

## Electronic supplementary information

### Synthesis of functional 4*H*-chromenes from phenols and acetophenones under solvent- and metal-free conditions

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## 2. General Information

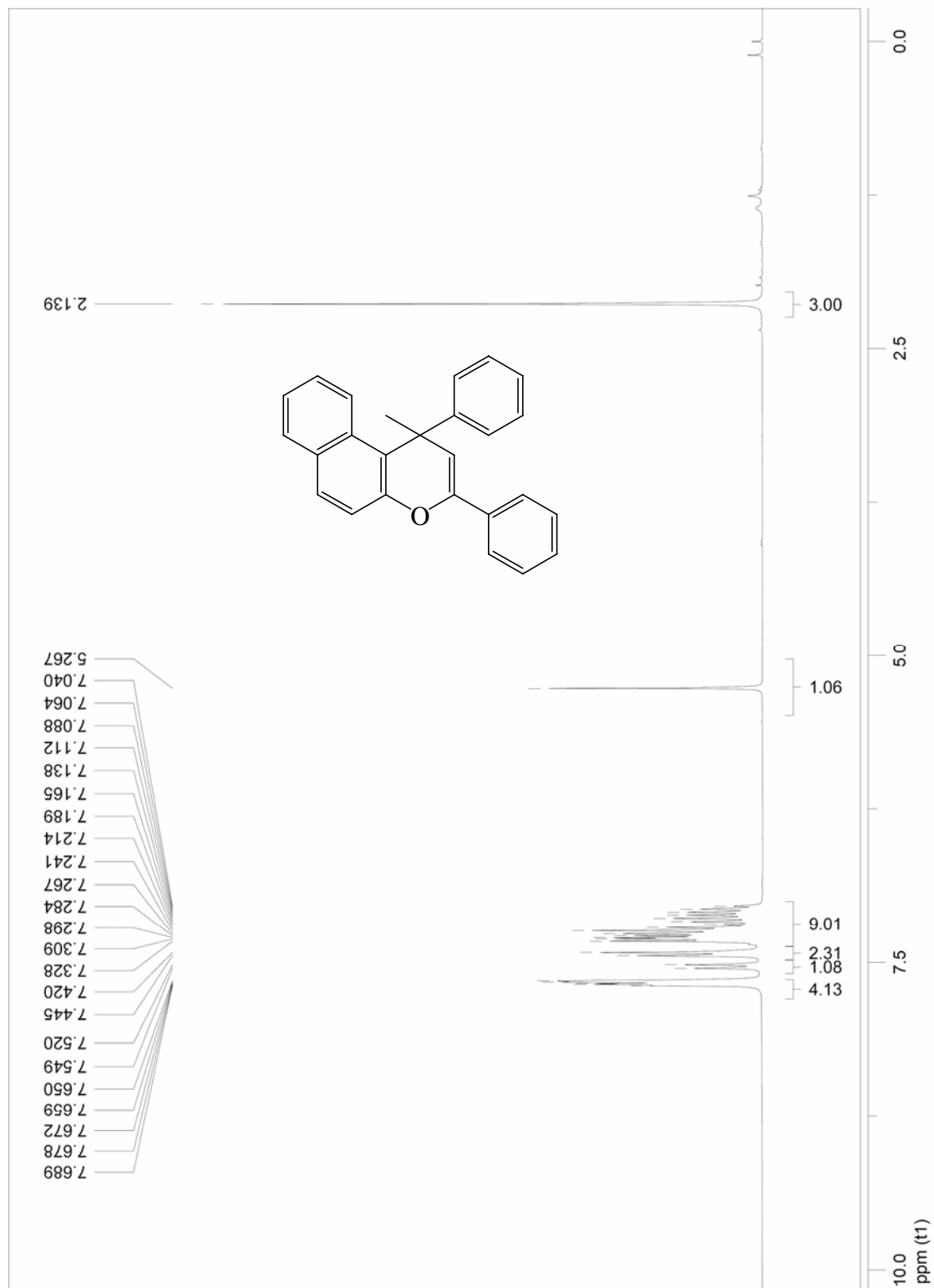
Common reagents and materials were purchased from commercial sources and purified by recrystallization or distillation. Where necessary, organic solvents were routinely dried and/or distilled prior to use and stored over molecular sieves under argon. Organic extracts were, in general, dried over anhydrous sodium sulfate ( $\text{Na}_2\text{SO}_4$ ). TLC plates were visualized by exposure to ultraviolet light (UV). Chemical shifts for protons are reported in parts per million ( $\delta$  scale) downfield from tetramethylsilane and are referenced to residual protium in the NMR solvents ( $\text{CHCl}_3$ :  $\delta$  7.26;  $\text{DMSO-}d_6$ :  $\delta$  2.50). Chemical shifts for carbon resonances are reported in parts per million ( $\delta$  scale) downfield from tetramethylsilane and are referenced to the carbon resonances of the solvent ( $\text{CDCl}_3$ :  $\delta$  77.0;  $\text{DMSO-}d_6$ :  $\delta$  39.43). Data are represented as follows: chemical shift, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad), coupling constant in Hertz (Hz), and integration.

### 3. NMR Spectra

#### 3a. NMR spectra of 4*H*-chromene **3a-p**

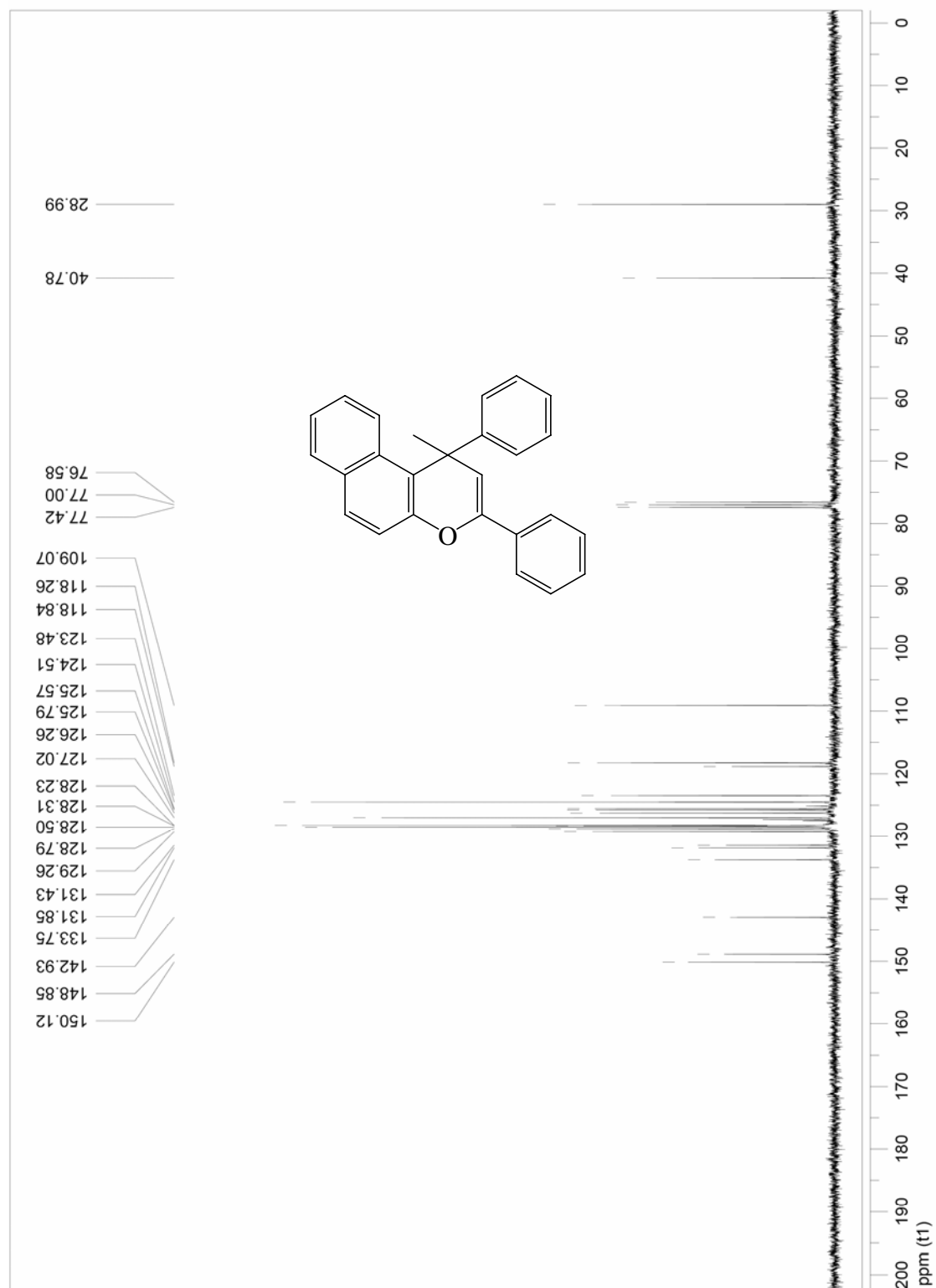
##### 4*H*-Chromene **3a**

$^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ )



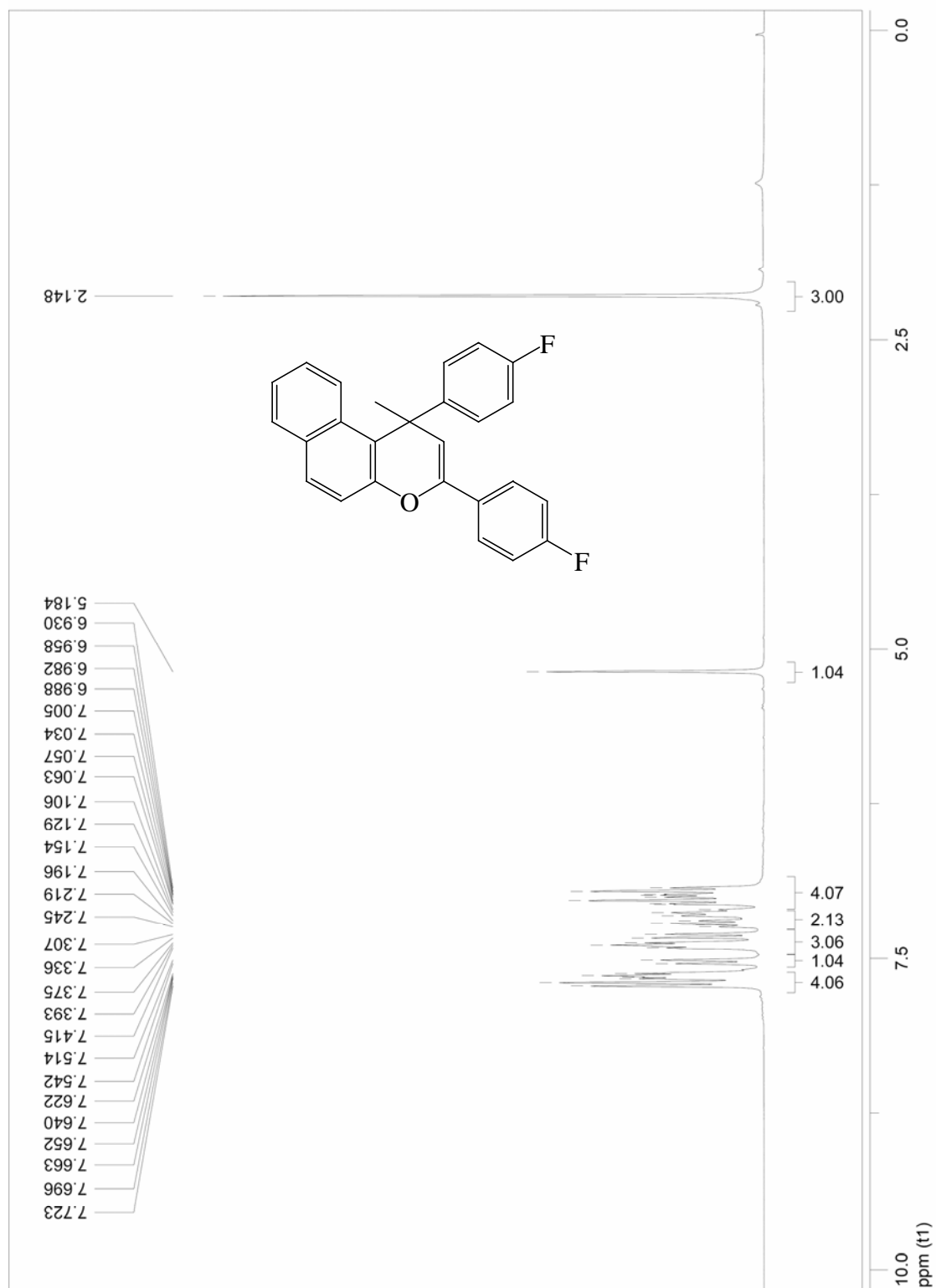
4*H*-Chromene 3a

<sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>)



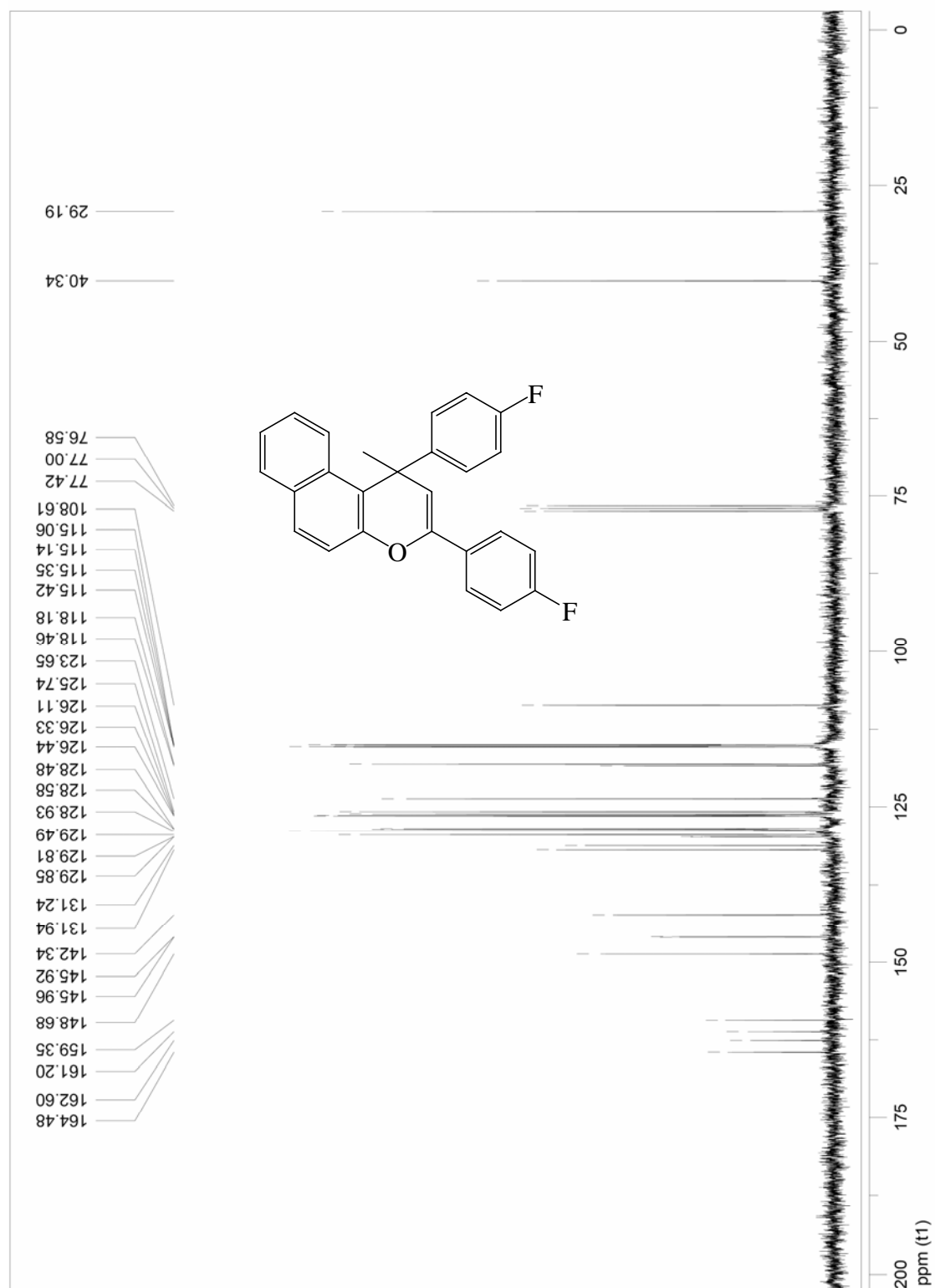
4*H*-Chromene **3b**

<sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>)



