

## **Supporting information**

### **Metal-Free Photoinduced Hydroalkylation Cascade Enabled by an Electron-Donor-Acceptor Complex**

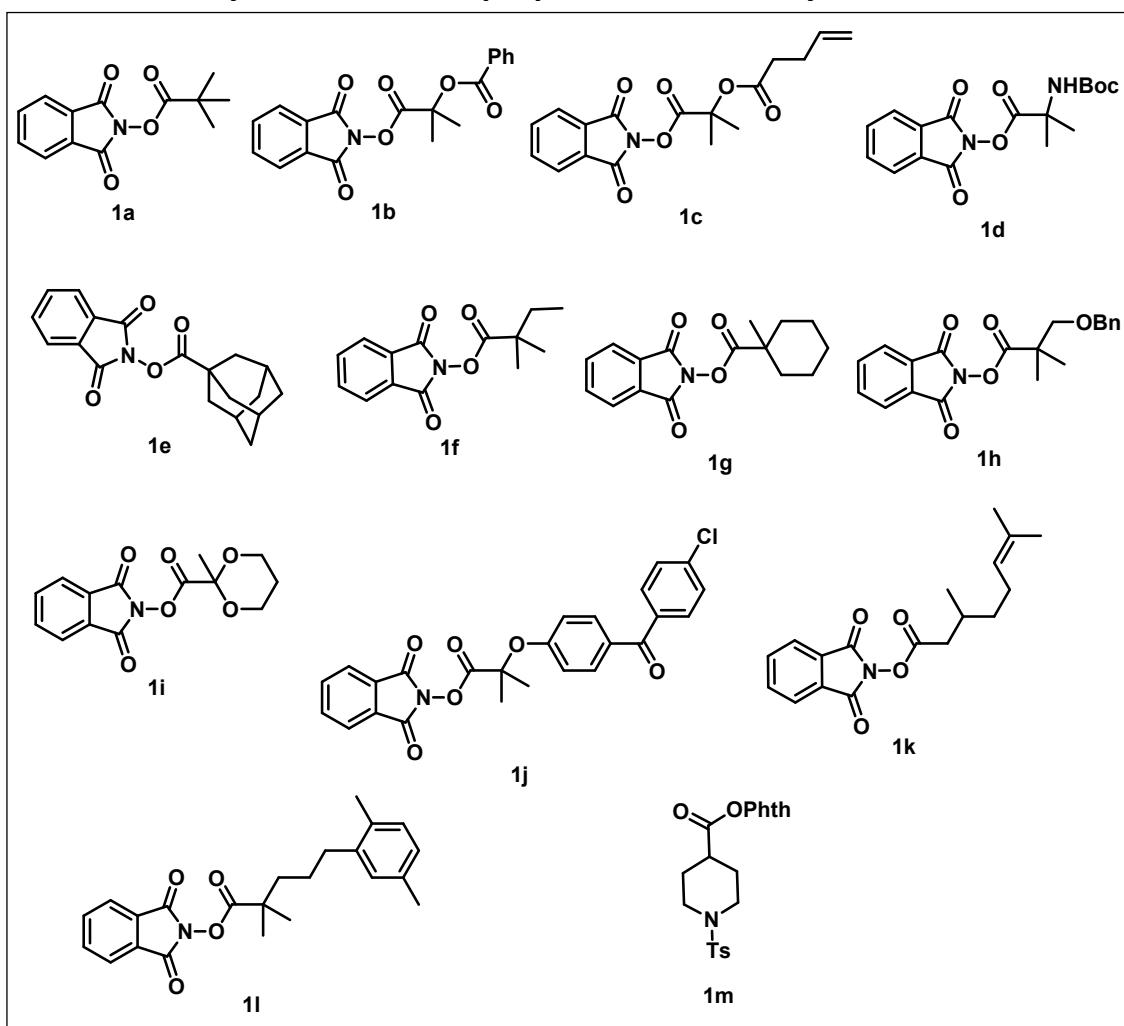
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## **1. Summary of NHPI esters prepared in this study**



### *Figure S1*

## 2. Summary of 1,7-enynes prepared in this study

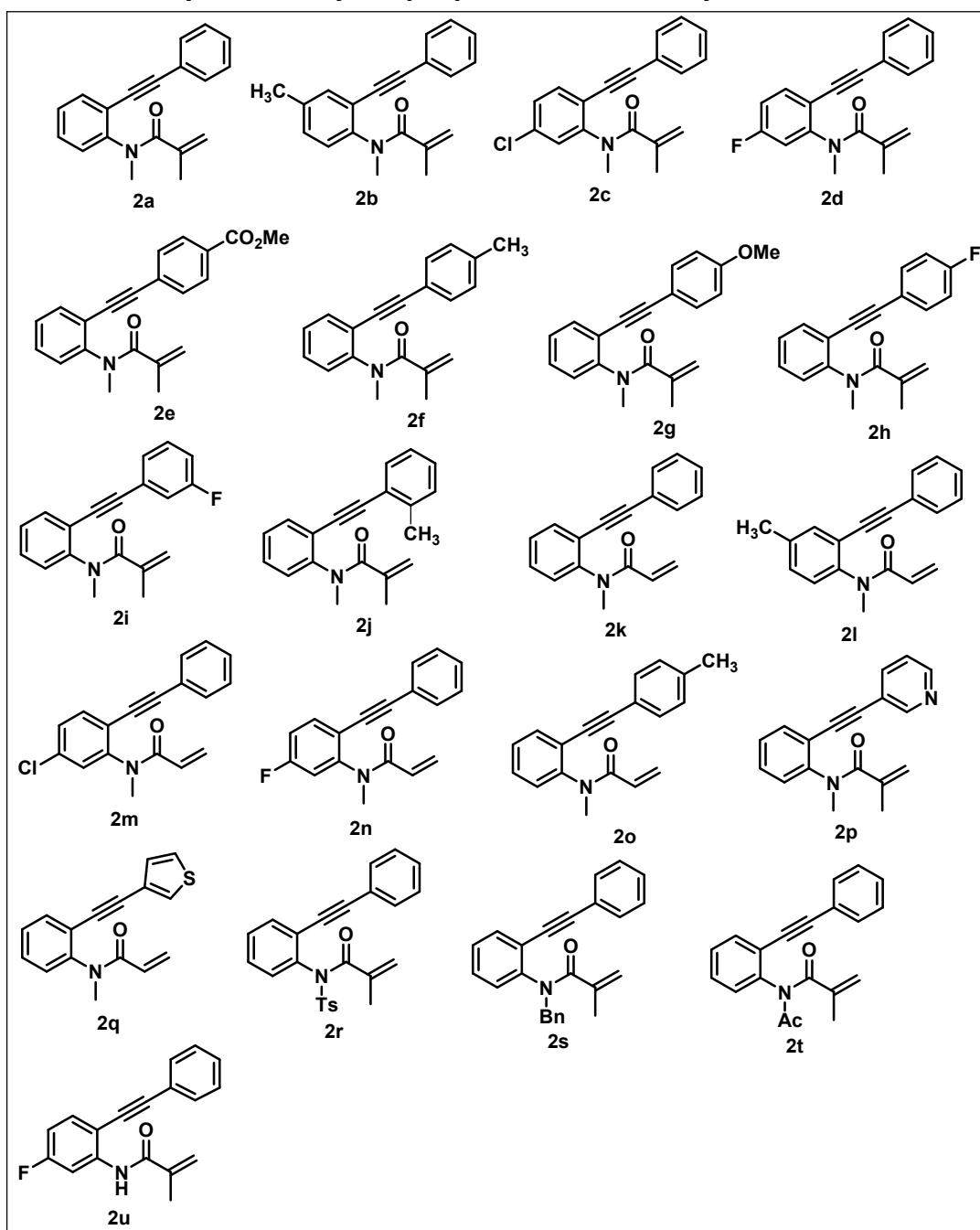


Figure S2

### 3. Spectroscopic and visual evidencies of EDA complex formation

**Spectroscopic evidence:** To identify light-absorbing species of the photoinduced cascade reaction, the optical absorption spectra of a series of solutions were recorded (figure S3). The solutions of **1a** ( $0.2 \text{ molL}^{-1}$ ), **2a** ( $0.2 \text{ molL}^{-1}$ ), Hantzsch ester (HE,  $0.2 \text{ molL}^{-1}$ ) and **2a + HE** ( $0.2 \text{ molL}^{-1}$ ) in DMF were prepared. No obvious change of the absorption was observed for the solutions of **1a** and **2a** in DMF. In contrast, HE solution showed a shift absorption spectrum to the lower energy region, and when the mixture **2a + HE** was analyzed, a clear bathochromic displacement in the visible region could be observed, which is diagnostic of an EDA complex.

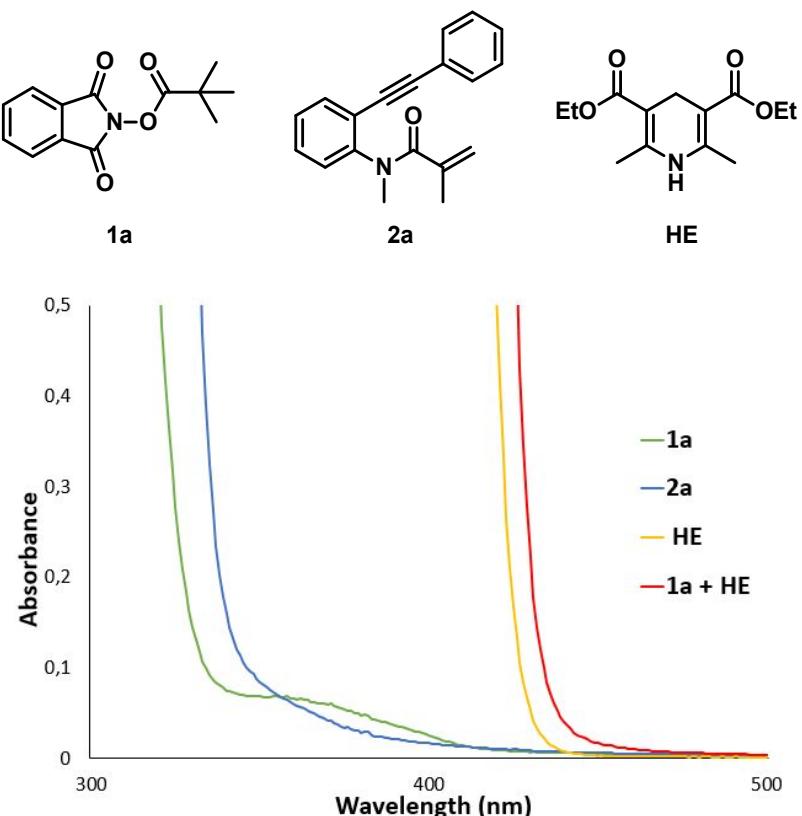
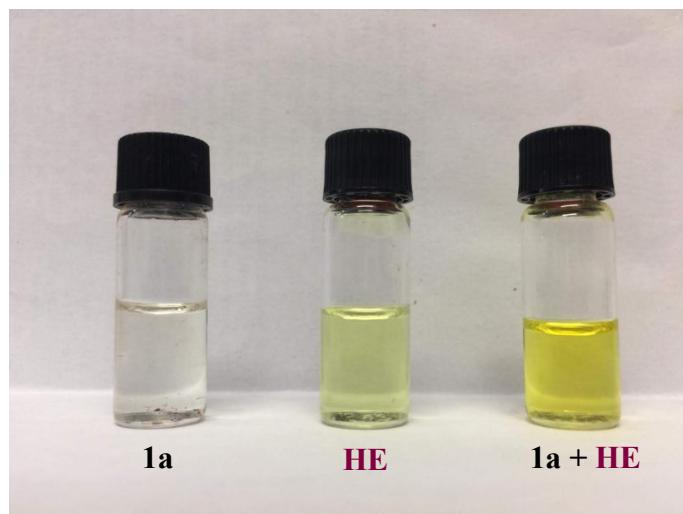


Figure S3. UV-vis spectras.

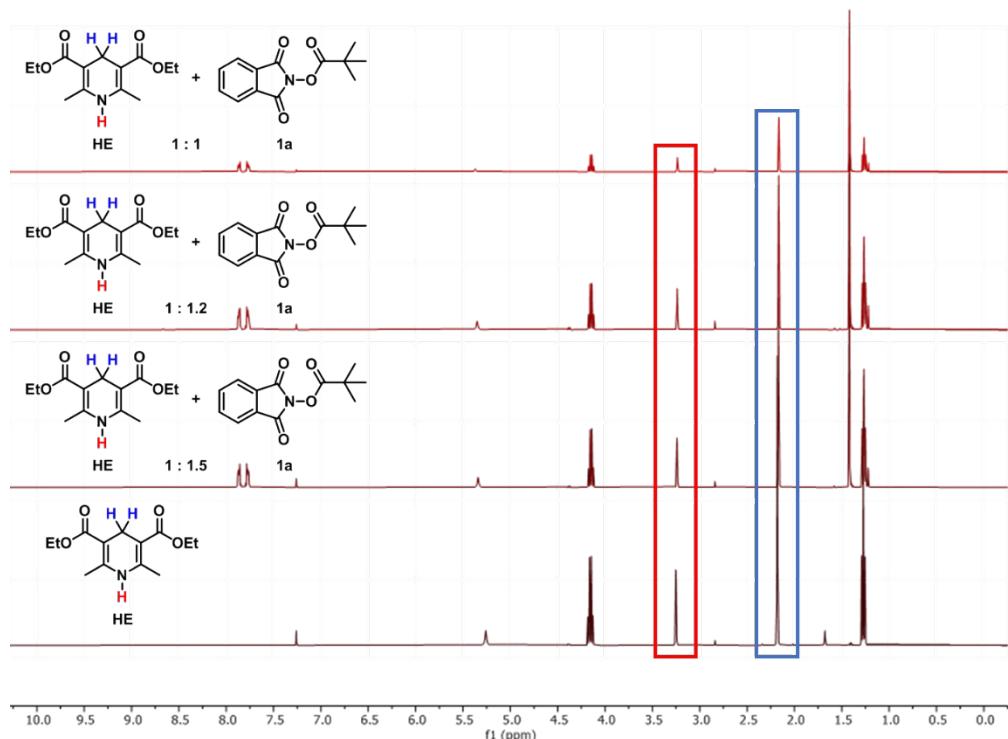
**Visual evidence:**  $0.2\text{M}$  solutions of *N*-(tertbutyloxy)-phthalimide (**1a**), diethyl 2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate (**HE**) and the 1:1 mixture of **1a** and **2a** were prepared (sonication was required to solubilize completely the Hantzsch ester), as shown by figure S4. The intensification of the color observed in the solution containing the mixture can be attributed to the formation of an EDA complex between the reactants.



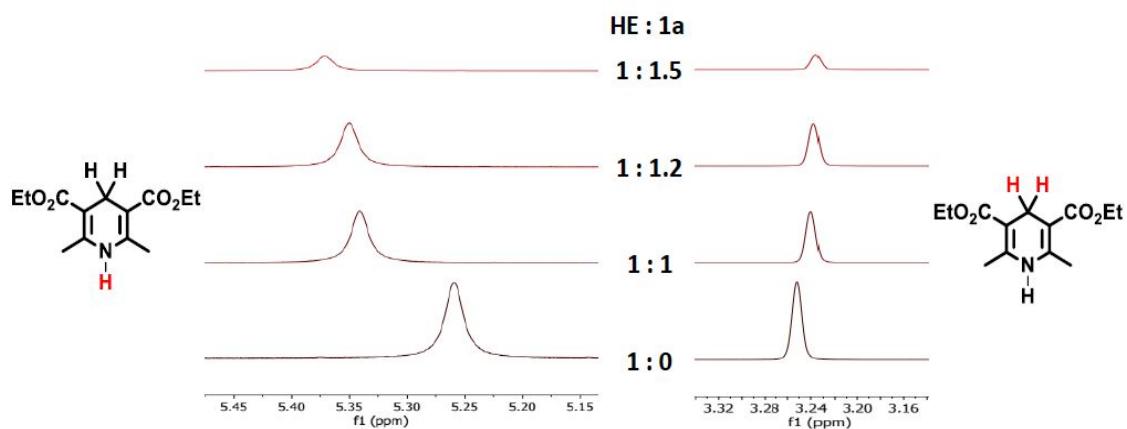
**Figure S4.** DMF 0.2M solutions of *N*-(tertbutyloxy)-phthalimide (**1a**), diethyl 2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate (**HE**) and respective mixture (**1a + HE**).

#### 4. EDA complex evidence through $^1\text{H}$ NMR experiments

$^1\text{H}$  NMR experiments were performed by the preparation of  $\text{CDCl}_3$  solutions containing Hantzsch ester (**HE**) and NHPI ester (**1a**) in three different ratios, keeping constant the amount of **HE** ( $0.1 \text{ mol L}^{-1}$ ) and increasing the amount of **1a** ( $\text{HE : 1a} = 1:1, 1:1.2$  and  $1:1.5$ ). The figure S5 shows the full spectra collected, monitoring of NH and  $\text{CH}_2$  Hantzsch ester's protons. The evidence of interaction between **HE** and **1a** is highlighted in figure S6, where is possible to observe the change in the chemical shifts of the monitored hydrogens with the addition of increasing amounts of **1a**.

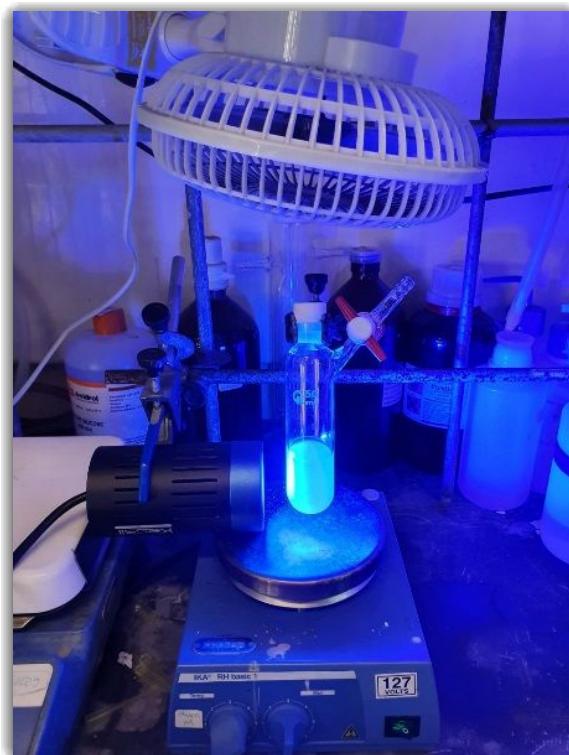


**Figure S5.** Solutions of **HE** and **1a** examined by the  $^1\text{H}$  NMR.



**Figure S6.** Evidence for the formation of EDA complex through  $^1\text{H}$  NMR.

## 5. EDA photoinduced cascade performed at gram-scale – reaction set-up



**Figure S7.** Large scale experiment set-up

## 6. Continuous flow chemistry procedure (optimization and reaction setup)

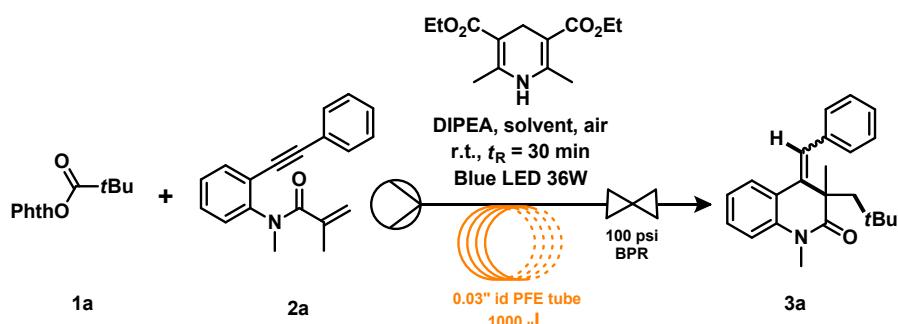


Figure S8

### General material information for flow setups:

1. Harvard Apparatus syringe pump, Pump 11 Elite, was purchased from Harvard Apparatus (Holliston, MA);
2. Stainless steel syringes, 8 mL (10 mm diameter);
3. fluorinated ethylene propylene (FEP) tubings were purchased from IDEX health & science (Oak Harbor, WA);
4. Super Flangeless fittings (include nuts and ferrules) were purchased from IDEX health & science (Oak Harbor, WA);
5. Kessil® Lamp Source, 36W Blue LED, was purchased from Kessil® Brand (Richmond, CA);
6. Back pack pressure (100 psi), was purchased from IDEX health & science (Oak Harbor, WA).

### Procedure:

As shown in figure S9, a Harvard Apparatus syringe pump (Pump 11 Elite) was used to deliver the reagent solution (syringe 1) from a Stainless steel, which was connected to the fluorinated ethylene propylene (FEP, OD 1/16", ID 0.03") tubing at a shut-off valve (OD 1/16", thru hole 0.03"). The tubing reactor was wrapped within the helical grooves around a glass tube. The cone reactor was irradiated by two blue LED lamp (34W). The Back pack pressure (100 psi) was used. The entire reactor was covered by black cardboard. The final exiting stream was collected into a flask.



**Figure S9.** Setup of the continuous photochemistry system: Left: The full setup; Right: Close-up of the reactor reaction.

**Reaction conditions:** Along the table 1 is possible to observe the experimental conditions evaluated during the development of a continuous flow photo-process.

**Table S1:** Applied procedures for the development of continuous flow photo-process.

<b>1a</b> (mol/L)	<b>2a</b> (mol/L)	HE (mol/L)	DIPEA	$t_R$ (min)	Solvent	V (ml)	<b>3a</b> (yield %)
0,2	0,1	0,15	0,2	30	DMF	5	76%
0,2	0,1	0,15	0,2	20	THF	10	48%
0,2	0,1	0,15	0,2	30	THF	10	51%
0,2	0,1	0,15	0,2	30	THF:DMF (9:1)	10	89%
0,2	0,1	0,15	0,2	30	THF:DMF (9:1)	25	70%

<b>Reaction Conditions:</b>	1a (1.0 equiv); 2a (2.0 equiv); 3 Hantzsch Ester (1.5 equiv); DIPEA (2.0 equiv). r.t., (PBR: PFE tube 0.03" diameter; 1000 μL), back pack pressure (100 psi)
* Same concentration as the batch conditions	
	The system was pre-filled with DMF before the injection of the reaction mixture. After the reaction mixture had been passed through the system under the indicated reaction conditions (5 mL), the system was washed with DMF and the total collected amount was submitted to the work-up procedure.
	The reaction mixture was injected (10 mL and 25 mL) without pre-stabilization. The volume corresponding to 3 retention times was collected and discarded and remaining volume was collected and submitted to the work-up.

## 7. Determination of E/Z configuration of the diastereomeric mixture through Nuclear Overhauser Effect (NOE)

In order to identify the double bond configuration of the diastereoisomers obtained in the photocascade process, NOE experiments were performed. As a result of the irradiation of some  $^1\text{H}$  nuclei from both diastereomers, the major and minor isomers could be assigned properly. The results from NOE experiments can be seen through the figures S10 to S16. The sample used in those experiments was obtained from the reaction performed in flow, which afforded a Z/E ratio superior to the bath process.

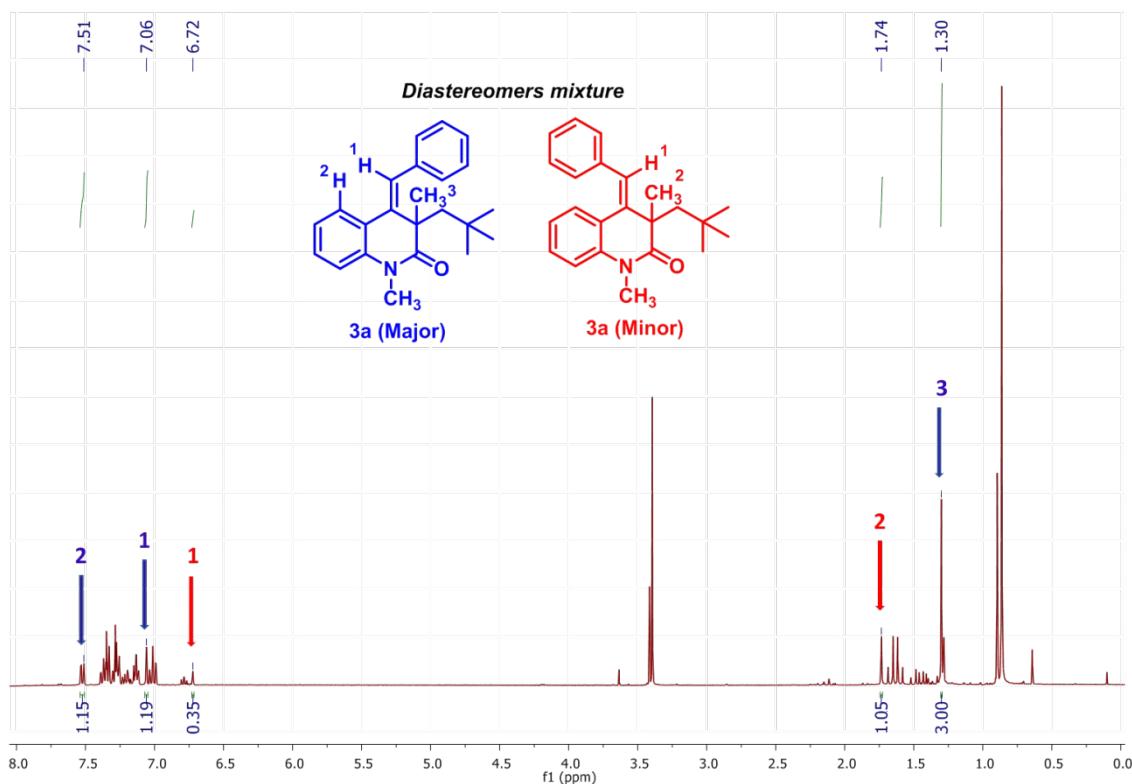
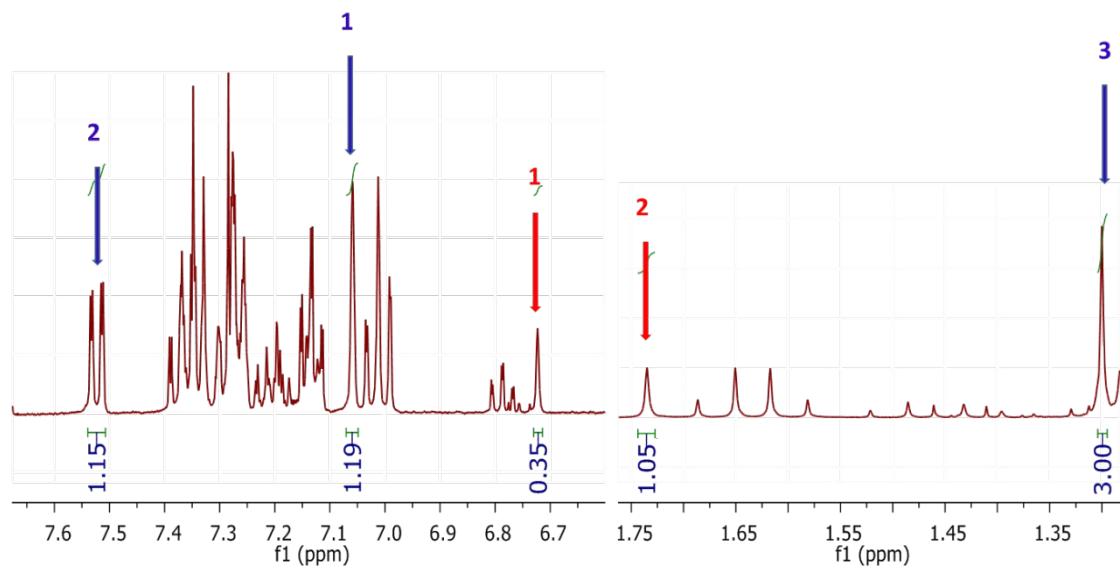
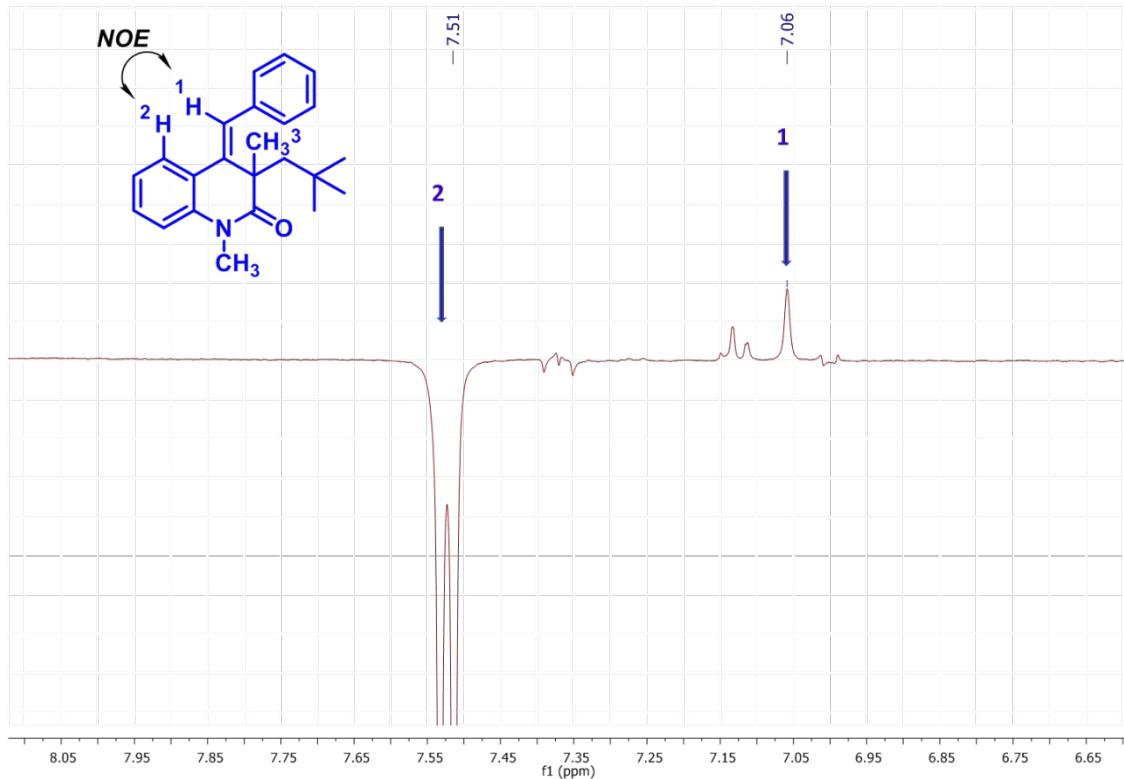


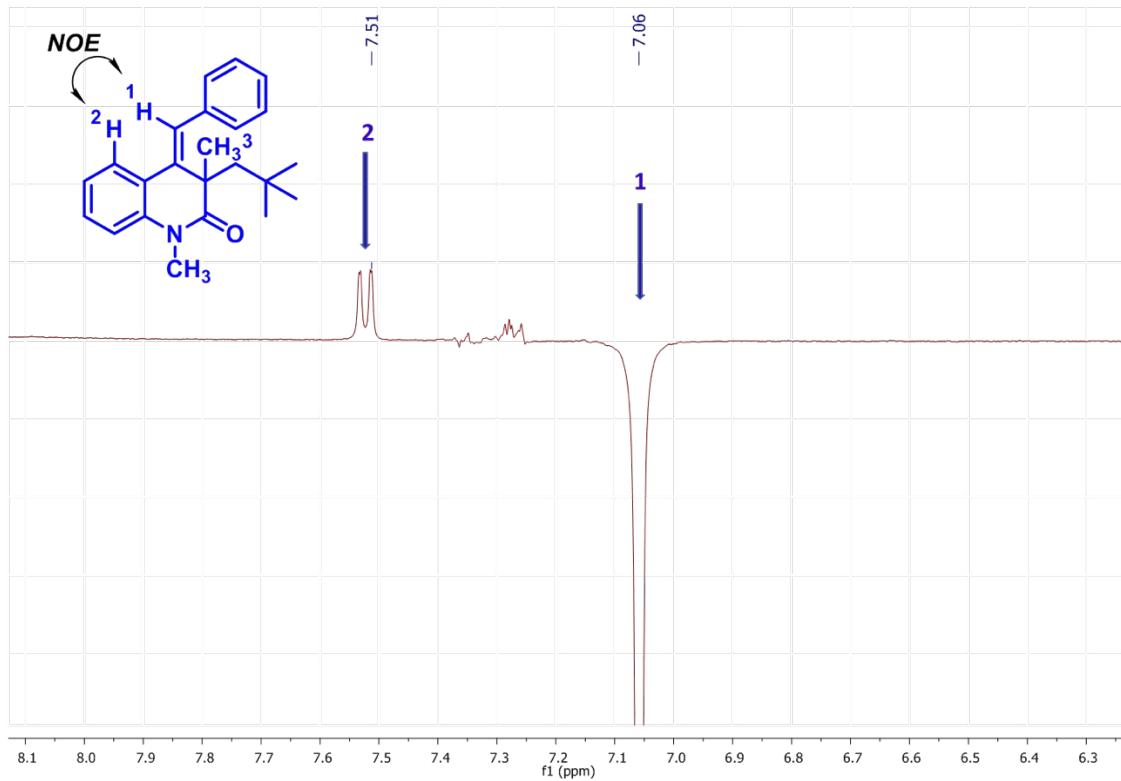
Figure S10. Full view of  $^1\text{H}$  spectra for a diastereomeric mixture (3:1) of the product **3a**.



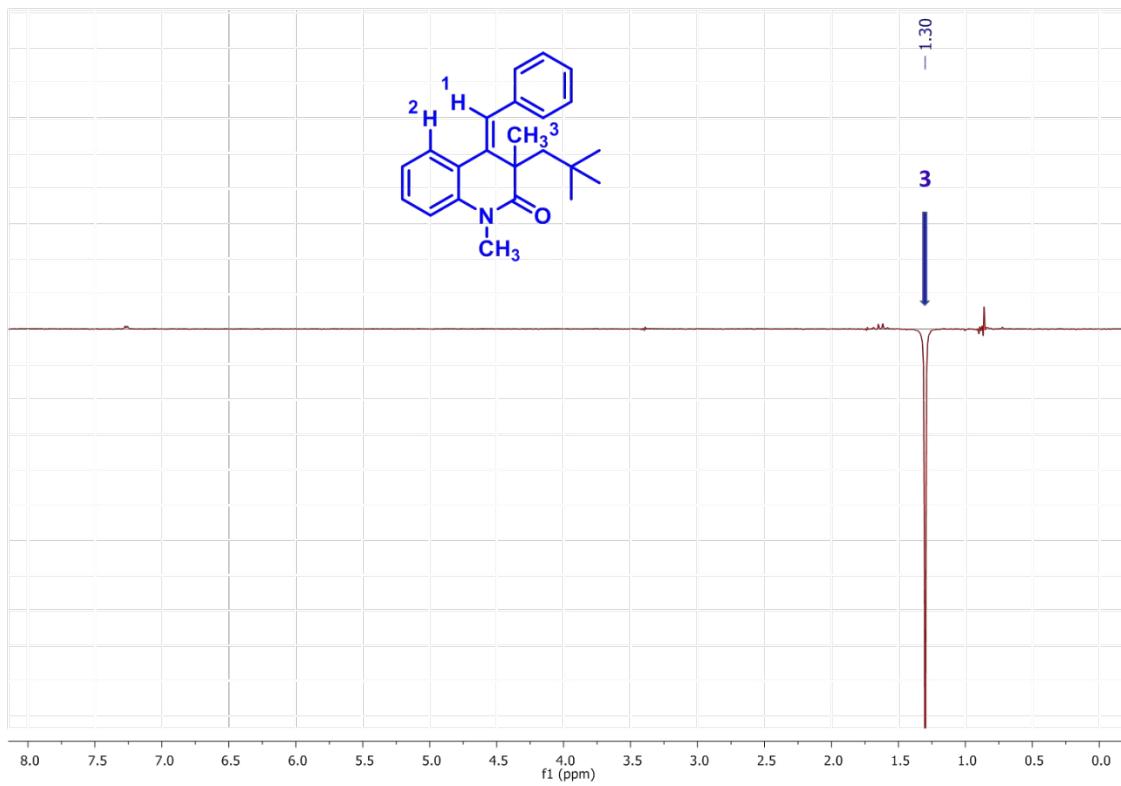
**Figure S11.** Zoom to highlight the <sup>1</sup>H signals irradiated by NOE experiments.



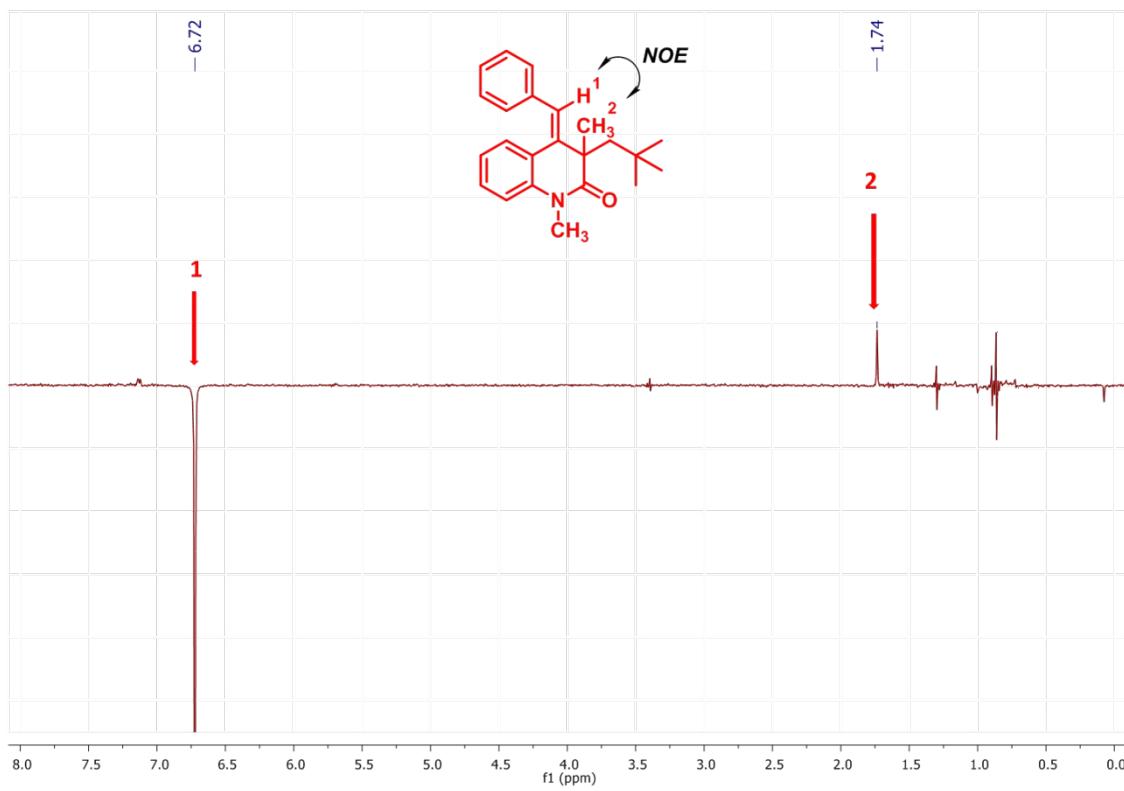
**Figure S12.** Observation of nuclear overhauser effect (NOE) between the represented hydrogens for the major diastereomer.



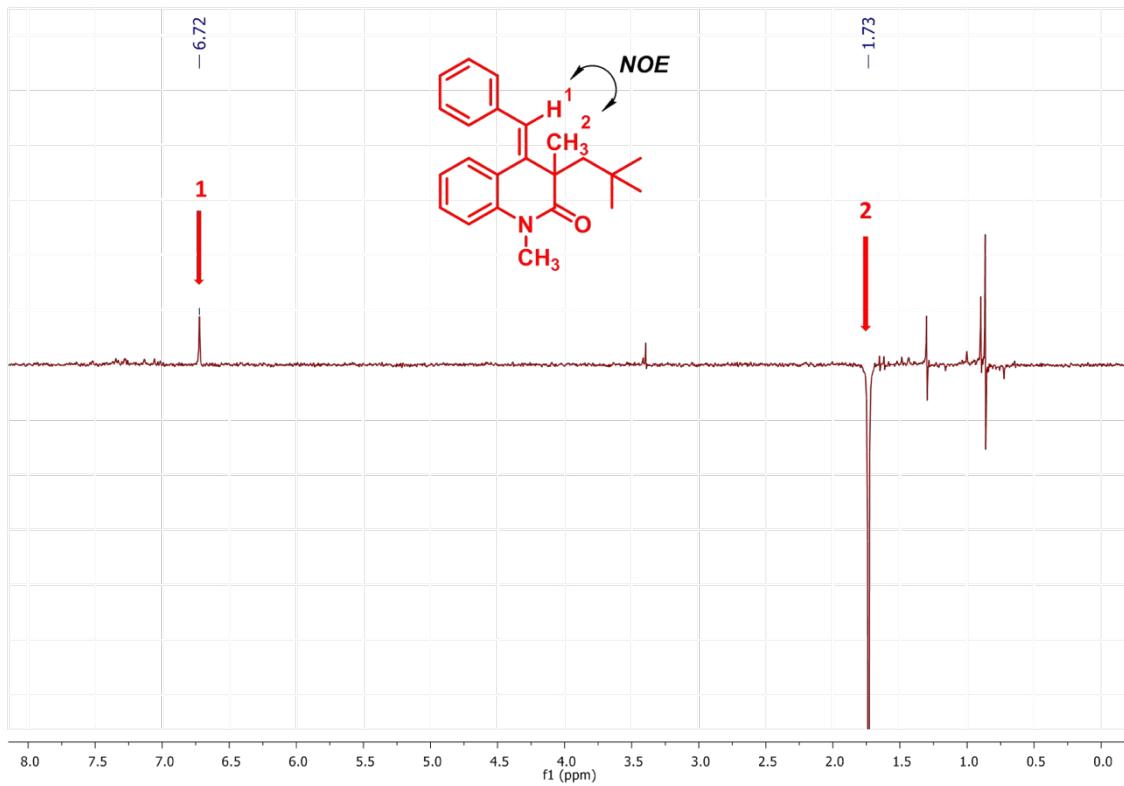
**Figure S13.** Observation of nuclear overhauser effect (NOE) between the represented hydrogens for the major diastereomer.



**Figure S 14.** Lack of nuclear overhauser effect (NOE) for the hydrogen assigned above.



**Figure S15.** Observation of nuclear overhauser effect (NOE) between the represented hydrogens for the minor diastereomer.

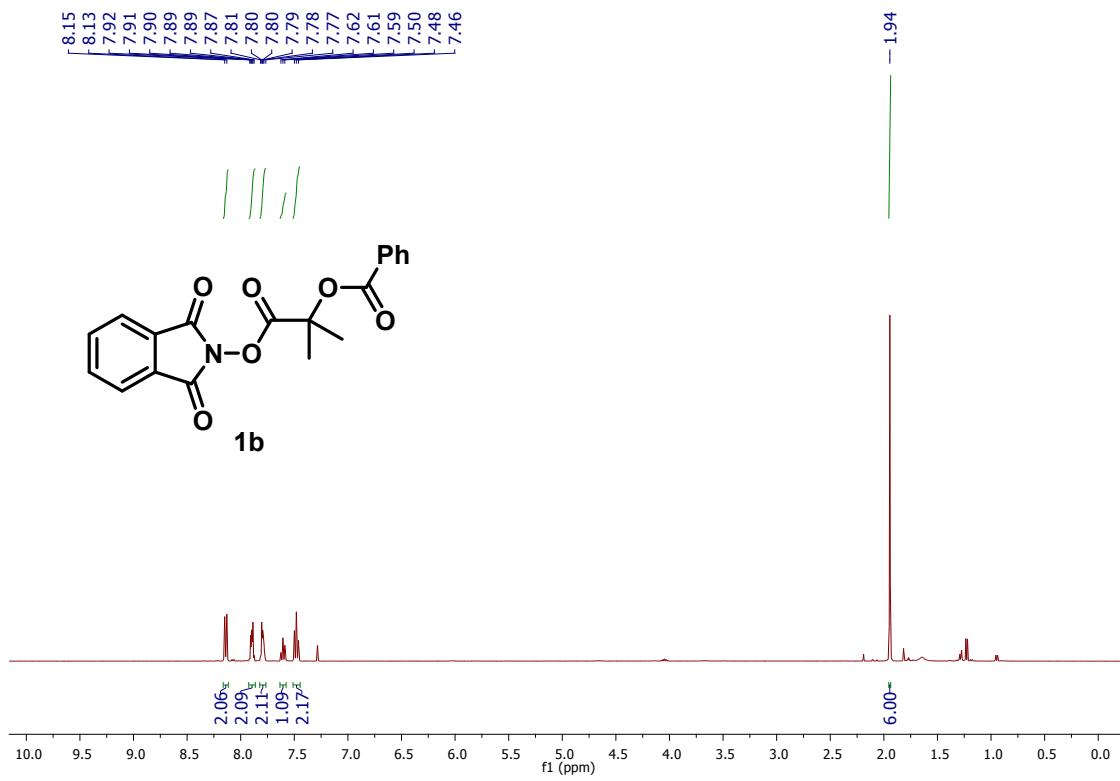


**Figure S16.** Observation of nuclear overhauser effect (NOE) between the represented hydrogens for the minor diastereomer.

