

Diastereo- and Enantioselective Synthesis of Highly Functionalized Tetrahydropyridines by Recyclable Novel Bifunctional C₂-Symmetric Ionic Liquid Supported (S)-Proline Organocatalyst

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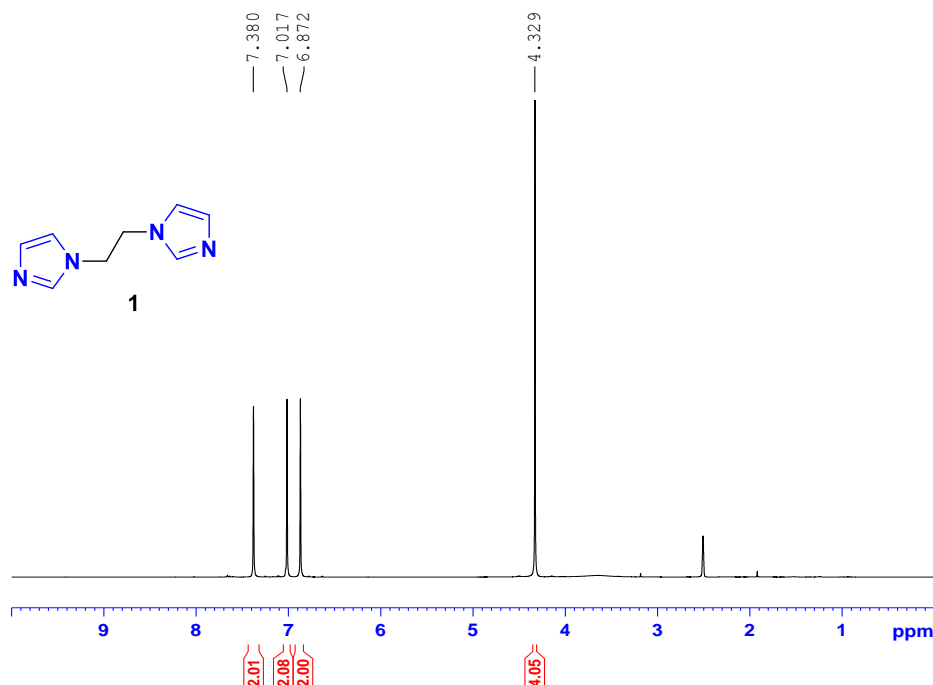
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Signature SIF VIT VELLORE
DI-IMI



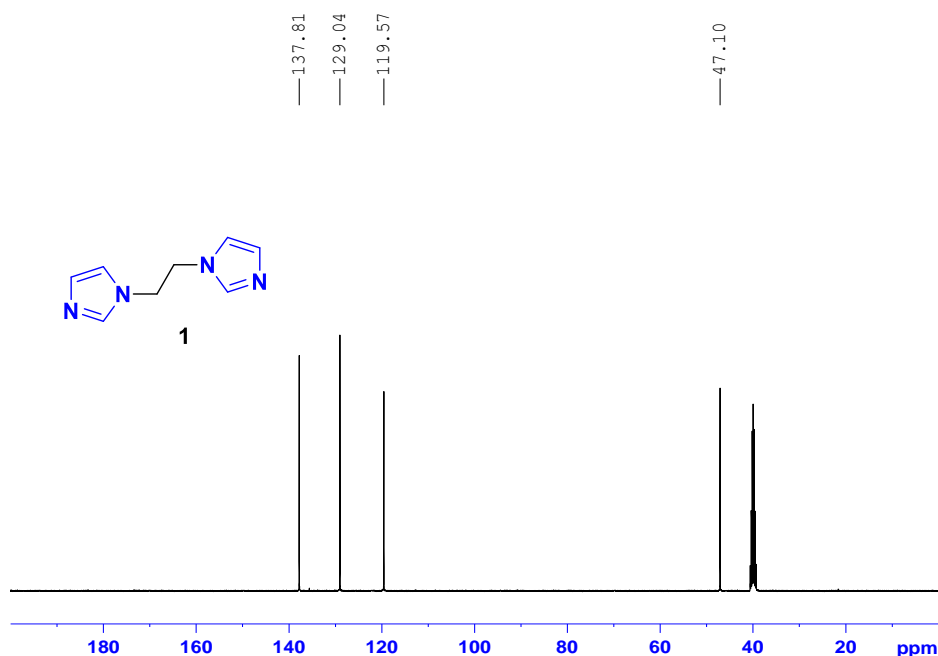
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Figure S1. ^1H NMR (400MHz) compound **1** in DMSO-d_6

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DI-IMI



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Figure S2. ^{13}C NMR Spectrum (100MHz) of compound **1** in DMSO-d_6

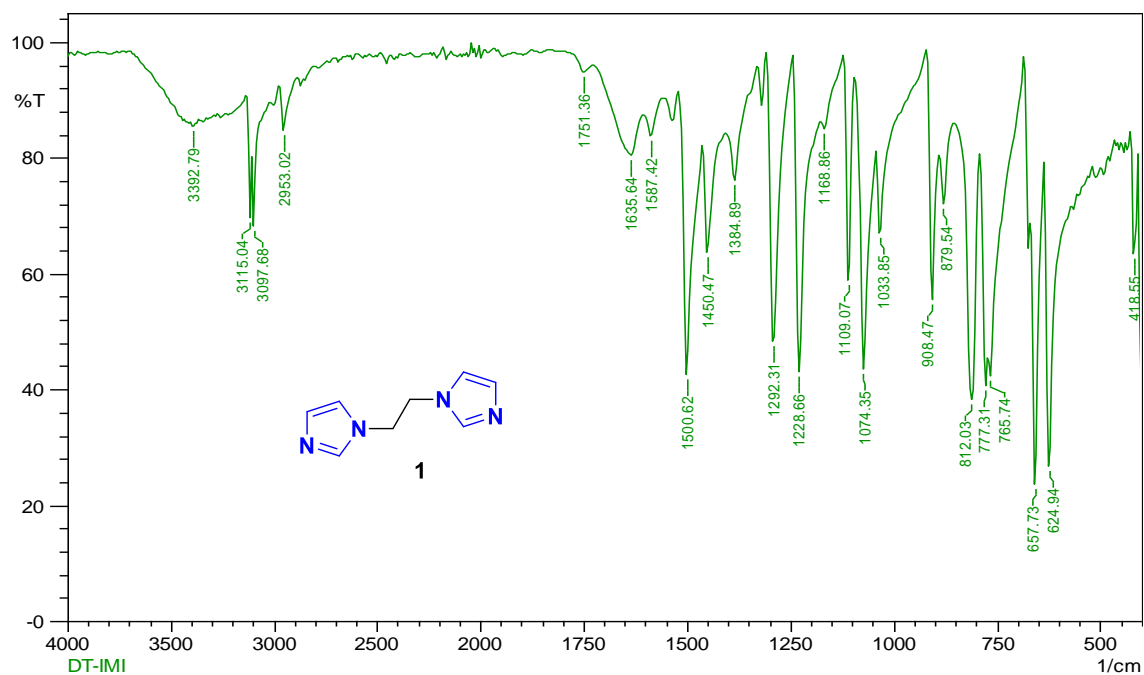


Figure S3. IR spectra of compound **1**

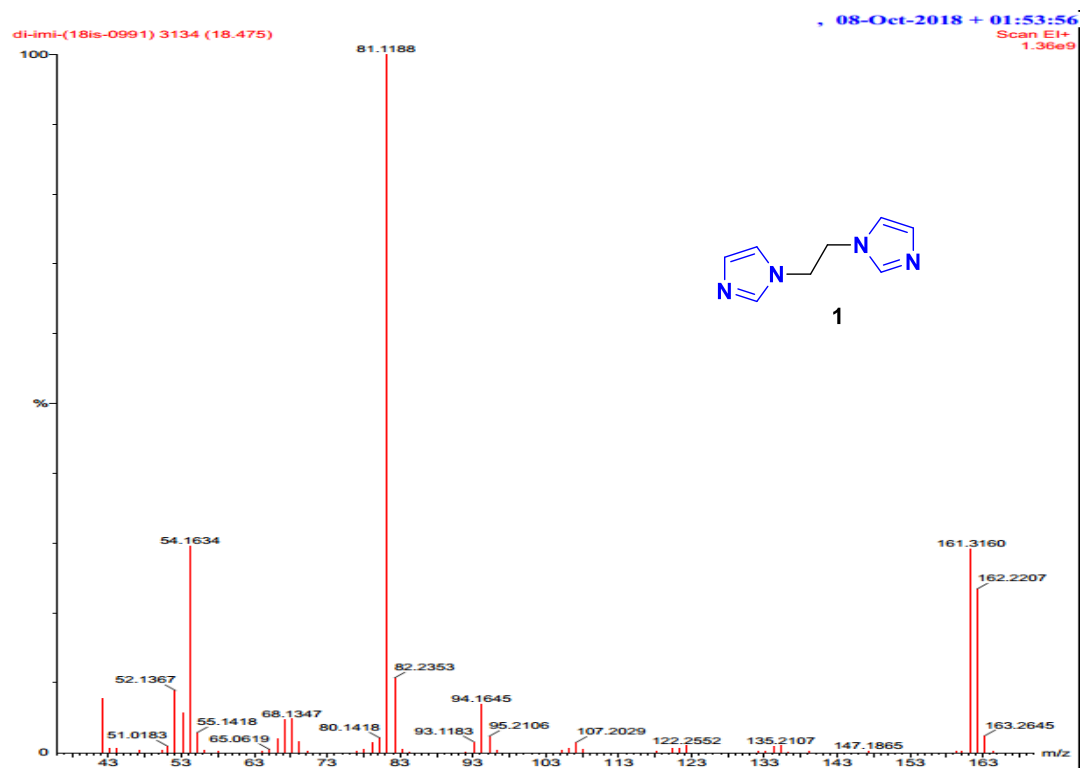
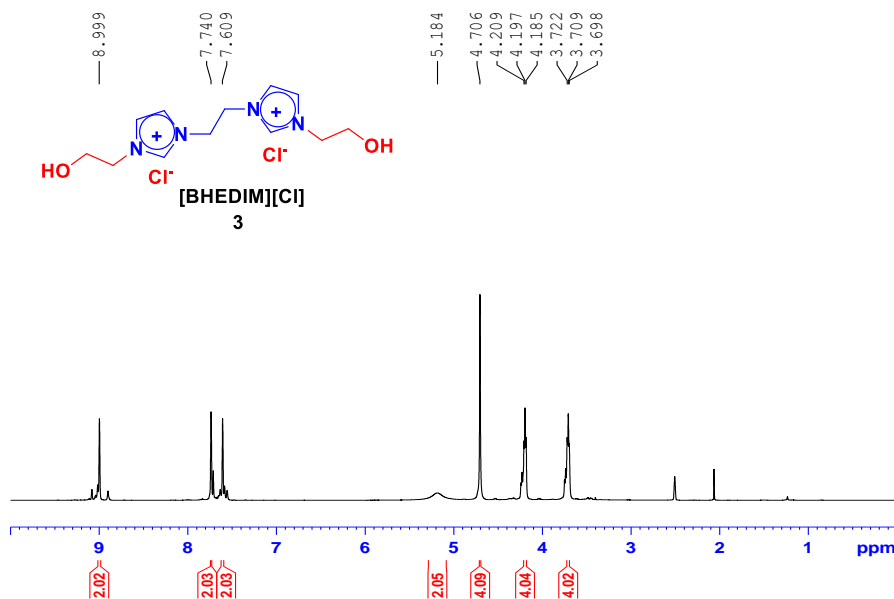


Figure S4. GCMS spectra of compound **1**.

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BI-IL-OH



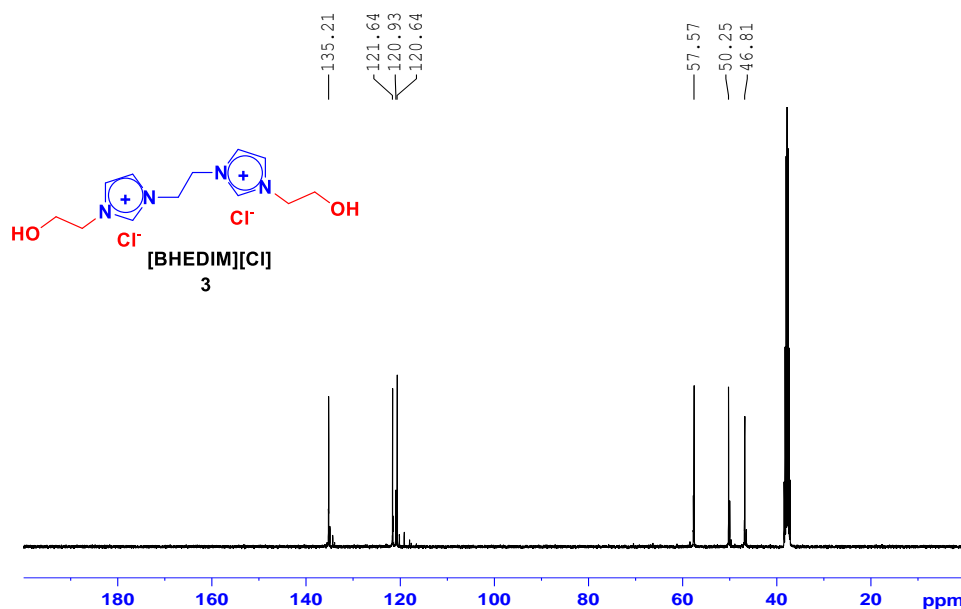
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DE 6.50 usec
TE 297.3 K
D1 1.00000000 sec
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NUC1 1H
P1 14.00 usec
PLW1 16.00000000 W

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Figure S5. ^1H NMR (400MHz) compound 3 in DMSO- d_6

Signature SIF VIT VELLORE
BI-IL-OH



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PROCNO 1

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DE 6.50 usec
TE 297.6 K
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D11 0.03000000 sec
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NUC1 13C
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NUC2 1H
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Figure S6. ^{13}C NMR (400MHz) compound 3 in DMSO- d_6

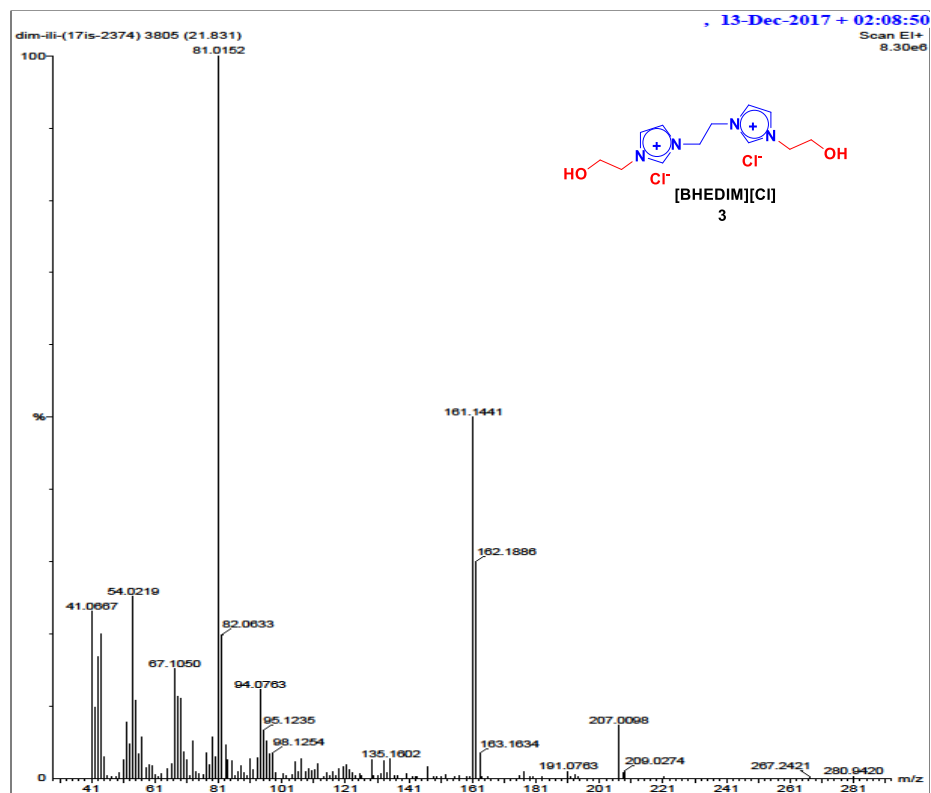
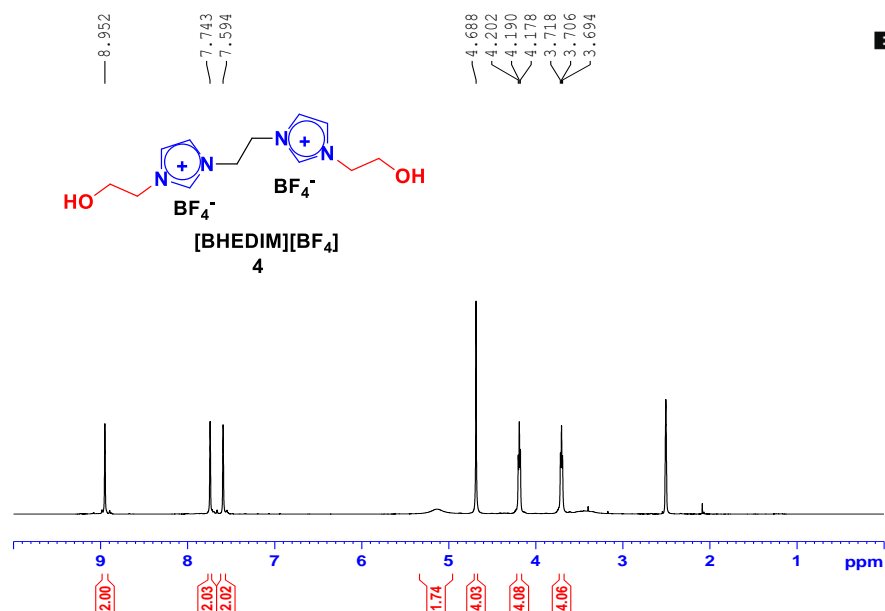


Figure S7. GCMS Spectrum of compound **3**

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ALCO

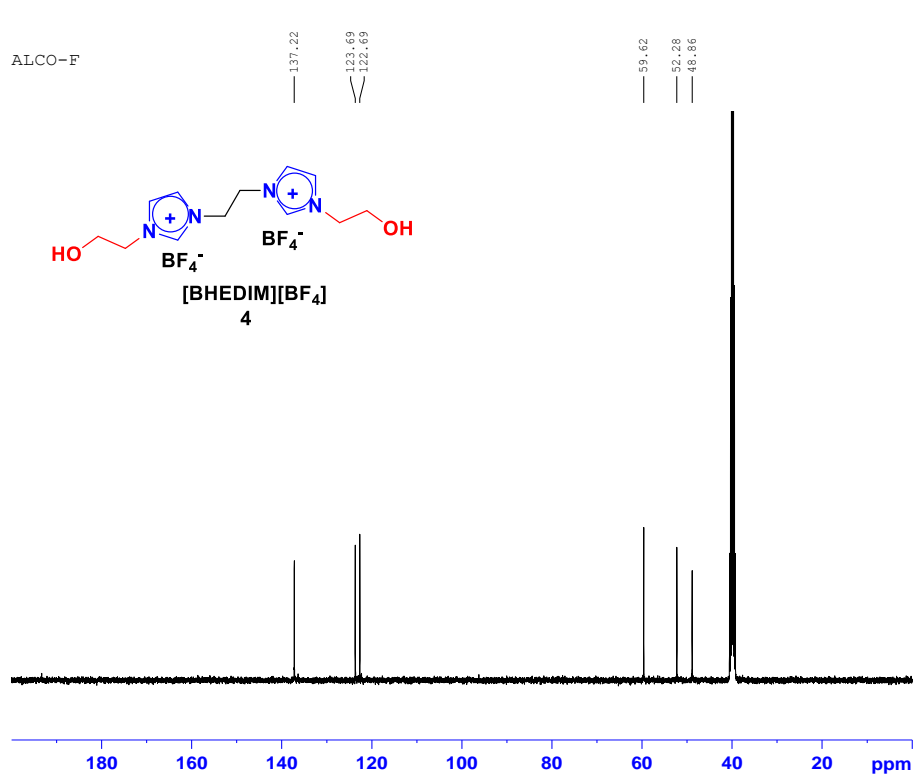


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PLW1 16.00000000 W

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Figure S8. ¹H NMR (400MHz) compound **4** in DMSO-d₆



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PLW13 0.19474000 W

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Figure S9. ¹³C NMR (400MHz) compound **4** in DMSO-d₆

