

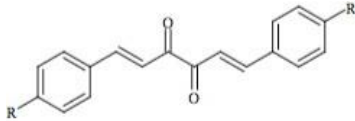
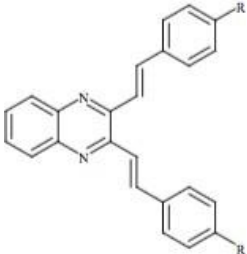
Supporting Information:

Cinnamil and quinoxaline derivative indicator dyes for detecting volatile amines in
fish spoilage

*Xiaoyu LUO, Loong-Tak LIM **

Department of Food Science, University of Guelph, Guelph, ON Canada, N1G 2W1

Table S1. Structures of each synthesized indicator dyes

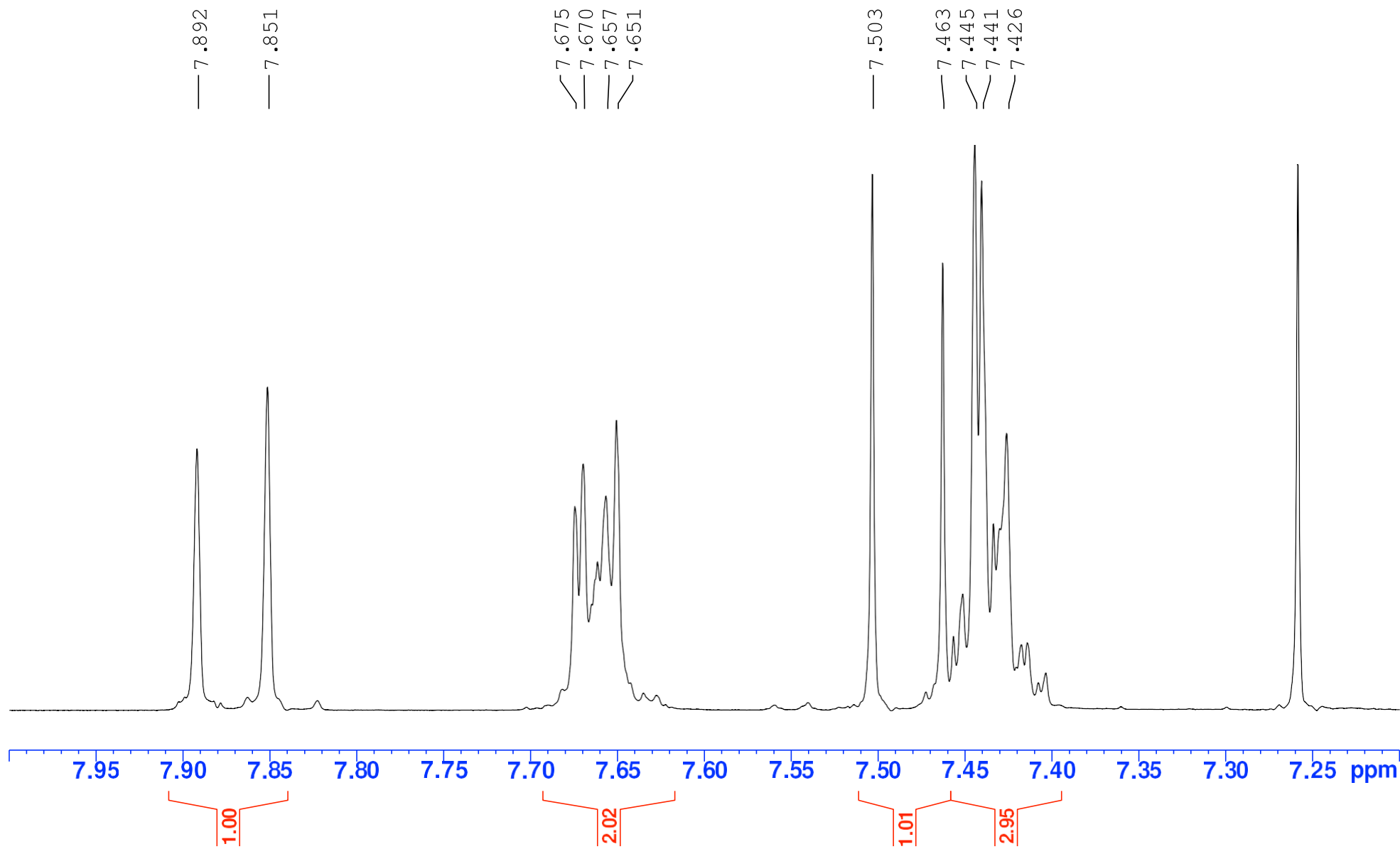
Dye	Structure	Substitution for R groups
Cinnamil Derivatives	 <p align="center">3a-c</p>	3a: R=H 3b: R=CH ₃ 3c: R=OCH ₃
Quinoxaline Derivatives	 <p align="center">5a-c</p>	5a: R=H 5b: R=CH ₃ 5c: R=OCH ₃

* Corresponding author. Email: llim@uoguelph.ca, Tel: 1-519-824-4120 ext. 56586

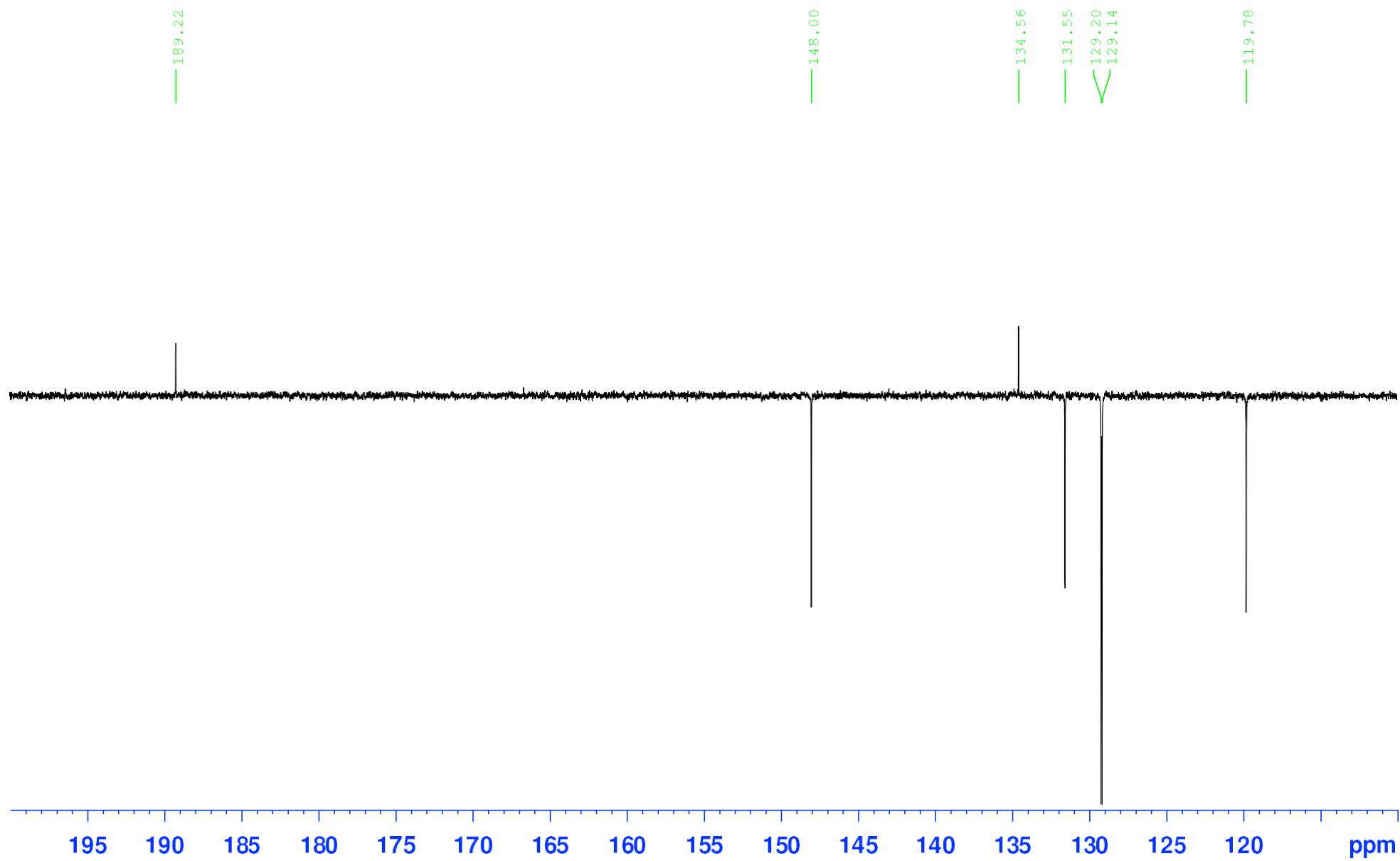
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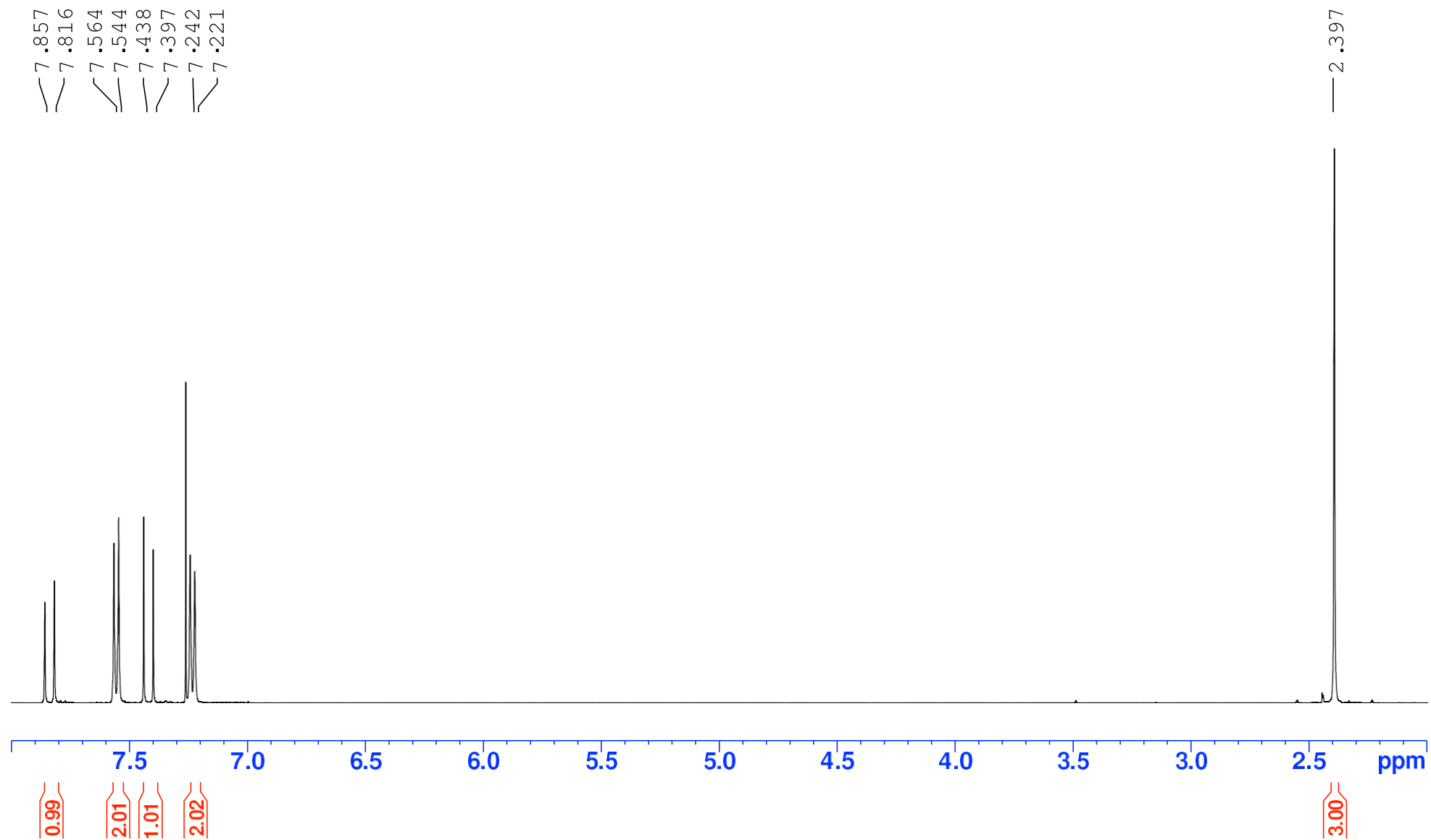
**¹H NMR (400 MHz)
Compound 3a in CDCl₃**