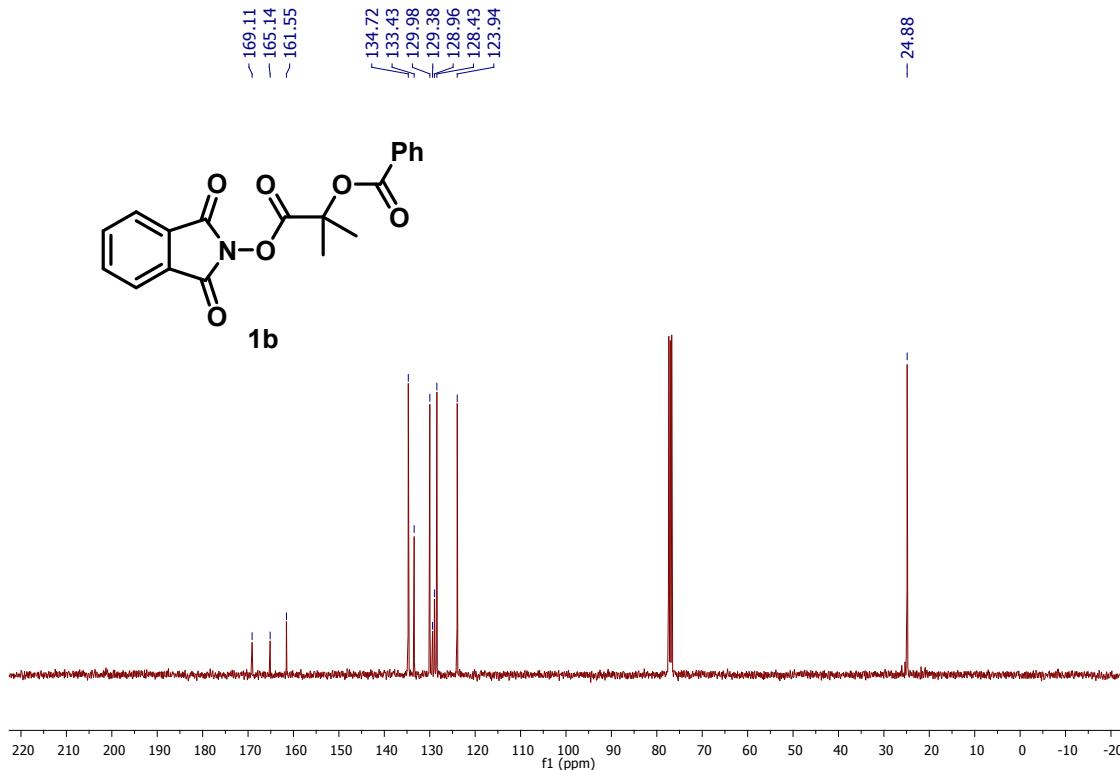
## 8. NMR Spectra of some NHPI esters and the photoinduced cascade products

**1-((1,3-dioxoisooindolin-2-yl)oxy)-2-methyl-1-oxopropan-2-yl benzoate (1b).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

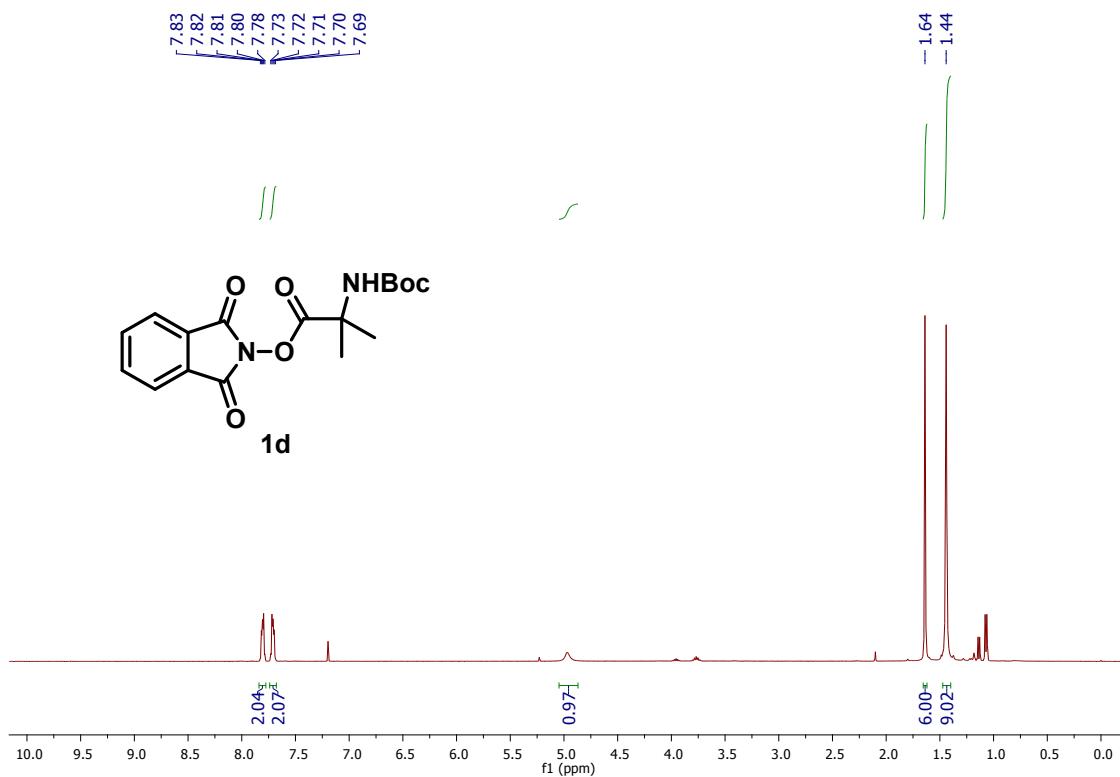


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

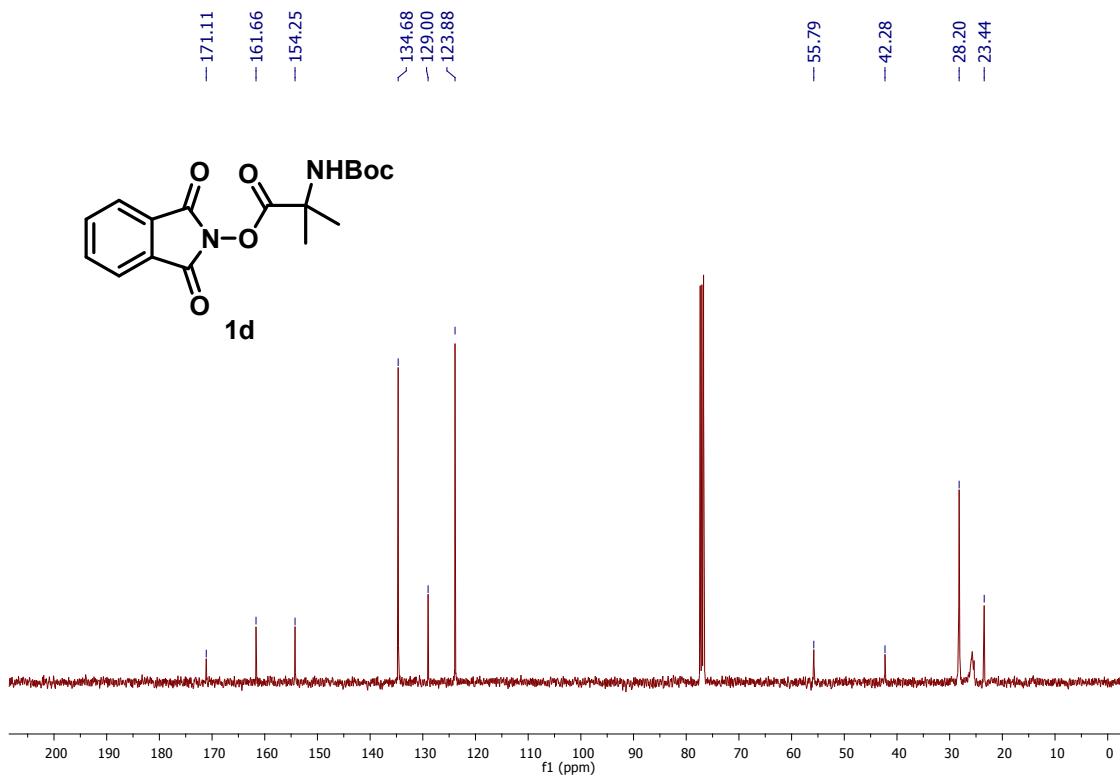


**1,3-dioxoisooindolin-2-yl 2-((tert-butoxycarbonyl)amino)-2-methylpropanoate (1d).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

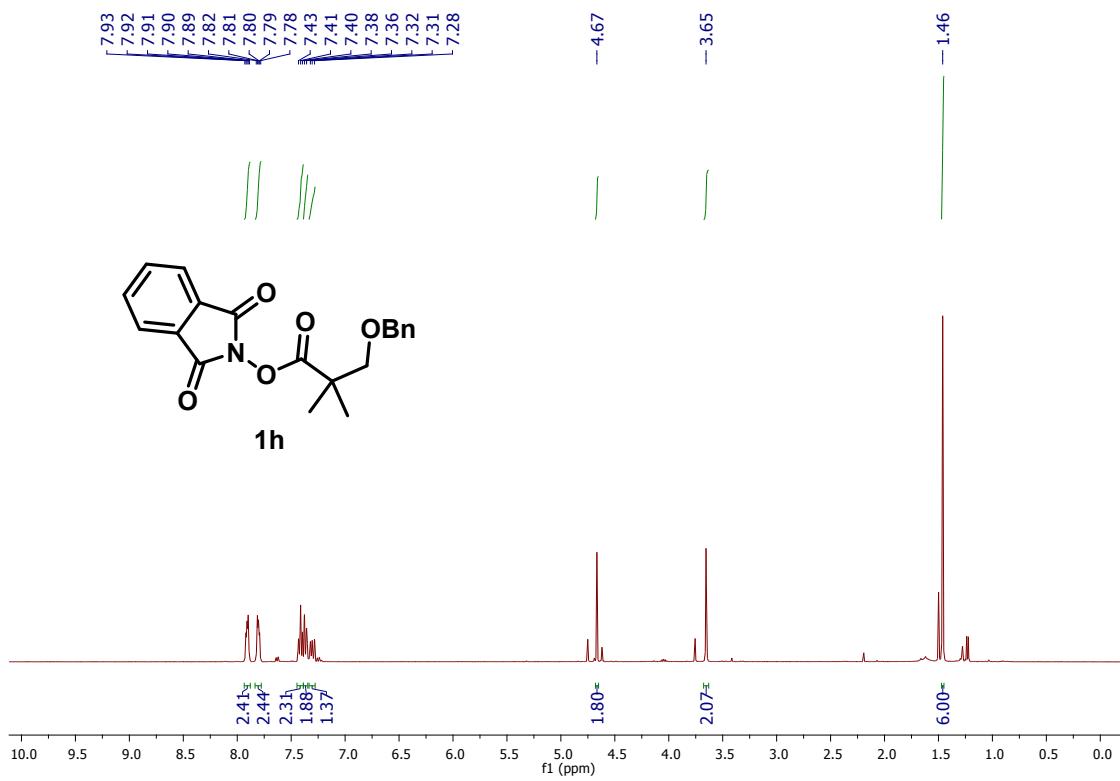


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

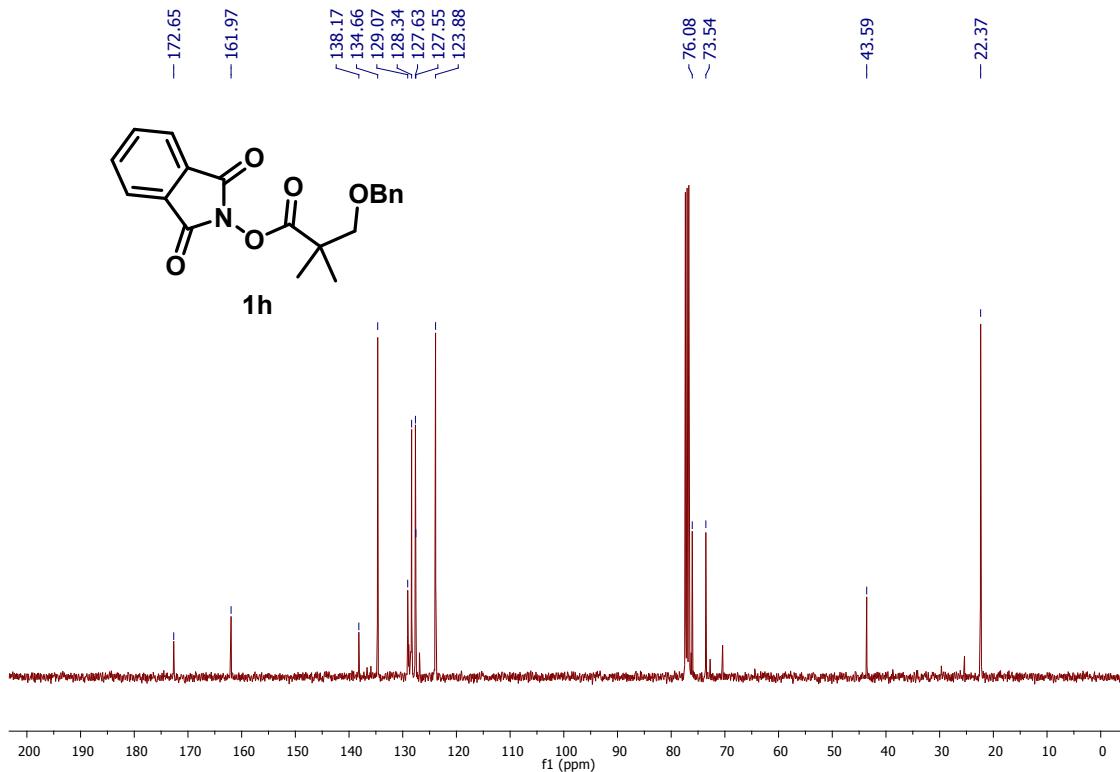


**1,3-dioxoisooindolin-2-yl 3-(benzyloxy)-2,2-dimethylpropanoate (1h).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

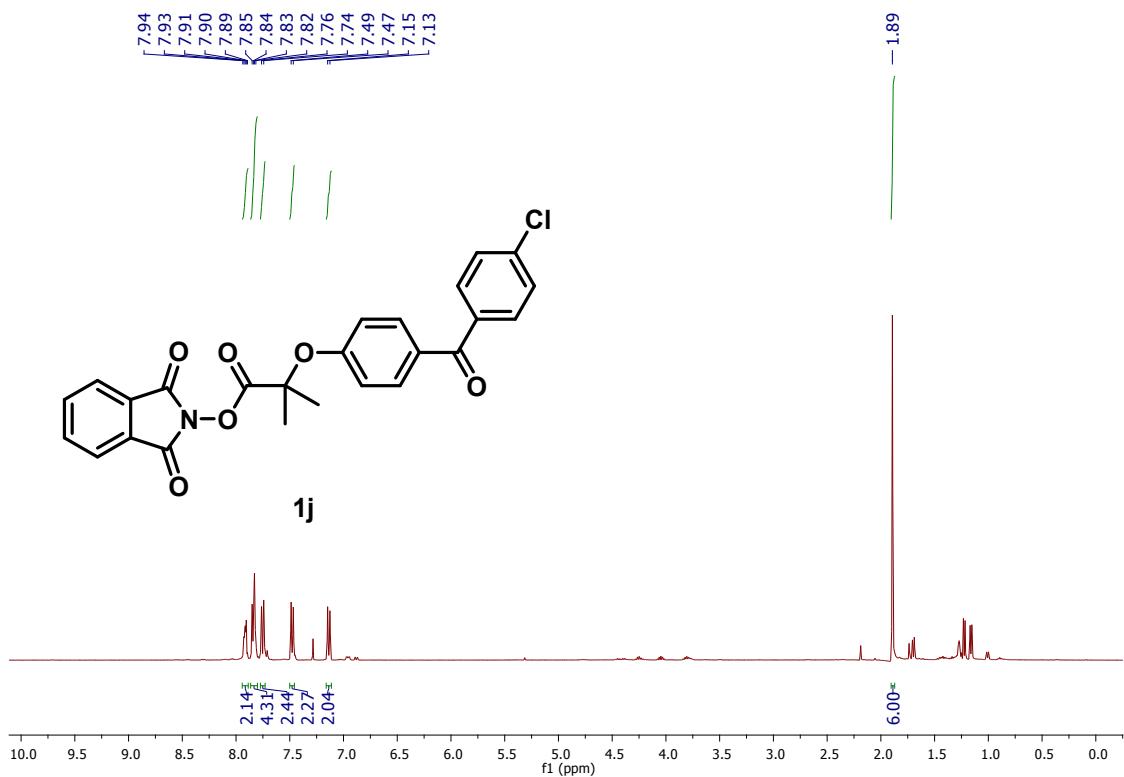


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

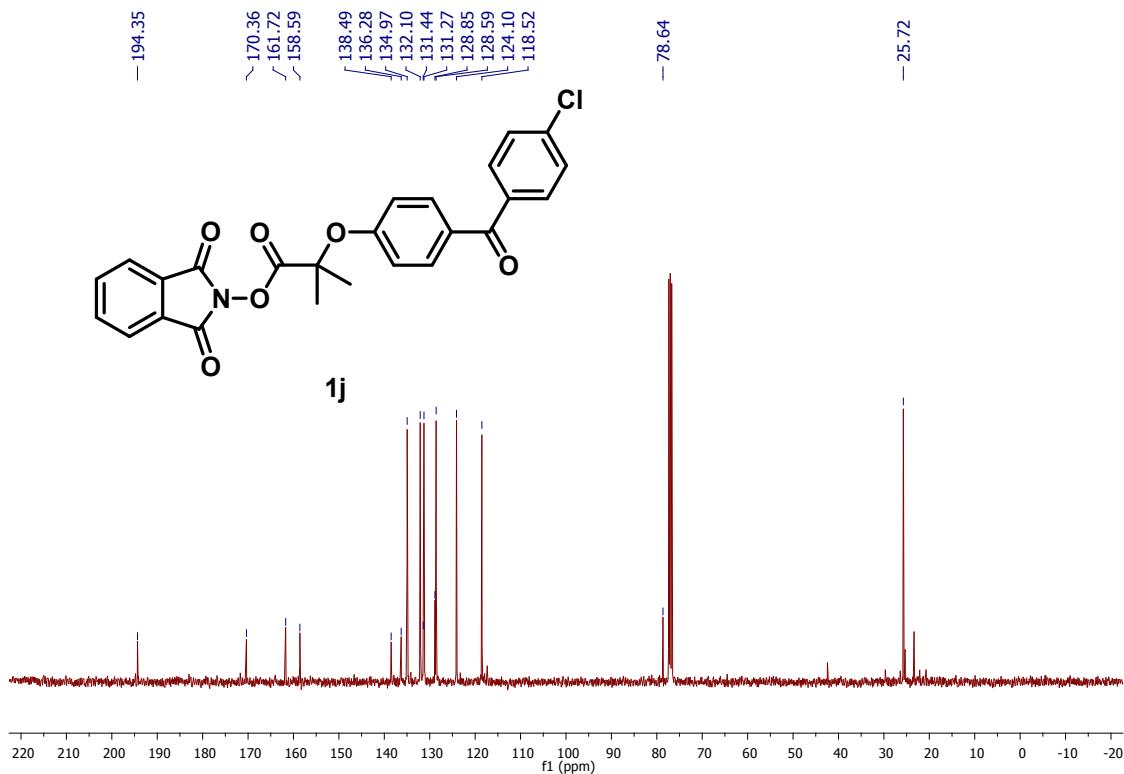


**1,3-dioxoisooindolin-2-yl 2-(4-(4-chlorobenzoyl)phenoxy)-2-methylpropanoate (1j).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

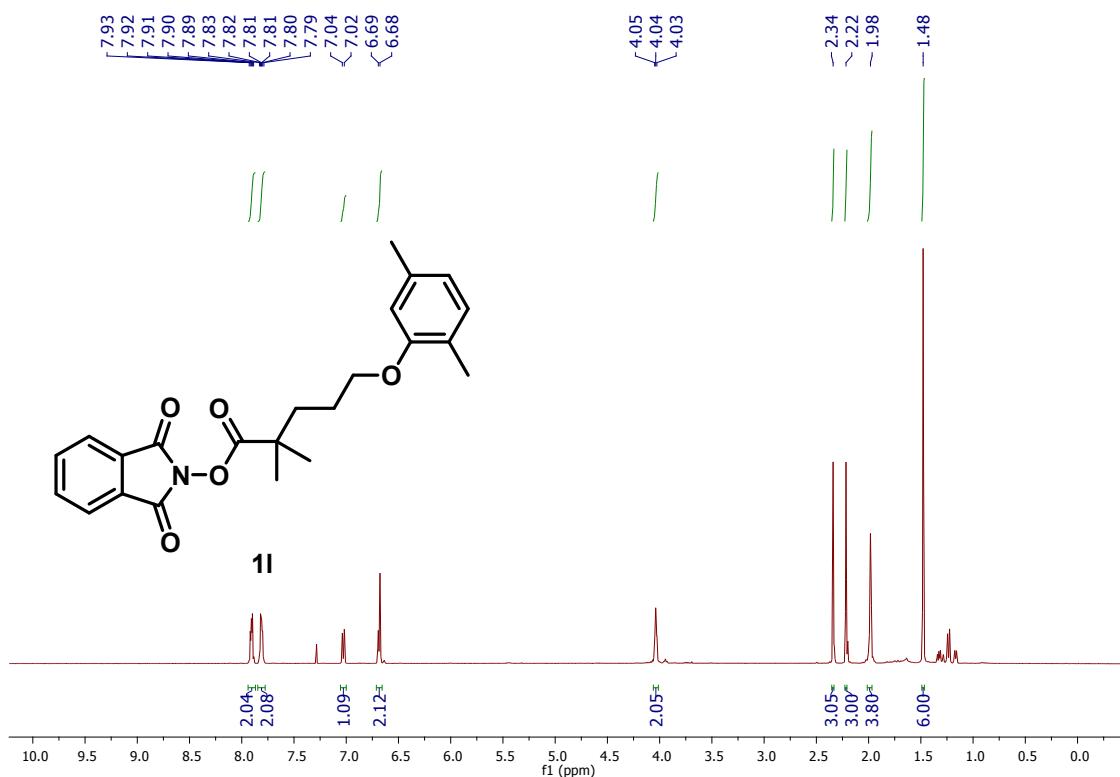


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

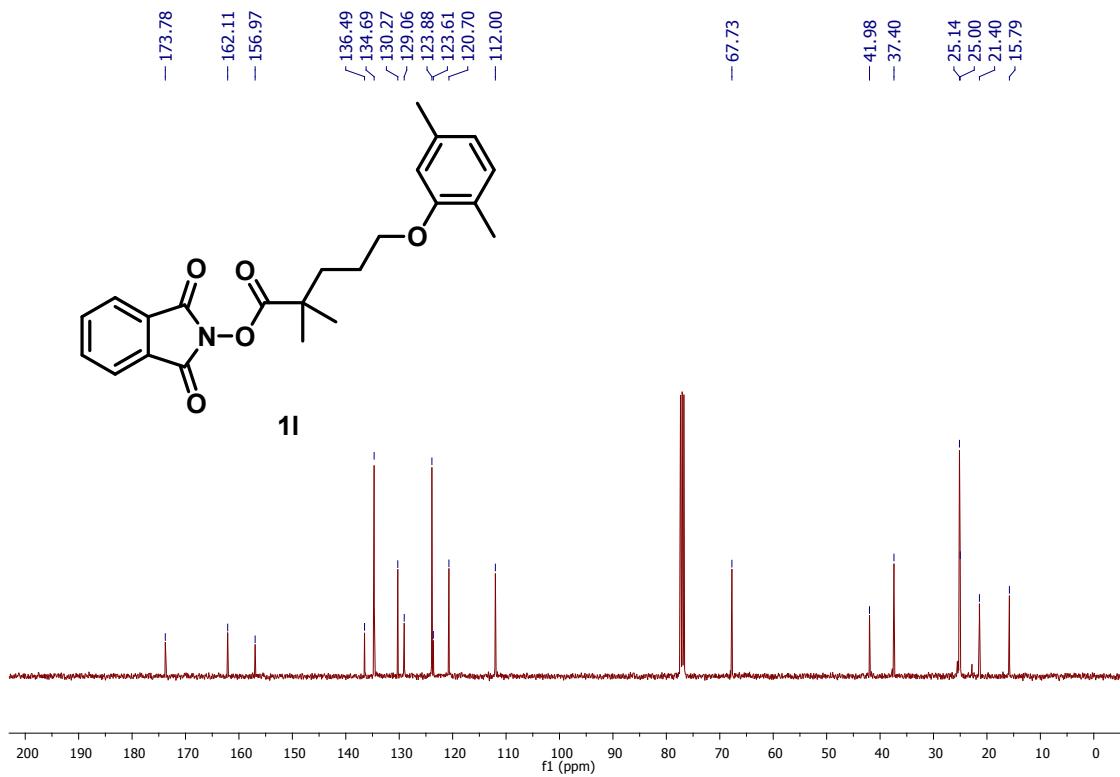


**1,3-dioxoisooindolin-2-yl 5-(2,5-dimethylphenoxy)-2,2-dimethylpentanoate (1l).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

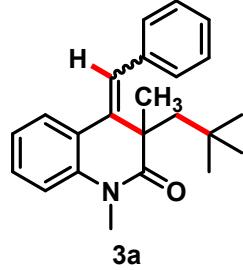
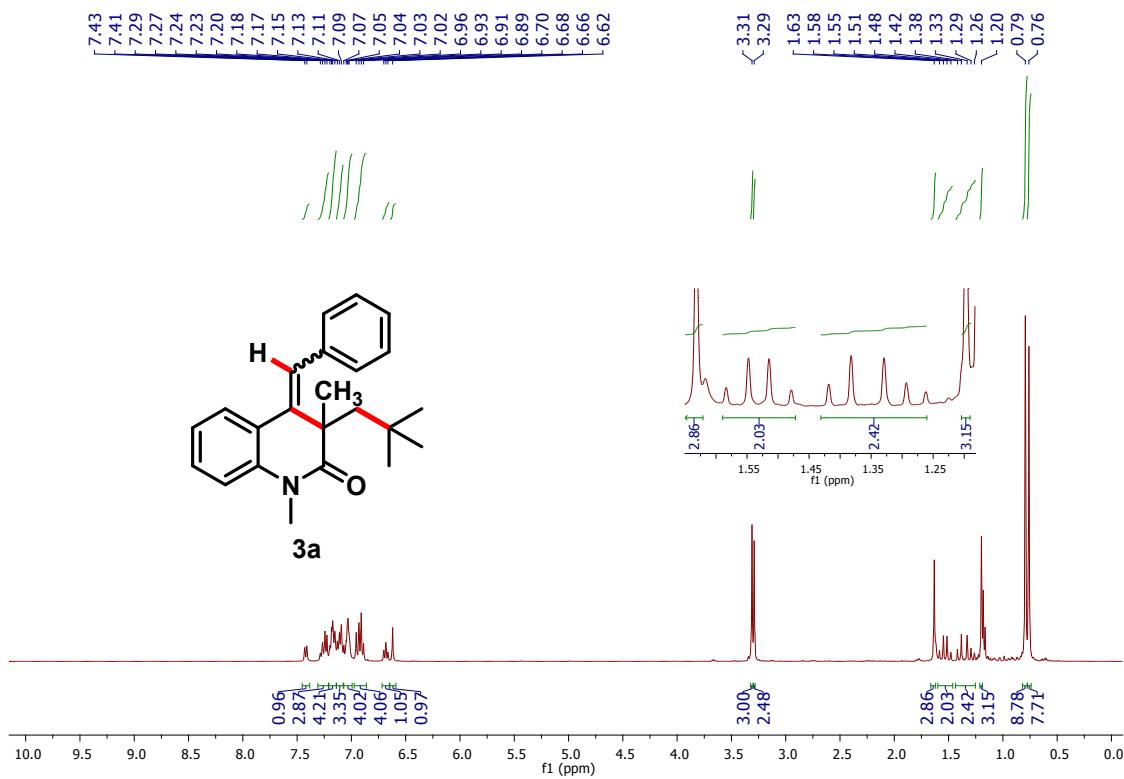


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

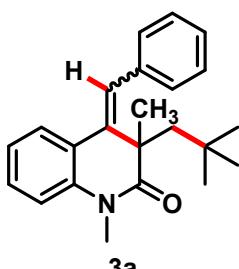
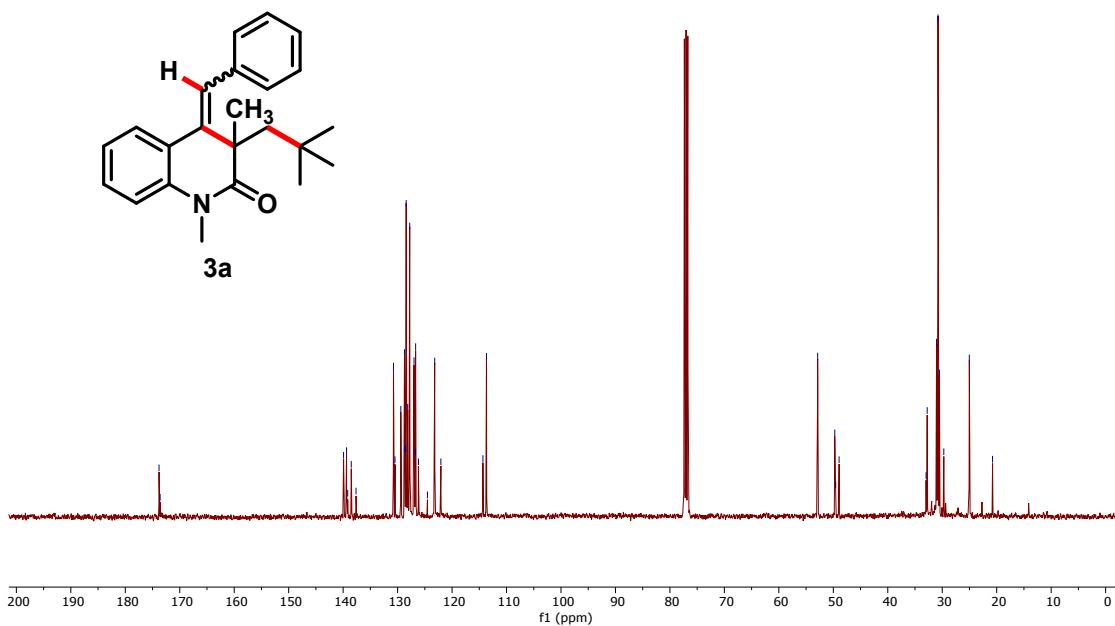


**4-benzylidene-1,3-dimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3a).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>



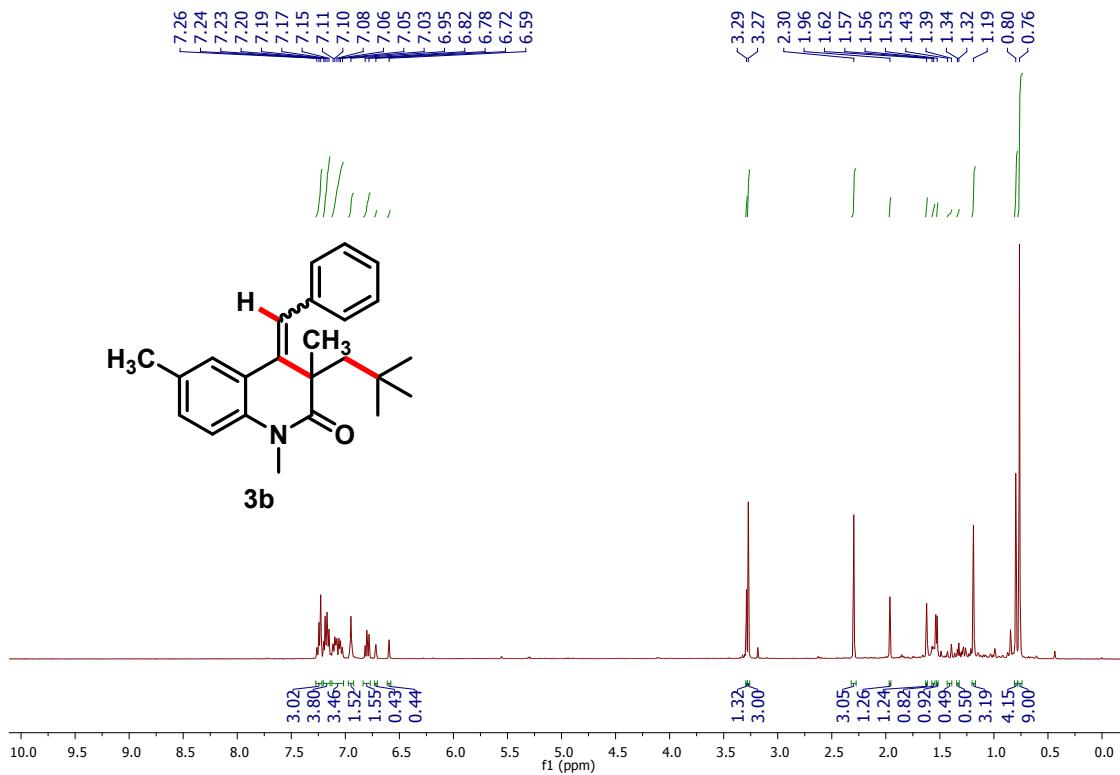
3a



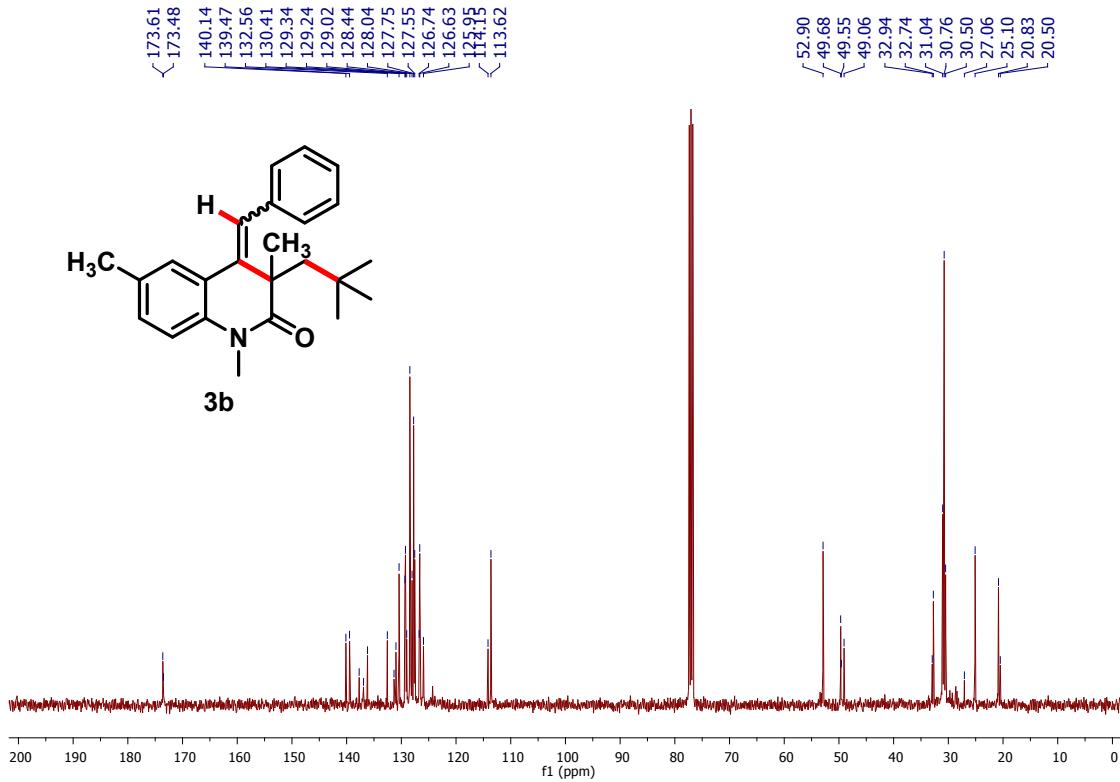
3a

**4-benzylidene-1,3,6-trimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3b).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

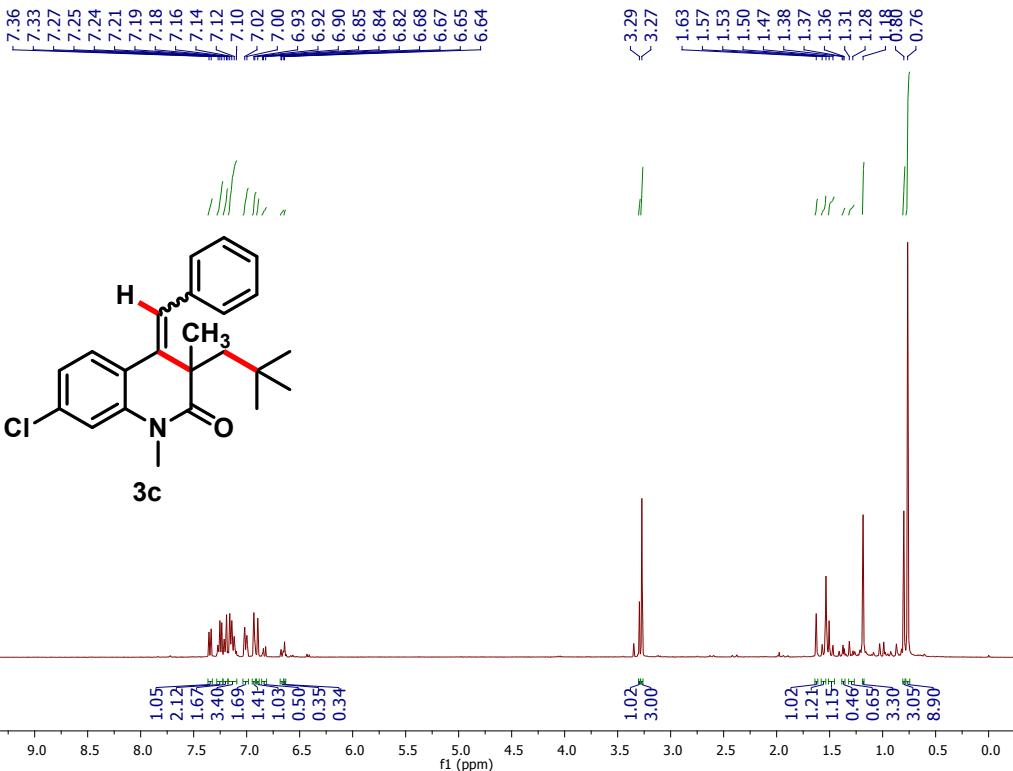


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

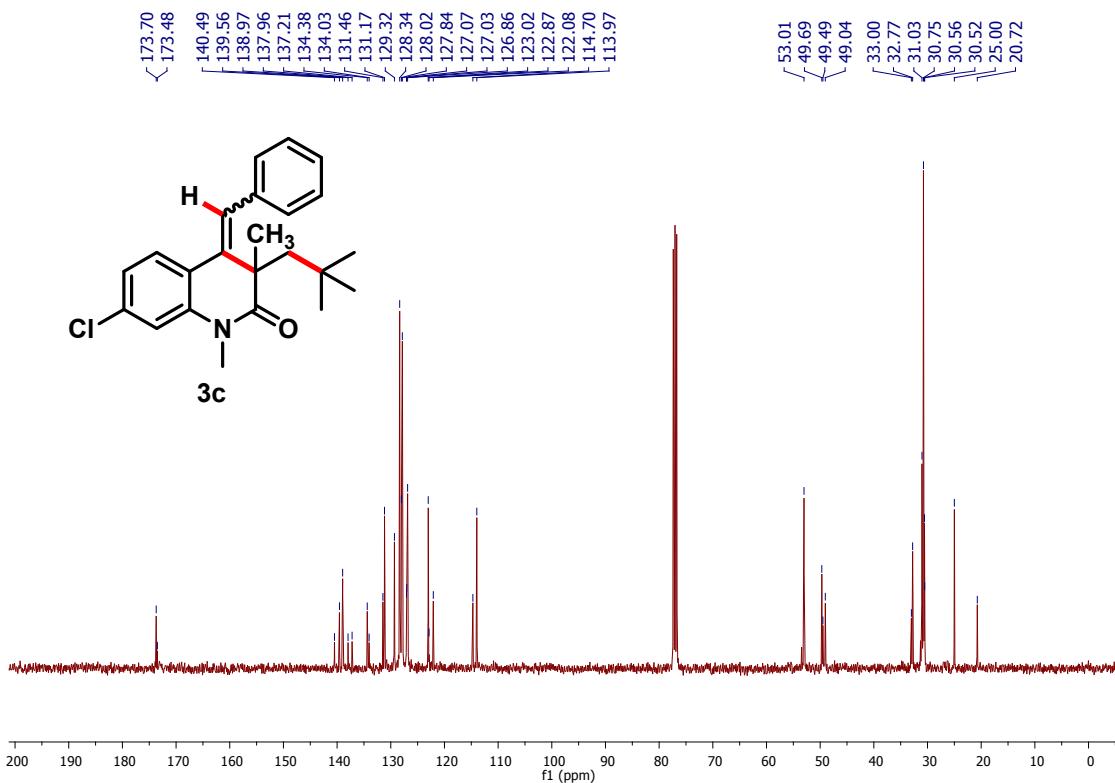


**4-benzylidene-7-chloro-1,3-dimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3c).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