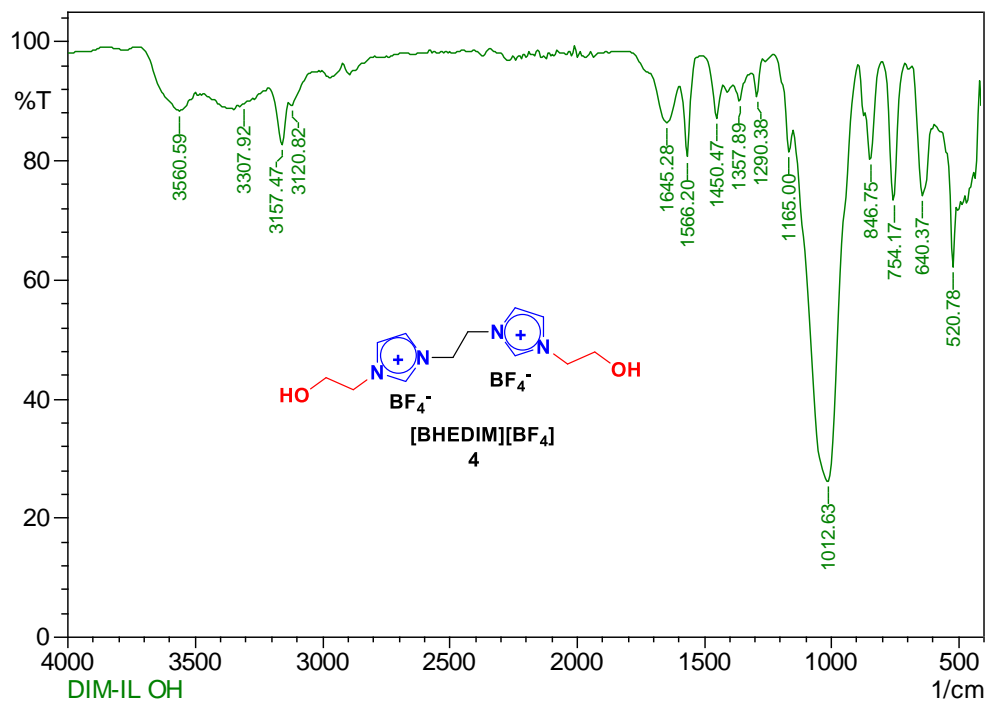


Figure S10. IR spectra of compound 4

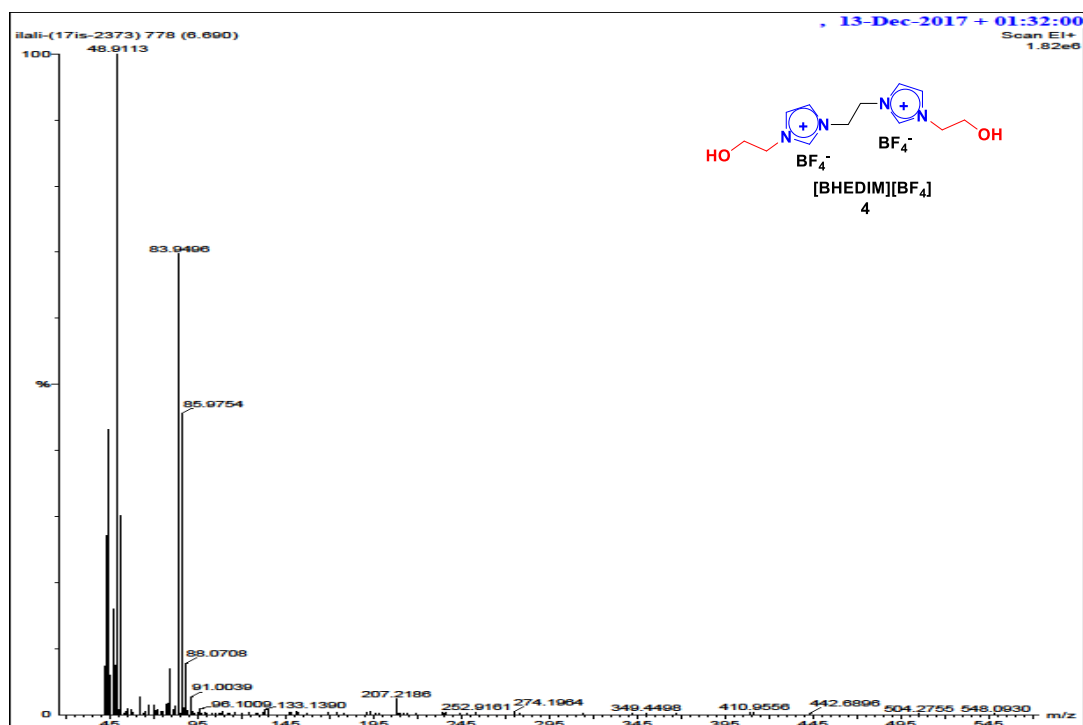


Figure S11. GCMS Spectrum of compound 4

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BI-IL-PC

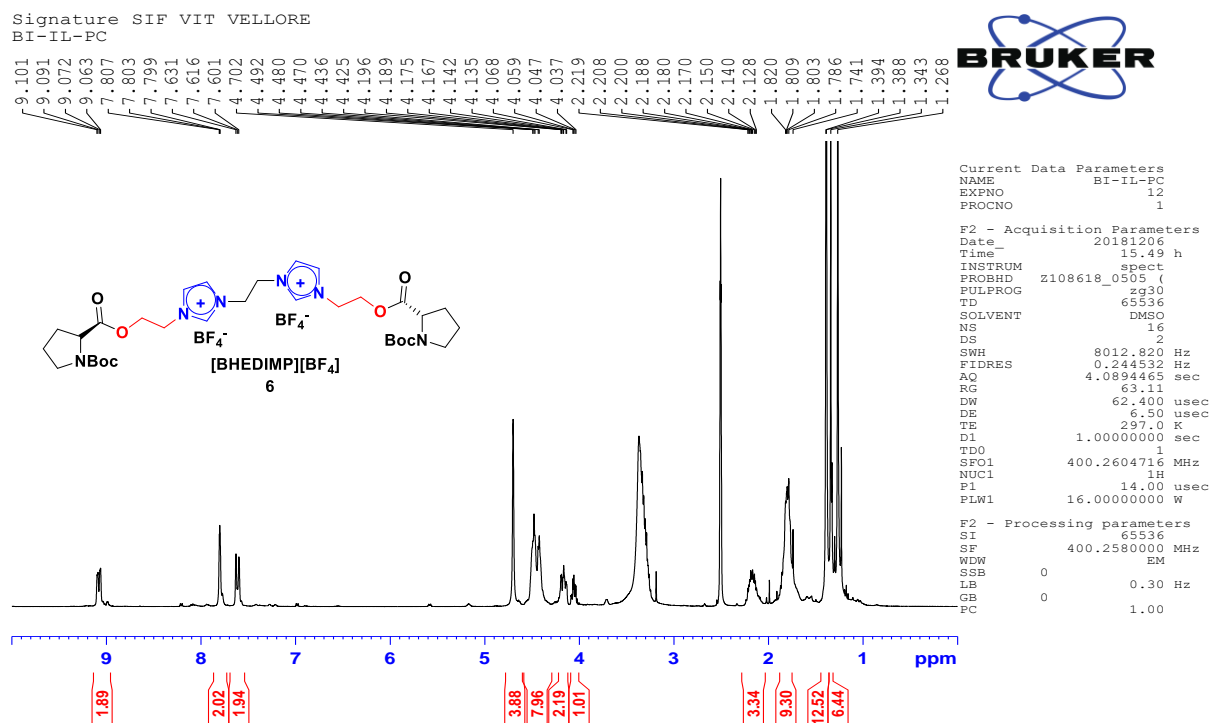


Figure S12. ¹H NMR (400MHz) compound 6 in DMSO-d₆

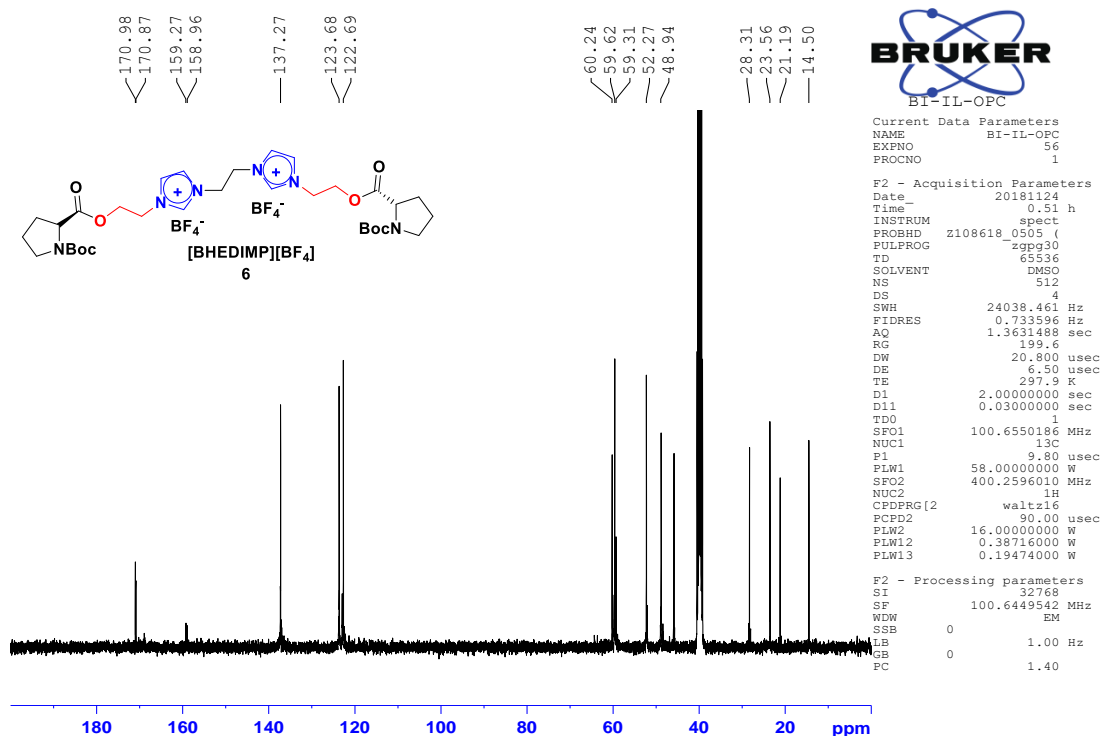


Figure S13. ¹³C NMR (400MHz) compound 6 in DMSO-d₆

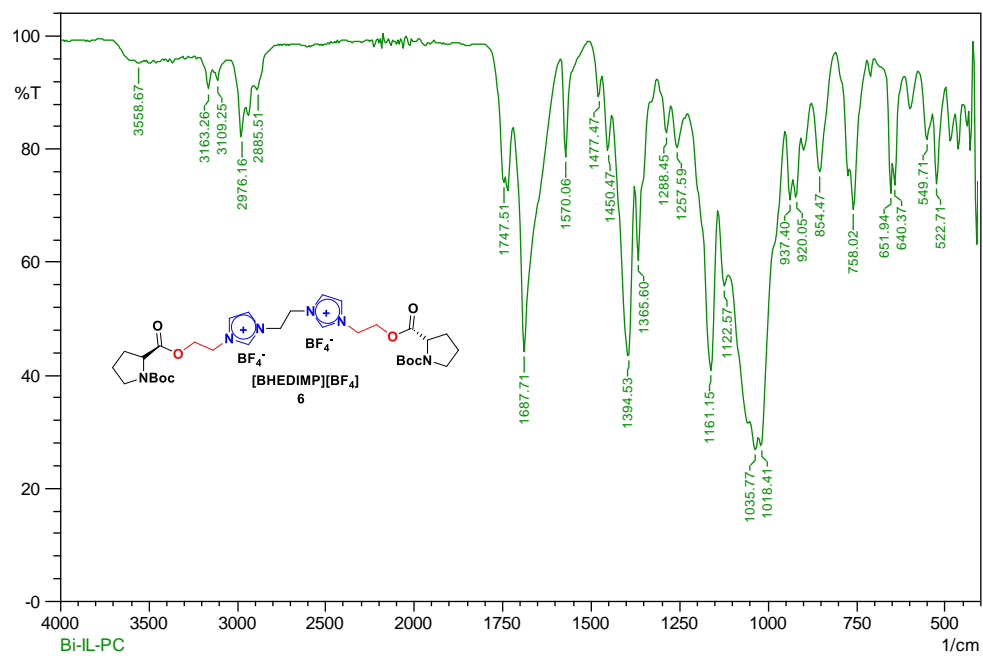
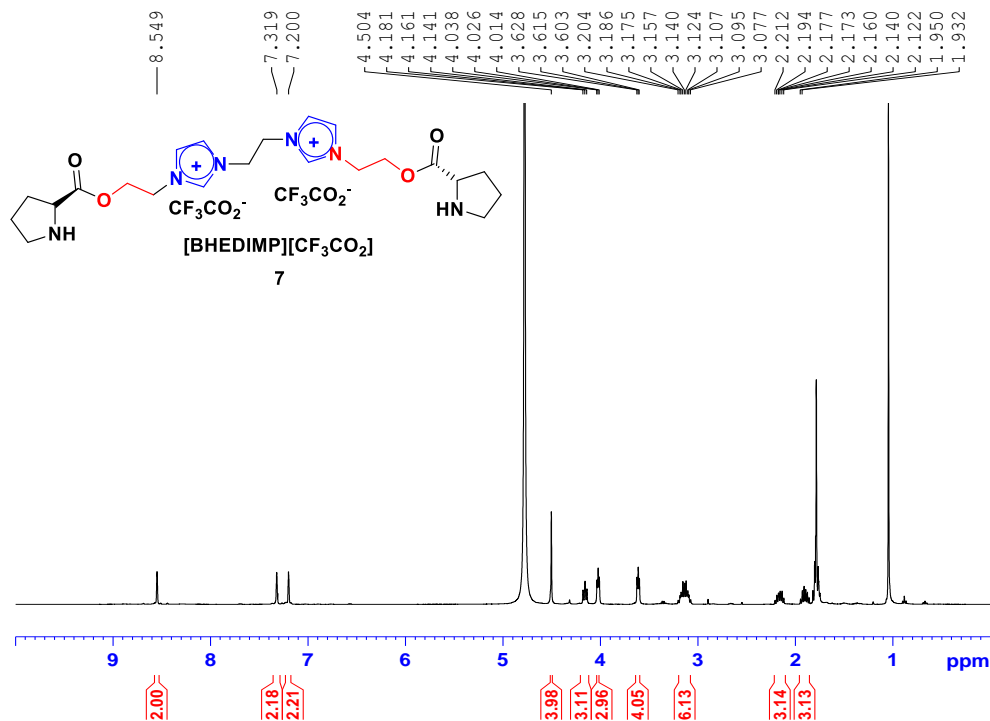


Figure S14. IR Spectrum of compound **6**

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BP-OH-IL-F



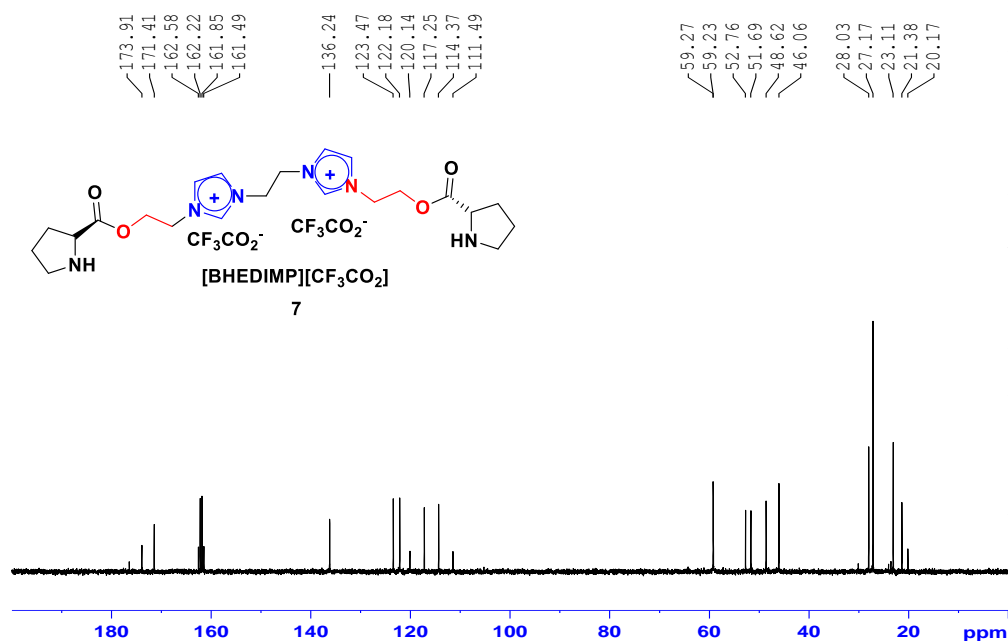
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Figure S15. ¹H NMR (400MHz) compound **7** in D₂O

Signature SIF VIT VELLORE
BP-OH-IL-F



Current Data Parameters
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EXPNO 8
PROCNO 1

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D11 0.03000000 sec
TD0 1
SFO1 100.6550186 MHz
NUC1 13C
P1 9.80 usec
PLW1 58.00000000 W
SFO2 400.2596010 MHz
NUC2 1H
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PCPD2 90.00 usec
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PLW13 0.19474000 W

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Figure S16. ¹³C NMR (400MHz) compound **7** in D₂O

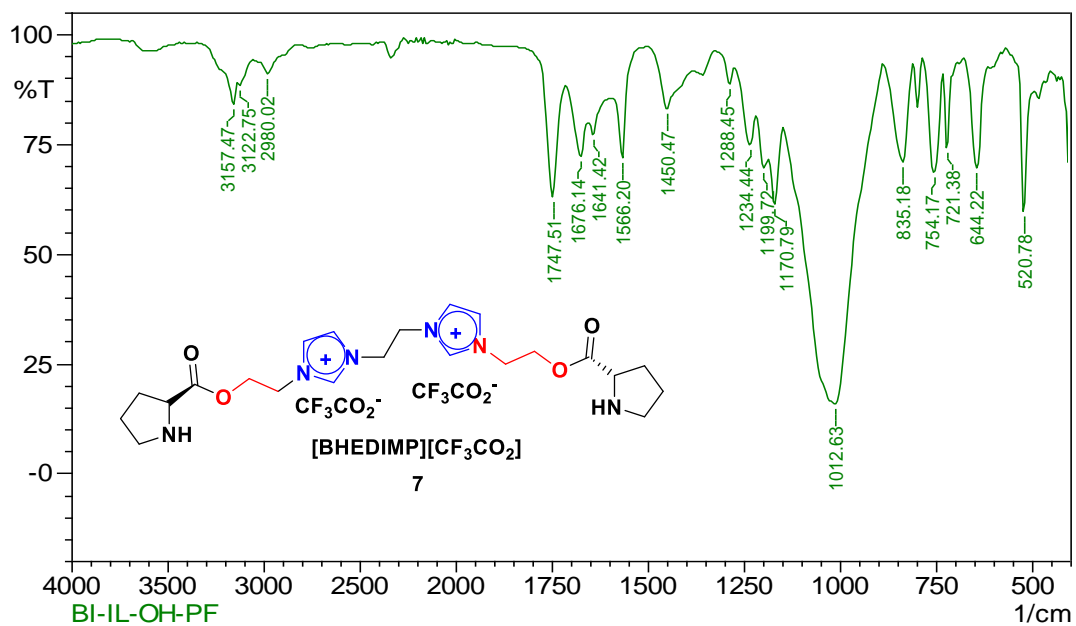


Figure S17. IR spectra of compound 7.

