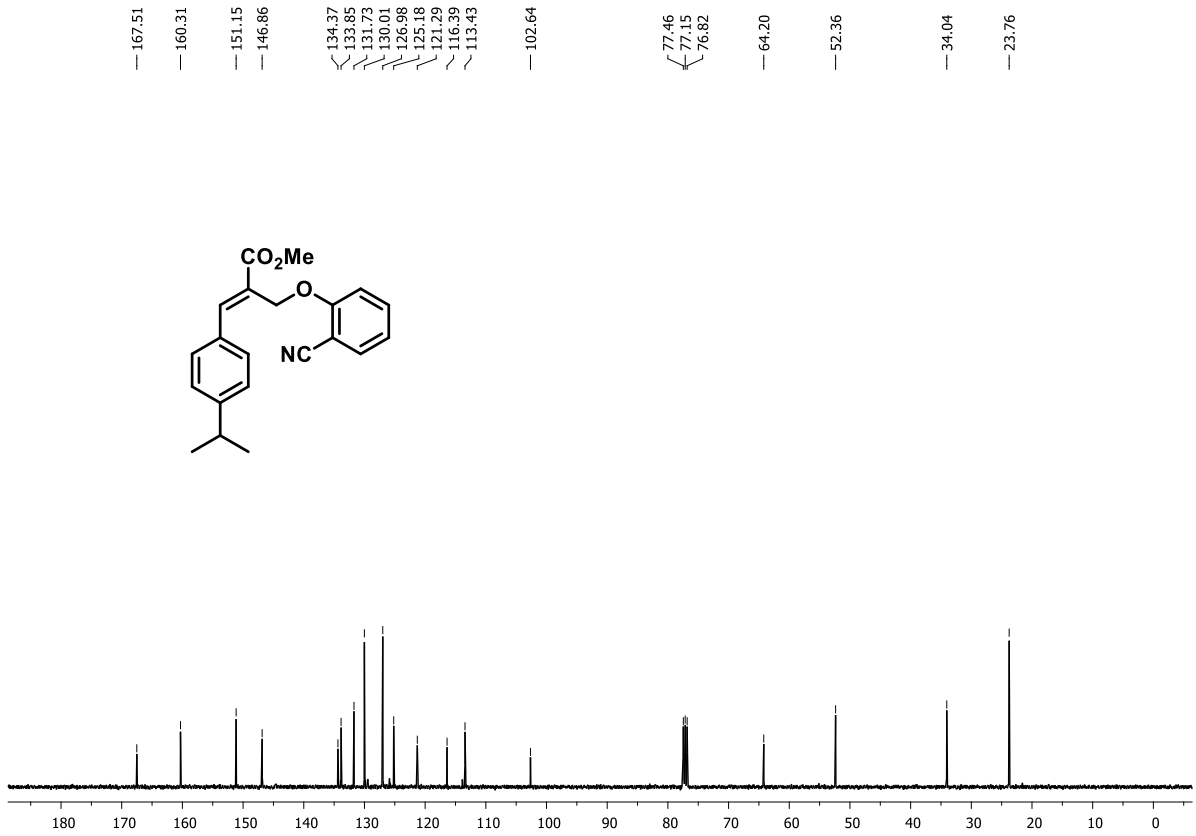
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-ethylphenyl) acrylate (1k)



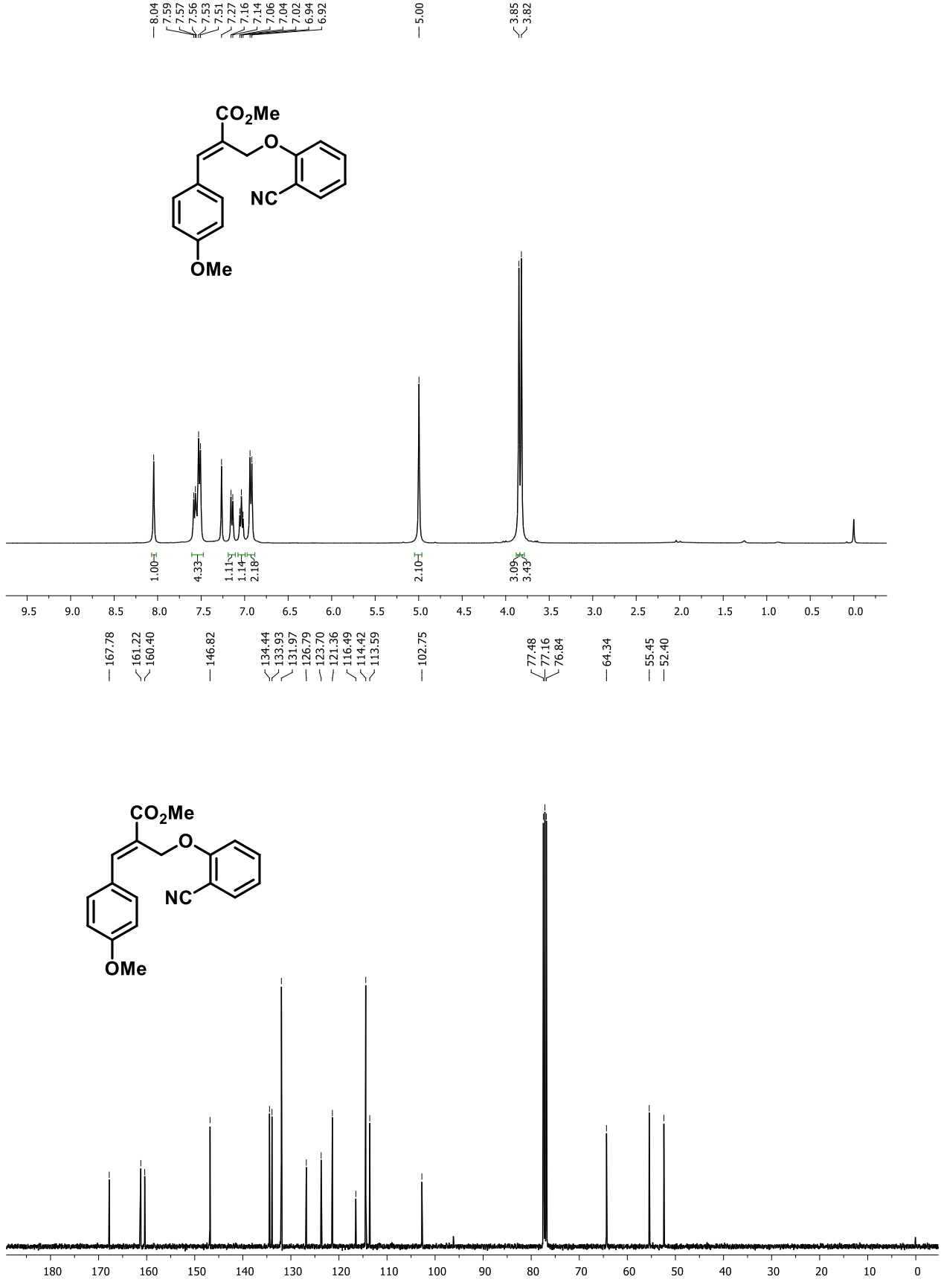


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-isopropylphenyl) acrylate (1l)

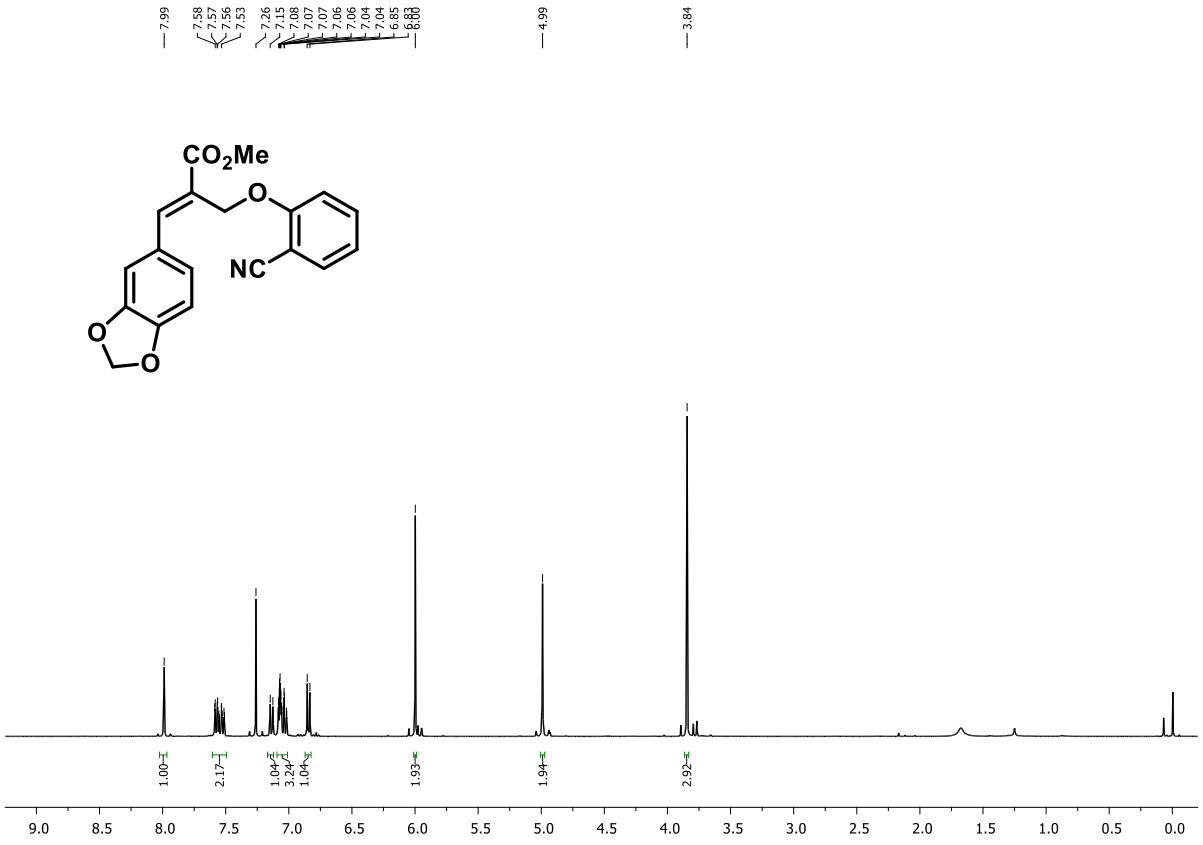


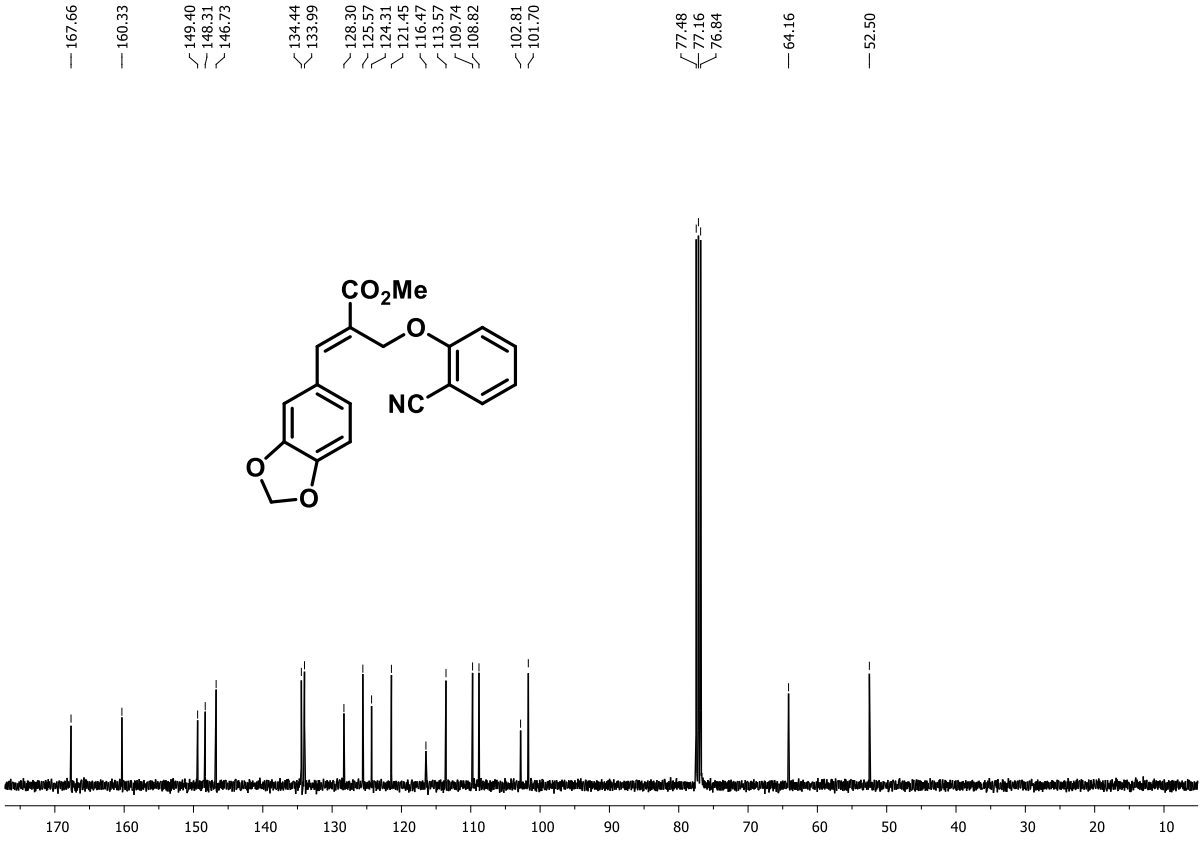


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-methoxyphenyl) acrylate (1m)

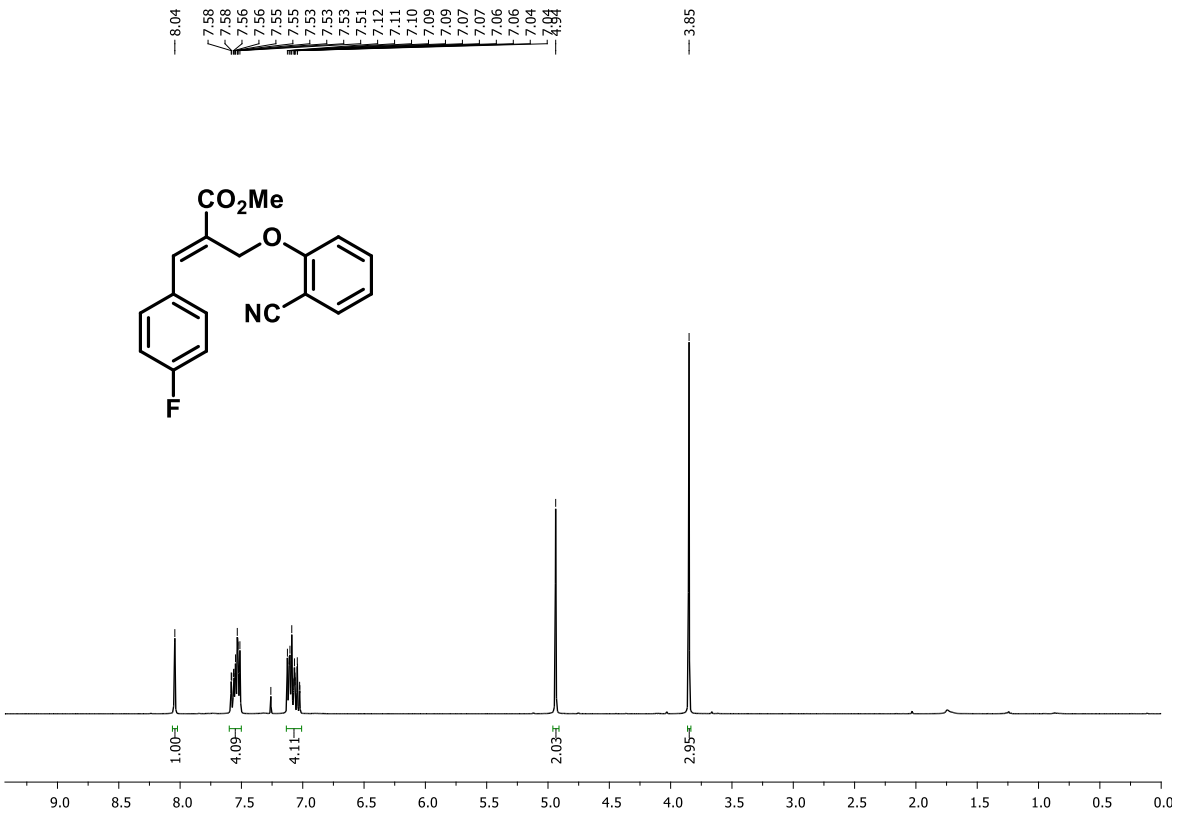


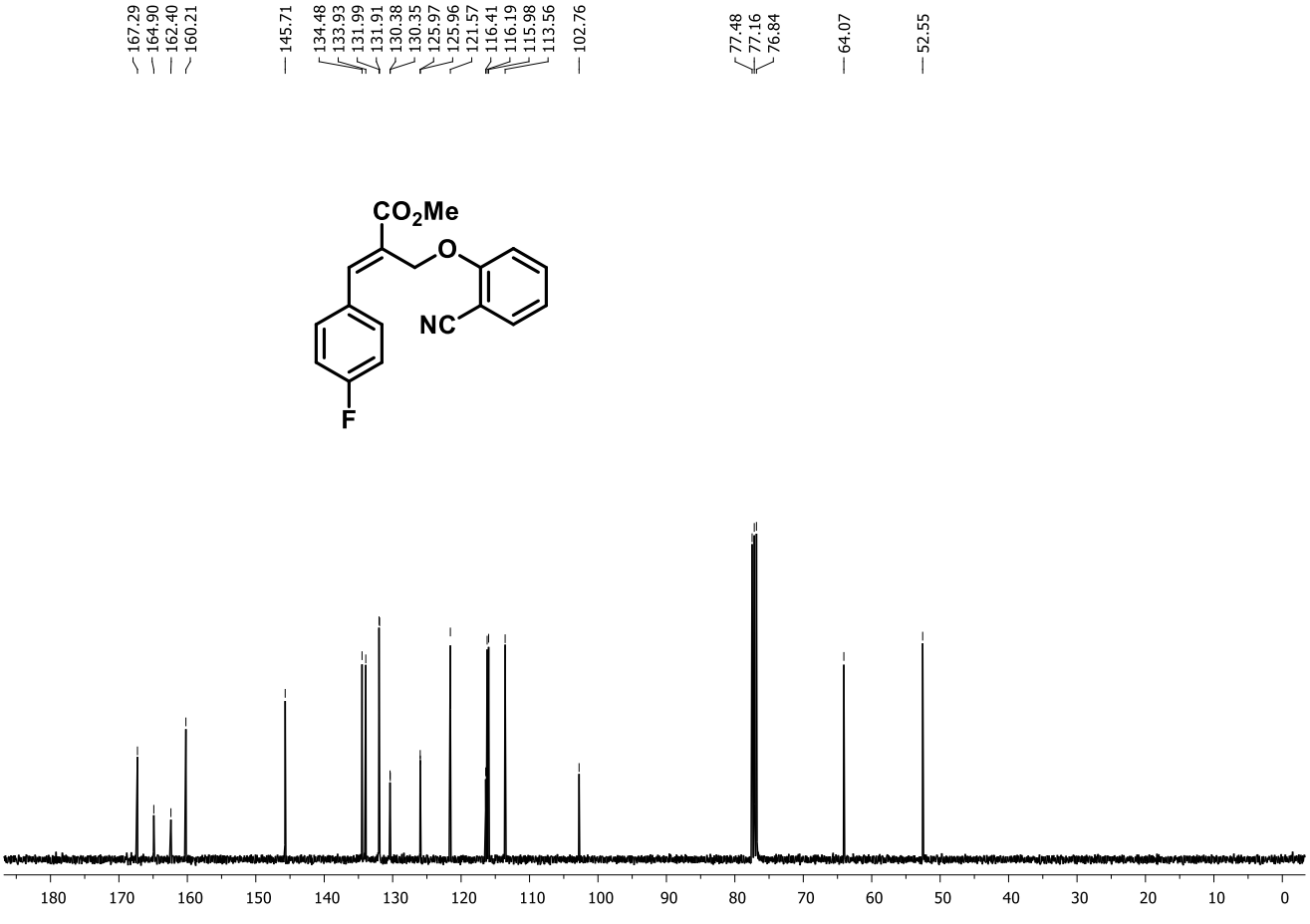
Methyl (*E*)-3-(benzo[d][1,3]dioxol-5-yl)-2-((2-cyanophenoxy) methyl) acrylate (1n)



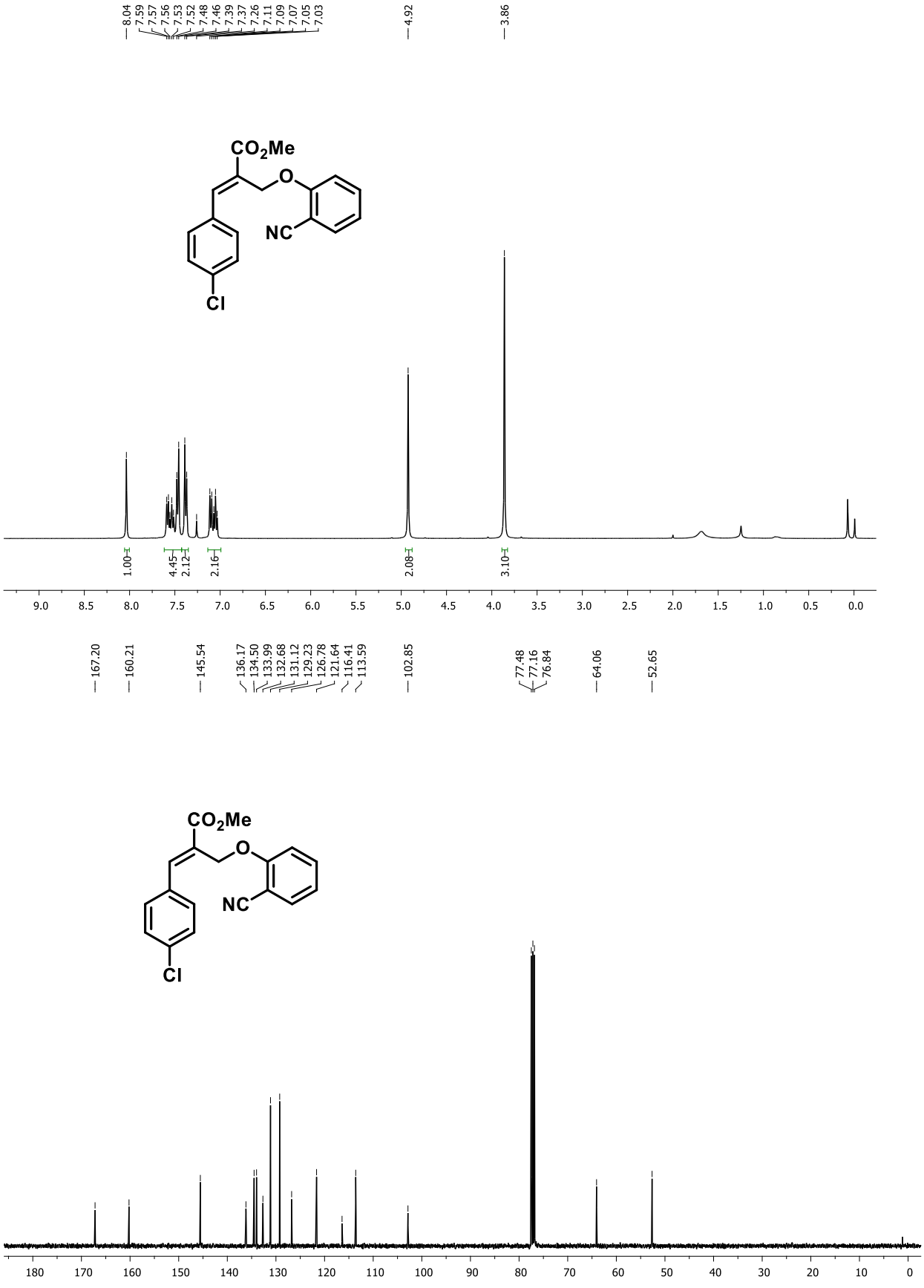


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(4-fluorophenyl) acrylate (1o)

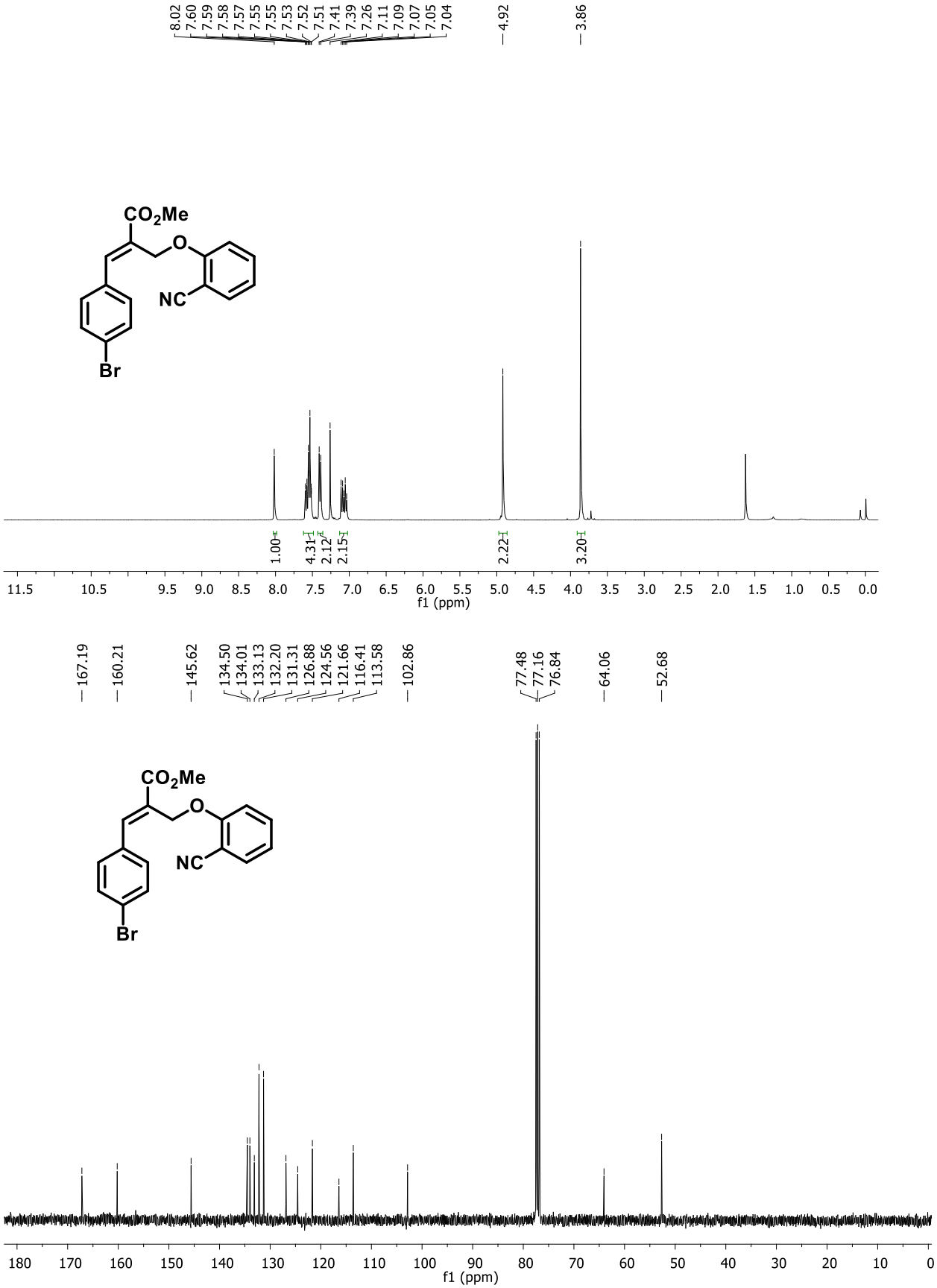




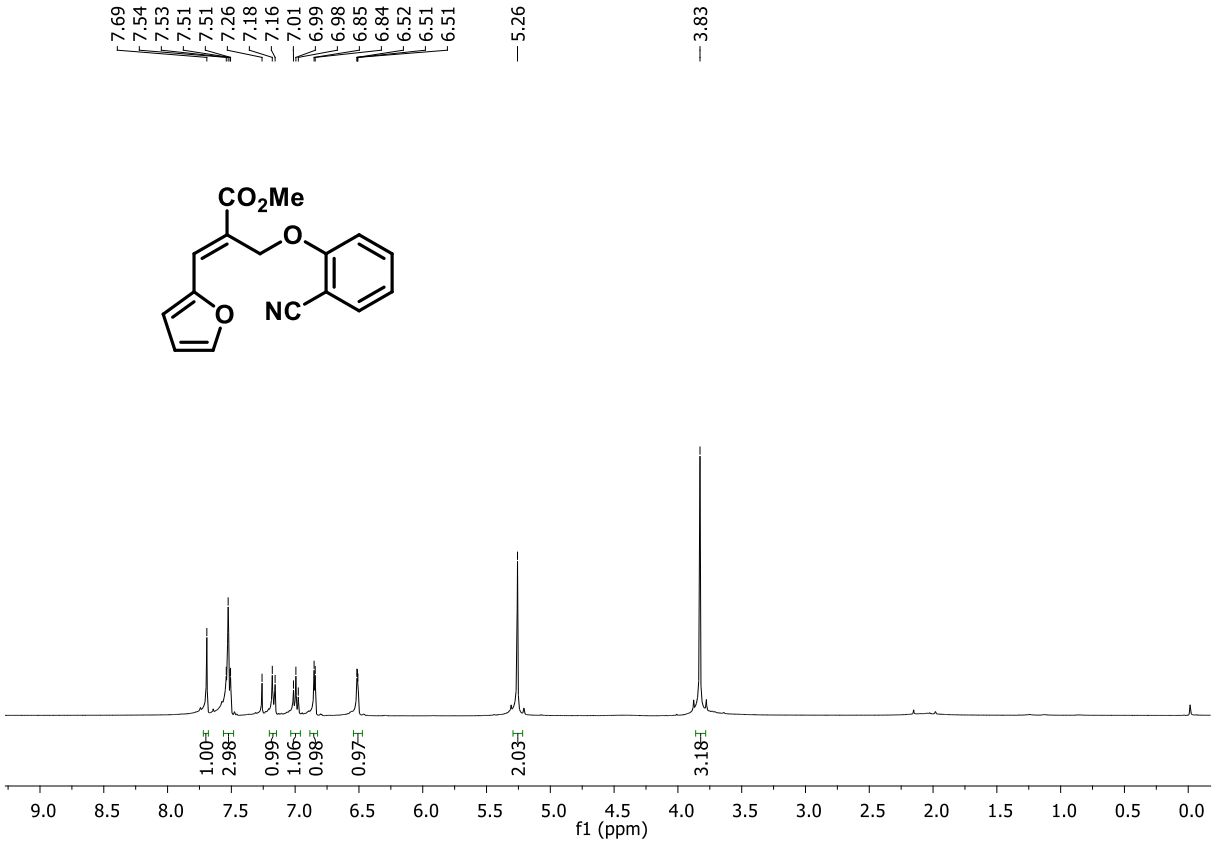
Methyl (*E*)-3-(4-chlorophenyl)-2-((2-cyanophenoxy) methyl) acrylate (1p)

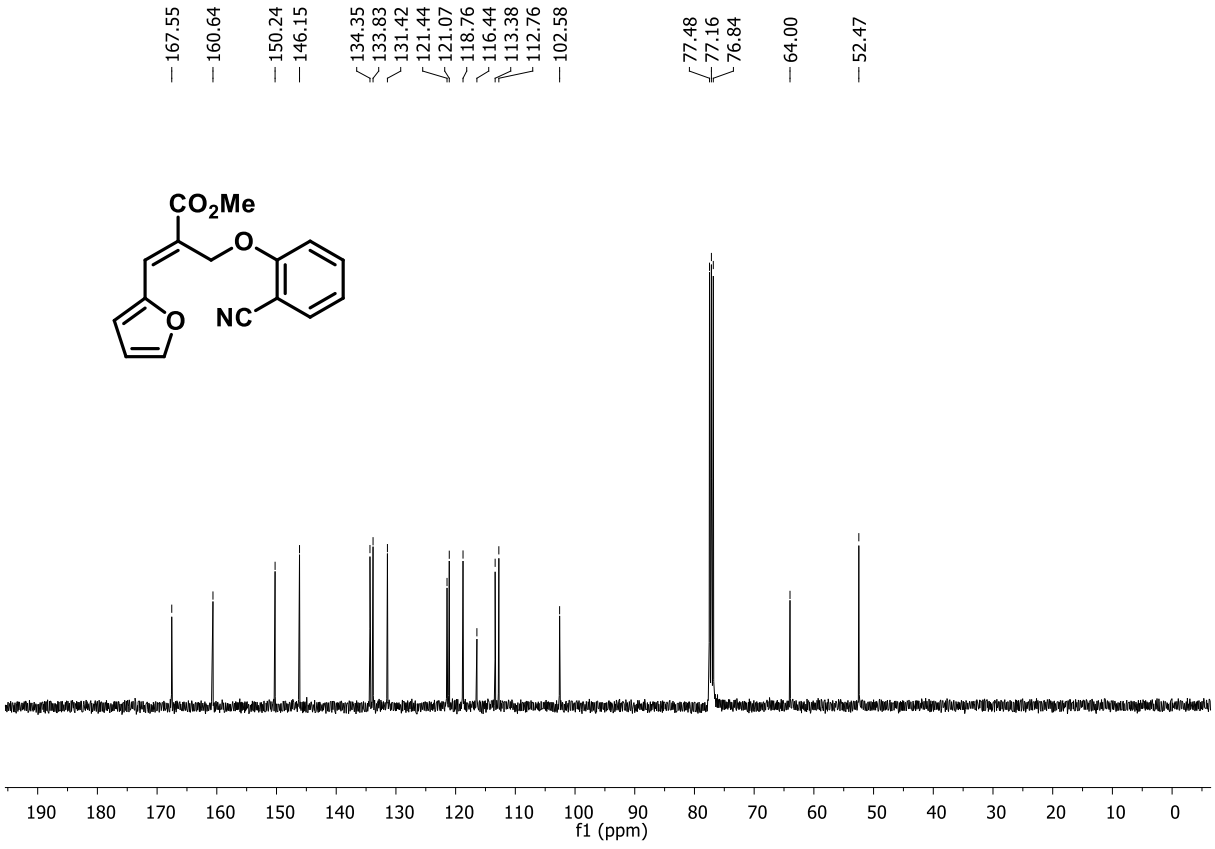


Methyl (*E*)-3-(4-bromophenyl)-2-((2-cyanophenoxy)methyl)acrylate (1q):

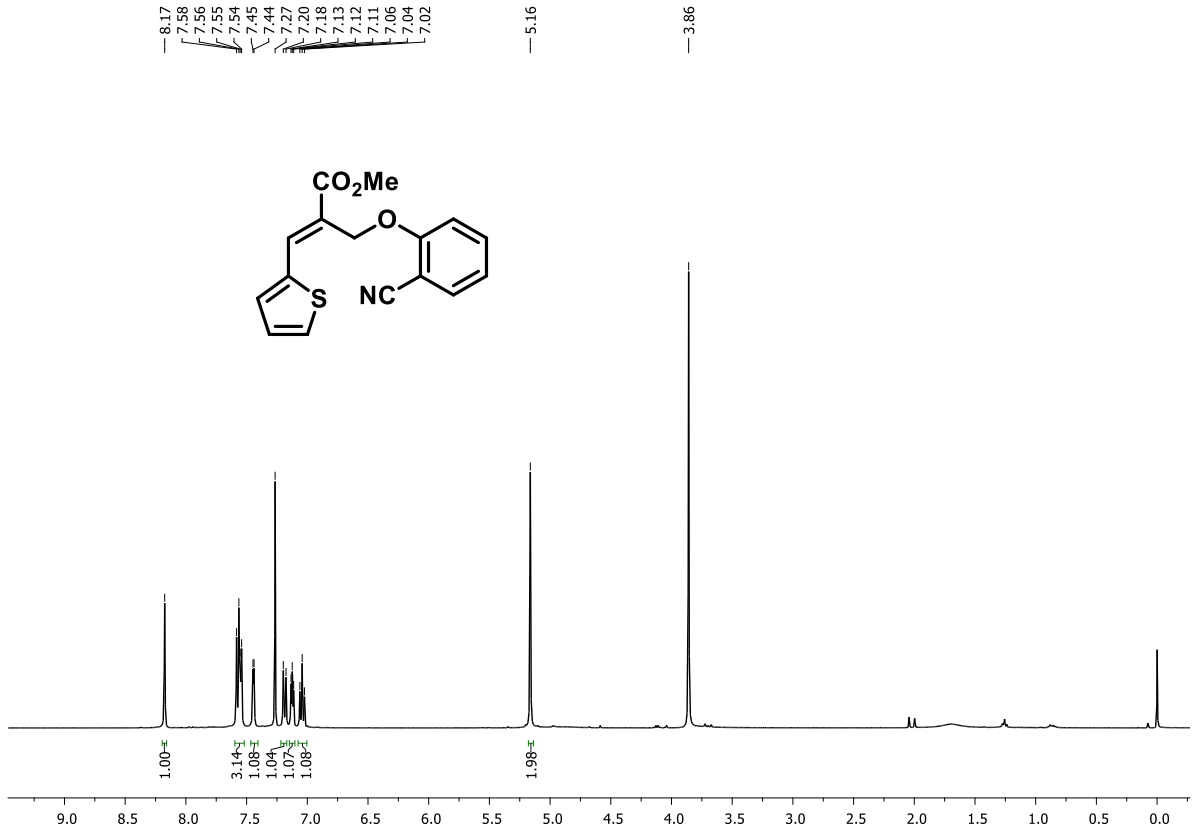


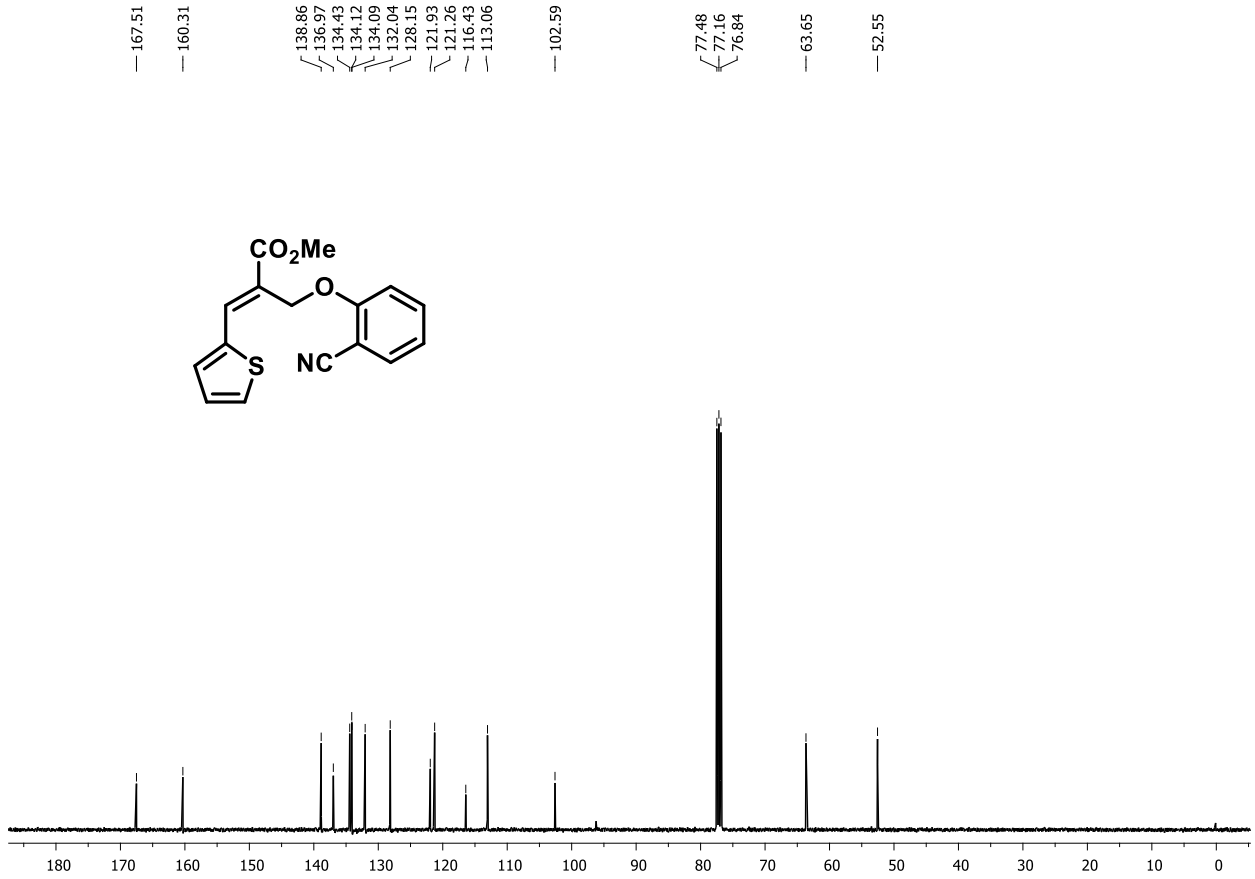
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(furan-2-yl)acrylate (1r)



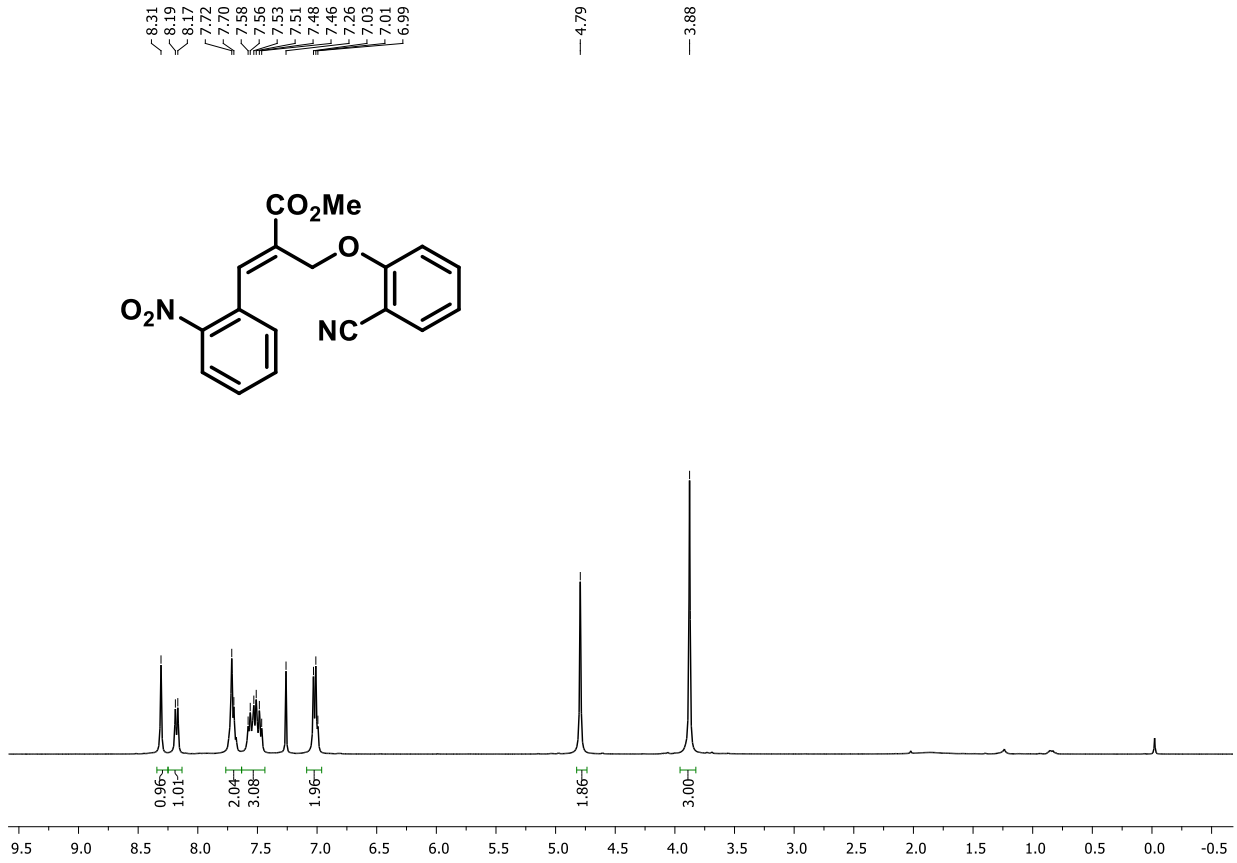


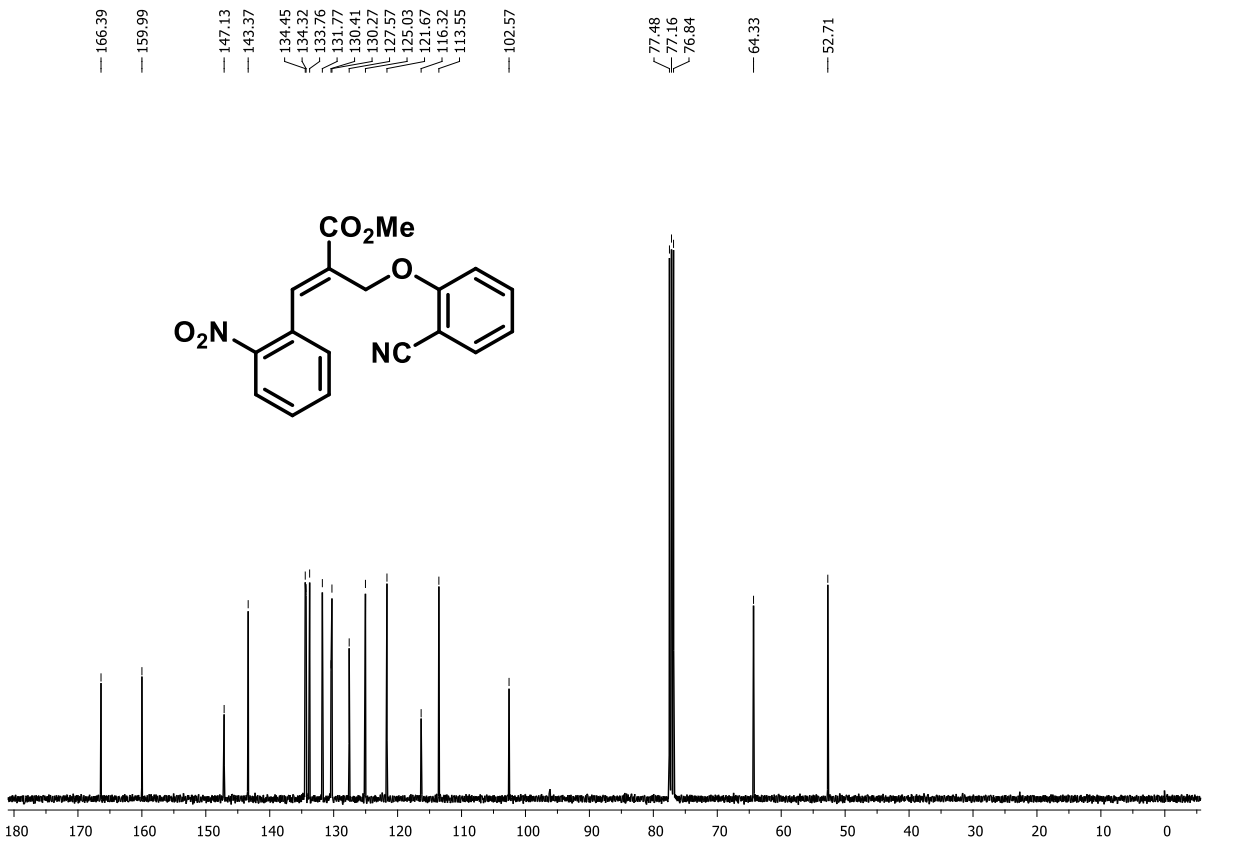
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(thiophen-2-yl) acrylate (1s)



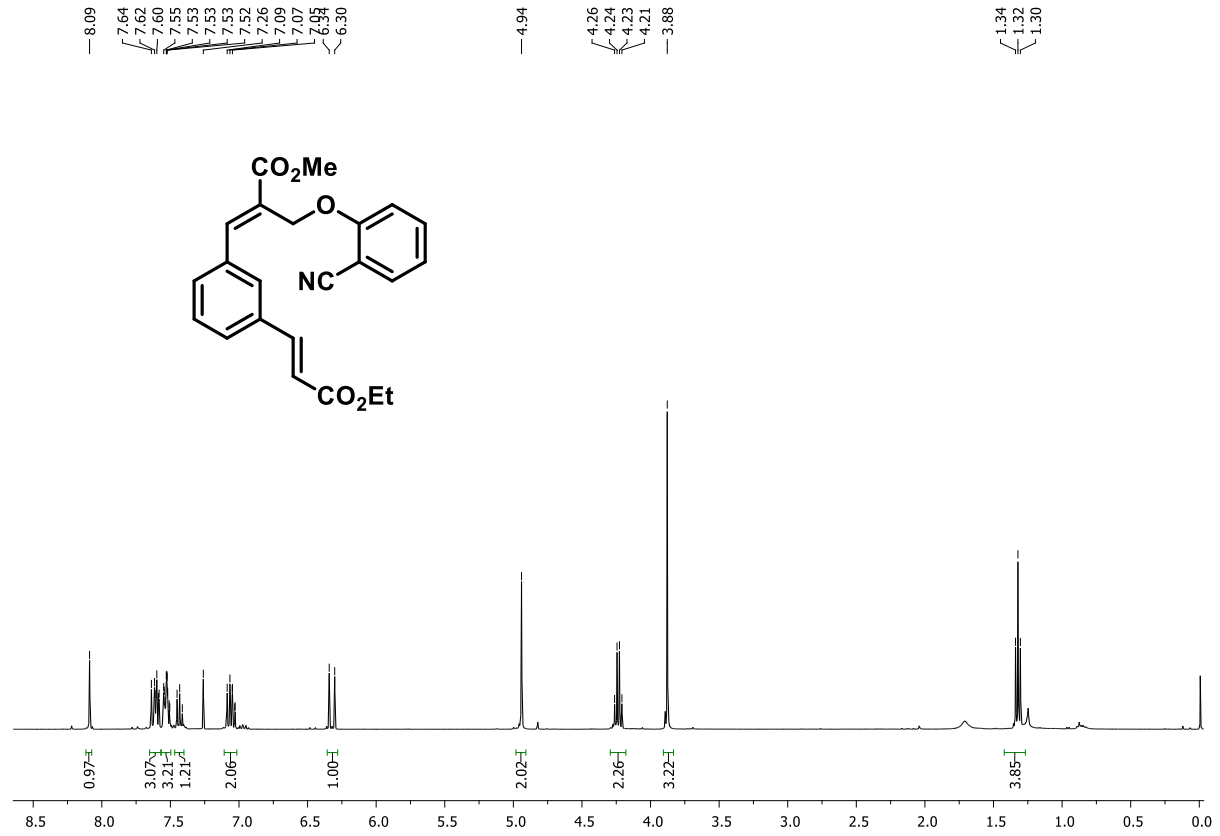


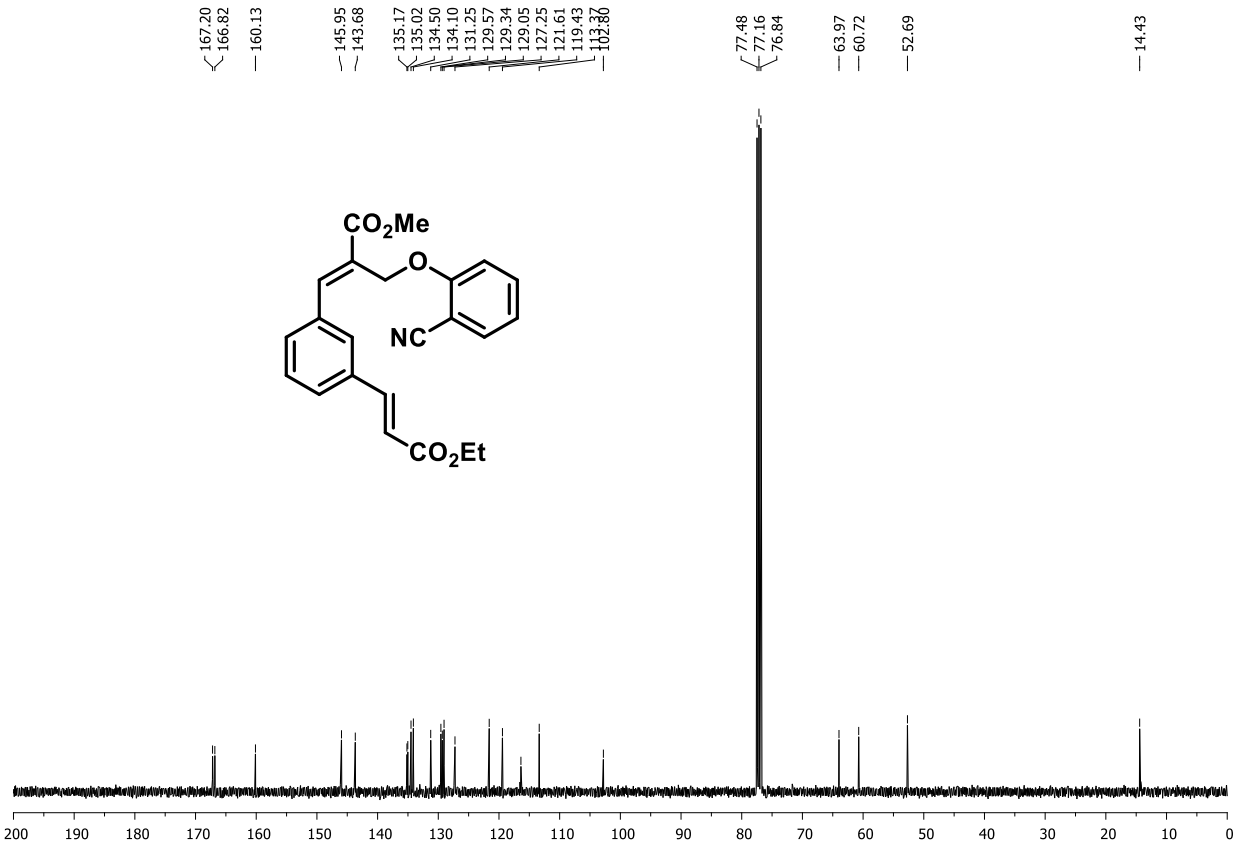
Methyl (E)-2-((2-cyanophenoxy)methyl)-3-(2-nitrophenyl)acrylate (1t)



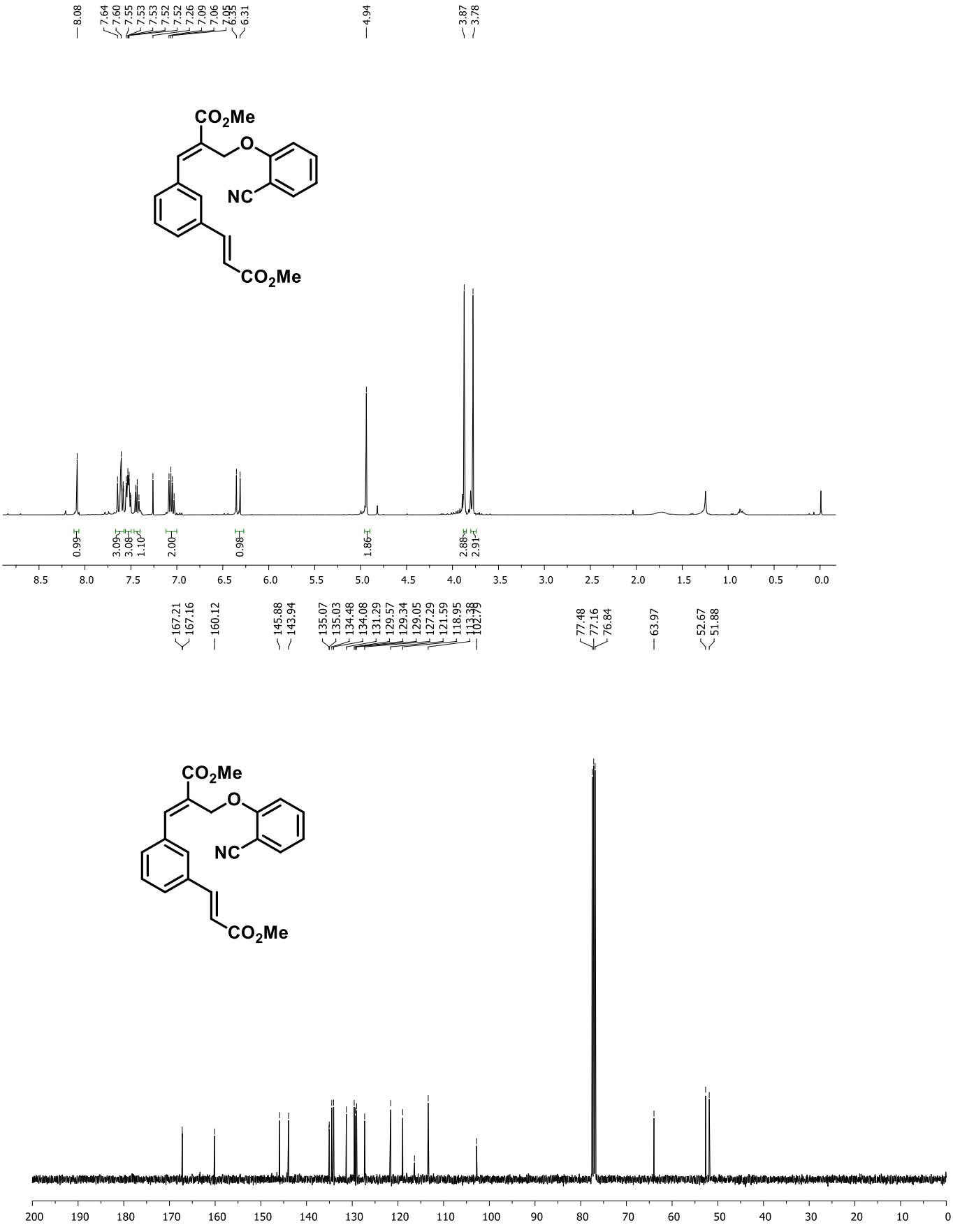


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (3a)

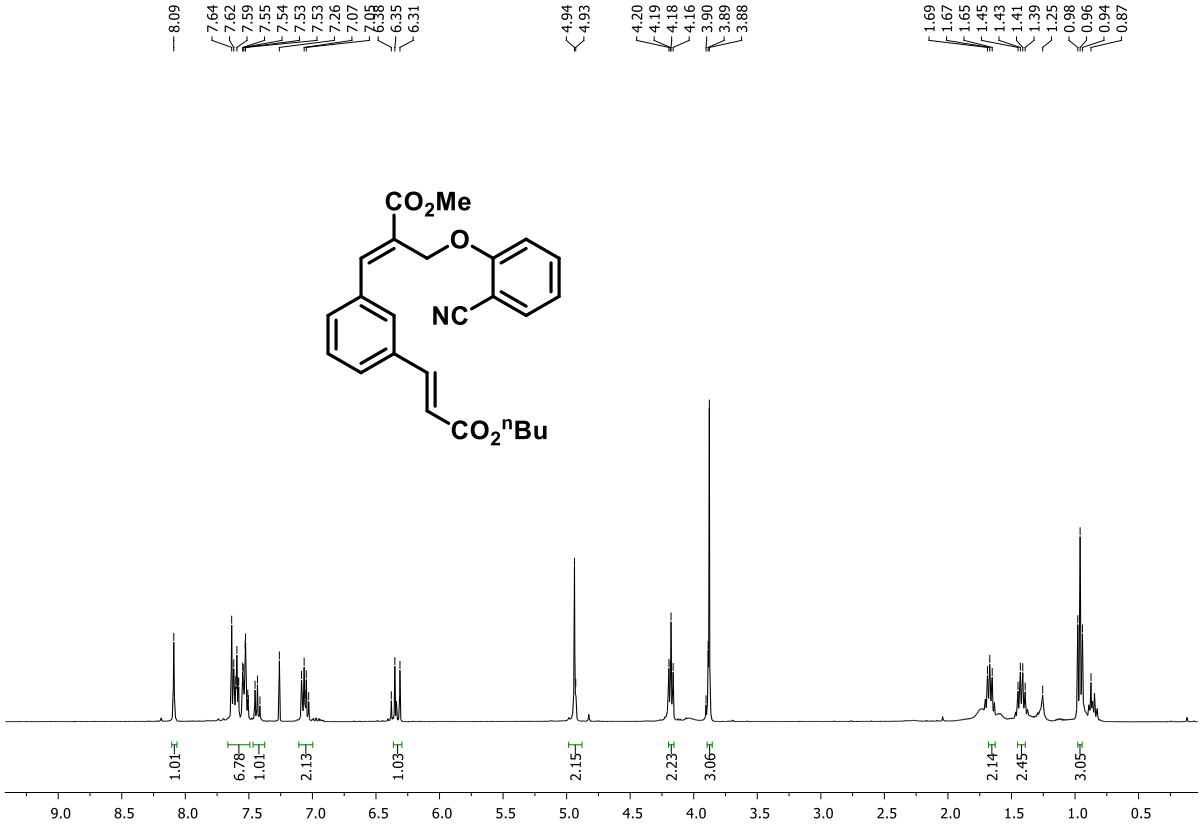


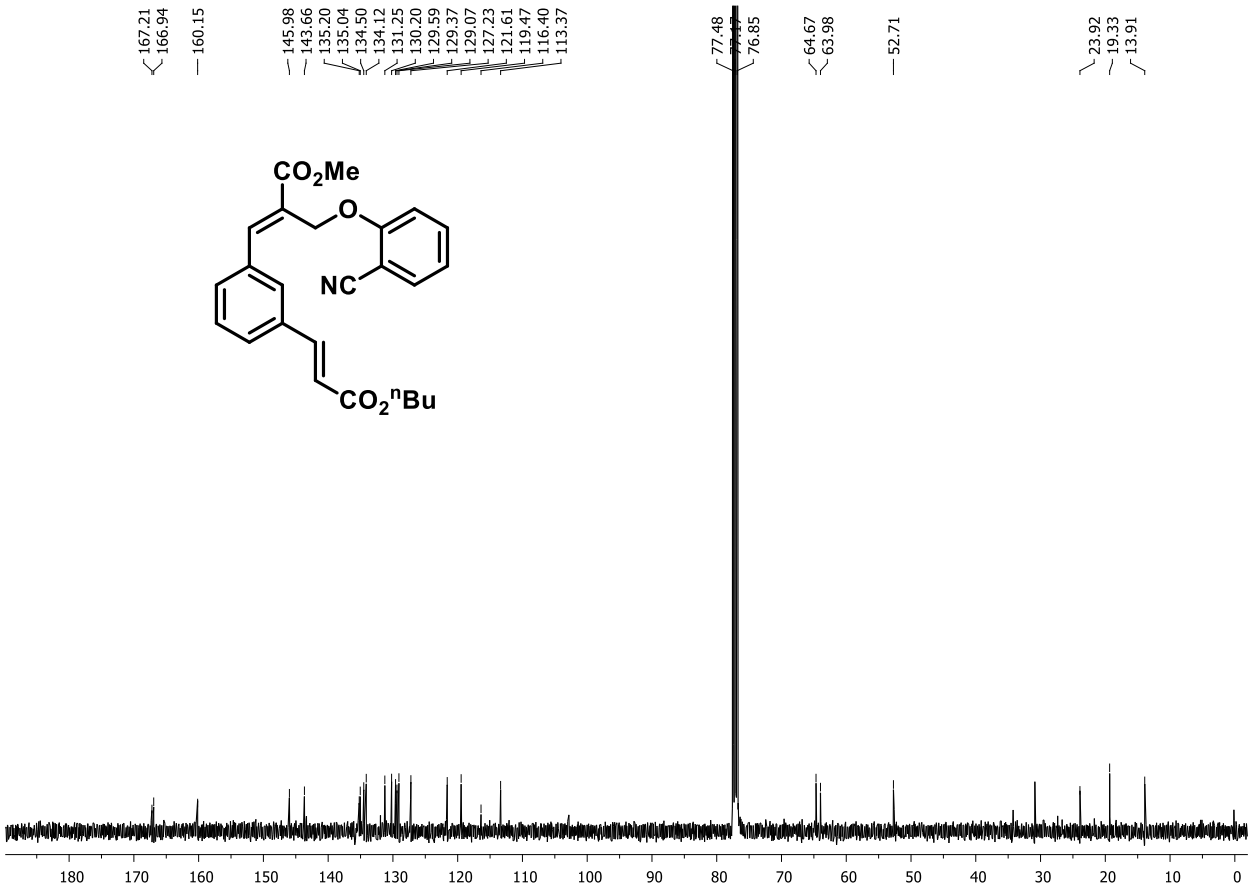


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl) acrylate (3b)

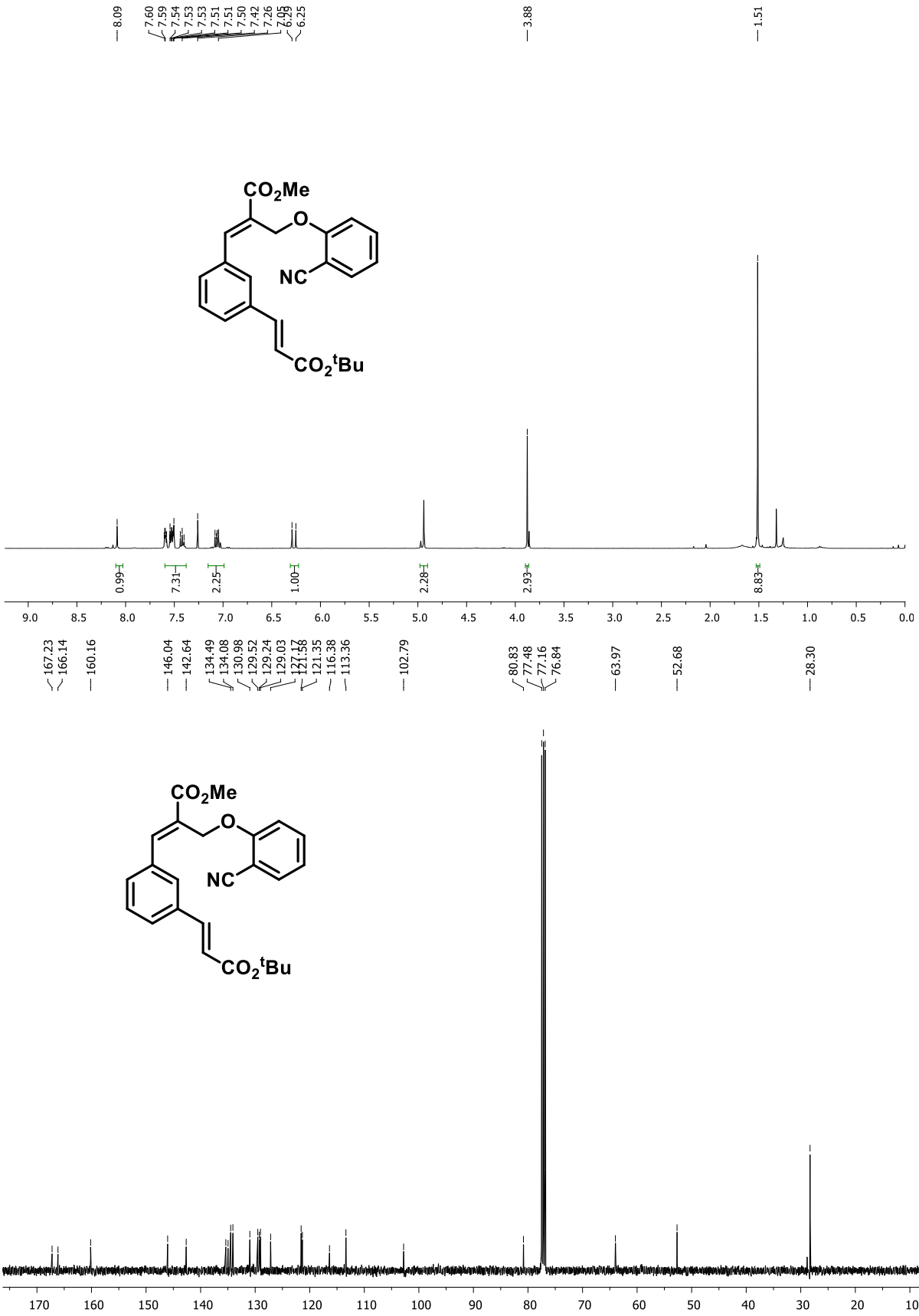


Methyl (*E*)-3-(3-((*E*)-3-butoxy-3-oxoprop-1-en-1-yl)phenyl)-2-((2 cyanophenoxy)methyl) acrylate (3c)

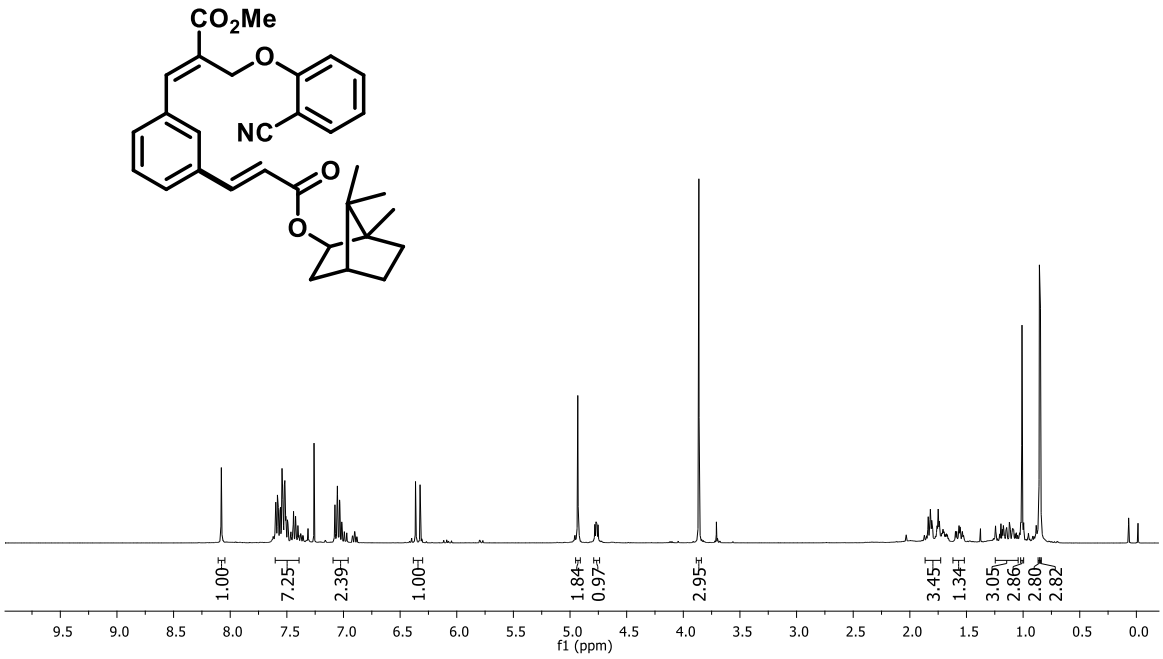


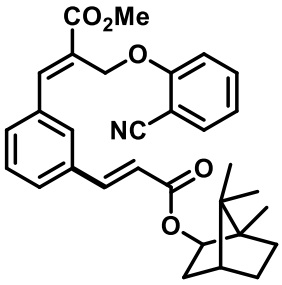


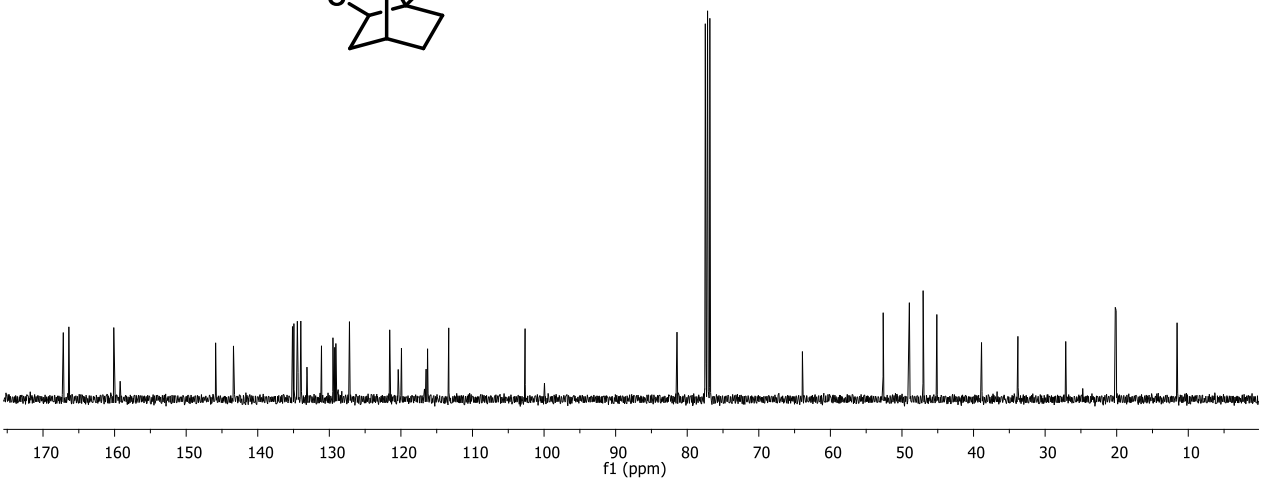
Methyl (*E*)-3-(3-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl) phenyl)-2-((2cyanophenoxy) methyl) acrylate (3d)



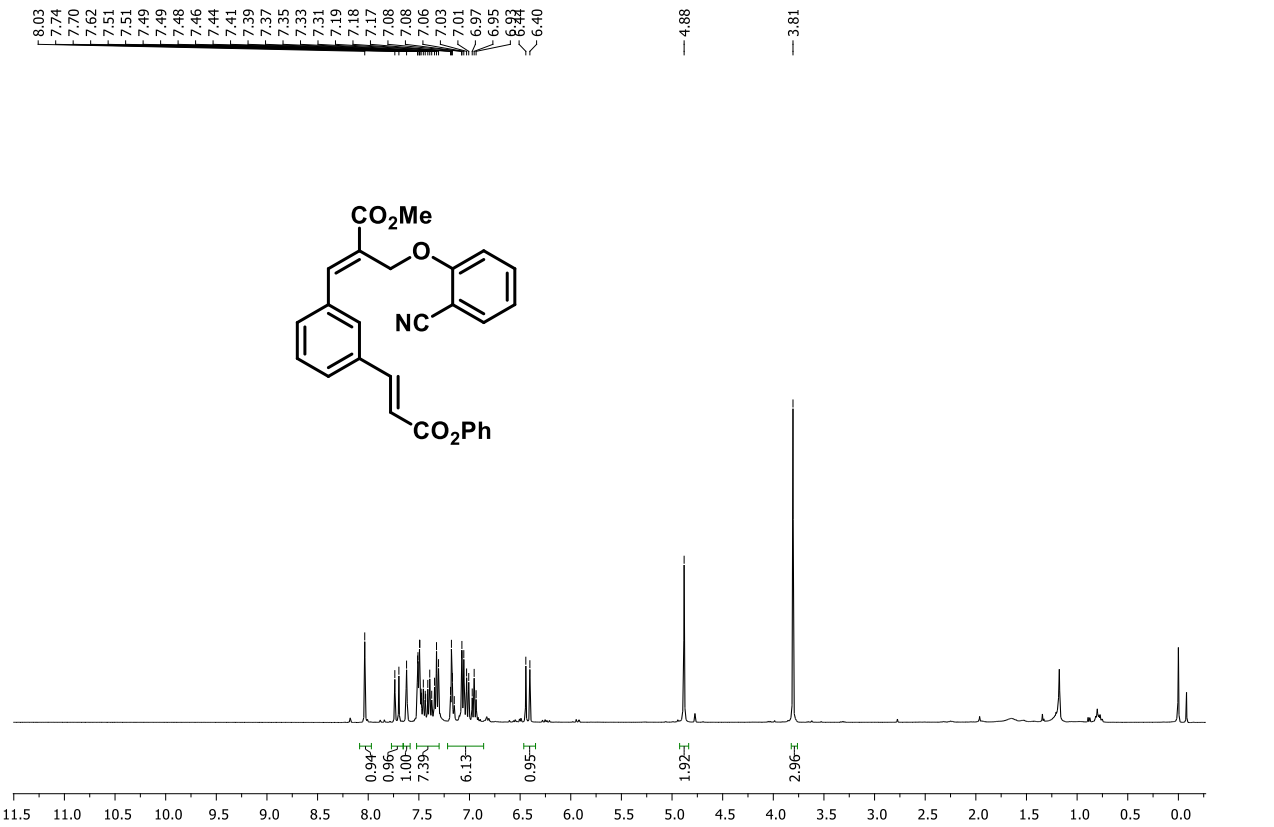
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-oxo-3-(((1*R*,2*R*,4*R*)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)oxy)prop-1-en-1-yl)phenyl)acrylate (3e)

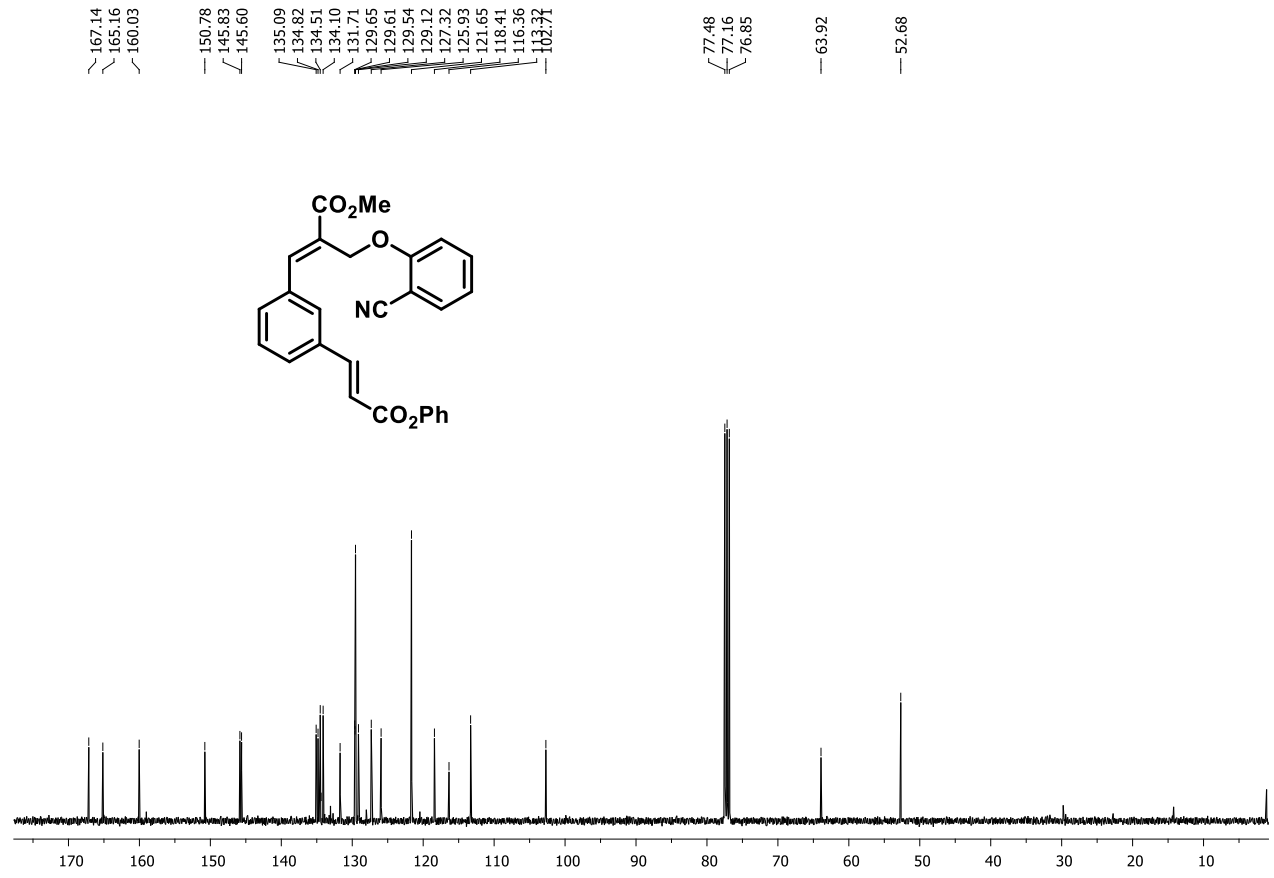




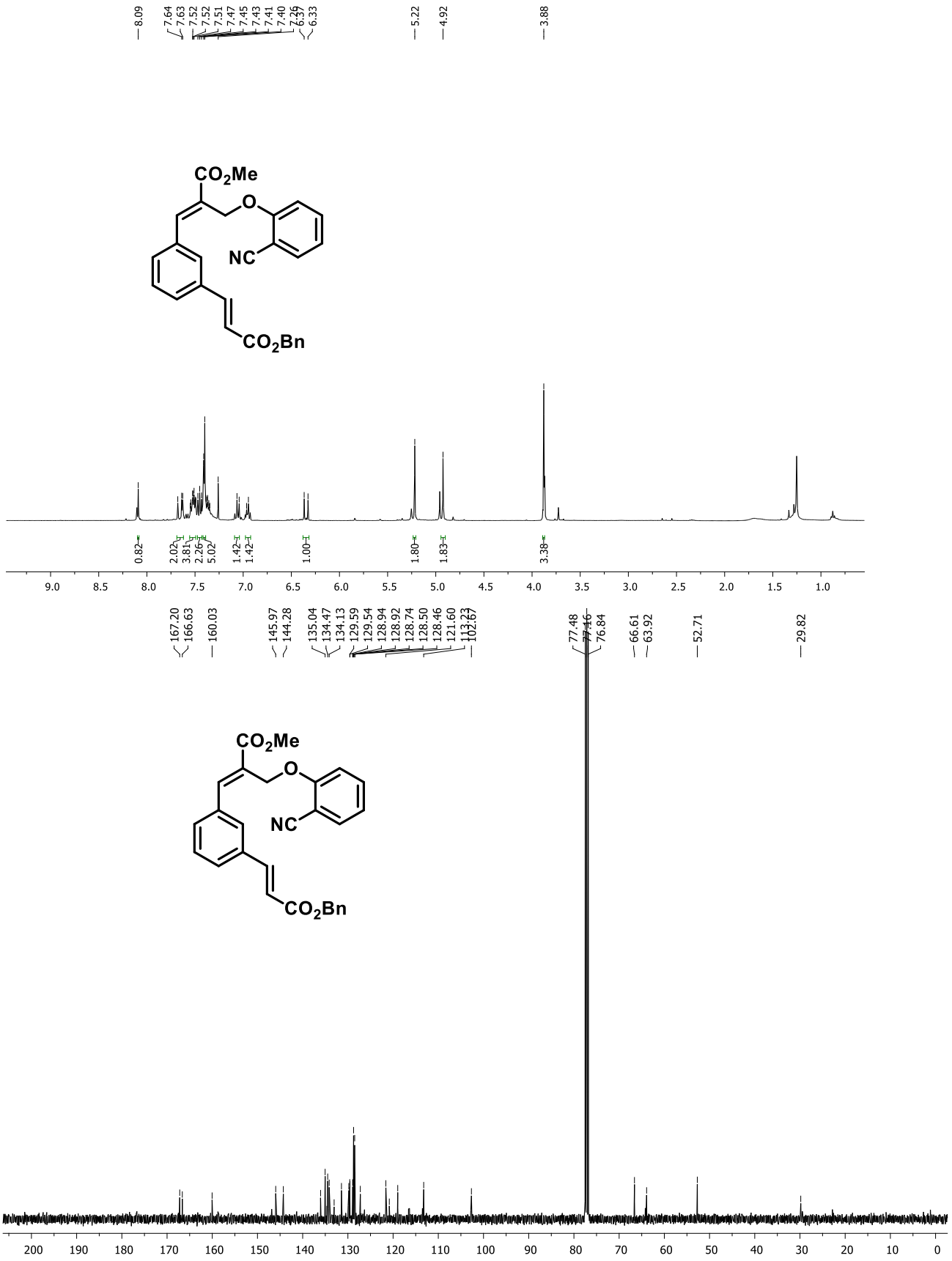


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-oxo-3-phenoxyprop-1-en-1-yl)phenyl) acrylate (3f)

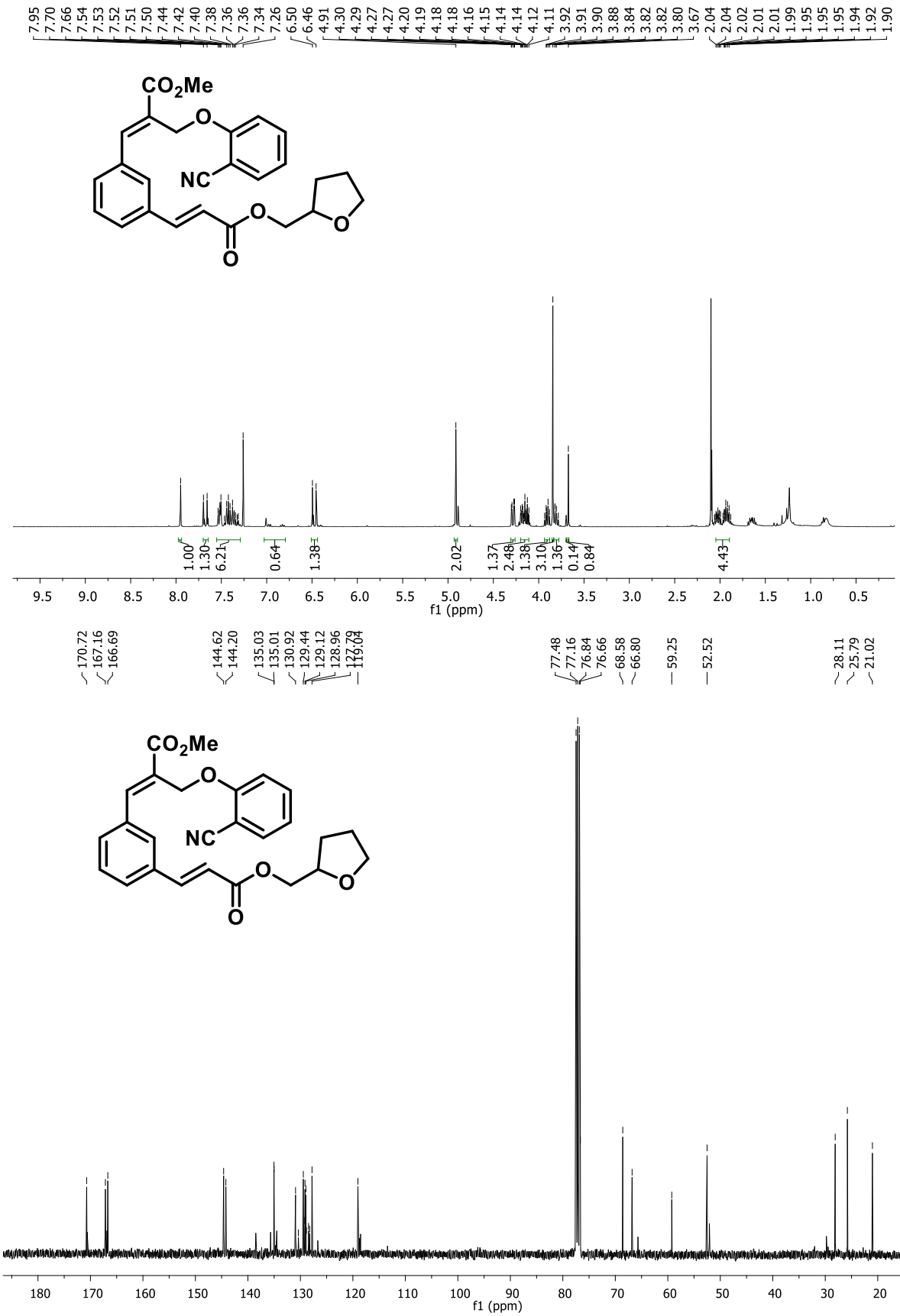




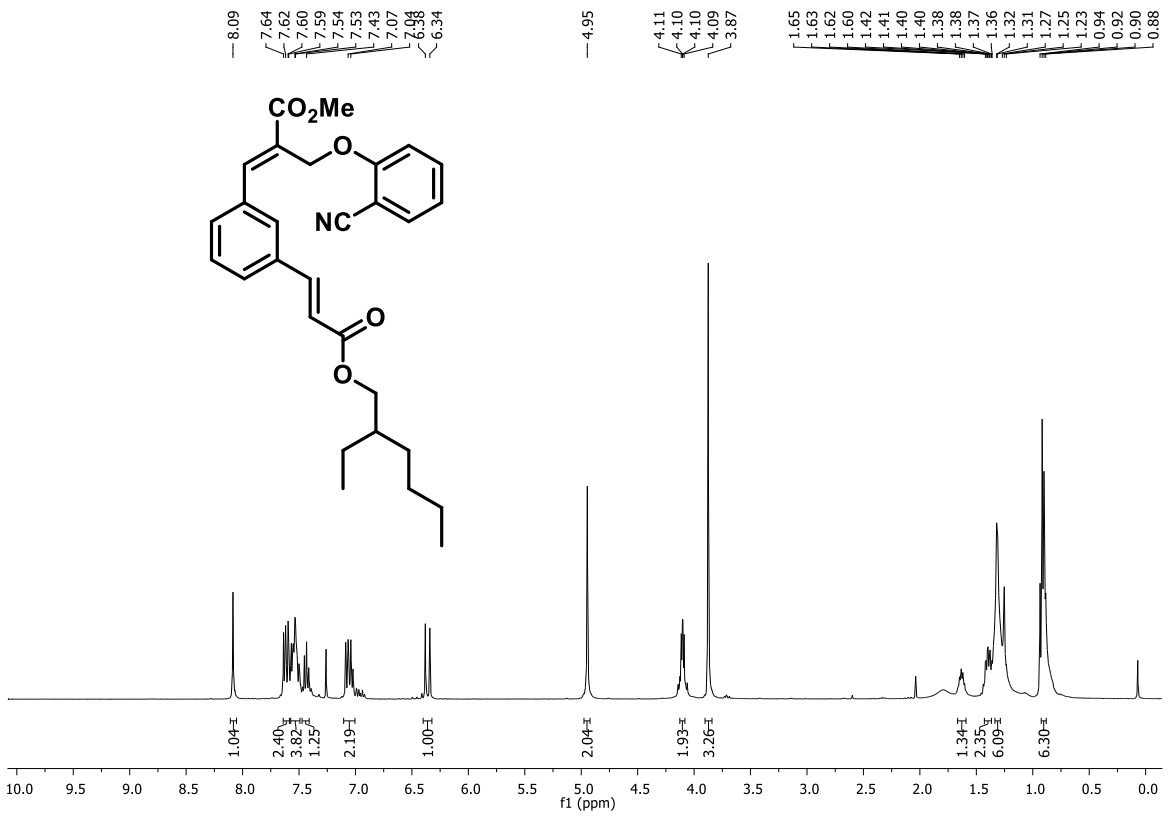
Methyl (*E*)-3-(3-((*E*)-3-(benzyloxy)-3-oxoprop-1-en-1-yl) phenyl)-2- ((2-cyanophenoxy) methyl) acrylate (3g)

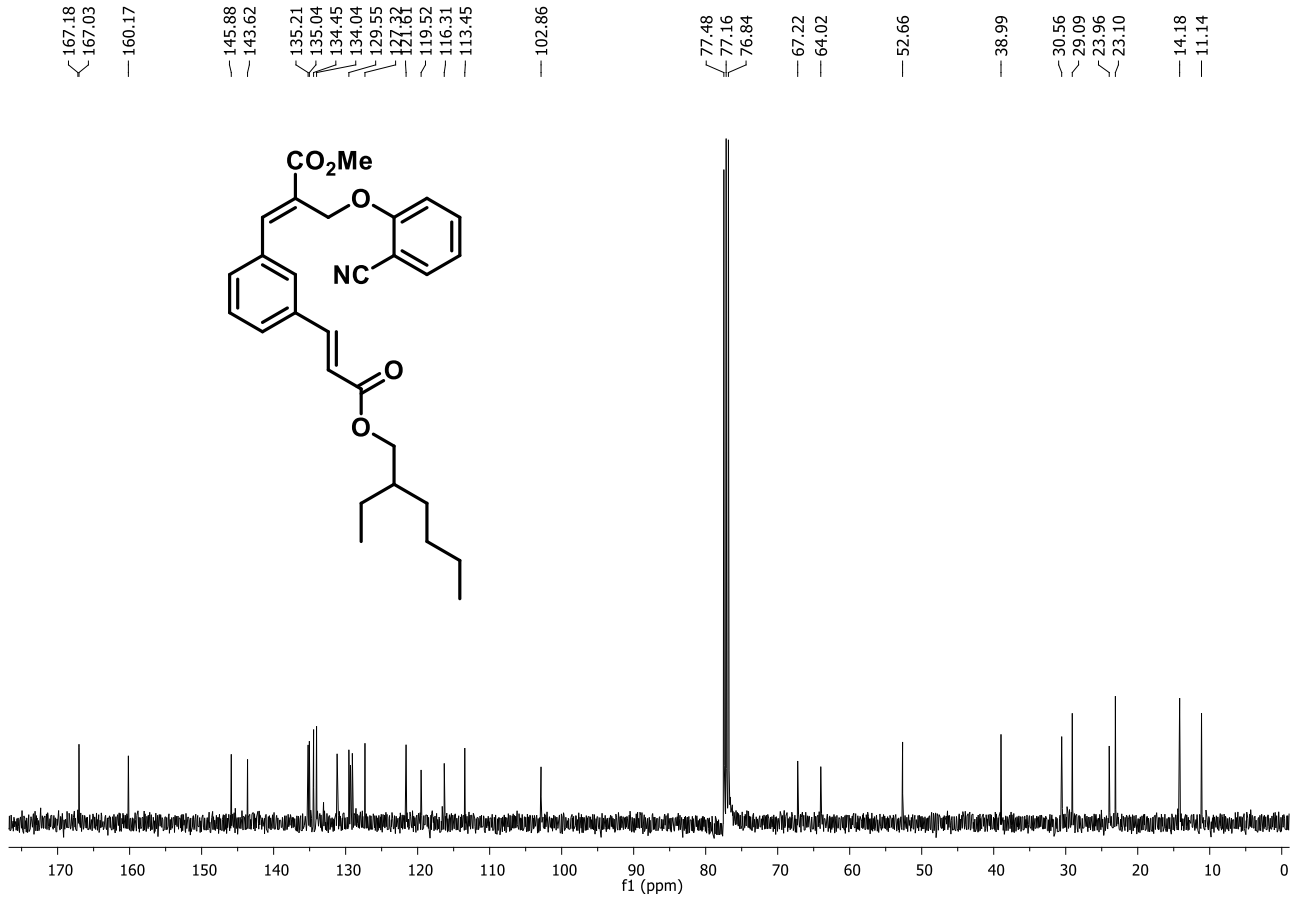


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-oxo-3-((tetrahydrofuran-2-yl)methoxy)prop-1-en-1-yl)phenyl) acrylate (3h)



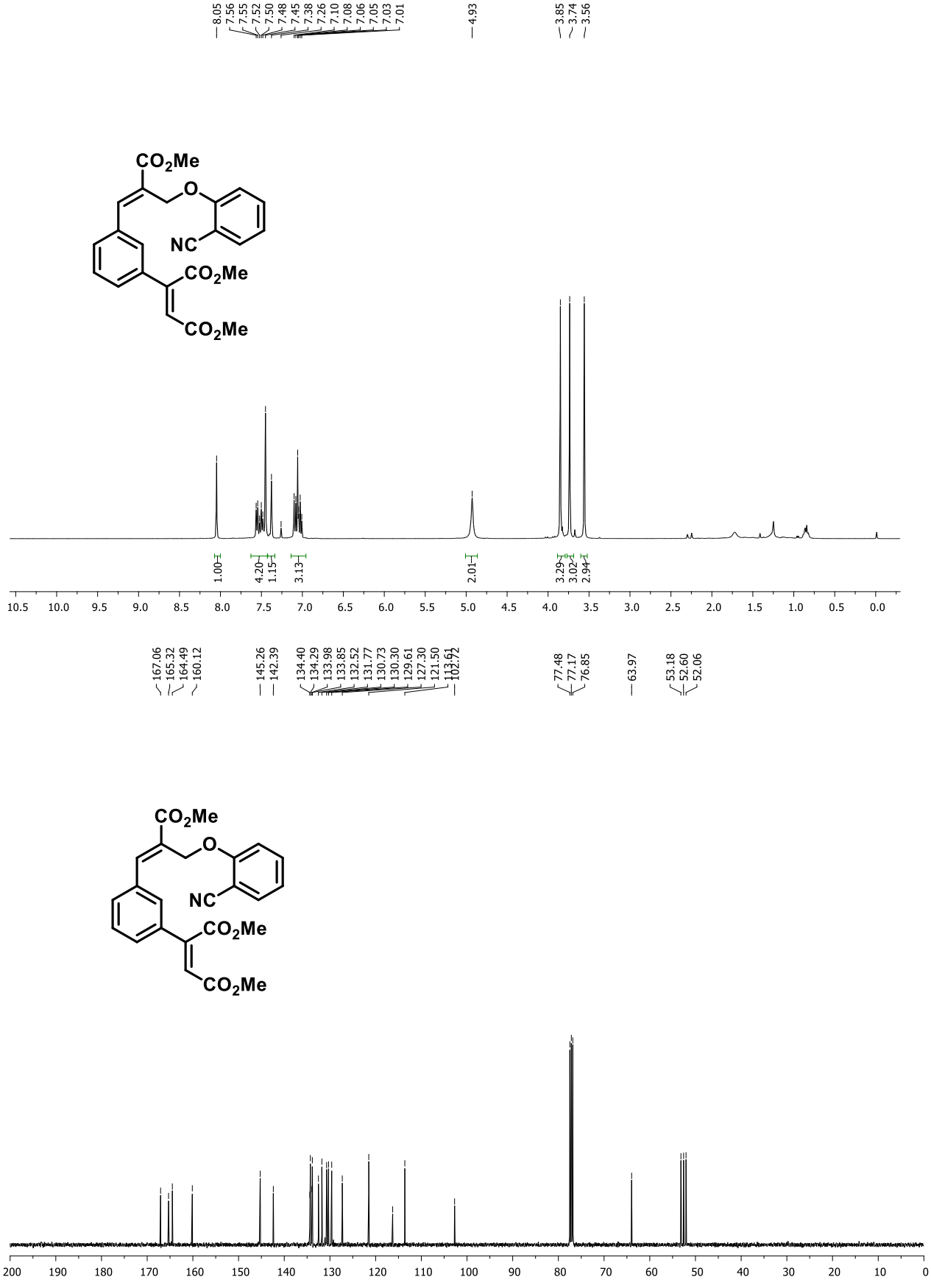
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl) phenyl) acrylate (3i)



