Supporting Information

Tetrathienylethene-based red aggregation-enhanced emission probes: super red-shifted mechanochromic behavior and highly photostable cell membrane imaging

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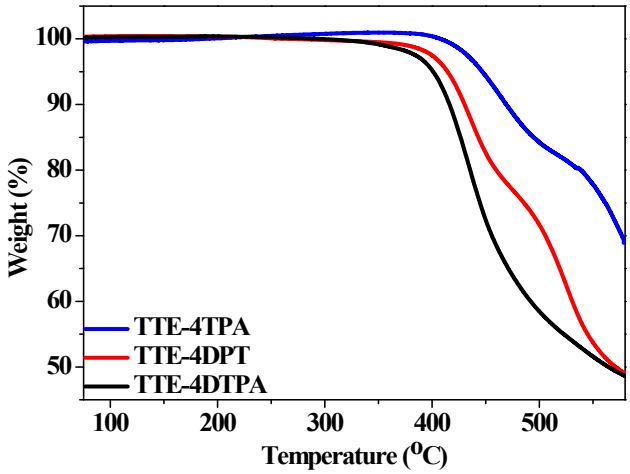


Figure S1. Thermogravimetric analysis (TGA) of **TTE-4TPA**, **TTE-4DPT** and **TTE-4DTPA** with a heating rate at 10 °C/min under N_2 atmosphere.

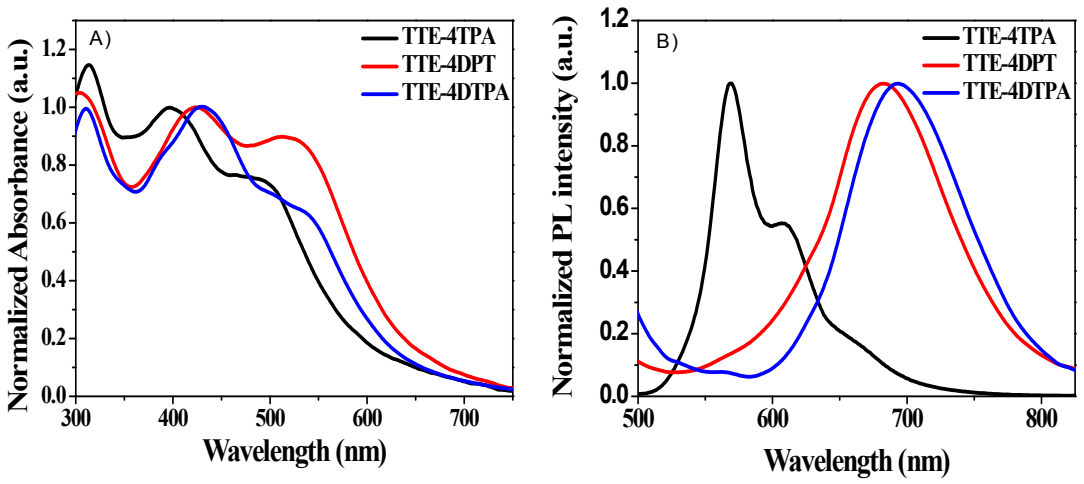


Figure S2. A) The absorption spectra of **TTE-4TPA**, **TTE-4DPT** and **TTE-4DTPA** in films; (B) the emission spectra of **TTE-4TPA**, **TTE-4DPT** and **TTE-4DTPA** in solid states.

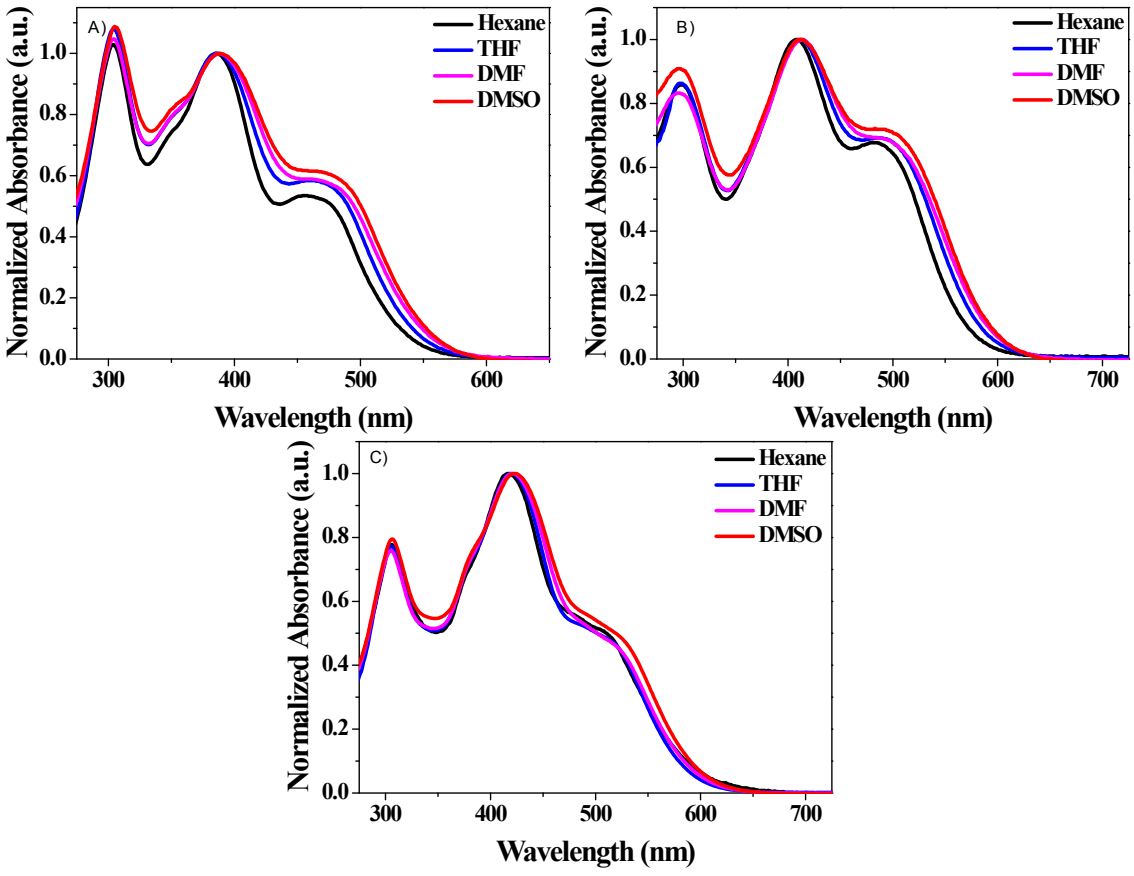


Figure S3. A) The absorption spectra of **TTE-4TPA** in solvents with different polarity; B) The absorption spectra of **TTE-4DPT** in solvents with different polarity; C) The absorption spectra of **TTE-4DTPA** in solvents with different polarity.

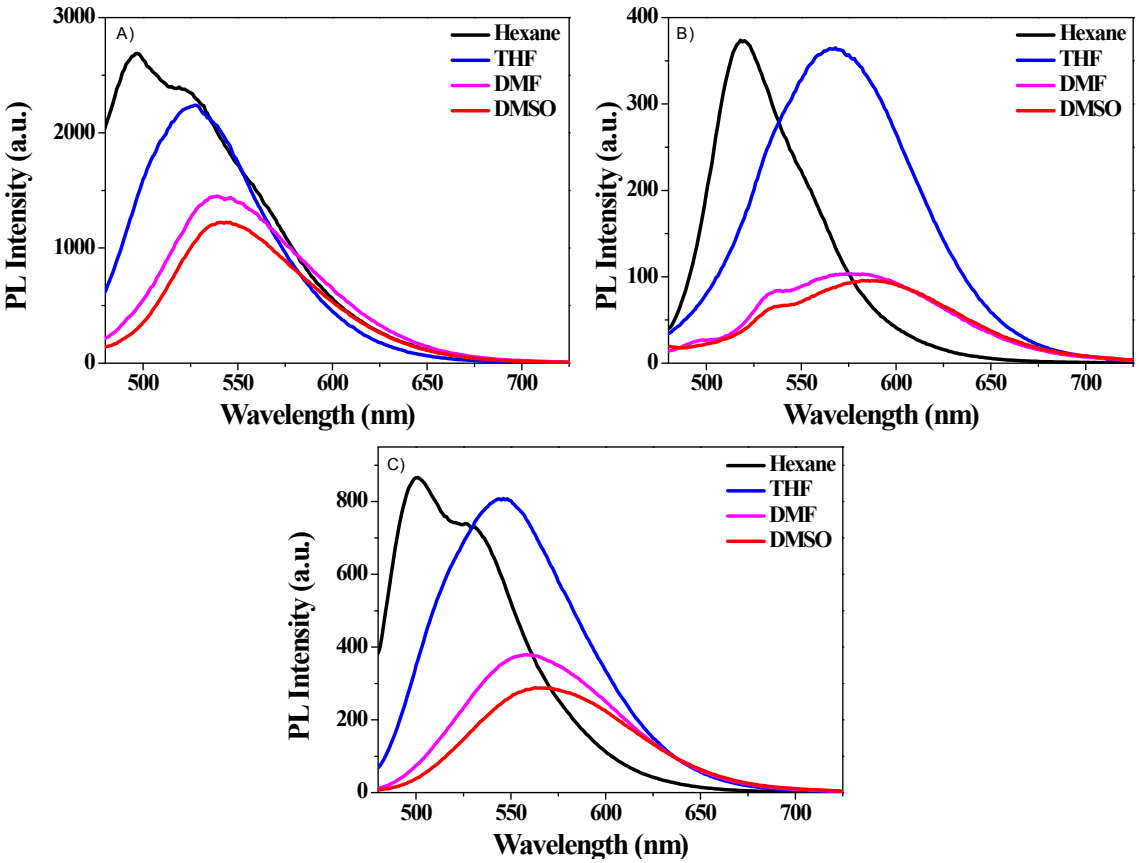


Figure S4. A) Emission spectra of **TTE-4TPA** in solvents with different polarity; B) Emission spectra of **TTE-4DPT** in solvents with different polarity; C) Emission spectra of **TTE-4DTPA** in solvents with different polarity.

Table 1. fluorescence lifetime of **TTE-4TPA**, **TTE-4DPT** and **TTE-4DTPA** in different polar solvents.[a]

Compd	Hexane	THF	DMF	DMSO
TTE-4TPA	3.0 ns	2.6 ns	3.3 ns	2.6 ns
TTE-4DPT	3.9 ns	3.4 ns	4.1 ns	4.0 ns
TTE-4DTPA	2.9 ns	4.0 ns	3.7 ns	2.7 ns

[a]excited at 365 nm and emission decay curve was monitored at the wavelength of maximum emission peak.

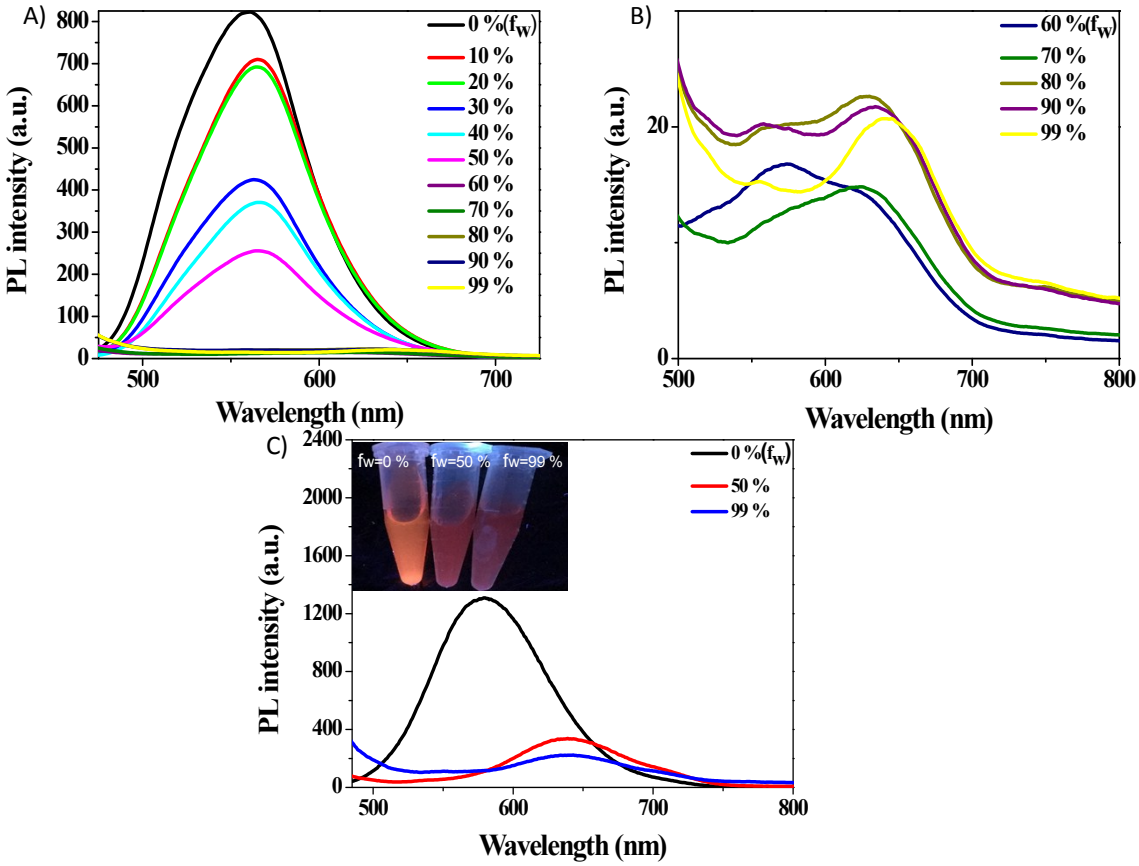


Figure S5. A) Emission spectra of **TTE-4DTPA** in THF-water mixtures with different water fractions (f_w); B) Enlarged emission spectra of **TTE-4DTPA** when f_w was over 60 %; C) Emission spectra of **TTE-4DTPA** in DMSO-water mixtures with different water fractions (f_w); Inset: photos of **TTE-4DTPA** with different water fractions under UV lamp illumination.