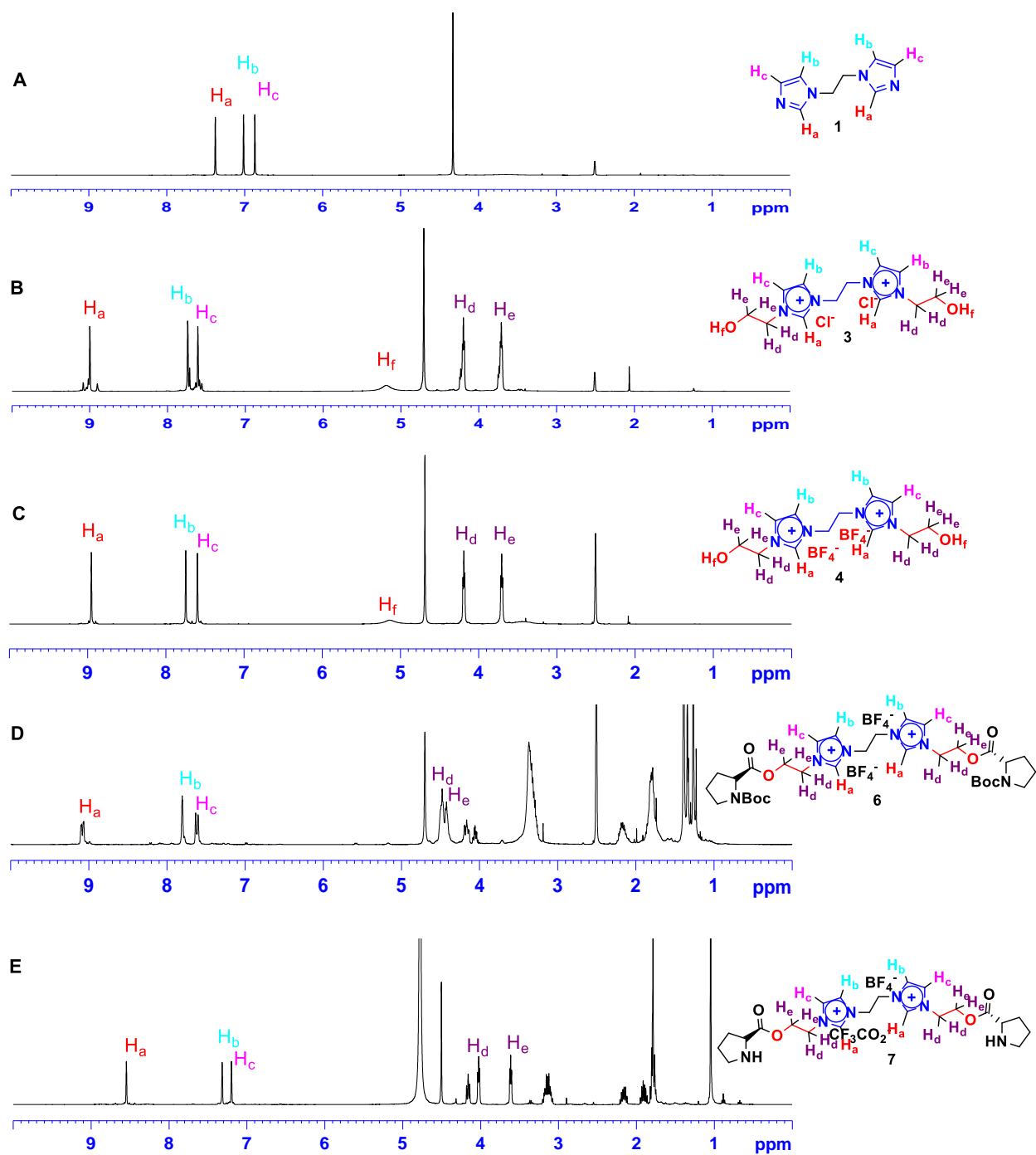


Figure S18. Stepwise ^1H NMR spectrum for (*S*)-proline organocatalyst $[\text{BHEDIMP}][\text{CF}_3\text{CO}_2]$ **7**.

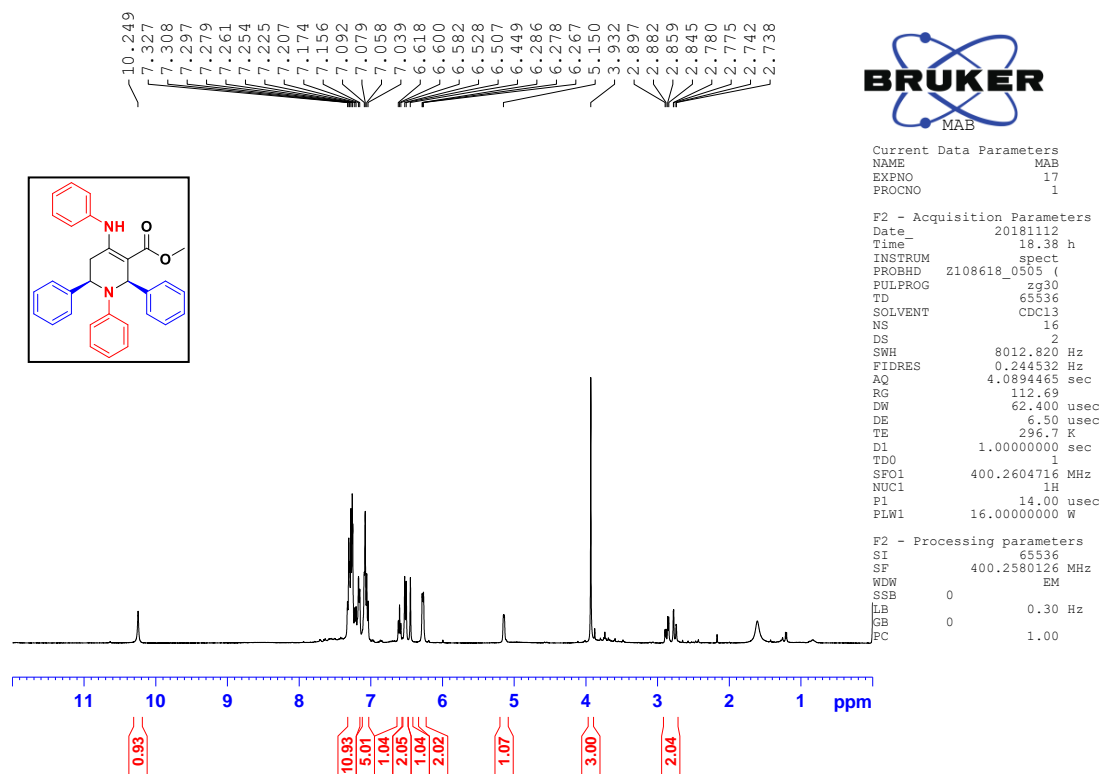


Figure S19. ¹H NMR (400 MHz) of compound **11a** in CDCl₃

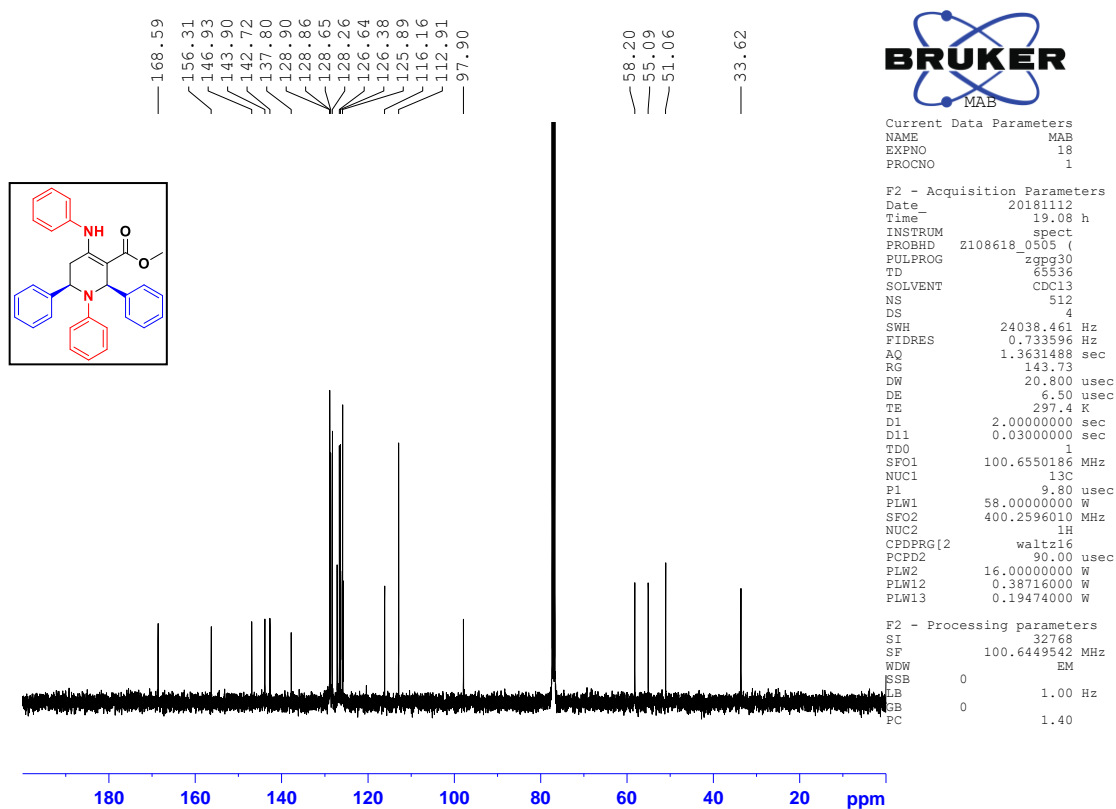


Figure S20. ¹³C NMR Spectrum (100 MHz) of compound **11a** in CDCl₃

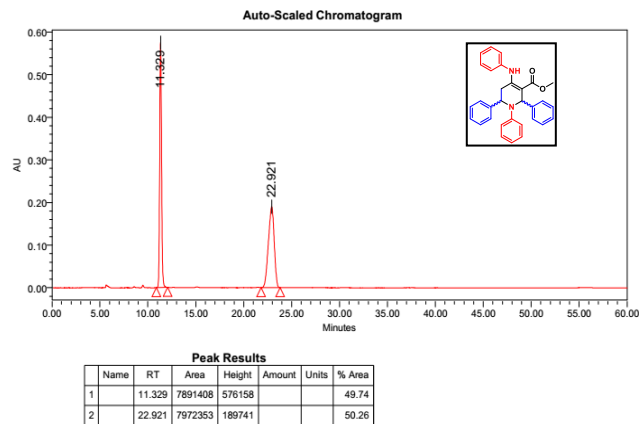
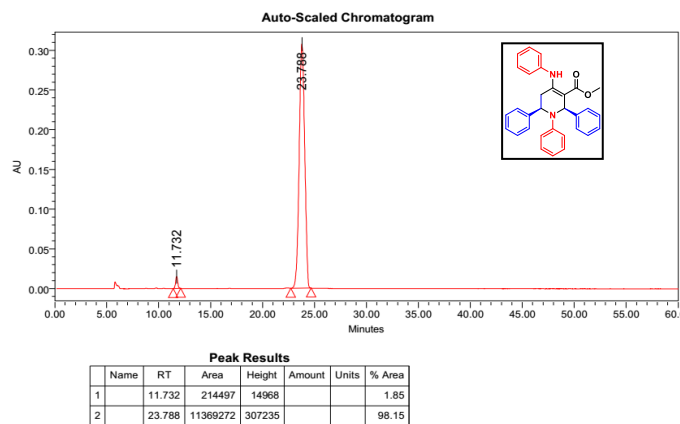


Figure S21. HPLC Chromatogram of compound **11a**

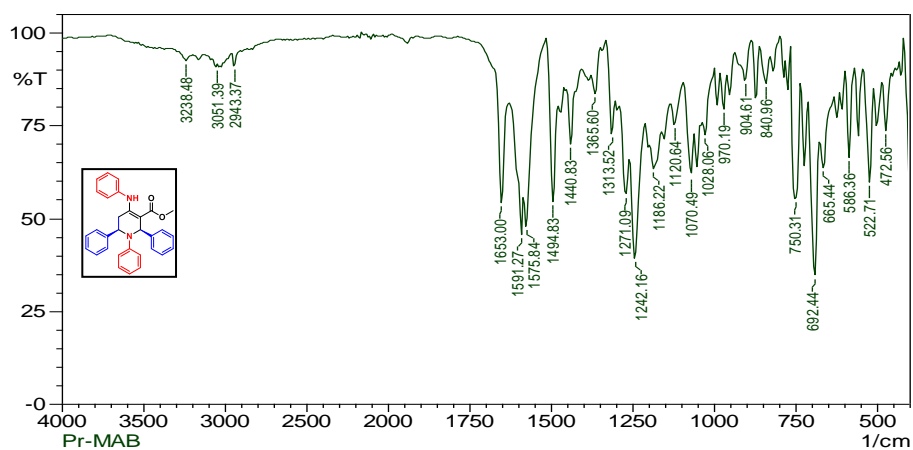
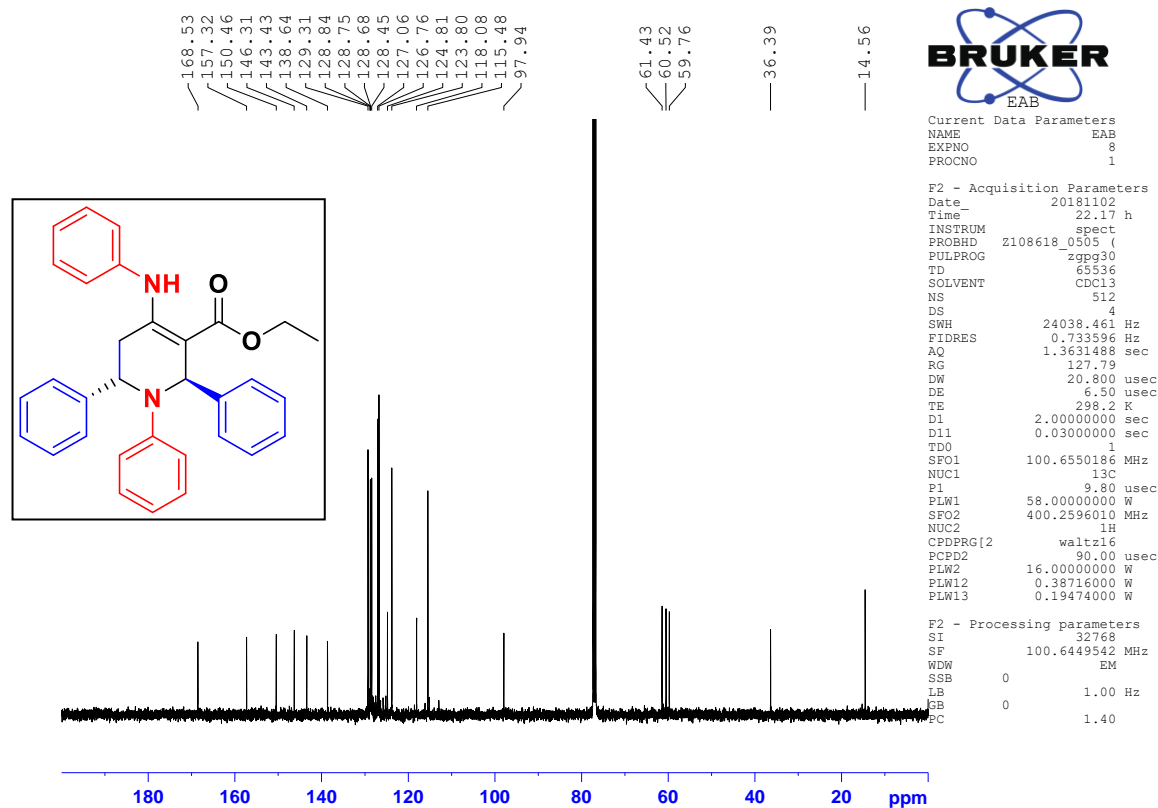
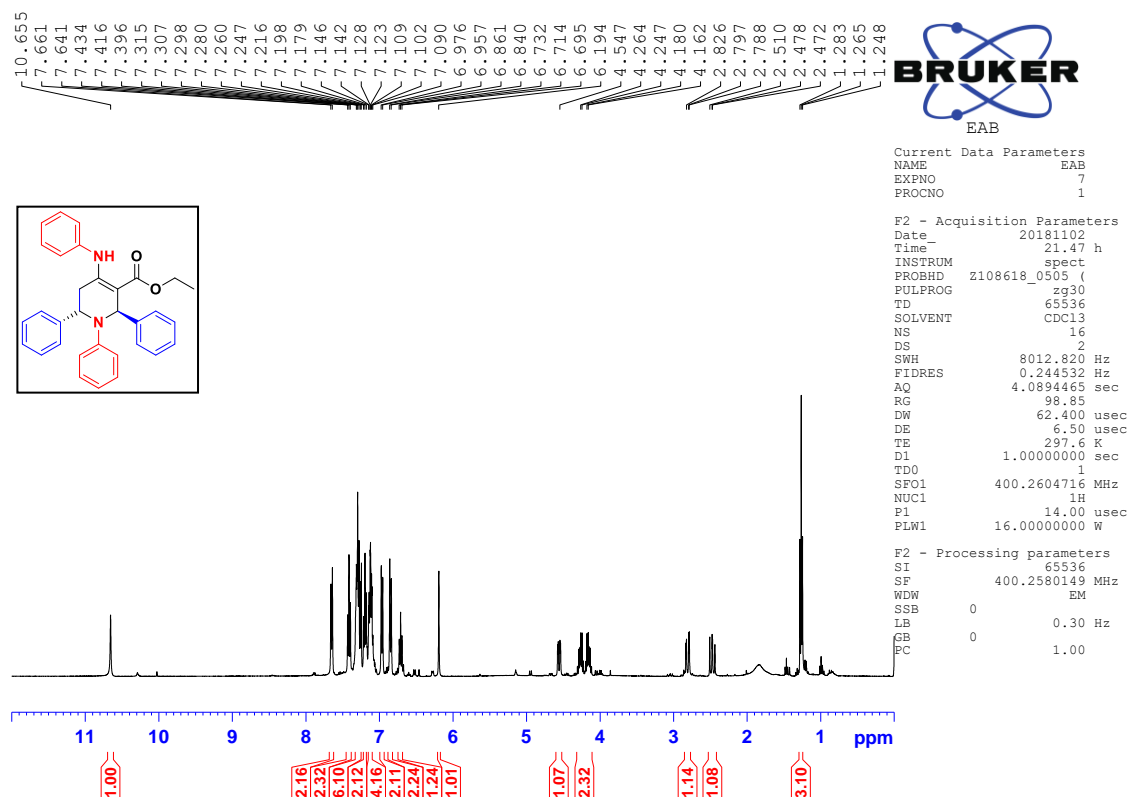