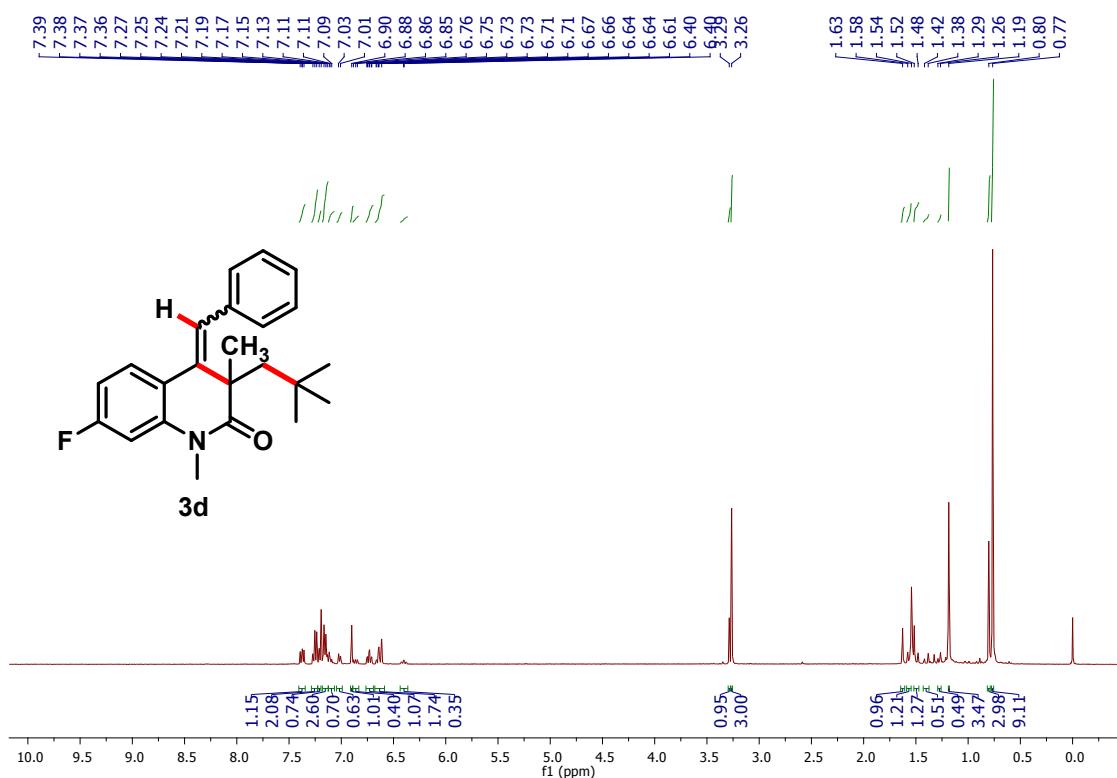


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

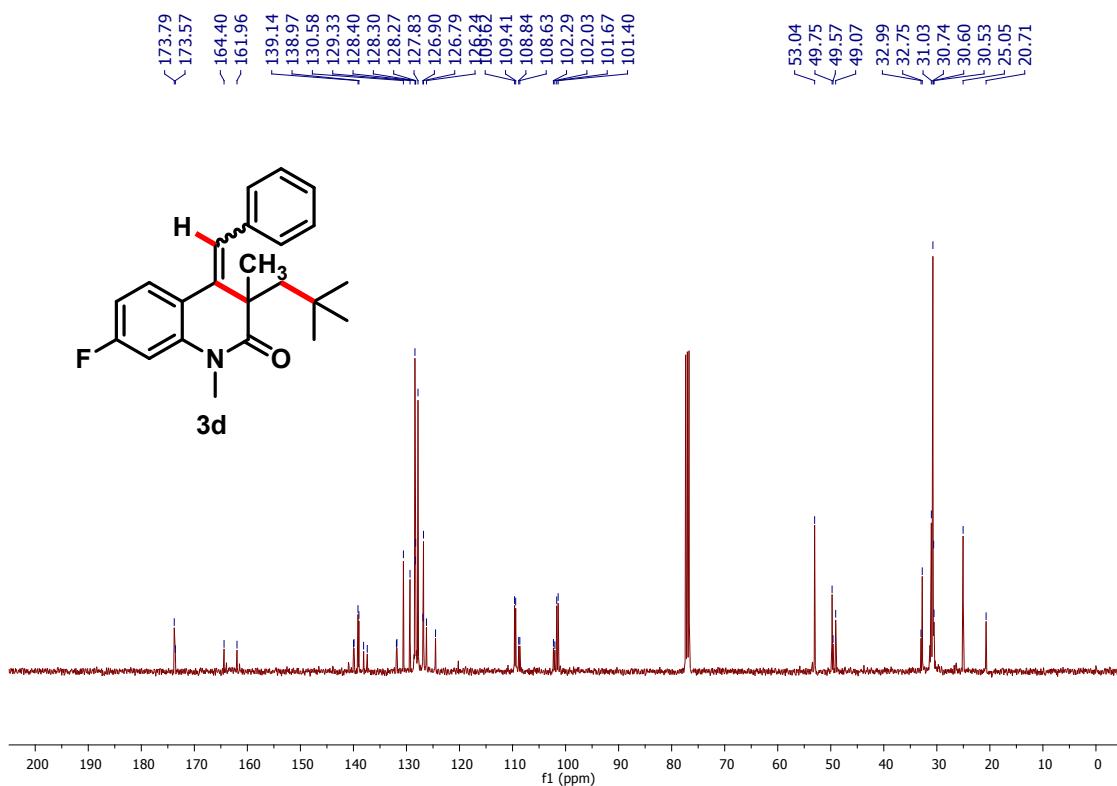


**4-benzylidene-7-fluoro-1,3-dimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3d).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

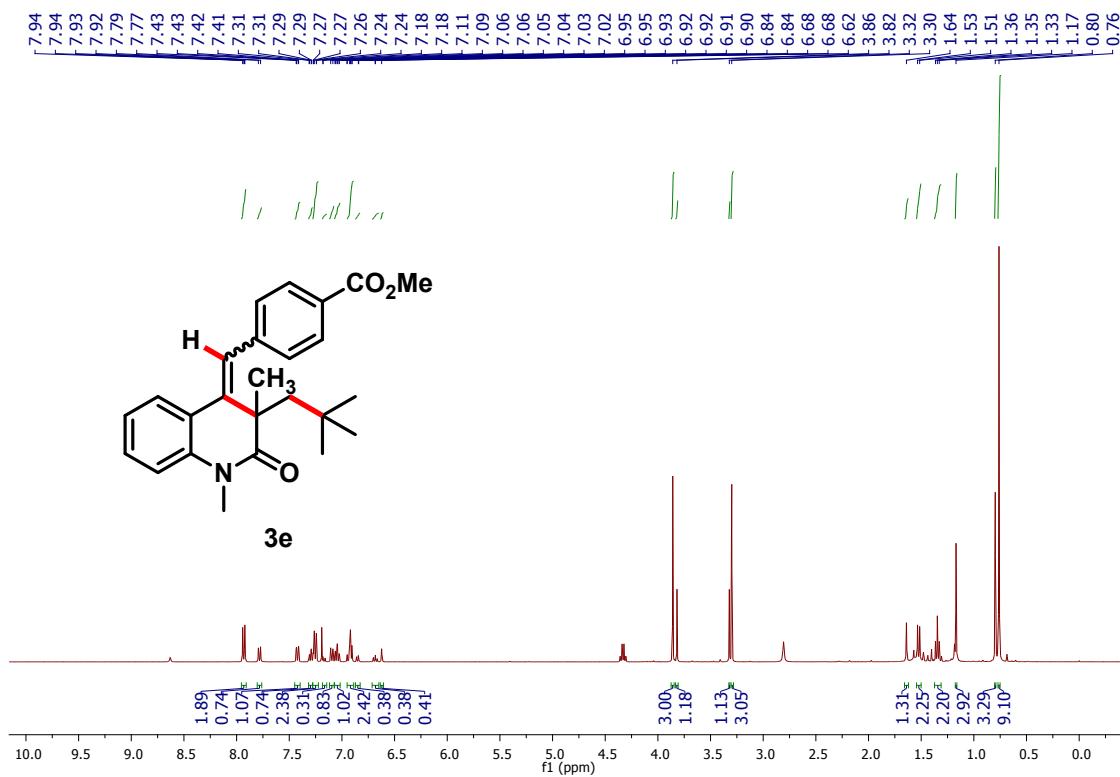


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

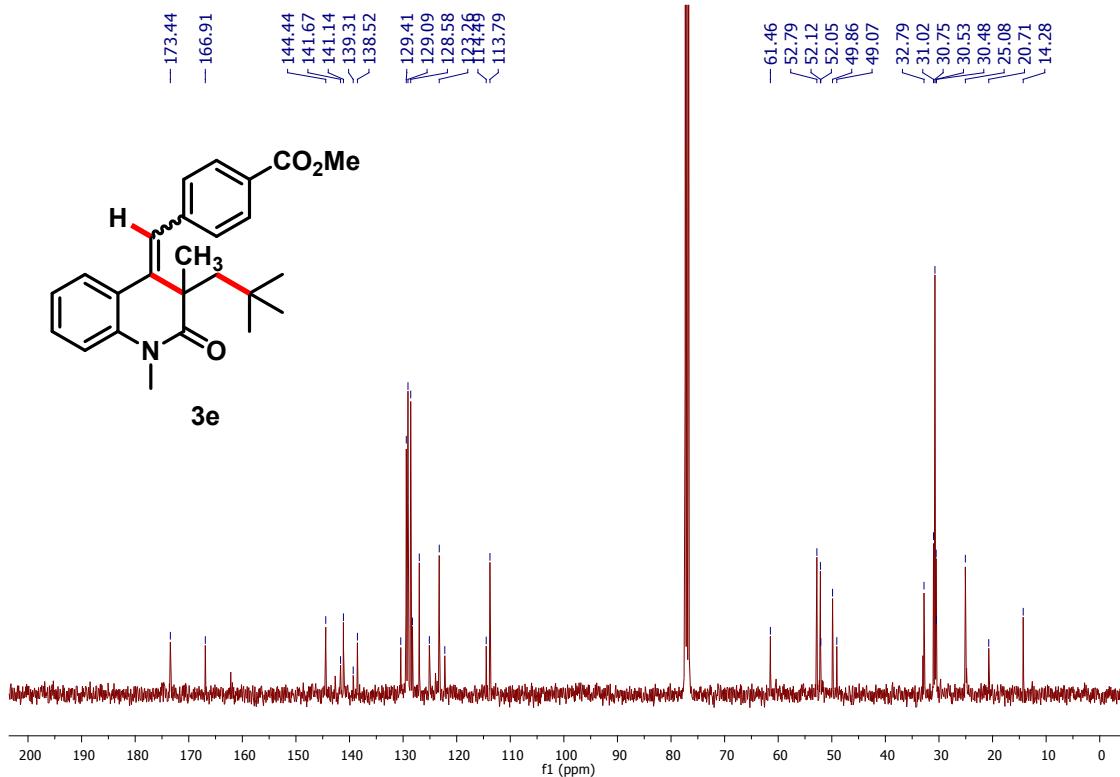


**Methyl-4-((1,3-dimethyl-3-neopentyl-2-oxo-2,3-dihydroquinolin-4(1H)-ylidene)methyl)benzoate (3e).**

$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )

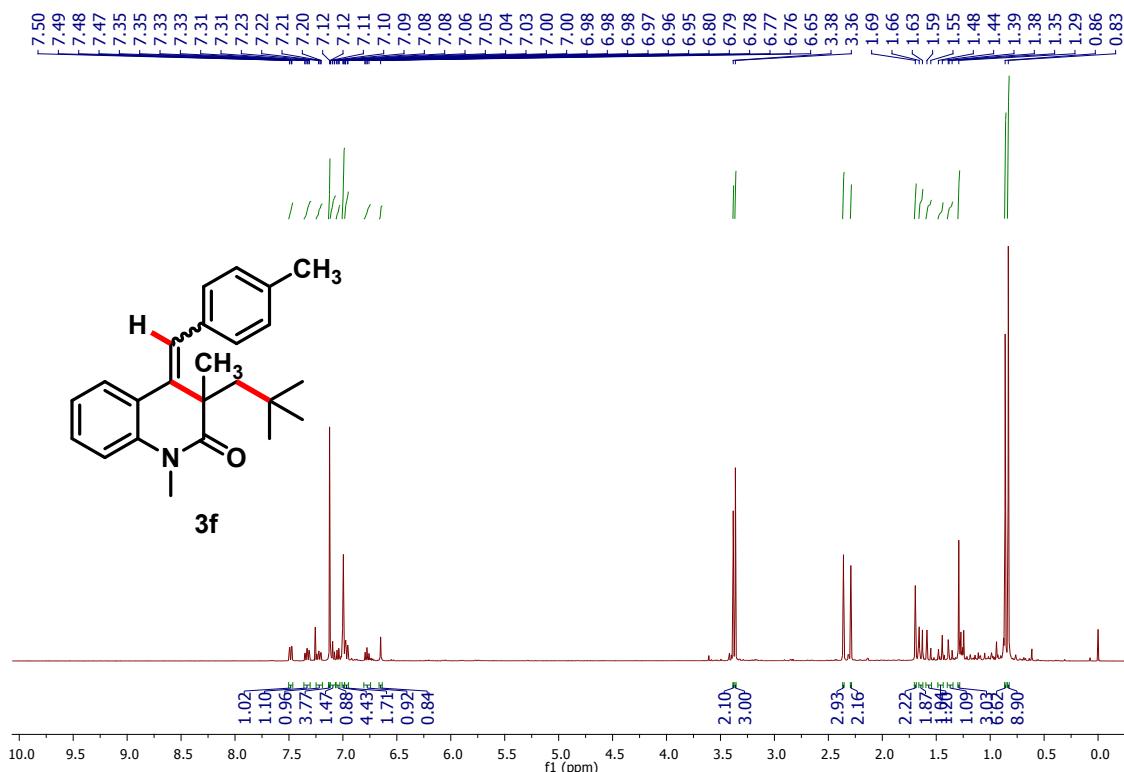


$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )

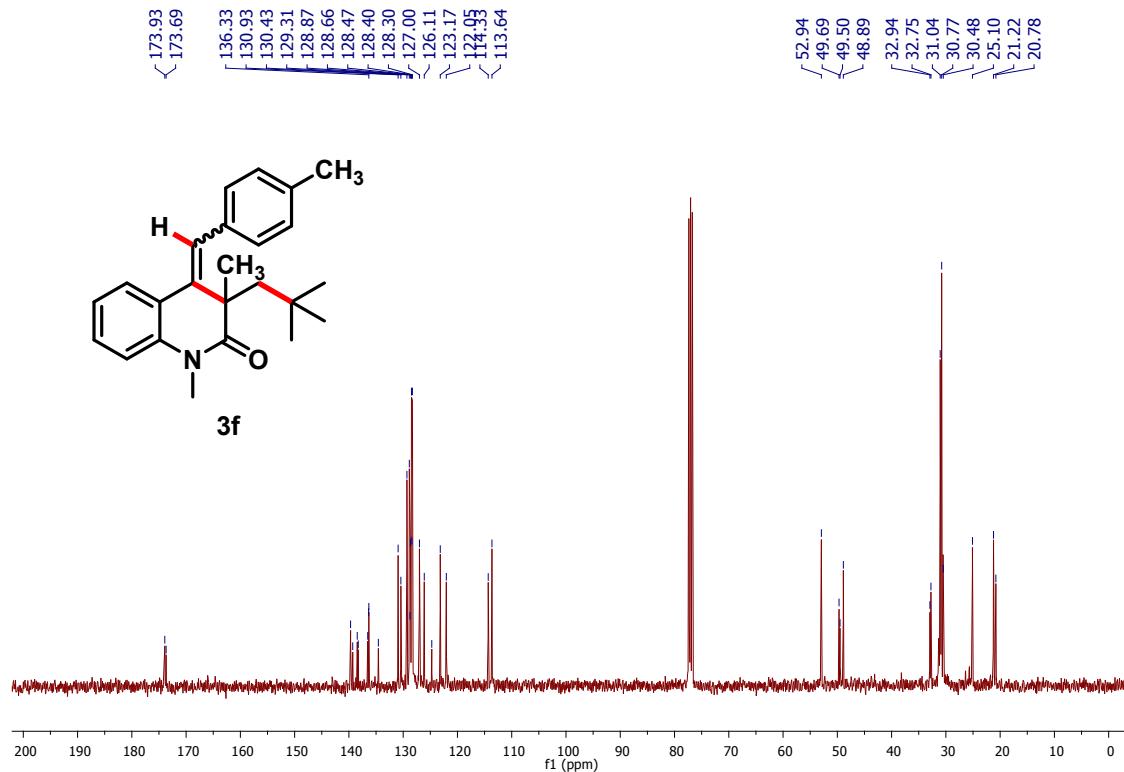


**1,3-dimethyl-4-(4-methylbenzylidene)-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3f).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

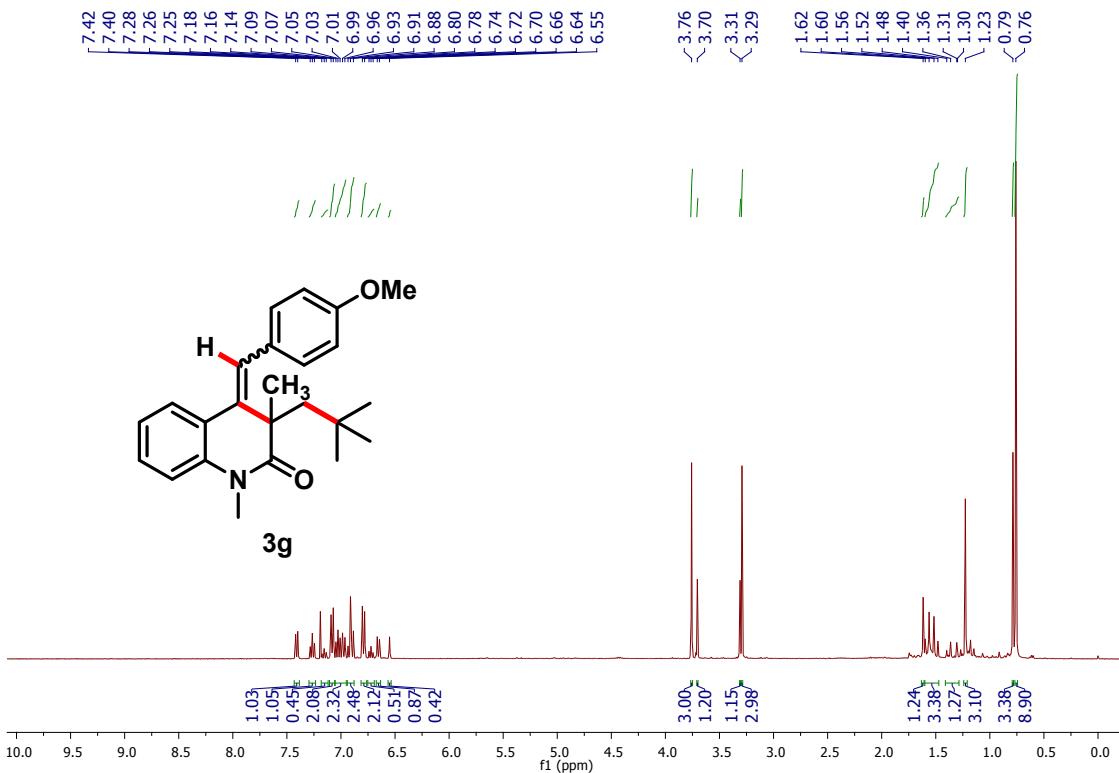


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

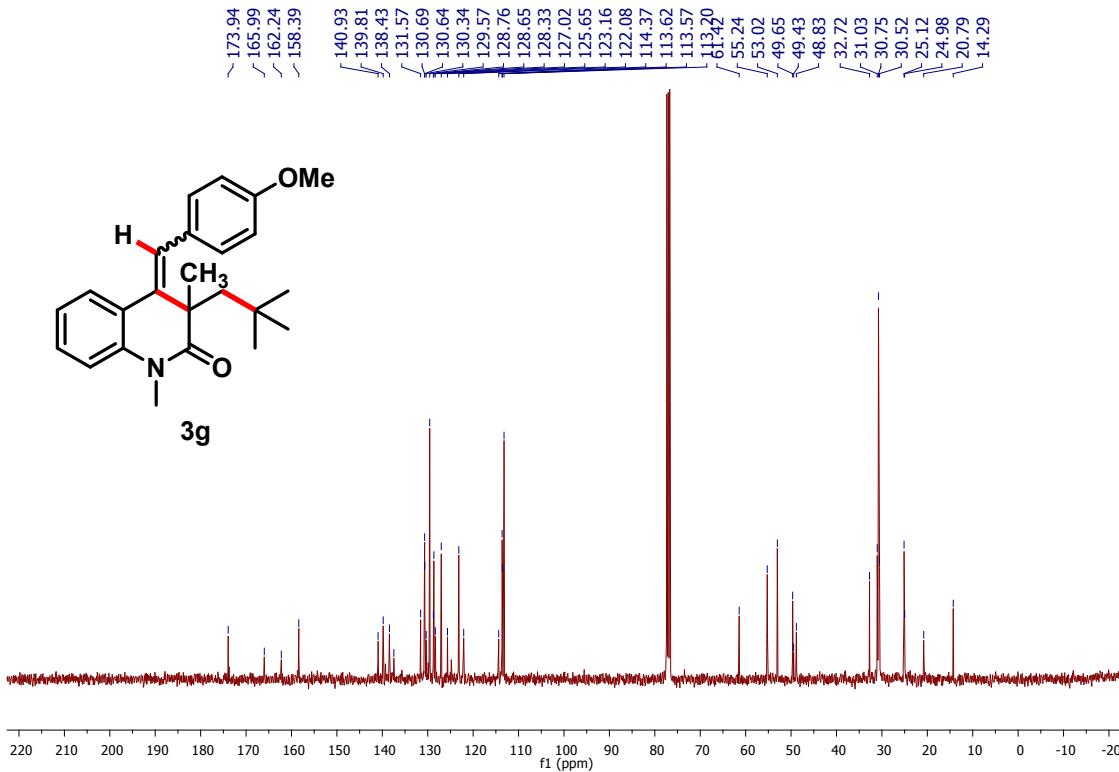


**4-(4-methoxybenzylidene)-1,3-dimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3g).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

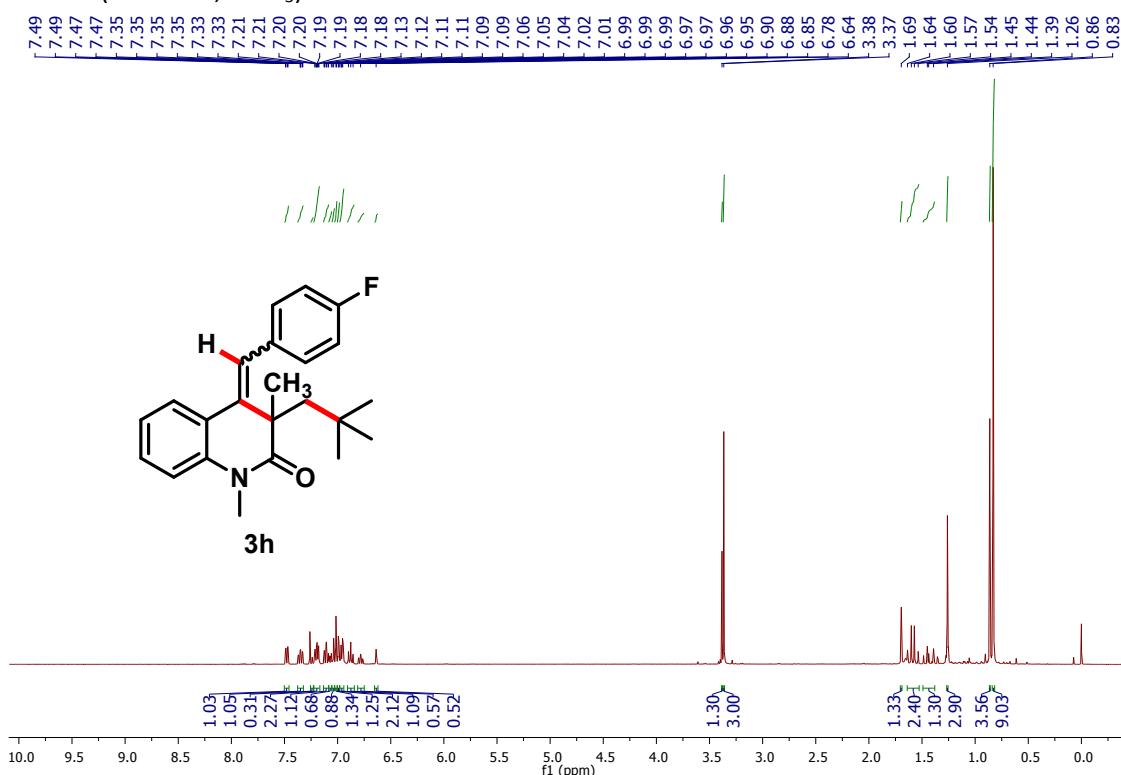


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

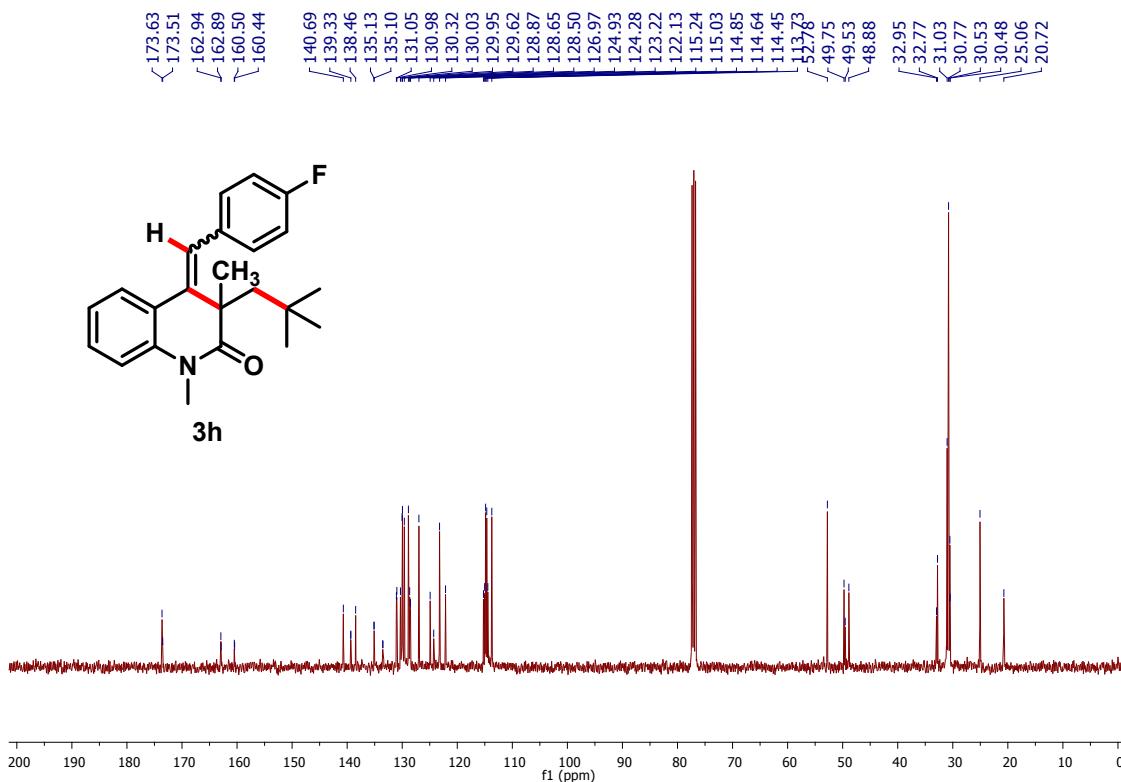


**4-(4-fluorobenzylidene)-1,3-dimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3h).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

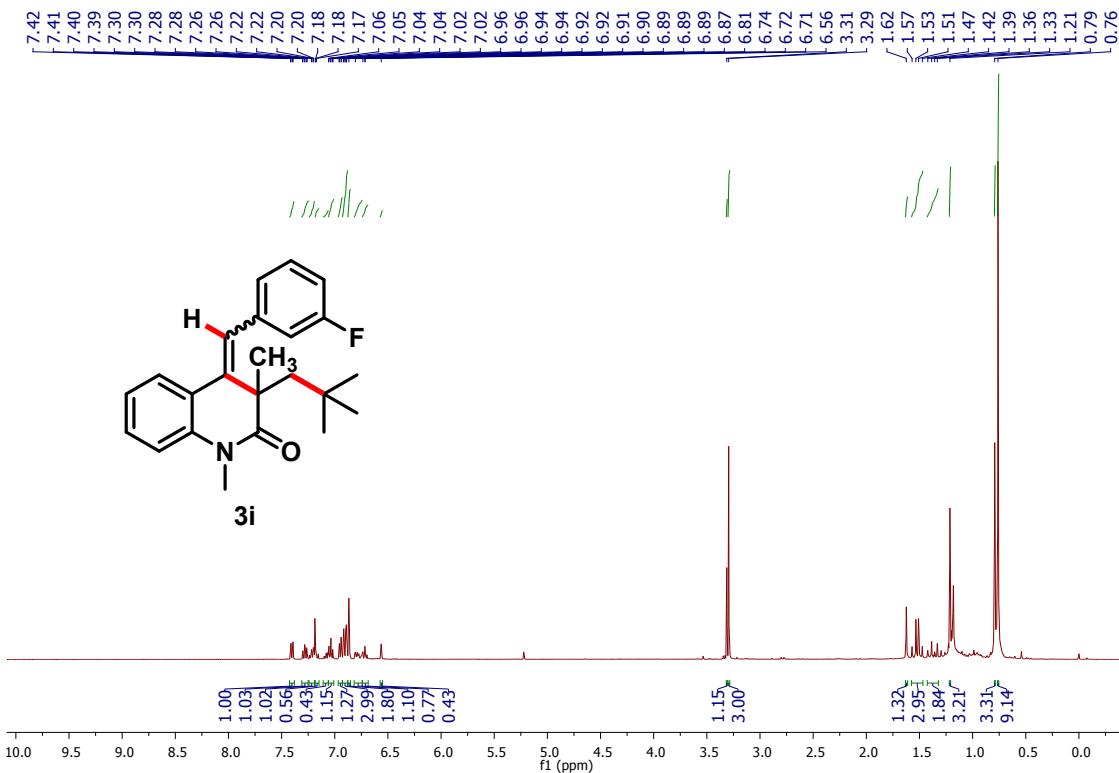


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

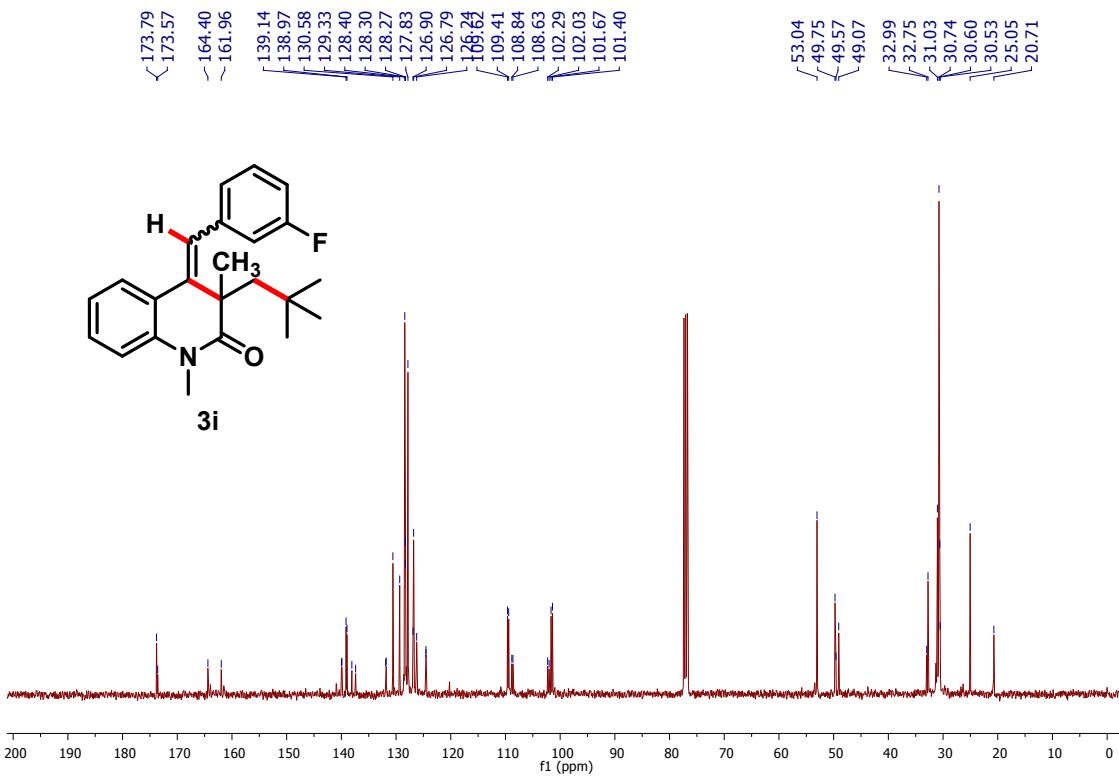


**4-benzylidene-7-fluoro-1,3-dimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3i).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

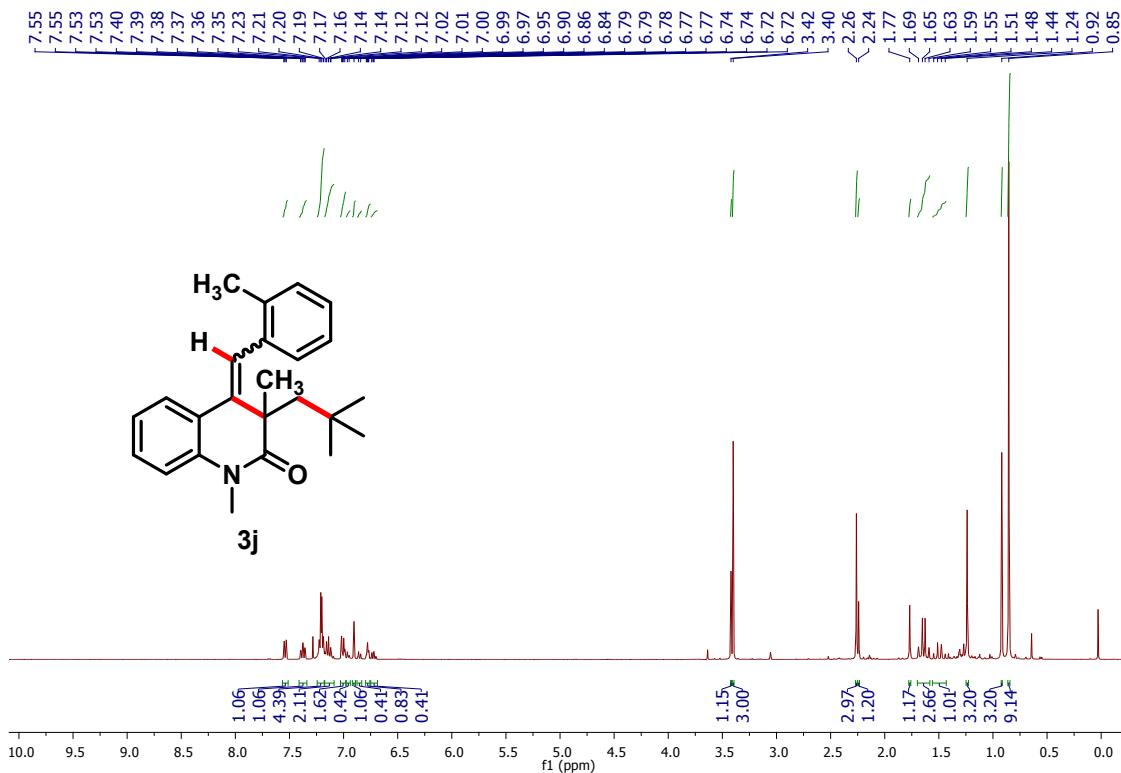


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

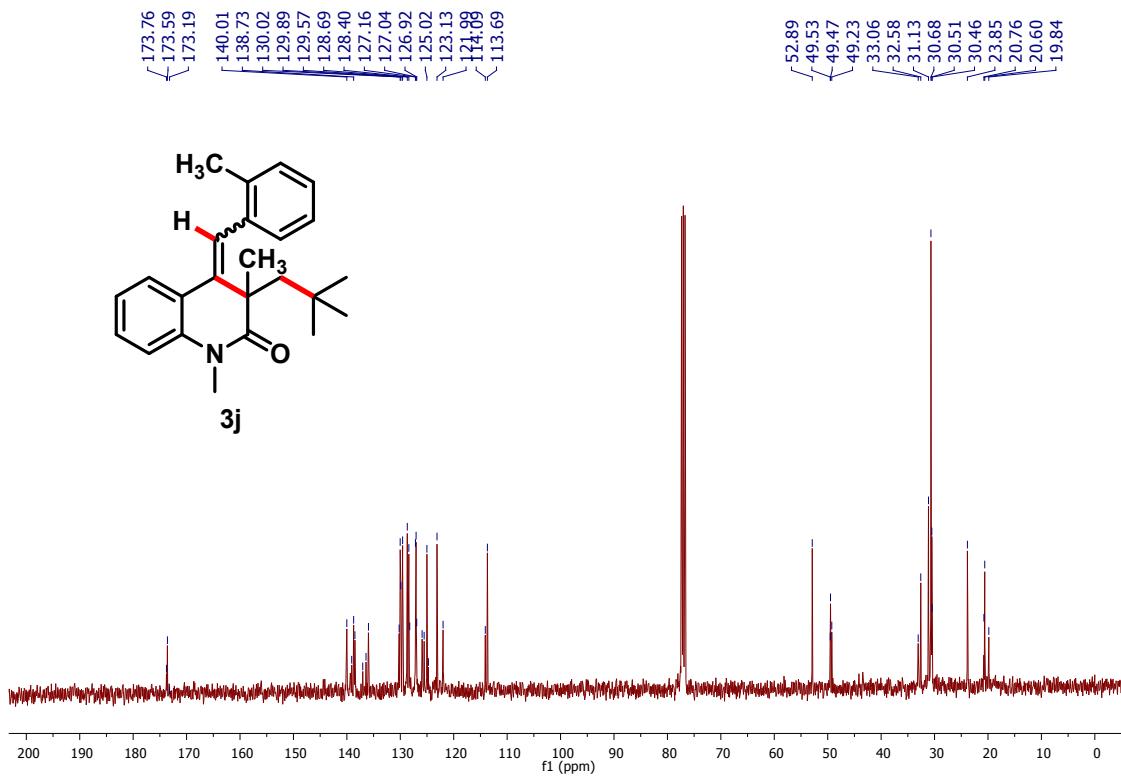


**1,3-dimethyl-4-(2-methylbenzylidene)-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3j).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

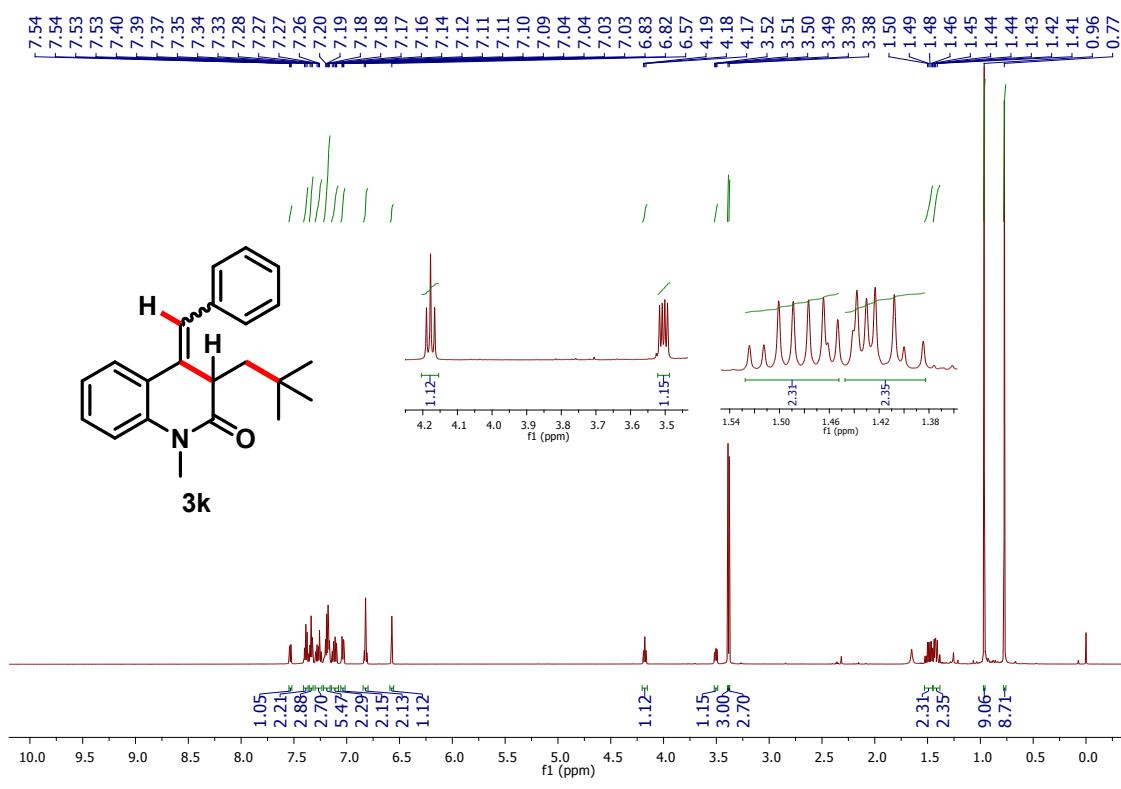


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

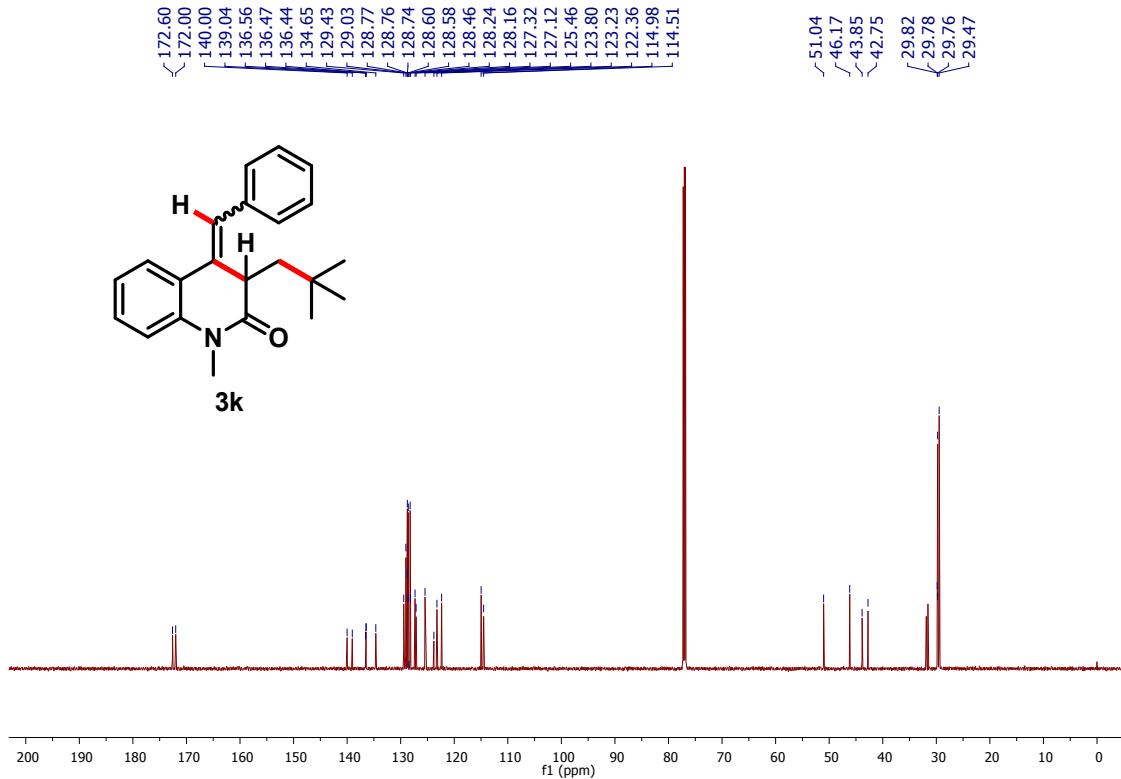


**4-benzylidene-1-methyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3k).**

<sup>1</sup>H NMR (600 MHz, CDCl<sub>3</sub>)