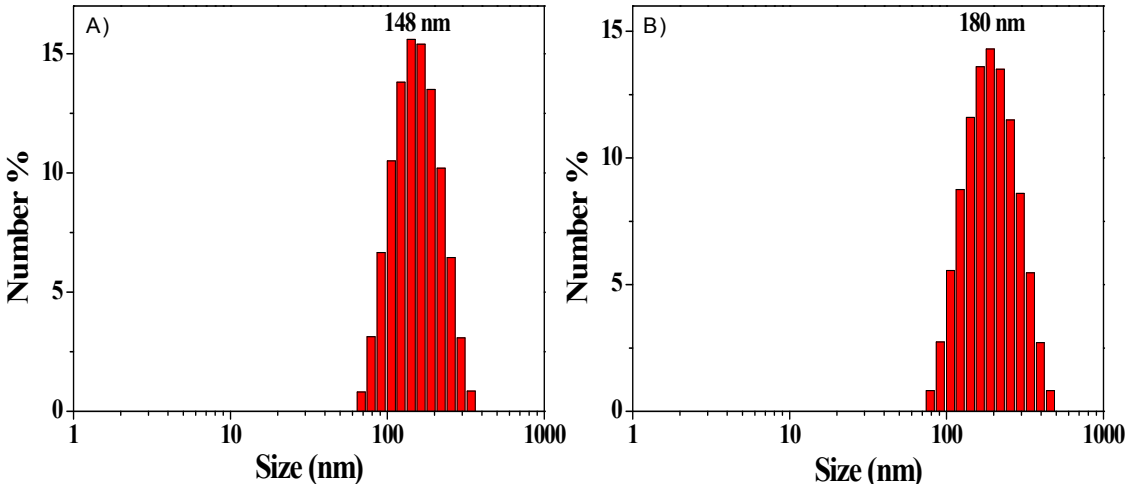


Figure S6. A) DLS plot of compound **TTE-4DPT** (10^{-5} M) in 99 % water/THF mixture; B) DLS plot of compound **TTE-4DTPA** (10^{-5} M) in 99 % water/THF mixture.

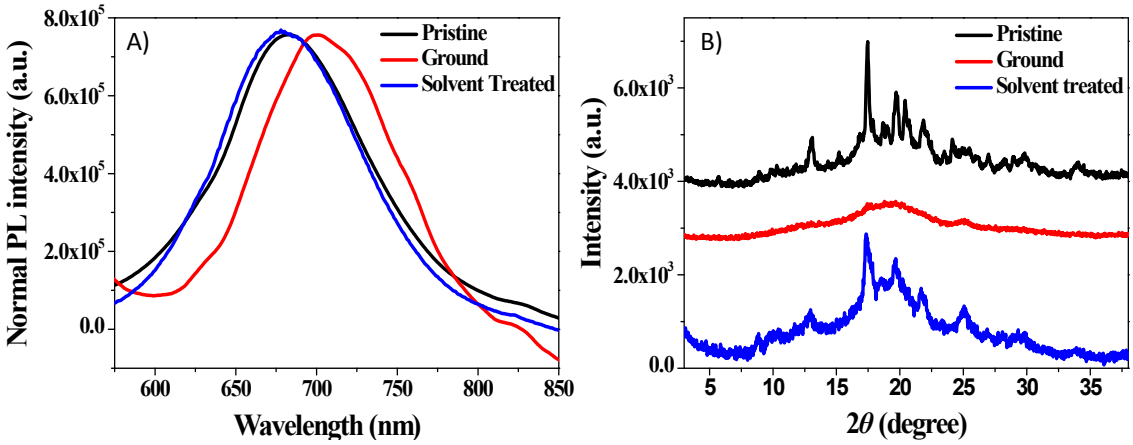


Figure S7. A) Emission spectra of **TTE-4DPT** as-pristine, ground, and solvent treated; (B) XRD of **TTE-4DPT** as-pristine, ground, and solvent treated.

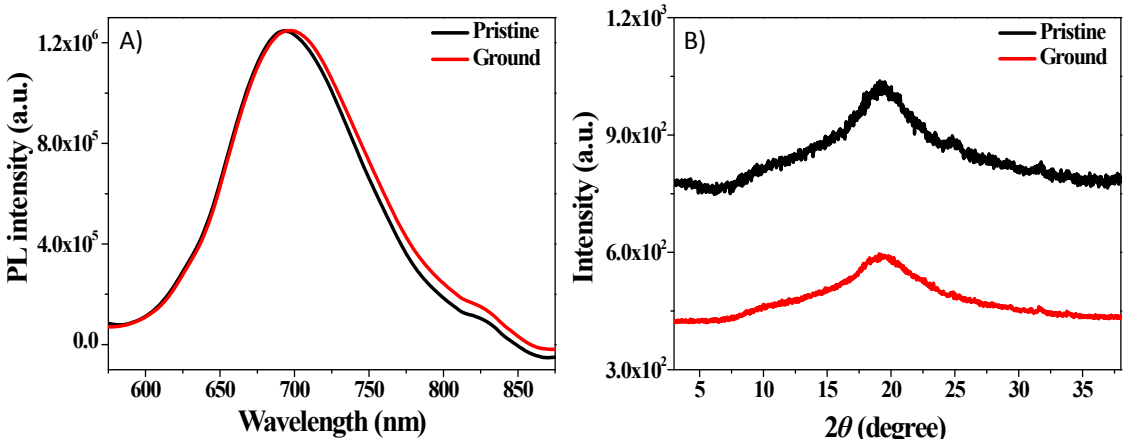


Figure S8. A) Emission spectra of **TTE-4DTPA** as-pristine and ground, (B) XRD of **TTE-4DTPA** as-pristine and ground.

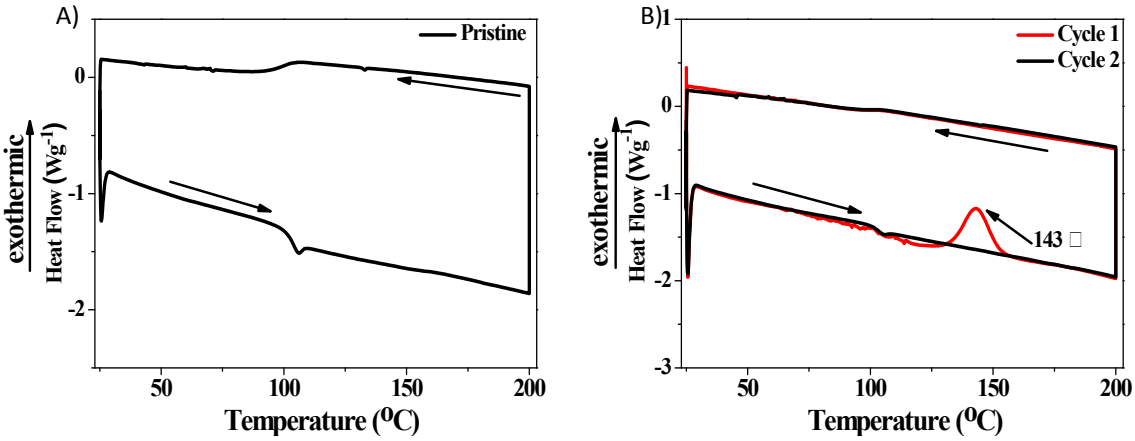


Figure S9. A) DSC thermograms of pristine **TTE-4DPT** recorded under N_2 atmosphere at a heating rate of 10 $^{o}Cmin^{-1}$. (B) DSC thermograms of ground **TTE-4DPT** recorded under N_2 at a heating rate of 10 ^{o}C min^{-1}.

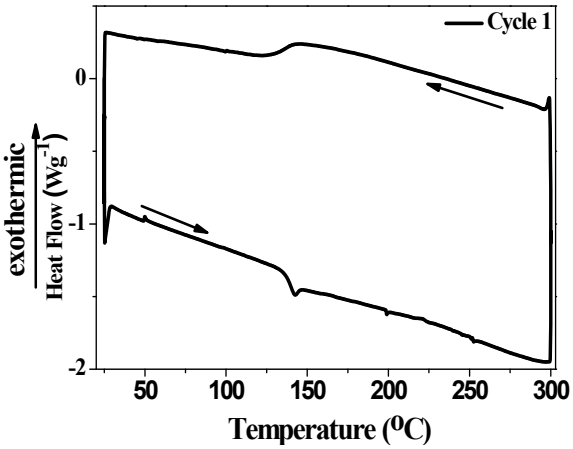


Figure S10. DSC thermograms of ground **TTE-4DTPA** recorded under N_2 atmosphere at a heating rate of 10 ^oC min^{-1}.

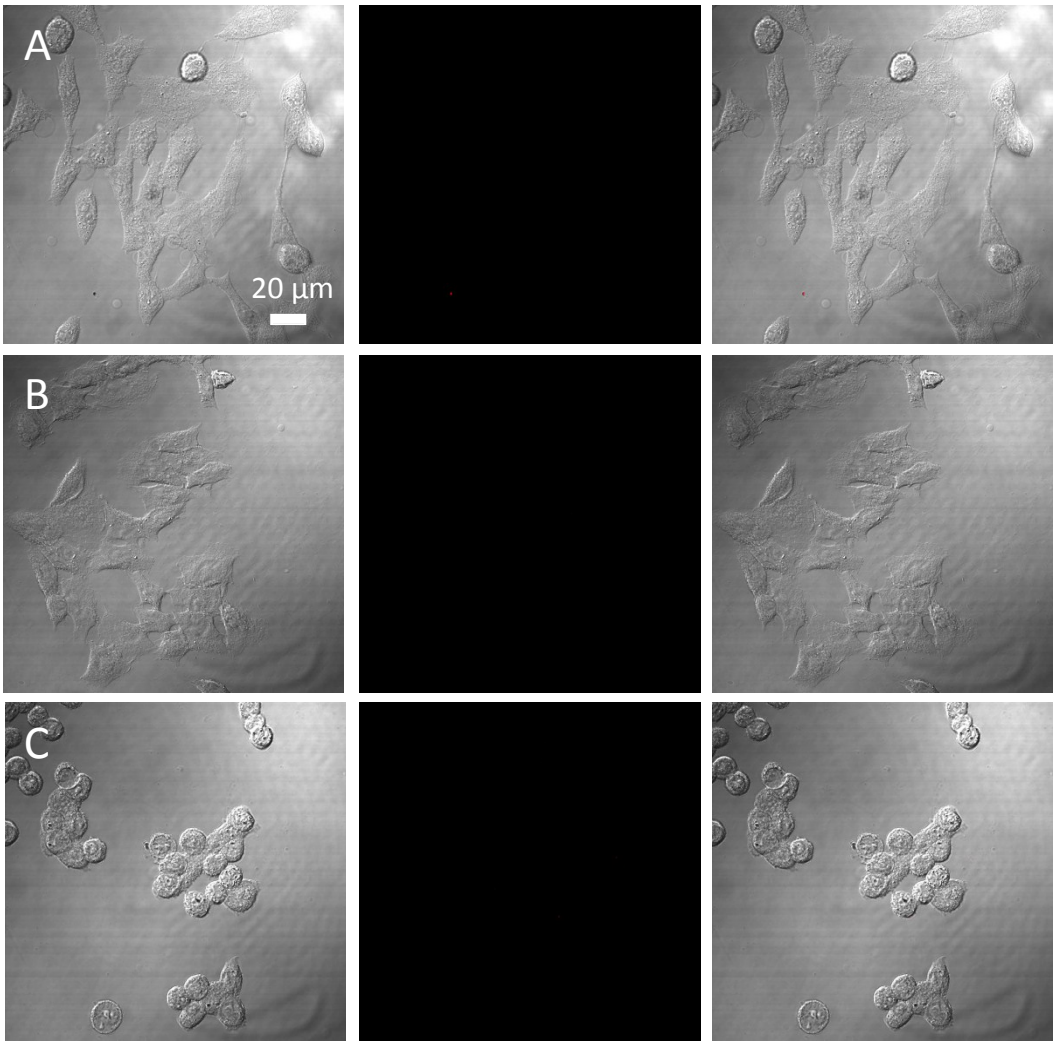


Figure S11. Confocal fluorescent images of HeLa cells incubated with different concentrations of **TTE-4TPA** (A, 10 µM), (B, 20 µM), (C, 50 µM) for 4 h. From left

to right are bright field images, fluorescent images, and the merged images. Excitation wavelength: 405 nm; emission collected: 540-600 nm. The scale bar is 20 μm.