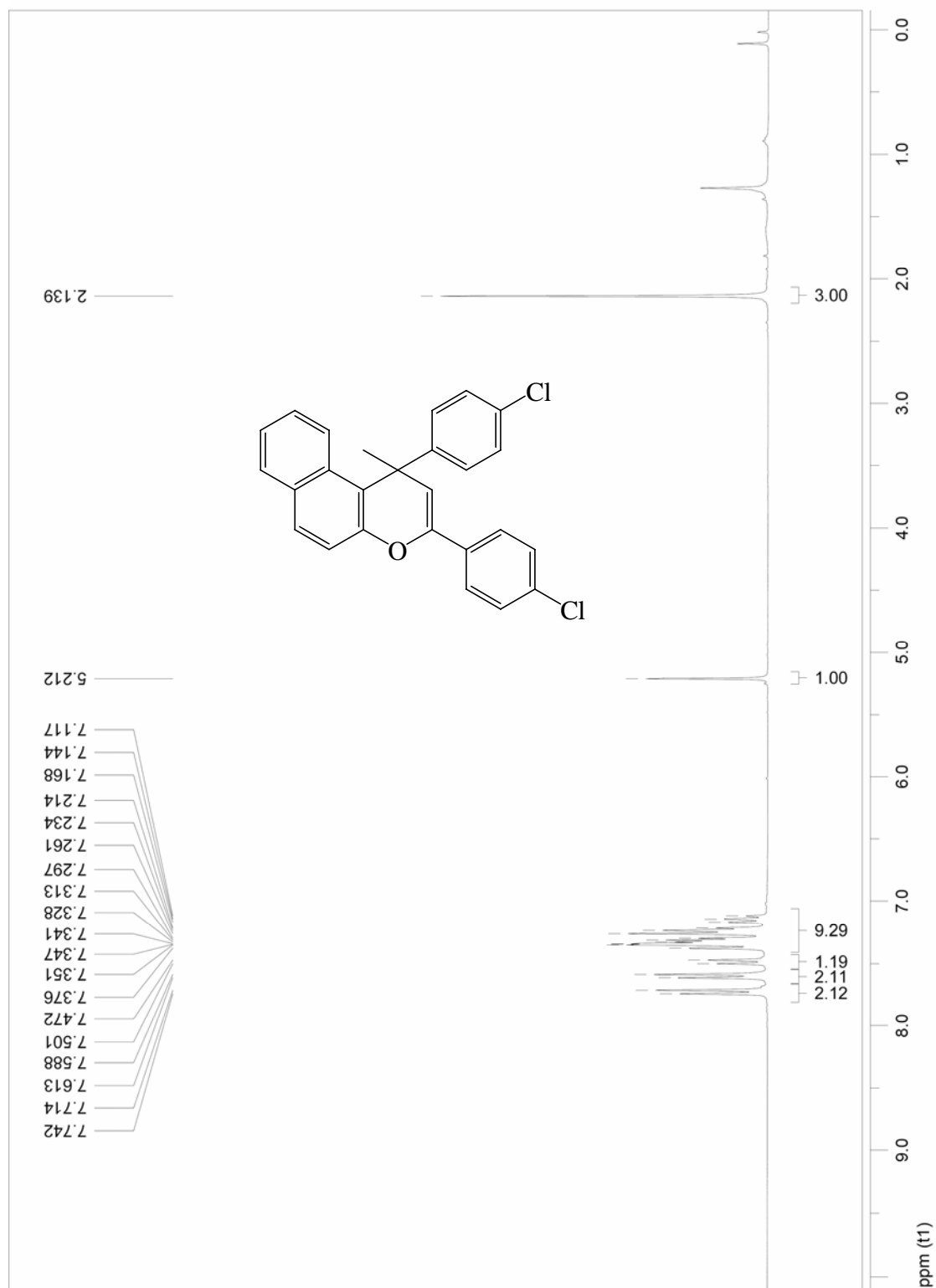
4*H*-Chromene 3b

<sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>)



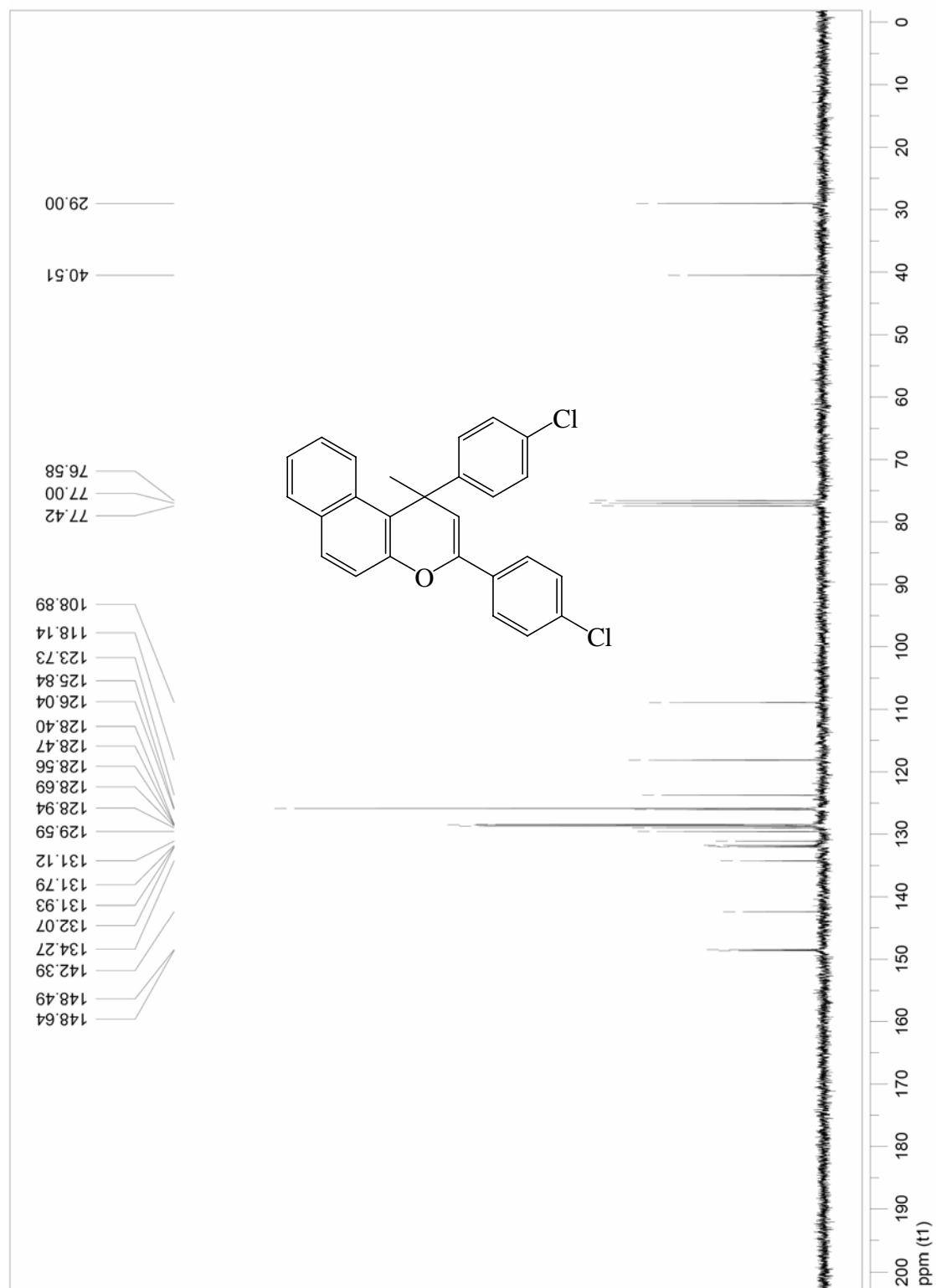
4*H*-Chromene 3c

<sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>)



4*H*-Chromene 3c

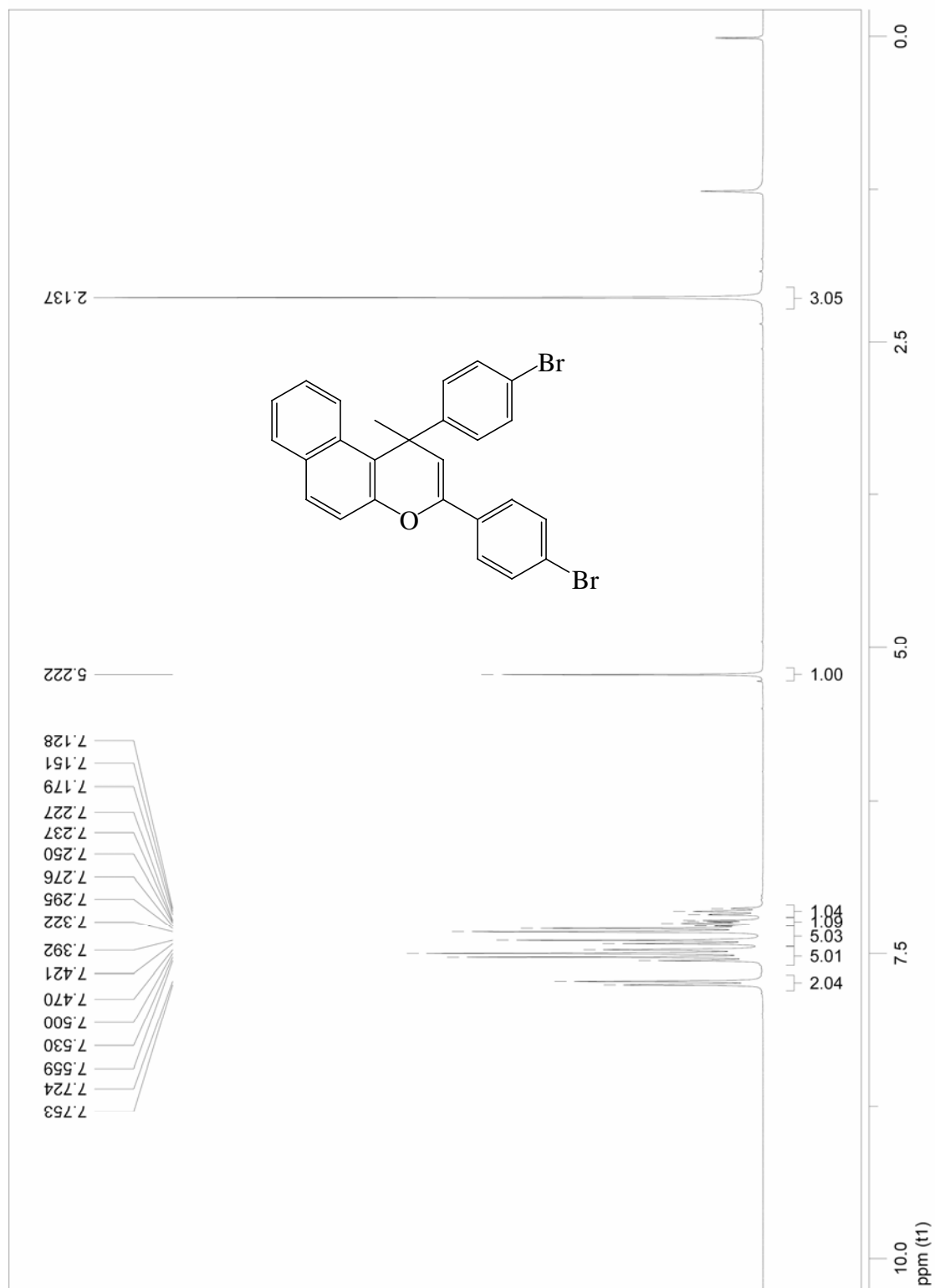
$^{13}\text{C}$  NMR (75 MHz,  $\text{CDCl}_3$ )





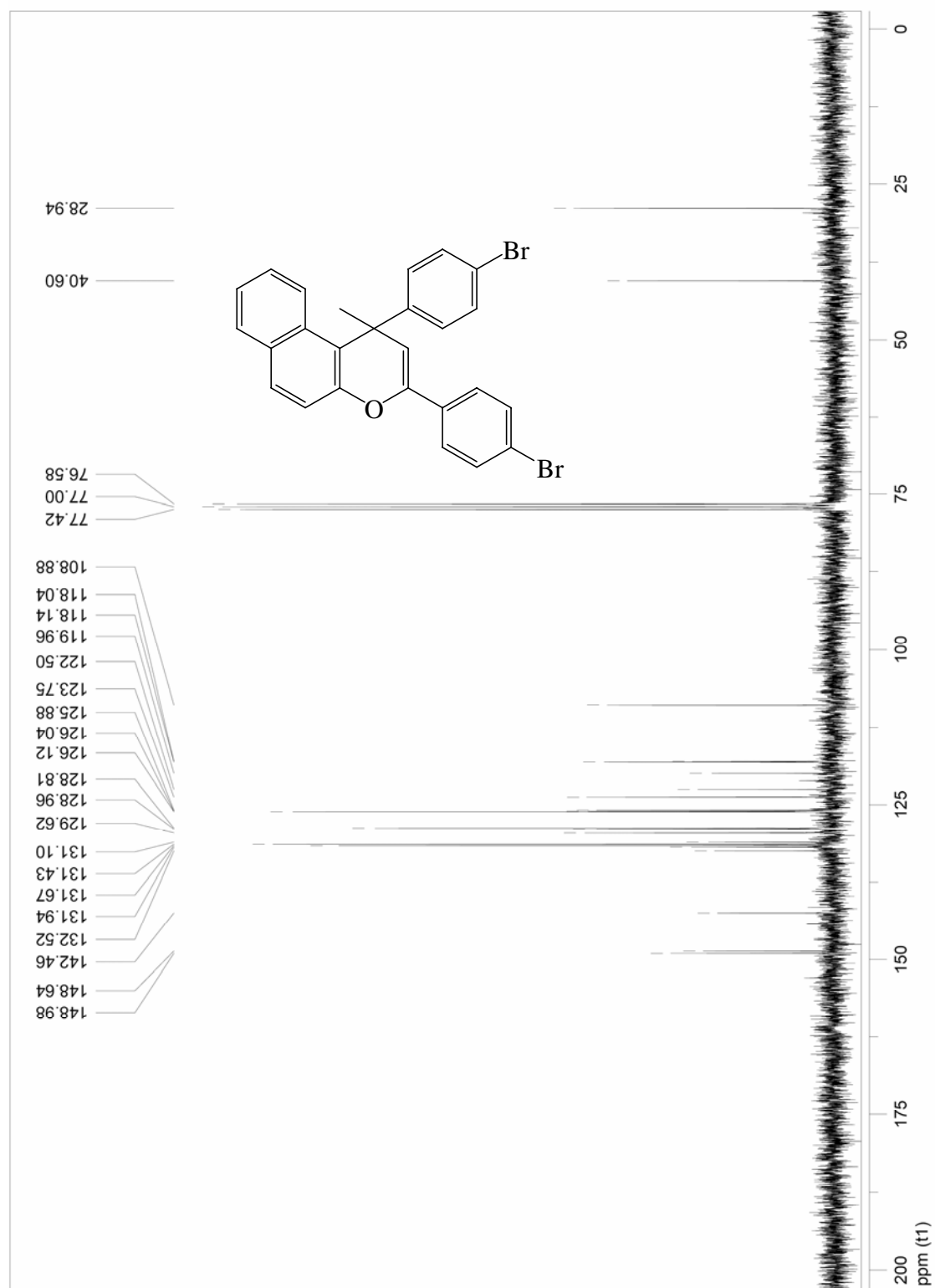
4*H*-Chromene **3d**

<sup>1</sup>H NMR (300 MHz, CDCl<sub>3</sub>)