Figure S22. IR Spectrum of compound **11a**



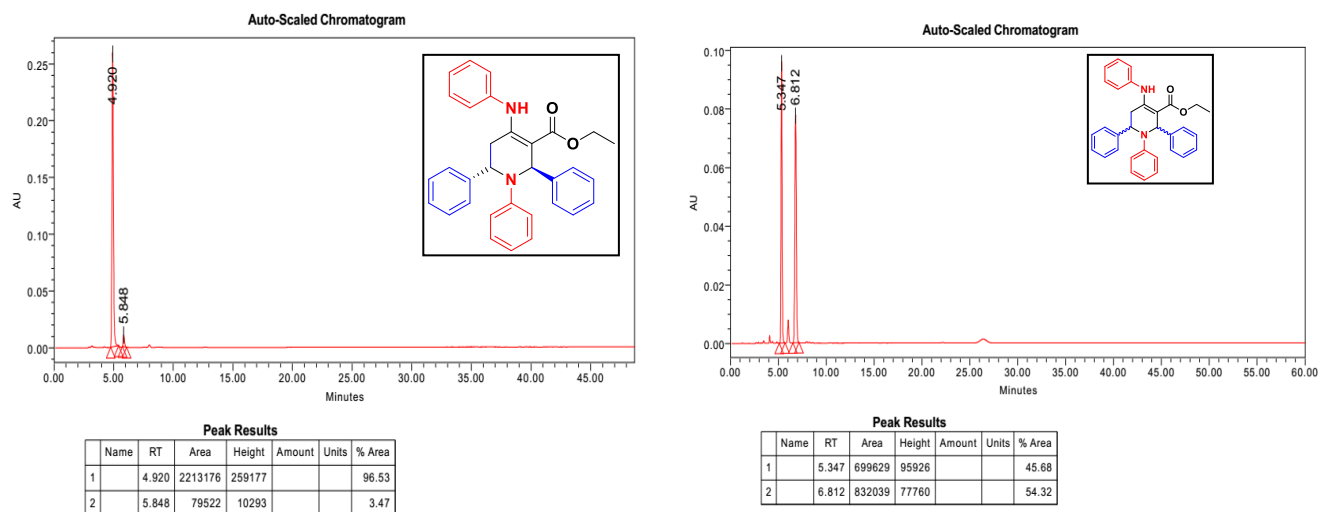


Figure S25. HPLC Chromatogram of compound **11b**

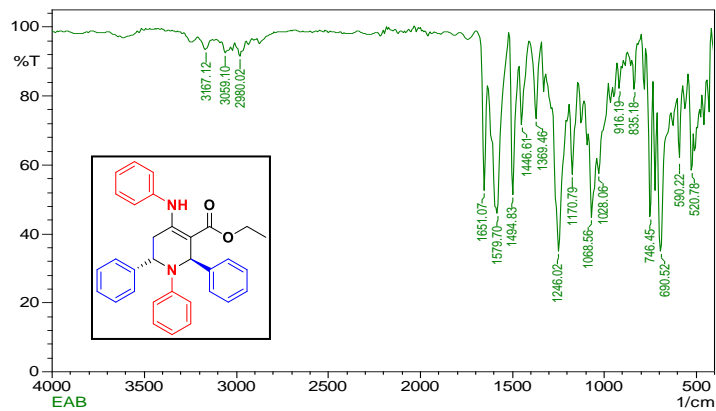


Figure S26. IR Spectrum of compound **11b**

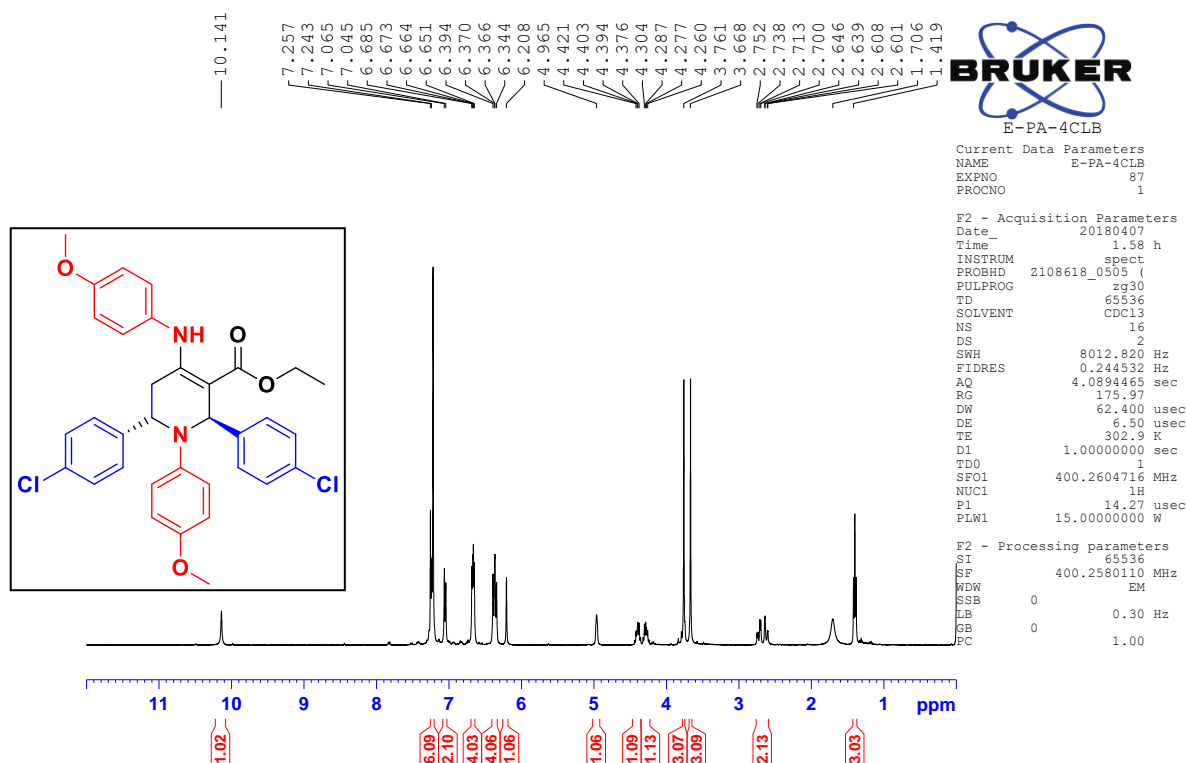


Figure S27. ¹H NMR (400 MHz) of compound 11c in CDCl₃

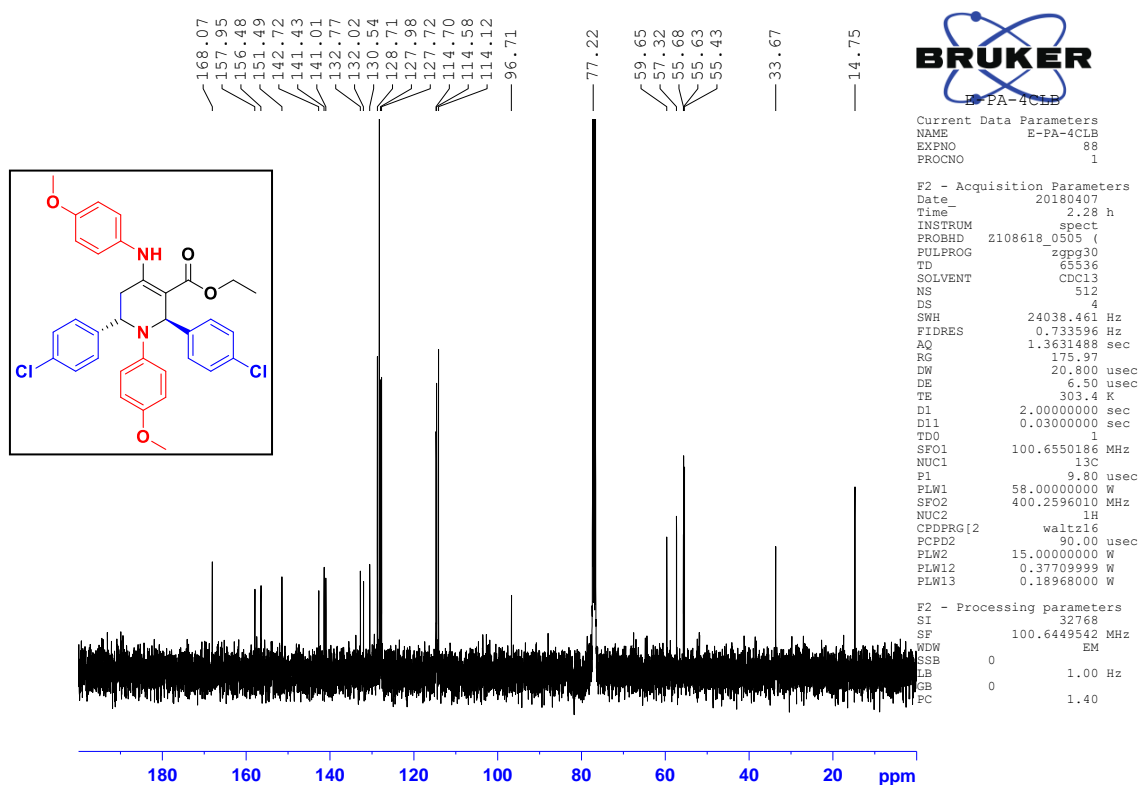


Figure S28. ¹³C NMR Spectrum (100 MHz) of compound 11c in CDCl₃

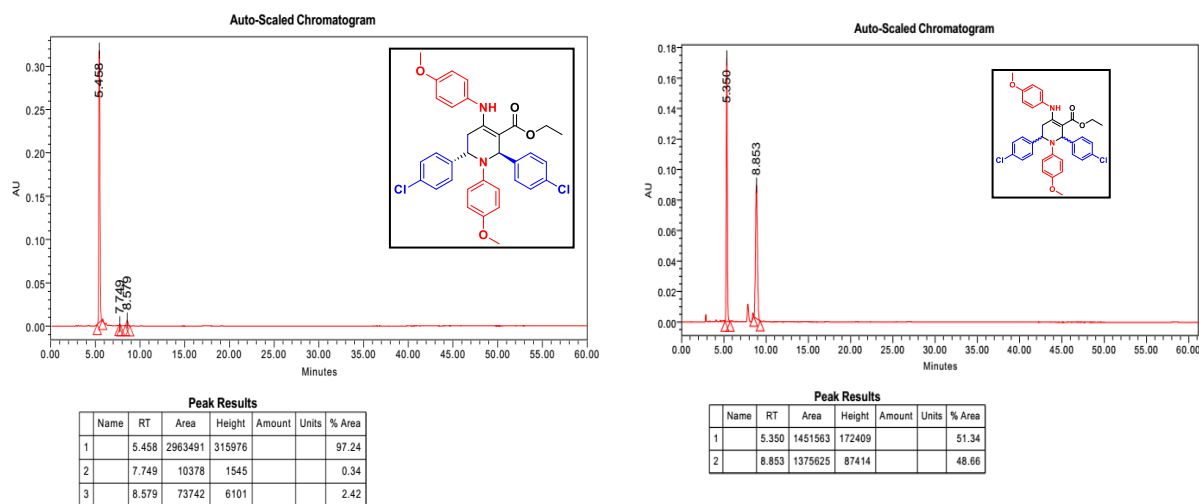


Figure S29. HPLC Chromatogram of compound **11c**

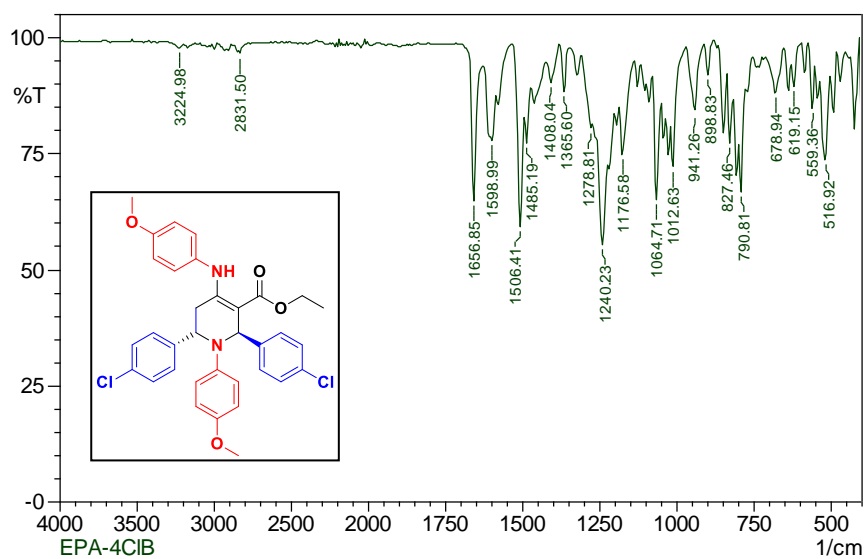


Figure S30. IR Spectrum of compound **11c**

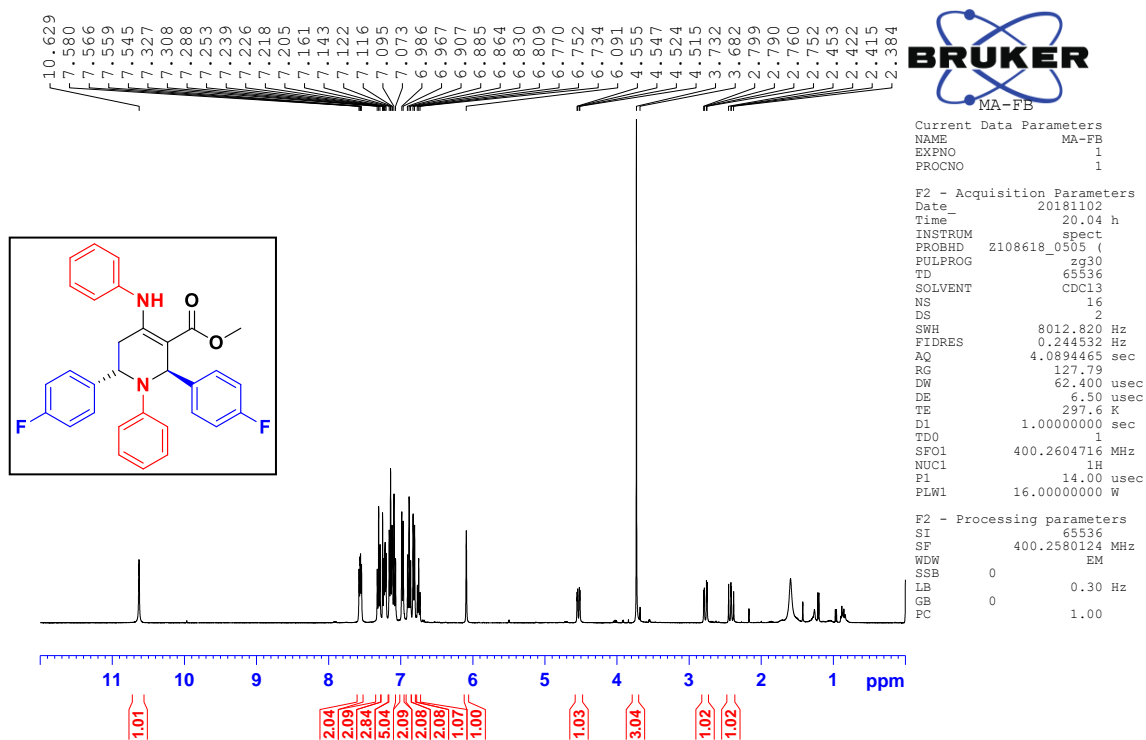


Figure S31. ^1H NMR (400 MHz) of compound **11d** in CDCl_3

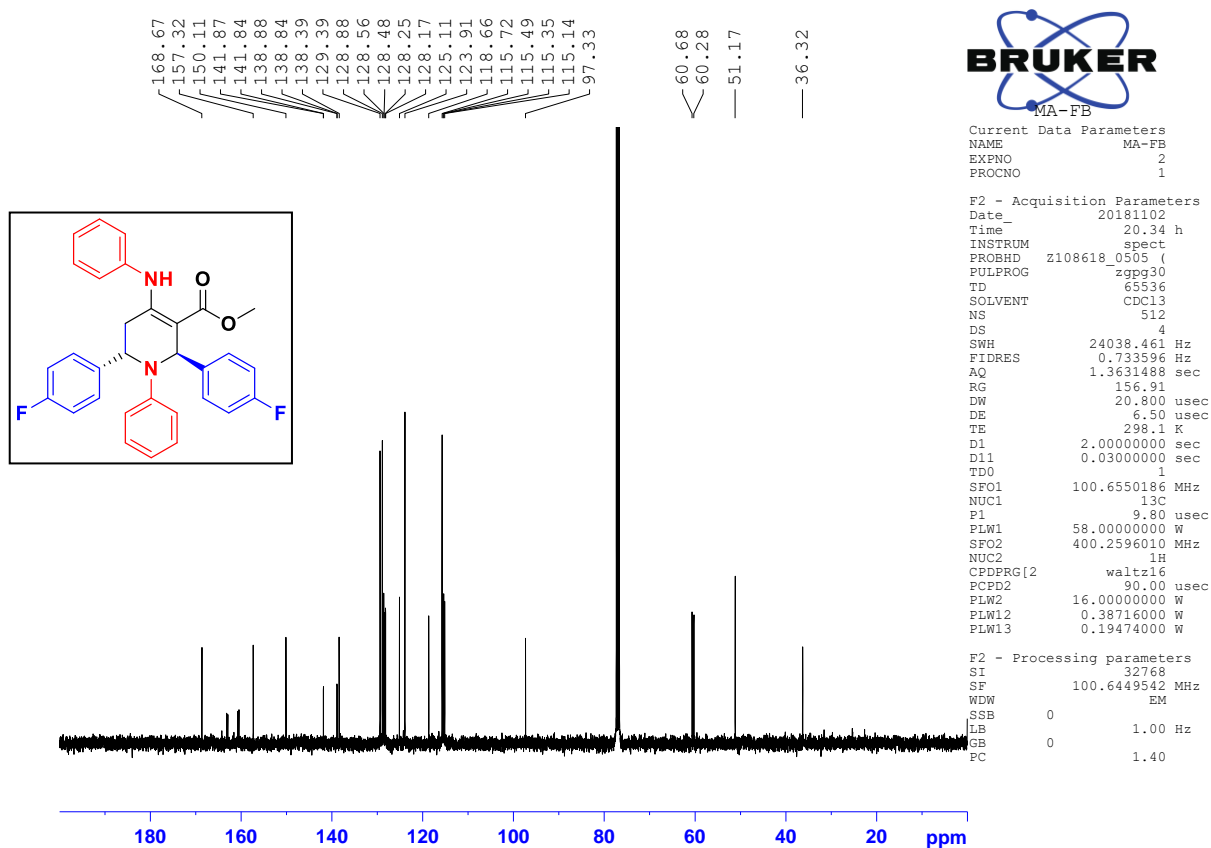