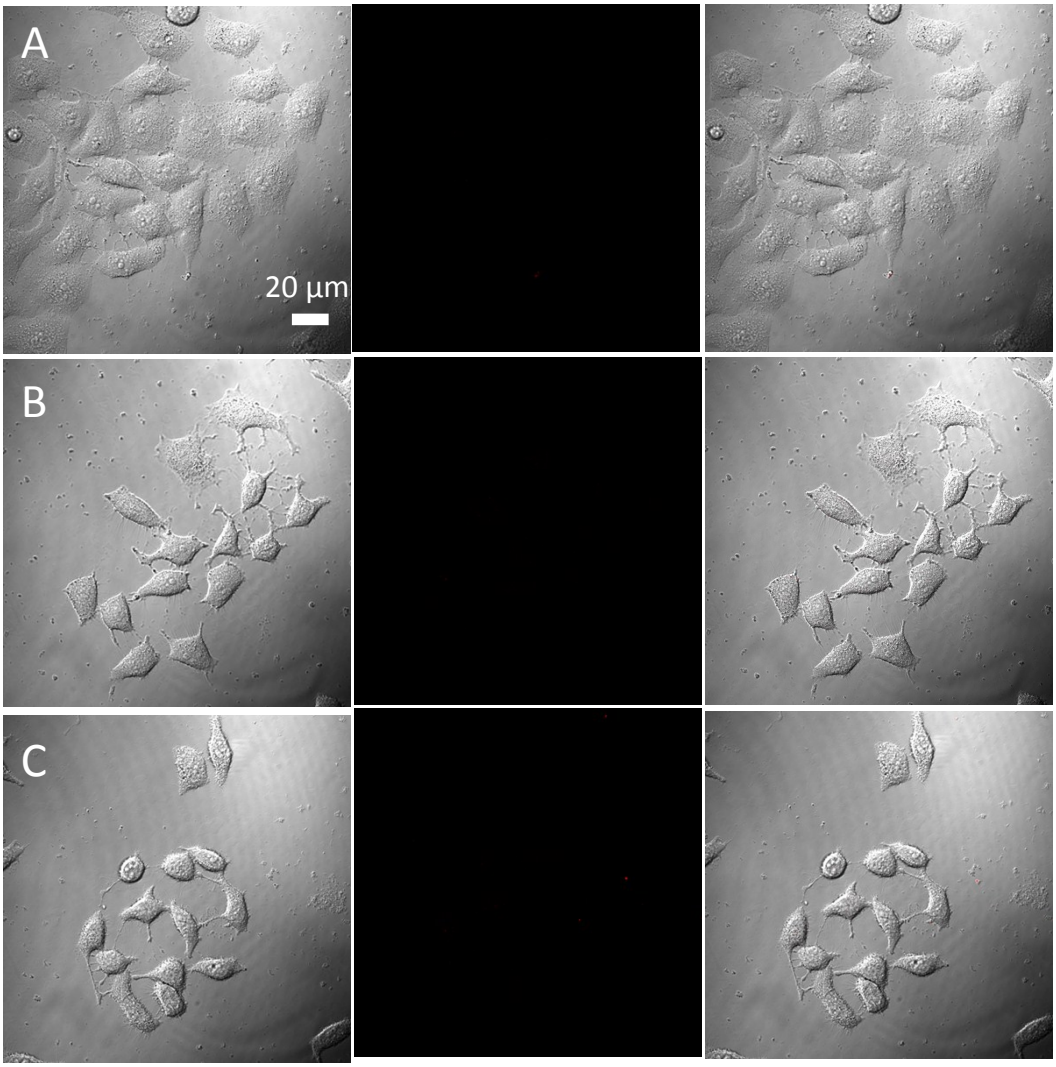


Figure S12. Confocal fluorescent images of HeLa cells incubated with different concentrations of **TTE-4DPT** (A, 10 μM), (B, 20 μM), (C, 50 μM) for 4 h. From left to right are bright field images, fluorescent images, and the merged images. Excitation wavelength: 405 nm; emission collected: 540-600 nm. The scale bar is 20 μm.

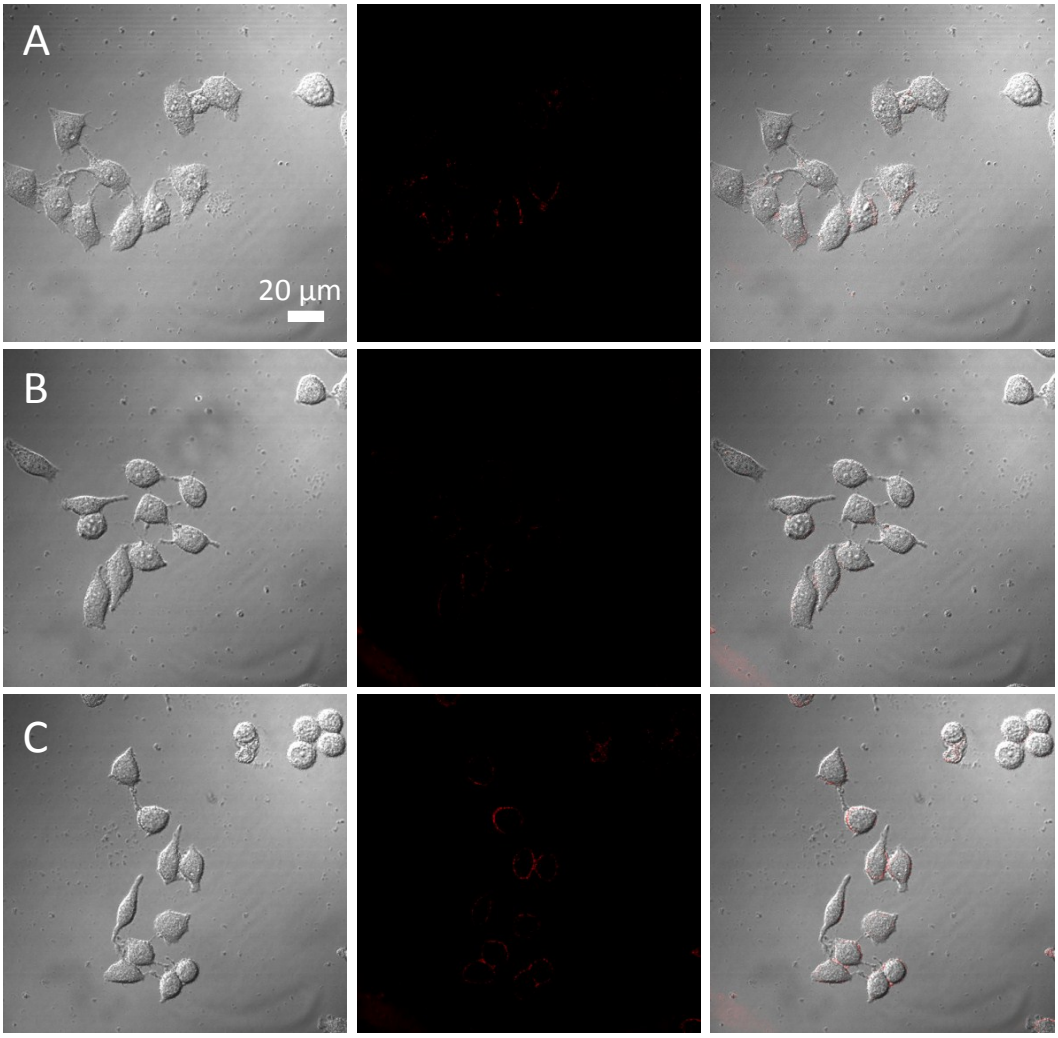


Figure S13. Confocal fluorescent images of HeLa cells incubated with **TTE-4DTPA** at different concentrations (A, 10 μM), (B, 20 μM), (C, 50 μM) for 4 h. From left to right are bright field images, fluorescent images, and the merged images. Excitation wavelength: 405 nm; emission collected: 540-600 nm. The scale bar is 20 μm.