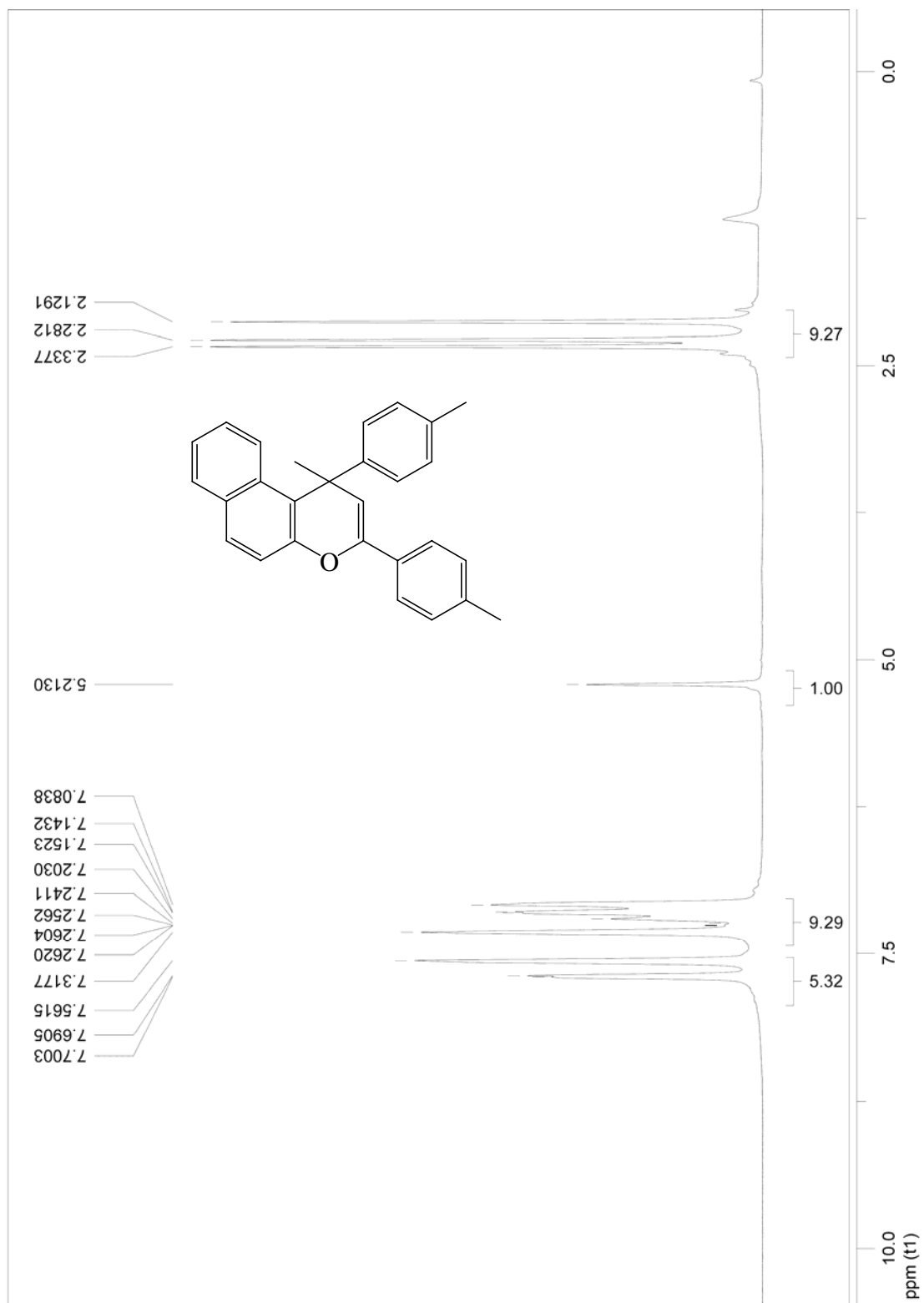
4*H*-Chromene 3d

<sup>13</sup>C NMR (75 MHz, CDCl<sub>3</sub>)