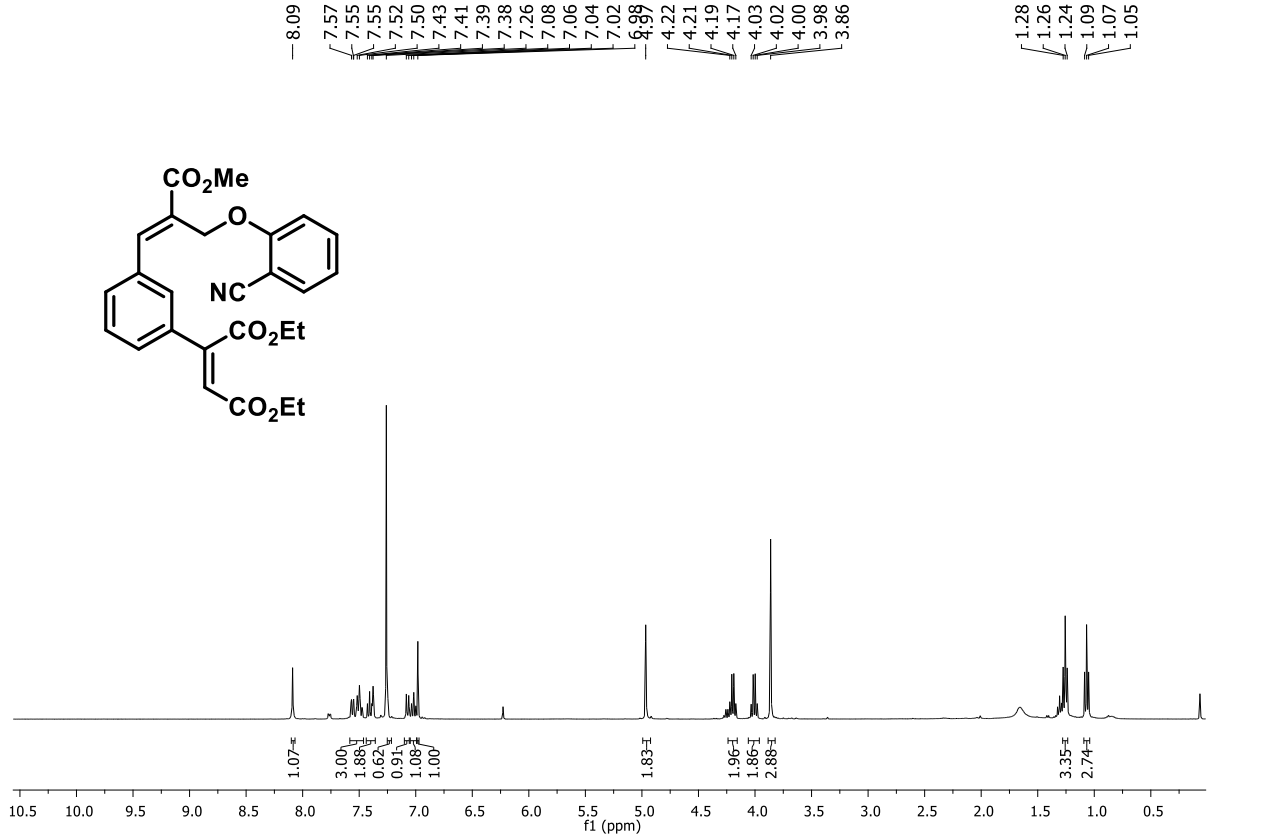


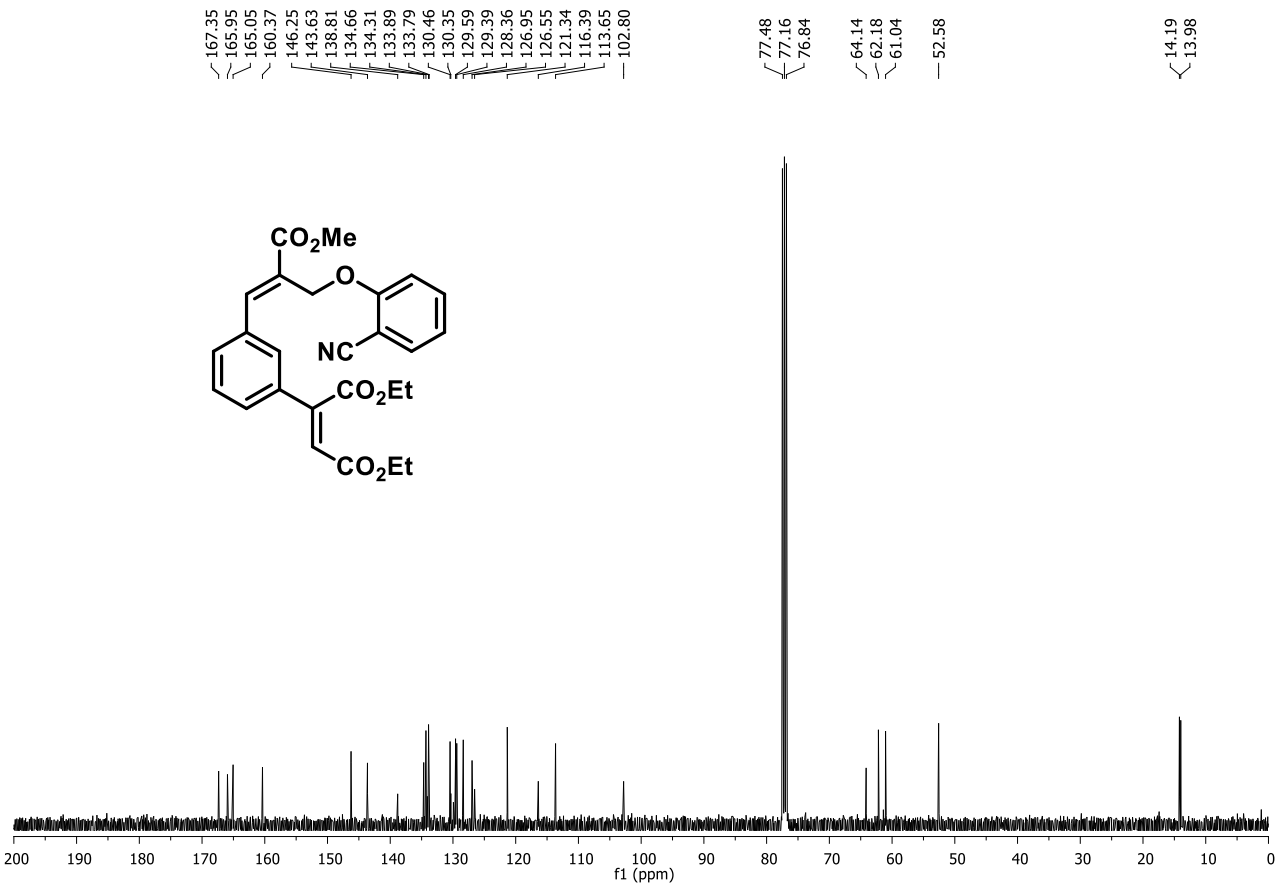
Methyl (*E*)-3-(3-((E)-3-(3-(acryloyloxy) phenoxy)-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (3j)

Dimethyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (3k)

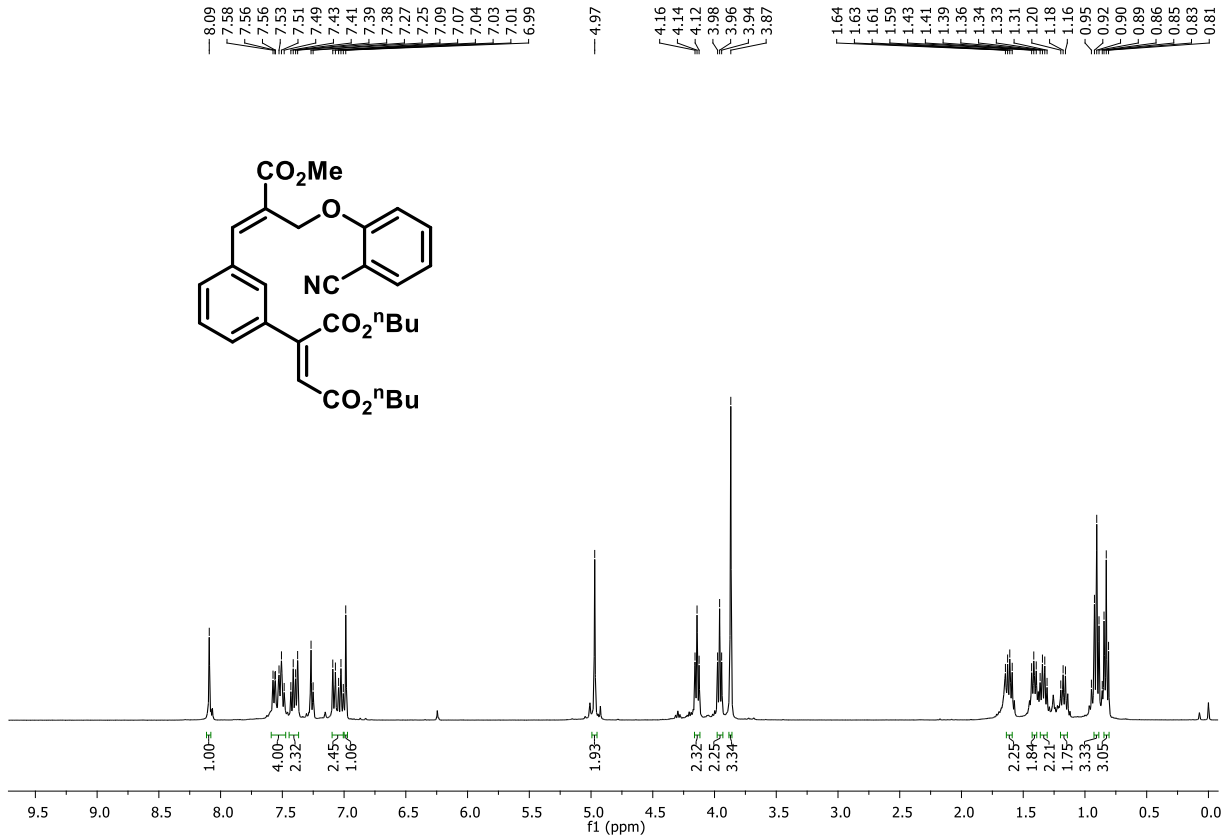


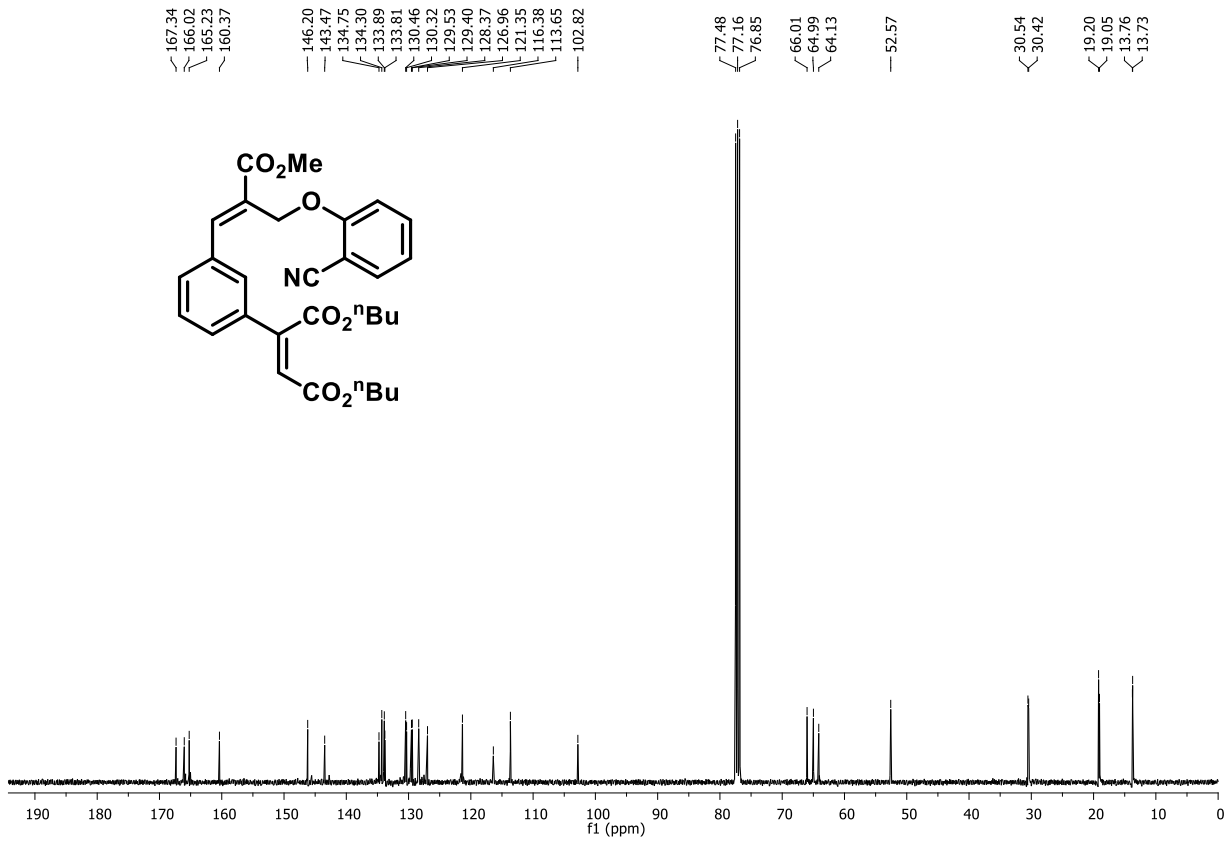
Diethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (3l)



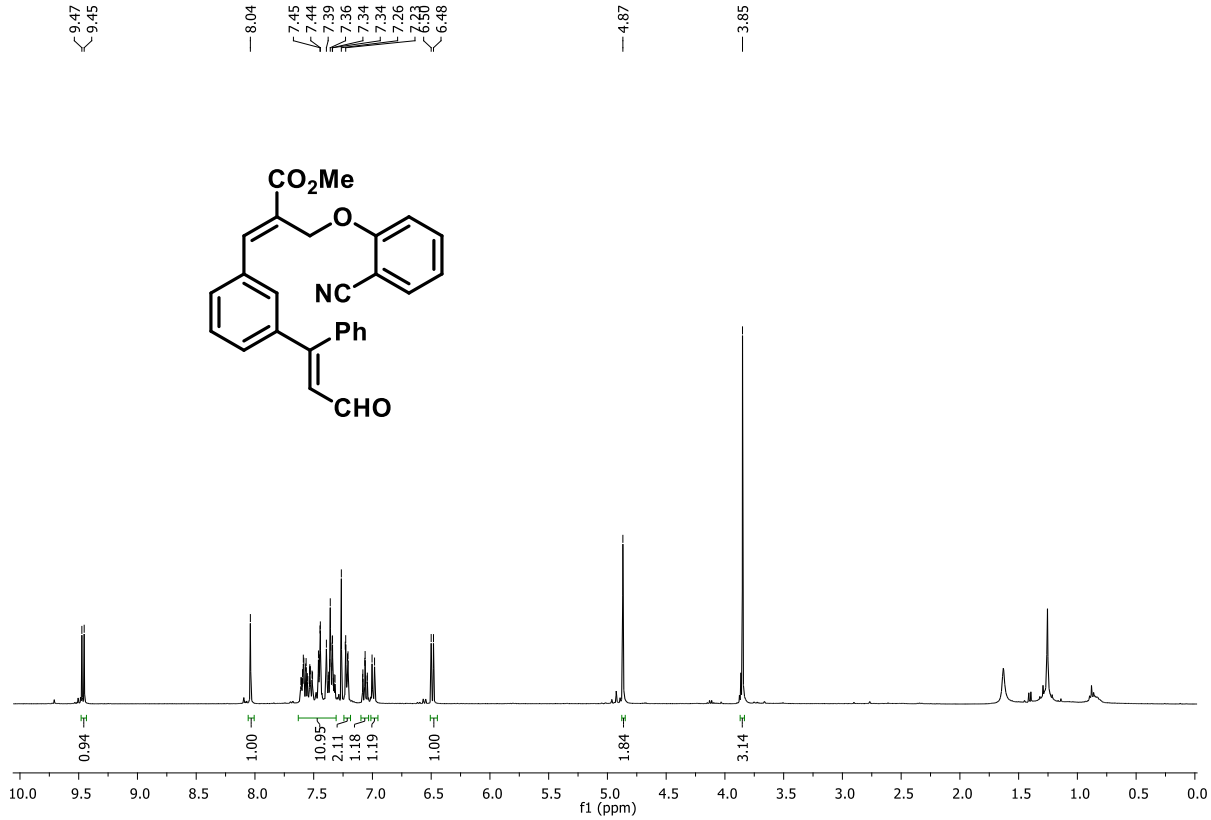


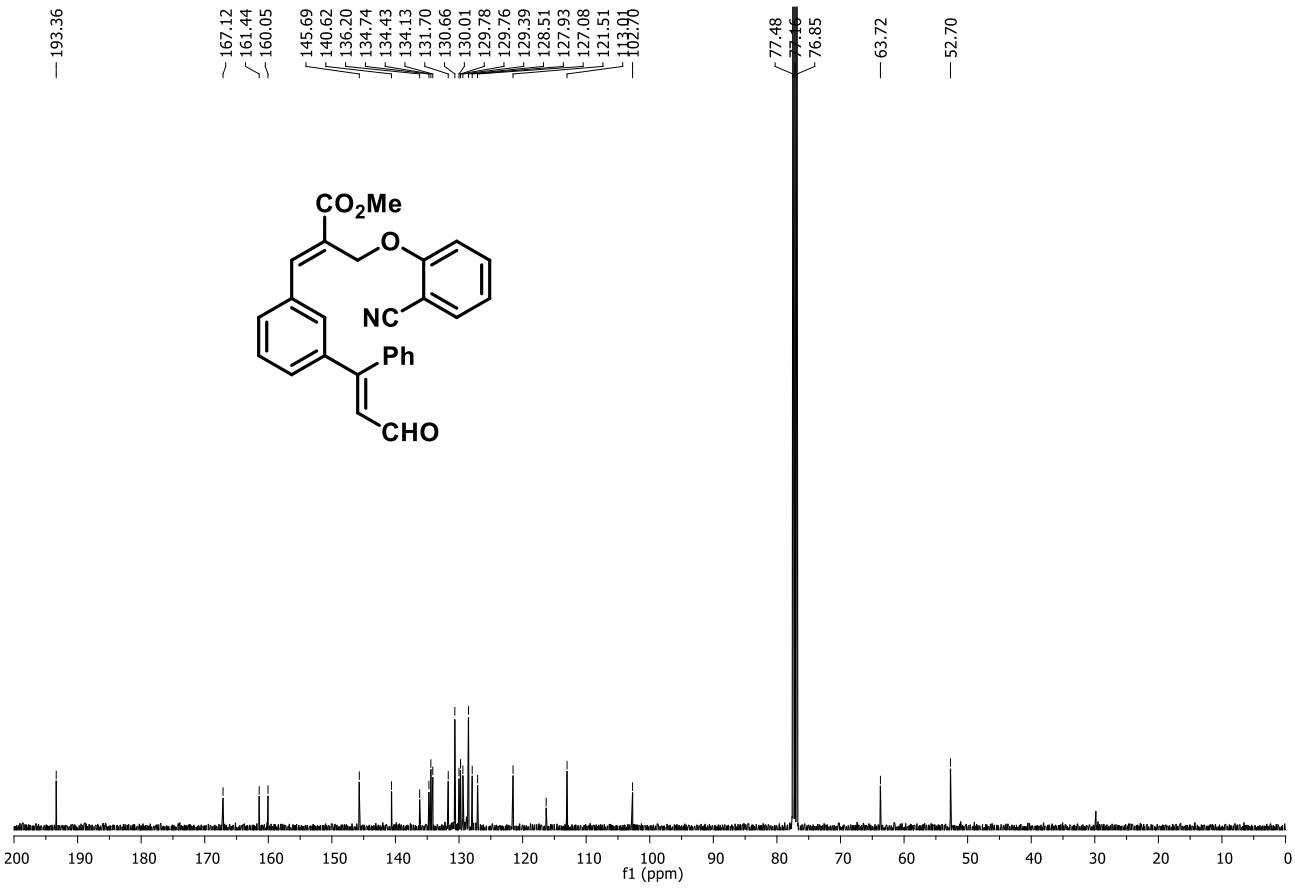
Dibutyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (3m)



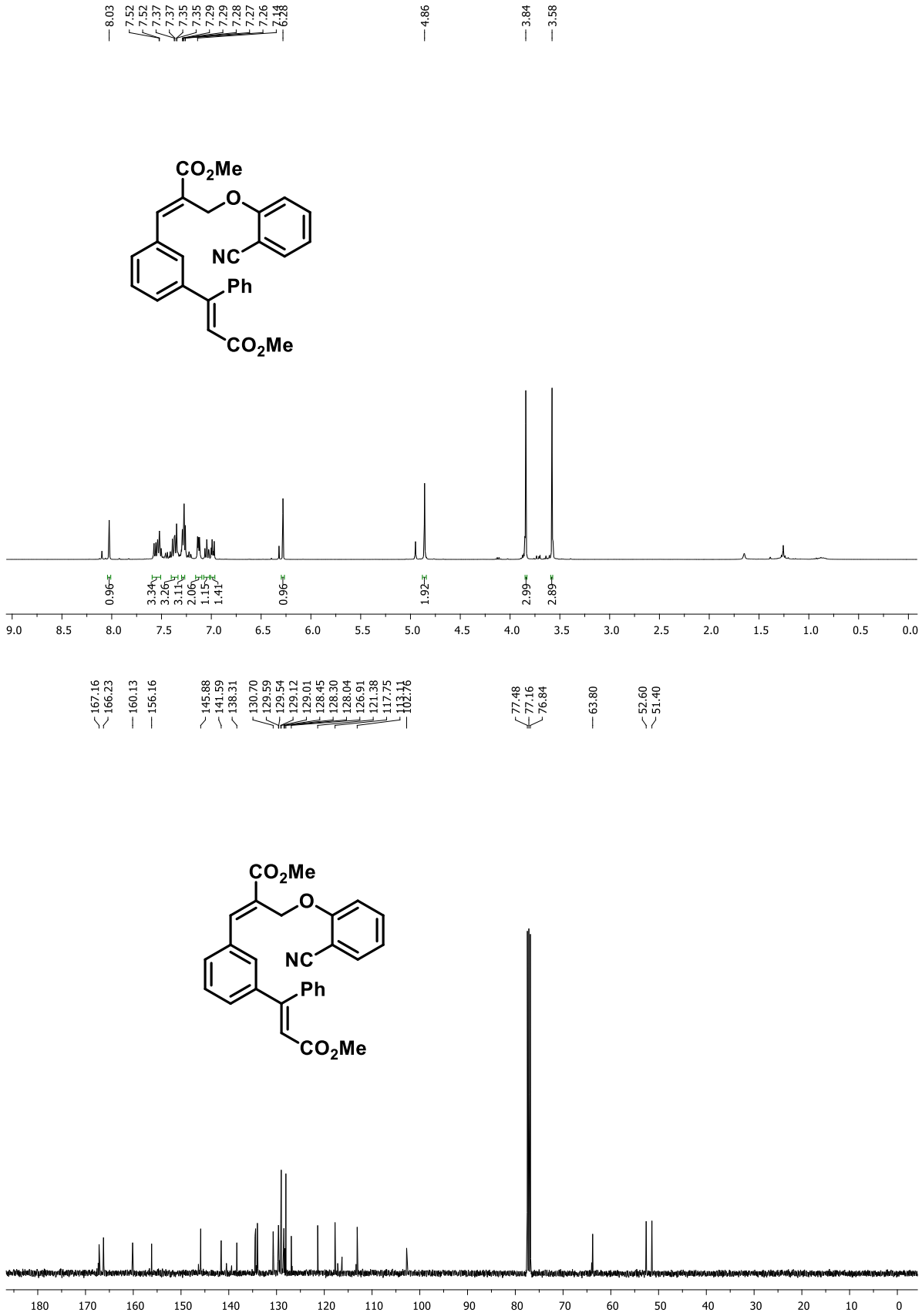


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-oxo-1-phenylprop-1-en-1-yl) phenyl) acrylate (3n)

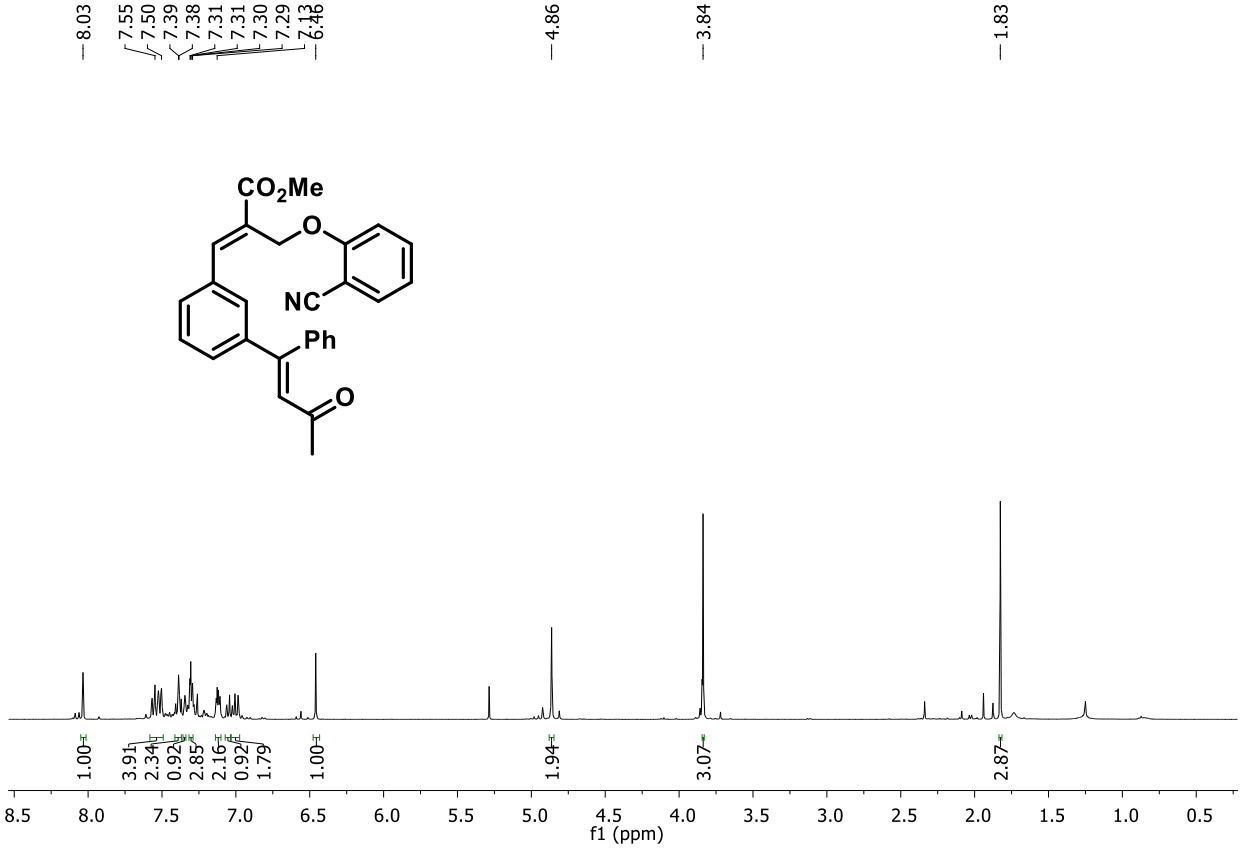


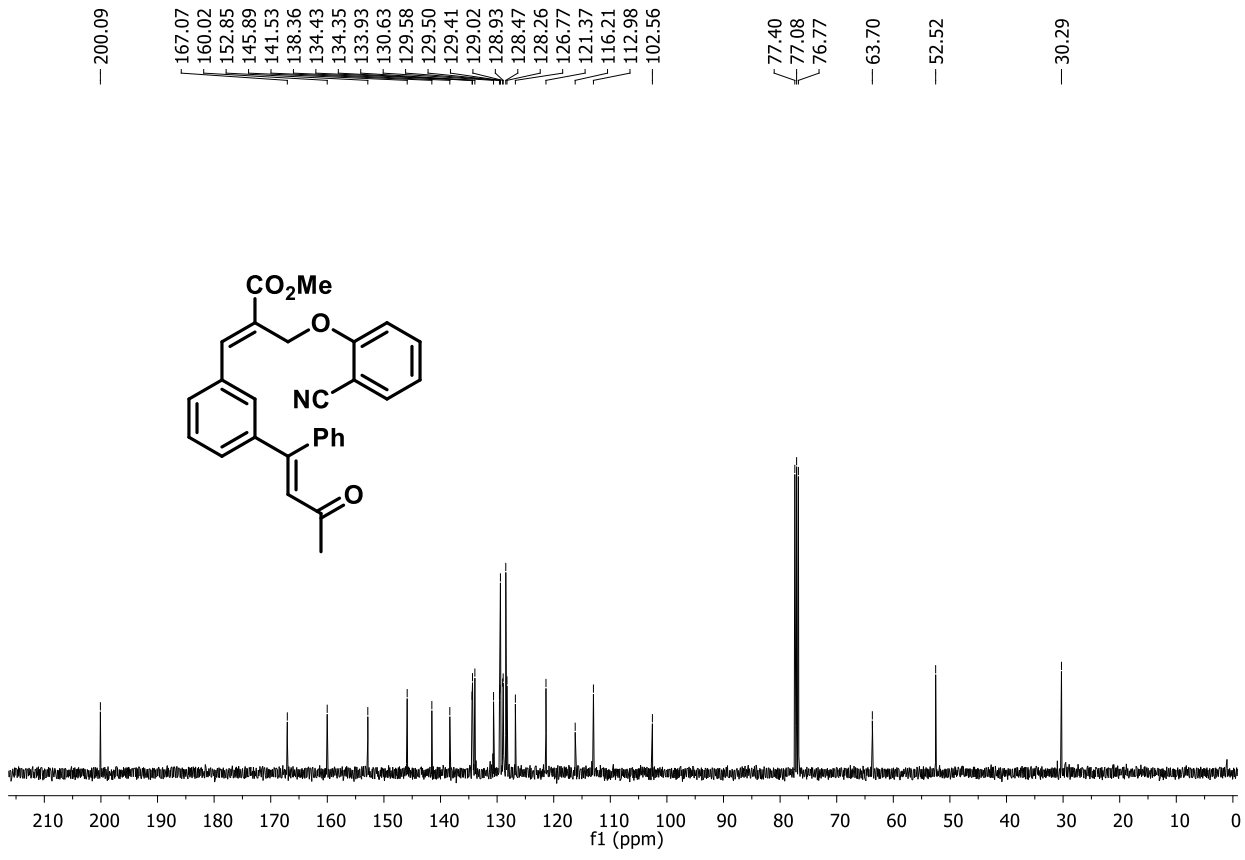


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl) phenyl) acrylate (3o)

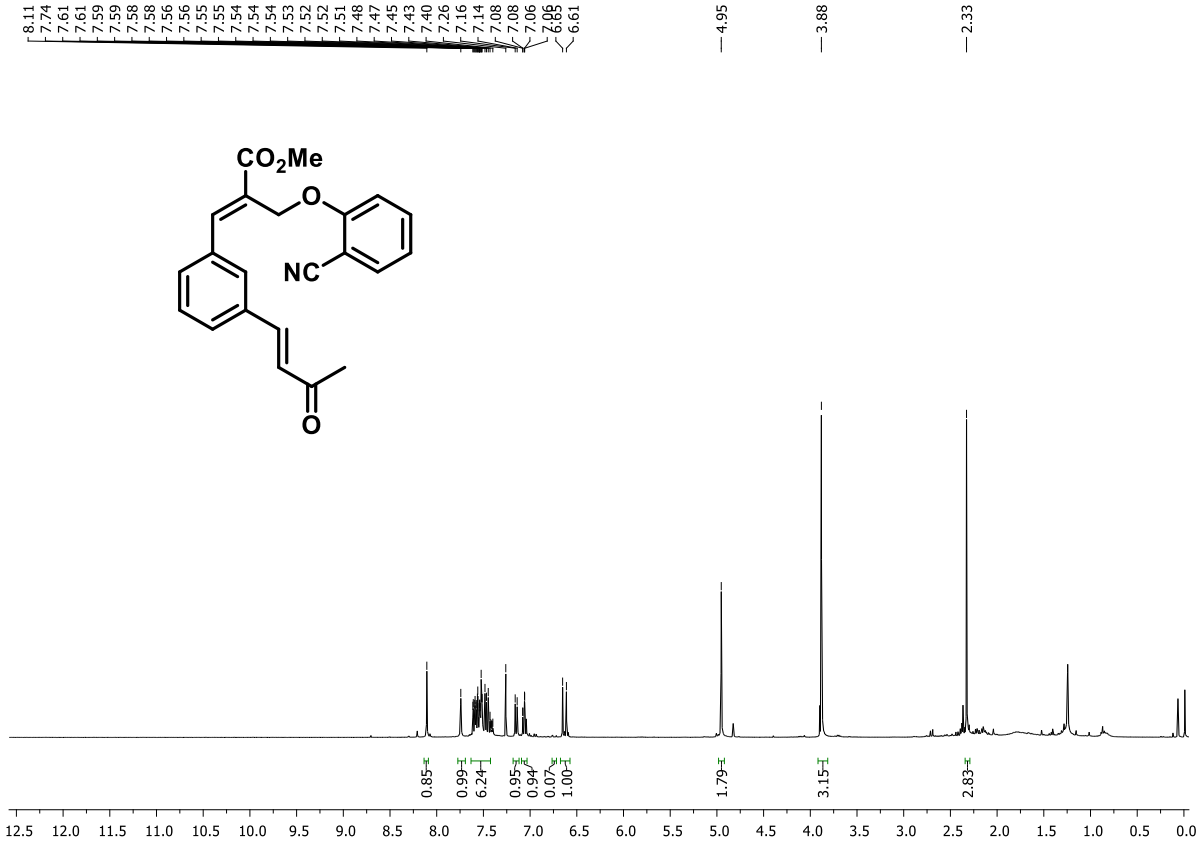


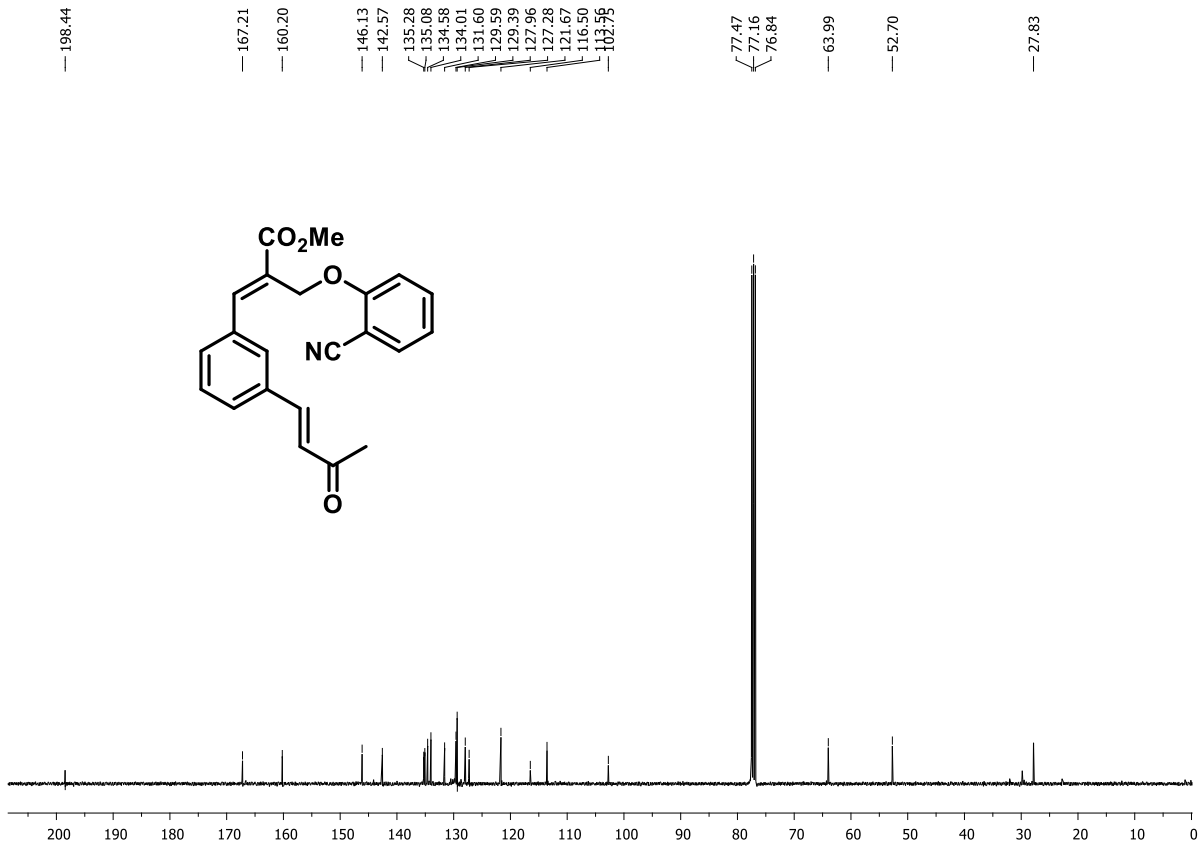
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-oxo-1-phenylbut-1-en-1-yl) phenyl) acrylate (3p)



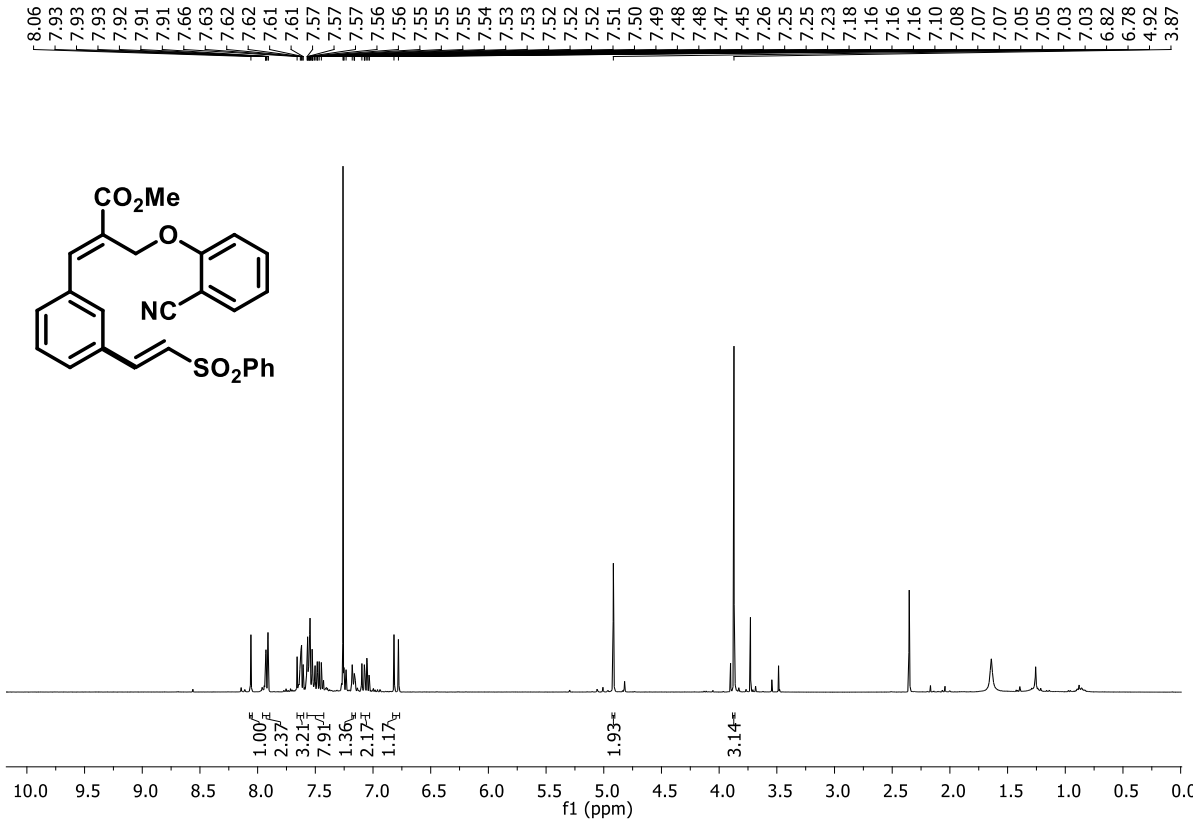


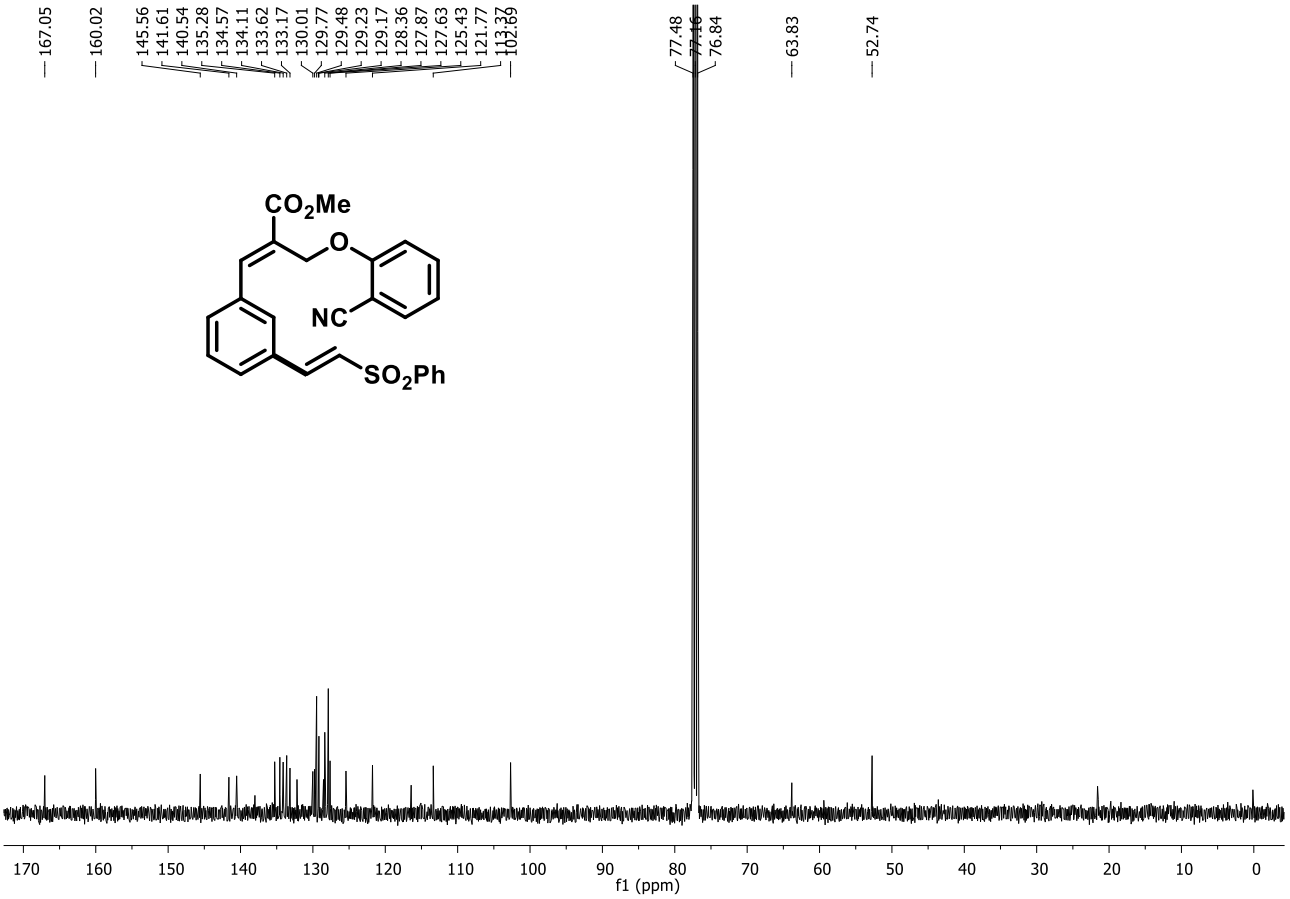
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (3q)



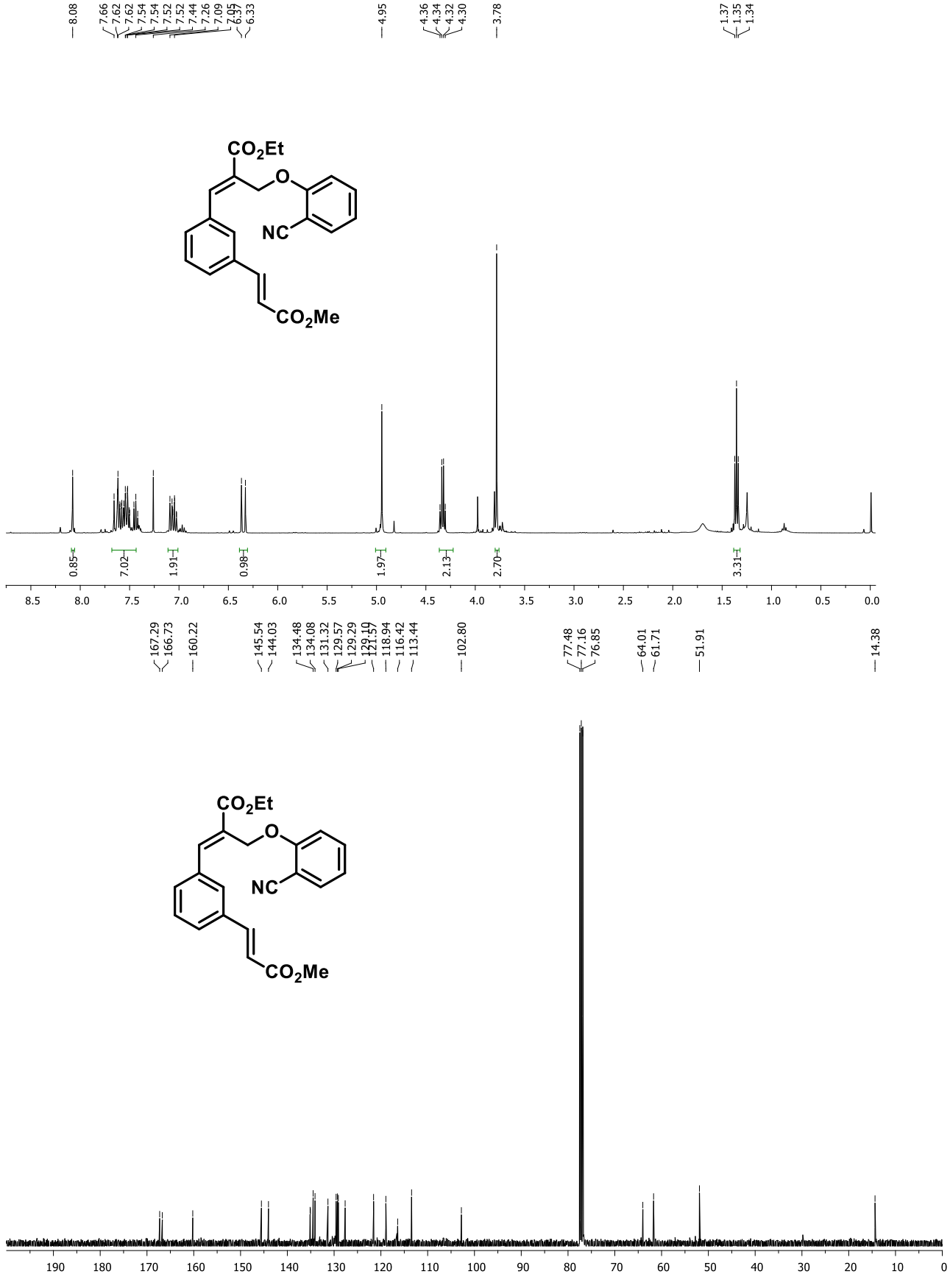


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-2-(phenylsulfonyl)vinyl)phenyl)acrylate (3r)

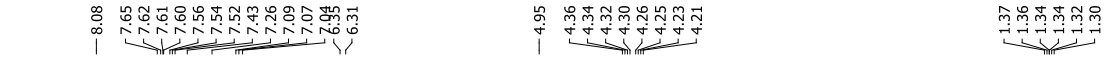


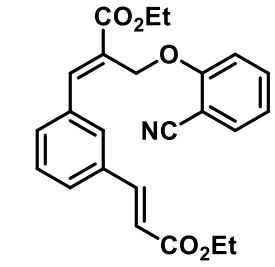


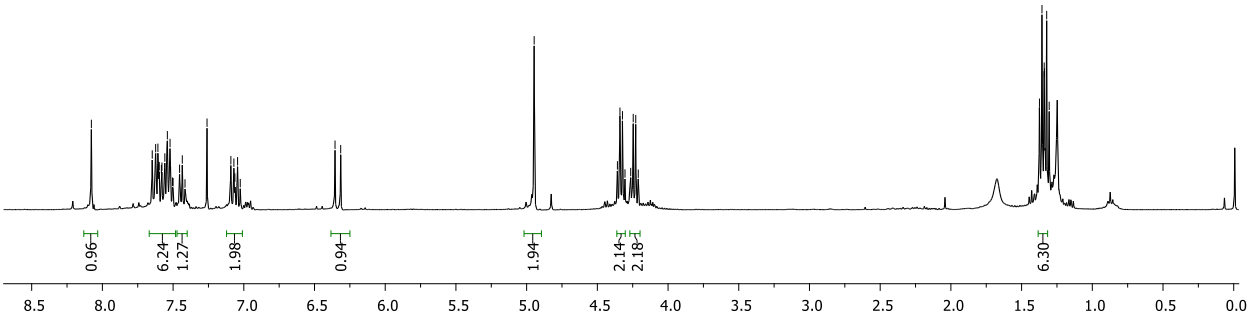
Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (4a)

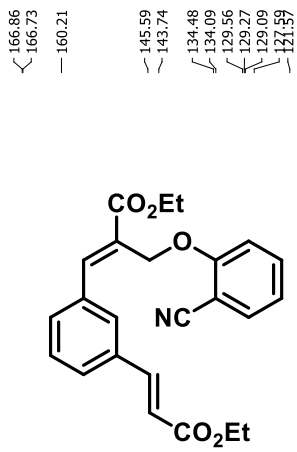


Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl) phenyl) acrylate (4b)

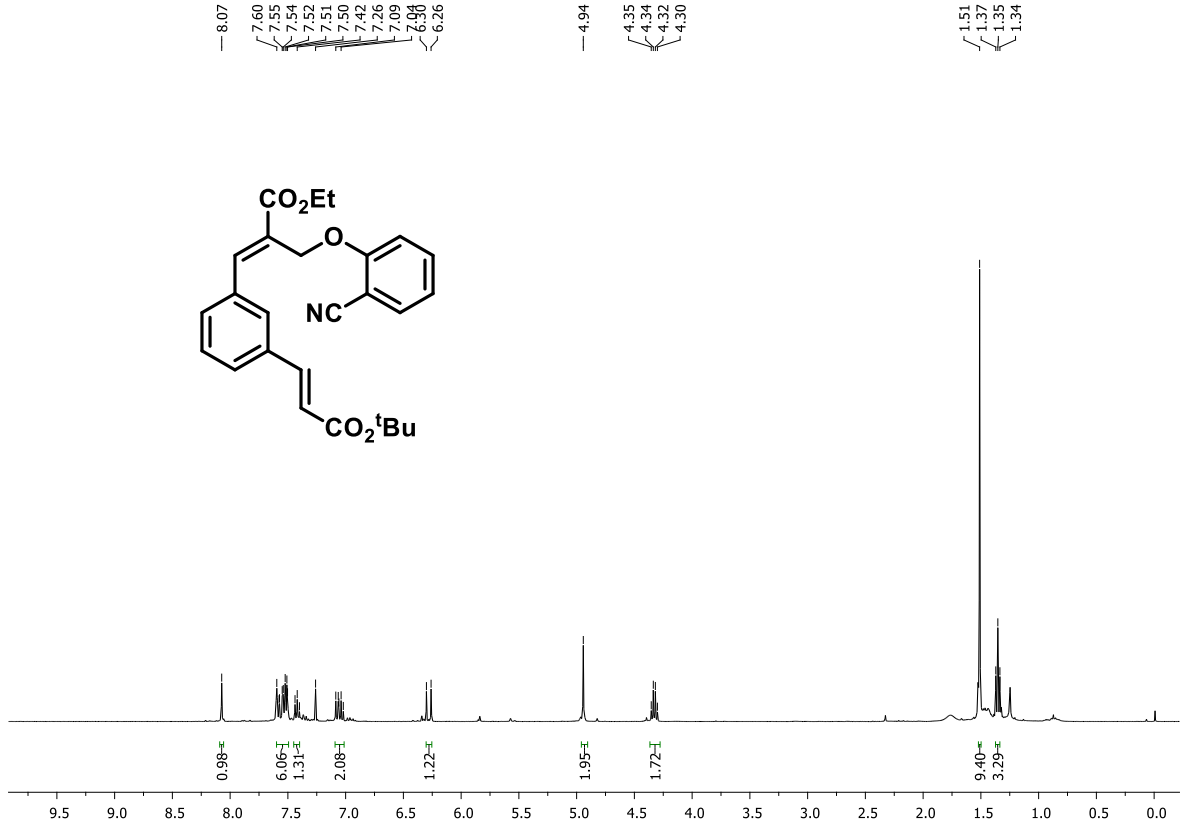


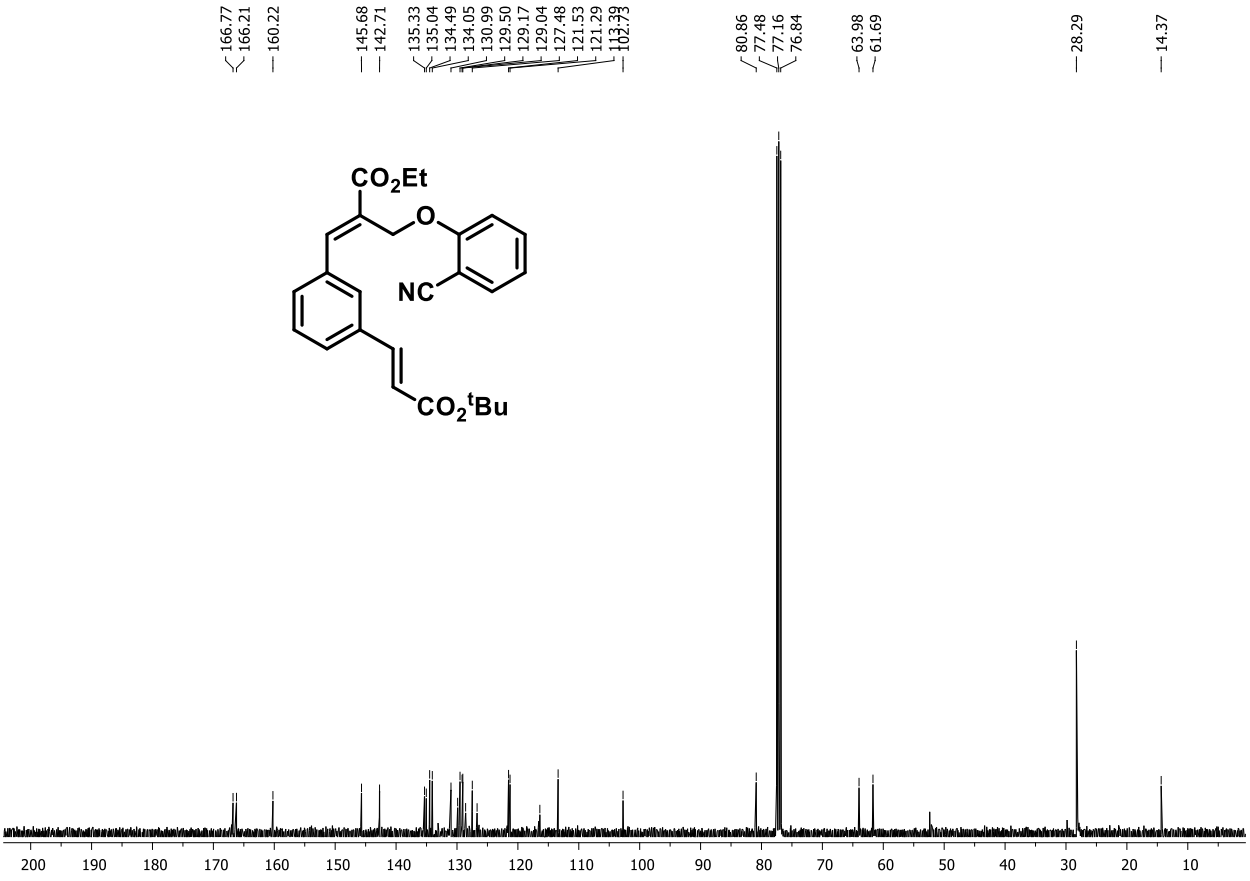




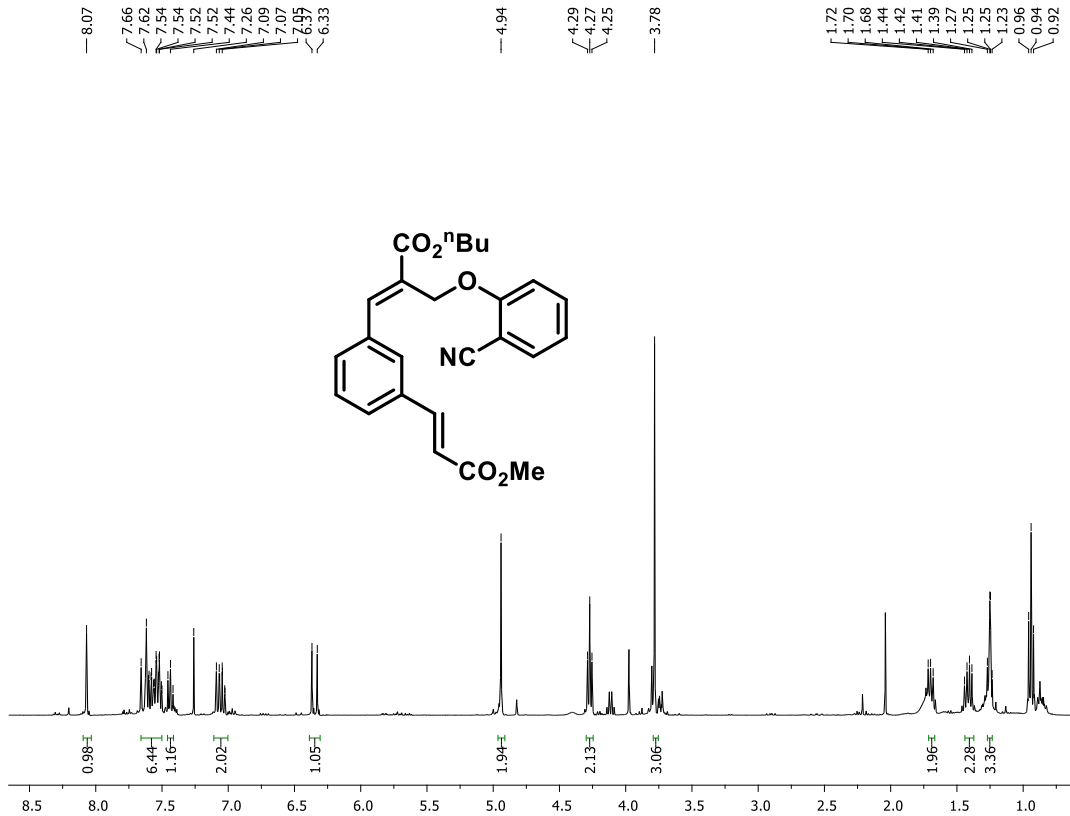


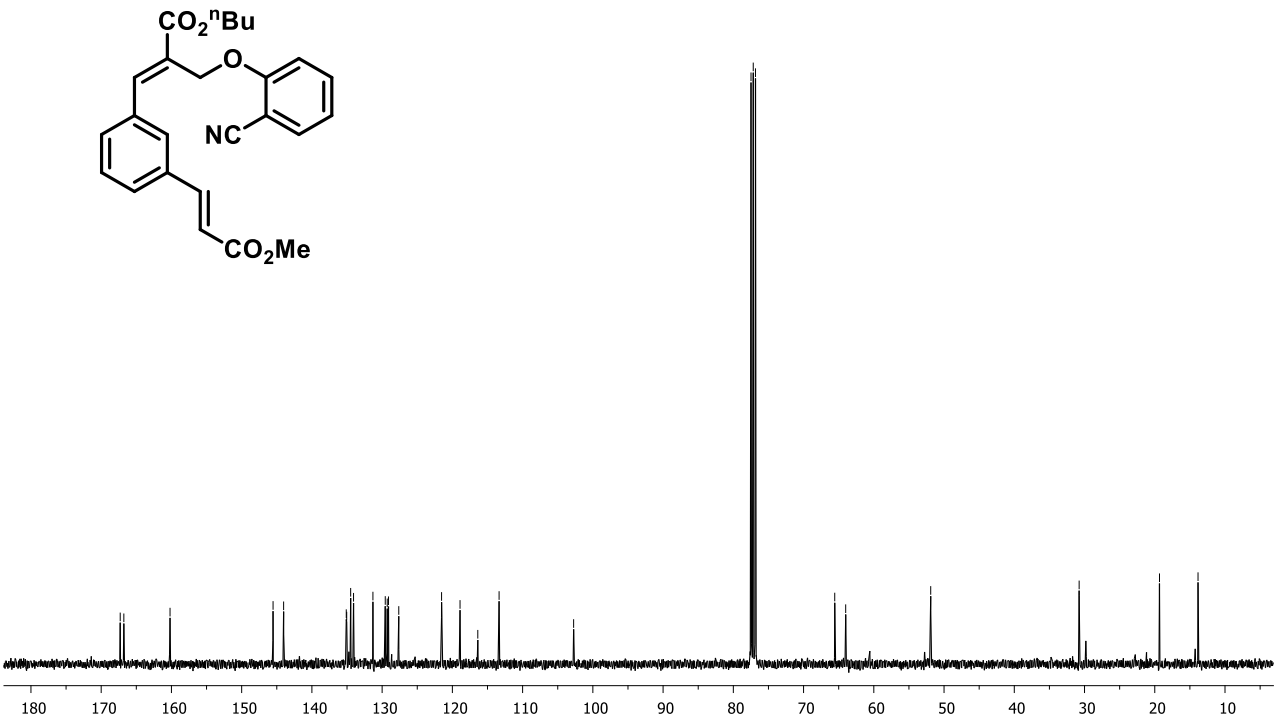
Ethyl (*E*)-3-(3-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy)methyl)acrylate (4c)



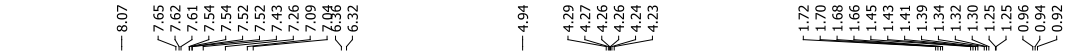


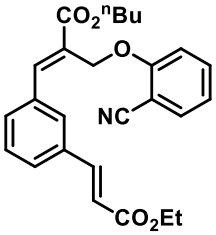
Butyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (4d)

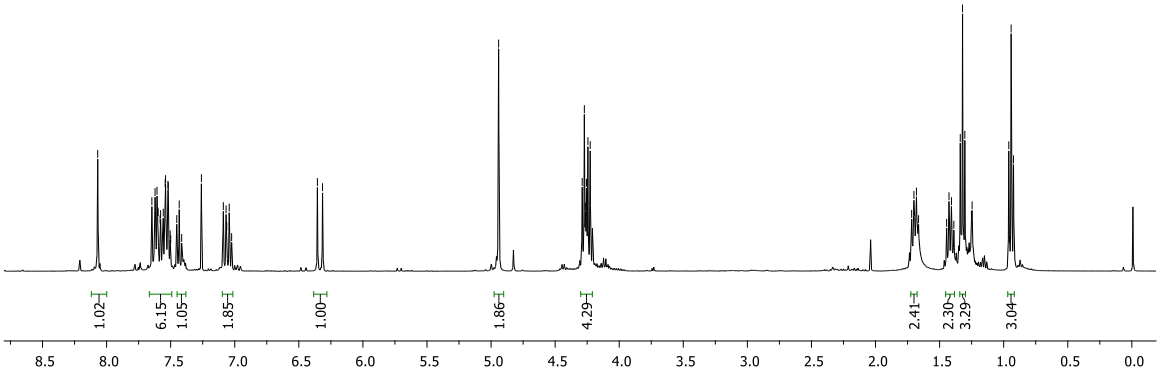


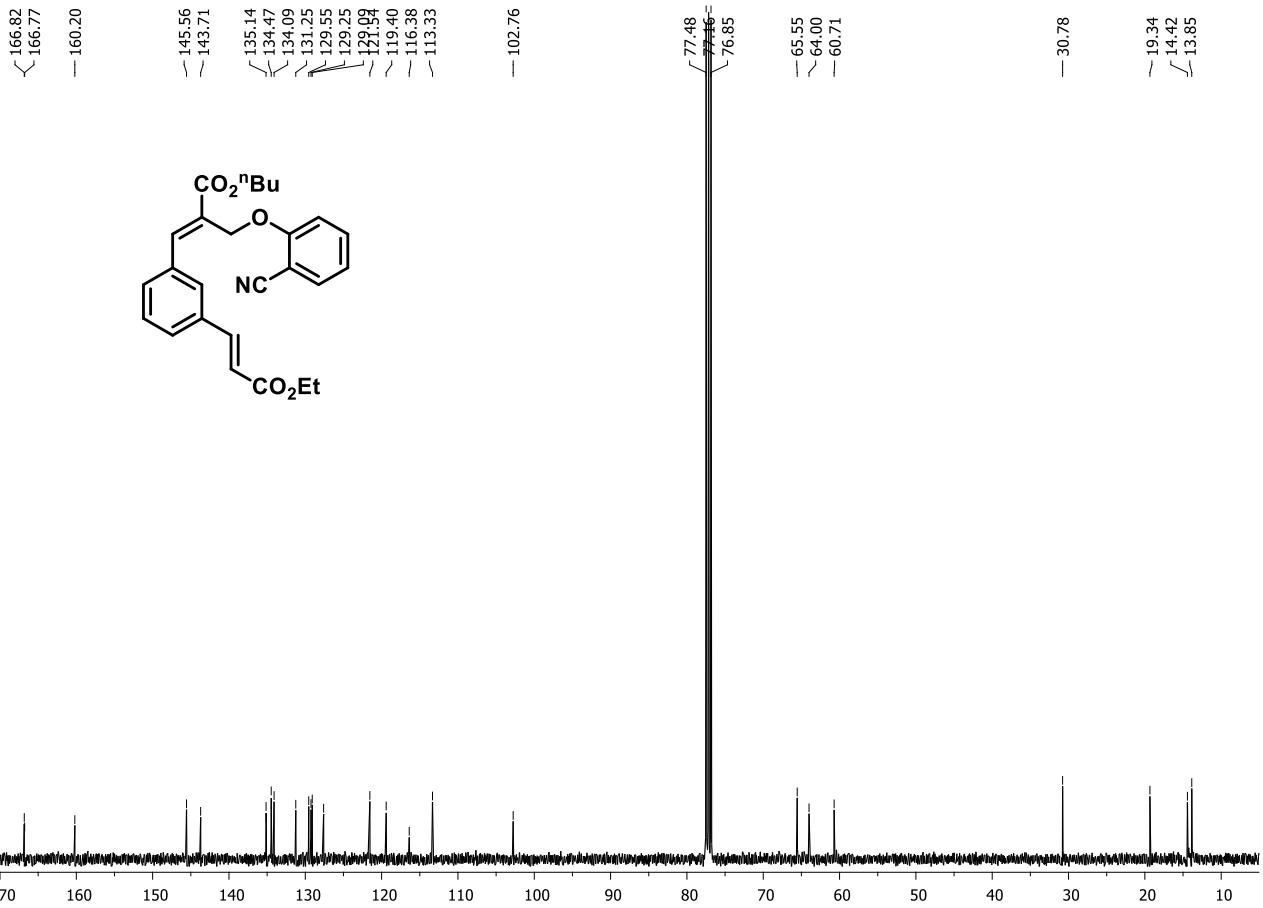


Butyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (4e)

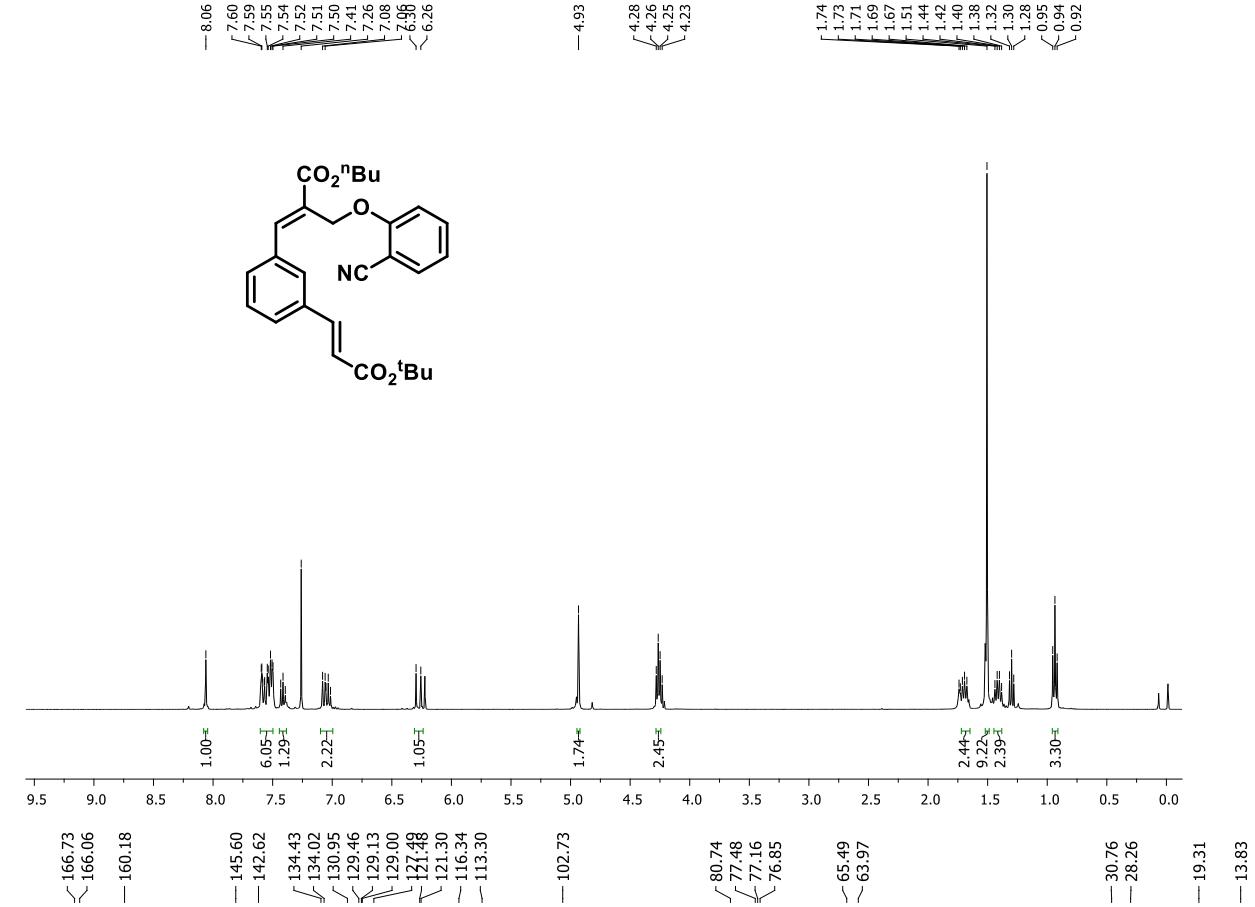


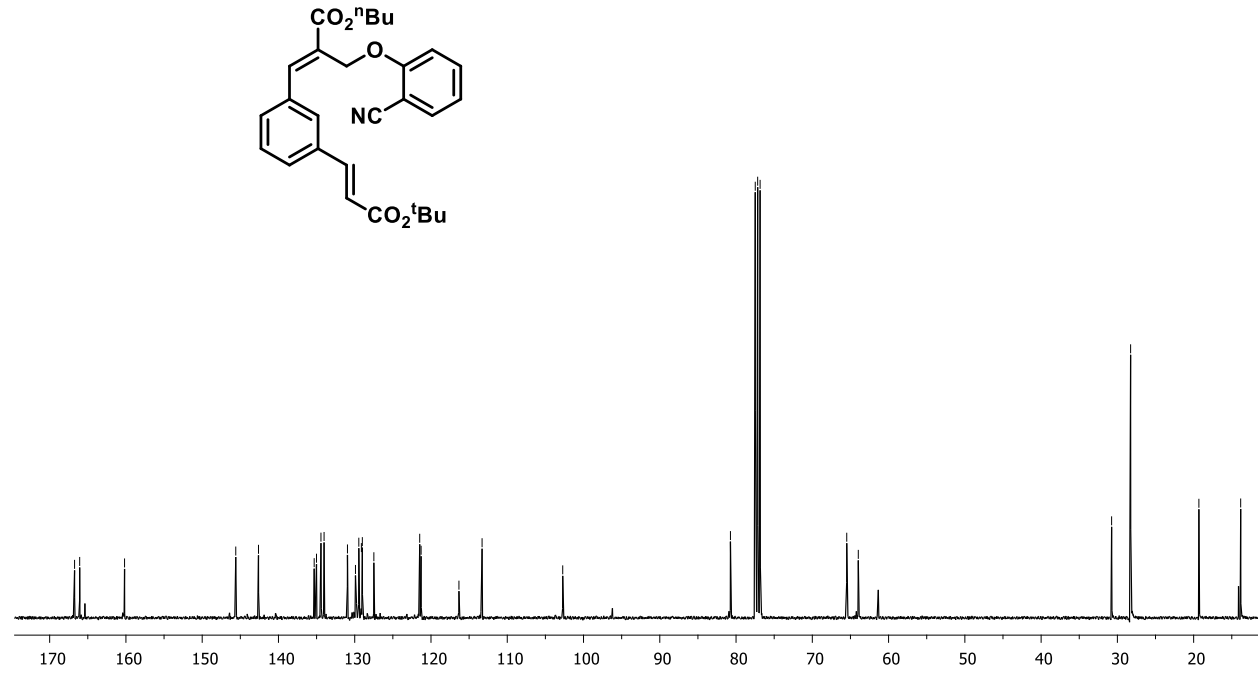




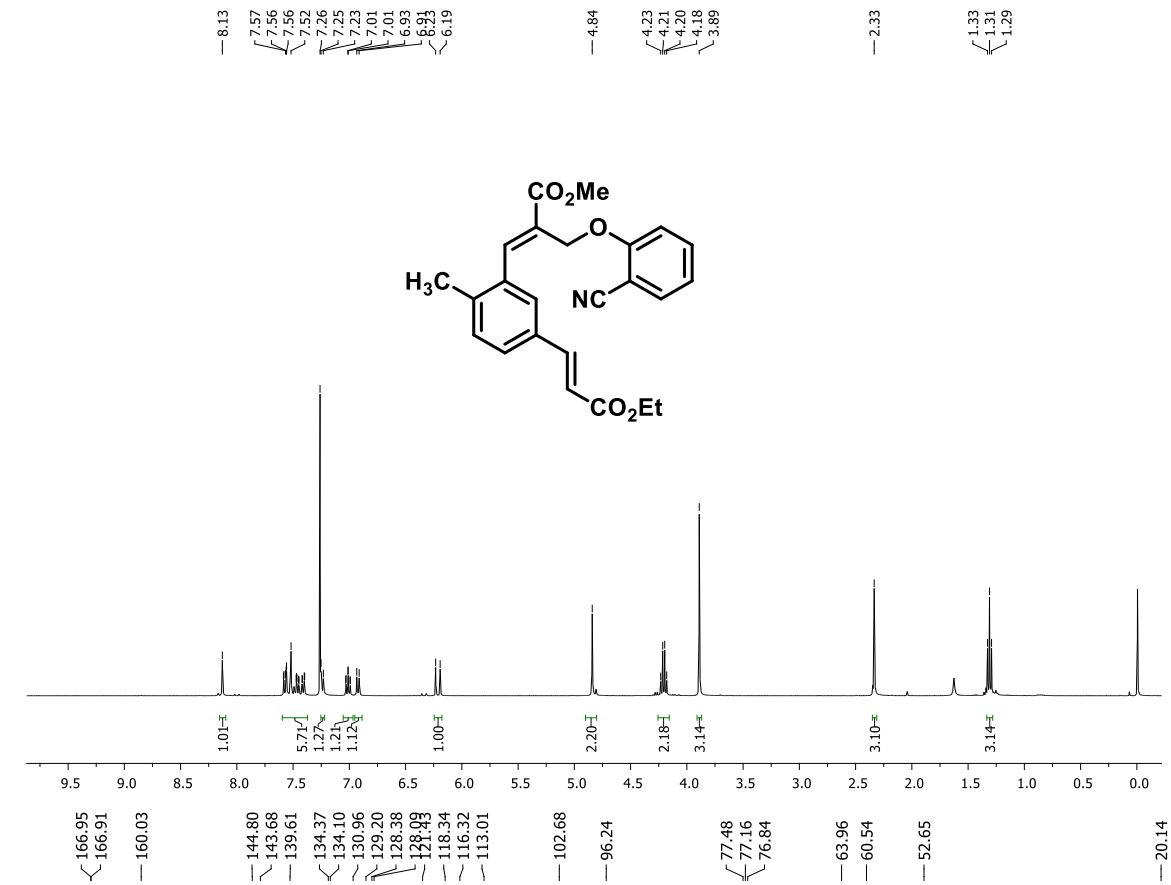


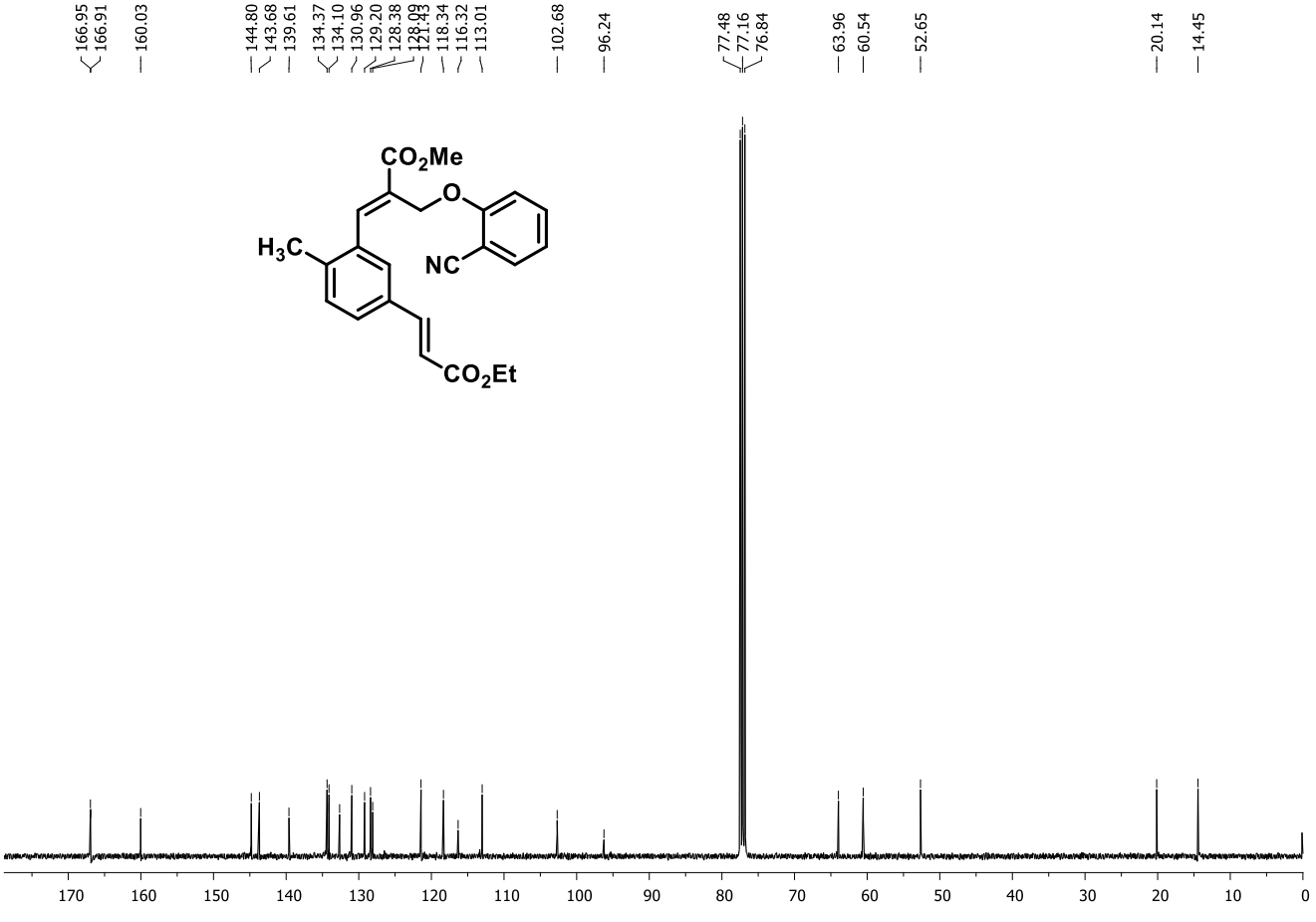
Butyl (*E*)-3-(3-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2cyanophenoxy)methyl) acrylate (4f)



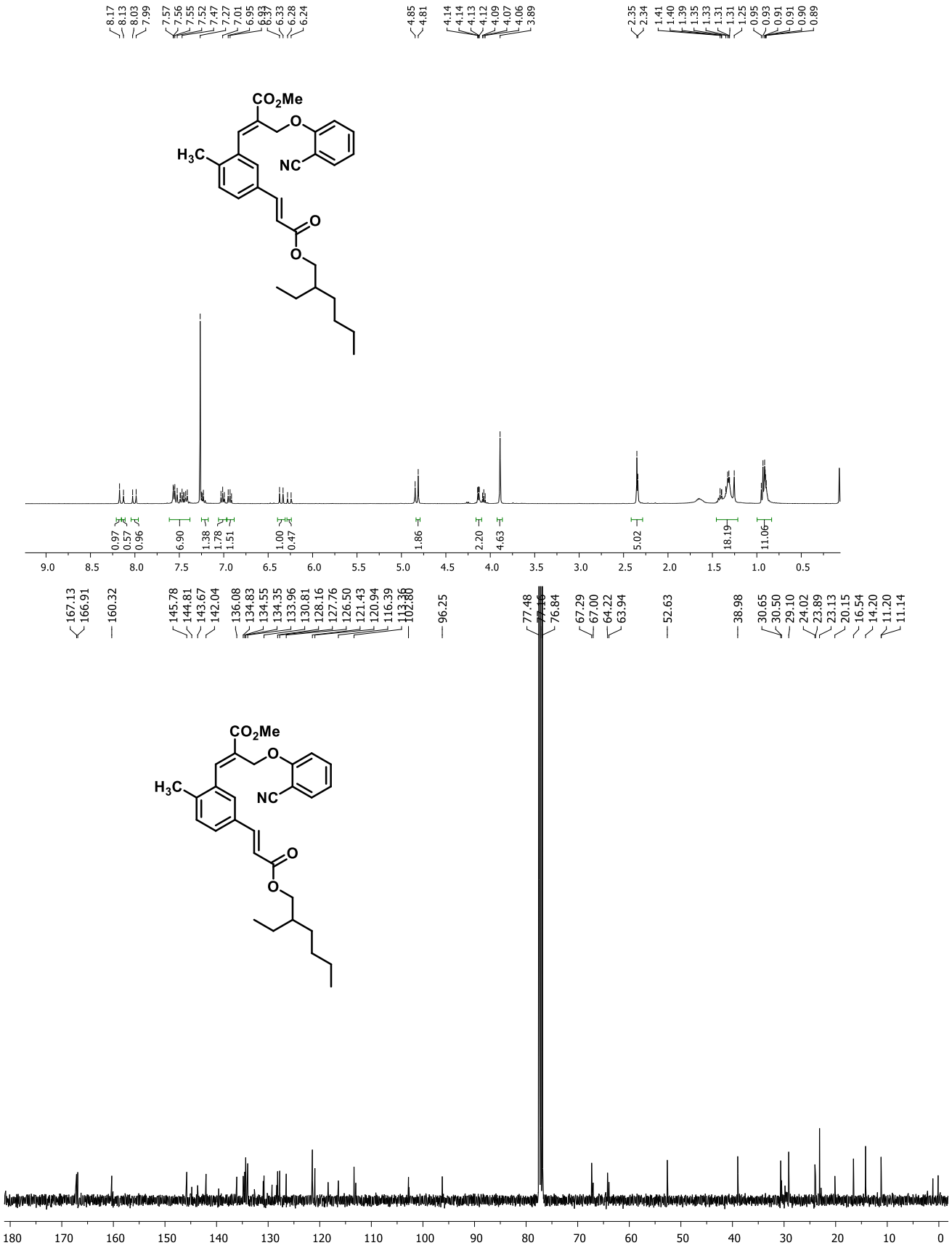


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-2-methylphenyl)acrylate (4g)

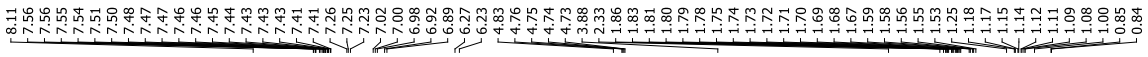


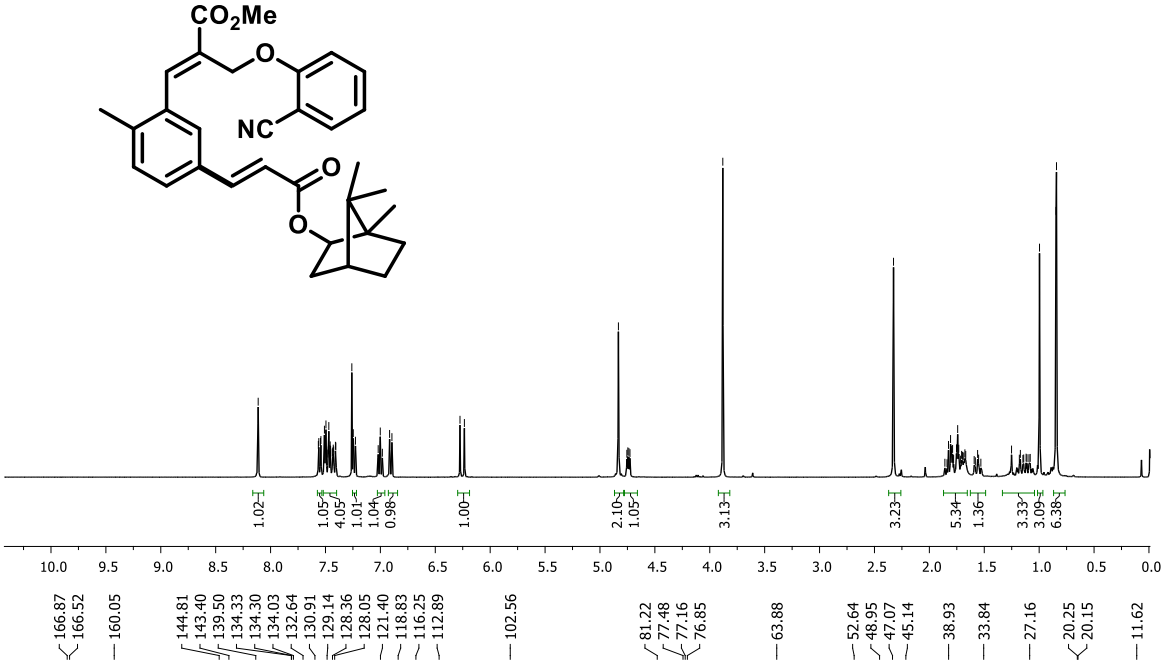


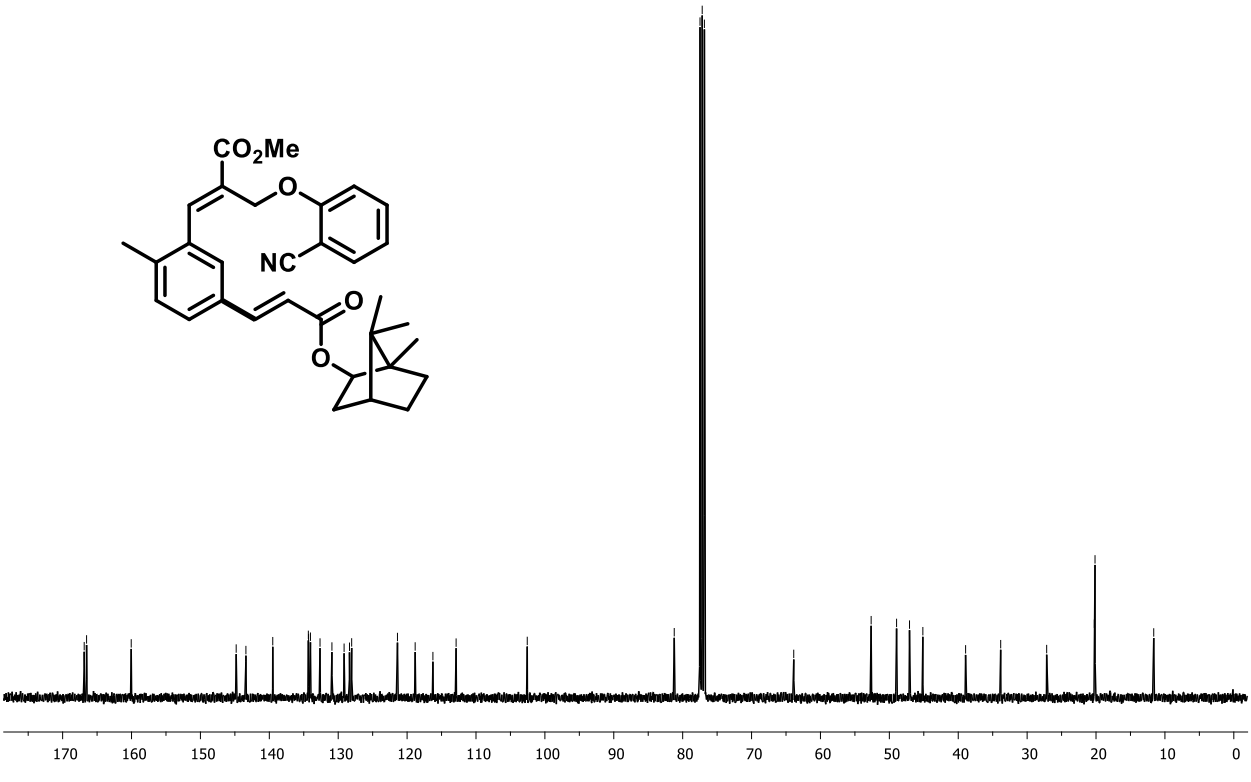
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methylphenyl)acrylate (4h)



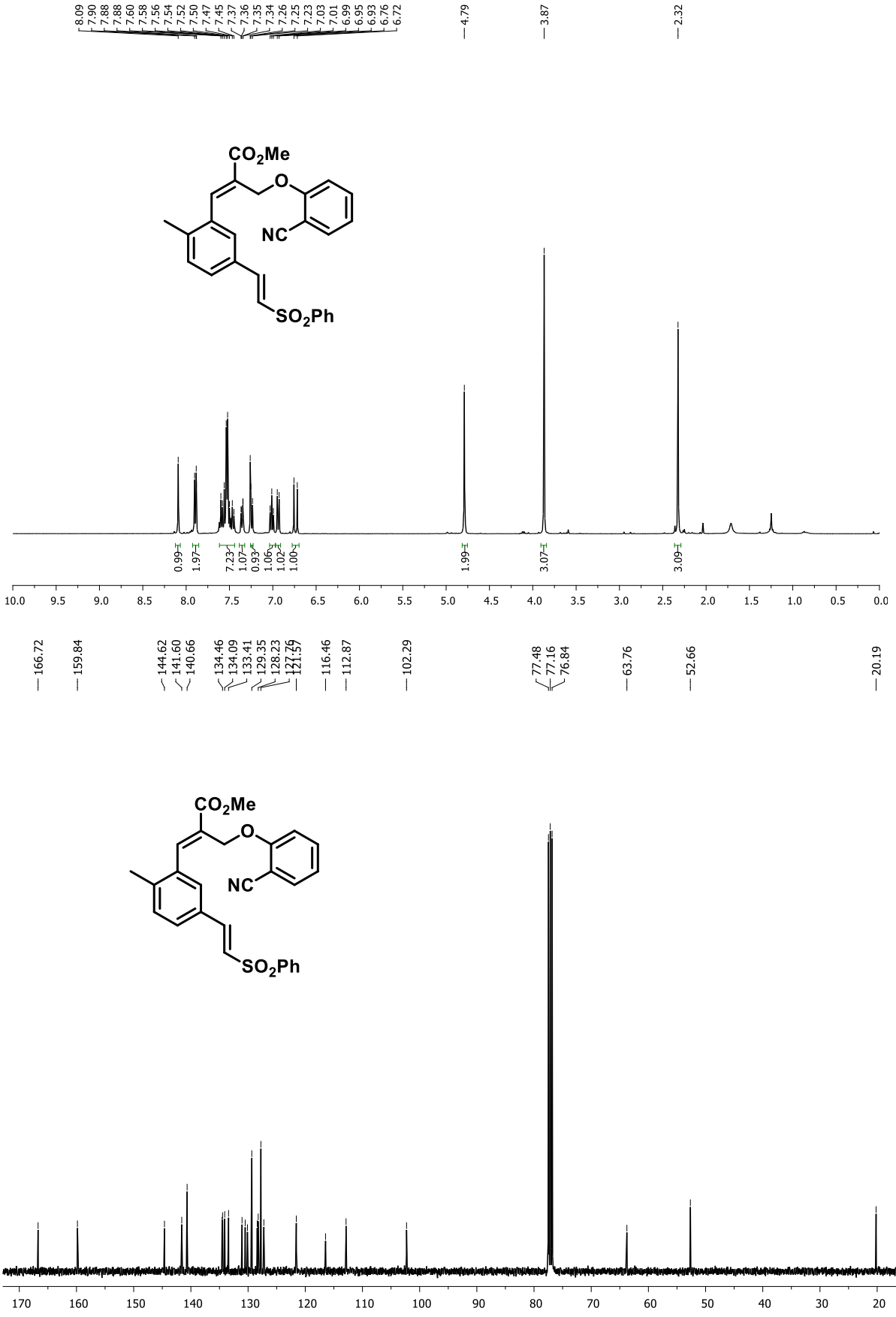
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methyl-5-((*E*)-3-oxo-3-(((1*R*,2*R*,4*R*)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)oxy)prop-1-en-1-yl)phenyl)acrylate (4i)



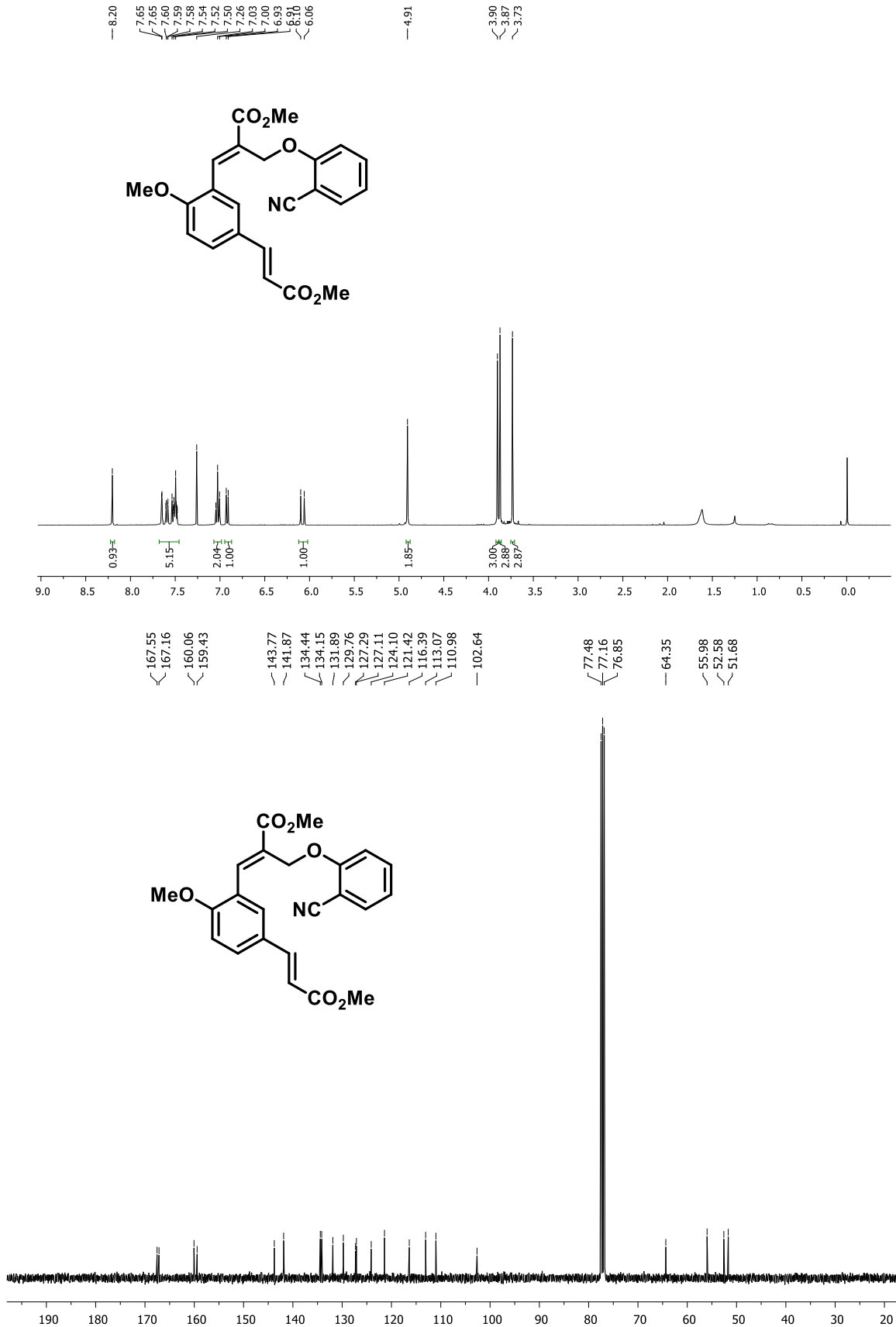




Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methyl-5-((*E*)-2-(phenylsulfonyl)vinyl)phenyl) acrylate (4j)

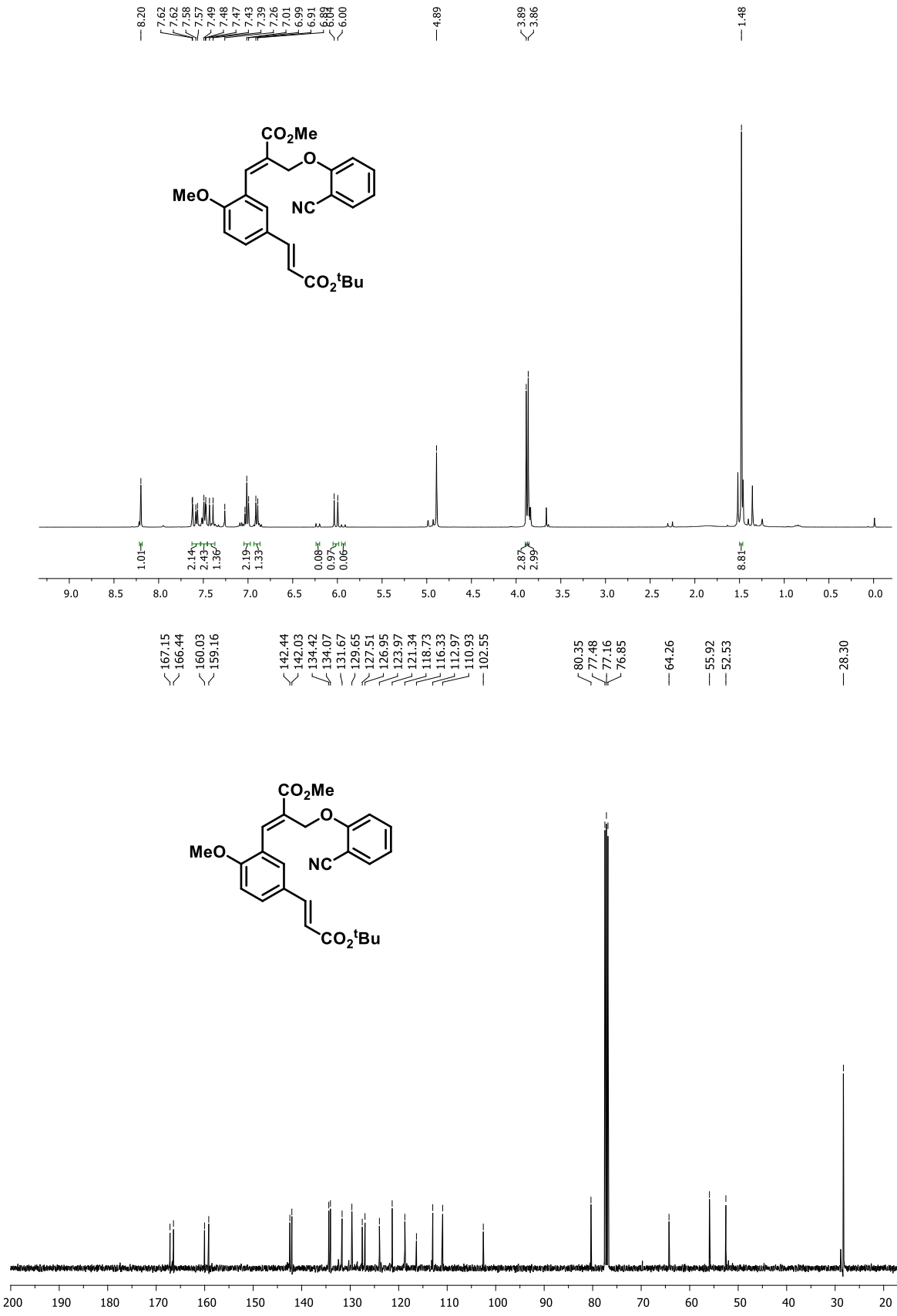


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (4k)