Figure S32. ^{13}C NMR Spectrum (100 MHz) of compound **11d** in CDCl_3

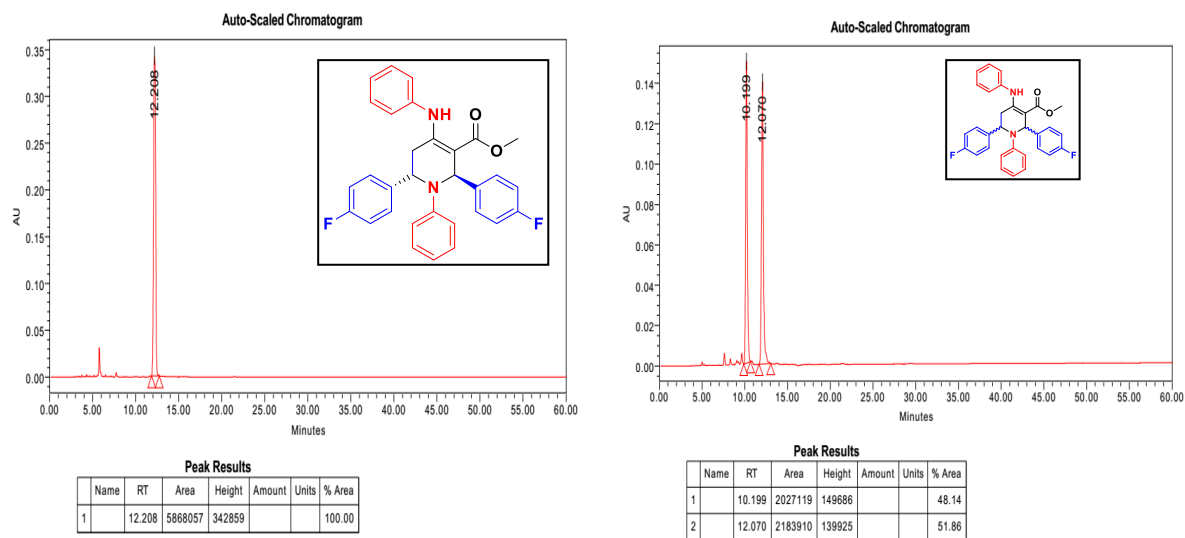


Figure S33. HPLC Chromatogram of compound **11d**

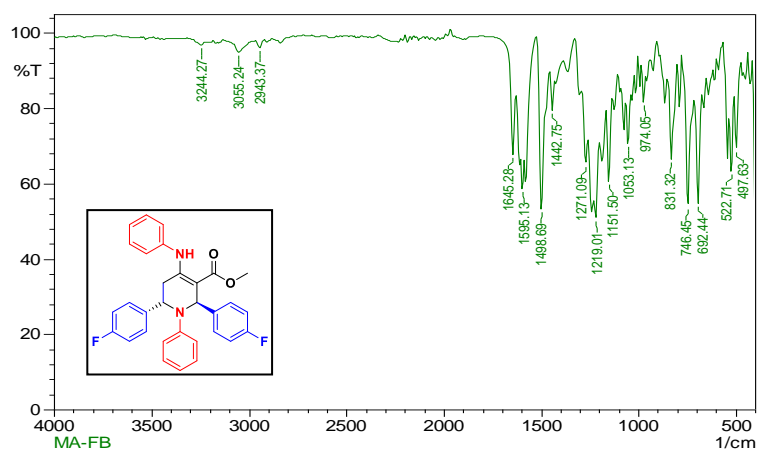


Figure S34. IR Spectrum of compound **11d**

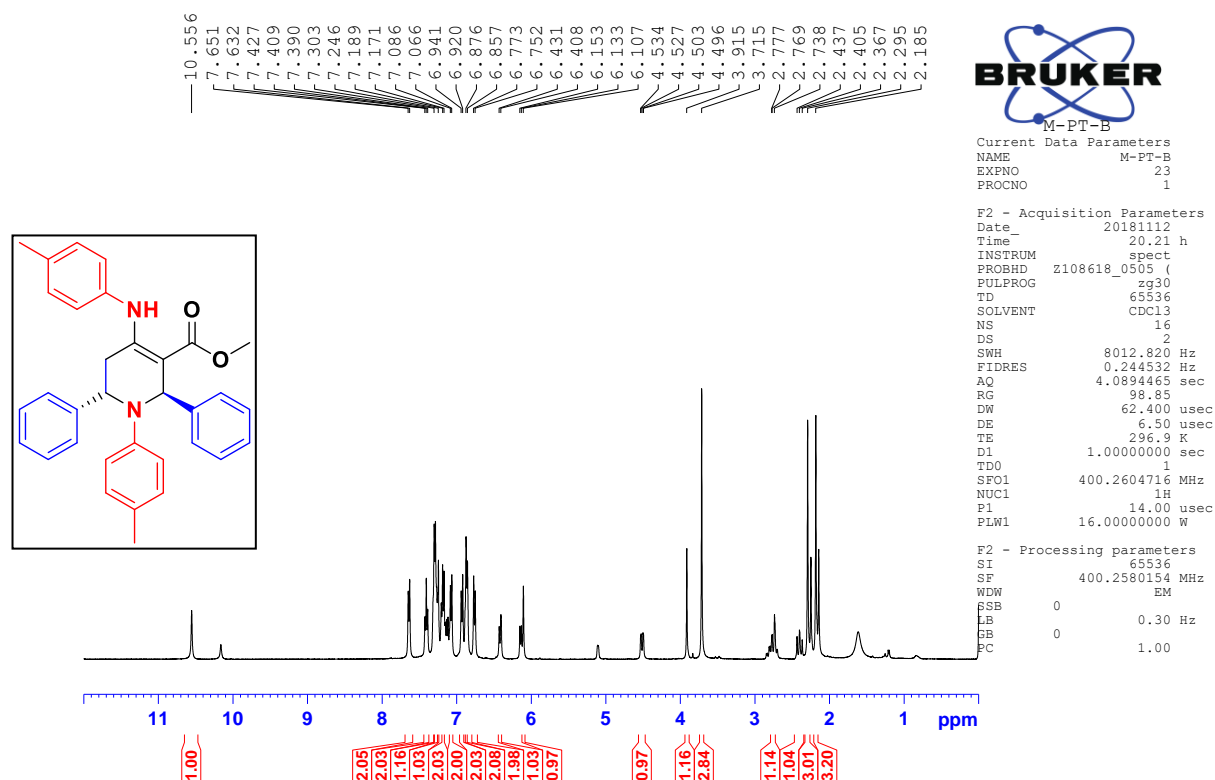


Figure S35. ¹H NMR (400 MHz) of compound **11e** in CDCl₃

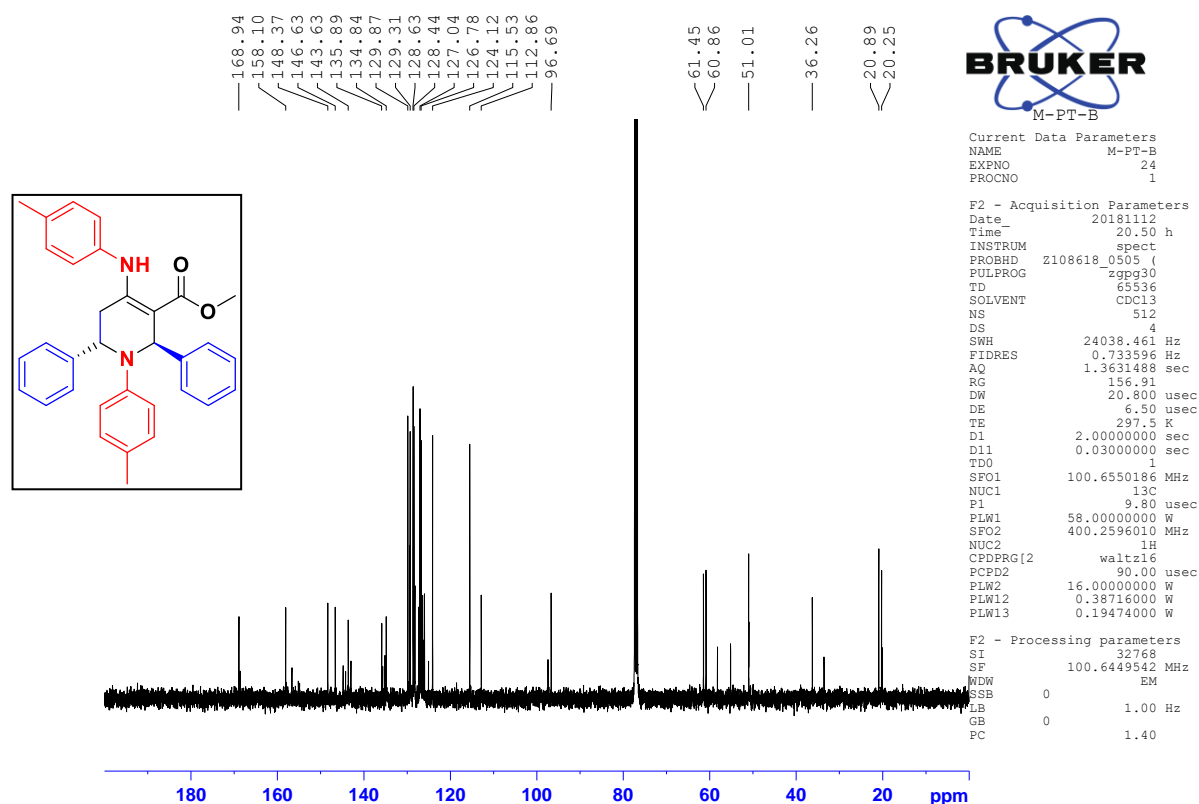


Figure S36: ¹³C NMR Spectrum (100 MHz) of compound **11e** in CDCl₃

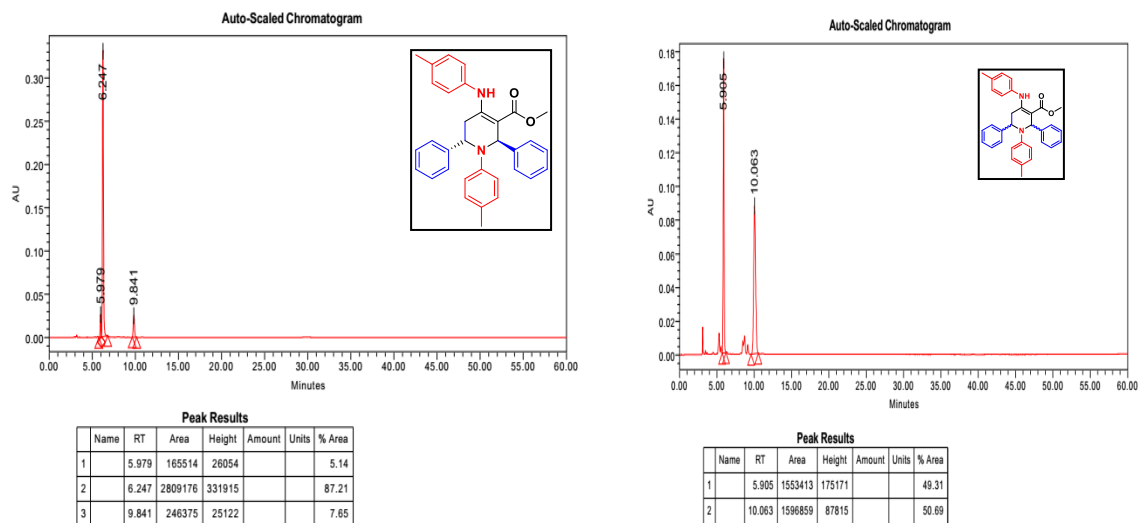


Figure S37. HPLC Chromatogram of compound **11e**

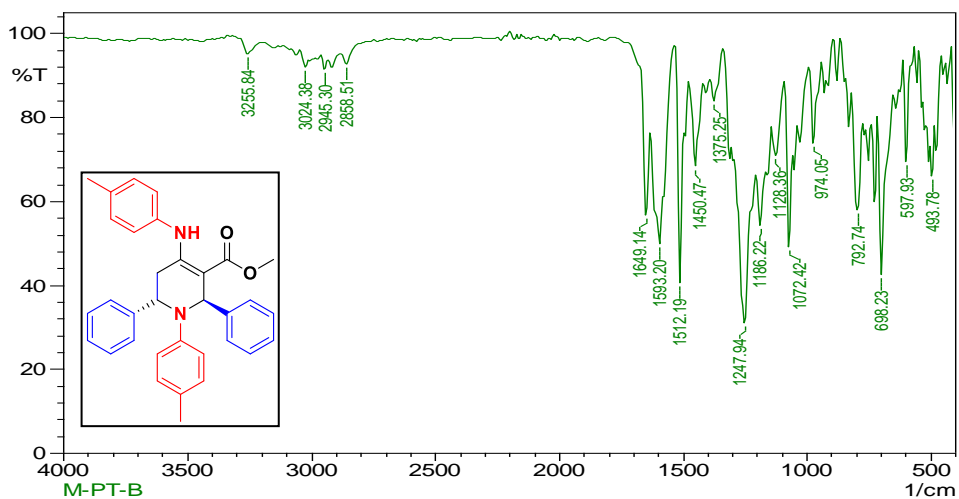


Figure S38. IR Spectrum of compound **11e**

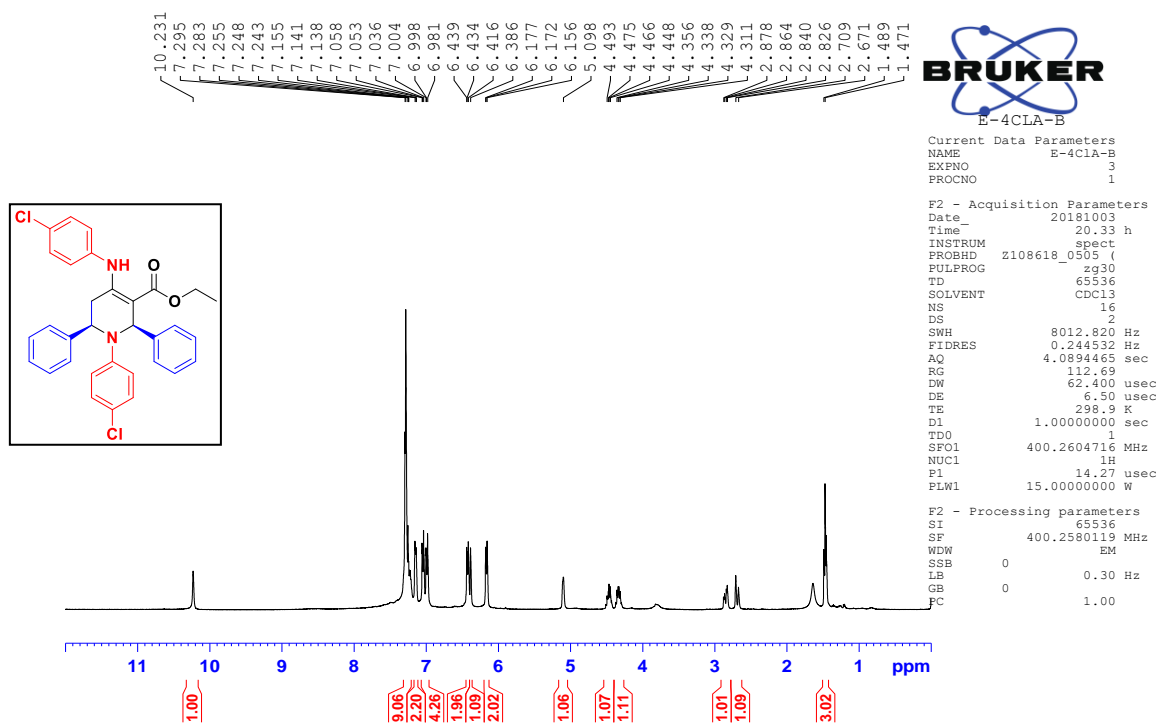
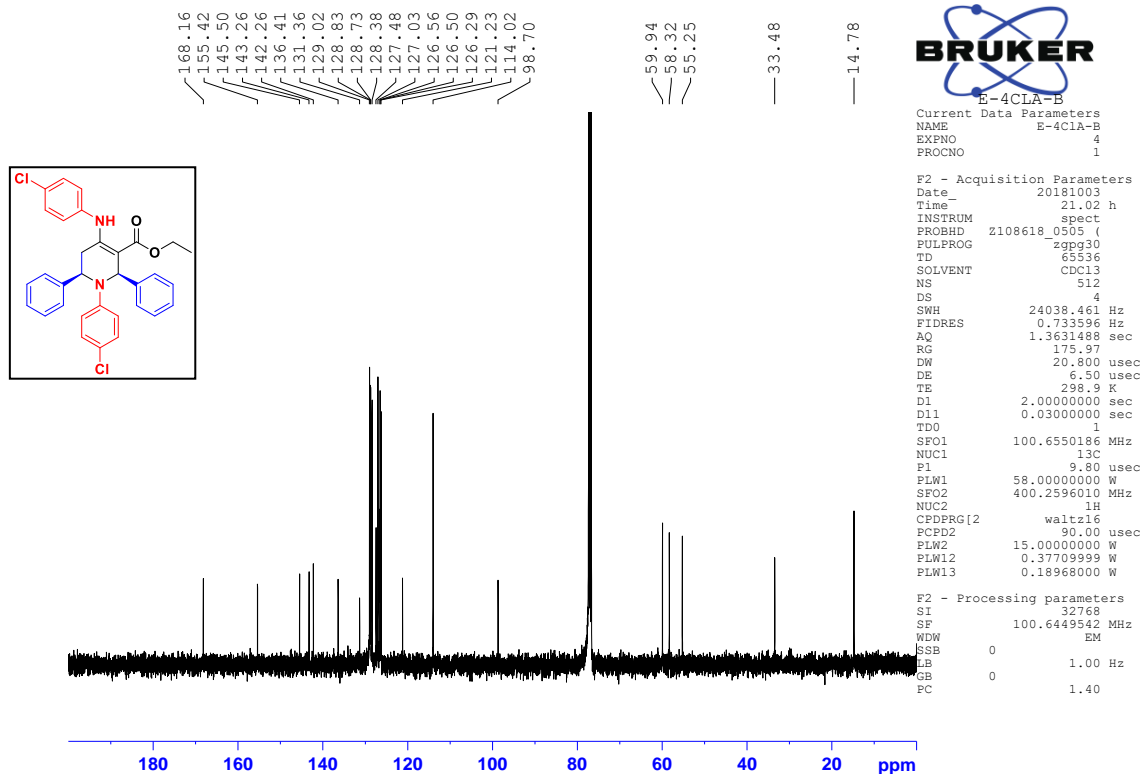
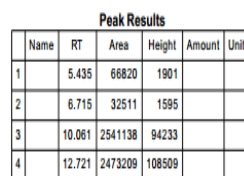
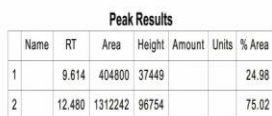