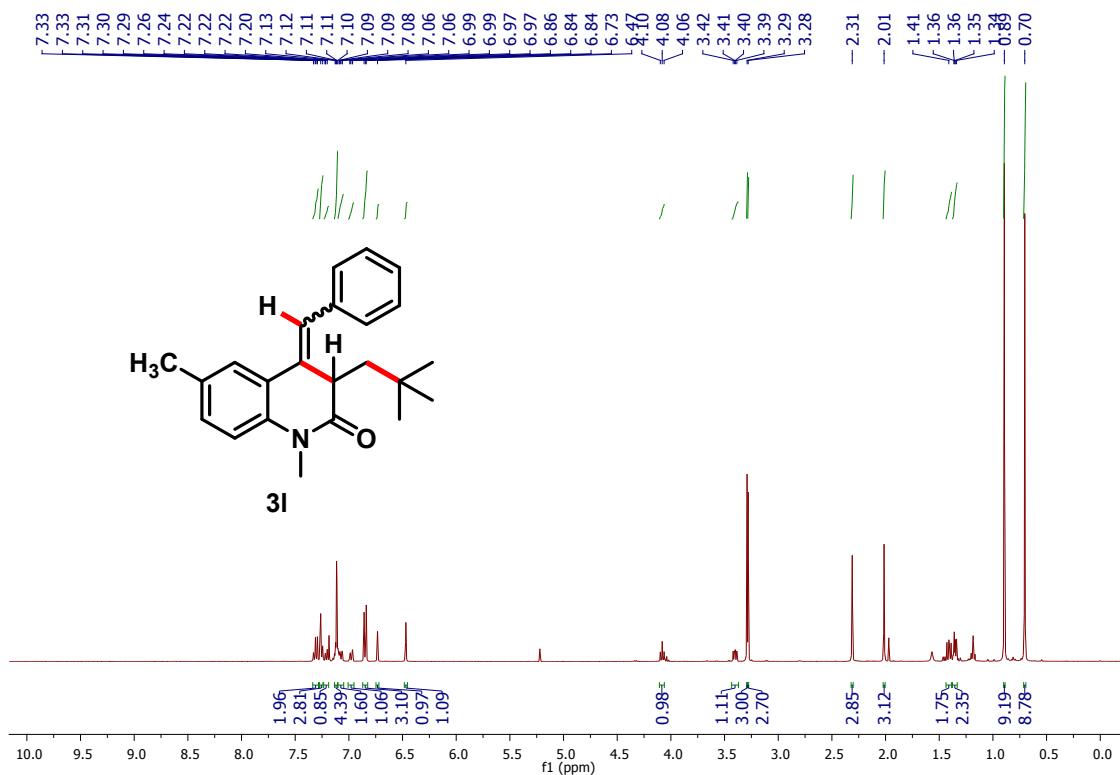


<sup>13</sup>C NMR (150 MHz, CDCl<sub>3</sub>)

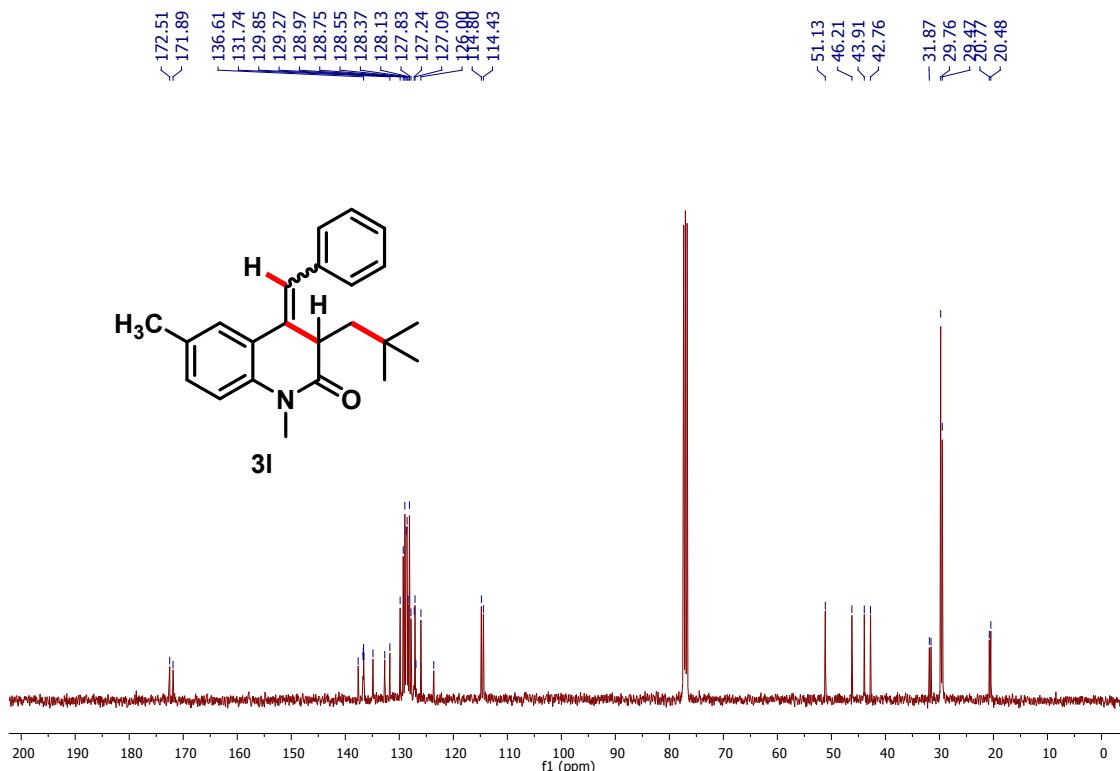


**4-benzylidene-1,6-dimethyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3I).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

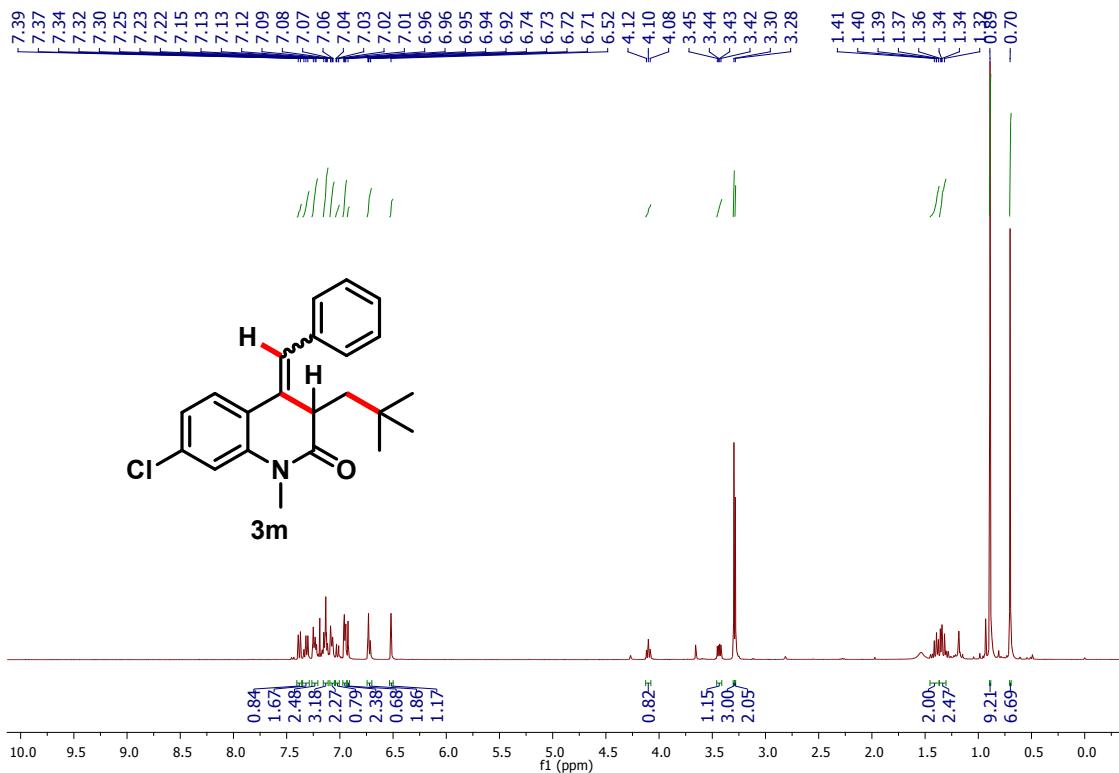


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

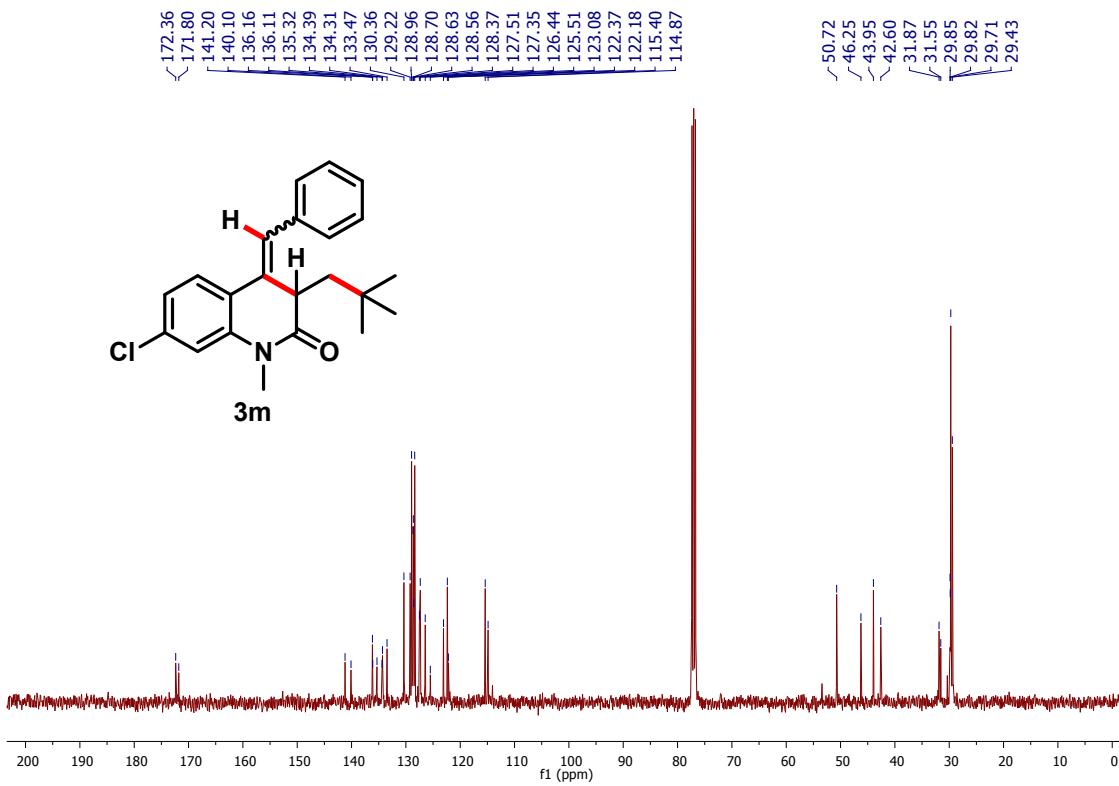


#### 4-benzylidene-7-chloro-1-methyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3m).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

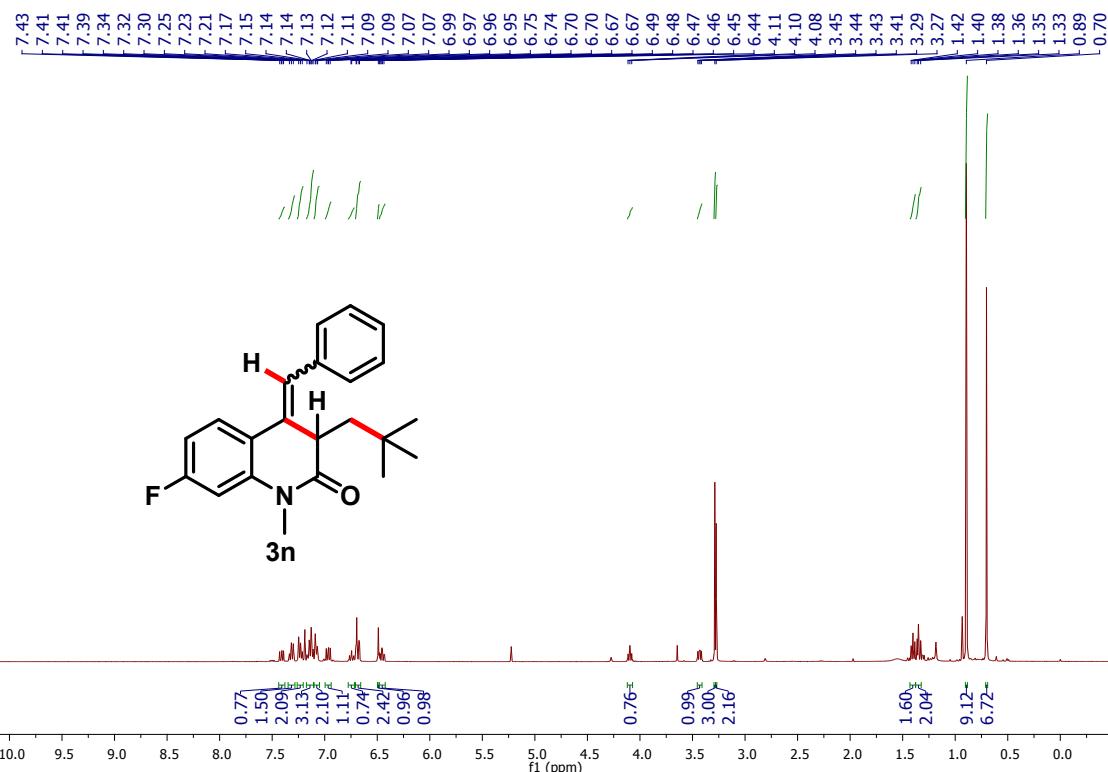


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

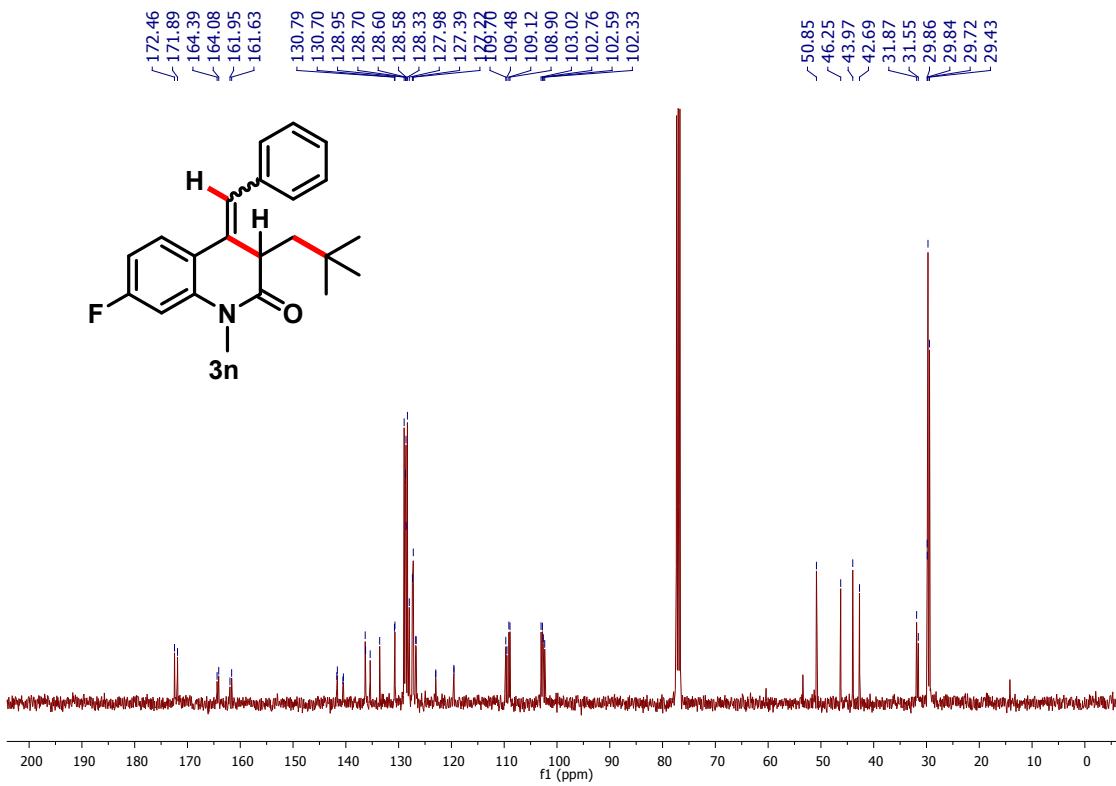


#### 4-benzylidene-7-fluoro-1-methyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3n).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

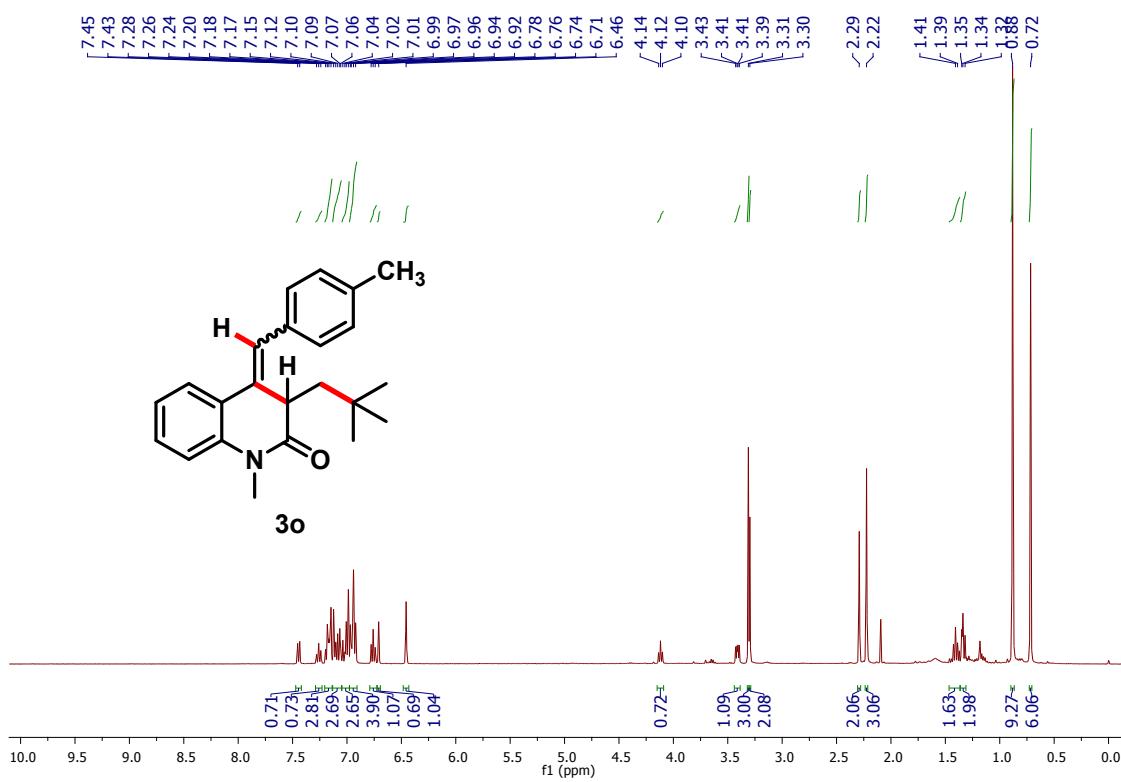


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

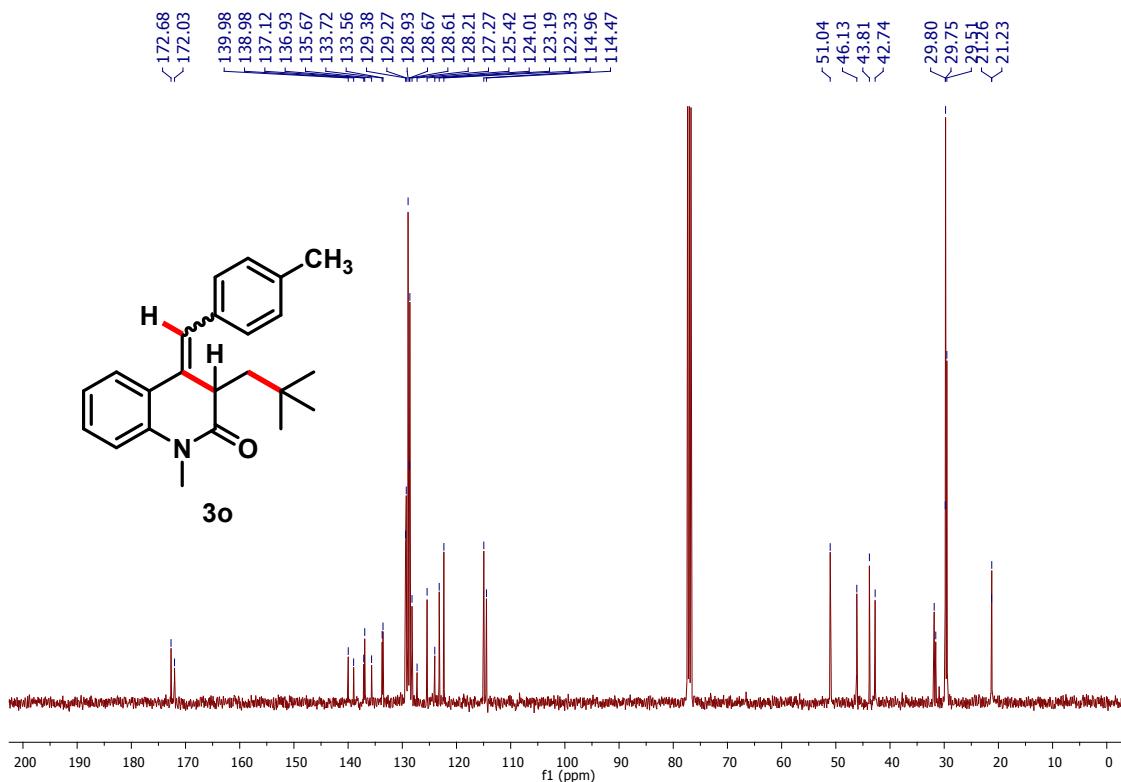


**1-methyl-4-(4-methylbenzylidene)-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3o).**

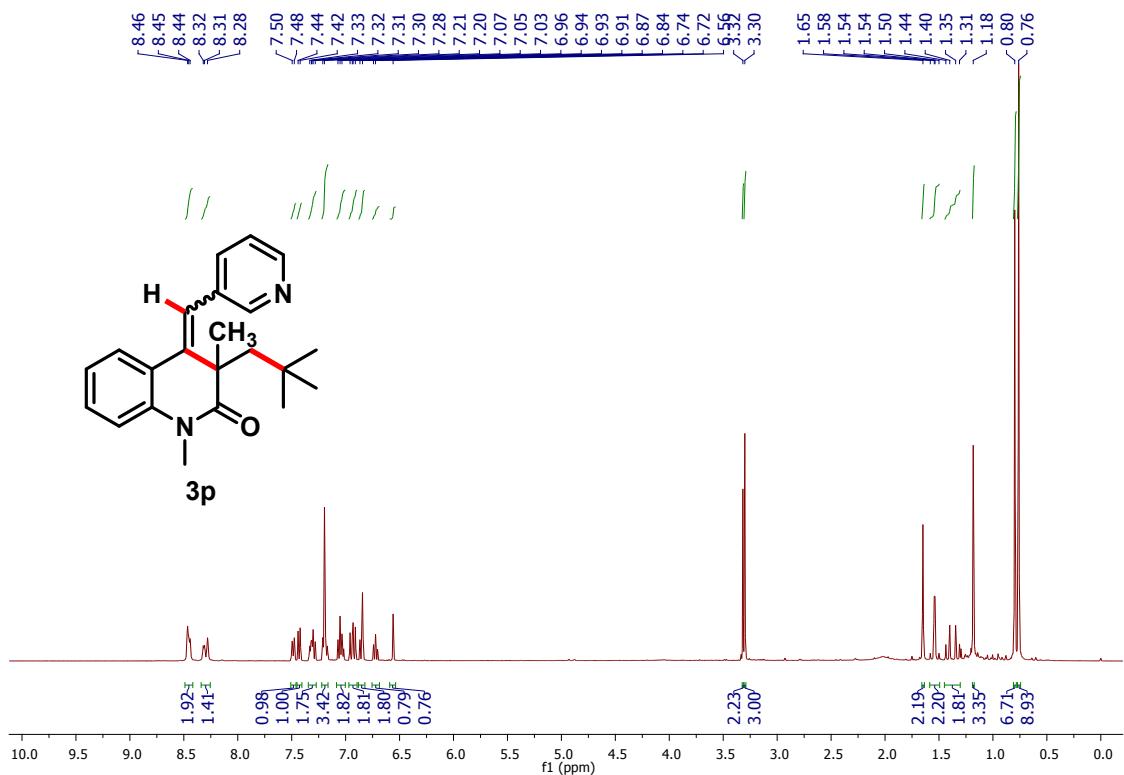
<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)



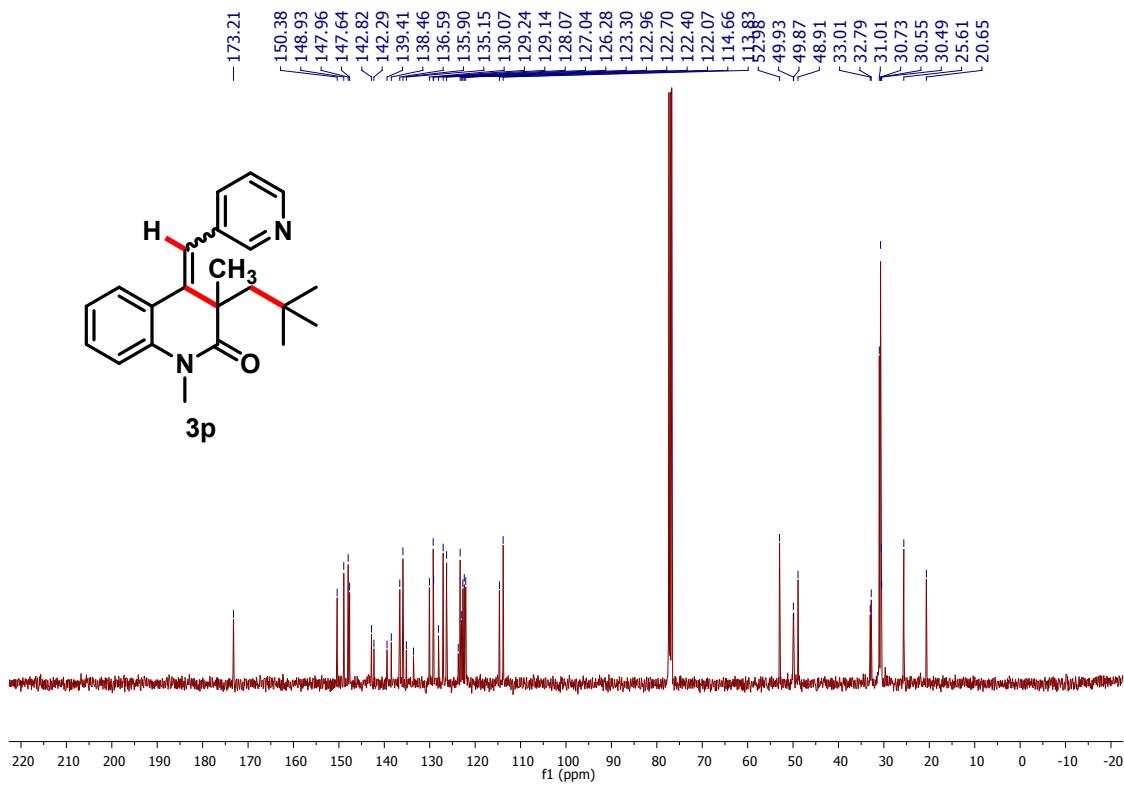
<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)



**1,3-dimethyl-3-neopentyl-4-(pyridin-3-ylmethylene)-3,4-dihydroquinolin-2(1H)-one (3p).**  
<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

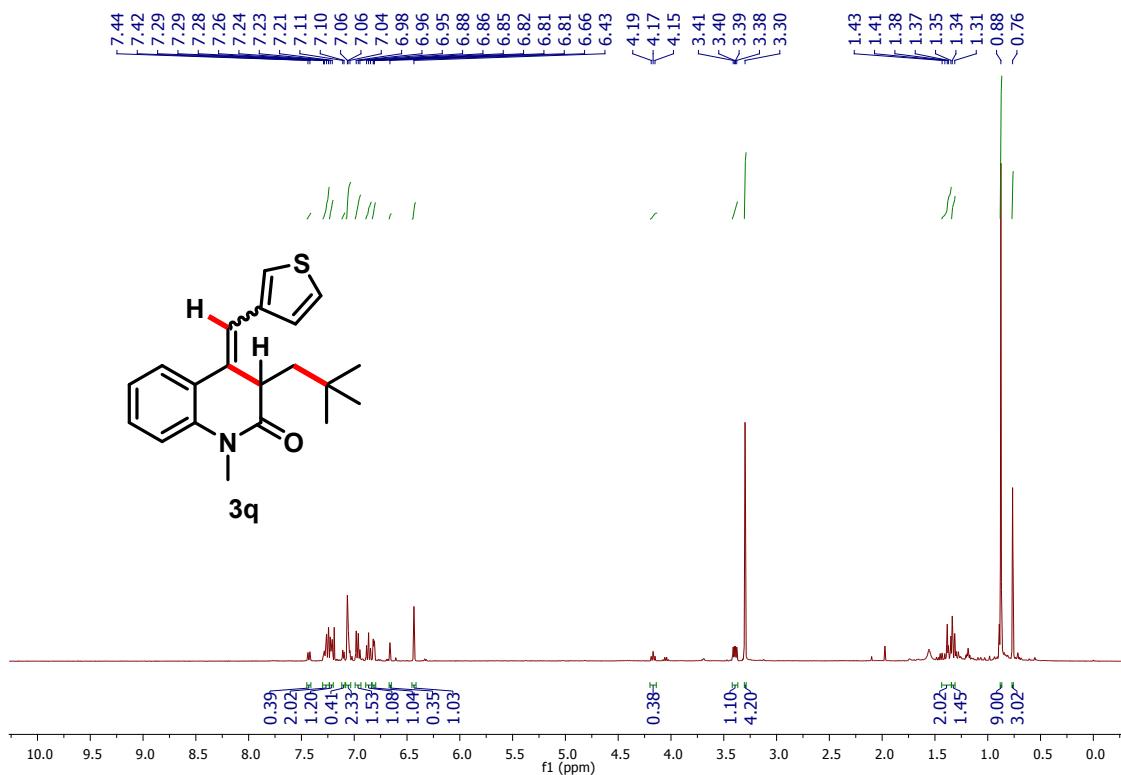


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

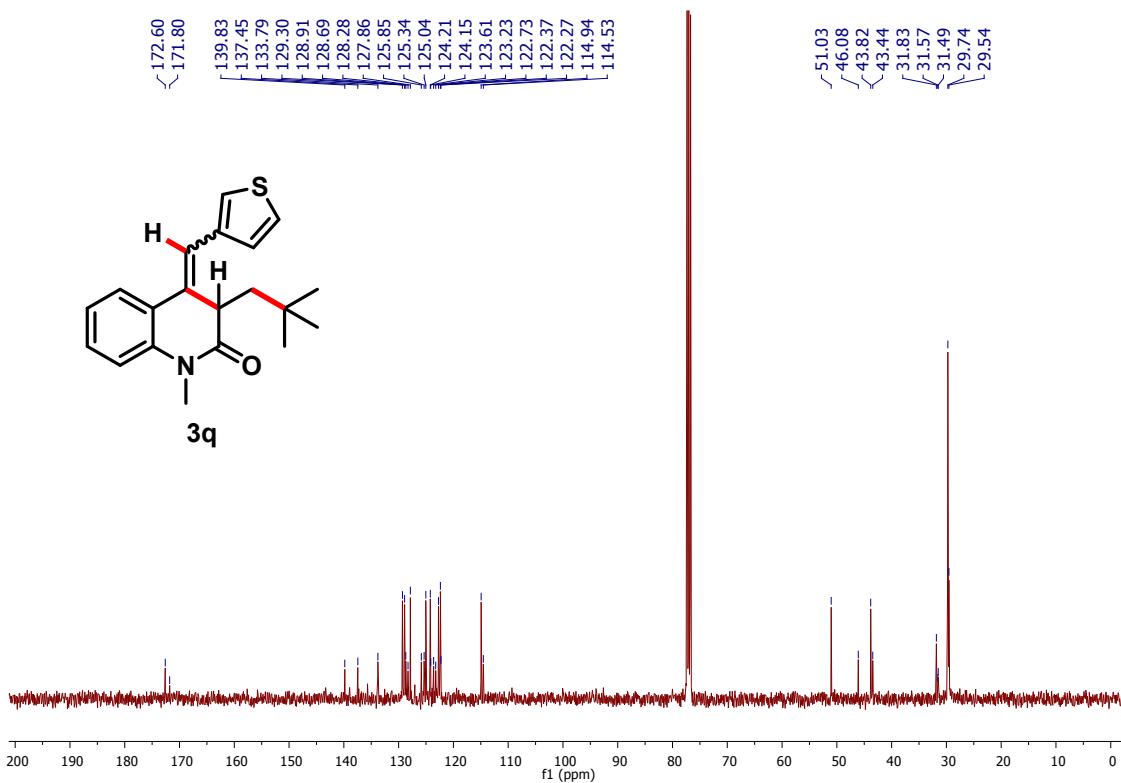


**1,3-dimethyl-3-neopentyl-4-(thiophen-3-ylmethylene)-3,4-dihydroquinolin-2(1H)-one (3q).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

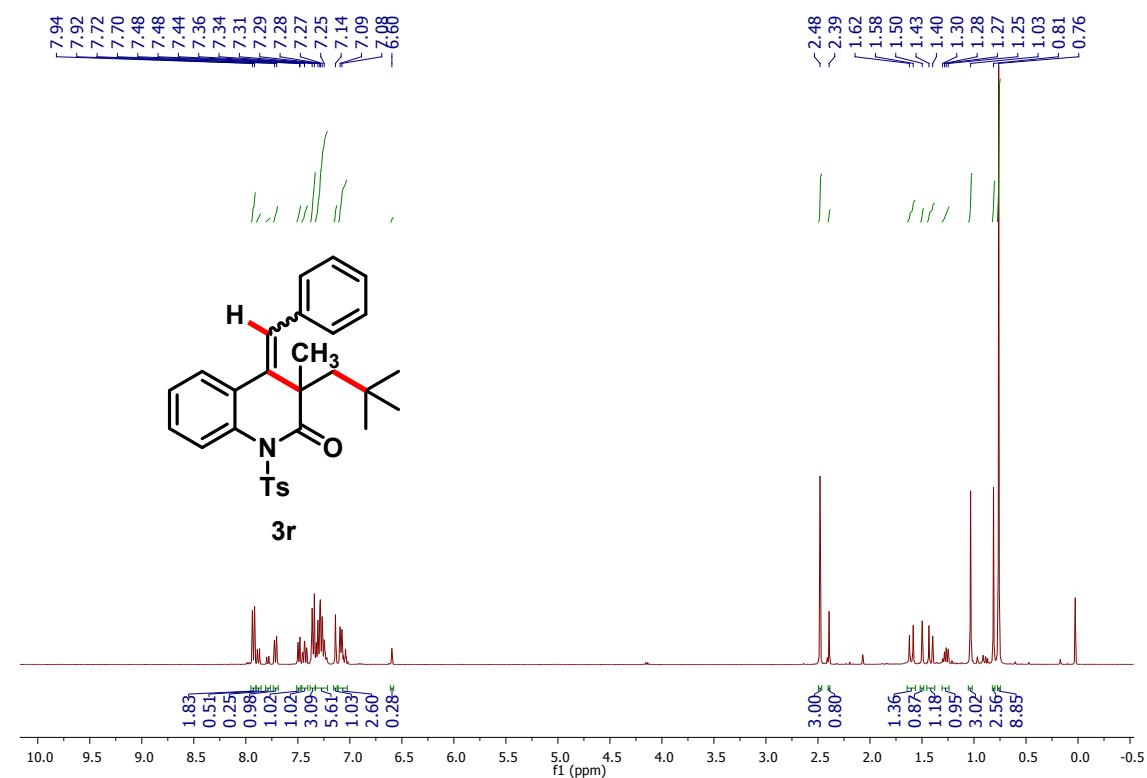


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

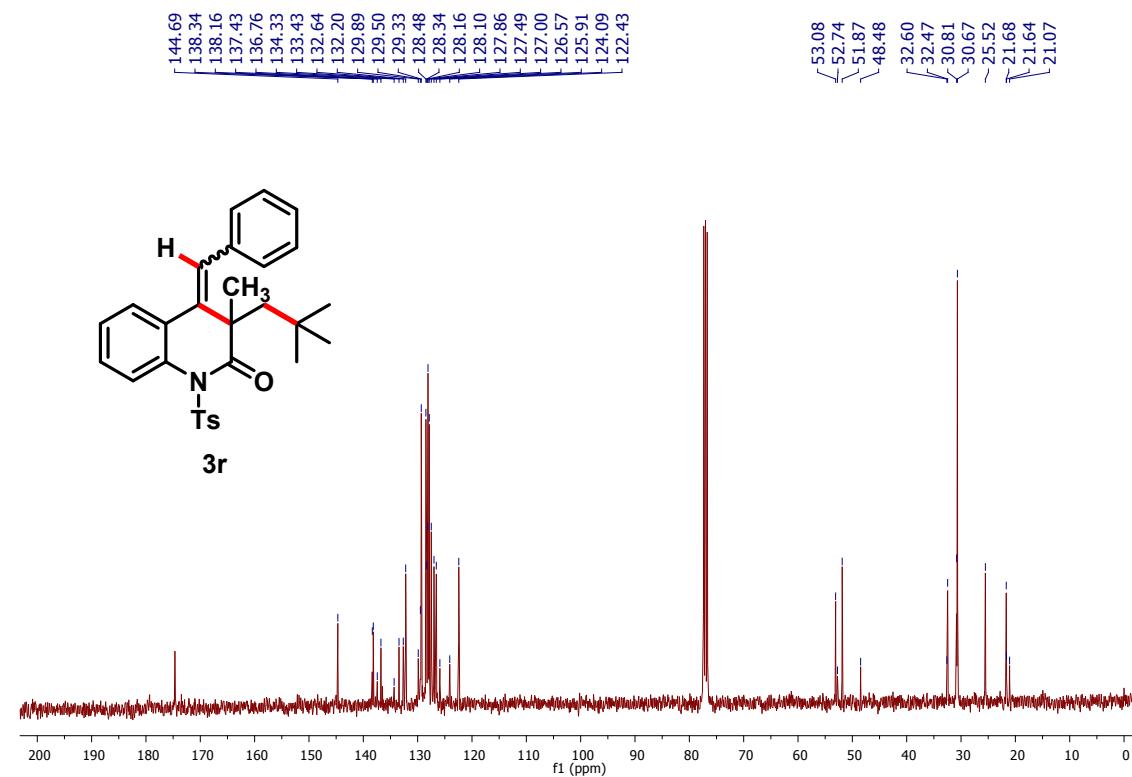


**4-benzylidene-3-methyl-3-neopentyl-1-tosyl-3,4-dihydroquinolin-2(1H)-one (3r).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

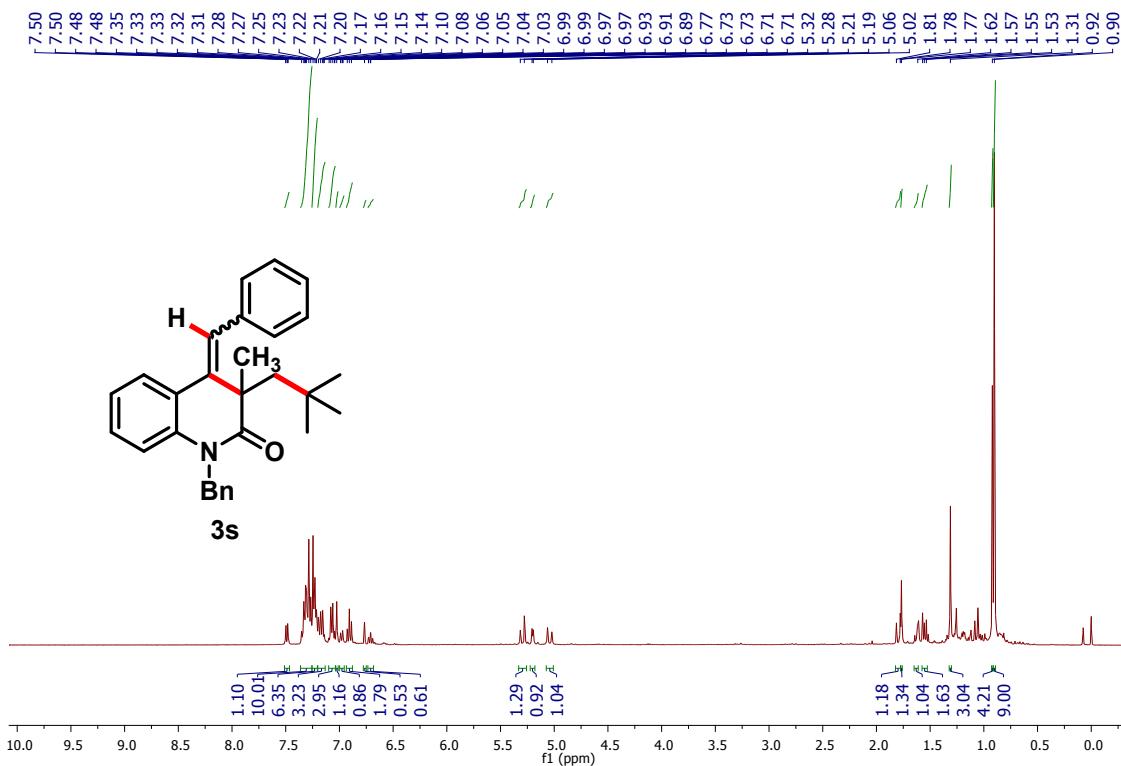


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

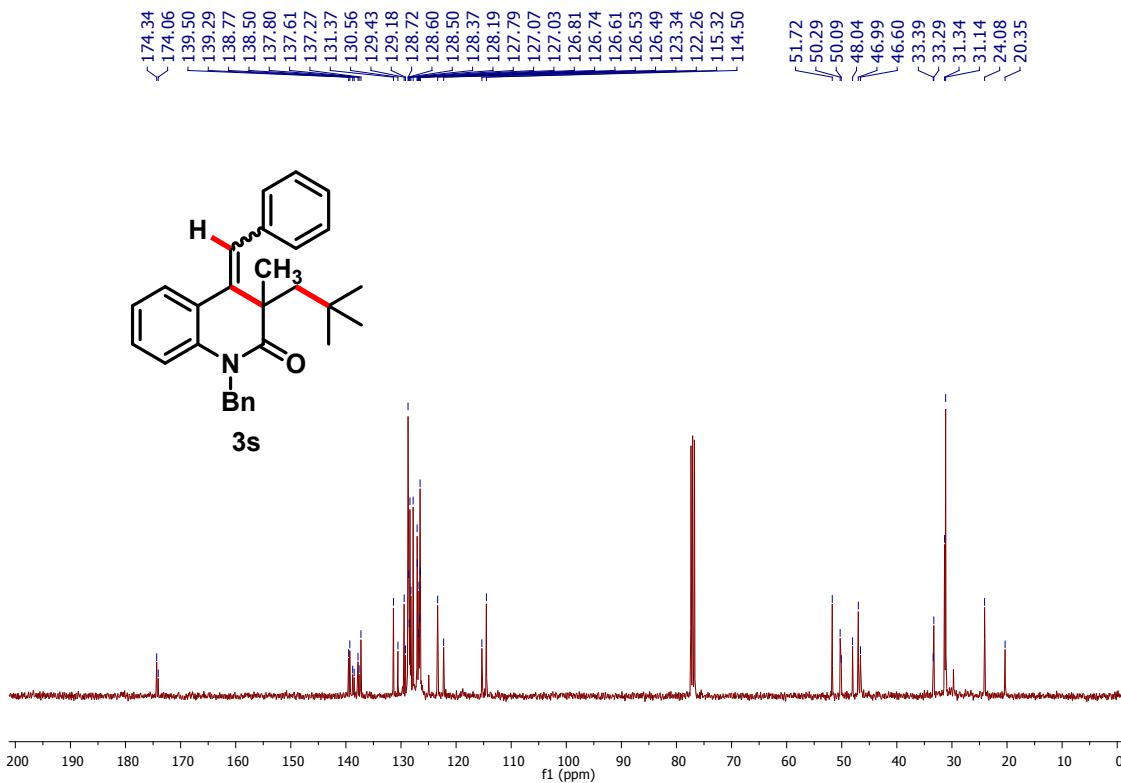


**1-benzyl-4-benzylidene-3-methyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3s).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