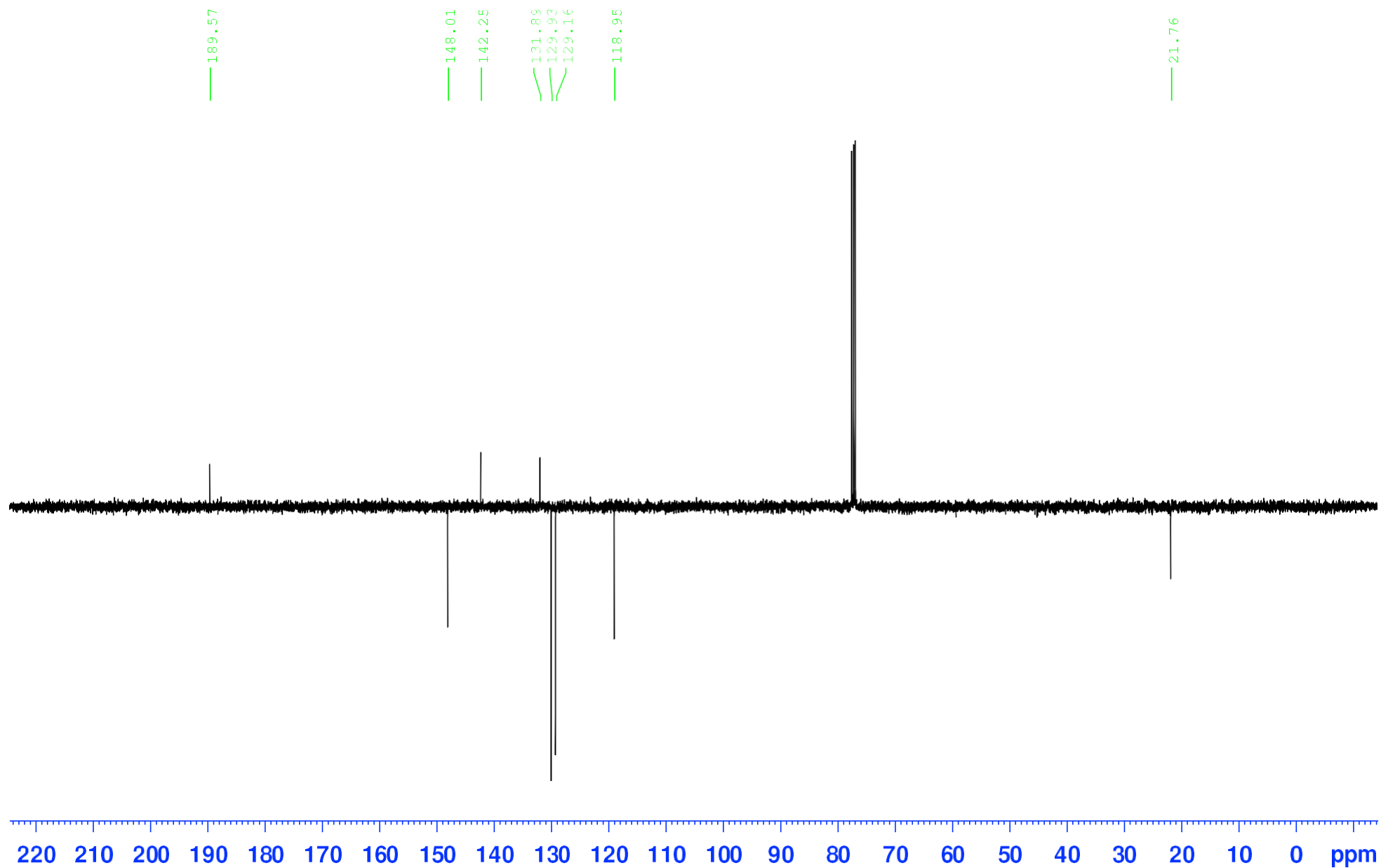
¹³C JMOD NMR (101 MHz)
Quaternary and CH₂ up, CH₃ and CH down
Compound 3a in CDCl₃



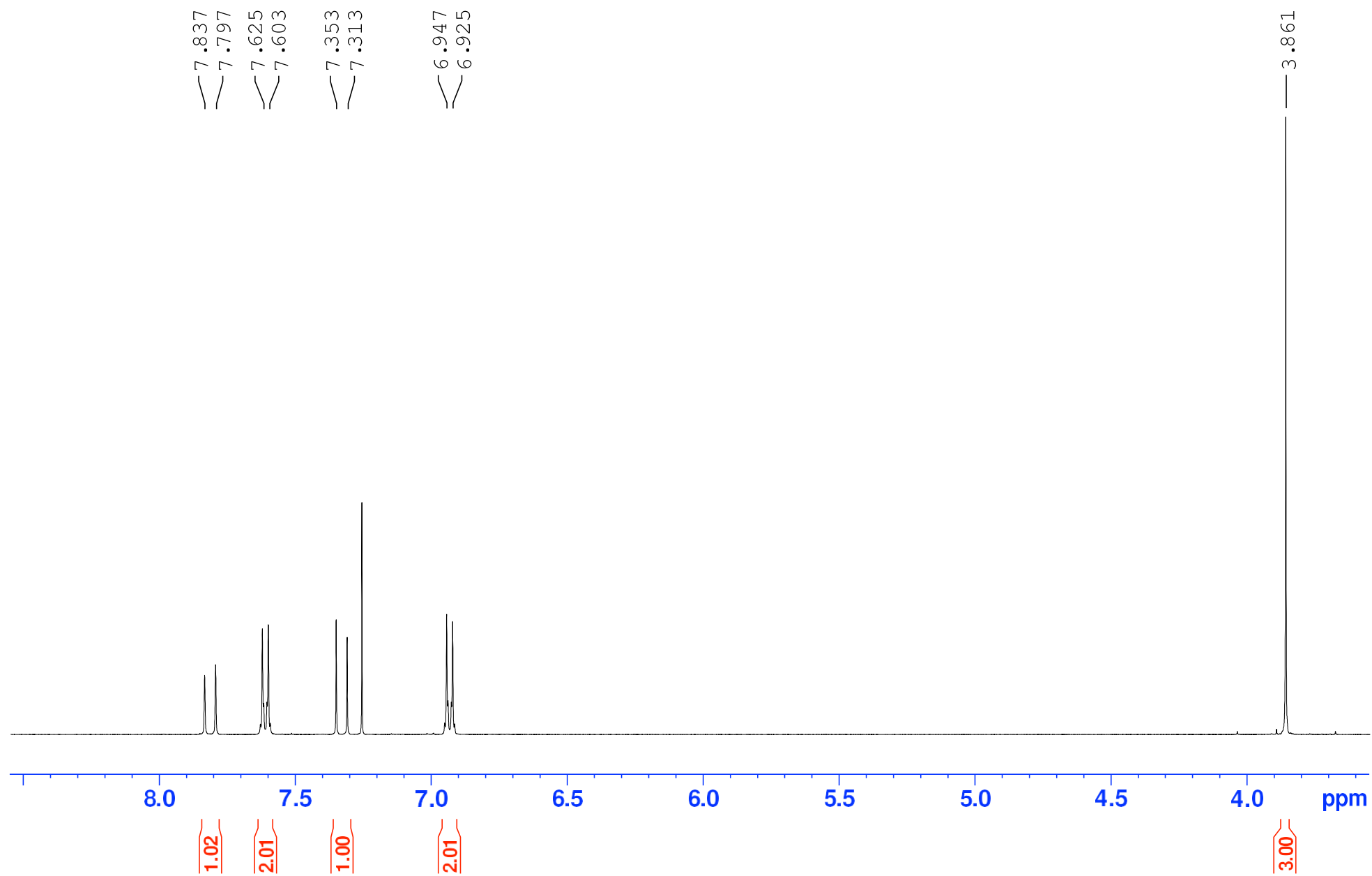
**¹H NMR (400 MHz)
Compound 3b in CDCl₃**