4*H*-Chromene **3e**

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



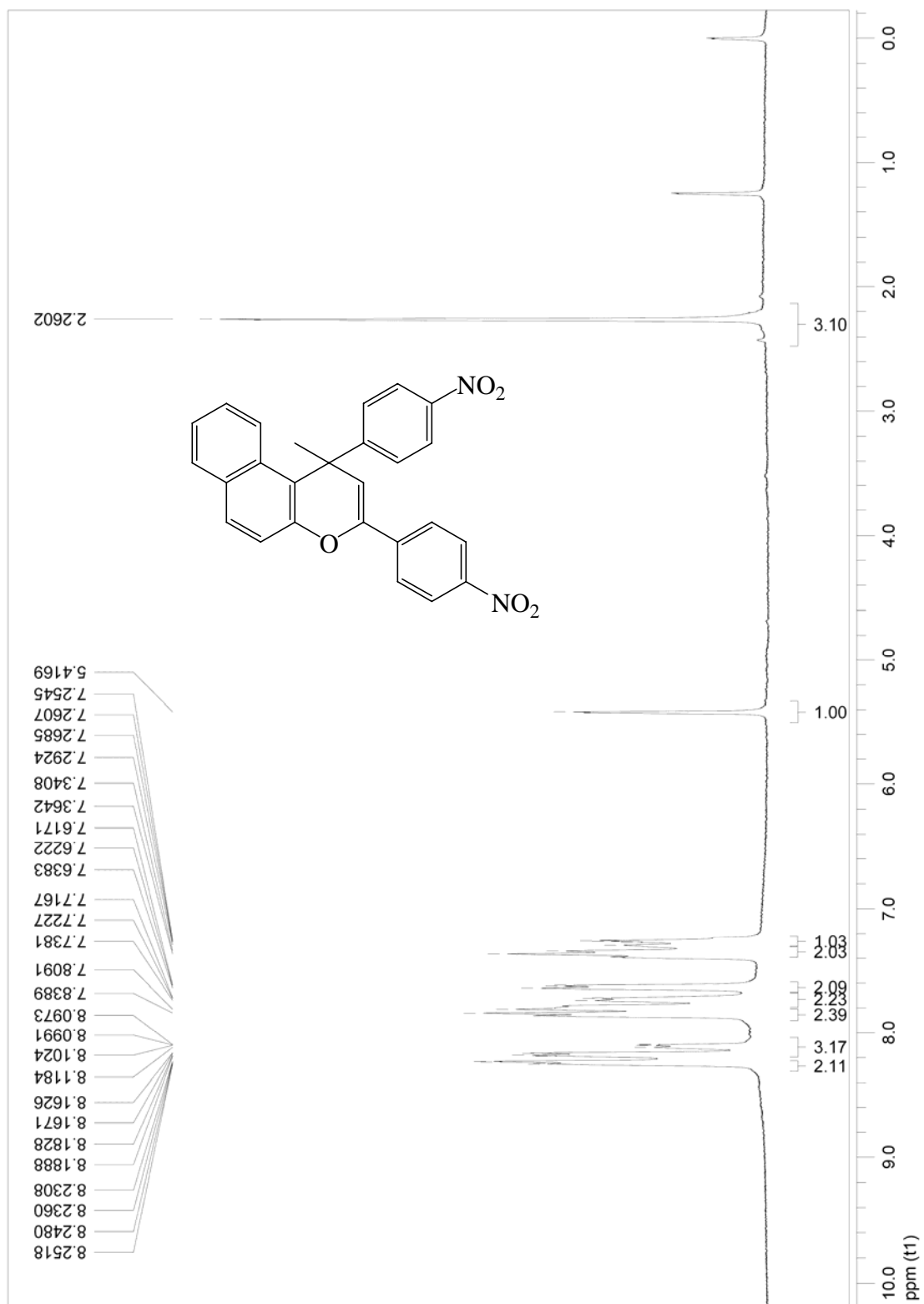
4*H*-Chromene **3e**

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



4*H*-Chromene **3f**

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



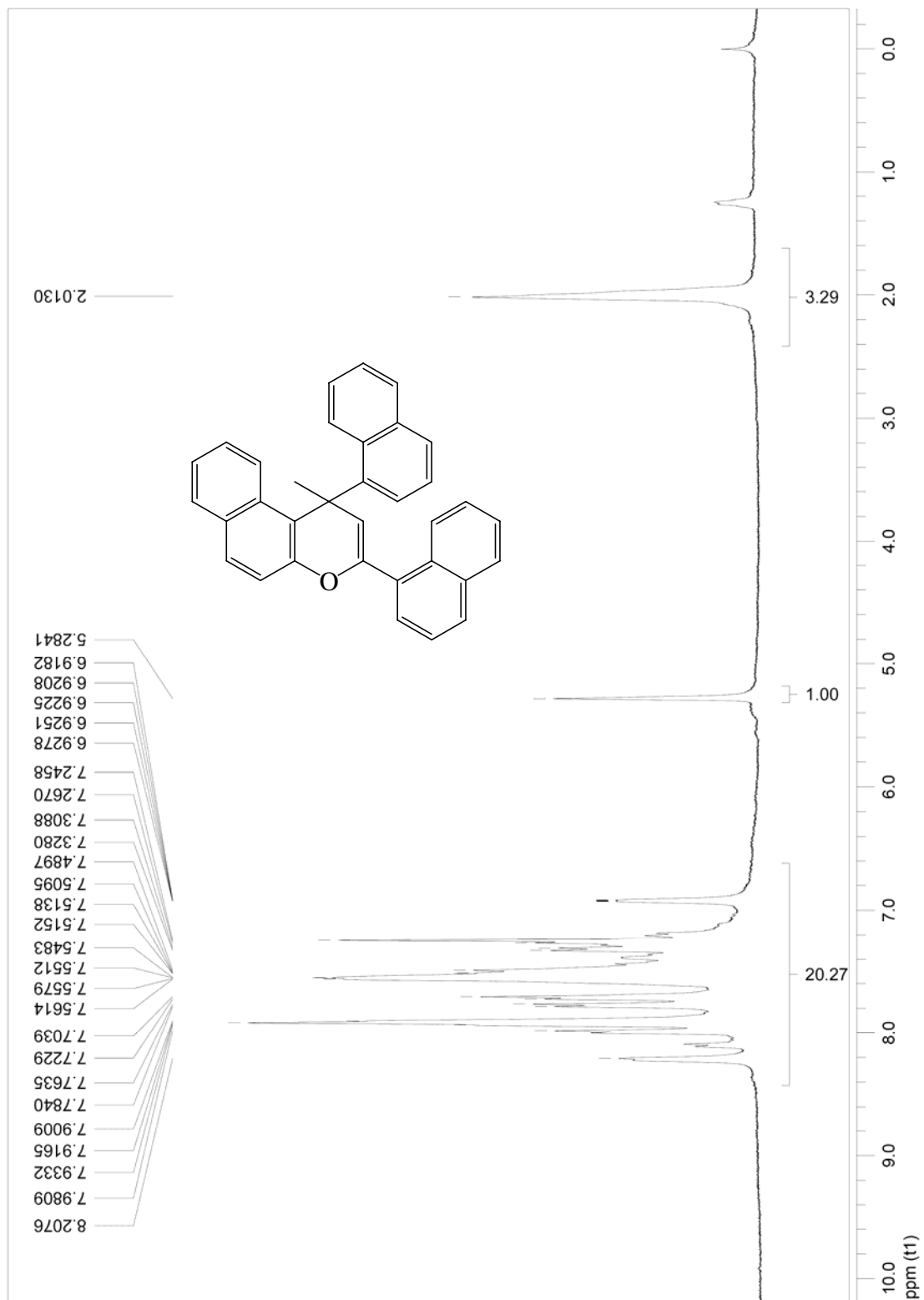
4*H*-Chromene 3f

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



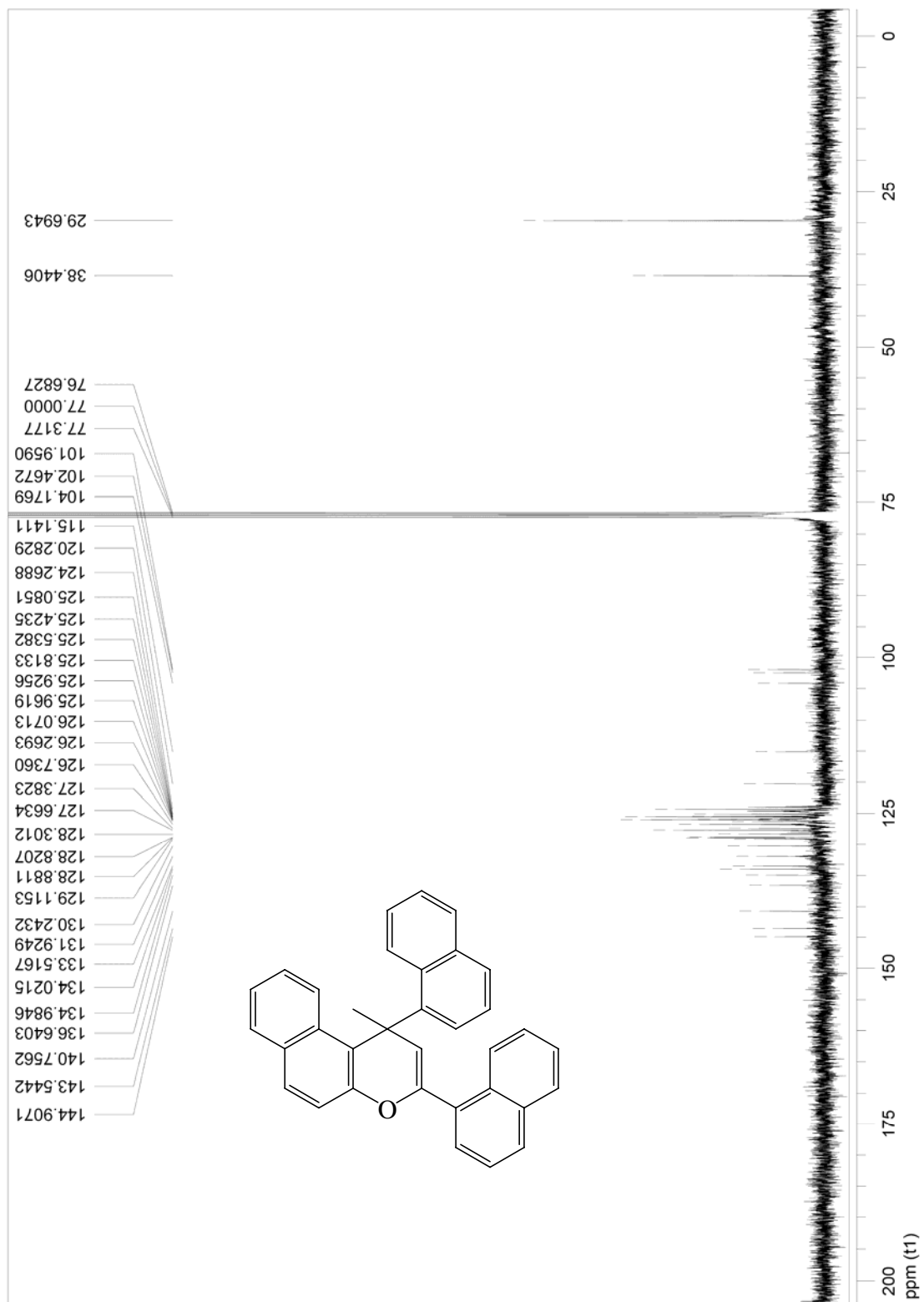
4*H*-Chromene **3g**

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



4*H*-Chromene 3g

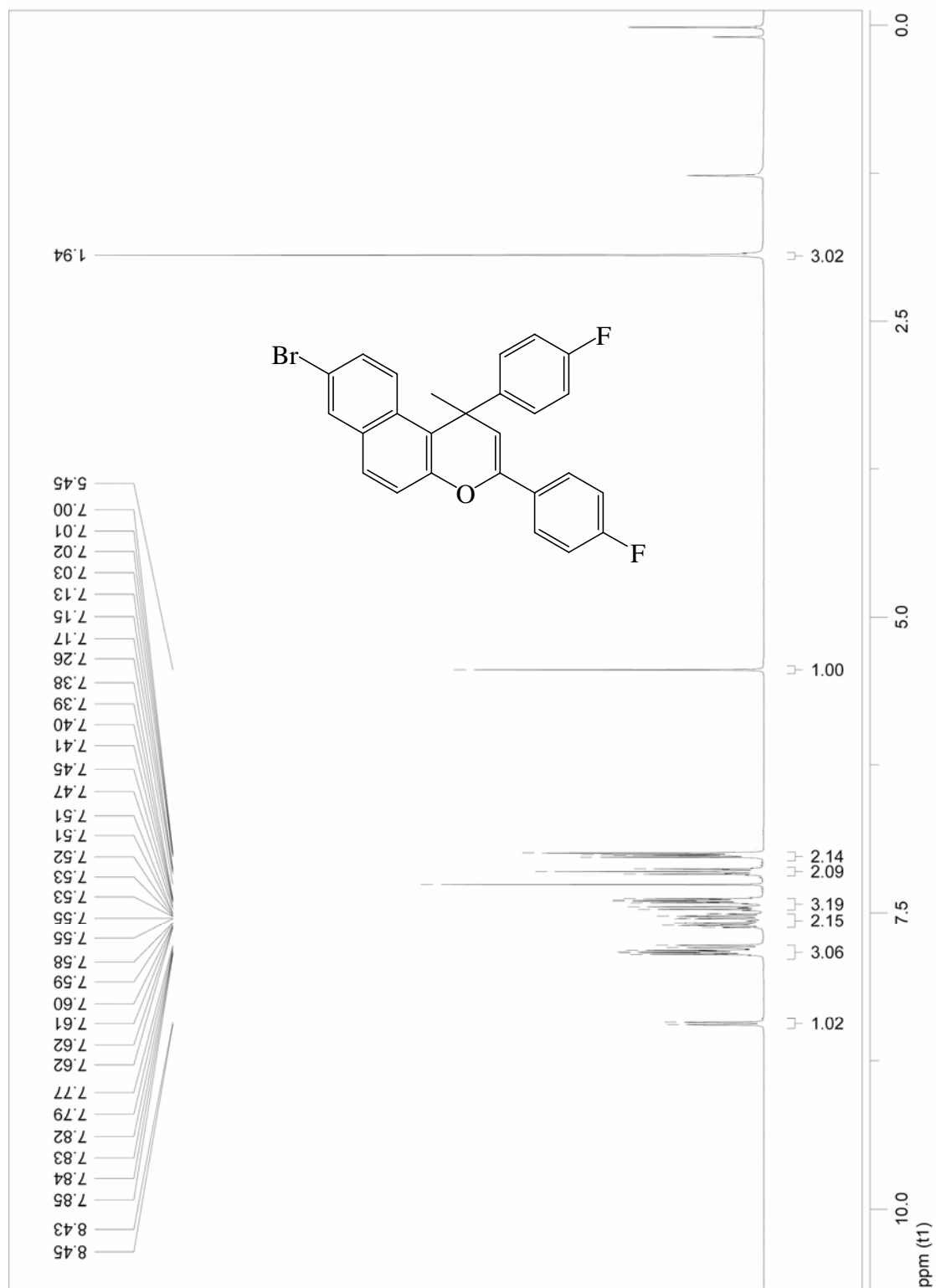
$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )