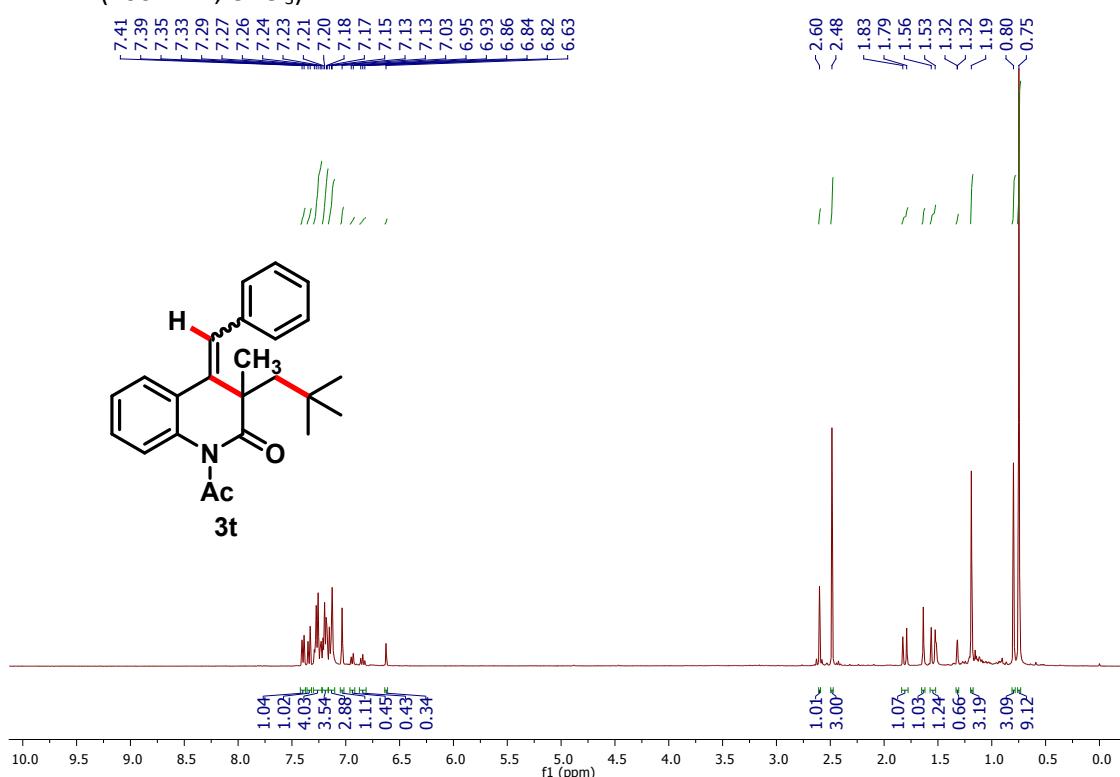


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

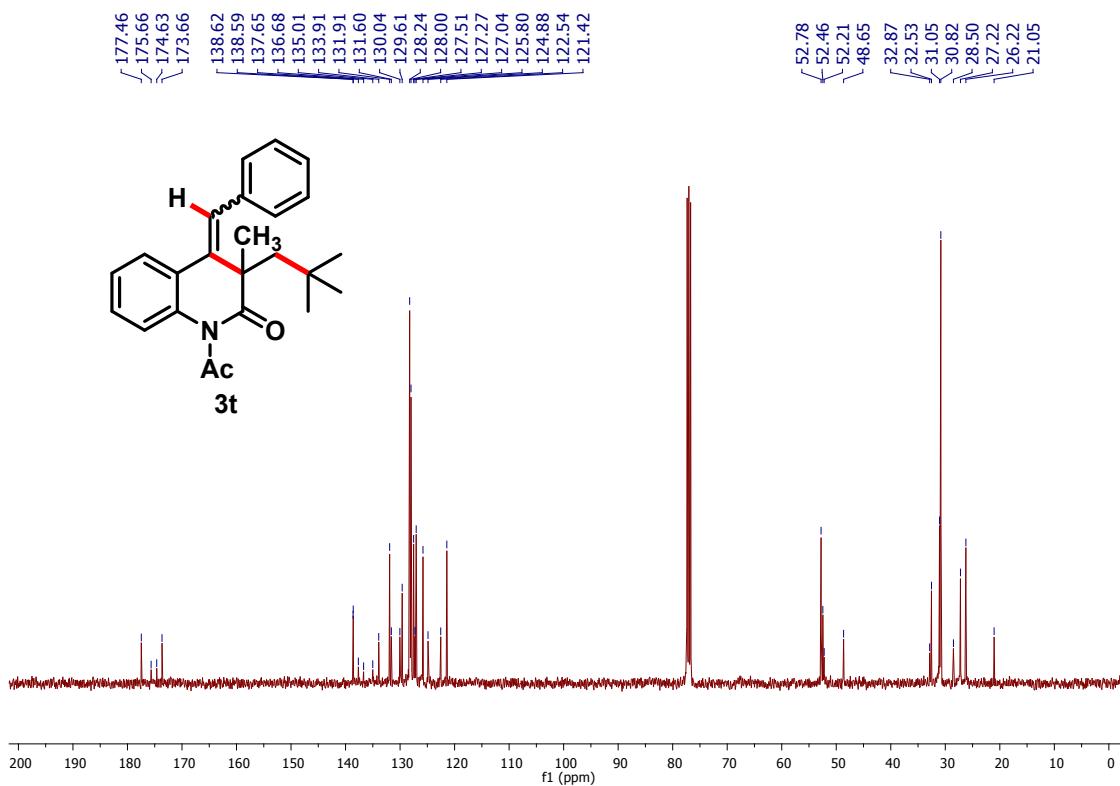


**1-acetyl-4-benzylidene-3-methyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3t).**

$^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )

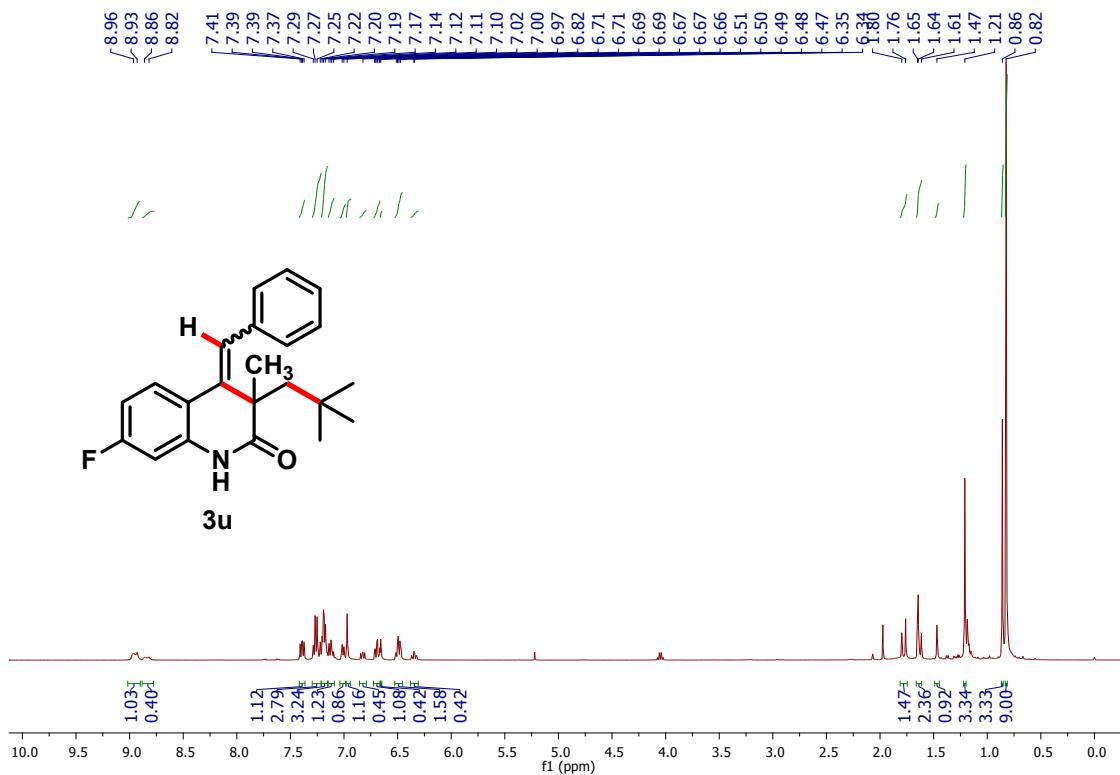


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

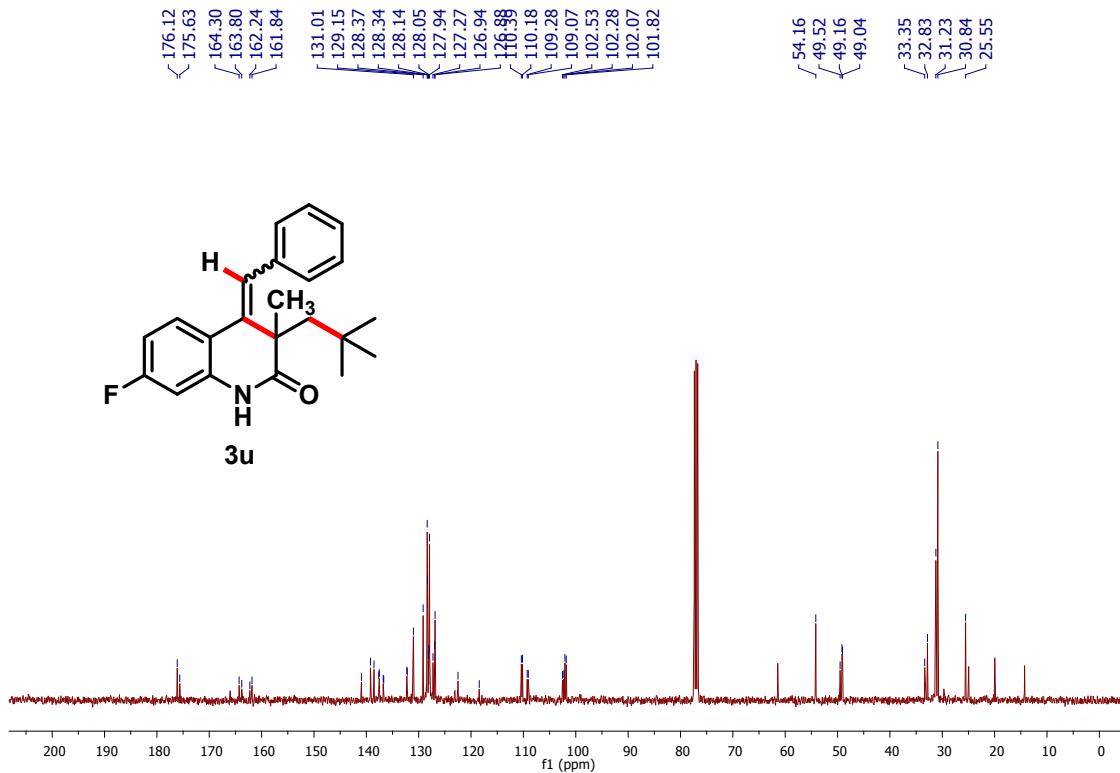


**4-benzylidene-7-fluoro-3-methyl-3-neopentyl-3,4-dihydroquinolin-2(1H)-one (3u).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

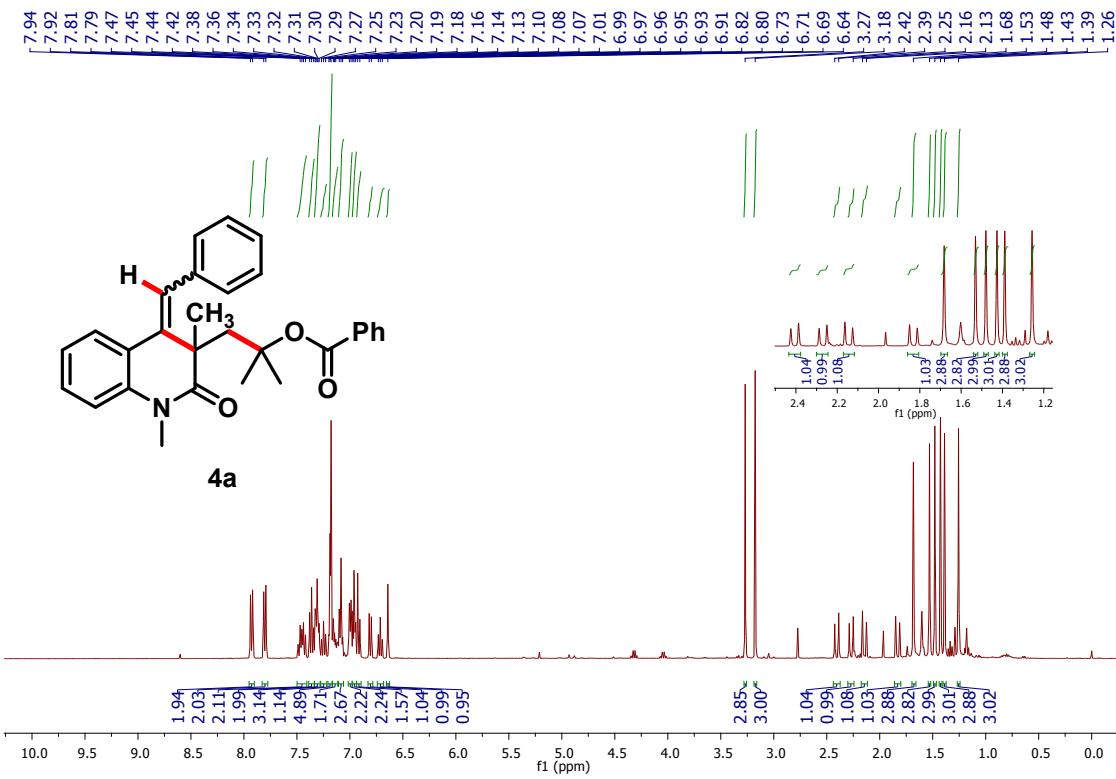


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

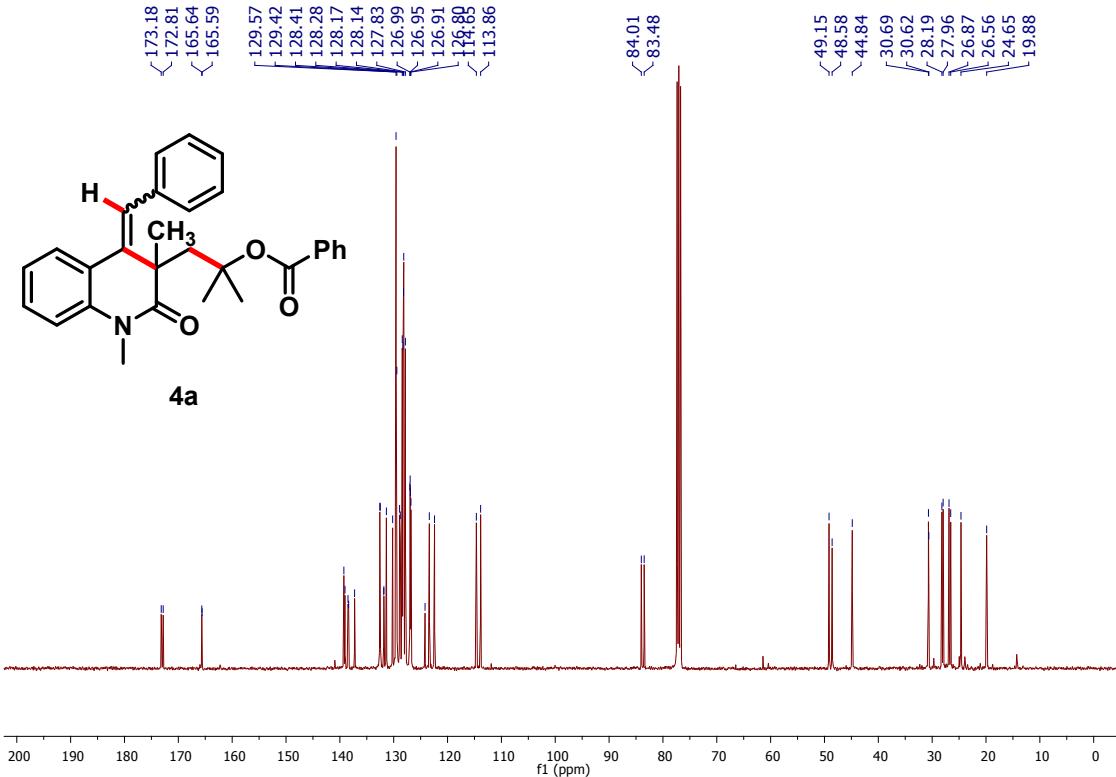


**1-(4-benzylidene-1,3-dimethyl-2-oxo-1,2,3,4-tetrahydroquinolin-3-yl)-2-methylpropan-2-yl benzoate (4a).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

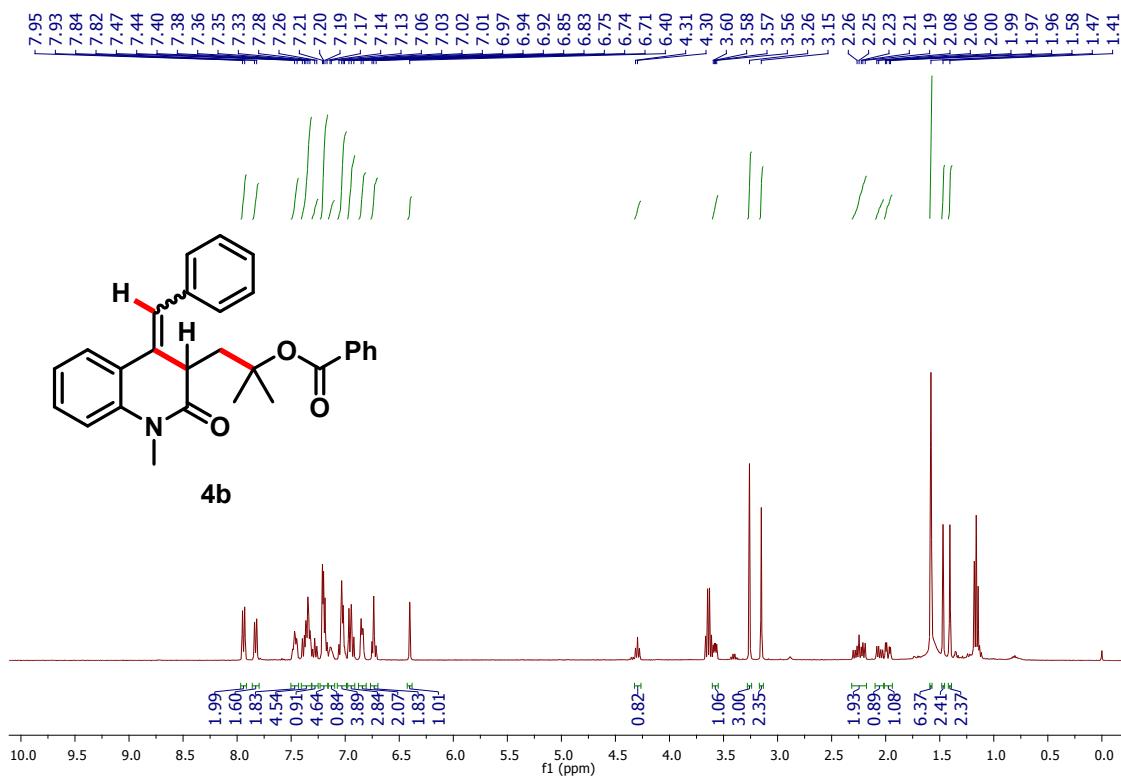


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

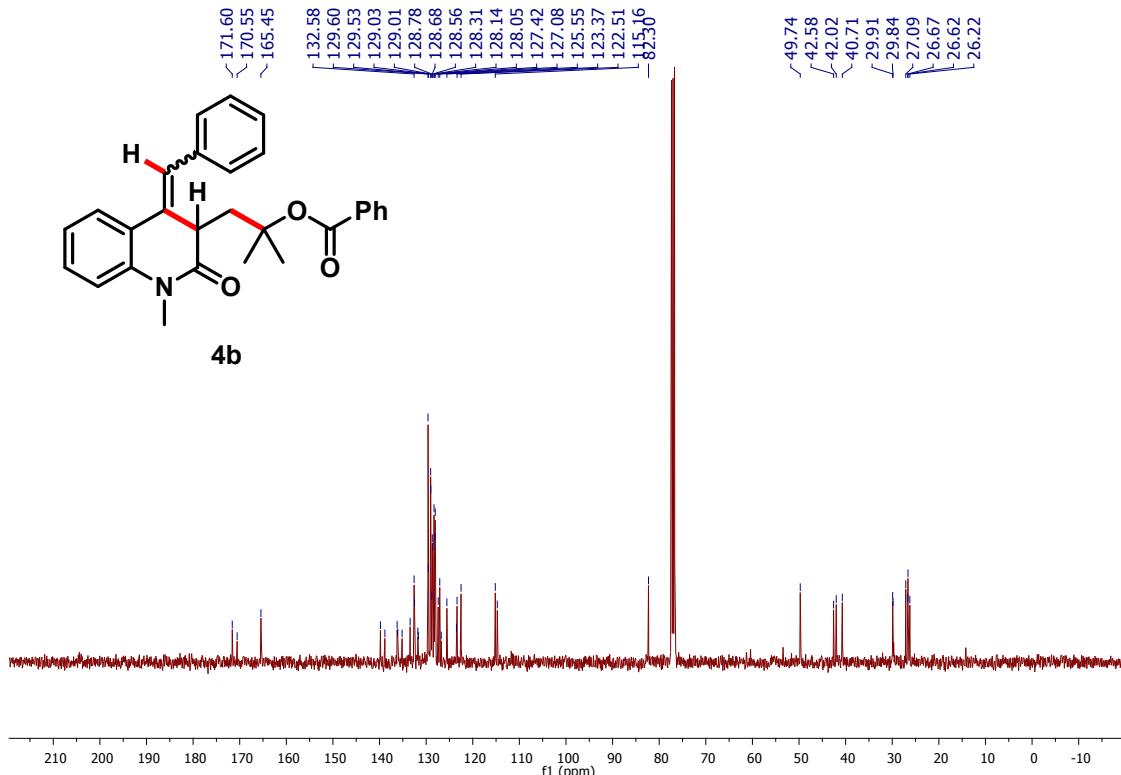


**1-(4-benzylidene-1-methyl-2-oxo-1,2,3,4-tetrahydroquinolin-3-yl)-2-methylpropan-2-yl benzoate (4b).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

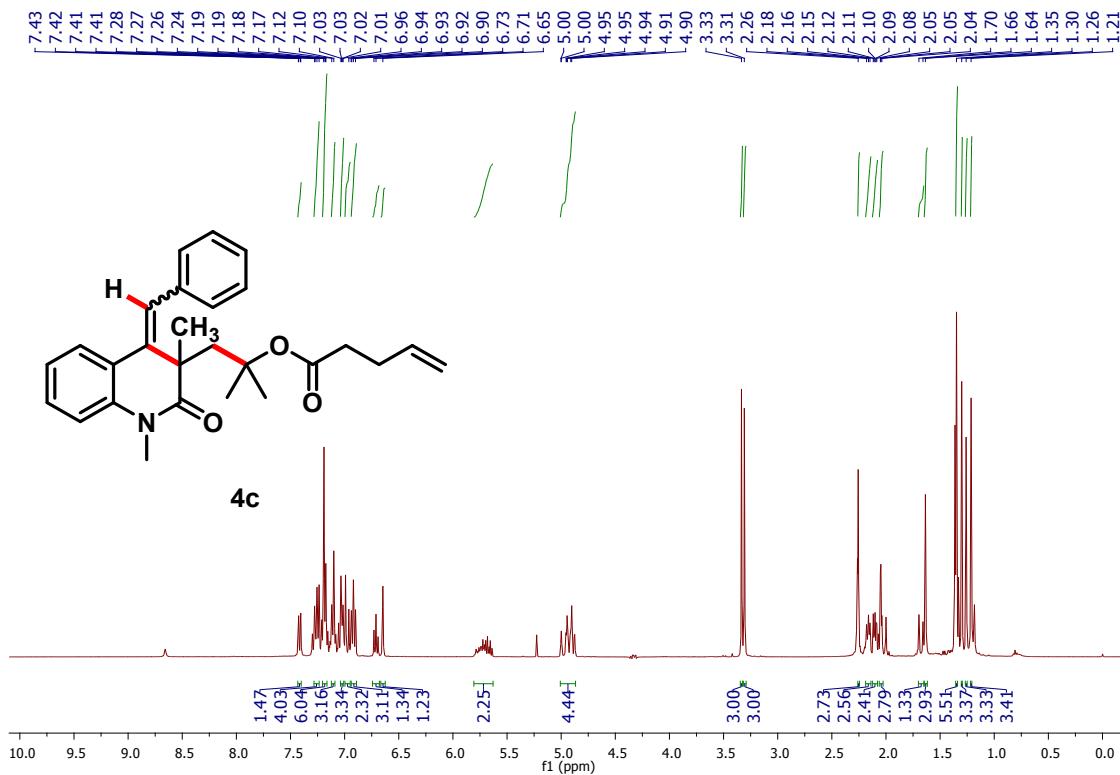


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

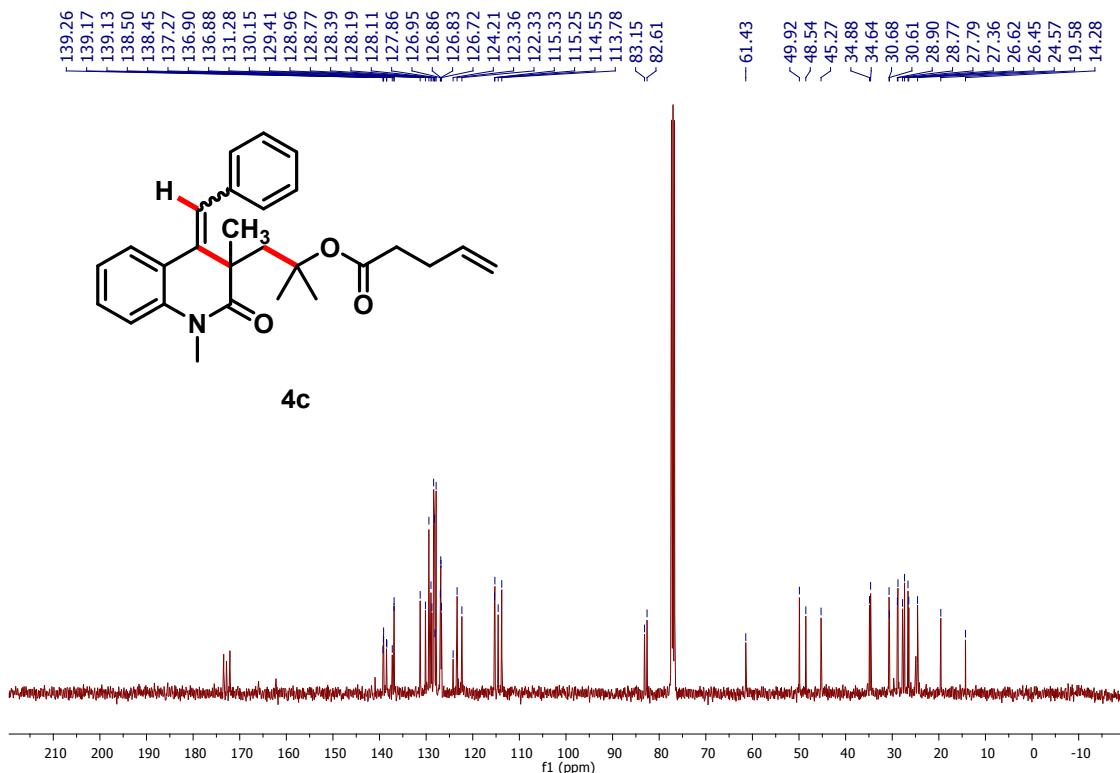


**1-(4-benzylidene-1,3-dimethyl-2-oxo-1,2,3,4-tetrahydroquinolin-3-yl)-2-methylpropan-2-yl pent-4-enoate (4c).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

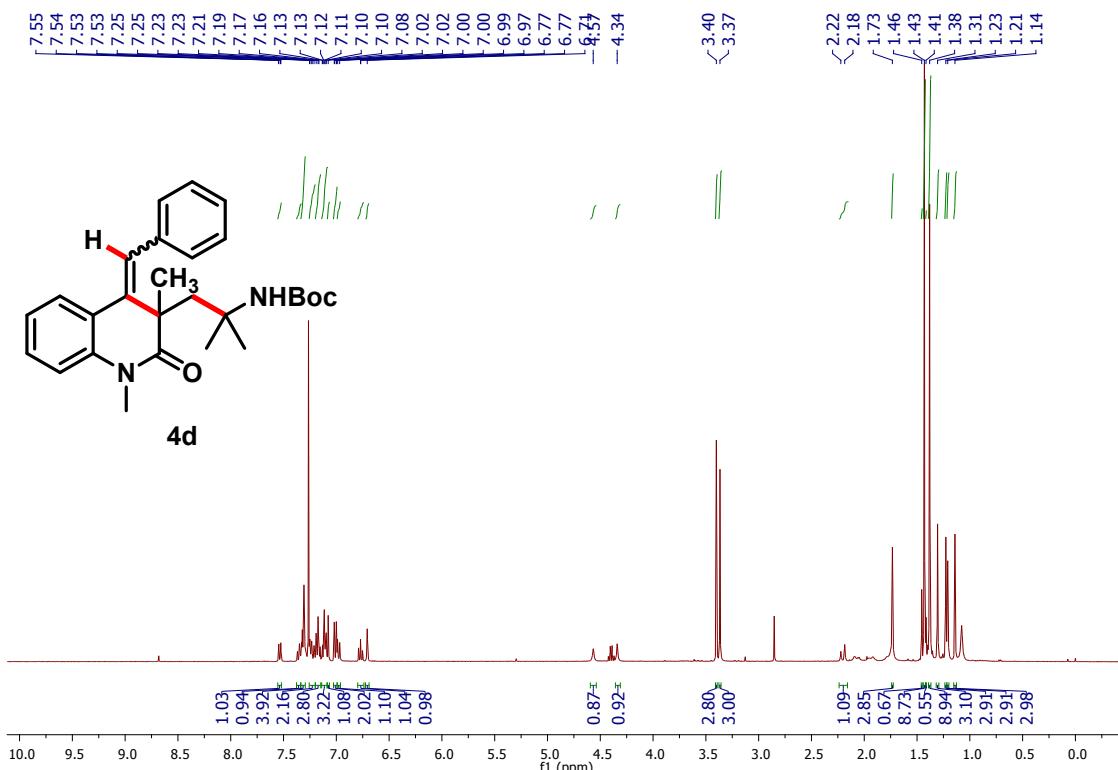


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

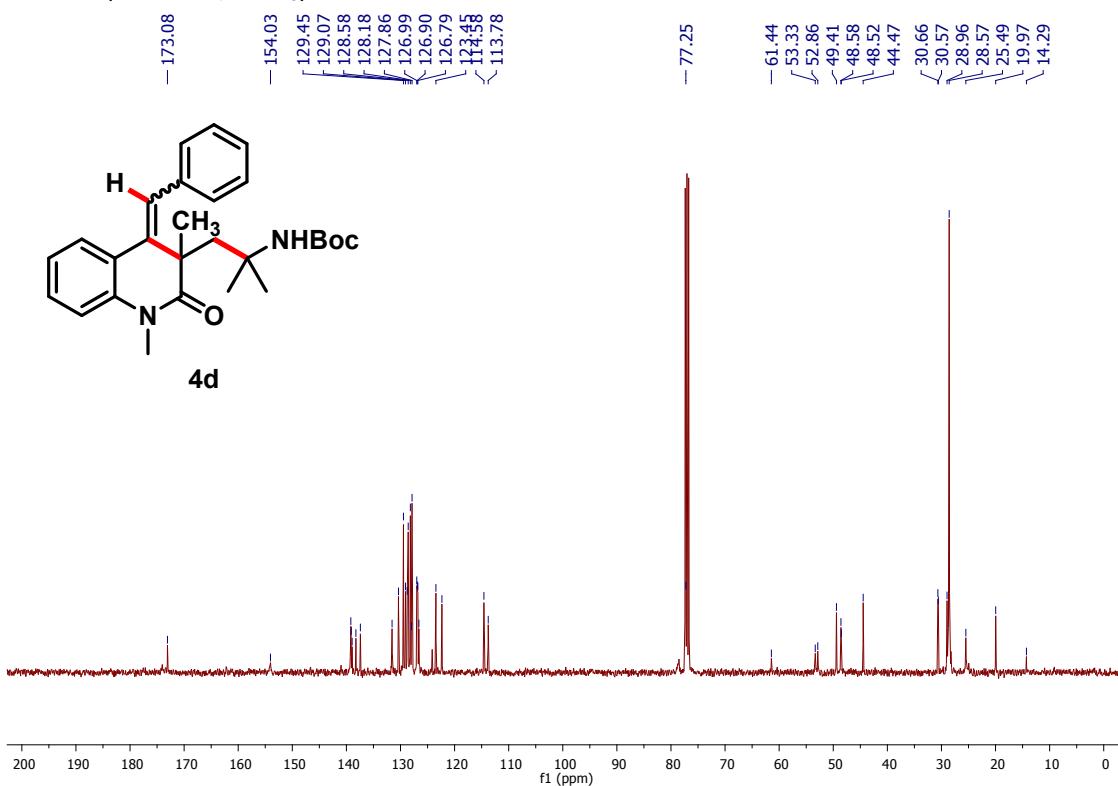


#### **Tert-butyl-(1-(4-benzylidene-1,3-dimethyl-2-oxo-1,2,3,4-tetrahy methylpropan-2-yl) carbamate (4d).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

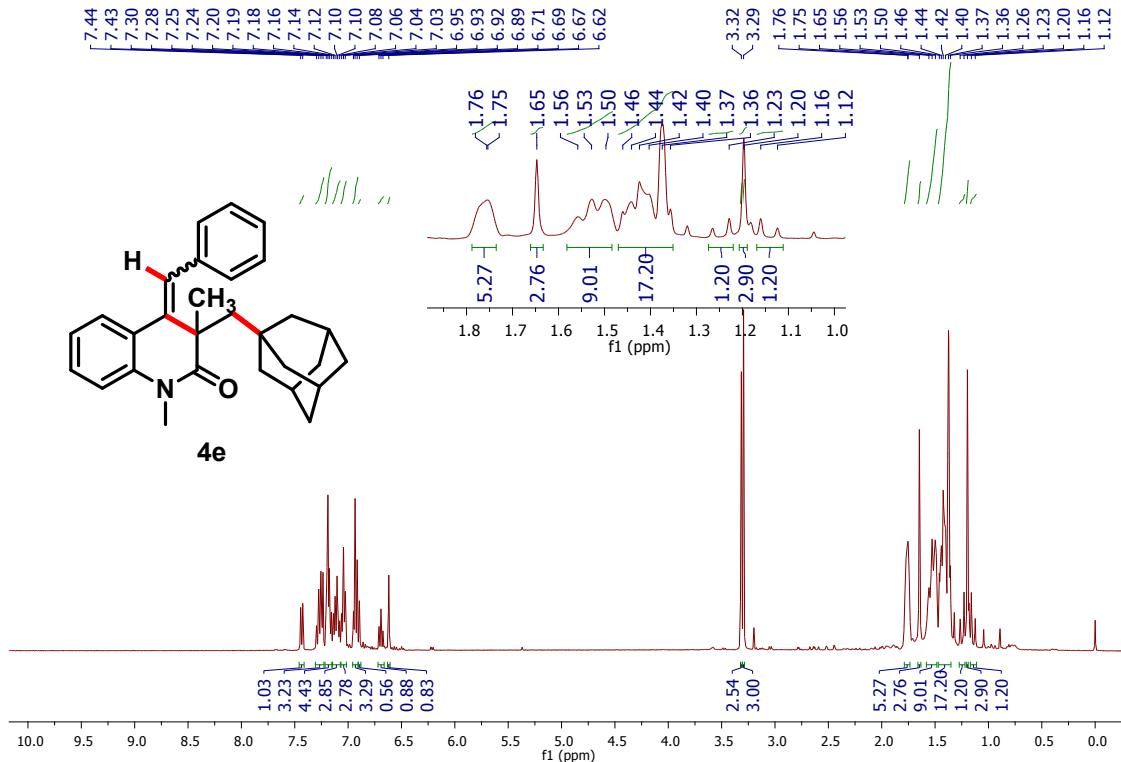


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

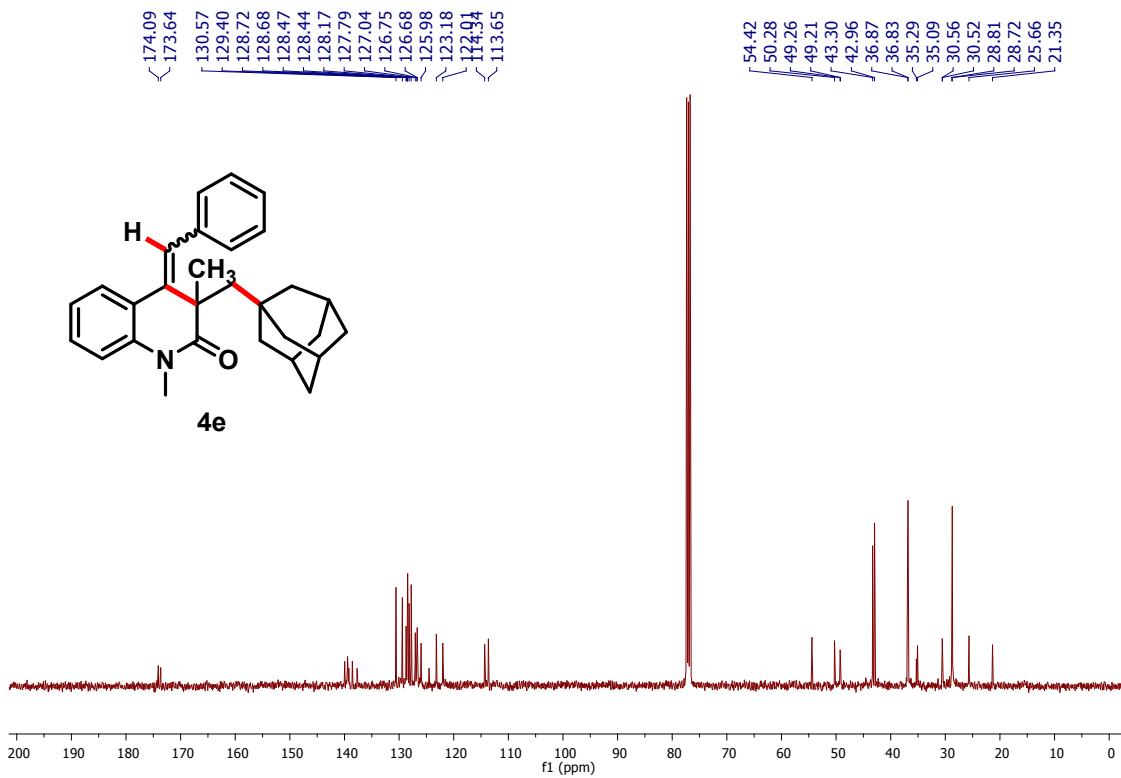


**(3R)-3-(((1*r*,3*R*)-adamantan-1-yl)methyl)-4-((E)-benzylidene)-1,3-dimethyl-3,4-dihydroquinolin-2(1*H*)-one (4e).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

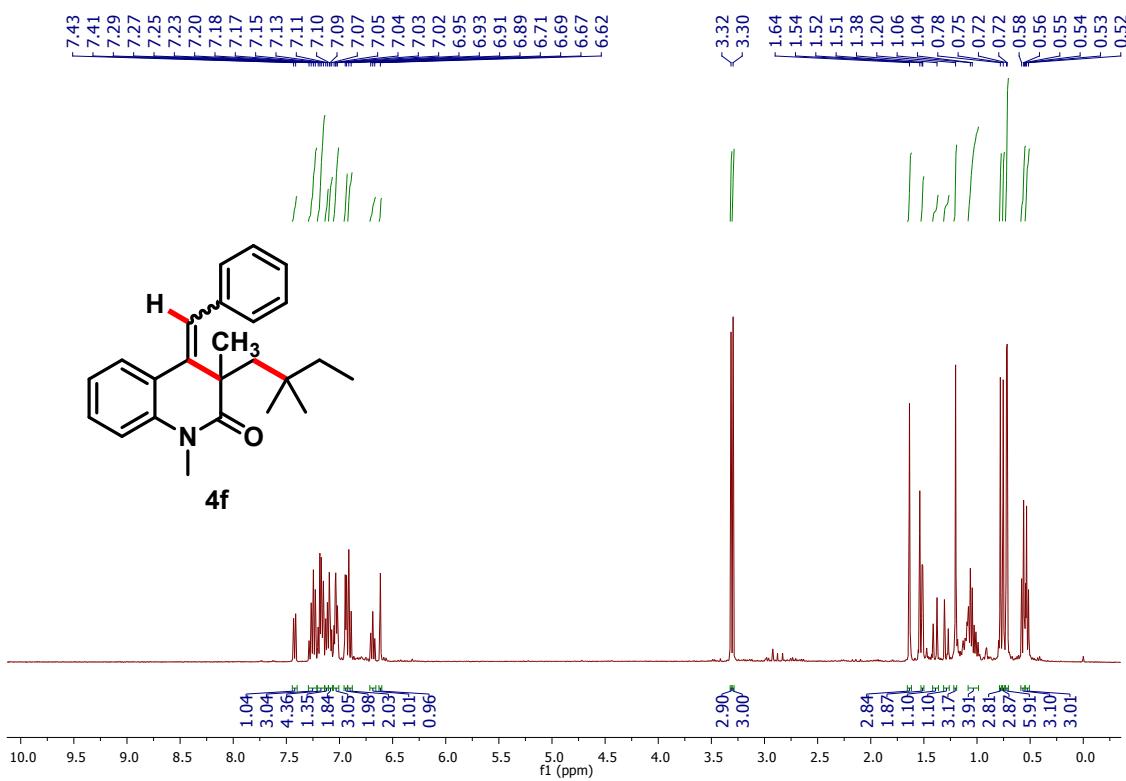


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

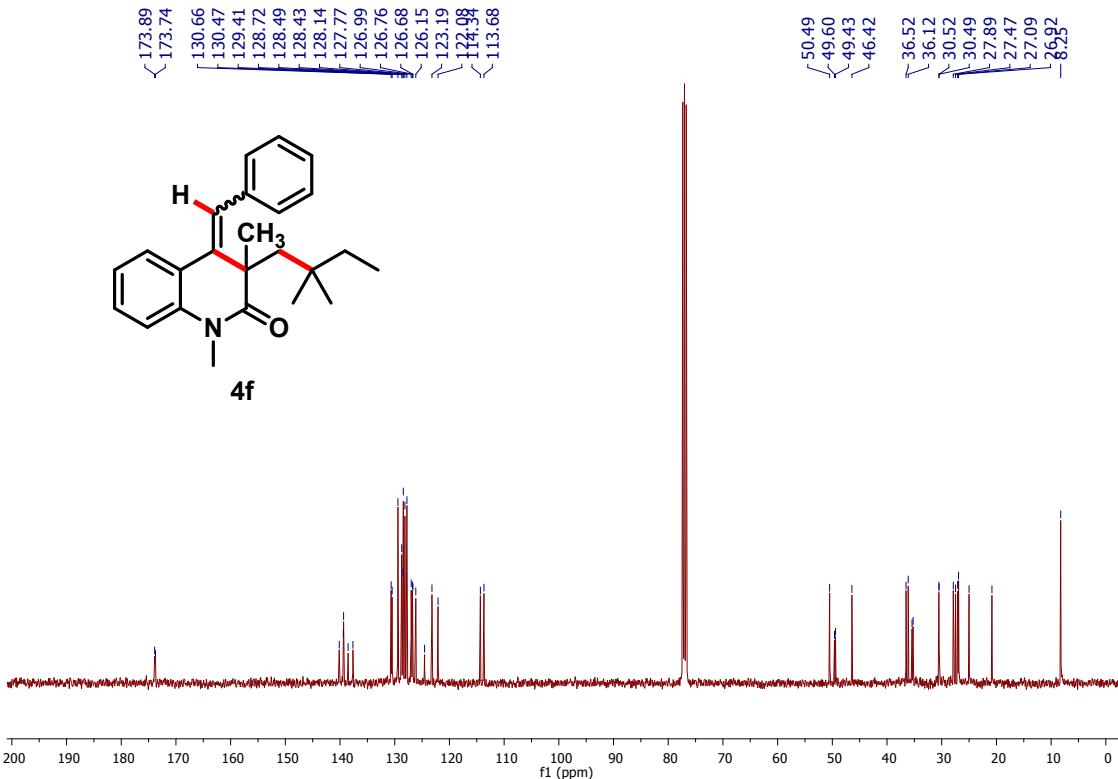


**4-benzylidene-3-(2,2-dimethylbutyl)-1,3-dimethyl-3,4-dihydroquinolin-2(1H)-one (4f).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