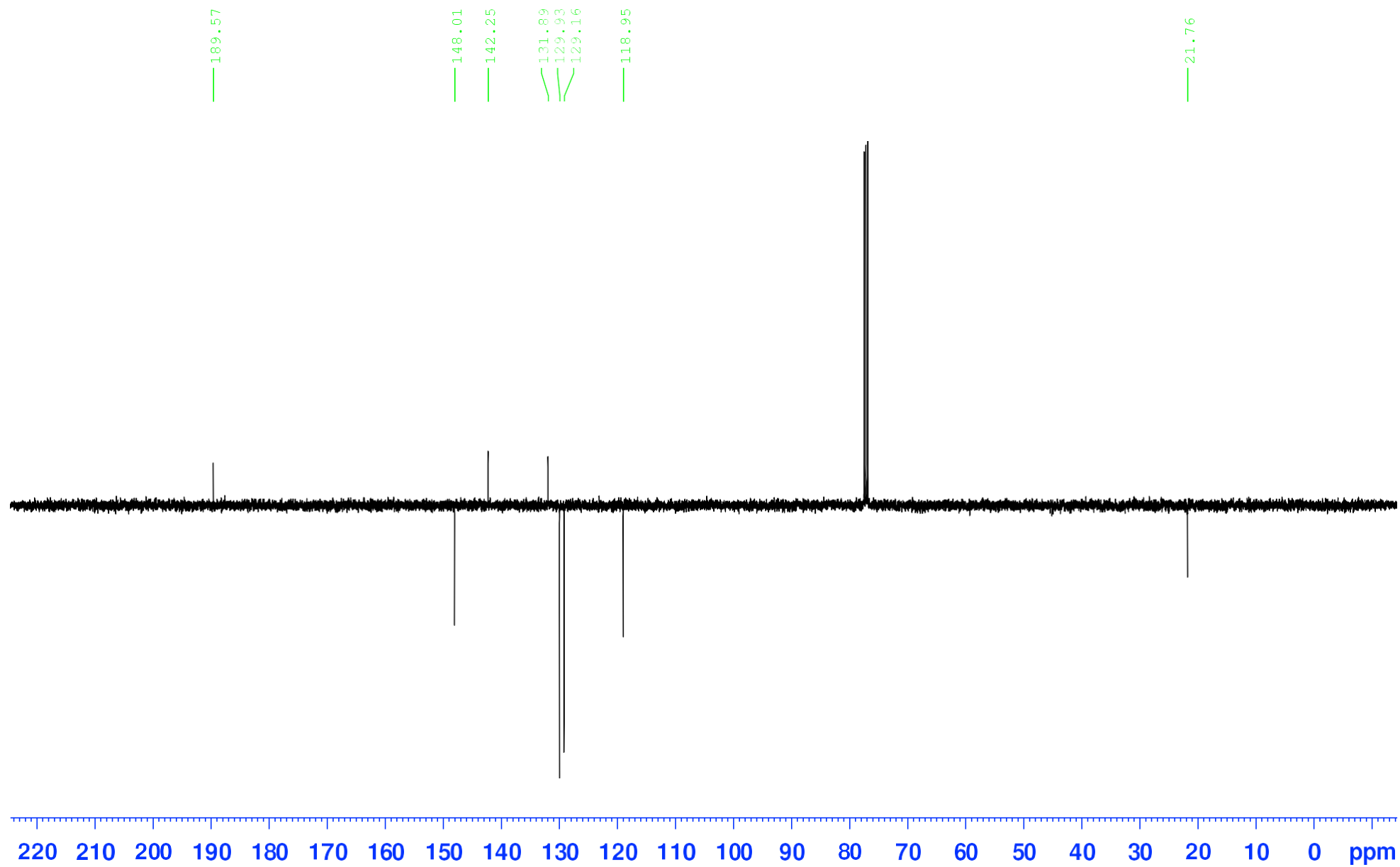
¹³C JMOD NMR (101 MHz)
Quaternary and CH2 up, CH3 and CH down
Compound 3b in CDCl₃



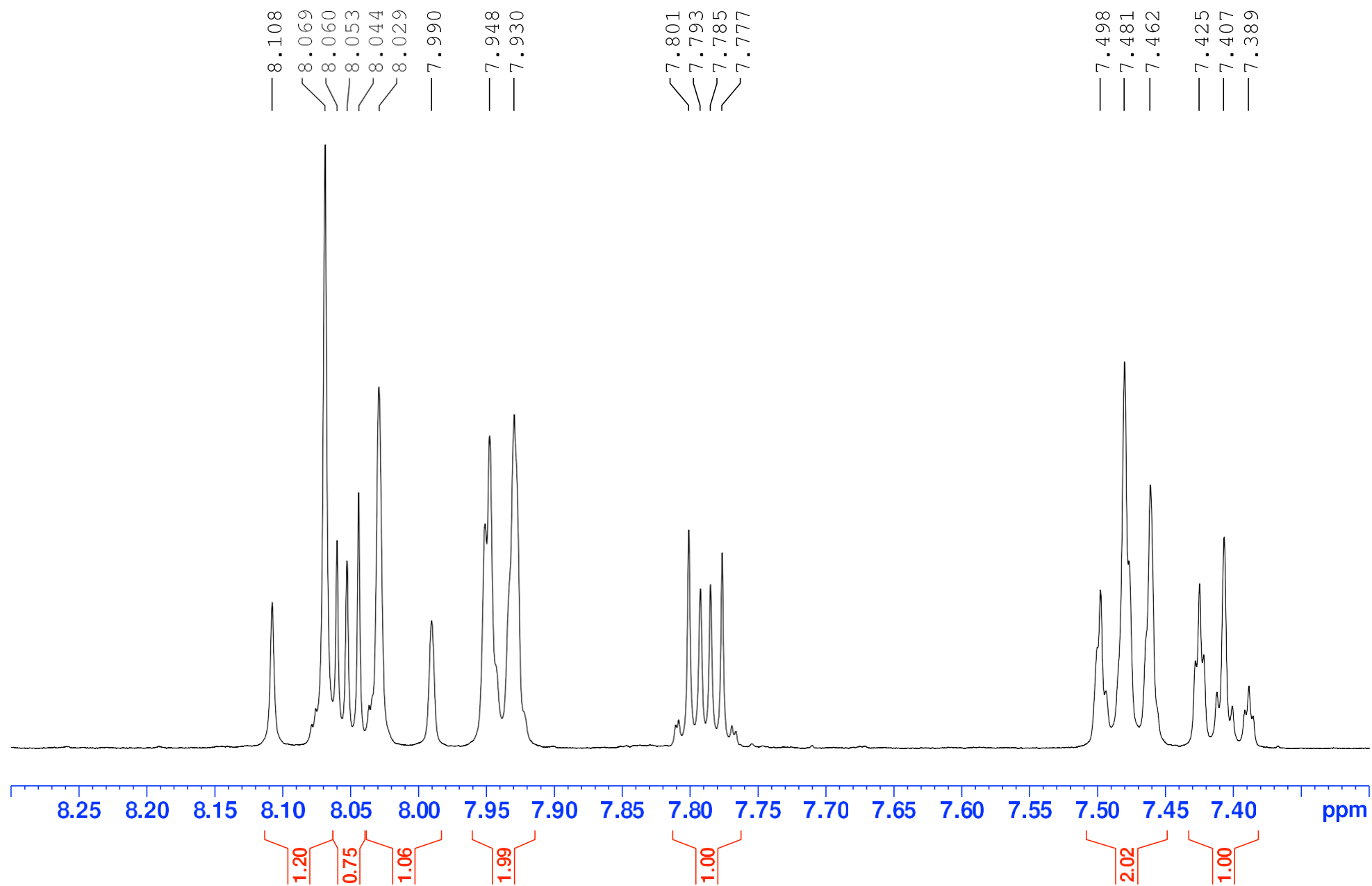
**¹H NMR (400 MHz)
Compound 3c in CDCl₃**



