

## Supporting Information

### **Efficient synthesis of fluorinated benzimidazoles, benzoxazolines, and benzothiazolines catalyzed by Hf(OTf)<sub>4</sub>**

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The NMR spectra of fluorinated benzimidazolines (3,14–24), benzoxazolines (25,28), benzothiazolines (32), and imine intermediate (34)

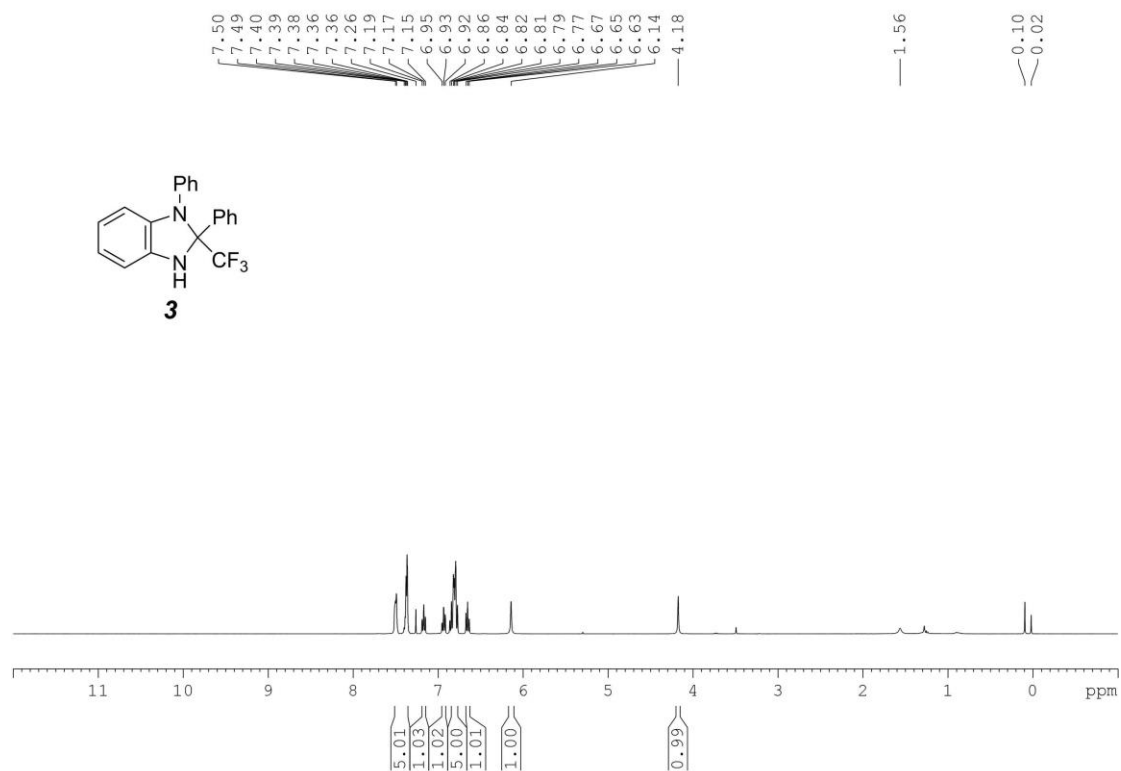


Figure S1. <sup>1</sup>H NMR of **3**

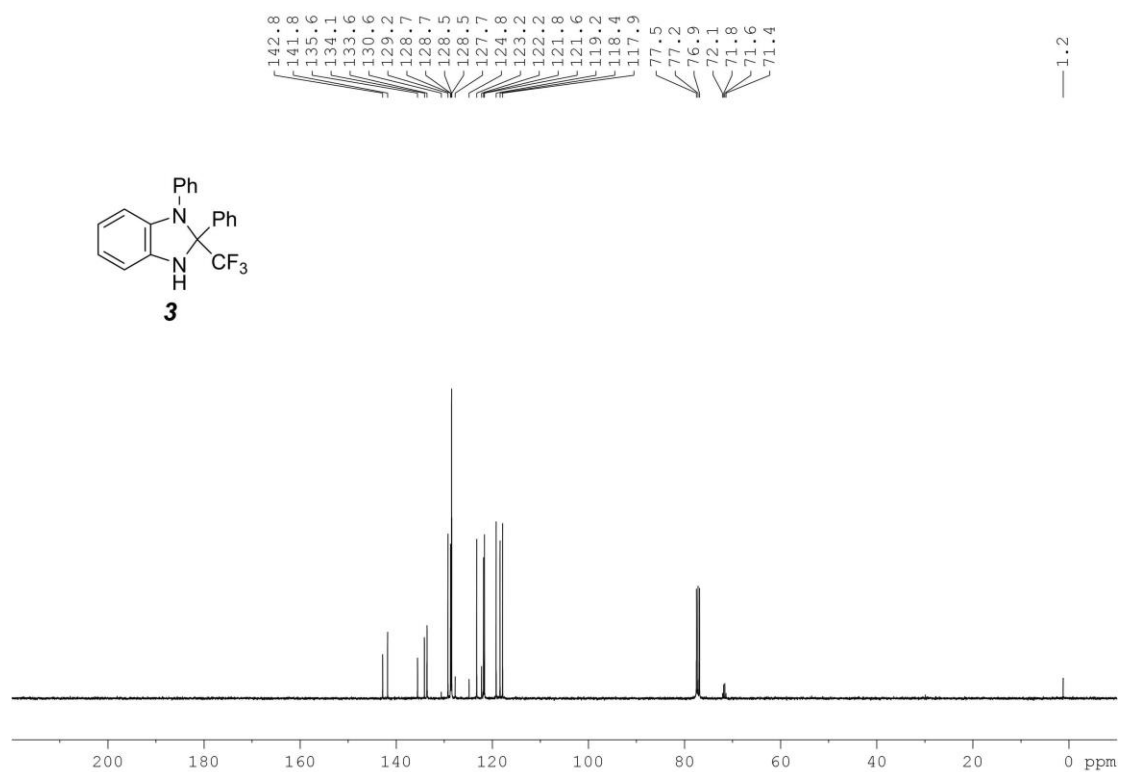


Figure S2.  $^{13}\text{C}$  NMR of **3**