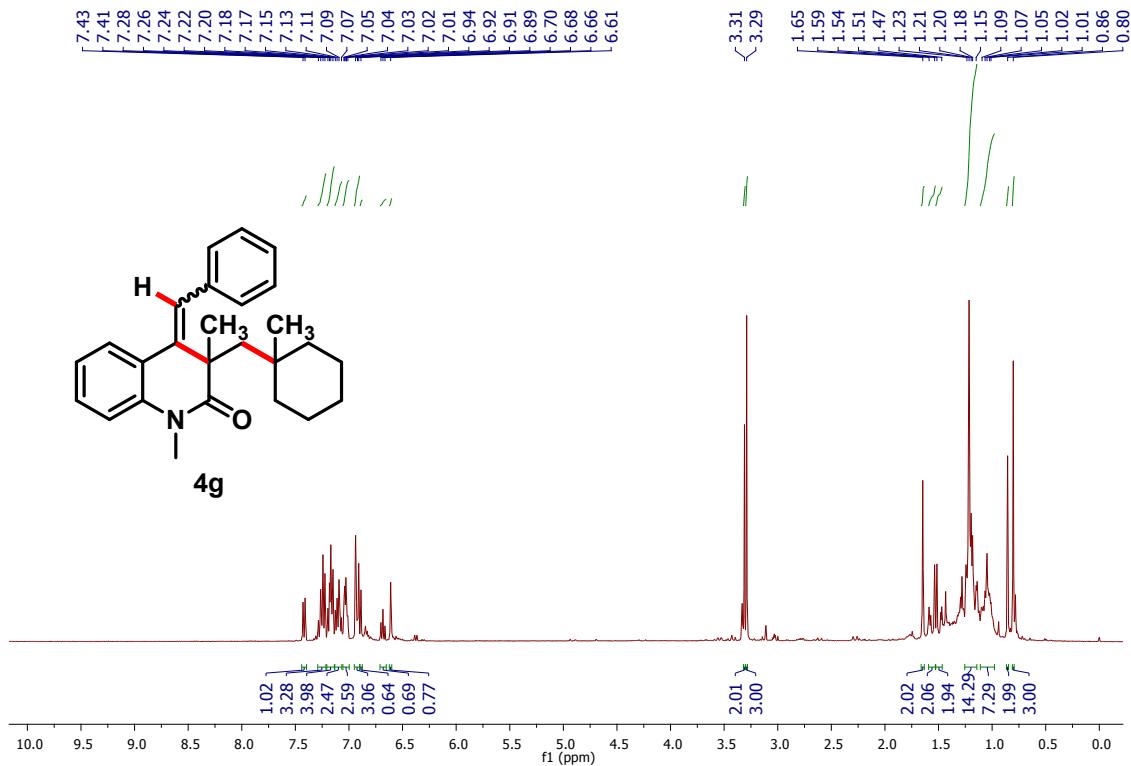


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

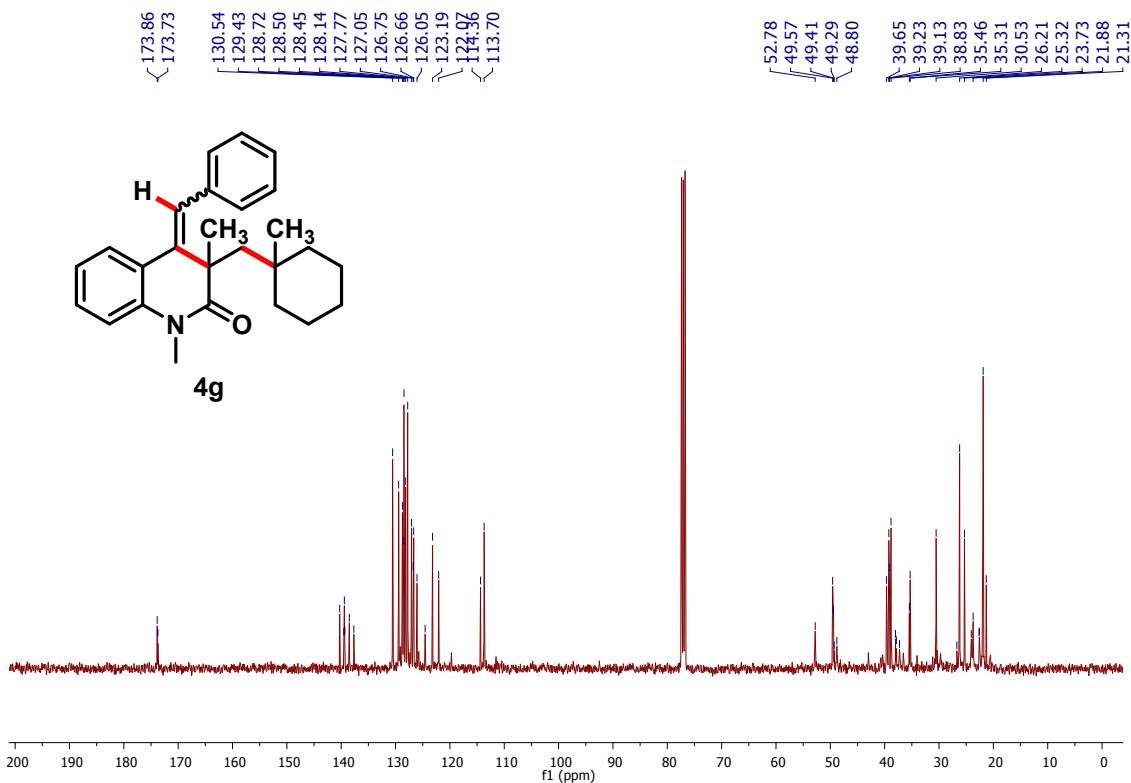


**4-benzylidene-1,3-dimethyl-3-((1-methylcyclohexyl)methyl)-3,4-dihydroquinolin-2(1H)-one (4g).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

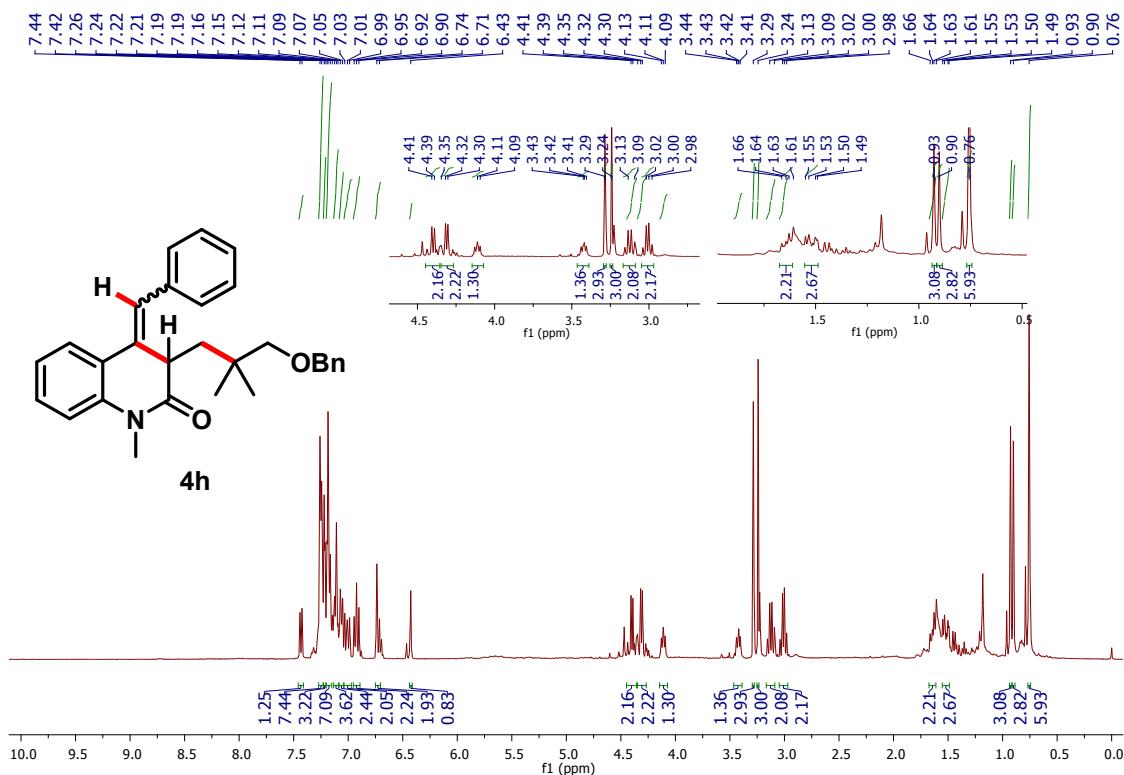


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

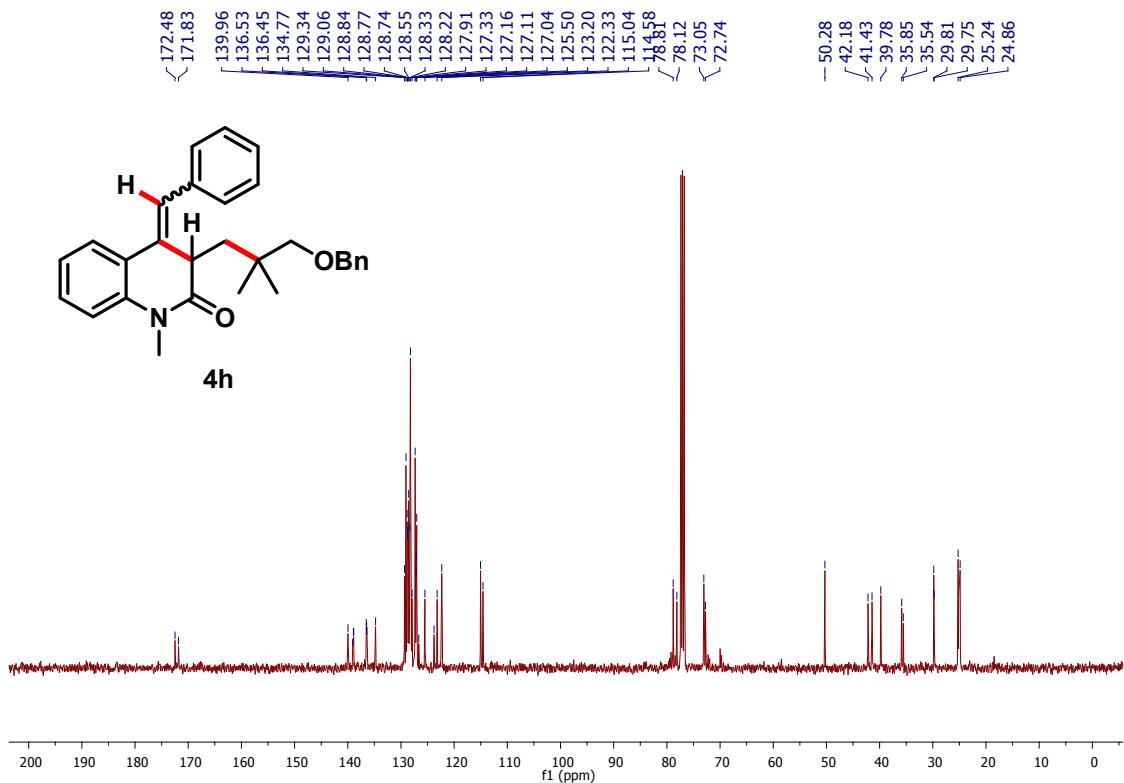


**4-benzylidene-3-(benzyloxy)-2,2-dimethylpropyl-1-methyl-3,4-dihydroquinolin-2(1H)-one (4h).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

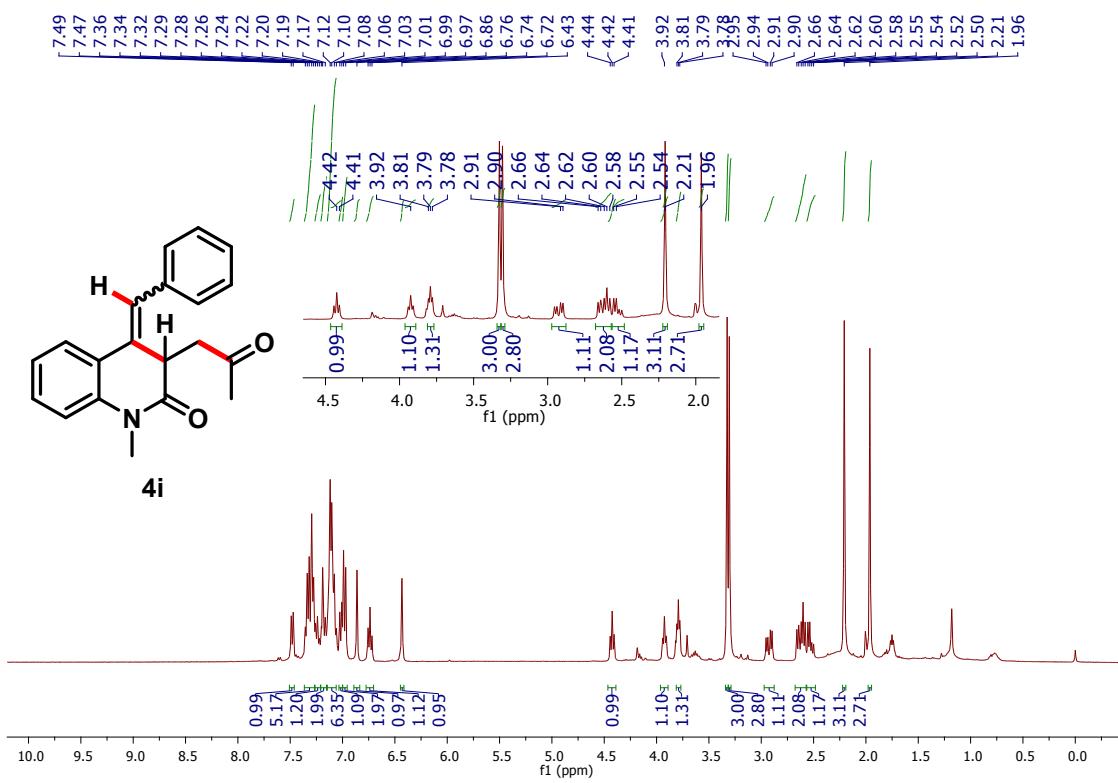


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

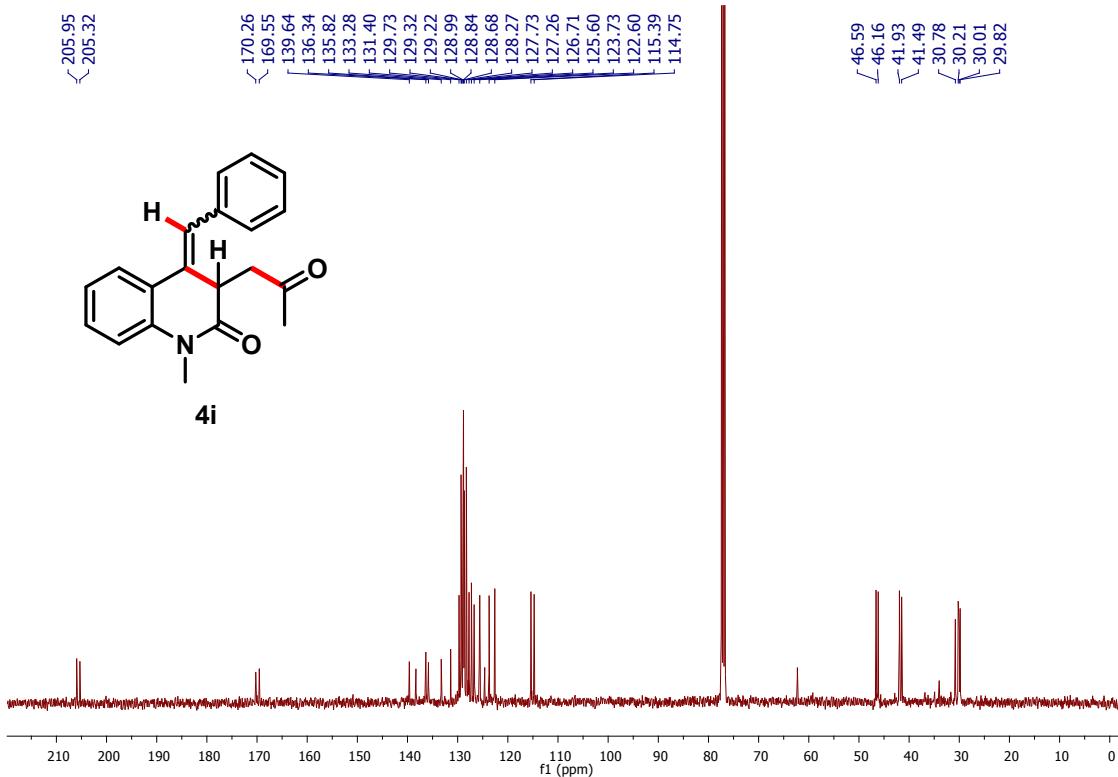


**4-benzylidene-1-methyl-3-(2-oxopropyl)-3,4-dihydroquinolin-2(1H)-one (4i).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

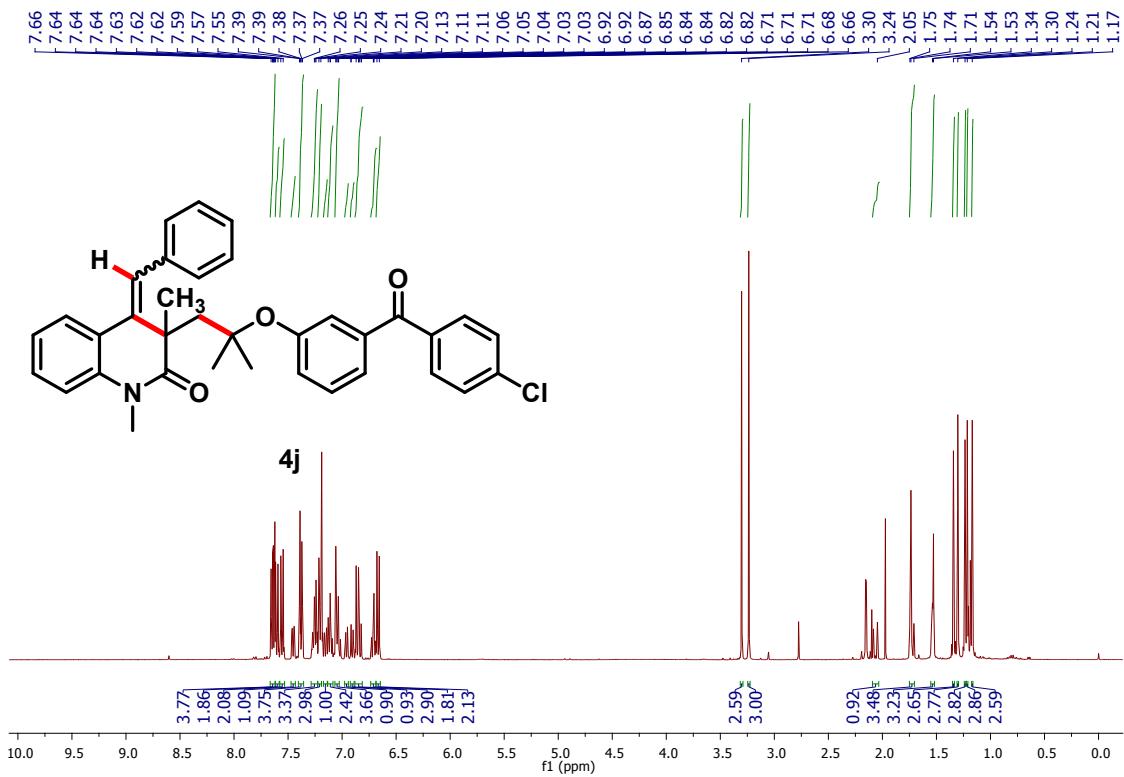


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

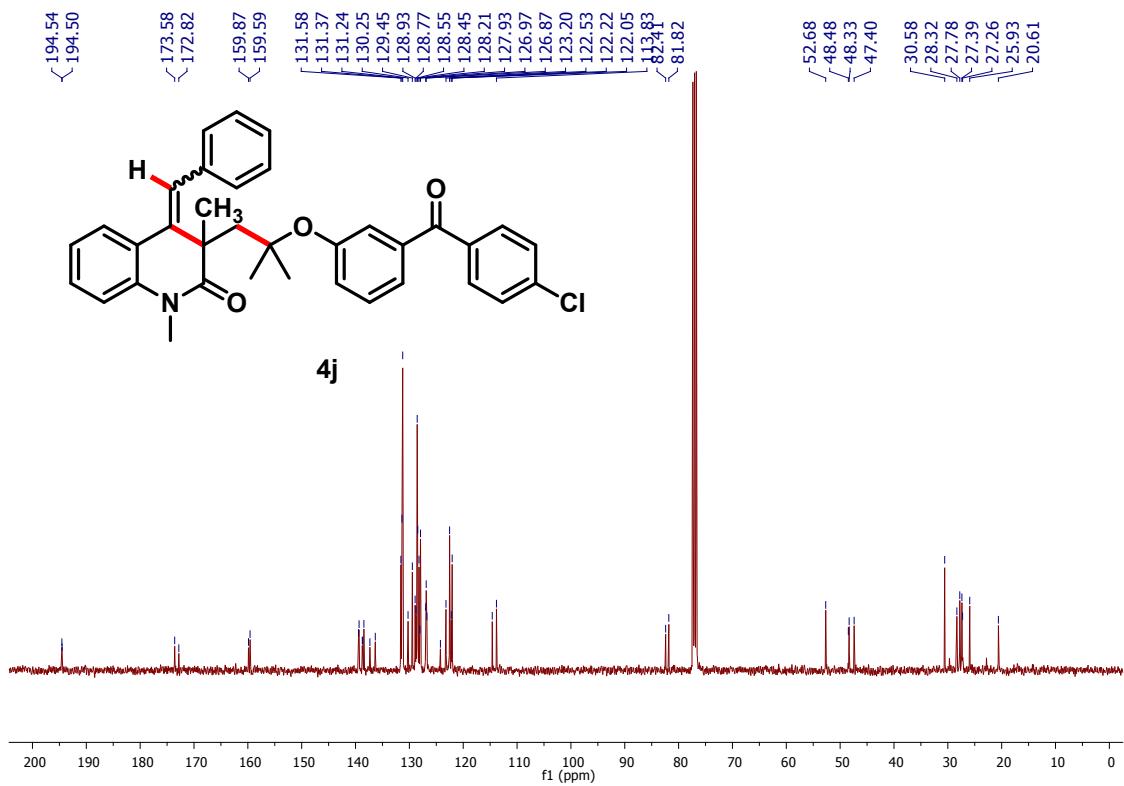


**4-benzylidene-3-(2-(3-(4-chlorobenzoyl)phenoxy)-2-methylpropyl)-1,3-dimethyl-3,4-dihydroquinolin-2(1H)-one (4j).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

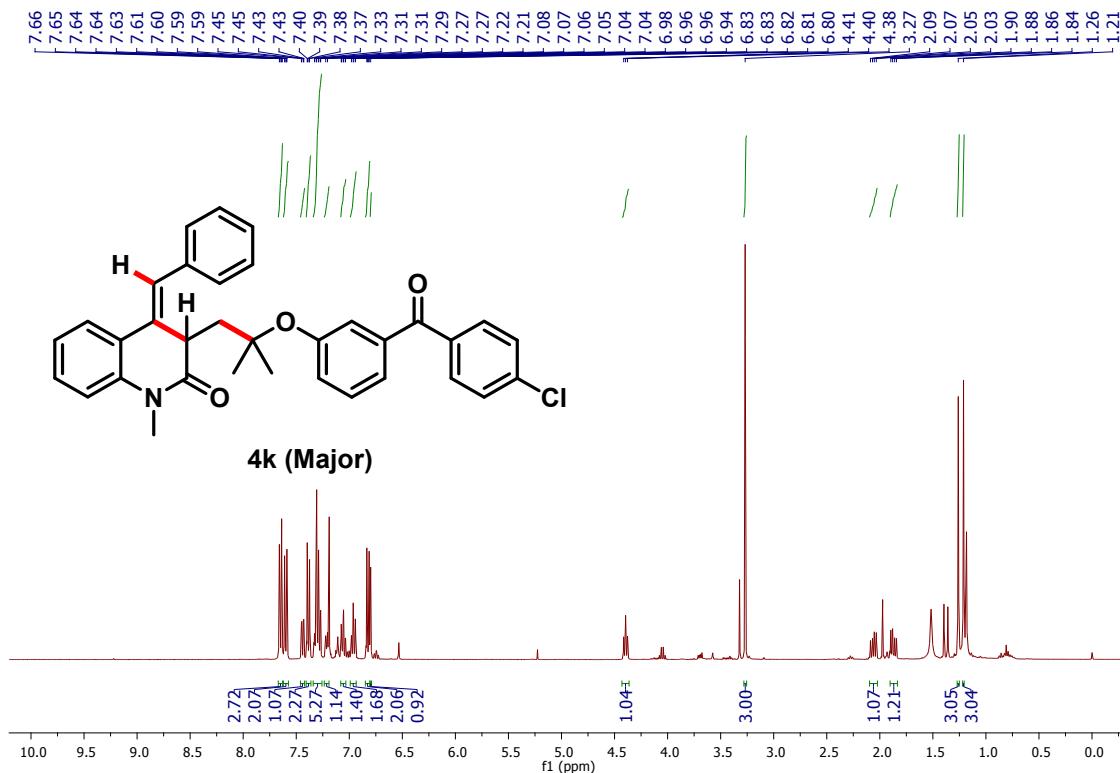


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

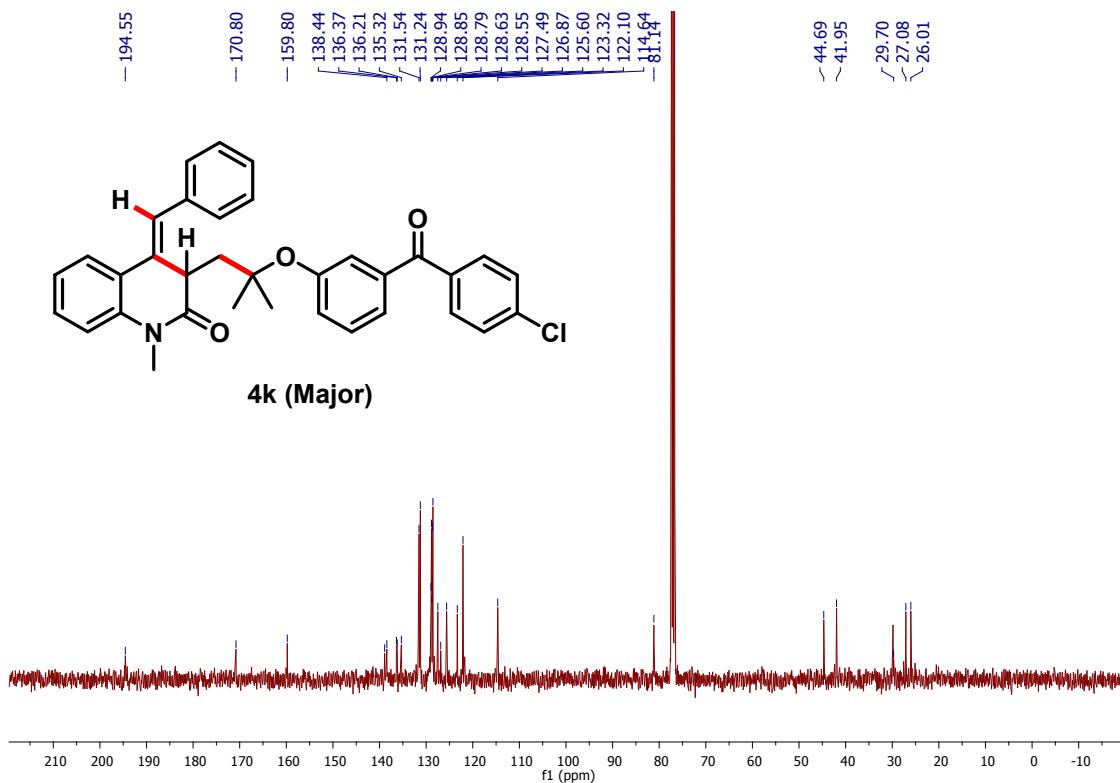


**4-benzylidene-3-(2-(3-(4-chlorobenzoyl)phenoxy)-2-methylpropyl)-1-methyl-3,4-dihydroquinolin-2(1H)-one (4k – Major and Minor diastereomers).**

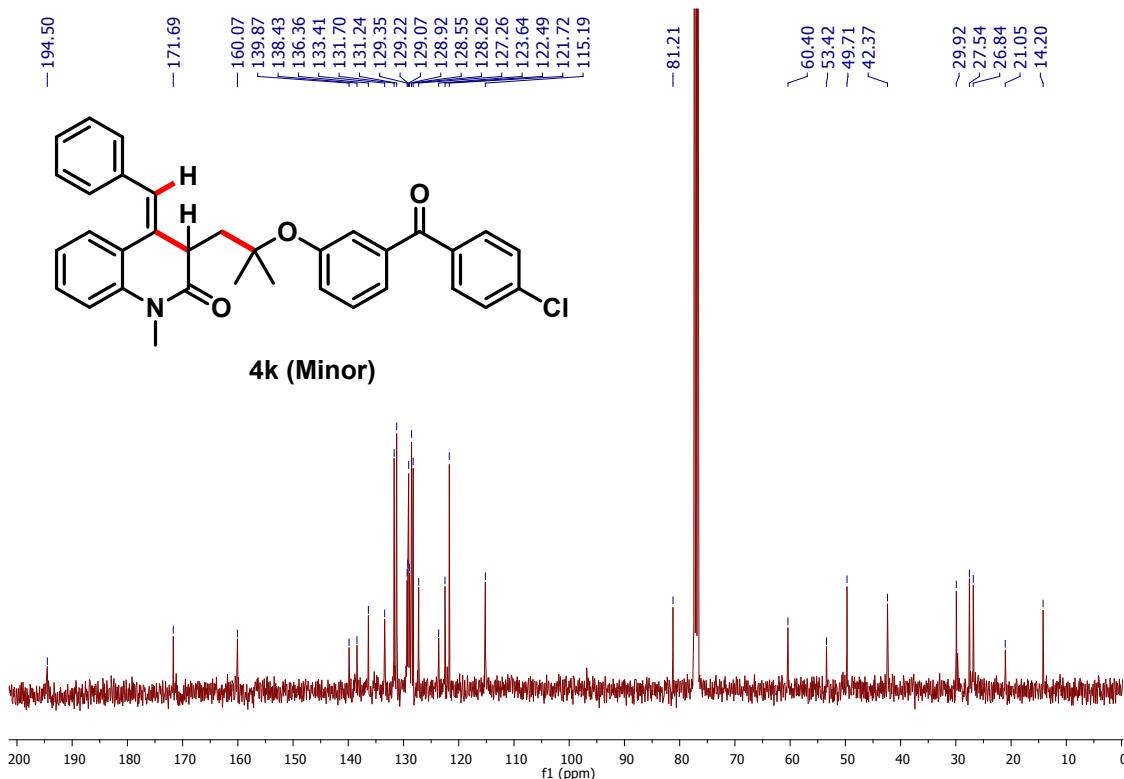
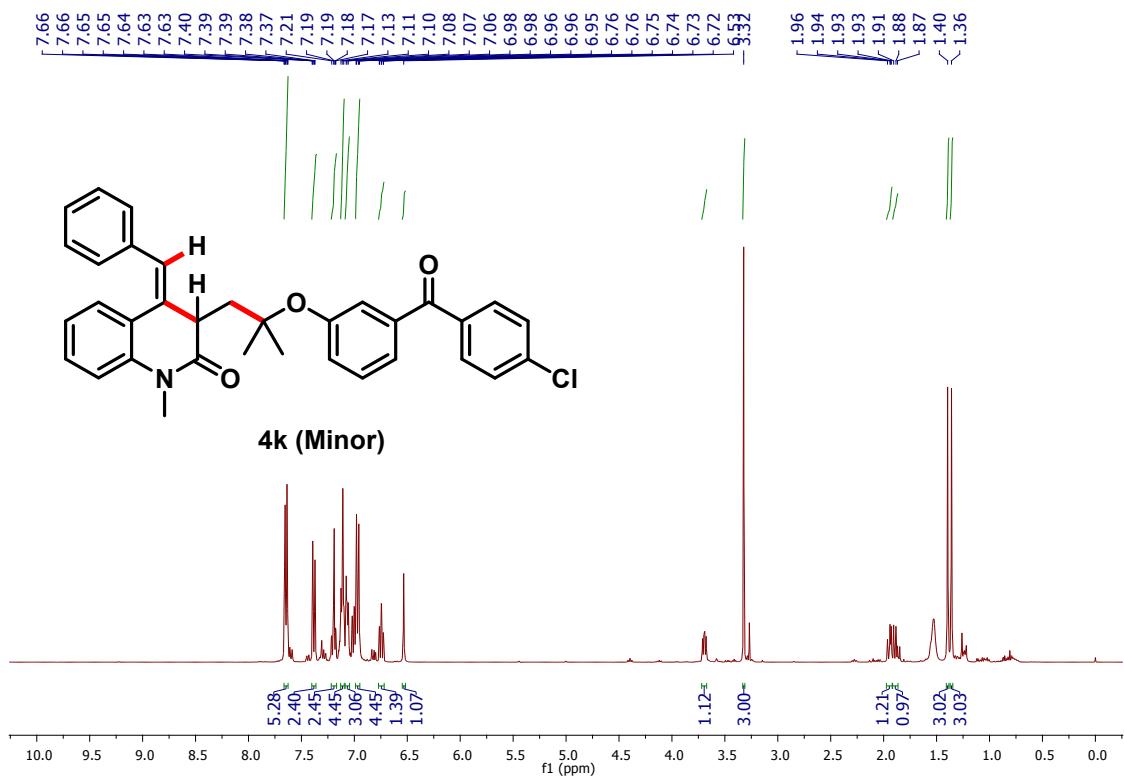
<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)



<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

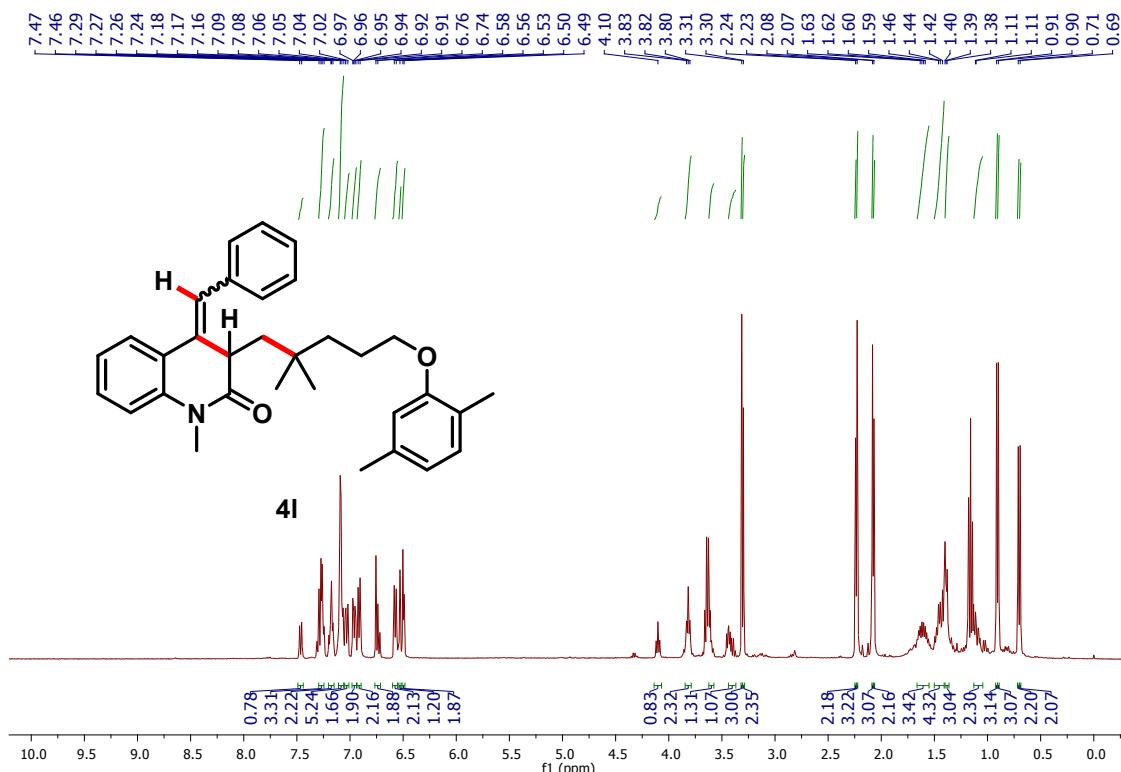


<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

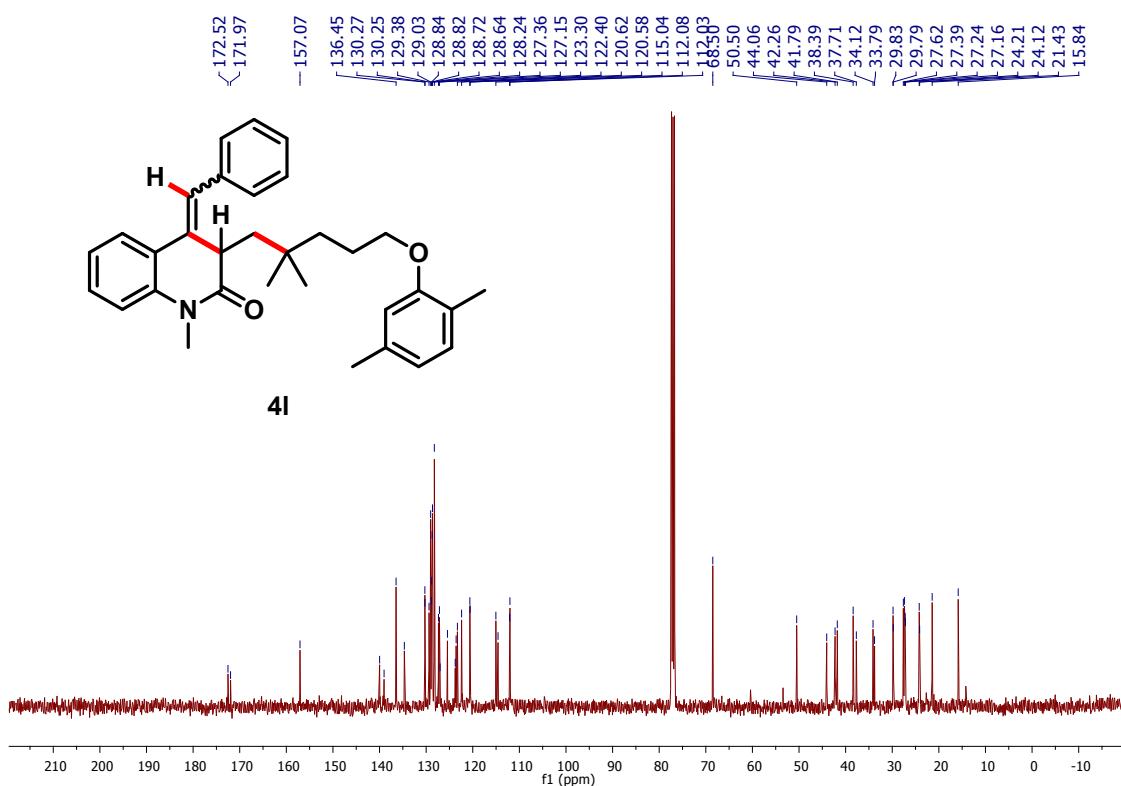


**4-benzylidene-3-(5-(2,5-dimethylphenoxy)-2,2-dimethylpentyl)-1-methyl-3,4-dihydroquinolin-2(1H)-one (4l).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

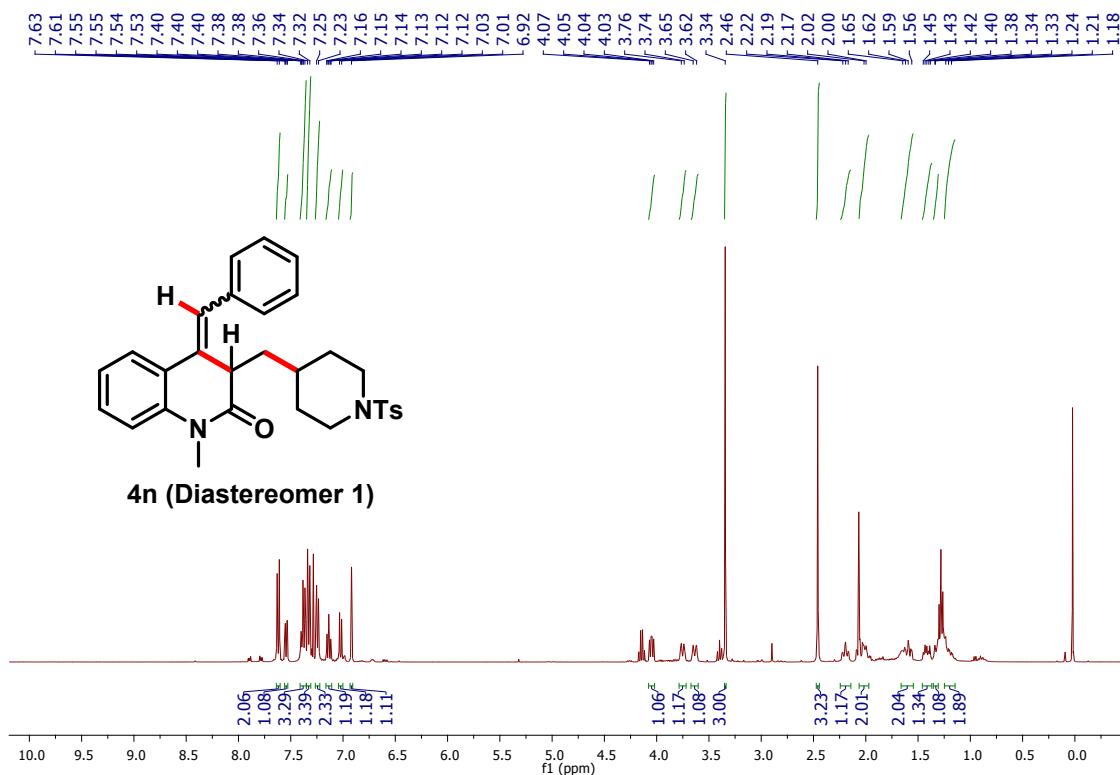


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

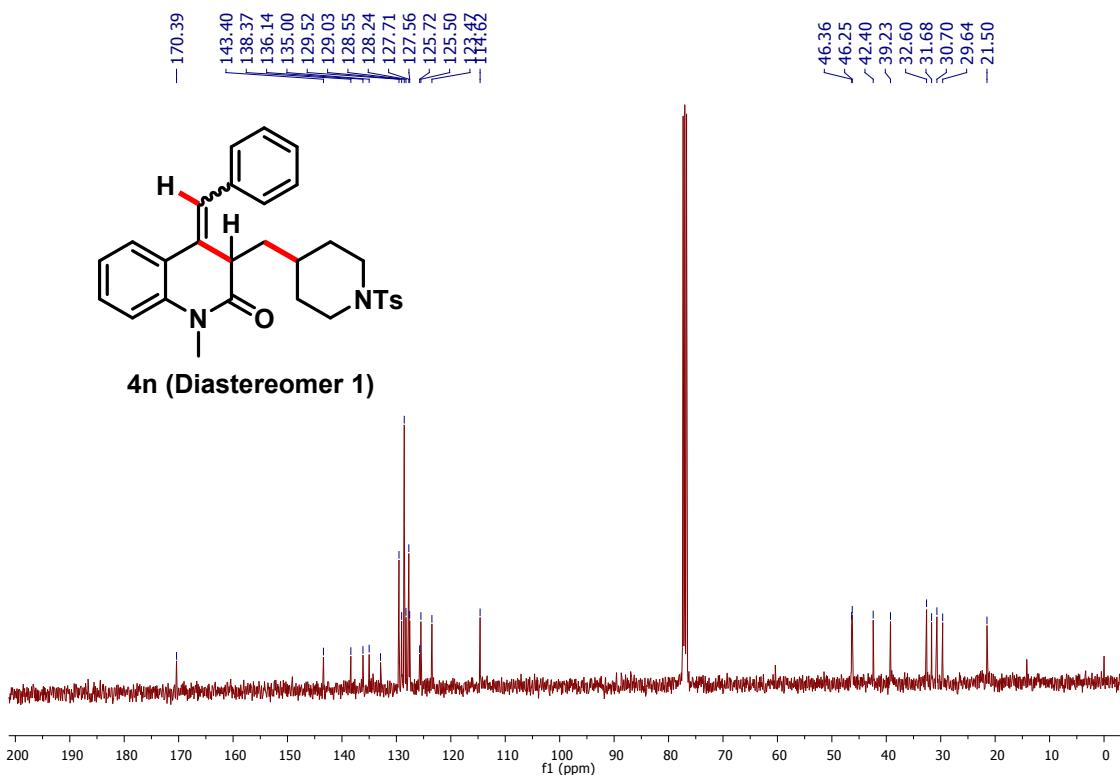


**4-benzylidene-1-methyl-3-((1-tosylpiperidin-4-yl)methyl)-3,4-dihydroquinolin-2(1H)-one (4n).**

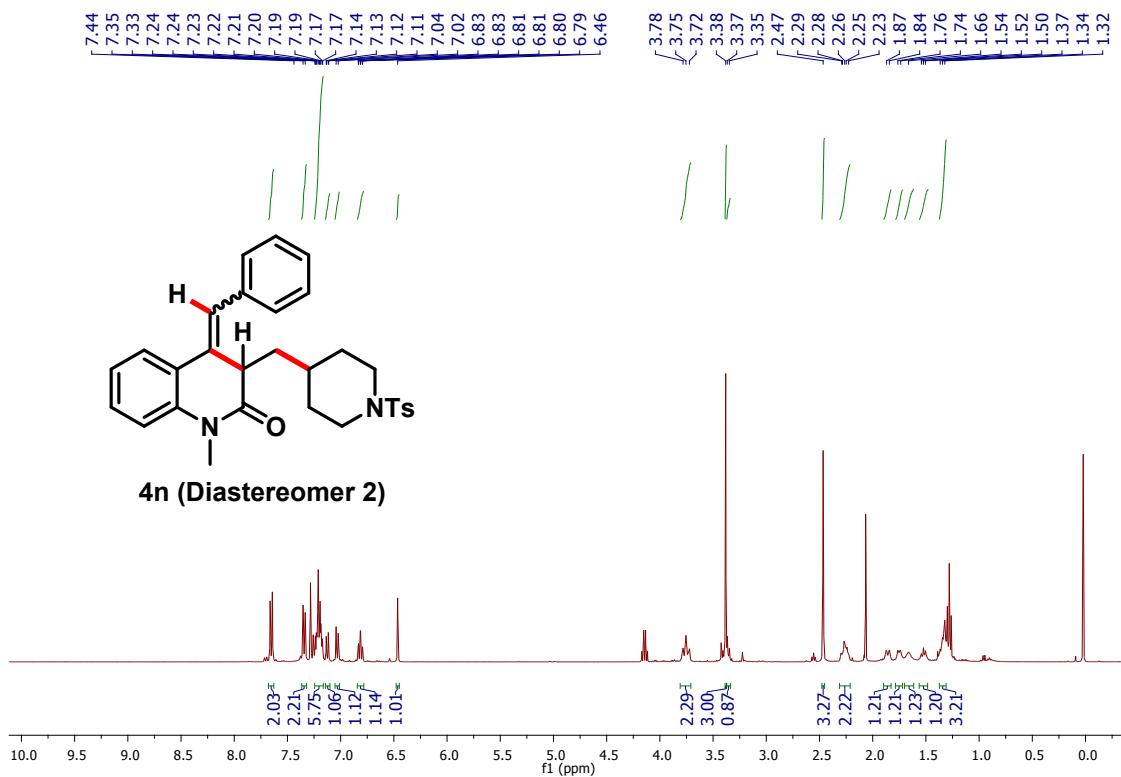
<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)