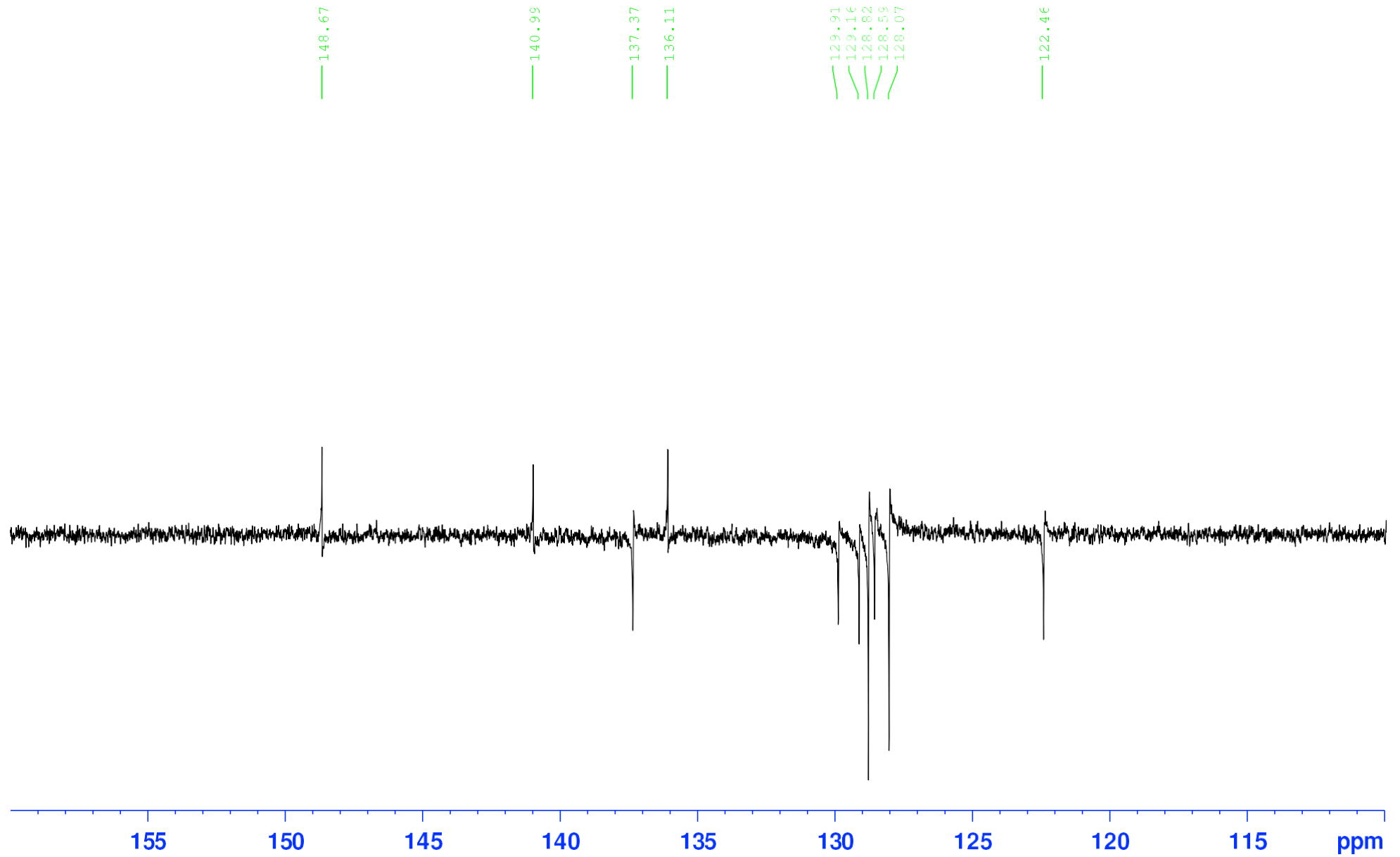
¹³C JMOD NMR (101 MHz)
Quaternary and CH₂ up, CH₃ and CH down
Compound 3c in CDCl₃



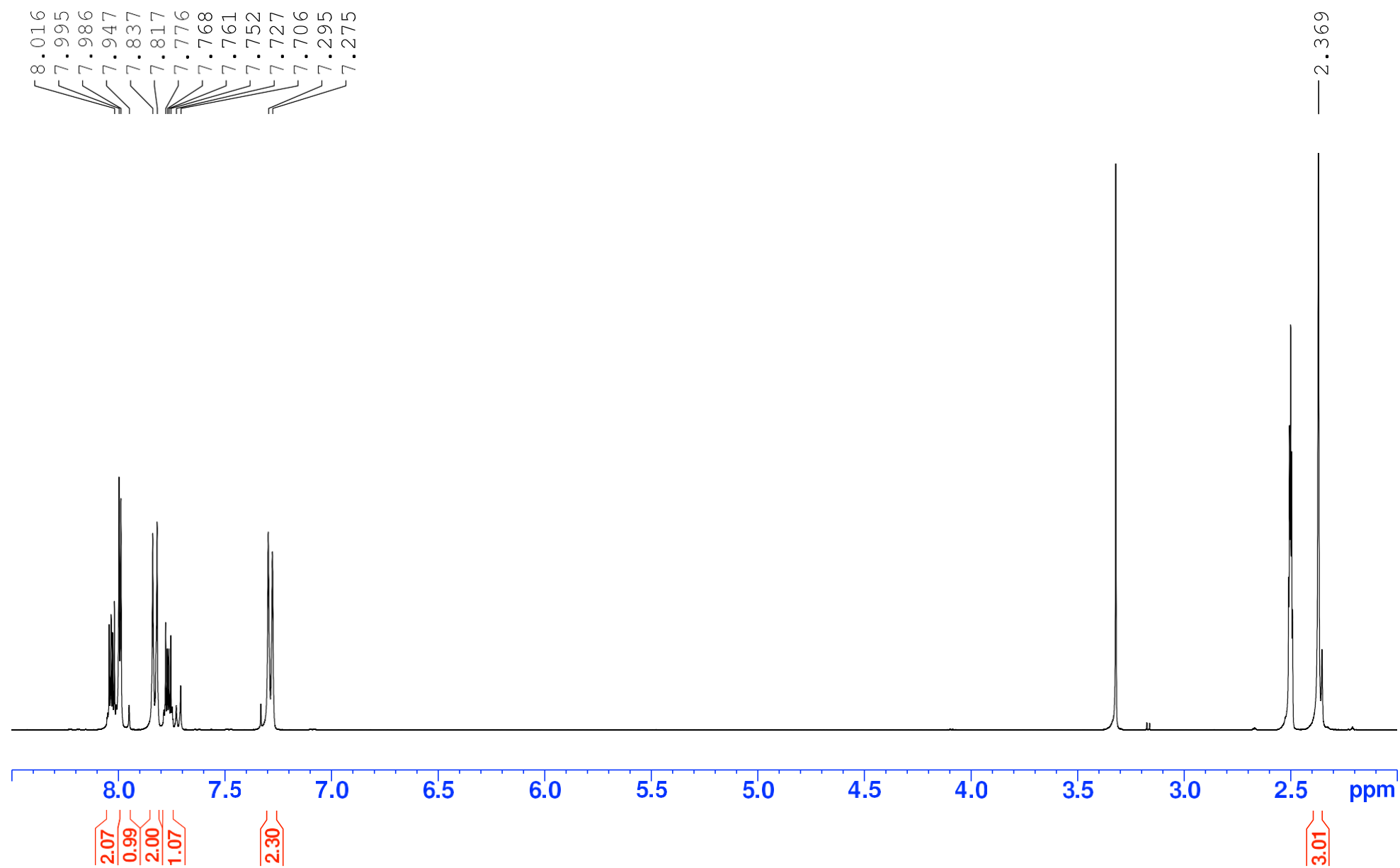
**¹H NMR (400MHz)
Compound 5a in DMSO-d6**