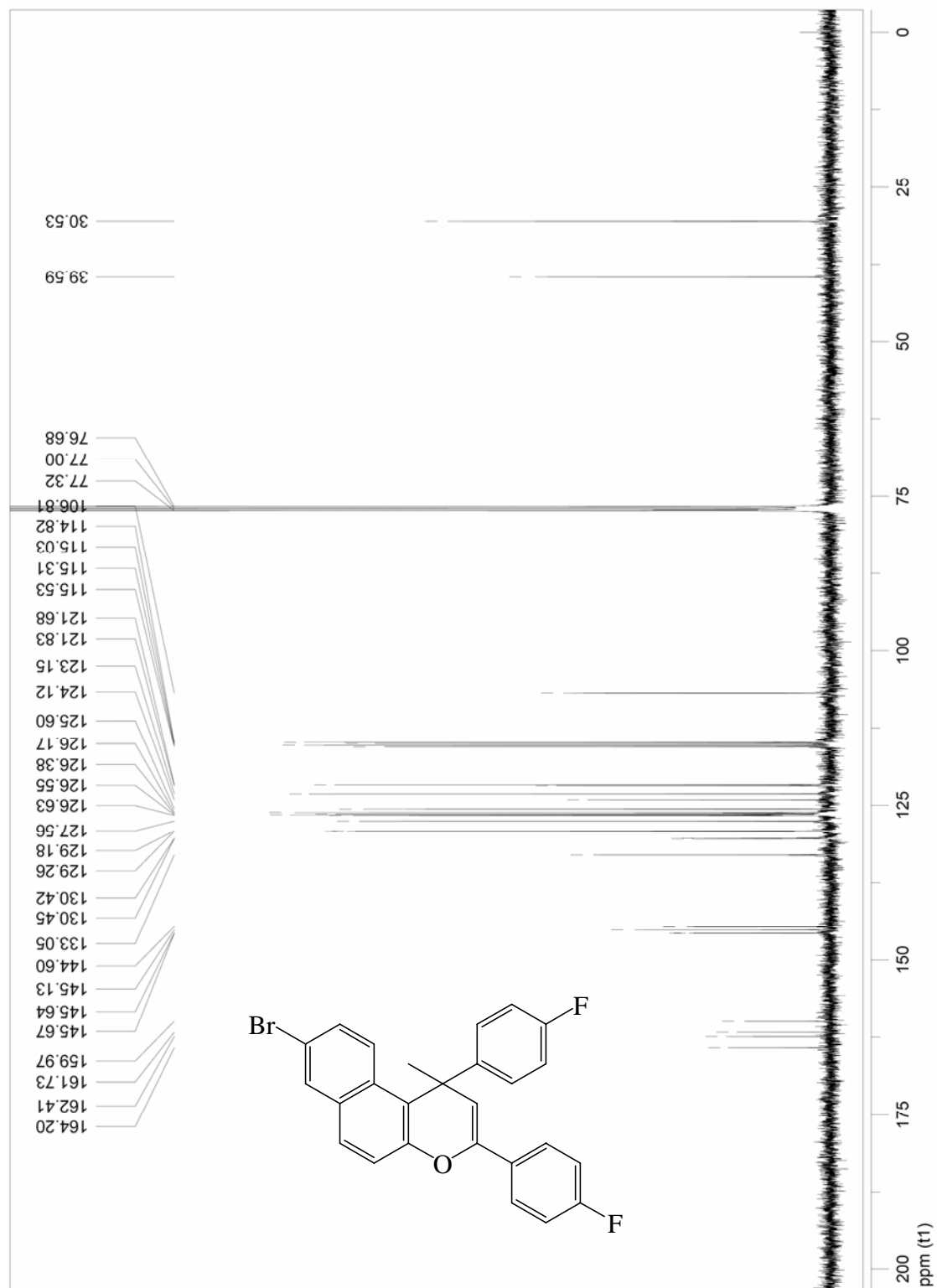
4*H*-Chromene **3h**

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



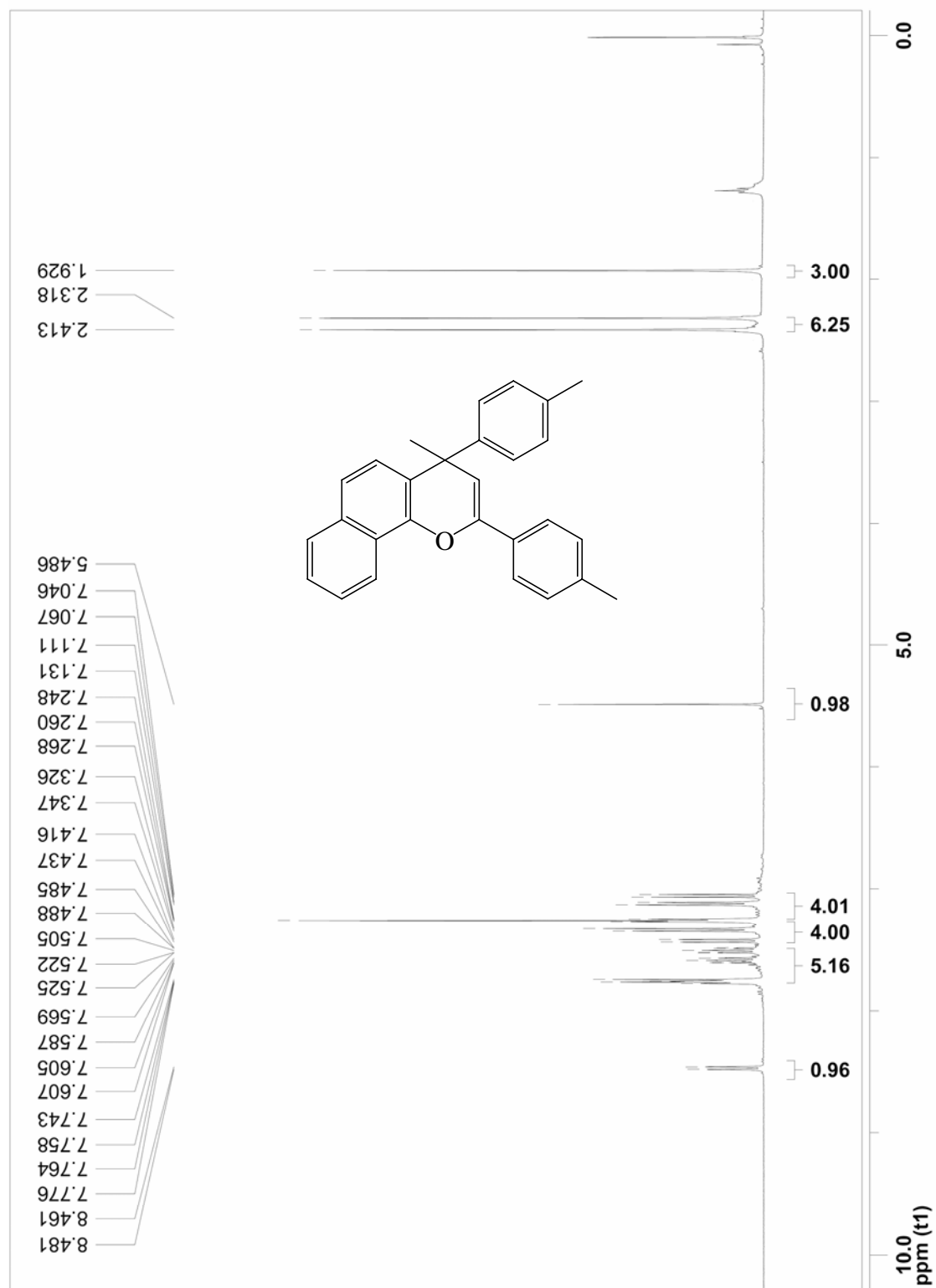
4*H*-Chromene 3h

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



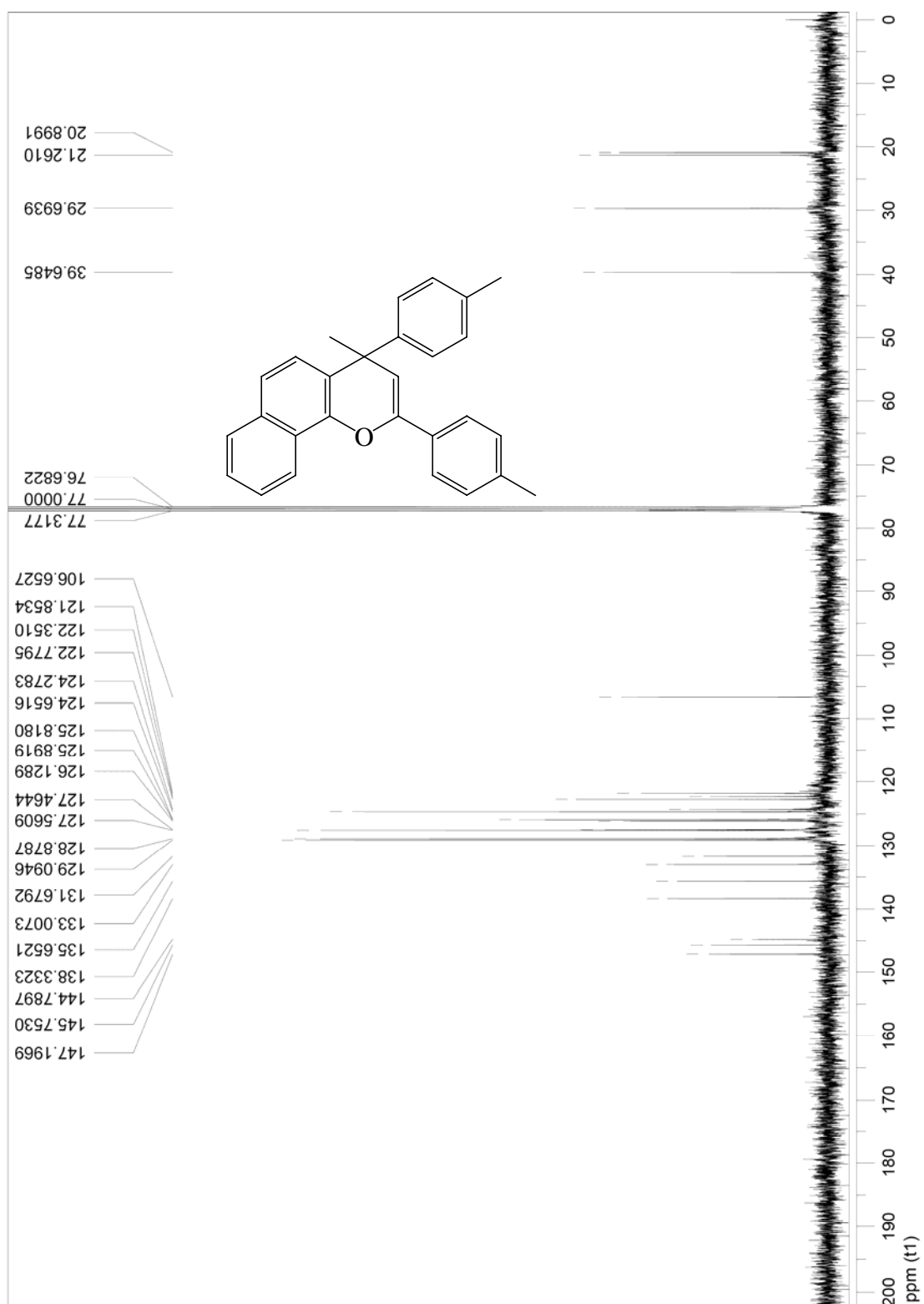
4*H*-Chromene **3i**

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



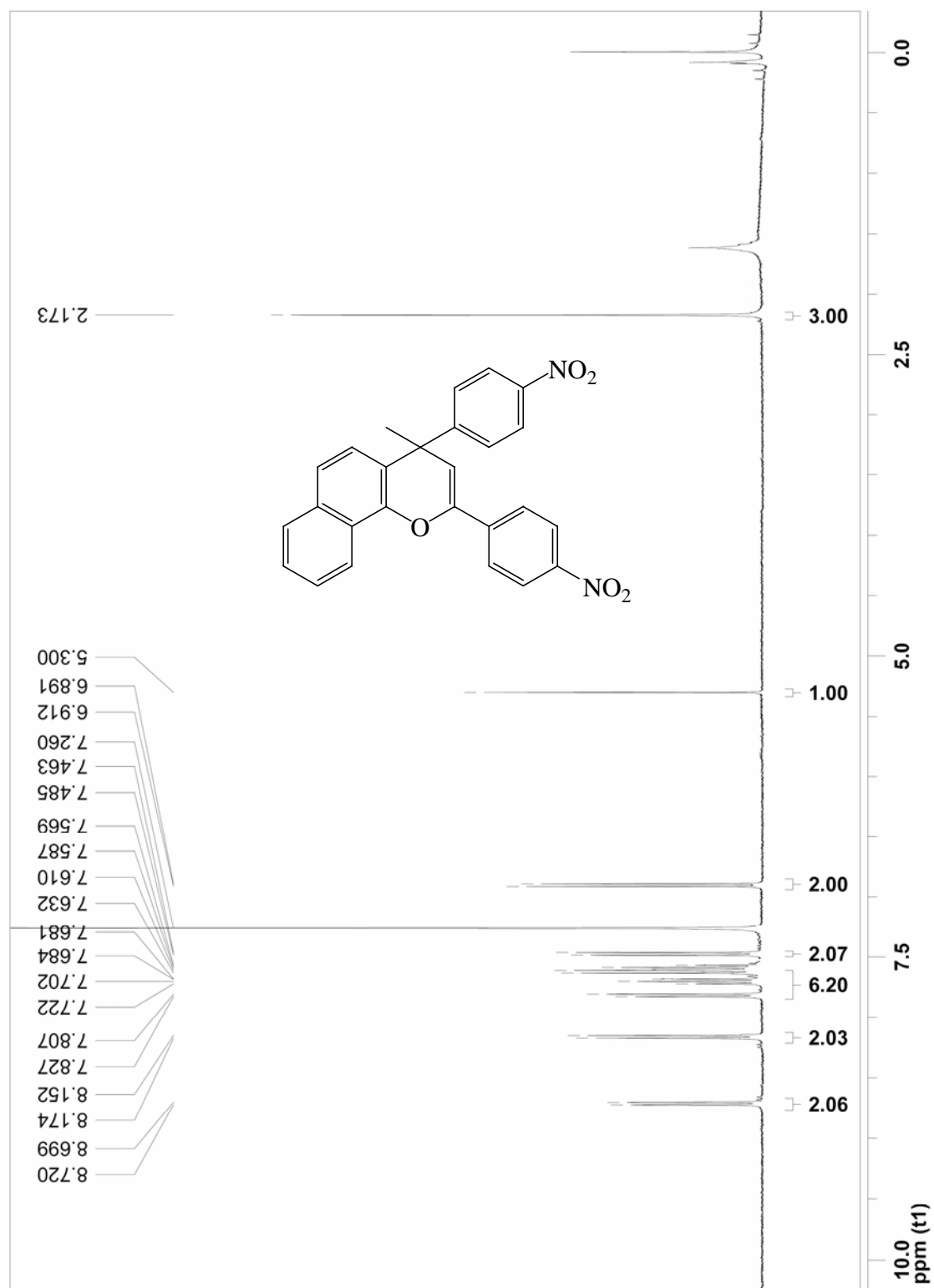
4*H*-Chromene **3i**

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