Figure S39. ^1H NMR (400 MHz) of compound **11f** in CDCl_3





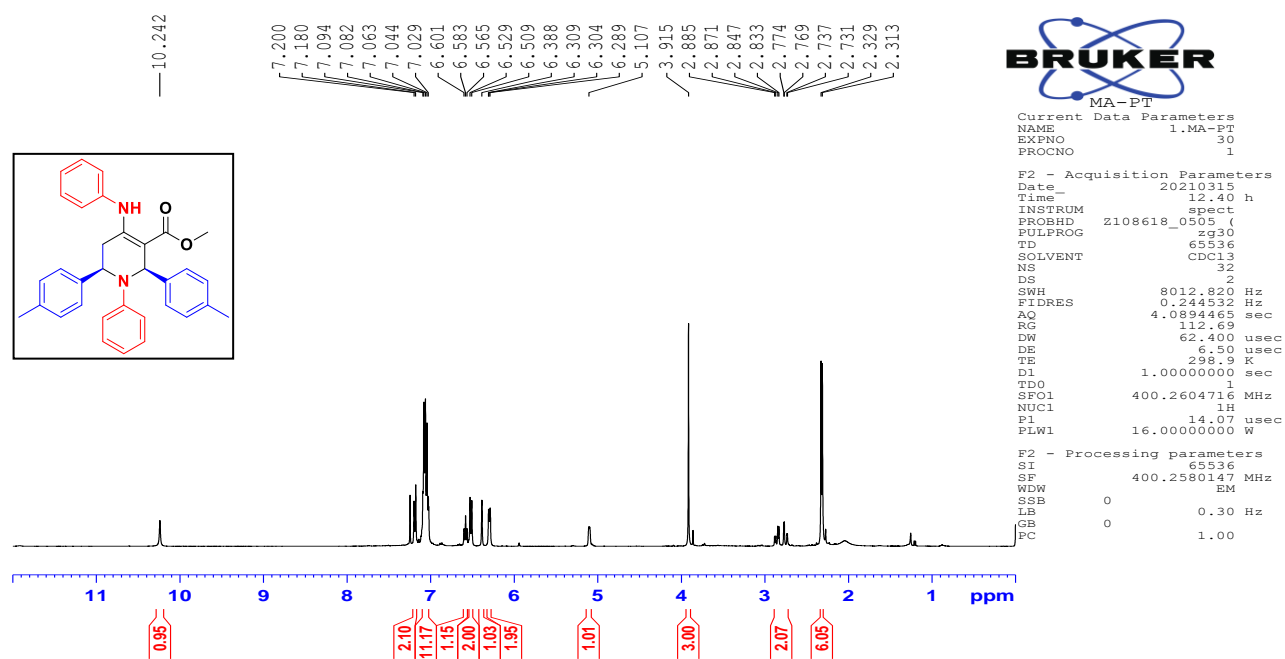


Figure S42. ¹H NMR (400 MHz) of compound **11g** in CDCl₃

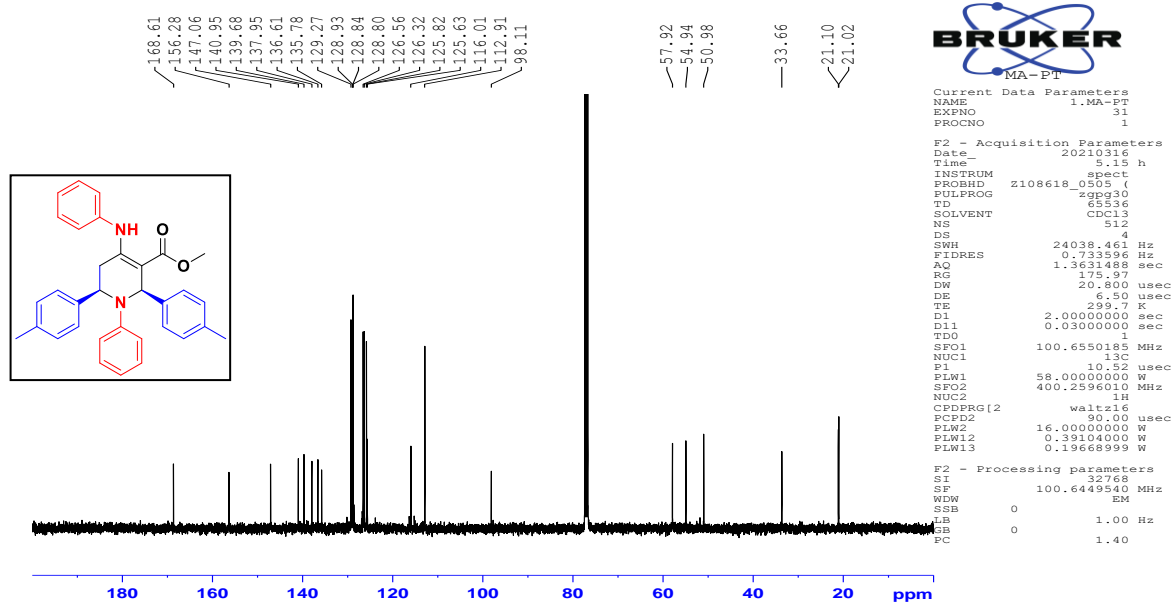


Figure S43. ¹³C NMR Spectrum (100 MHz) of compound **11g** in CDCl₃

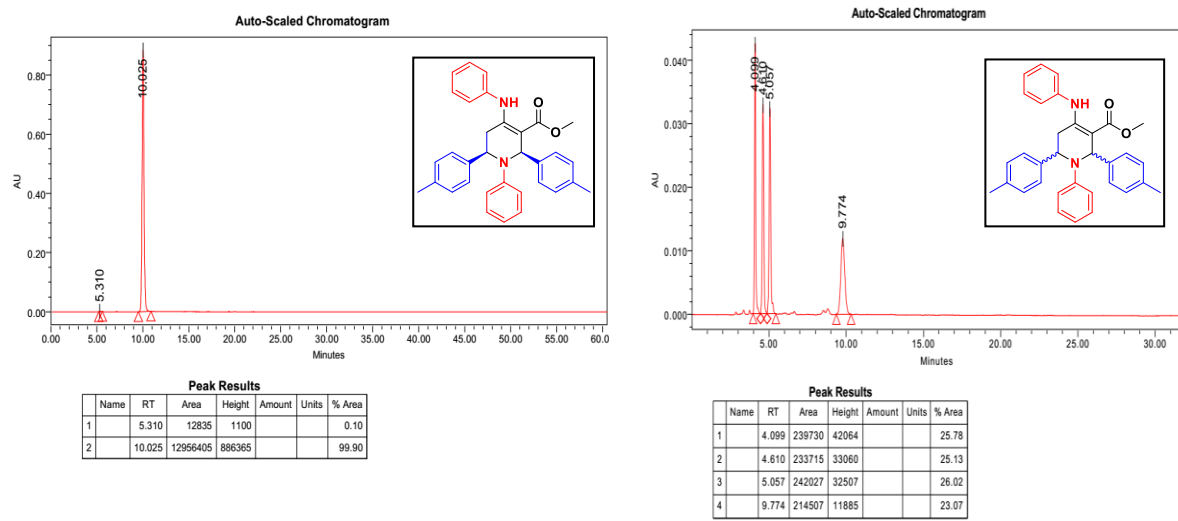


Figure S44. HPLC Chromatogram of compound **11g**

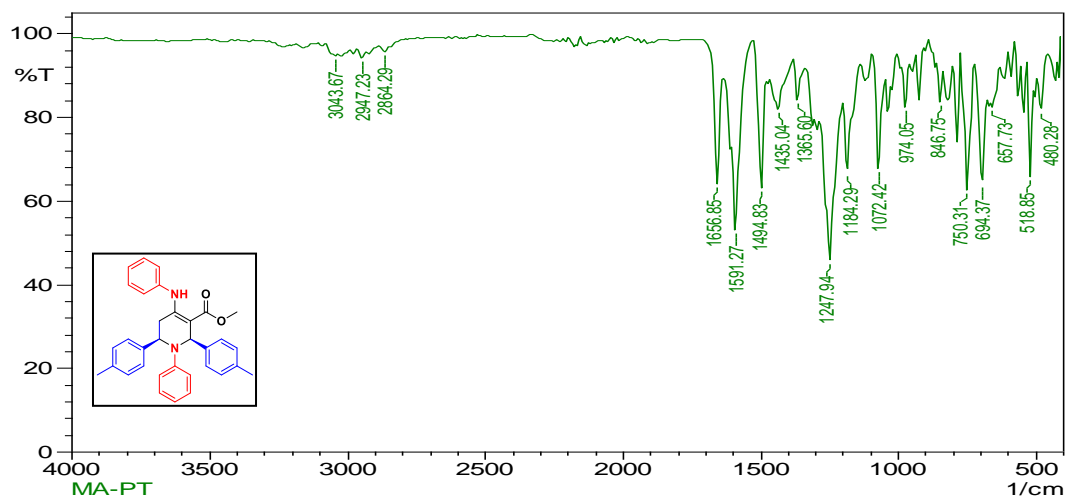


Figure S45. IR Spectrum of compound **11g**

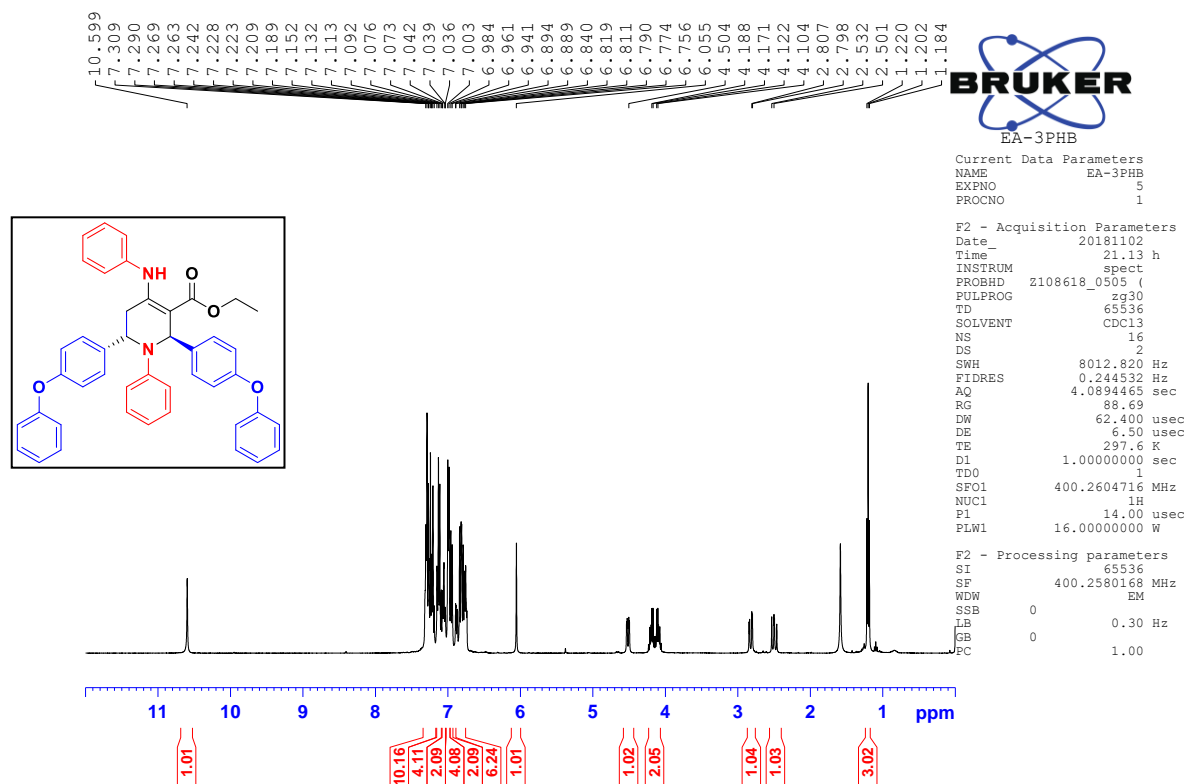


Figure S46: ¹H NMR (400 MHz) of compound **11h** in CDCl₃

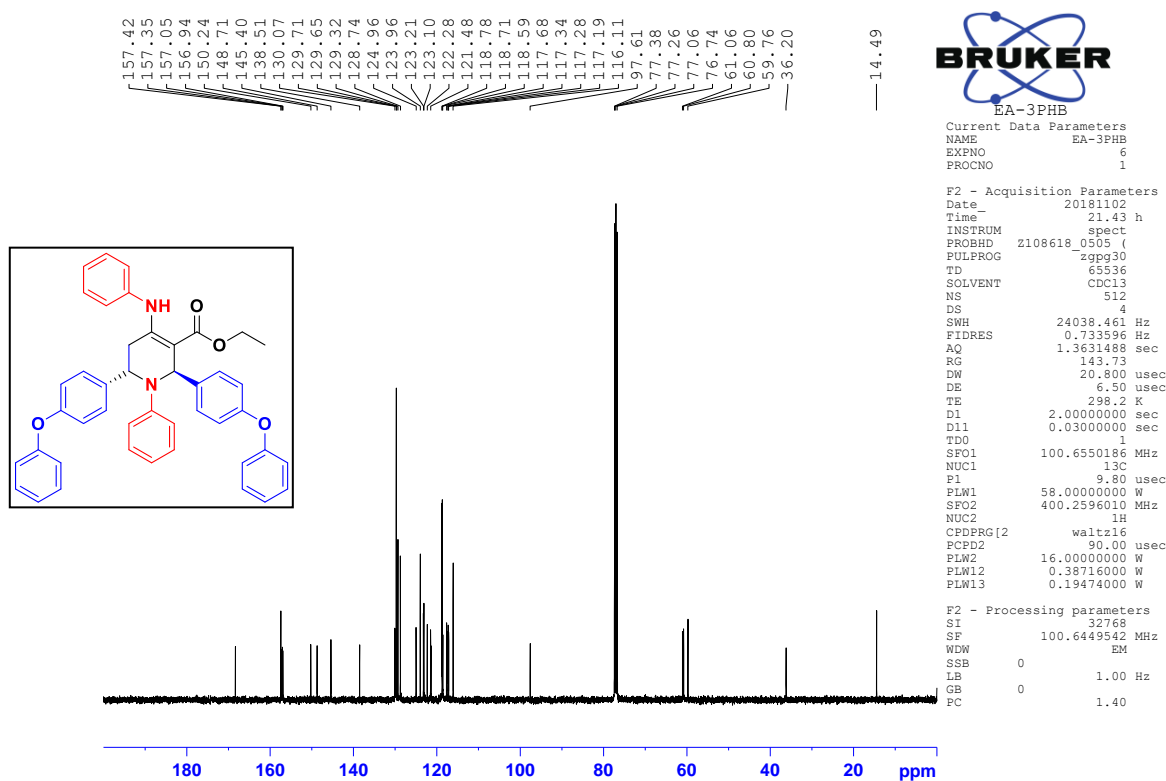


Figure S47: ¹³C NMR Spectrum (100 MHz) of compound **11h** in CDCl₃

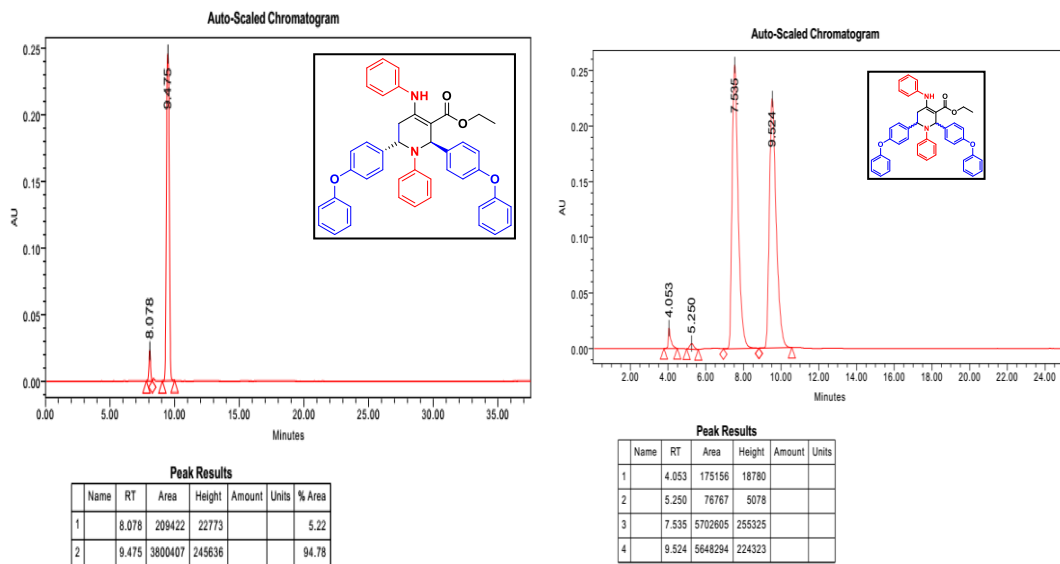


Figure S48. HPLC Chromatogram of compound **11h**

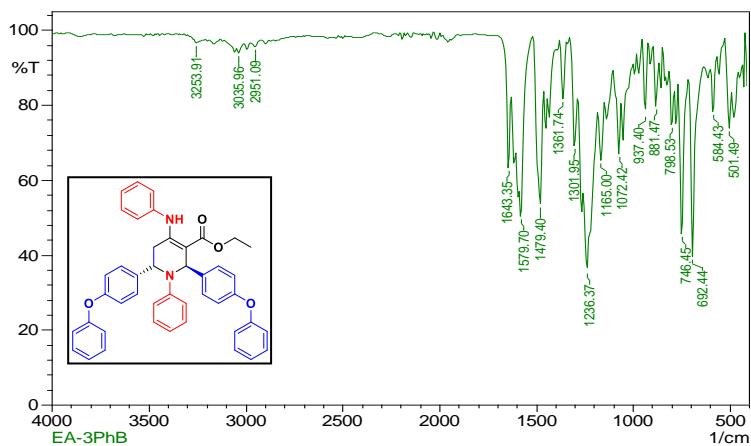


Figure S49. IR Spectrum of compound **11h**

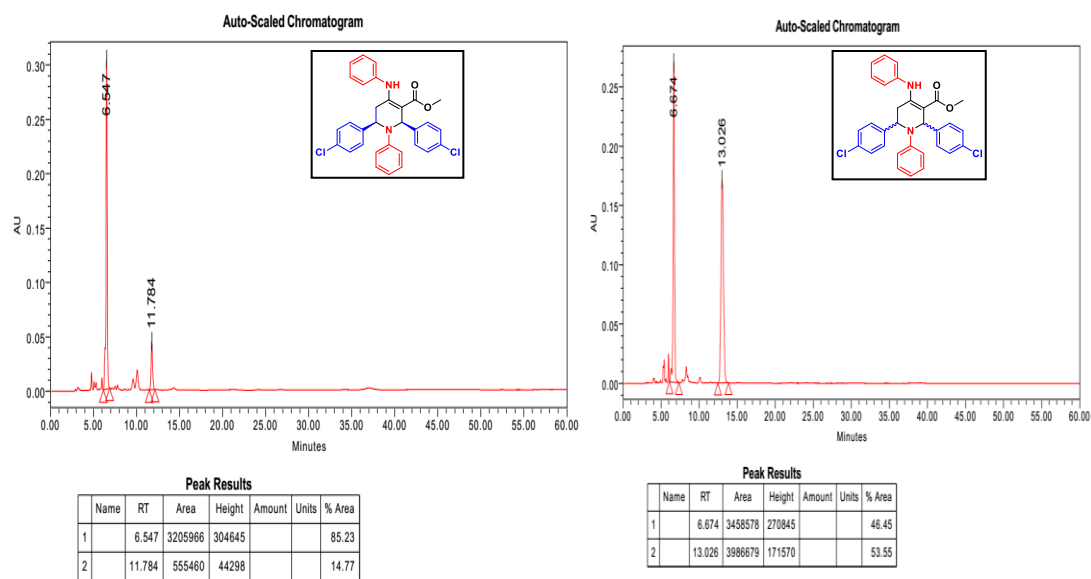


Figure S52. HPLC Chromatogram of compound **11i**

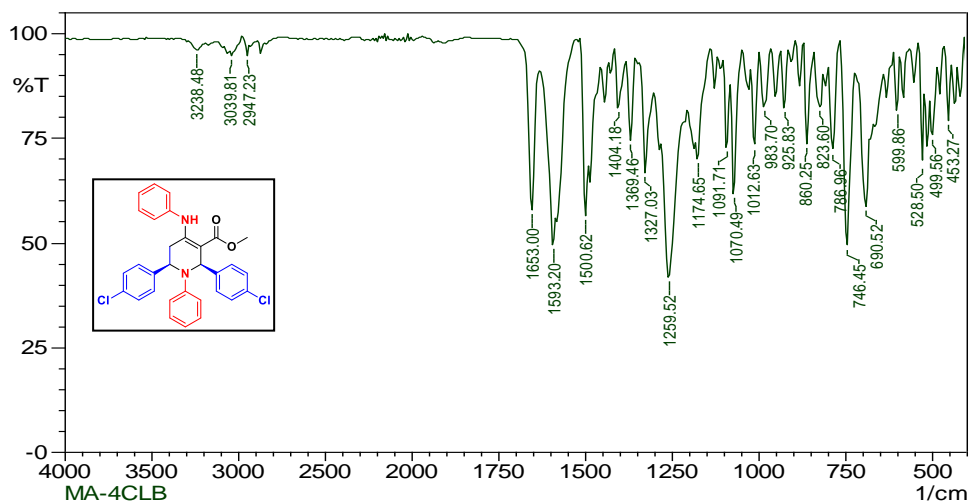


Figure S53. IR Spectrum of compound **11i**

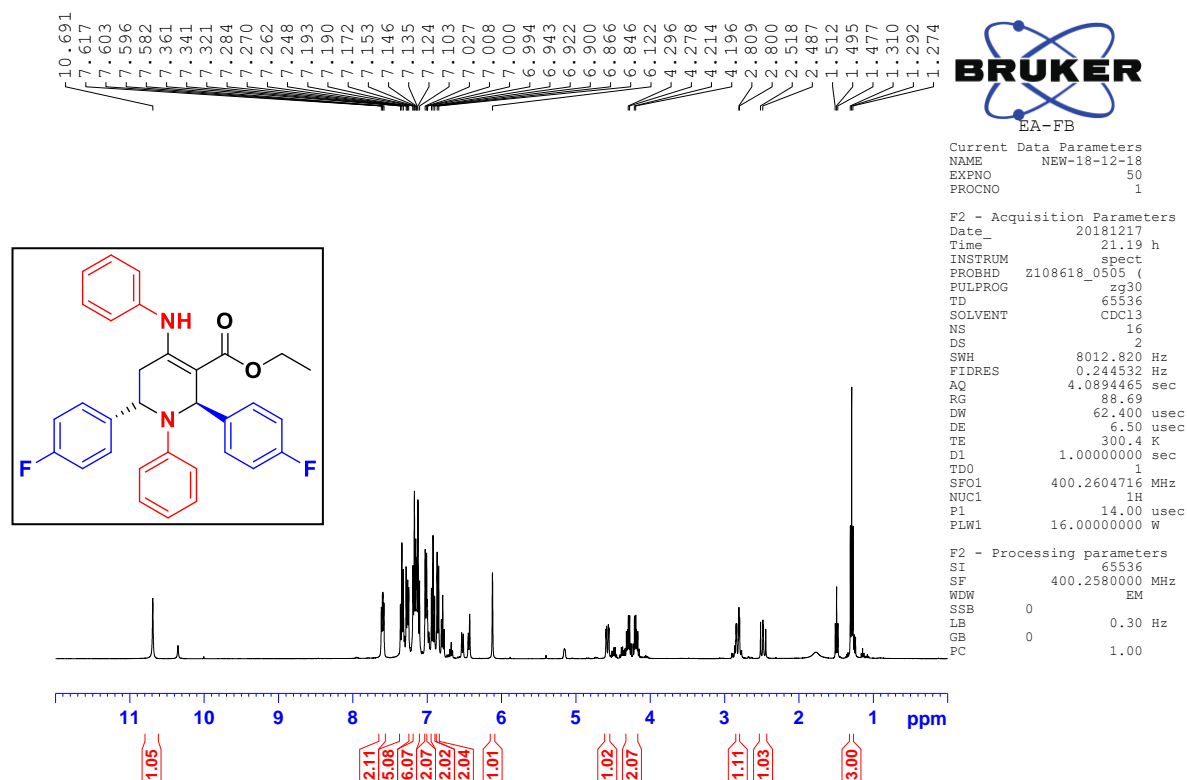


Figure S54. ¹H NMR (400 MHz) of compound **11j** in CDCl₃