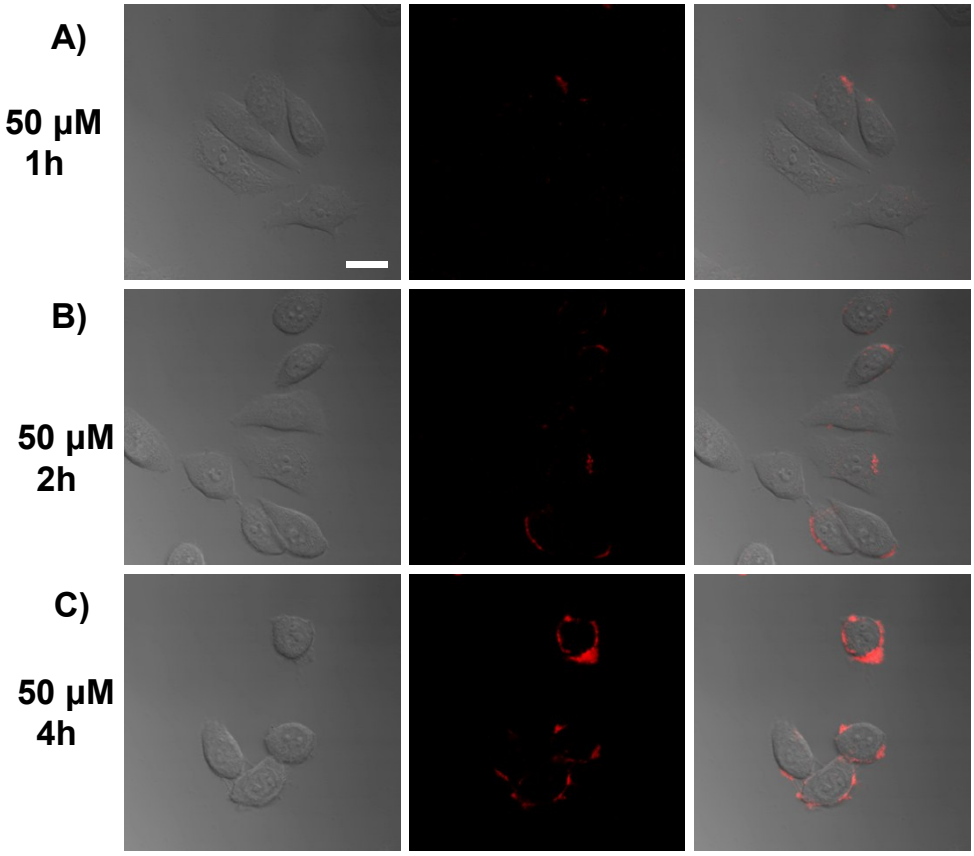
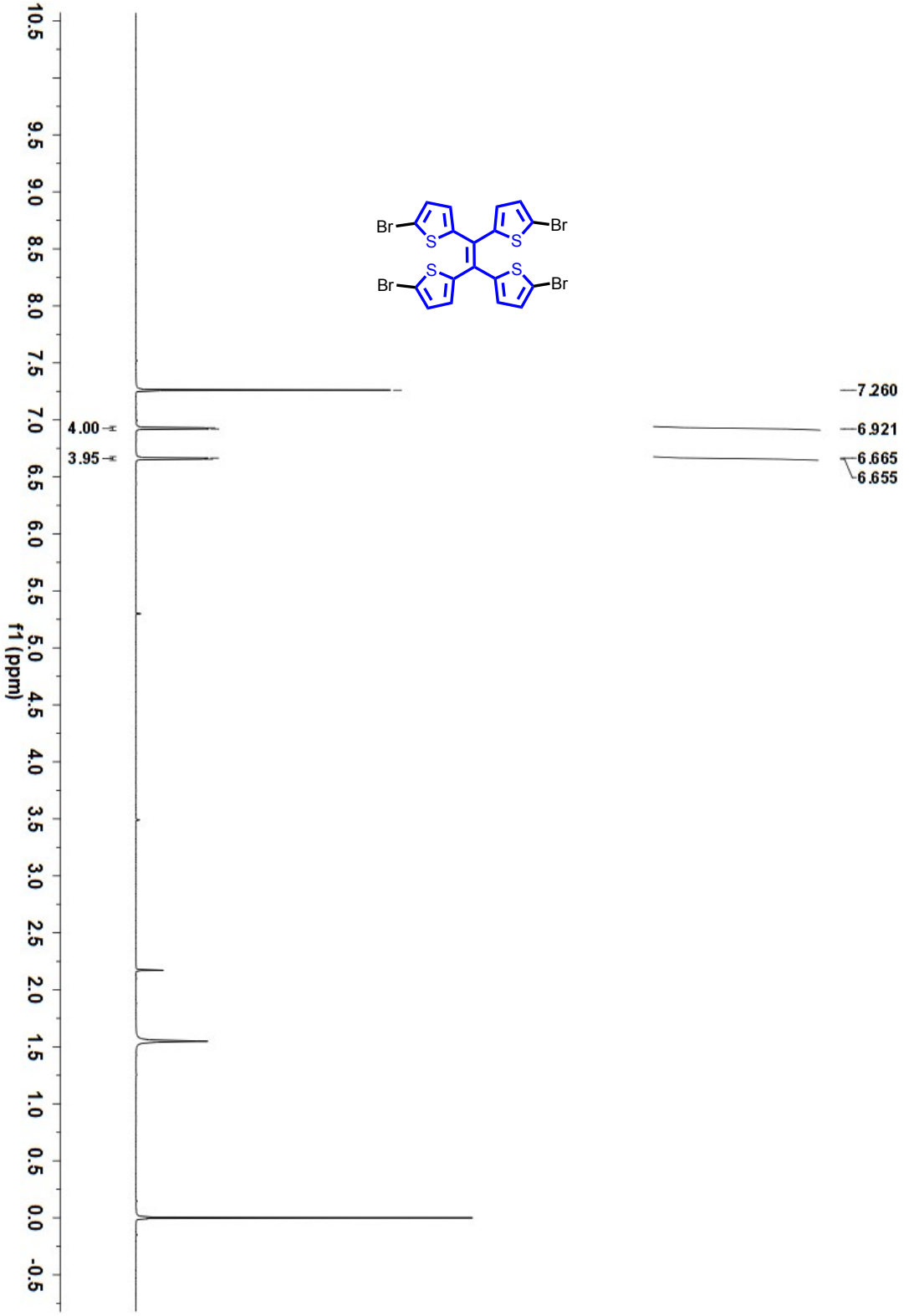
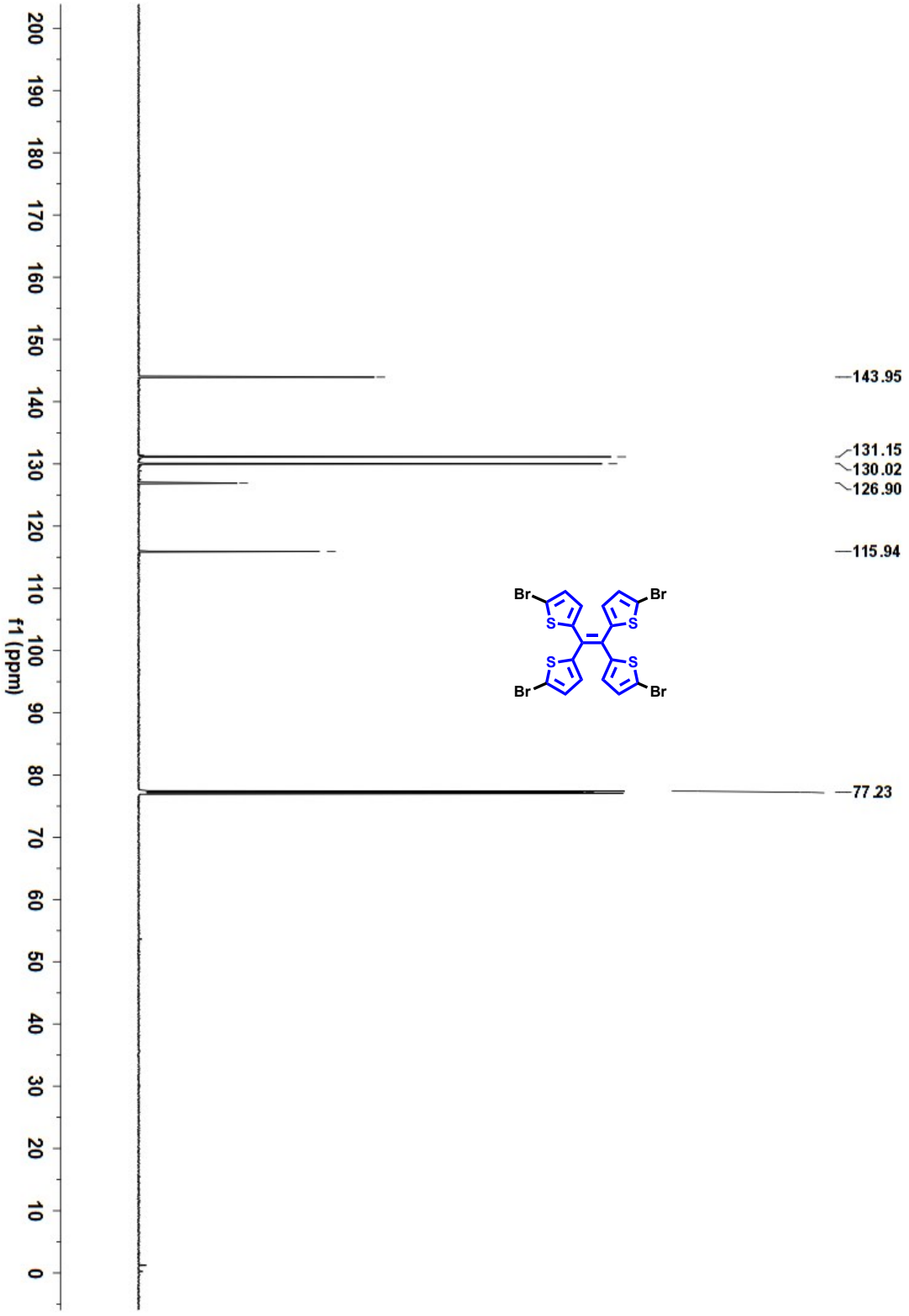


Figure S14. Confocal fluorescent images of HeLa cells incubated with 50 μM **TTE-4DTPA** for different incubation time (A, 1 h), (B, 2 h), (C, 4 h), from left to right are bright field images, fluorescent images, and the merge images. Excitation wavelength: 405 nm; emission collected: 540-600 nm. The scale bar is 20 μm.

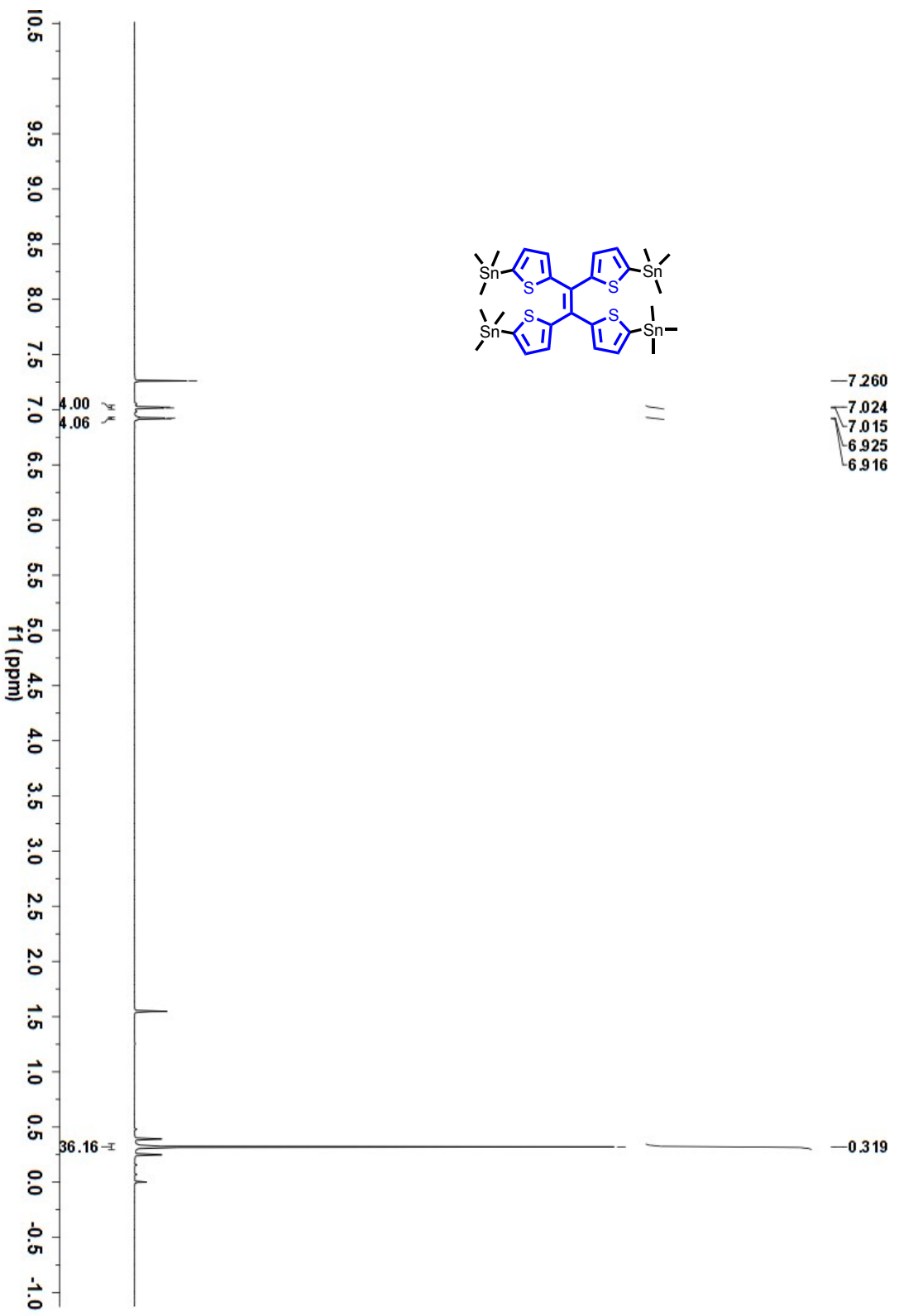
Copies of ^{1}H, ^{13}C NMR Spectra and MS Spectra



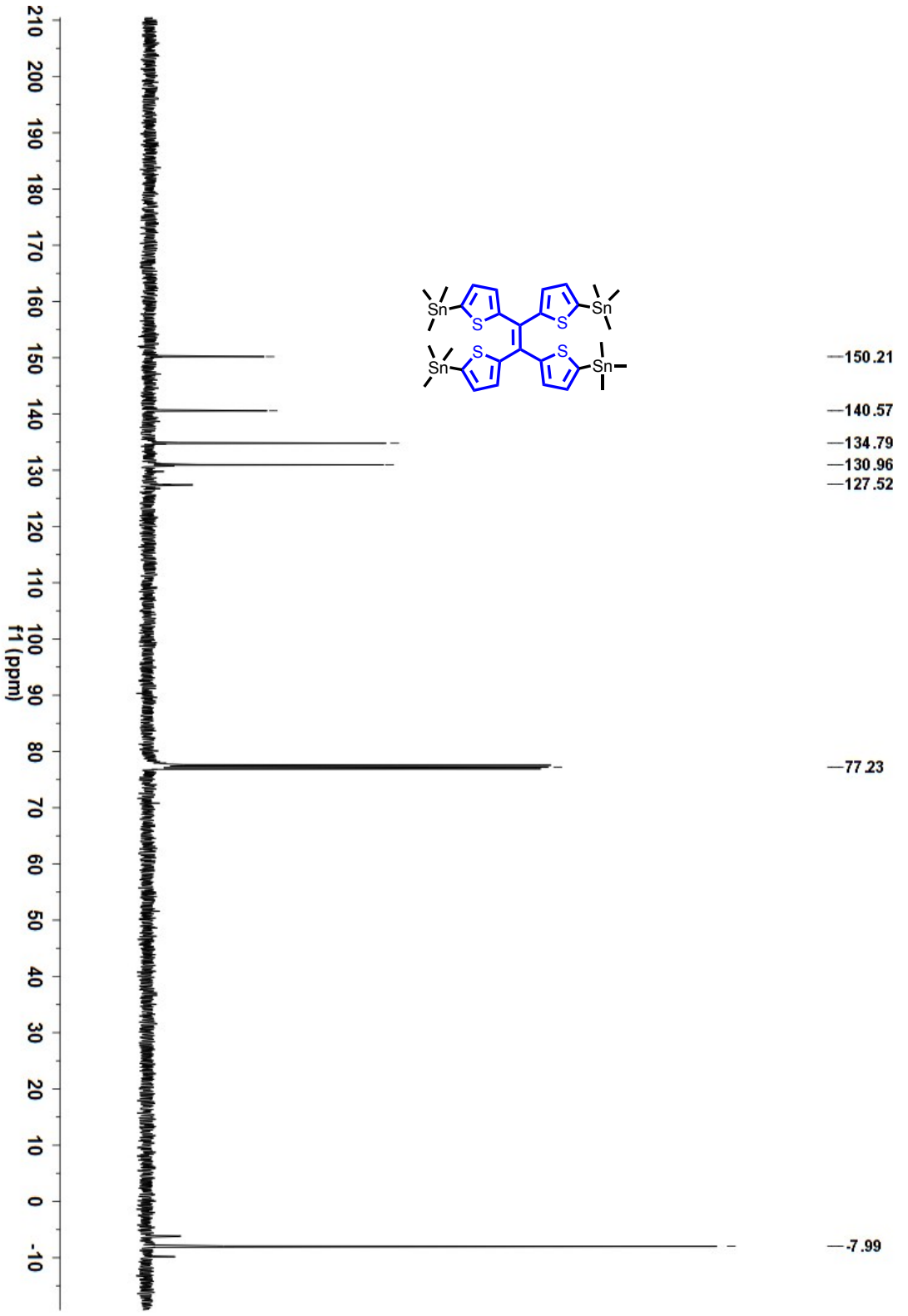
^{1}H NMR spectrum of compound **2** in $CDCl_3$.