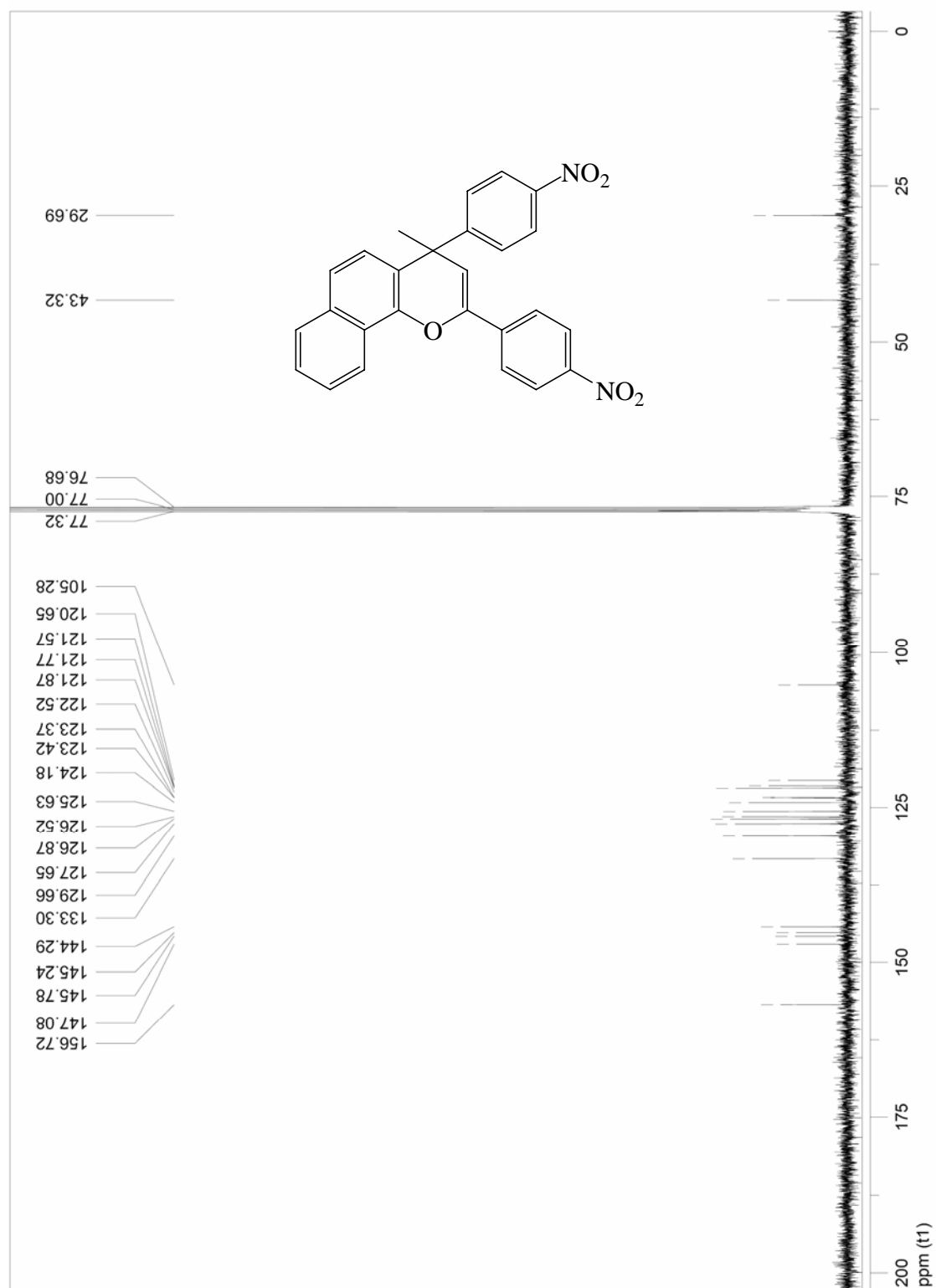
4*H*-Chromene **3j**

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



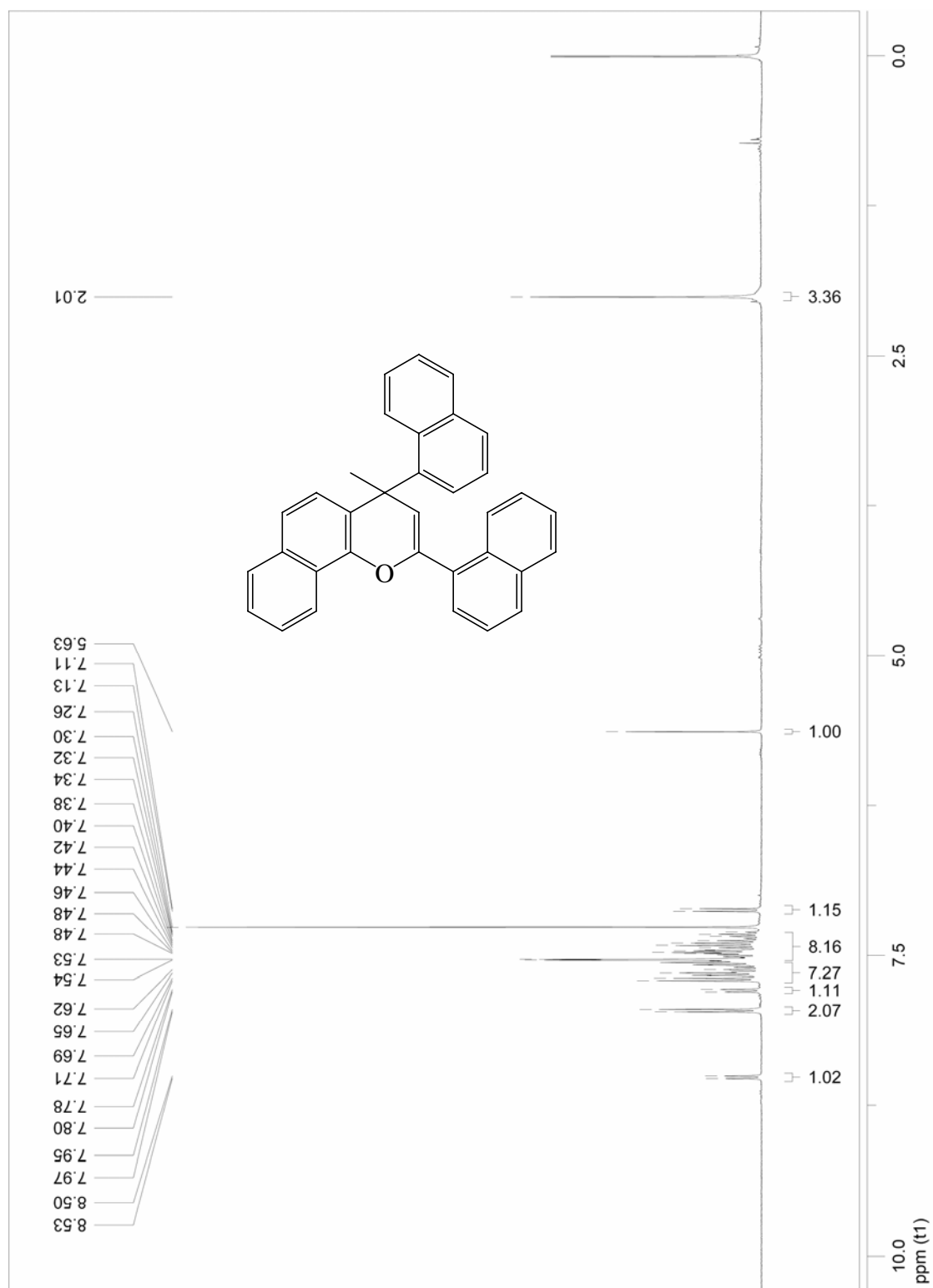
4*H*-Chromene 3j

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



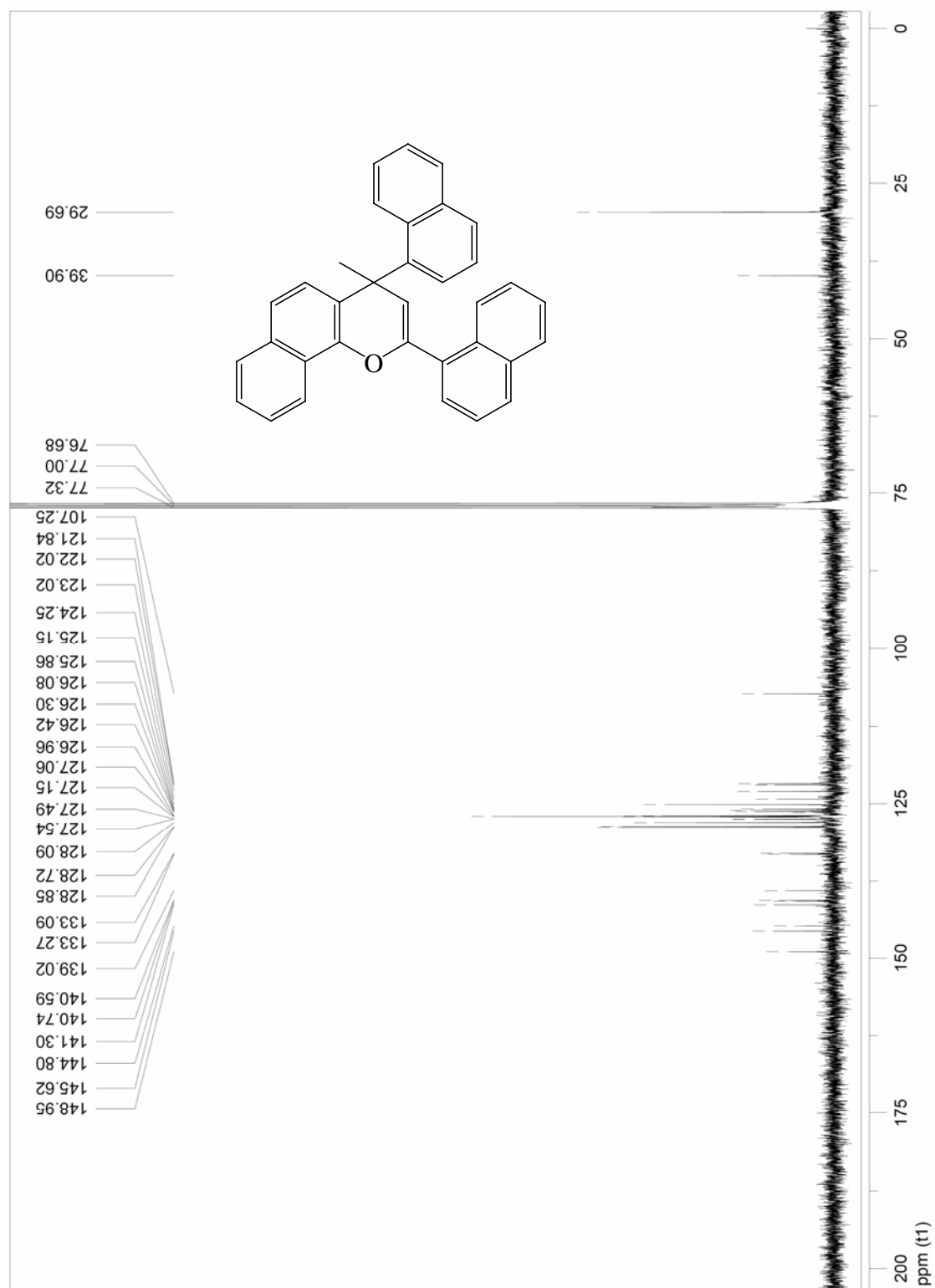
4*H*-Chromene **3k**

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



4*H*-Chromene **3k**

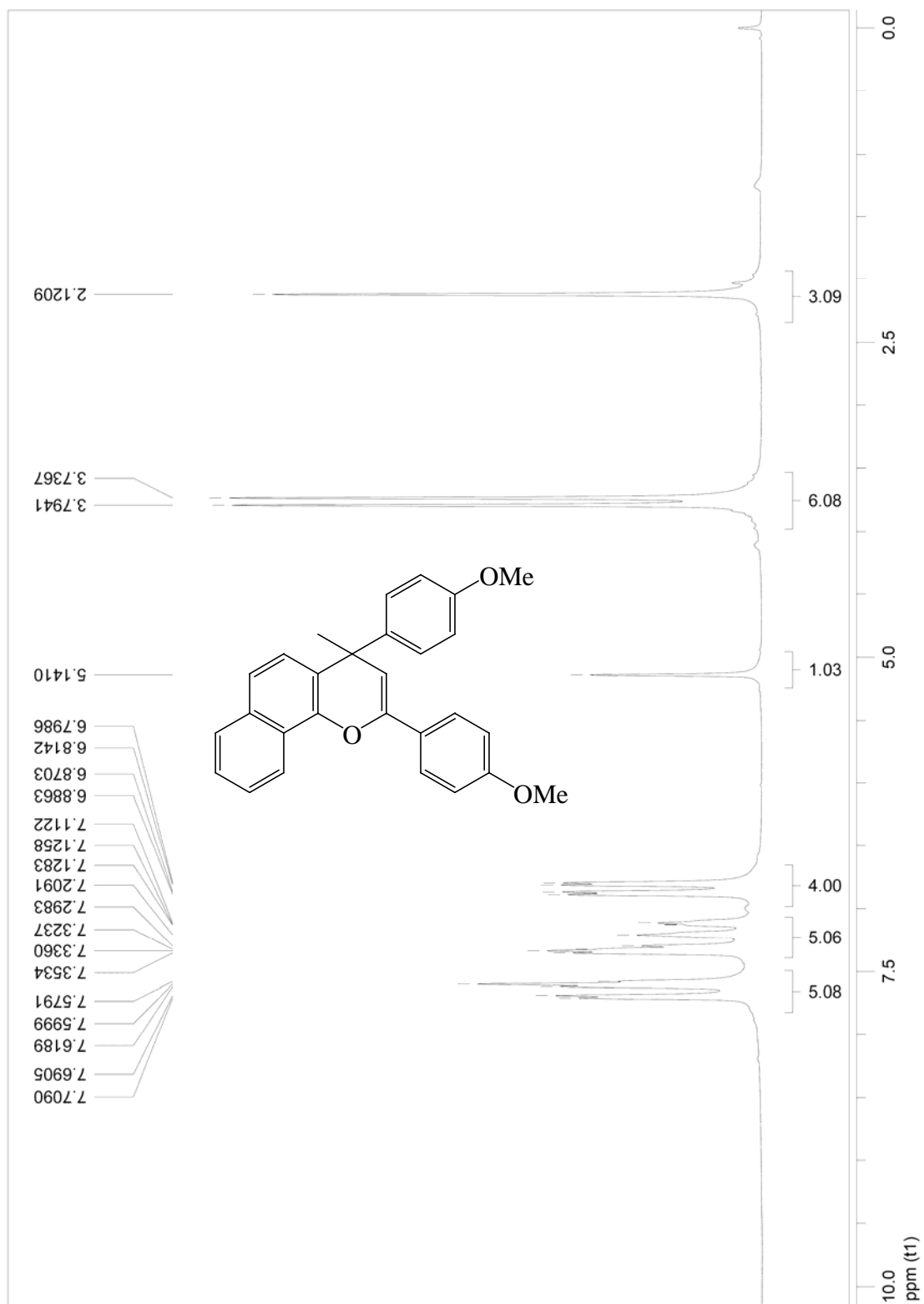
<sup>13</sup>C NMR (100 MHz, CDCl<sub>3</sub>)