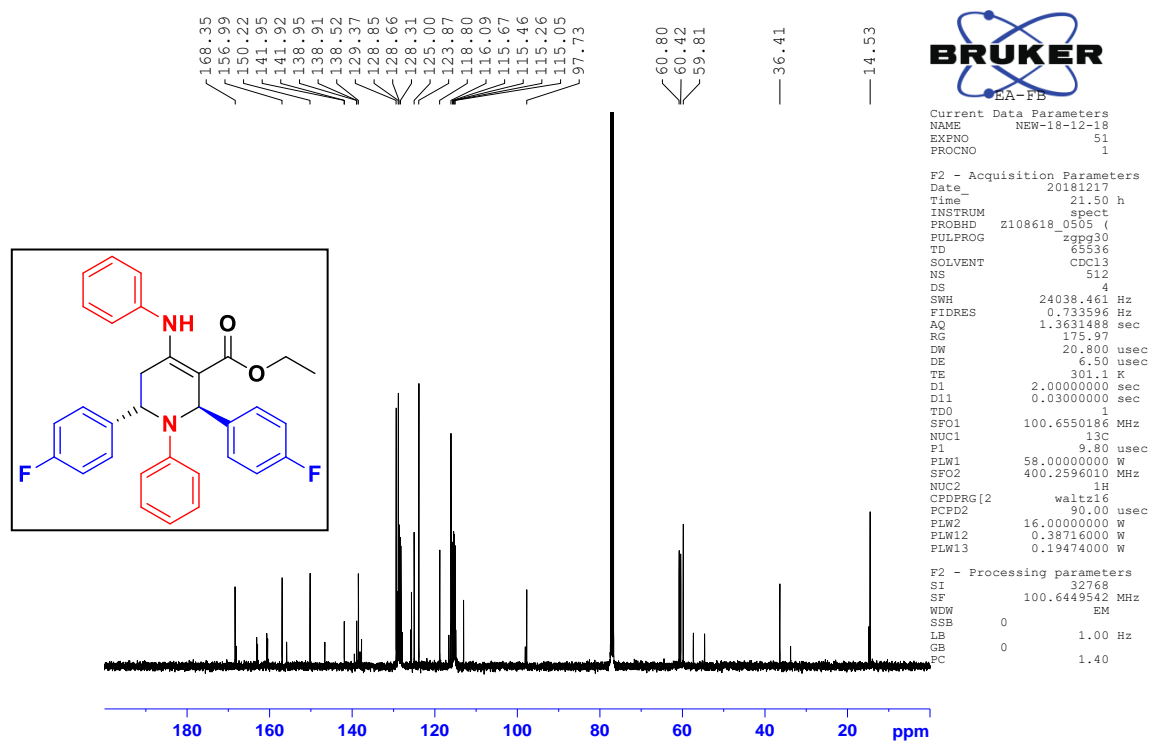


Figure S55. ¹³C NMR Spectrum (100 MHz) of compound **11j** in CDCl₃

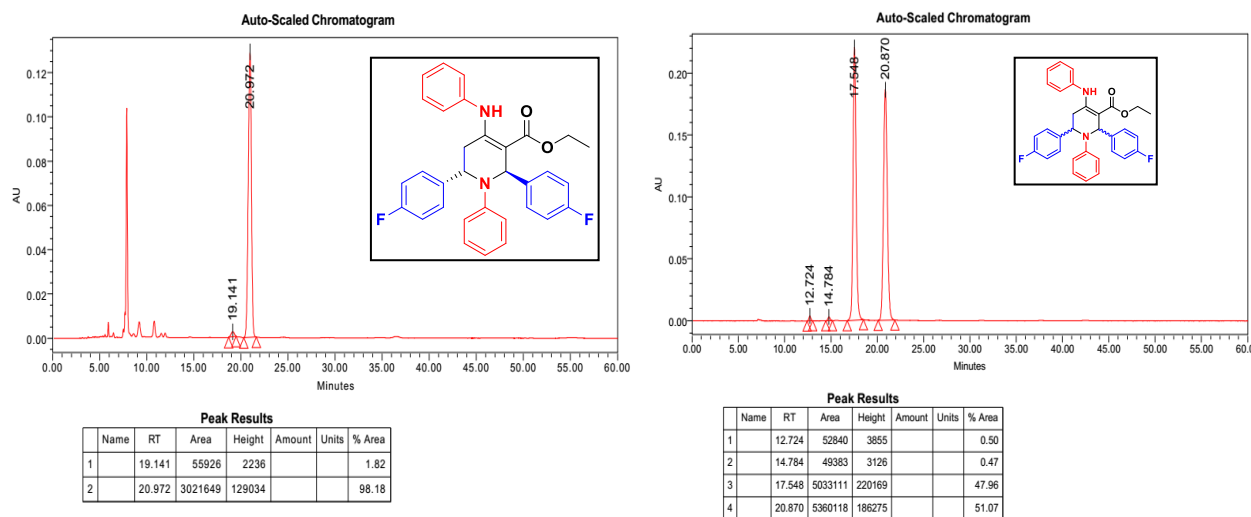


Figure S56. HPLC Chromatogram of compound **11j**

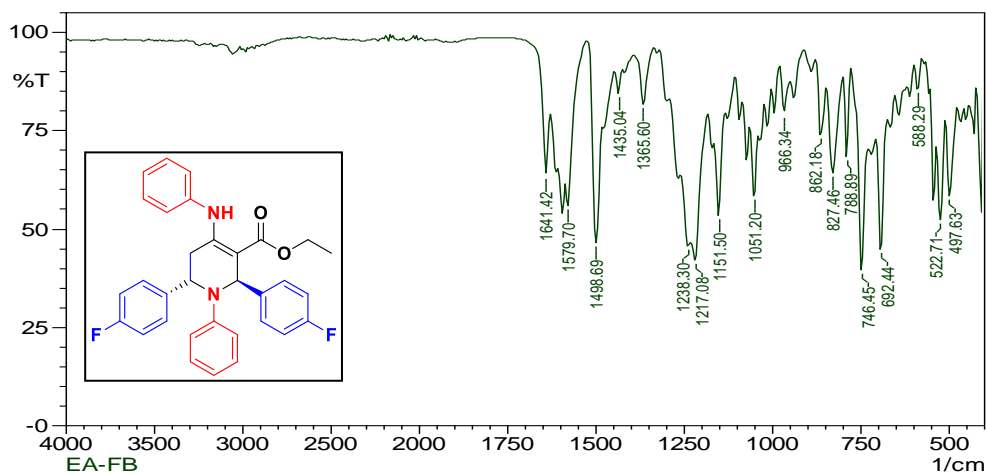


Figure S57. IR Spectrum of compound **11j**

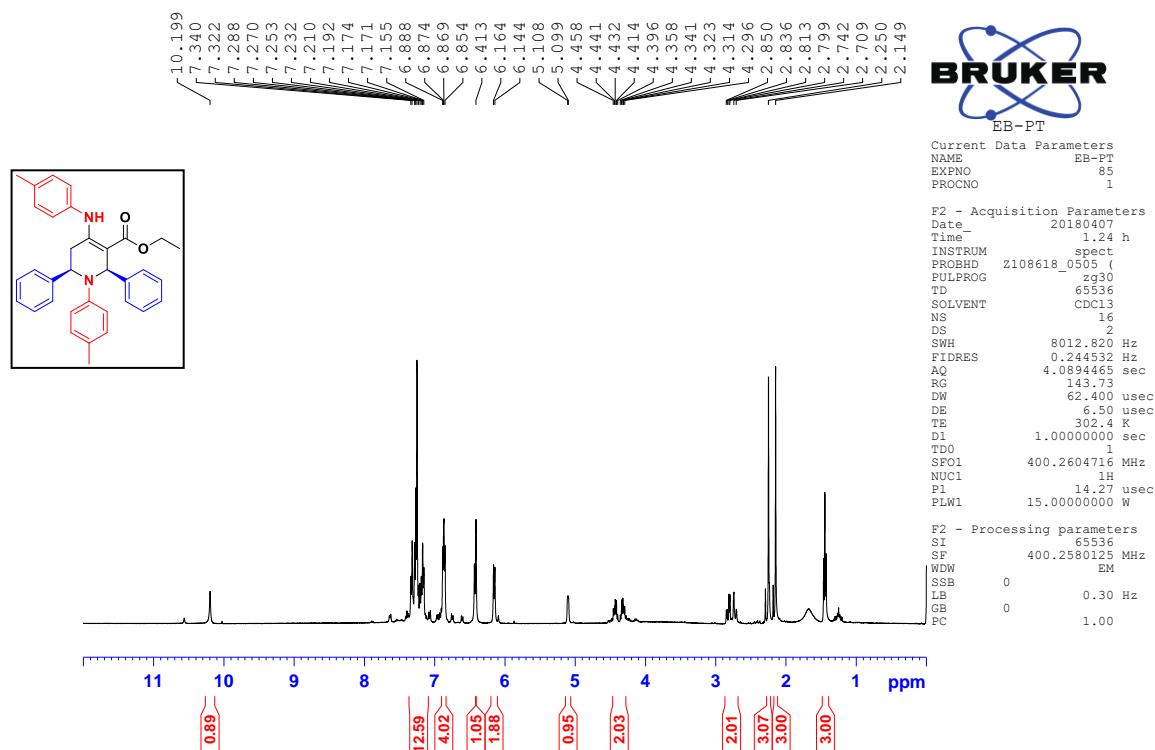


Figure S58. ¹H NMR (400 MHz) of compound **11k** in CDCl₃

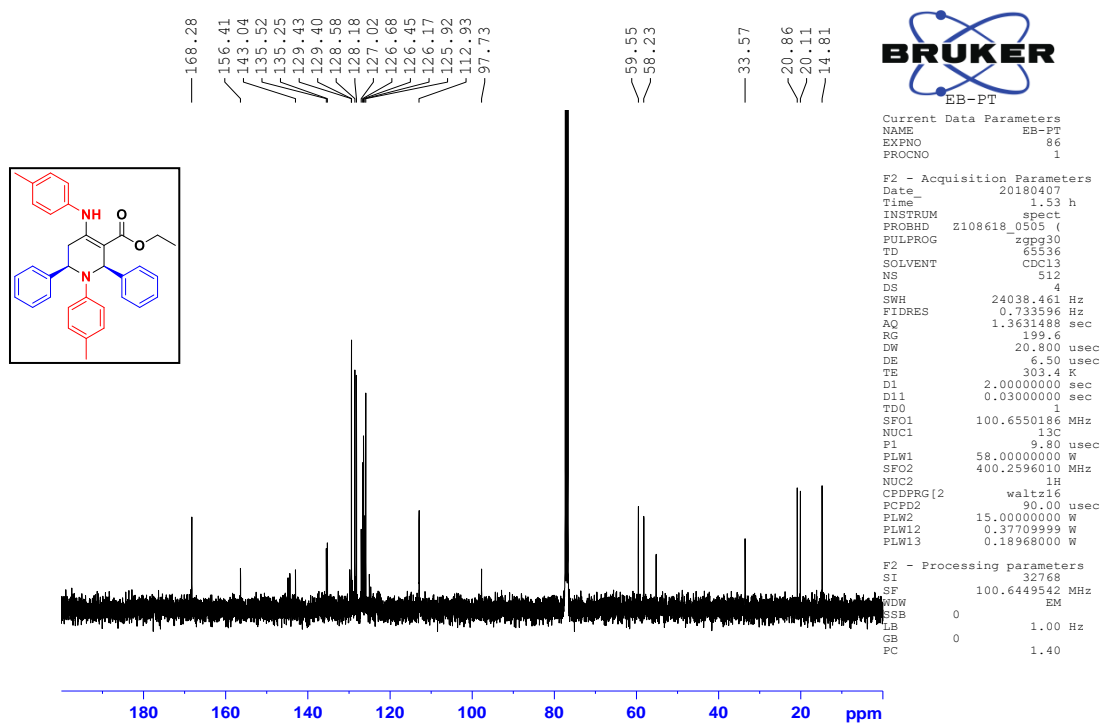


Figure S59. ¹³C NMR Spectrum (100 MHz) of compound **11k** in CDCl₃

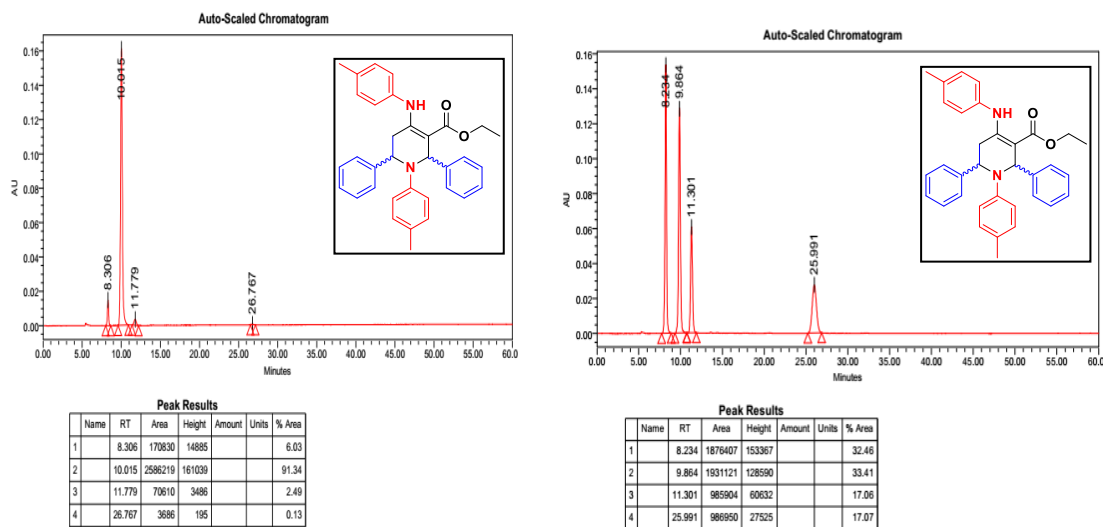


Figure S60. HPLC Chromatogram of compound **11k**

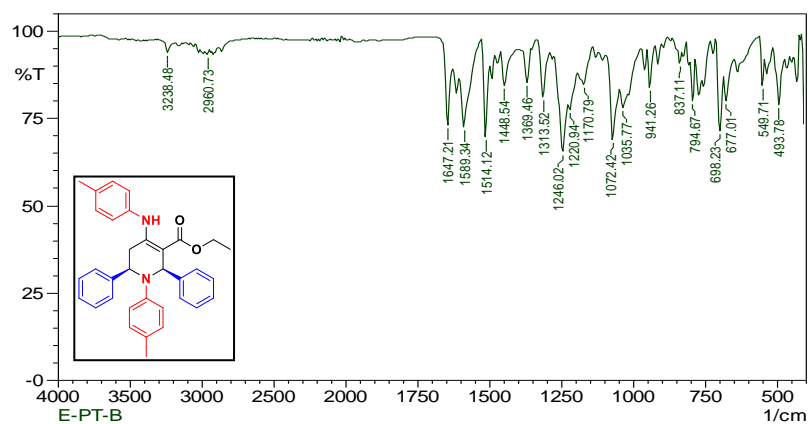


Figure S61. IR Spectrum of compound **11k**

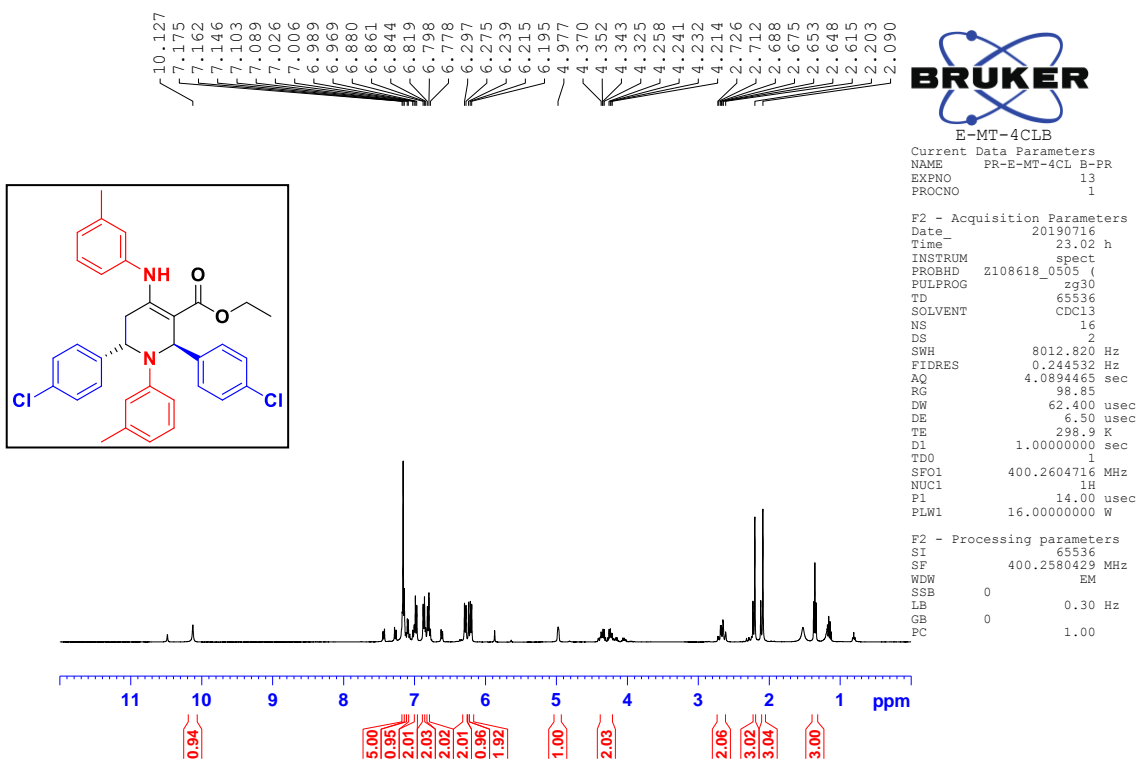


Figure S62. ¹H NMR (400 MHz) of compound **11l** in CDCl₃

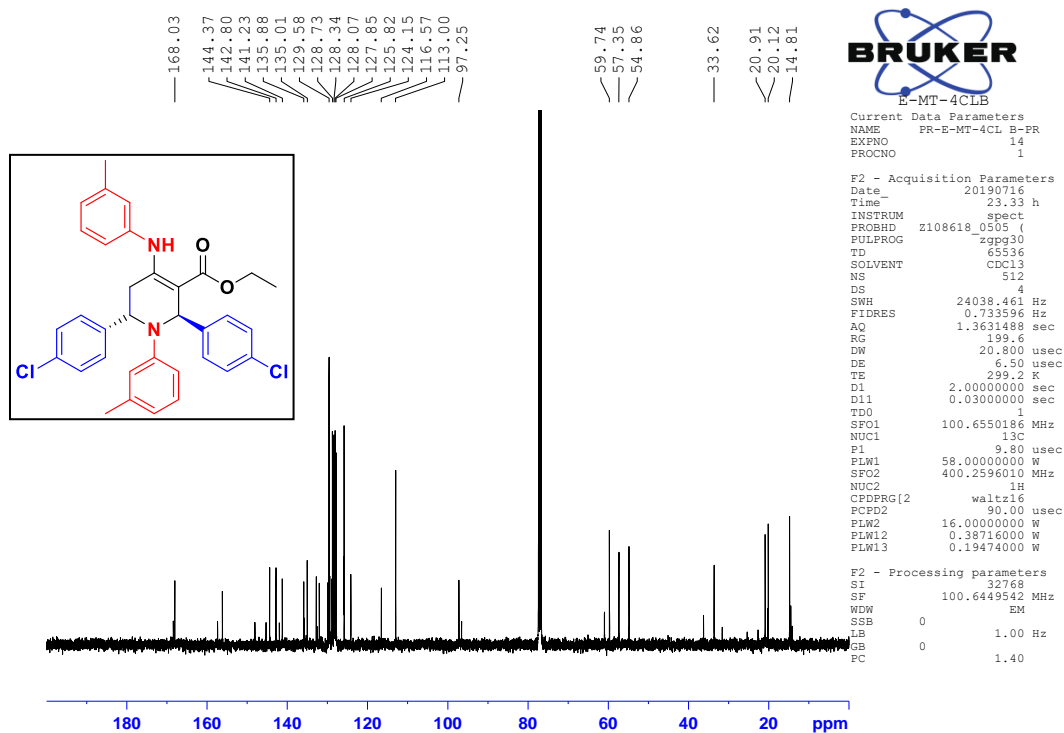


Figure S63. ¹³C NMR Spectrum (100 MHz) of compound **11l** in CDCl₃

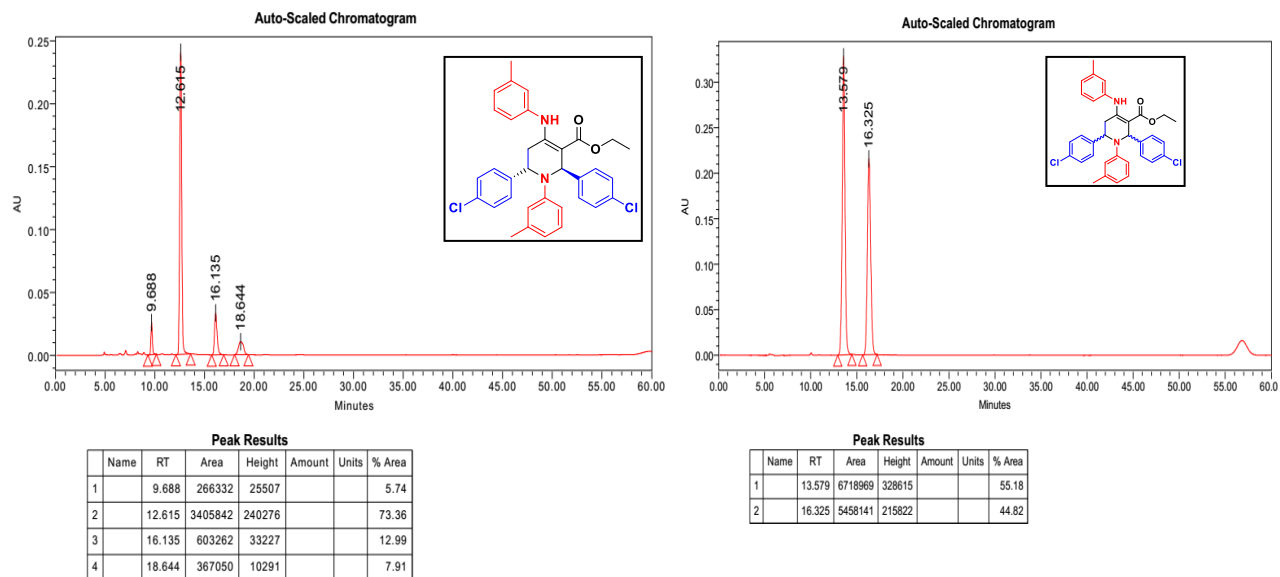


Figure S64. HPLC Chromatogram of compound **11l**

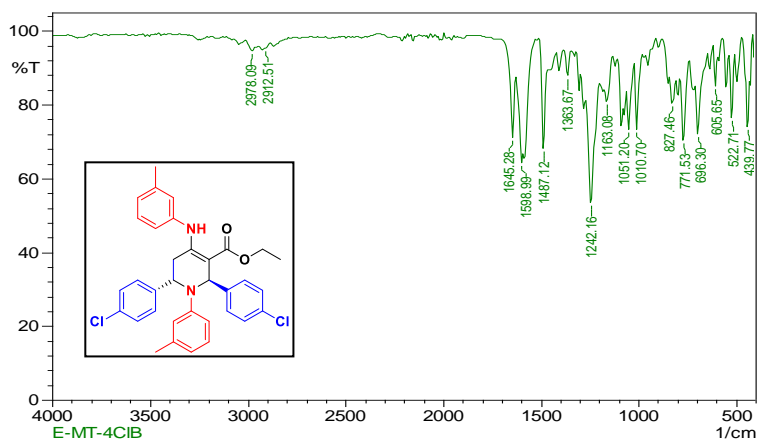


Figure S65. IR Spectrum of compound **11k**

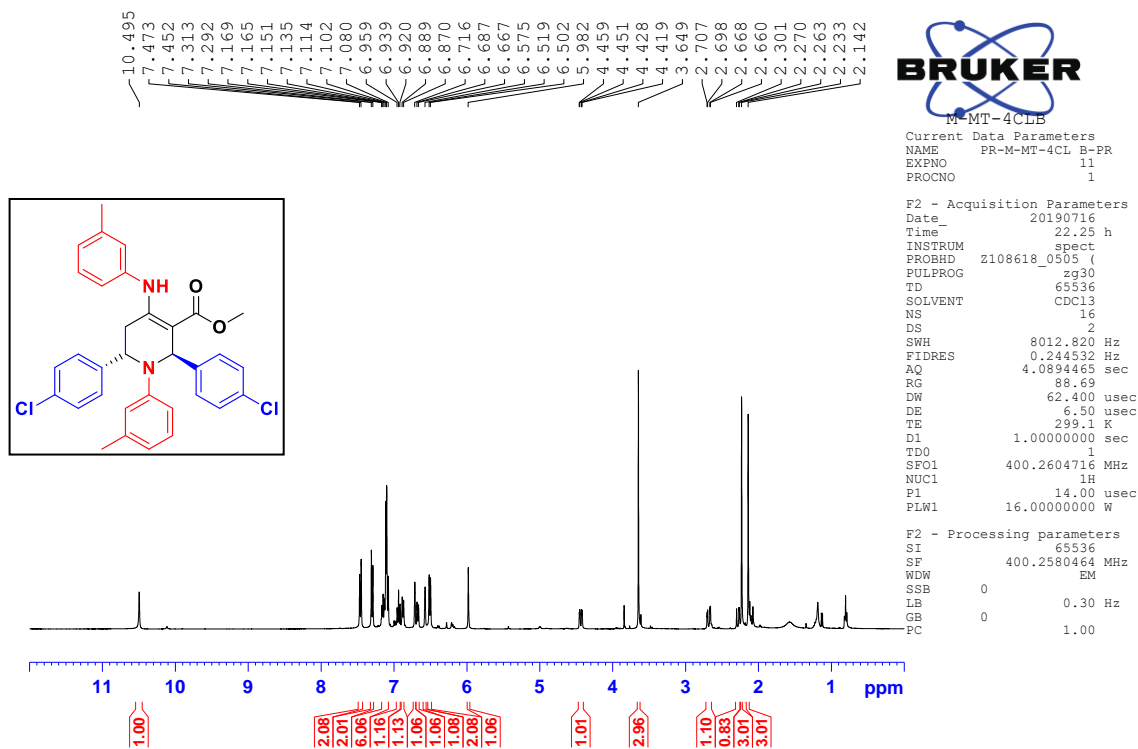