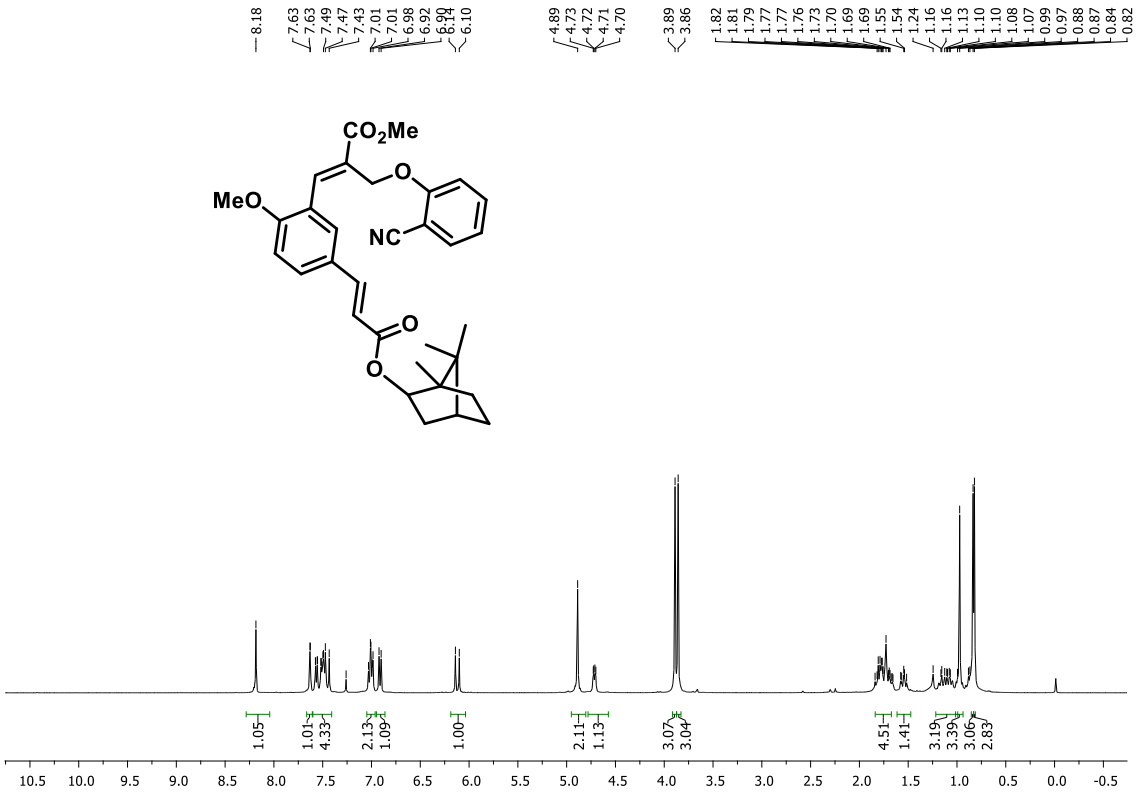


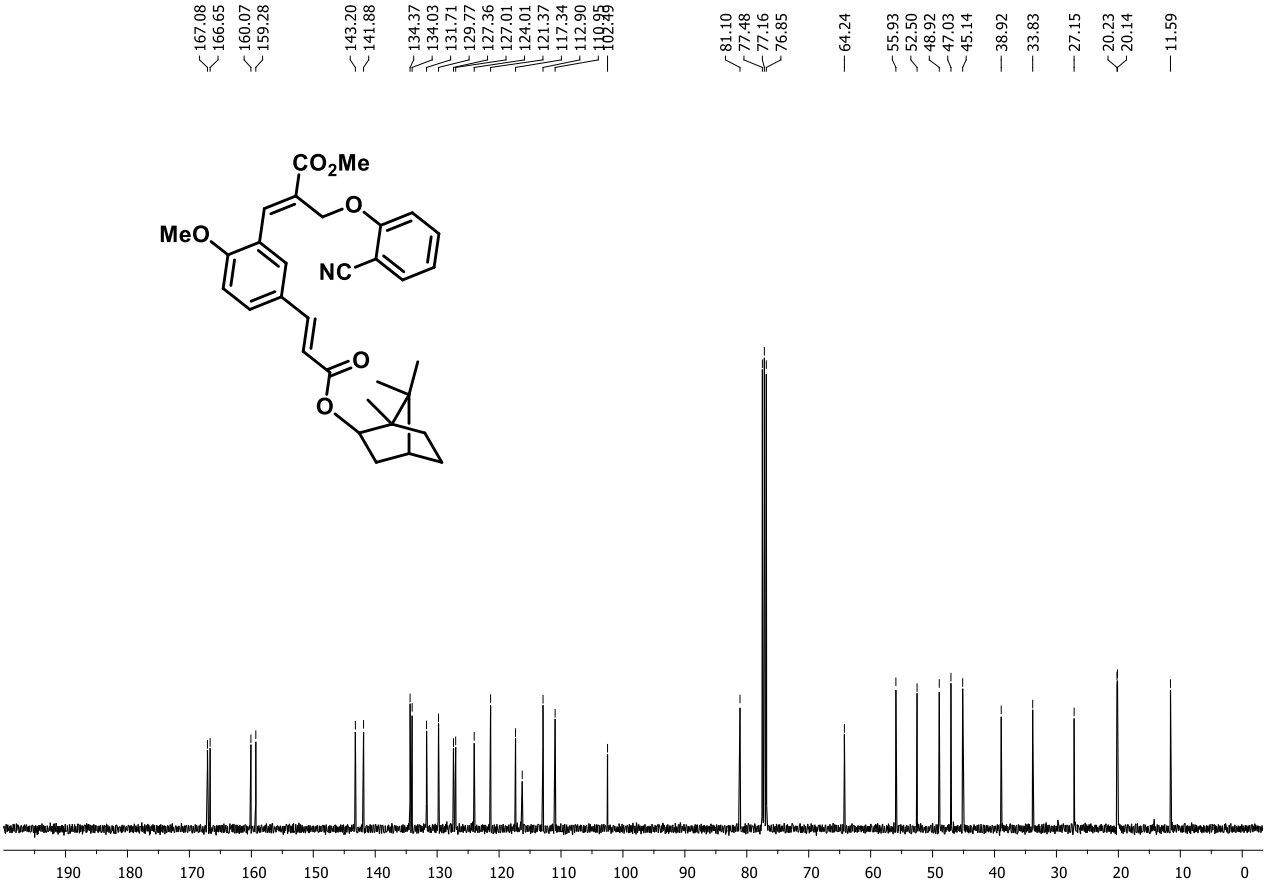
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-2-methoxyphenyl) acrylate (4l)

Methyl (*E*)-3-(5-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)-2-((2cyanophenoxy) methyl) acrylate (4m)

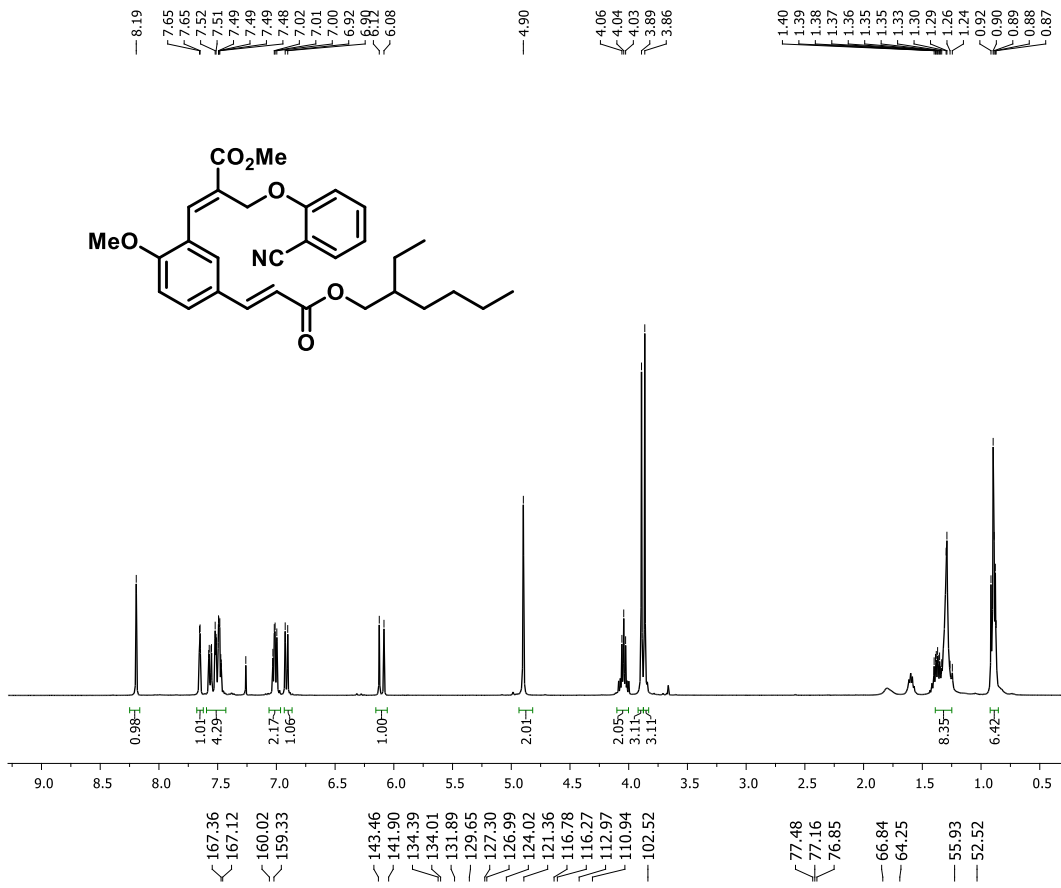


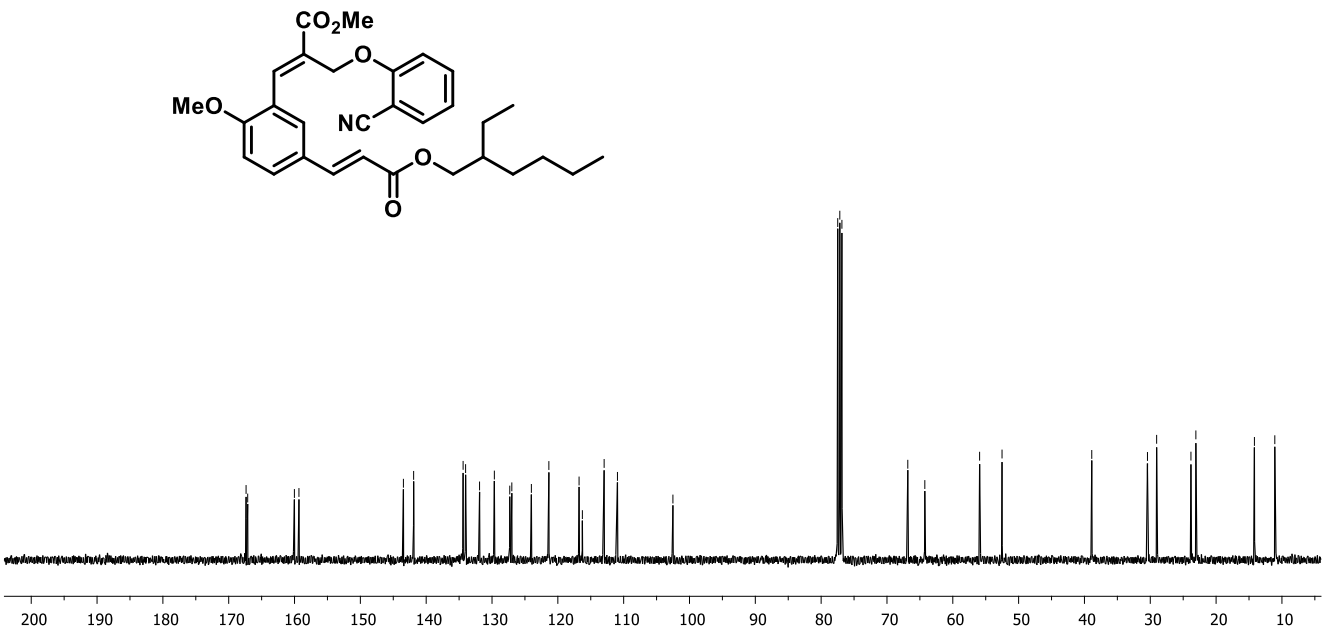
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-((7, 7-dimethyl bicyclo [2.2.1] heptan-2-yl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)acrylate (4n)



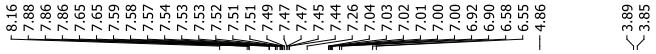


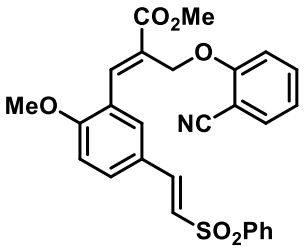
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)acrylate (4o)

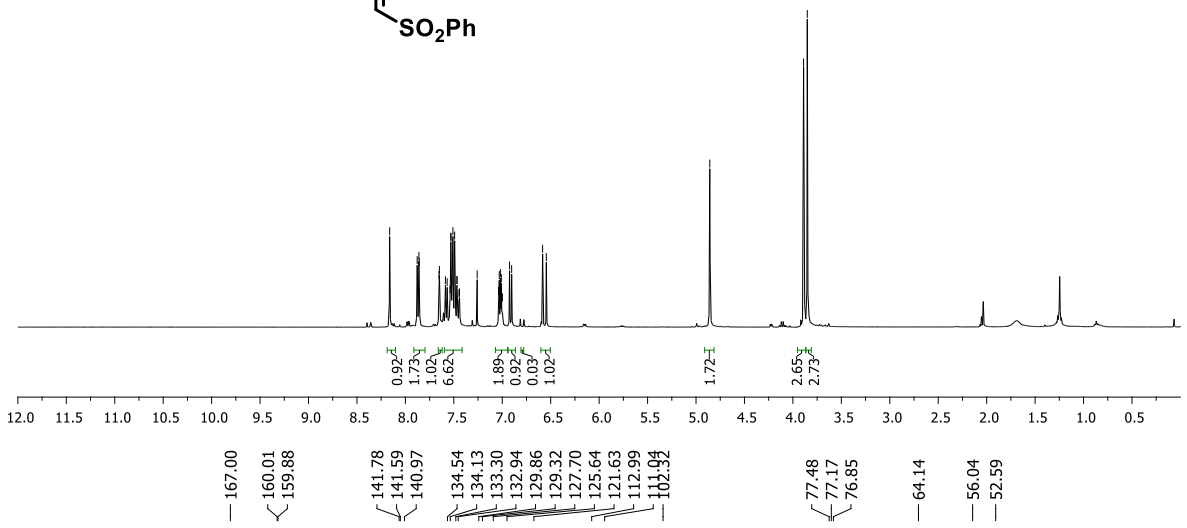


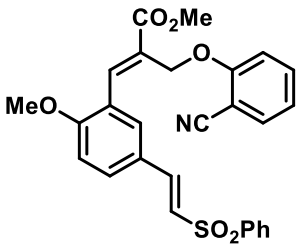


Methyl(*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*E*)-2(phenylsulfonyl) vinyl)phenyl) acrylate (4p)

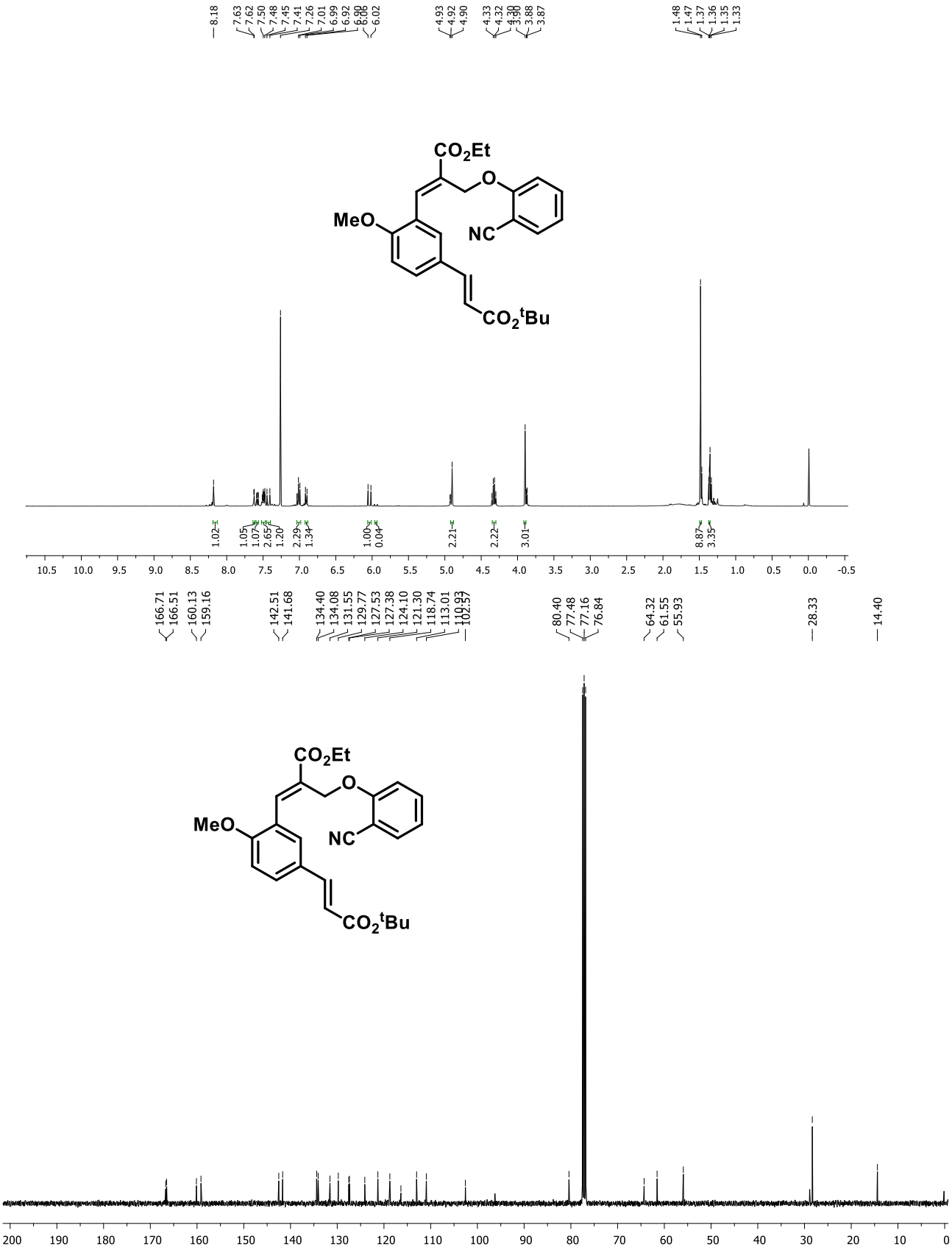




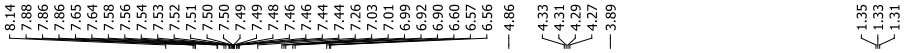


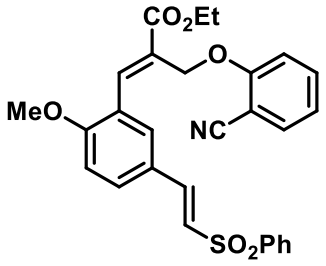


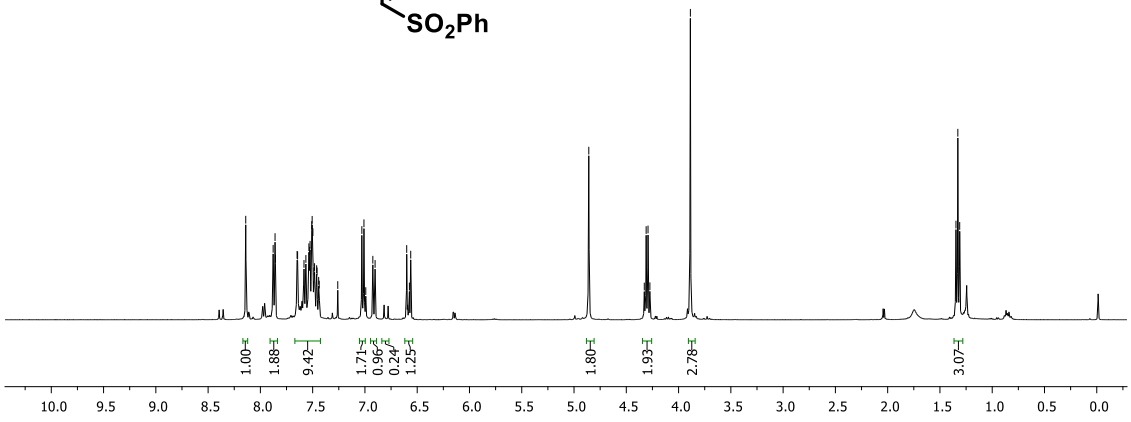
Ethyl (*E*)-3-(5-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)-2-((2-cyanophenoxy) methyl) acrylate (4q)

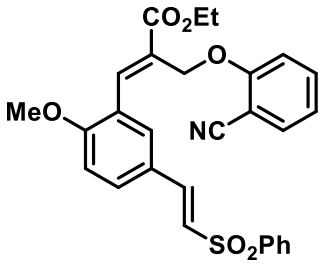


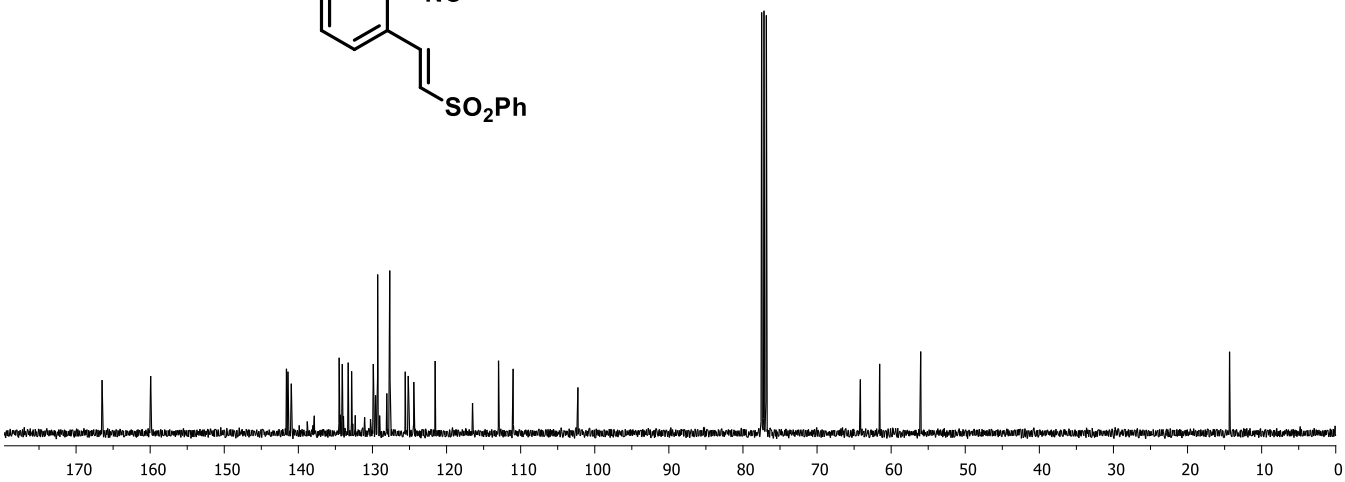
Ethyl(*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*E*)-2-(phenylsulfonyl) vinyl)phenyl) acrylate (4r)



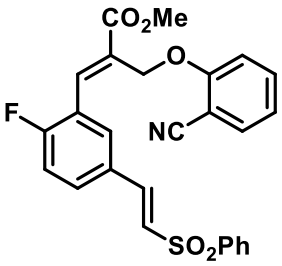


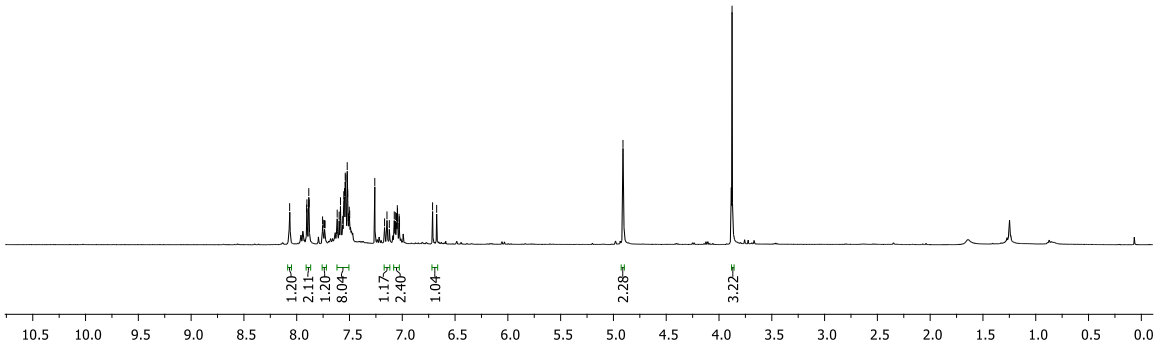


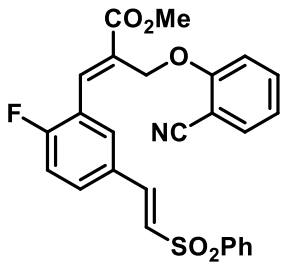


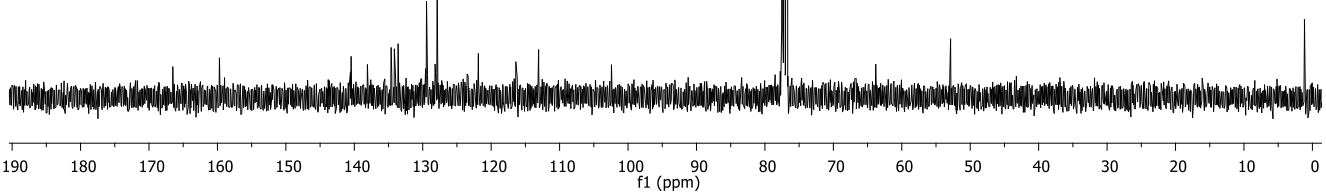


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-fluoro-5-((*E*)-2-(phenylsulfonyl)vinyl)phenyl) acrylate (4s)



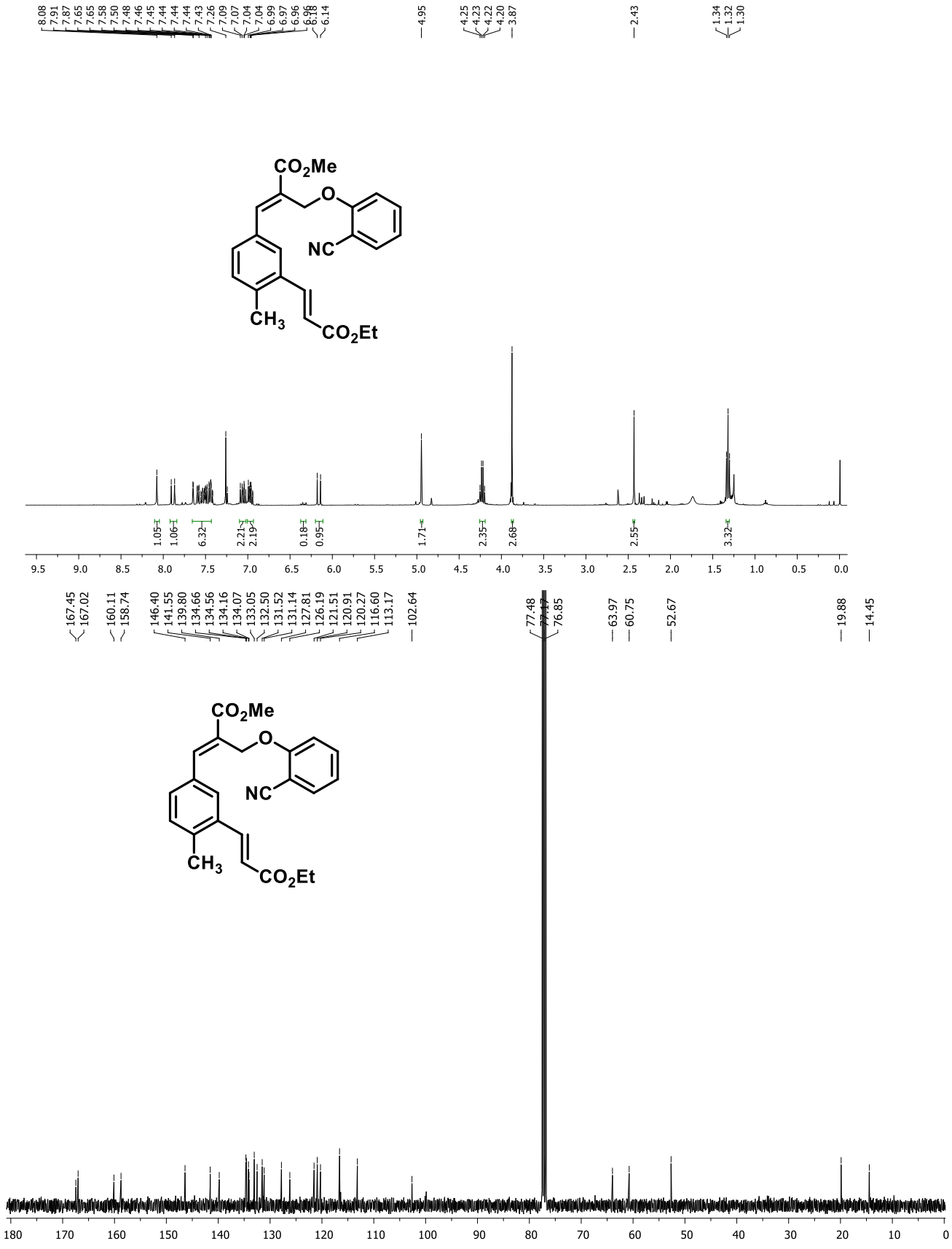




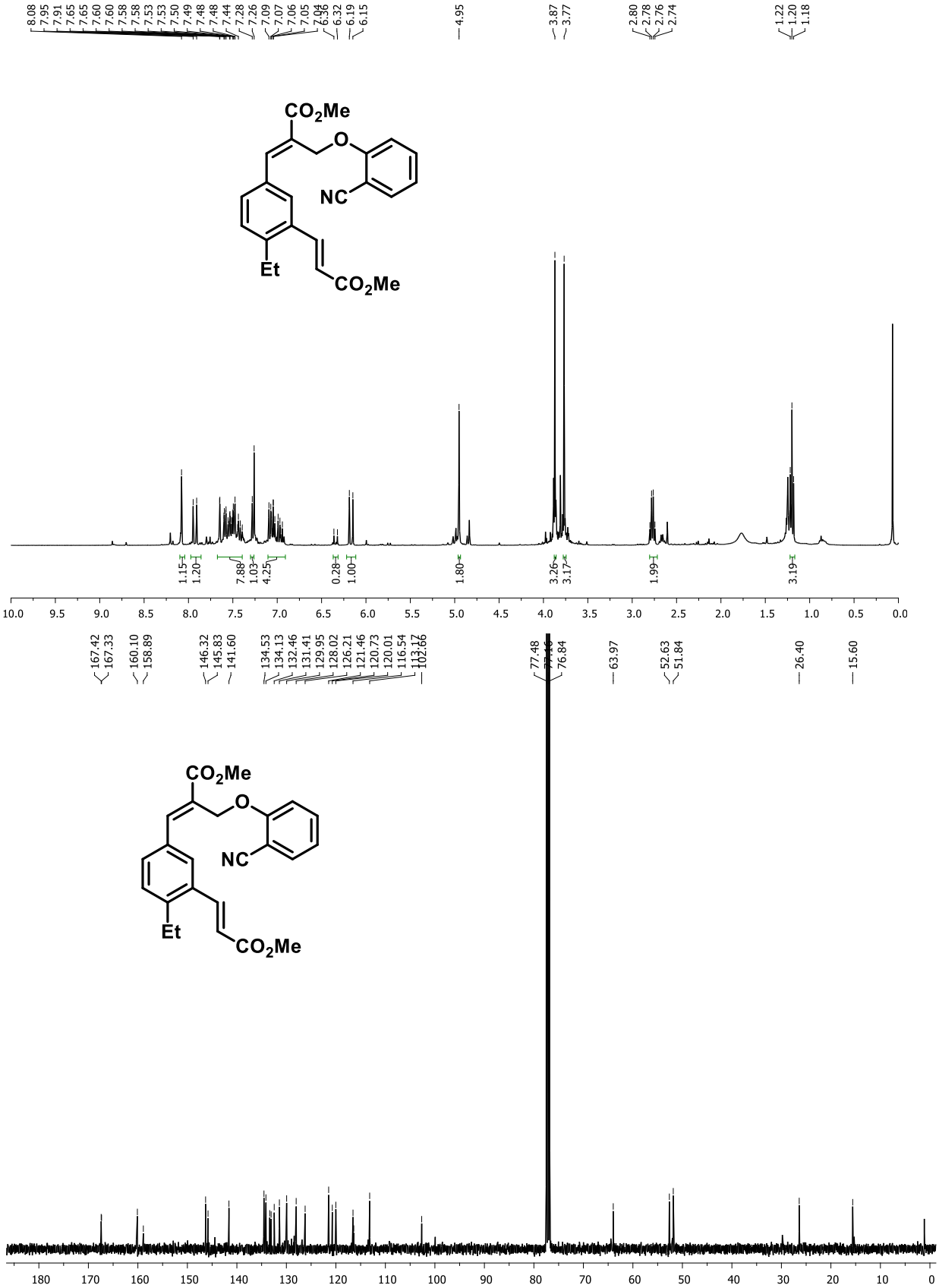


Methyl (*E*)-3-(2-chloro-5-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (4t)

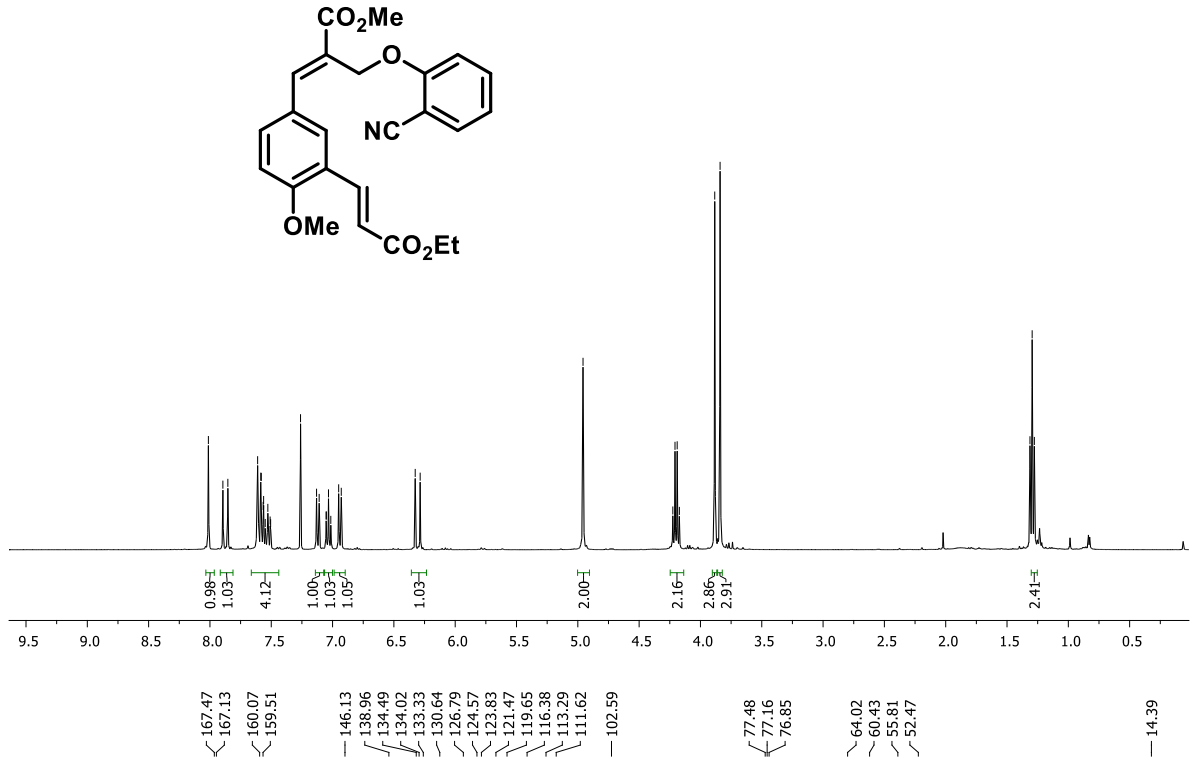
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-4-methylphenyl) acrylate (4u)

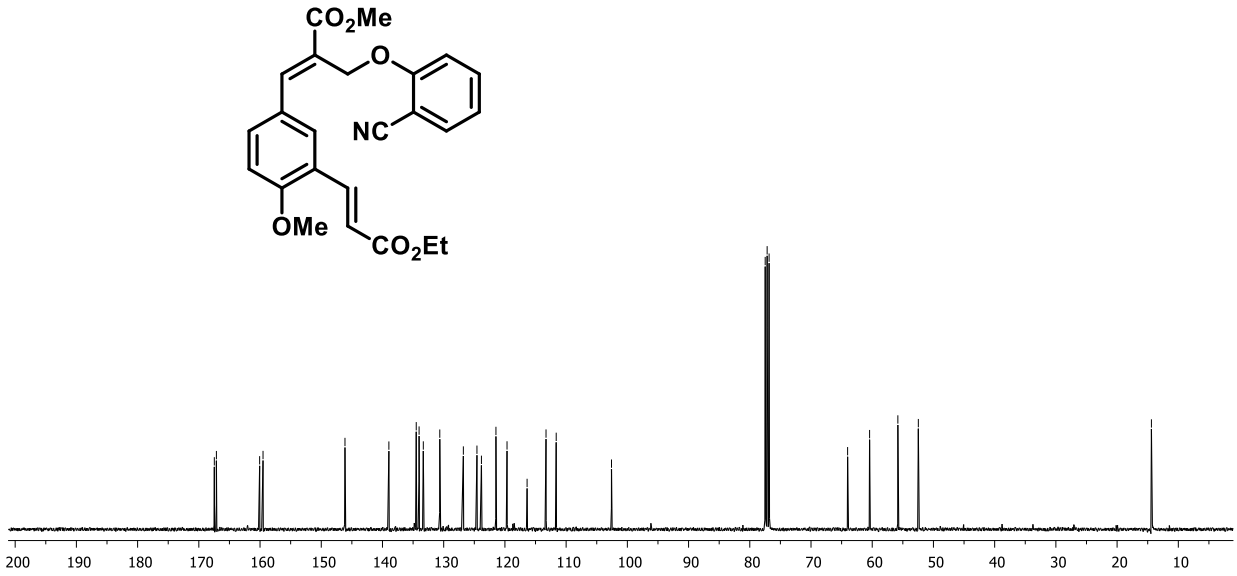


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-ethyl-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)acrylate (4v)

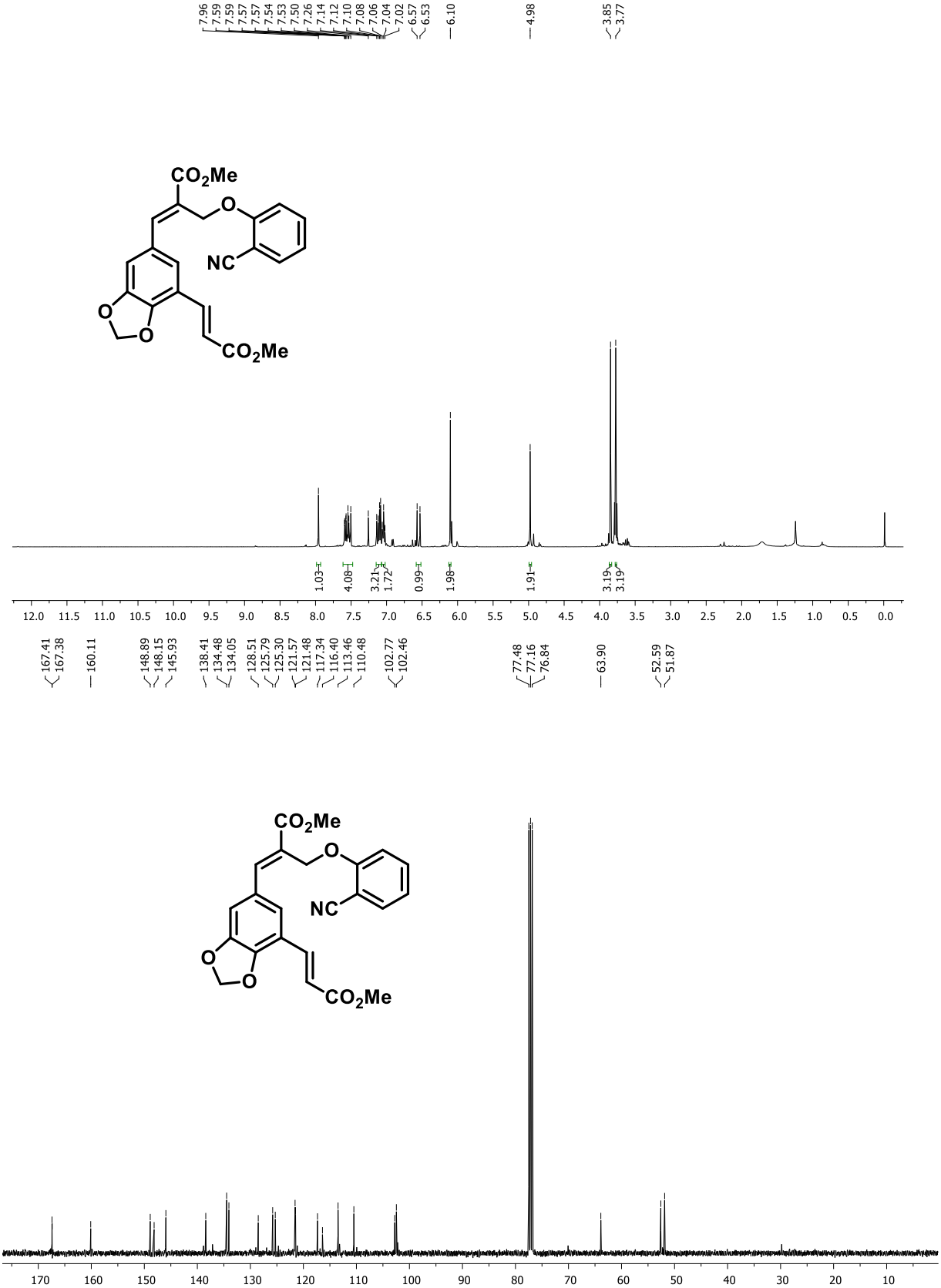


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl) acrylate (4w)

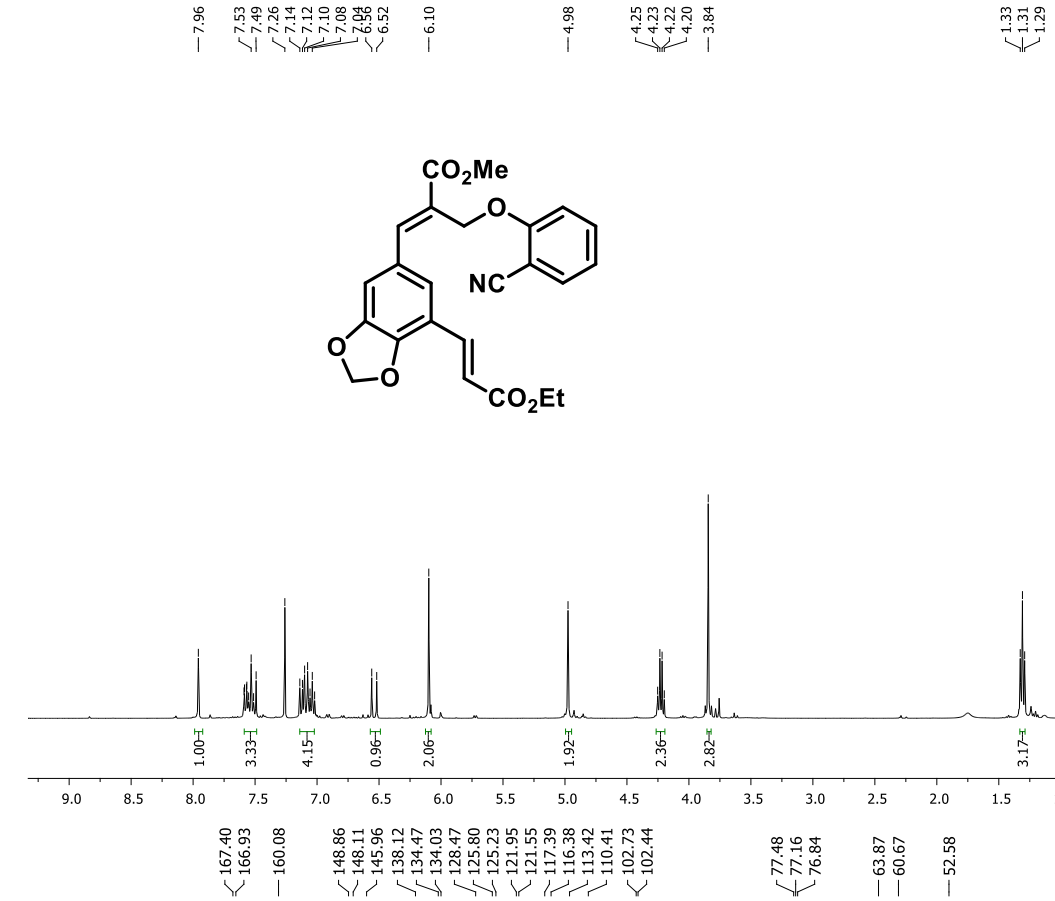


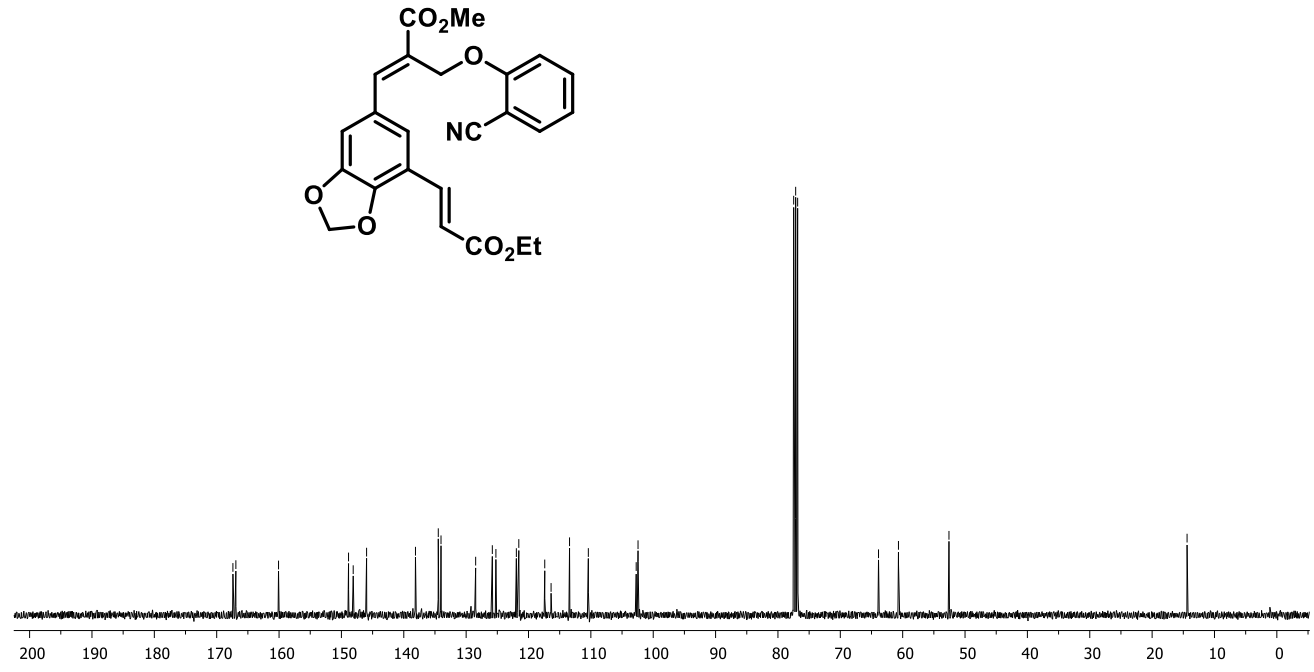


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(7-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) benzo[d][1,3]dioxol-5-yl)acrylate (4x)

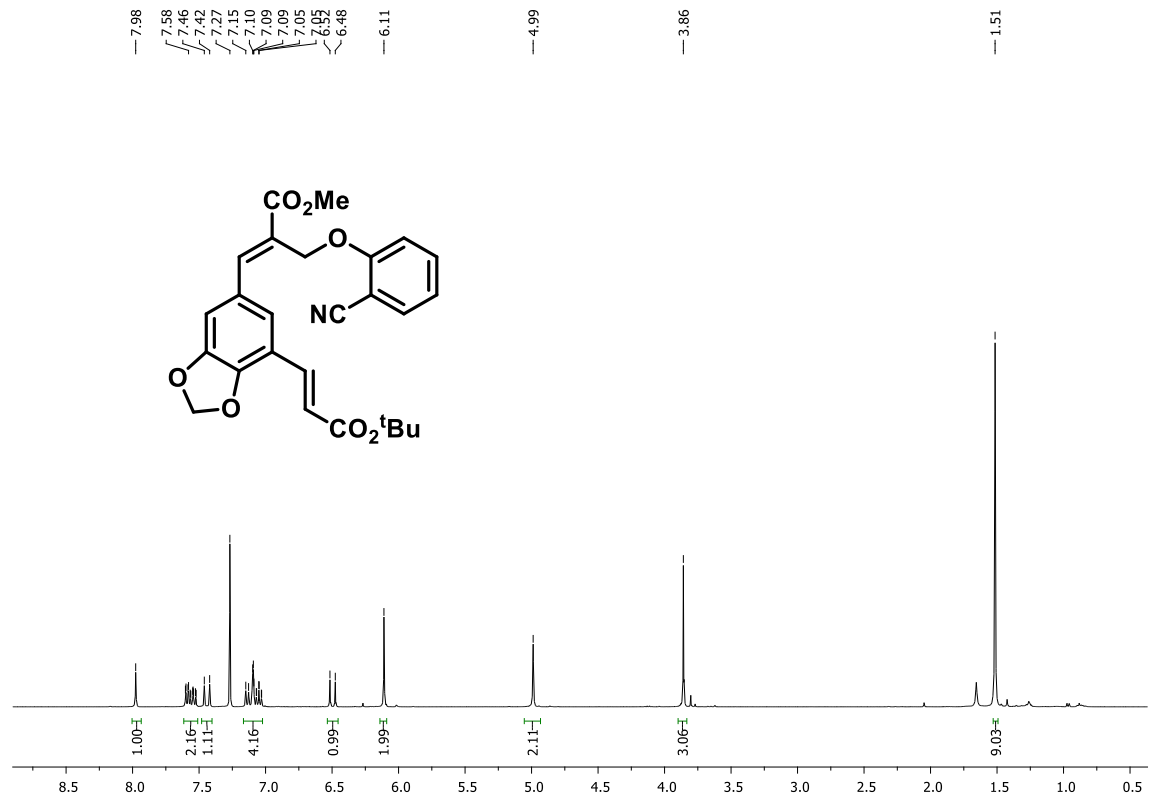


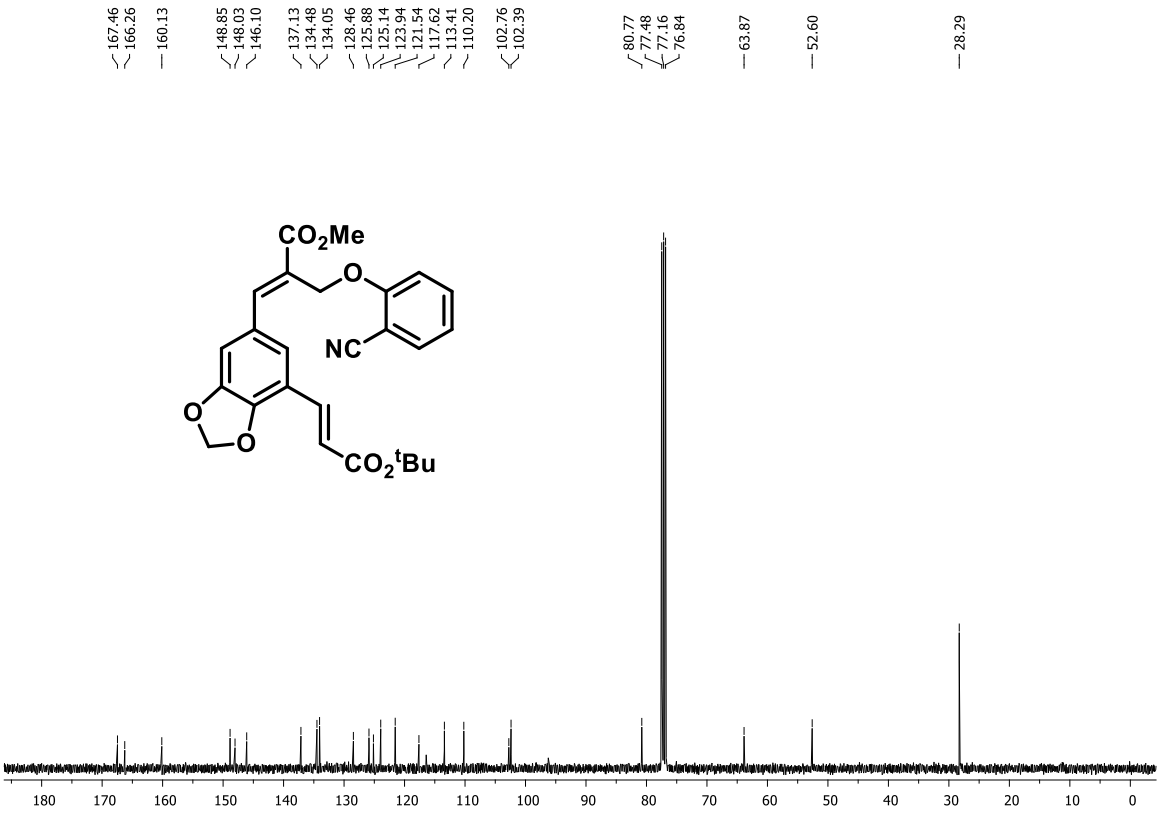
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(7-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl) benzo[d][1,3]dioxol-5-yl) acrylate (4y)



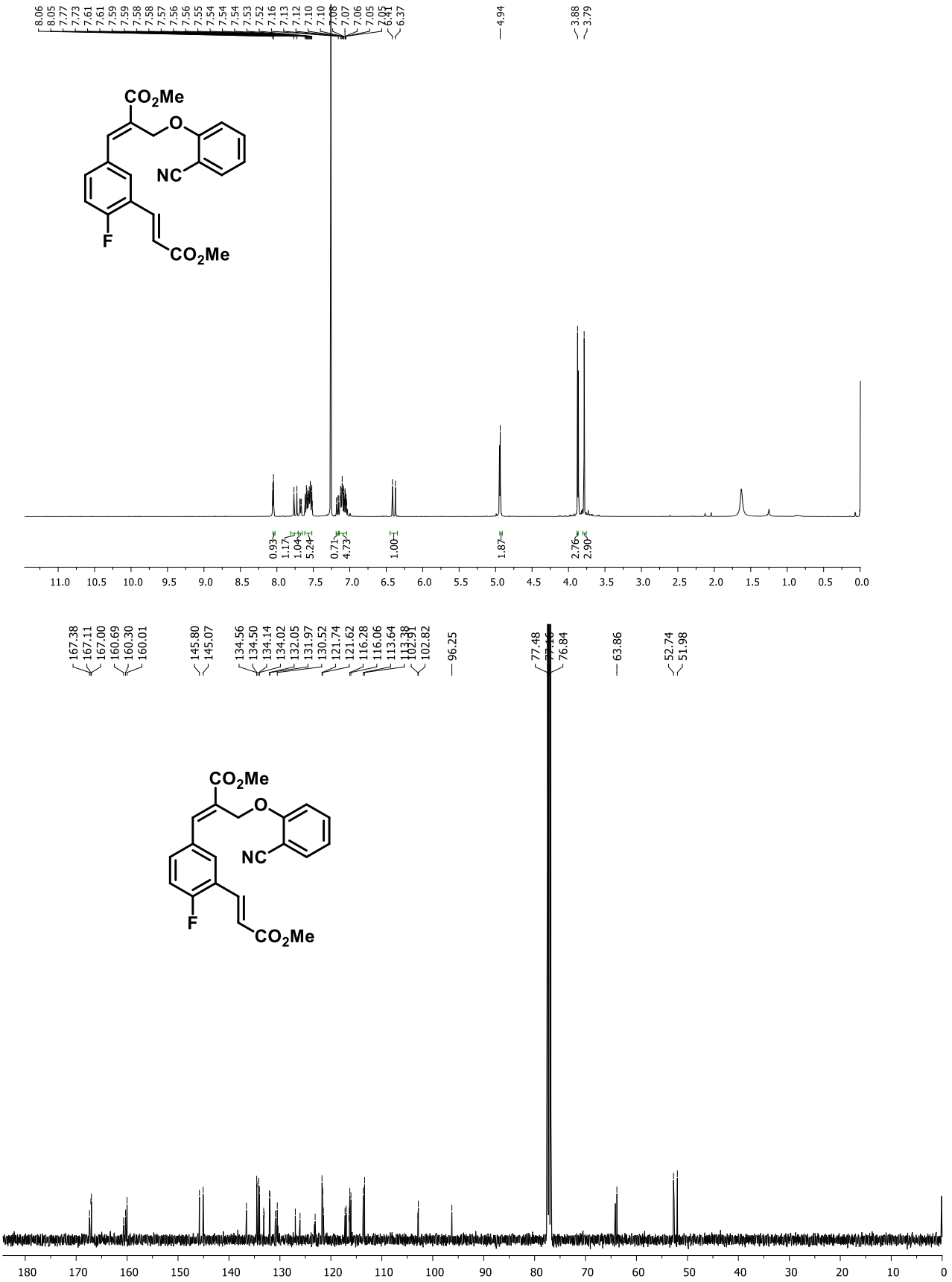


Methyl (*E*)-3-(7-((*E*)-3-(tert-butoxy)-3-oxoprop-1-en-1-yl) benzo[d][1,3]dioxol-5-yl)-2-((2-cyanophenoxy) methyl) acrylate (4z)

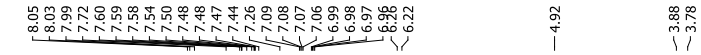


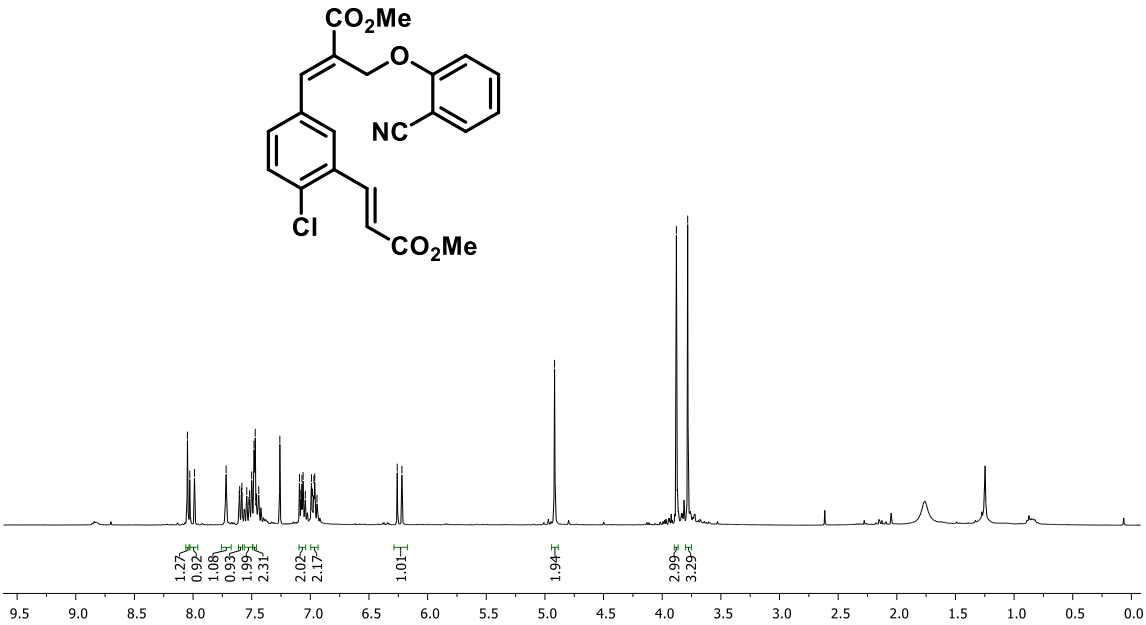


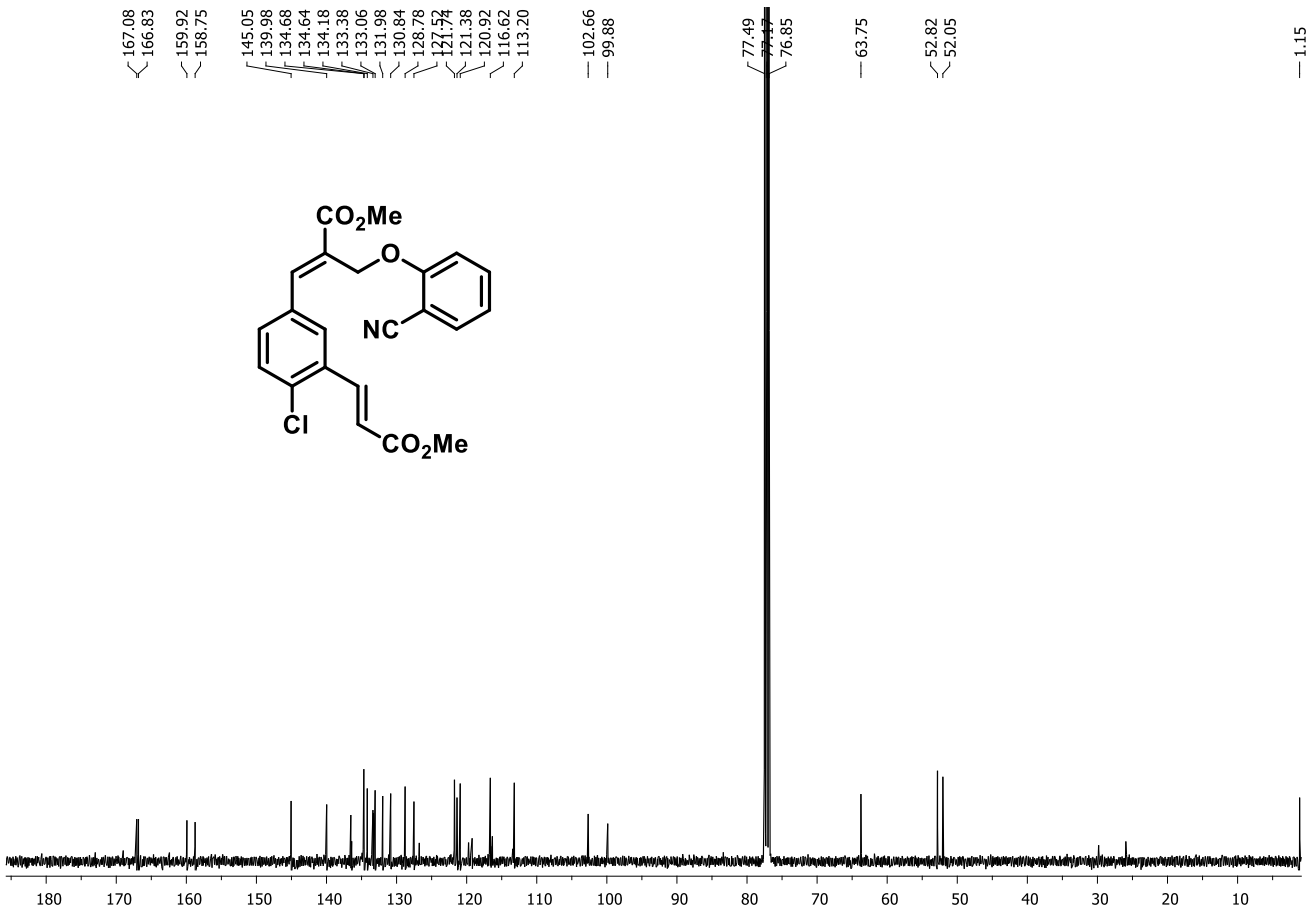
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-fluoro-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acrylate (4aa)



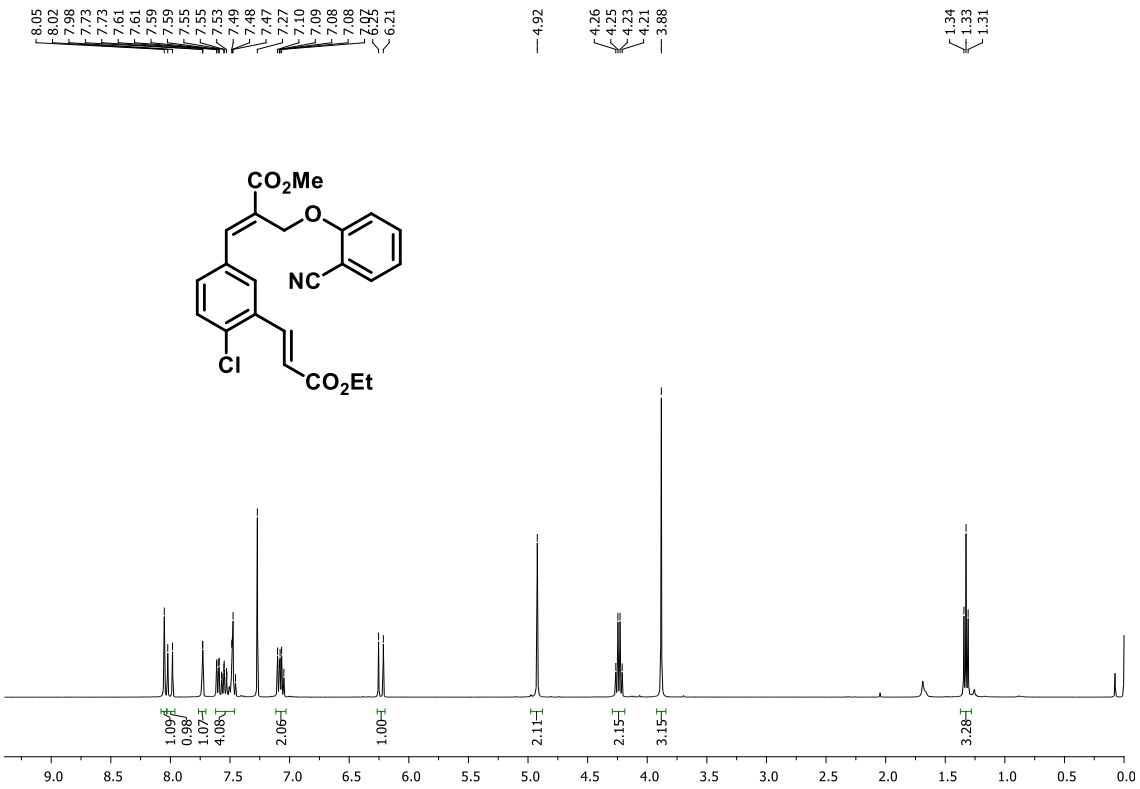
Methyl (*E*)-3-(4-chloro-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy)methyl) acrylate (4ab)

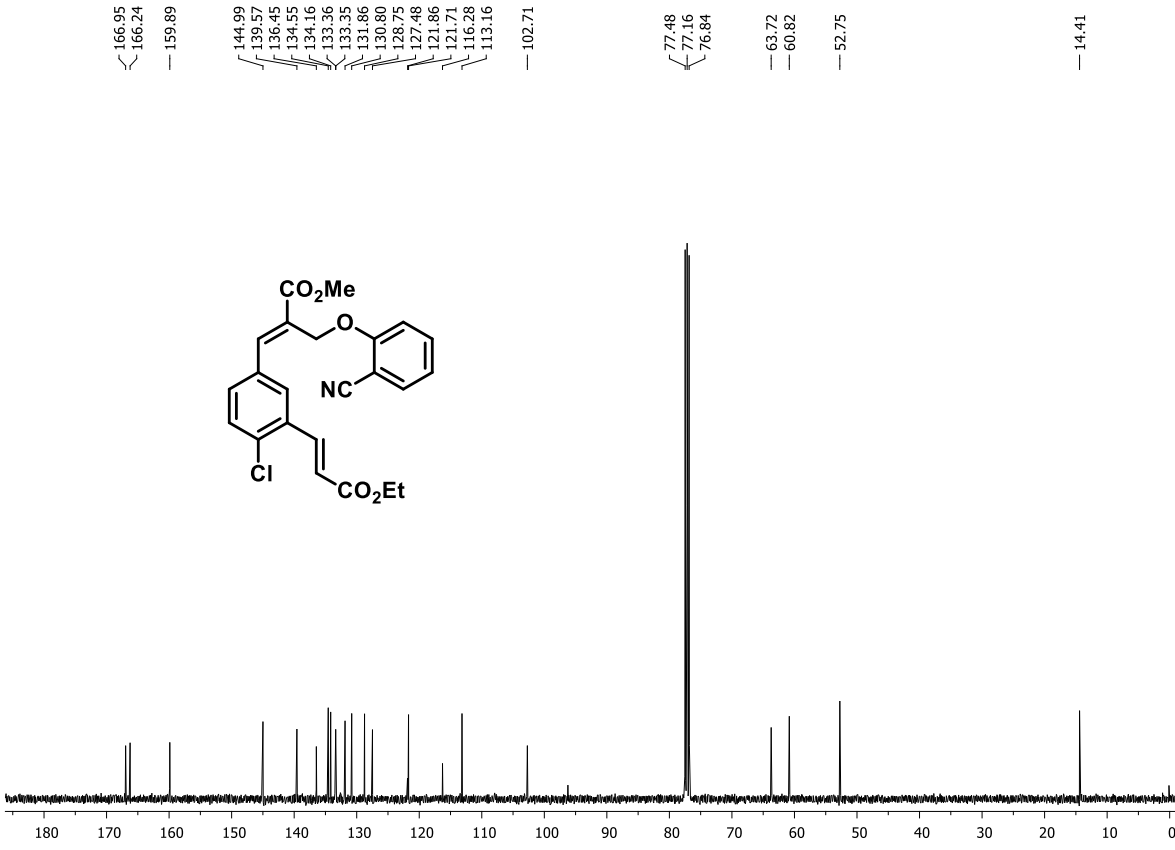




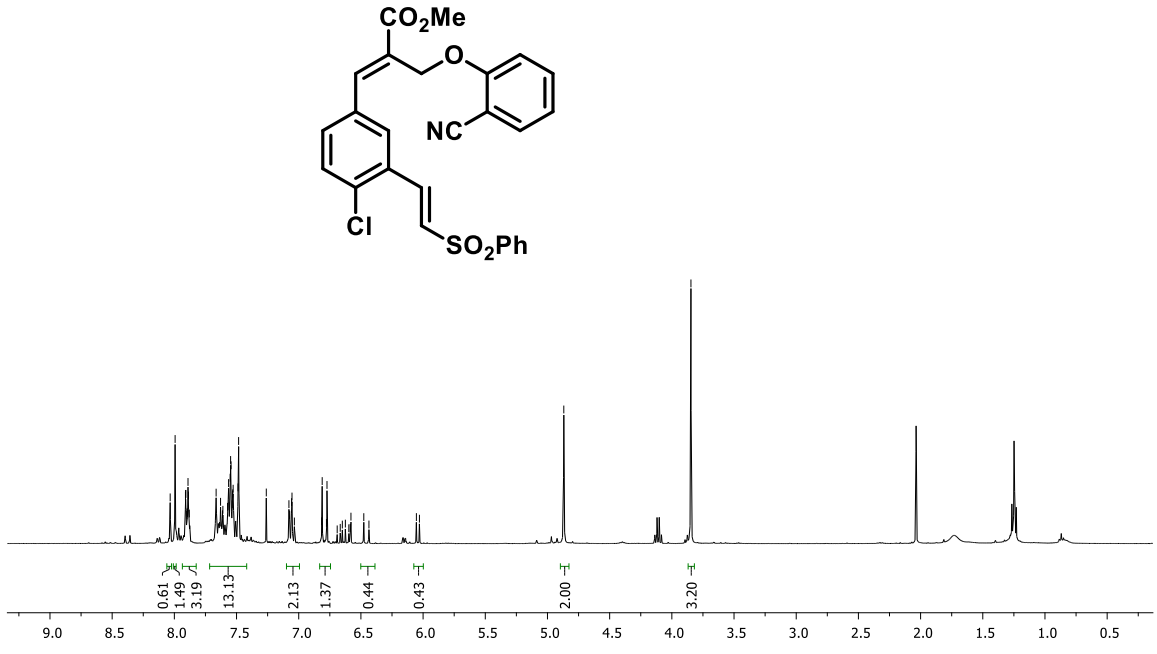


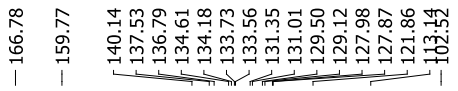
Methyl (*E*)-3-(4-chloro-3-((*E*)-3-ethoxy-3-oxoprop-1-en-1-yl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (4ac)

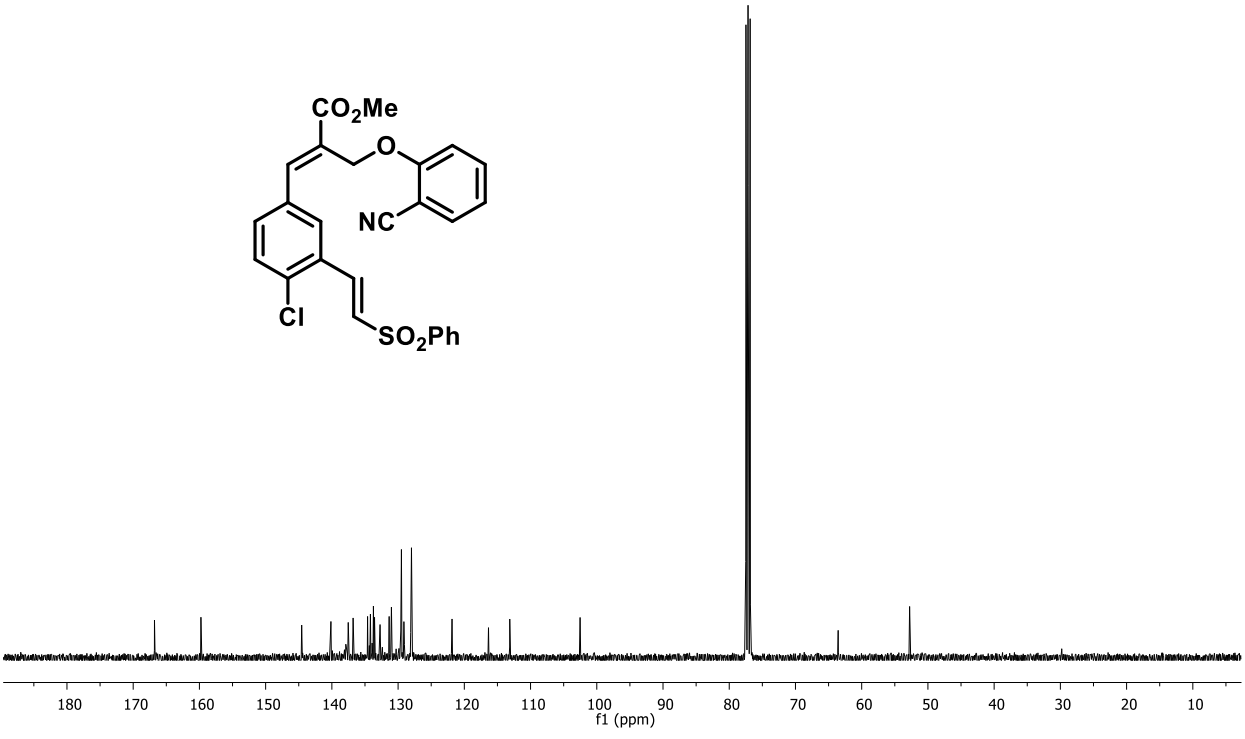




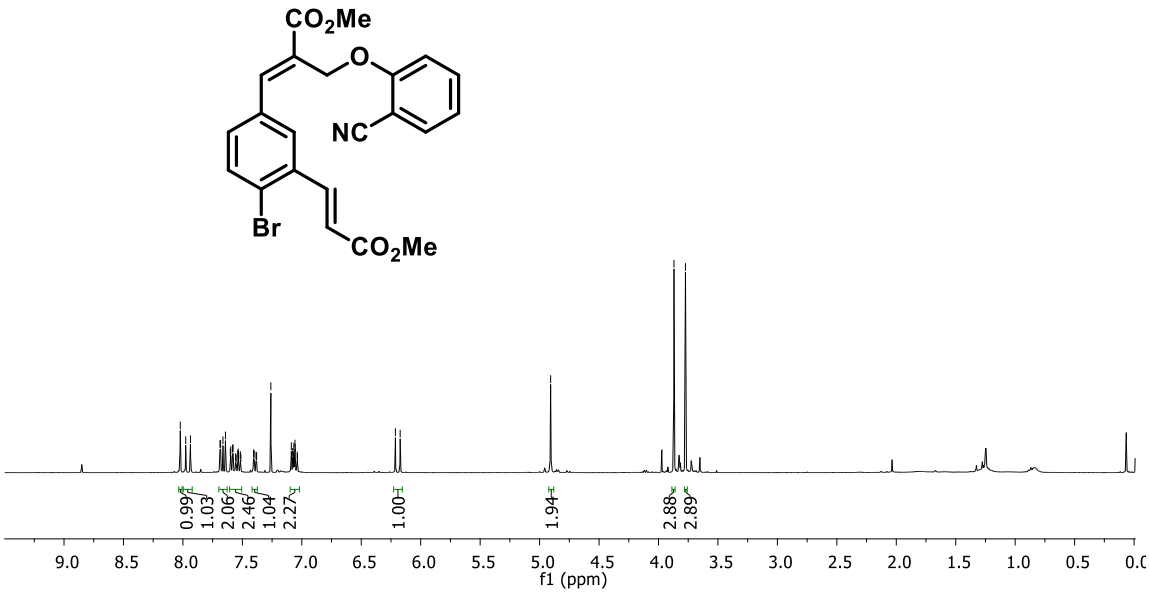
Methyl (*E*)-3-(4-chloro-3-((*E*)-2-(phenylsulfonyl) vinyl) phenyl)-2-((2-cyanophenoxy) methyl) acrylate (4ad)

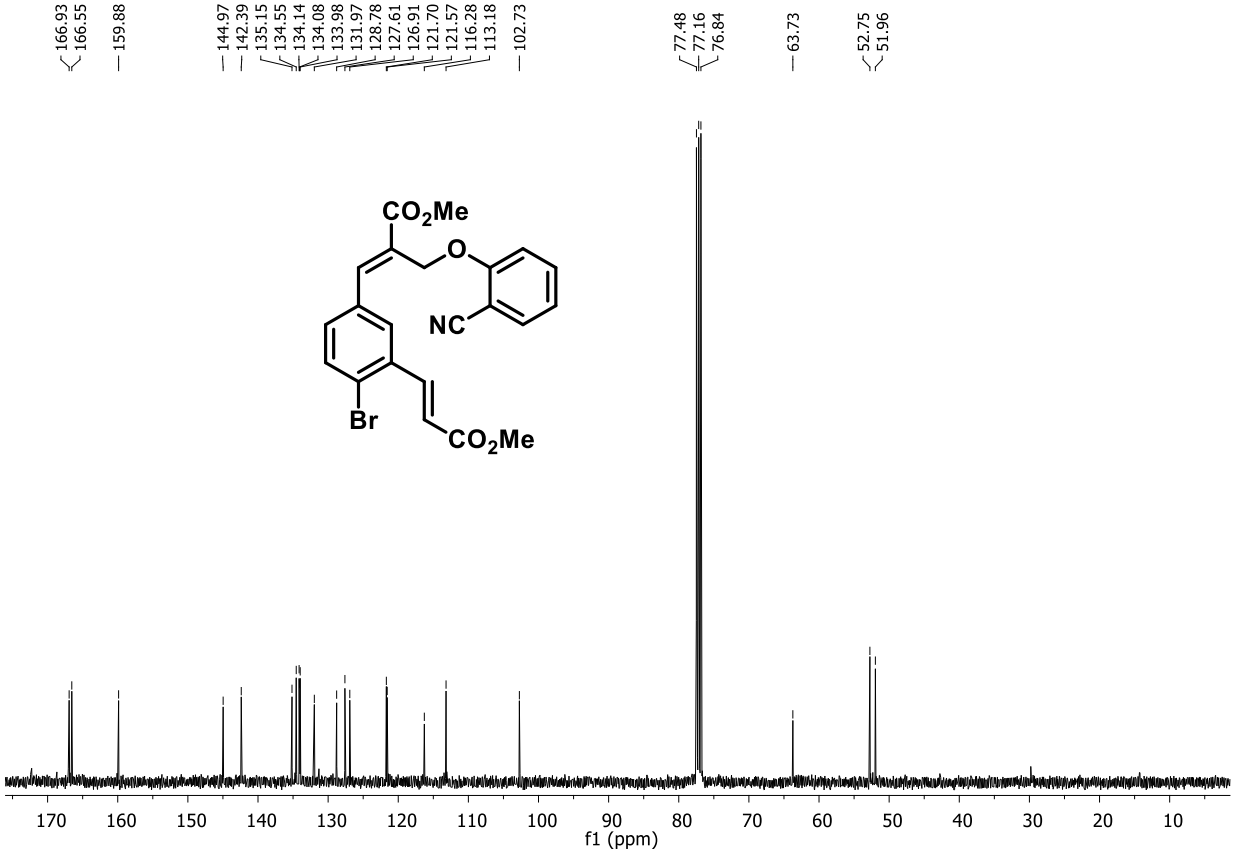




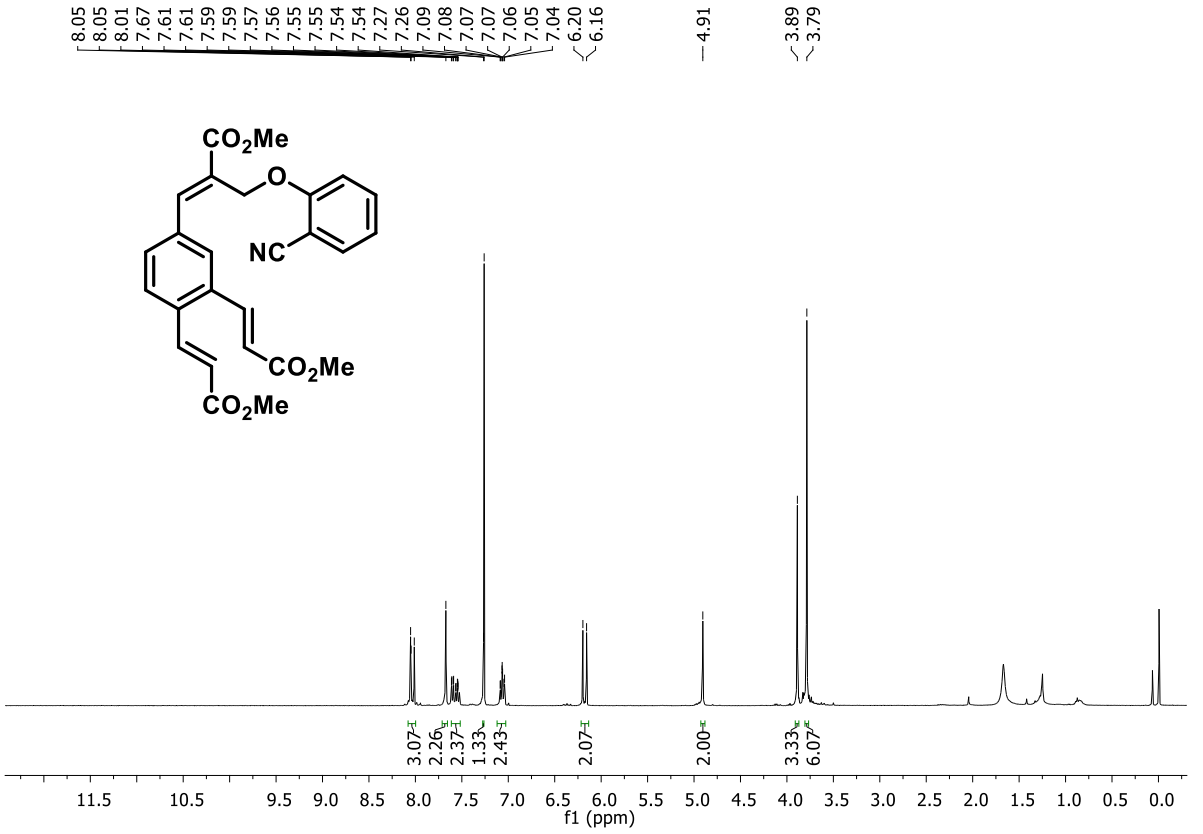


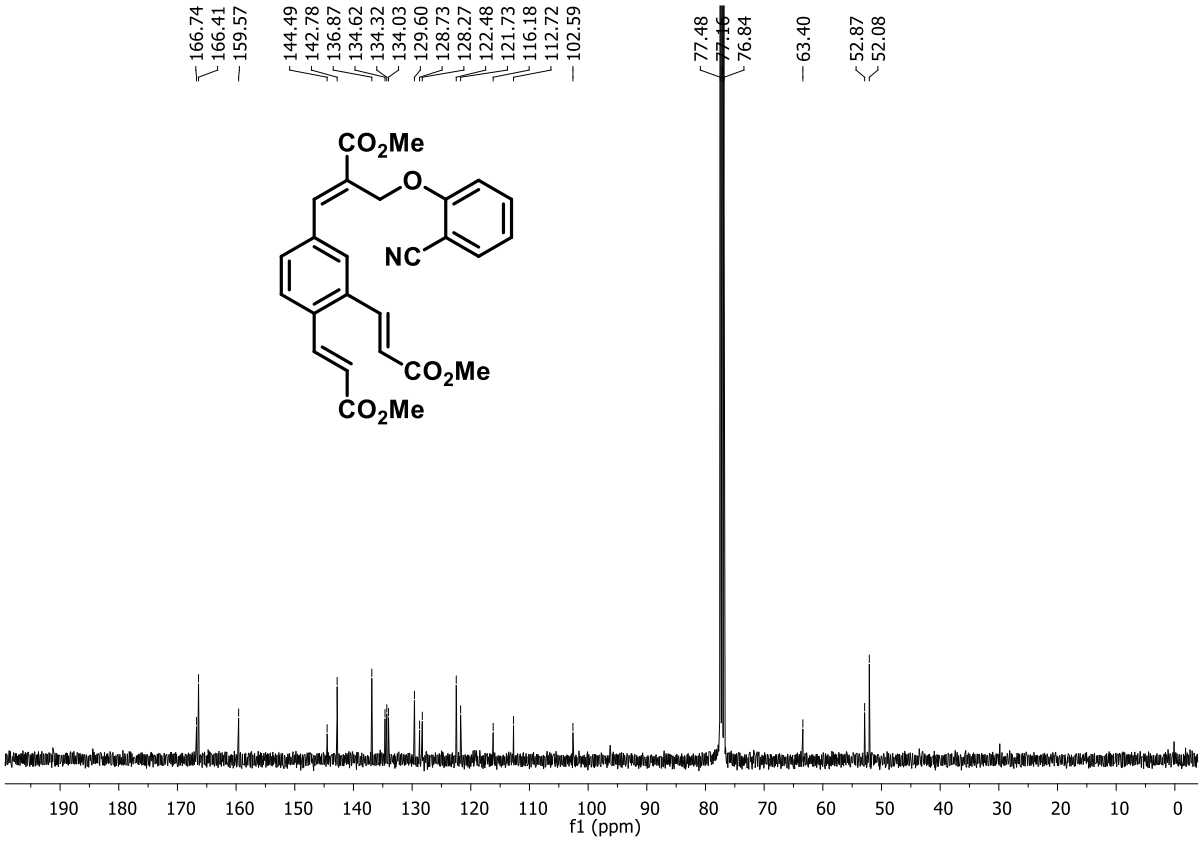
Methyl (*E*)-3-(4-bromo-3-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl) acrylate (4ae)



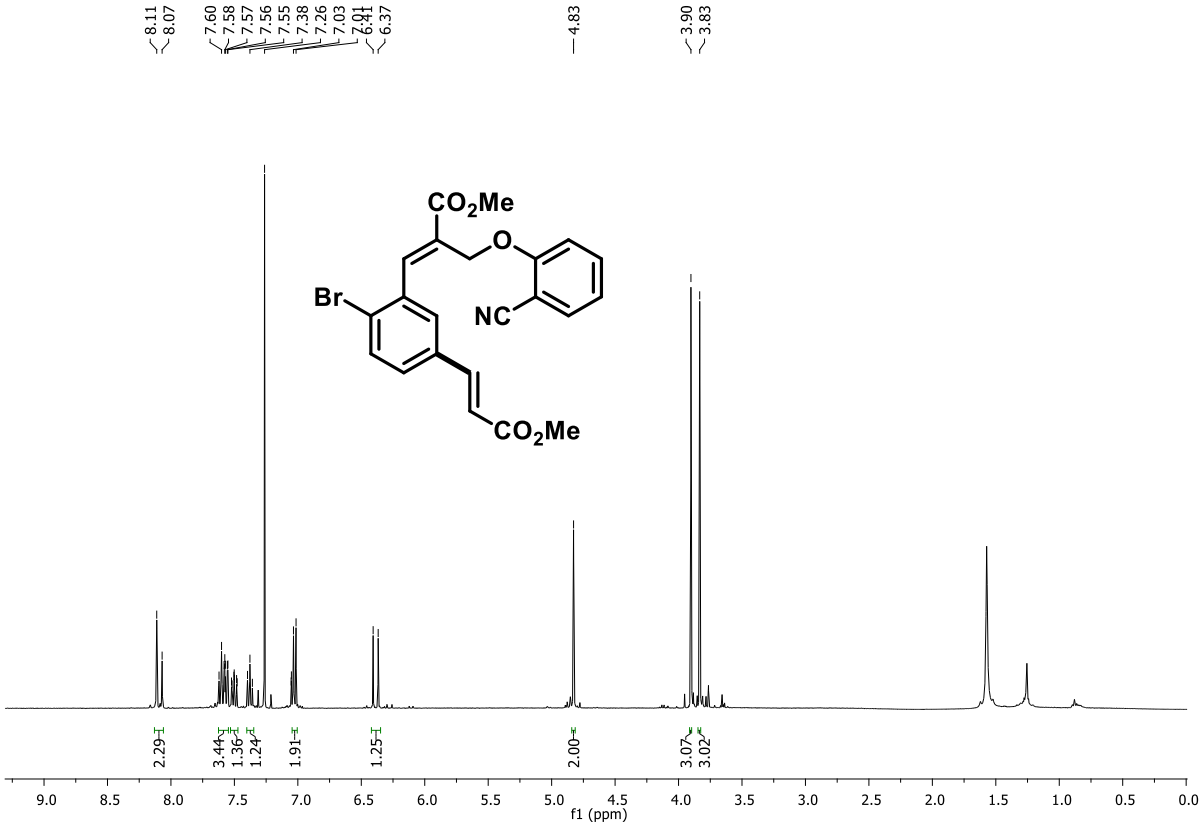


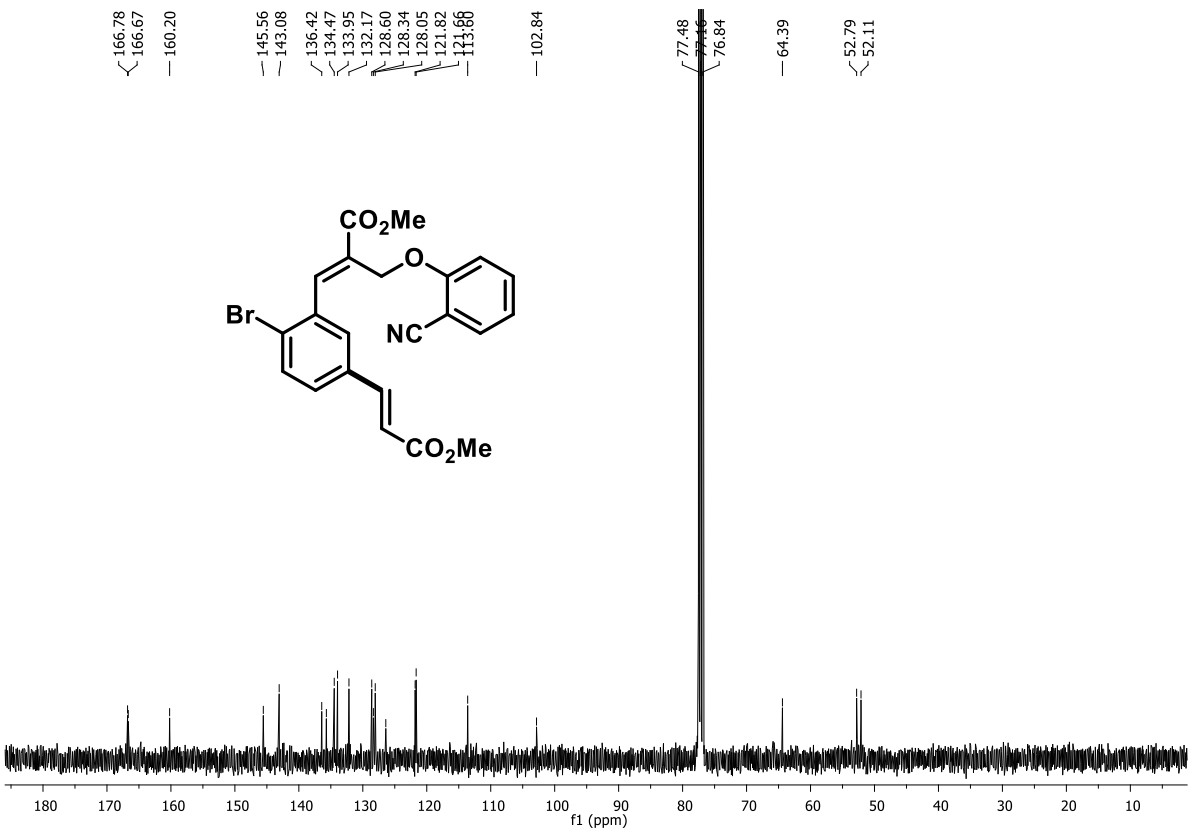
Dimethyl 3,3'-(4-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-1,2-phenylene)(2*E*,2'*E*) diacrylate (4ae')



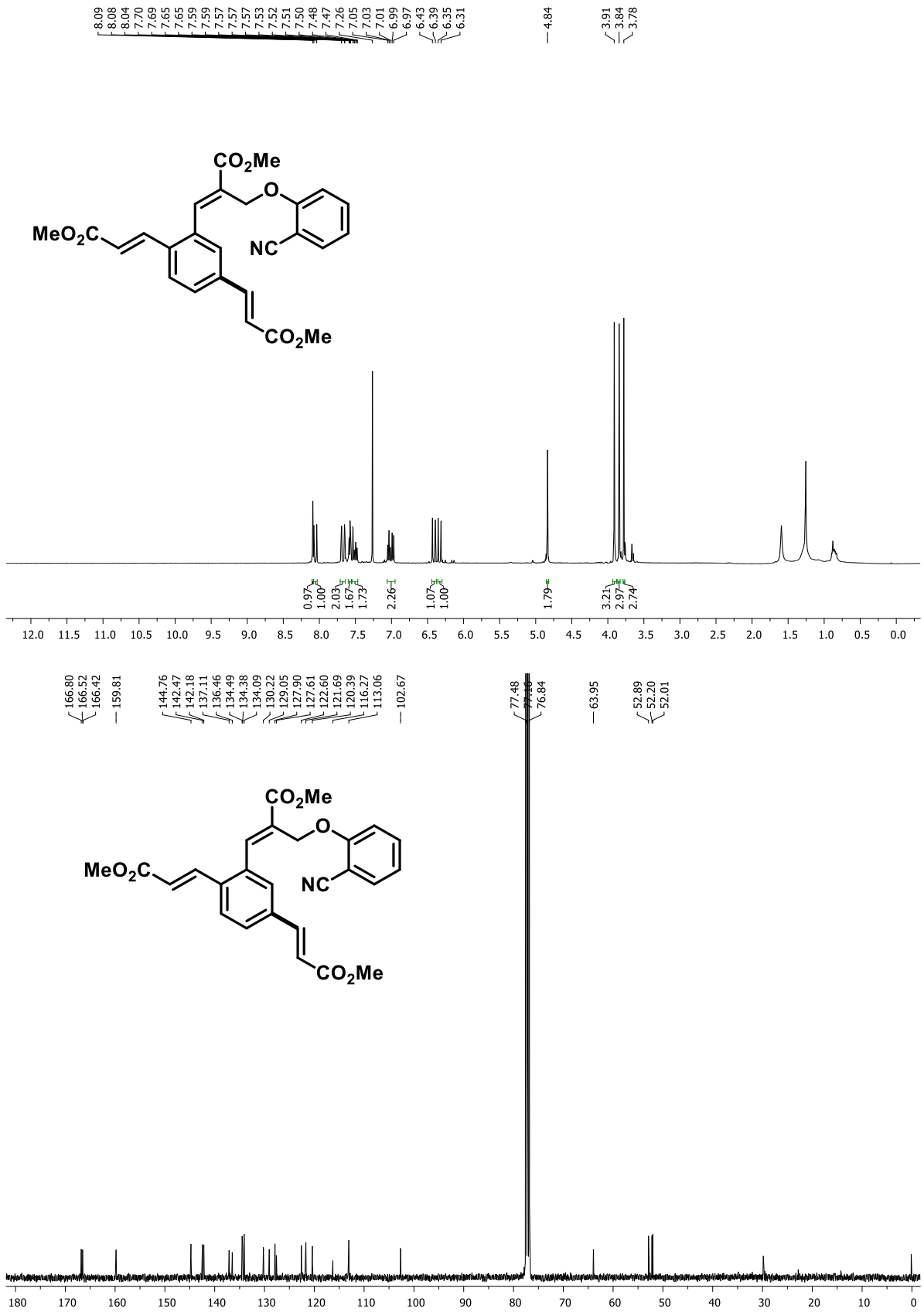


Methyl (*E*)-3-(2-bromo-5-((*E*)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy) methyl) acrylate (4af)

