

## Supplementary Information

### Quinoxaline derivatives with broadened absorption patterns

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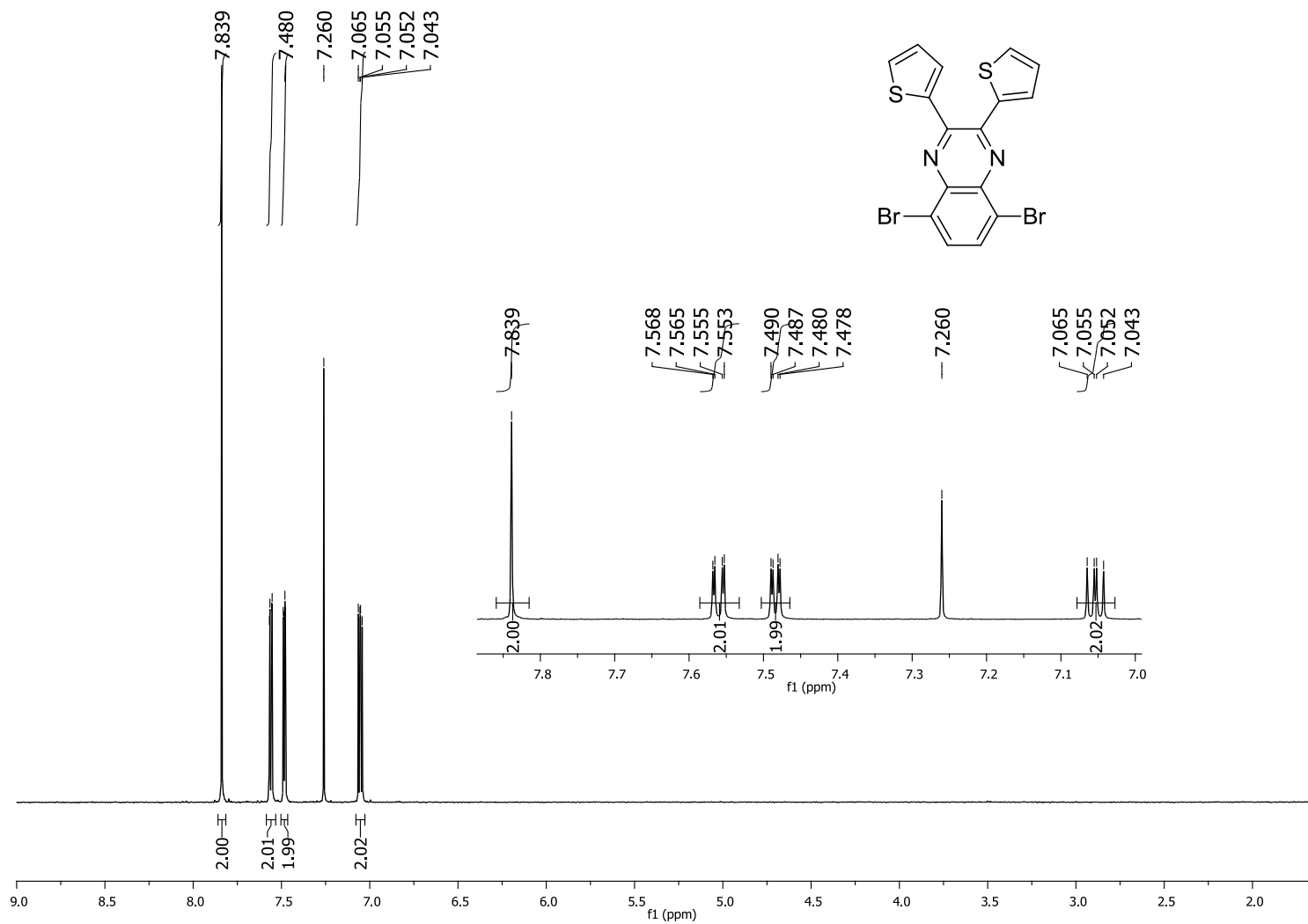
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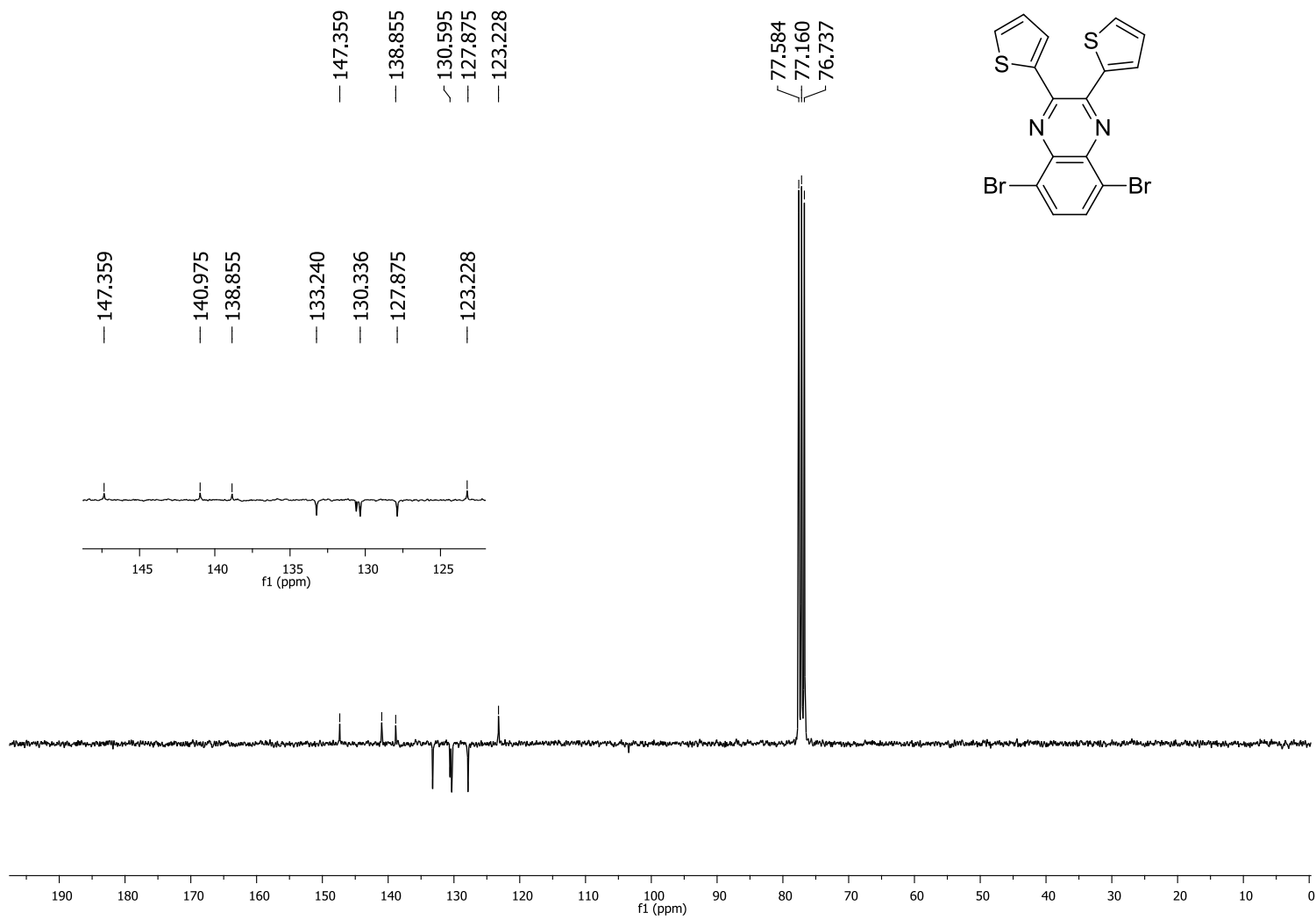
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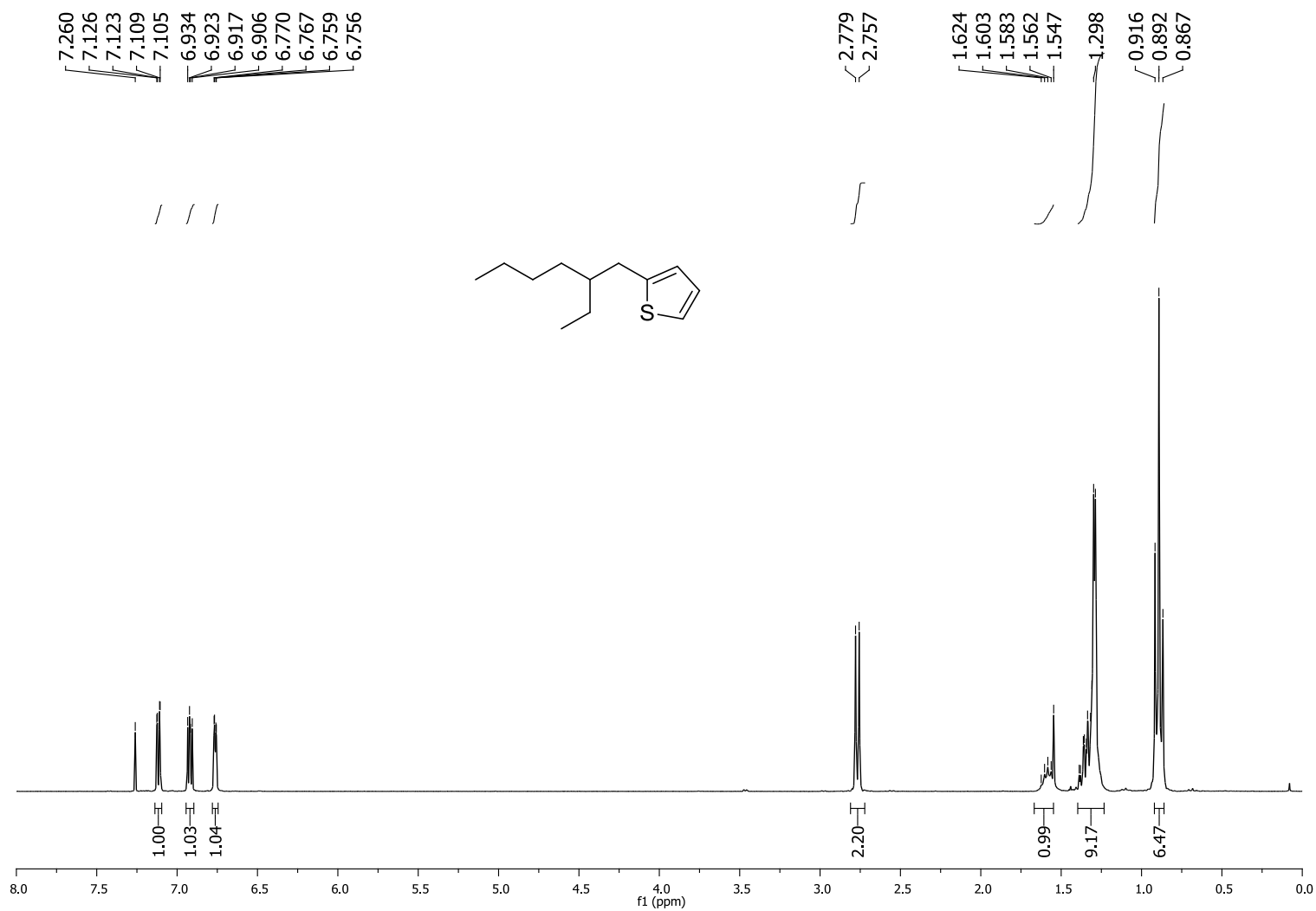
**Fig. S1.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **Q3**



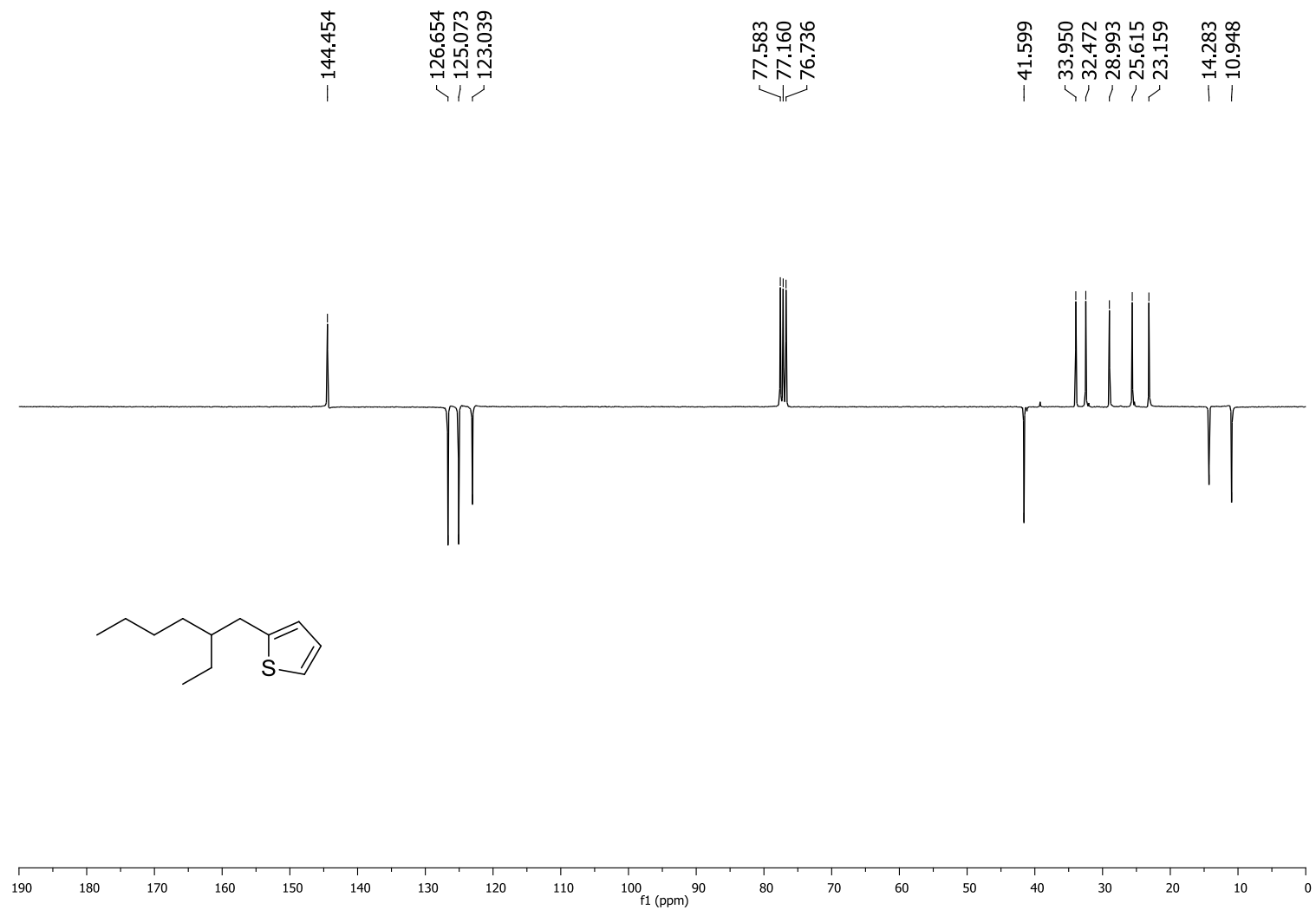
**Fig. S2.** APT spectrum (75 MHz, CDCl<sub>3</sub>) of **Q3**



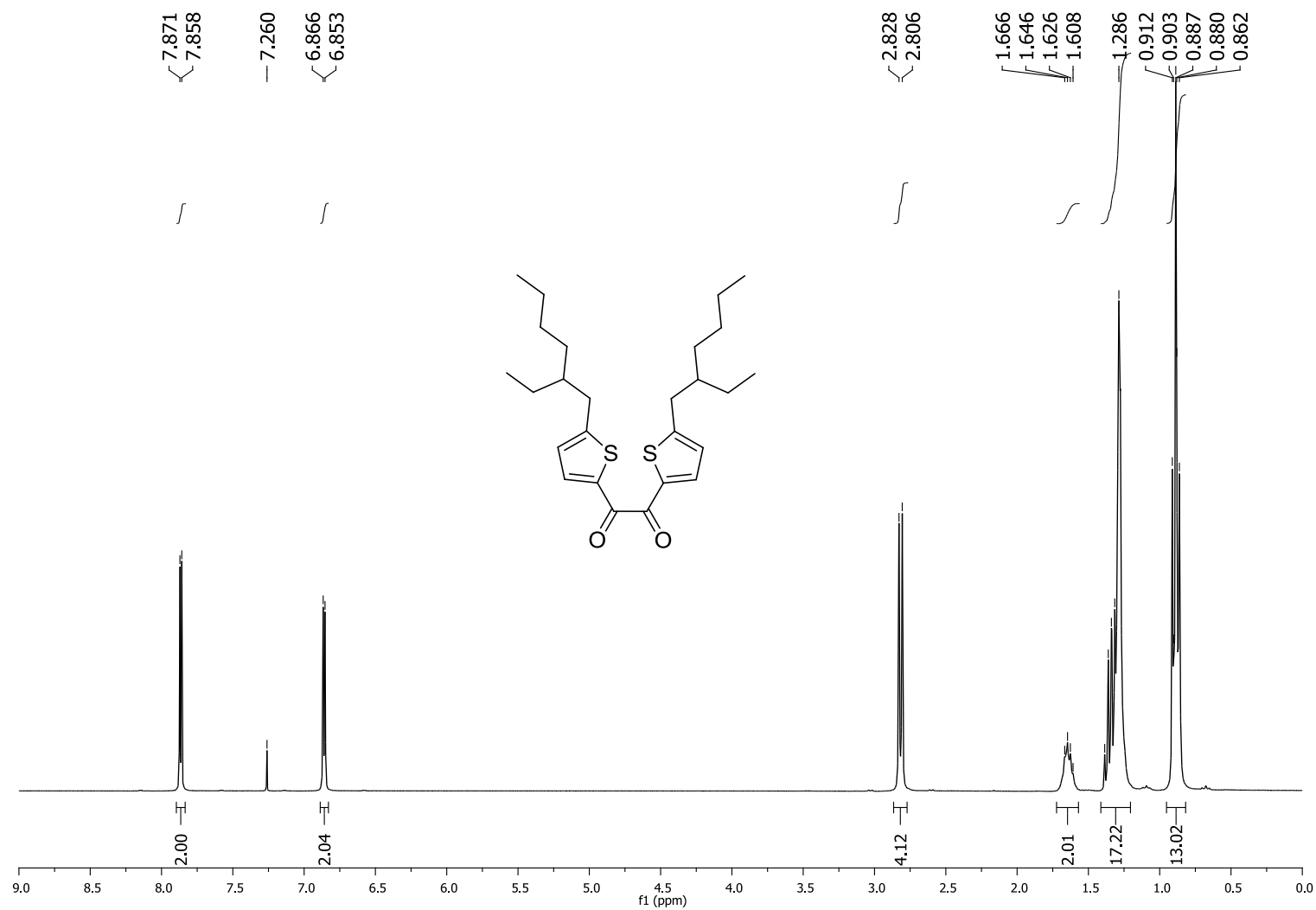
**Fig. S3.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of 2-(2-ethylhexyl)thiophene