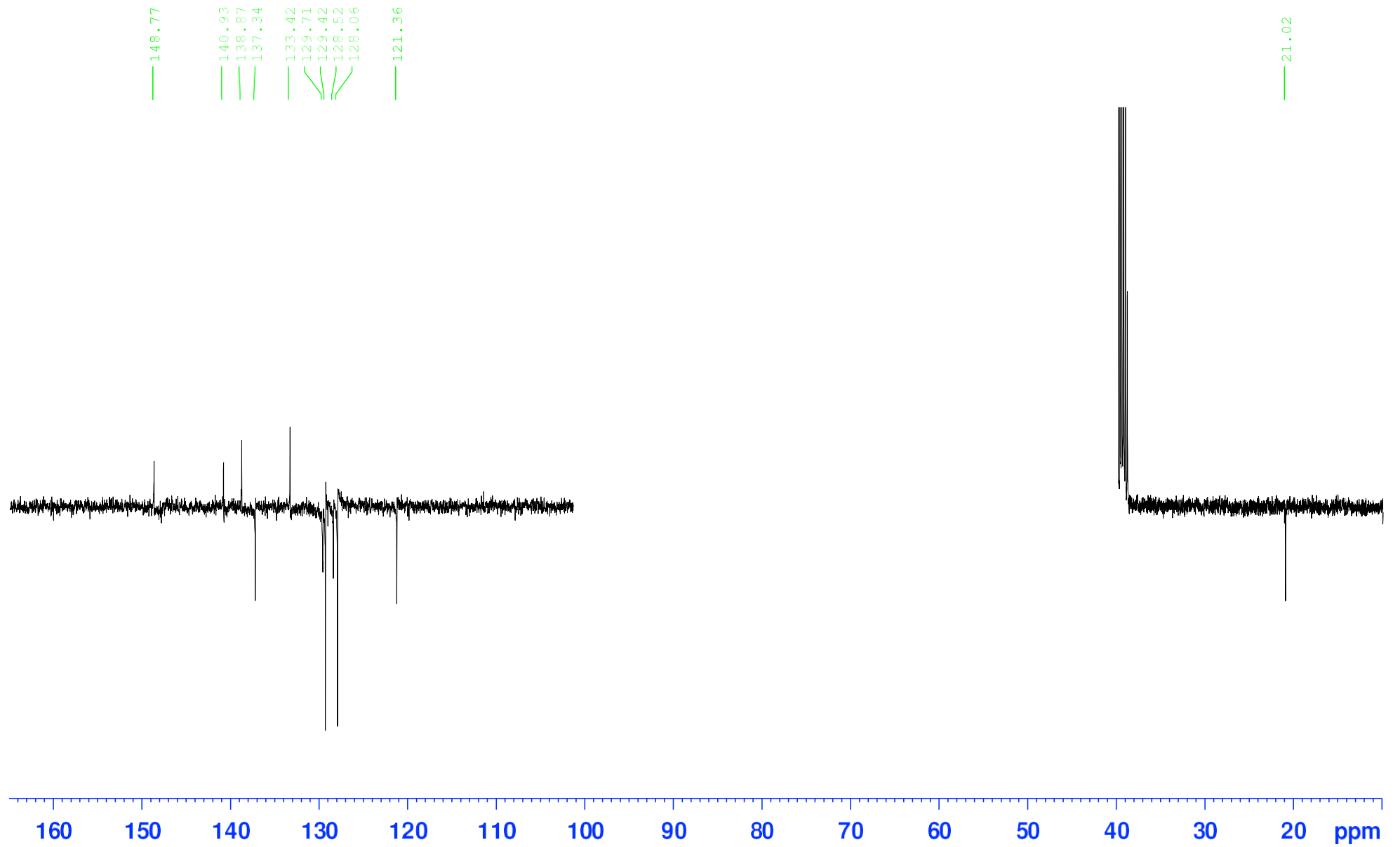
^{13}C JMOD NMR (101 MHz)
Quaternary and CH2 up, CH3 and CH down
Compound 5a in DMSO-d6



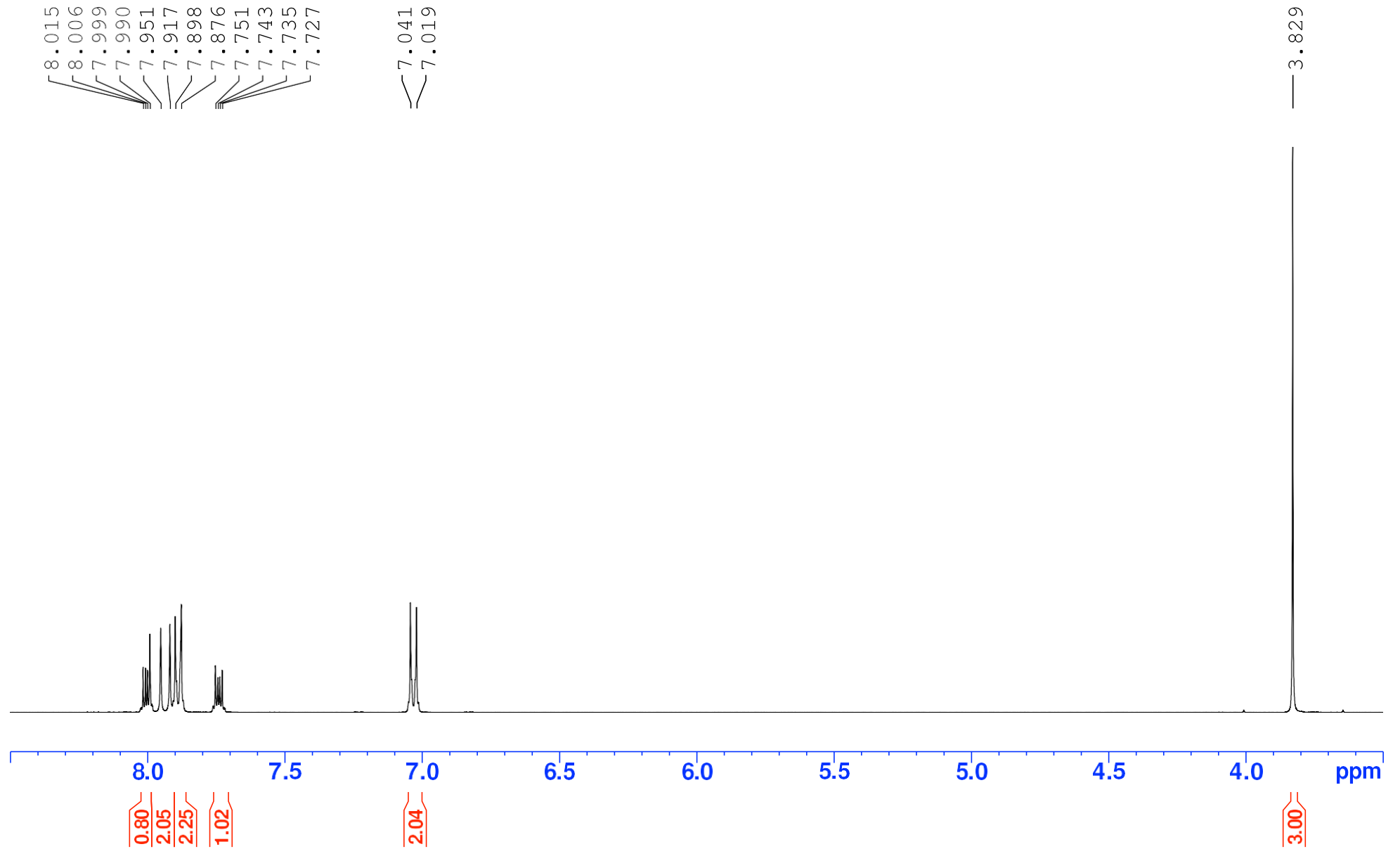
**¹H NMR (400 MHz)
Compound 5b in DMSO-d₆**



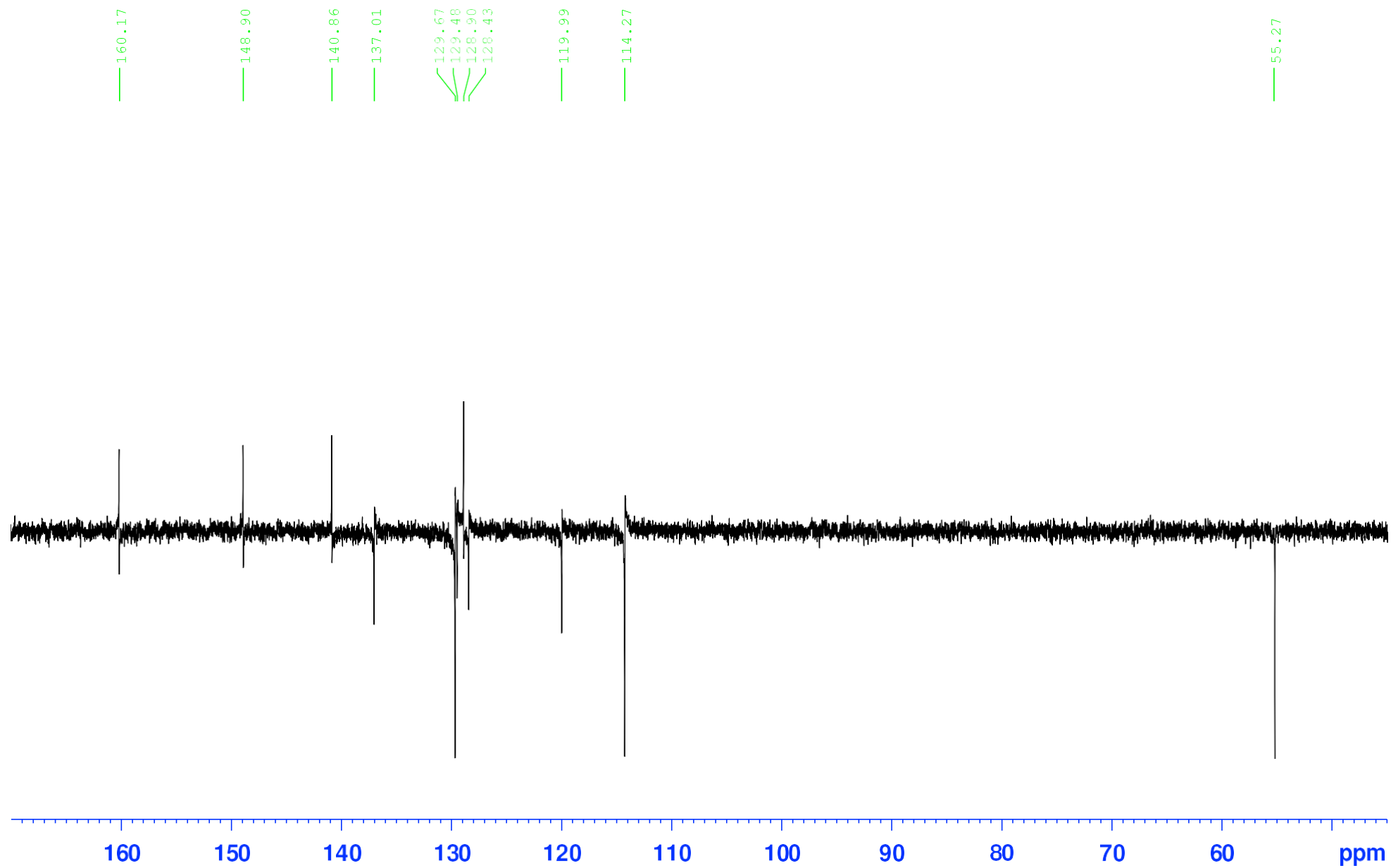
¹³C JMOD NMR (101 MHz)
Quaternary and CH₂ up, CH₃ and CH down
Compound 5b in DMSO-d₆