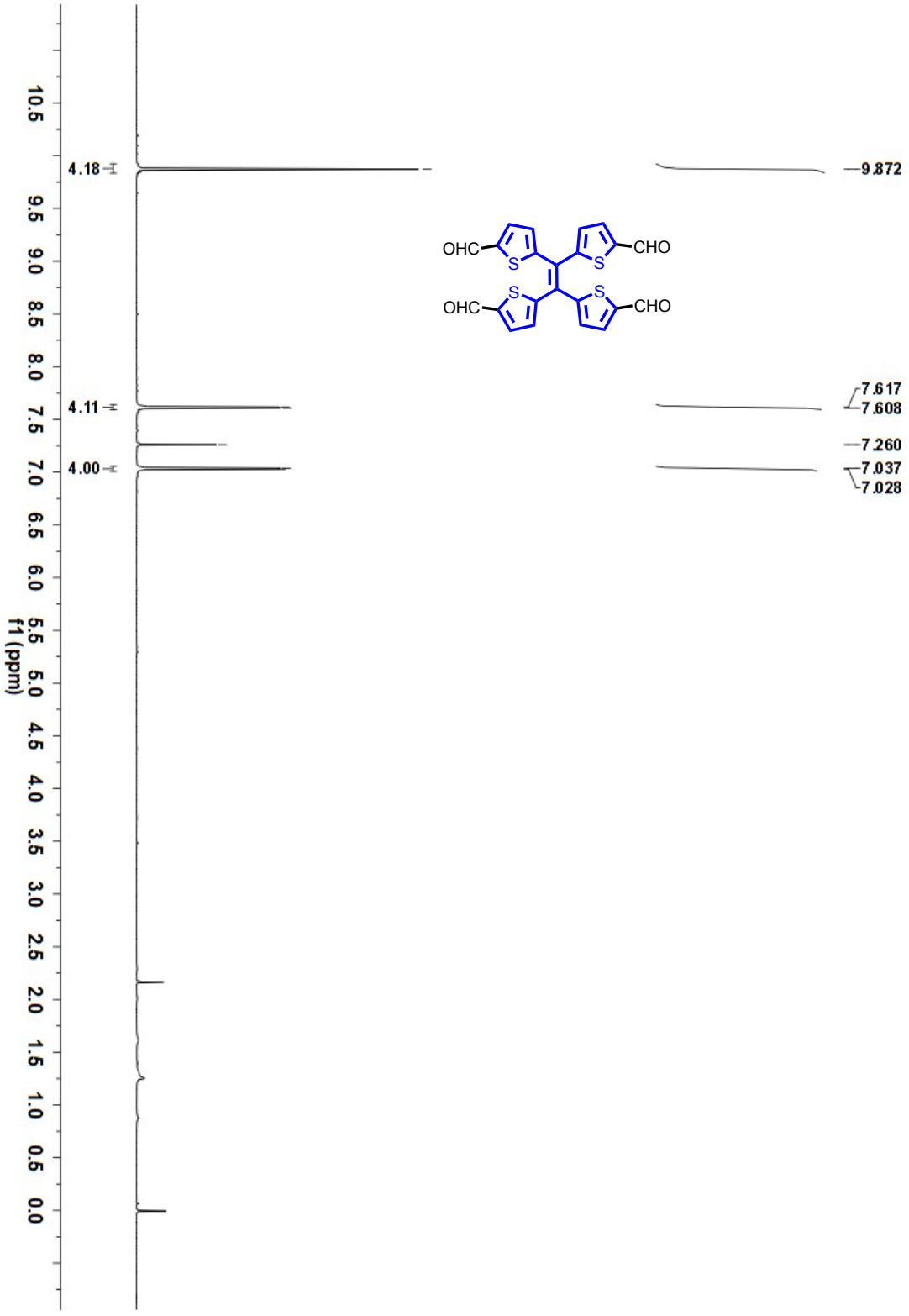
^{13}C NMR spectrum of compound **2** in $CDCl_3$.



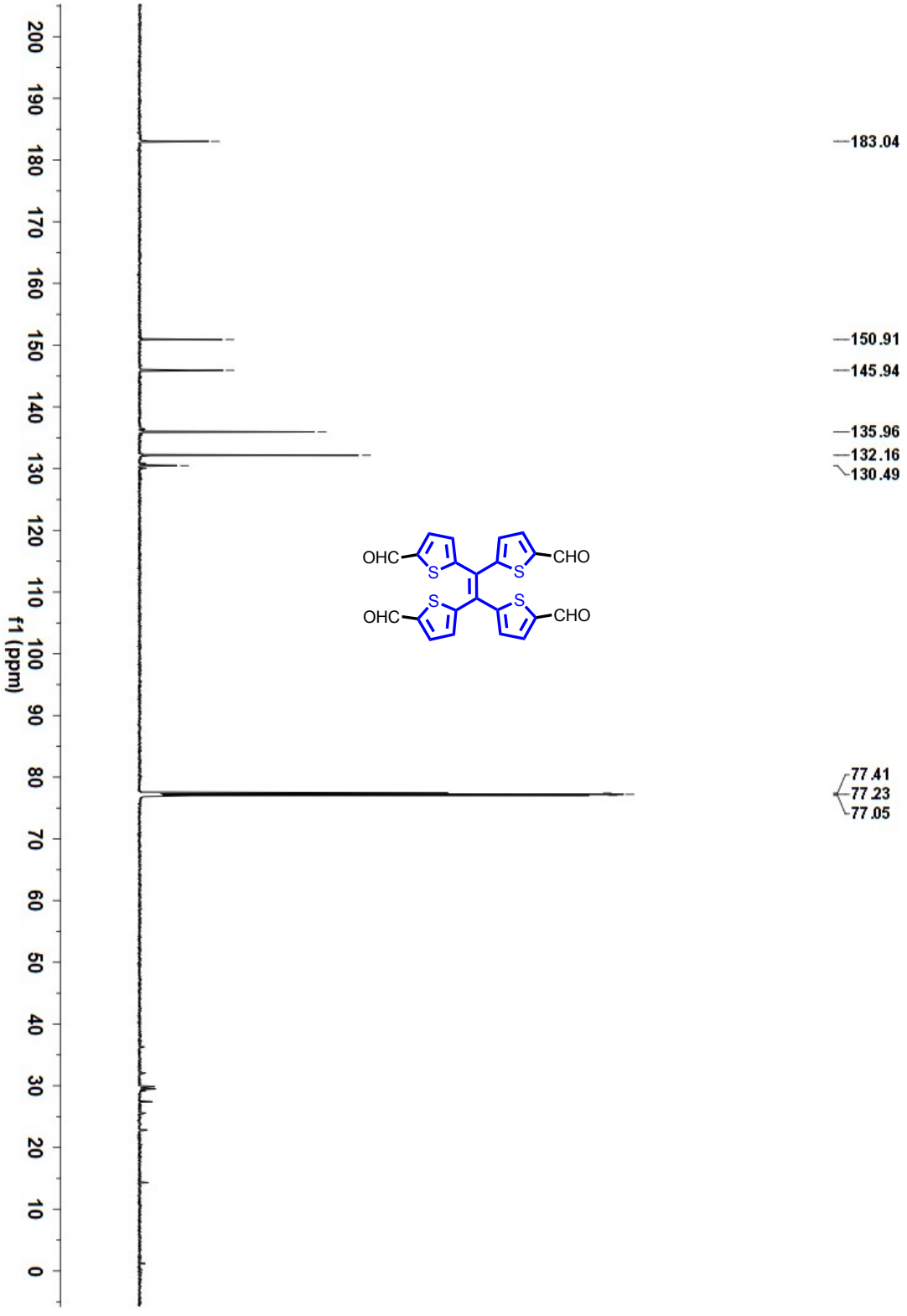
^{1}H NMR spectrum of compound **4** in $CDCl_3$.



^{13}C NMR spectrum of compound **4** in $CDCl_3$.



^{1}H NMR spectrum of compound **6** in $CDCl_3$.