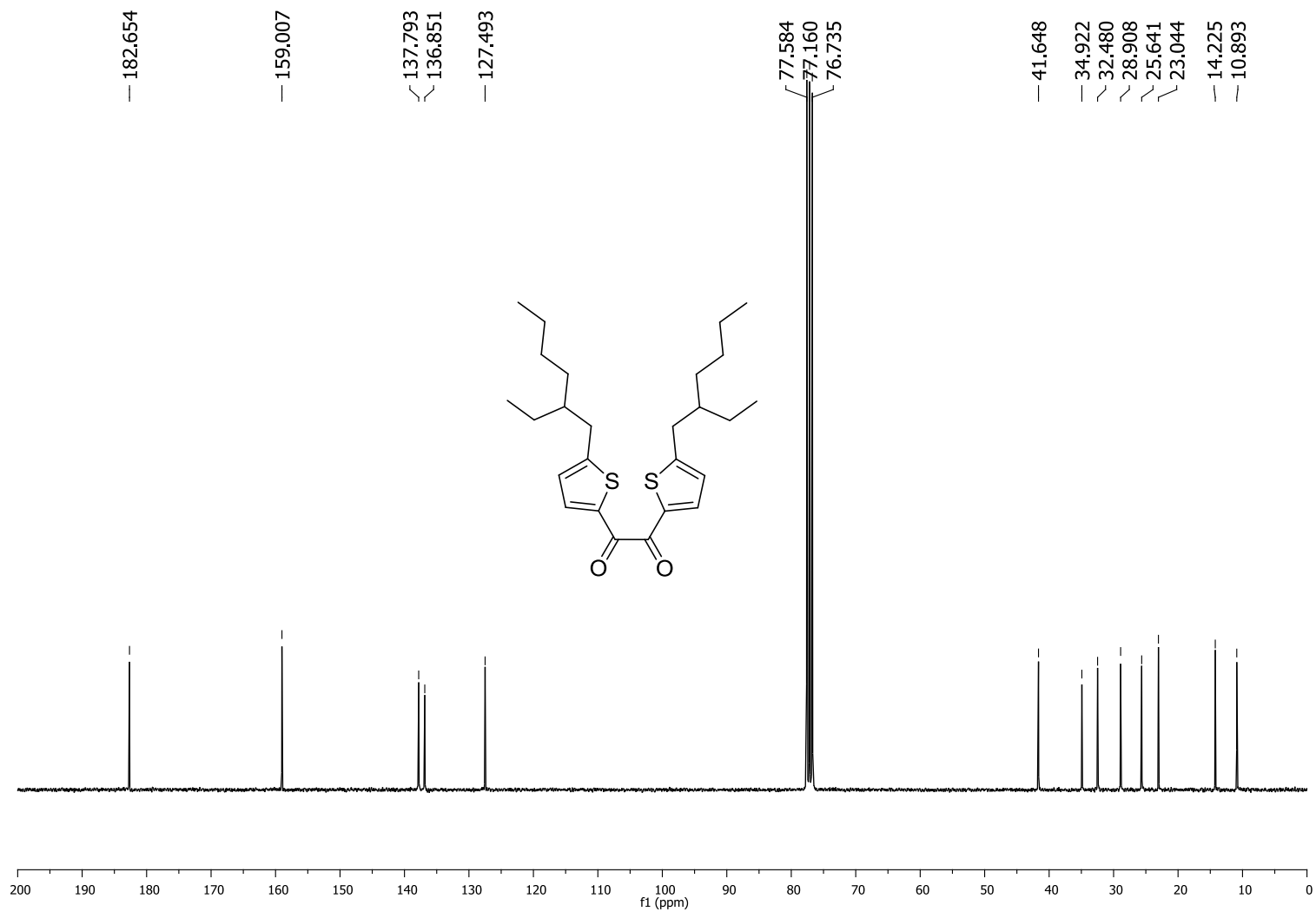
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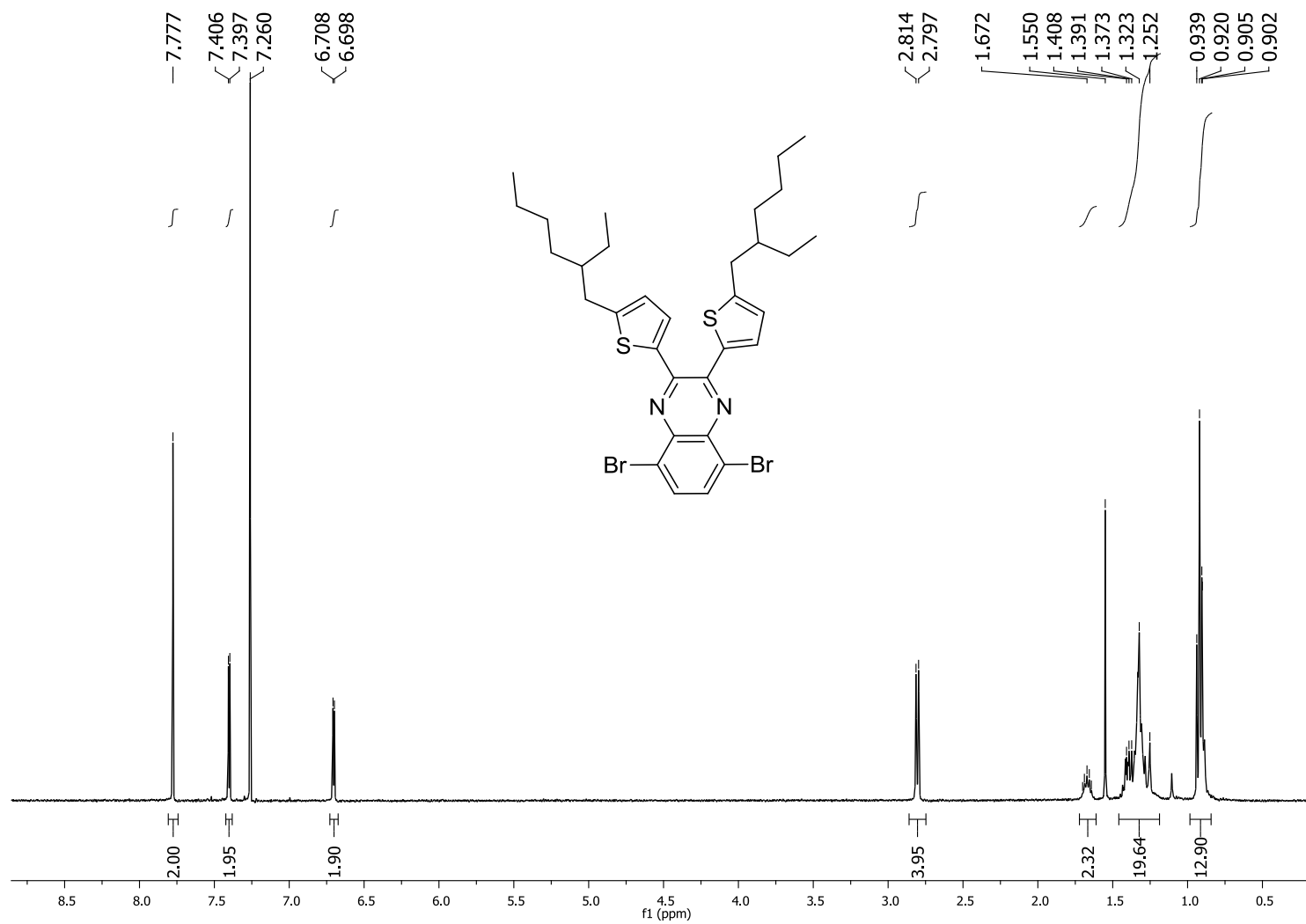


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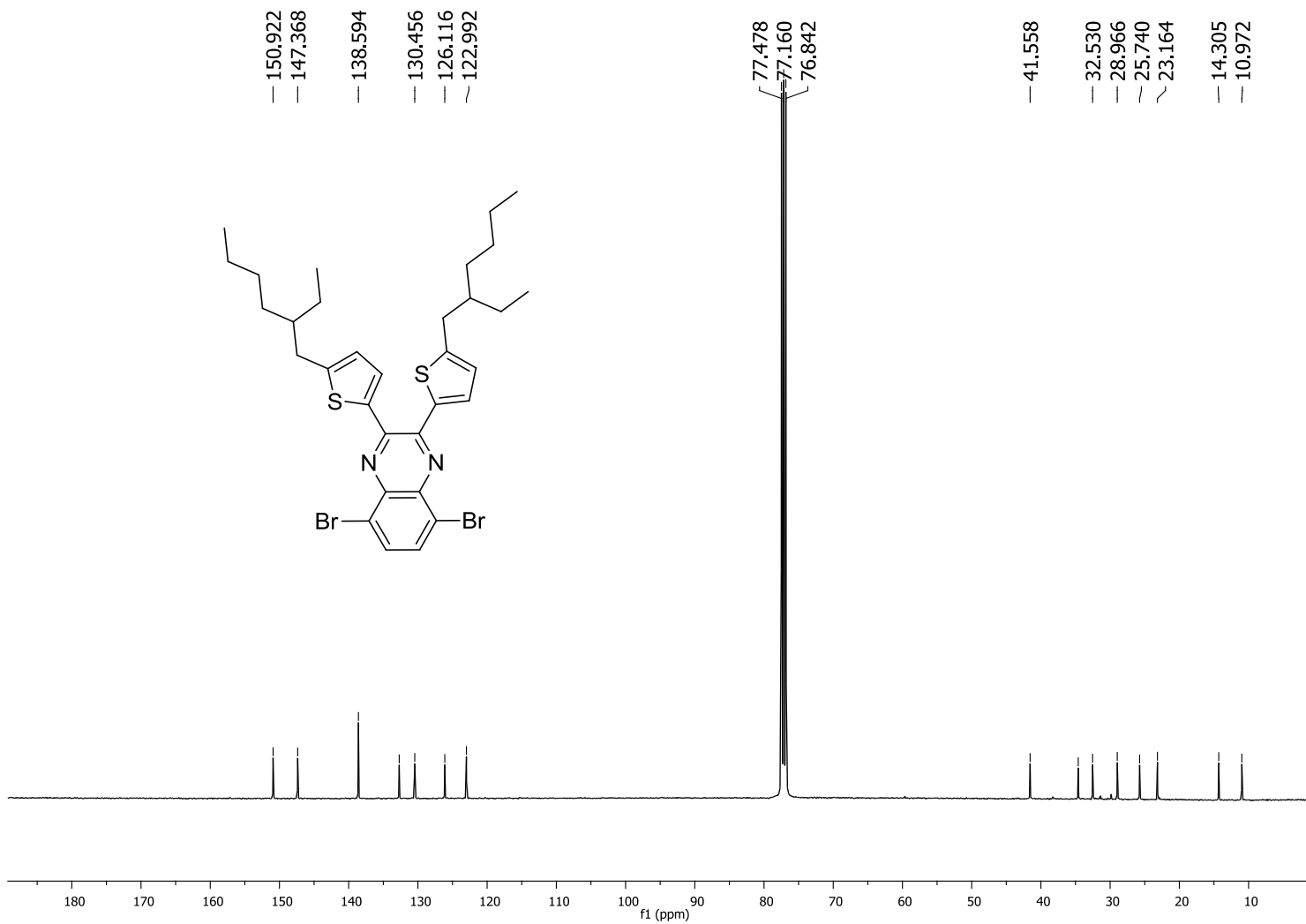