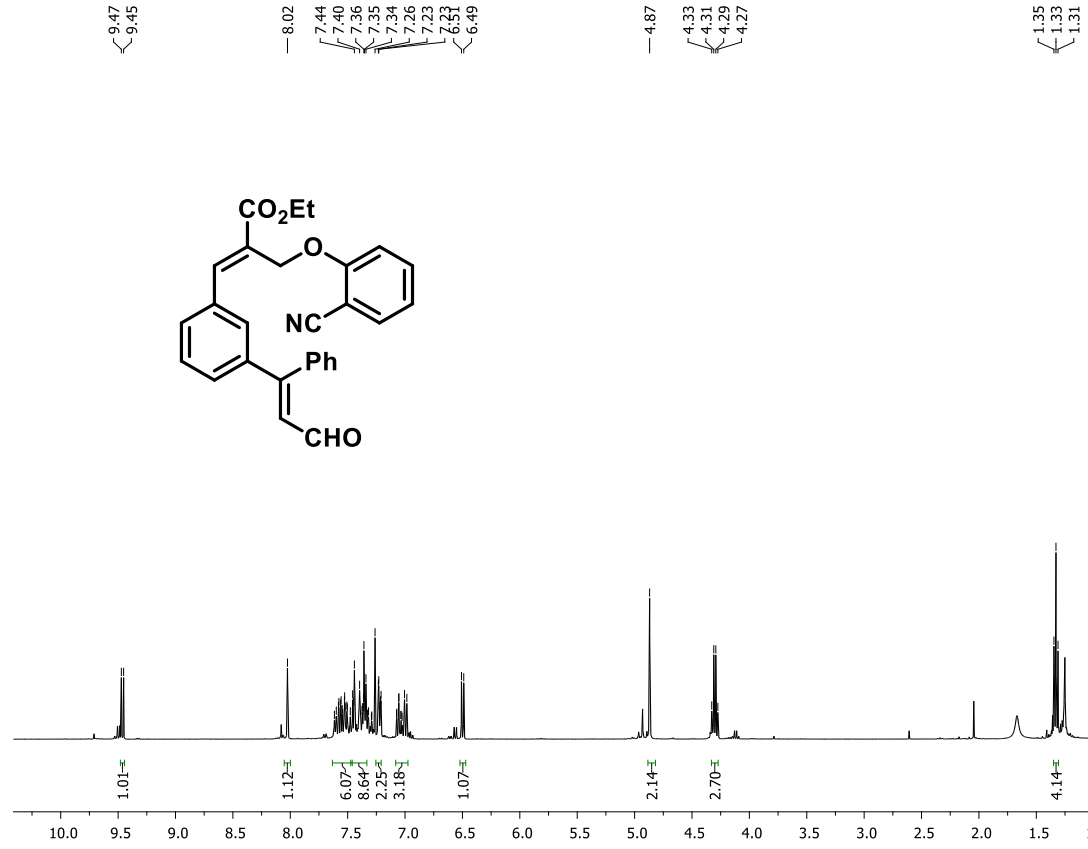


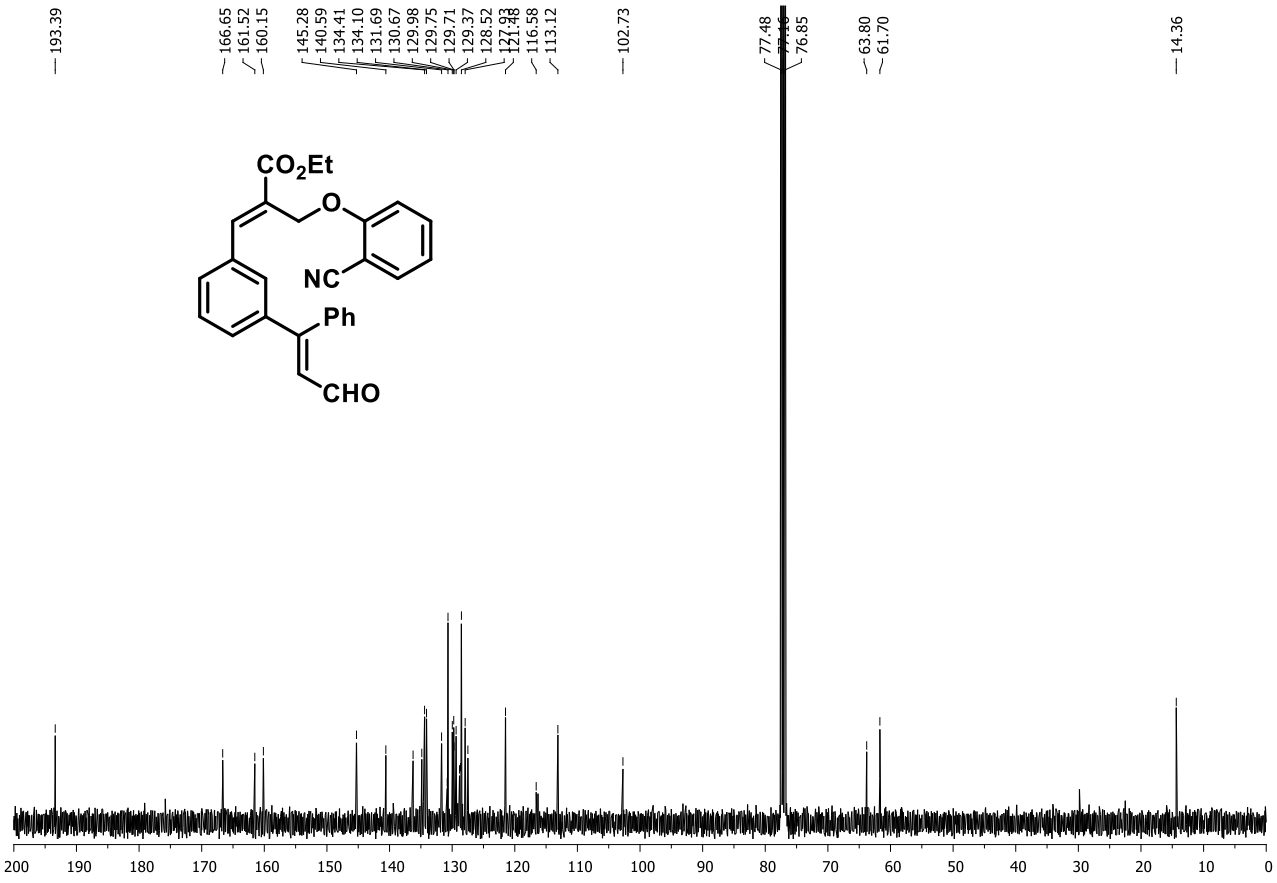


Dimethyl 3,3'-(2-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-1,4-phenylene) (2*E*,2'*E*)-diacrylate (4af')

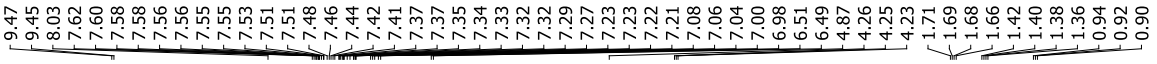


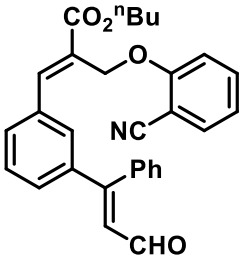
Ethyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl)phenyl) acrylate (5a)

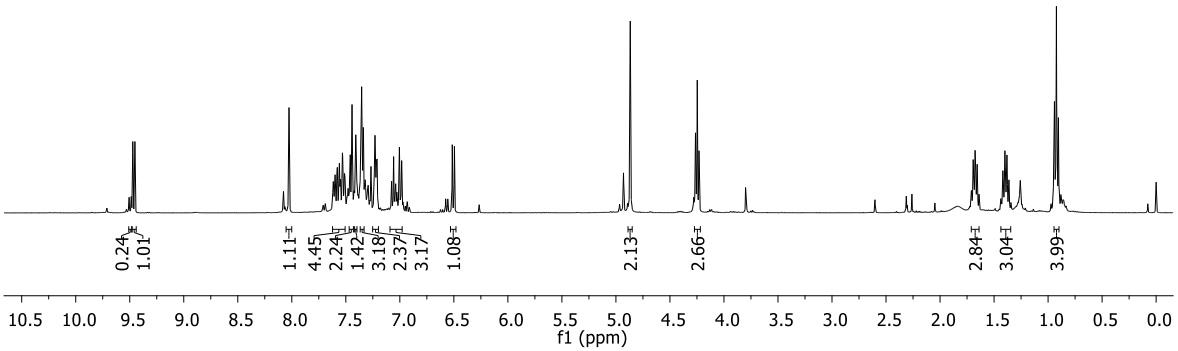


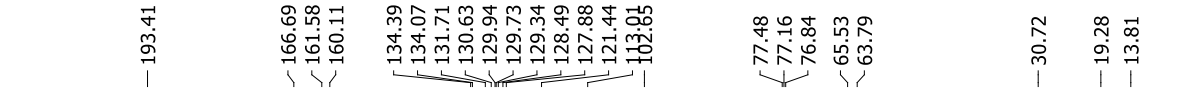


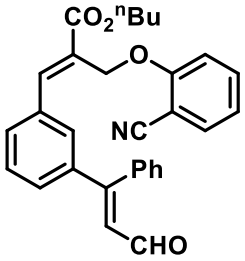
Butyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl)phenyl) acrylate (5b)



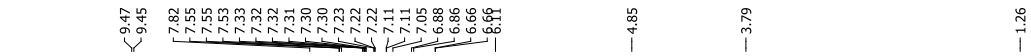


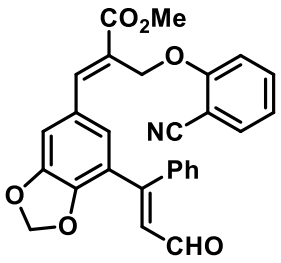


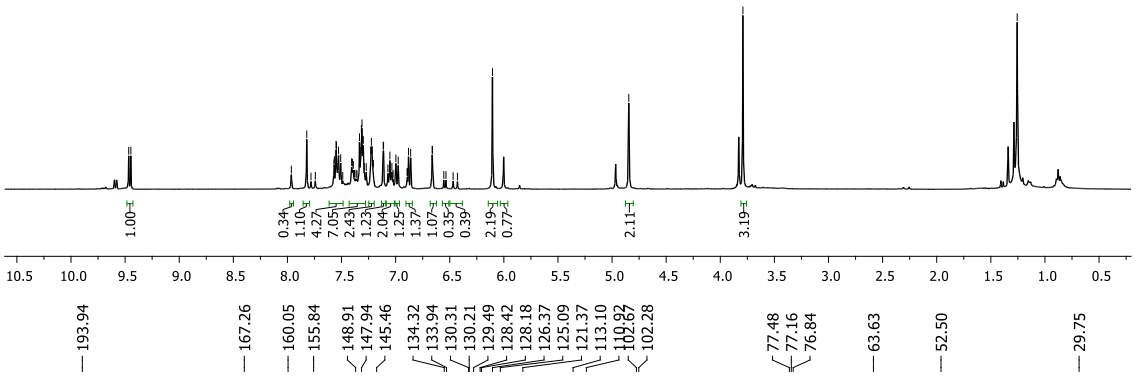


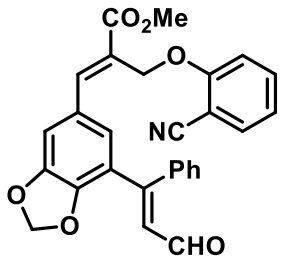


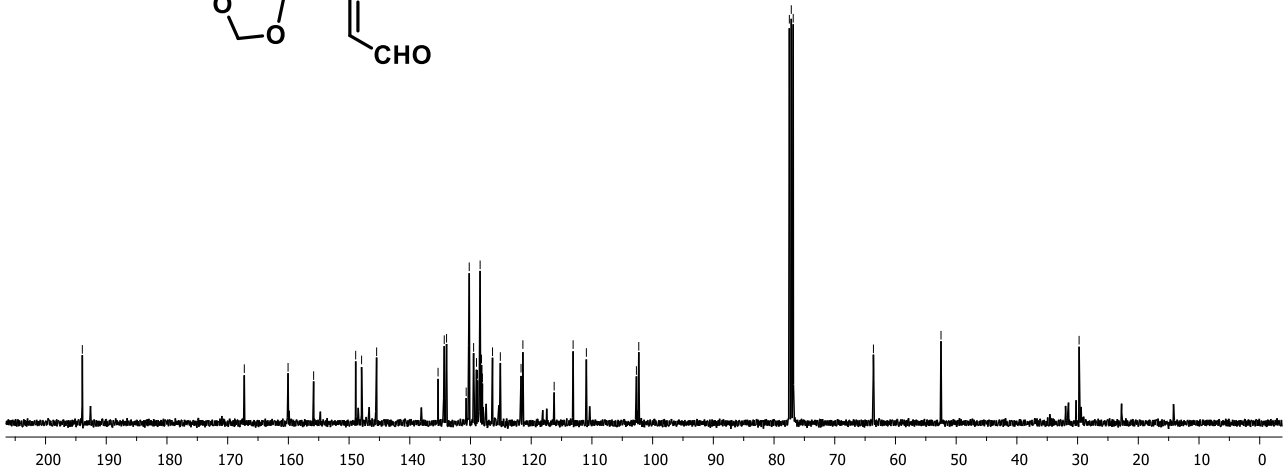
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(7-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl)benzo[d][1,3]dioxol-5-yl) acrylate (5c)



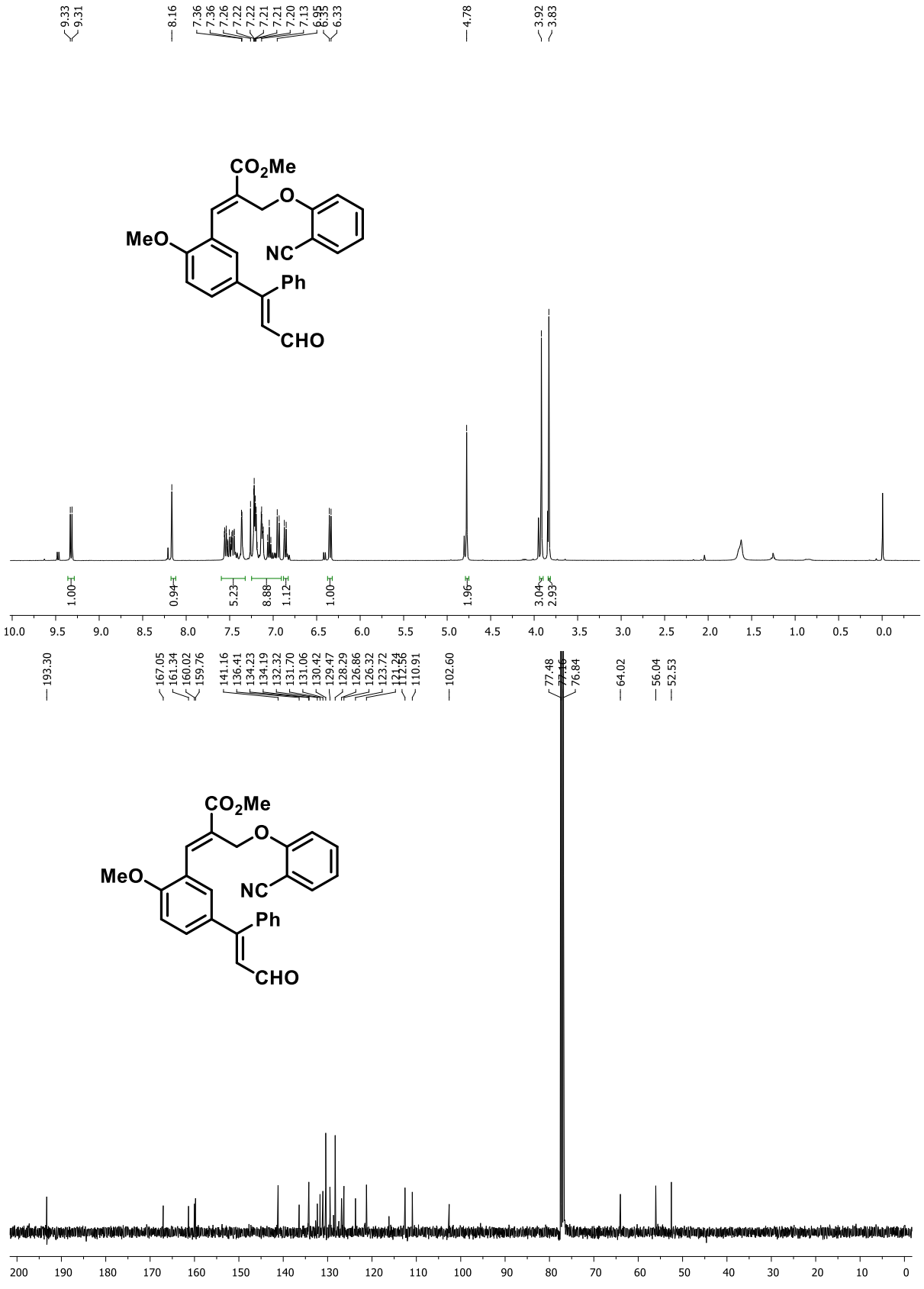




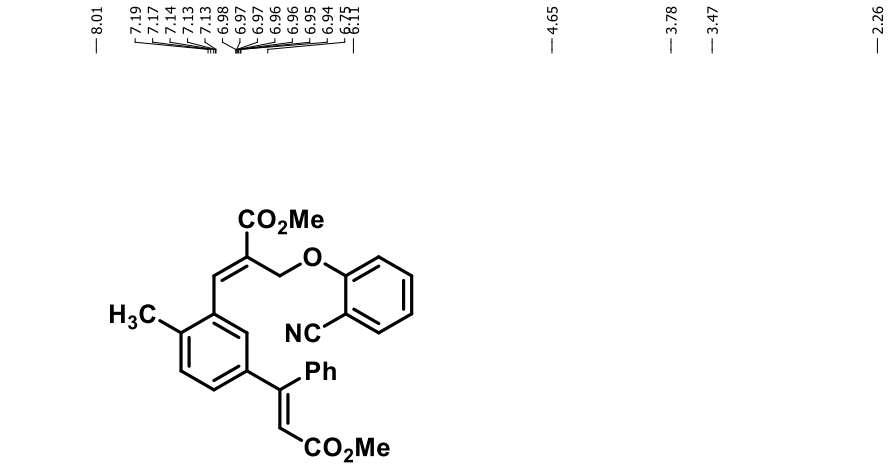


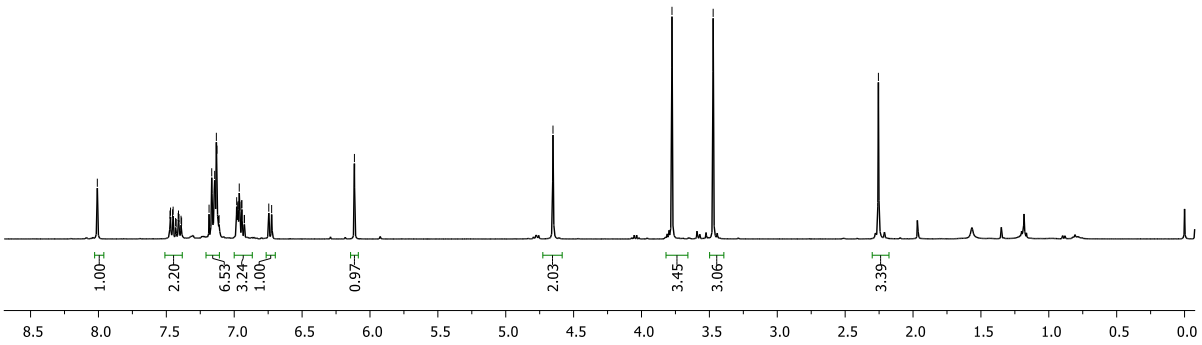


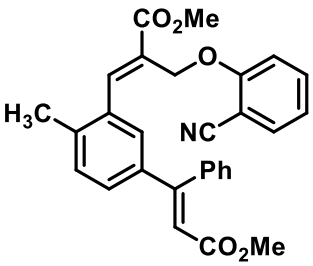
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl)phenyl) acrylate (5d)

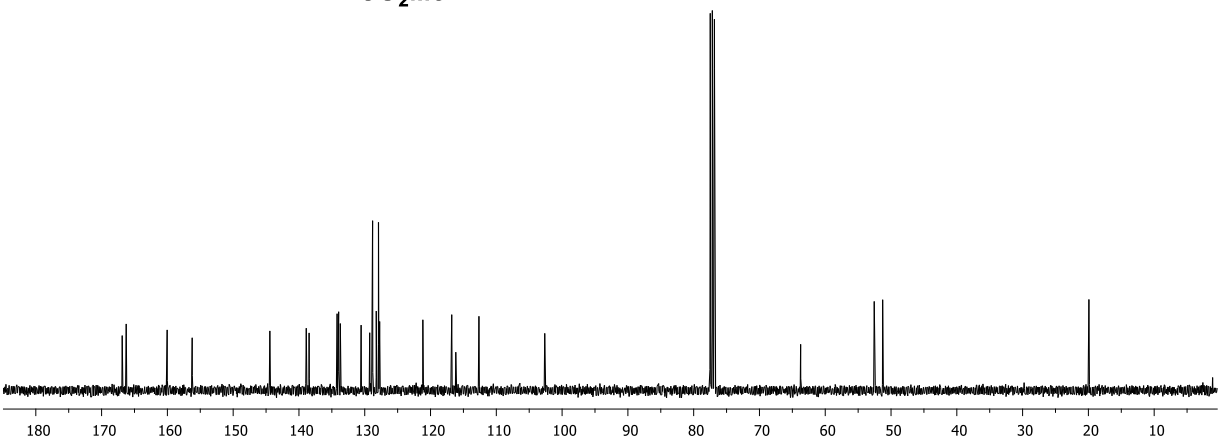


Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(5-((*Z*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl)-2-methylphenyl) acrylate (5e)

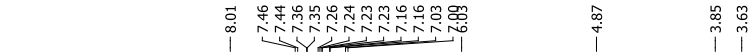


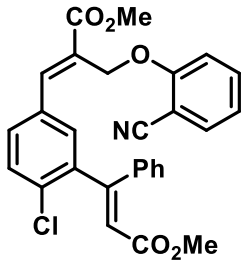


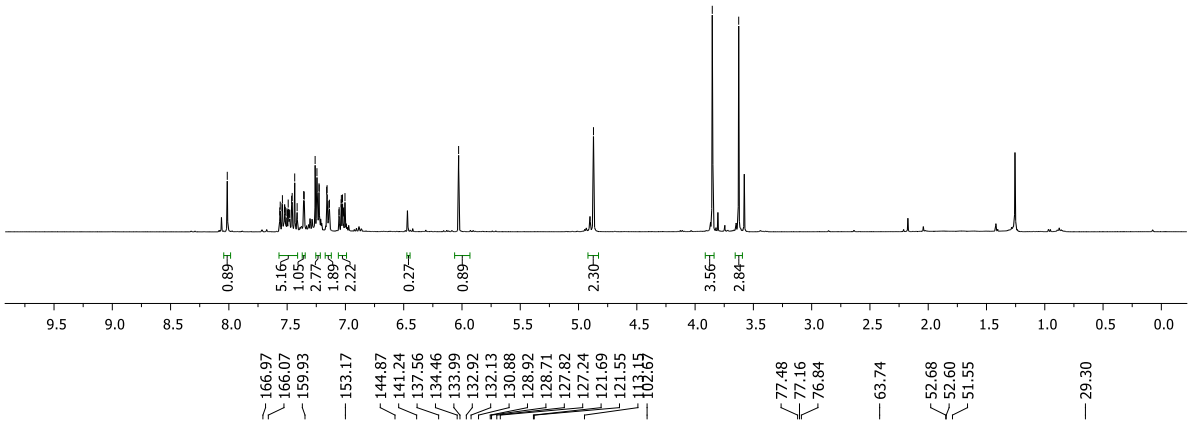


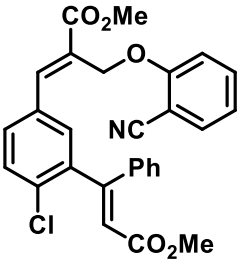


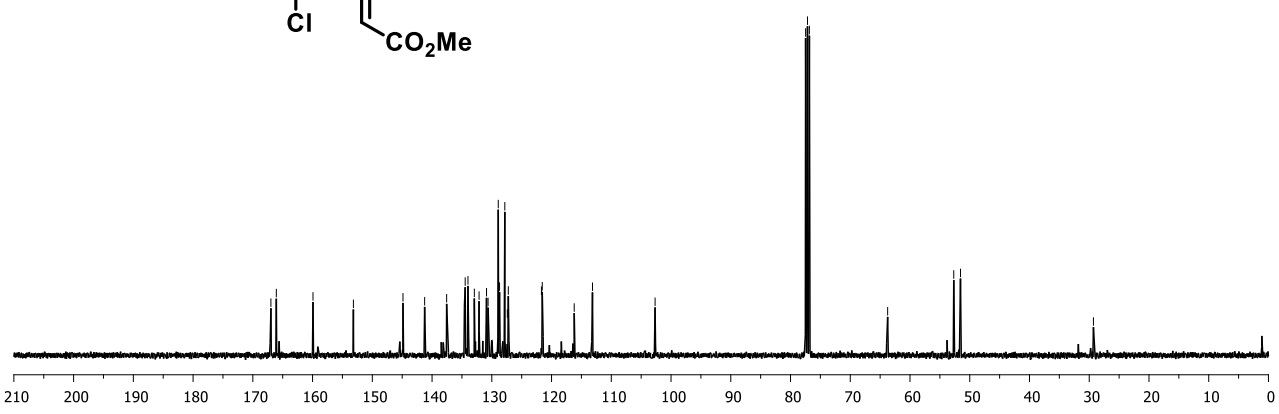
Methyl (*E*)-3-(4-chloro-3-((*Z*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl) phenyl) -2-((2-cyanophenoxy) methyl) acrylate (5f)



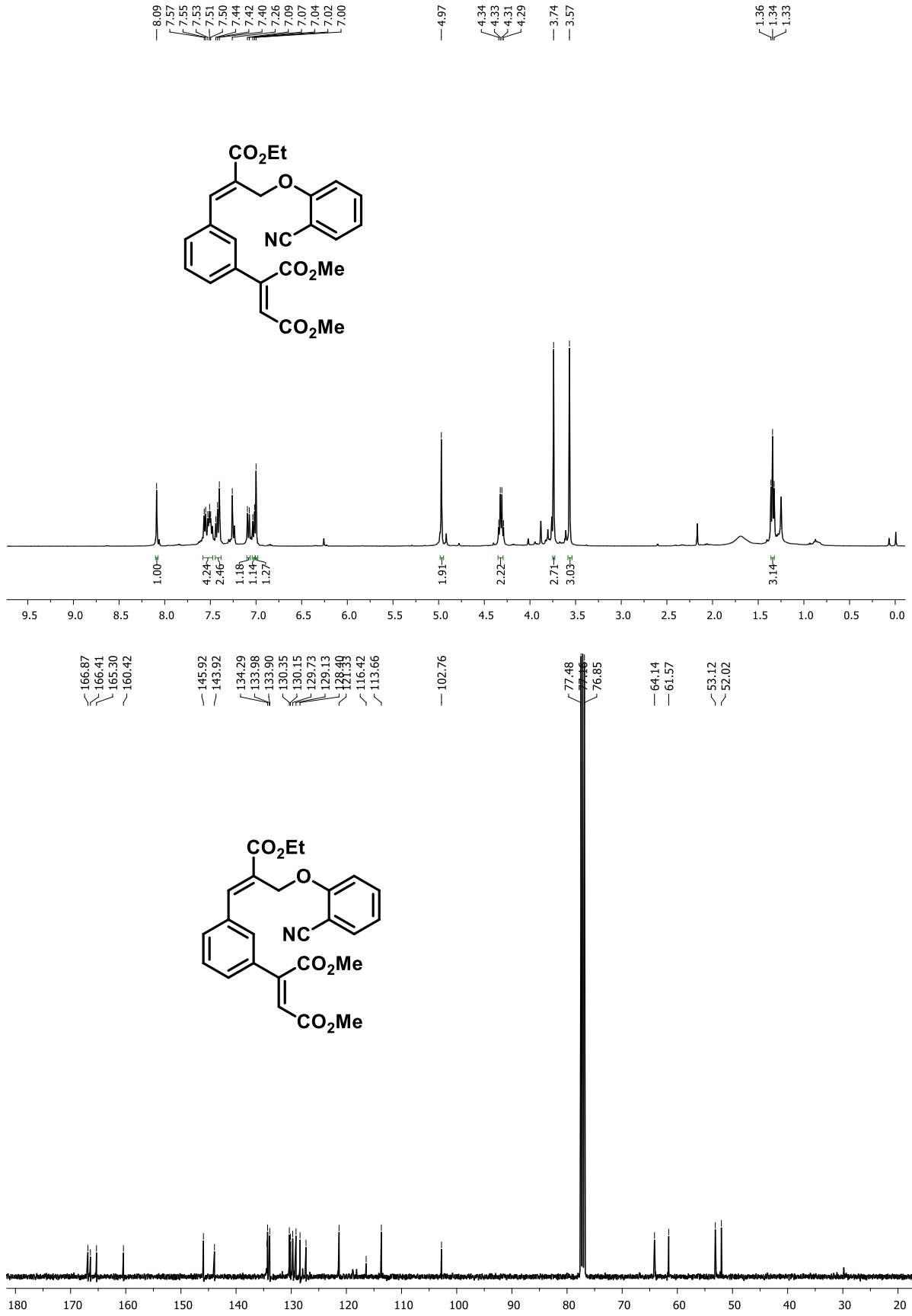




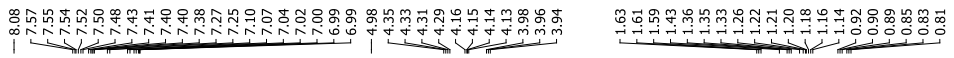


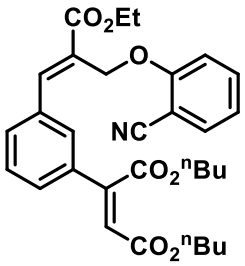


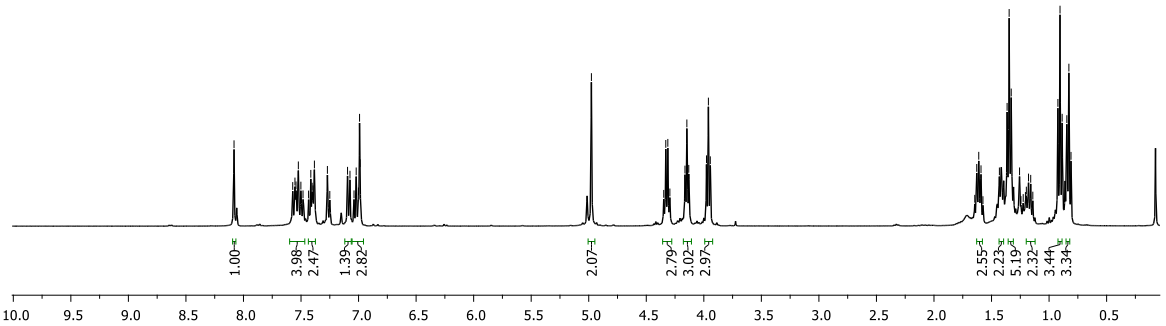
Dimethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl)maleate (6a)

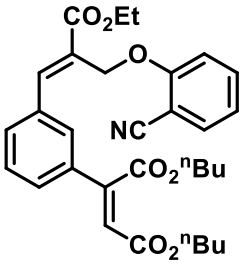


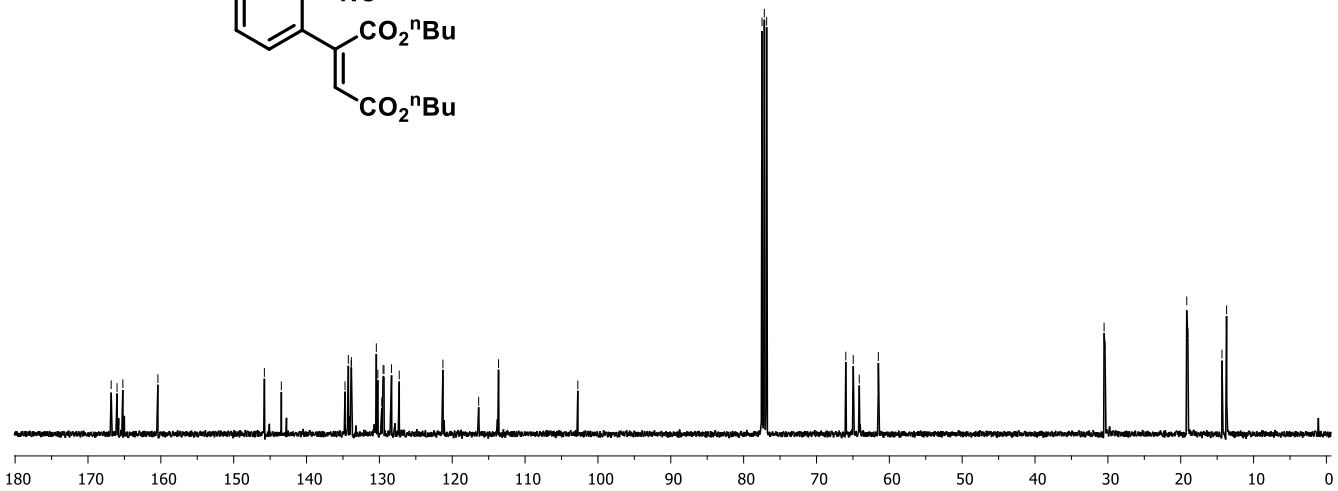
Dibutyl 2-(3-((*E*)-2-((2-cyanophenoxy) methyl)-3-ethoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (6b)



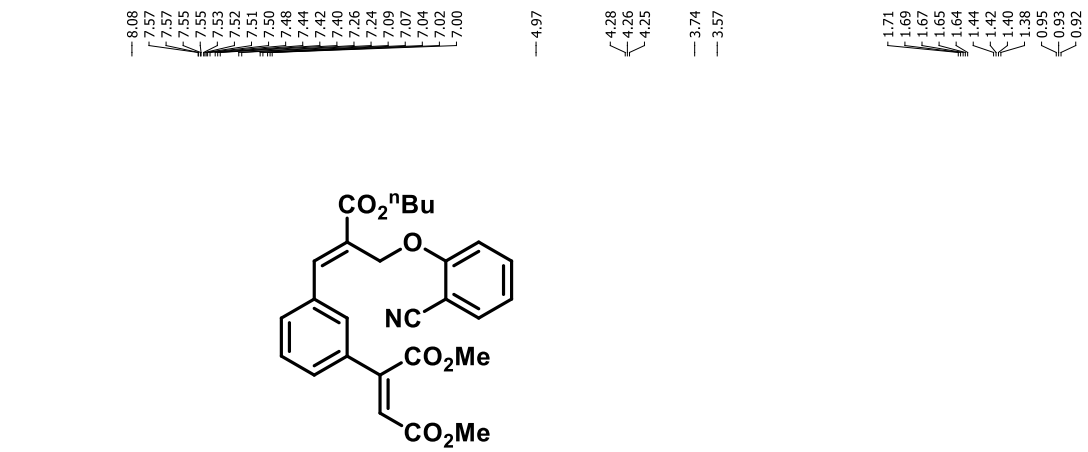


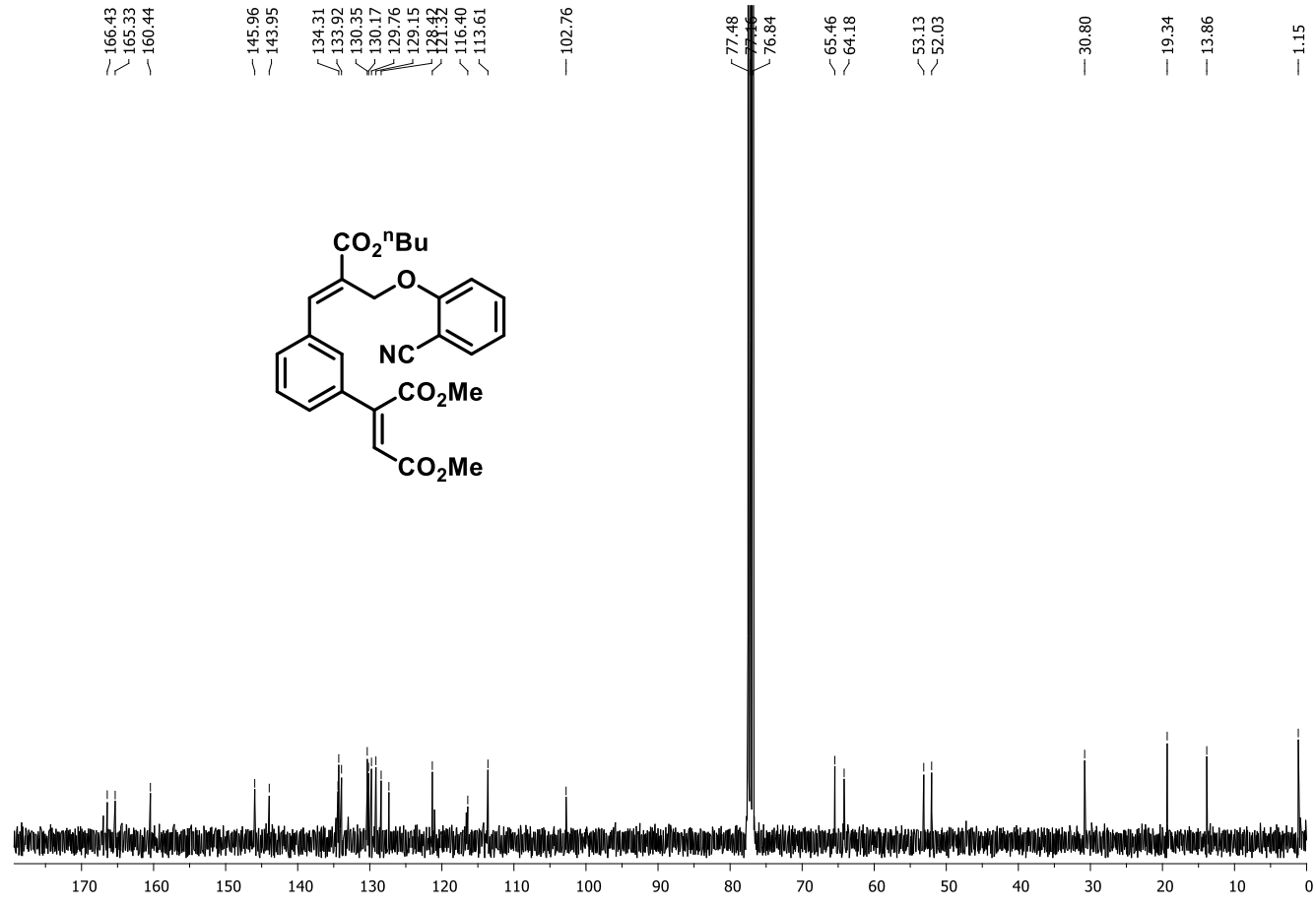




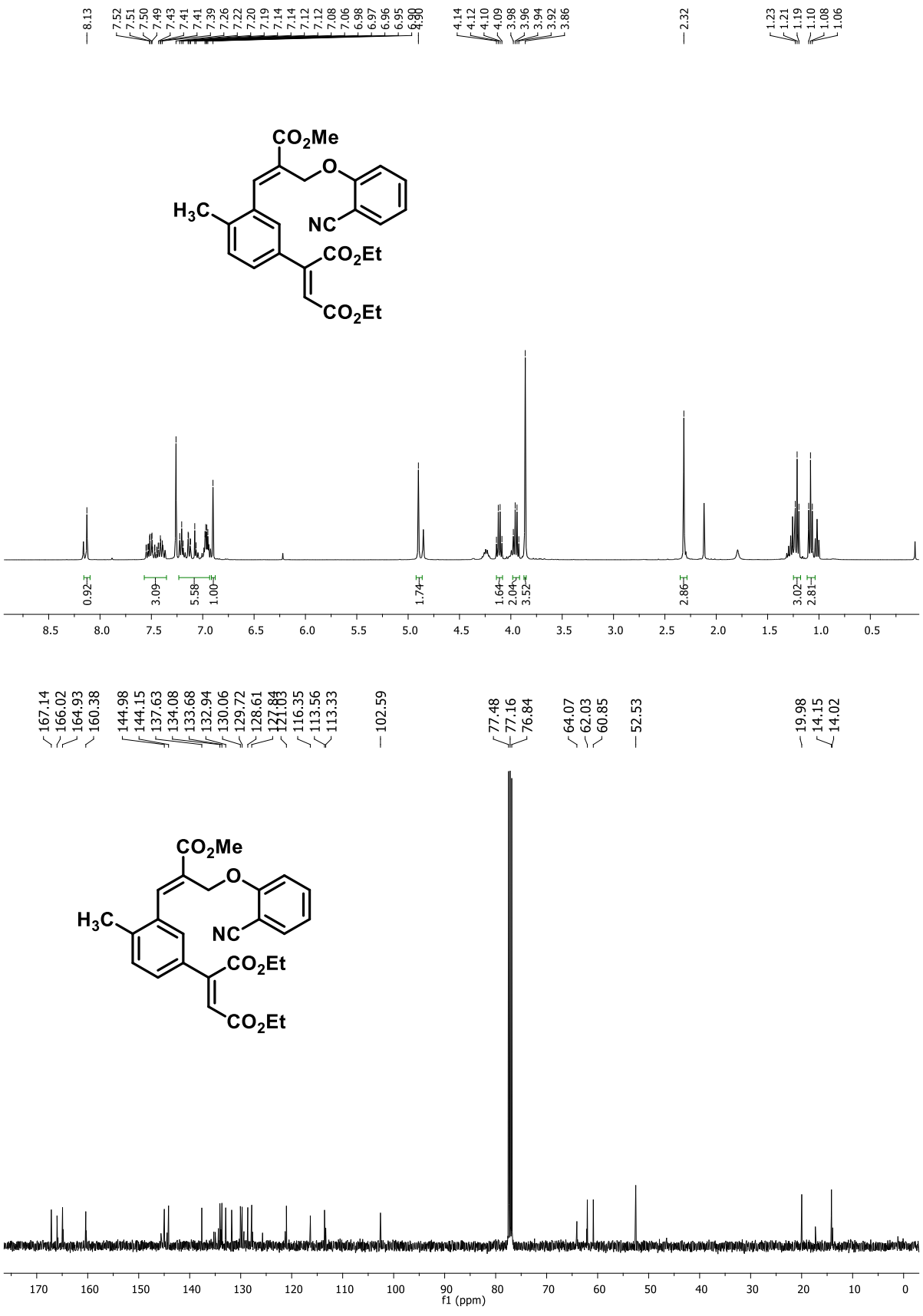


Dimethyl 2-(3-((*E*)-3-butoxy-2-((2-cyanophenoxy)methyl)-3-oxoprop-1-en-1-yl)phenyl) maleate (6c)

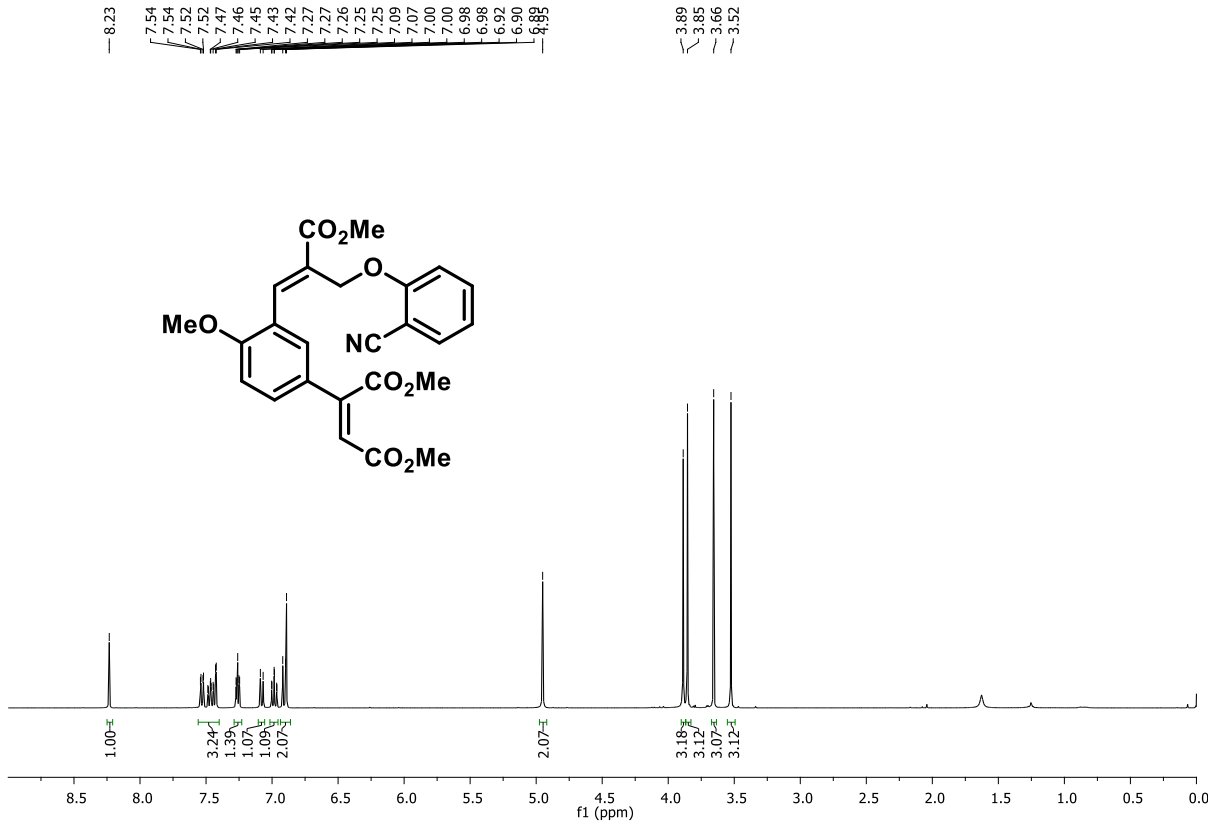


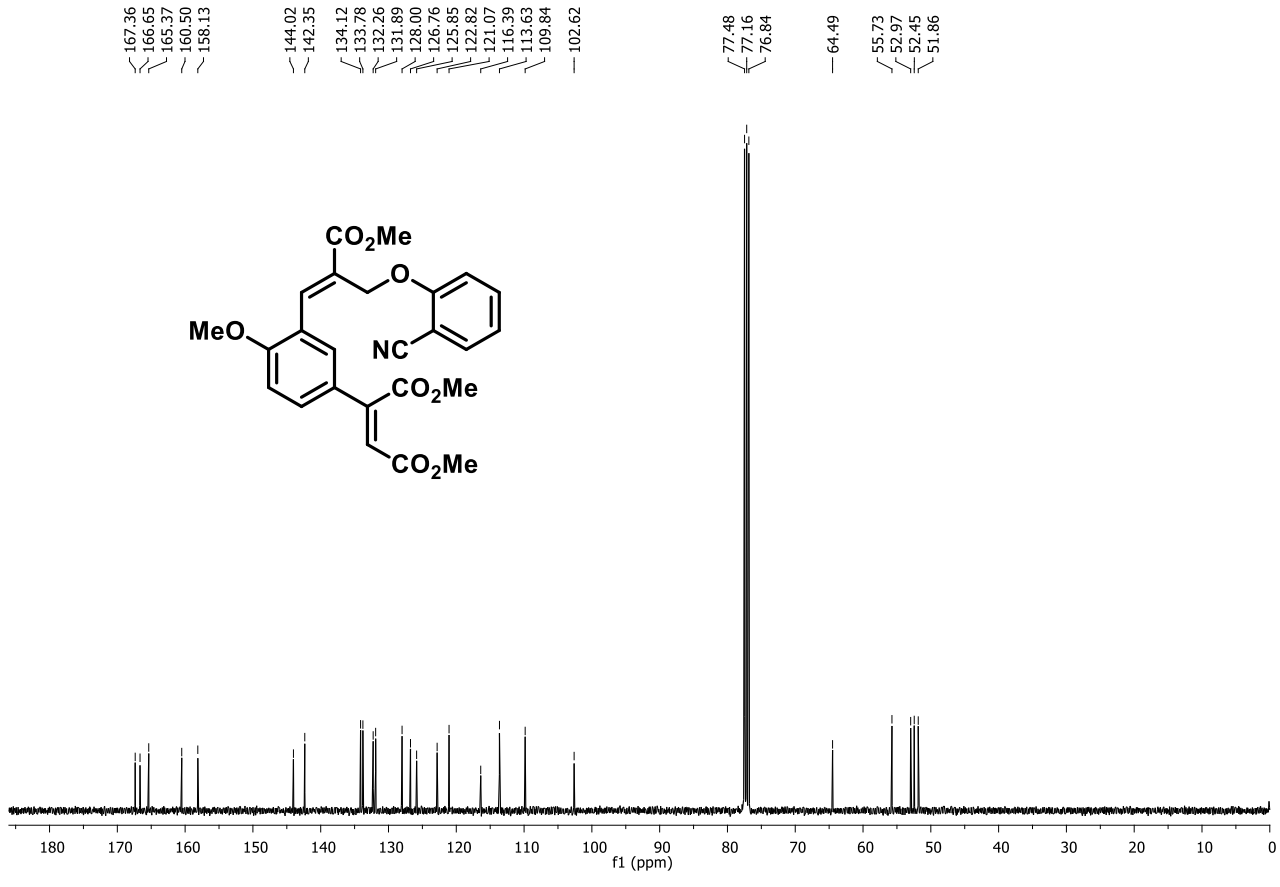


Diethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methylphenyl)maleate (6d)

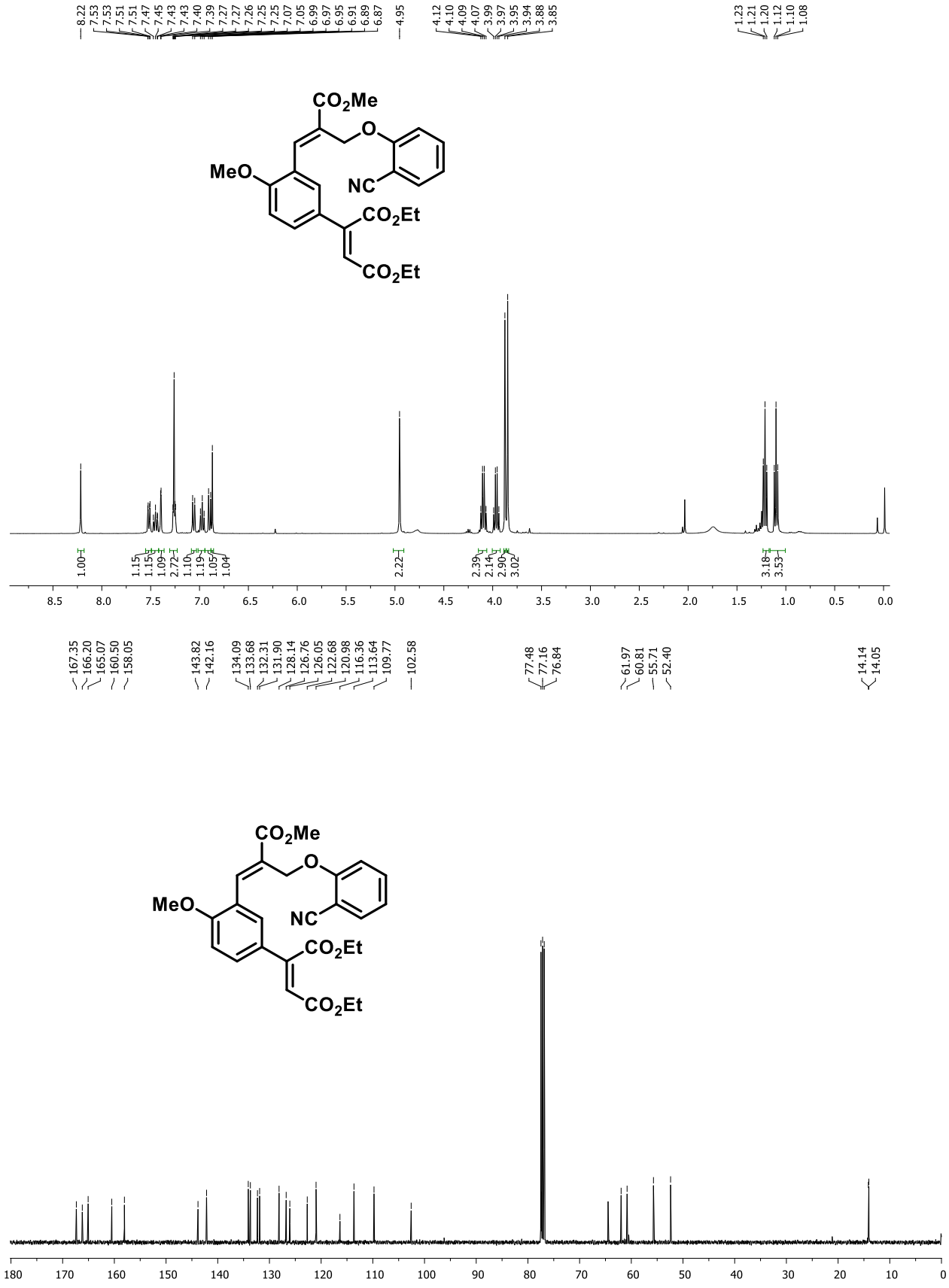


Dimethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl) maleate (6e)

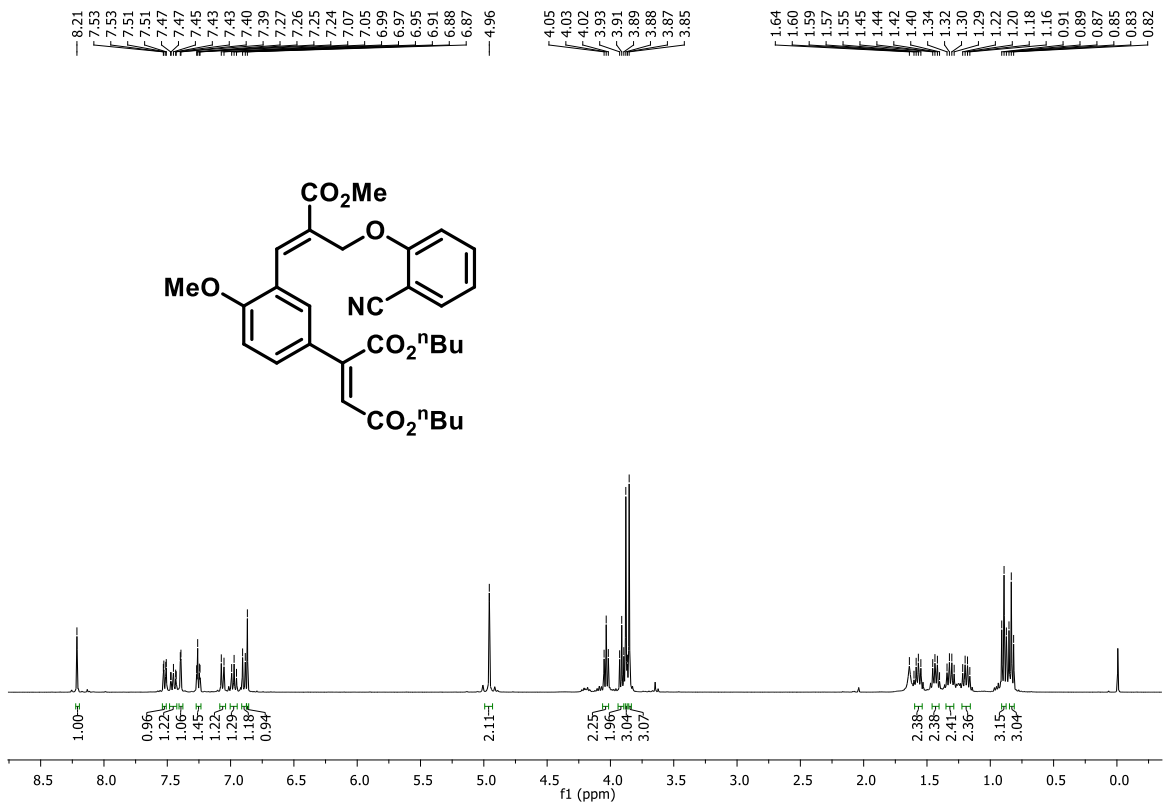


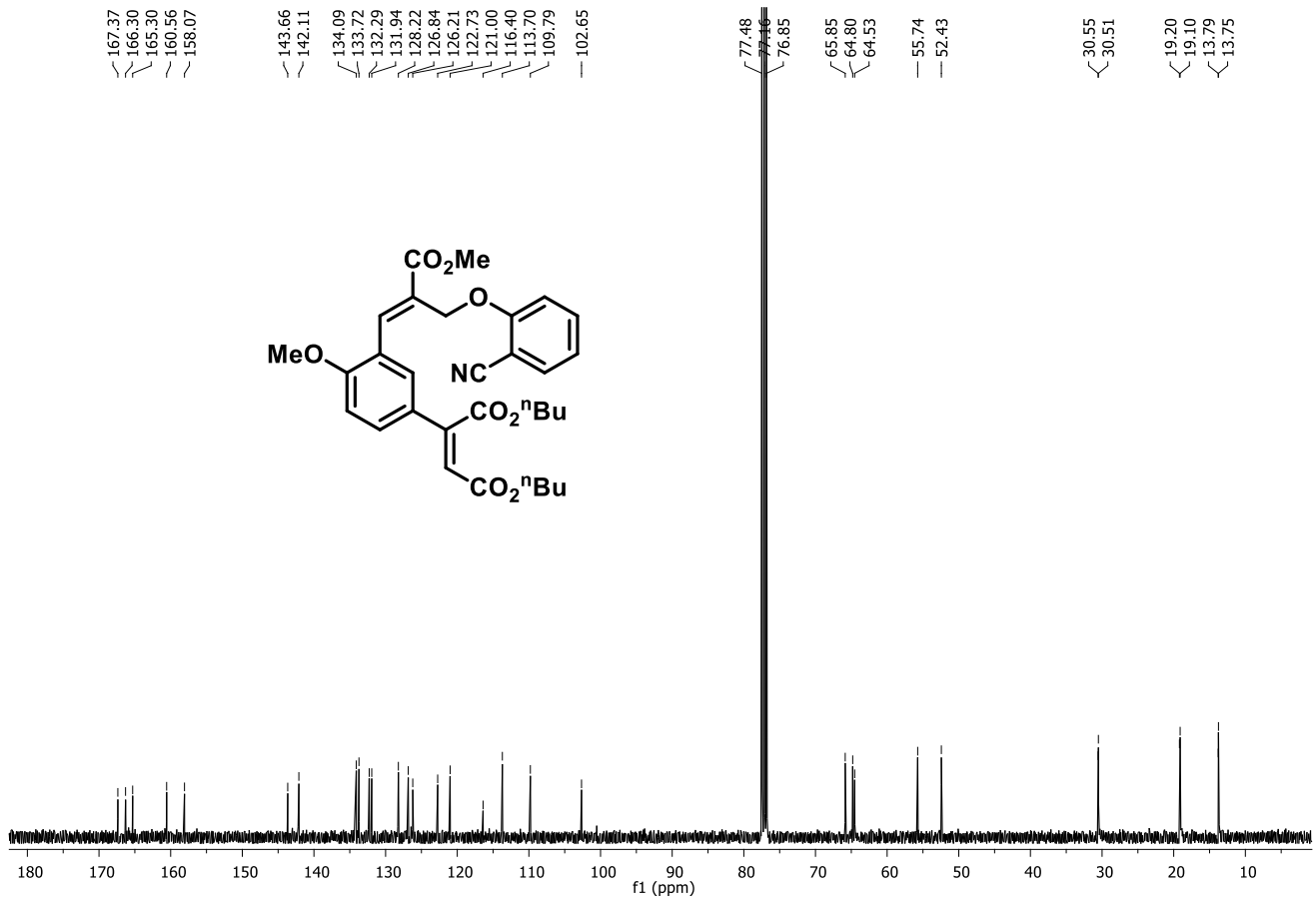


Diethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl) maleate (6f)

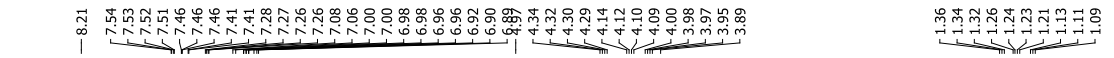


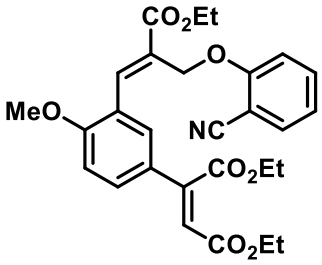
Dibutyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl) maleate (6g)

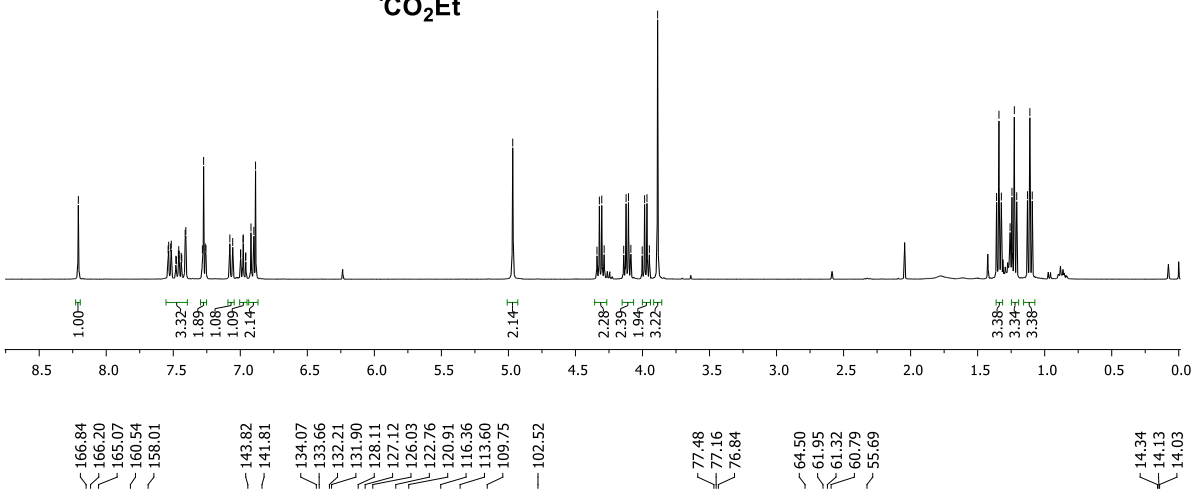


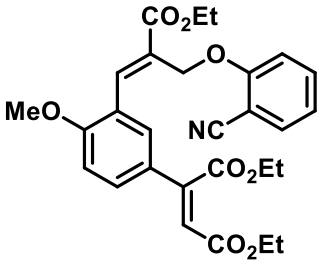


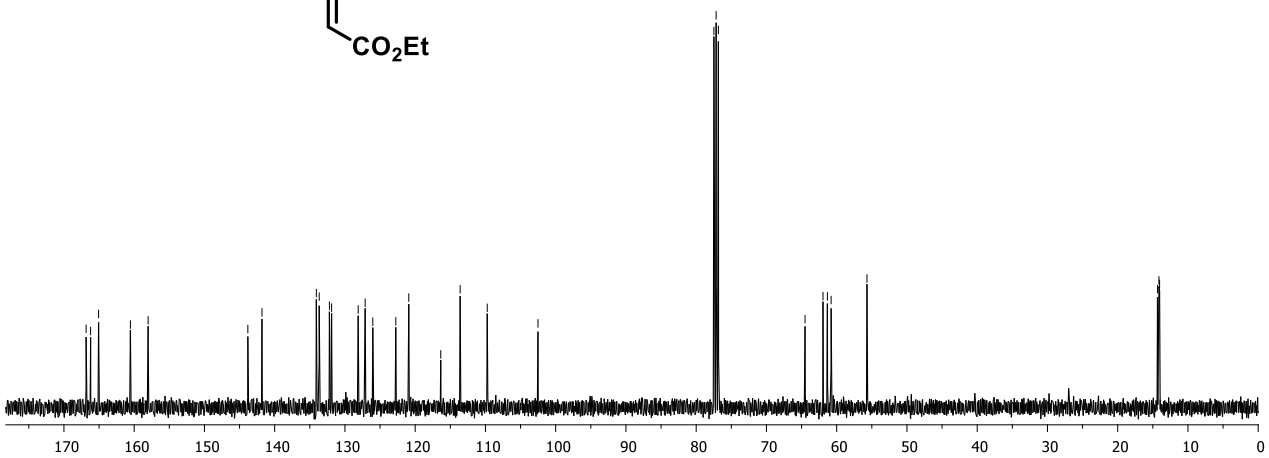
Diethyl 2-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-ethoxy-3-oxoprop-1-en-1-yl)-4-methoxyphenyl)maleate (6h)



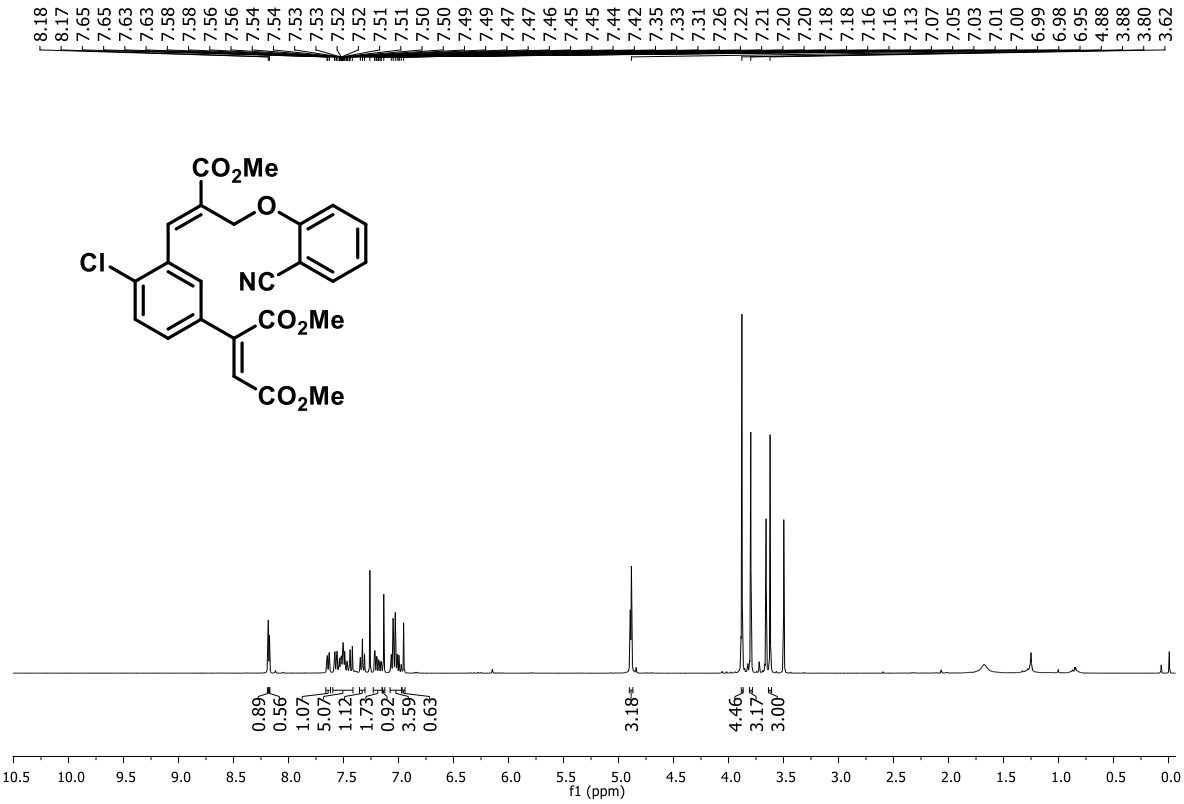


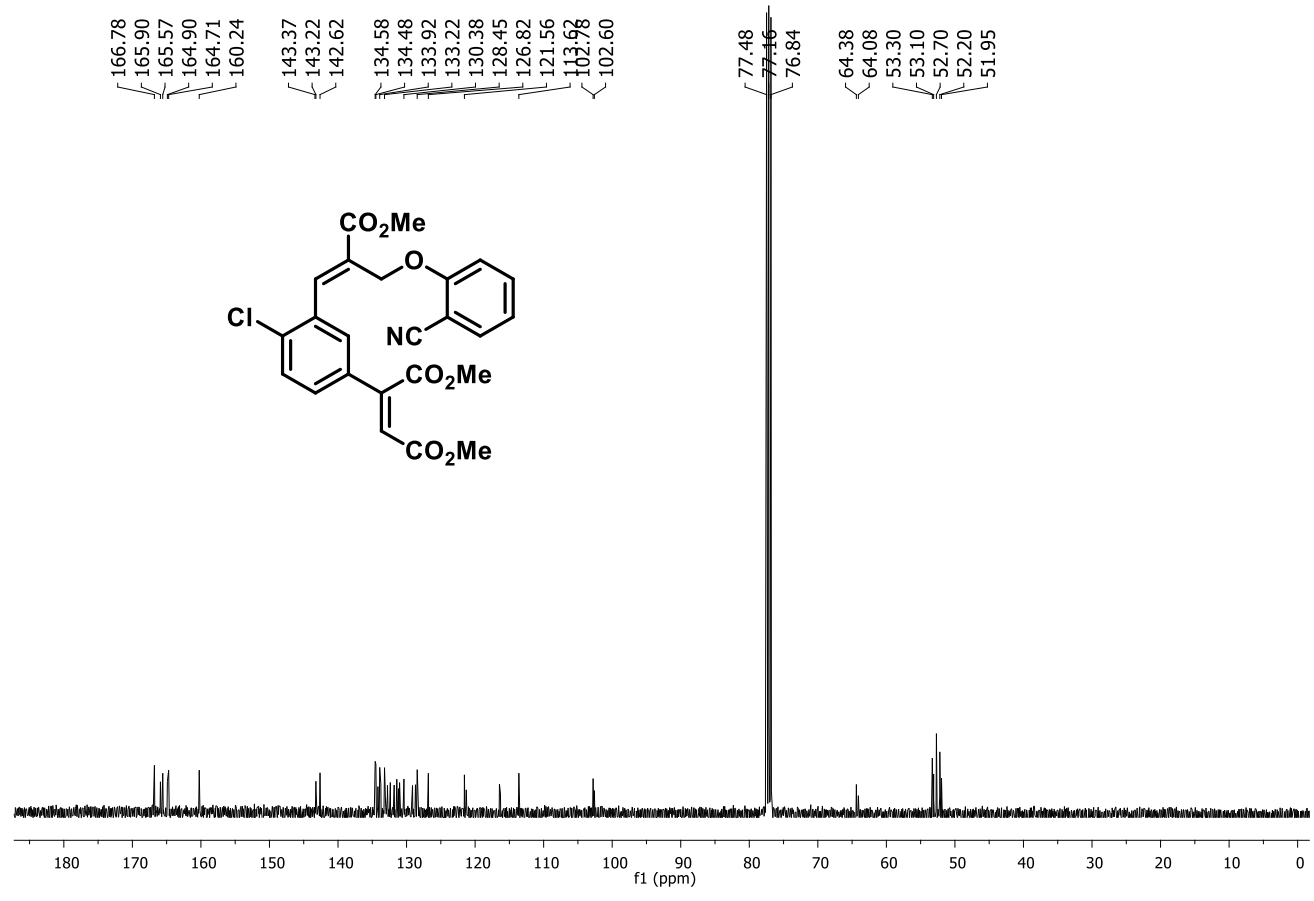




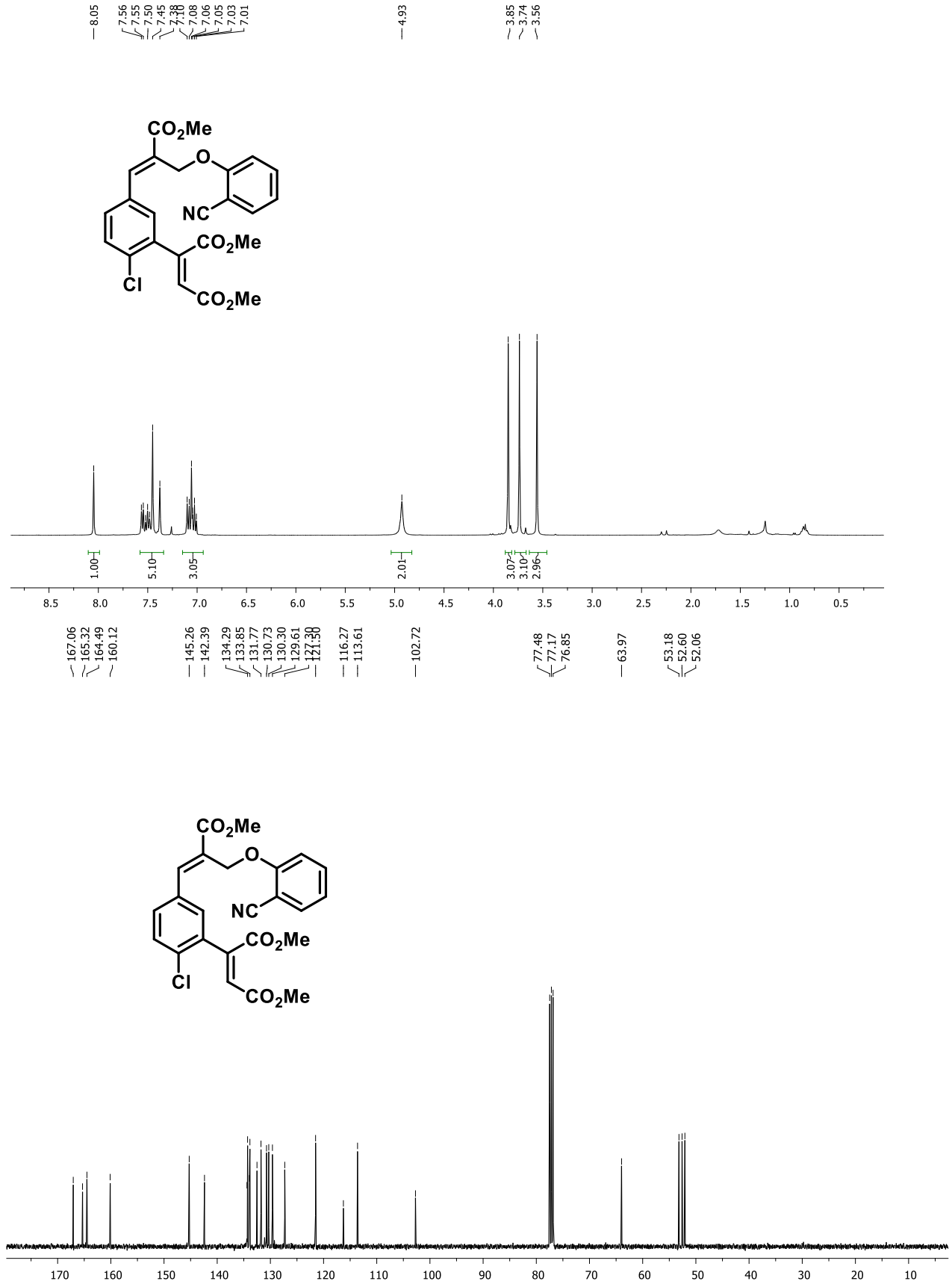


Dimethyl 2-(4-chloro-3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl)maleate (6i)

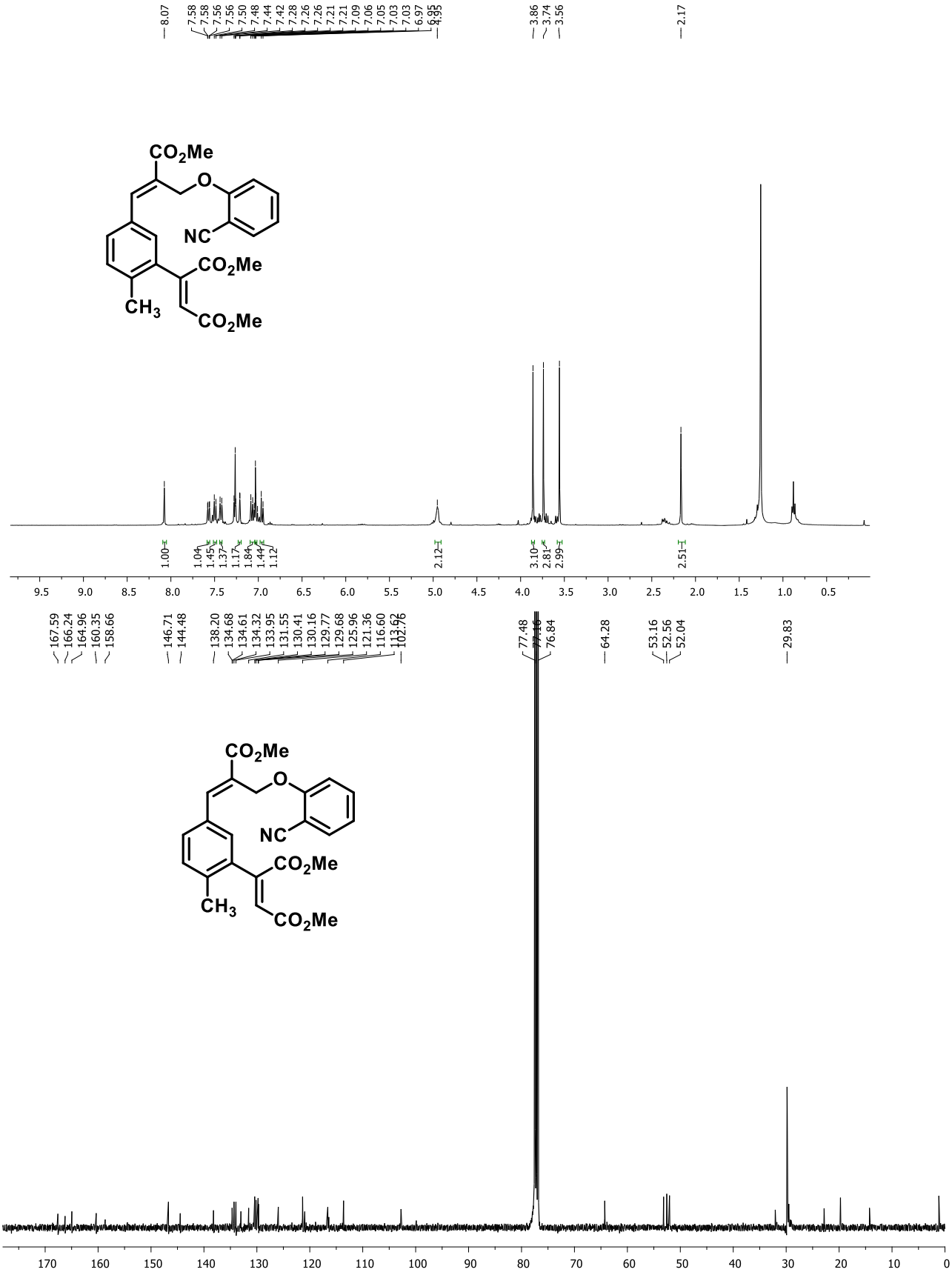




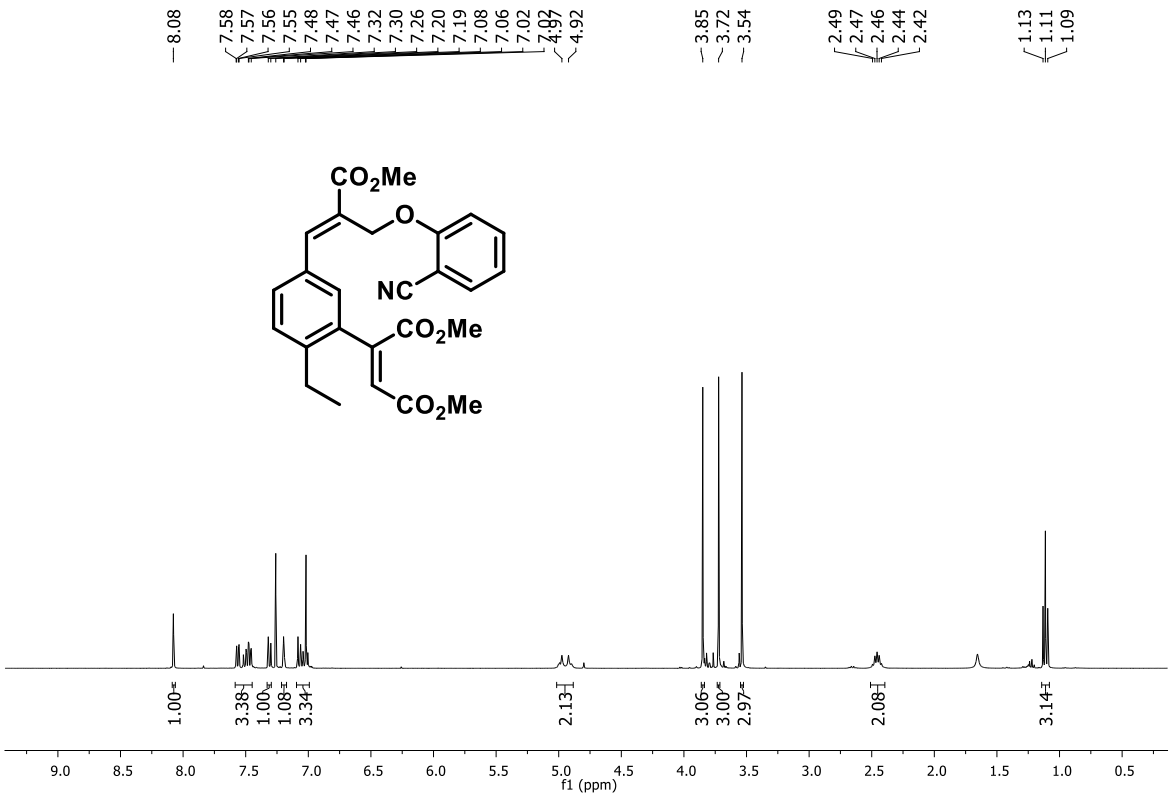
Dimethyl 2-(2-chloro-5-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) maleate (6j)

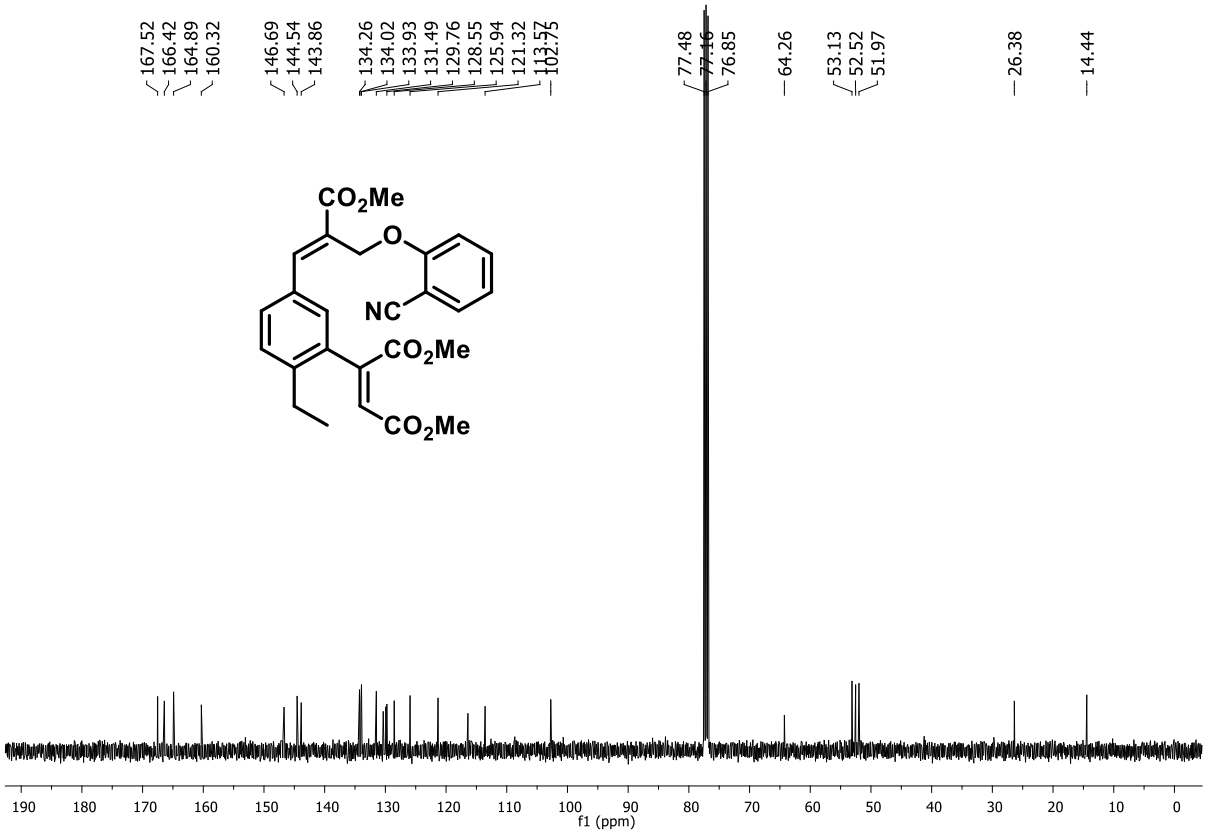


Dimethyl maleate (6k) **2-(5-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-methylphenyl)**

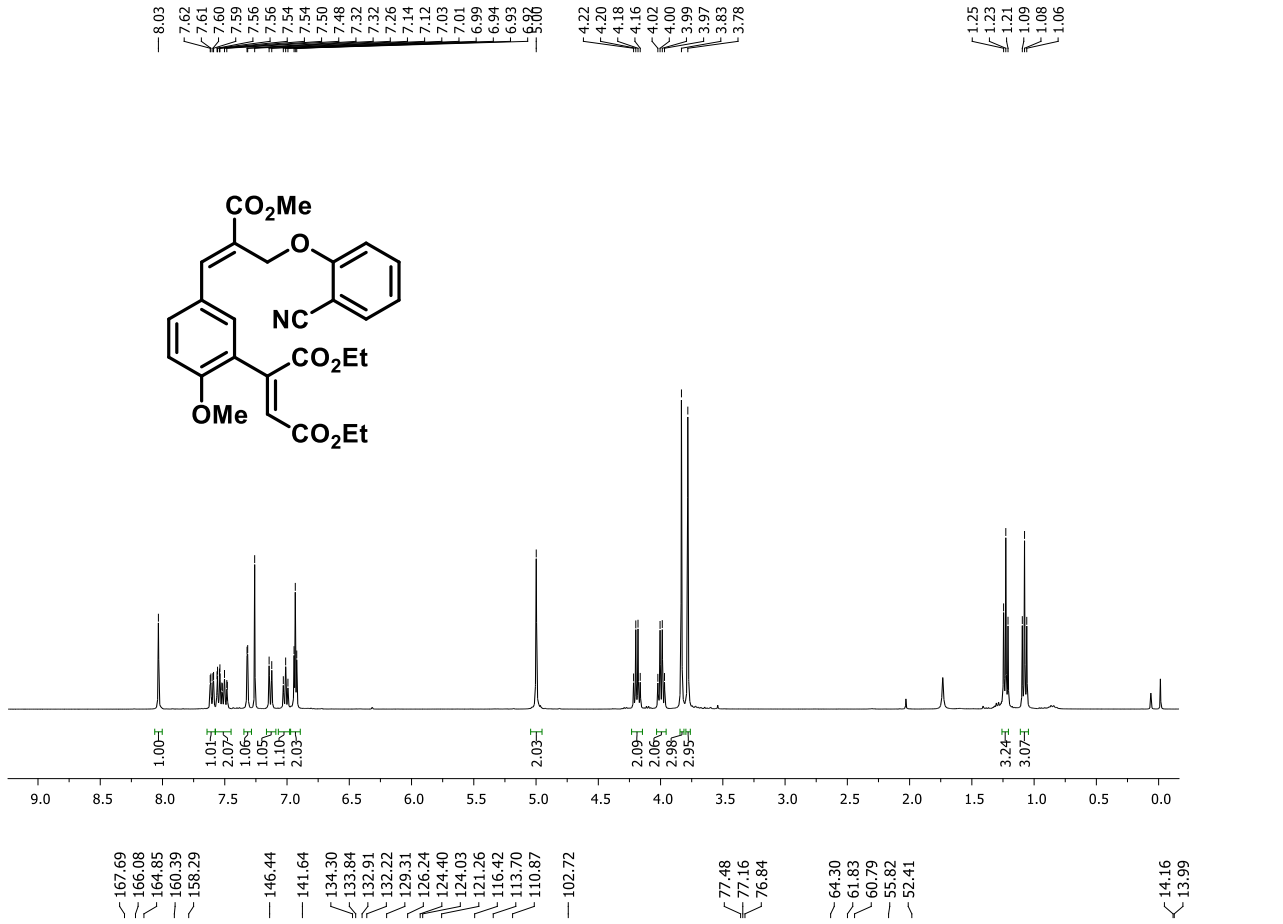


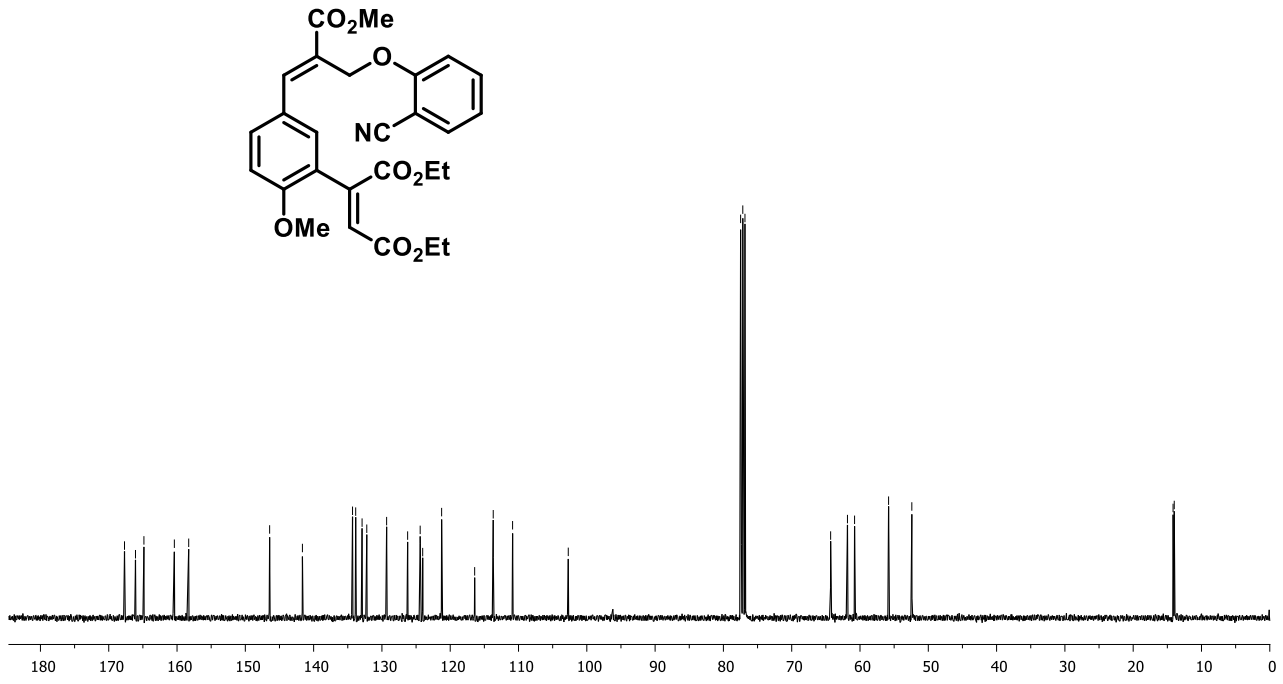
Dimethyl 2-(5-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-ethylphenyl) maleate (6l)



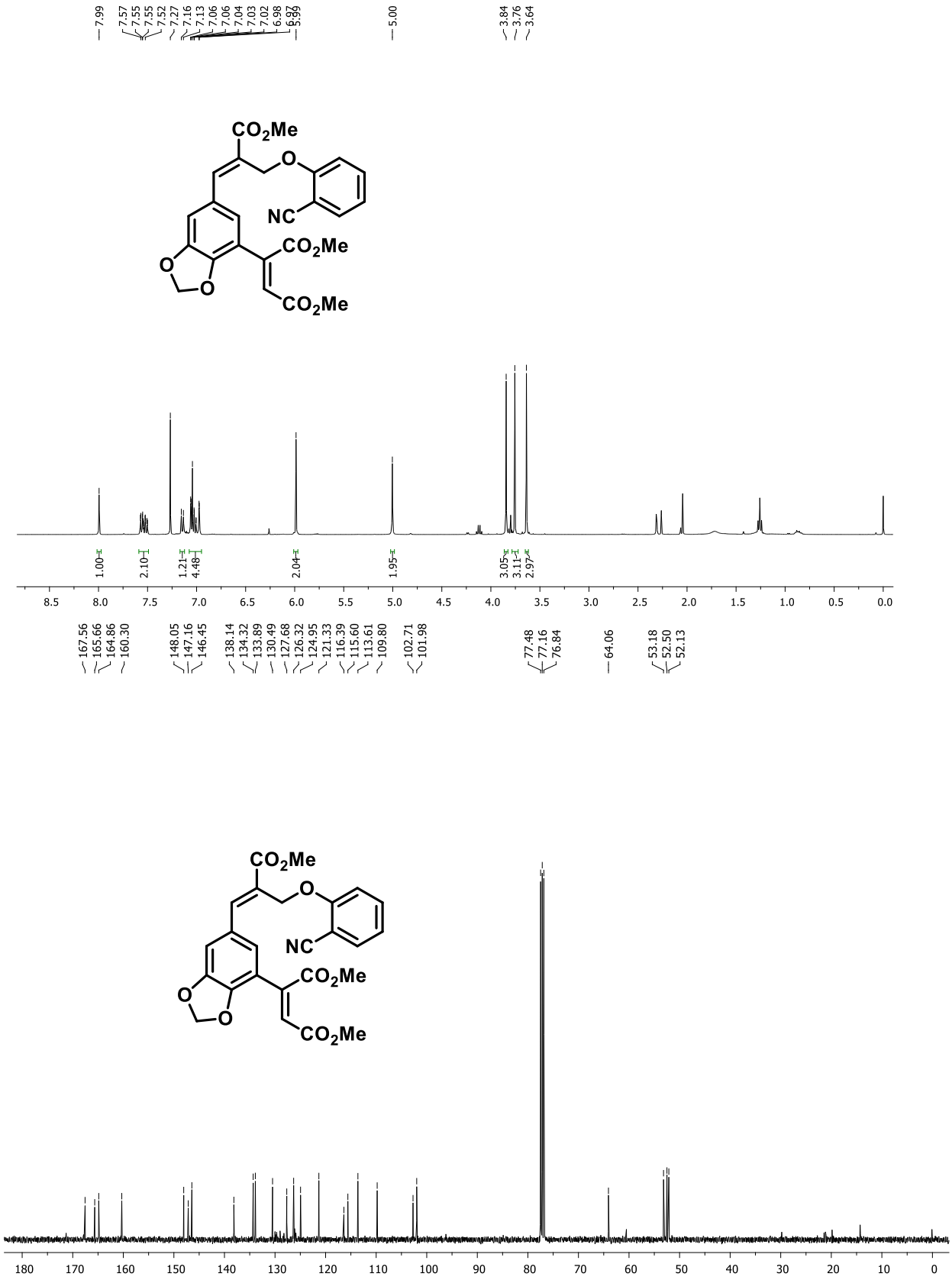


Diethyl 2-(5-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)maleate (6m)

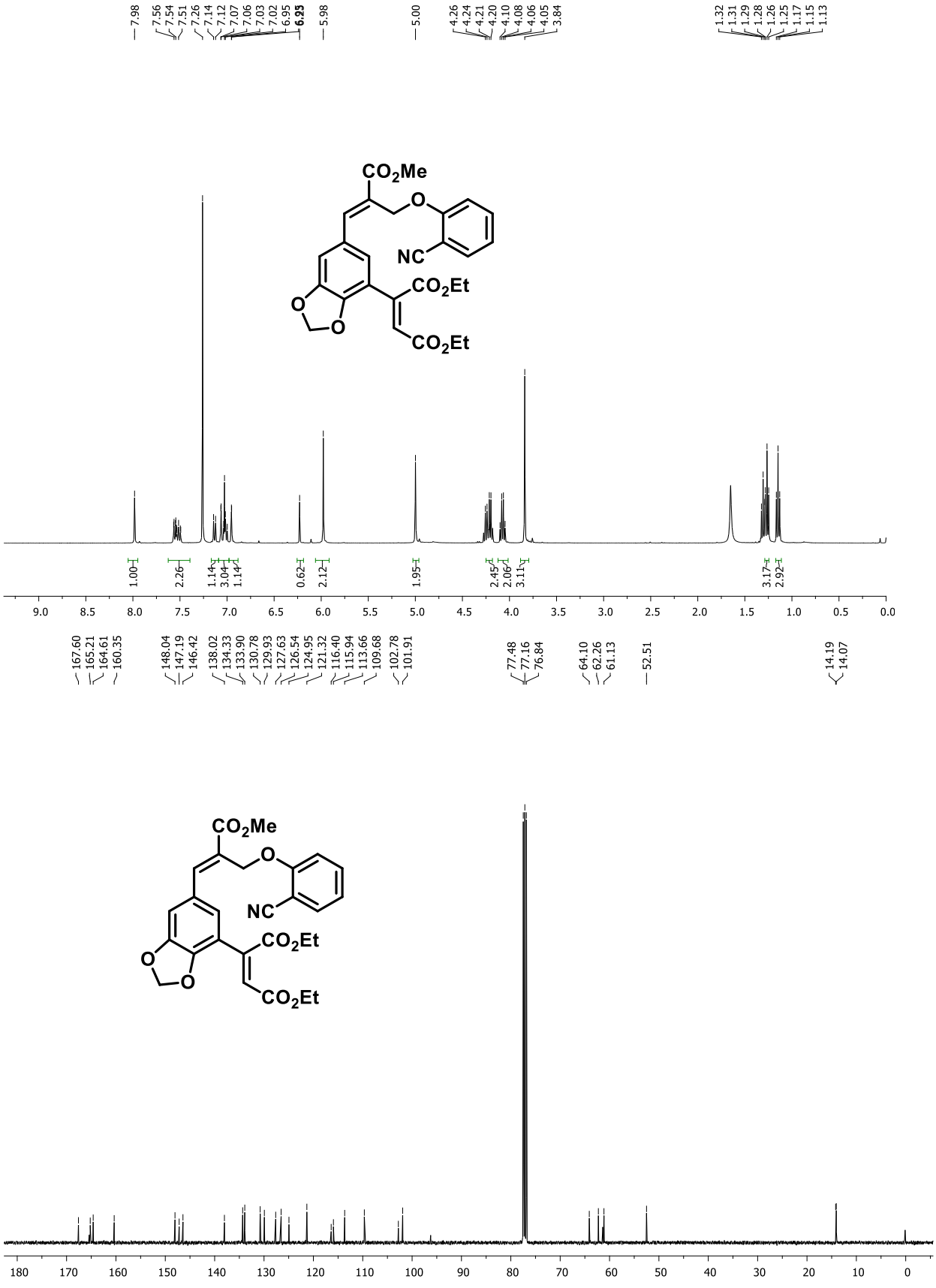




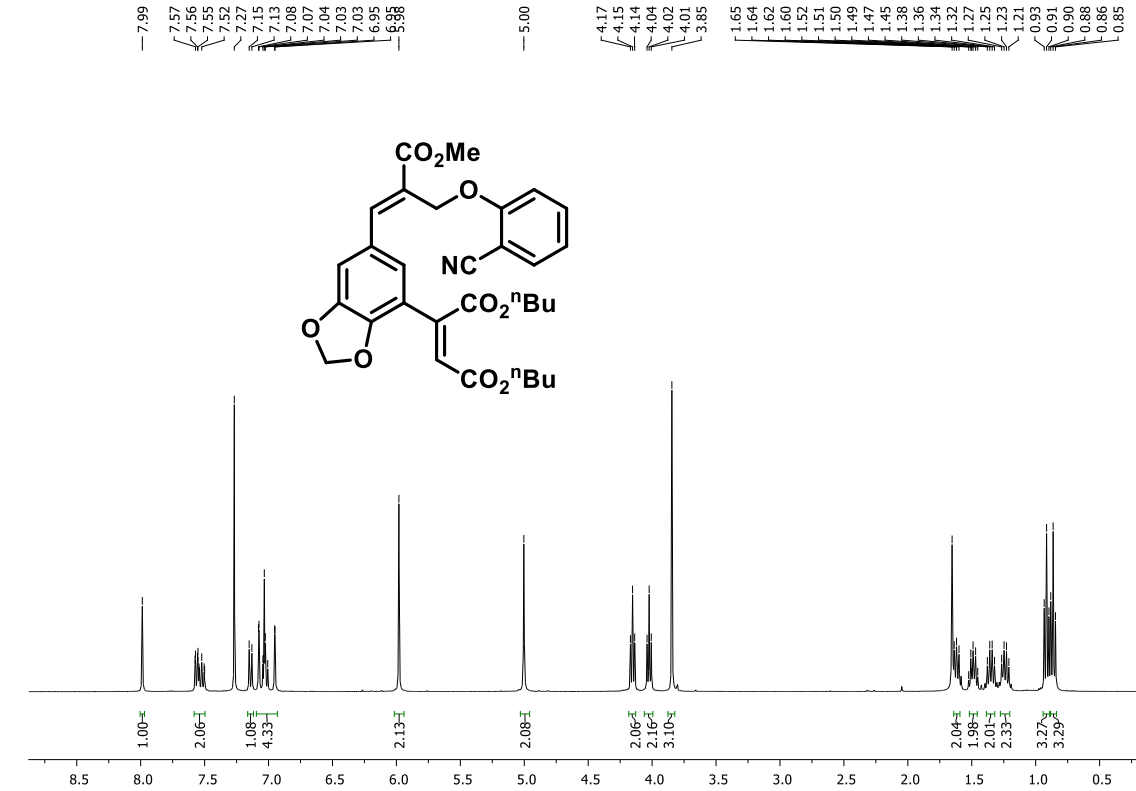
Dimethyl 2-(6-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)benzo[d][1,3]dioxol-4-yl) maleate (6n)