**¹H NMR (400 MHz)
Compound 5c in DMSO-d₆**



¹³C JMOD NMR (101 MHz)
Quaternary and CH₂ up, CH₃ and CH down
Compound 5c in DMSO-d₆



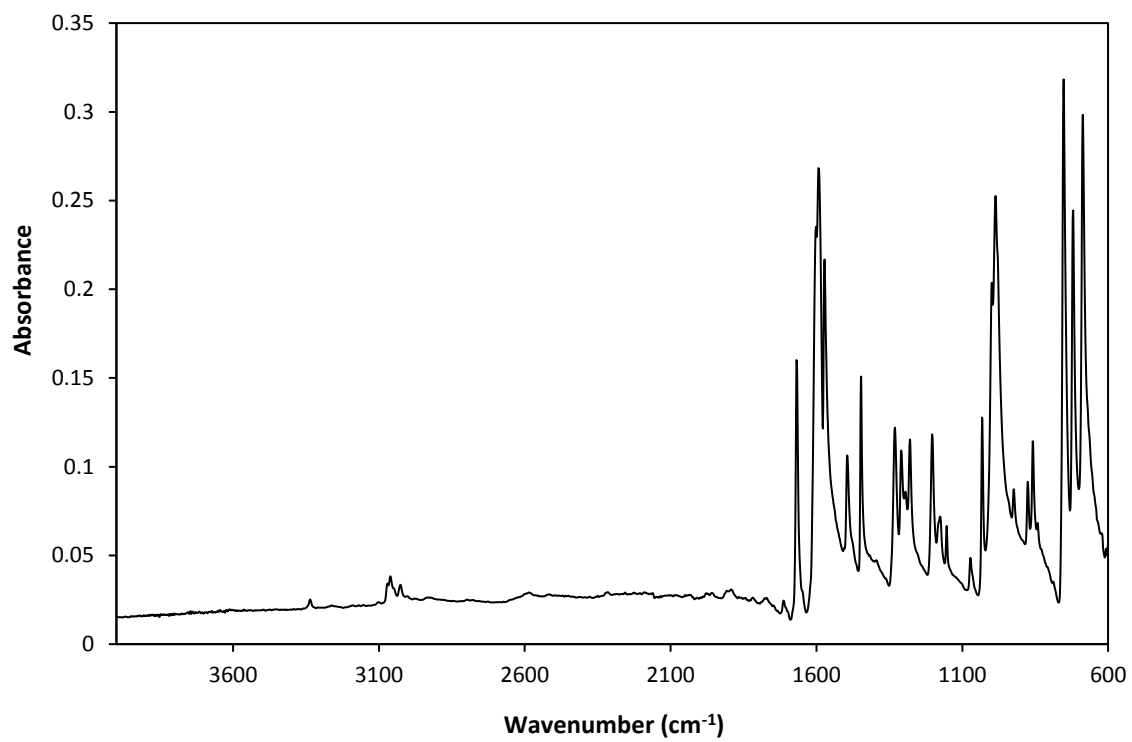


Figure S13. ATR-FTIR absorbance spectrum of cinnamil **3a**.

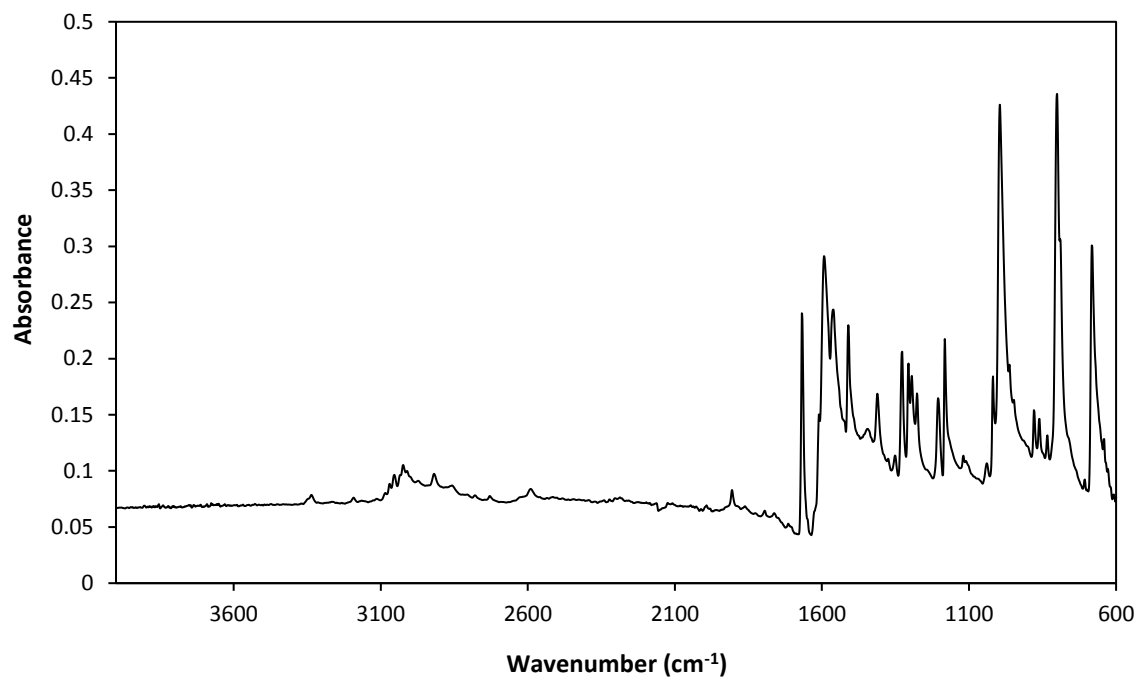


Figure S14. ATR-FTIR absorbance spectrum of cinnamil derivative **3b**.

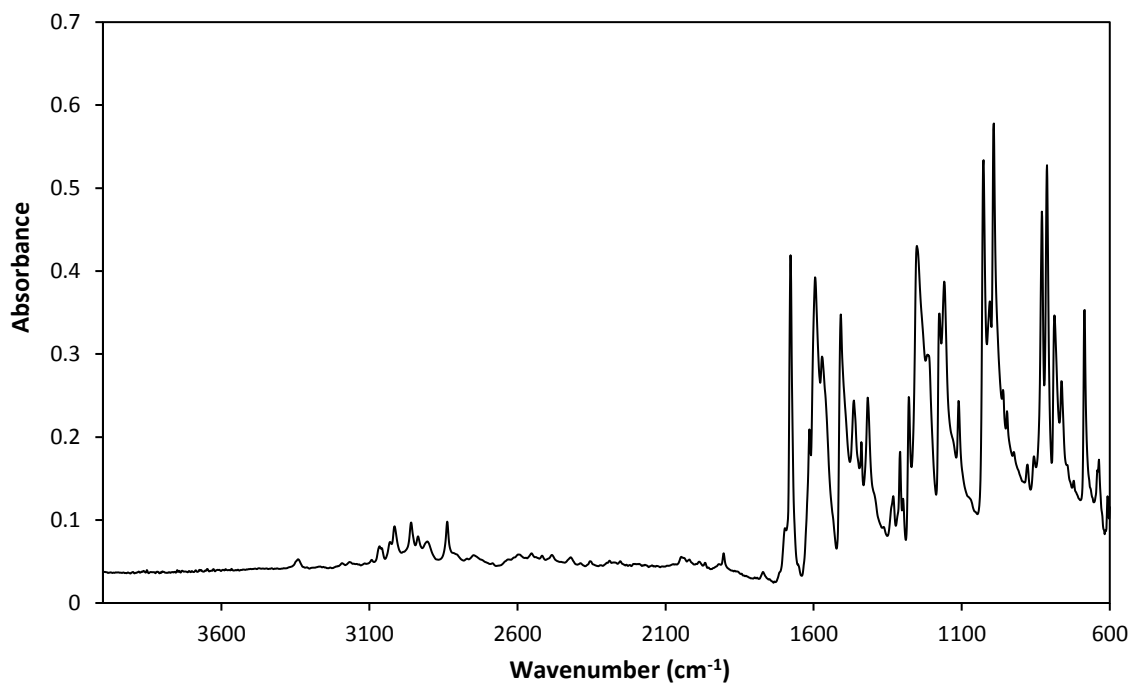


Figure S15. ATR-FTIR spectrum of cinnamil derivative **3c**.