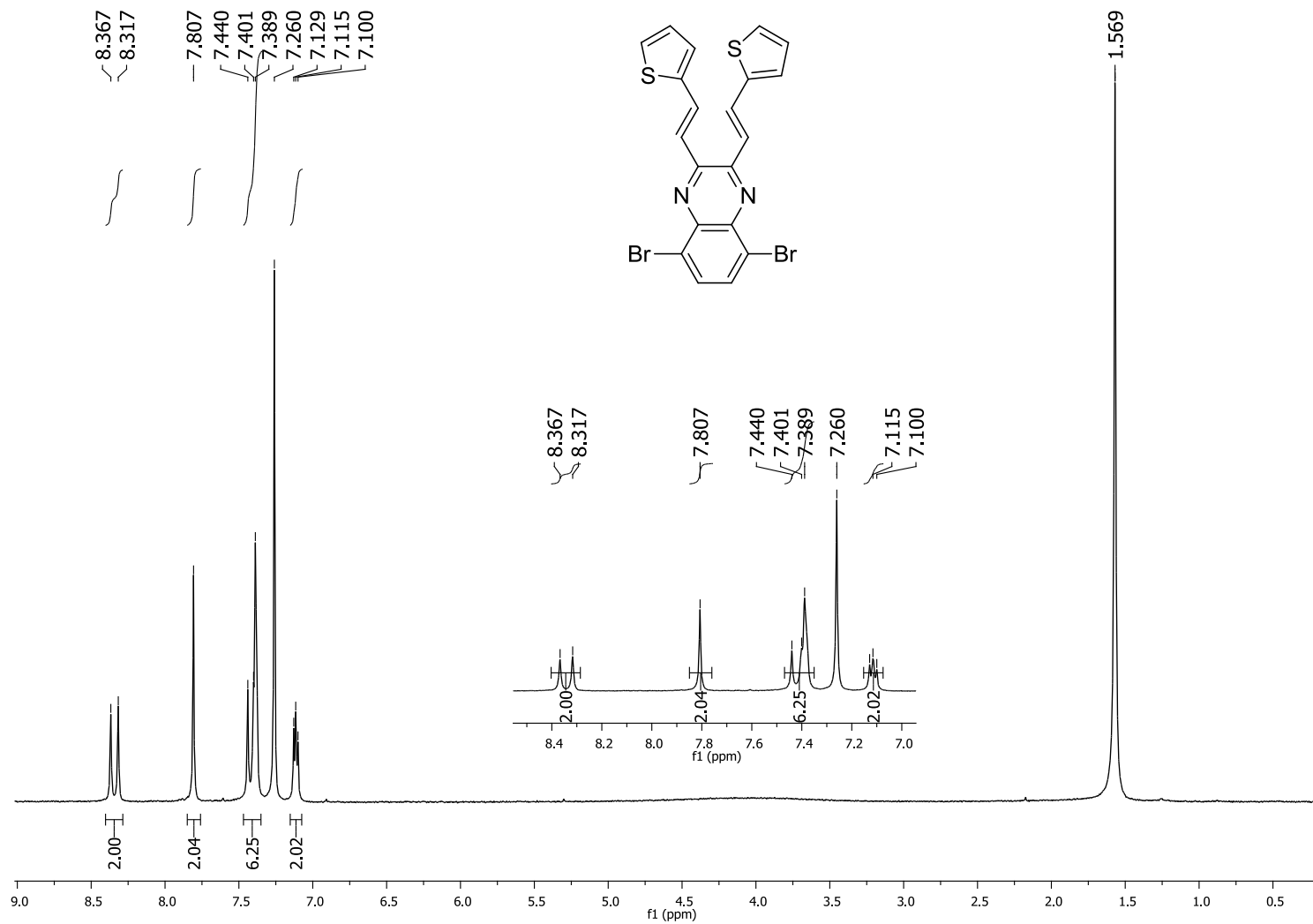
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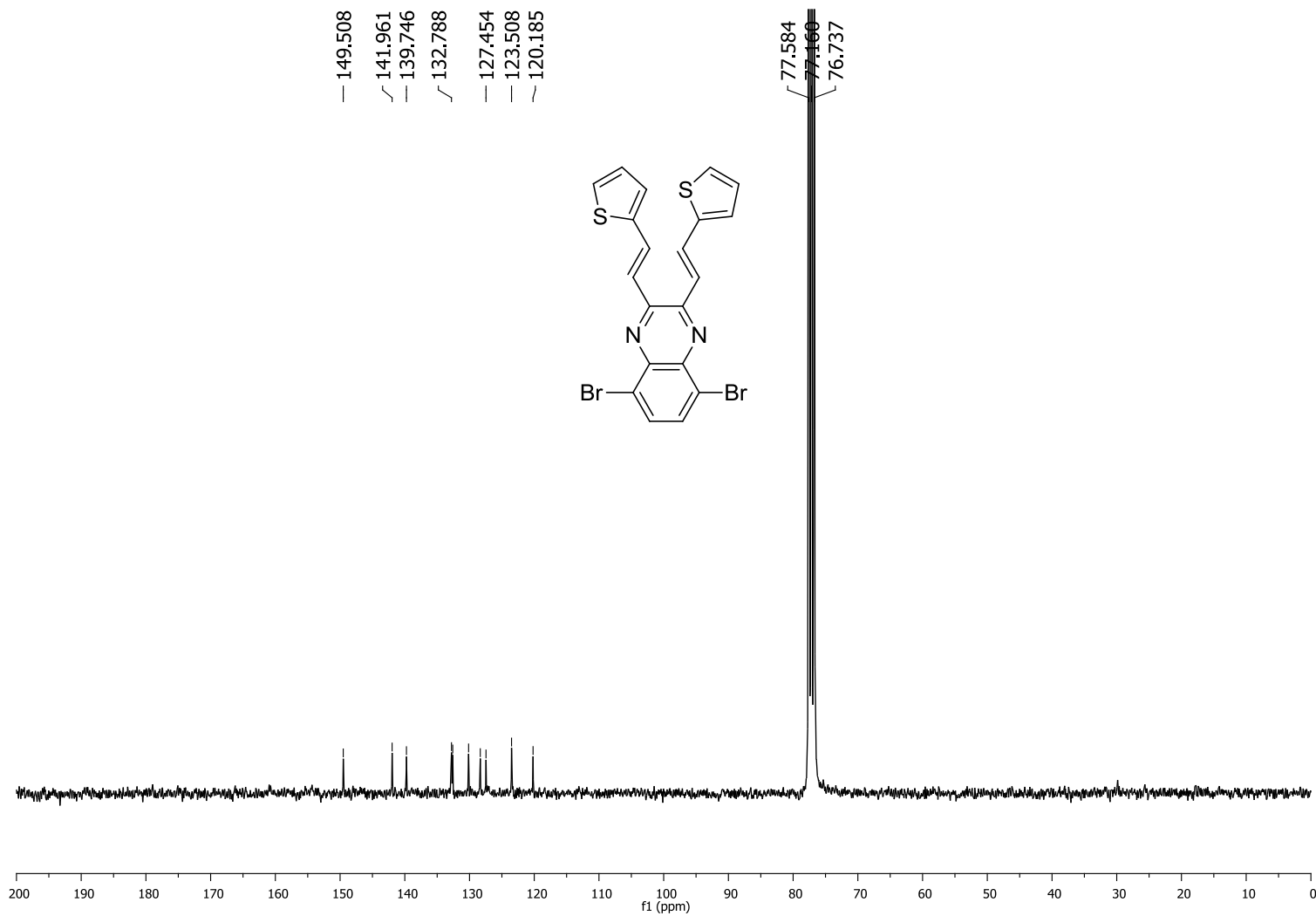
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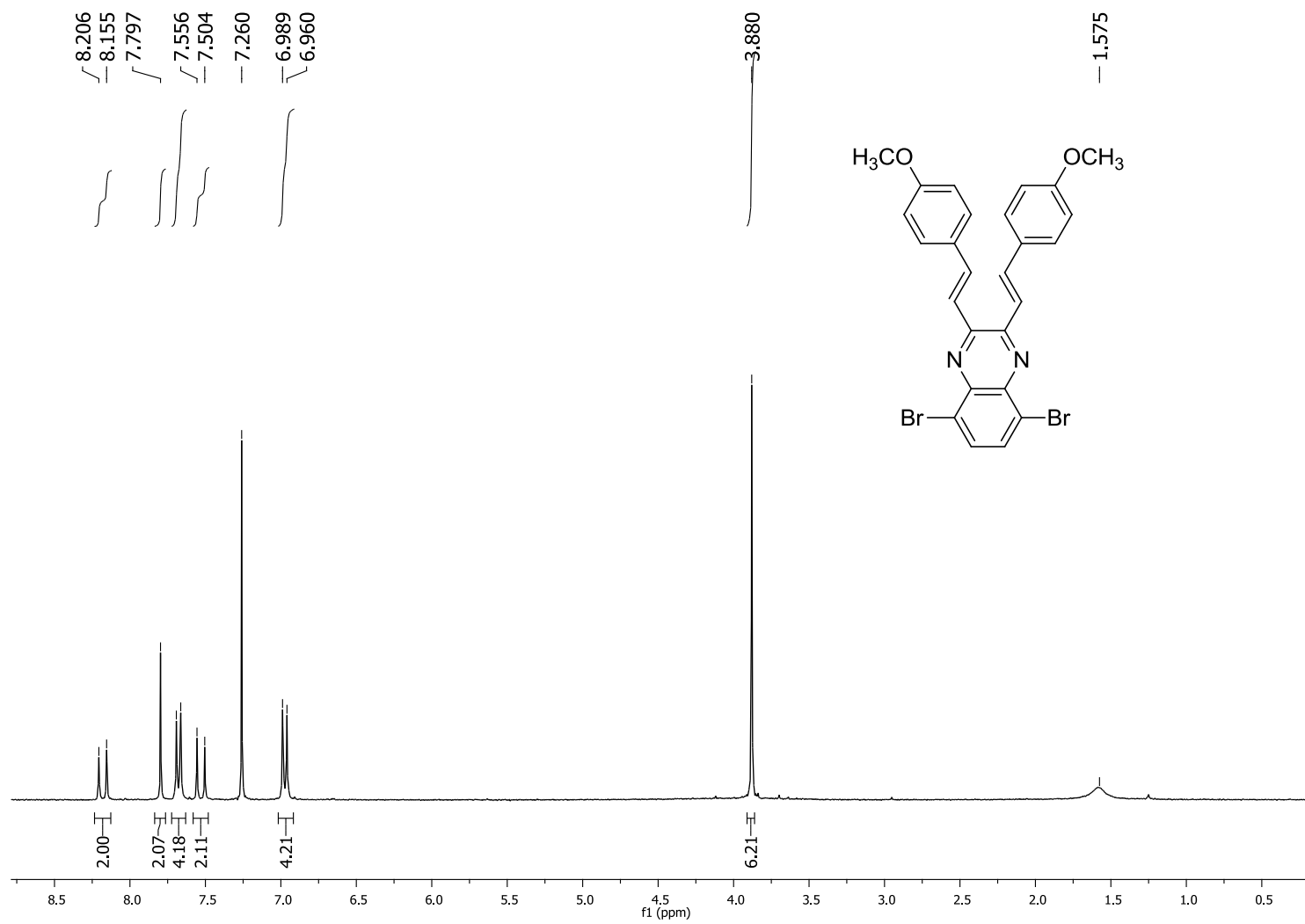
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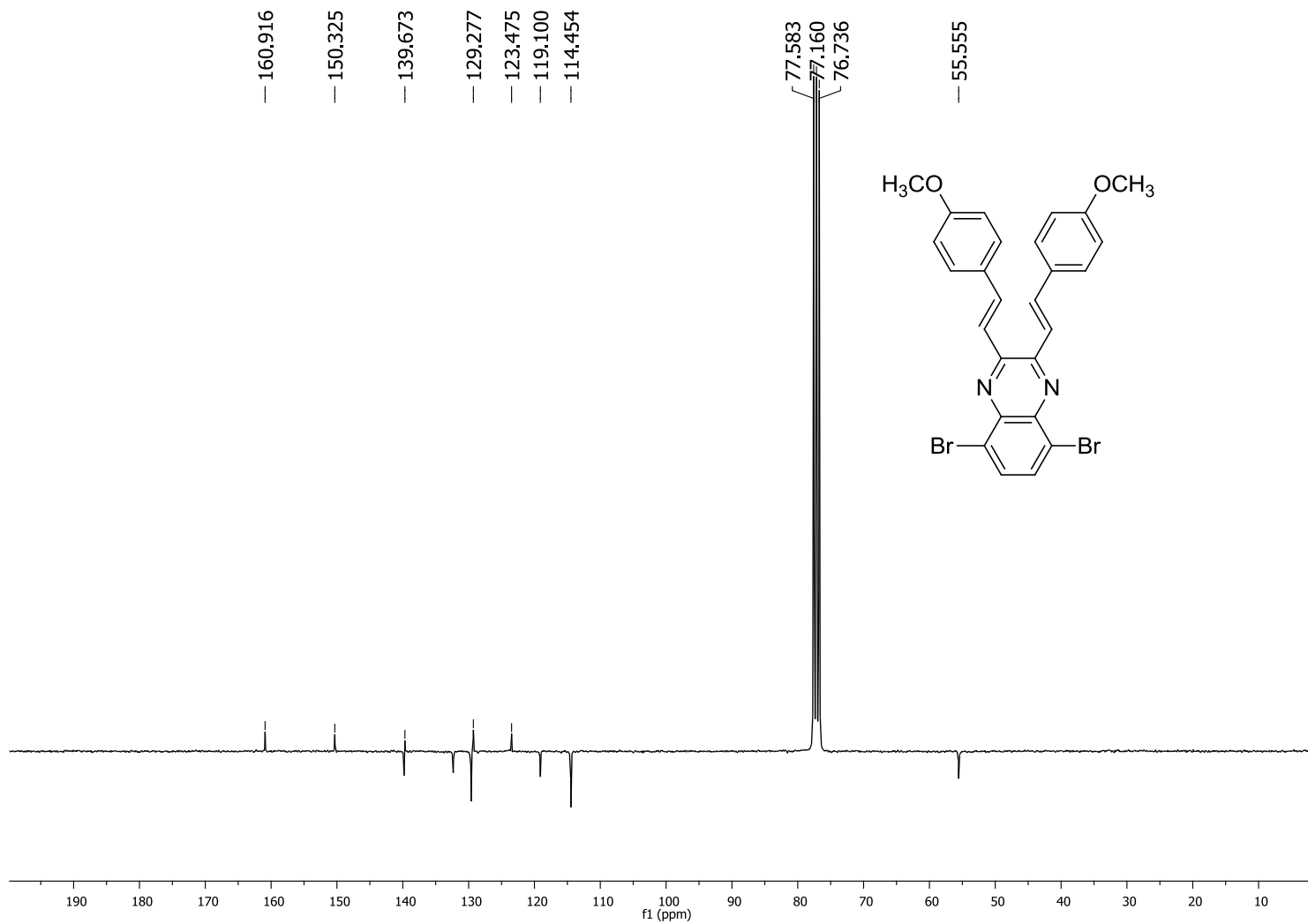
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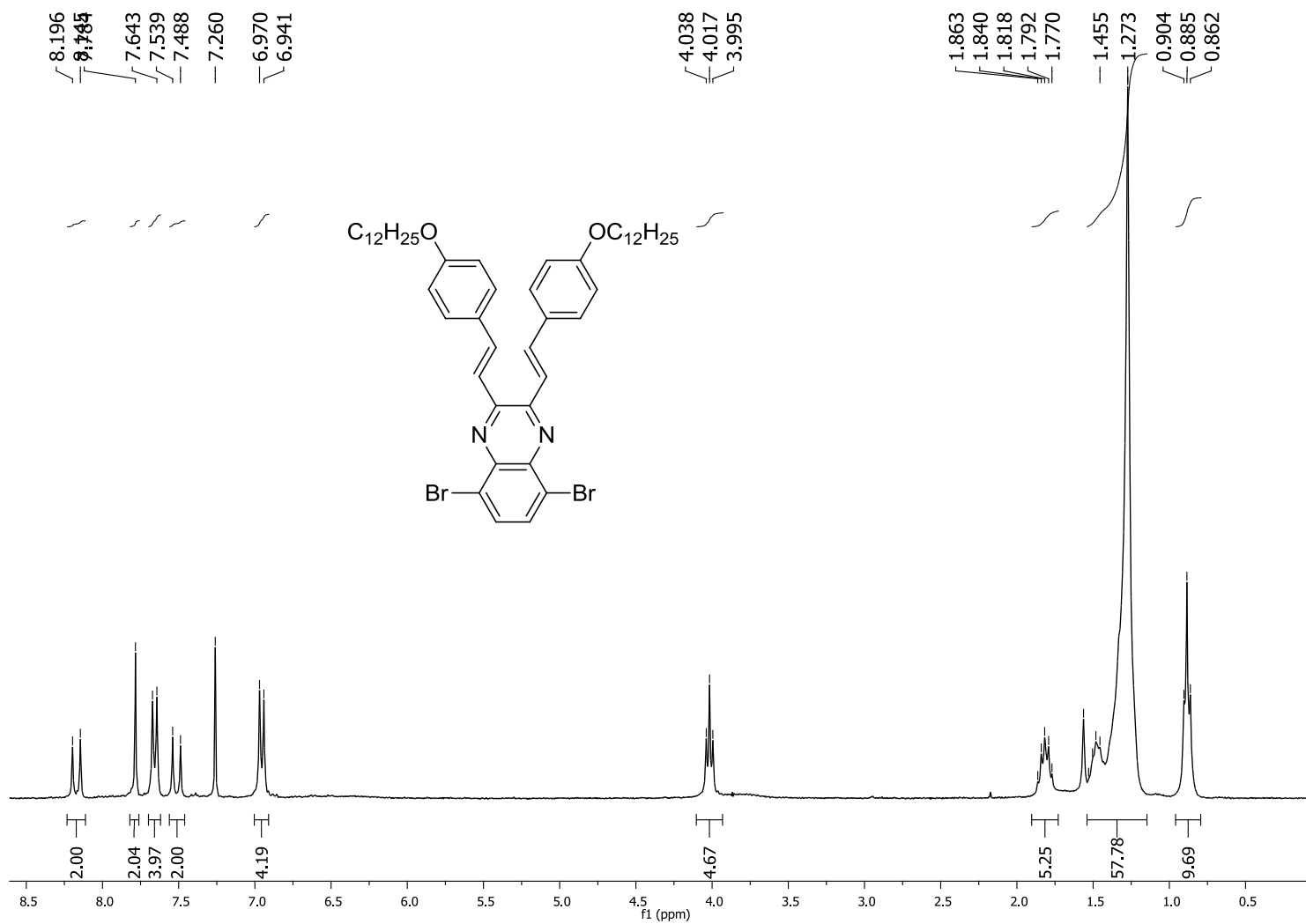
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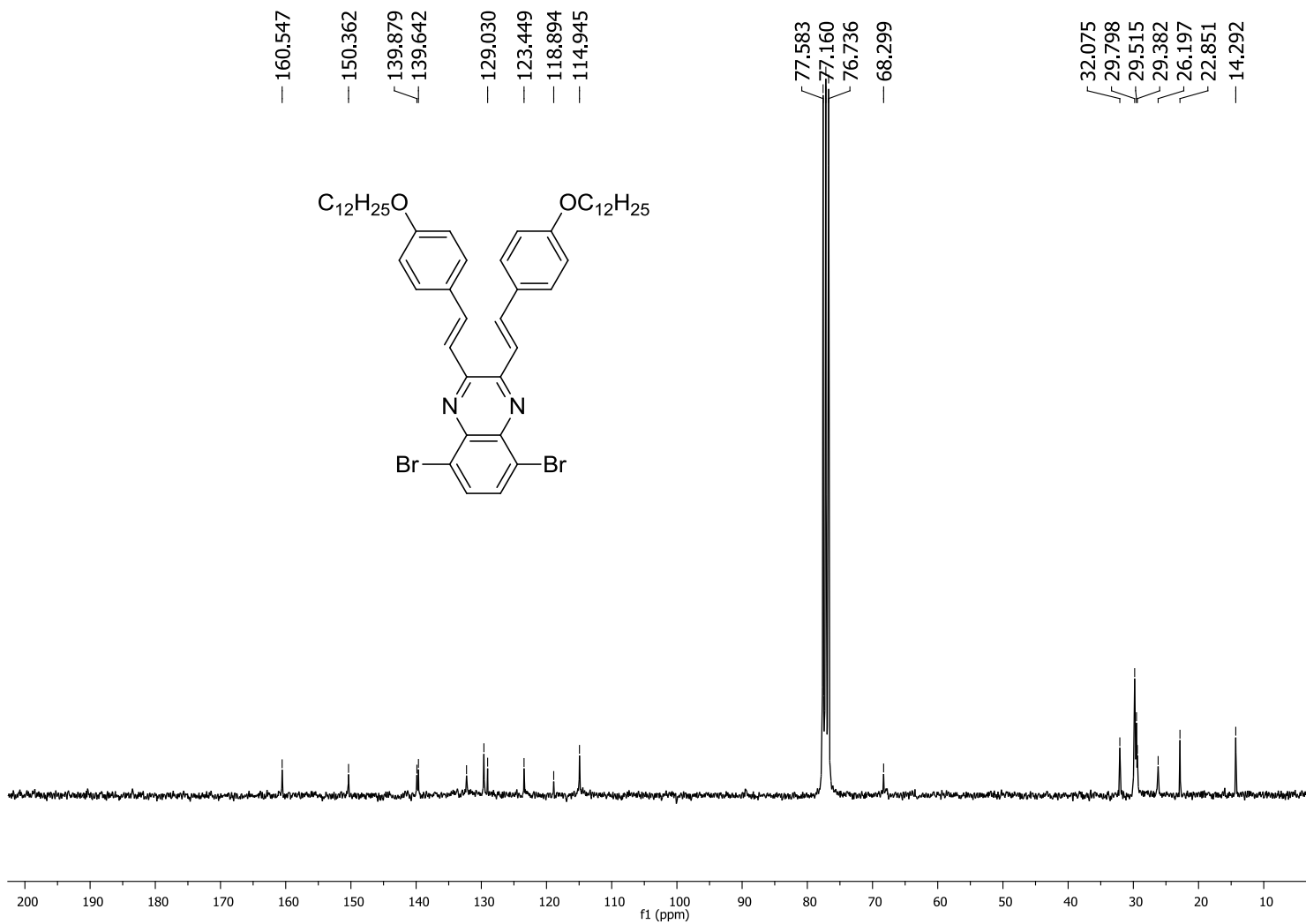
**Fig. S12.** APT spectrum (75 MHz, CDCl<sub>3</sub>) of **M2**