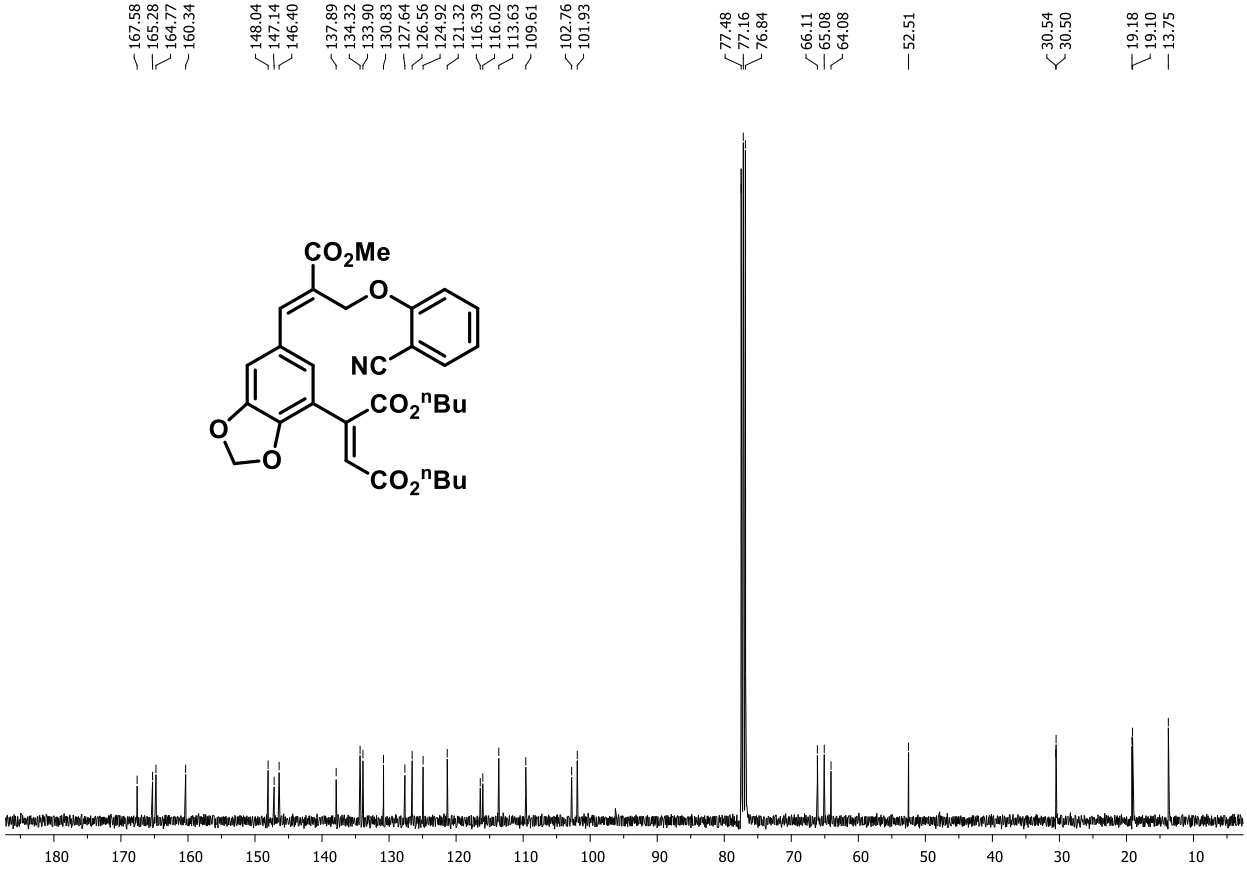


Diethyl 2-(6-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)benzo[d][1,3]dioxol-4-yl)maleate (6o)

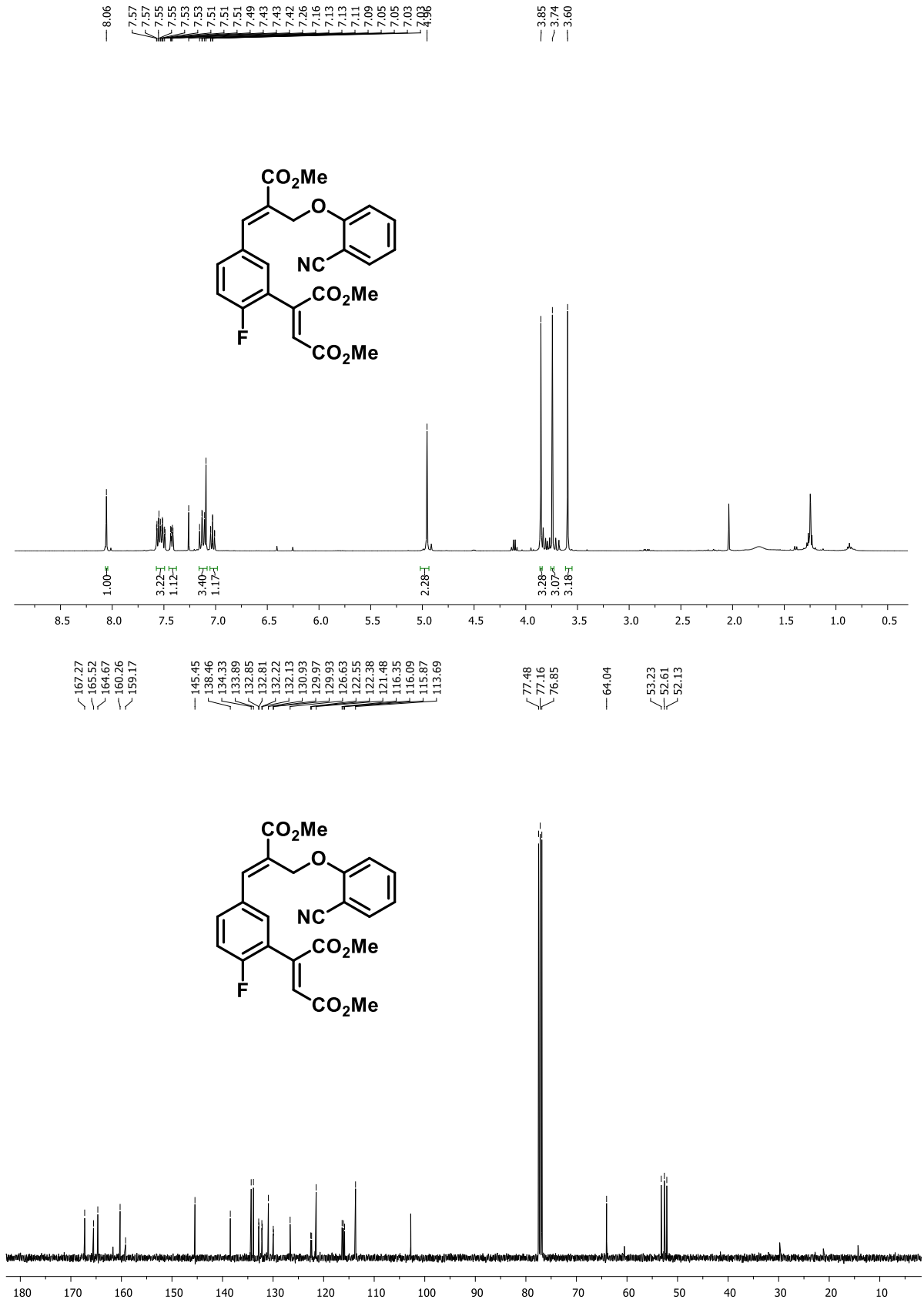


Dibutyl 2-(6-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)benzo[d][1,3]dioxol-4-yl) maleate (6p)

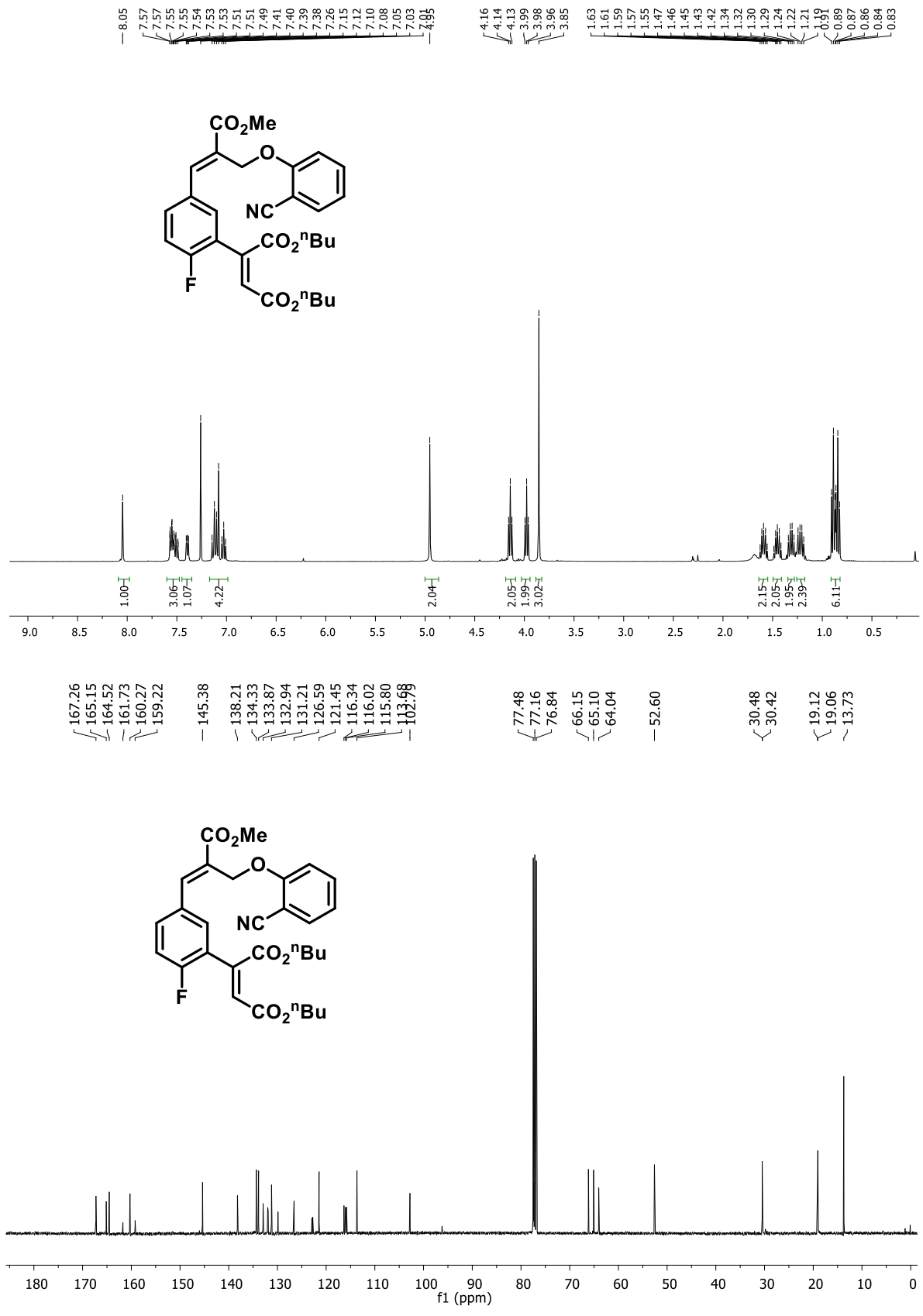




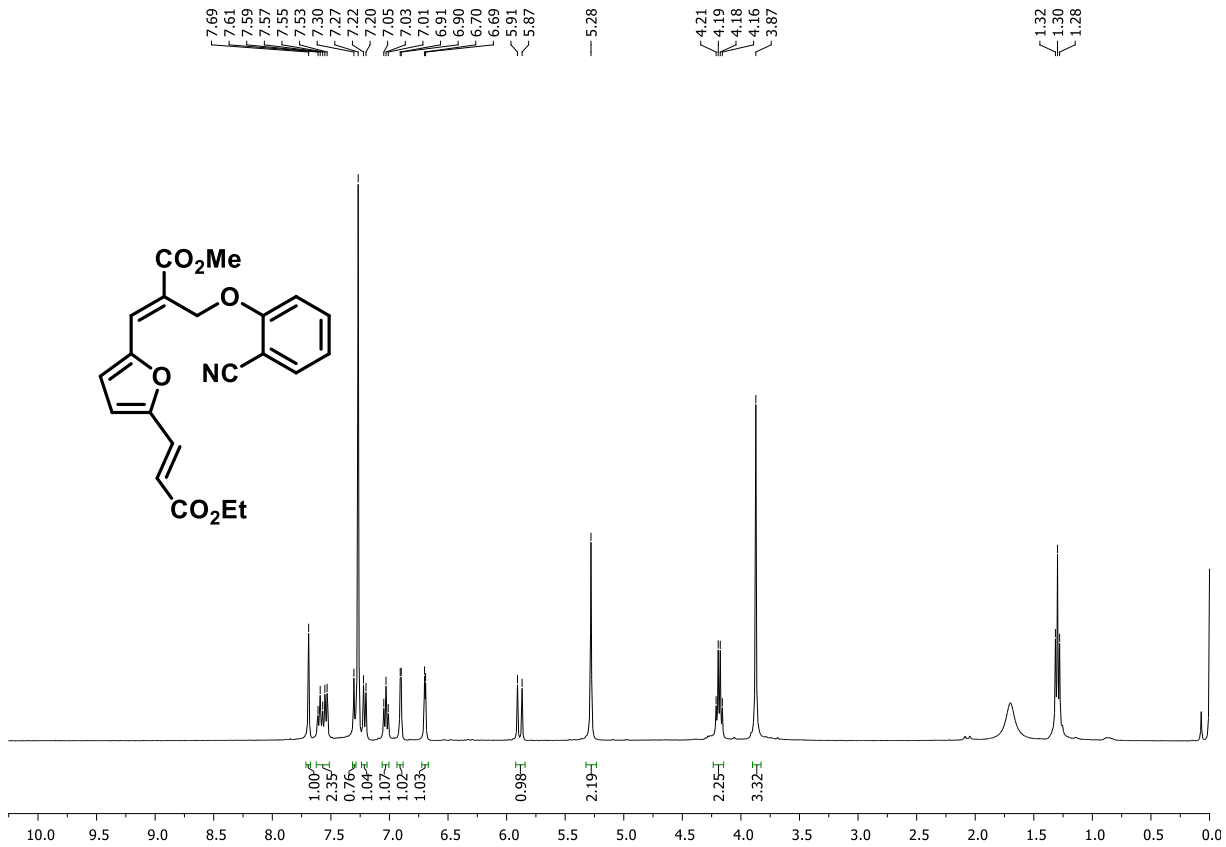
Dimethyl 2-(5-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-fluorophenyl)maleate (6q)

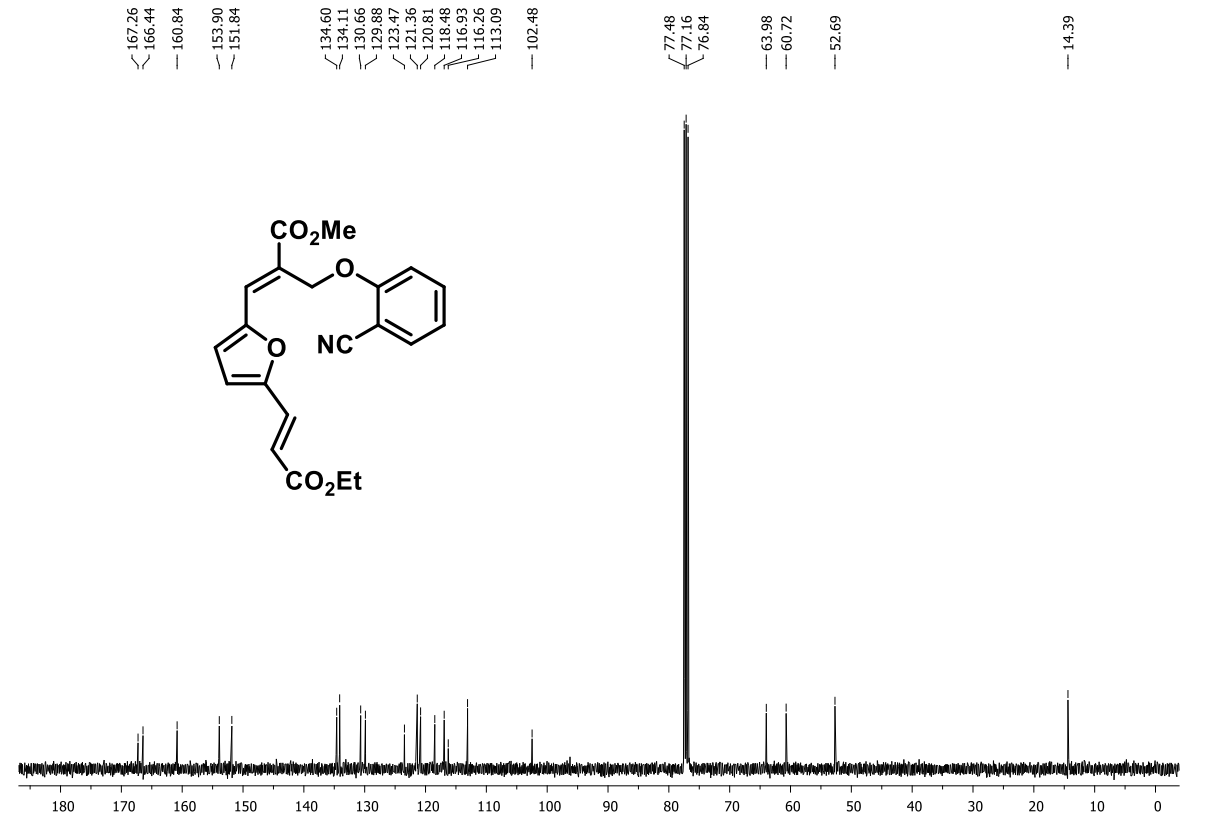


Dibutyl 2-(5-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)-2-fluorophenyl) maleate (6r)

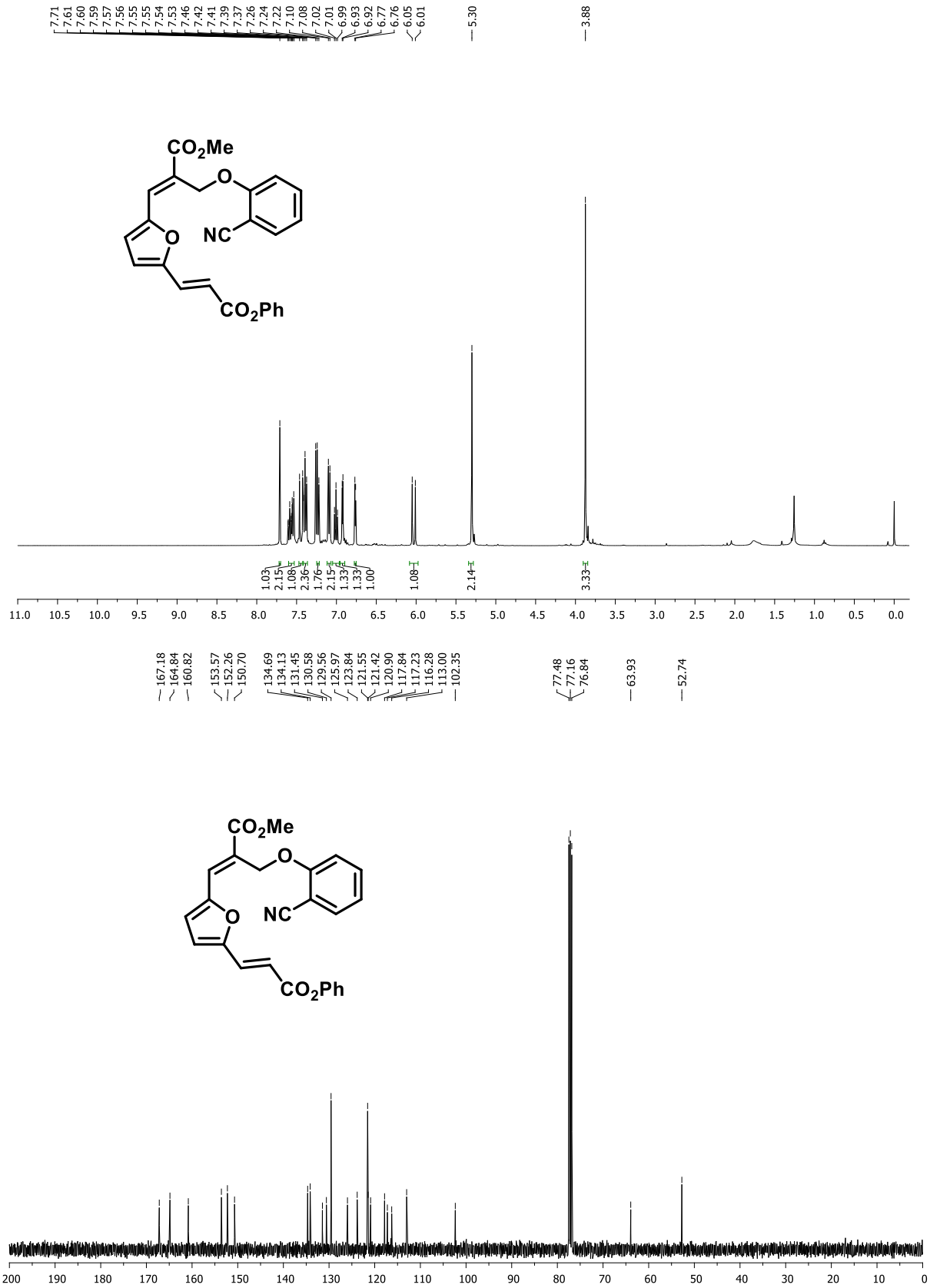


Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-ethoxy-3-oxoprop-1-en-1-yl) furan-2-yl)acrylate (8a)

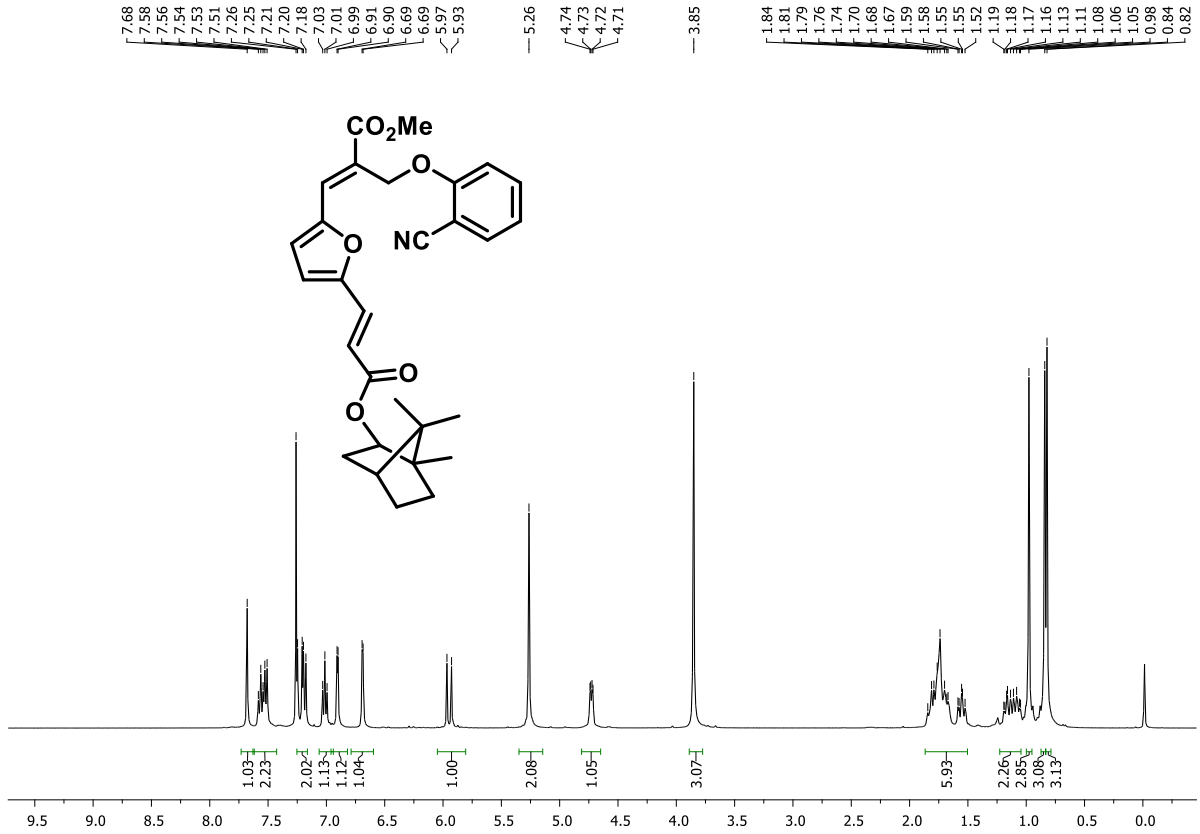


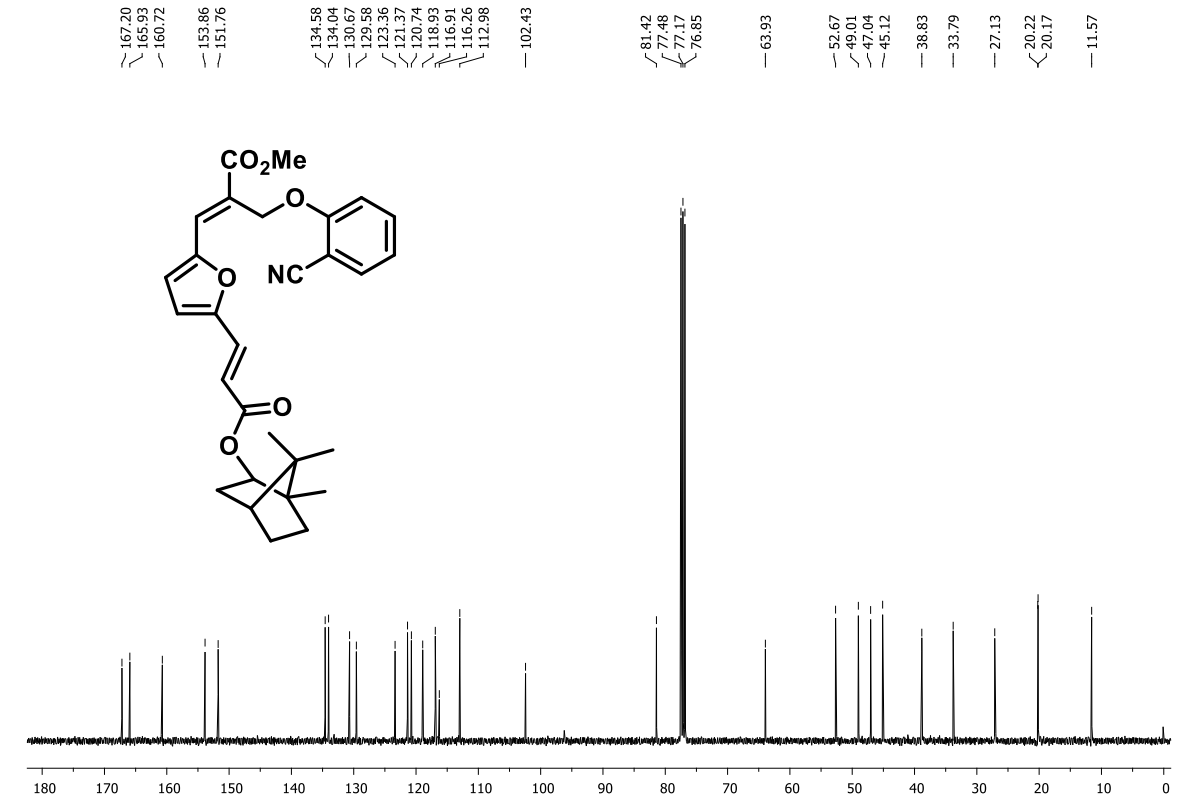


Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-oxo-3-phenoxyprop-1-en-1-yl)furan-2-yl)acrylate (8b)

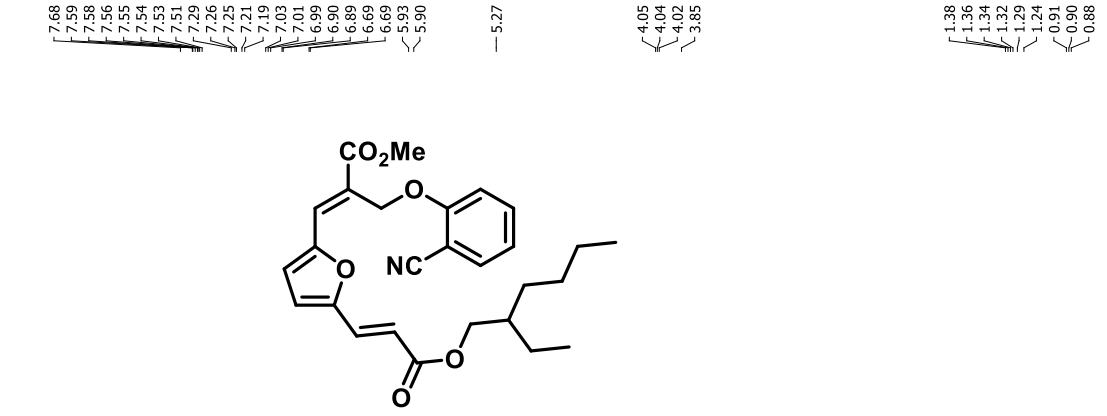


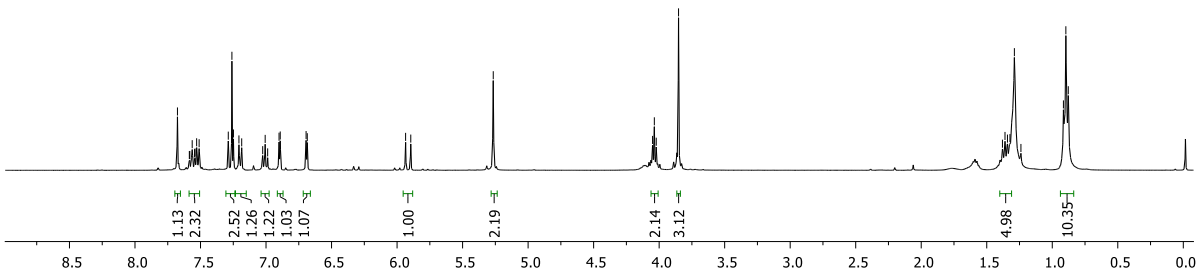
Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-((7,7-dimethylbicyclo [2.2.1] heptan-2-yl)oxy)-3-oxoprop-1-en-1-yl)furan-2-yl) acrylate (8c)

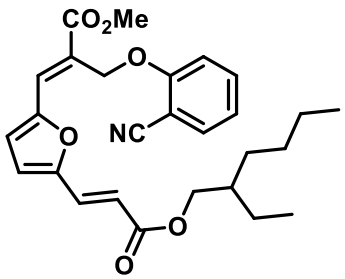




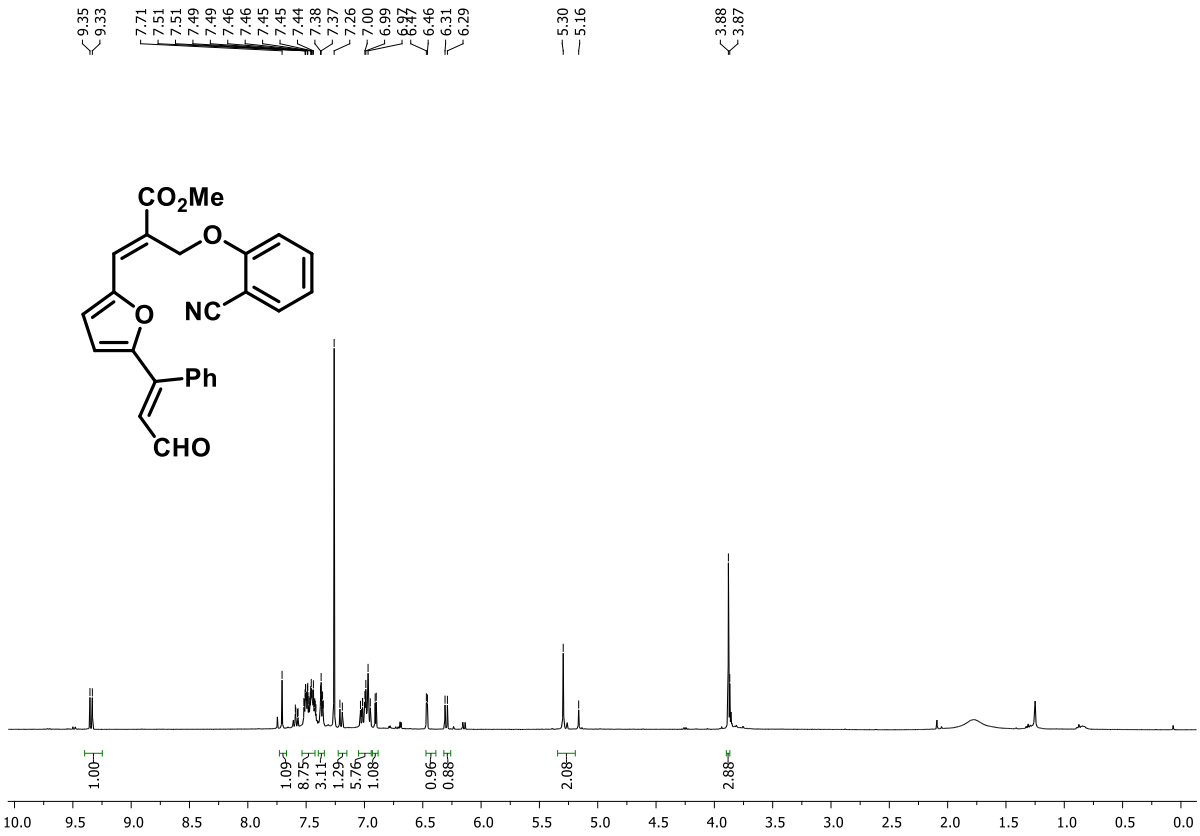
Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-((2-ethylhexyl) oxy)-3-oxoprop-1-en-1-yl)furan-2-yl) acrylate (8d)

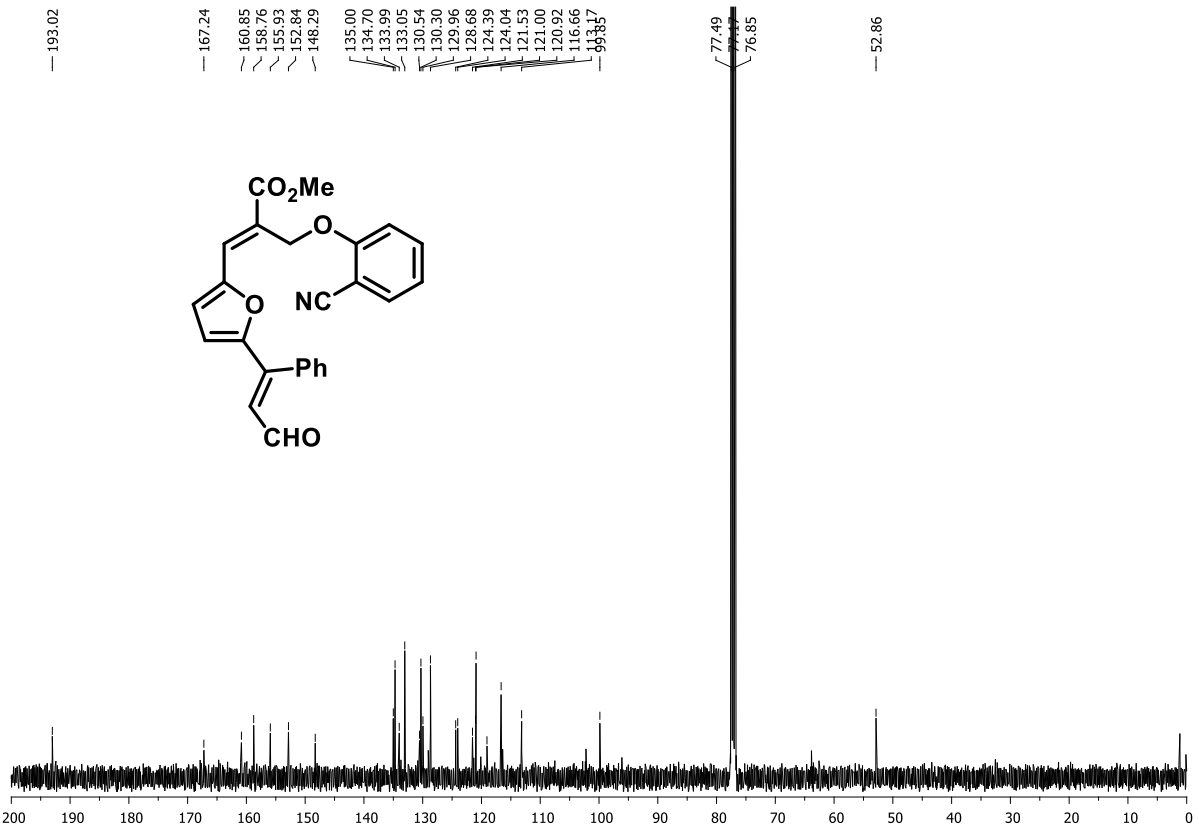




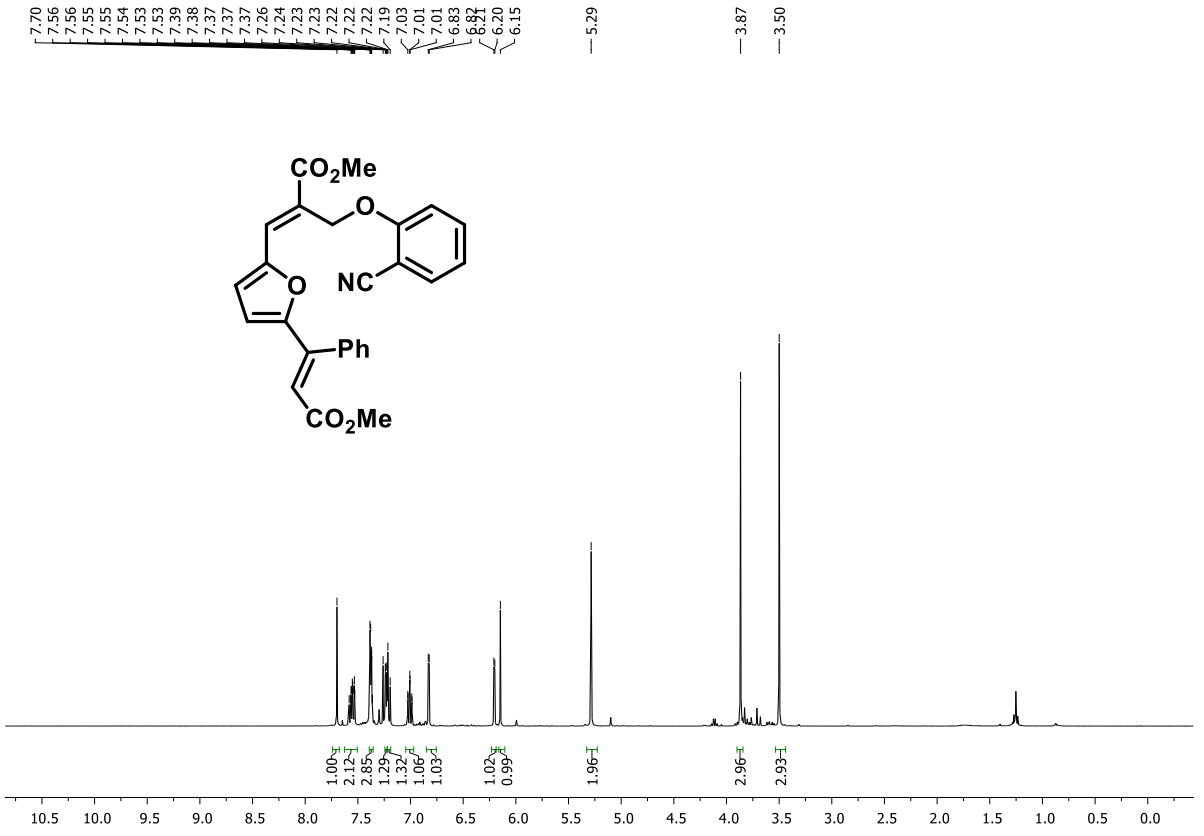


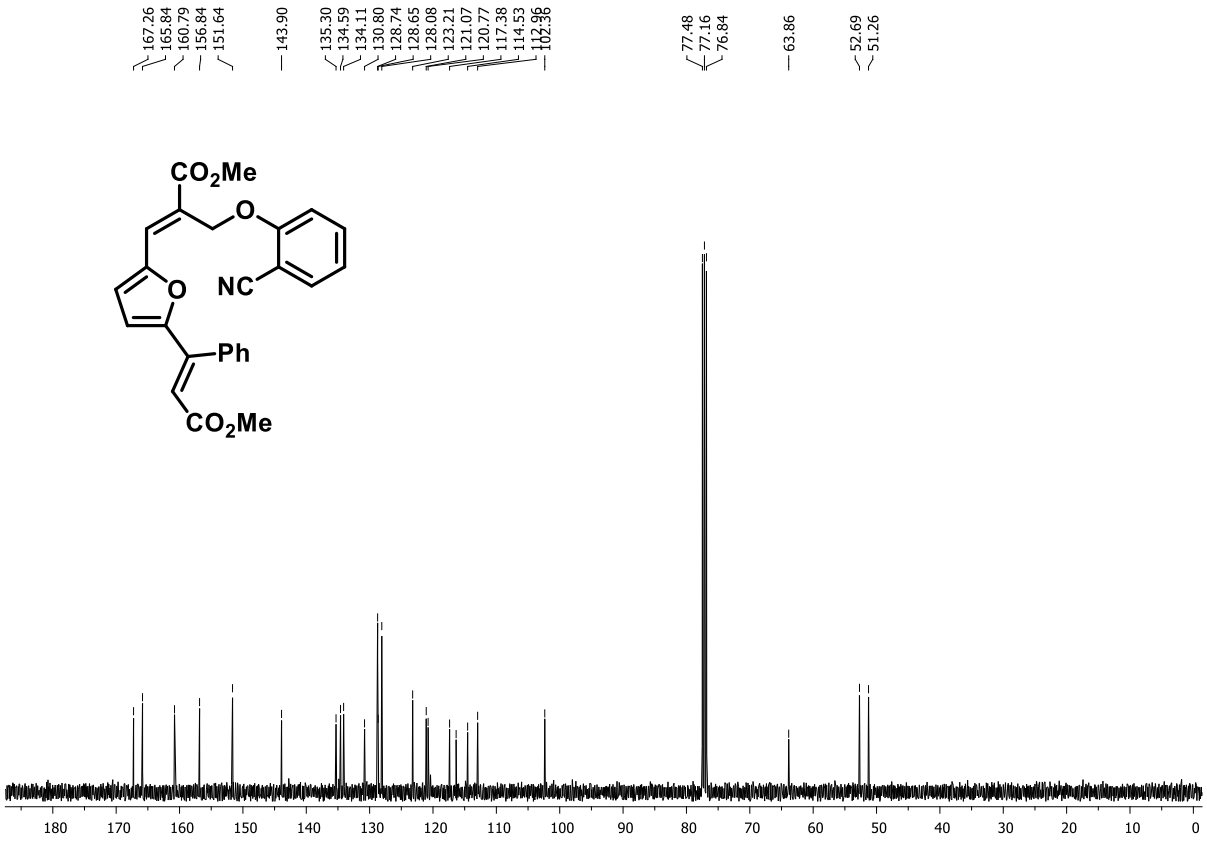
Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*Z*)-3-oxo-1-phenylprop-1-en-1-yl)furan-2-yl) acrylate (8e)



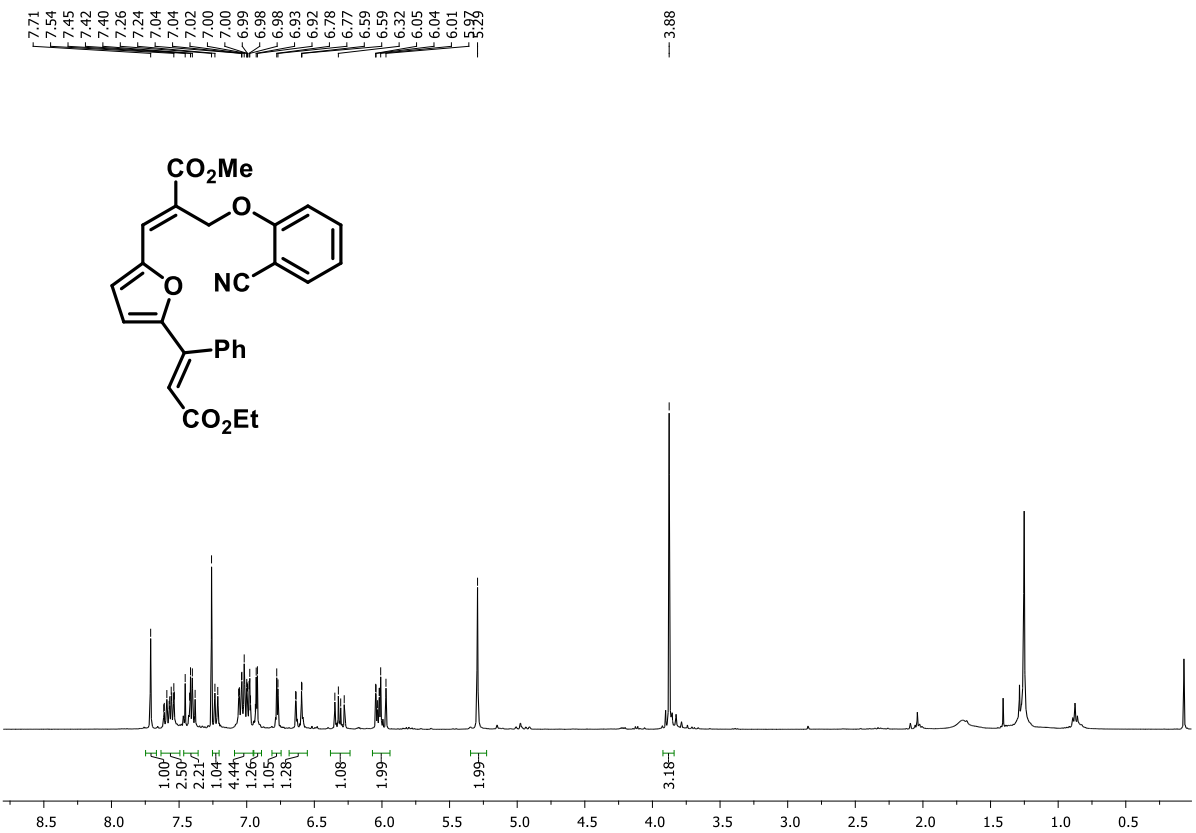


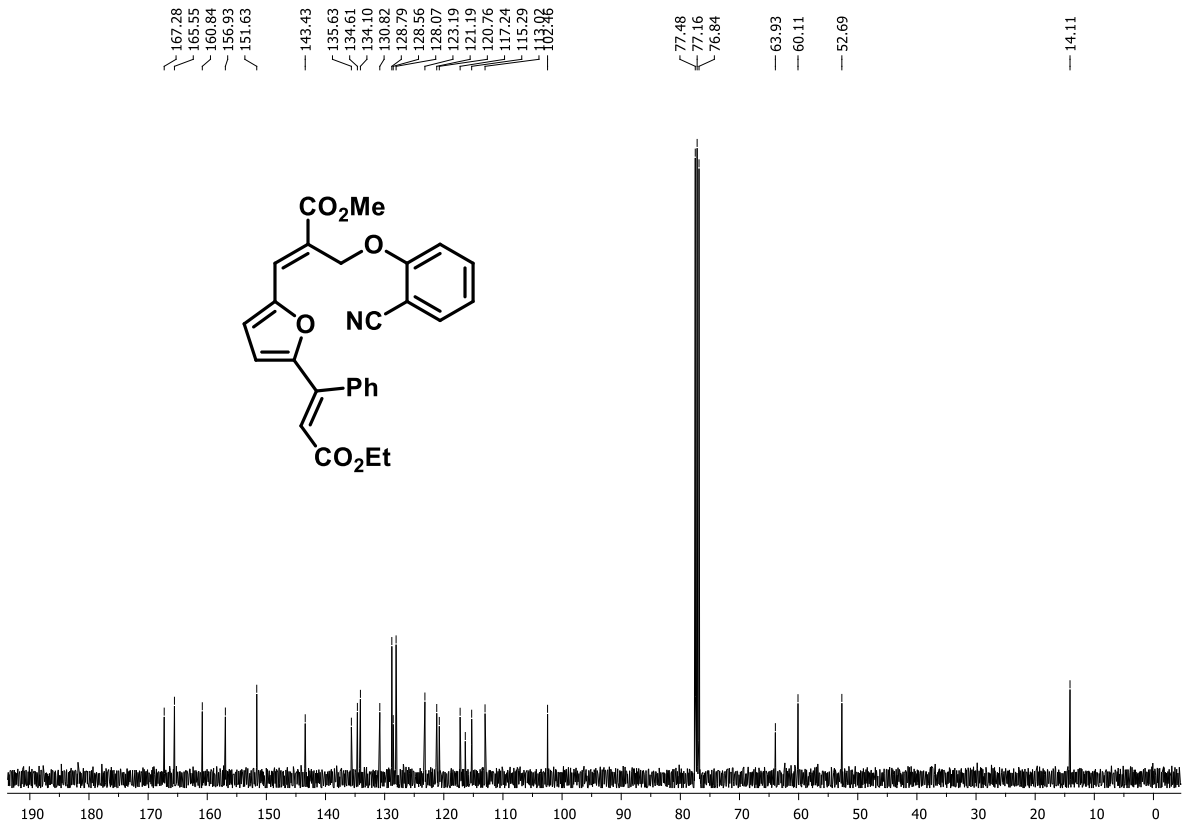
Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*Z*)-3-methoxy-3-oxo-1-phenylprop-1-en-1-yl) furan-2-yl) acrylate (8f)



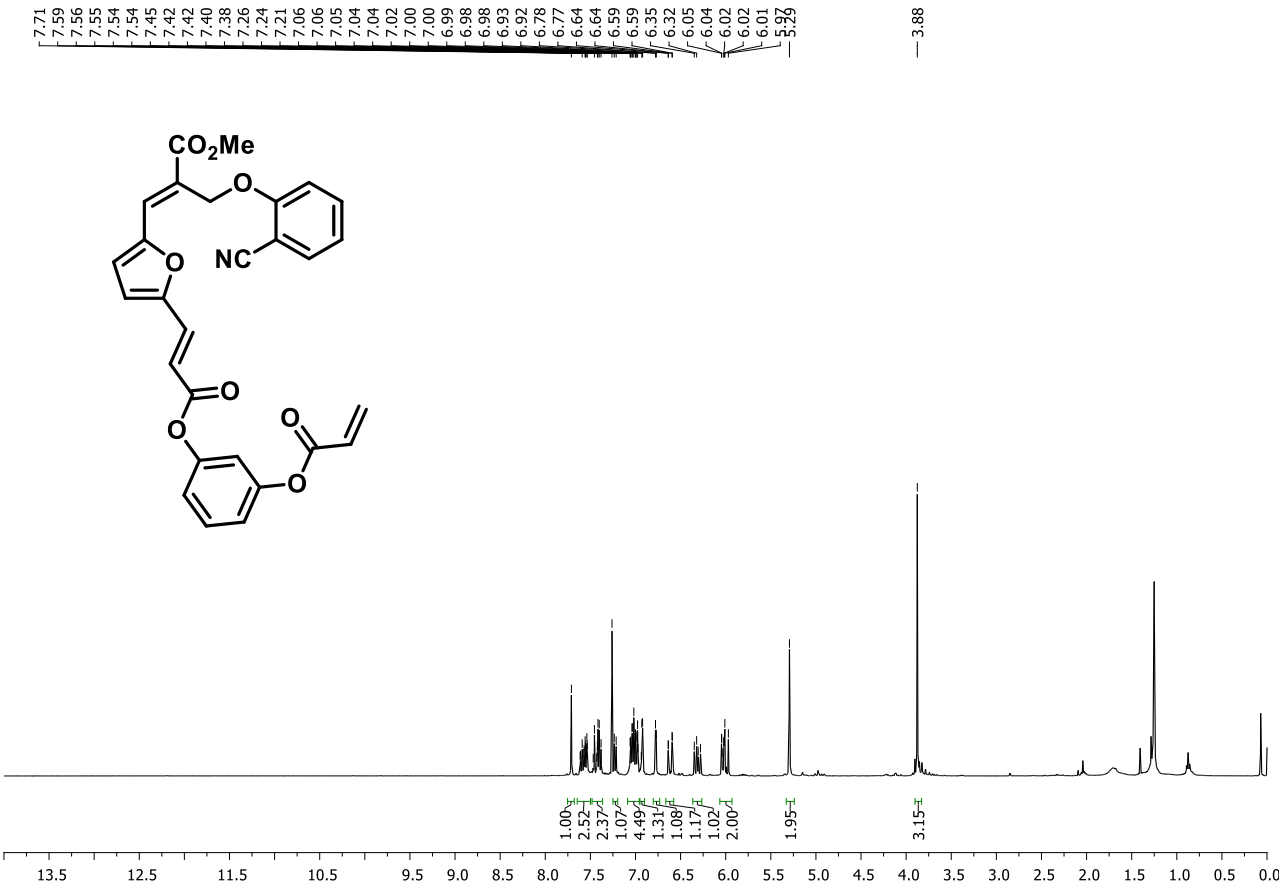


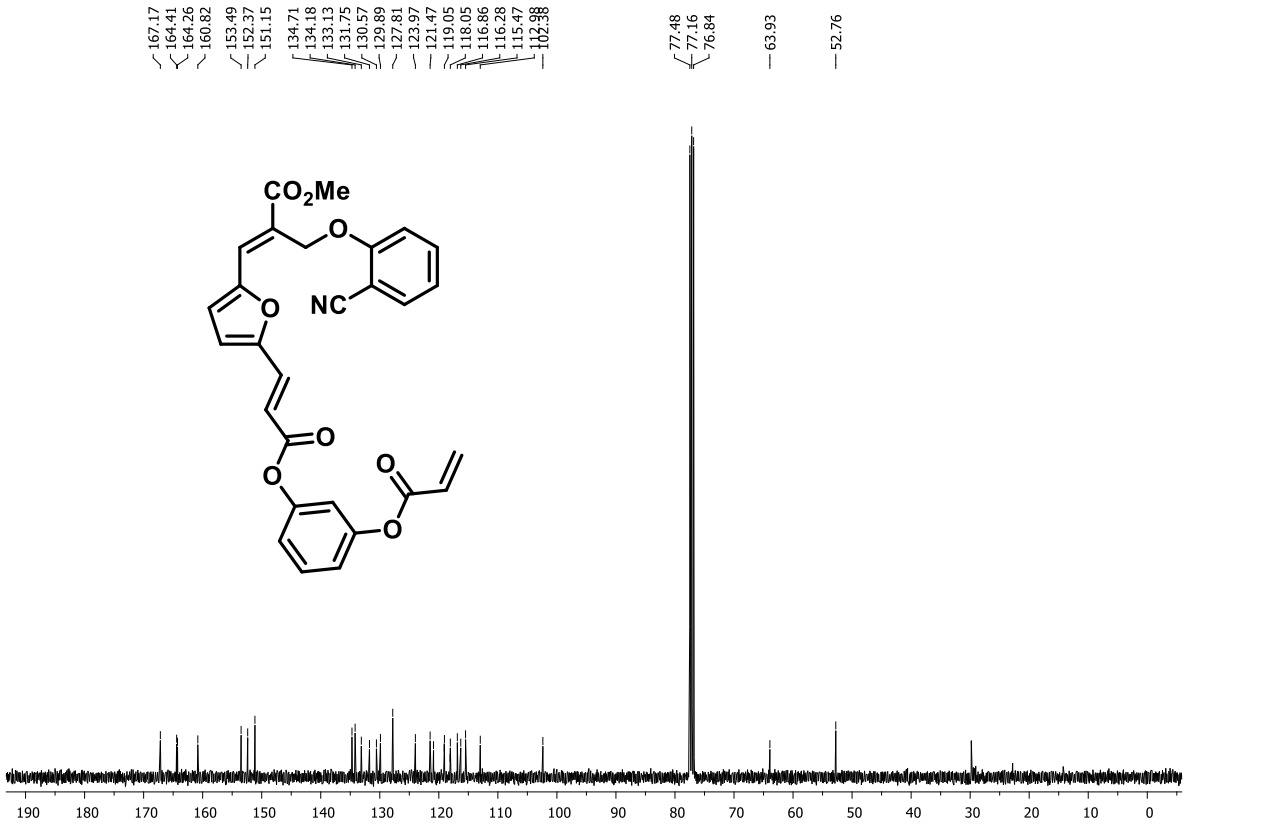
Ethyl (*Z*)-3-(5-((*E*) -2-((2-cyanophenoxy) methyl)-3-methoxy-3-oxoprop-1-en-1-yl)furan-2-yl)-3- phenyl acrylate (8g)



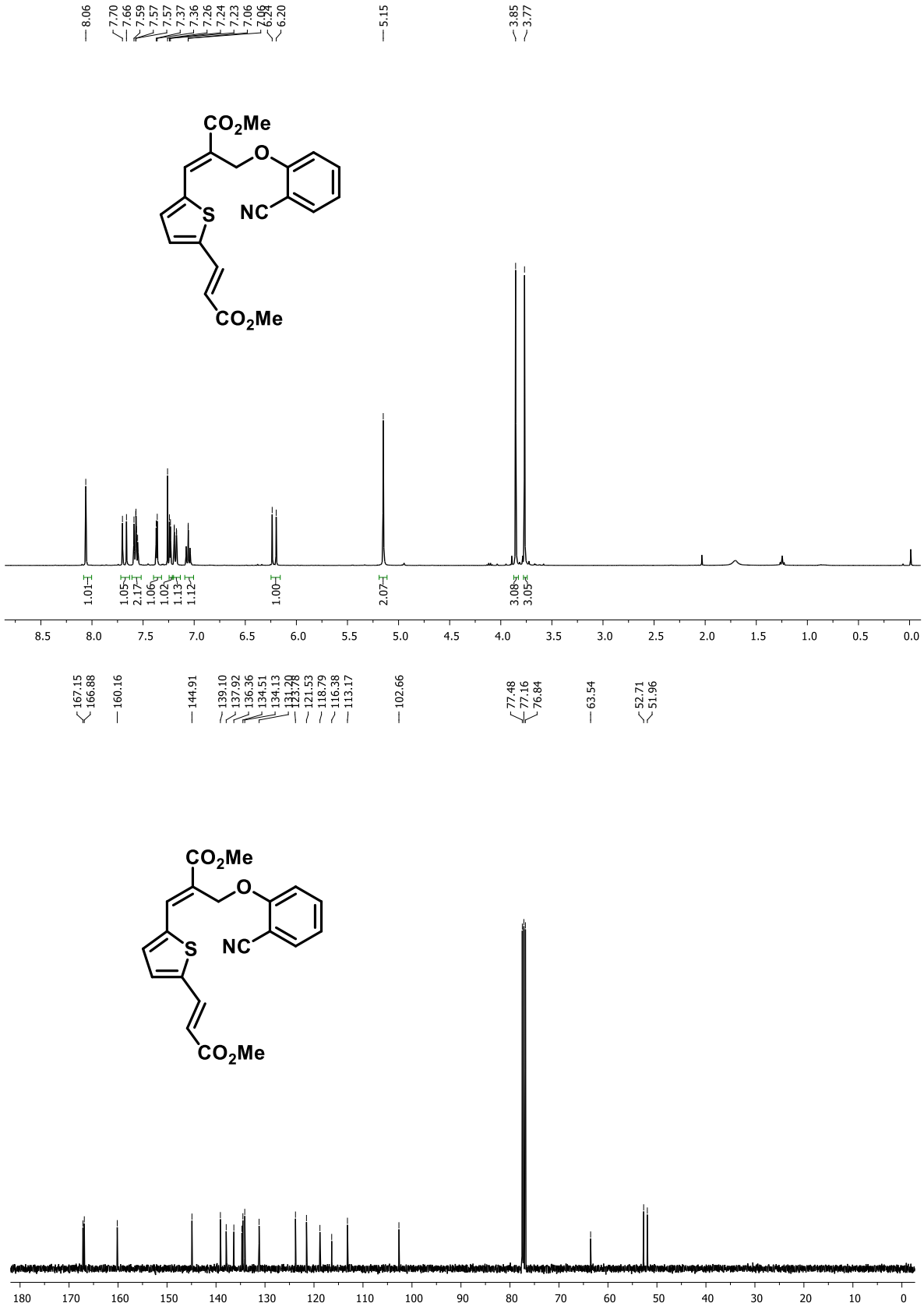


Methyl (*E*) -3-(5-((*E*) -3-(3-(acryloyloxy) phenoxy)-3-oxoprop-1-en-1-yl) furan-2-yl)-2-((2-cyanophenoxy) methyl) acrylate (8h)

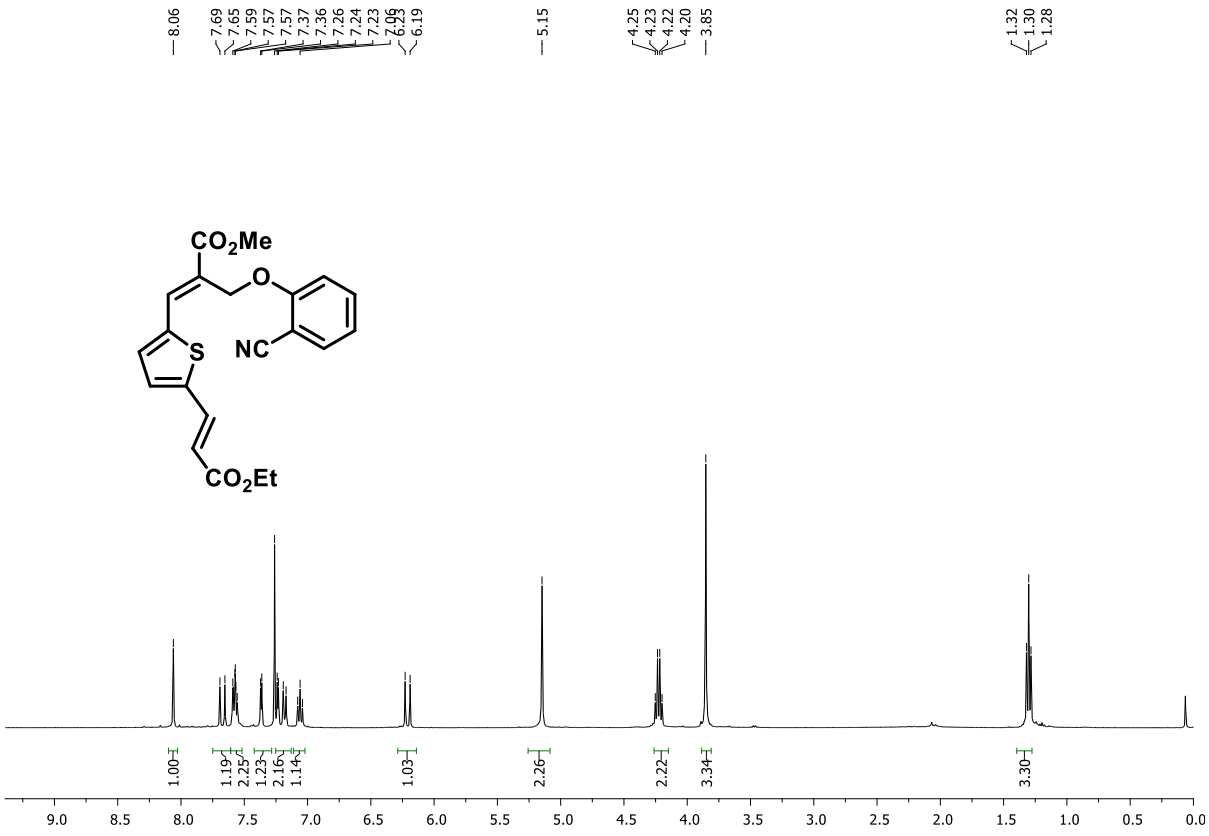


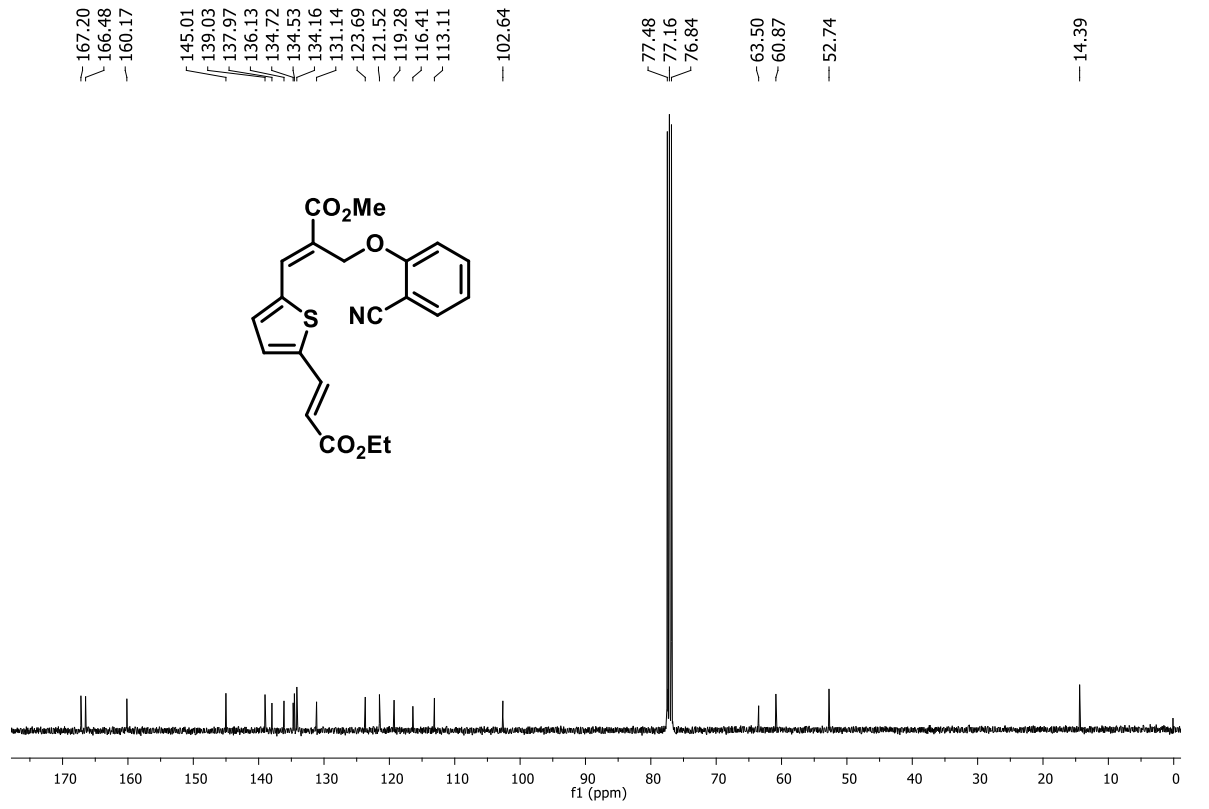


Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-methoxy-3-oxoprop-1-en-1-yl) thiophen-2-yl) acrylate (8i)

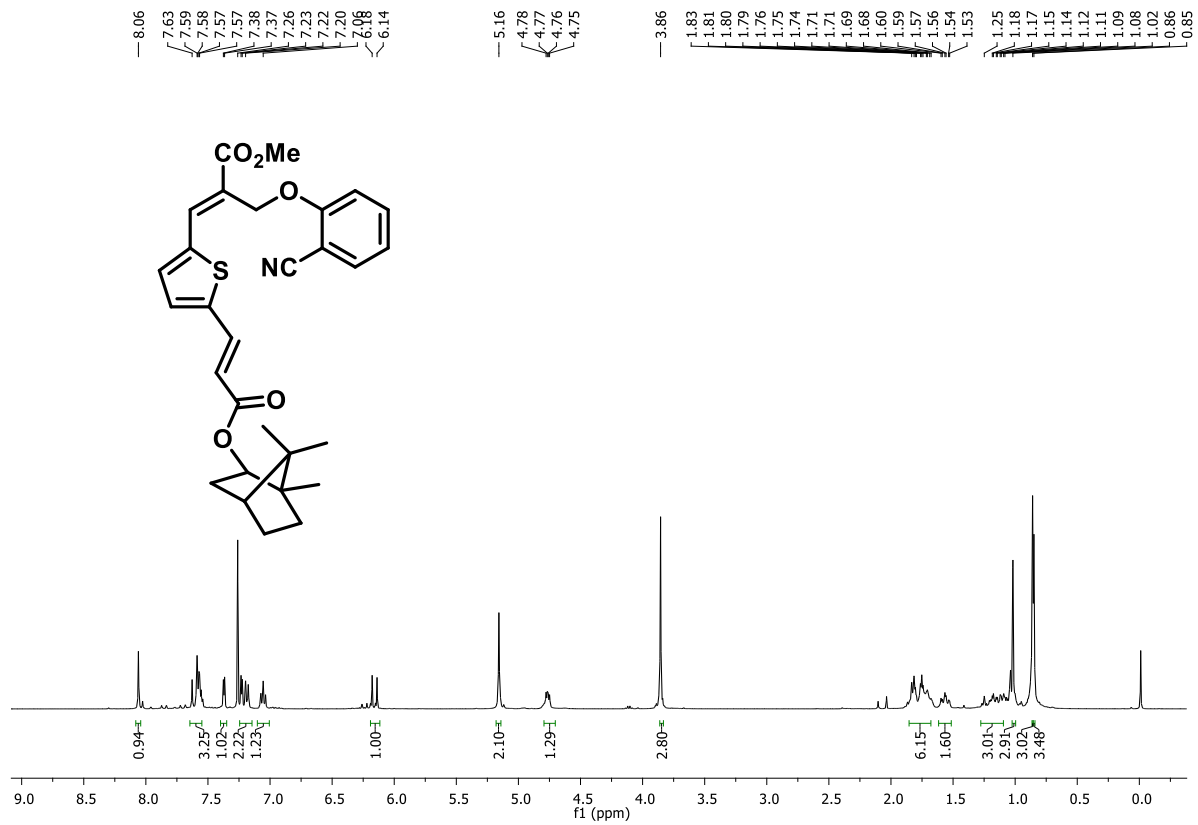


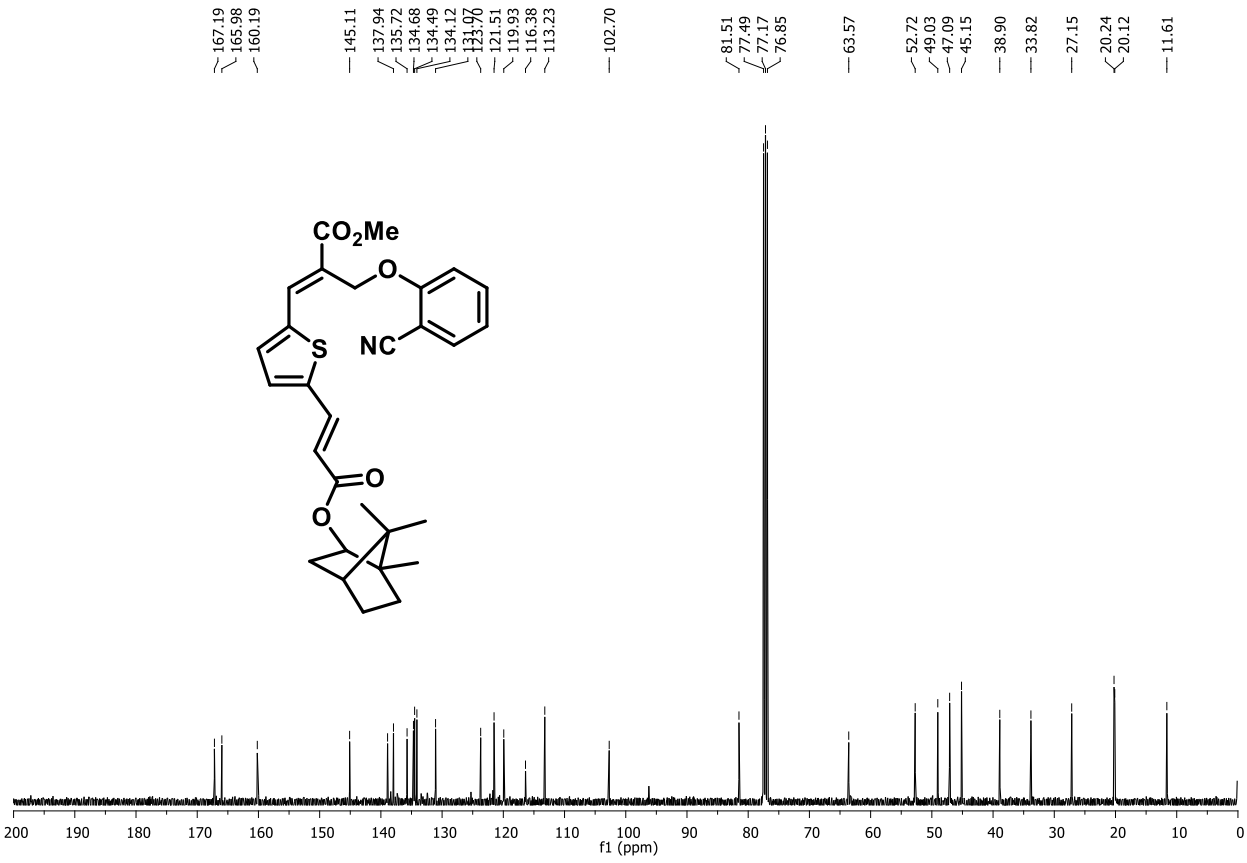
Methyl (*E*) -2-((2-cyanophenoxy) methyl)-3-(5-((*E*) -3-ethoxy-3-oxoprop-1-en-1-yl) thiophen-2-yl)acrylate (8j)



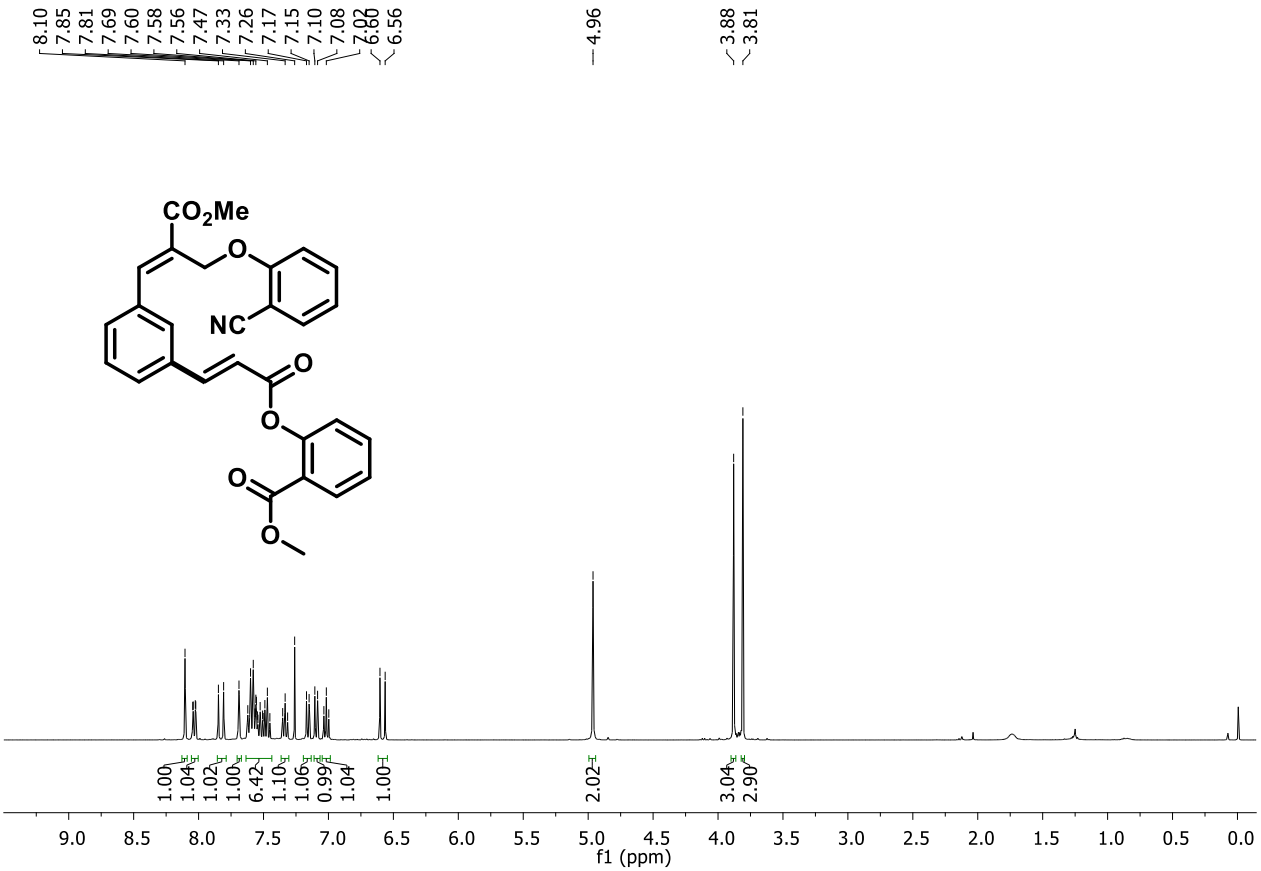


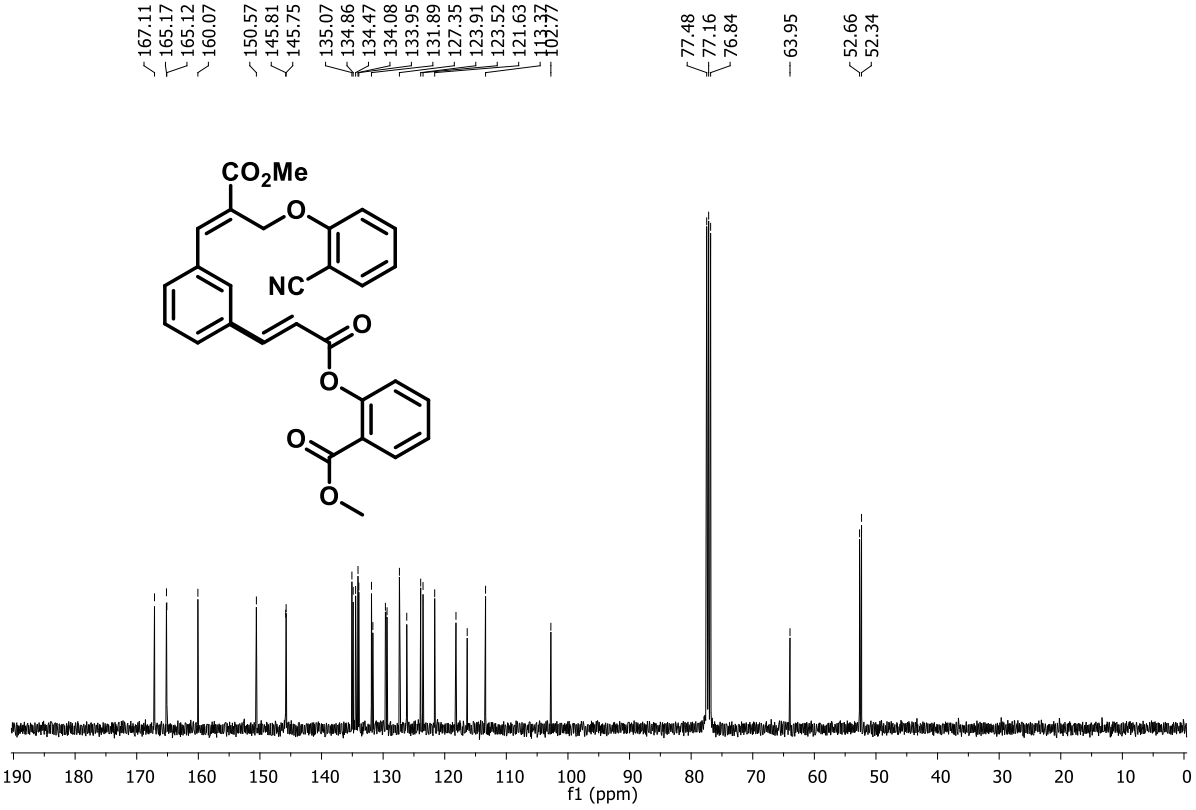
Methyl (*E*) -2-((2-cyanophenoxy)methyl)-3-(5-((*E*) -3-oxo-3-(((1R,2R,4R)-1,7,7- trimethylbicyclo[2.2.1] heptan-2-yl)oxy)prop-1-en-1-yl)thiophen-2-yl)acrylate (8k)



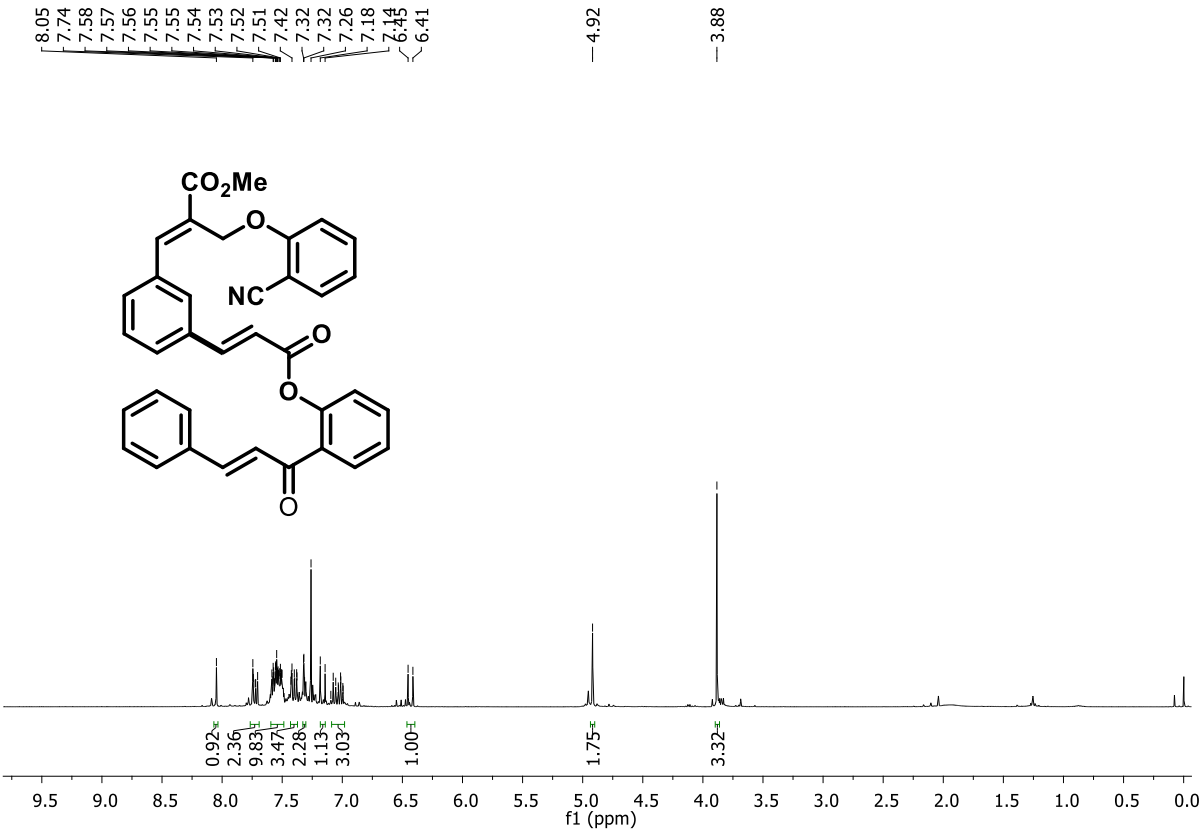


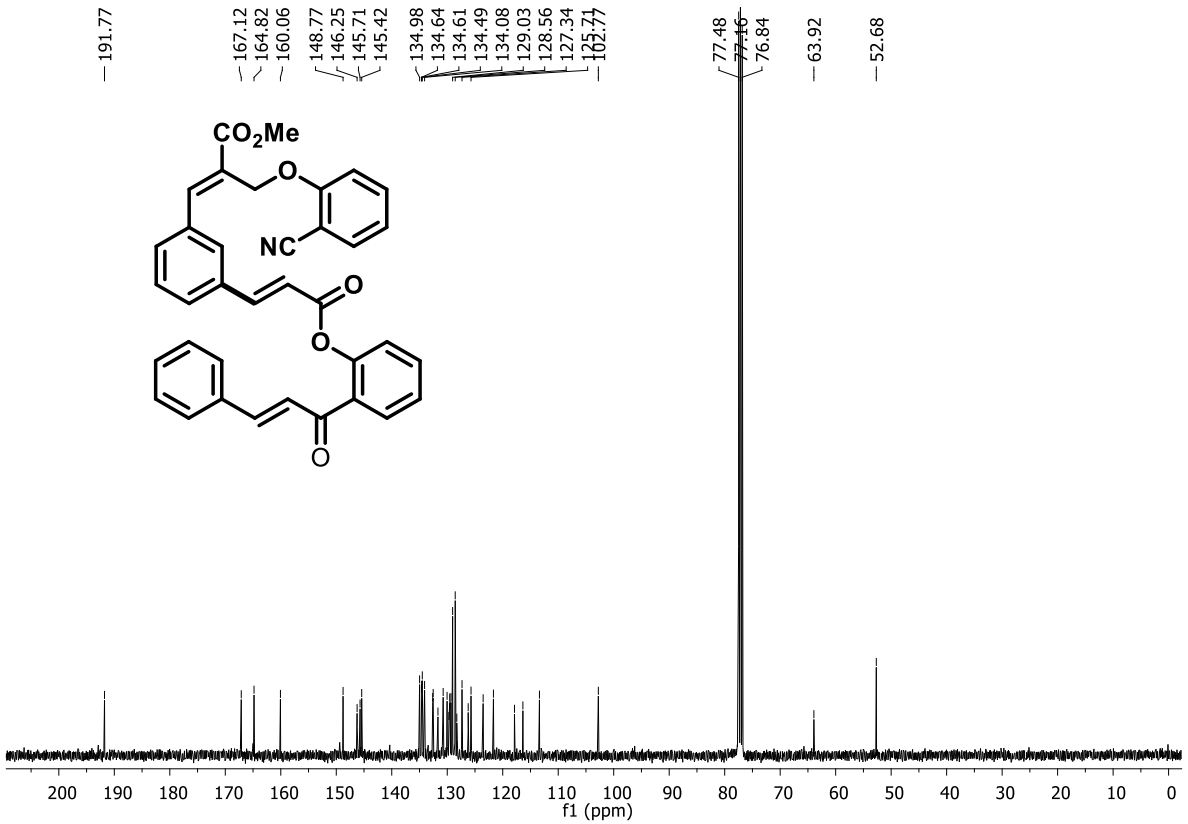
Methyl 2-(((*E*)-3-(3-((*E*)-2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxoprop-1-en-1-yl)phenyl) acryloyl) oxy)benzoate (3s)



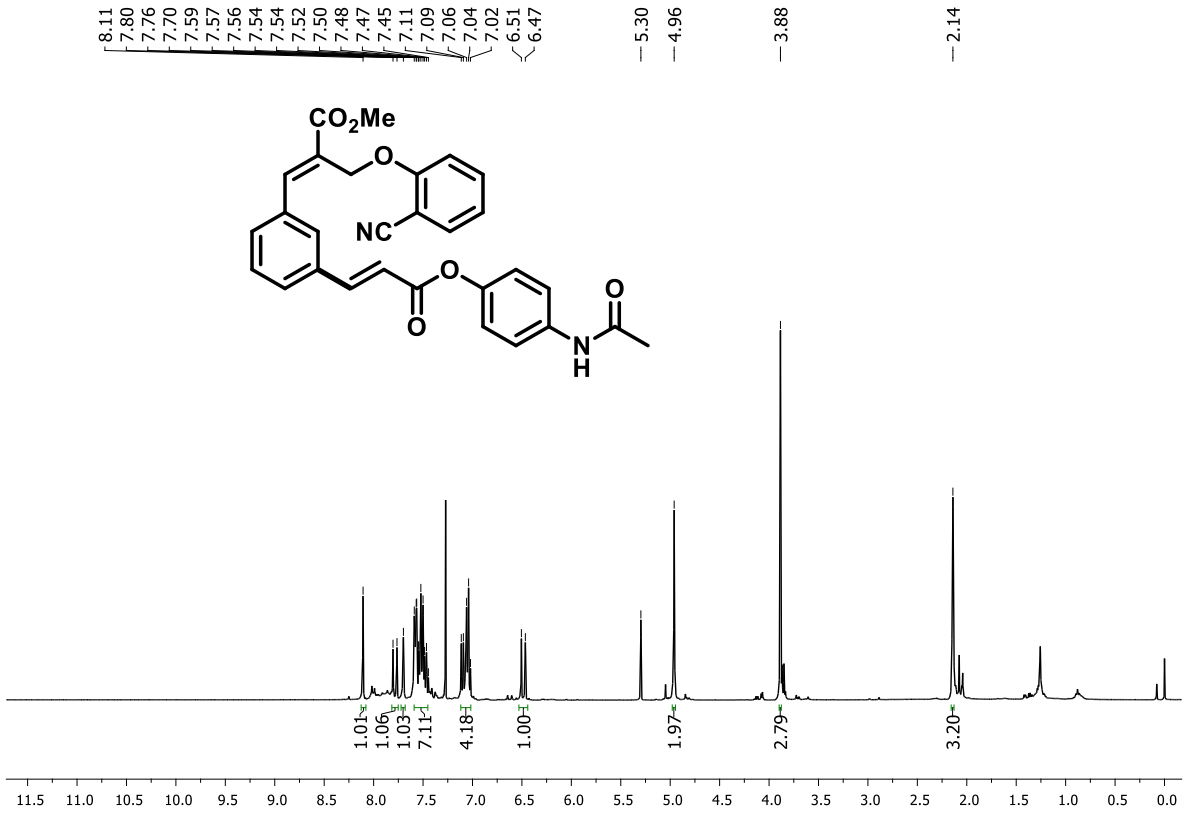


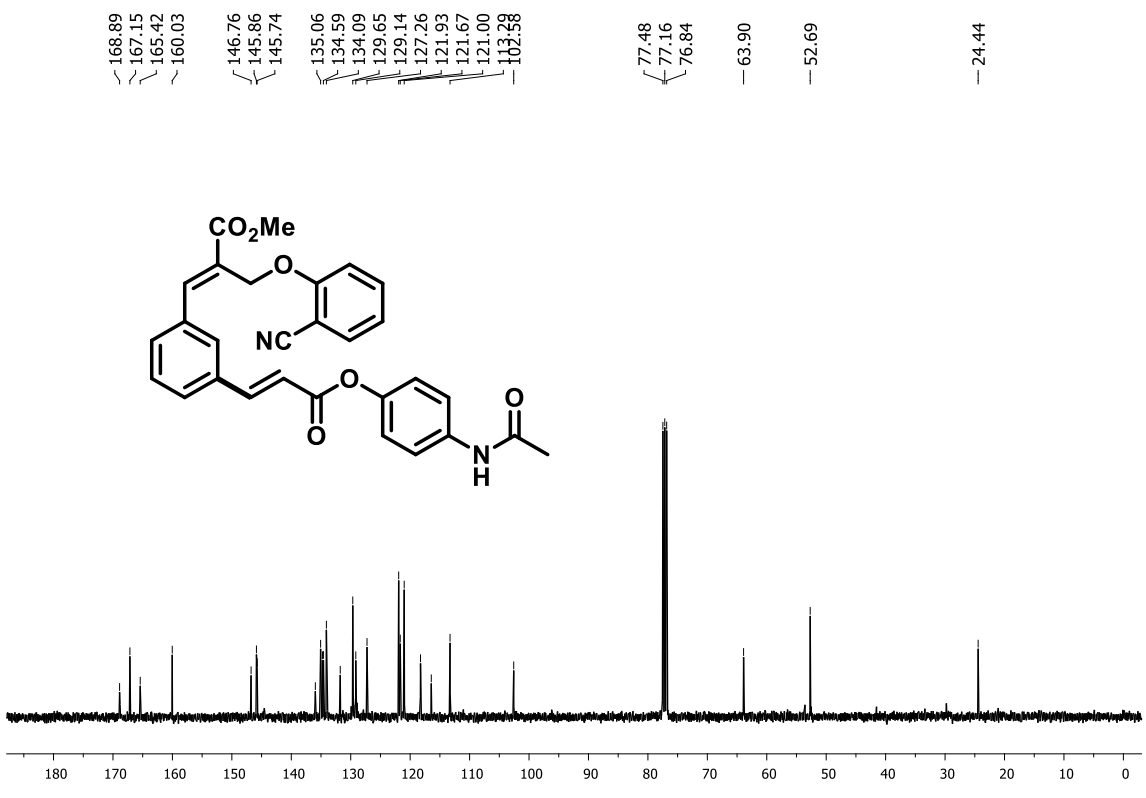
Methyl (*E*)-3-(3-((*E*)-3-(2-cinnamoylphenoxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl) acrylate (3t)



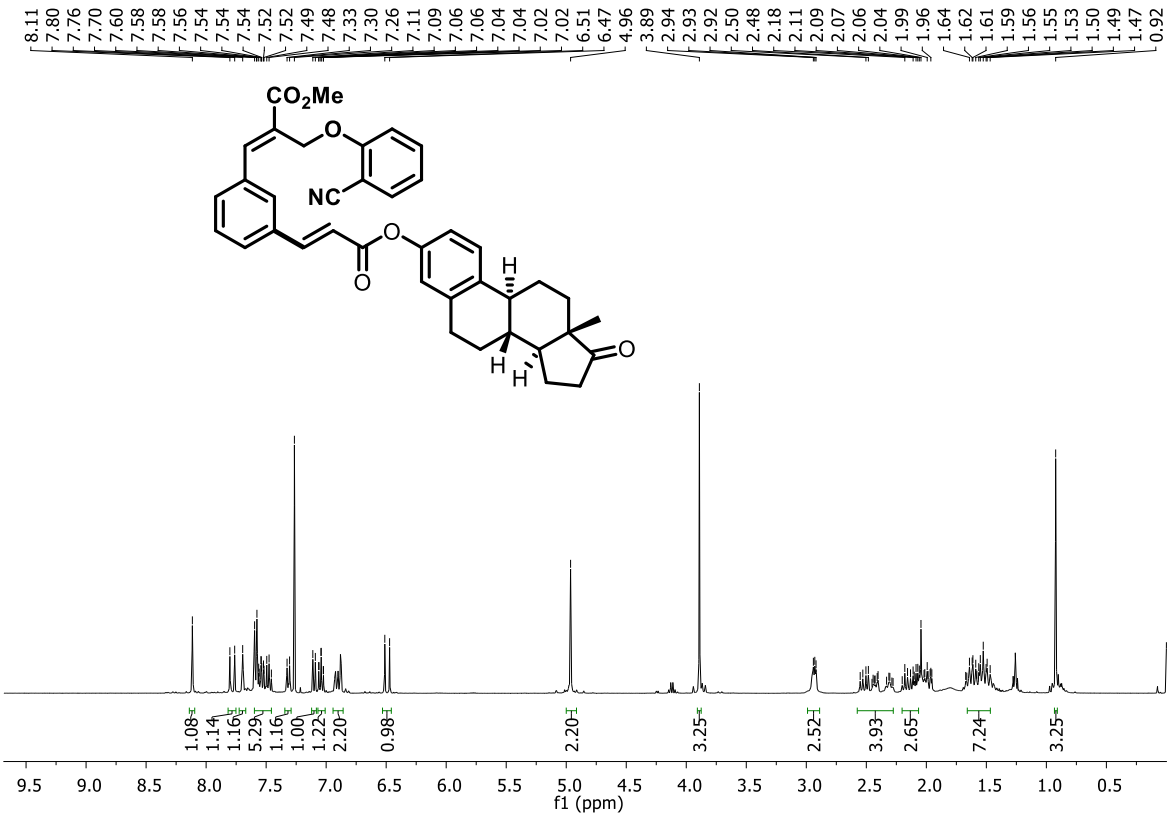


Methyl (*E*)-3-(3-((*E*)-3-(4-acetamidophenoxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy)methyl) acrylate (3u)

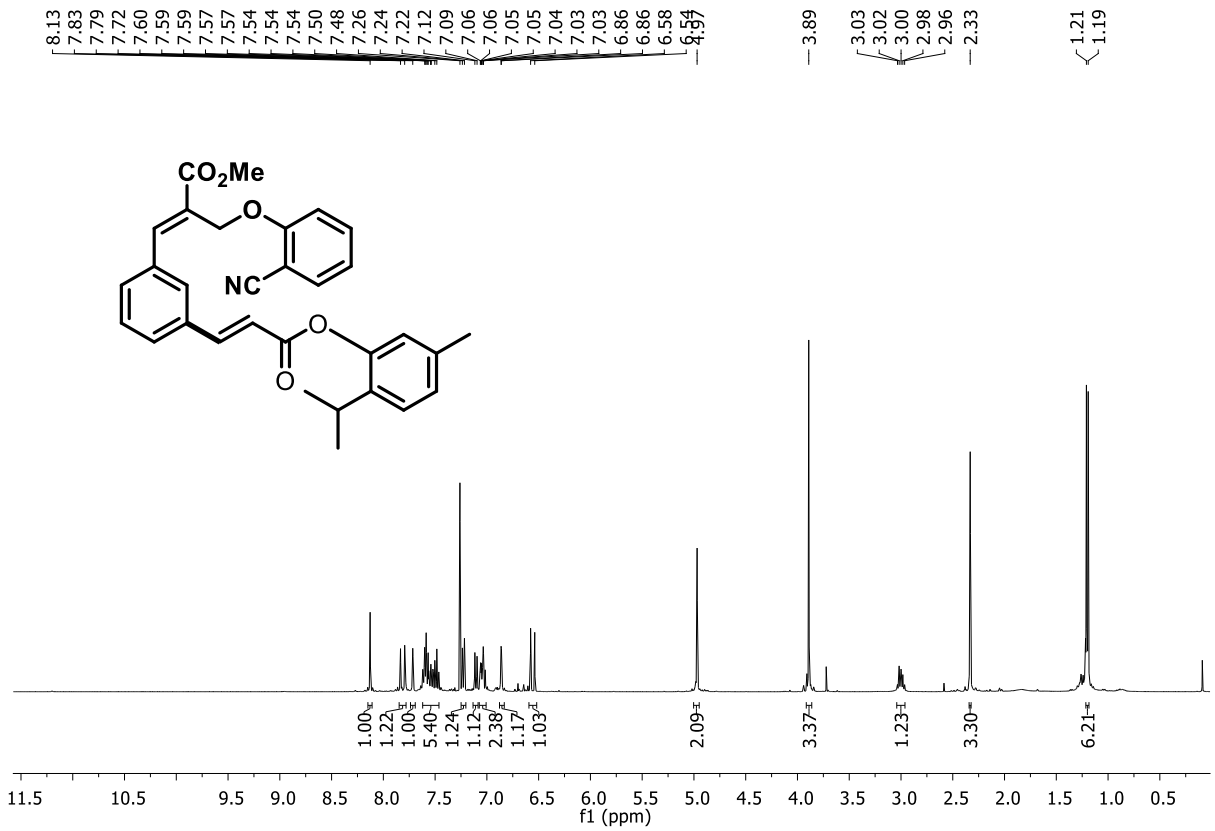


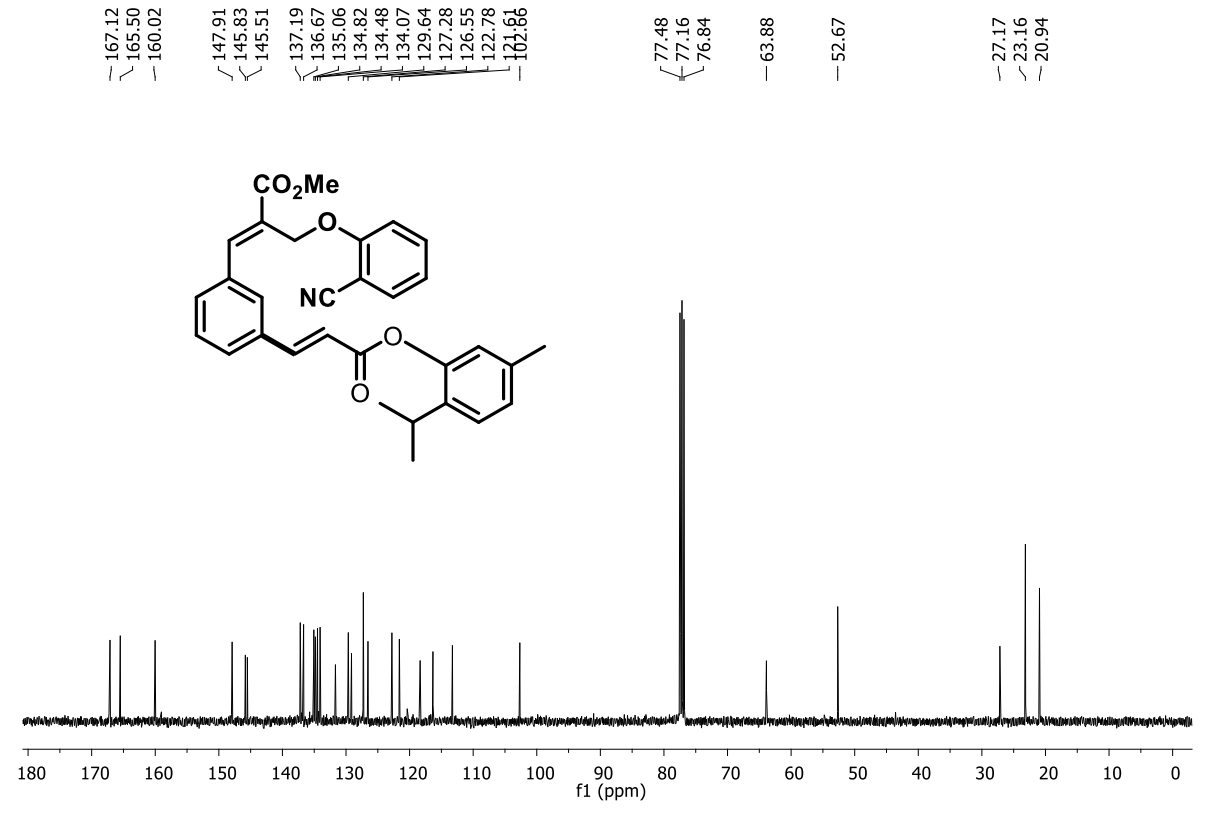


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-(((8R,9S,13S,14S)-13-methyl-17-oxo-7,8,9,11,12,13,14,15,16,17-decahydro-6H-cyclopenta[a]phenanthren-3-yl)oxy)-3-oxoprop-1-en-1-yl)phenyl)acrylate (3v)