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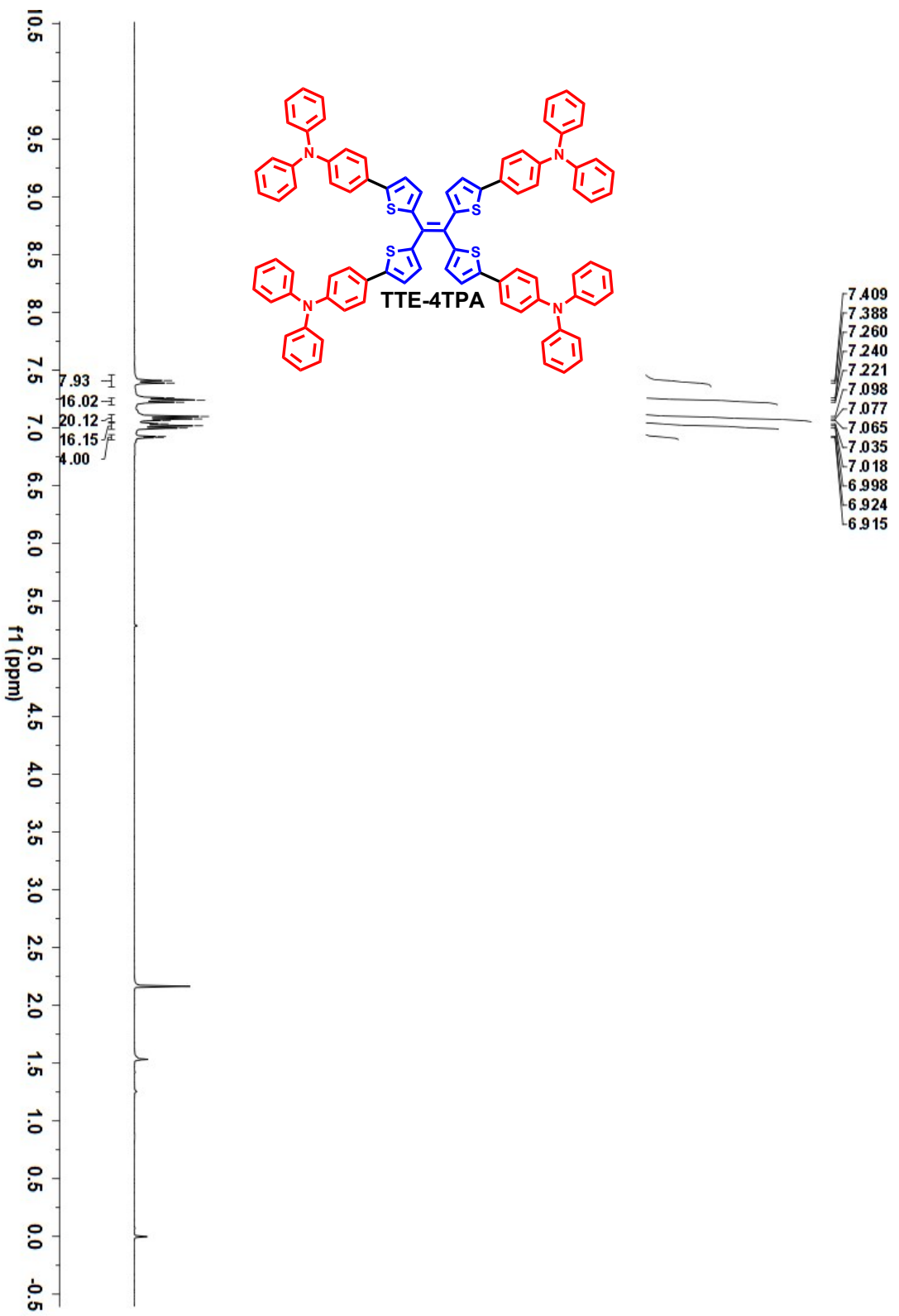
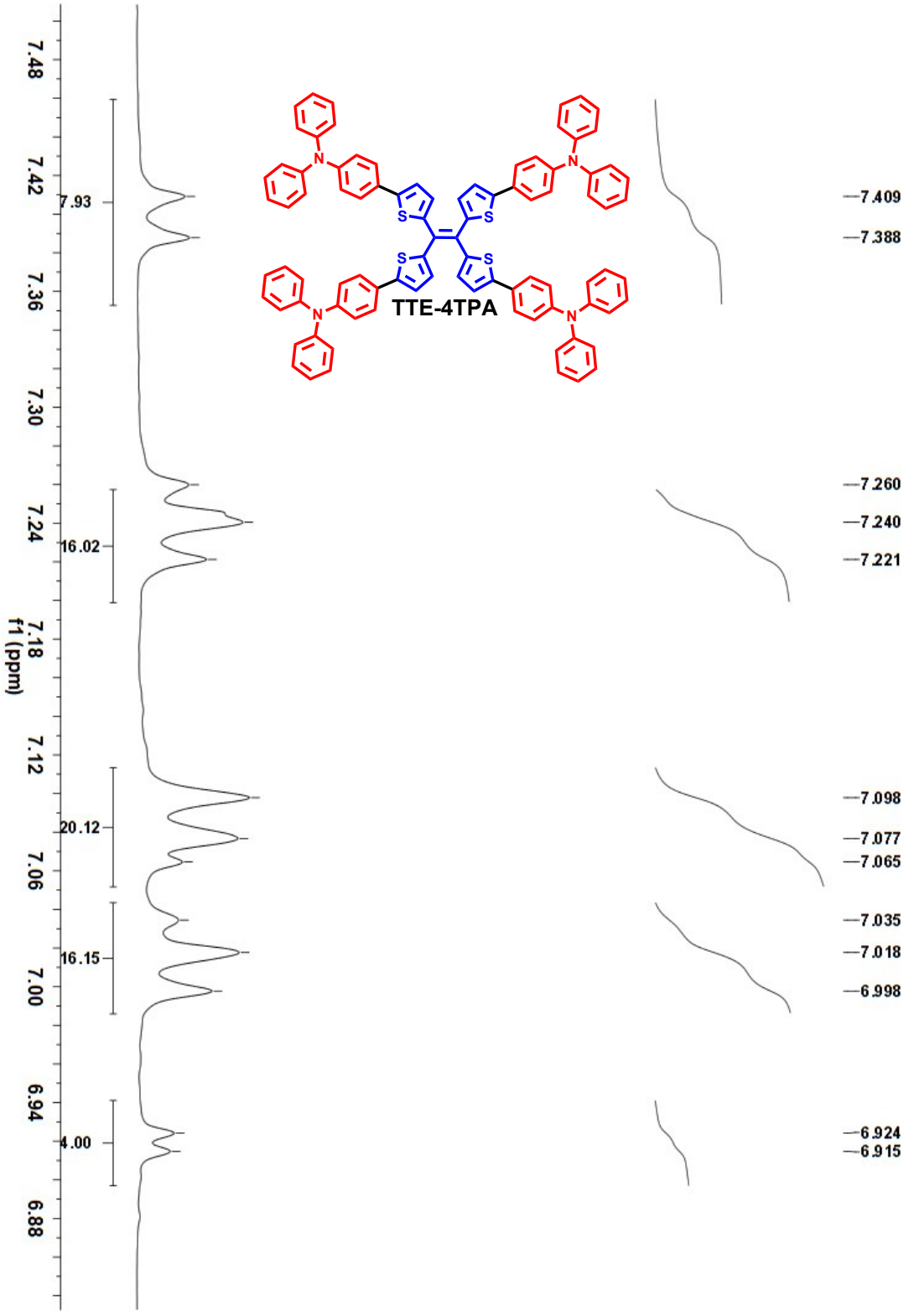
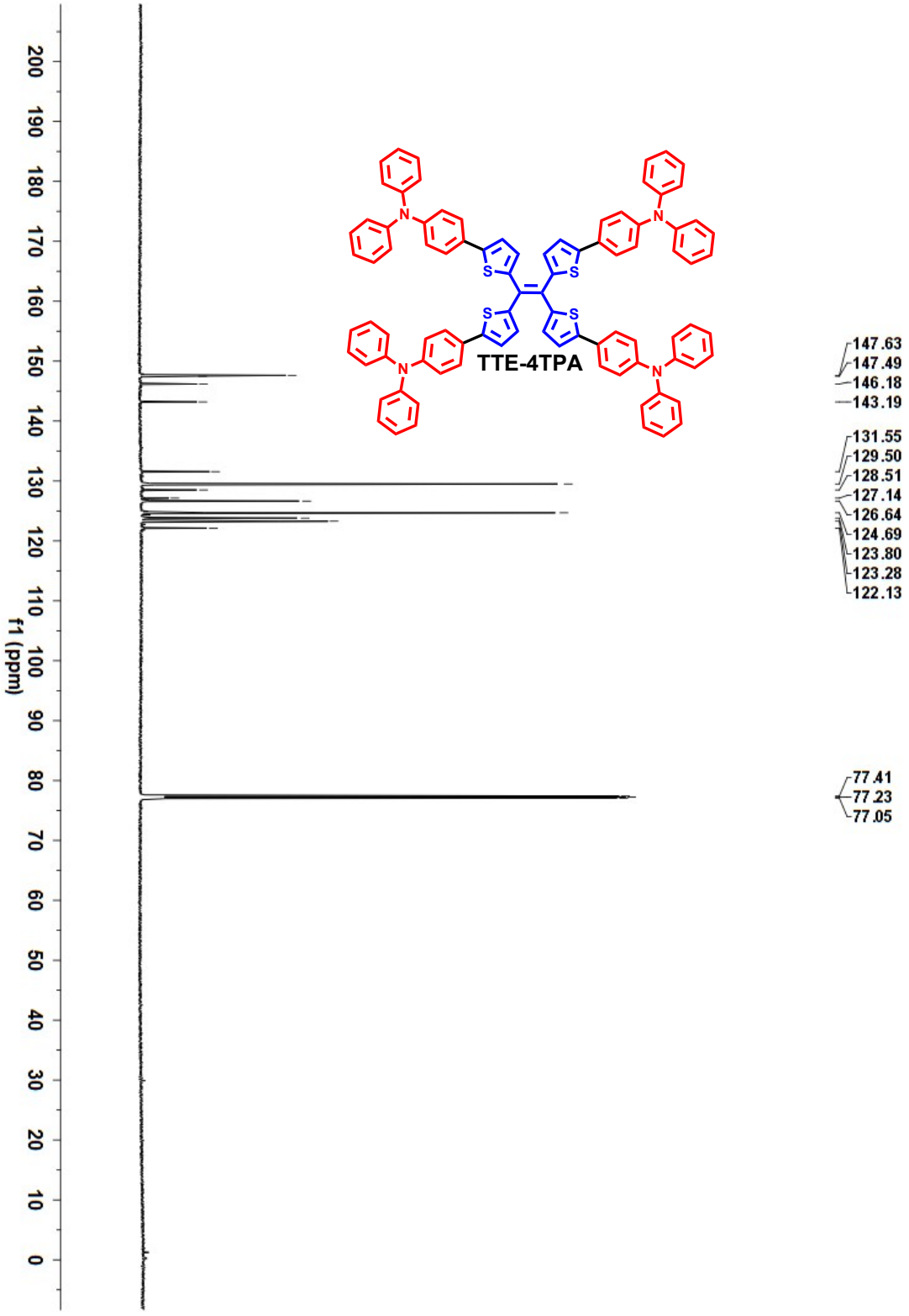


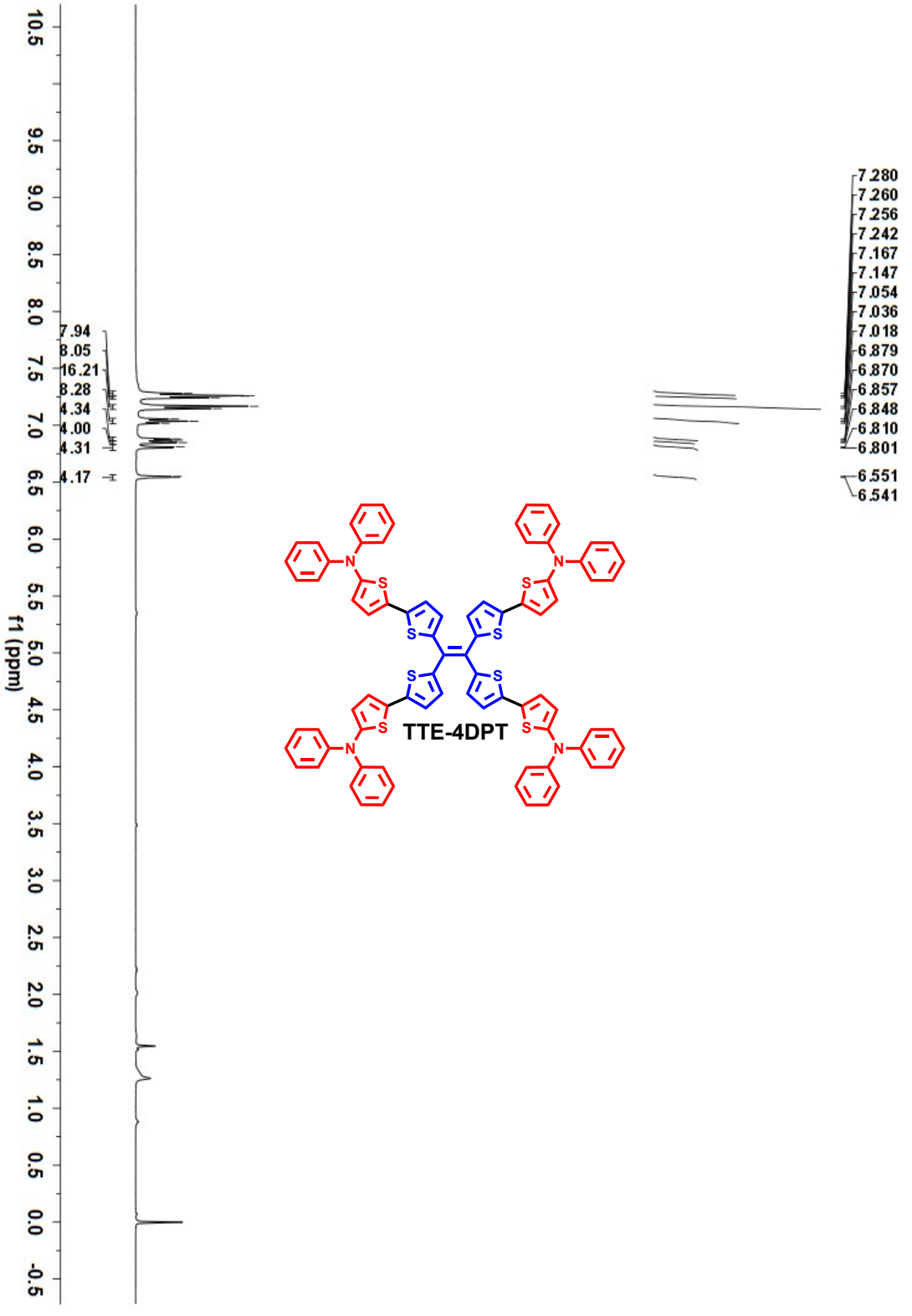
^{1}H NMR spectrum of **TTE-4TPA** in $CDCl_3$.