**Fig. S13.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **M3**

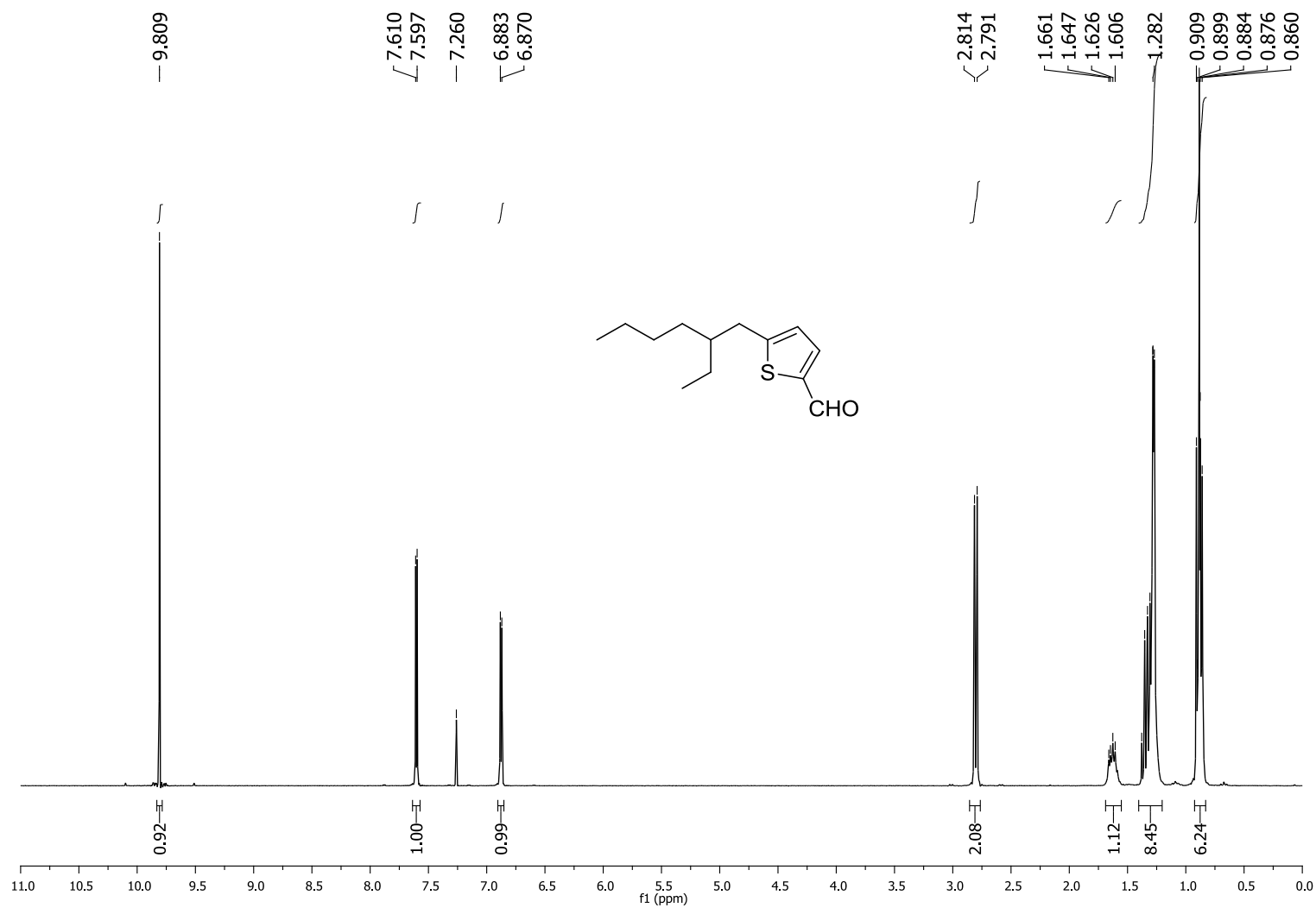


**Fig. S14.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **M3**

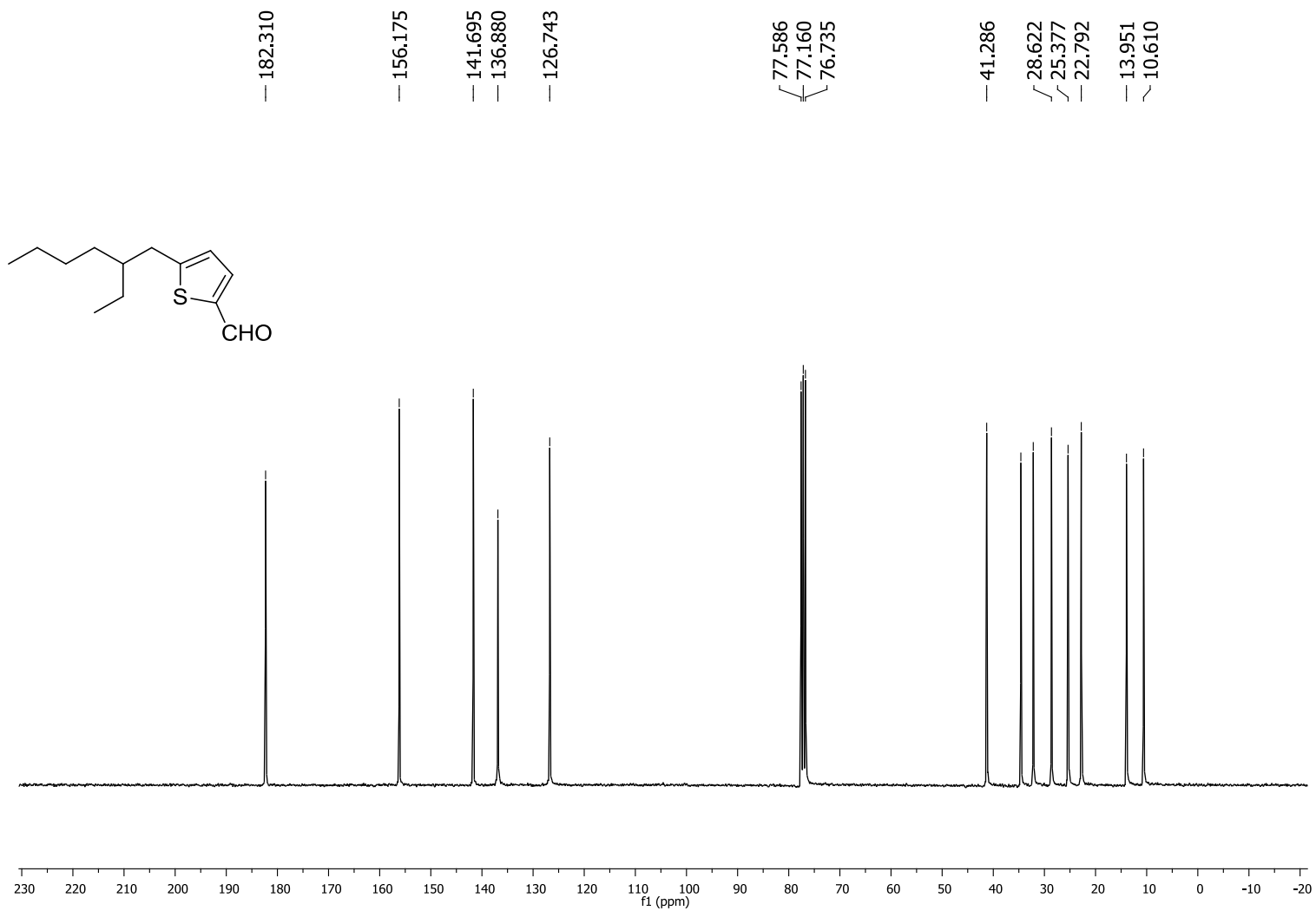




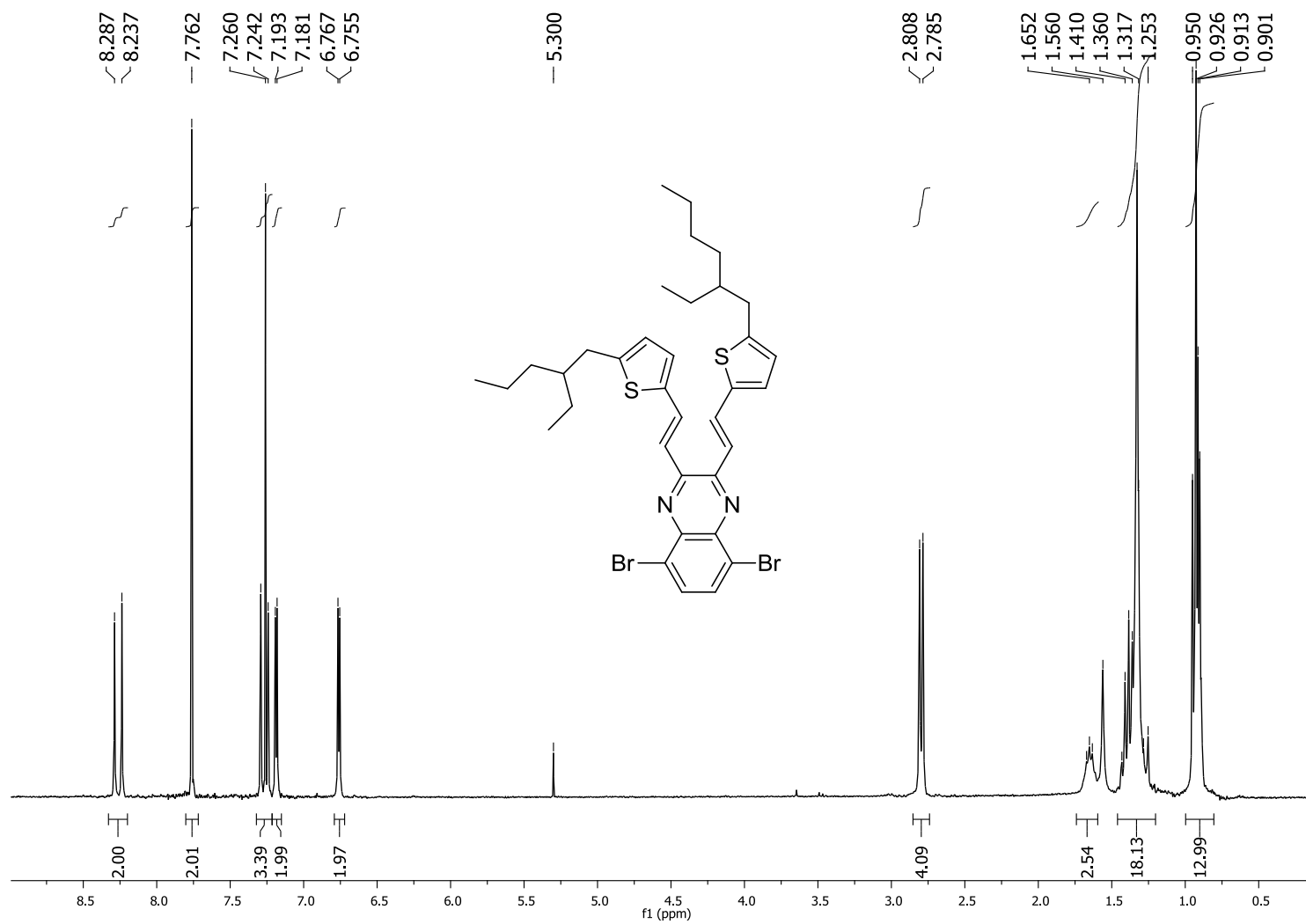
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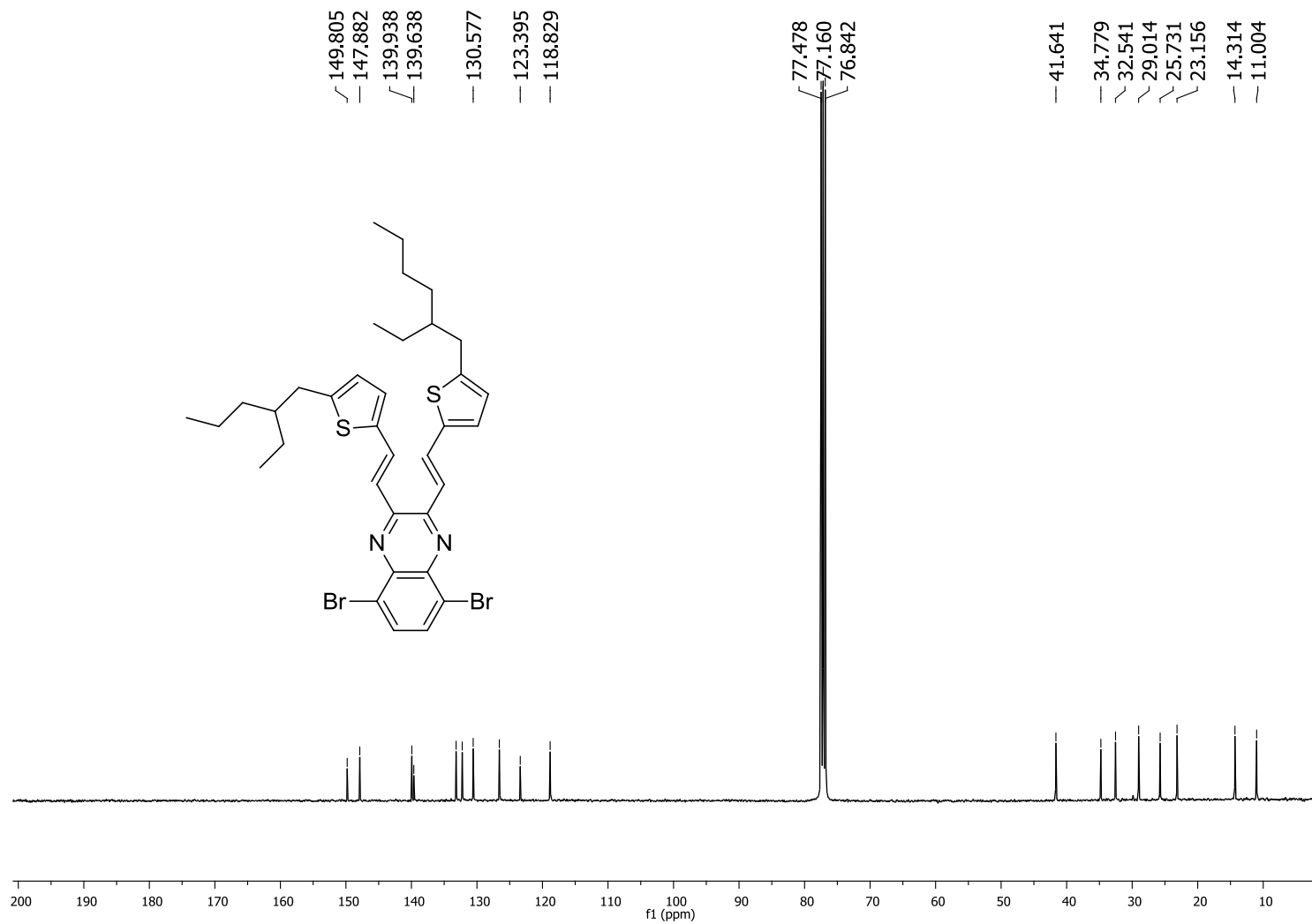
**Fig. S16.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **A4**



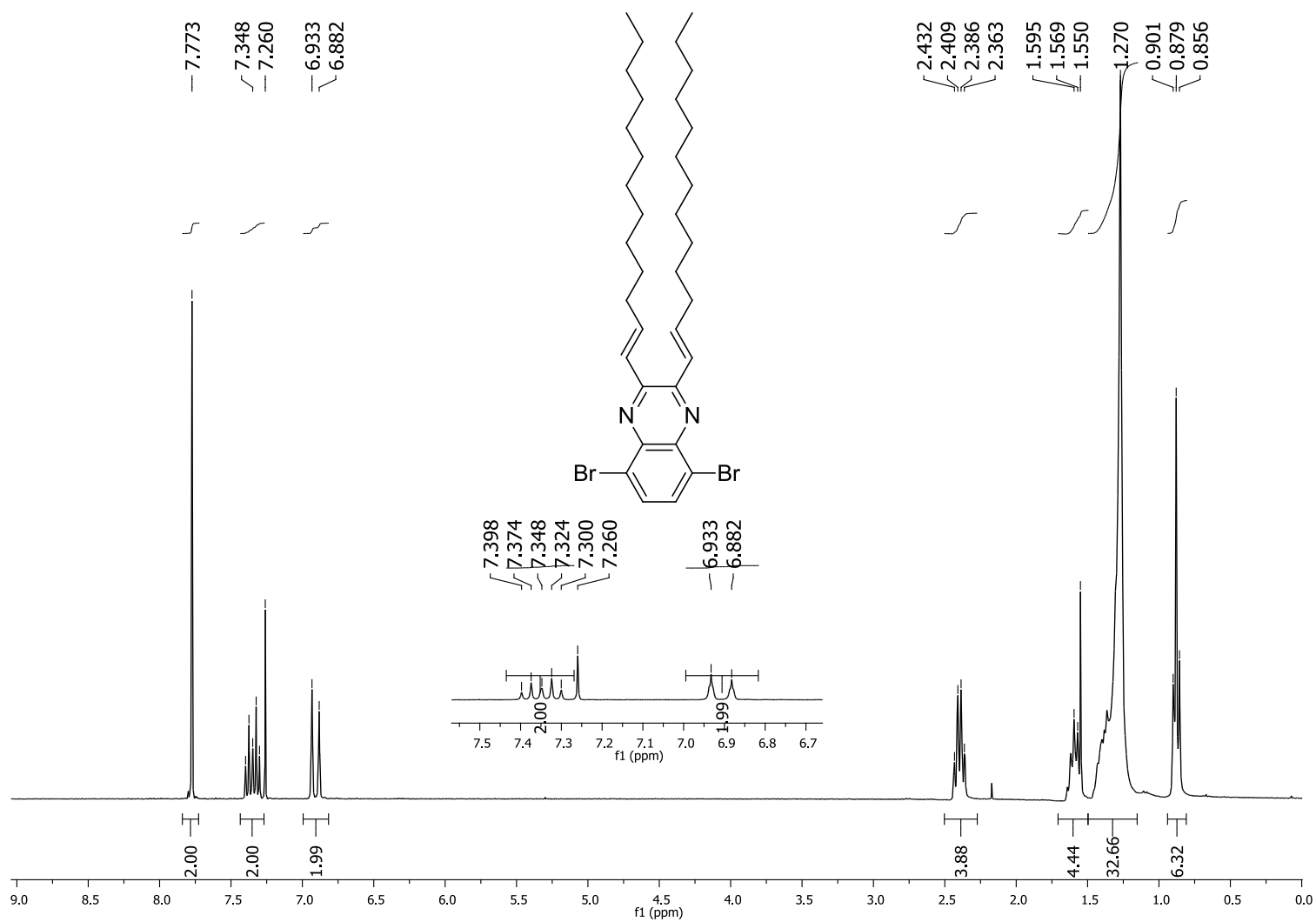
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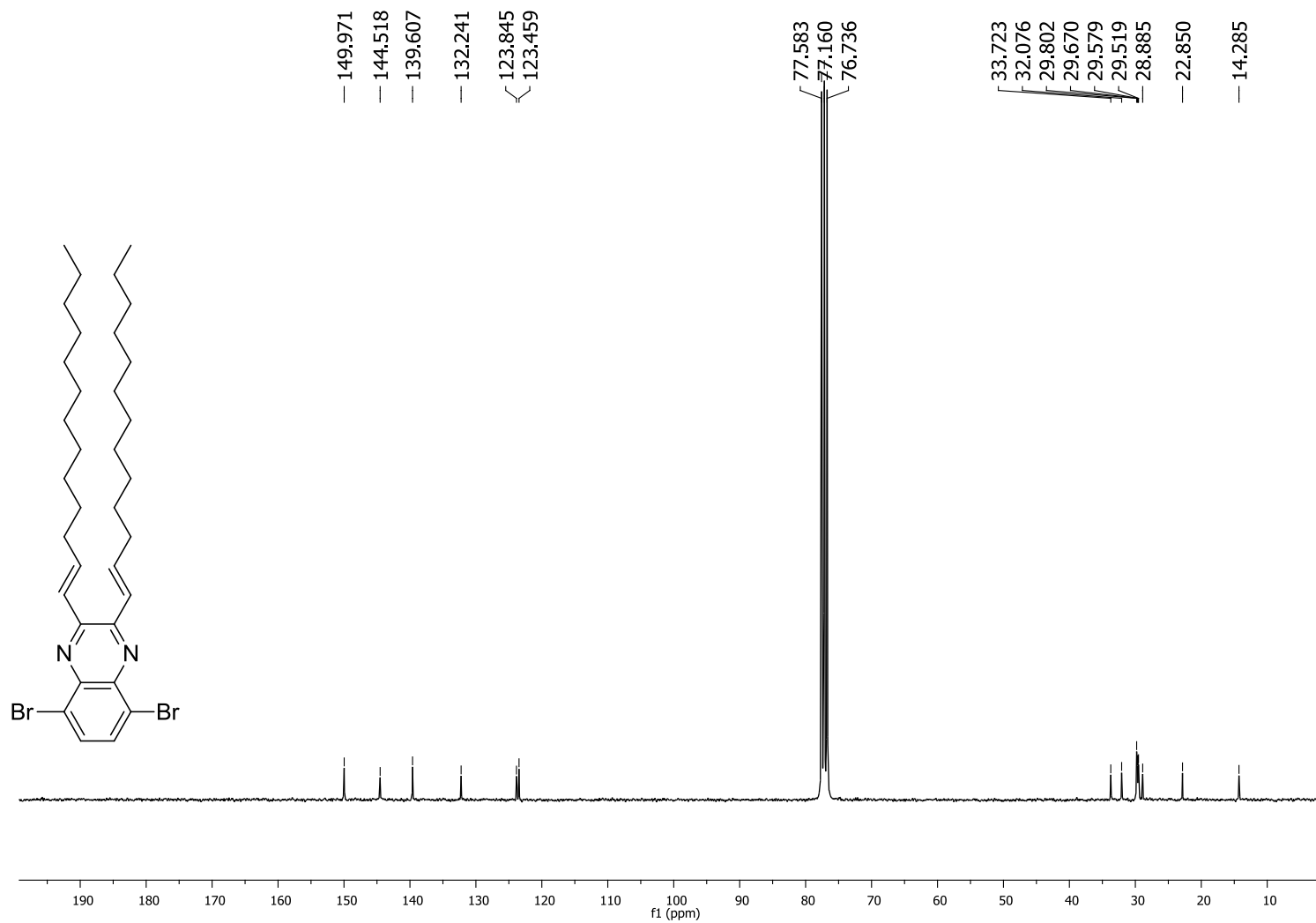
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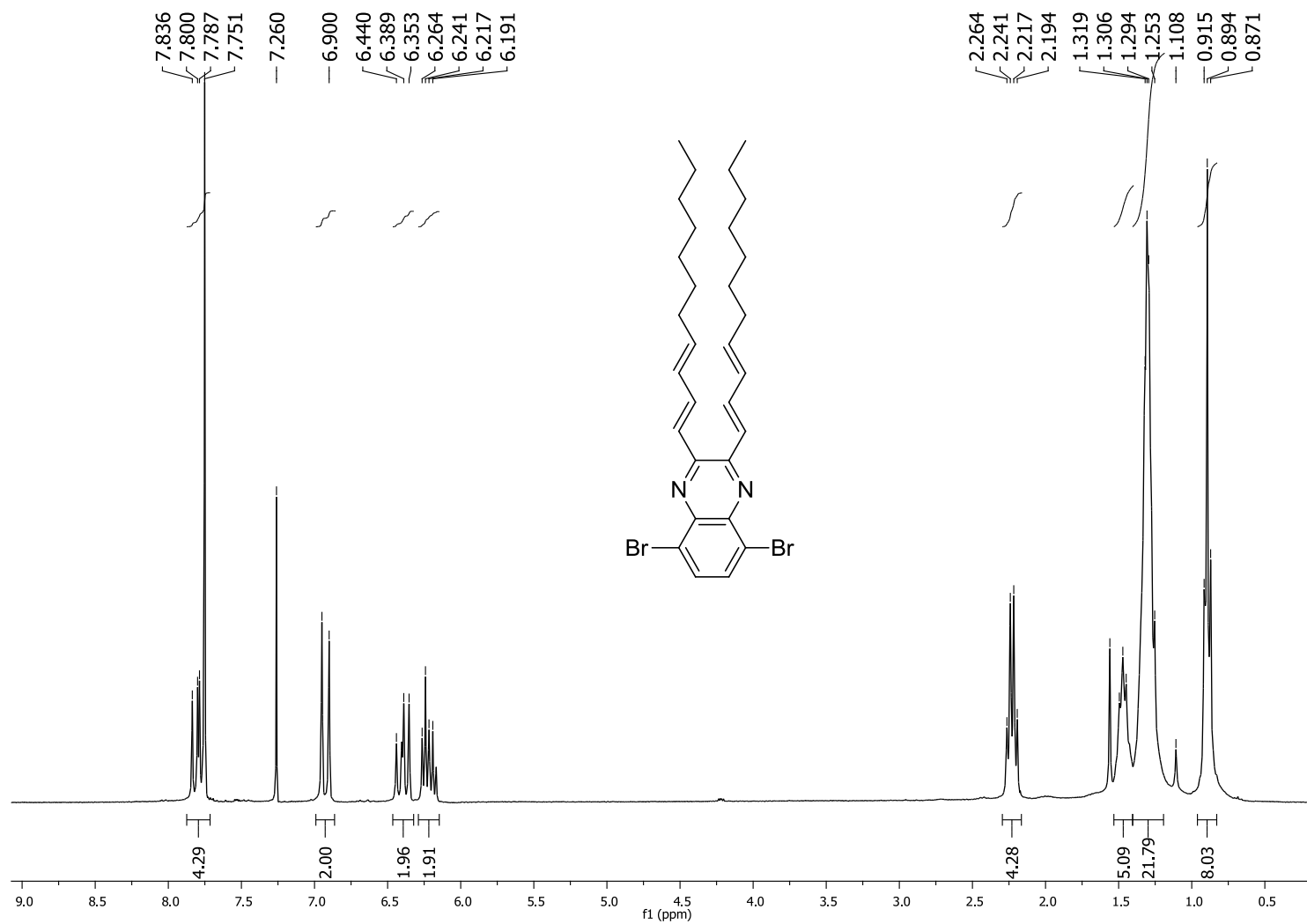
**Fig. S19.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **M5**