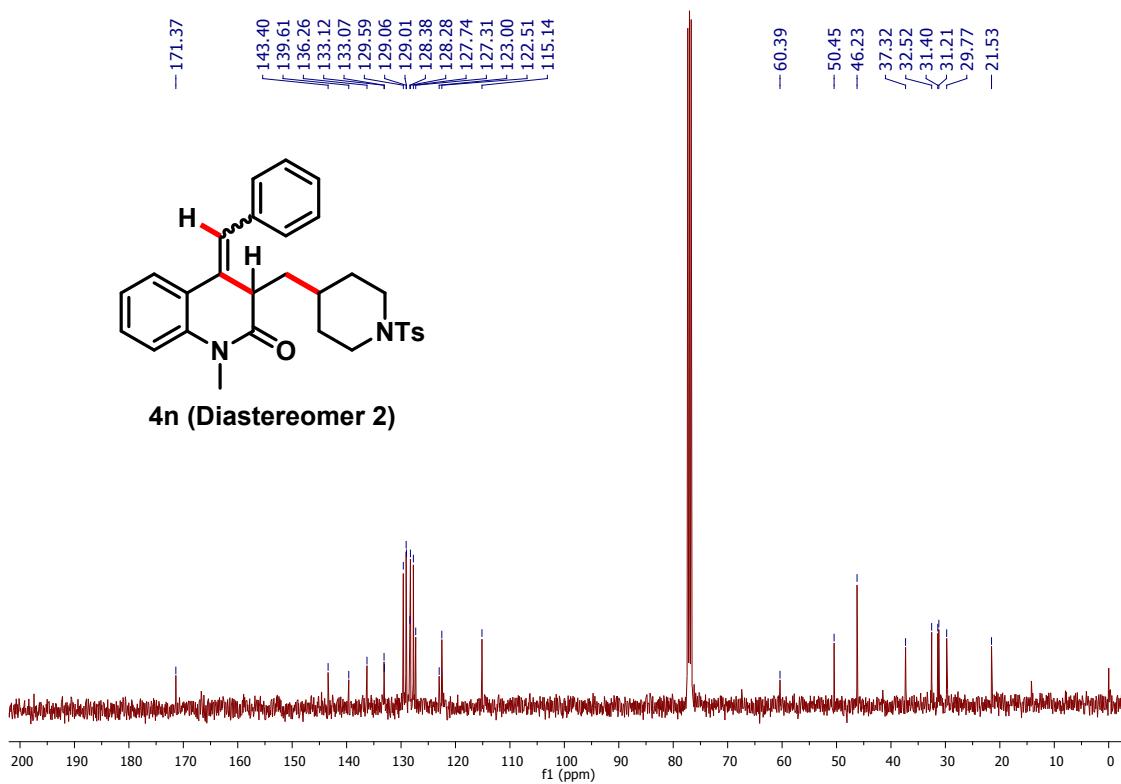
<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)



<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

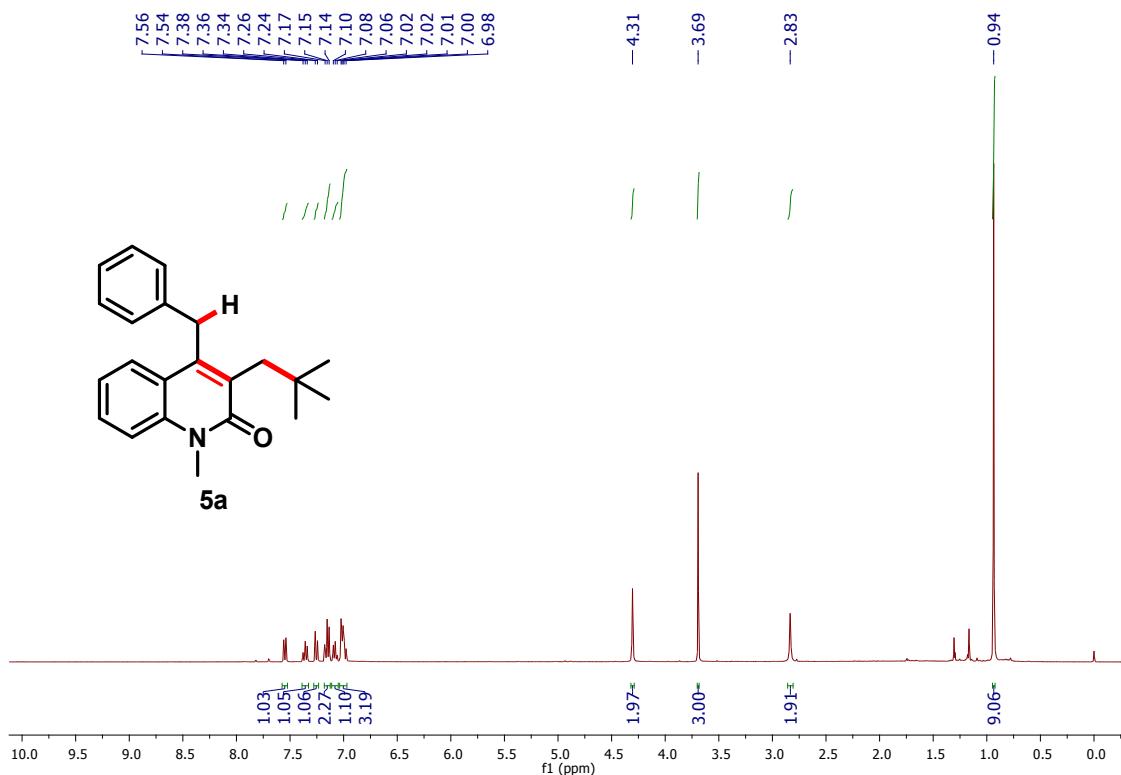


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

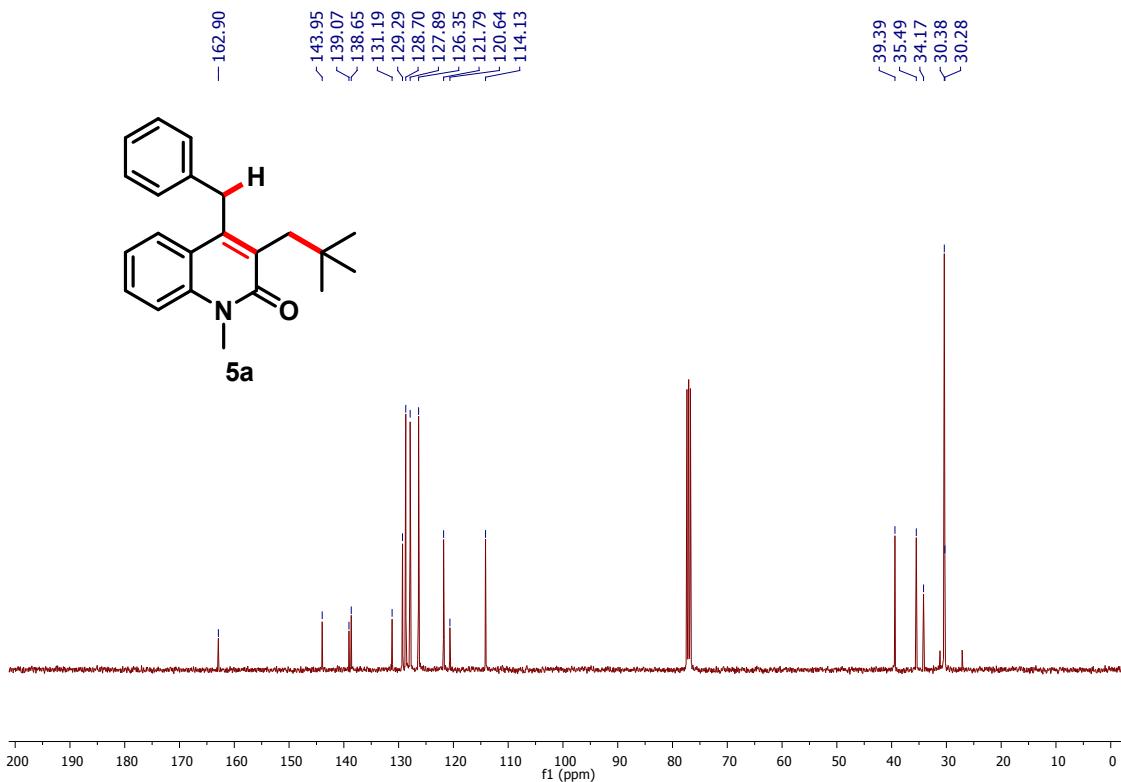


**4-benzyl-1-methyl-3-((1-methylcyclohexyl)methyl)quinolin-2(1H)-one (5a).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

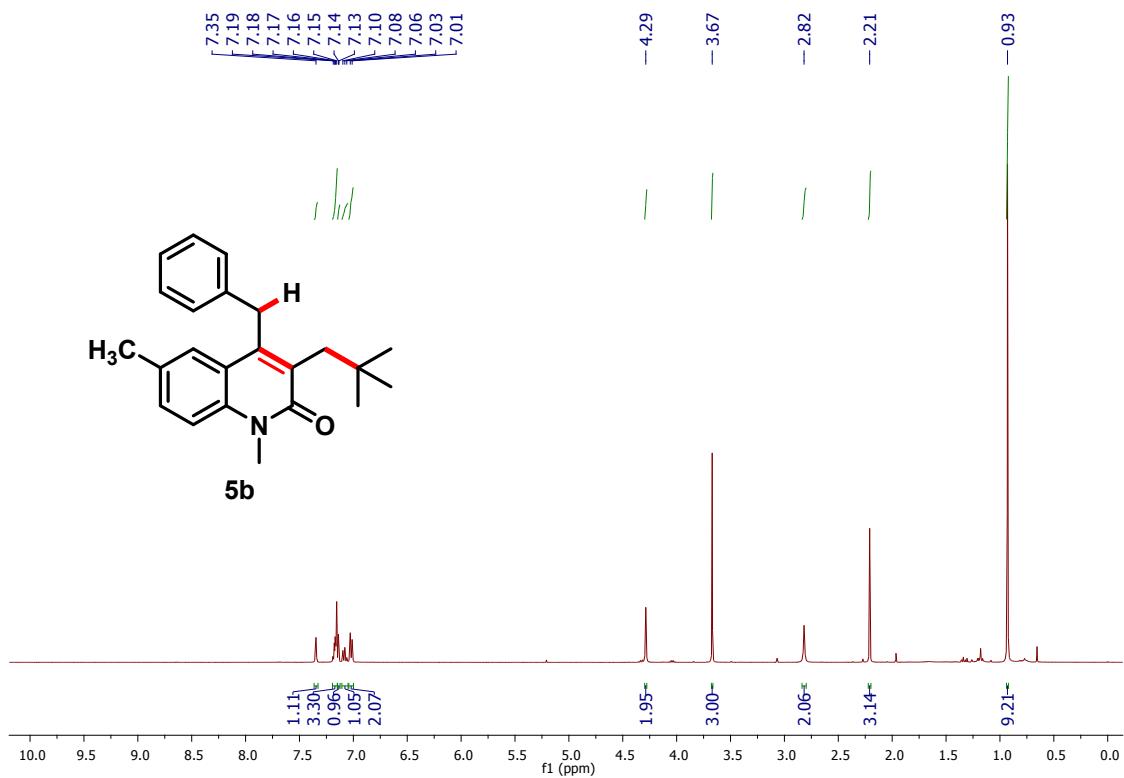


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

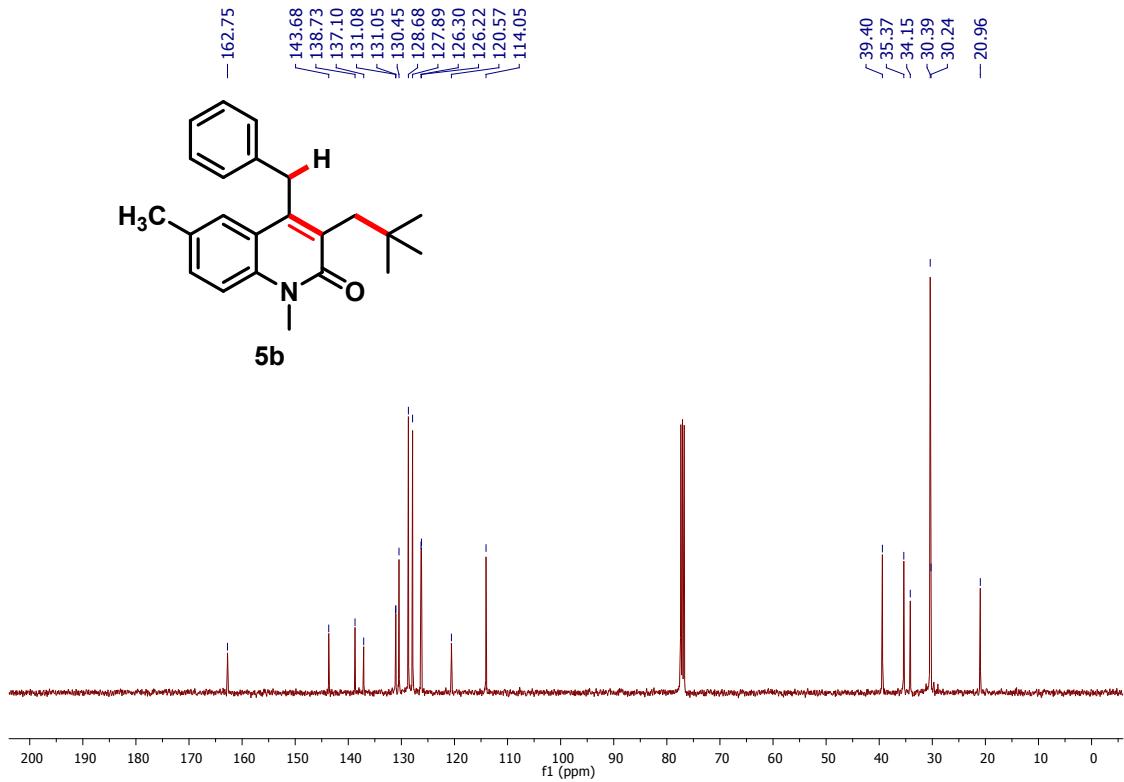


#### **4-benzyl-1,6-dimethyl-3-neopentylquinolin-2(1H)-one (5b).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

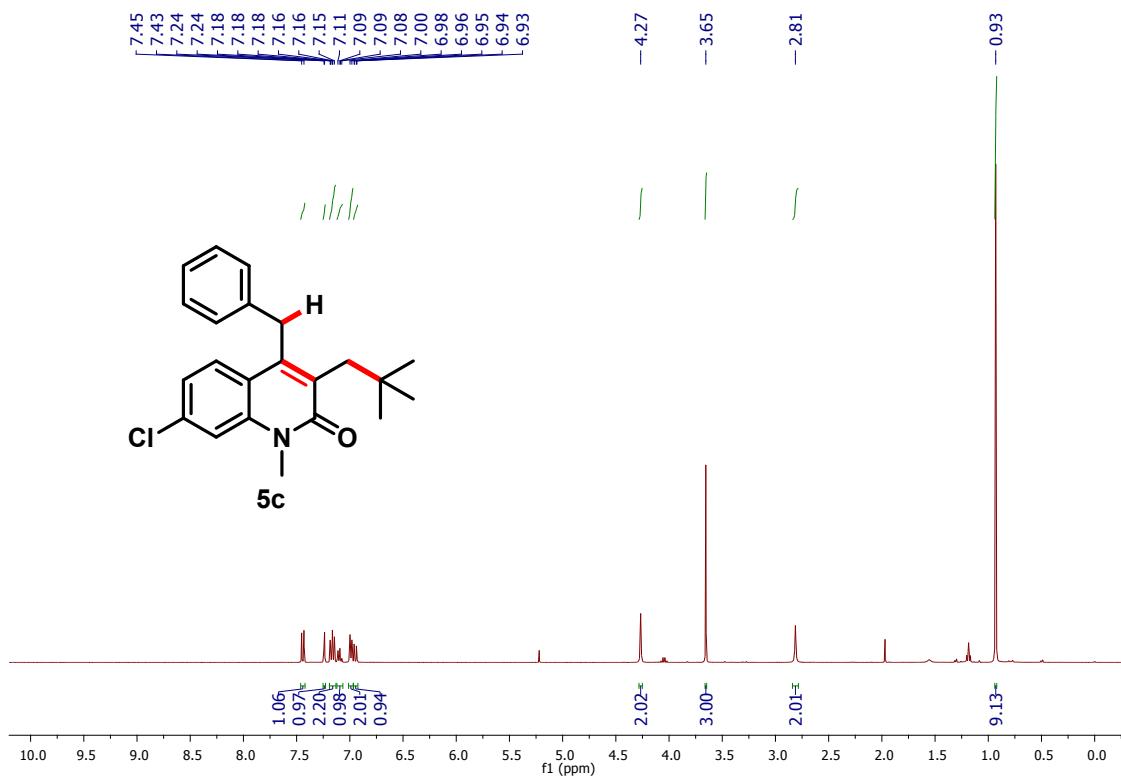


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

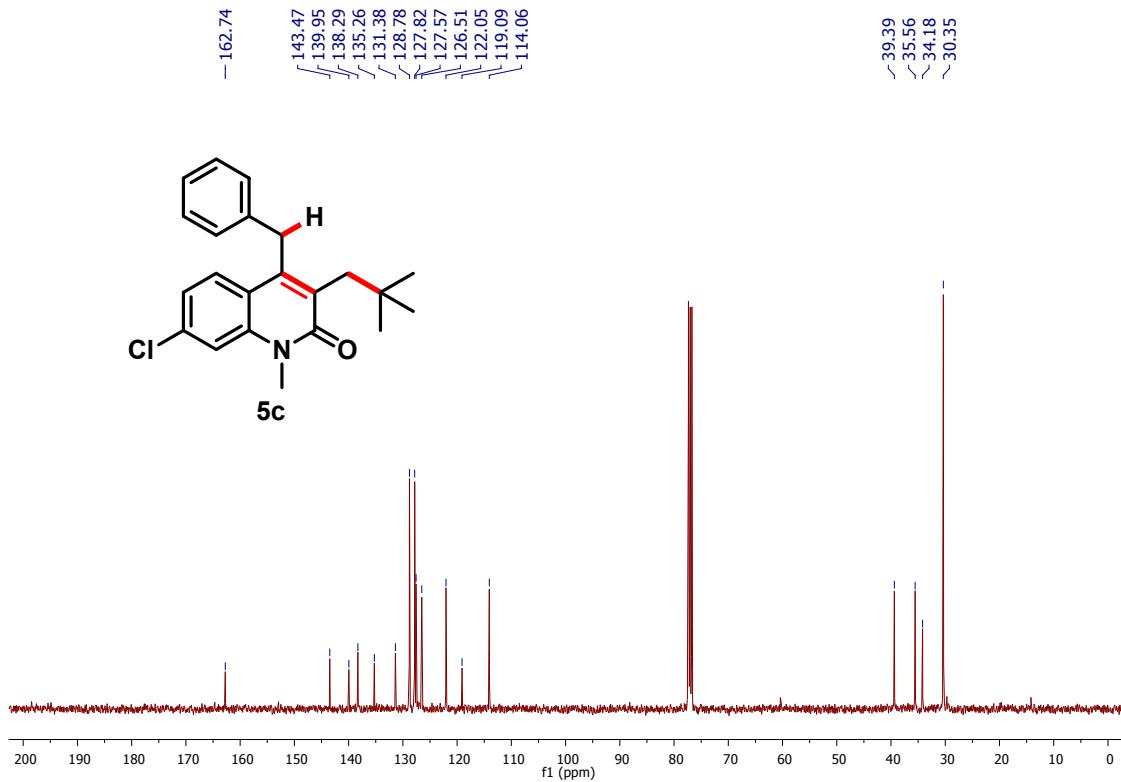


**4-benzyl-7-chloro-1-methyl-3-neopentylquinolin-2(1H)-one (5c).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

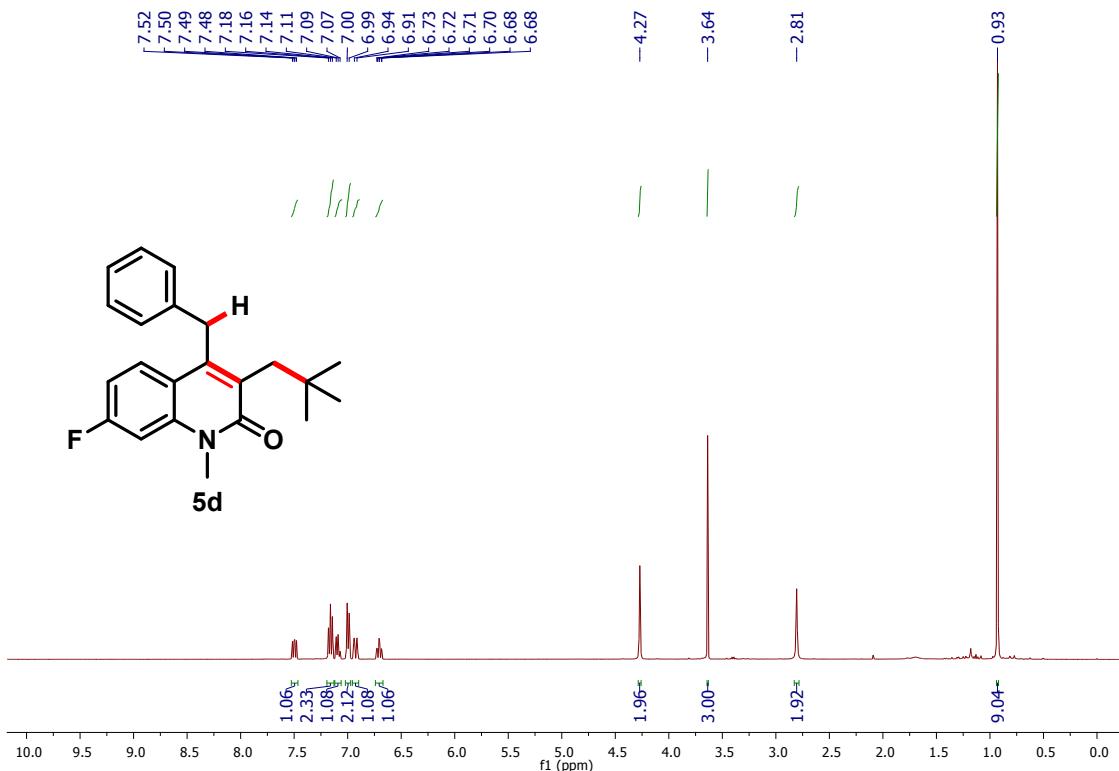


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

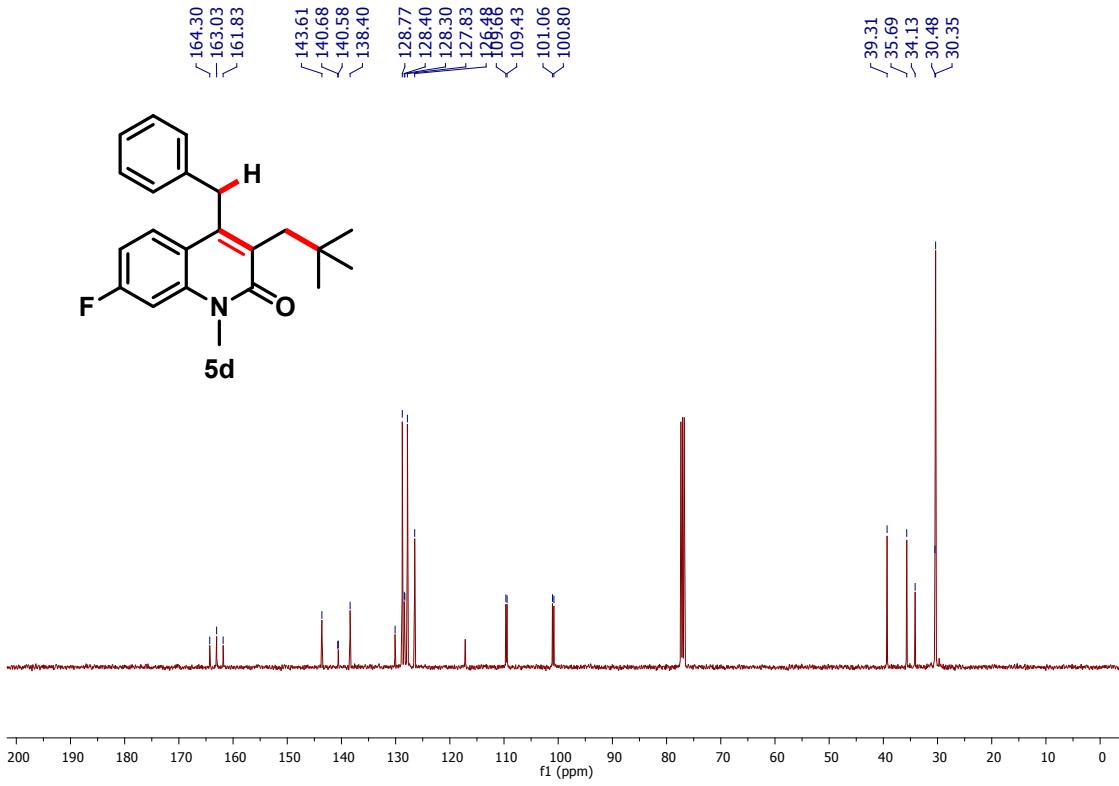


#### 4-benzyl-7-fluoro-1-methyl-3-neopentylquinolin-2(1H)-one (5d).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

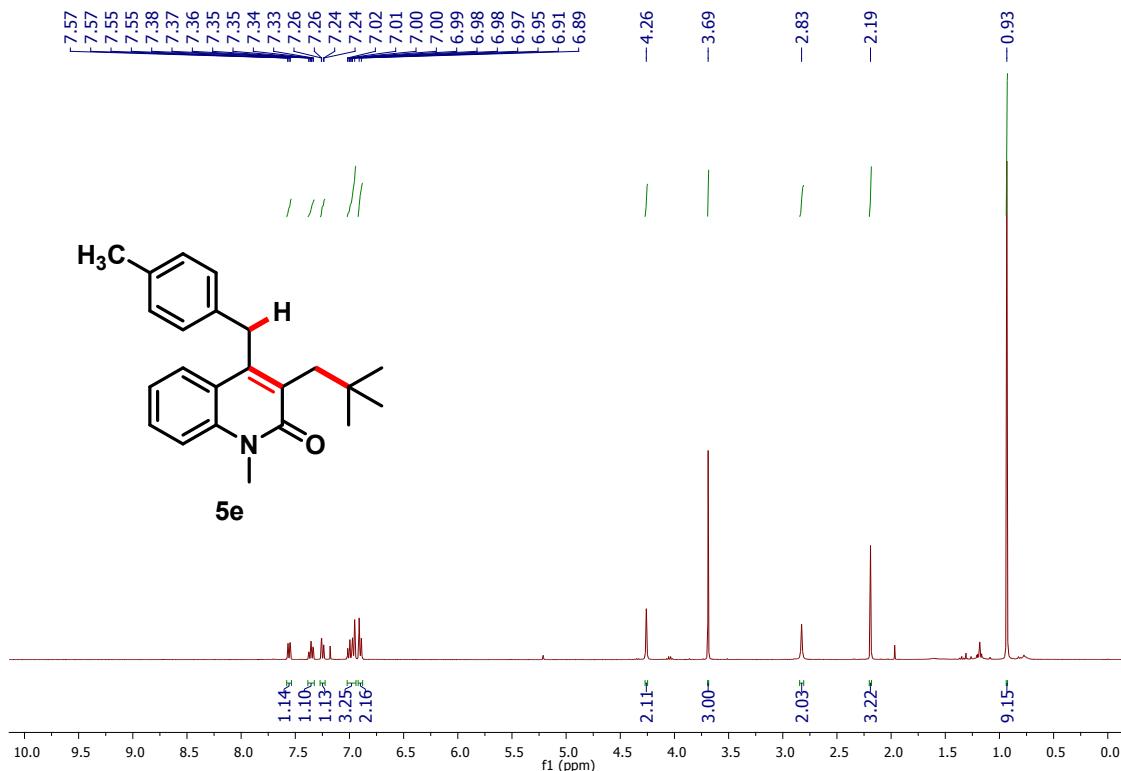


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

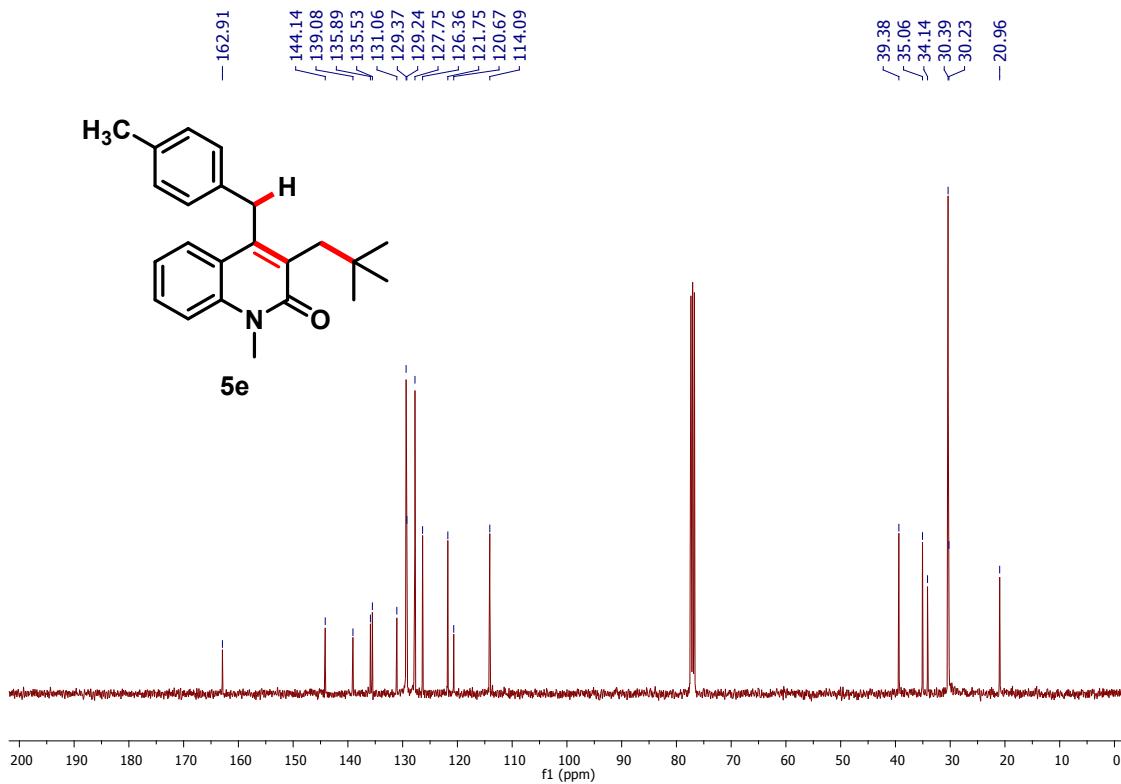


**1-methyl-4-(4-methylbenzyl)-3-neopentylquinolin-2(1H)-one (5e).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

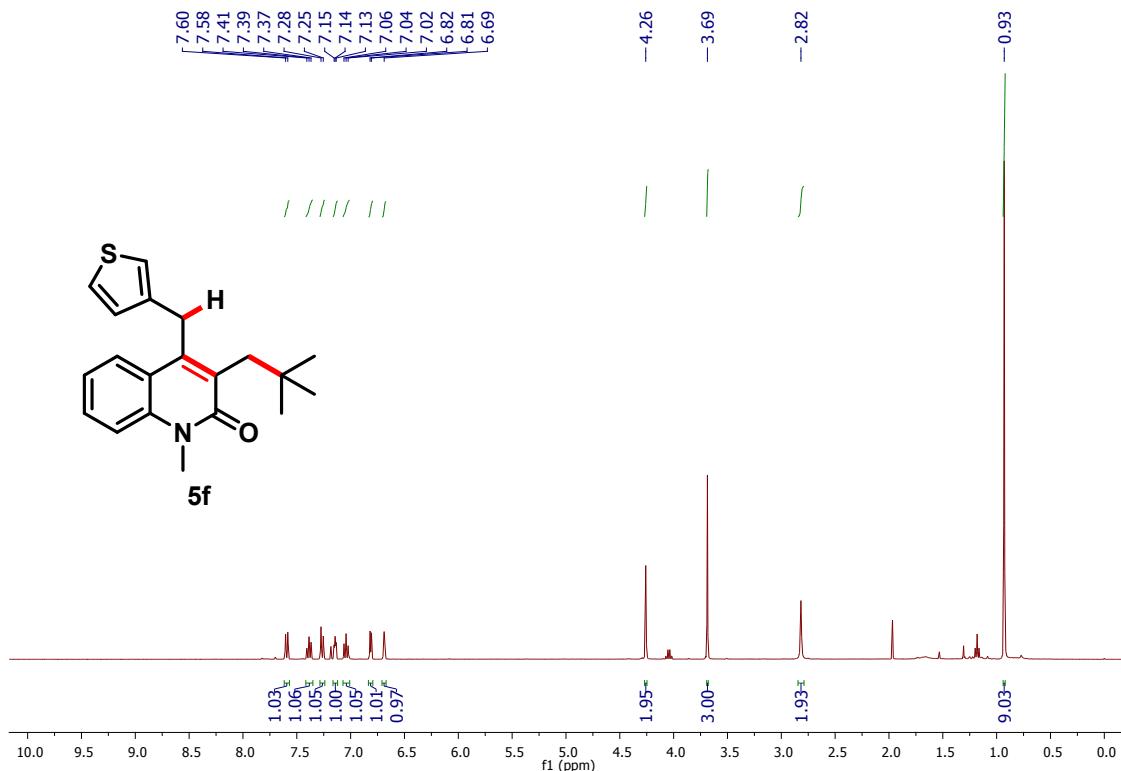


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

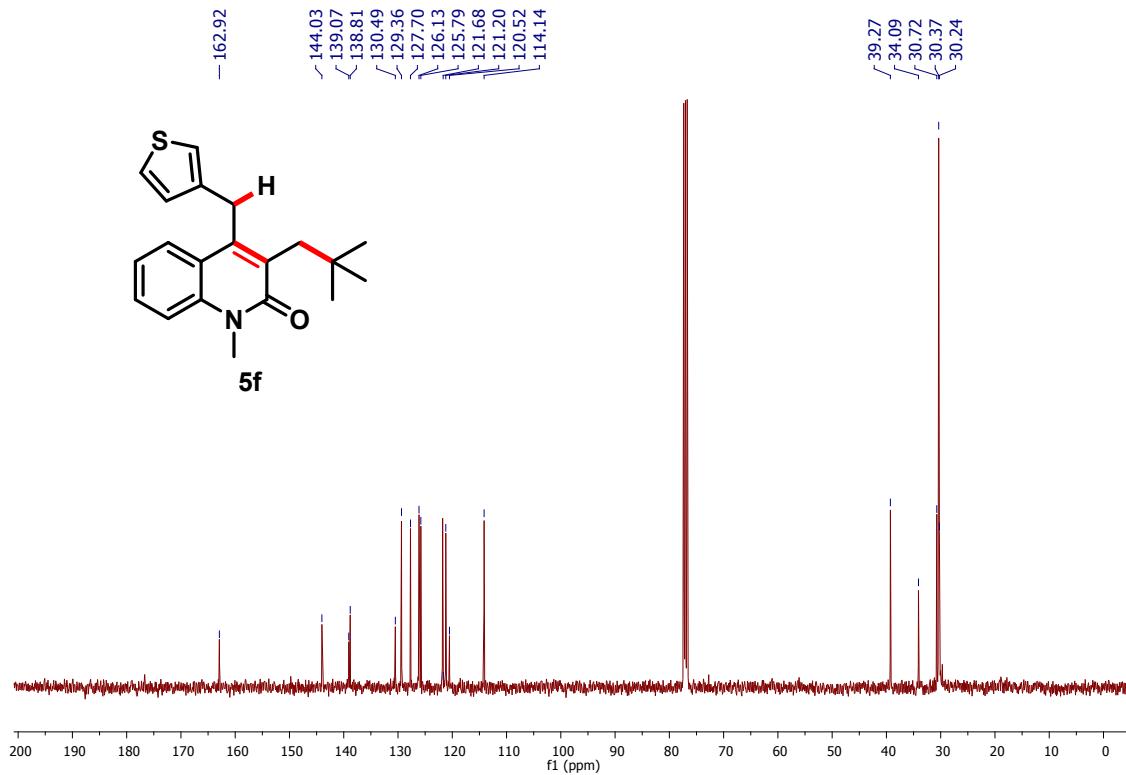


**1-methyl-3-neopentyl-4-(thiophen-3-ylmethyl)quinolin-2(1H)-one (5f).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

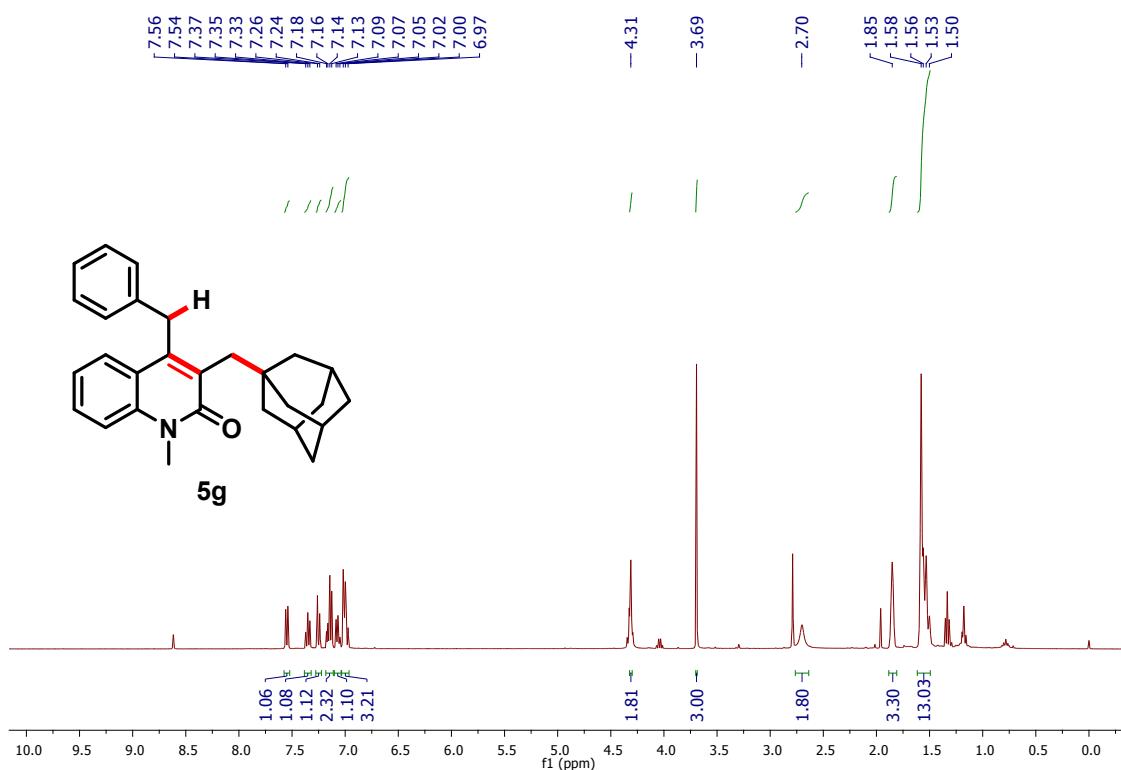


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

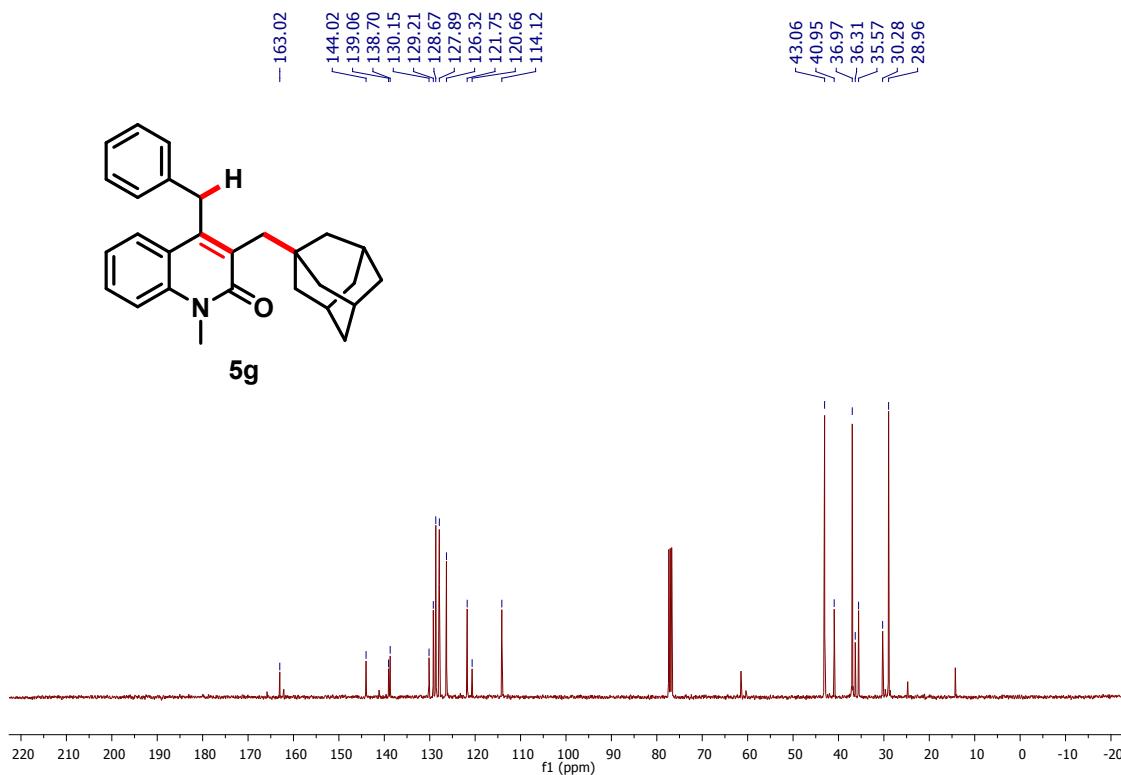


**3-((1*r*,3*r*)-adamantan-1-yl)methyl)-4-benzyl-1-methylquinolin-2(1*H*)-one (**5g**).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