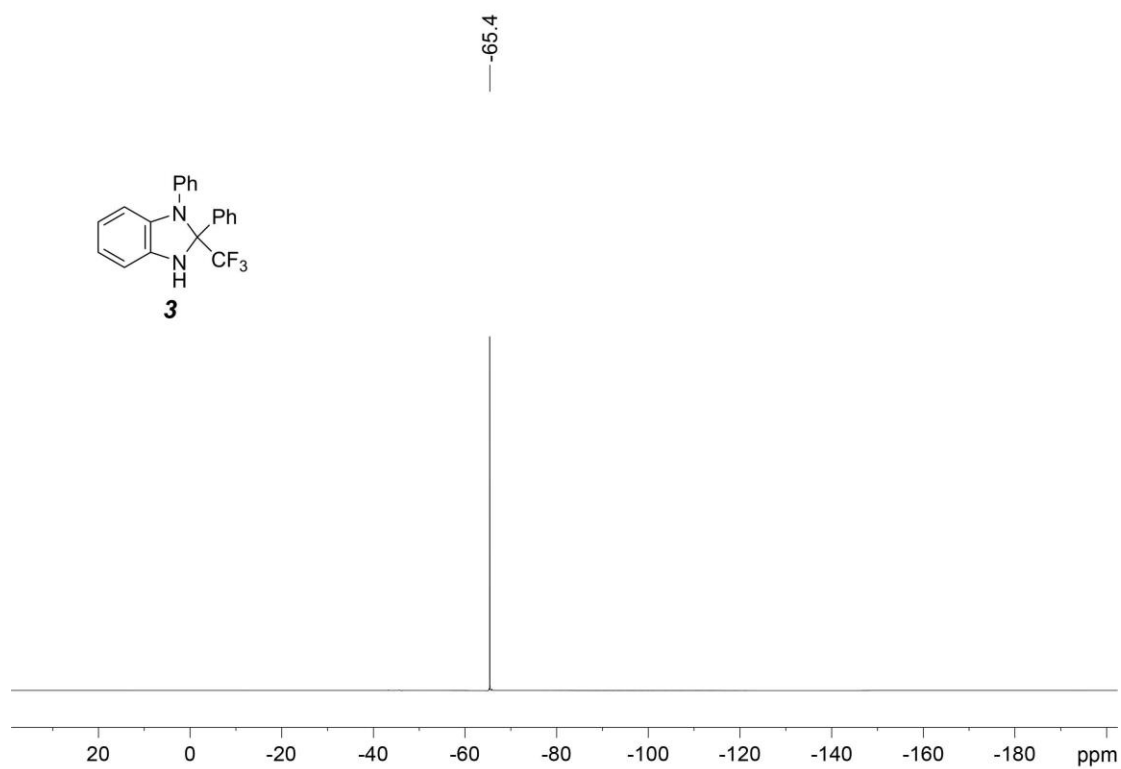


Figure S3.  $^{19}\text{F}$  NMR of **3**

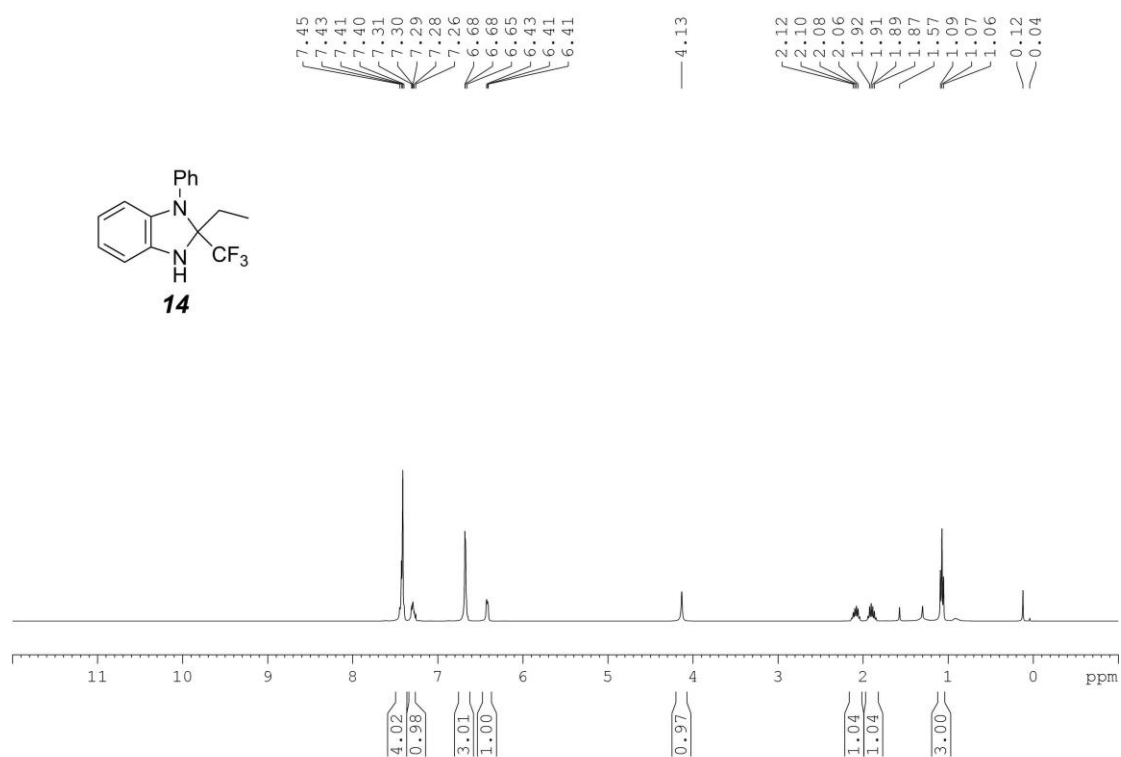


Figure S4.  $^1\text{H}$  NMR of **14**