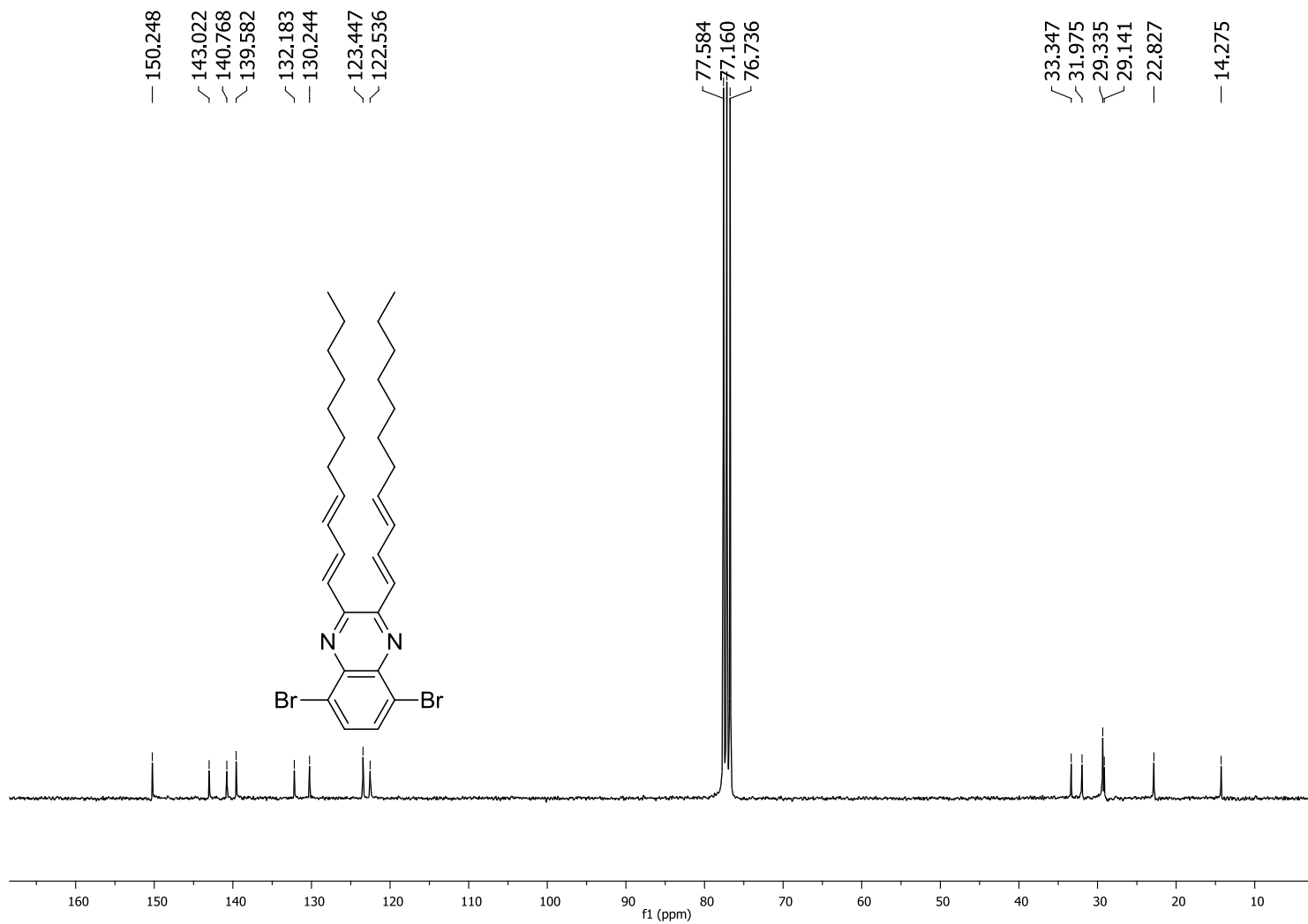
**Fig. S20.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **M5**



**Fig. S21.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **M6**

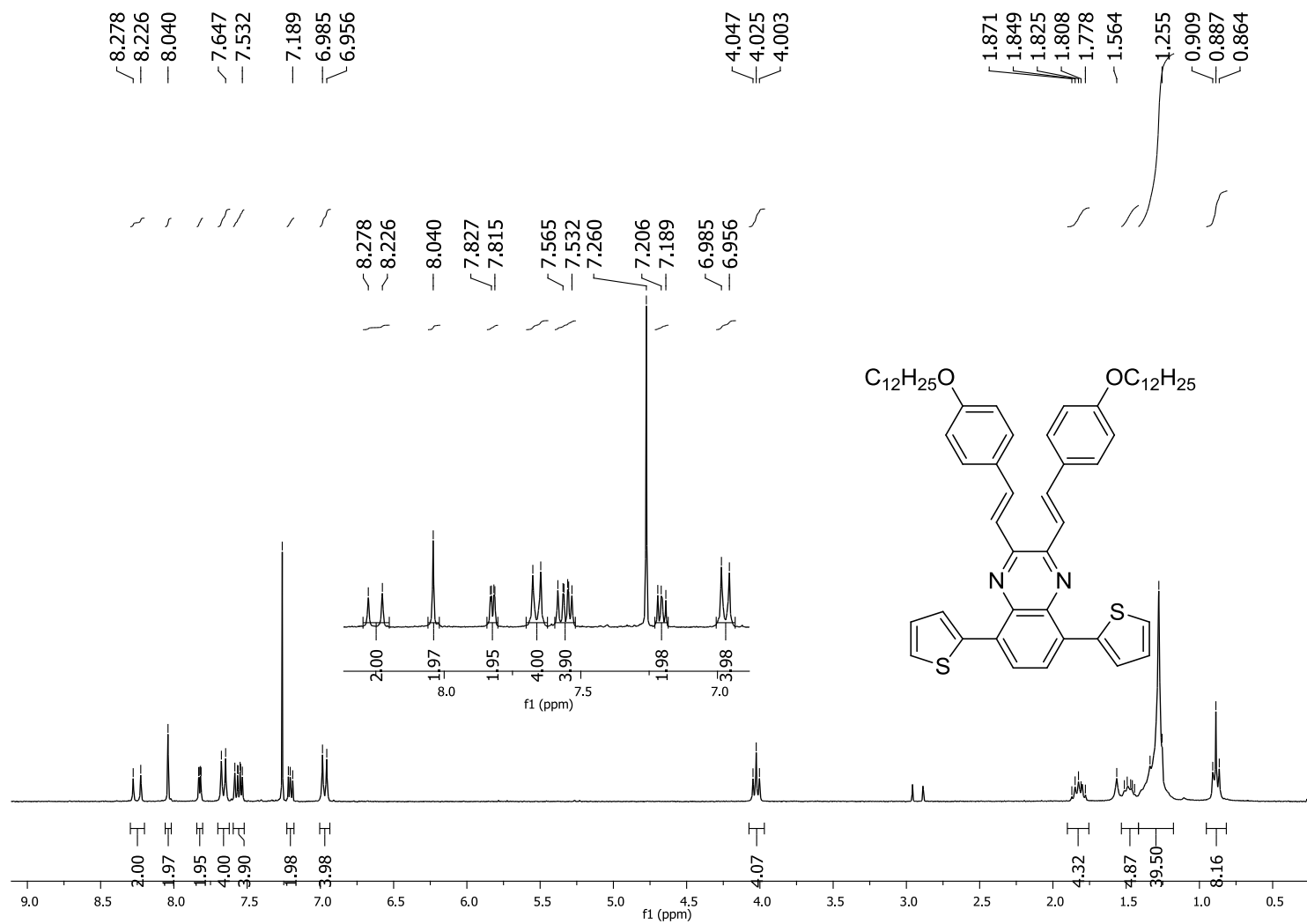


**Fig. S22.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **M6**

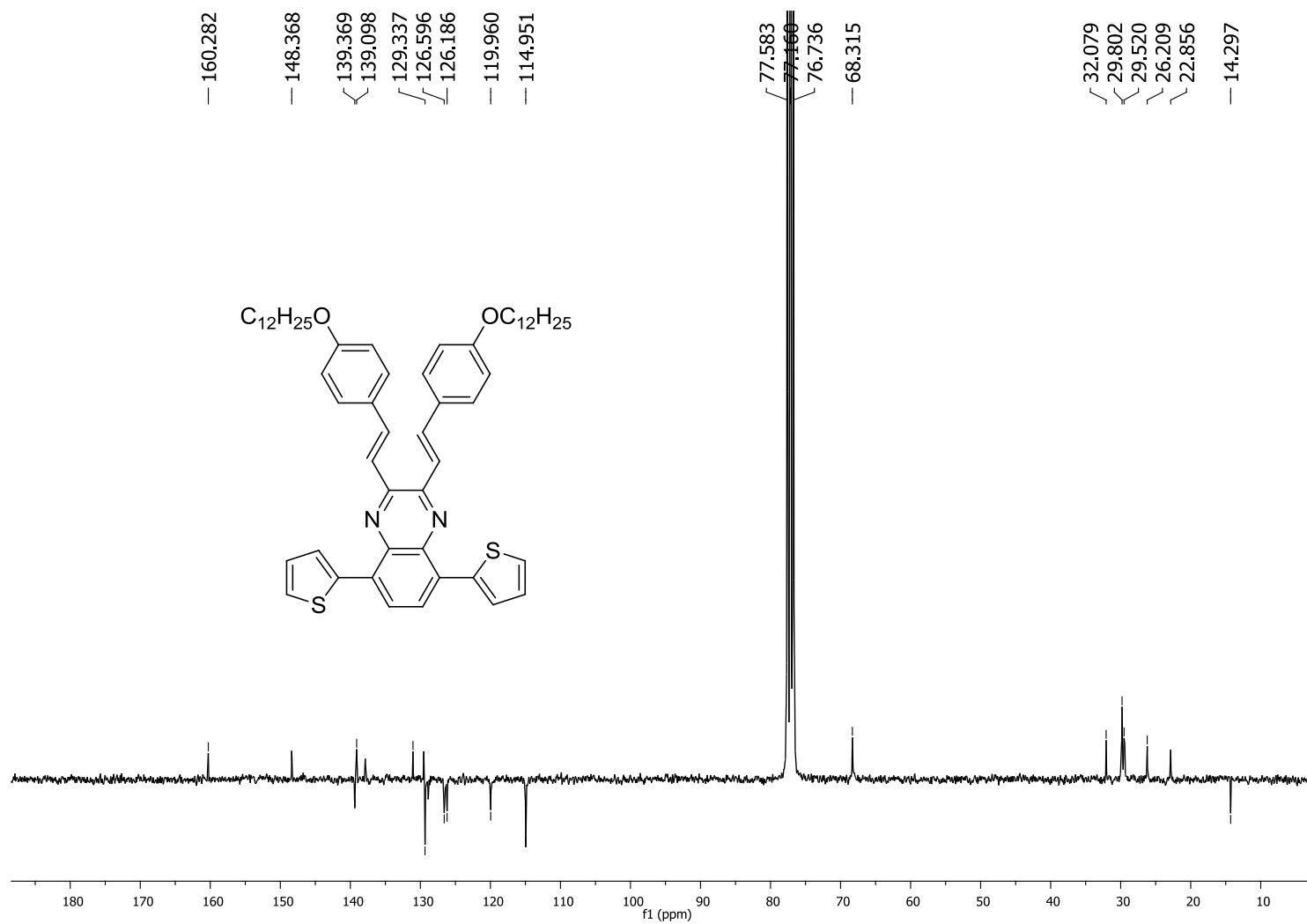




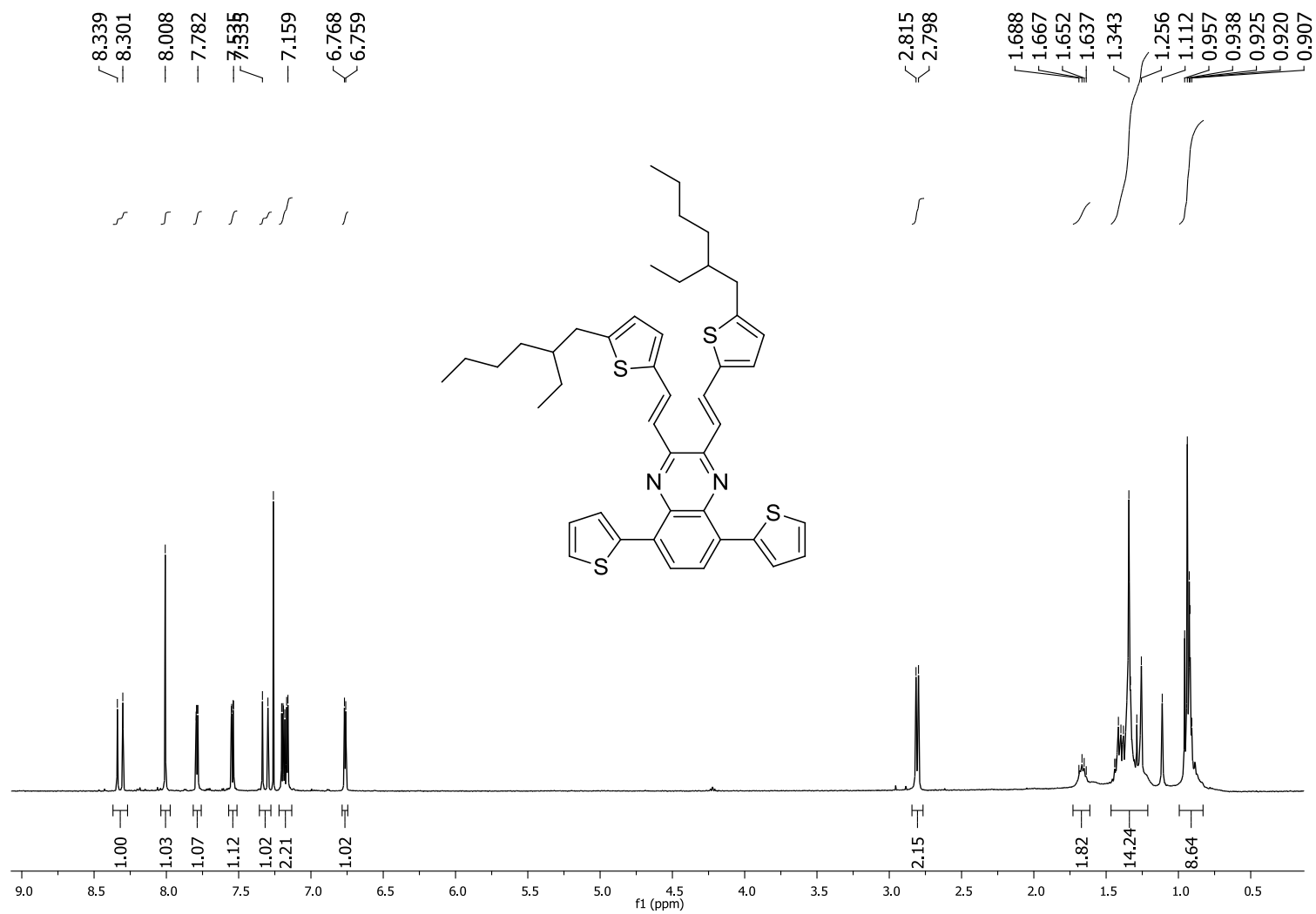
**Fig. S23.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **T1**