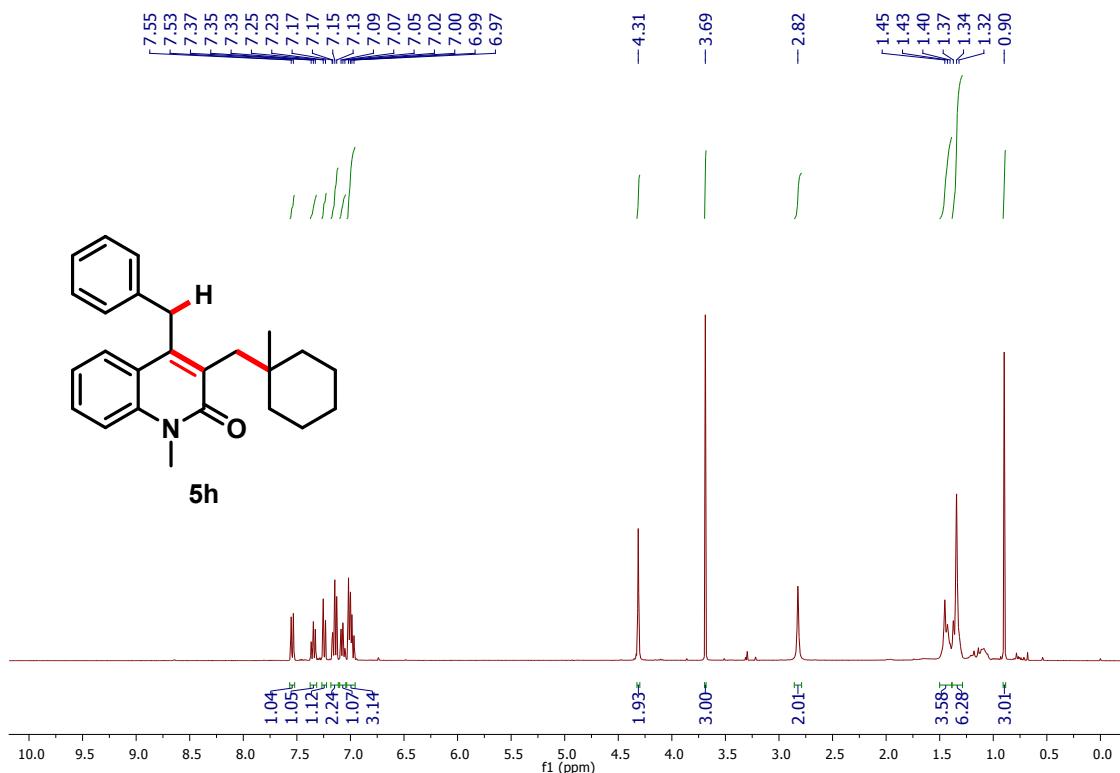


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

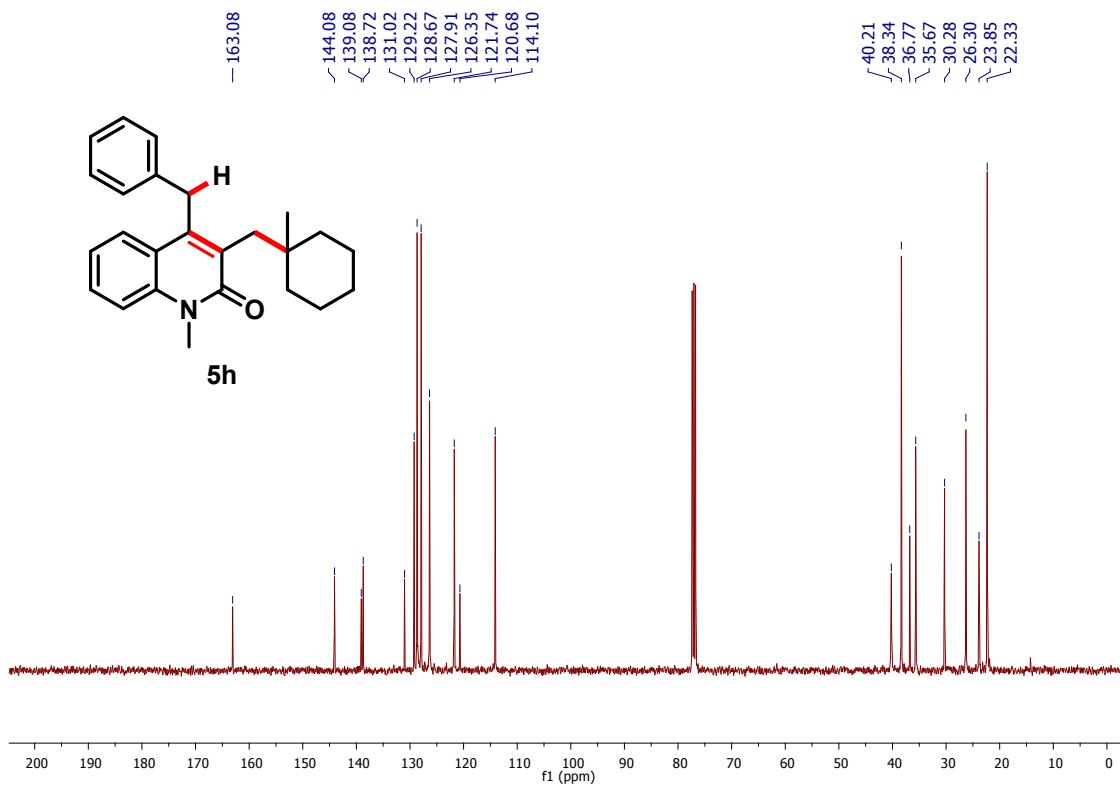


#### 4-benzyl-1-methyl-3-((1-methylcyclohexyl)methyl)quinolin-2(1H)-one (5h).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

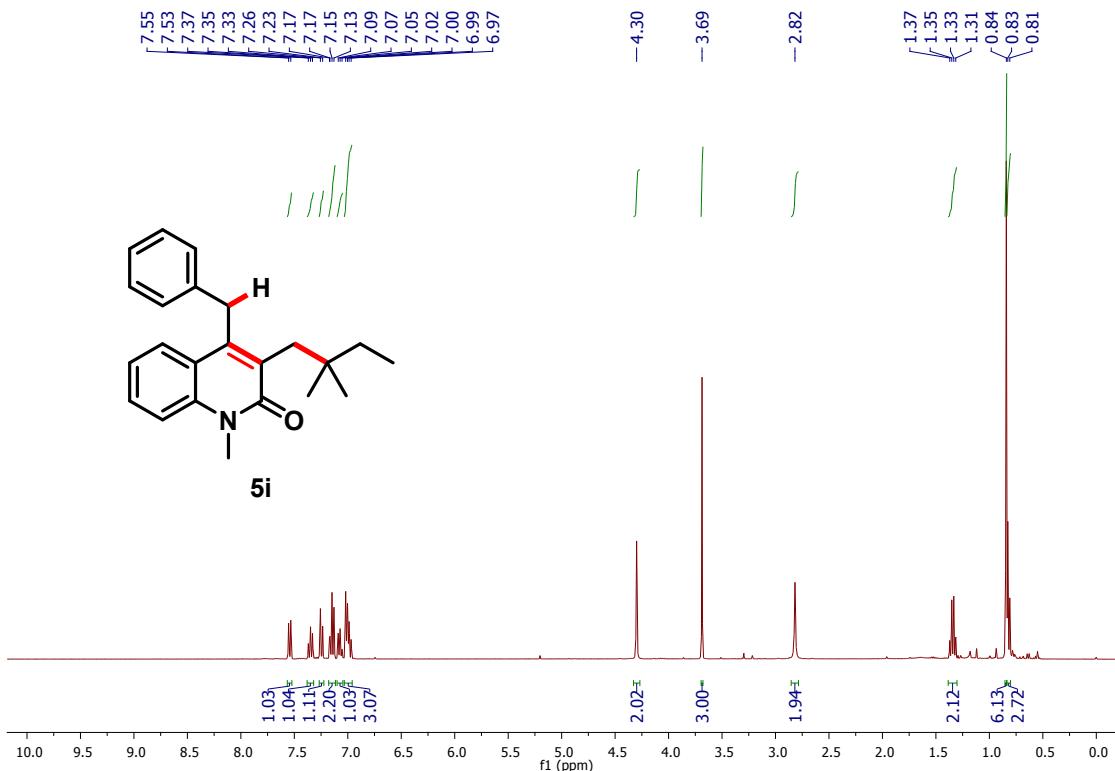


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

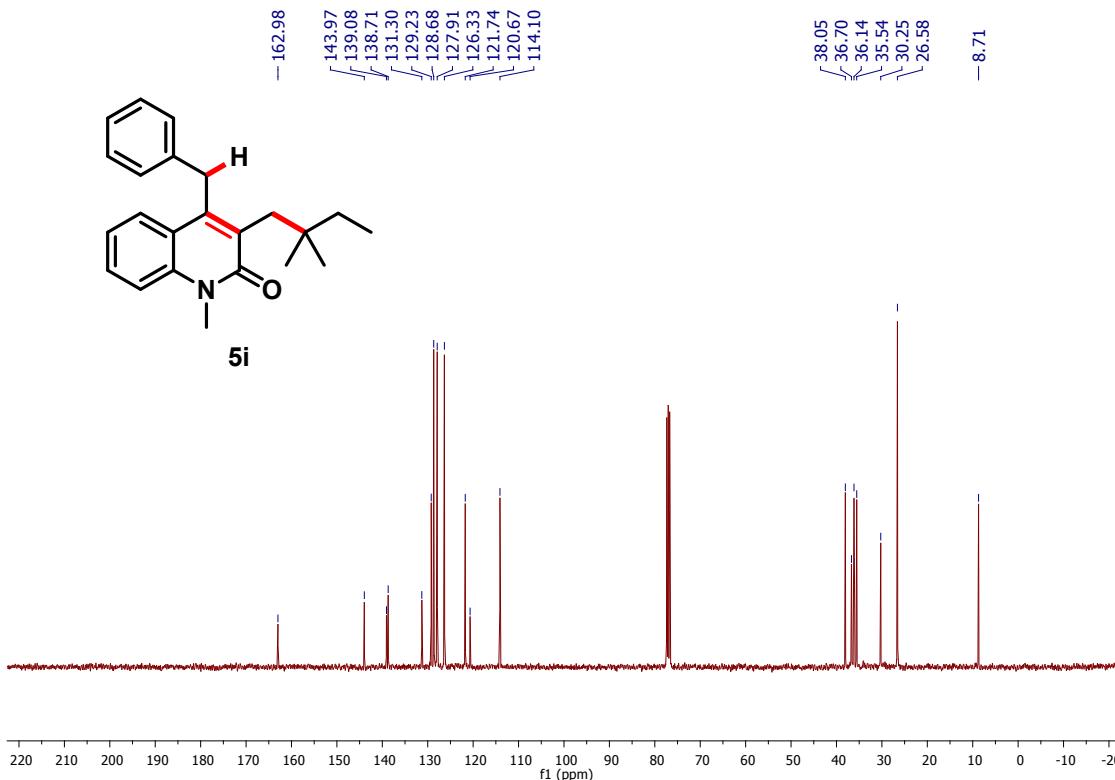


**4-benzyl-3-(2,2-dimethylbutyl)-1-methylquinolin-2(1H)-one (5i).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

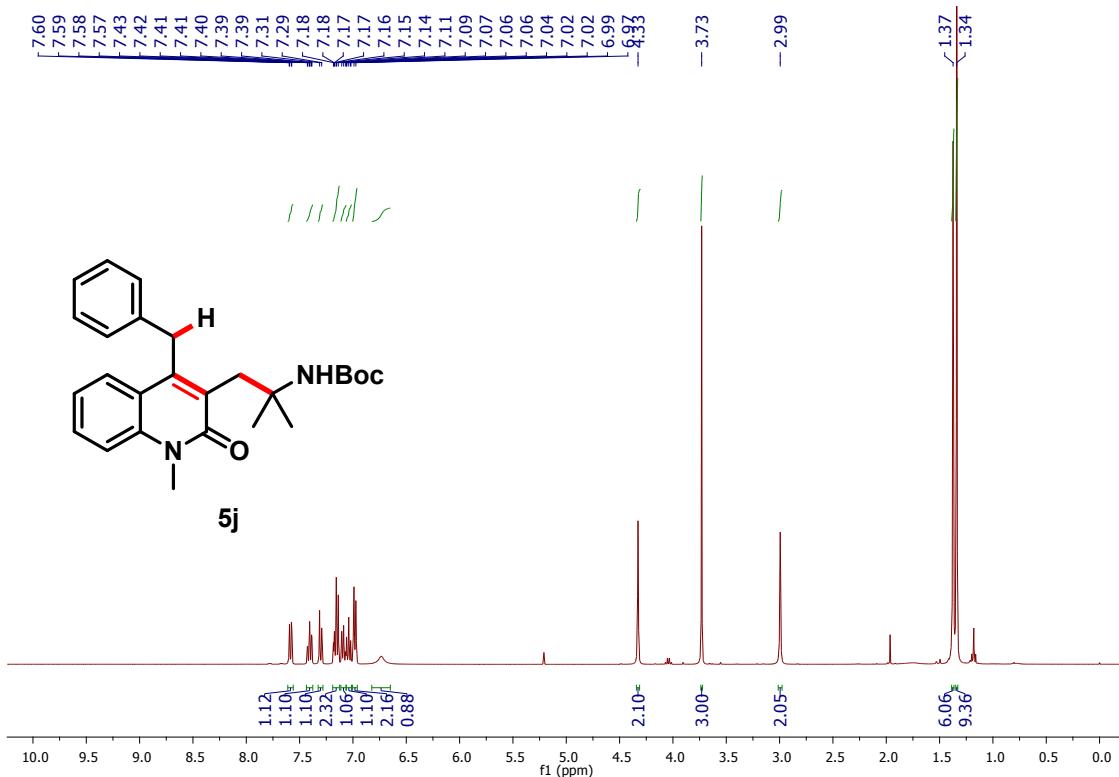


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

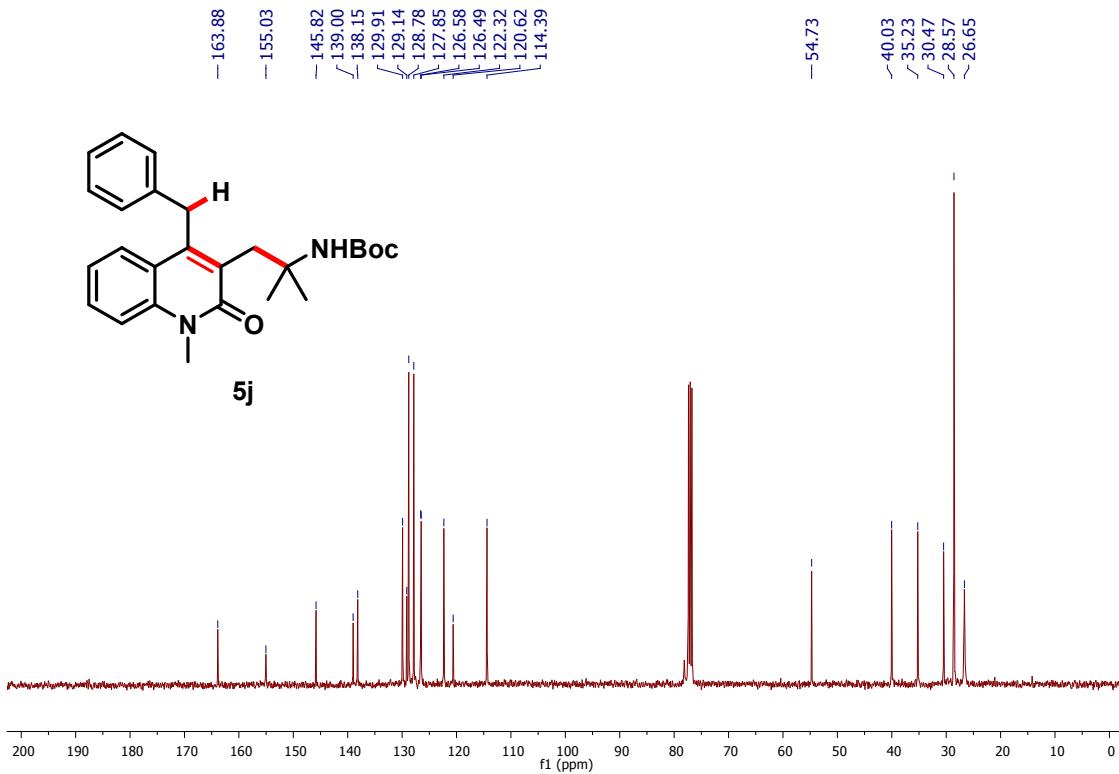


**Tert-butyl (1-(4-benzyl-1-methyl-2-oxo-1,2-dihydroquinolin-3-yl)-2-methylpropan-2-yl)carbamate (5j).**

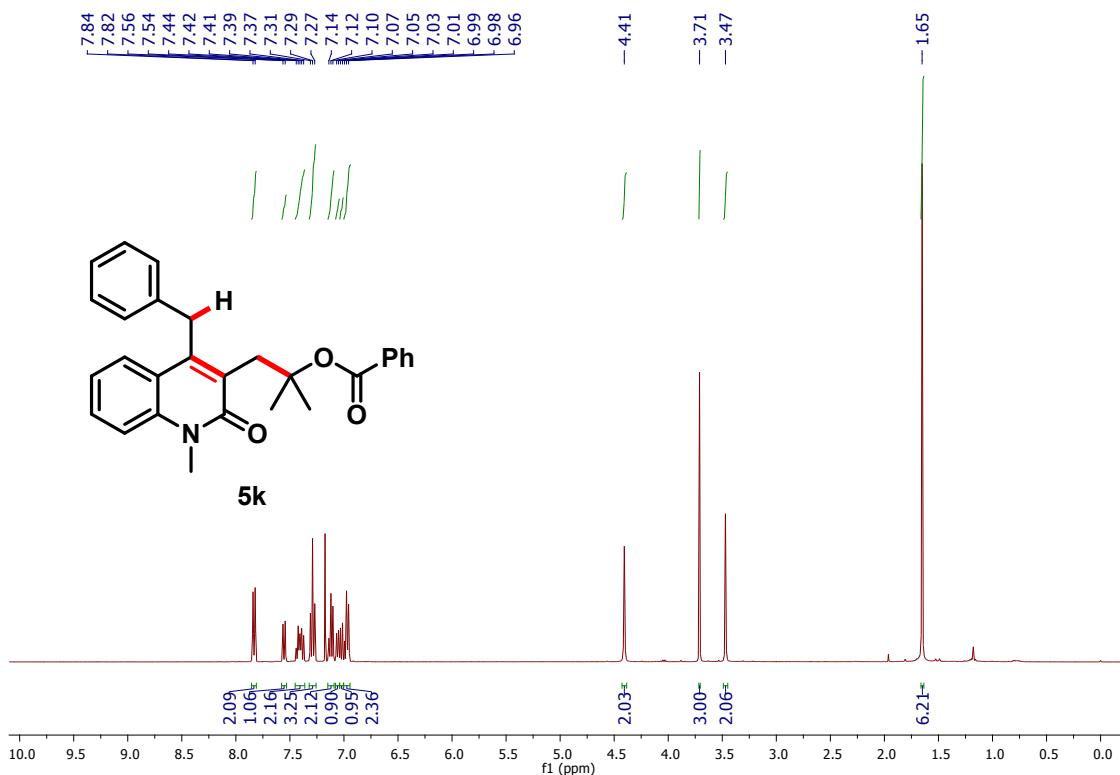
<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)



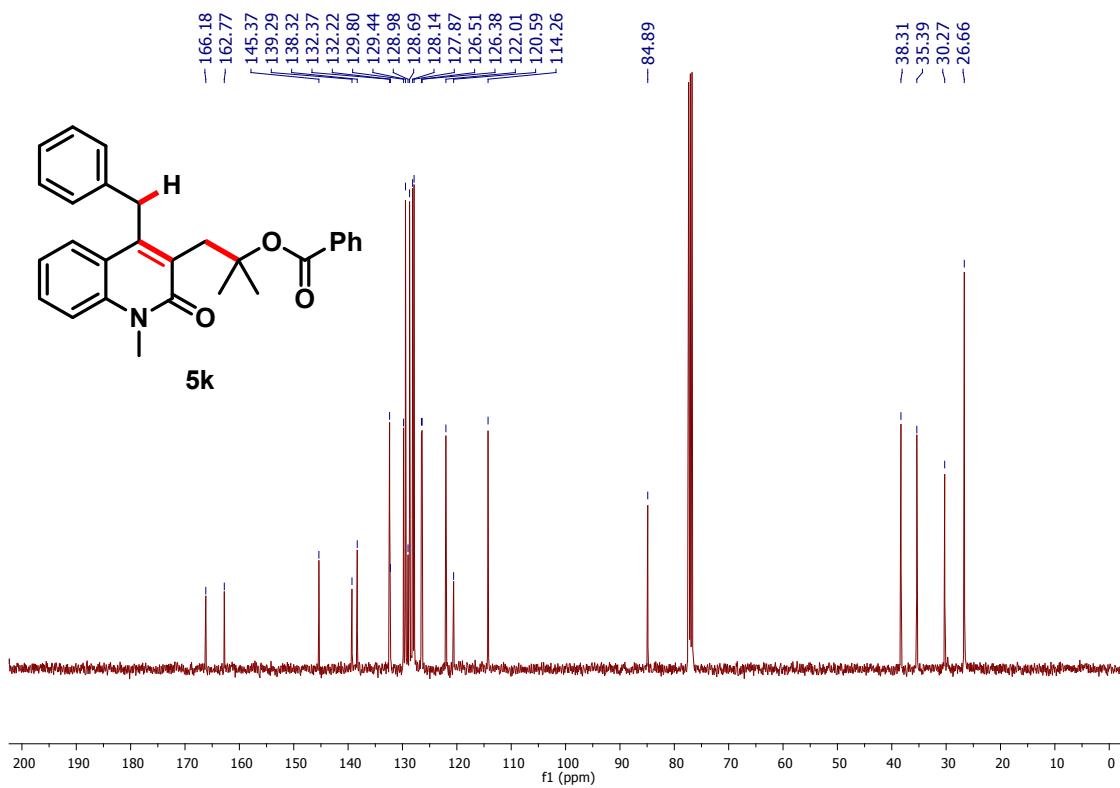
<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)



**1-(4-benzyl-1-methyl-2-oxo-1,2-dihydroquinolin-3-yl)-2-methyl propan-2-yl benzoate (5k).**  
<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

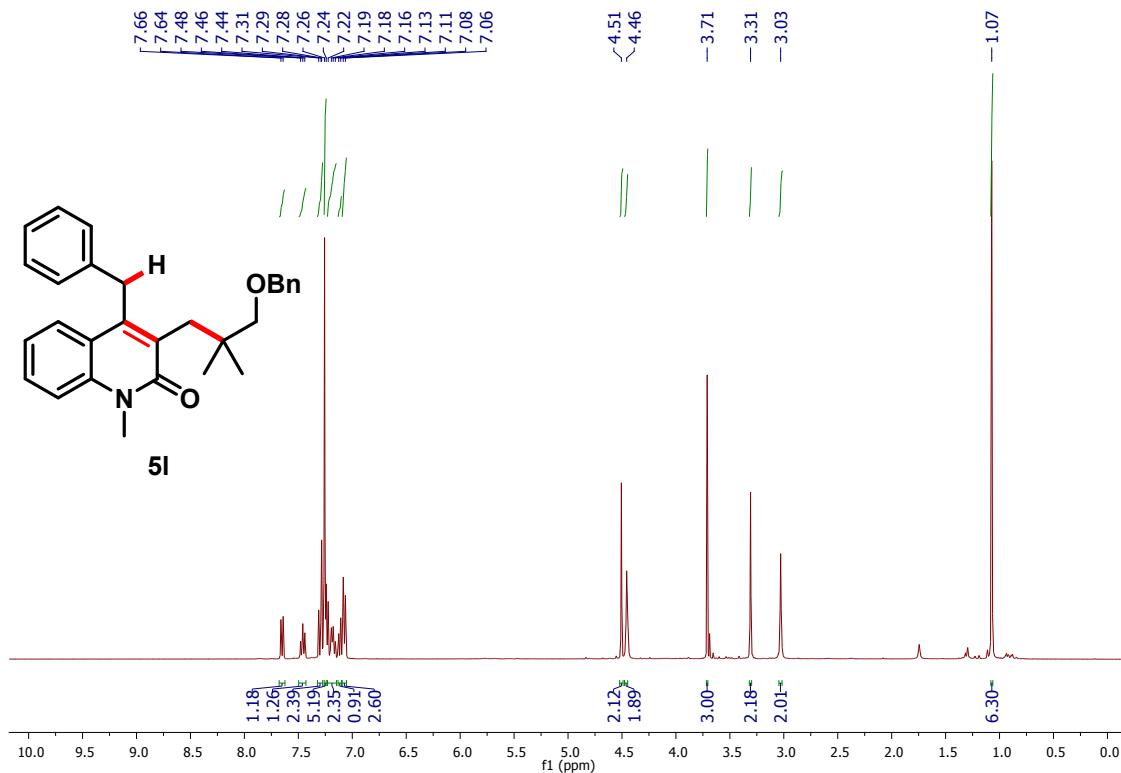


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

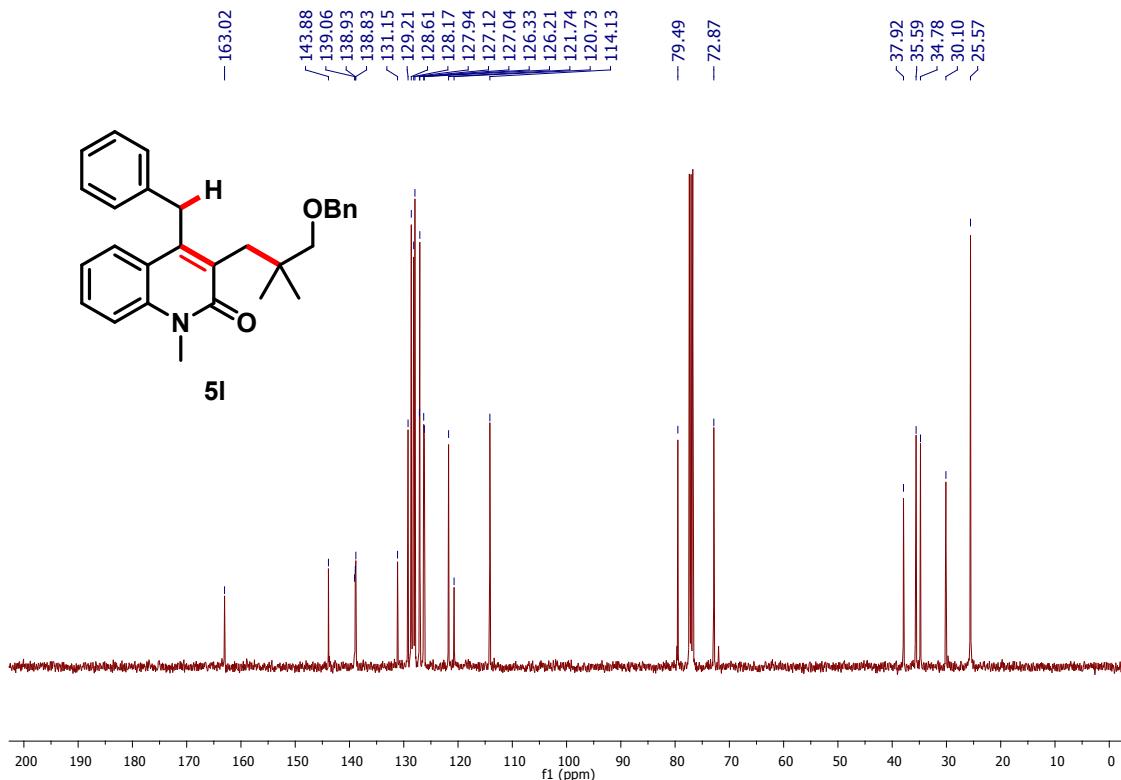


**4-benzyl-3-(3-(benzyloxy)-2,2-dimethylpropyl)-1-methylquinolin-2(1H)-one (5I).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

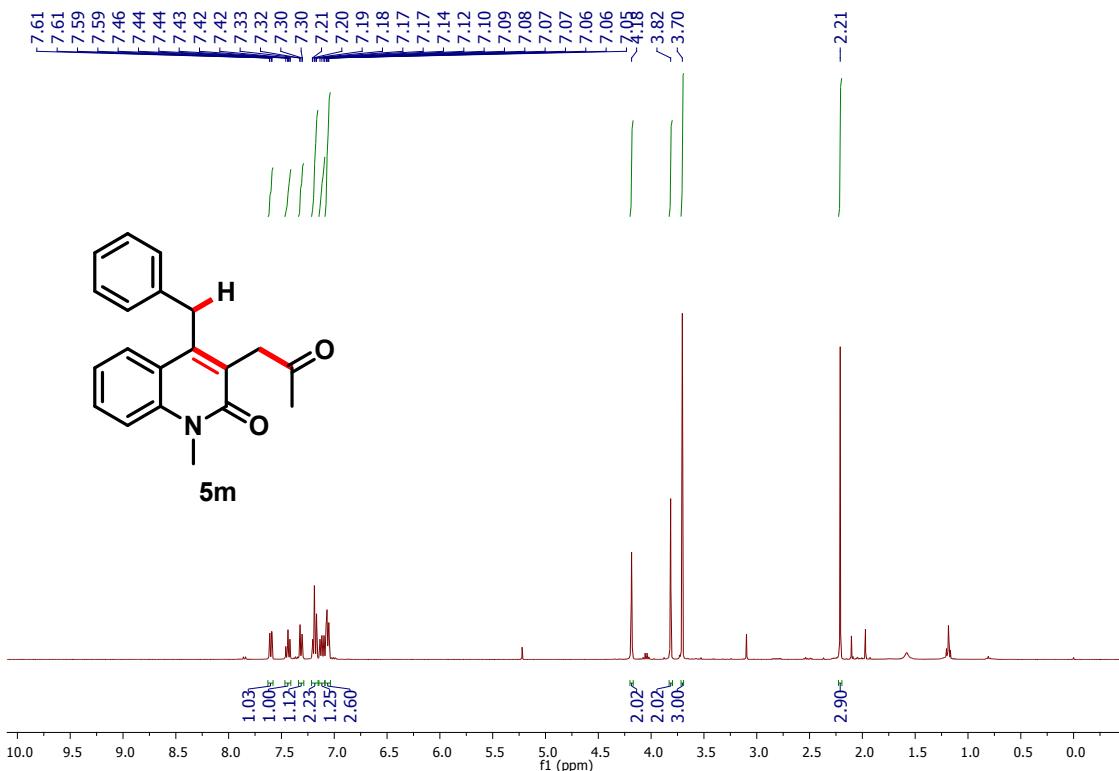


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

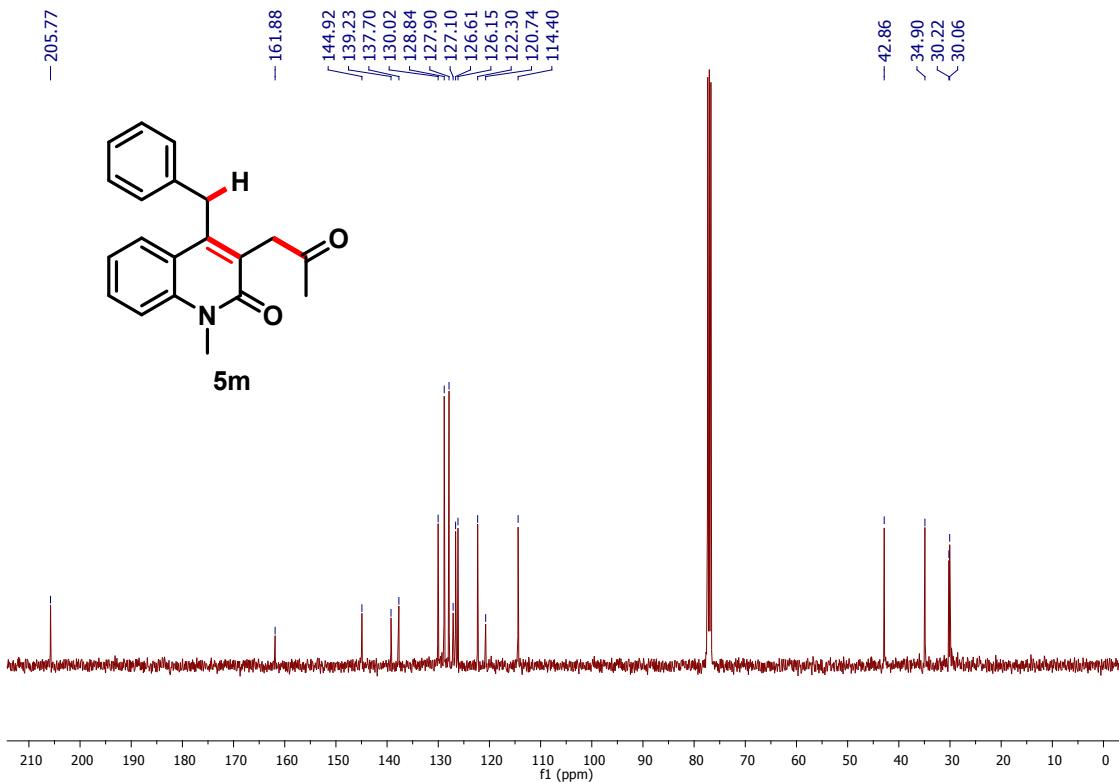


#### **4-benzyl-1-methyl-3-(2-oxopropyl)quinolin-2(1H)-one (5m).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

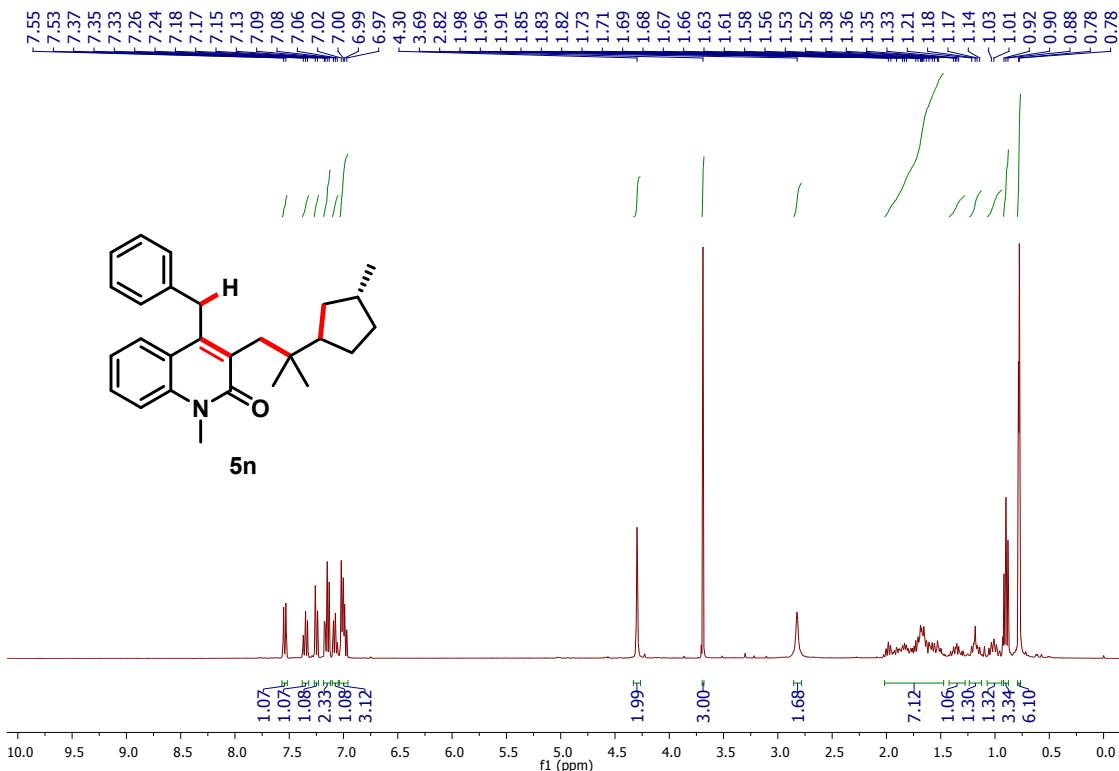


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

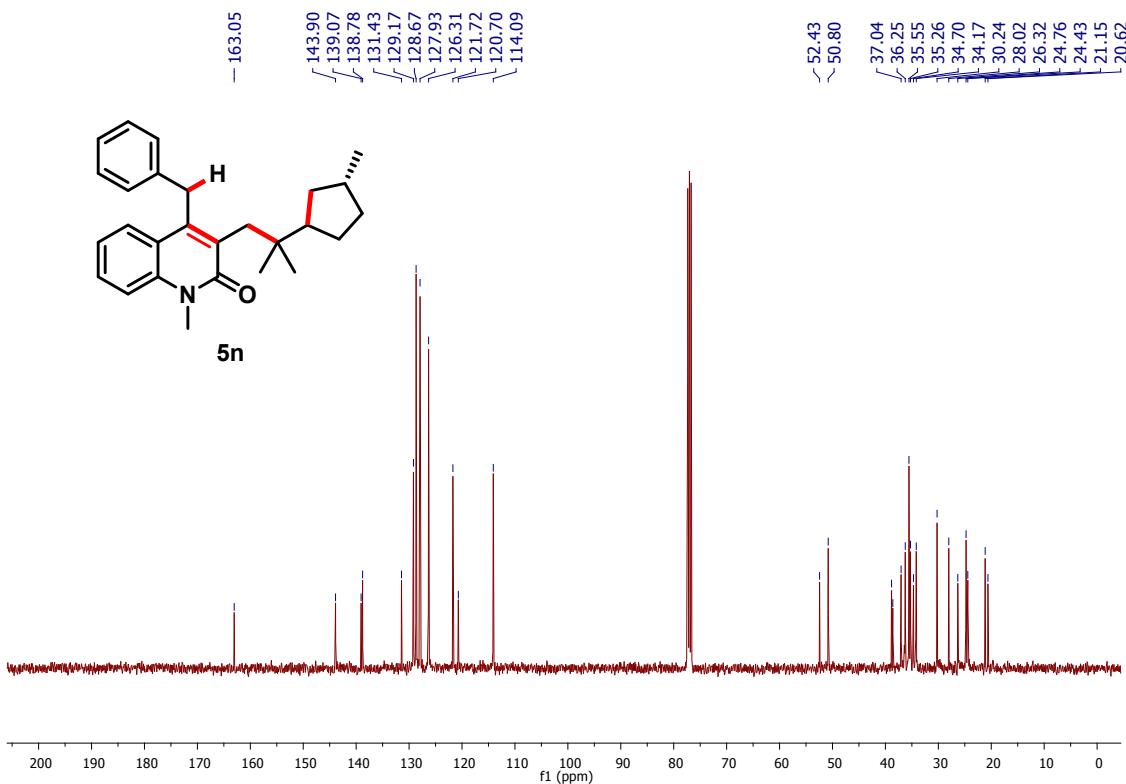


4-benzyl-1-methyl-3-(2-methyl-2-(3-methylcyclopentyl)propyl) quinolin-2(1H)-one (5n).

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)

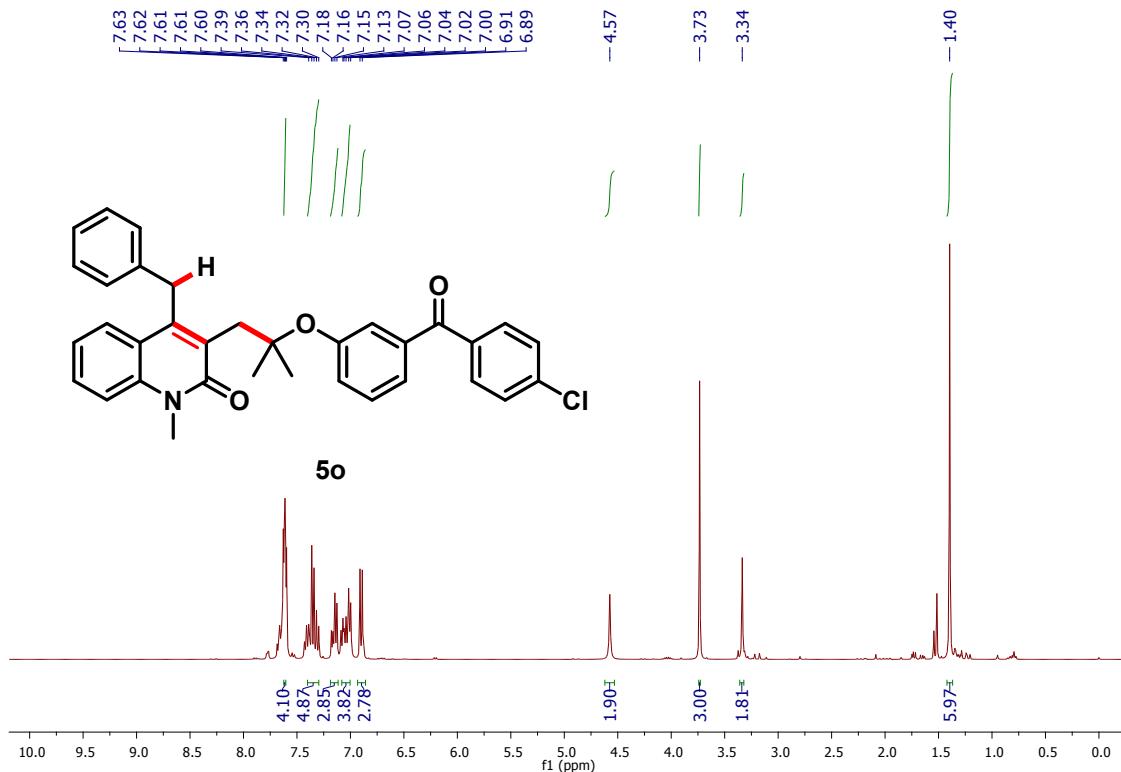


<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)



**4-benzyl-3-(2-(3-(4-chlorobenzoyl)phenoxy)-2-methylpropyl)-1-methylquinolin-2(1H)-one (5o).**

<sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>)



<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)