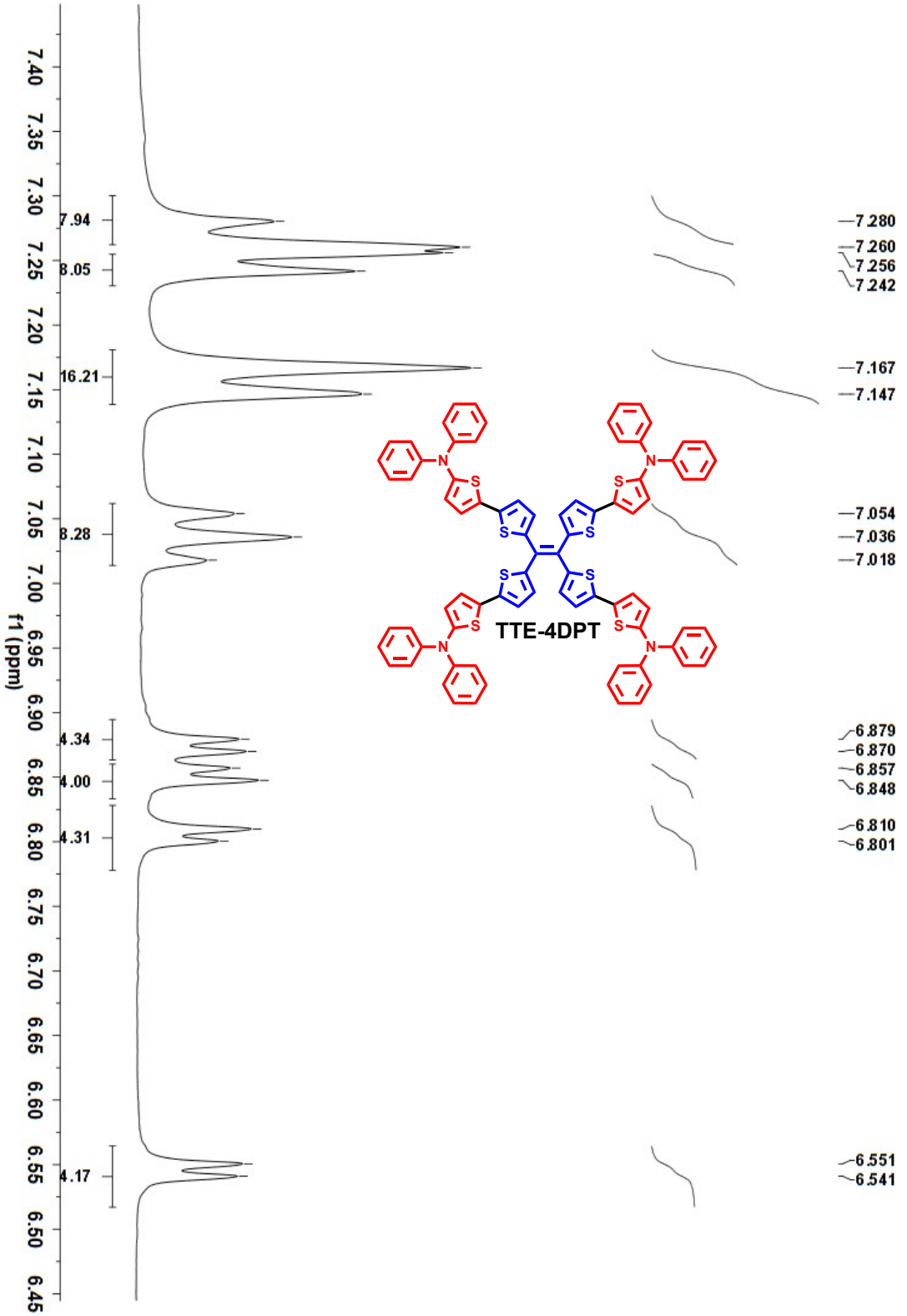
The expended ^{1}H NMR spectrum of **TTE-4TPA** in $CDCl_3$.



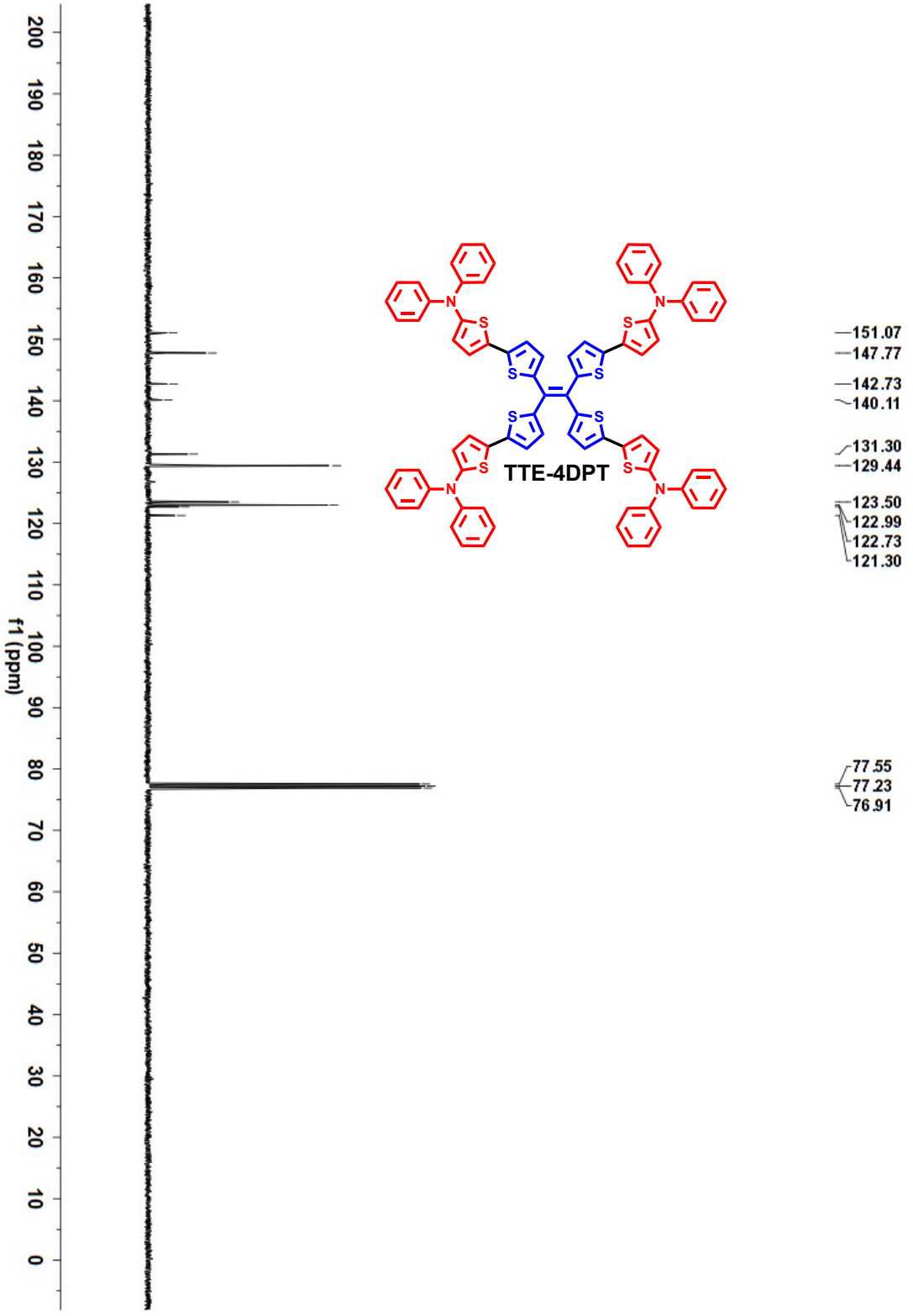
^{13}C NMR spectrum of **TTE-4TPA** in $CDCl_3$.



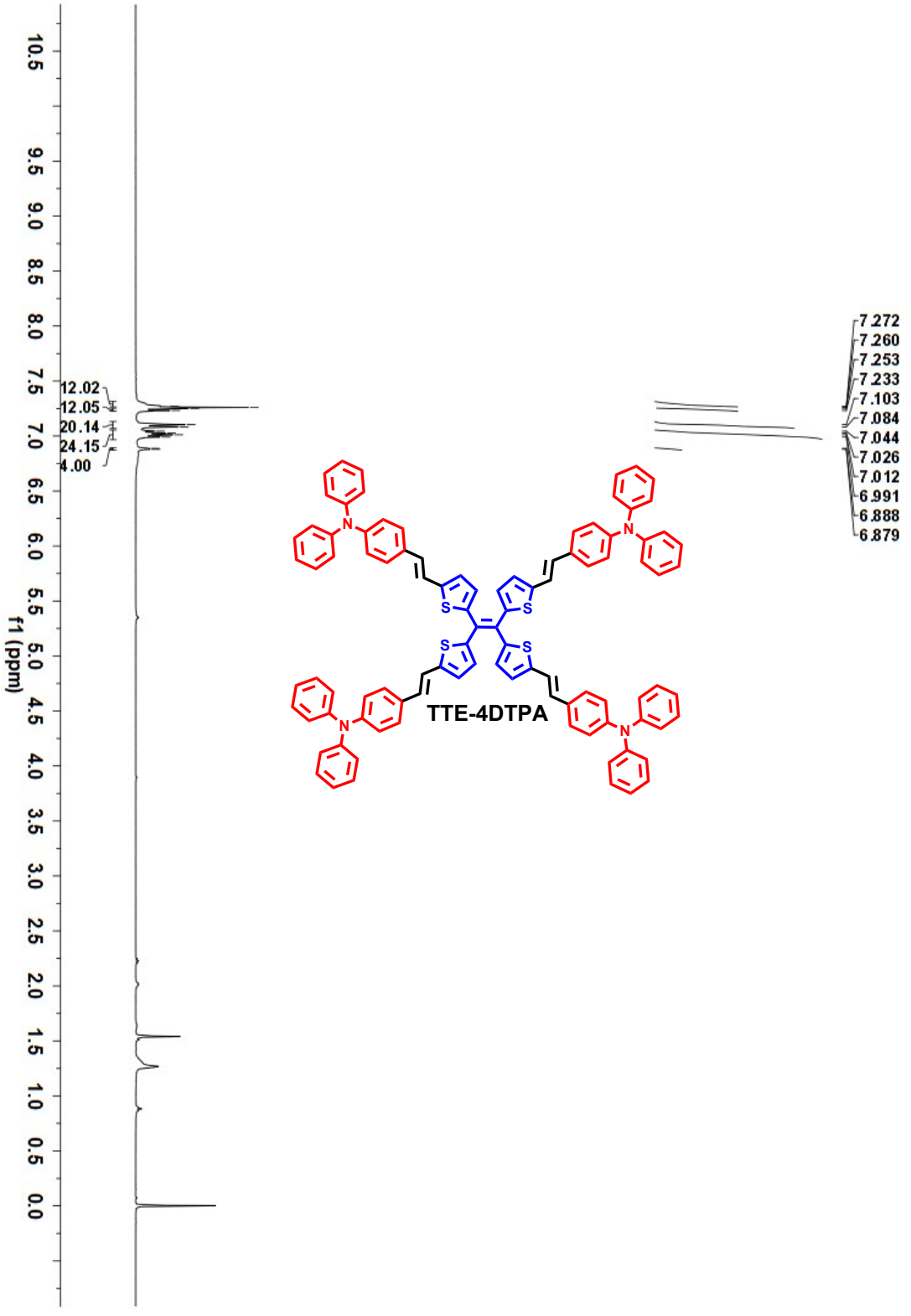
^{1}H NMR spectrum of **TTE-4DPT** in $CDCl_3$.



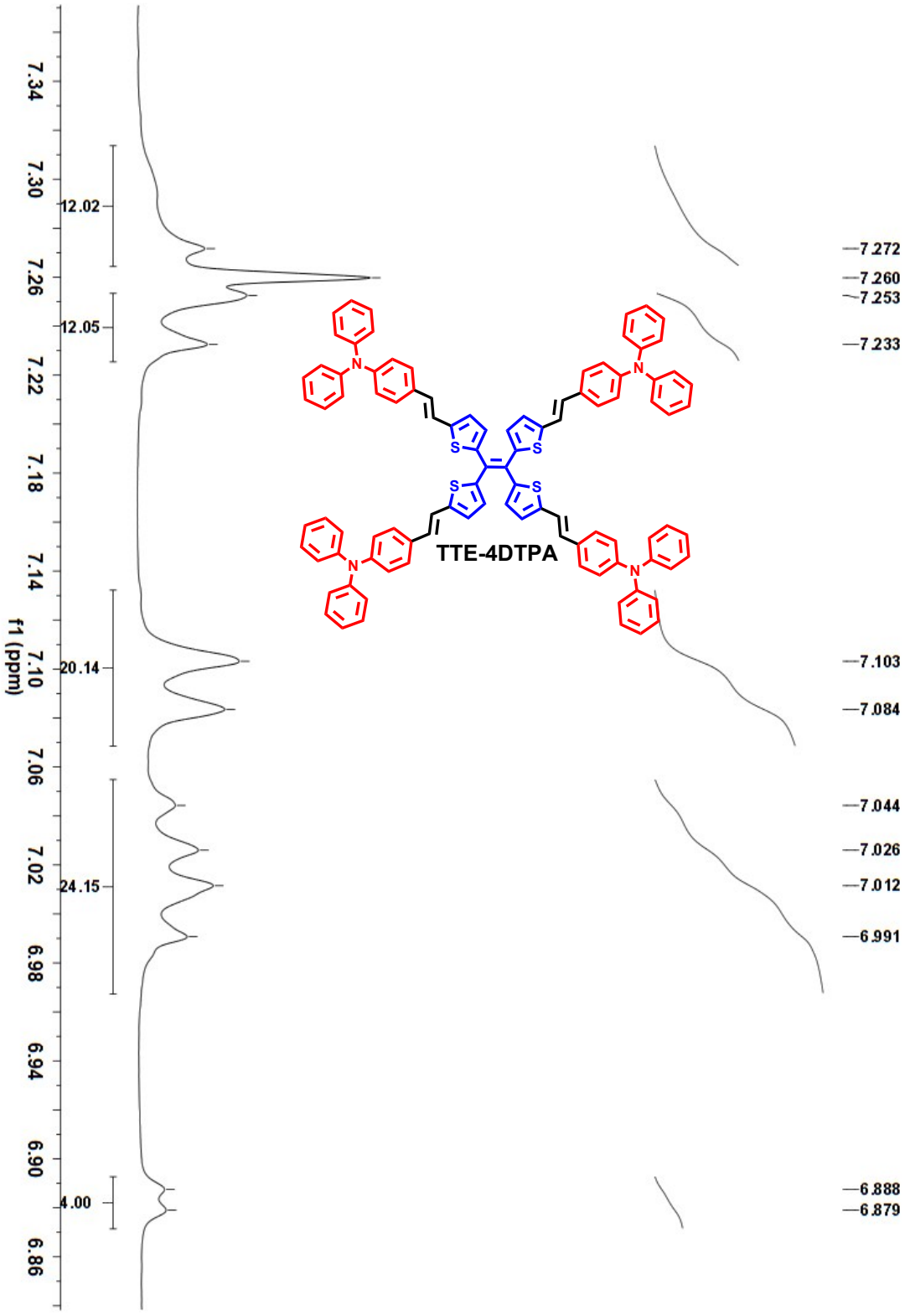
The expended ^{1}H NMR spectrum of **TTE-4DPT** in $CDCl_3$.