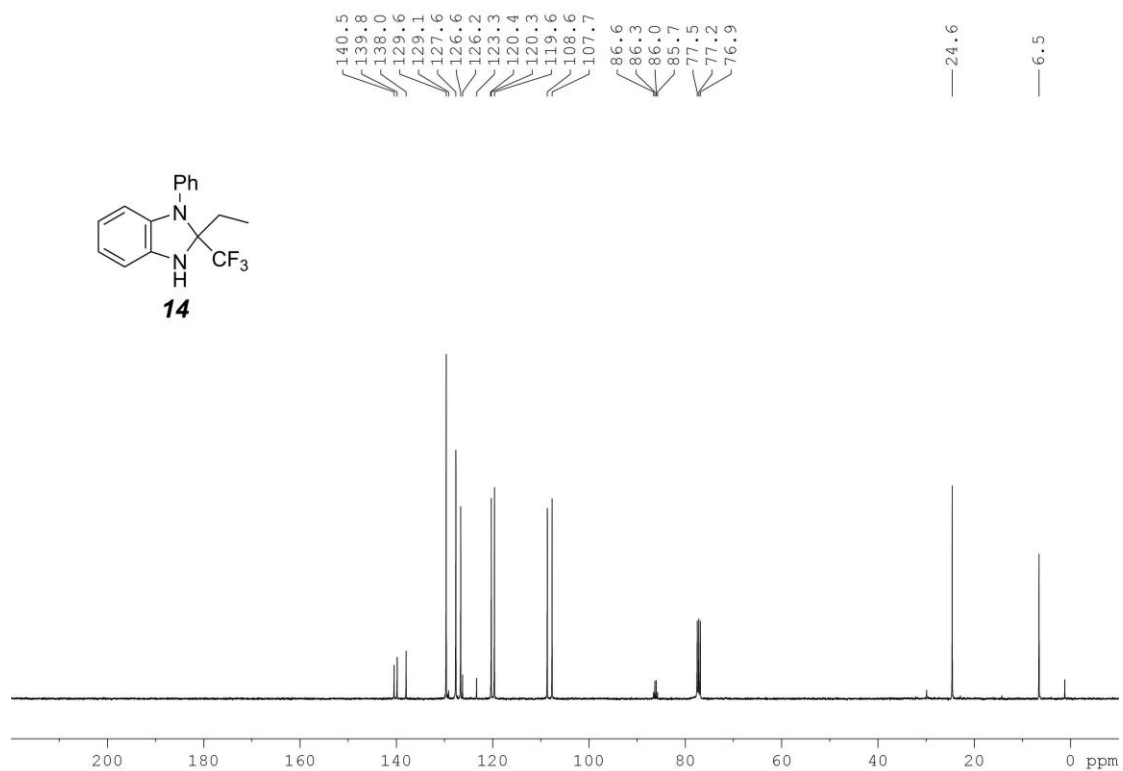


Figure S5. <sup>13</sup>C NMR of **14**

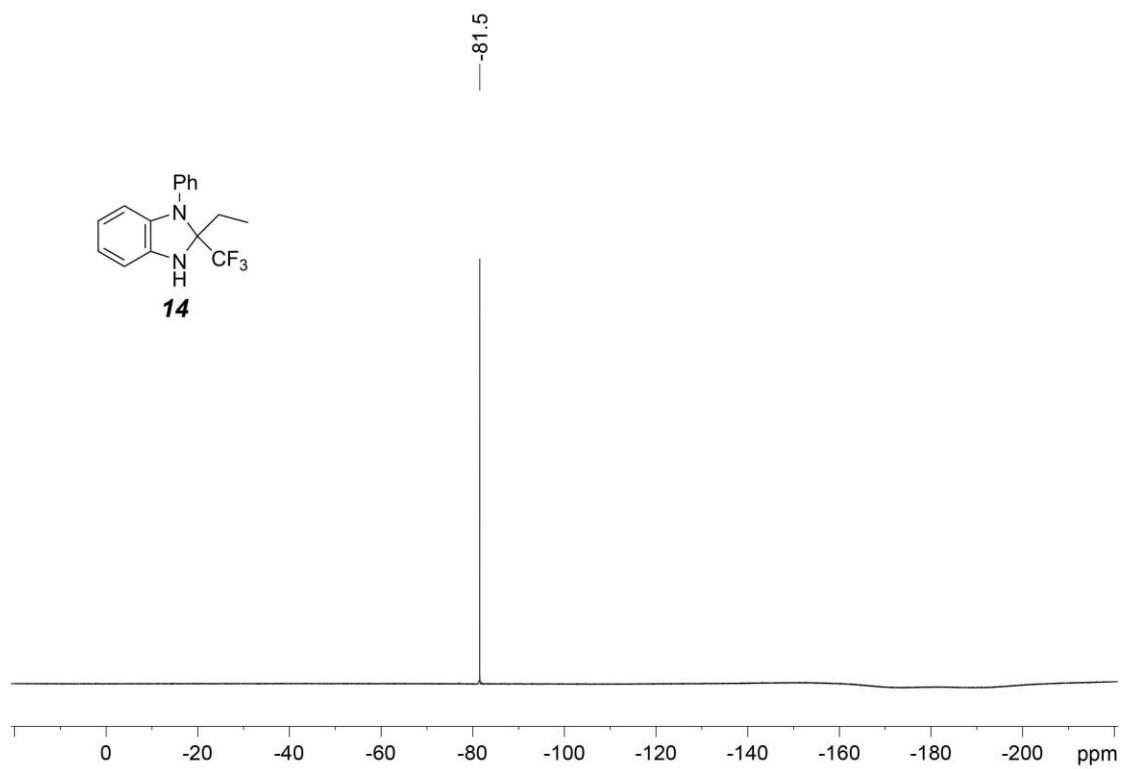


Figure S6. <sup>19</sup>F NMR of **14**