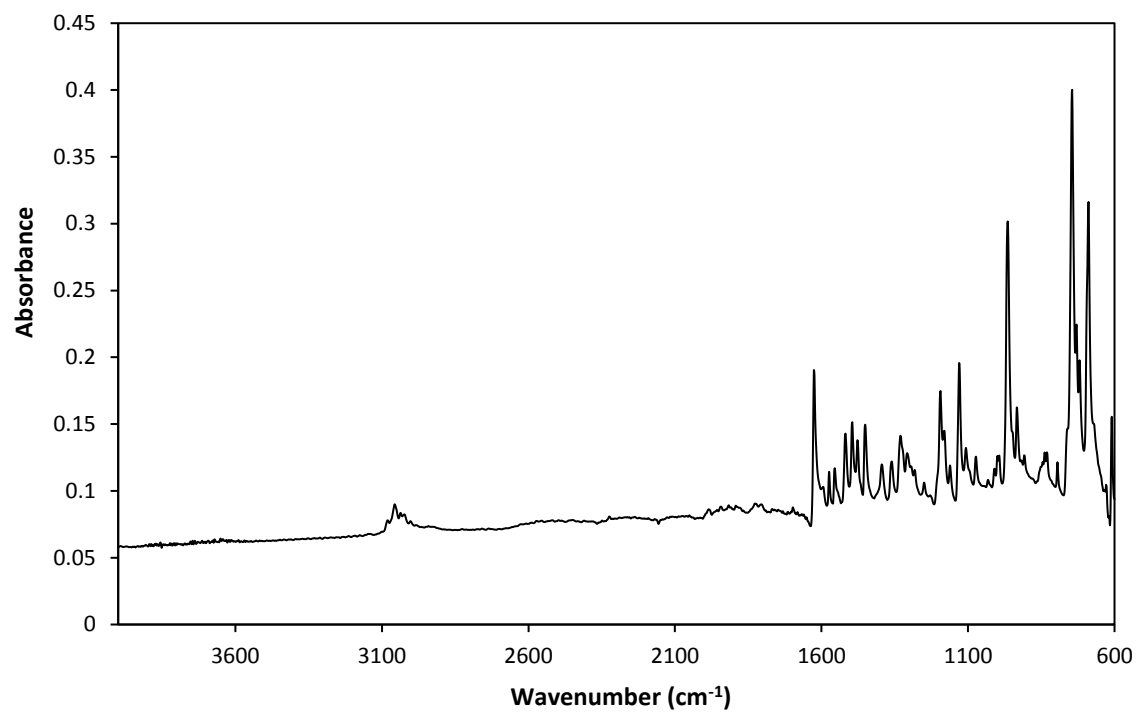


Figure S16. ATR-FTIR absorbance spectrum of quinoxaline derivative **5a**.

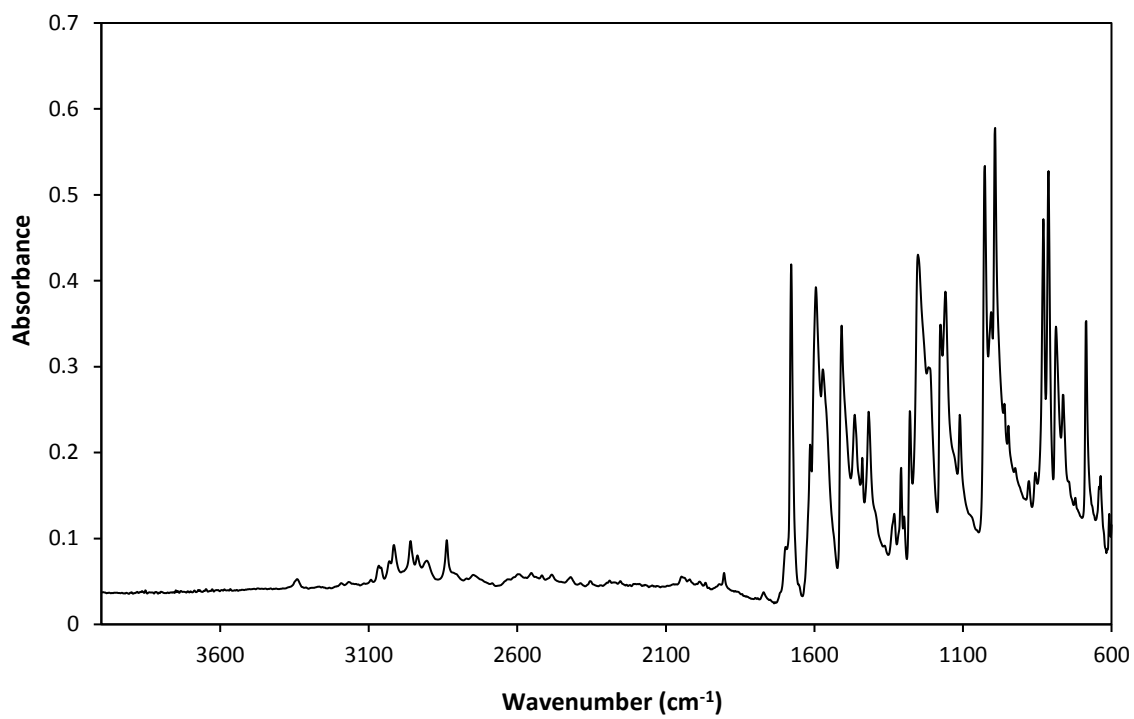


Figure S17. ATR-FTIR spectrum of quinoxaline derivative **5b**.

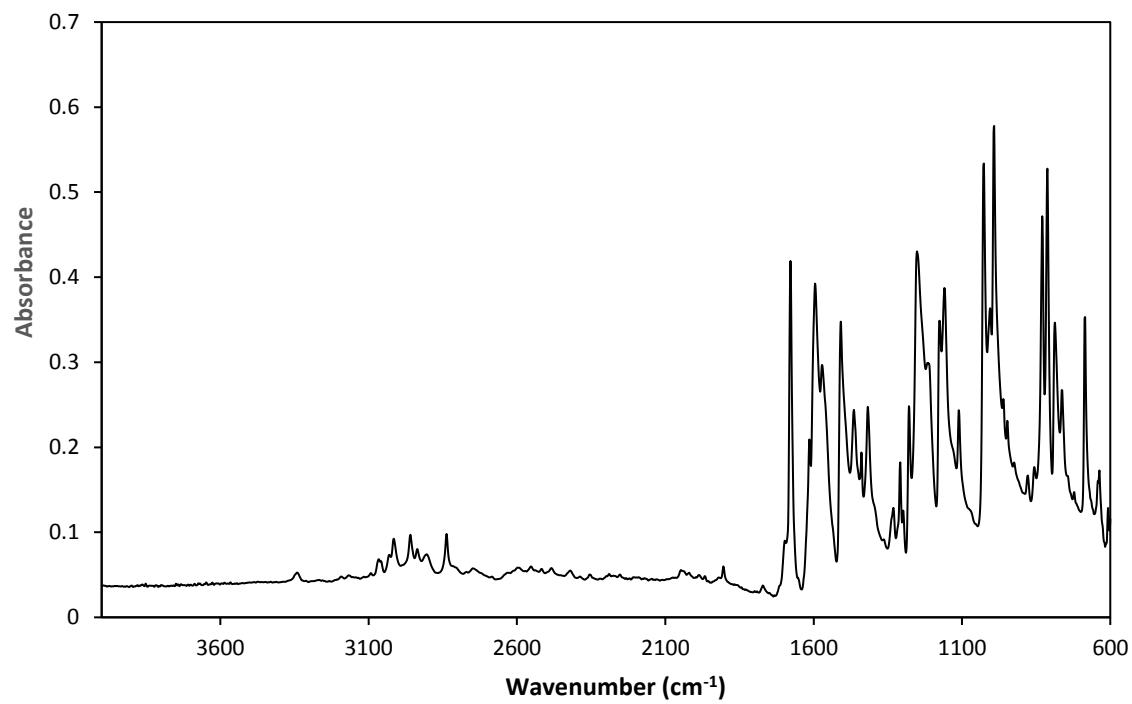


Figure S18. ATR-FTIR spectrum of quinoxaline derivative **5c**.

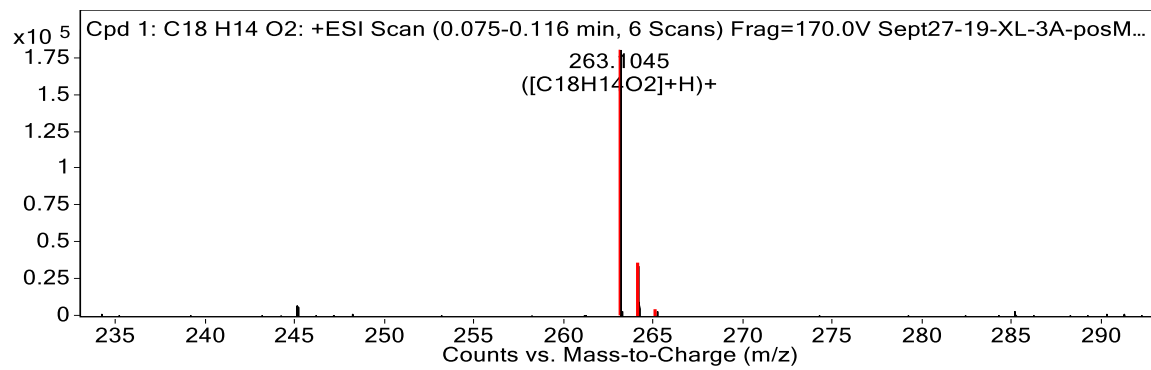


Figure S19. MS spectrum of cinnamil **3a**.