4*H*-Chromene **31**

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



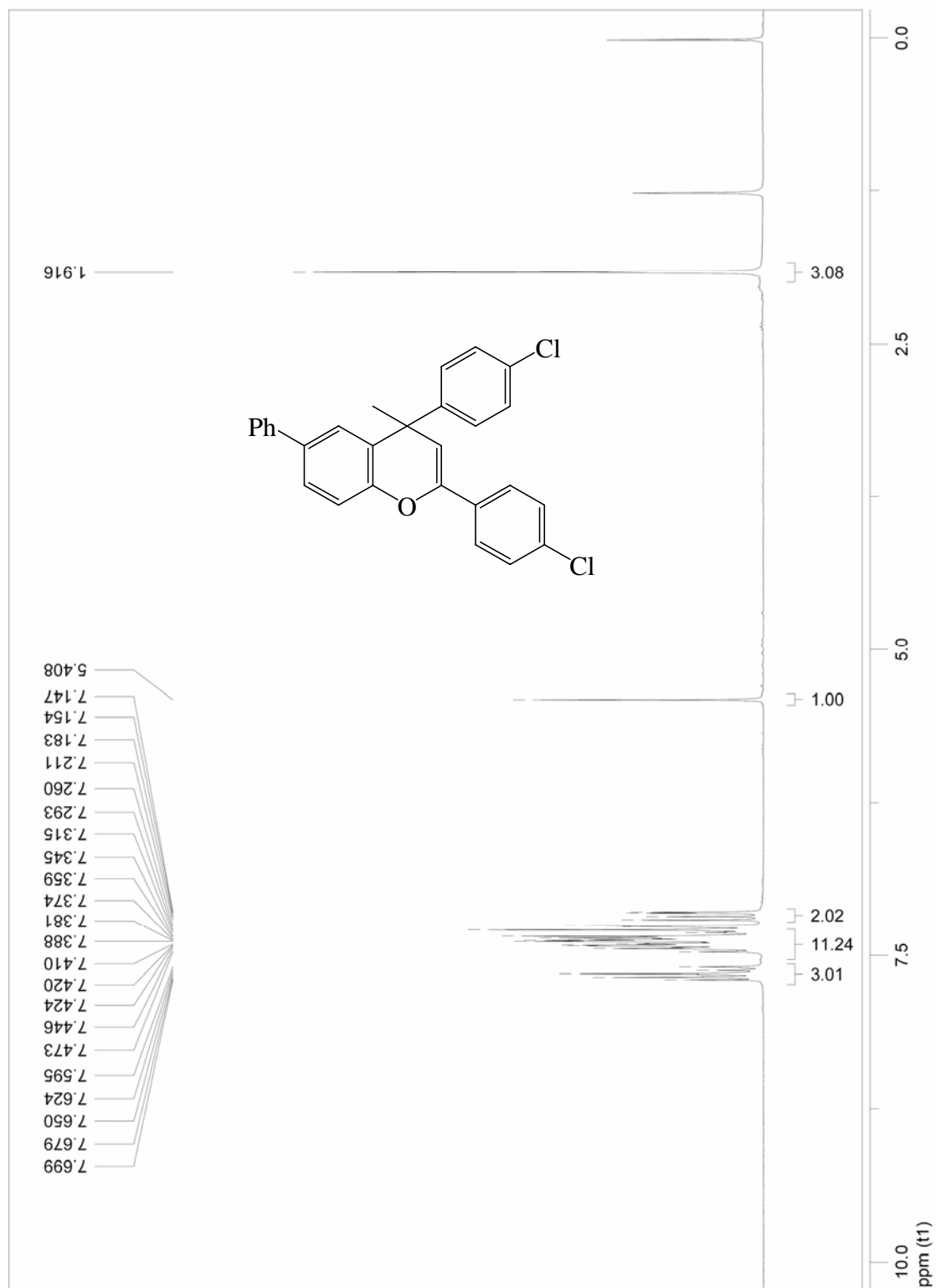
4*H*-Chromene 31

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



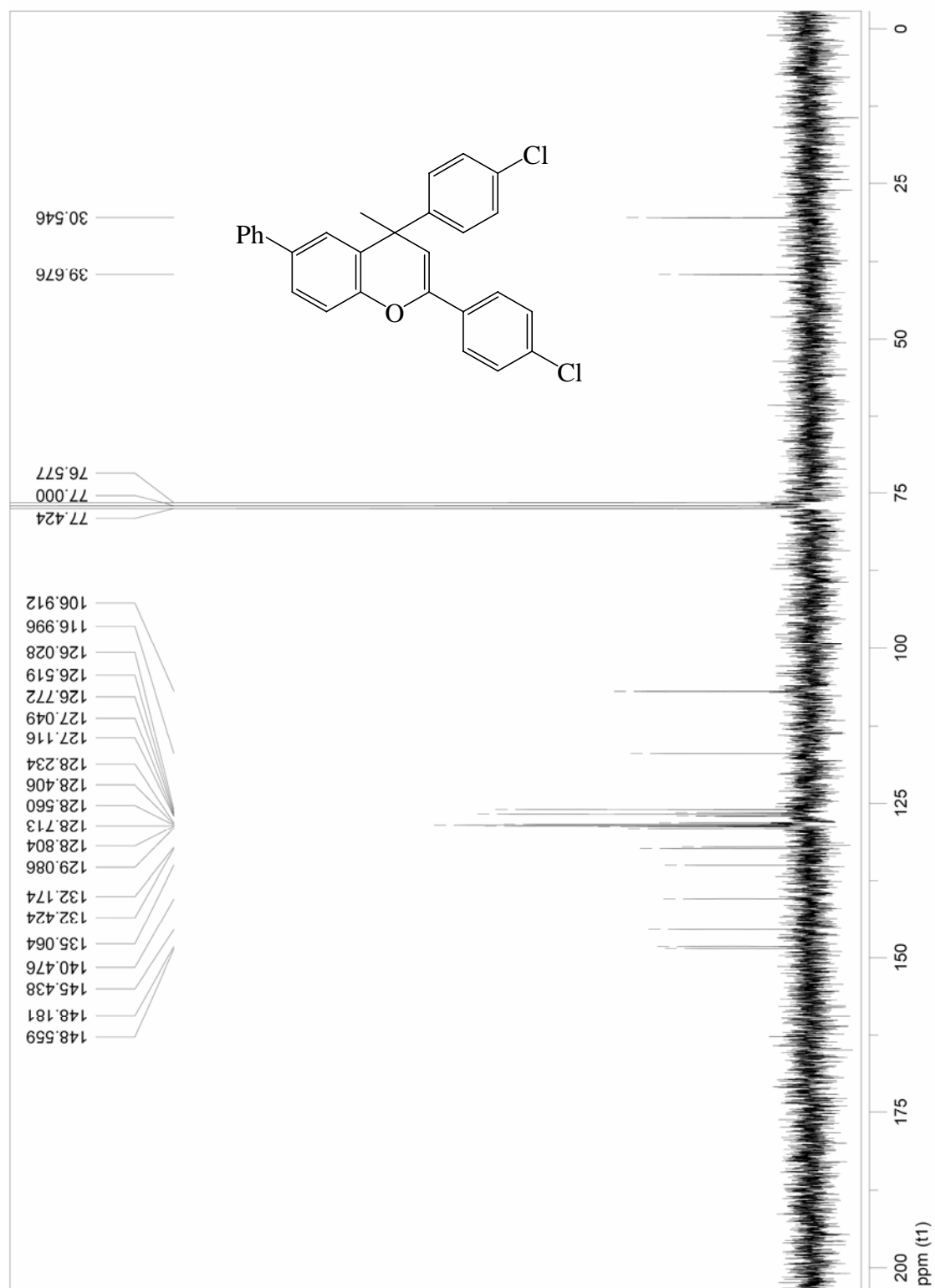
4*H*-Chromene **3m**

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



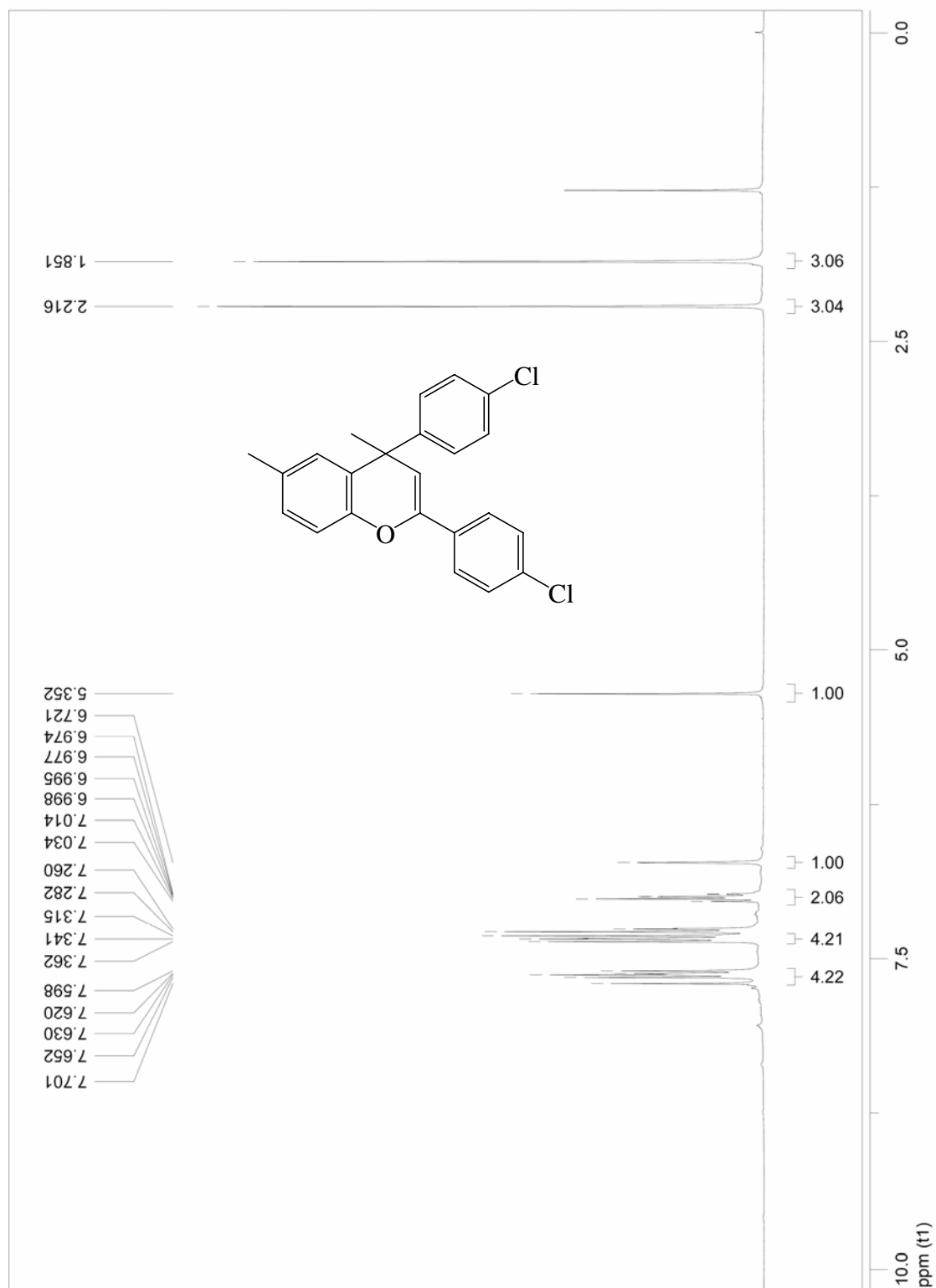
4*H*-Chromene **3m**

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



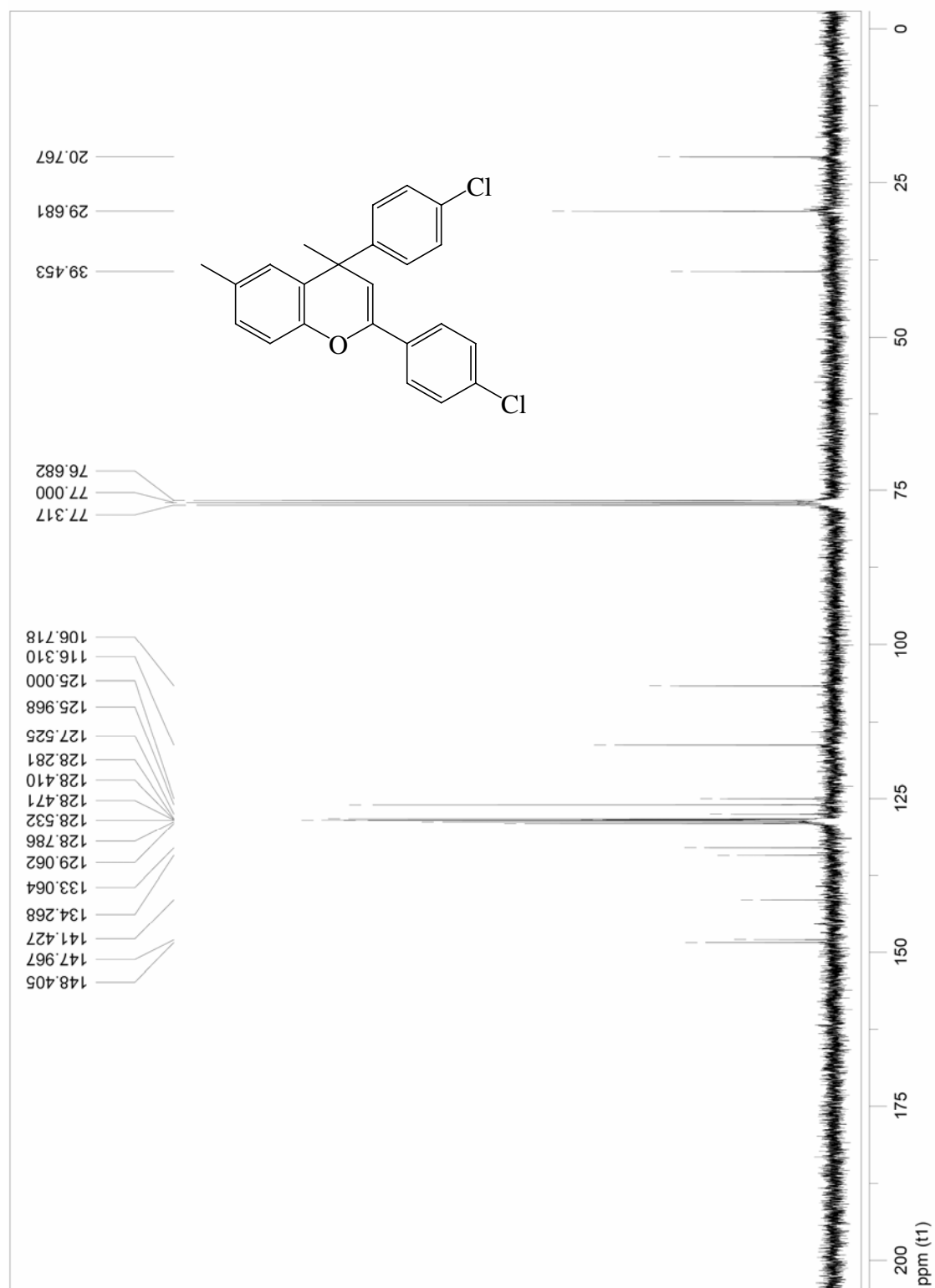
4*H*-Chromene **3n**

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



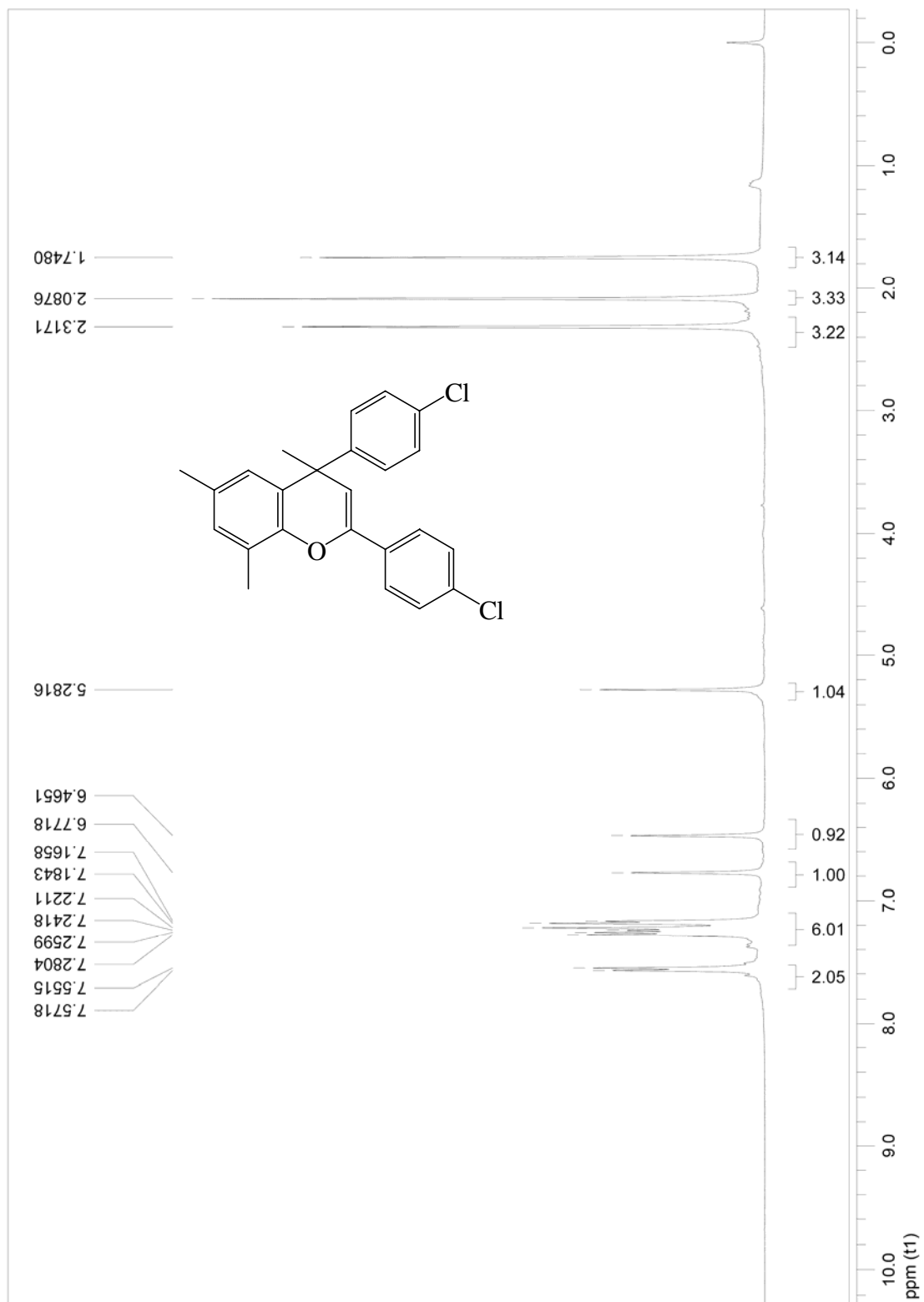
4*H*-Chromene **3n**

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



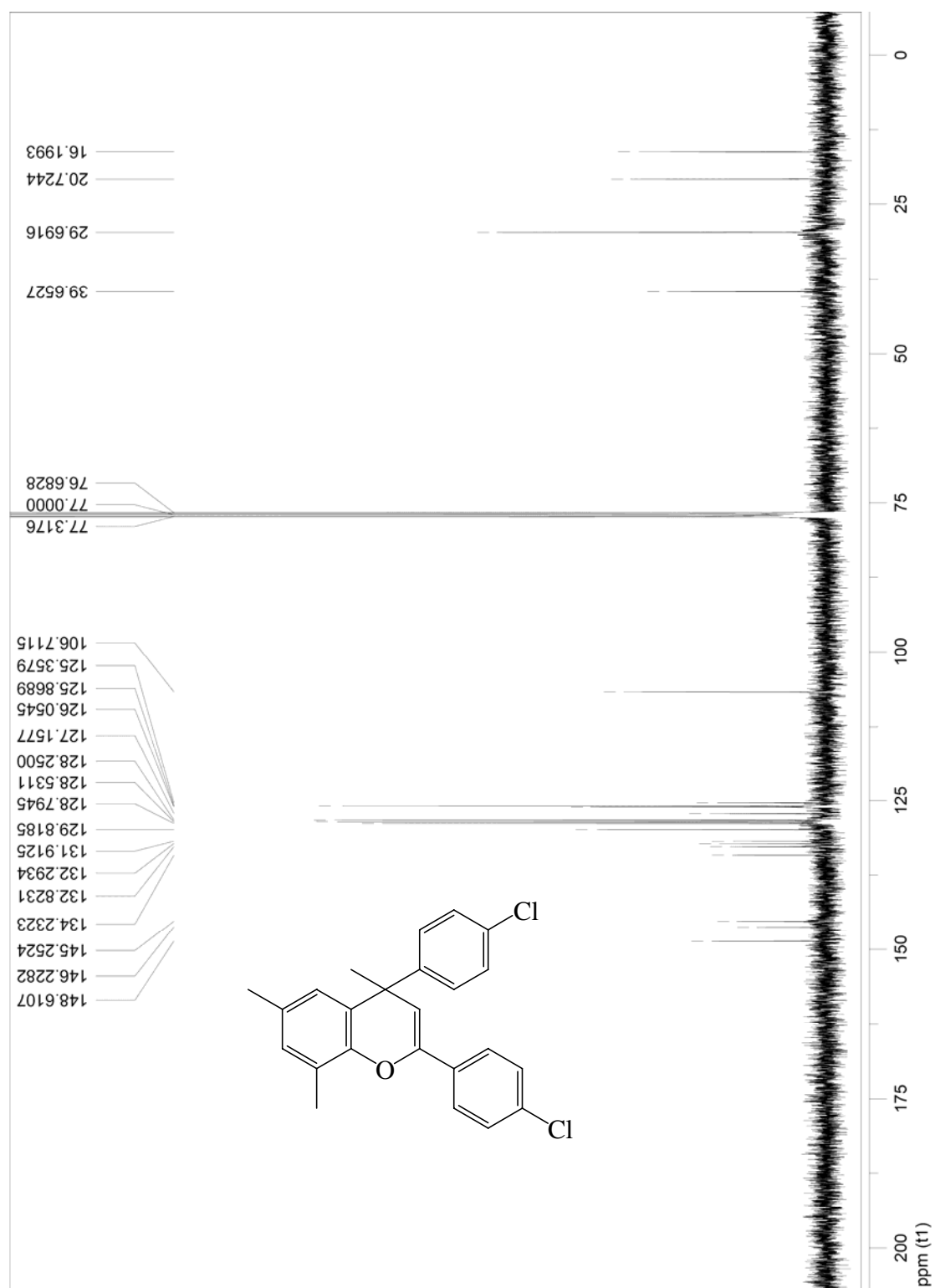
4*H*-Chromene **3o**

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



4*H*-Chromene **3o**

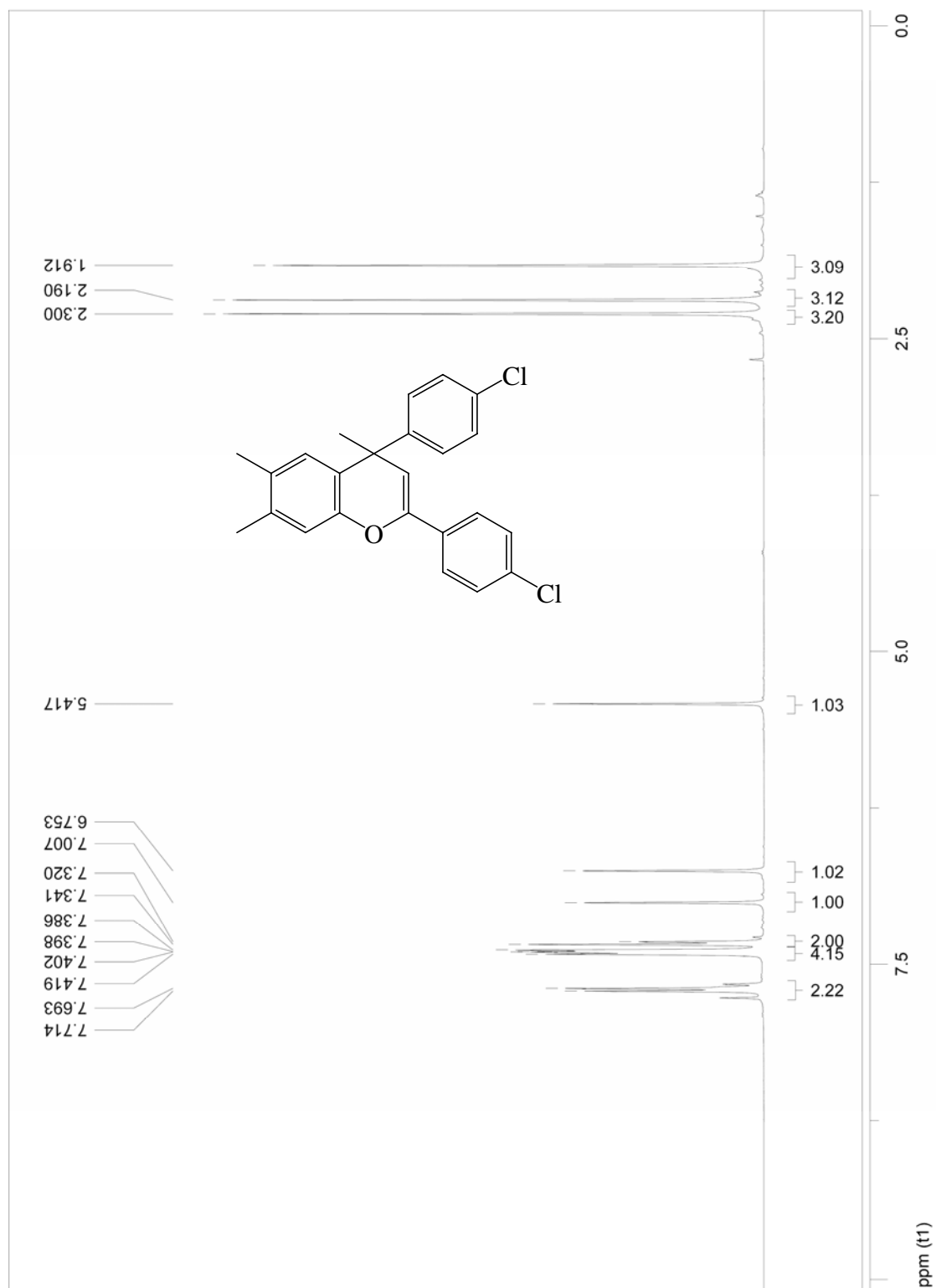
$^{13}\text{C}$  NMR (100 MHz,  $\text{CDCl}_3$ )