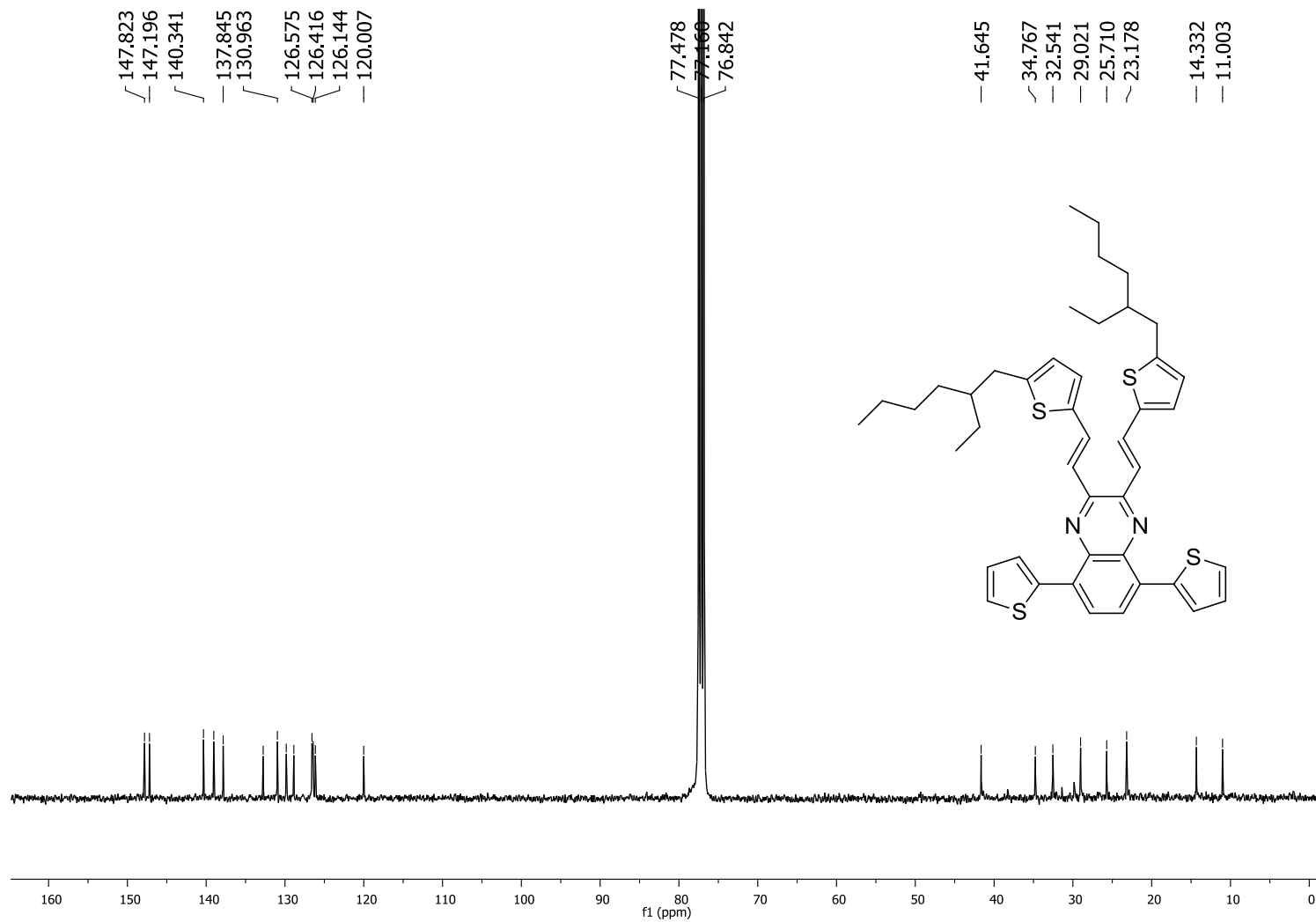
**Fig. S24.** APT spectrum (75 MHz, CDCl<sub>3</sub>) of **T1**



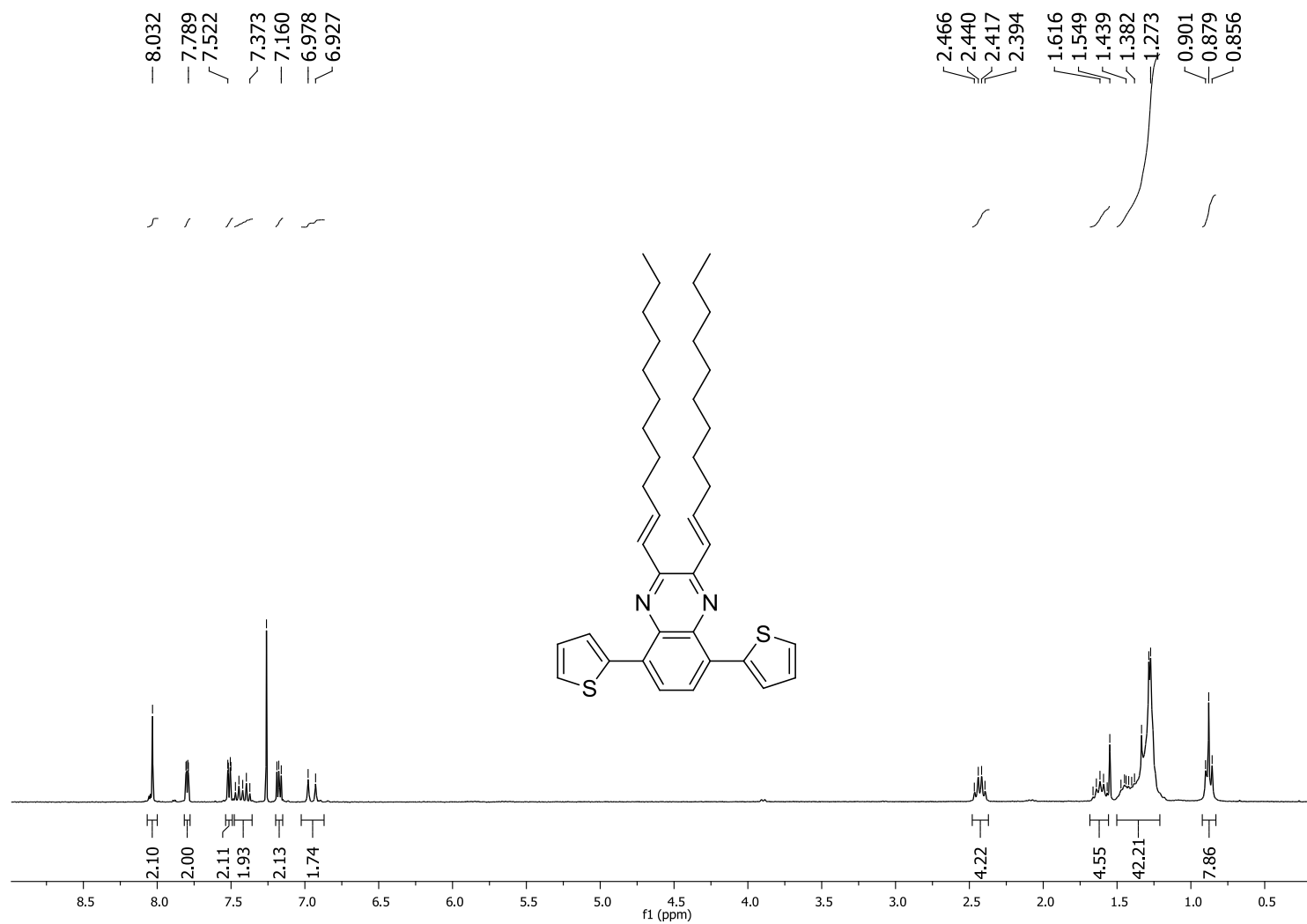
**Fig. S25.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **T2**



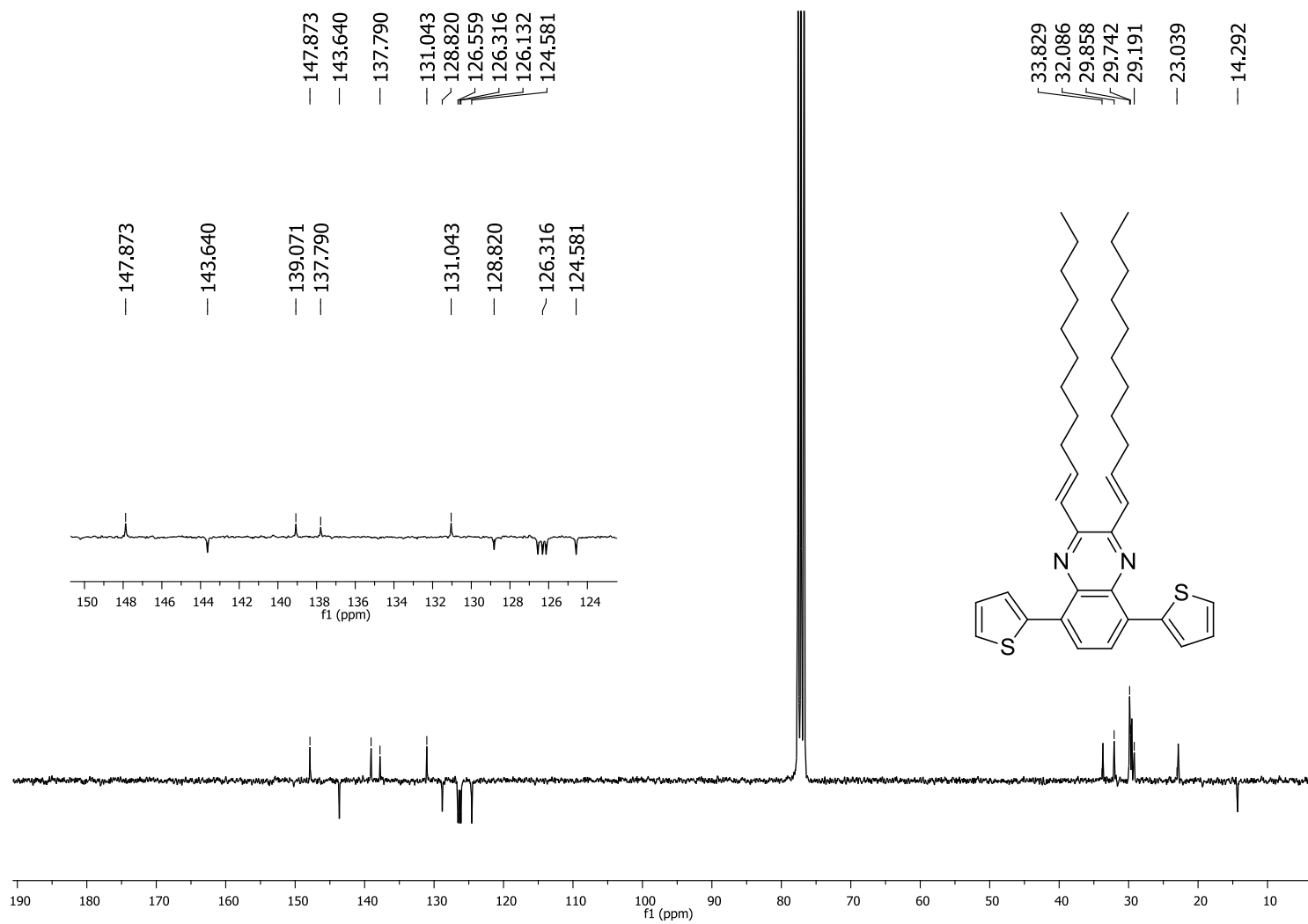
**Fig. S26.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **T2**



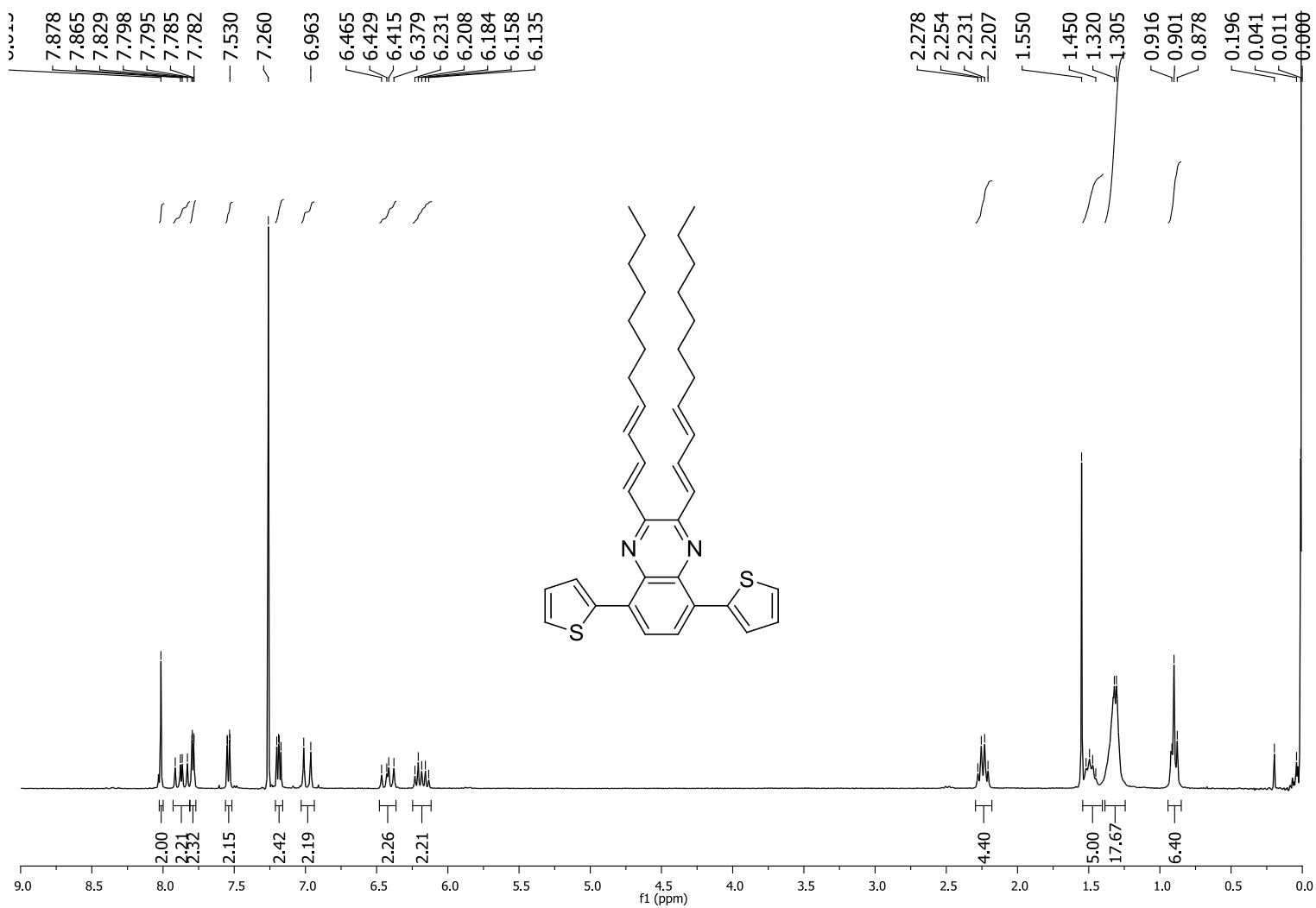
**Fig. S27.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **T3**



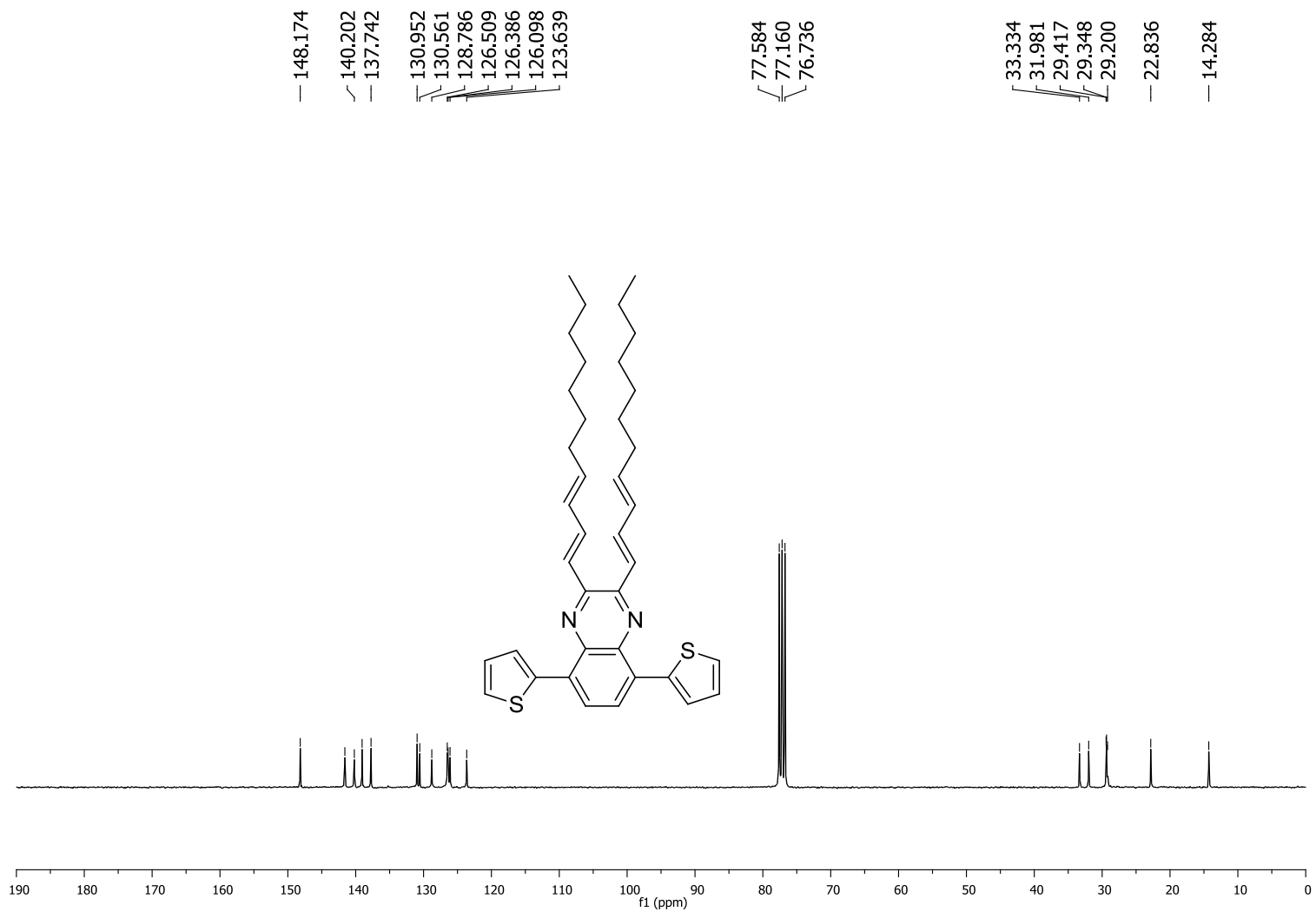
**Fig. S28.** APT spectrum (75 MHz, CDCl<sub>3</sub>) of **T3**