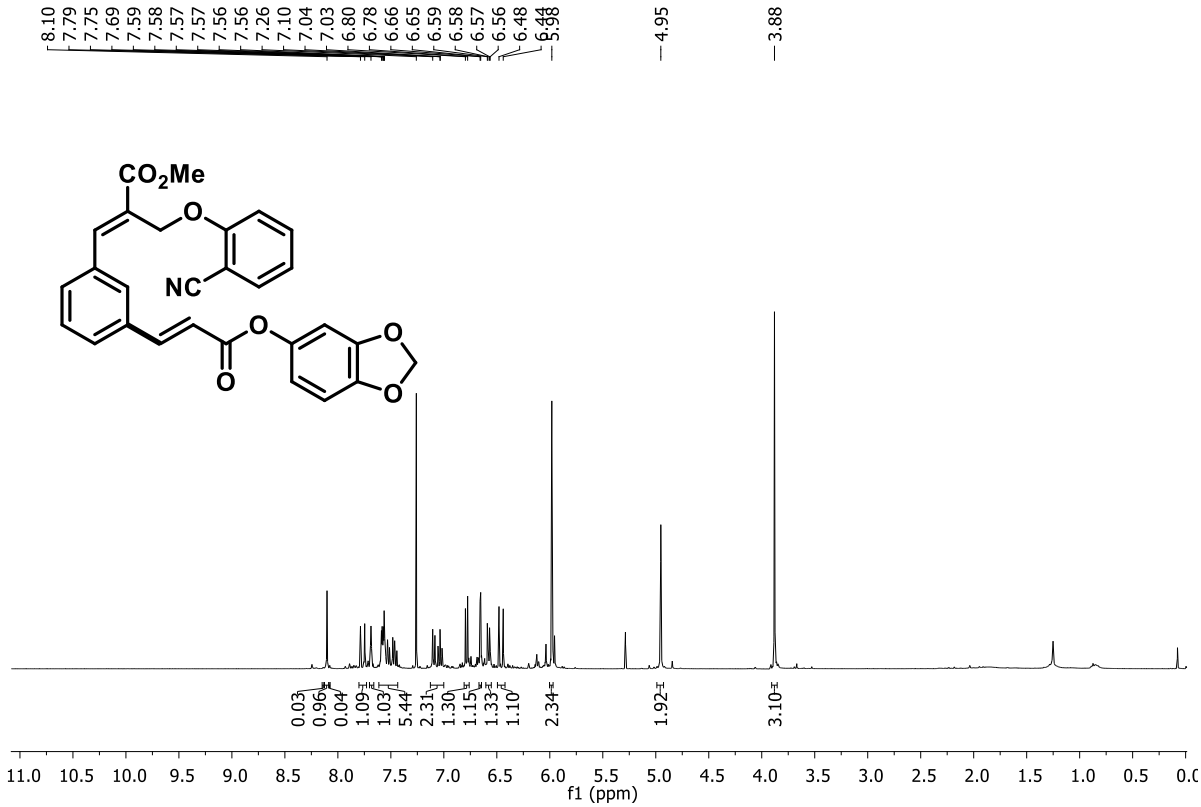


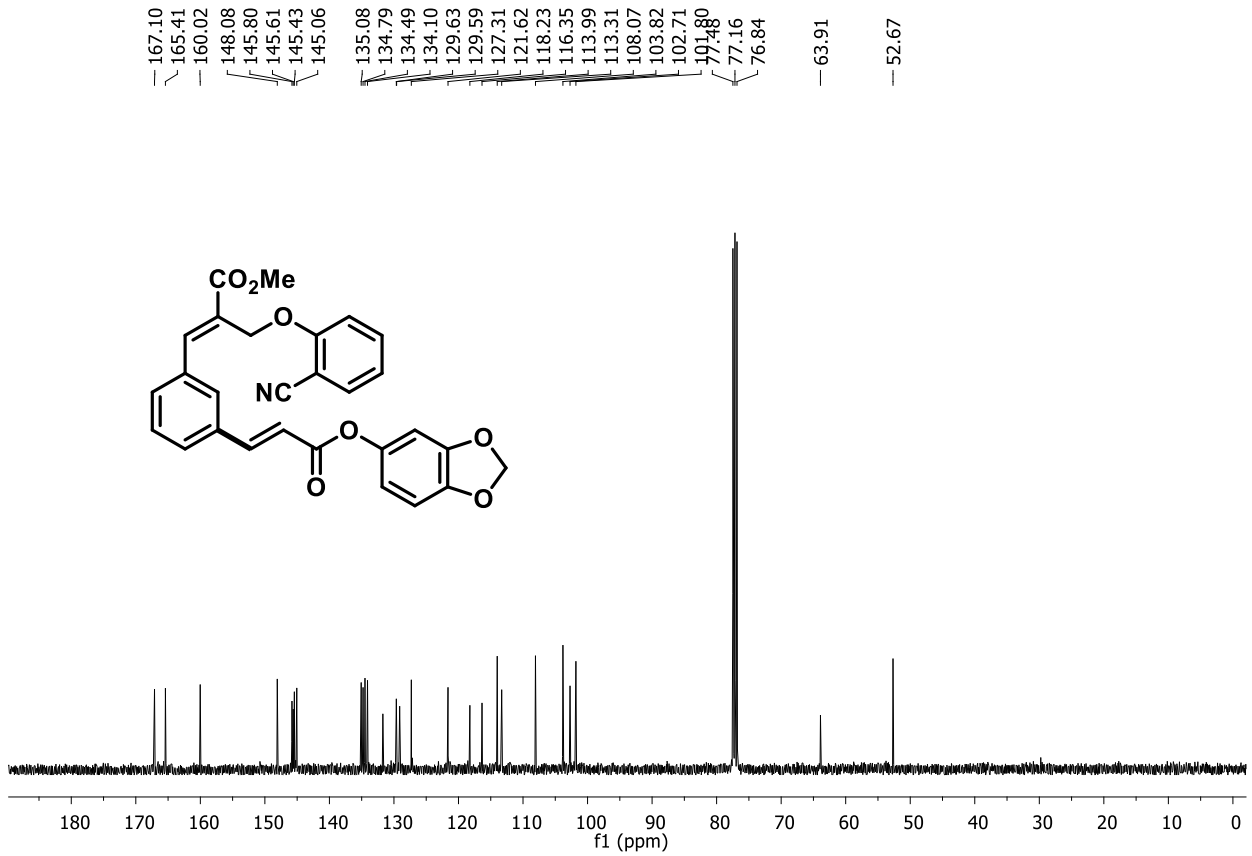
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-((*E*)-3-(2-isopropyl-5-methylphenoxy)-3-oxoprop-1-en-1-yl)phenyl)acrylate (3w)



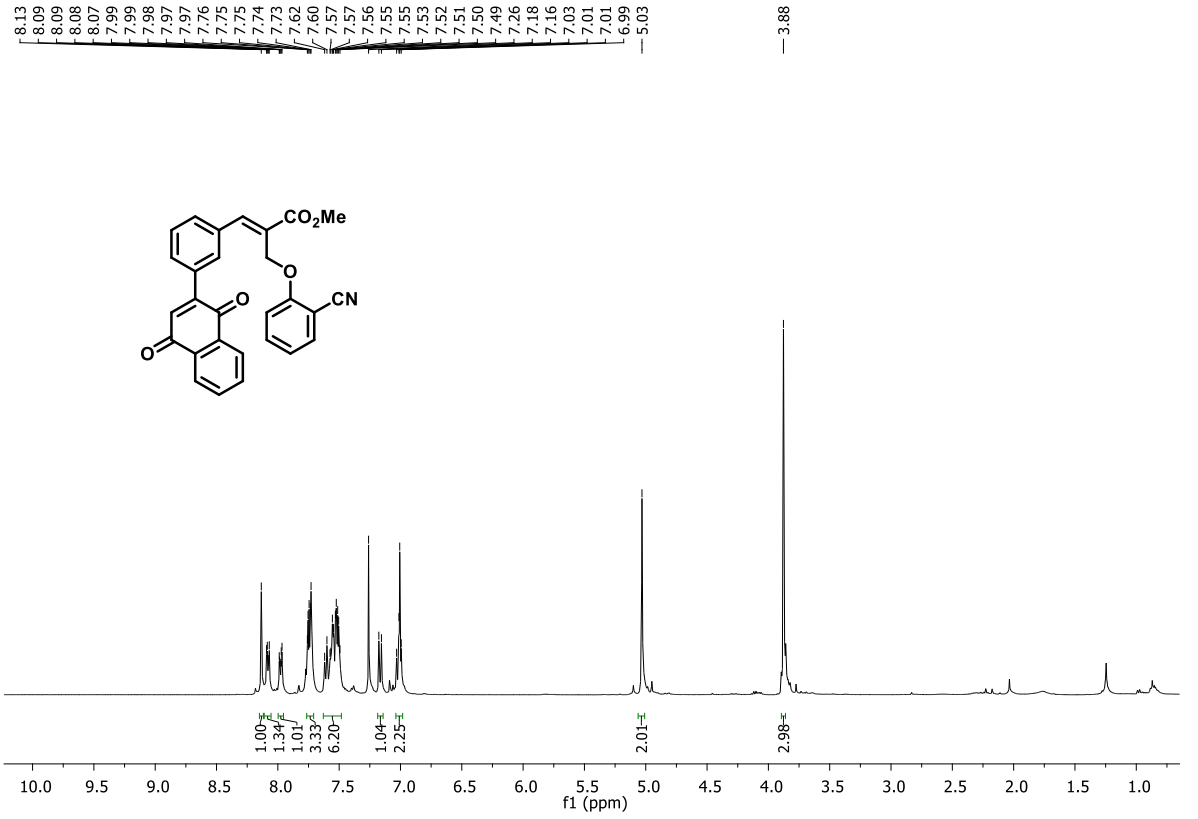


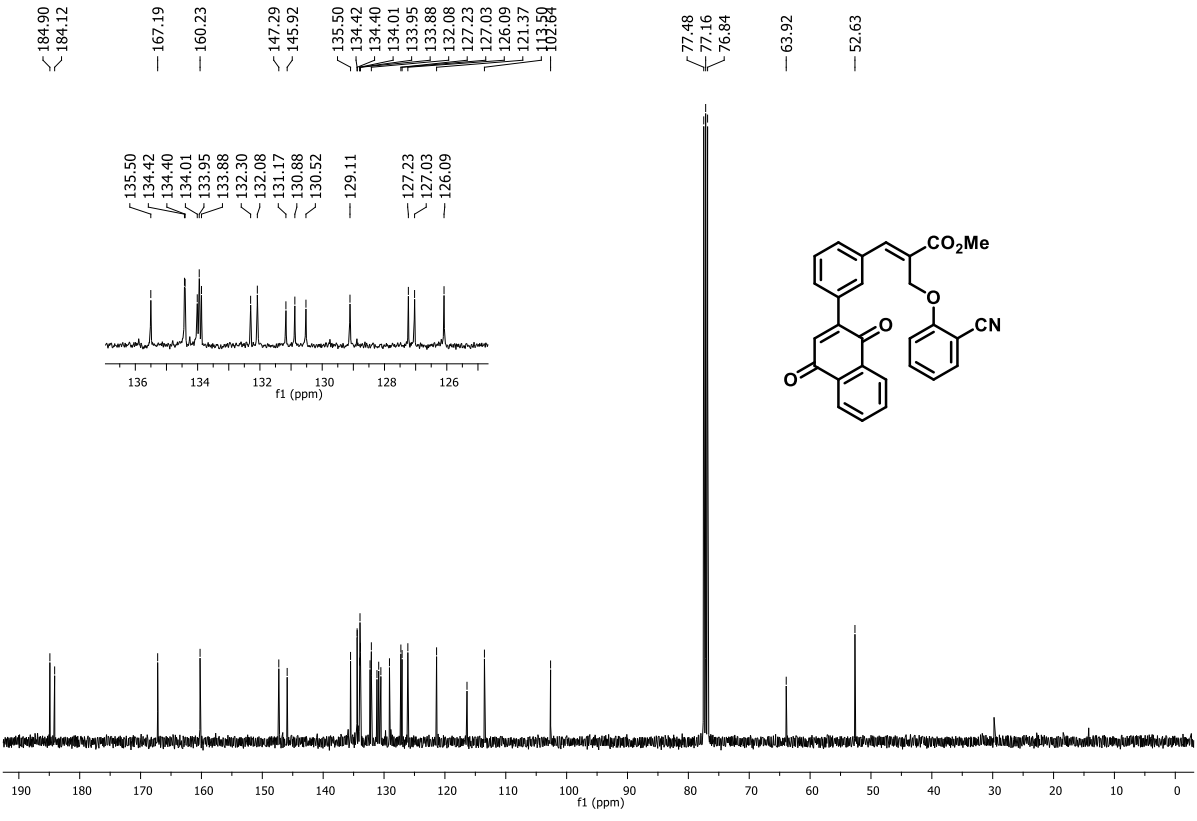
Methyl (*E*)-3-(3-((*E*)-3-(benzo[d][1,3]dioxol-5-yloxy)-3-oxoprop-1-en-1-yl)phenyl)-2-((2-cyanophenoxy) methyl)acrylate (3x)



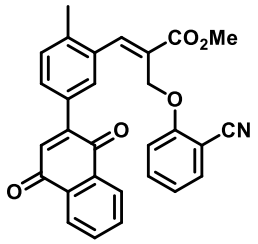


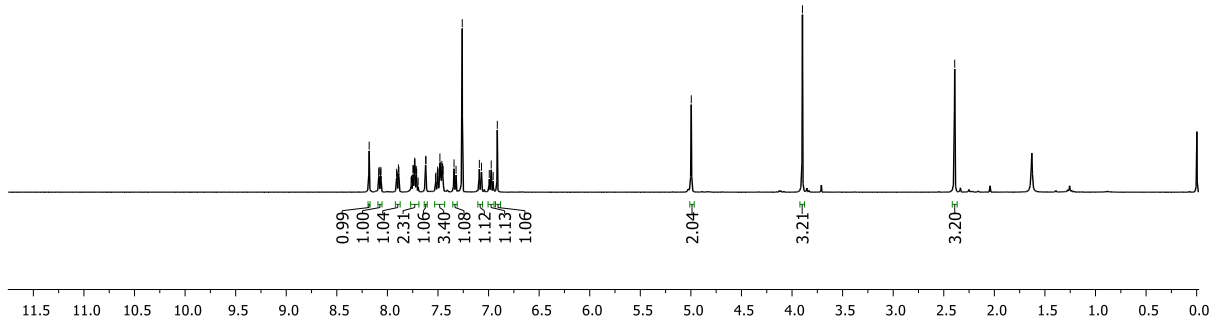
Methyl (*E*)-2-((2-cyanophenoxy) methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl) acrylate (10a)

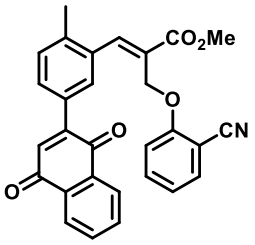




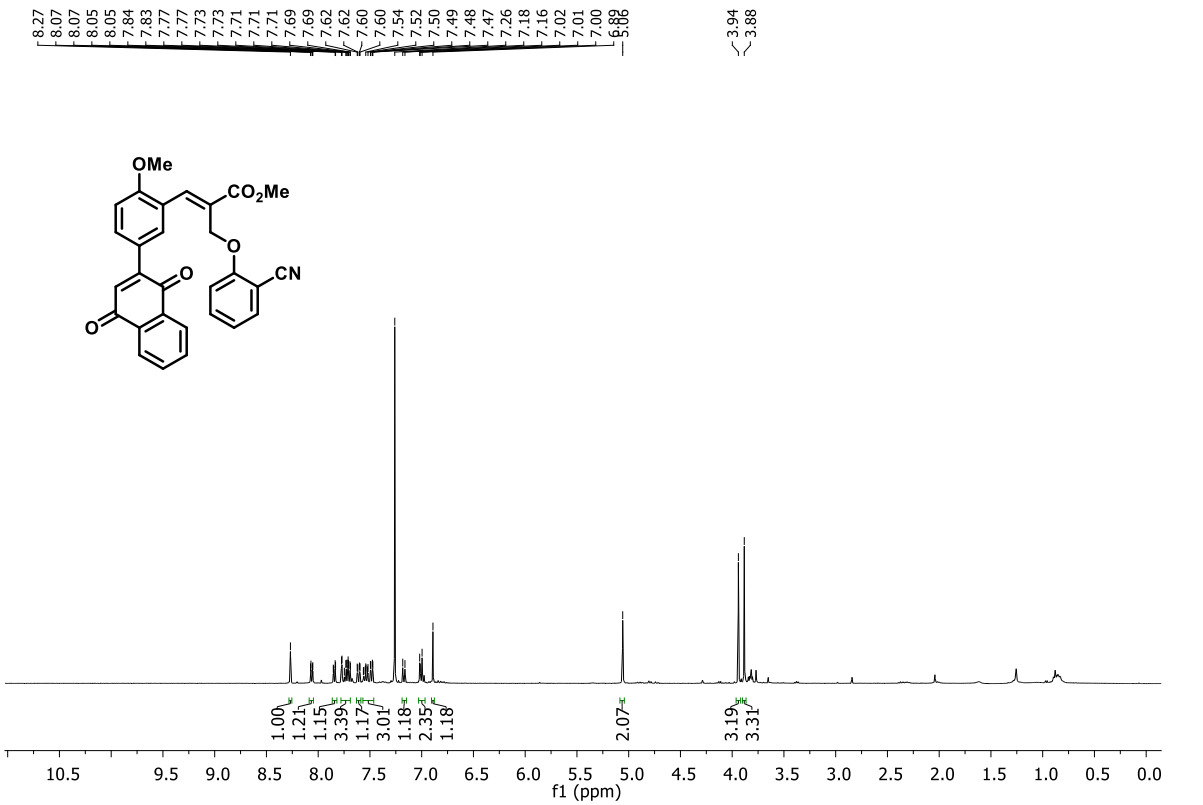
Methyl(*E*)-2-((2-cyanophenoxy)methyl)-3-(5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-2-methylphenyl)acrylate (10b)

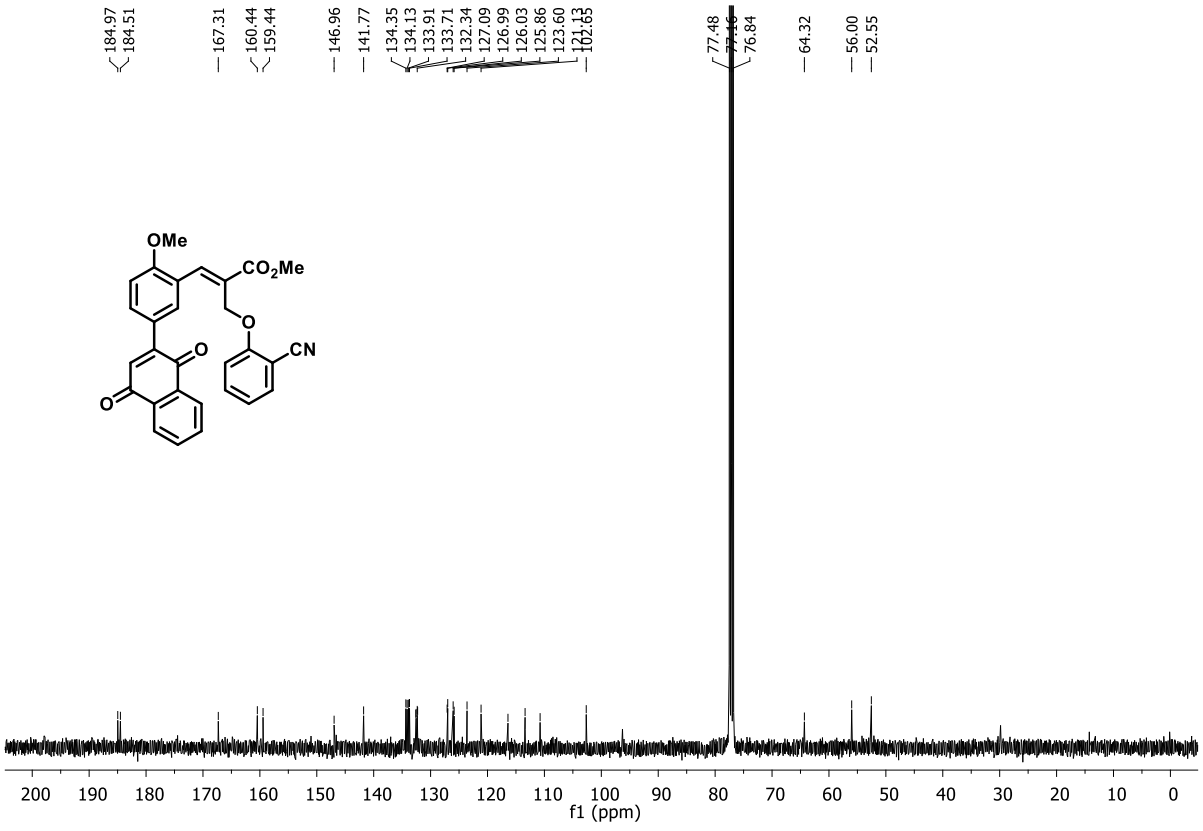




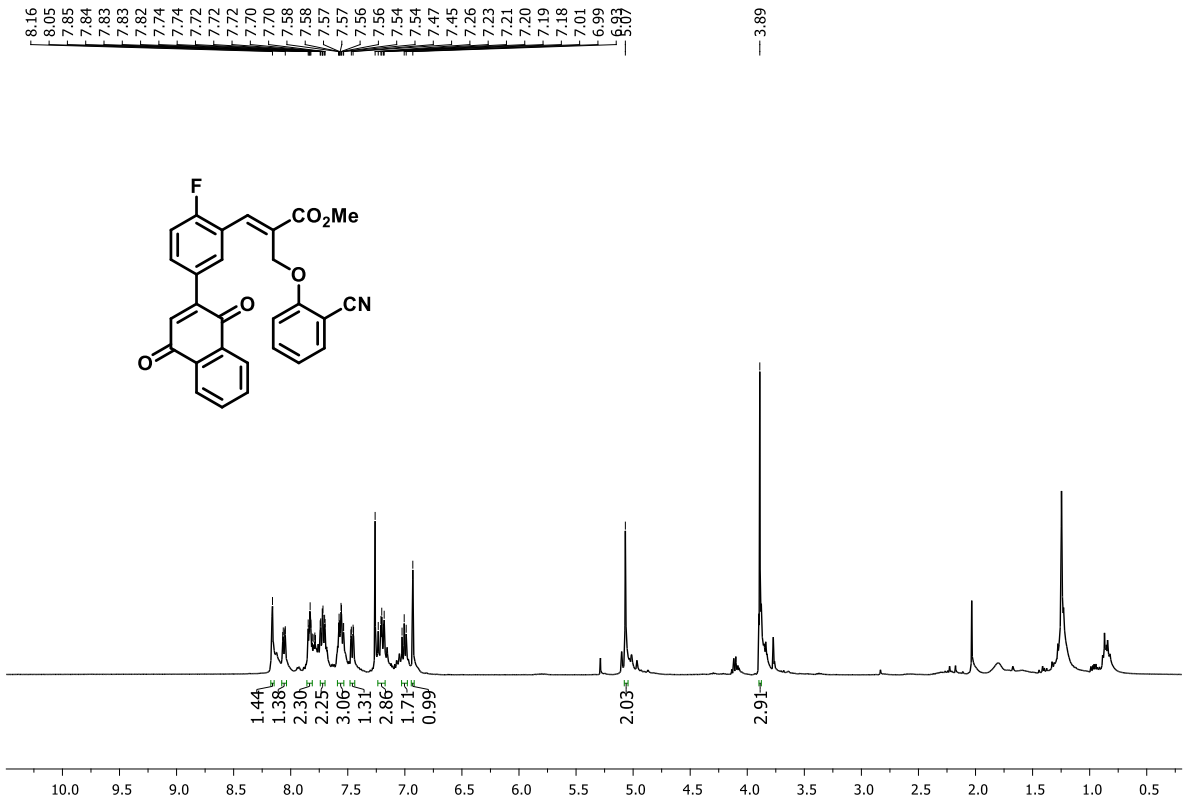


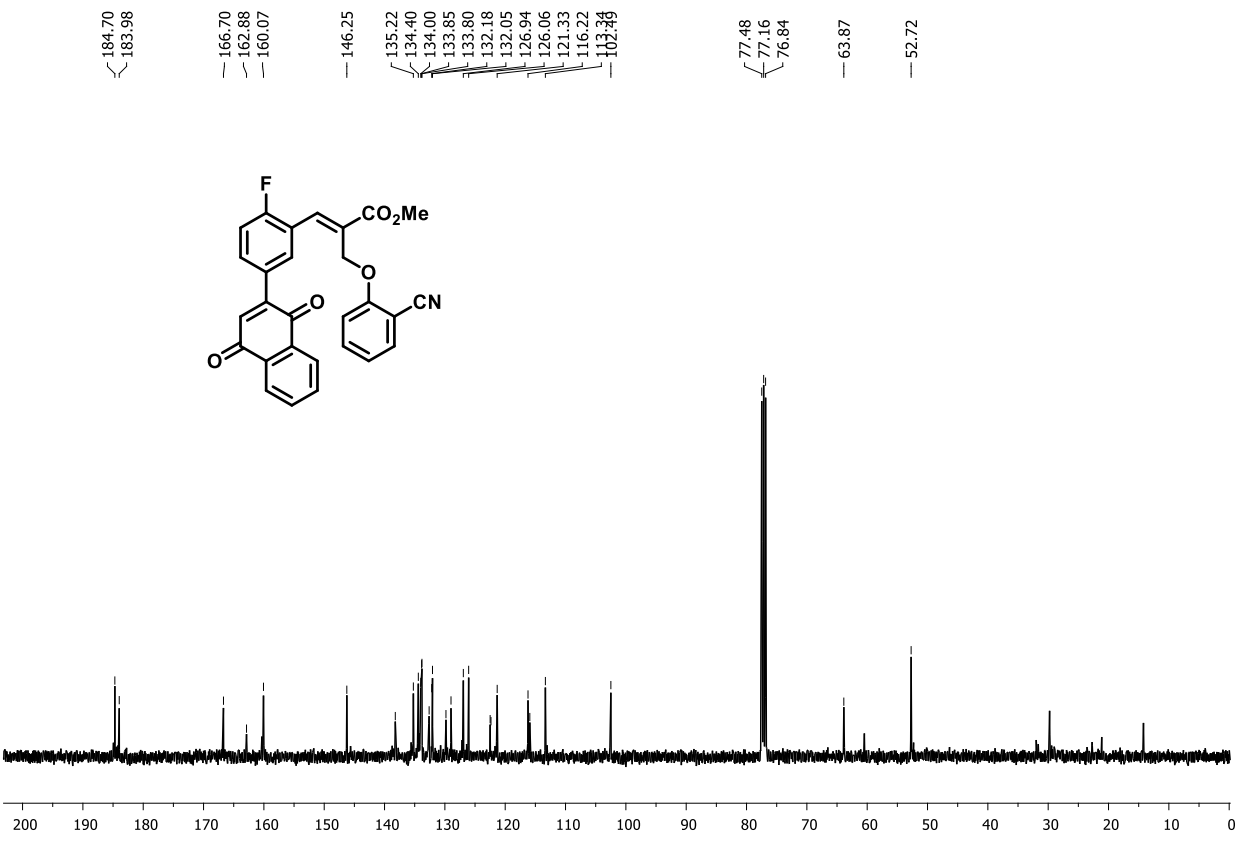
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-2-methoxyphenyl)acrylate (10c)



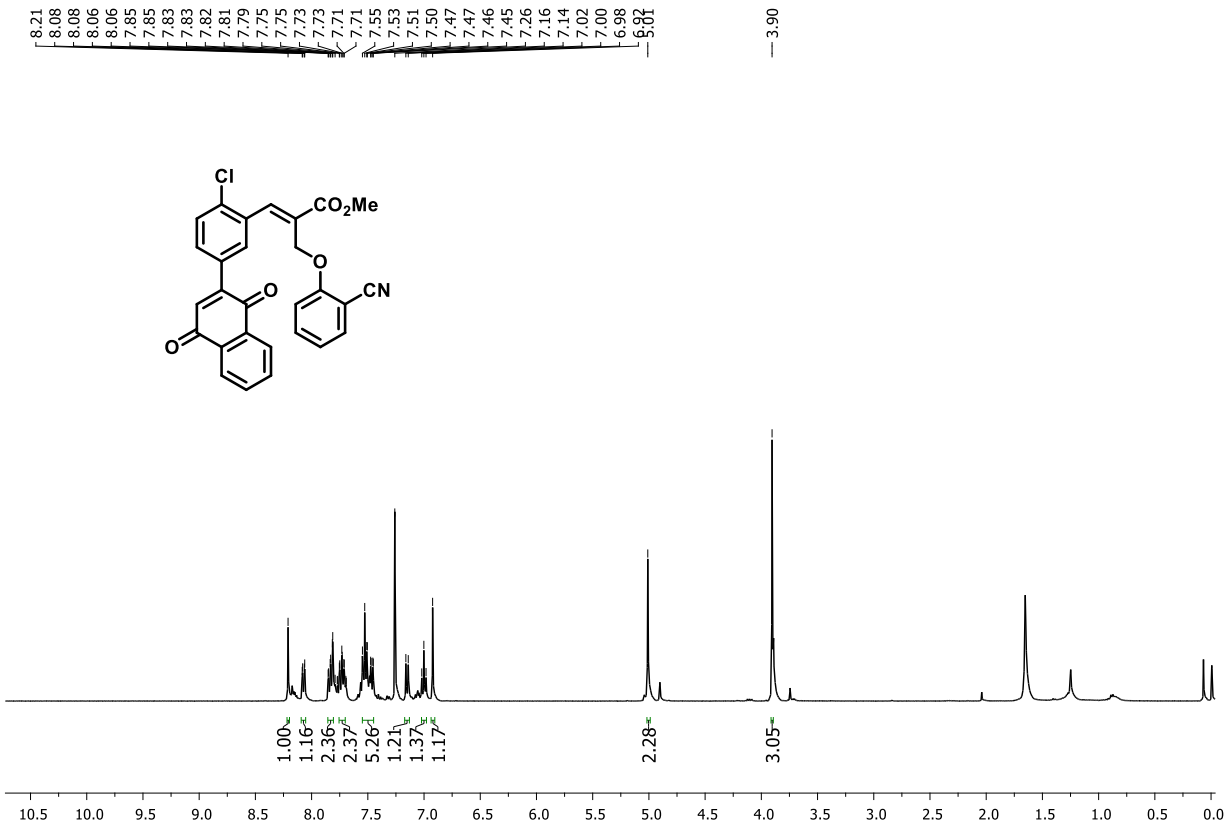


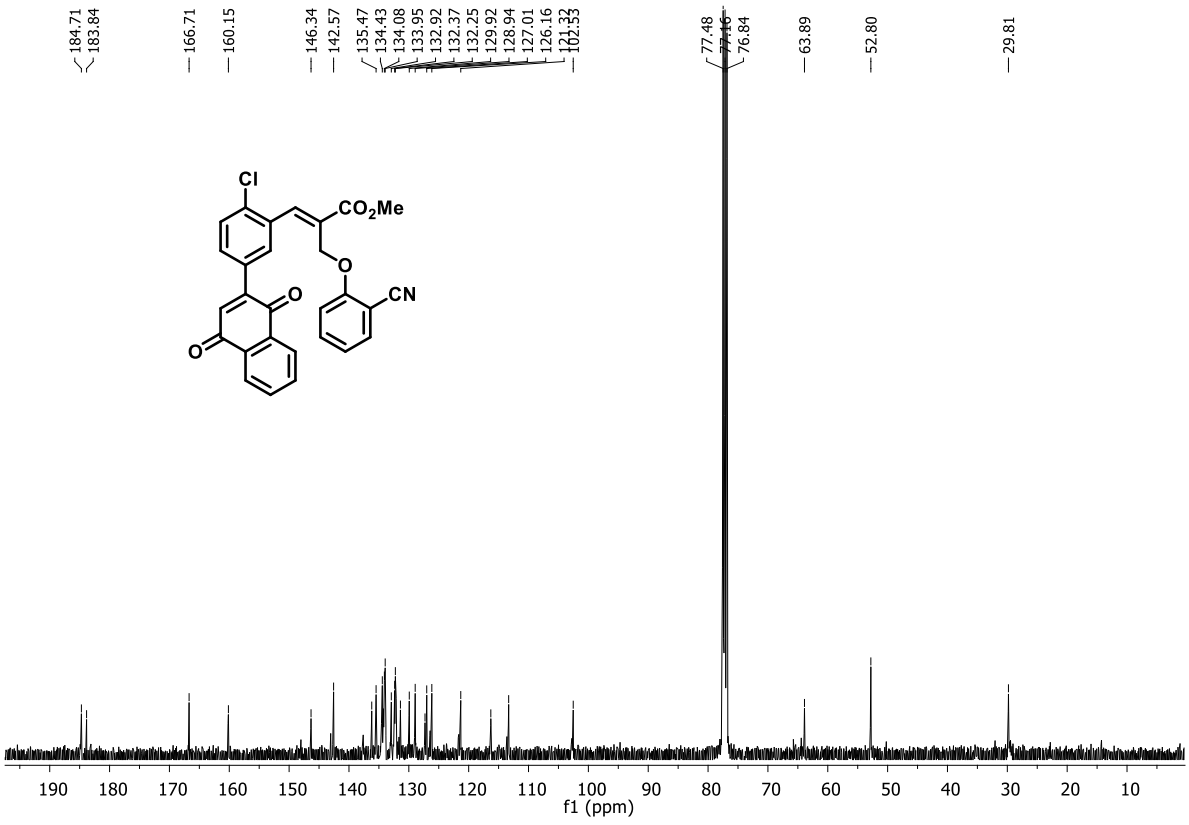
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-2-fluorophenyl) acrylate (10d)



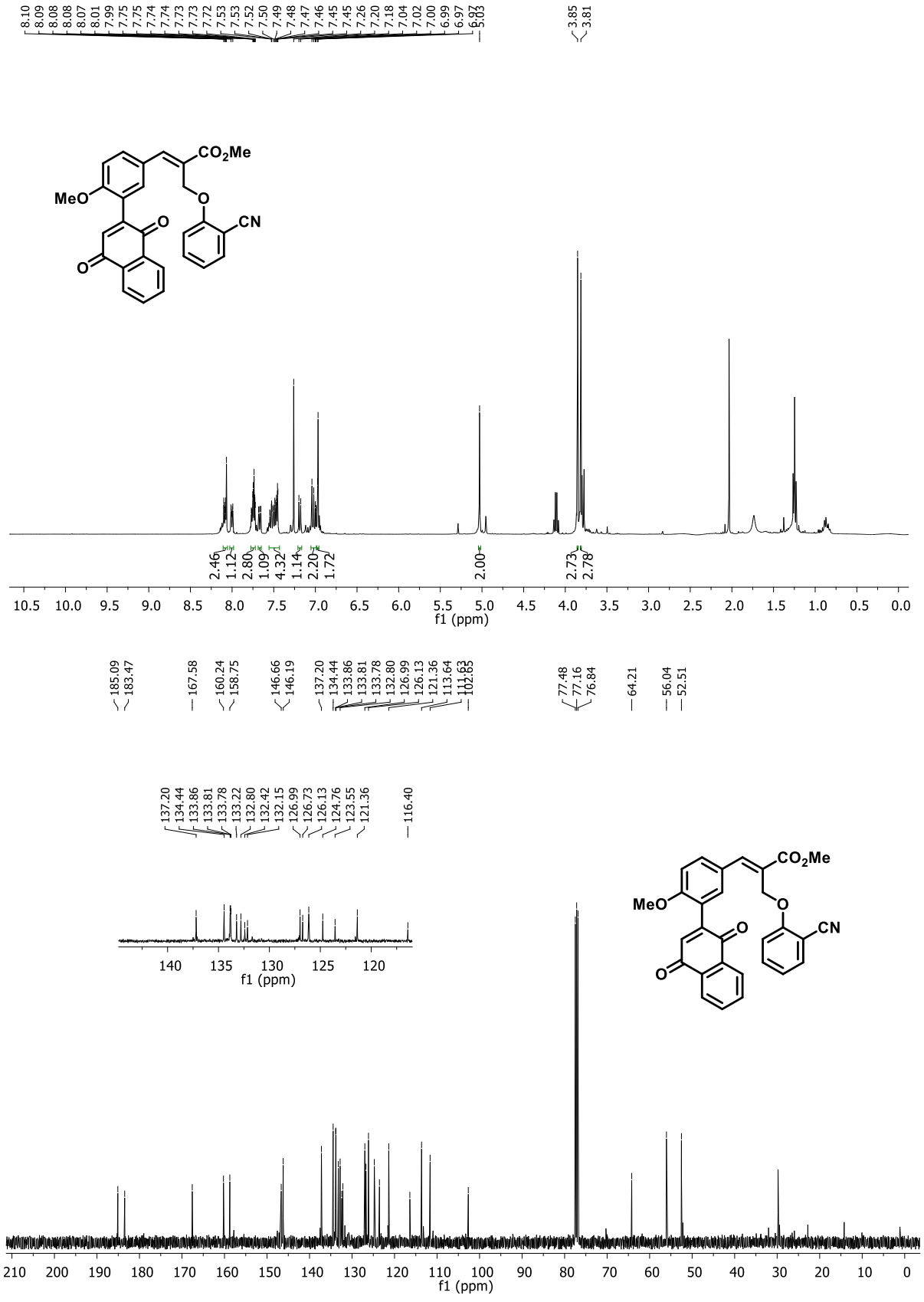


Methyl (*E*)-3-(2-chloro-5-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (10e)

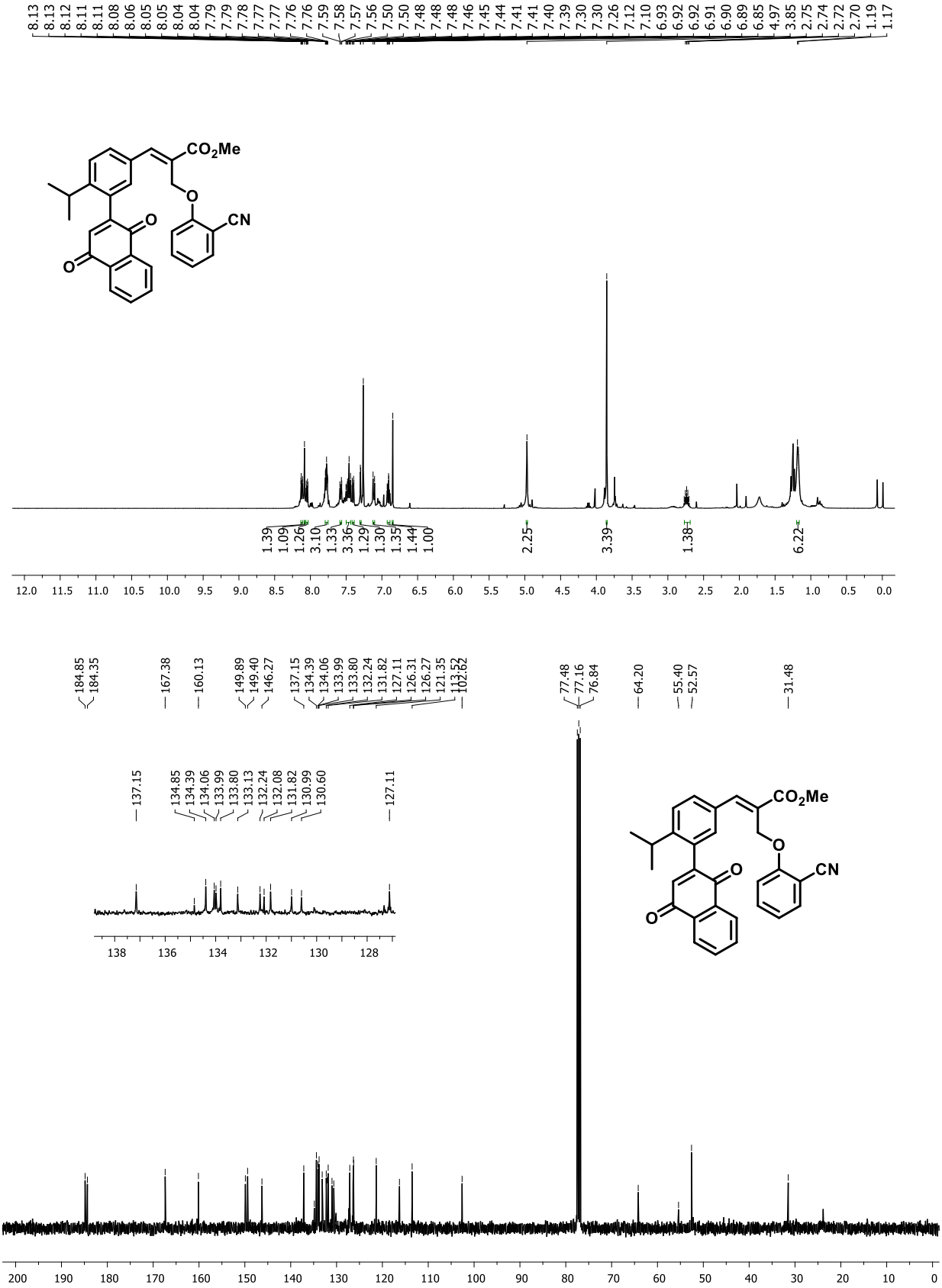




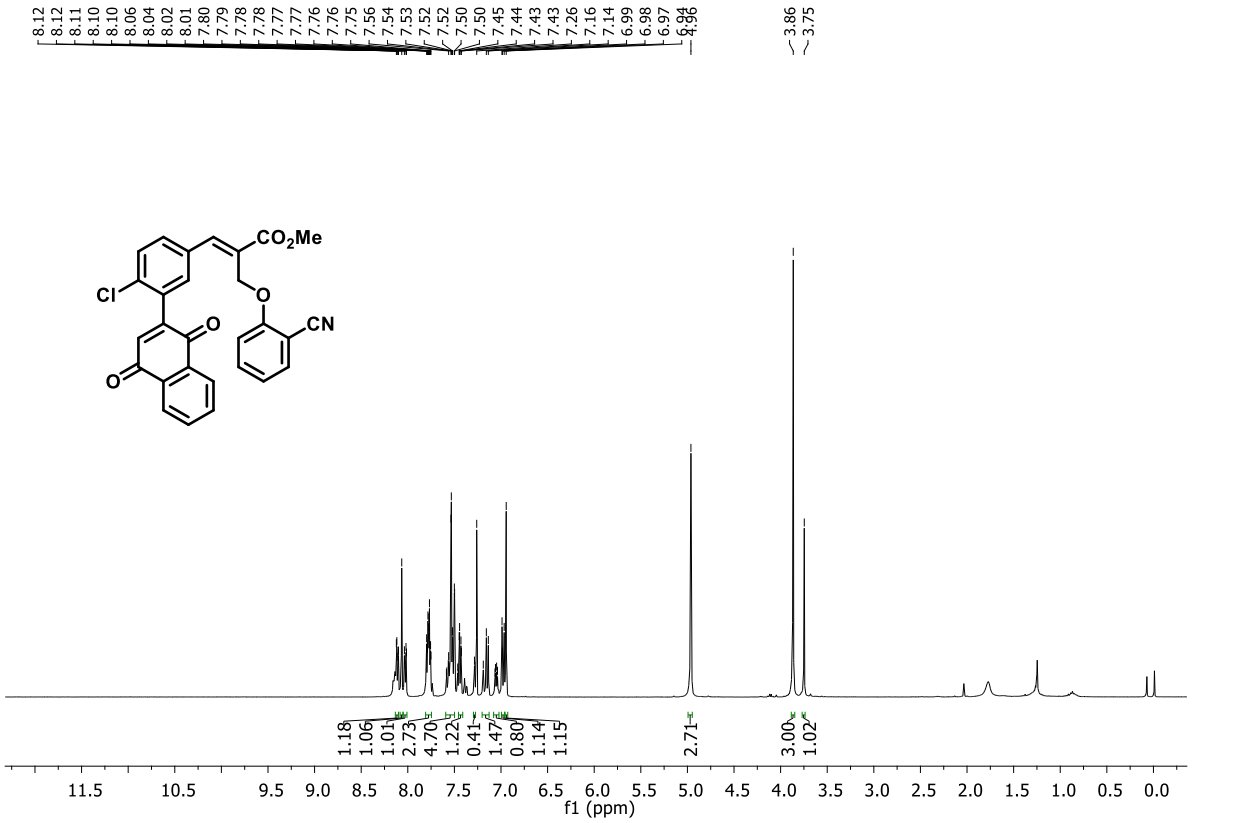
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-4-methoxyphenyl)acrylate (10f)

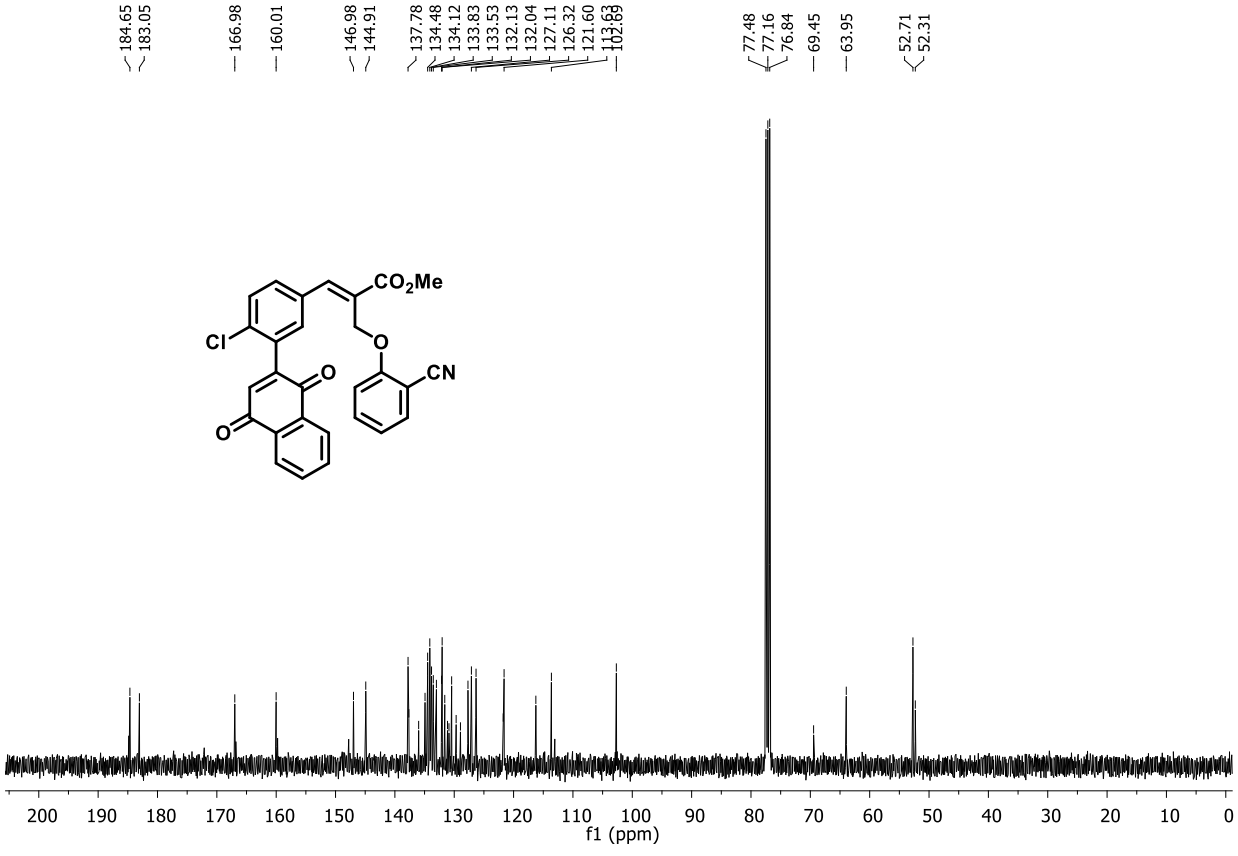


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)-4-isopropylphenyl) acrylate (10g)

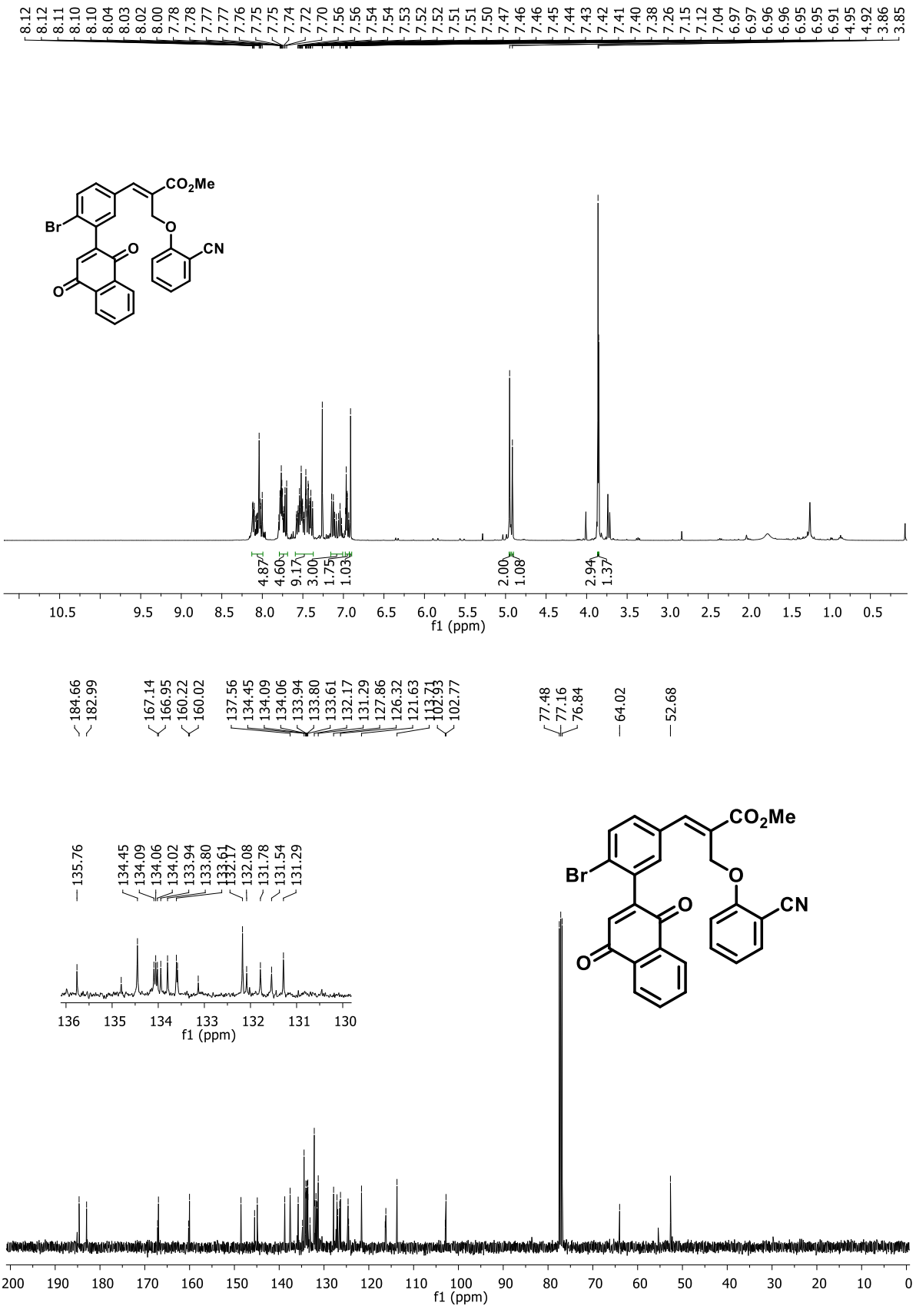


Methyl (*E*)-3-(4-chloro-3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl) acrylate (10h)

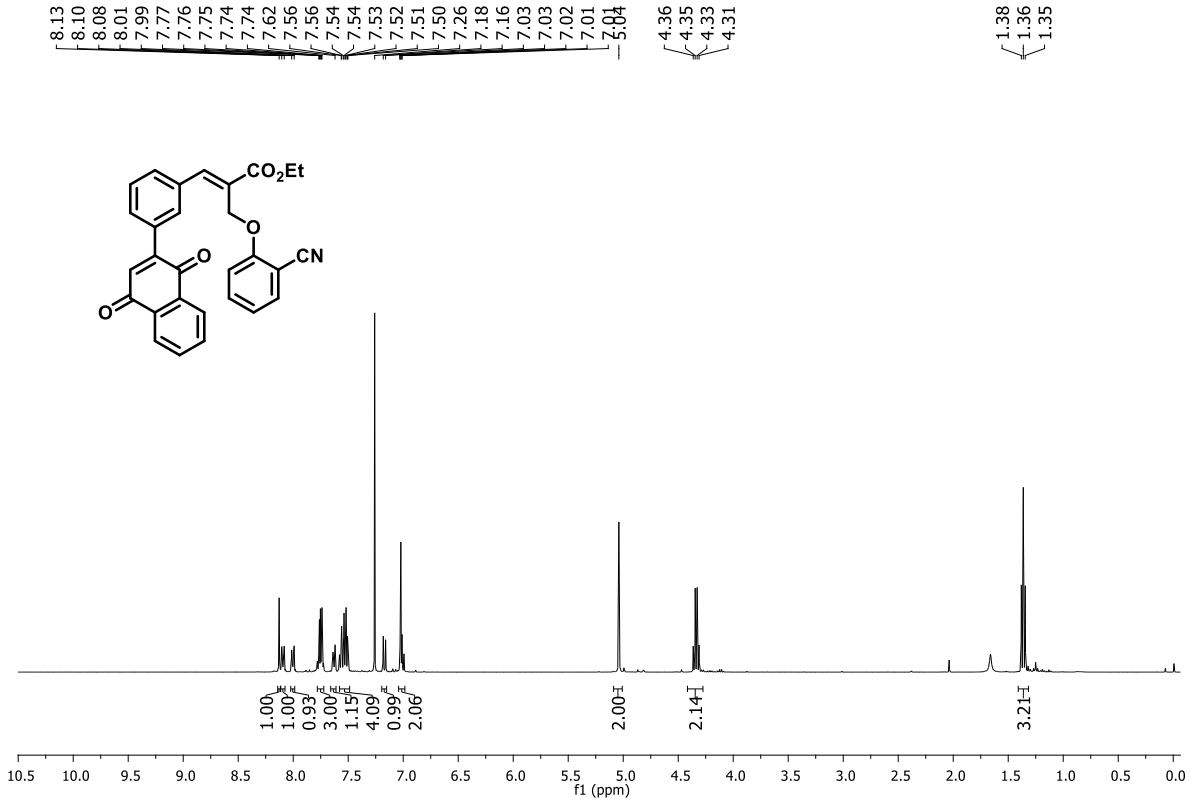


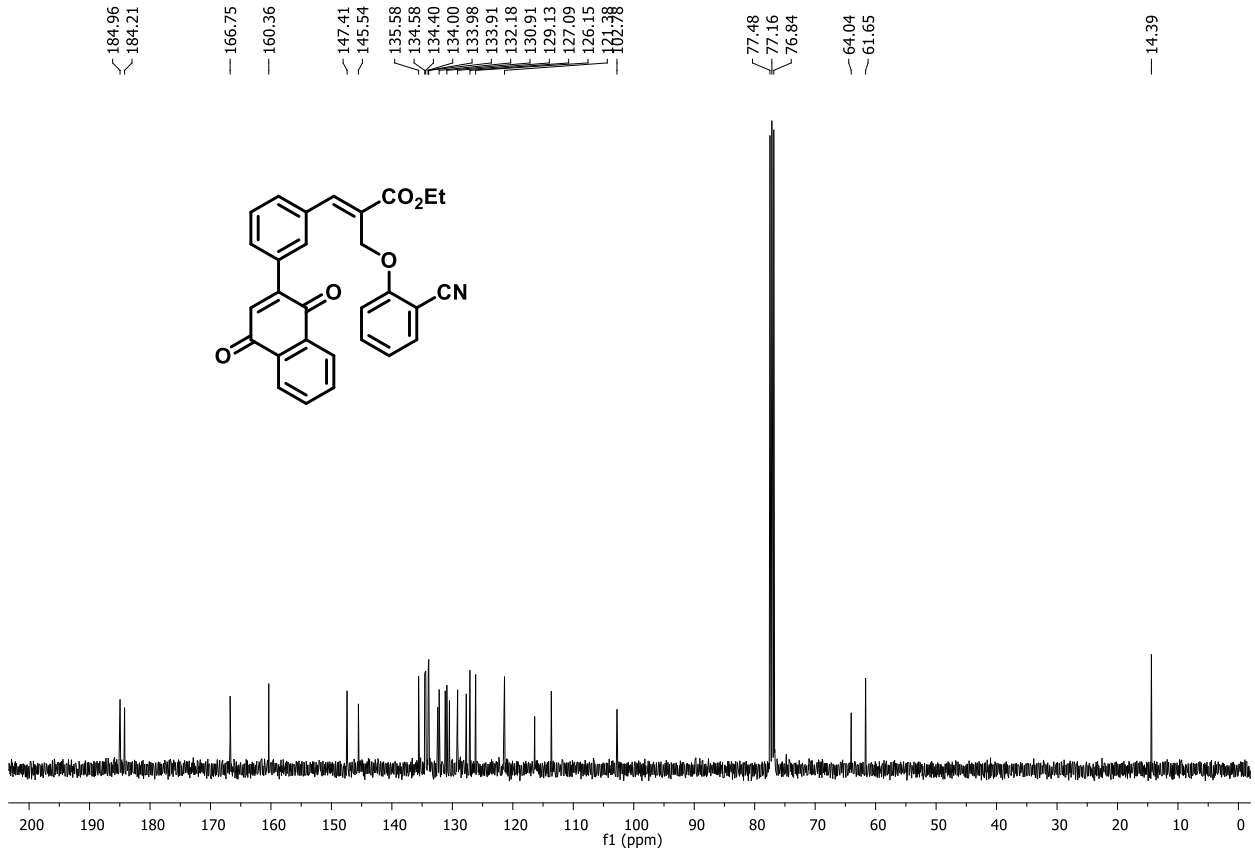


Methyl (*E*)-3-(4-bromo-3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl) acrylate (10i)

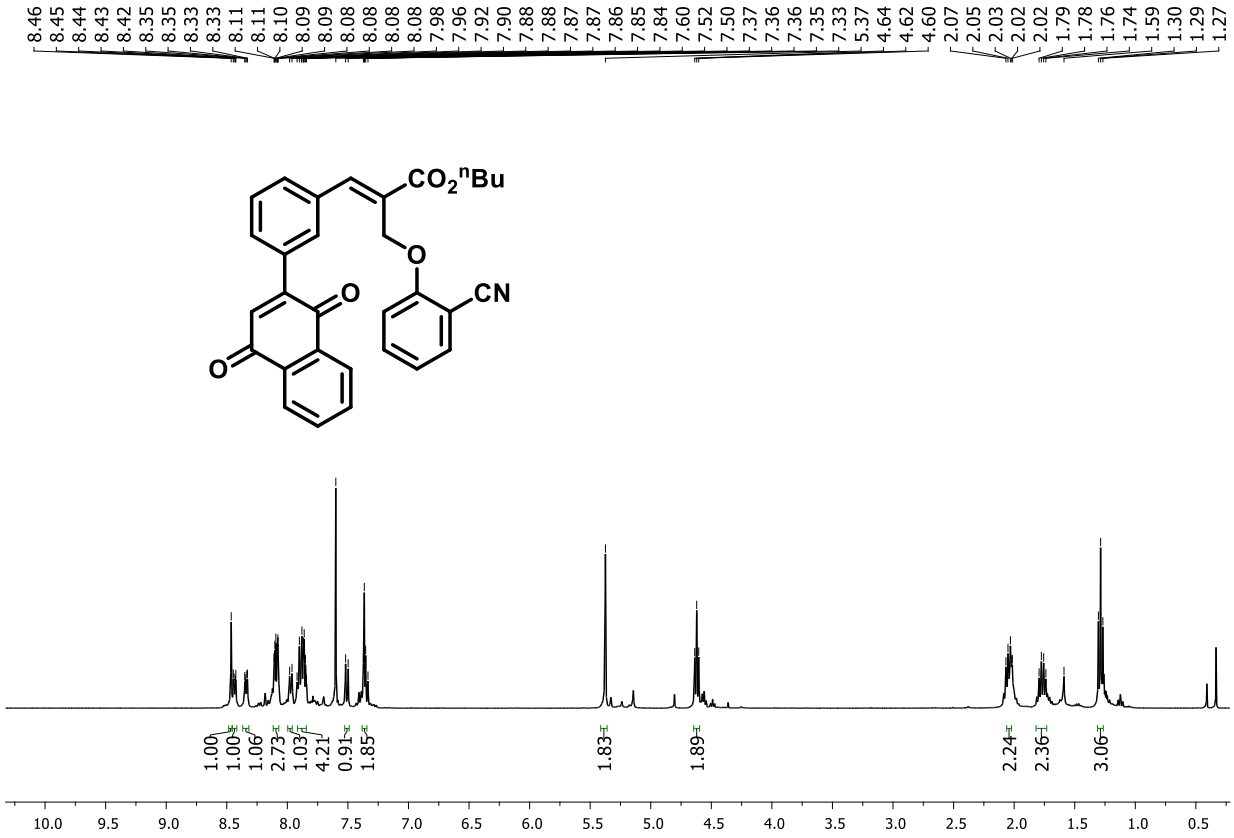


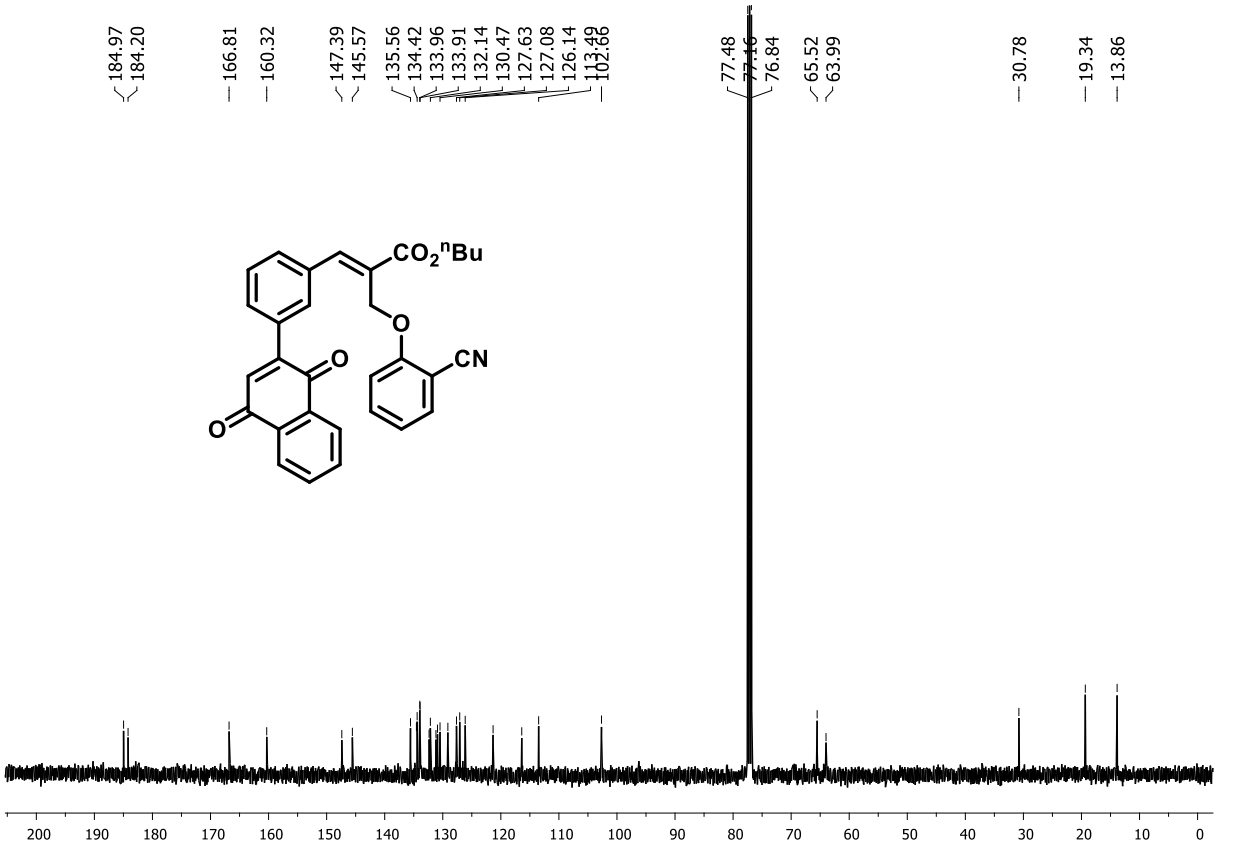
Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)acrylate (10j)



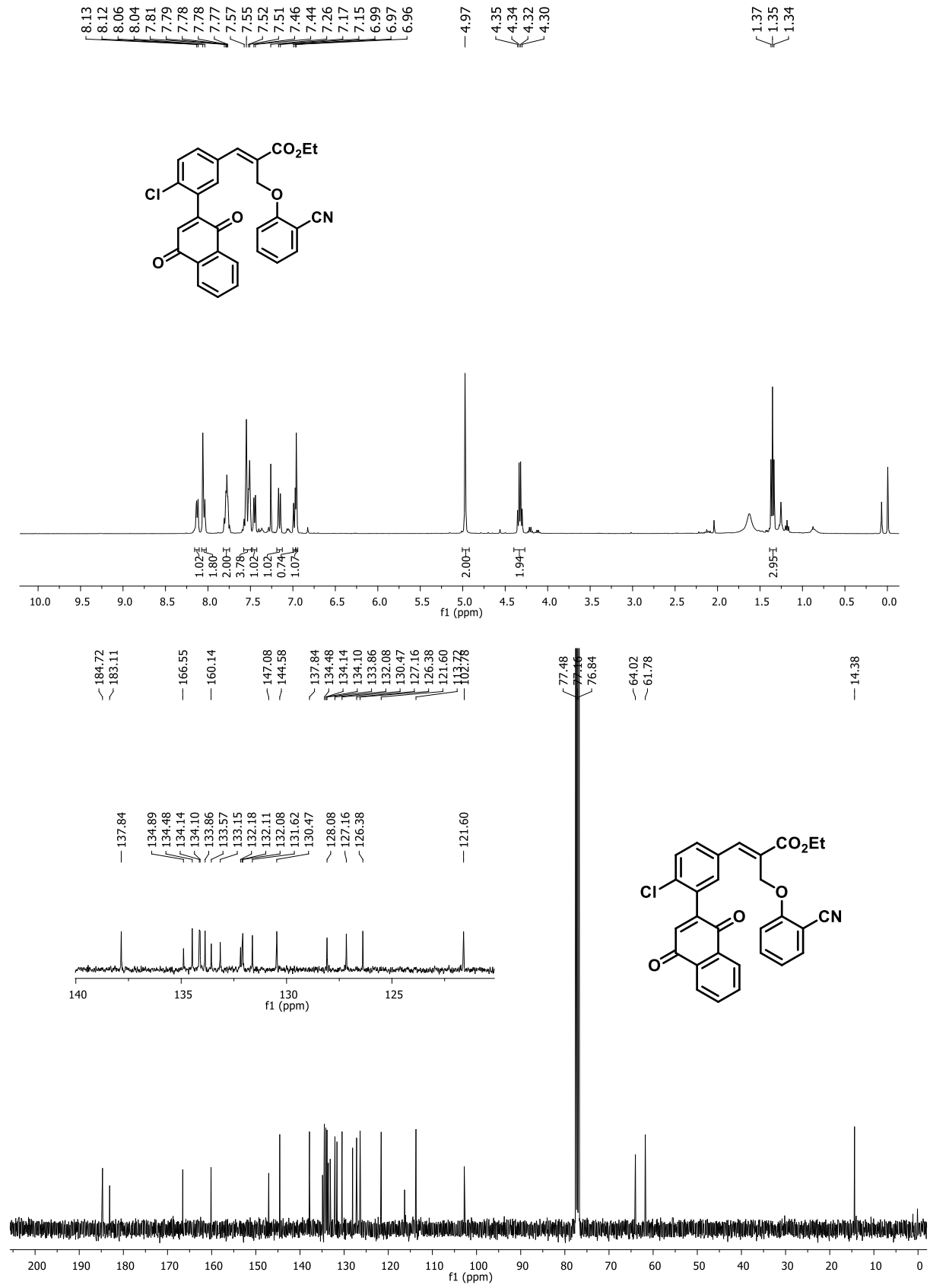


Butyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)acrylate (10k)

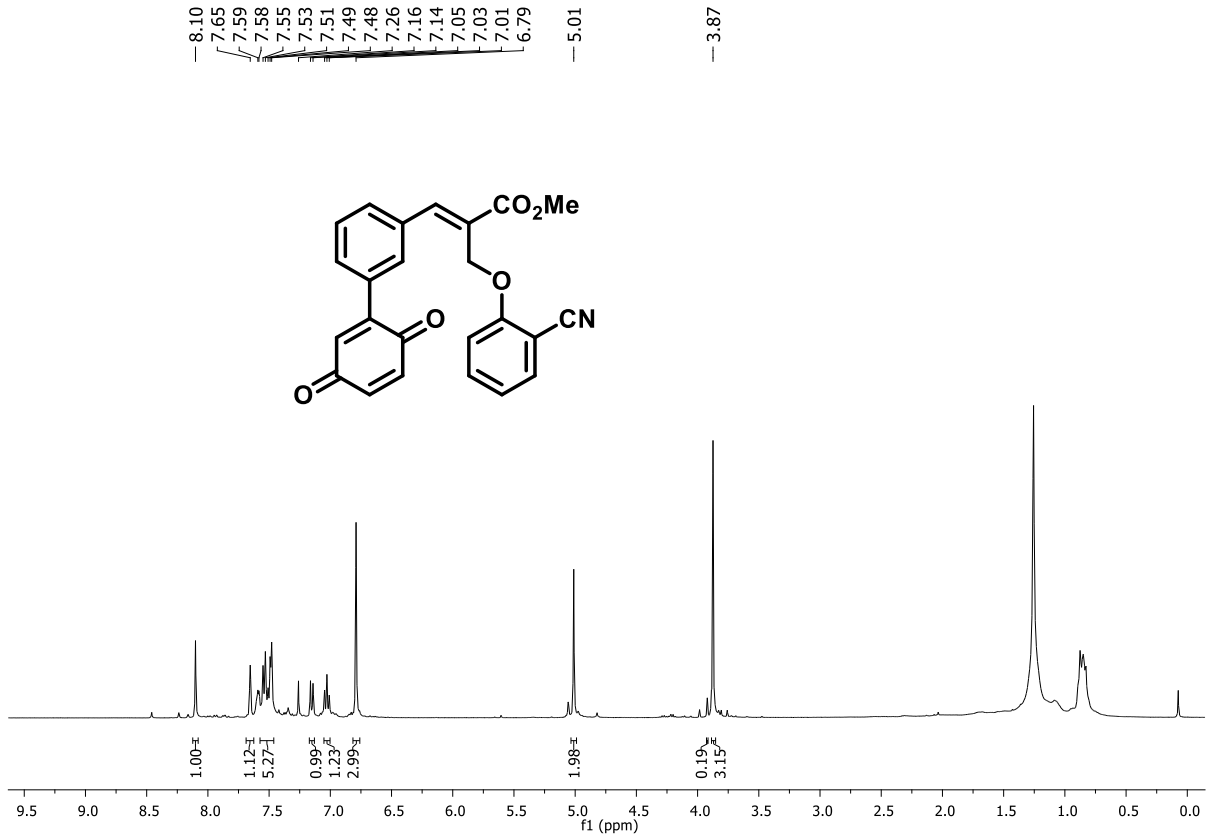


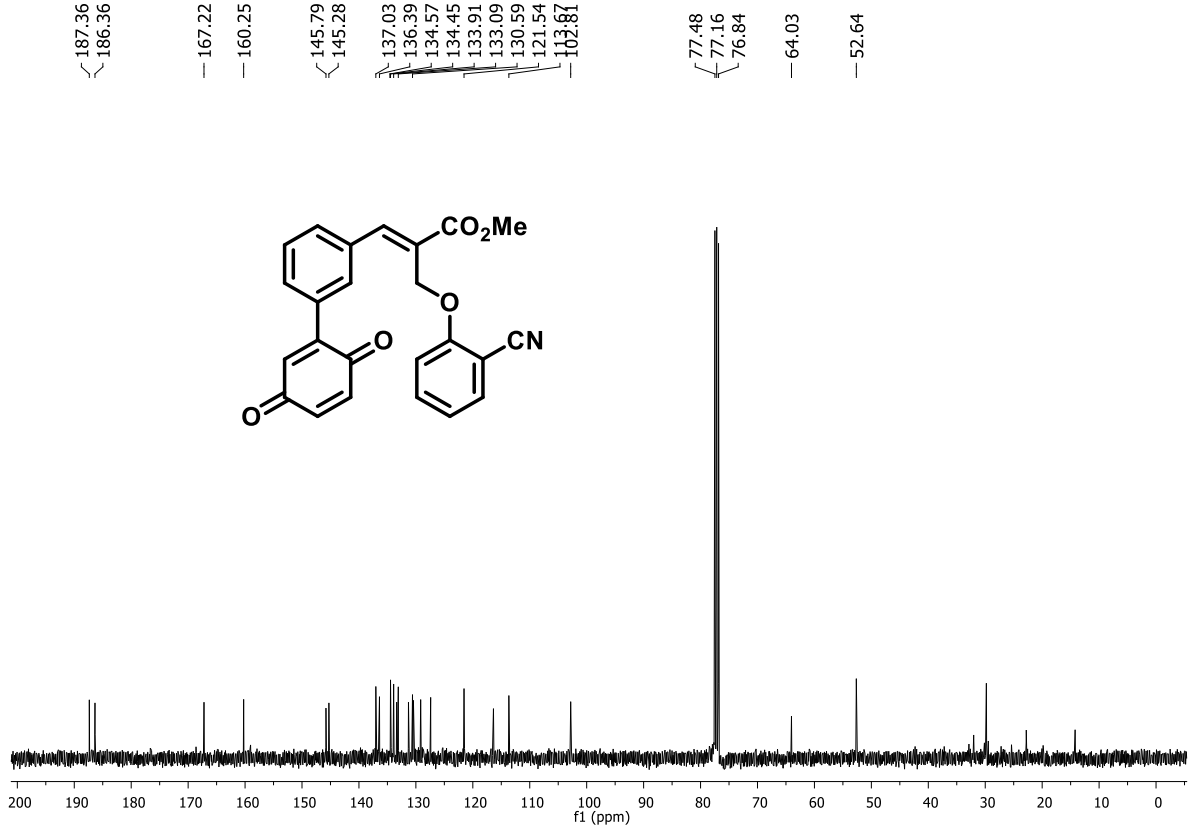


Ethyl (*E*)-3-(4-chloro-3-(1,4-dioxo-1,4-dihydronaphthalen-2-yl)phenyl)-2-((2-cyanophenoxy)methyl) acrylate (10l)

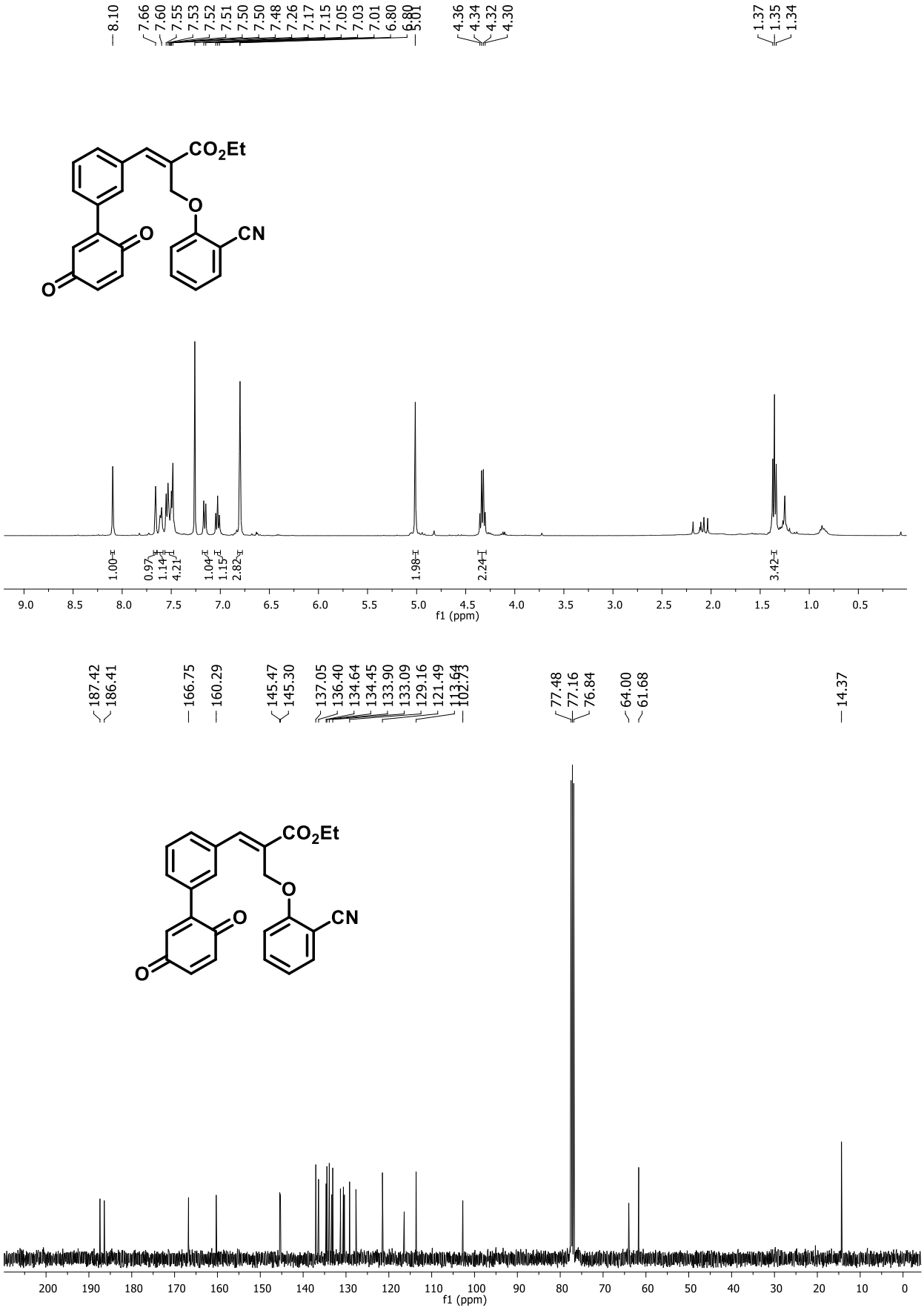


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10m)

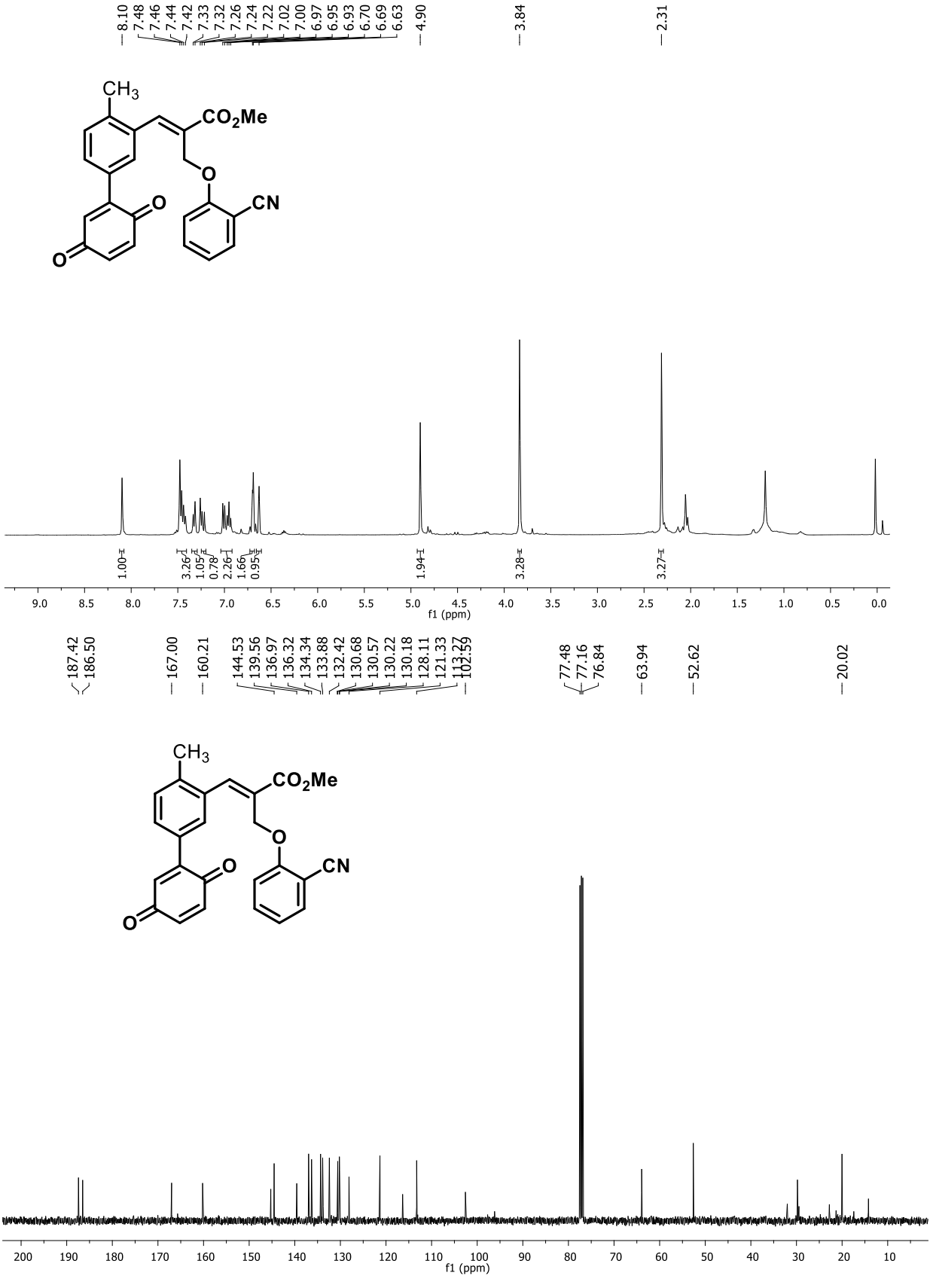




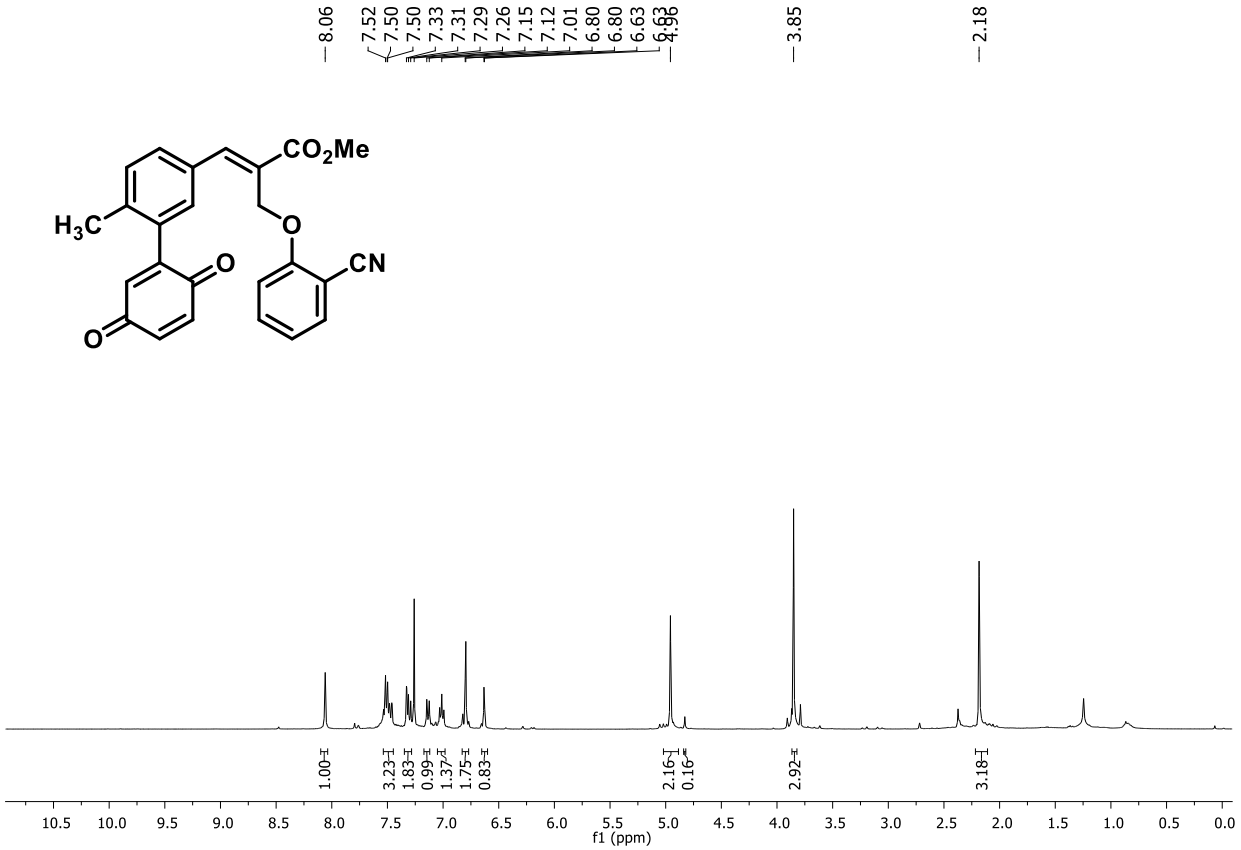
Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10n)

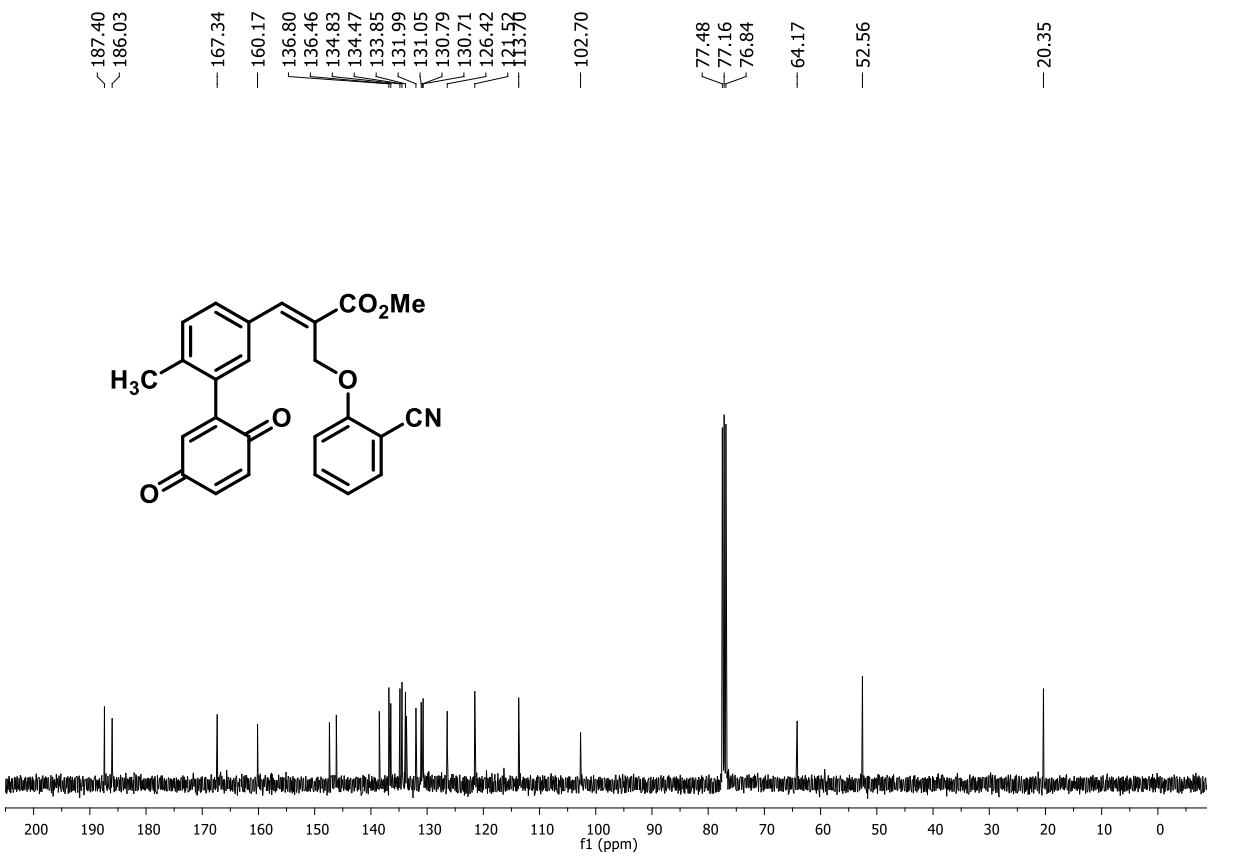


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10o)

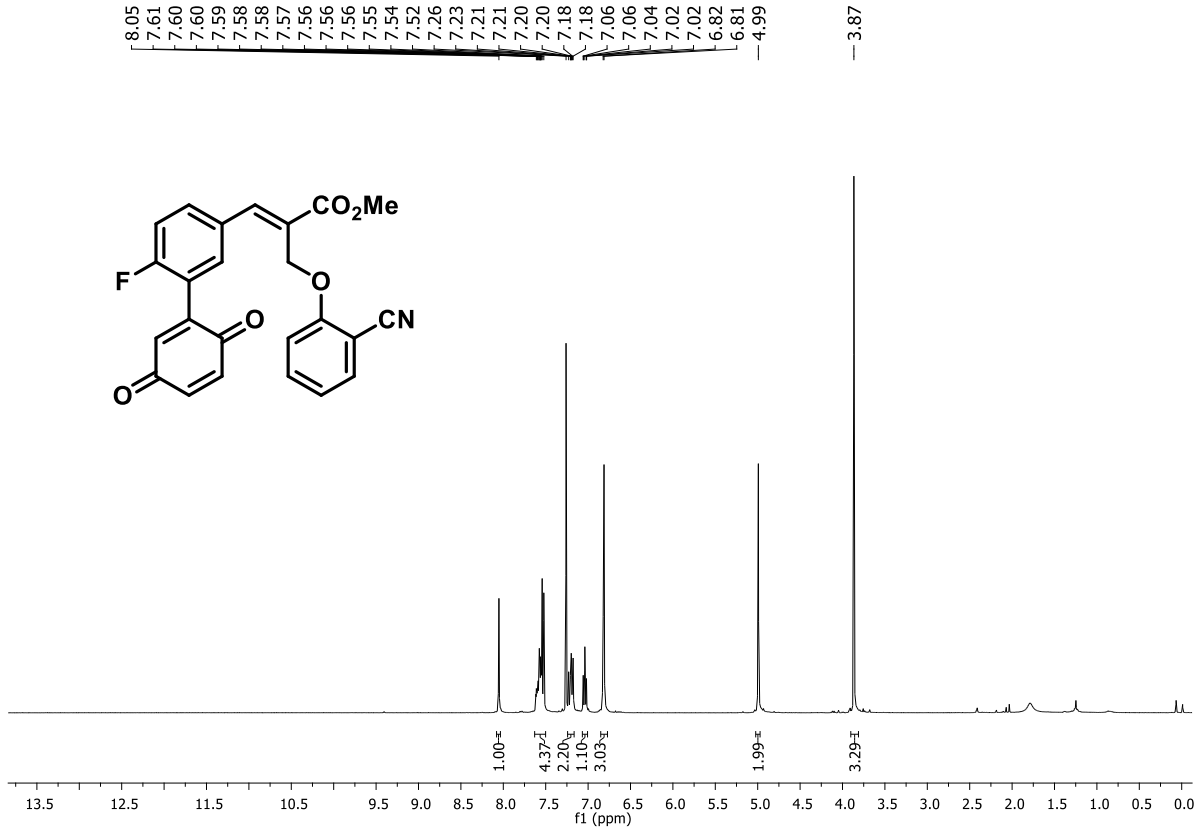


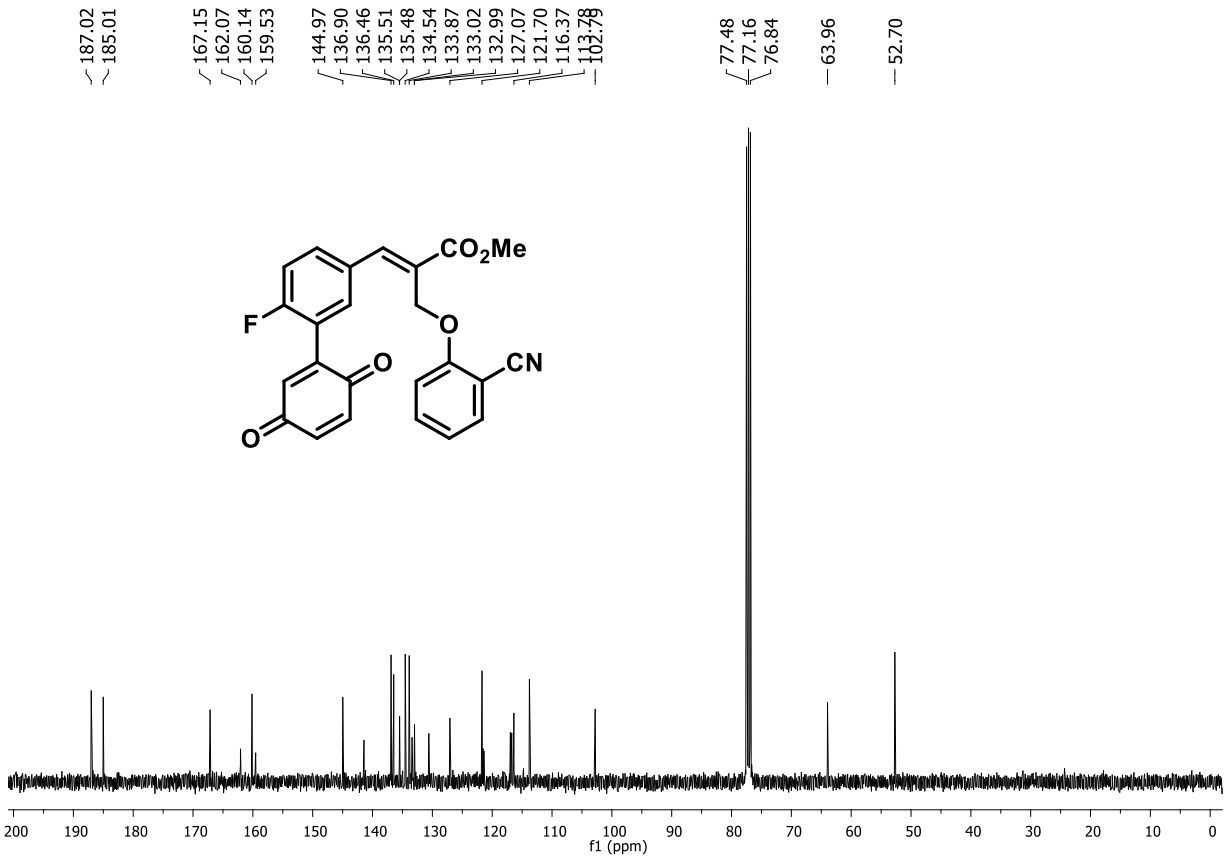
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(6-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10p)



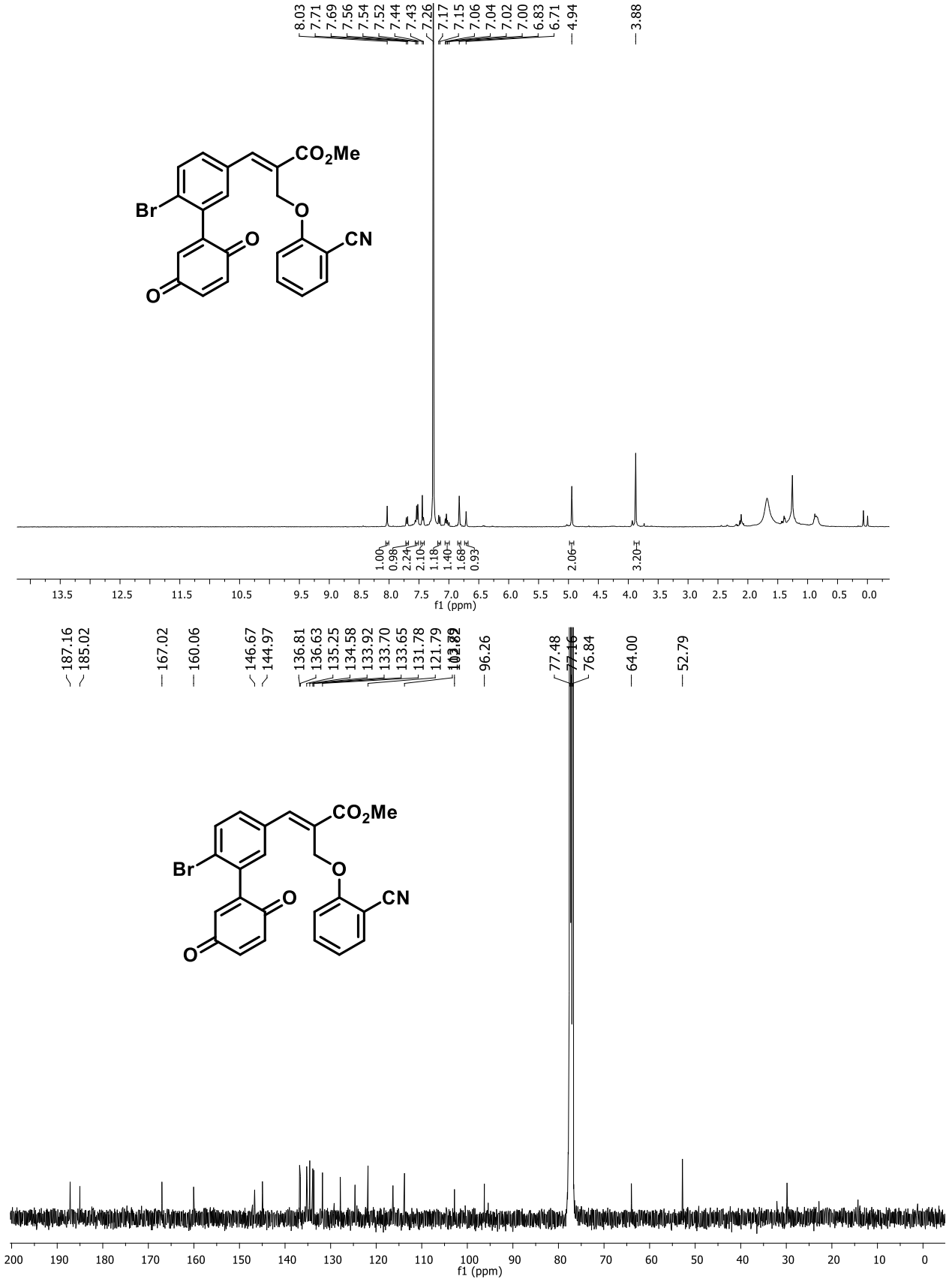


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(6-fluoro-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10q)