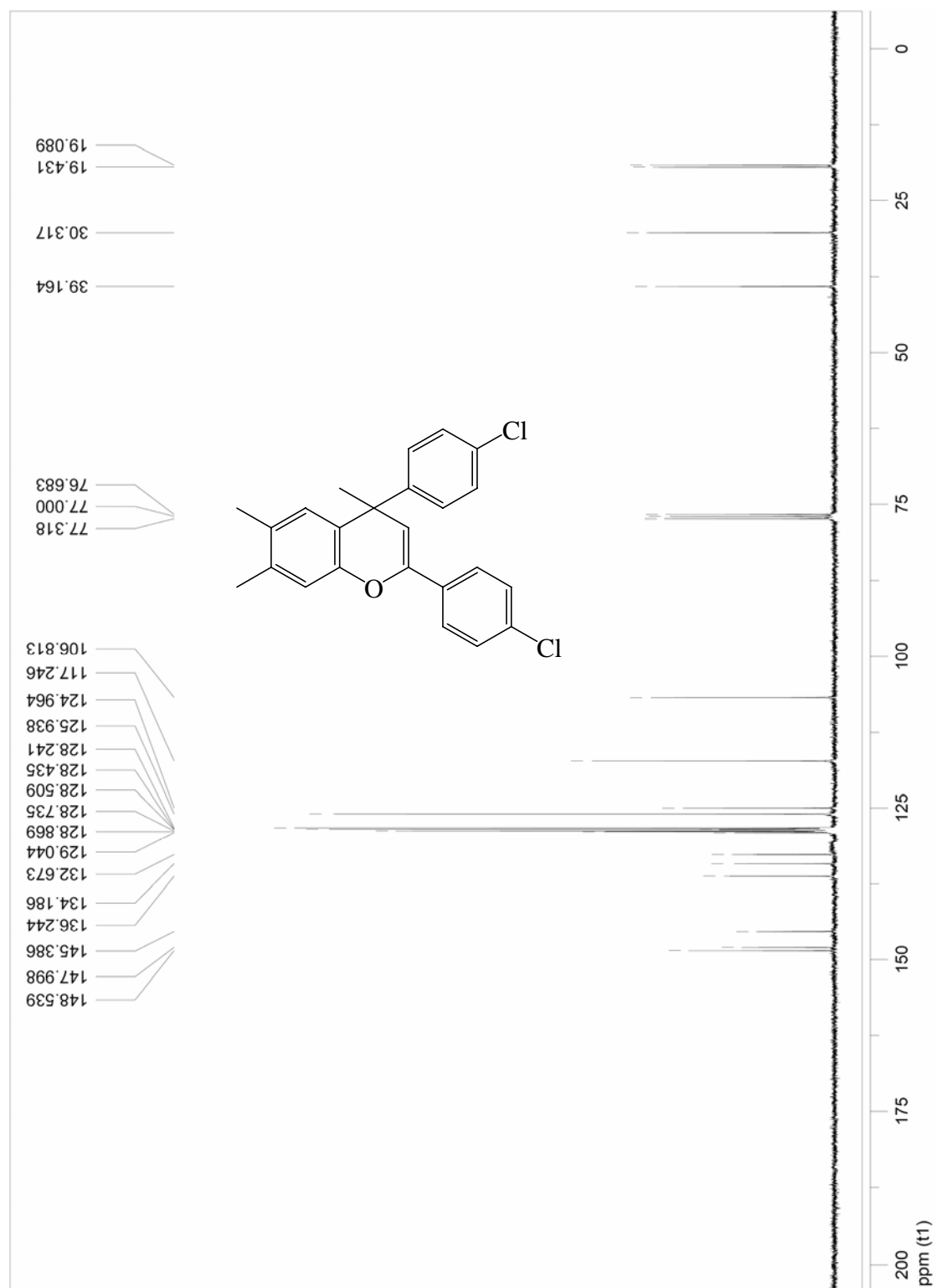
4*H*-Chromene **3p**

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



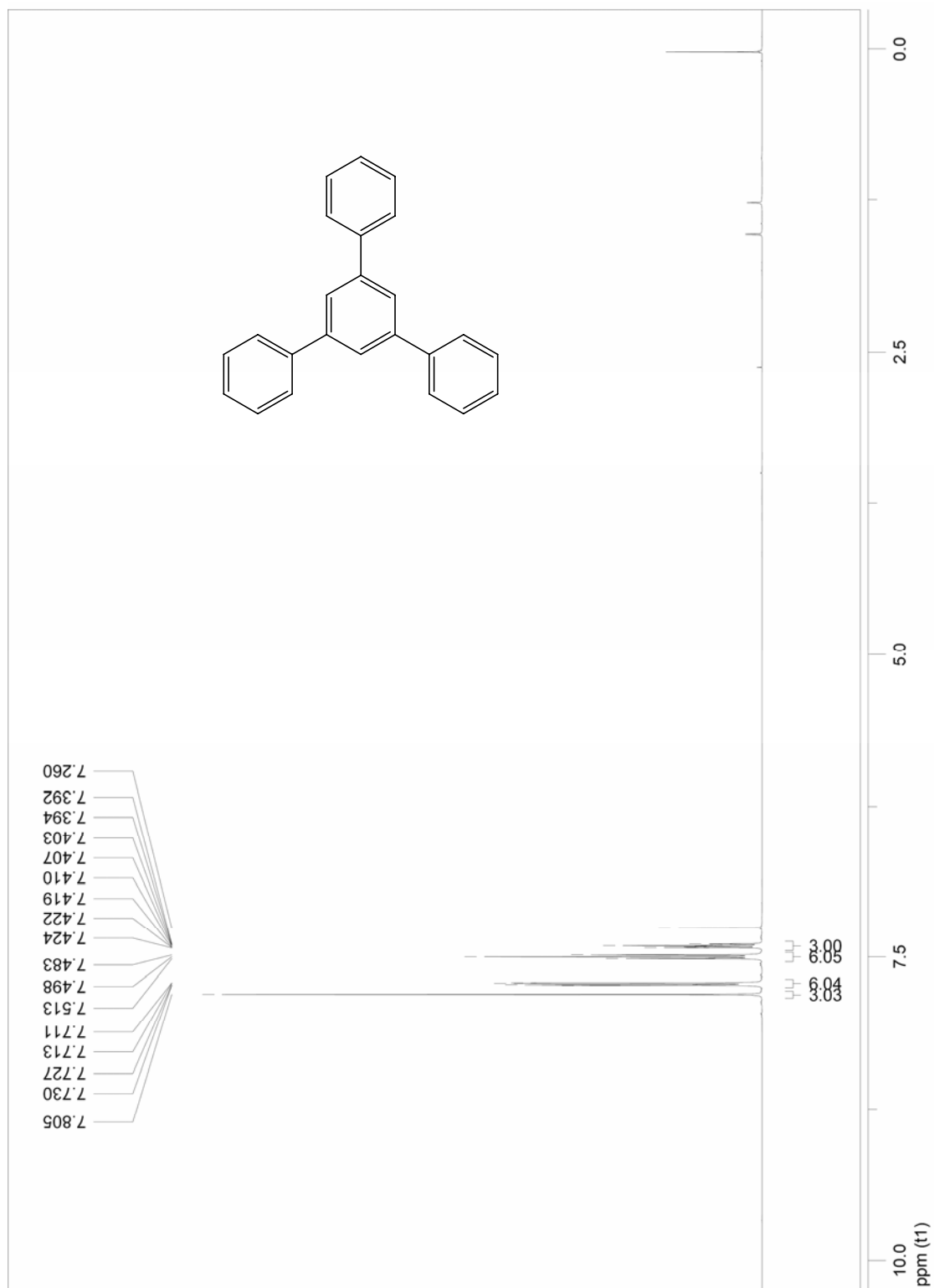
4*H*-Chromene **3p**

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



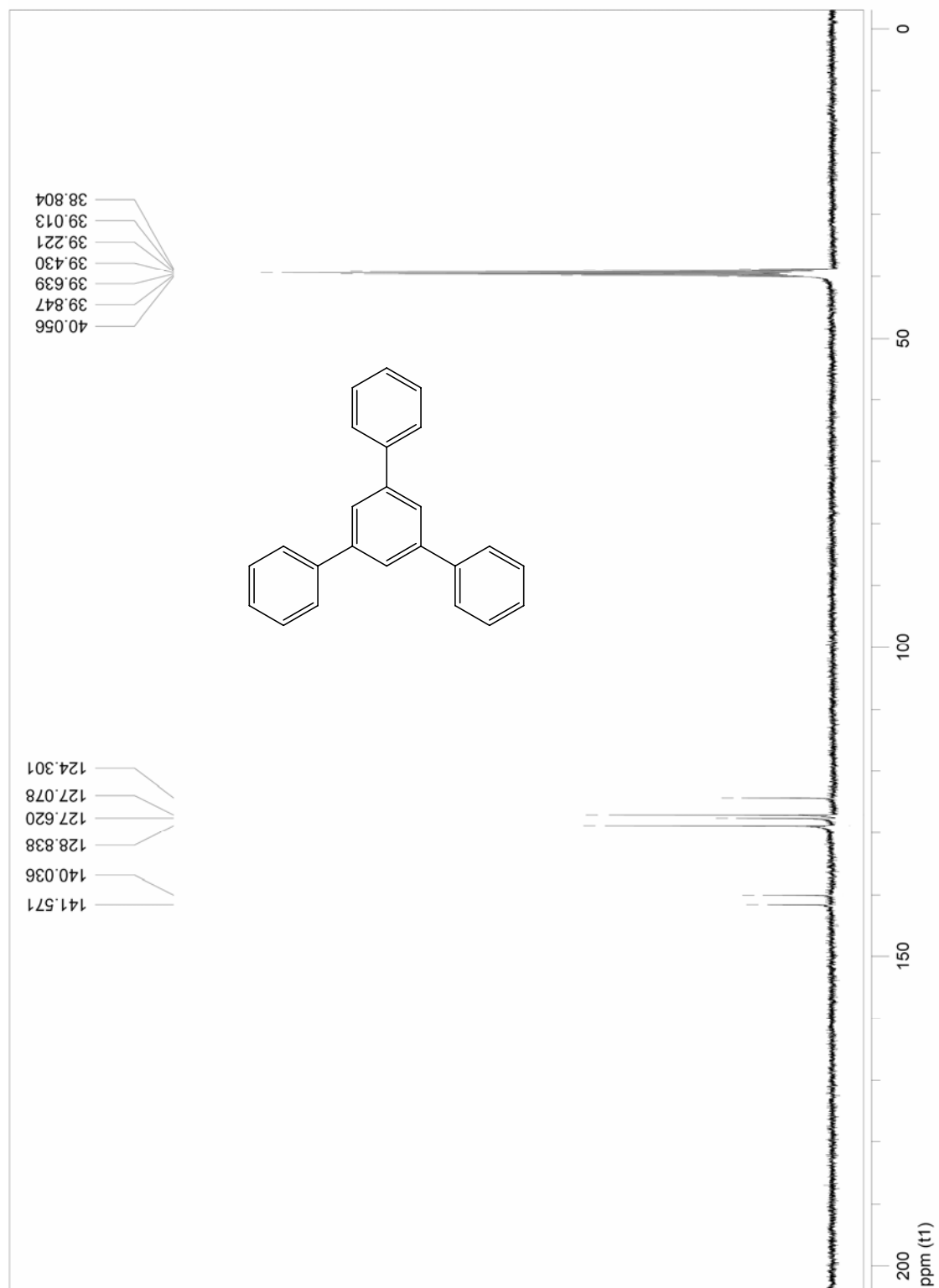
3b. NMR spectra of by-product **4a**

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



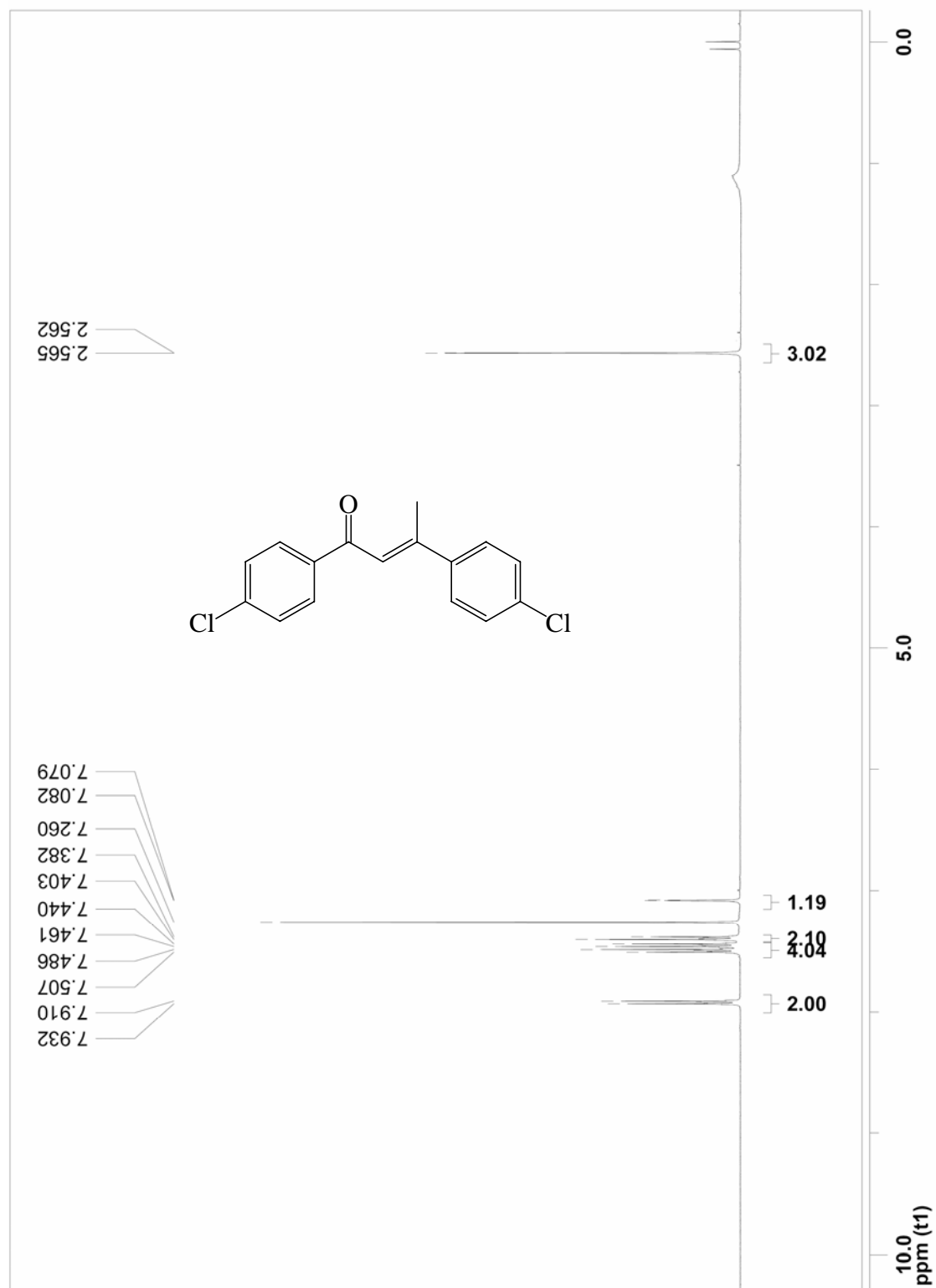
By-product **4a**

$^{13}\text{C}$  NMR (100 MHz, DMSO- $d_6$ )



3c. NMR spectra of chalcone **5c**

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



Chalcone **5c**

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