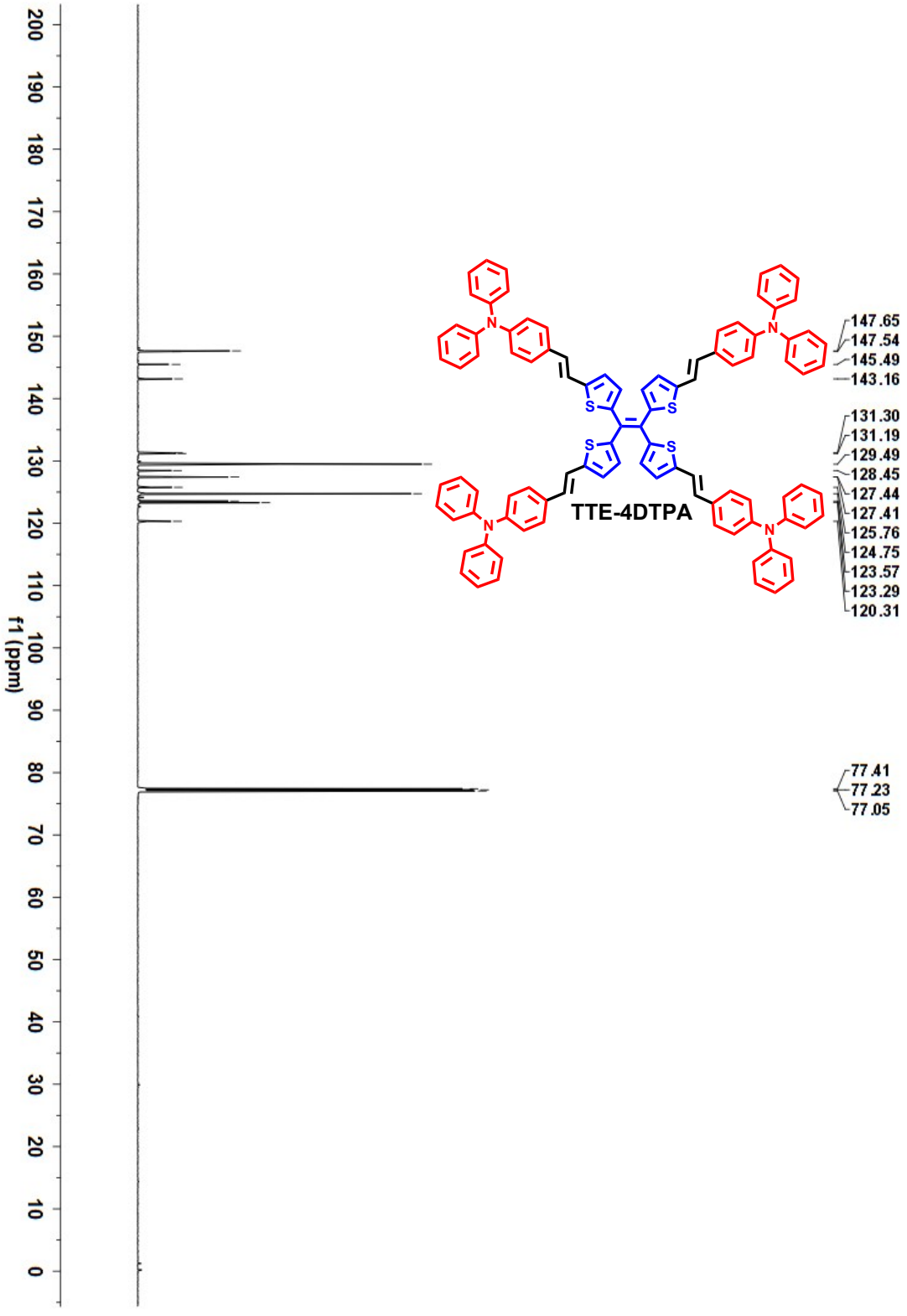
^{13}C NMR spectrum of **TTE-4DPT** in $CDCl_3$.



^{1}H NMR spectrum of **TTE-4DTPA** in $CDCl_3$.



The expended ^{1}H NMR spectrum of **TTE-4DTPA** in $CDCl_3$.



^{13}C NMR spectrum of **TTE-4DTPA** in $CDCl_3$.

Peking University Mass Spectrometry Sample Analysis Report

Analysis Info

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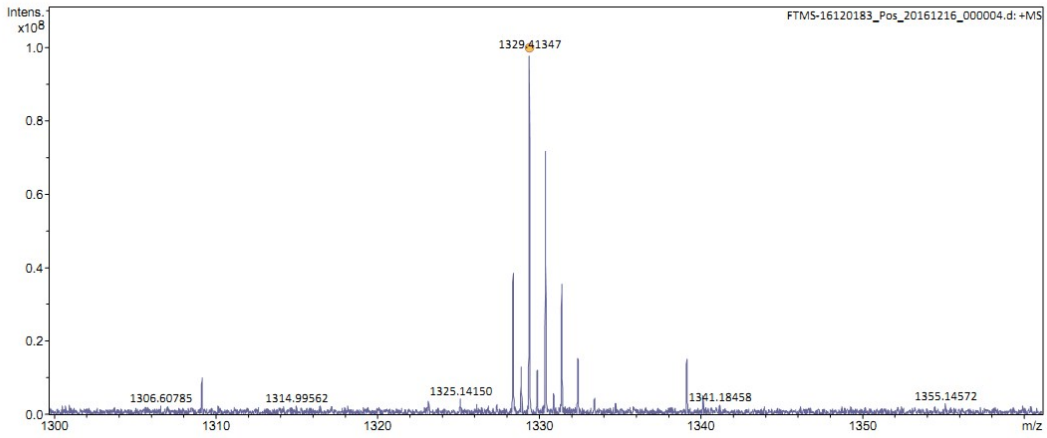
Comment		Operator	Peking University



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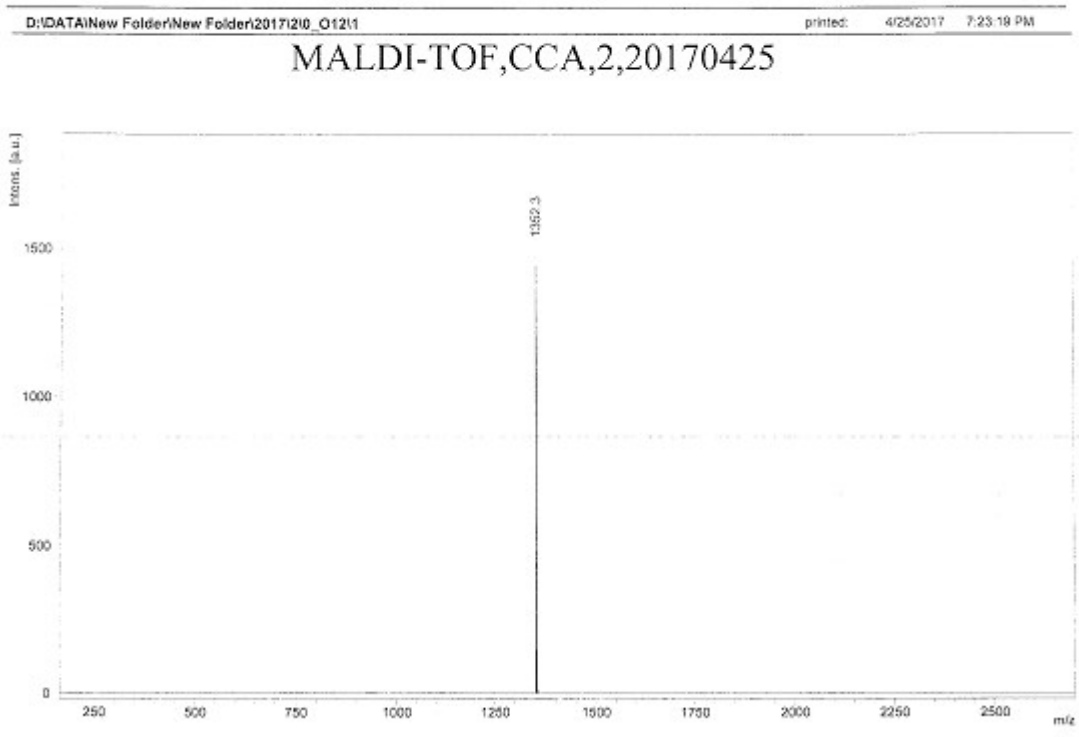
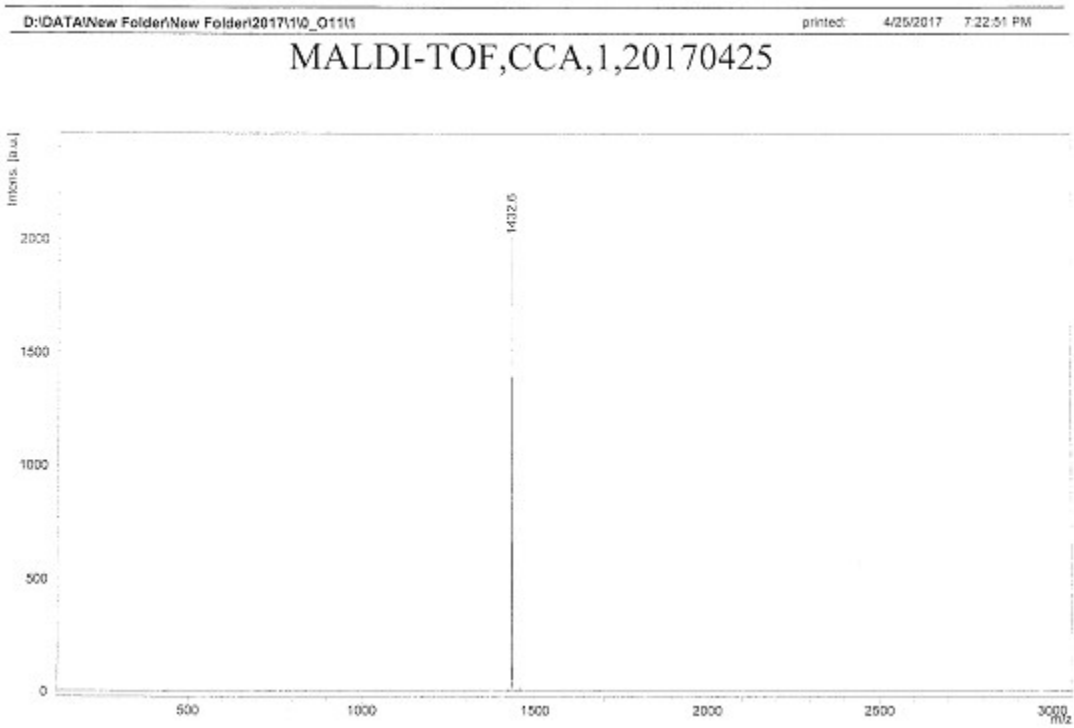
HR-ESI-MS Spectra for **TTE-4TPA**



MALDI-TOF MS Spectra for **TTE-4DPT**



MALDI-TOF MS Spectra for **TTE-4DTPA**