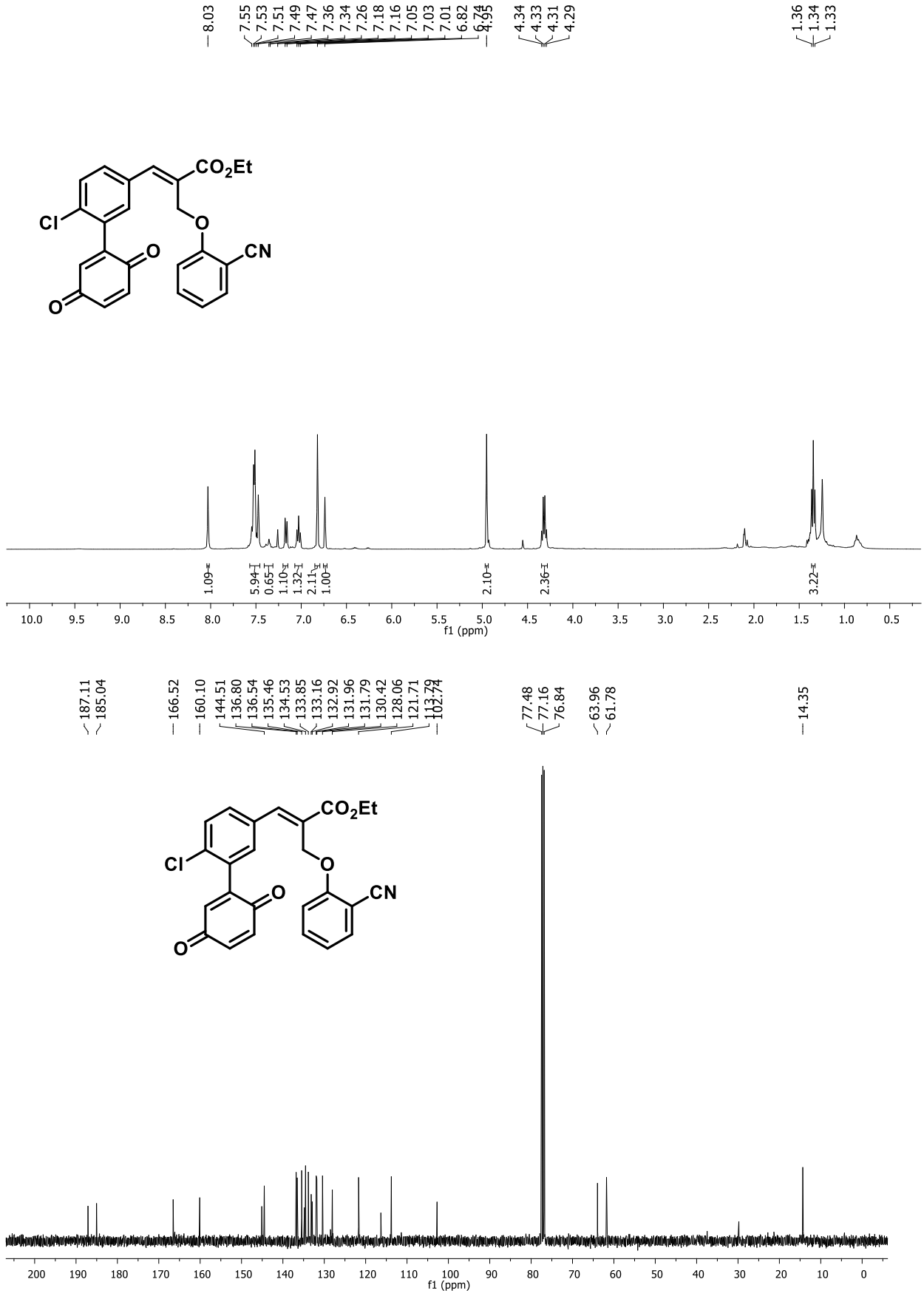




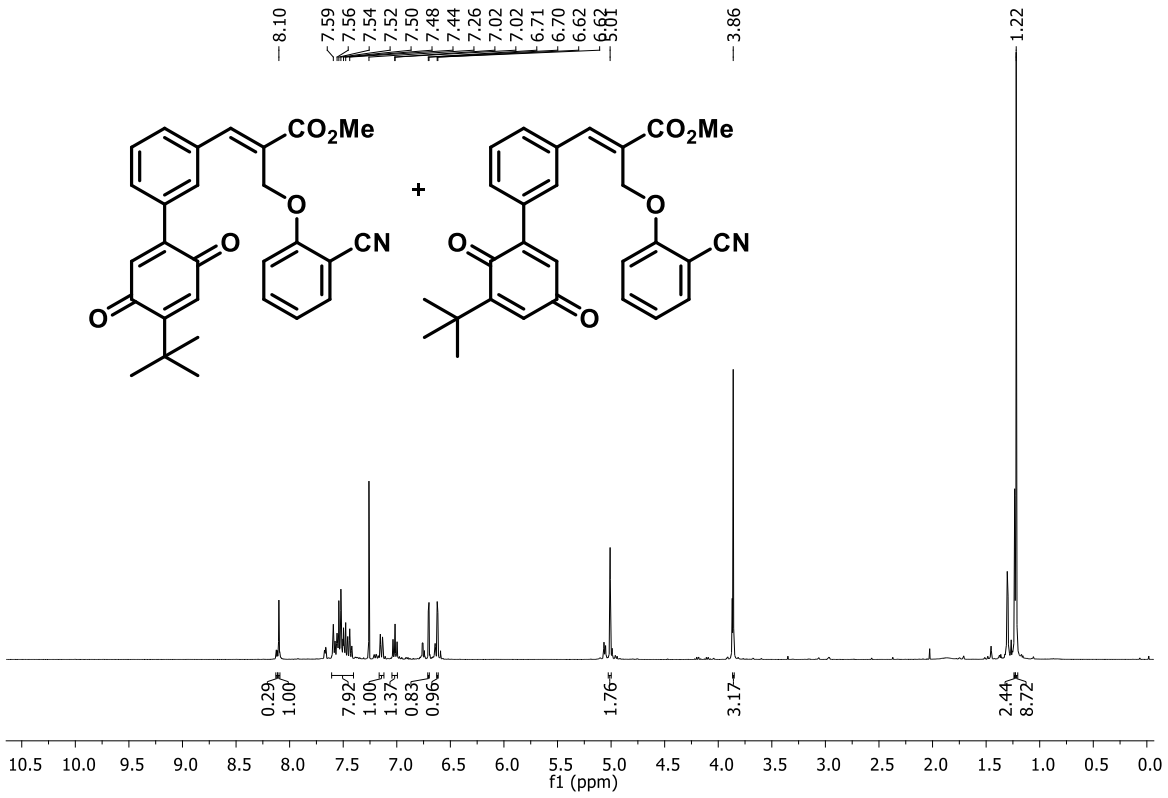
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(6-bromo-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)acrylate (10r)

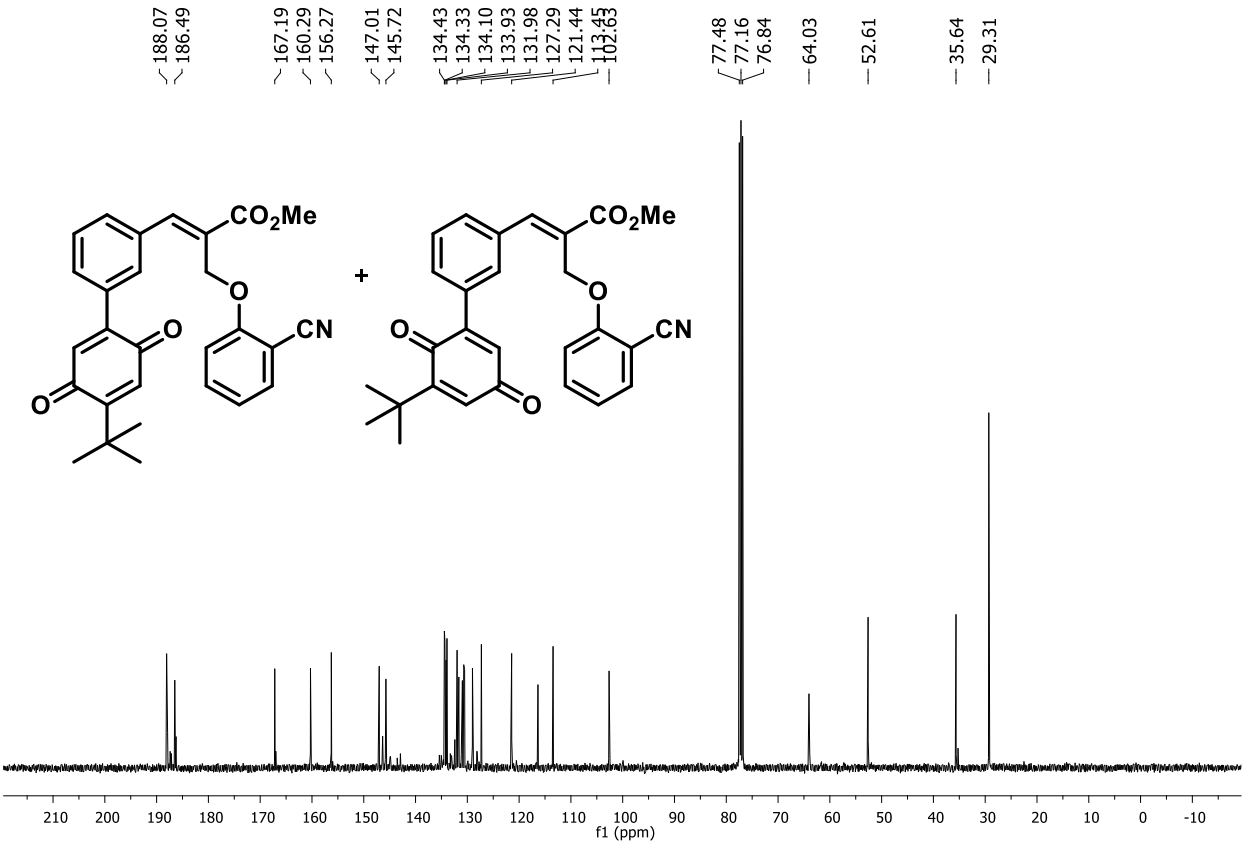


Ethyl (*E*)-3-(6-chloro-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)-2-((2-cyanophenoxy)methyl)acrylate (10s)

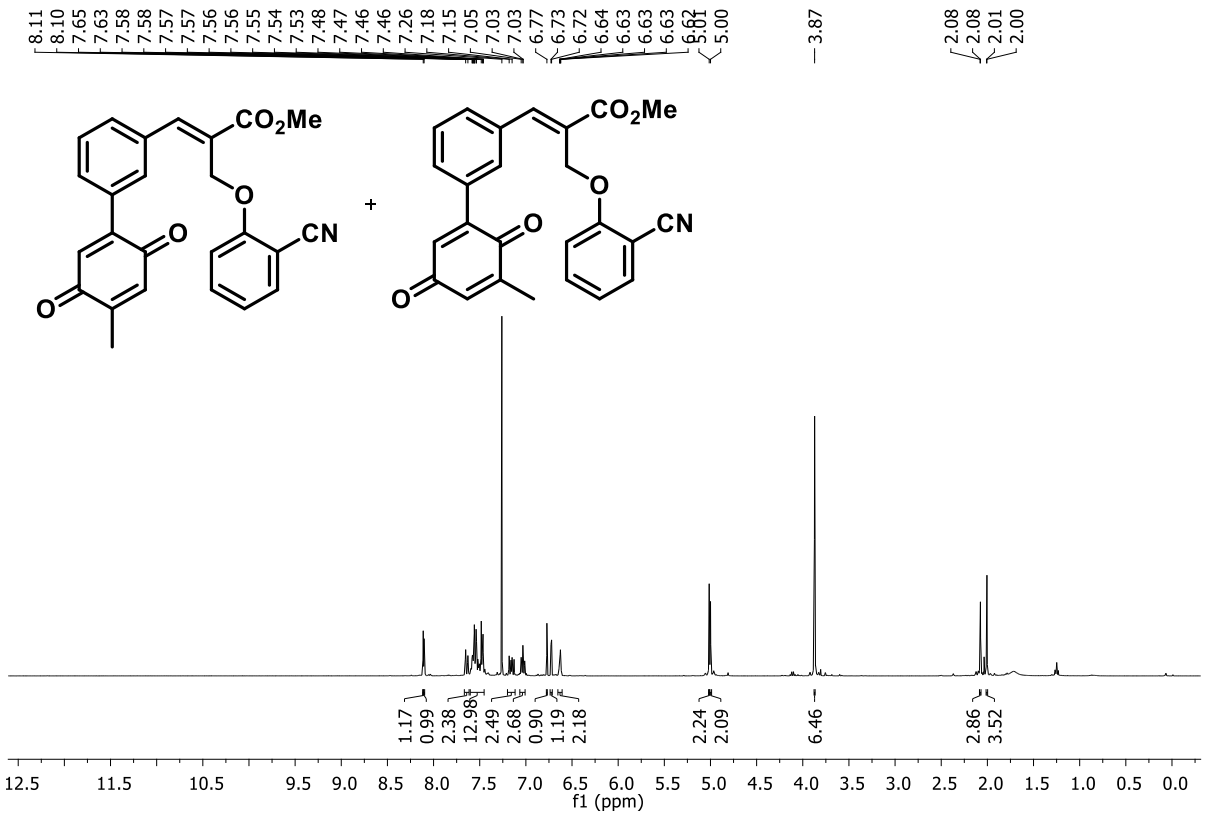


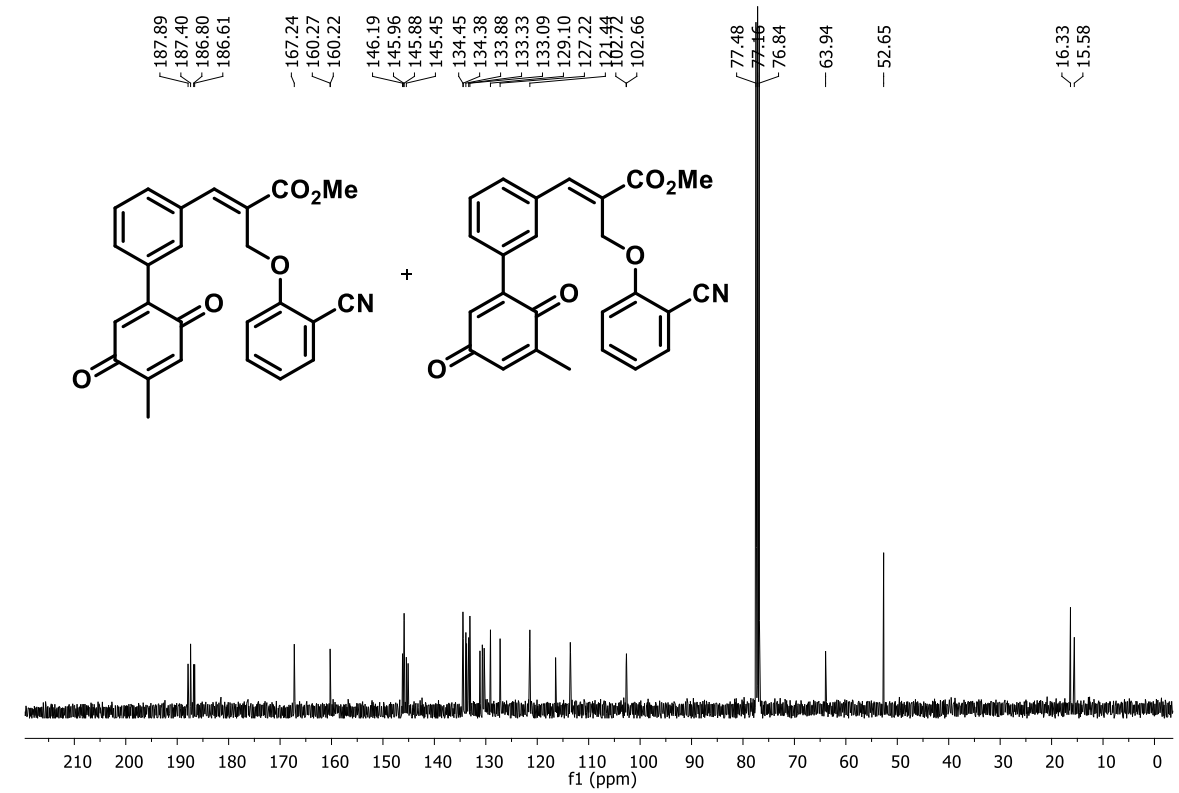
Methyl (*E*)-3-(4'-(tert-butyl)-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)-2-((2-cyanophenoxy)methyl) acrylate (10t) (78:22)



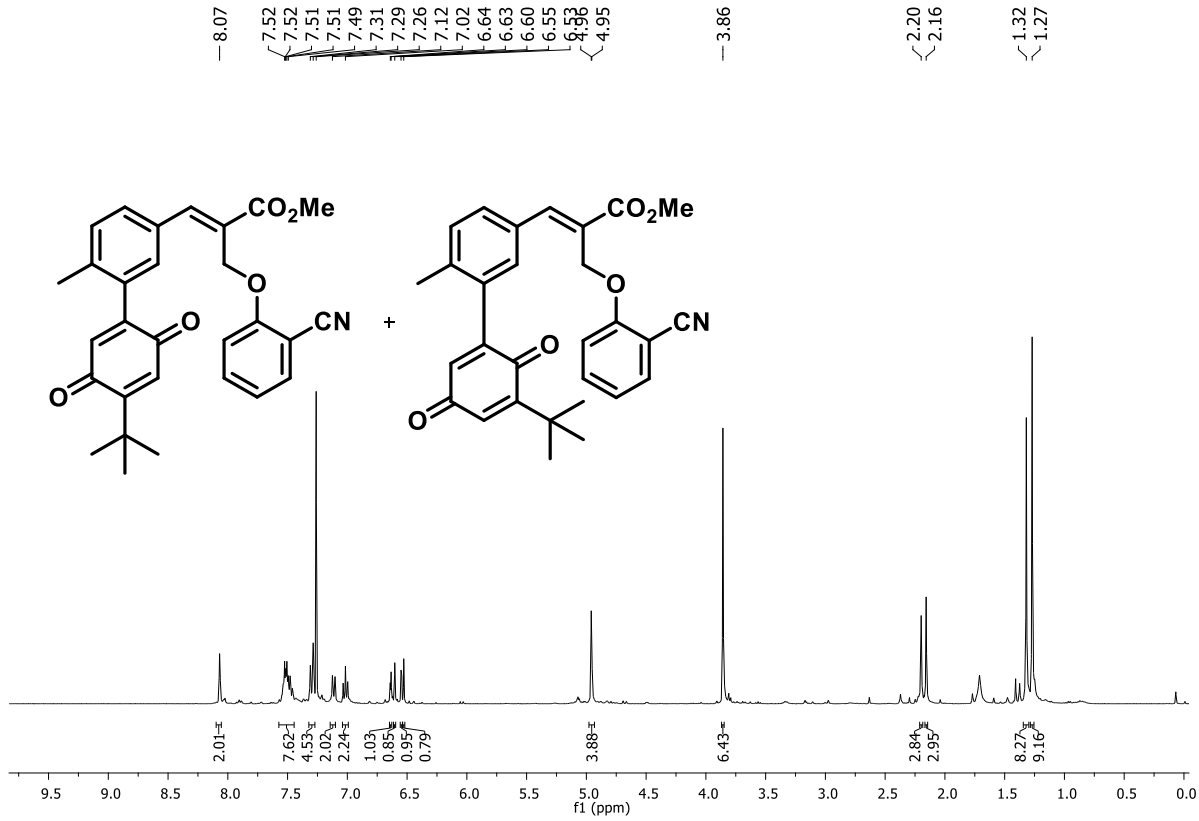


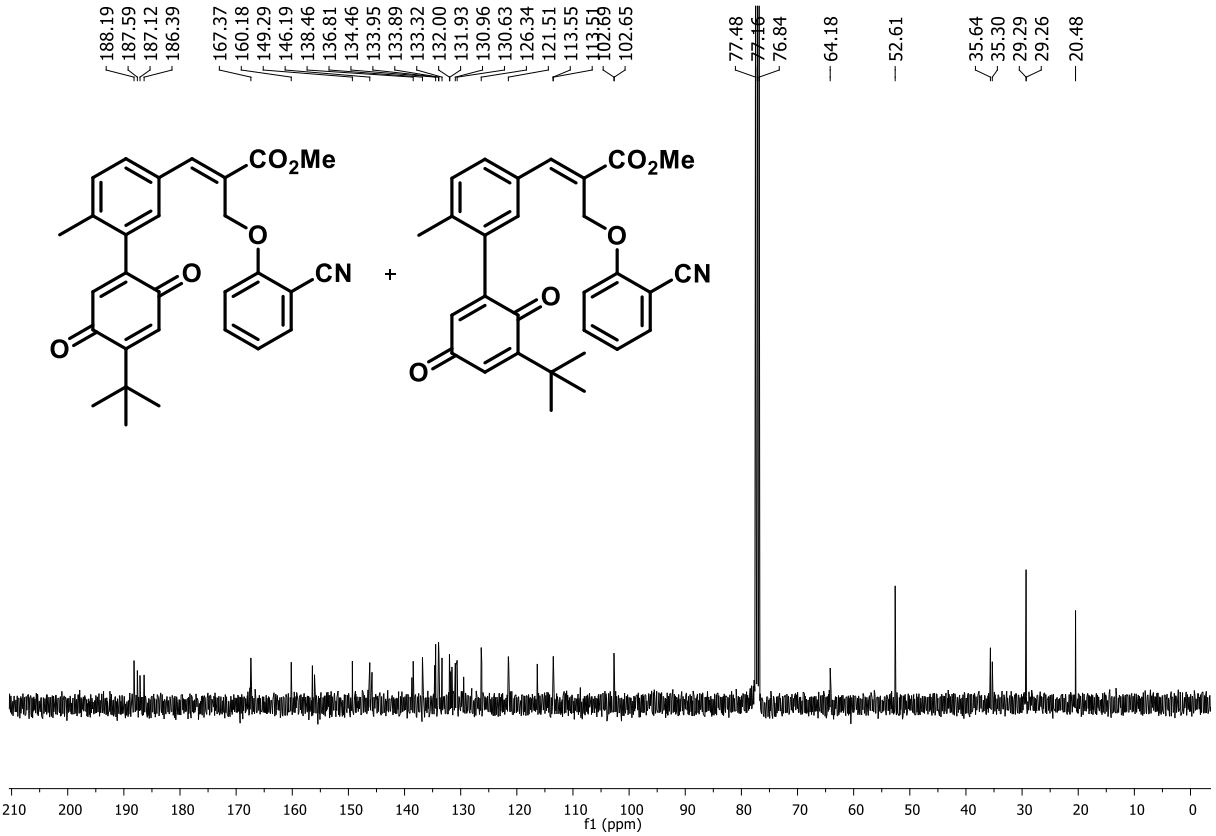
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3'-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl) acrylate (10u) (54:46)



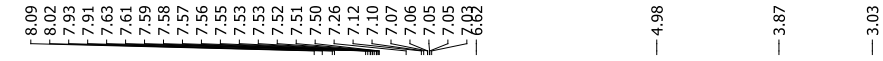


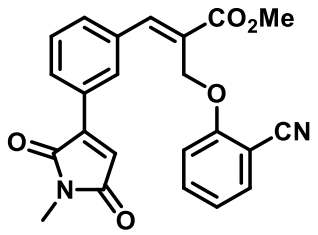
Methyl (*E*)-3-(3'-(tert-butyl)-6-methyl-2',5'-dioxo-2',5'-dihydro-[1,1'-biphenyl]-3-yl)-2-((2-cyanophenoxy) methyl)acrylate (10v) (51:49)

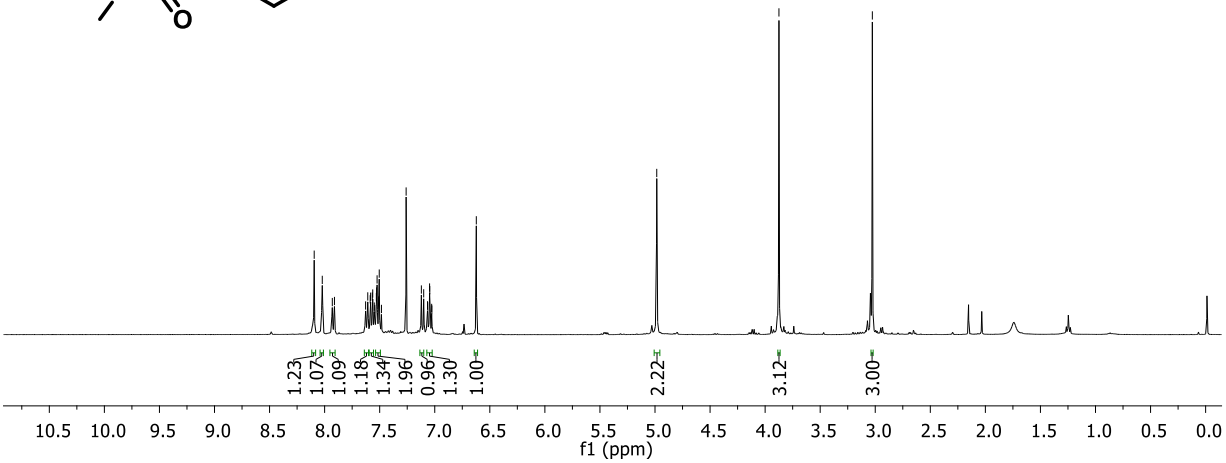


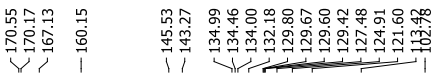


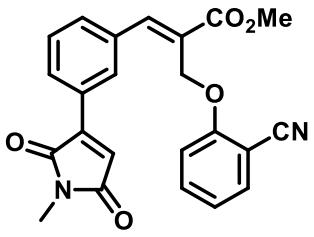
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl) acrylate (12a)



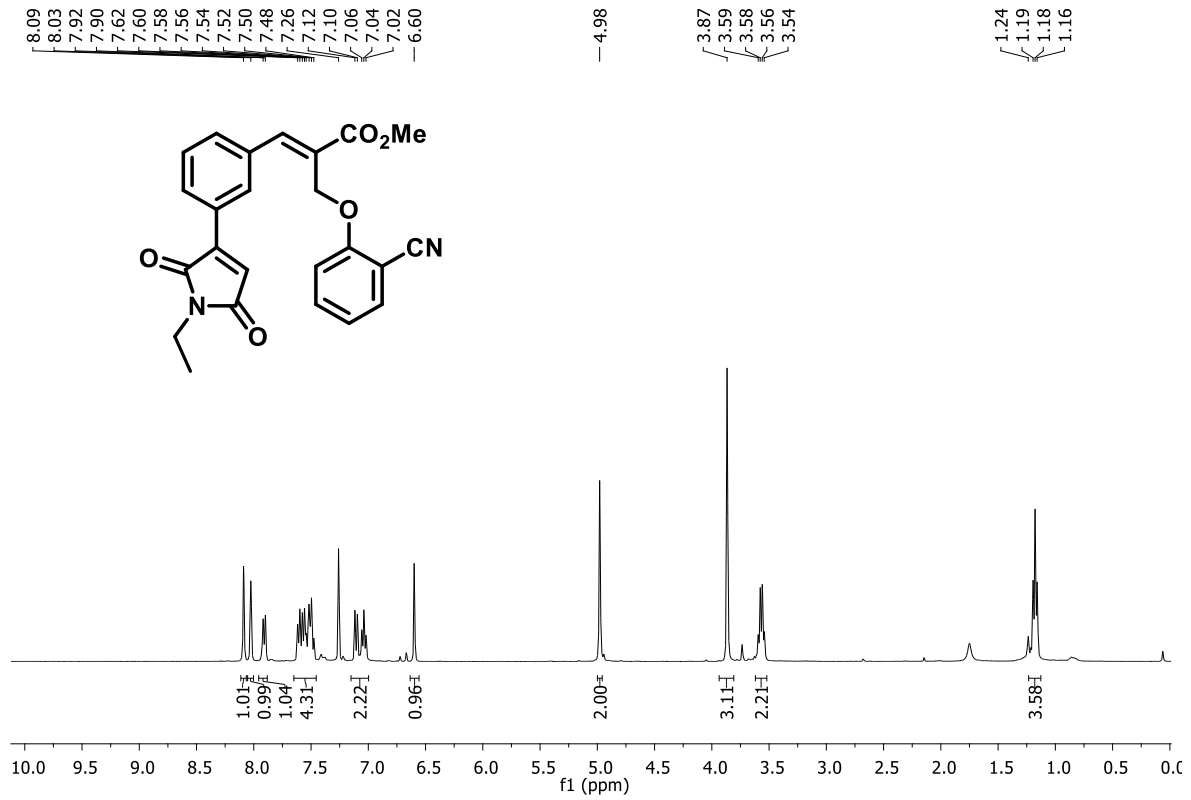


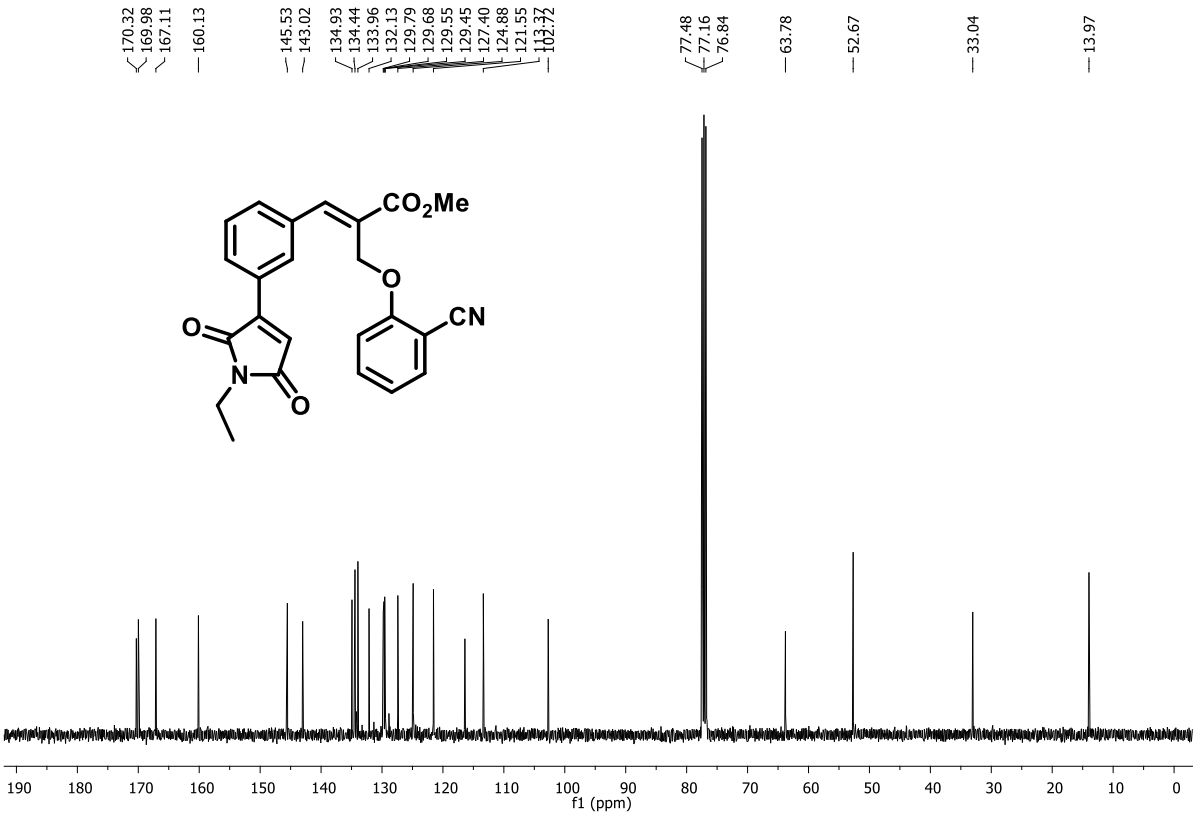




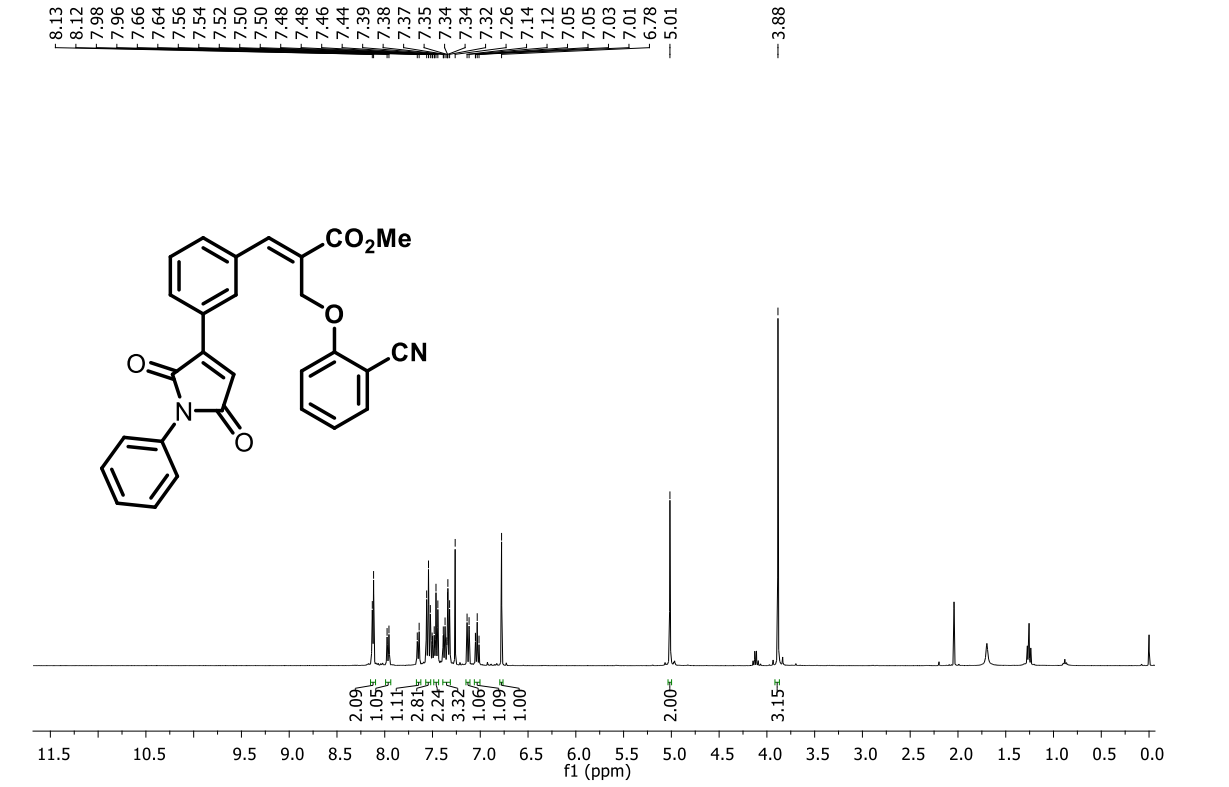


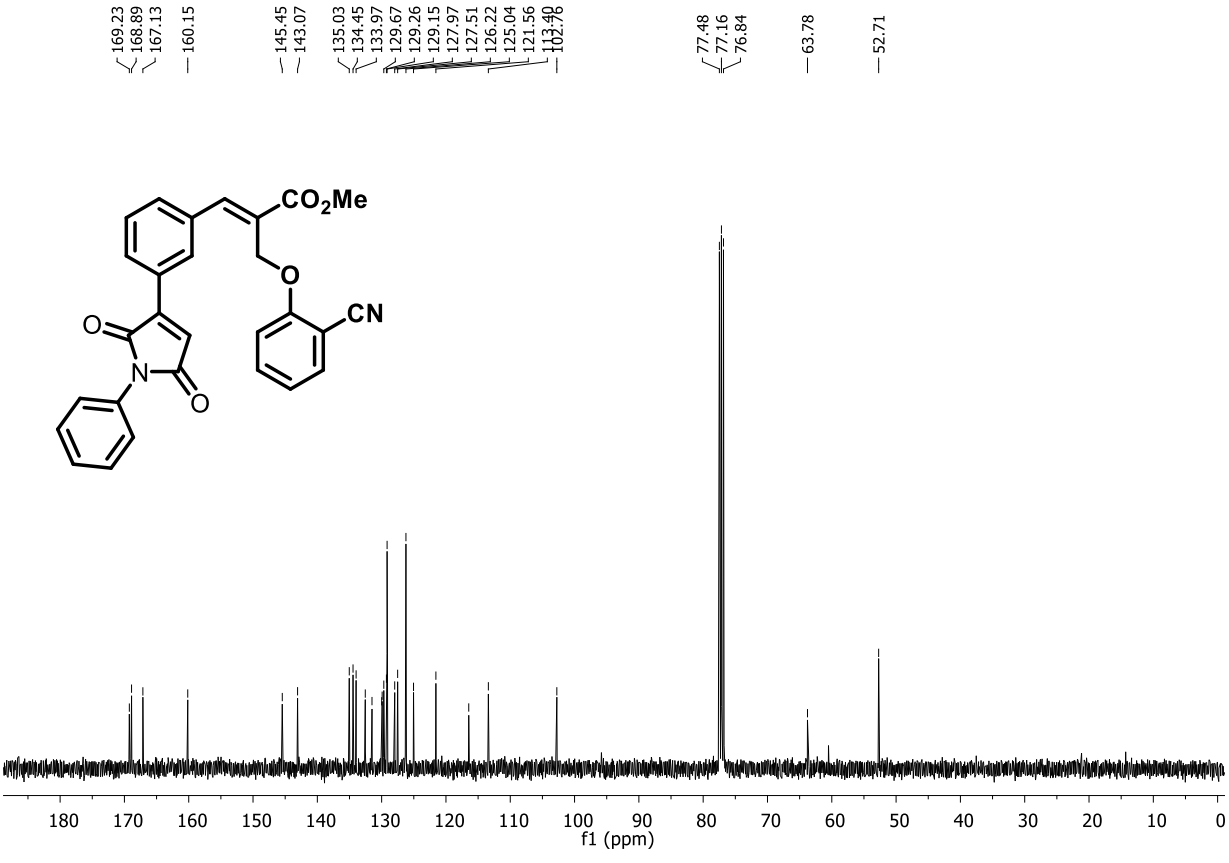
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-ethyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl) acrylate (12b)



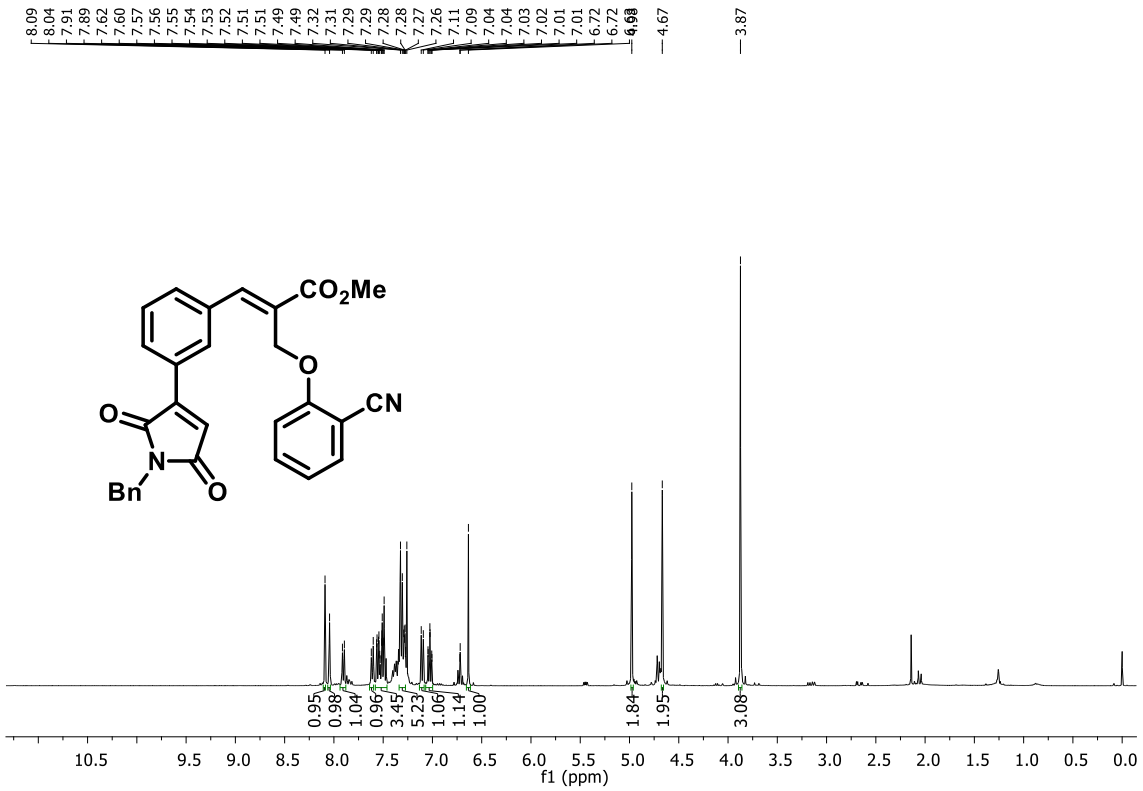


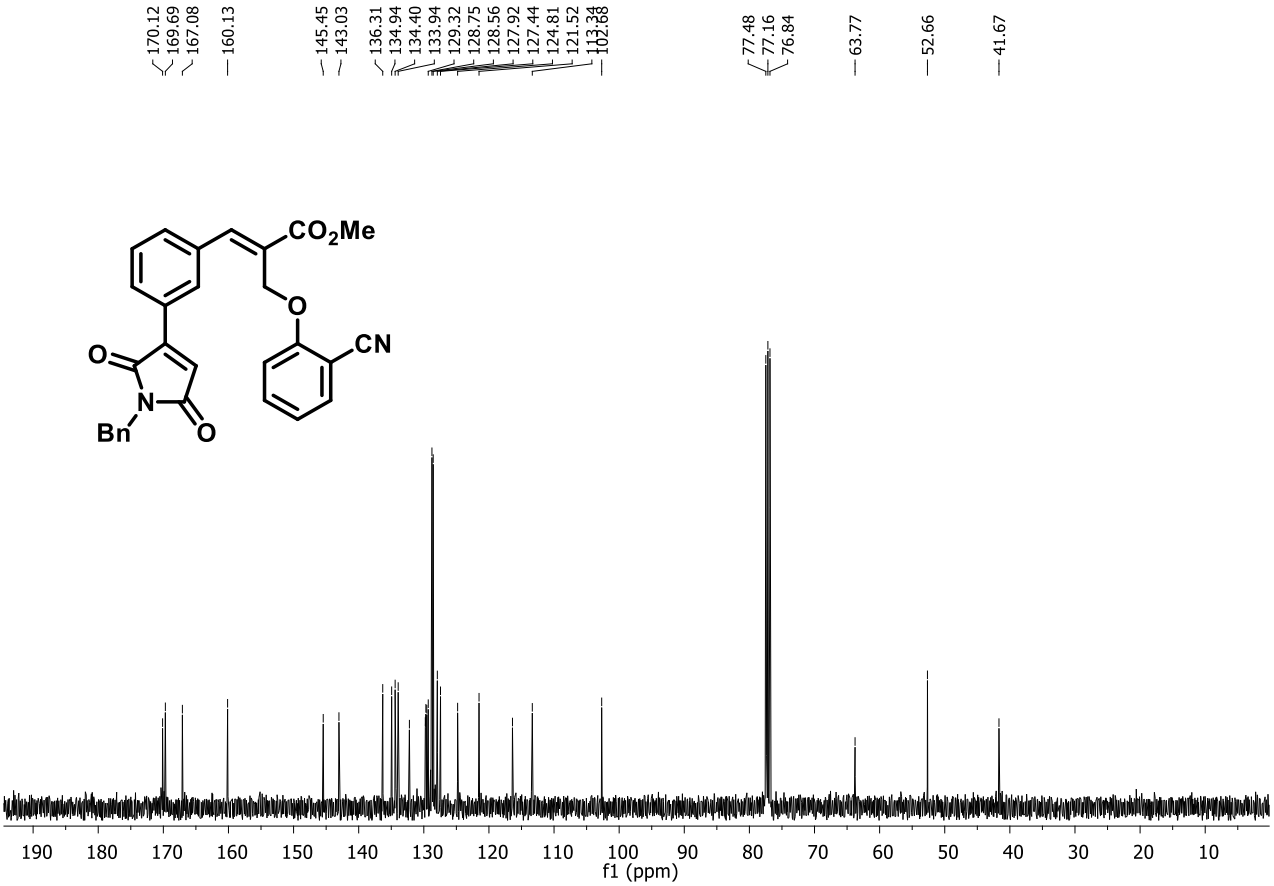
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(2,5-dioxo-1-phenyl-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12c)



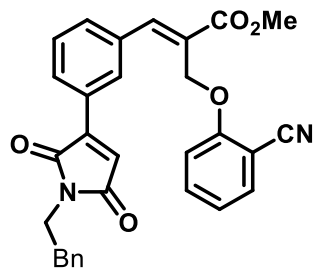


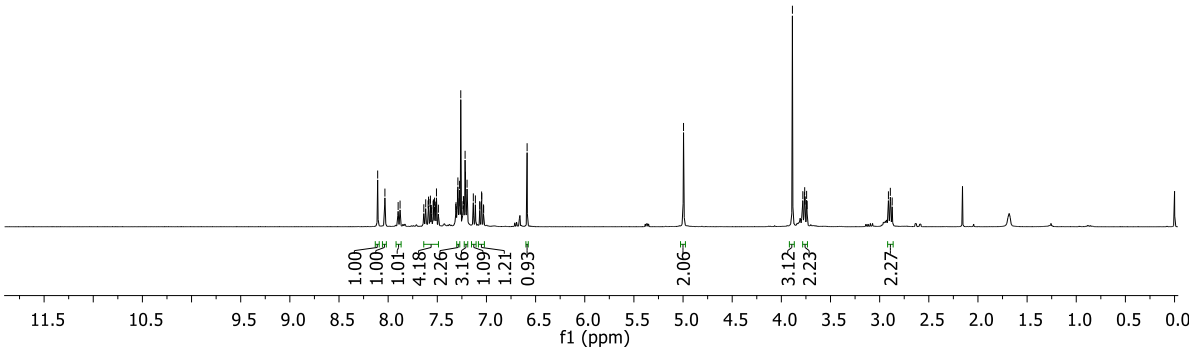
Methyl (*E*)-3-(3-(1-benzyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (12d)

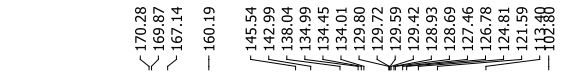


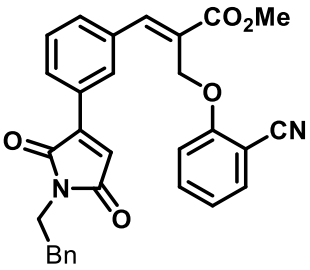


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(2,5-dioxo-1-phenethyl-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12e)

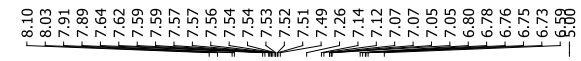


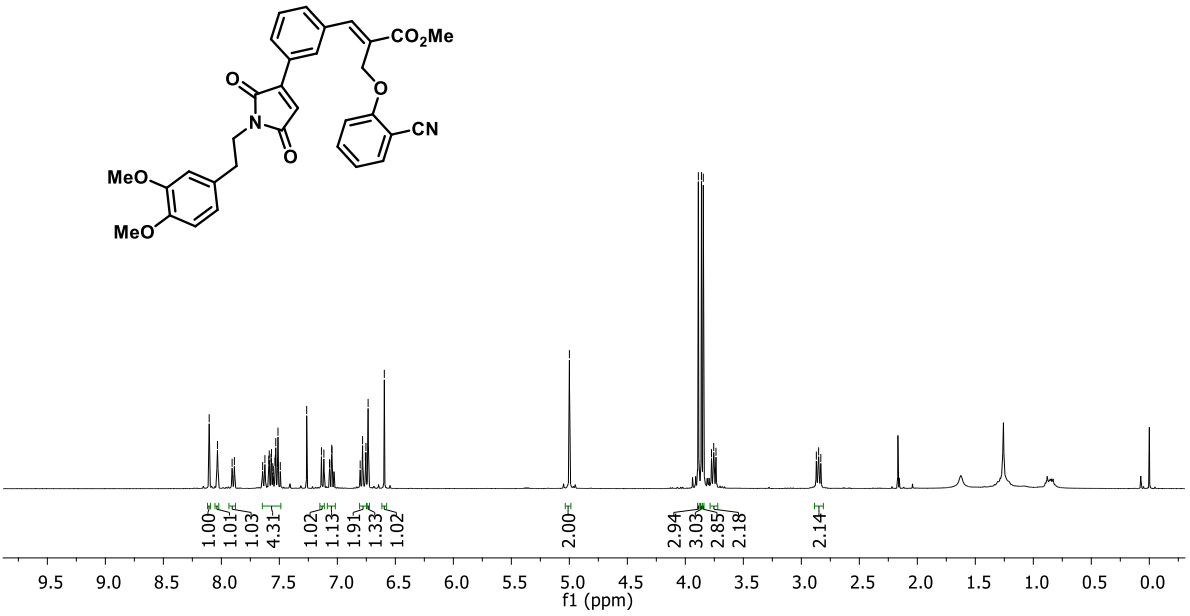


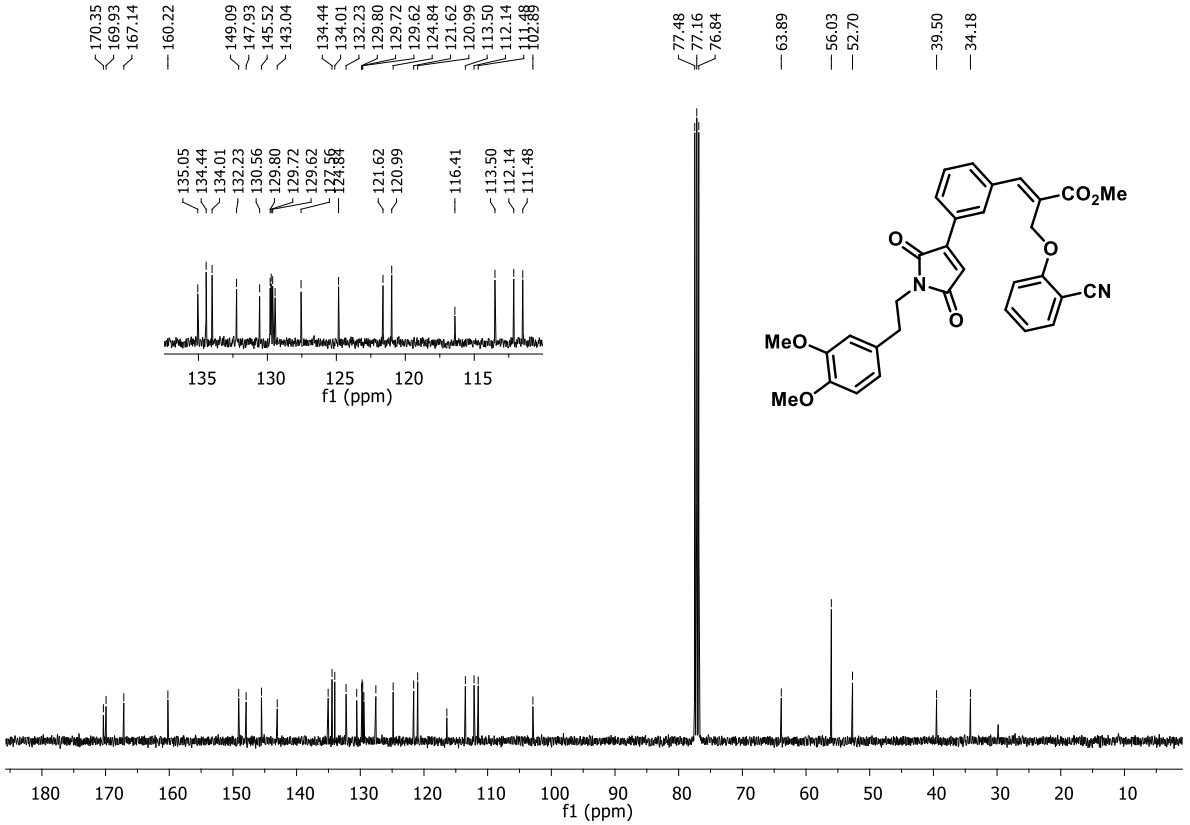




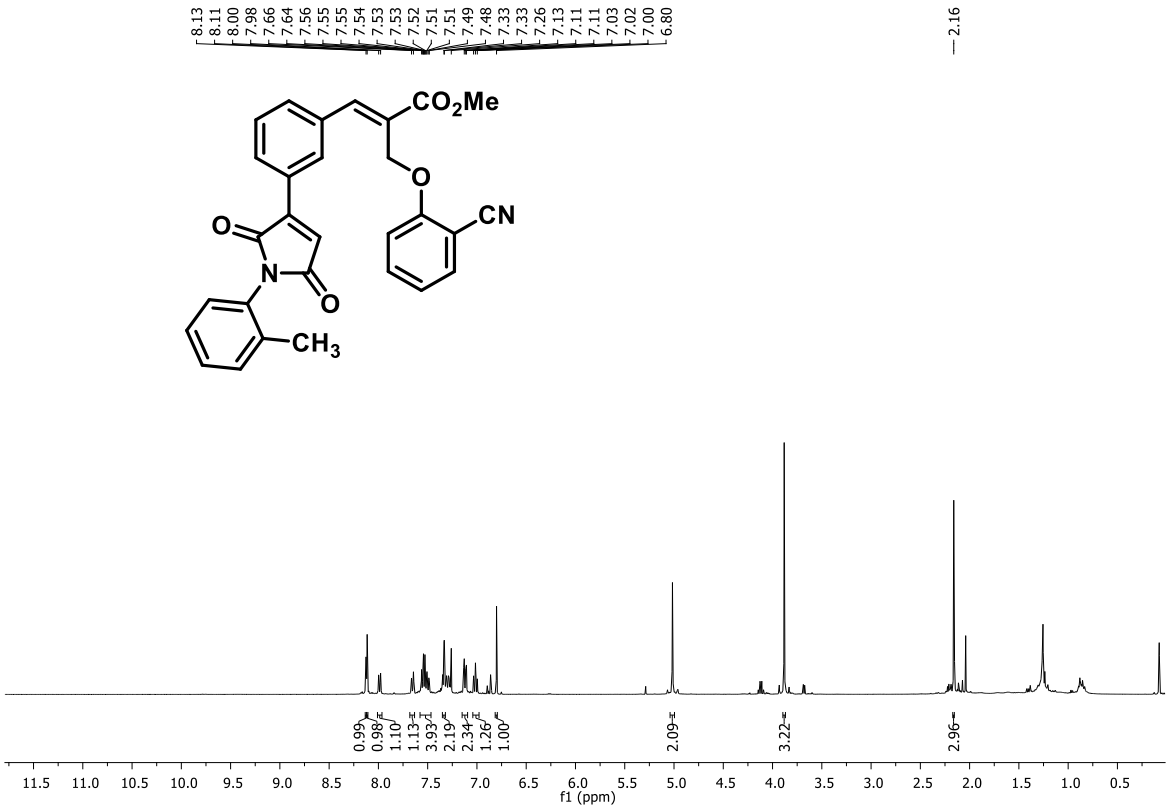
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-(3,4-dimethoxyphenethyl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl) phenyl) acrylate (12f)

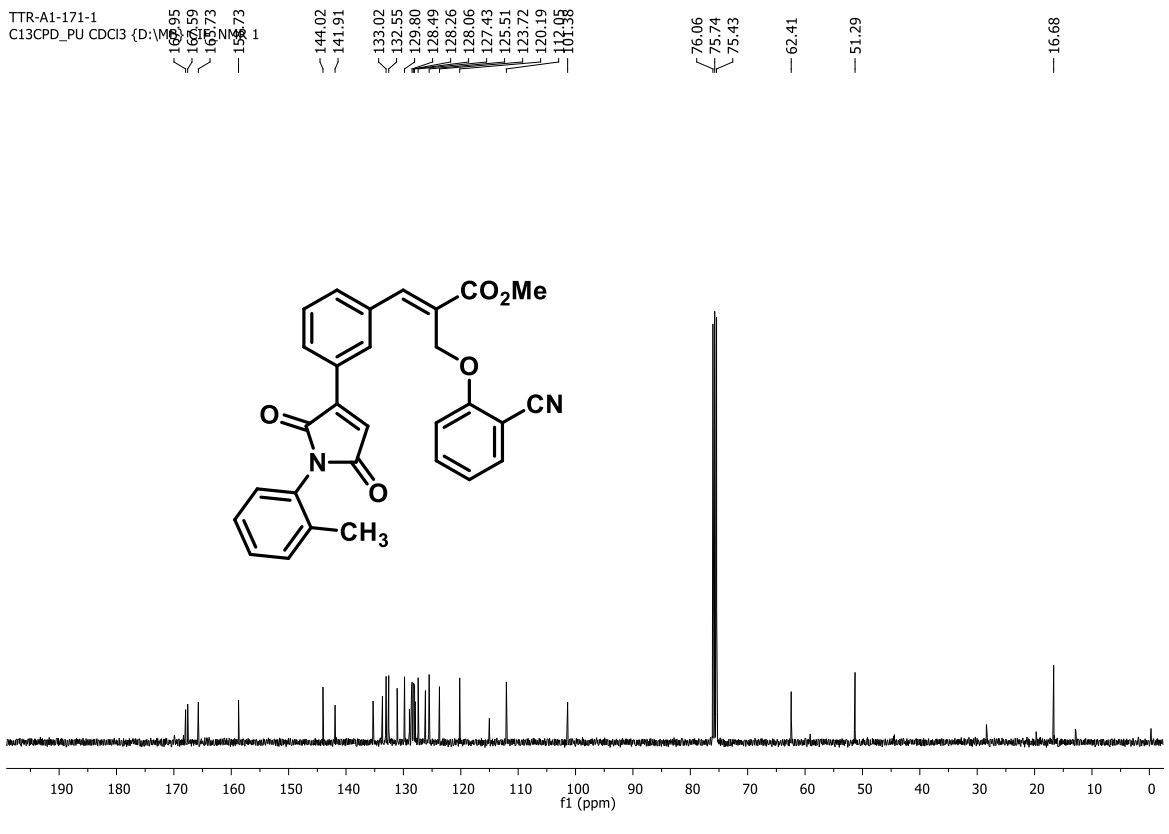




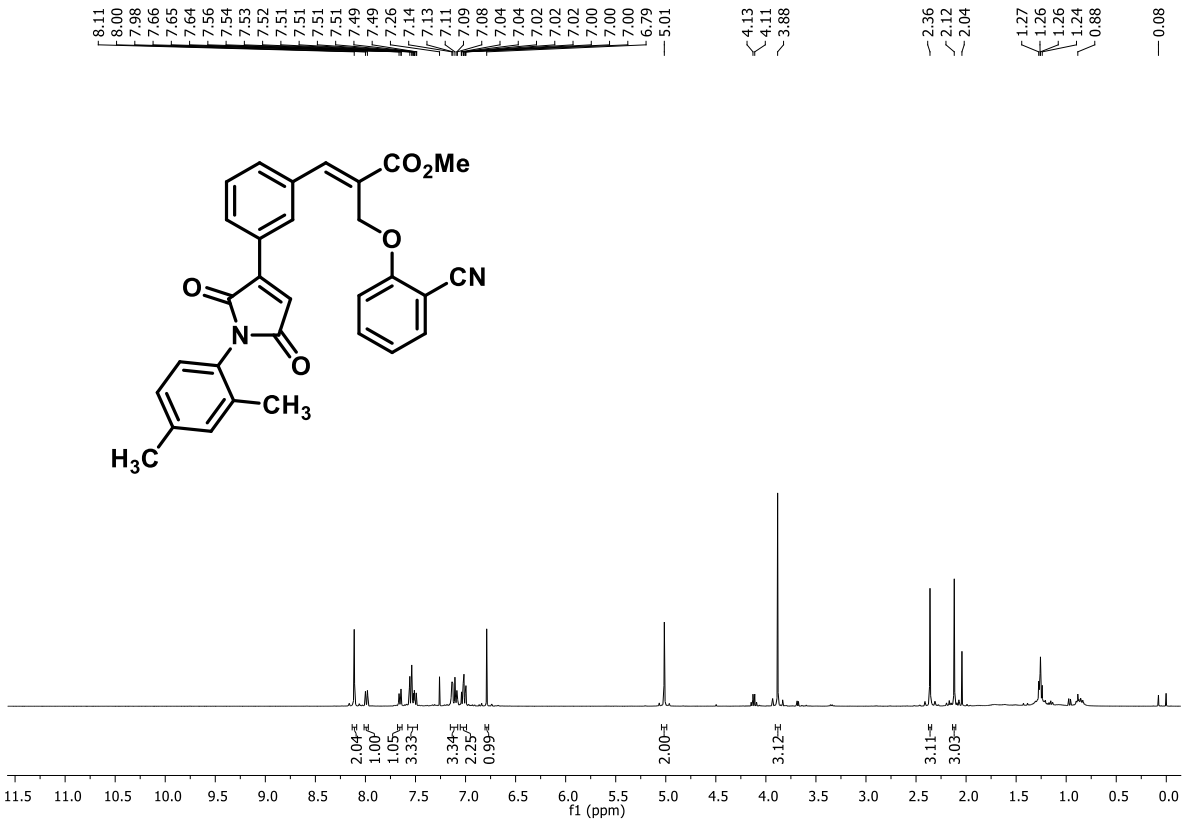


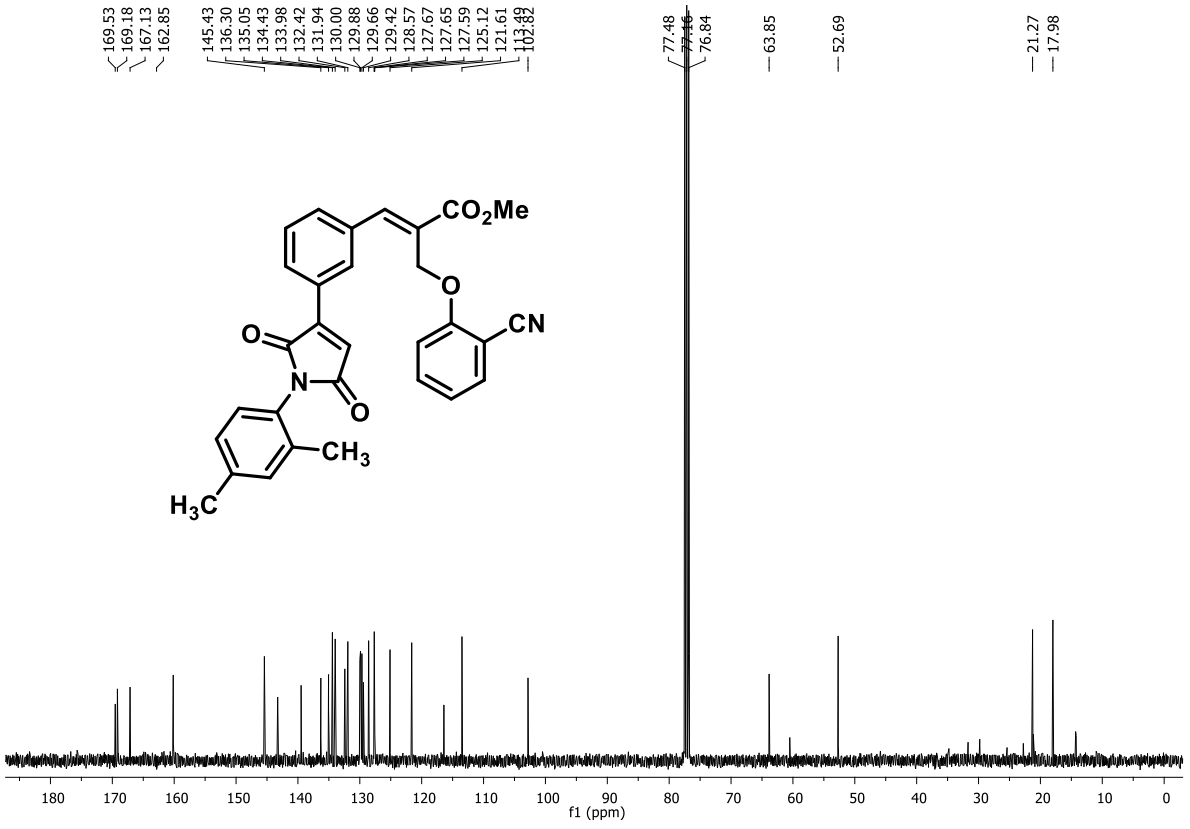
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(2,5-dioxo-1-(o-tolyl)-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12g)



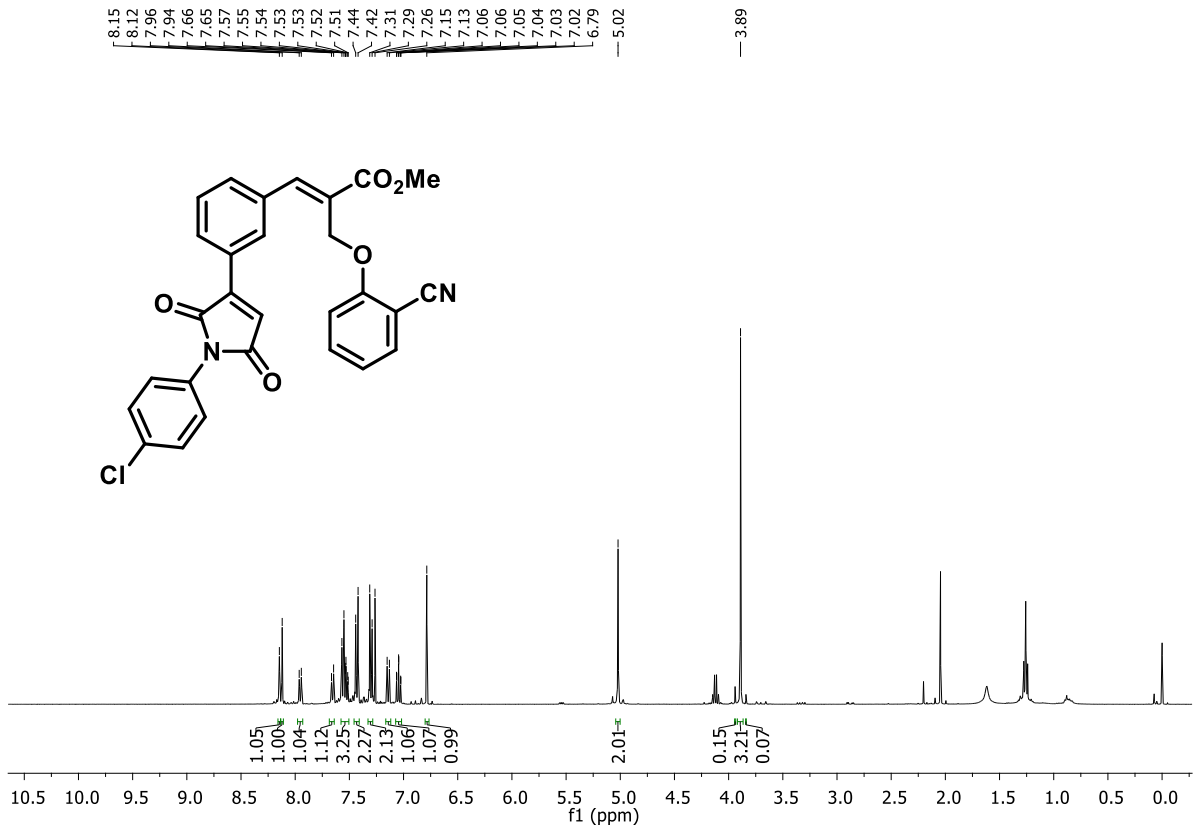


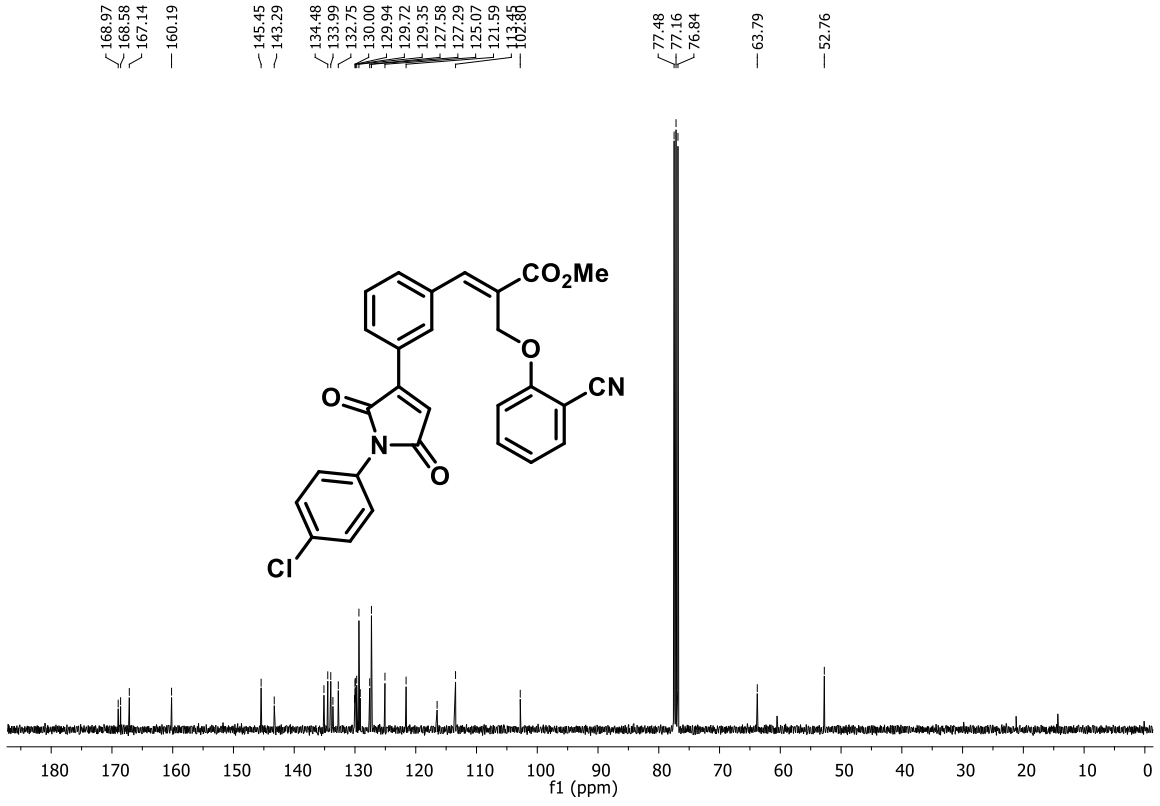
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-(2,4-dimethylphenyl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12h)



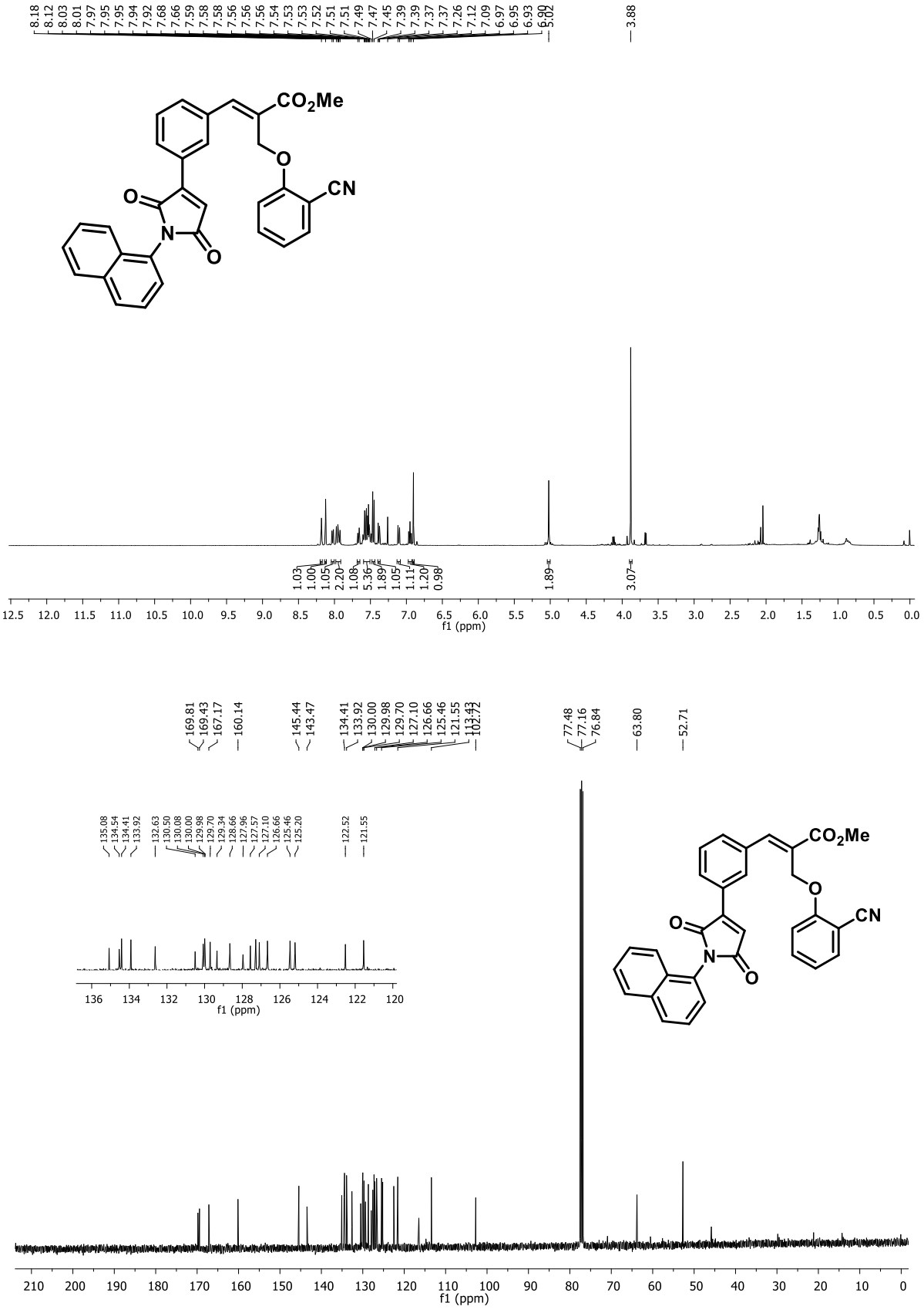


Methyl (*E*)-3-(3-(1-(4-chlorophenyl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)-2-((2-cyanophenoxy)methyl)acrylate (12i)

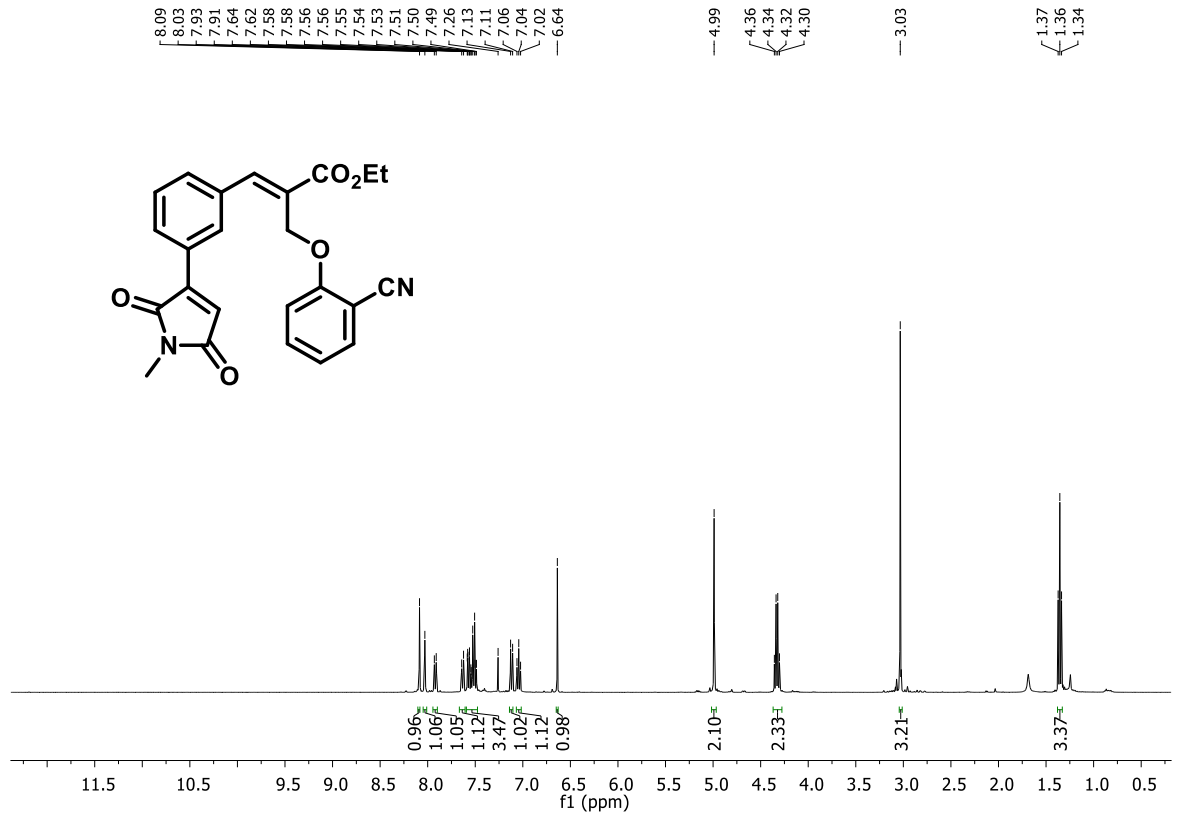


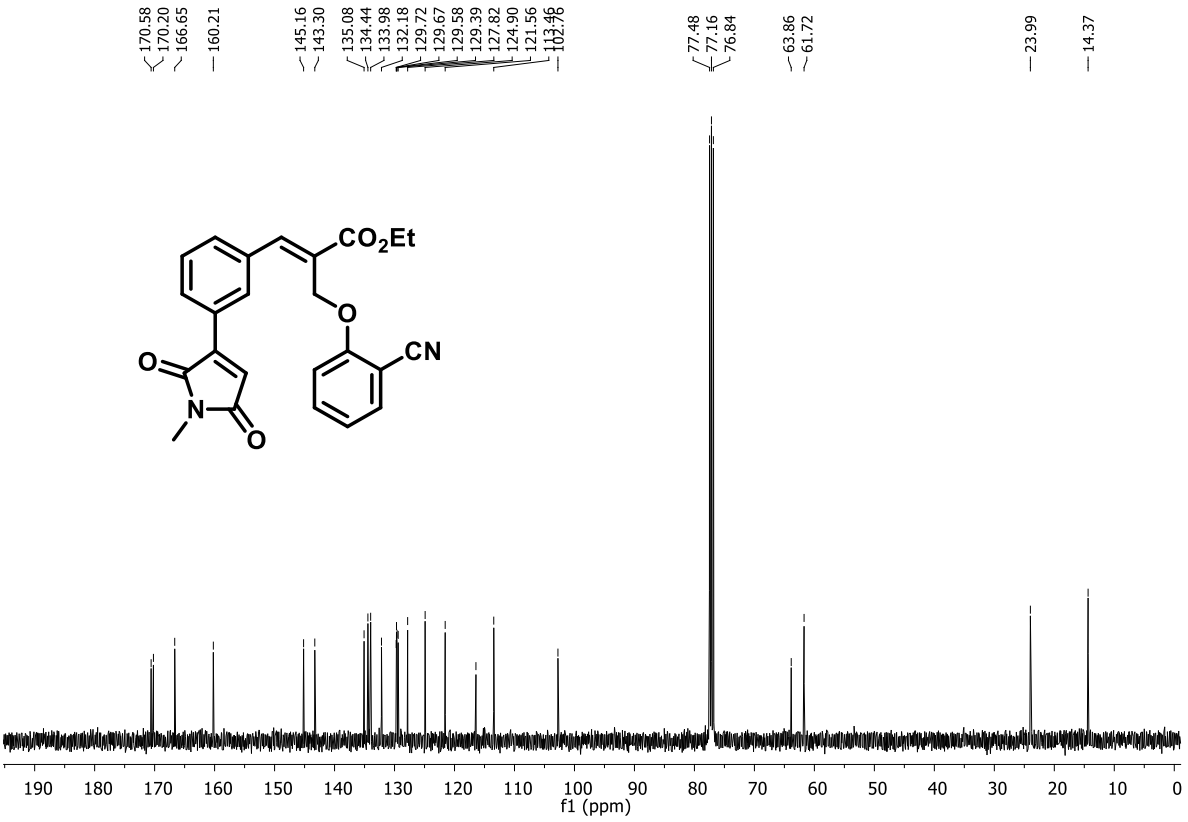


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-(naphthalen-1-yl)-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12j)

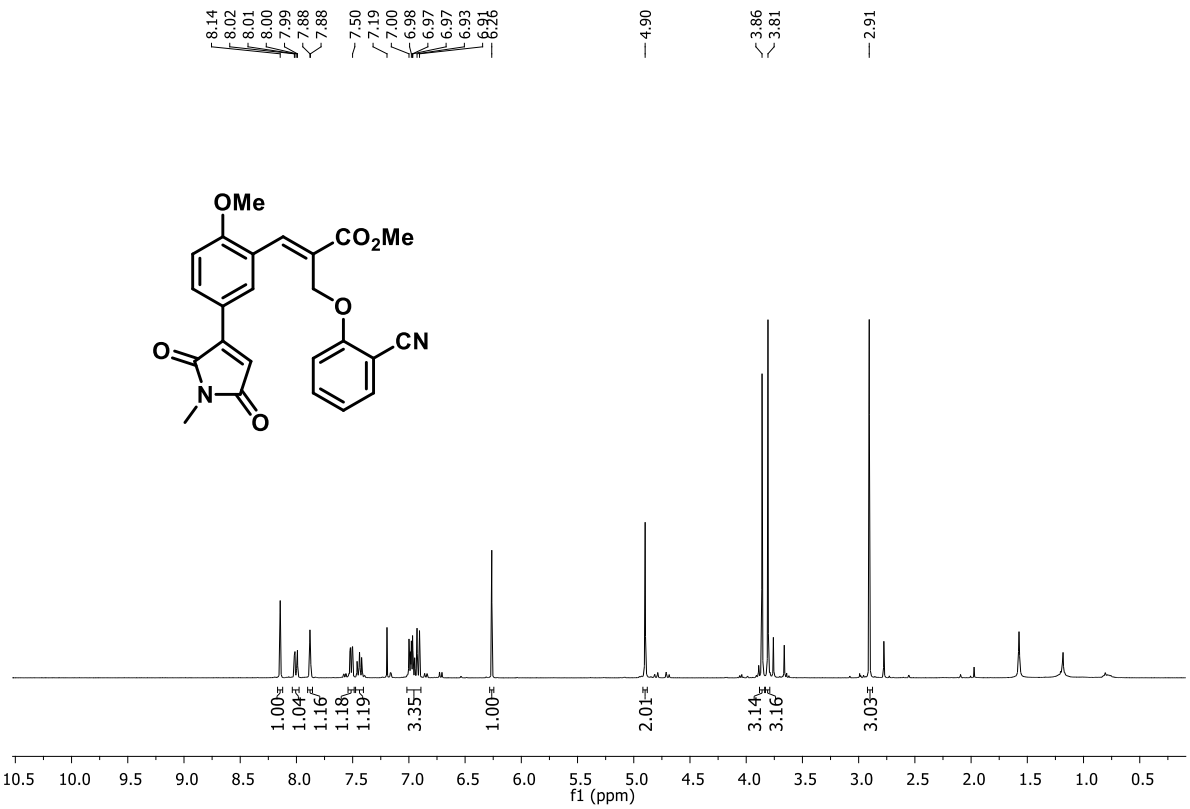


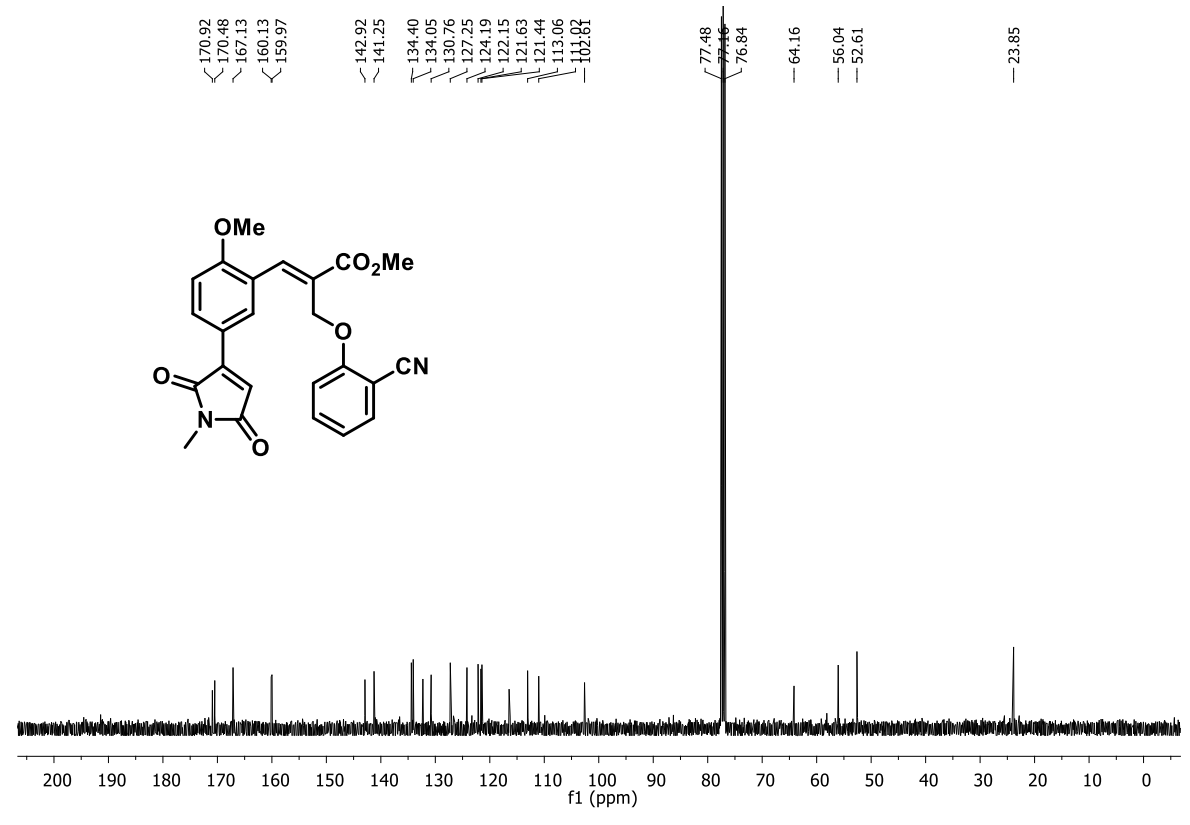
Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12k)



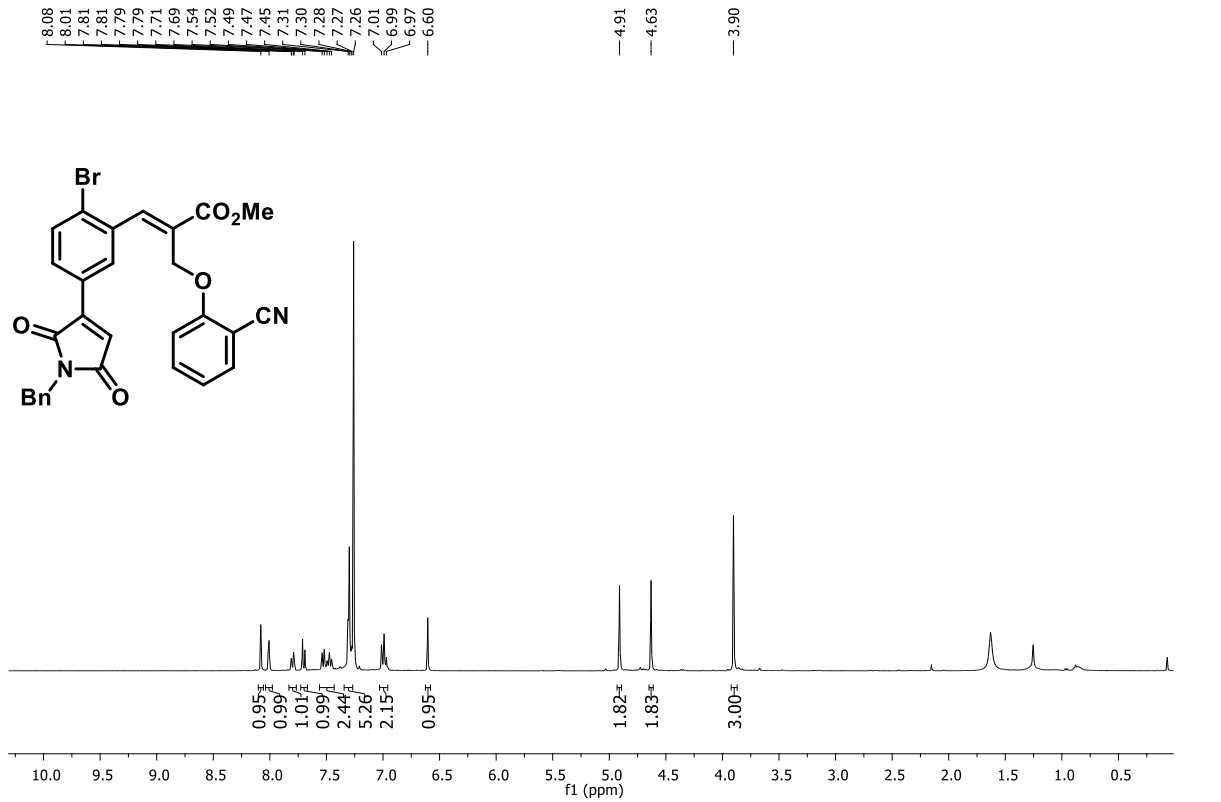


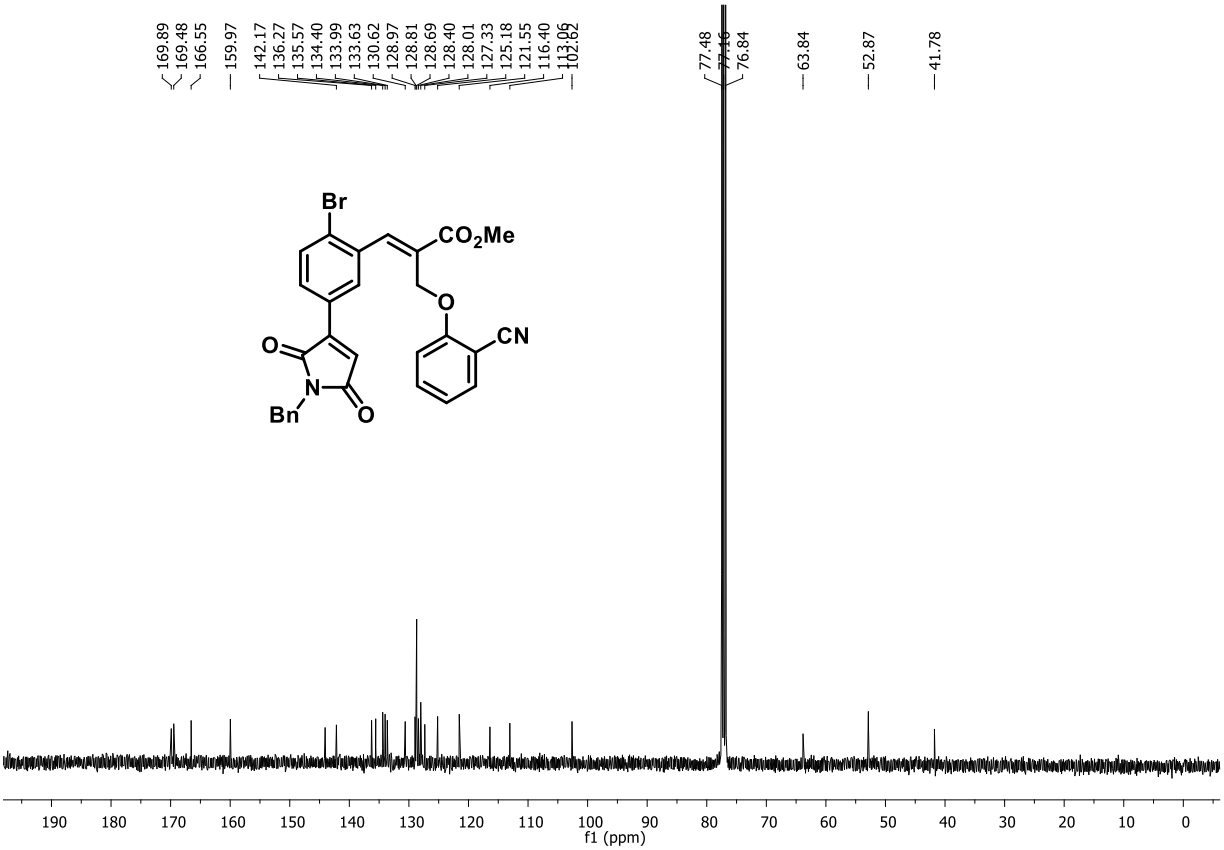
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(2-methoxy-5-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12l)



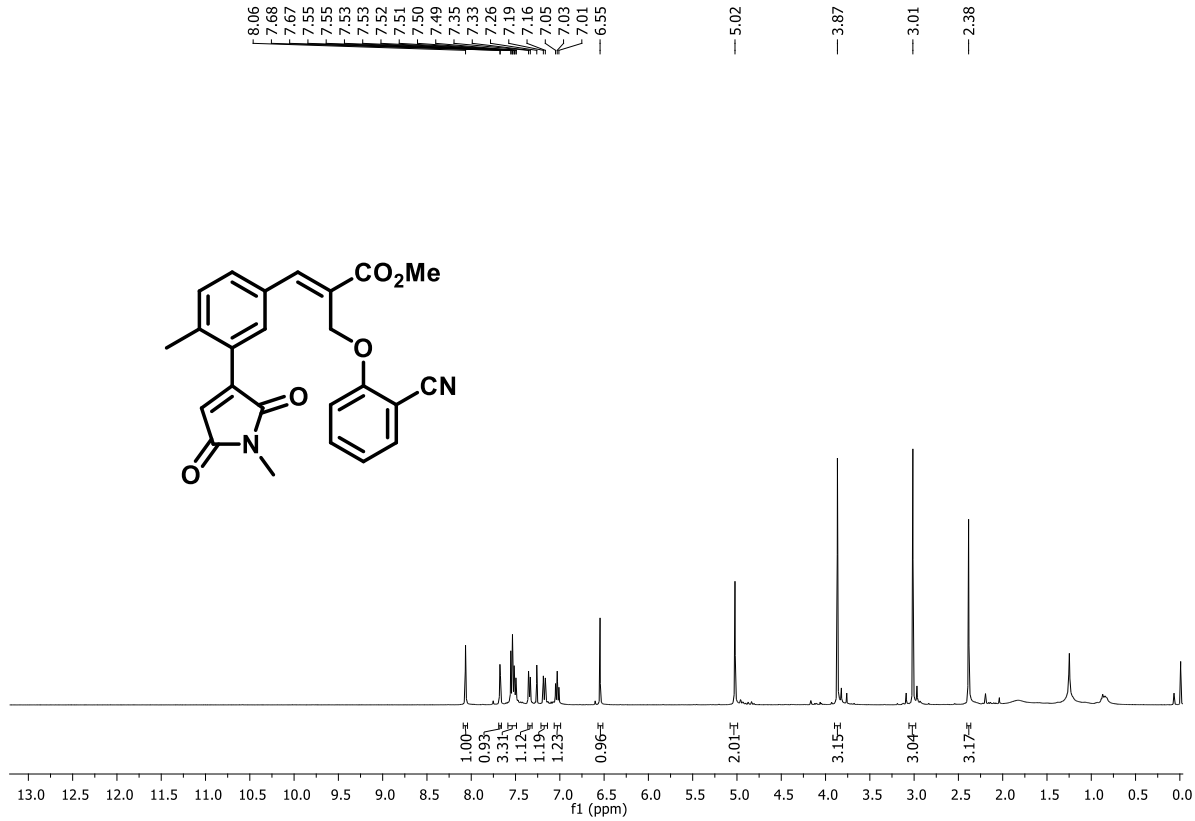


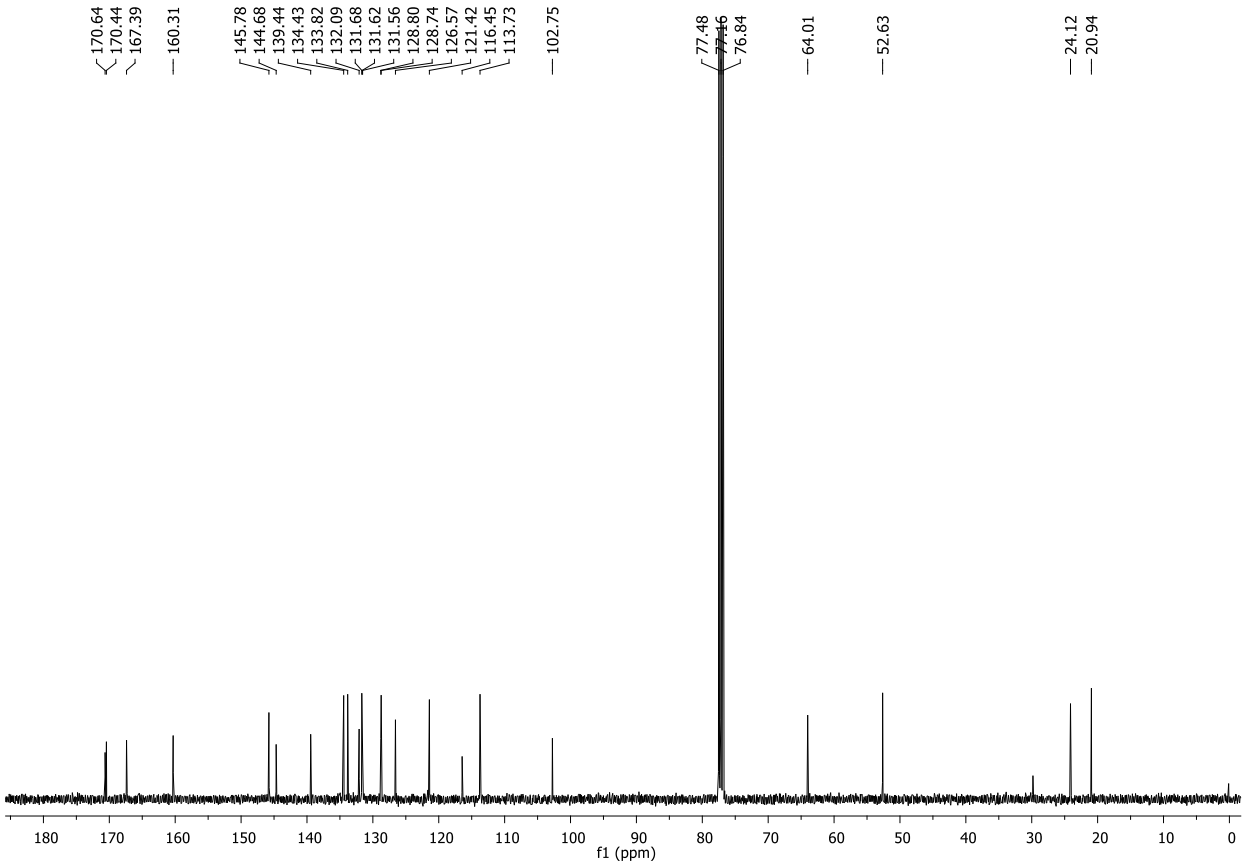
Methyl (*E*)-3-(5-(1-benzyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)-2-bromophenyl)-2-((2-cyanophenoxy) methyl)acrylate (12m)