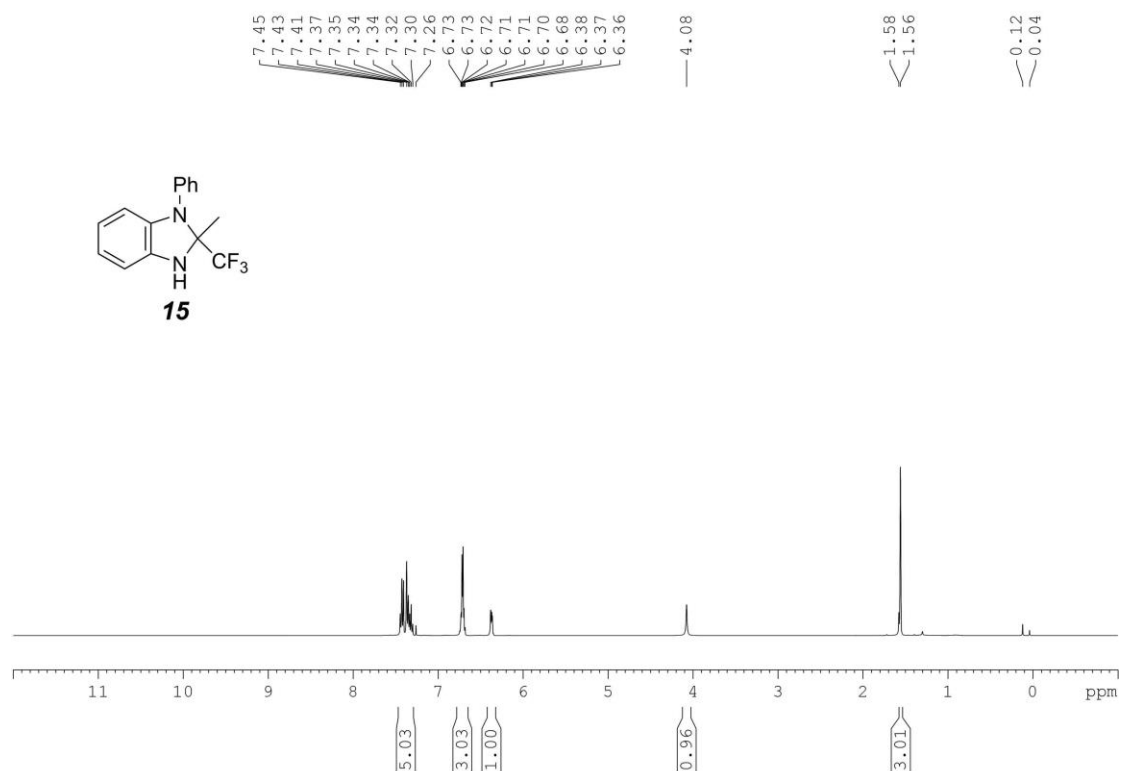


Figure S7. <sup>1</sup>H NMR of **15**

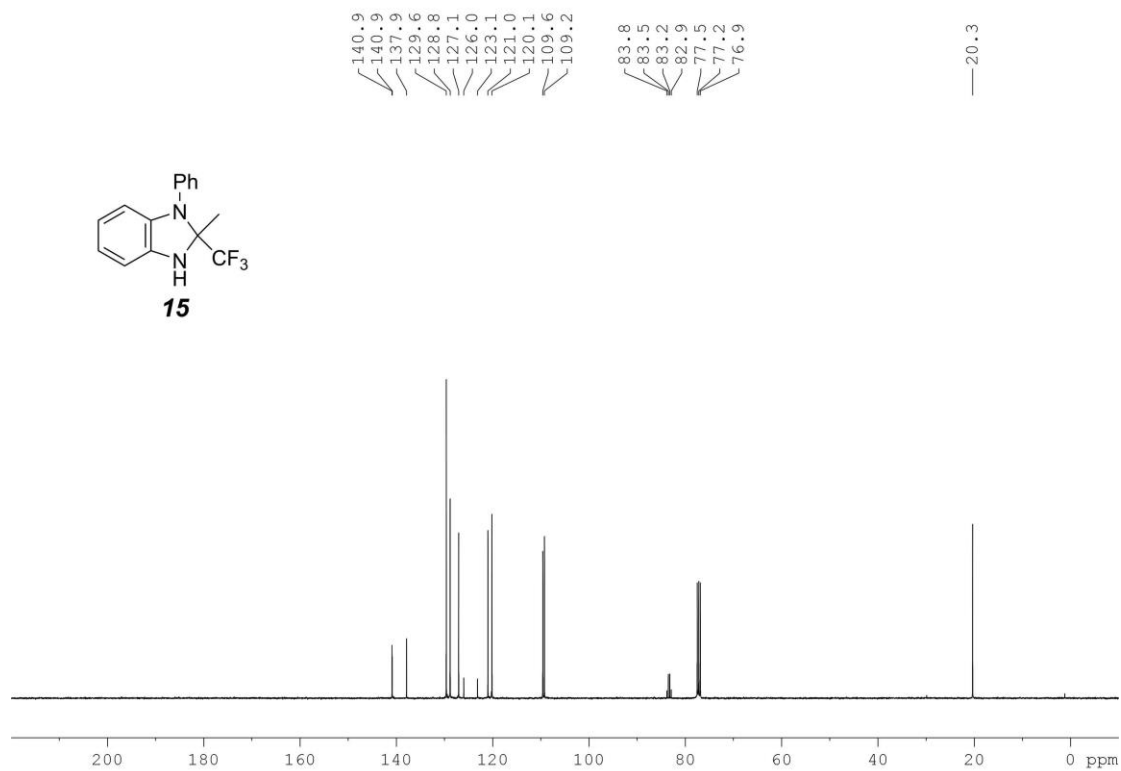


Figure S8. <sup>13</sup>C NMR of **15**