**Fig. S29.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **T4**

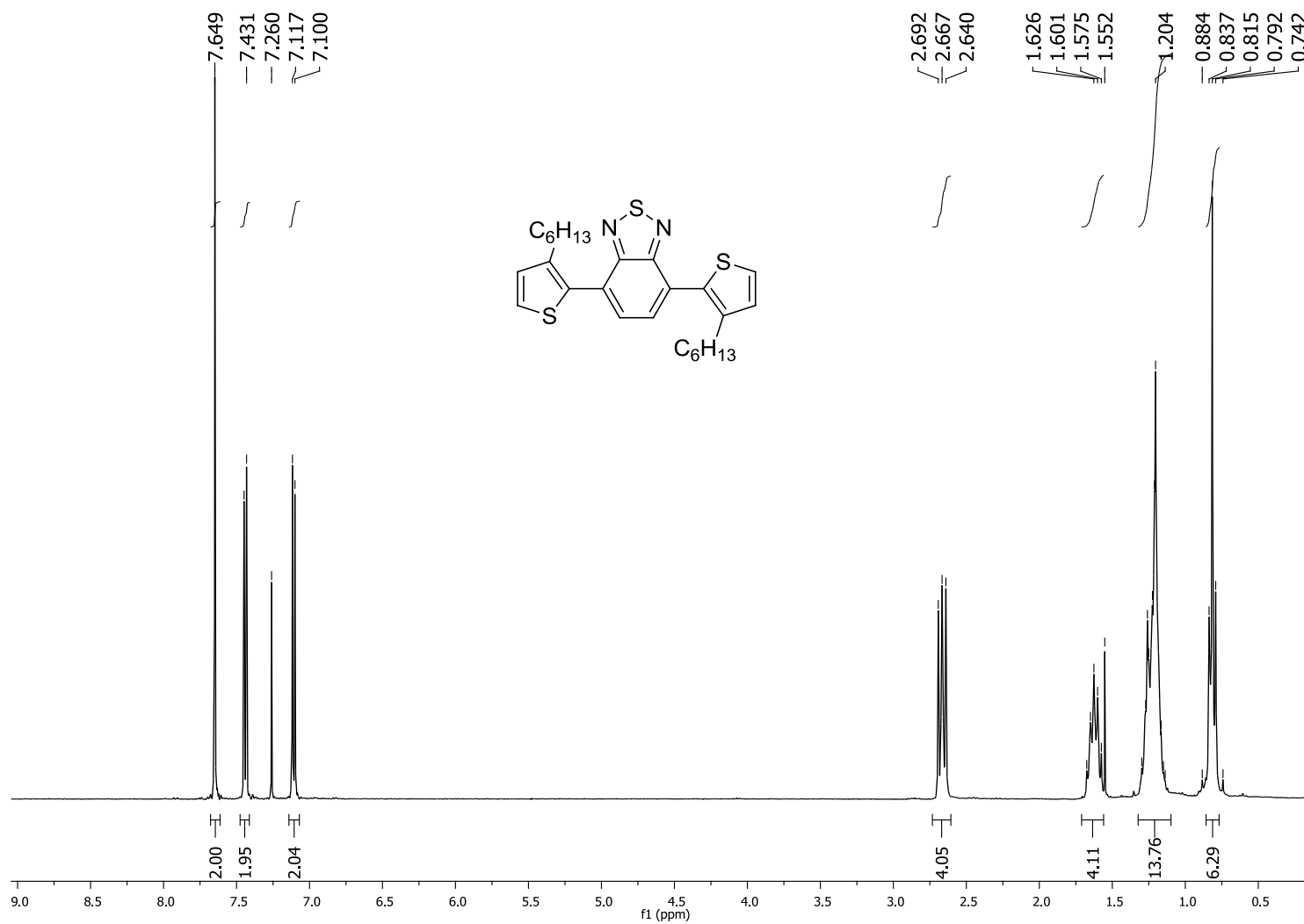


**Fig. S30.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **T4**

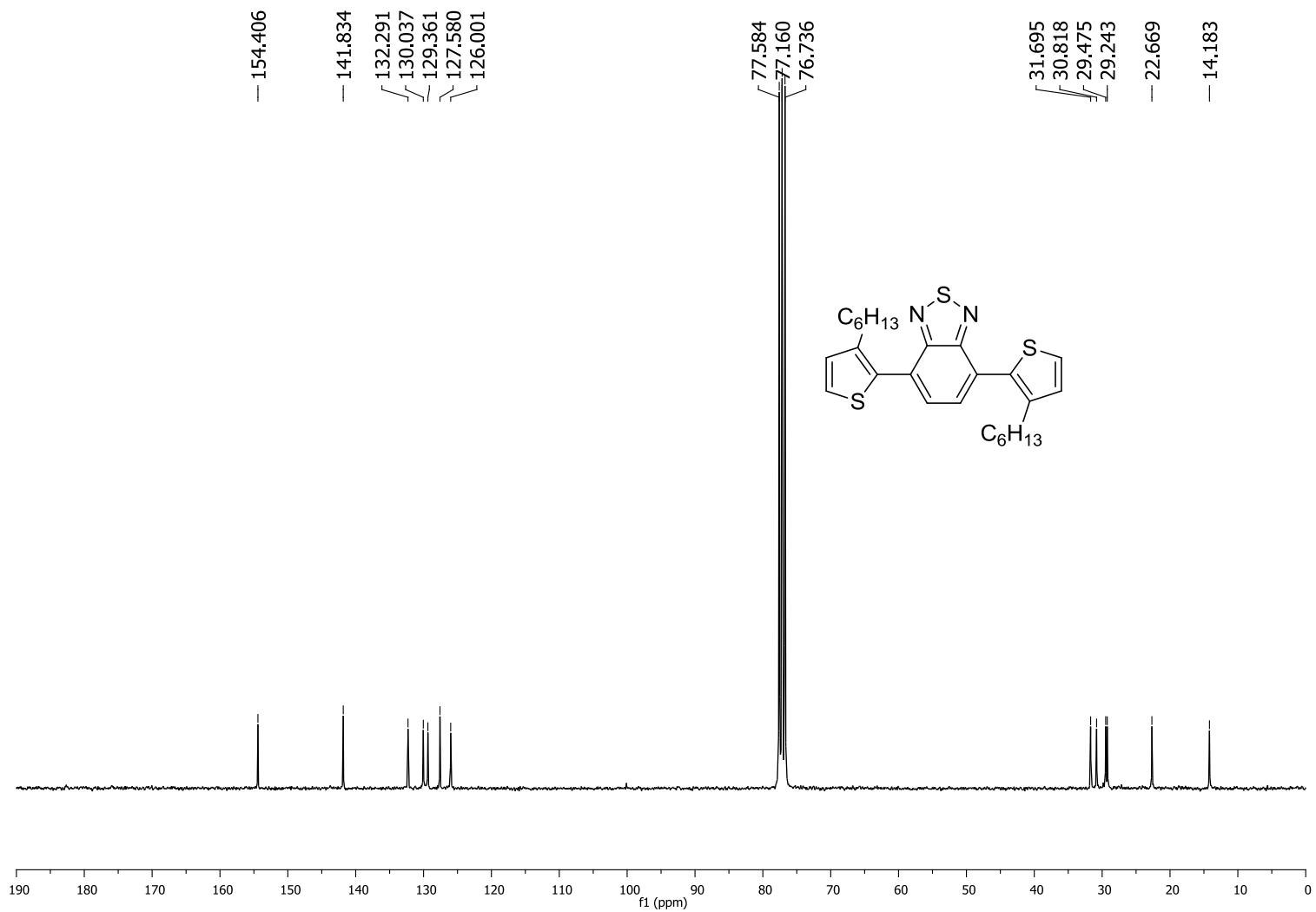




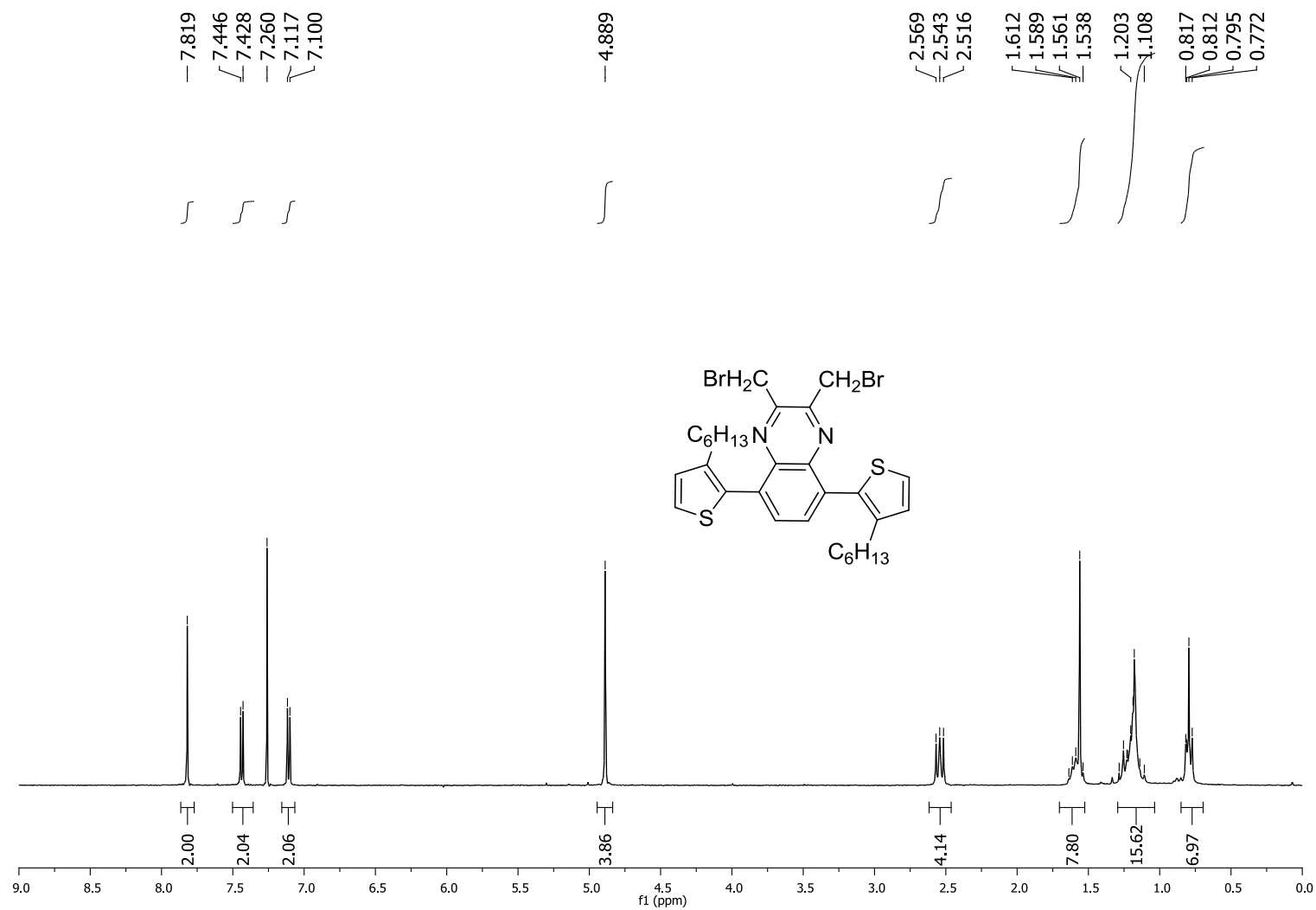
**Fig. S31.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **7**



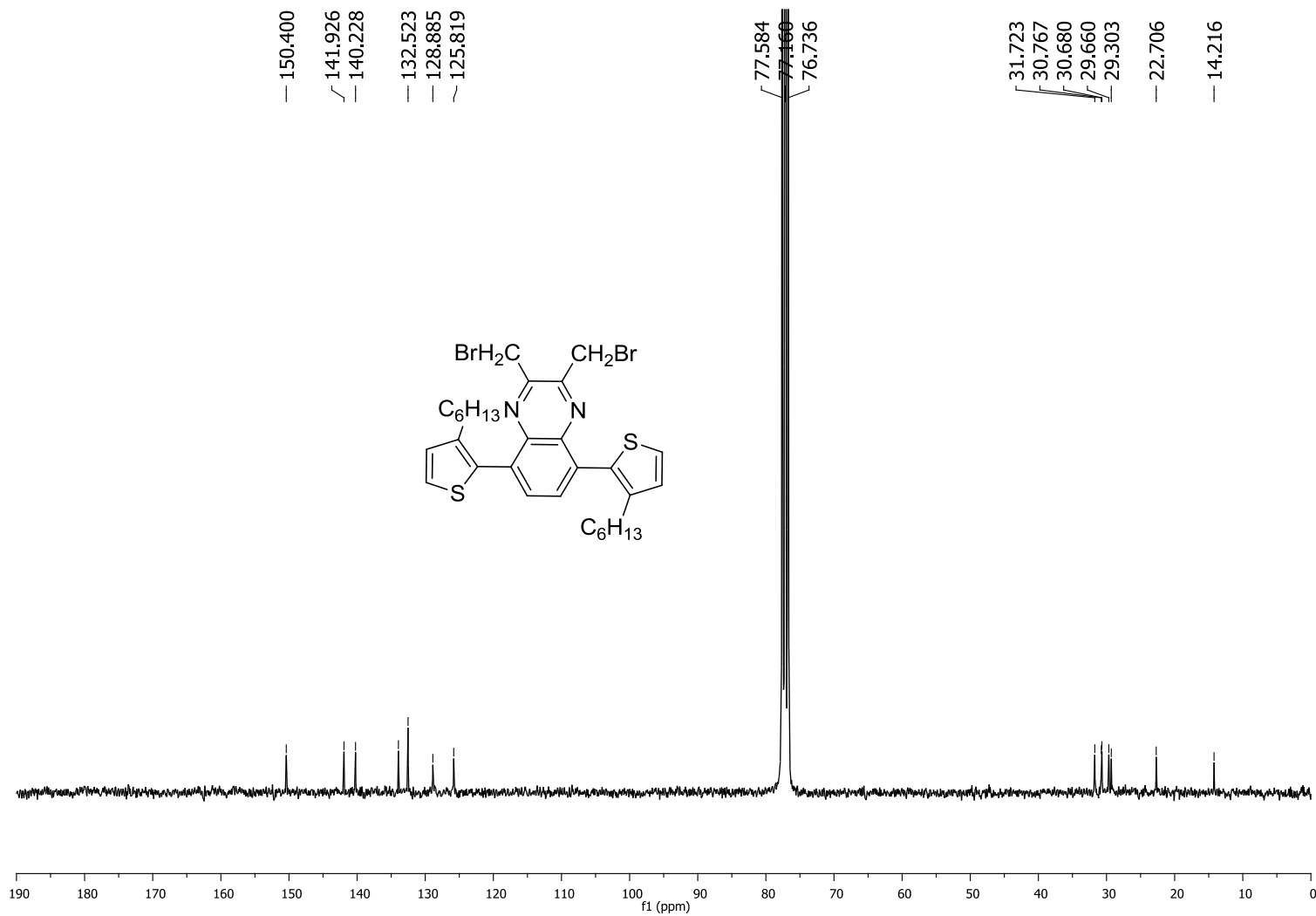
**Fig. S32.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **7**



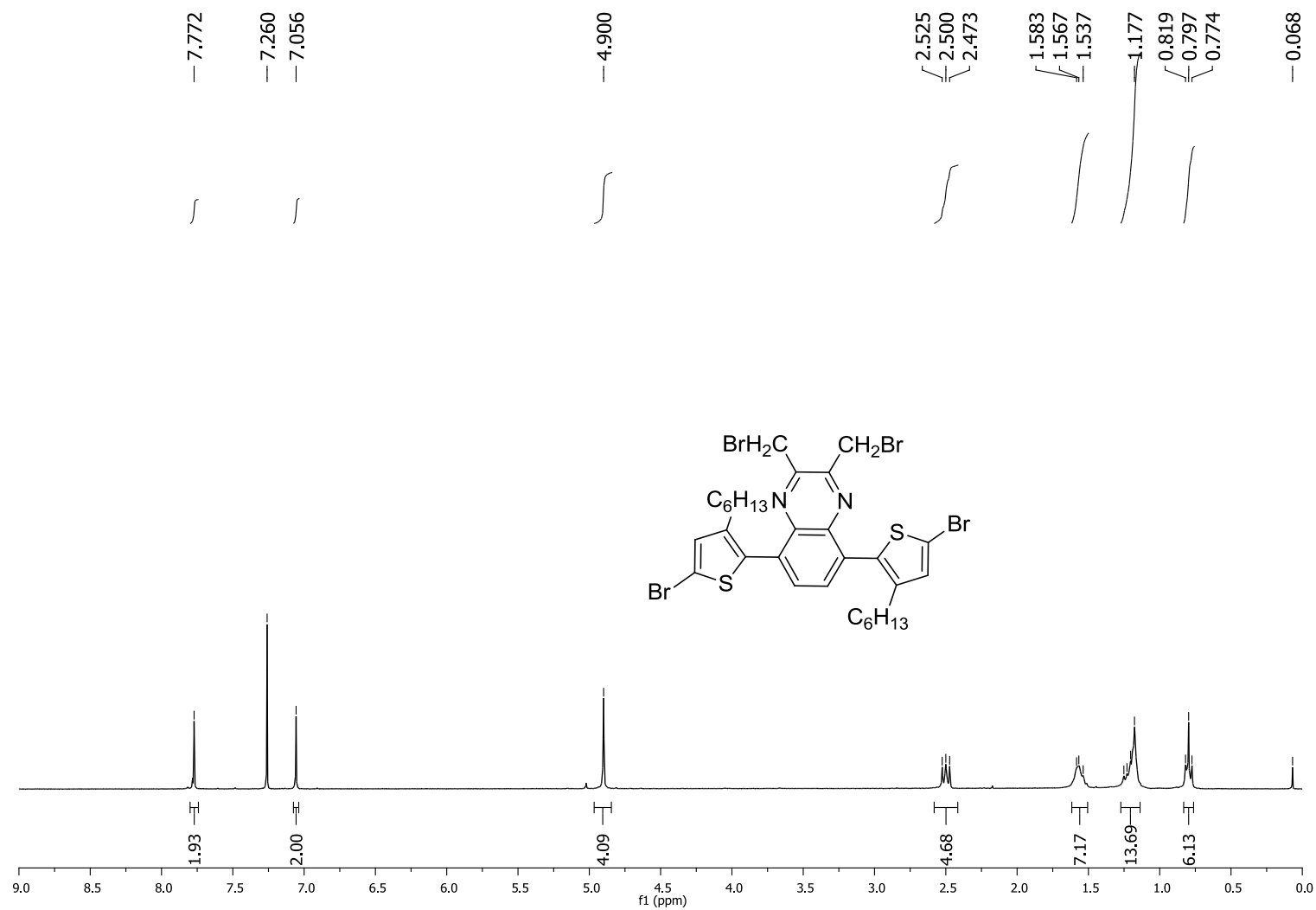
**Fig. S33.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **8**