Figure S66. ¹H NMR (400 MHz) of compound **11m** in CDCl₃

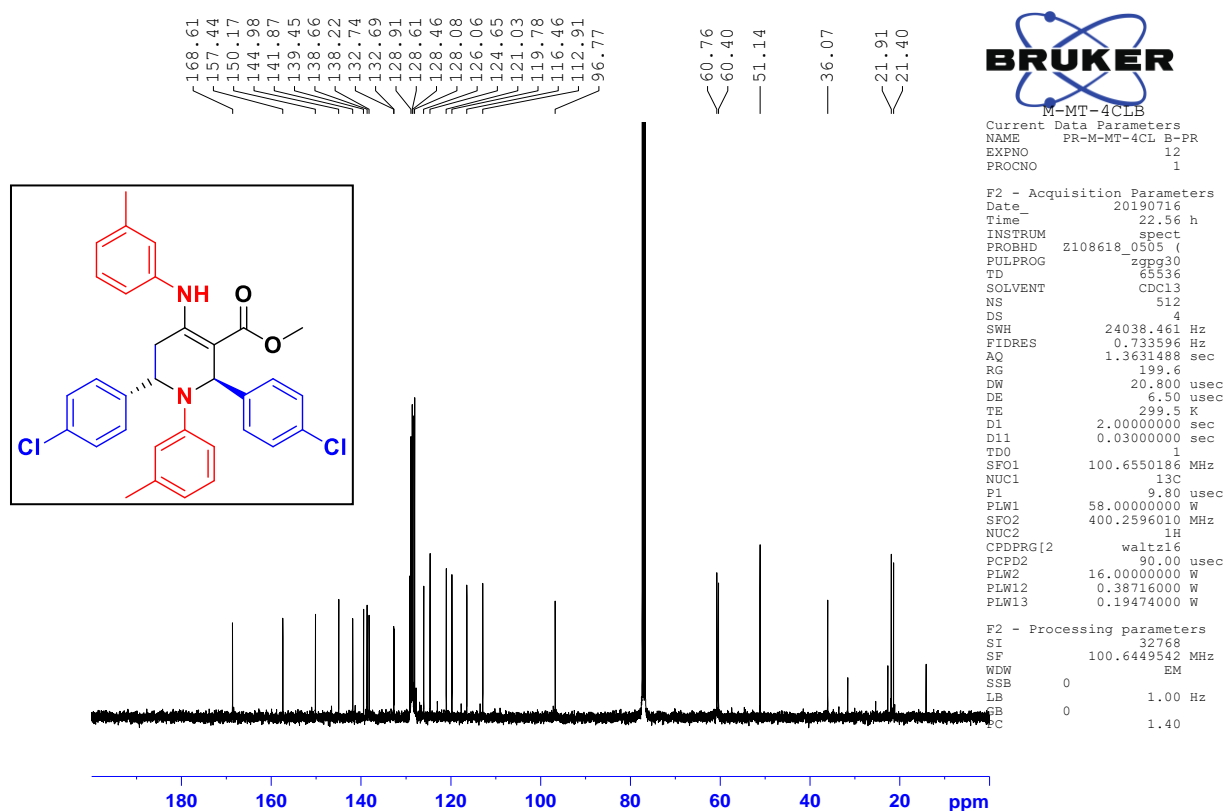


Figure S67. ¹³C NMR Spectrum (100 MHz) of compound **11m** in CDCl₃

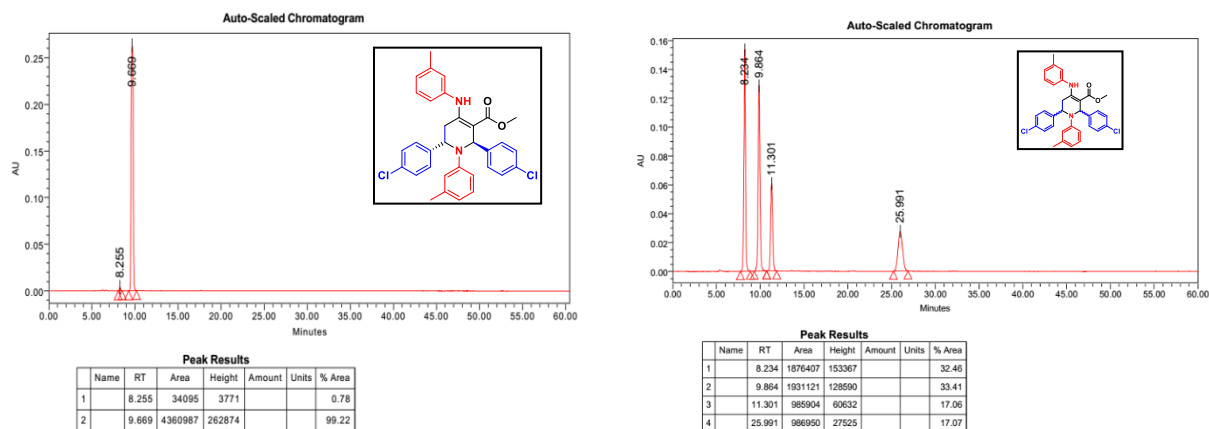


Figure S68. HPLC Chromatogram of compound **11m**

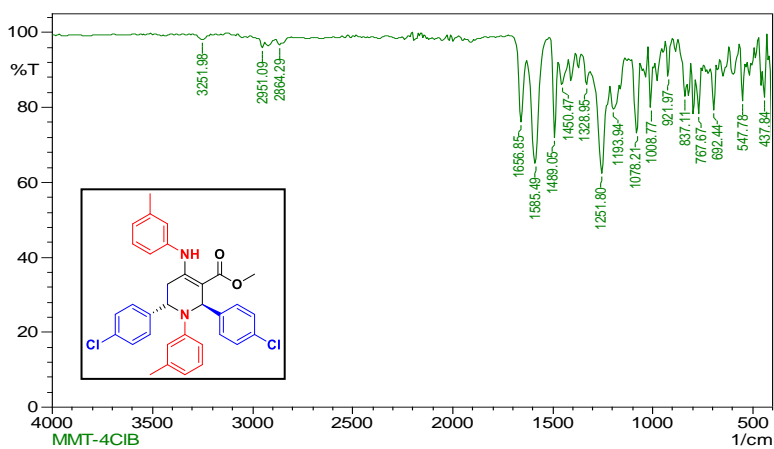


Figure S69. IR Spectrum of compound **11m**

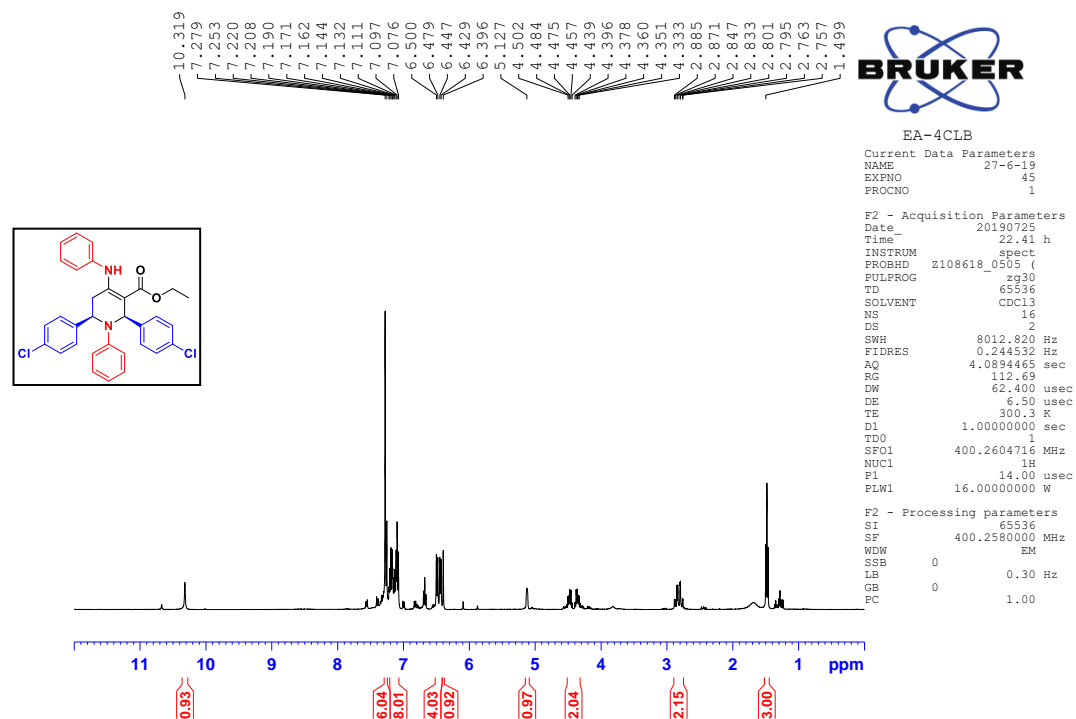


Figure S70. ^1H NMR (400 MHz) of compound **11n** in CDCl_3

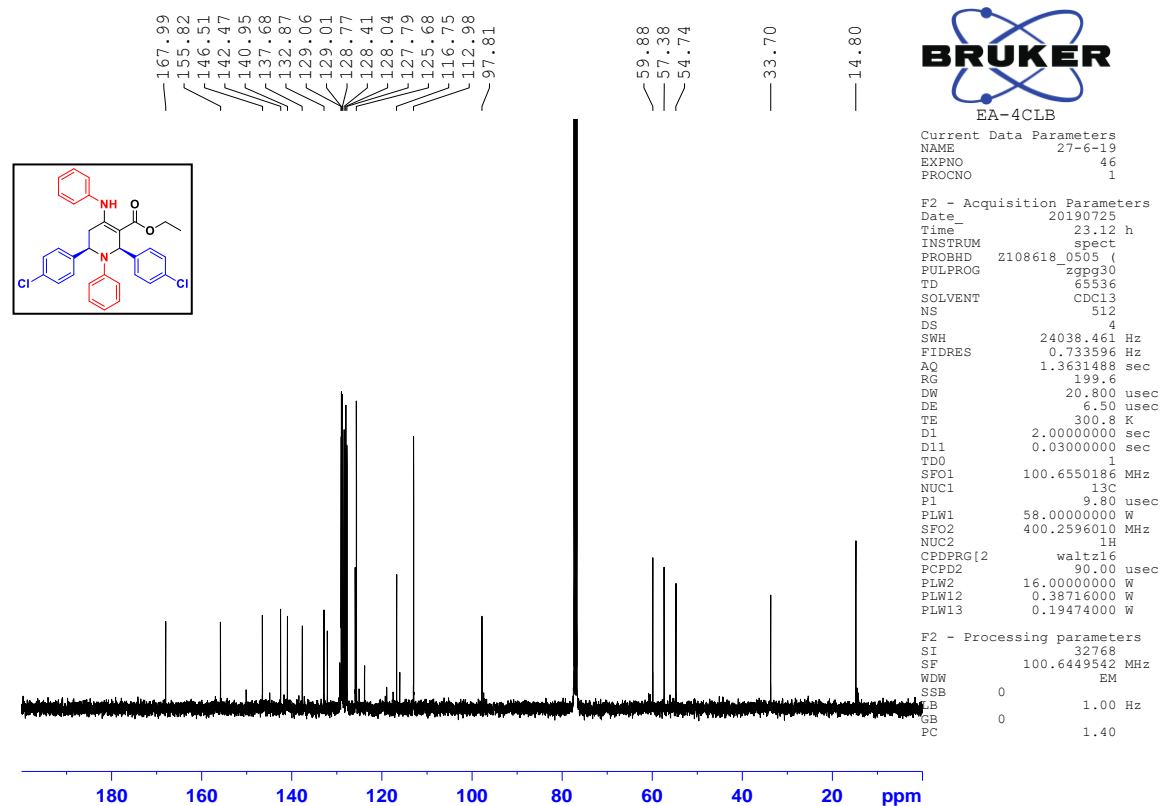


Figure S71. ^{13}C NMR Spectrum (100 MHz) of compound **11n** in CDCl_3

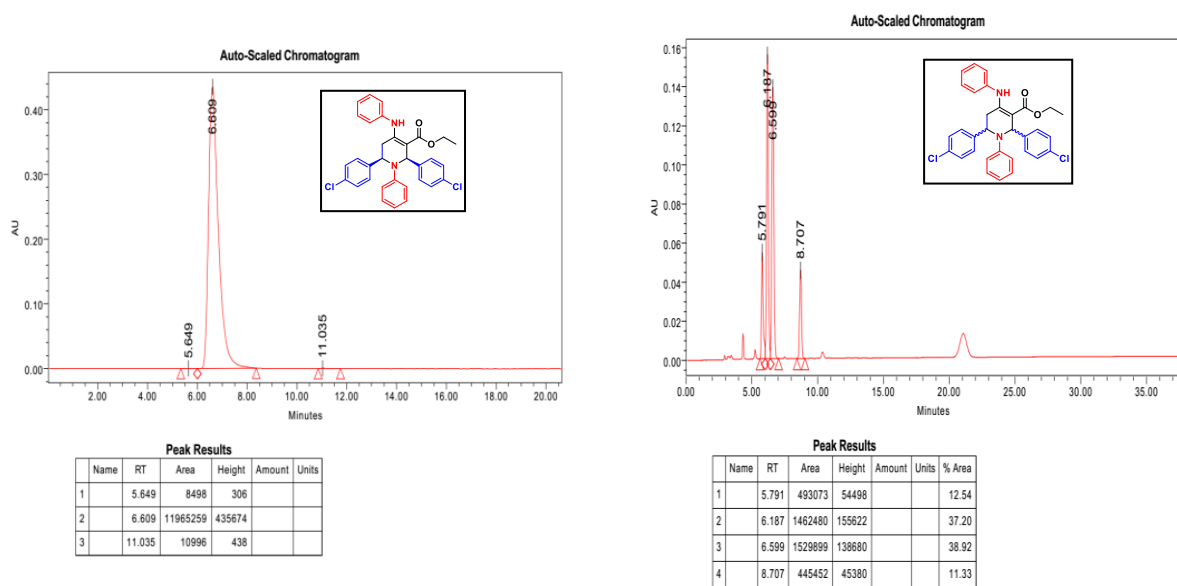


Figure S72. HPLC Chromatogram of compound **11n**

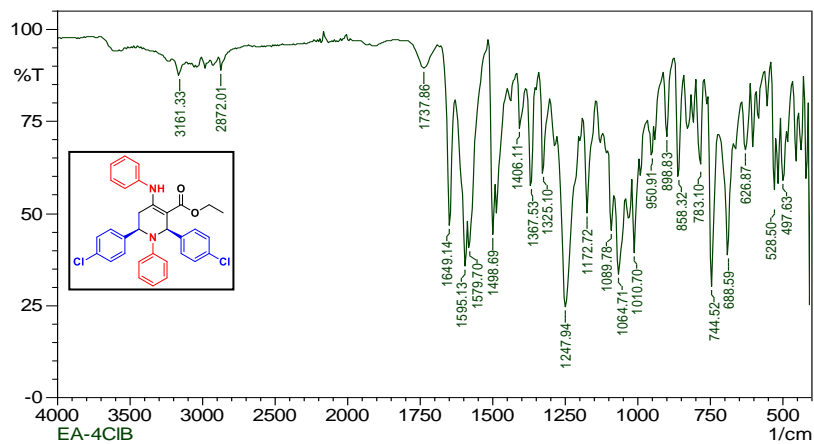
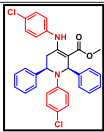
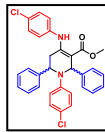


Figure S73. IR Spectrum of compound **11n**



Peak Results							
	Name	RT	Area	Height	Amount	Units	% Area
1		18.067	619787	36917			8.16
2		19.476	927500	45043			12.21
3		21.204	6051721	234153			79.64



	Name	RT	Area	Height	Amount	Units	% Area
1		12.724	52840	3855			0.50
2		14.784	49383	3126			0.47
3		17.548	5033111	220169			47.96
4		20.870	5360118	186275			51.07