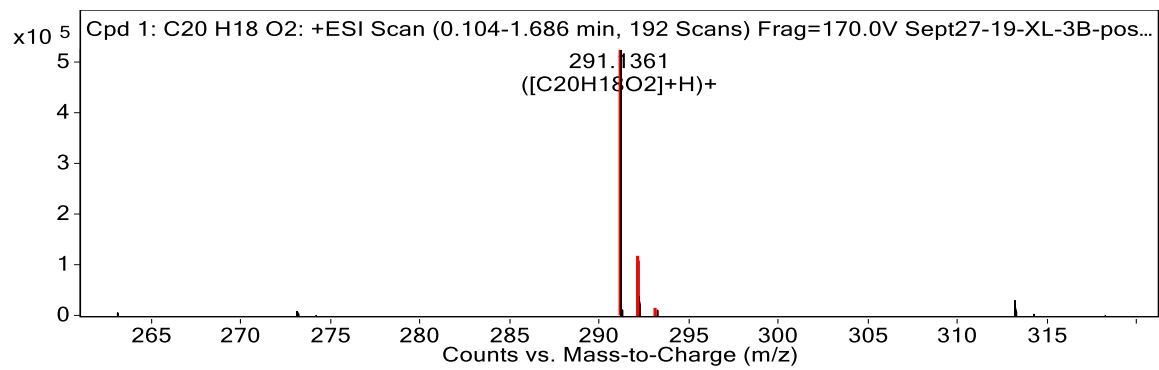


Figure S20. MS spectrum of cinnamil derivative **3b**.

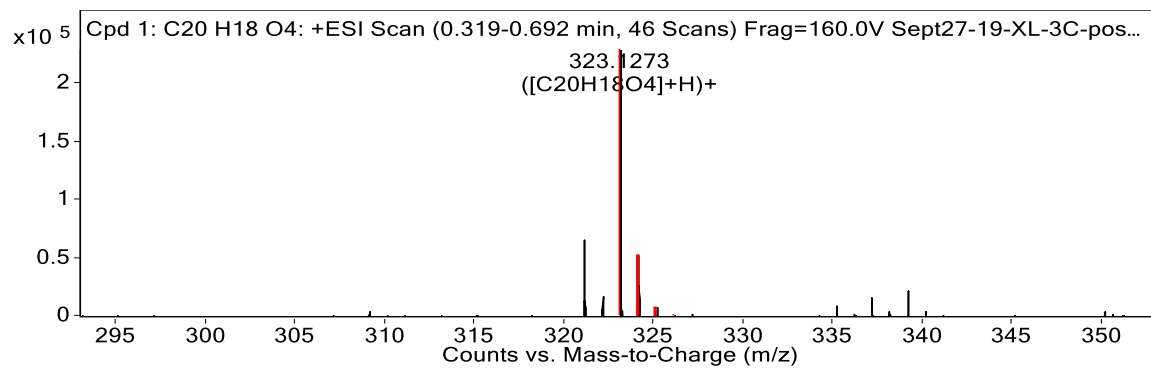


Figure S21. MS spectrum of cinnamil derivative **3c**.

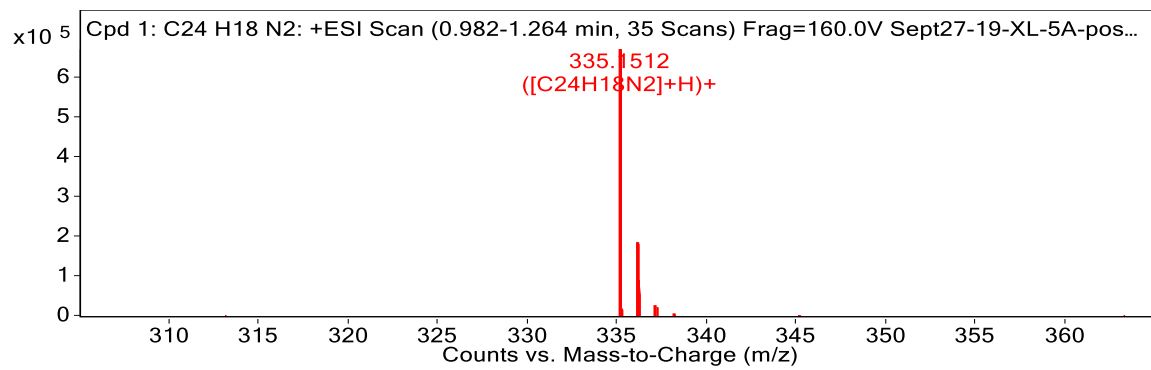


Figure S22. MS spectrum of quinoxaline derivative **5a**.

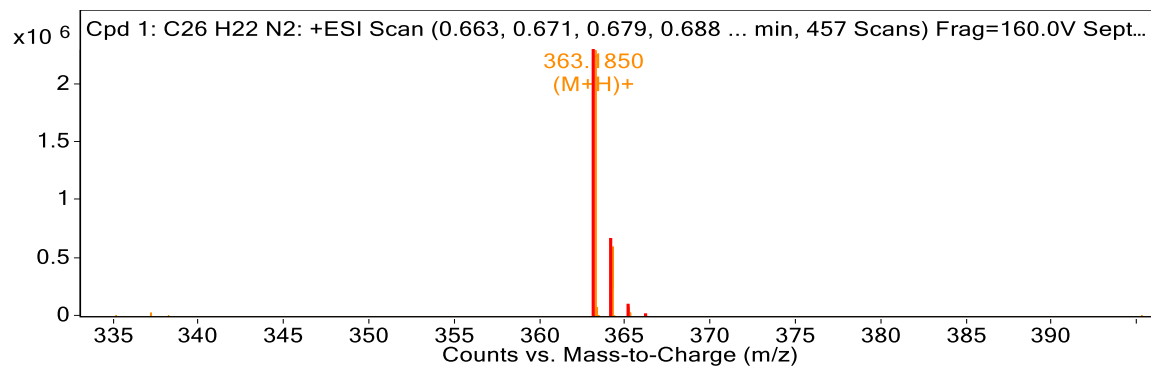


Figure S23. MS spectrum of quinoxaline derivative **5b**.

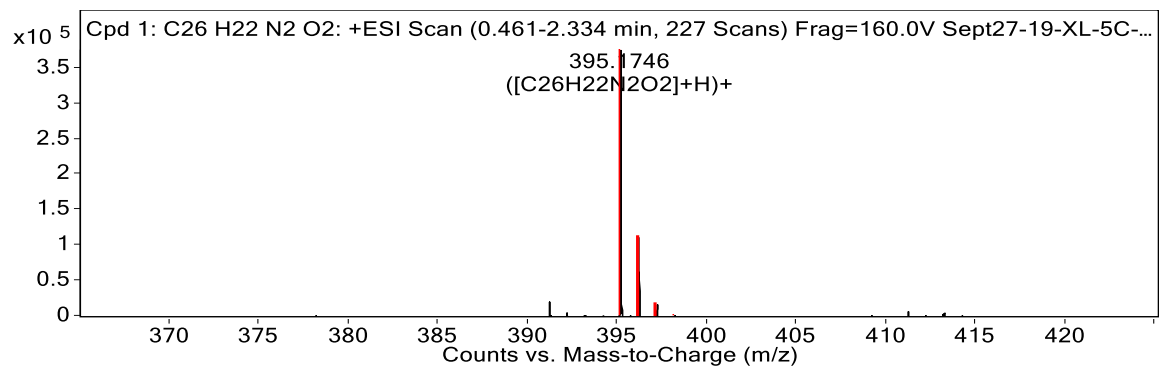


Figure S24. MS spectrum of quinoxaline derivative **5c**.

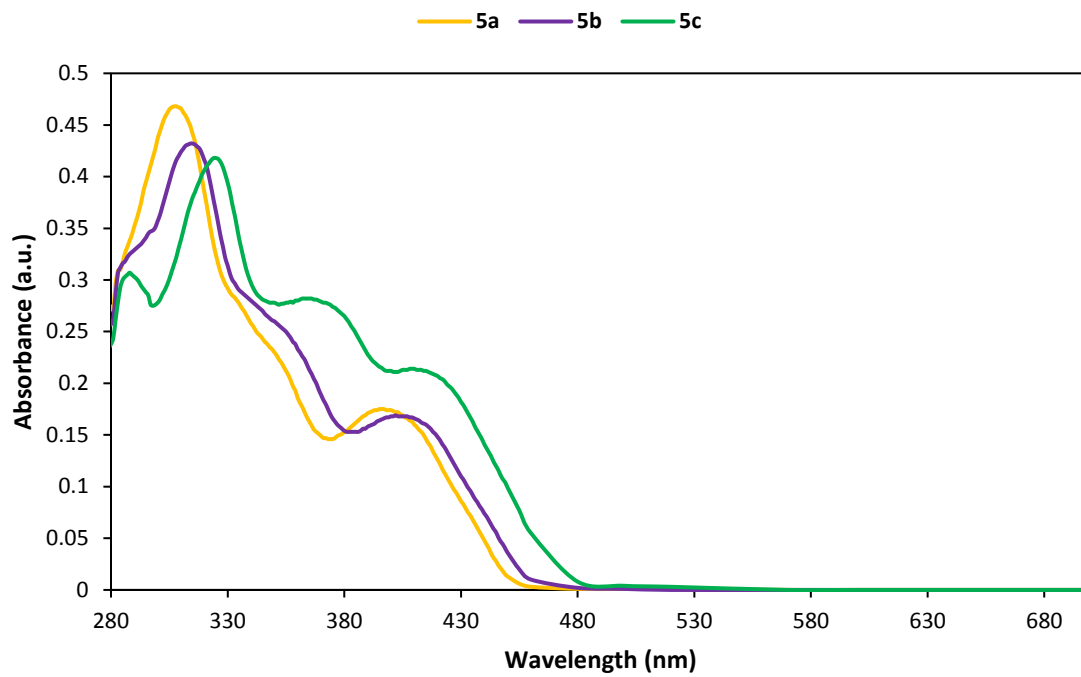


Figure S25. UV-Vis absorbance spectra of 10 μM acid-doped **5a-c** (1:5000 quinoxaline/acid molar ratio) in DMSO.