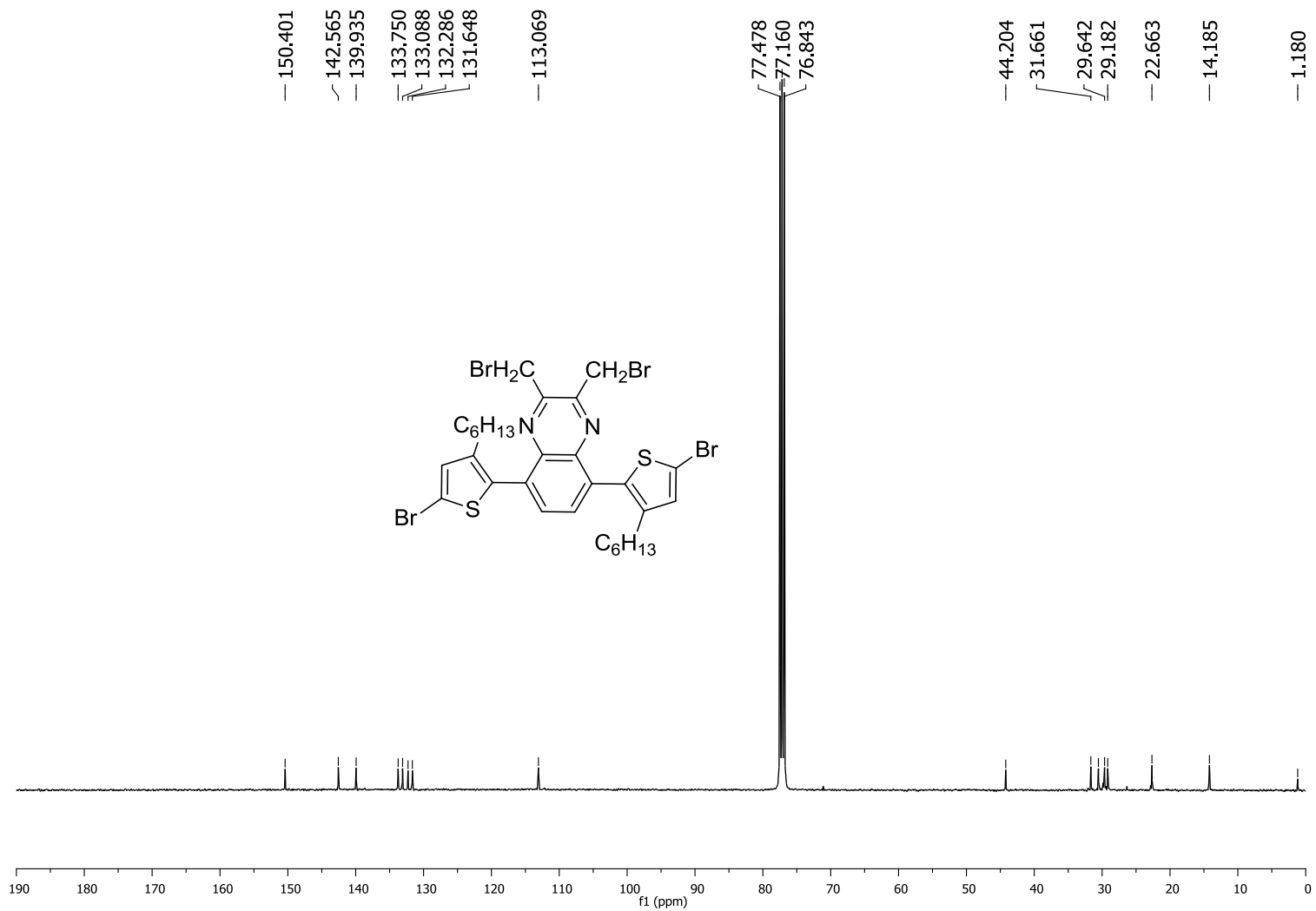
**Fig. S34.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **8**



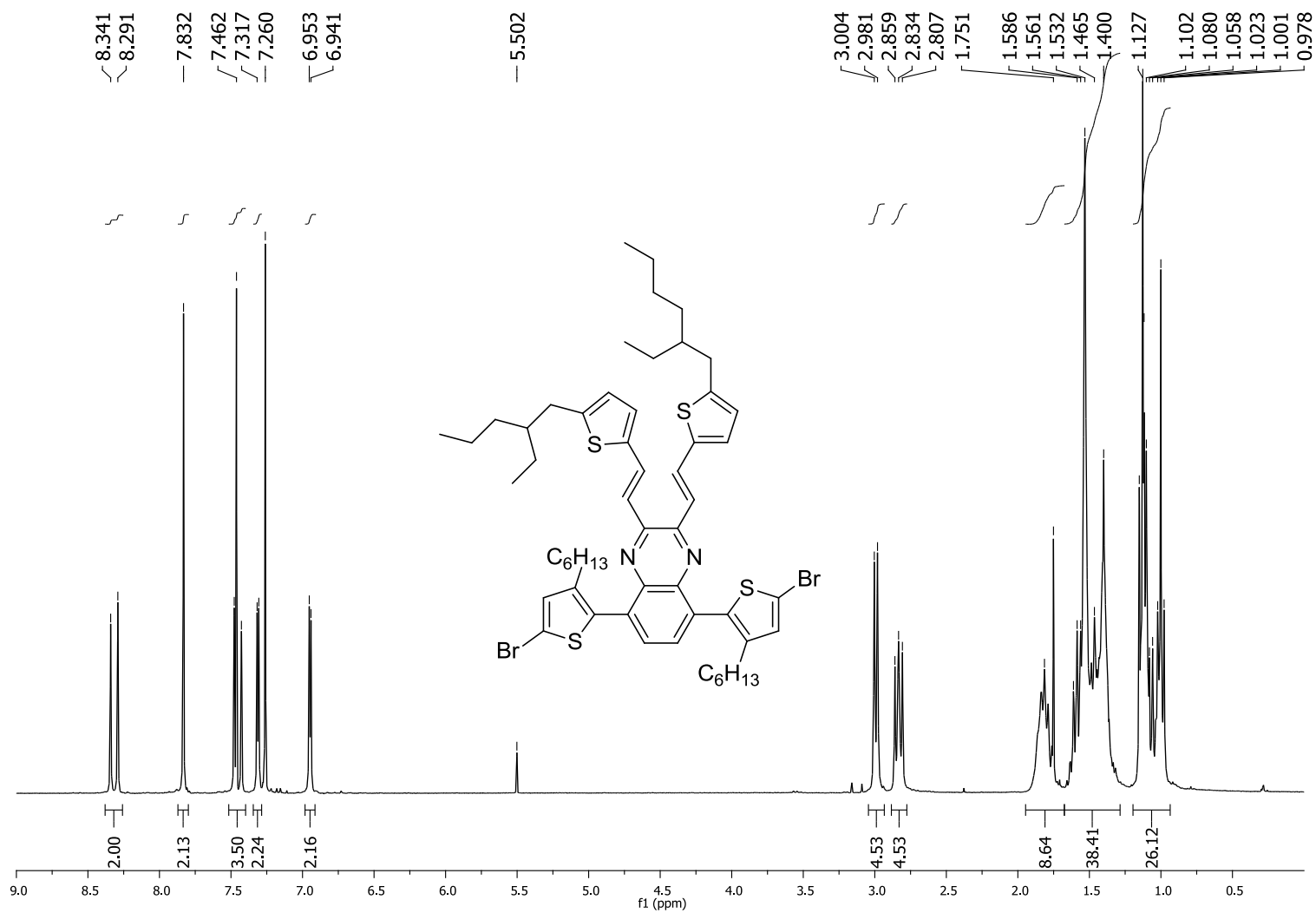
**Fig. S35.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **9**



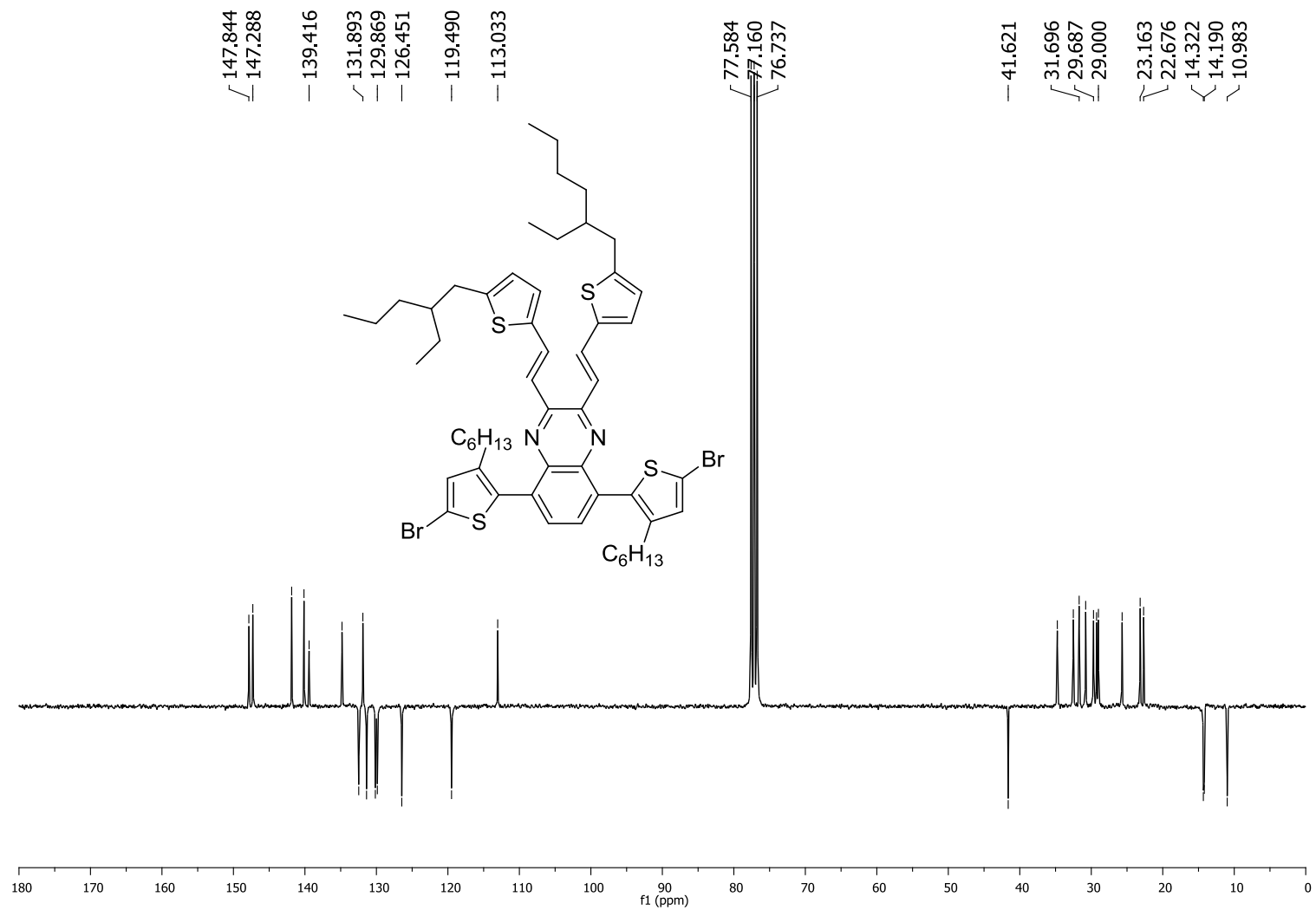
**Fig. S36.**  $^{13}\text{C}$  NMR spectrum (75 MHz,  $\text{CDCl}_3$ ) of **9**



**Fig. S37.**  $^1\text{H}$  NMR spectrum (300 MHz,  $\text{CDCl}_3$ ) of **T5**



**Fig. S38.** APT spectrum (75 MHz, CDCl<sub>3</sub>) of **T5**



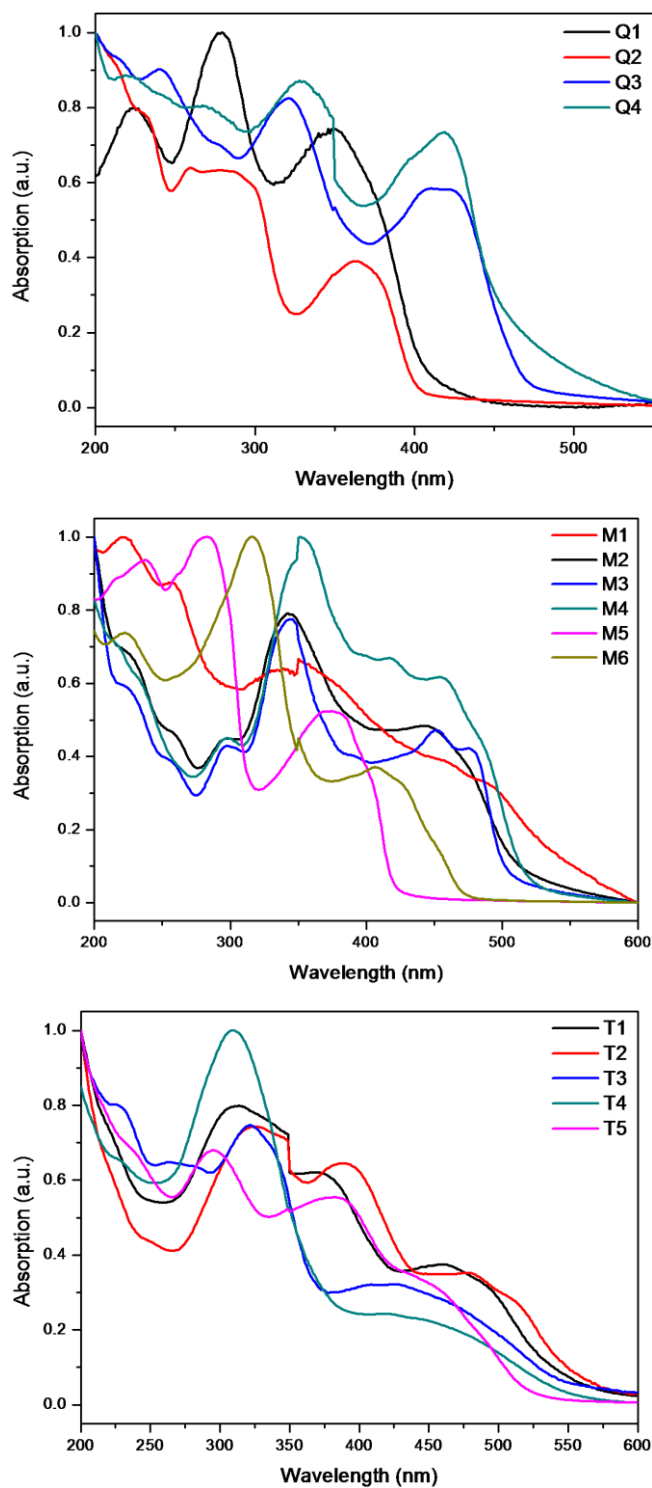


**Table S1** UV-Vis and PL data of all quinoxaline derivatives (**Q1–Q4**), monomers (**M1–M6**) and triads (**T1–T5**)

Product	$\lambda_{\text{max}}$ (log $\epsilon$ )	$\lambda_{\text{max}}$ (nm)	Onset (nm)	$E_g$ (opt) (eV)	$\lambda_{\text{max}}$ (nm)	Side chain
	UV-vis (CHCl <sub>3</sub> , nm)	(film)			PL (CHCl <sub>3</sub> , nm)	
<b>Q1</b>	268 (4.554)/ 333 (3.753)	224/280/349	426	2.91	<sup>a</sup>	CH <sub>2</sub> Br
<b>Q2</b>	254 (4.402)/ 285 (4.348)/ 358 (4.085)	260/277/363	410	3.02	<sup>a</sup>	Ph
<b>Q3</b>	262 (4.238)/ 316 (4.355)/ 401 (4.085)	328/419	472	2.63	461	Th
<b>Q4</b>	270 (4.068)/ 324 (4.314)/ 420 (4.100)	240/321/410	477	2.60	472	2EH-Th
<b>M1</b>	292 (4.382)/ 341 (4.857)/ 431 (4.528)	220/257/350			495	Th*
<b>M2</b>	290 (4.300)/ 336 (4.661)/ 428 (4.331)	343/443	544	2.28	501	MeO-Ph*
<b>M3</b>	292 (4.271)/ 338 (4.636)/ 431 (4.315)	224/345/451	512	2.42	383/498	C <sub>12</sub> OPh*
<b>M4</b>	296 (3.782)/ 345 (4.091)/ 415 (3.949)/ 448 (3.867)	298/351/456	530	2.34	475	2EH-Th*
<b>M5</b>	284 (4.280)/ 376 (3.780)	238/283/370	430	2.88	414	C <sub>11</sub> *
<b>M6</b>	319 (4.065)/ 408 (3.363)	223/316/407	487	2.55	463	C <sub>7</sub> **
<b>T1</b>	363 (4.304)/ 442 (3.931)	314/368/460	575	2.16	578	C <sub>12</sub> OPh*
<b>T2</b>	310 (3.957)/ 380 (4.000)/ 454 (3.708)	325/390/478	596	2.08	580	2EH-Th*
<b>T3</b>	311 (4.463)/ 410 (3.902)	264/322/427	606	2.05	552	C <sub>11</sub> *
<b>T4</b>	309 (4.384)/ 433 (3.622)	309/453	604	2.05	568	C <sub>7</sub> **
<b>T5</b>	290 (4.541)/ 364 (4.357)	296/383/457	554	2.24	553	2EH-Th*

<sup>a</sup> Not measured; \* Ethenyl linker; \*\* Butadienyl linker.

**Fig. S39.** UV-Vis absorption spectra (in film) of all quinoxaline derivatives (**Q1–Q4**), monomers (**M1–M6**) and triads (**T1–T5**)



**Fig. S40.** PL spectra (normalized, in  $\text{CHCl}_3$  solution) of quinoxaline triads **T1–T5**