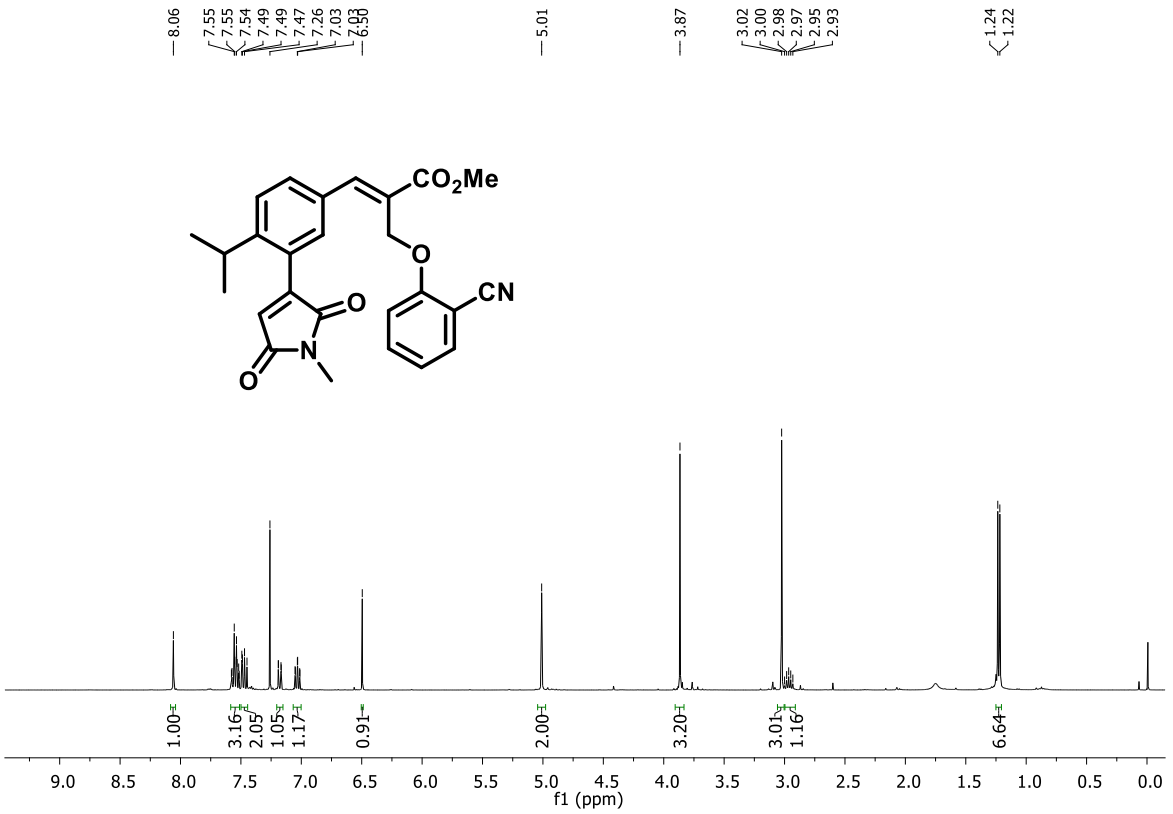


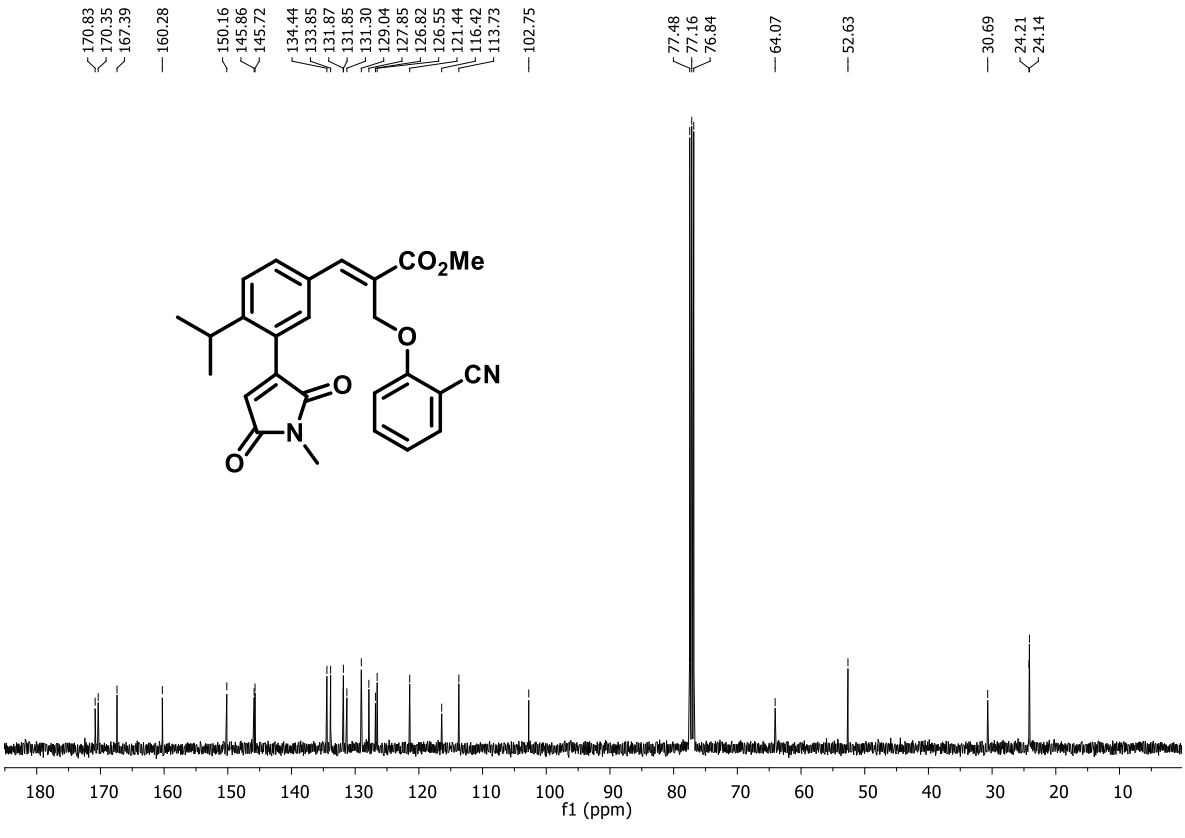
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-methyl-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12n)



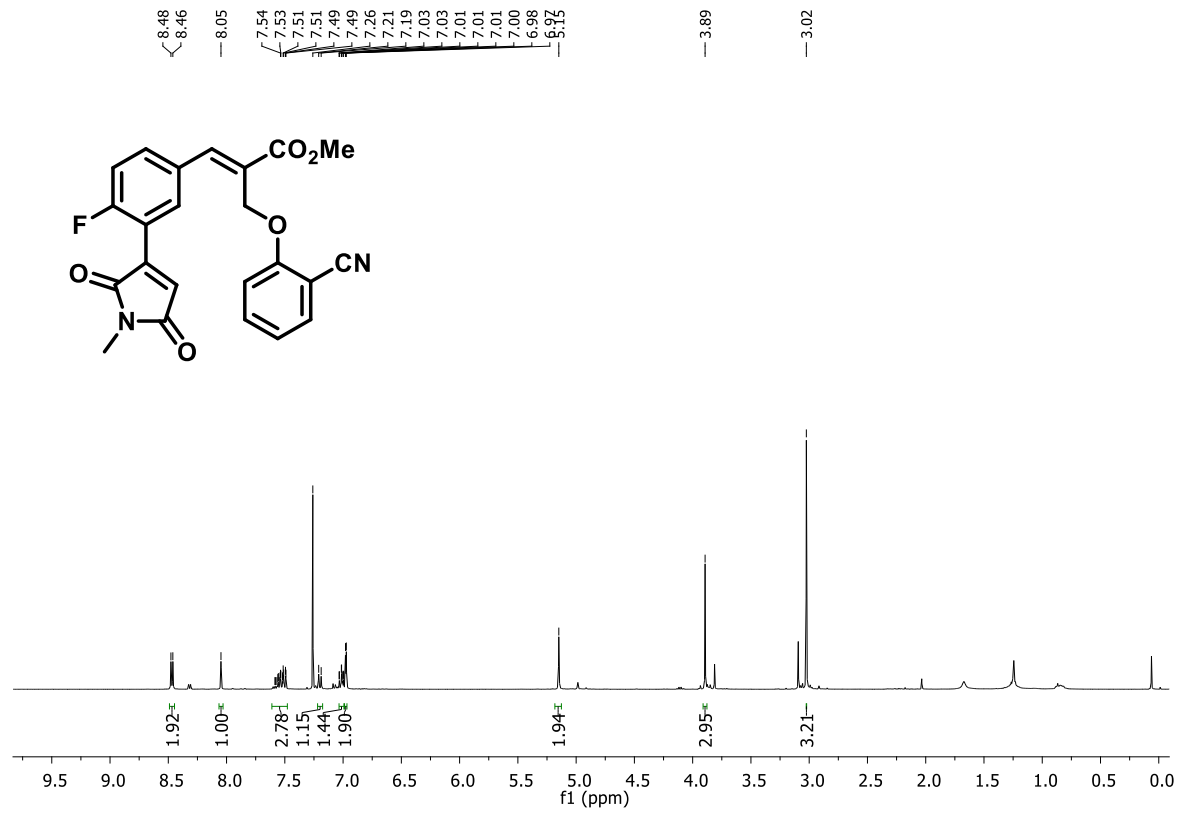


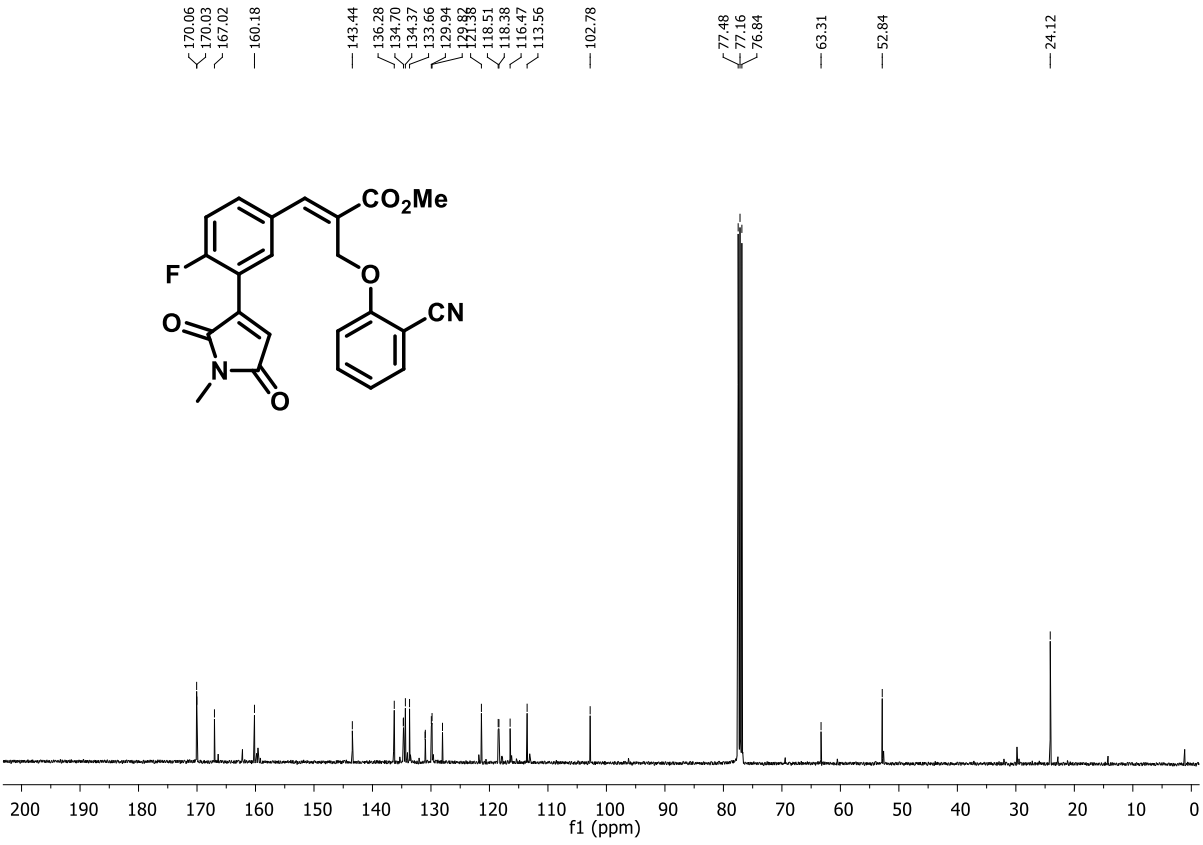
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-isopropyl-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12o)



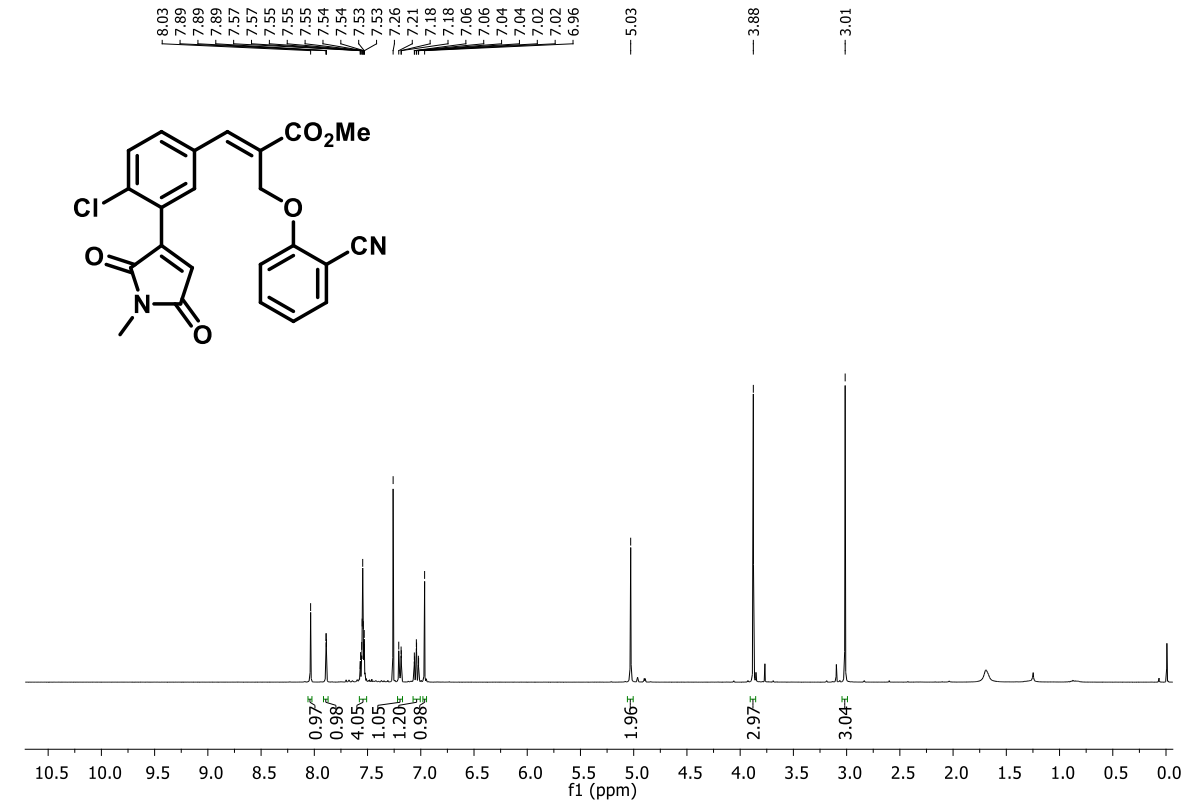


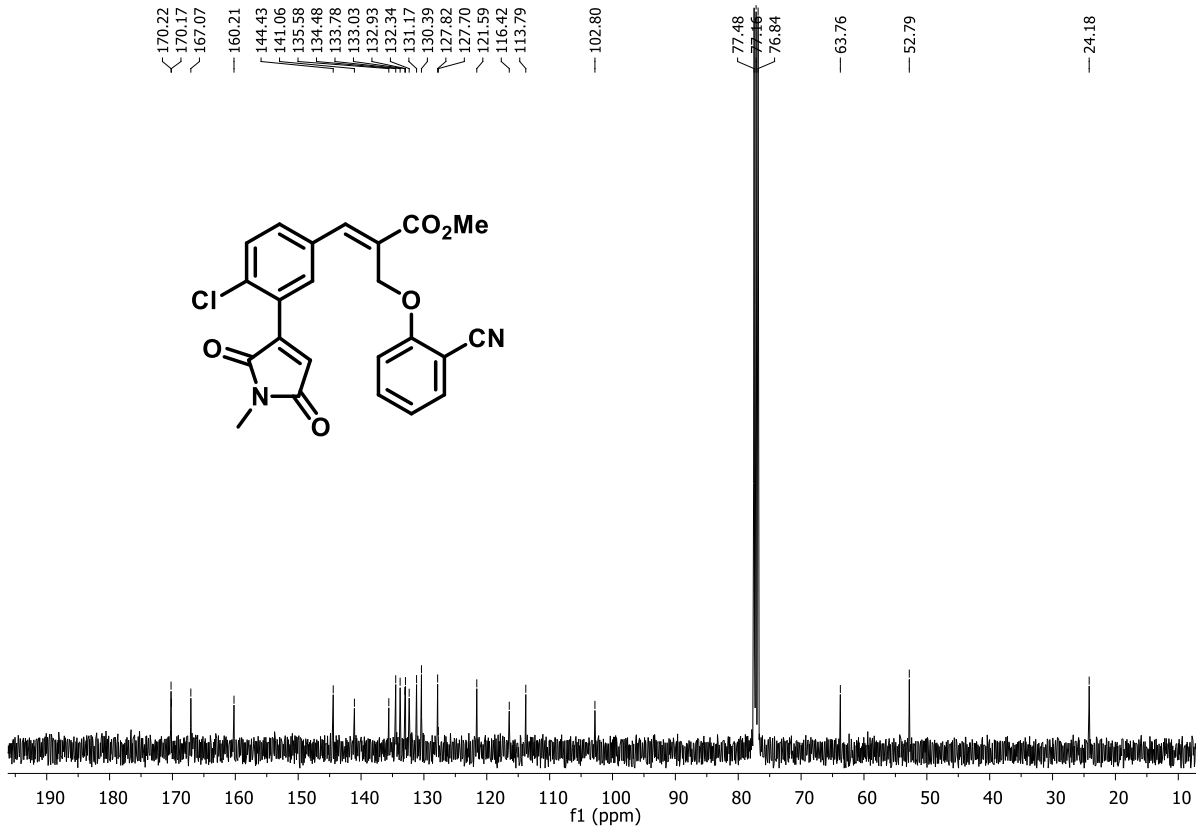
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(4-fluoro-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)acrylate (12p)



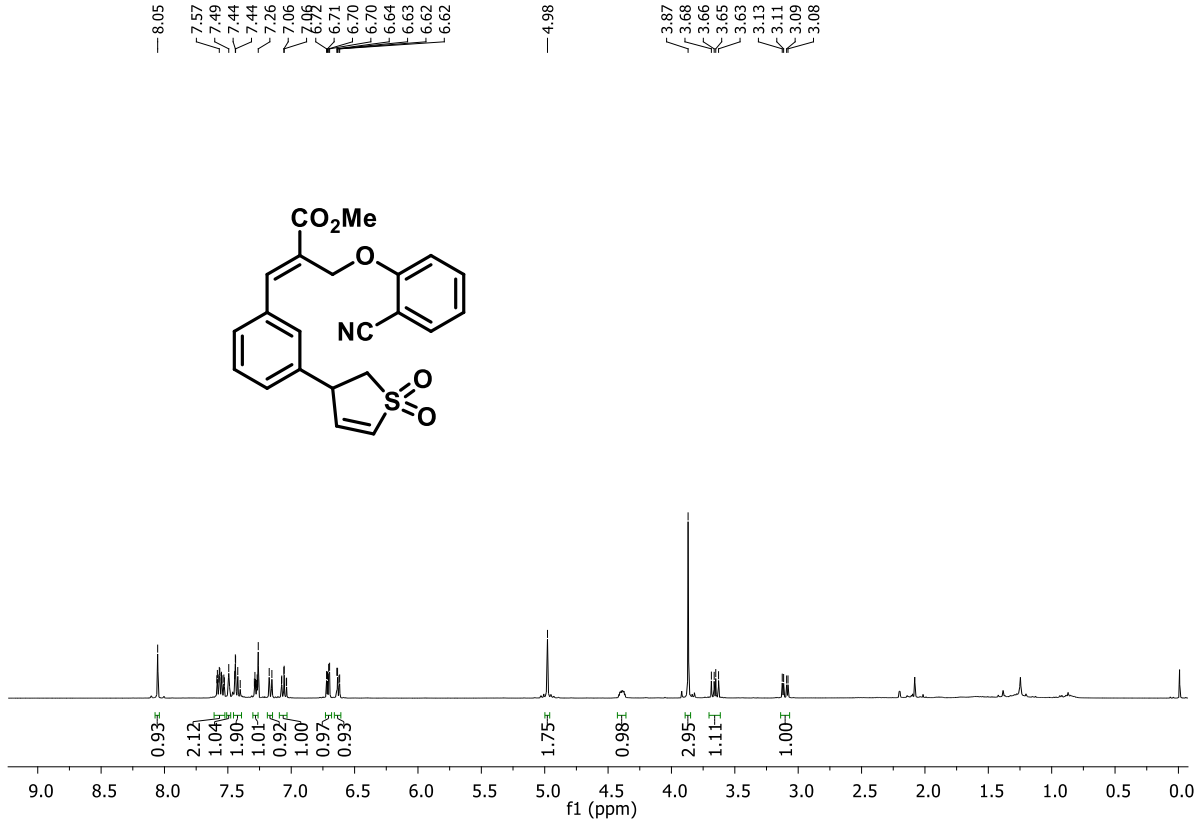


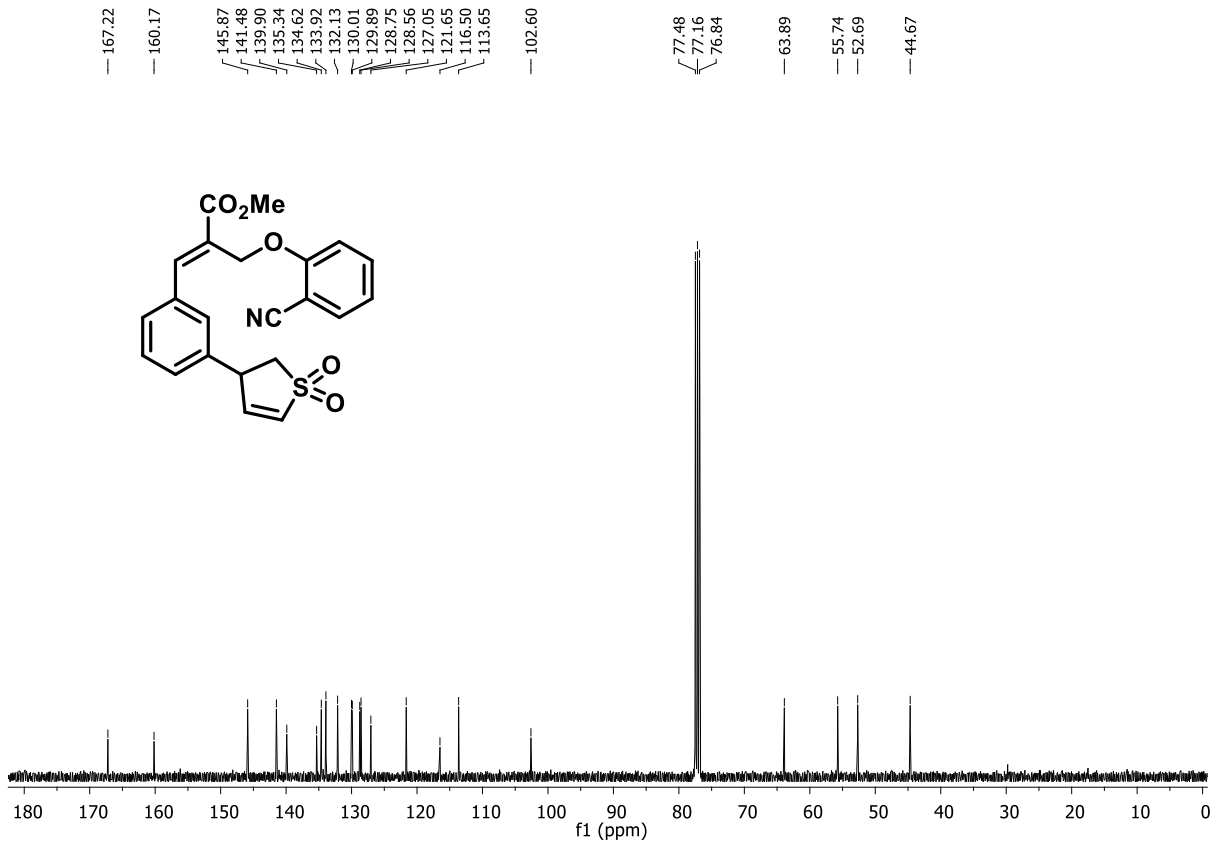
Methyl (*E*)-3-(4-chloro-3-(1-methyl-2,5-dioxo-2,5-dihydro-1H-pyrrol-3-yl)phenyl)-2-((2-cyanophenoxy) methyl)acrylate (12q)



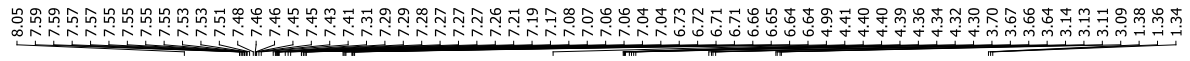


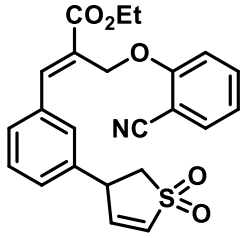
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,1-dioxido-2,3-dihydrothiophen-3-yl)phenyl)acrylate (13a)

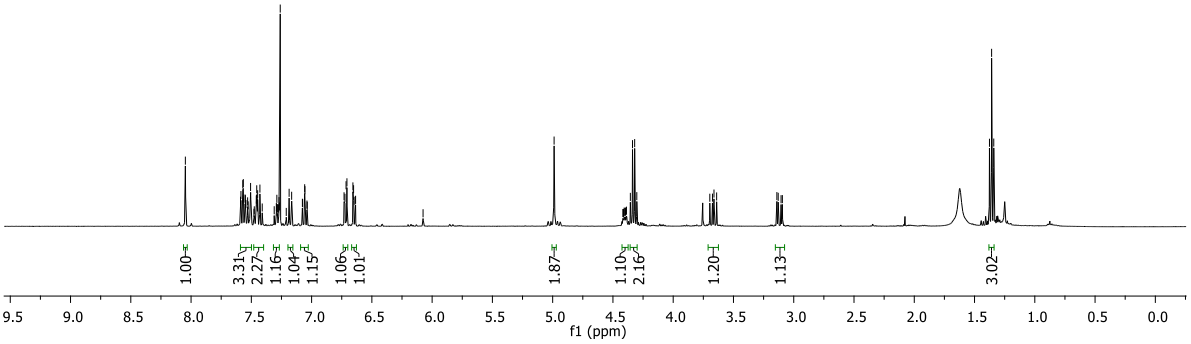


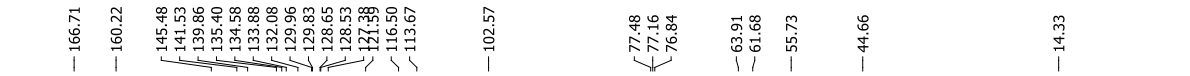


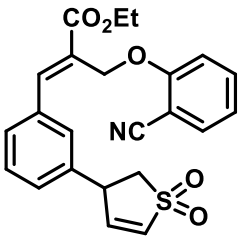
Ethyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-(1,1-dioxido-2,3-dihydrothiophen-3-yl)phenyl) acrylate (13b)

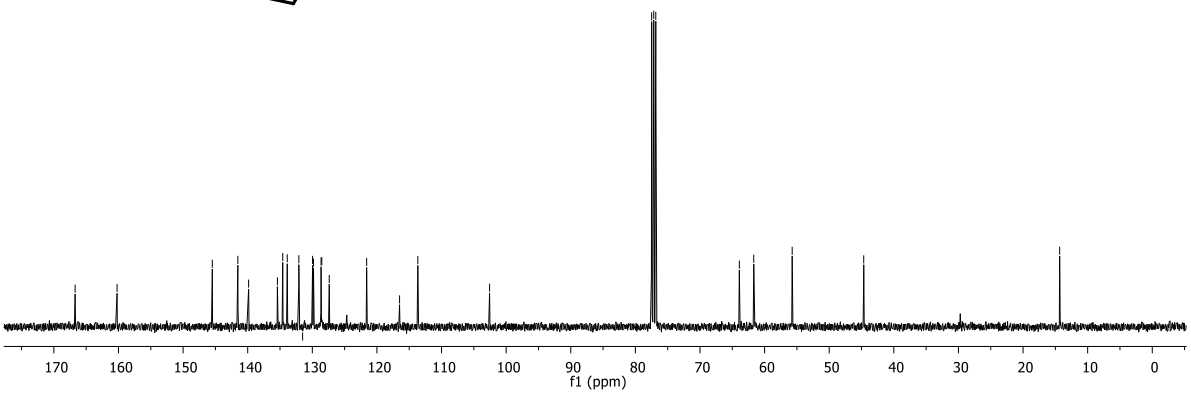




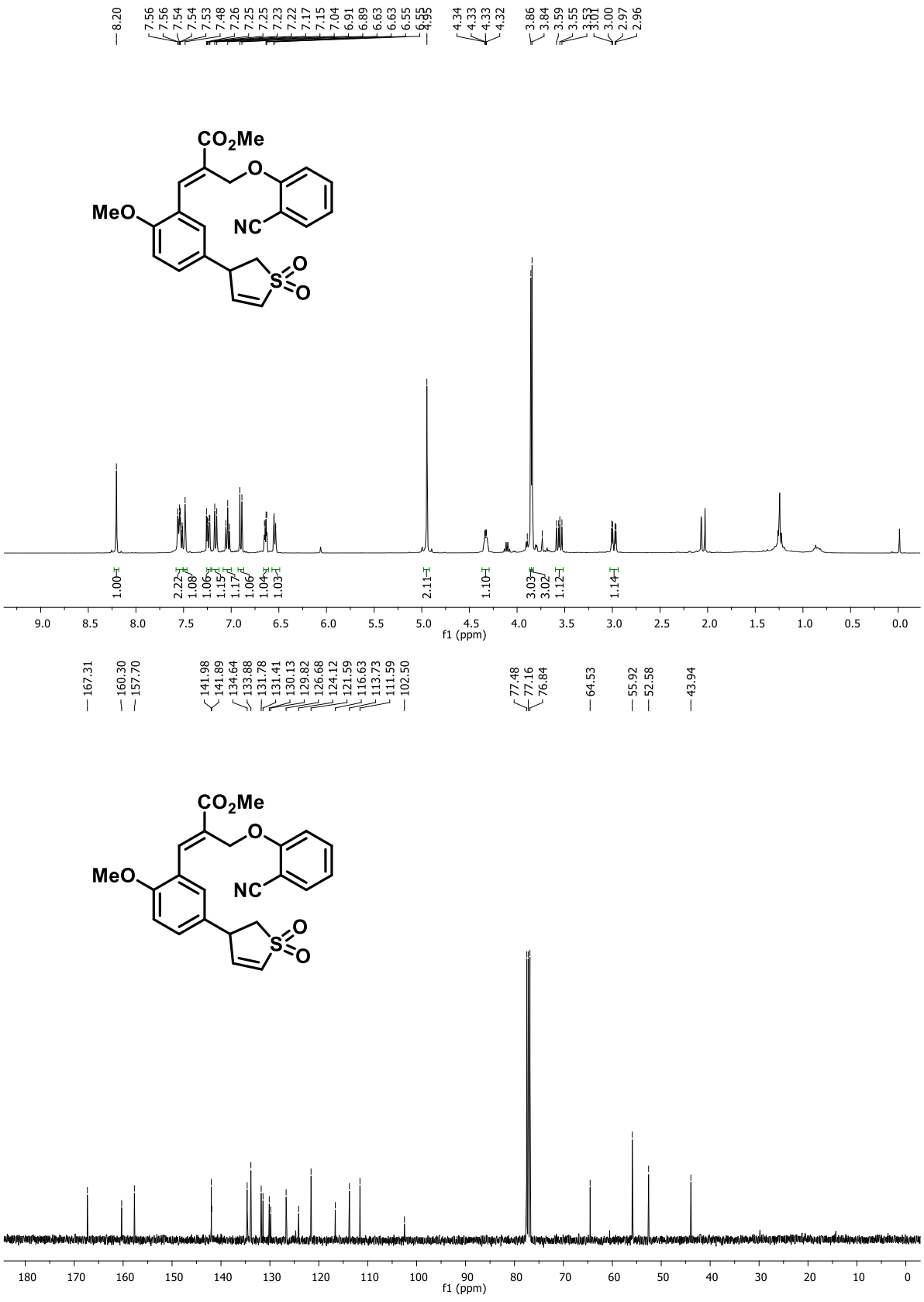




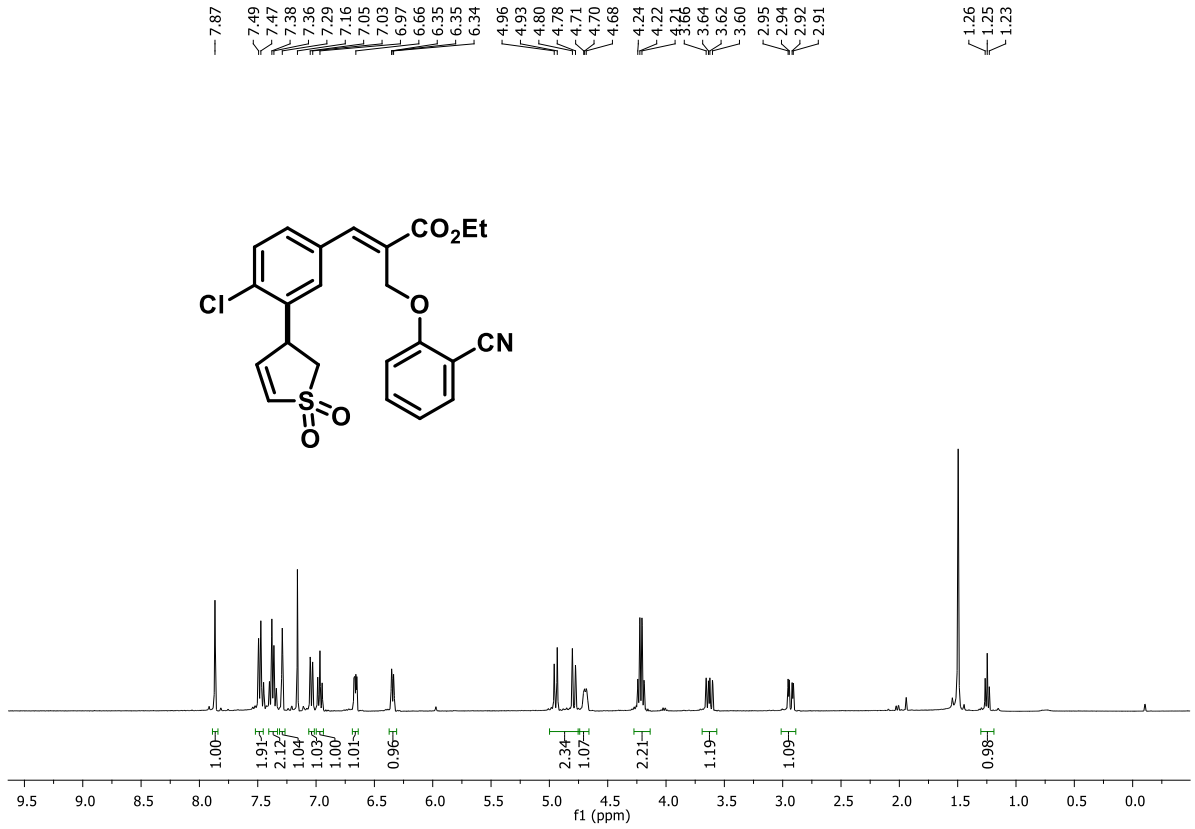


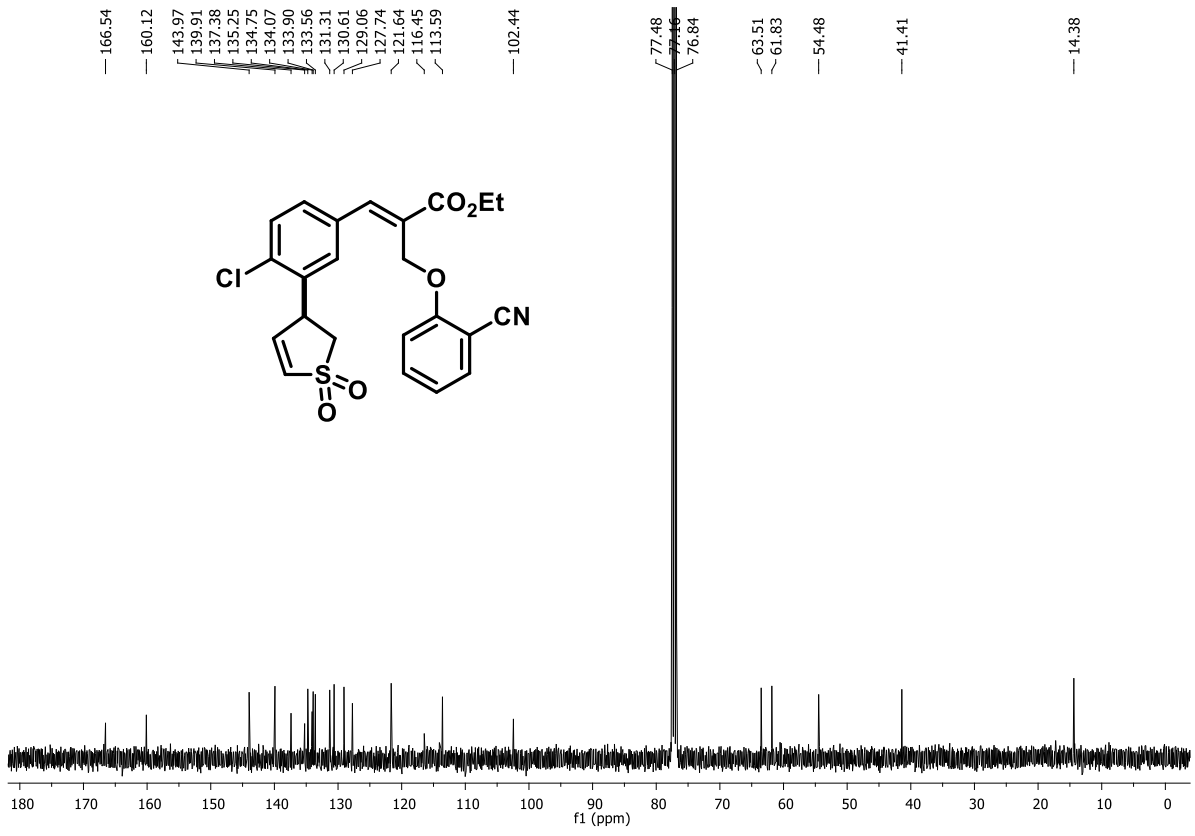


Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(5-(1,1-dioxido-2,3-dihydrothiophen-3-yl)-2-methoxyphenyl) acrylate (13c)

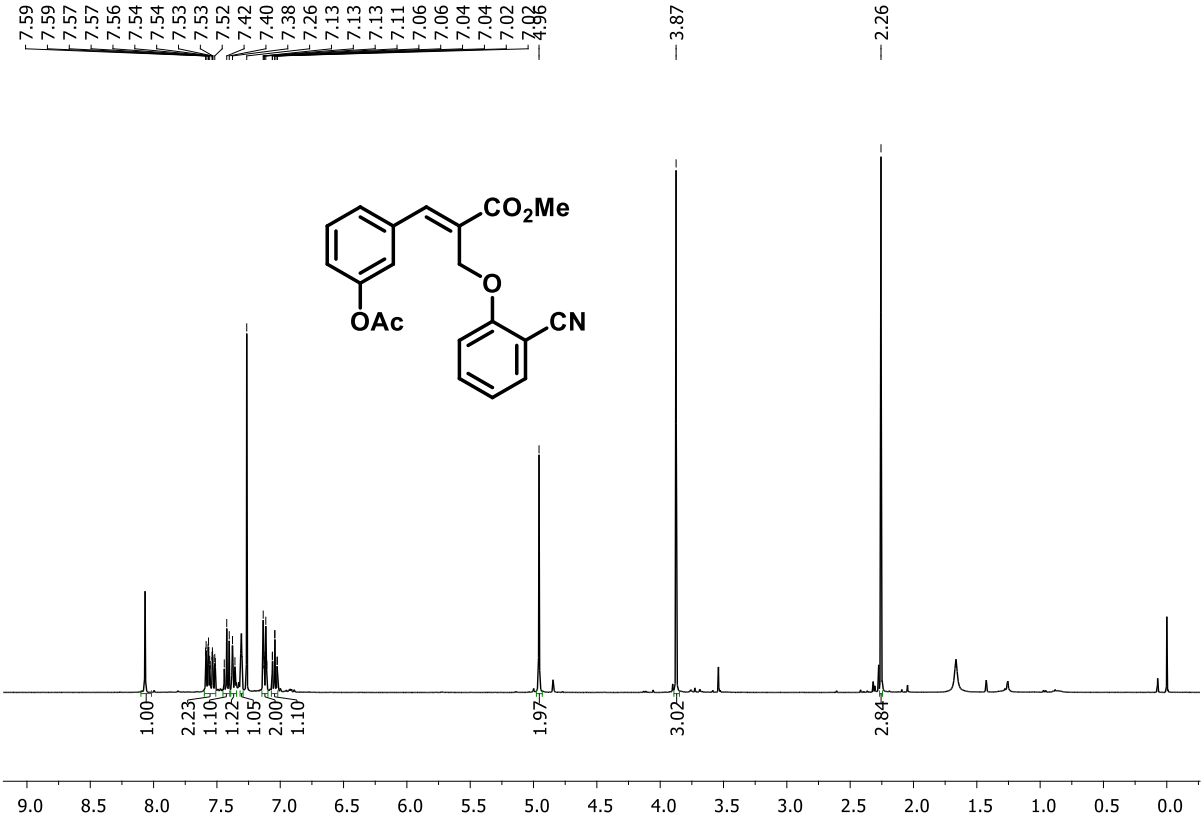


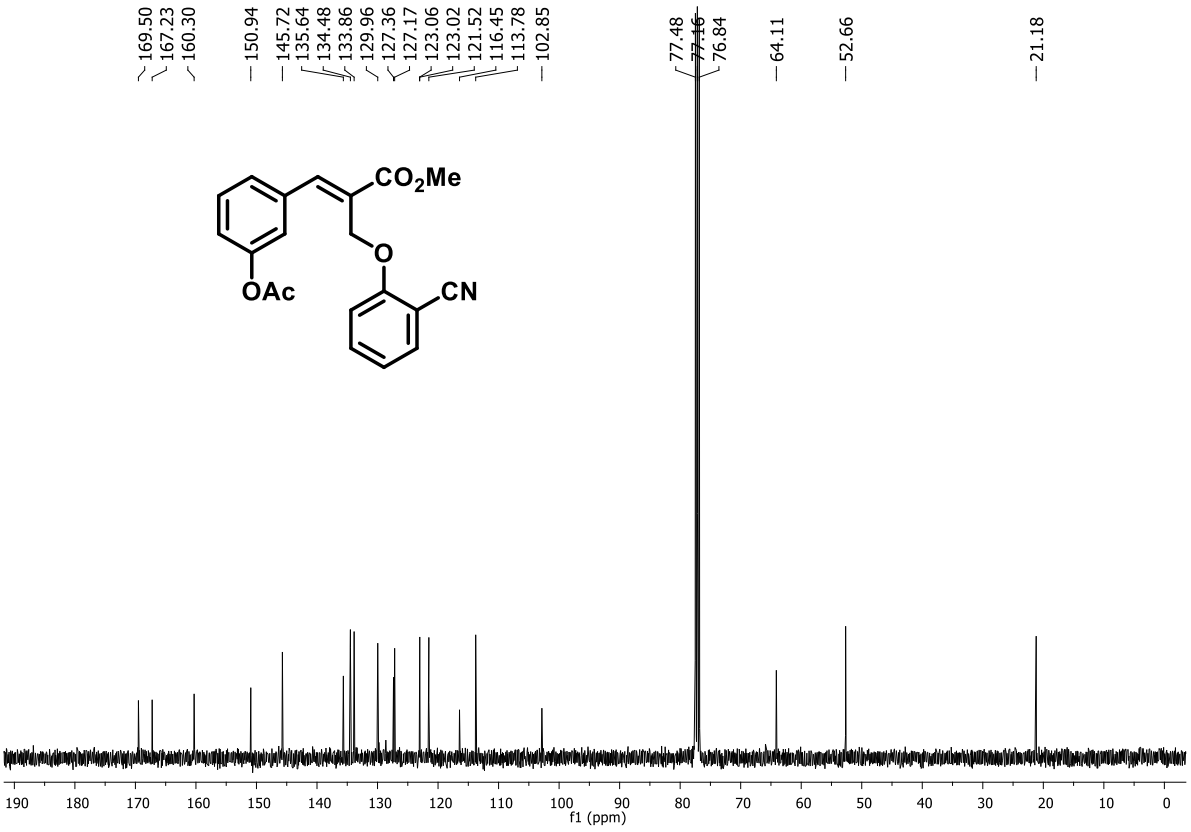
Ethyl (*E*)-3-(4-chloro-3-(1,1-dioxido-2,3-dihydrothiophen-3-yl)phenyl)-2-((2-cyanophenoxy) methyl) acrylate (14d)



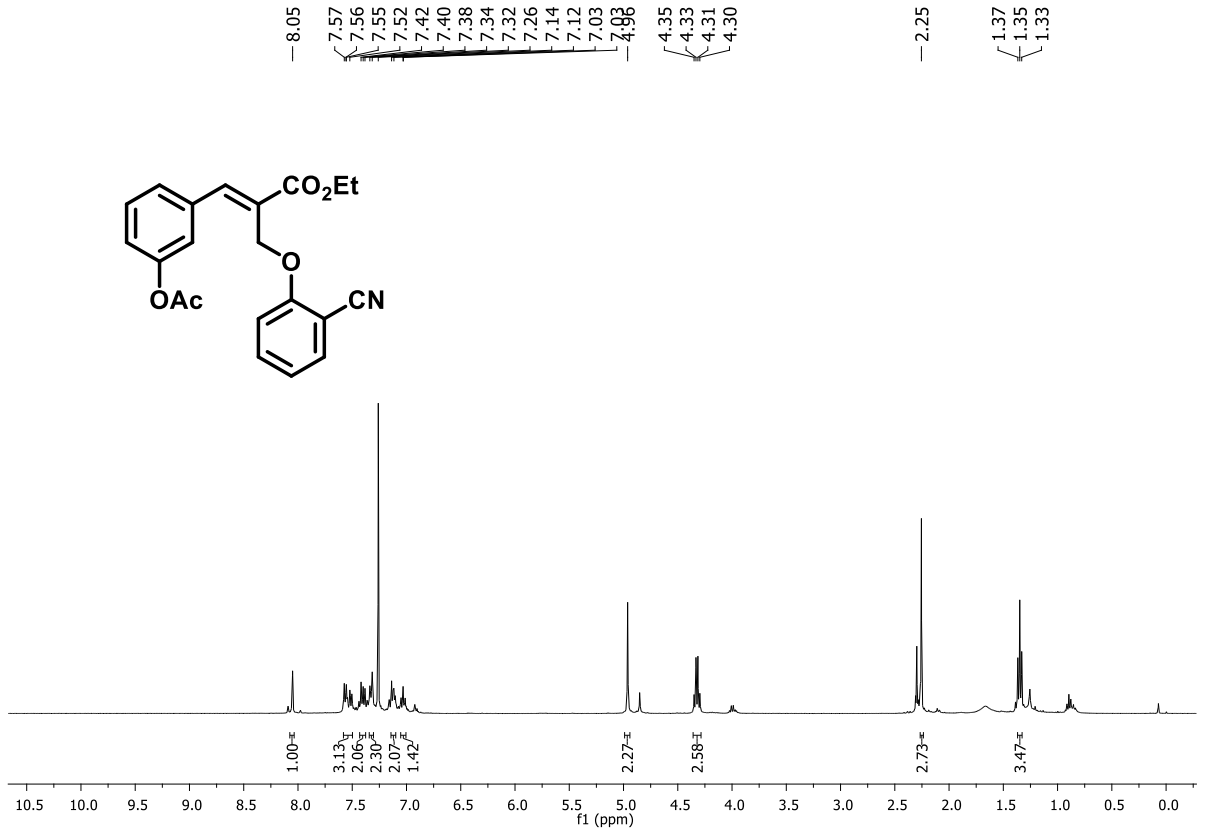


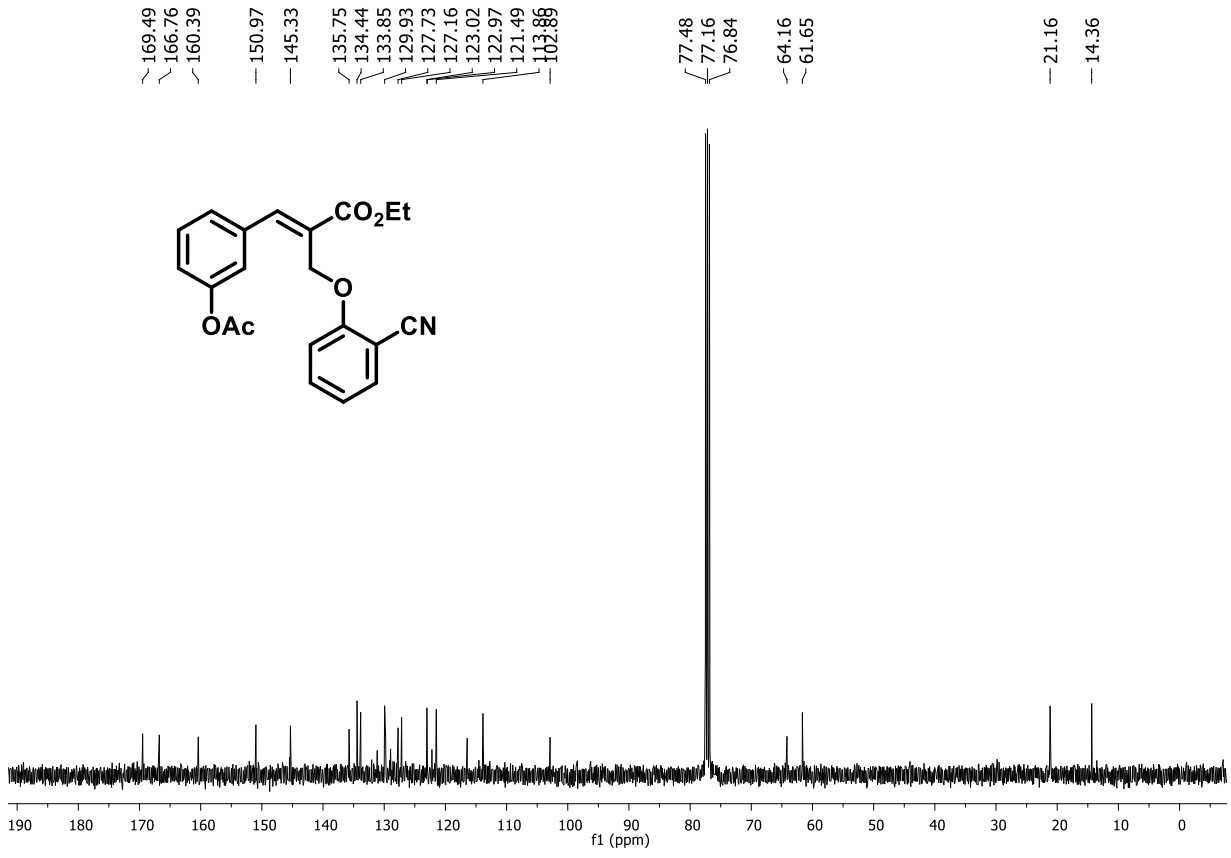
Methyl (*E*)-3-(3-acetoxyphenyl)-2-((2-cyanophenoxy)methyl)acrylate (14a)



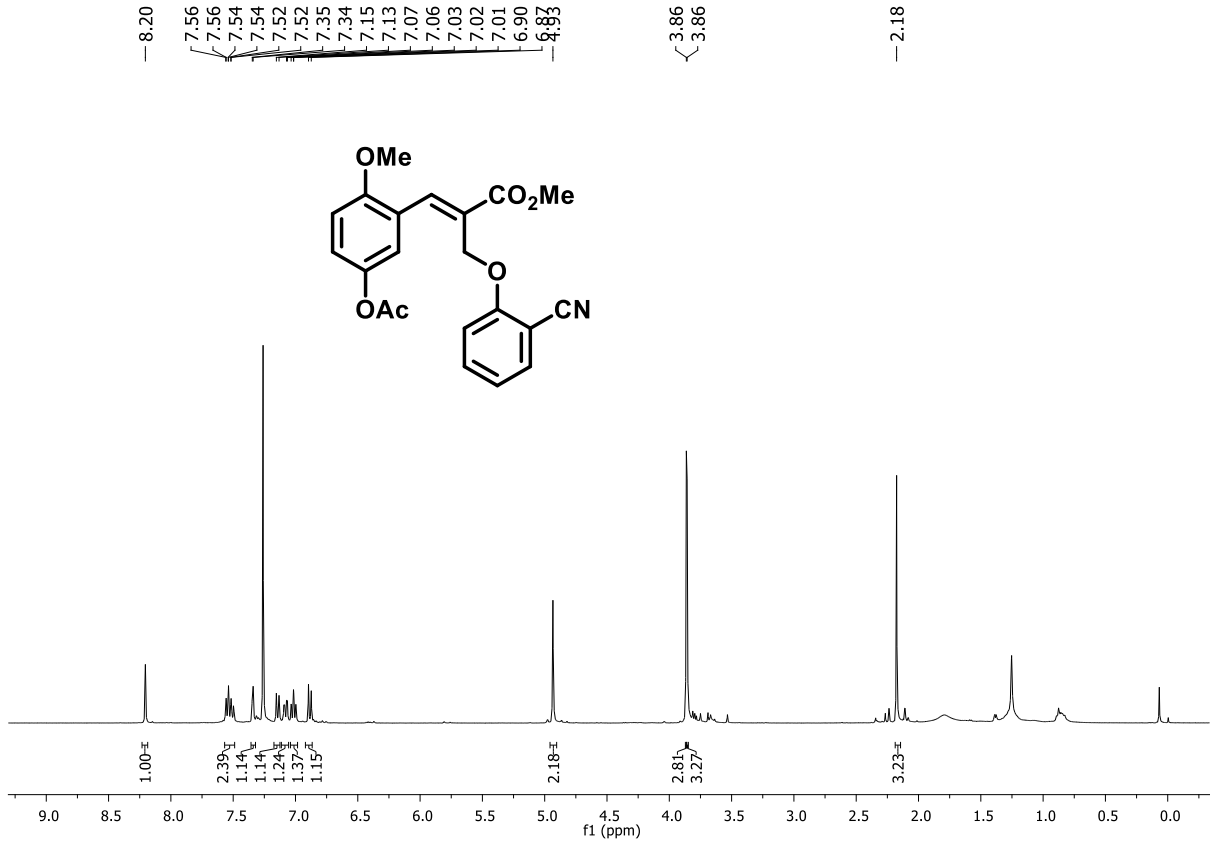


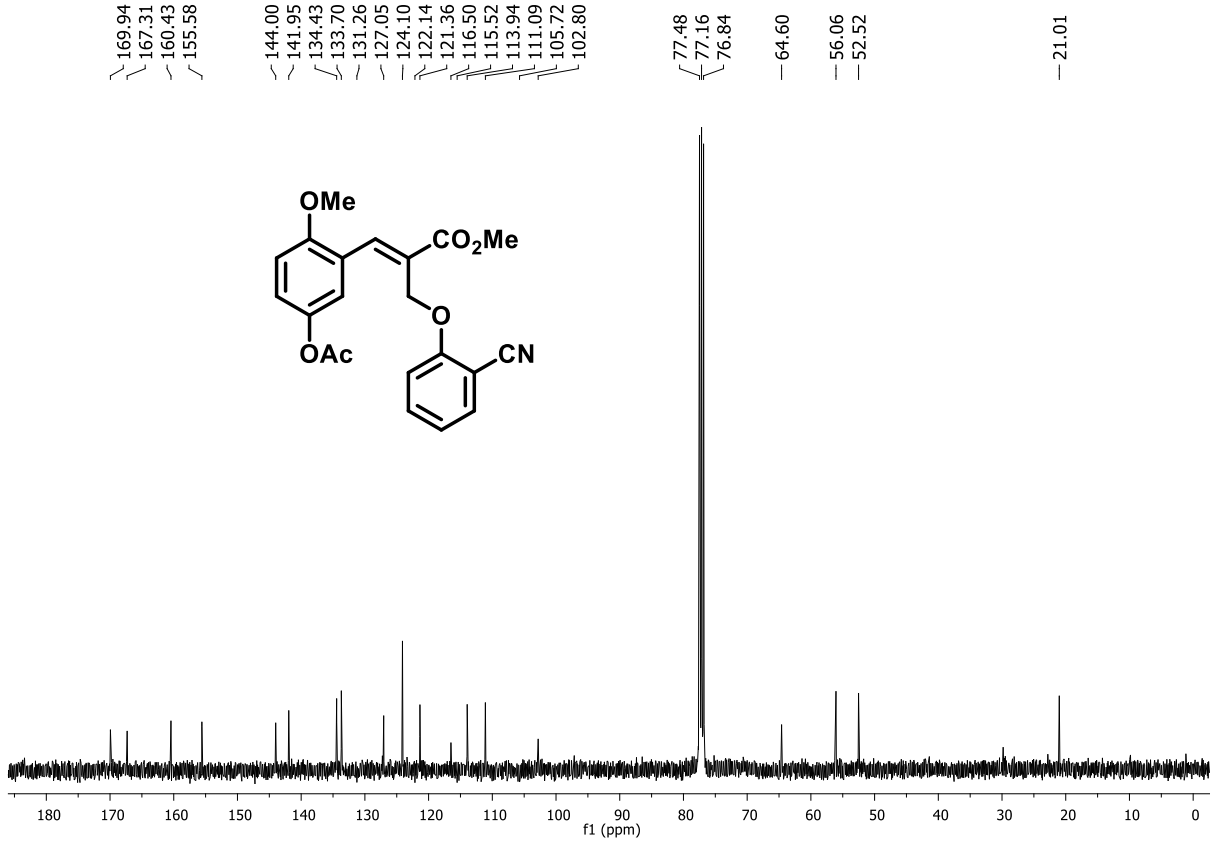
Ethyl (*E*)-3-(3-acetoxyphenyl)-2-((2-cyanophenoxy)methyl)acrylate (14b)



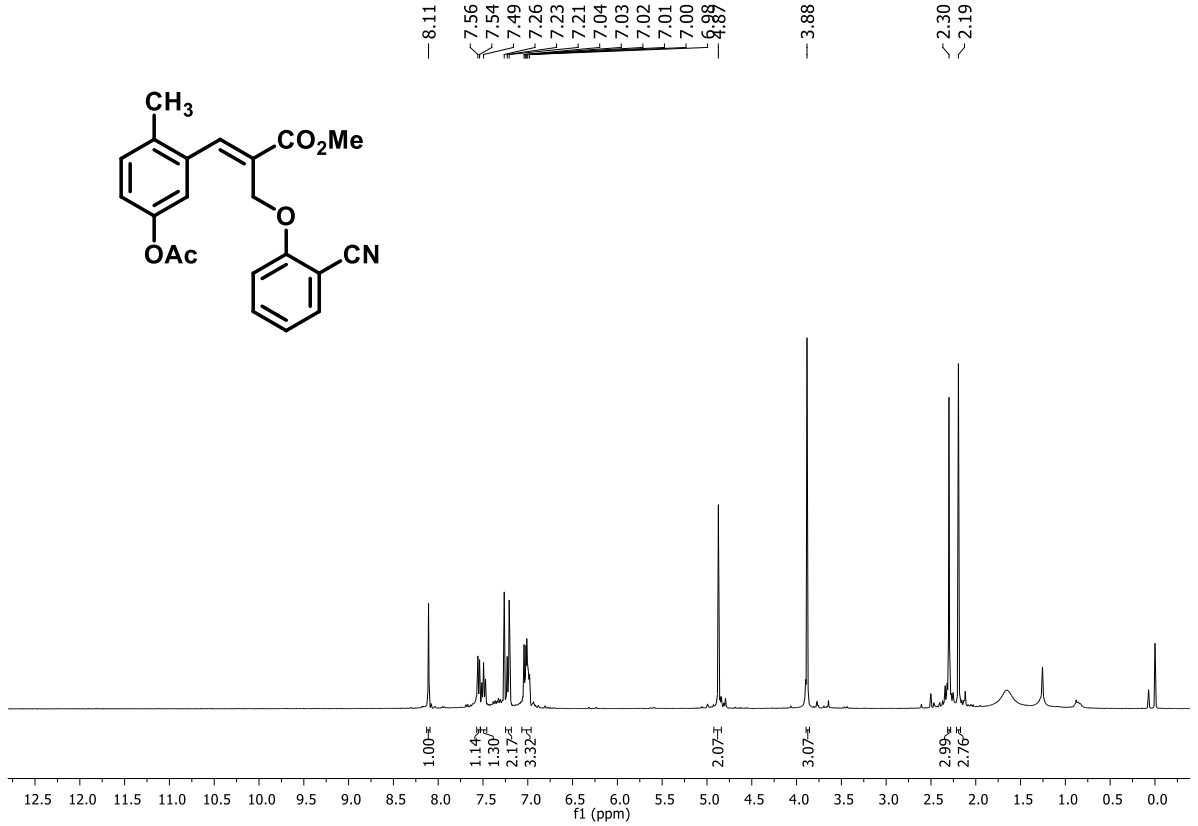


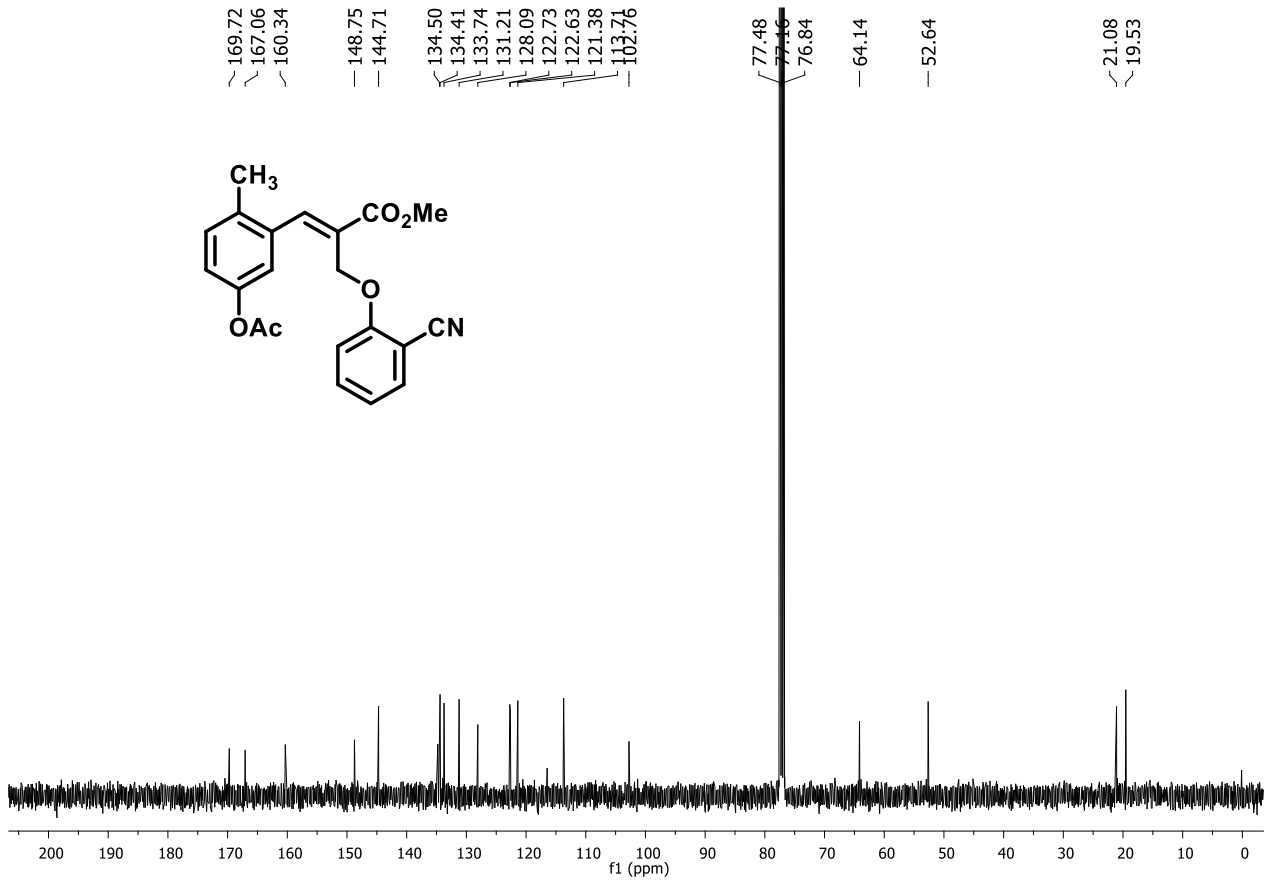
Methyl (*E*)-3-(5-acetoxy-2-methoxyphenyl)-2-((2-cyanophenoxy)methyl) acrylate (14c)



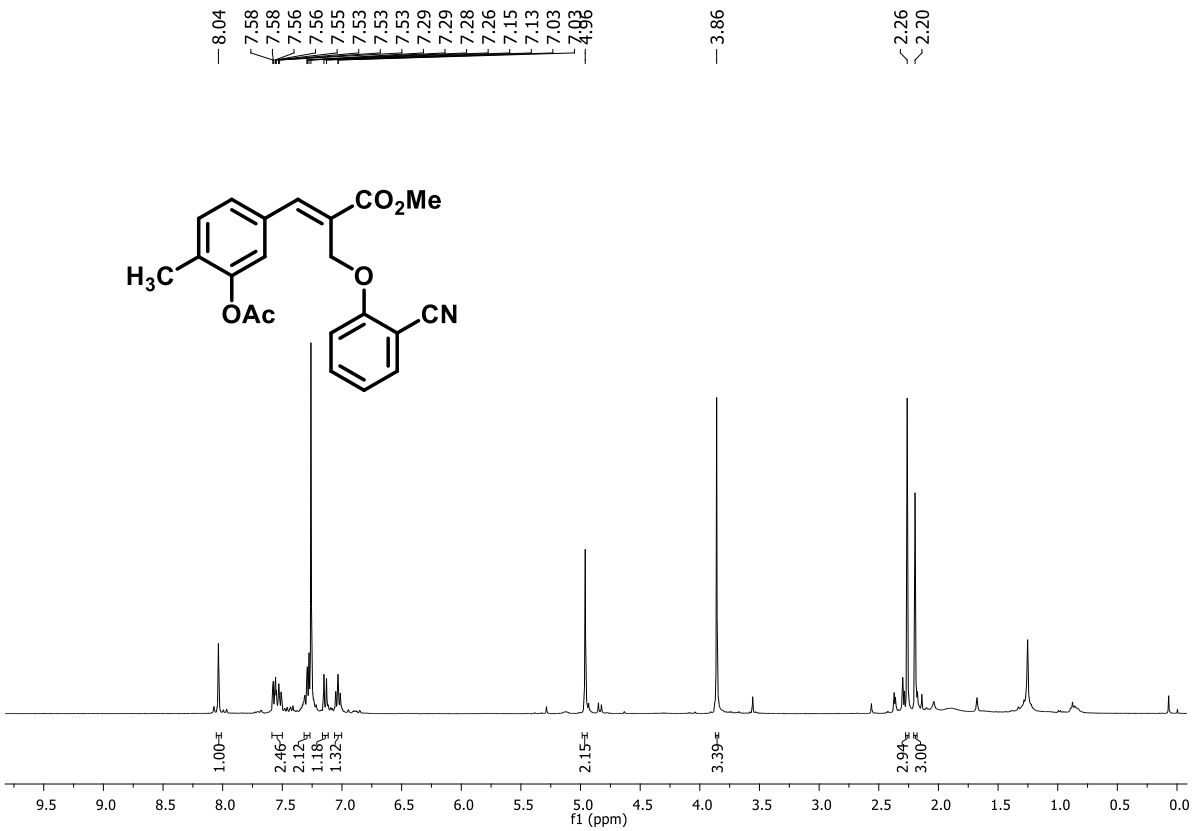


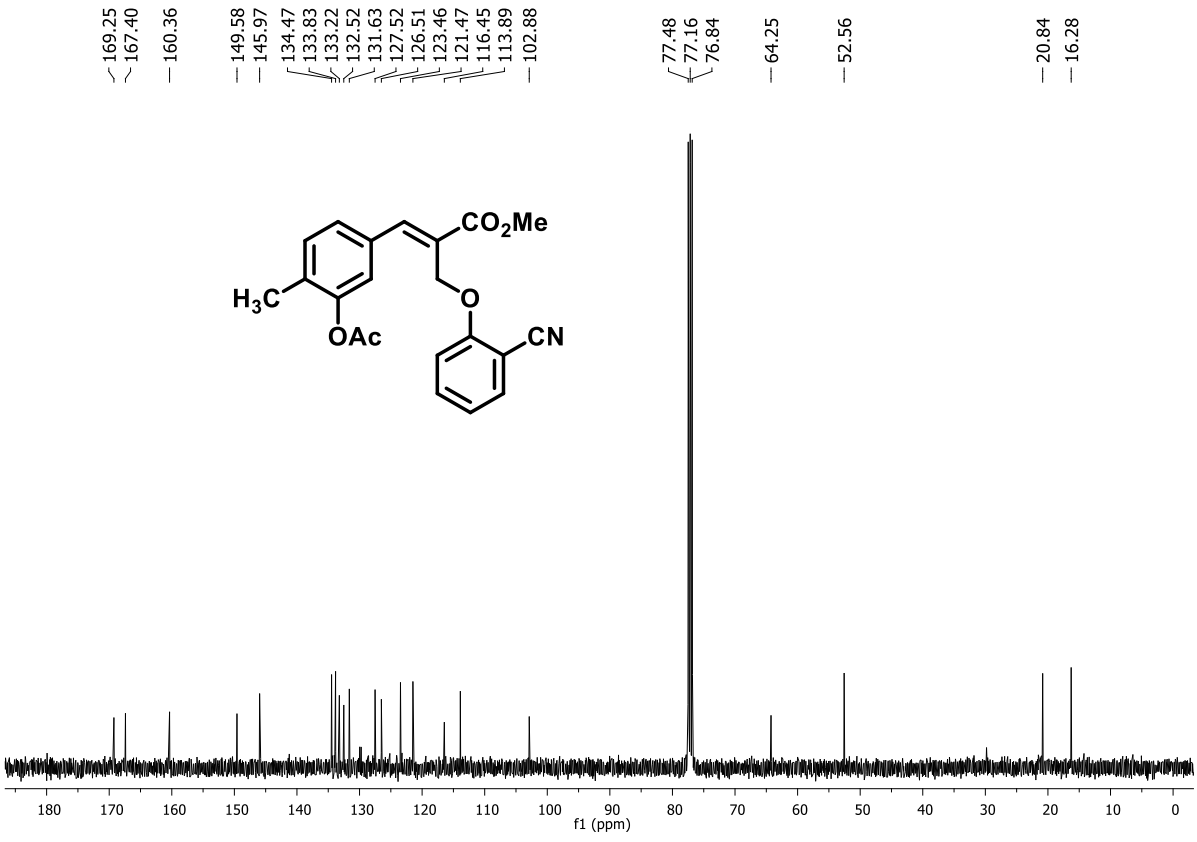
Methyl (*E*)-3-(5-acetoxy-2-methylphenyl)-2-((2-cyanophenoxy)methyl)acrylate (14d)



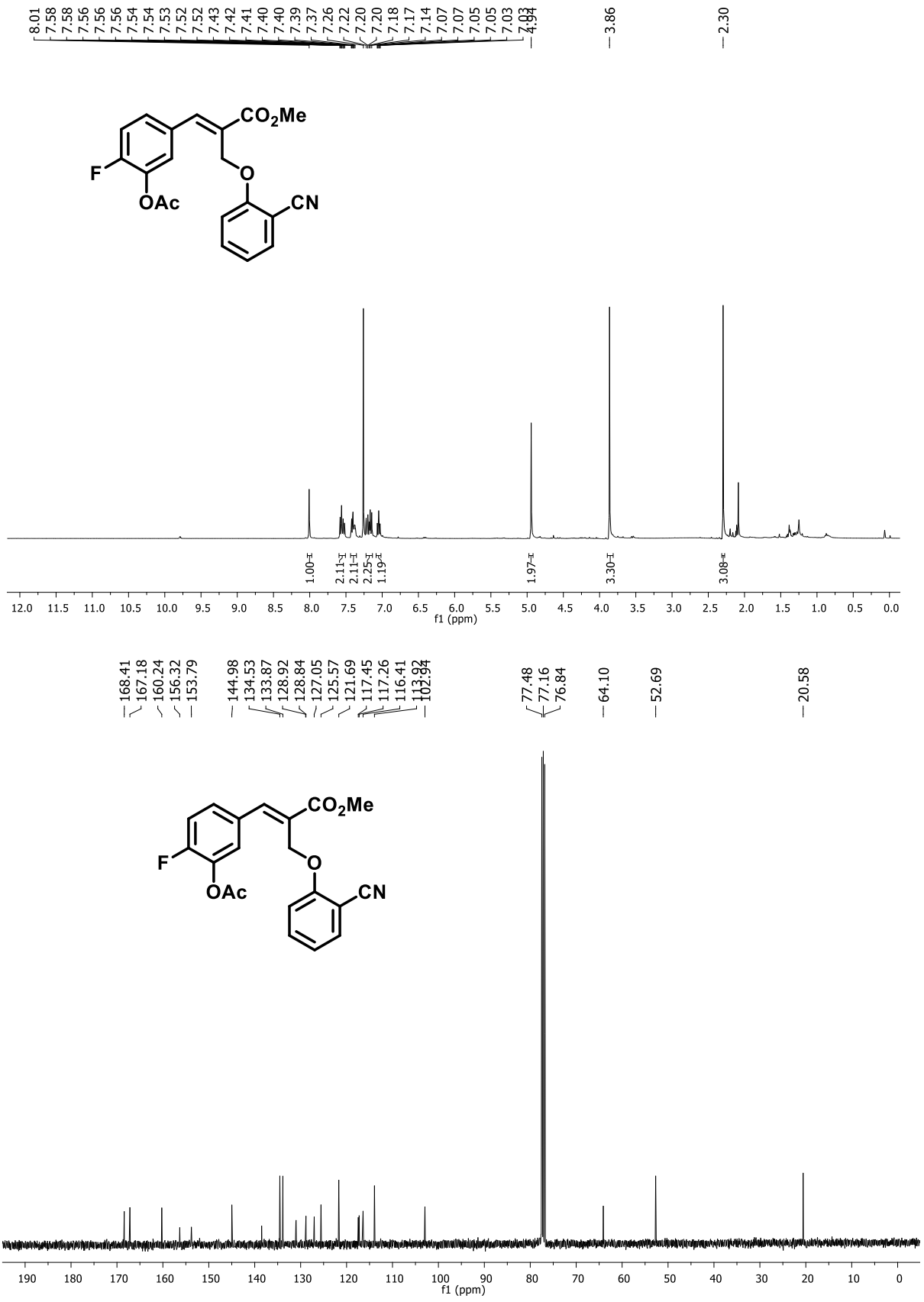


Methyl (*E*)-3-(3-acetoxy-4-methylphenyl)-2-((2 cyanophenoxy)methyl) acrylate (14e)

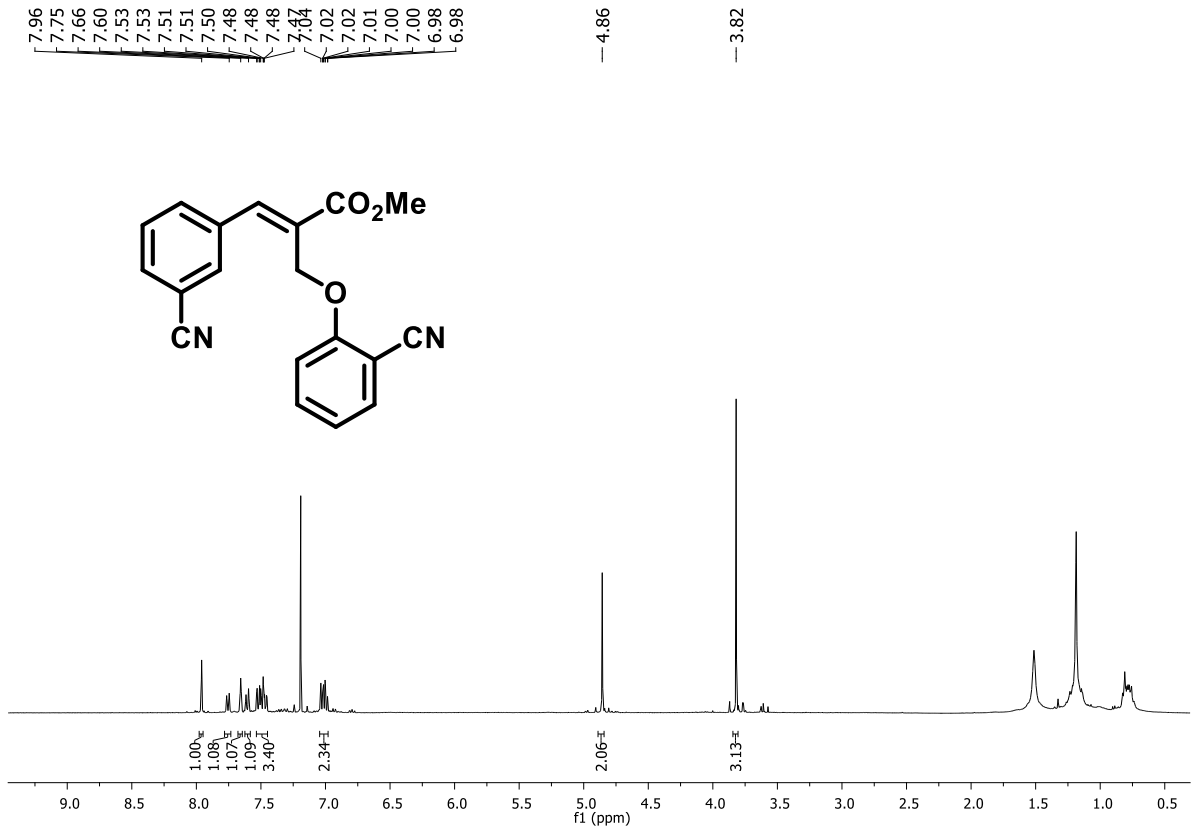


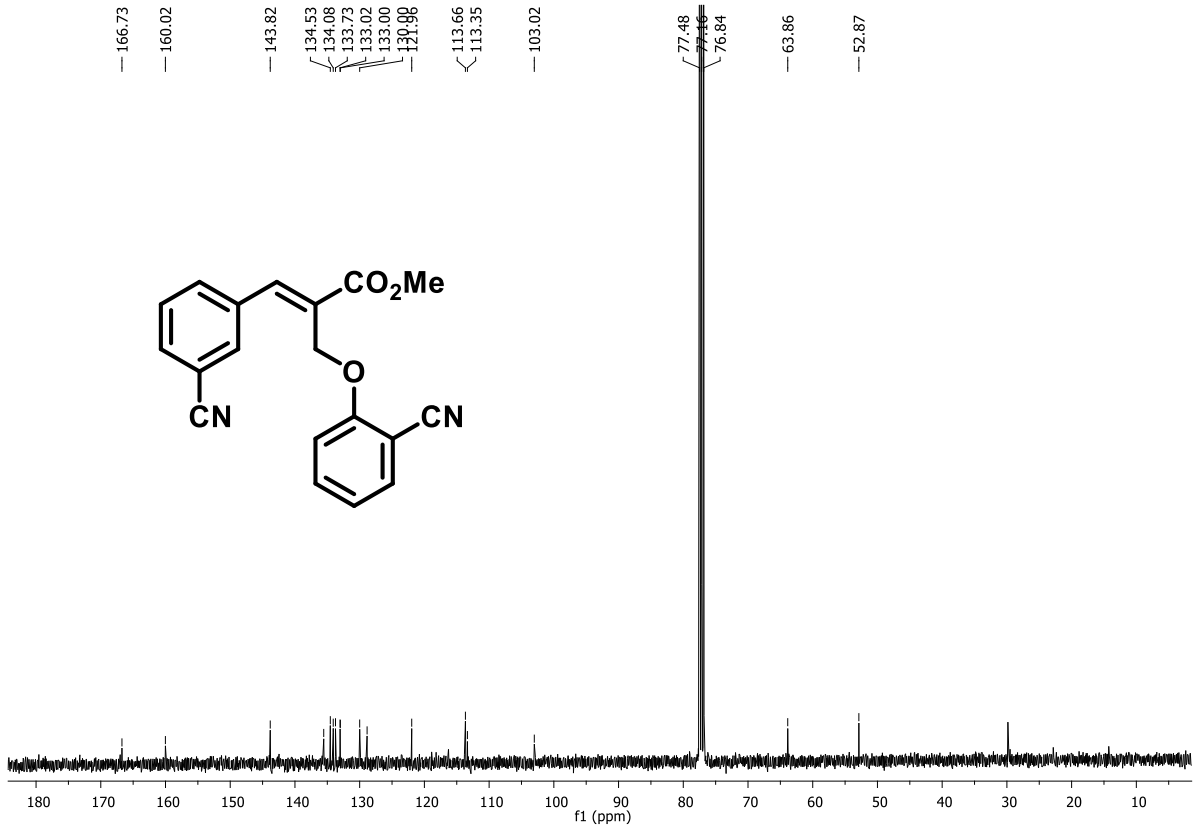


Methyl (*E*)-3-(3-acetoxy-4-fluorophenyl)-2-((2-cyanophenoxy)methyl) acrylate (14f)

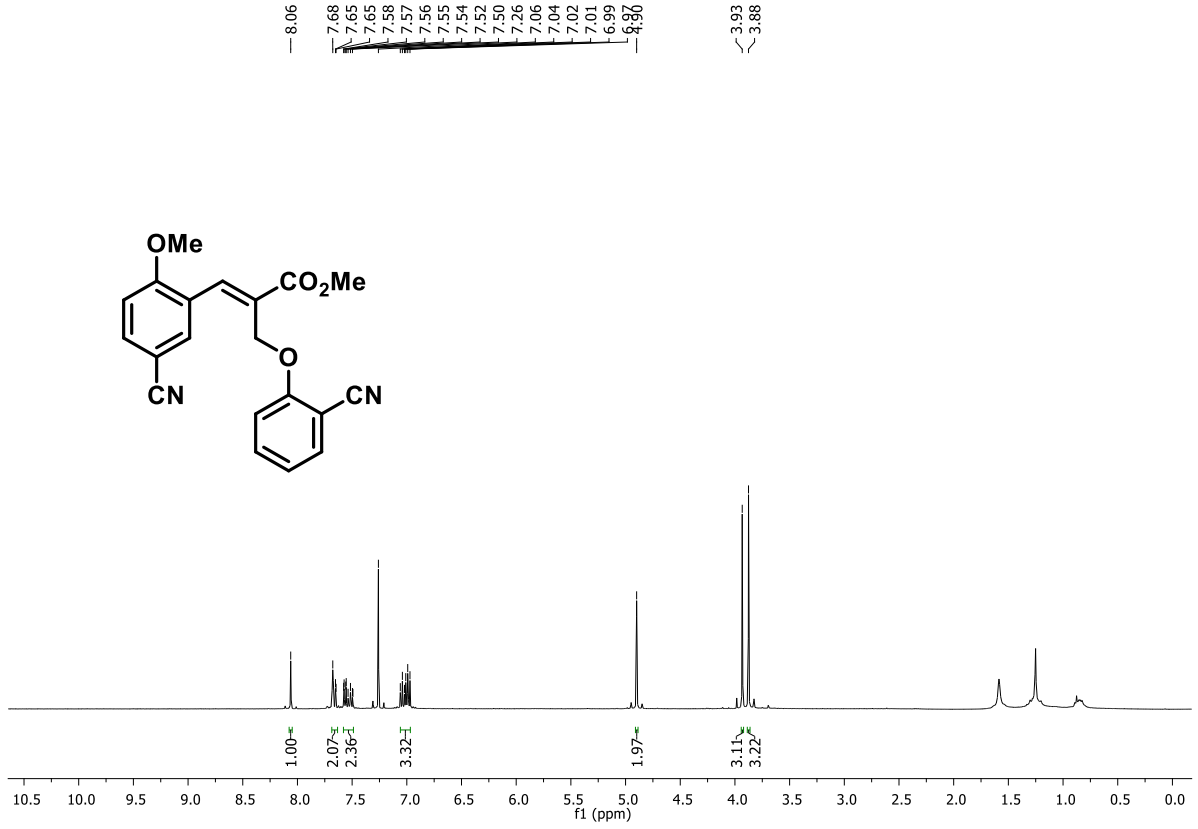


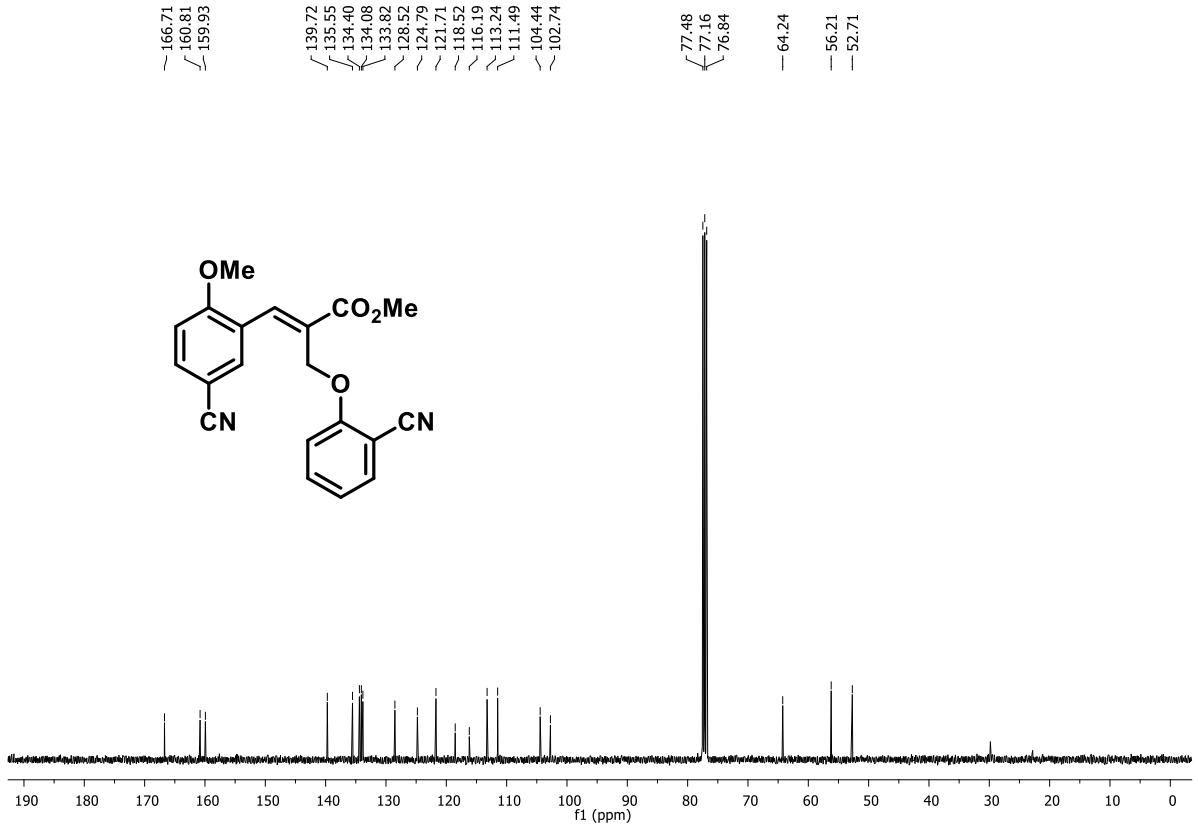
Methyl (*E*)-2-((2-cyanophenoxy)methyl)-3-(3-cyanophenyl)acrylate (15a)



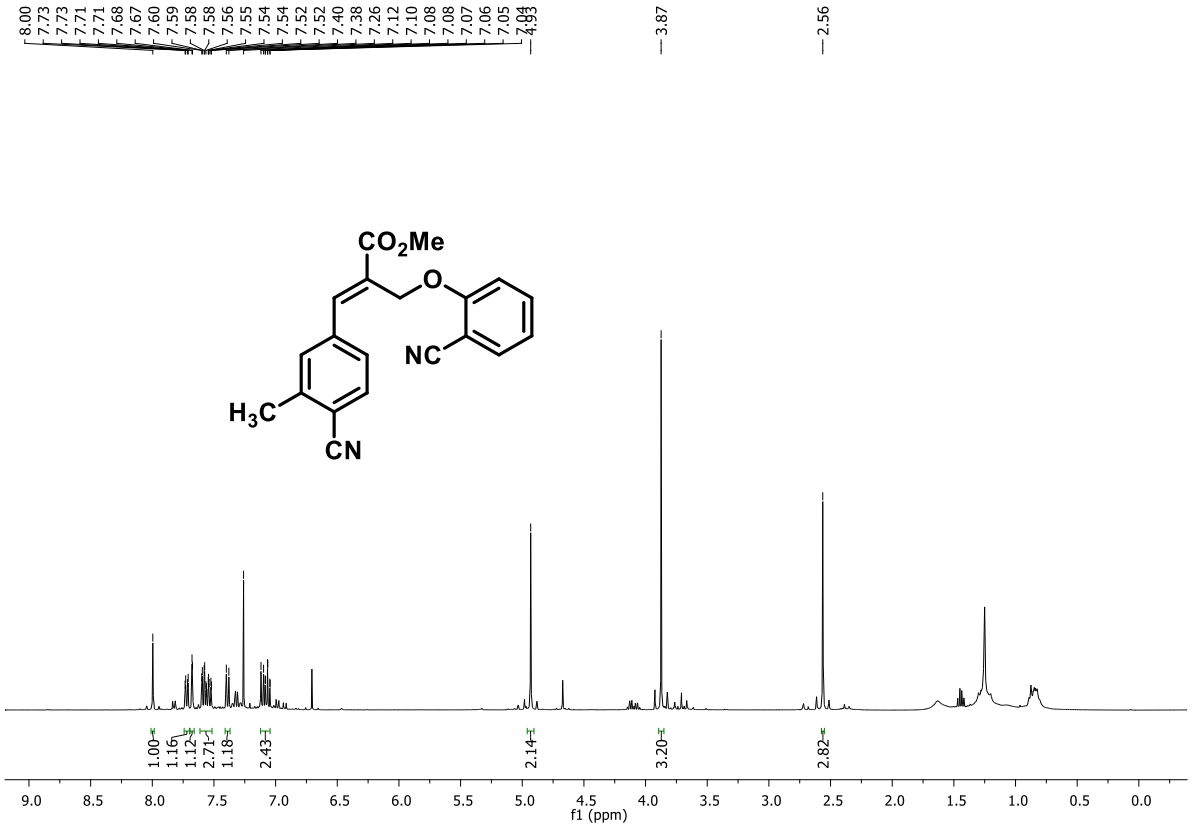


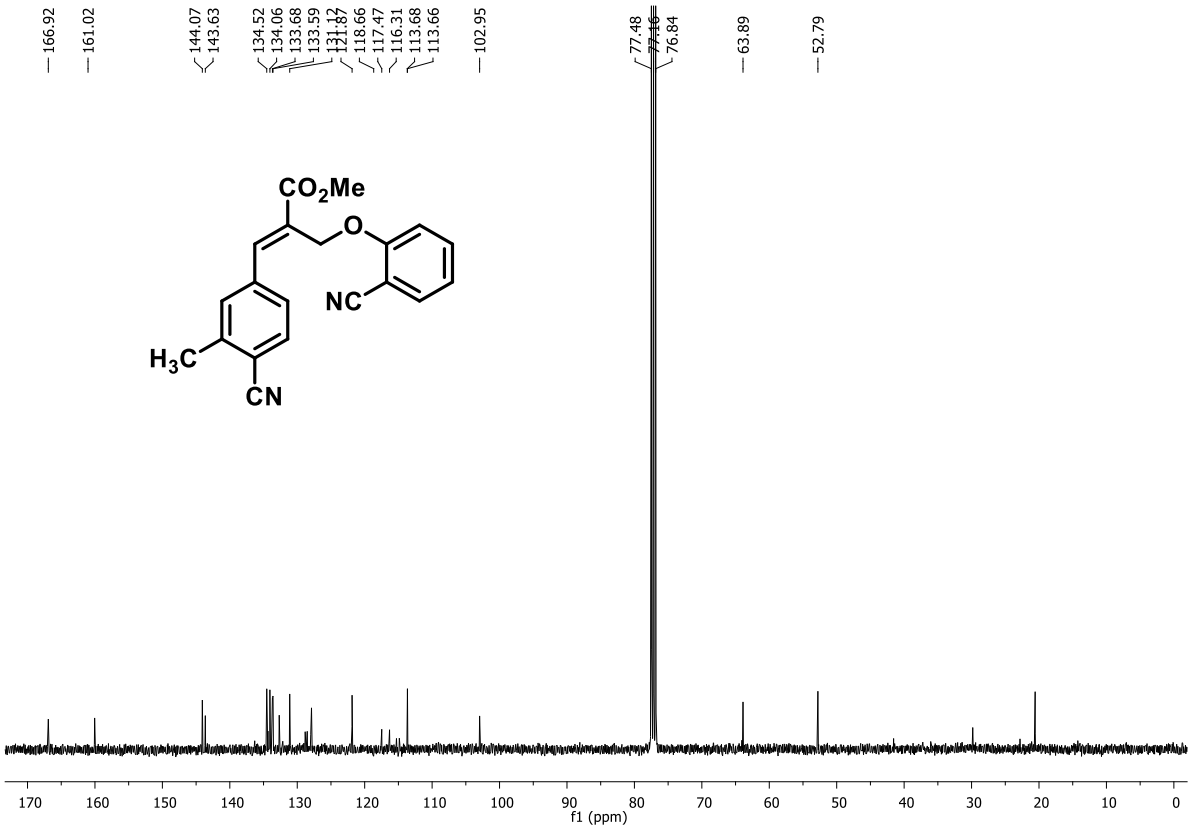
Methyl (*E*)-3-(5-cyano-2-methoxyphenyl)-2-((2-cyanophenoxy)methyl)acrylate (15b)



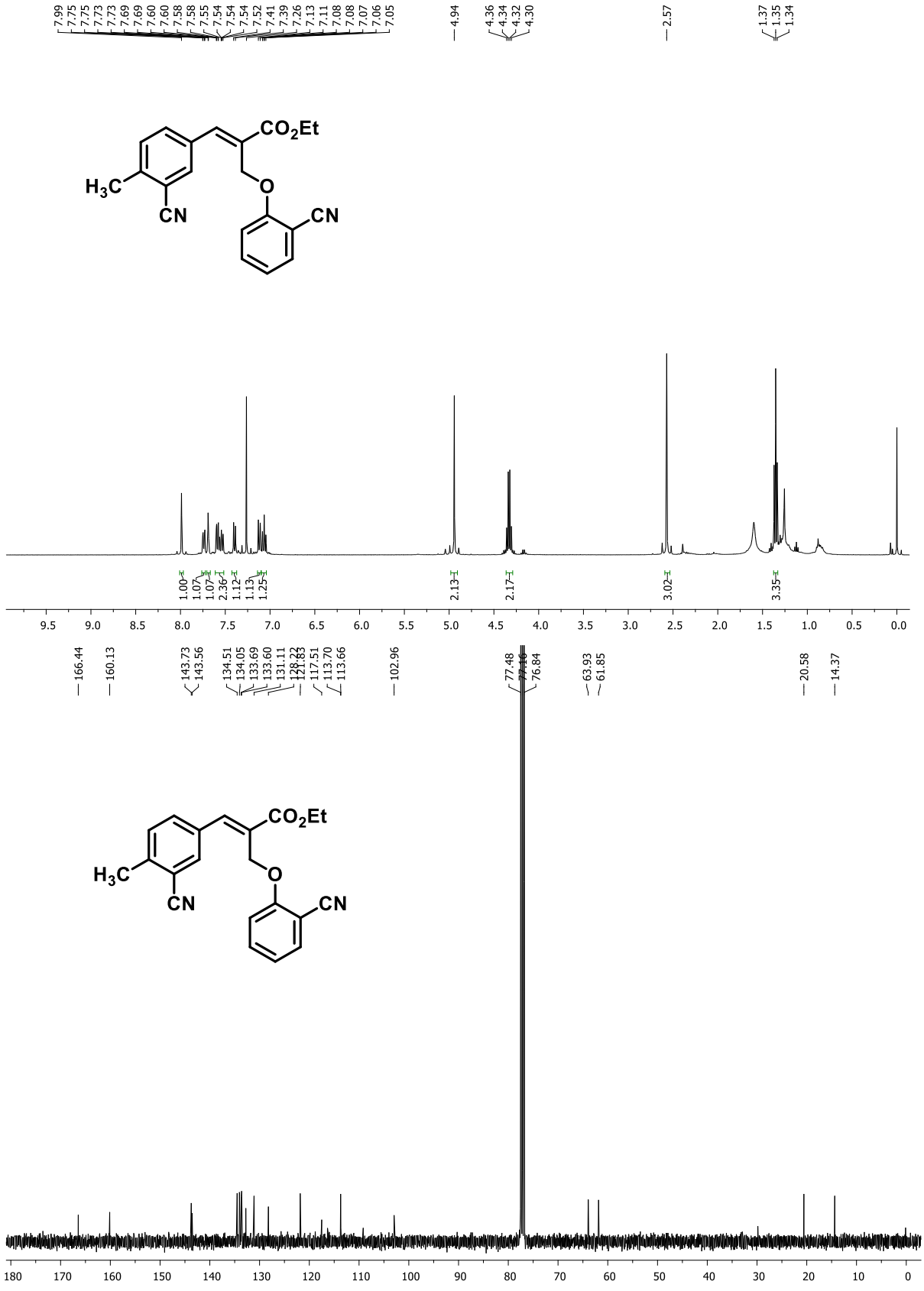


Methyl (*E*)-3-(4-cyano-3-methylphenyl)-2-((2-cyanophenoxy)methyl)acrylate (15c)



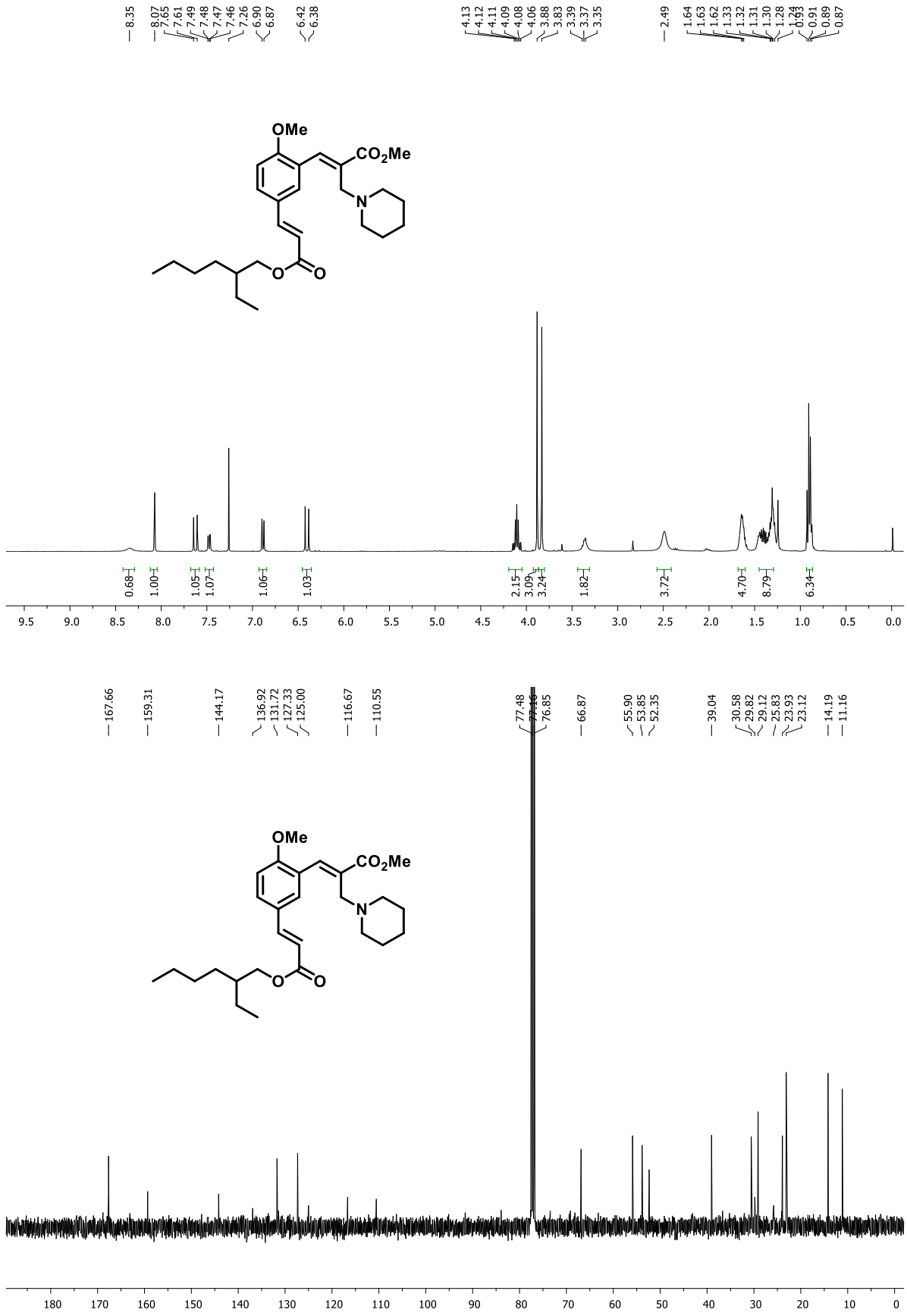


Ethyl (*E*)-3-(3-cyano-4-methylphenyl)-2-((2-cyanophenoxy)methyl)acrylate (15d)



Methyl (*Z*)-2-(bromomethyl)-3-(5-((E)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl) acrylate (16)

Methyl (*E*)-3-(5-((*E*)-3-((2-ethylhexyl)oxy)-3-oxoprop-1-en-1-yl)-2-methoxyphenyl)-2-(pyrrolidin-1-ylmethyl)acrylate (17)



Dimethyl 3,3'-(5-(2-((2-cyanophenoxy)methyl)-3-methoxy-3-oxopropyl)-1,3-phenylene) (2*E*,2'*E*)-diacrylate (19)