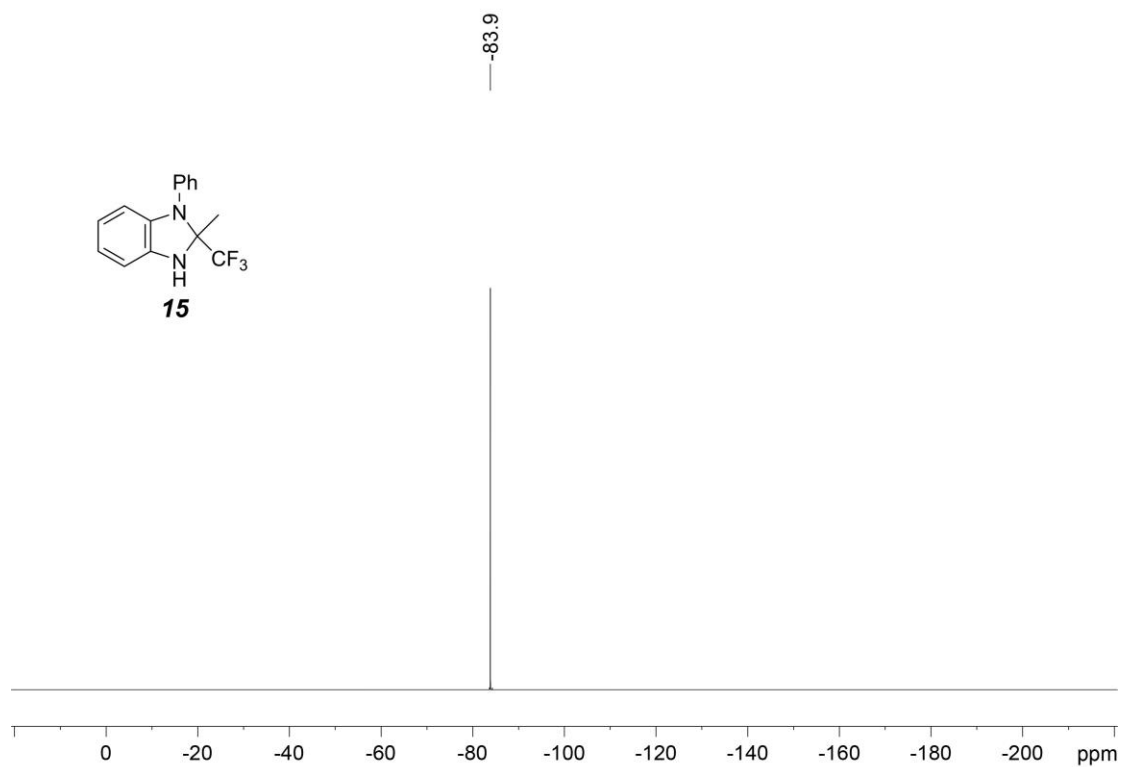


Figure S9. <sup>19</sup>F NMR of **15**

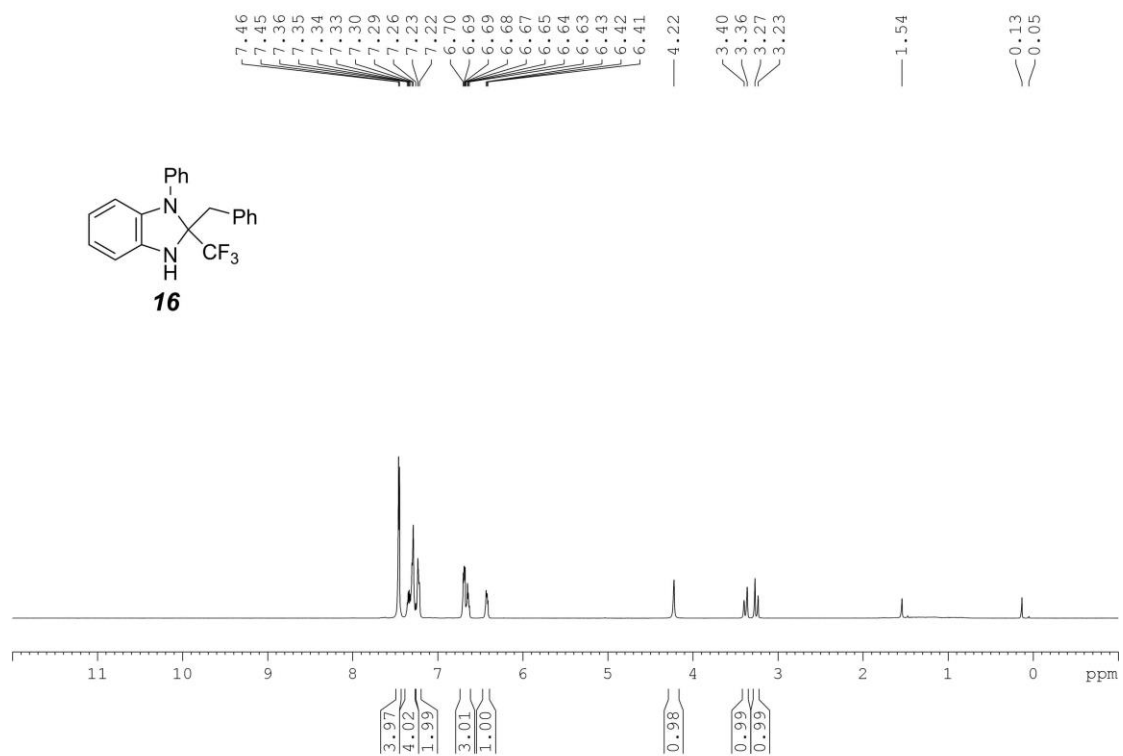


Figure S10. <sup>1</sup>H NMR of **16**

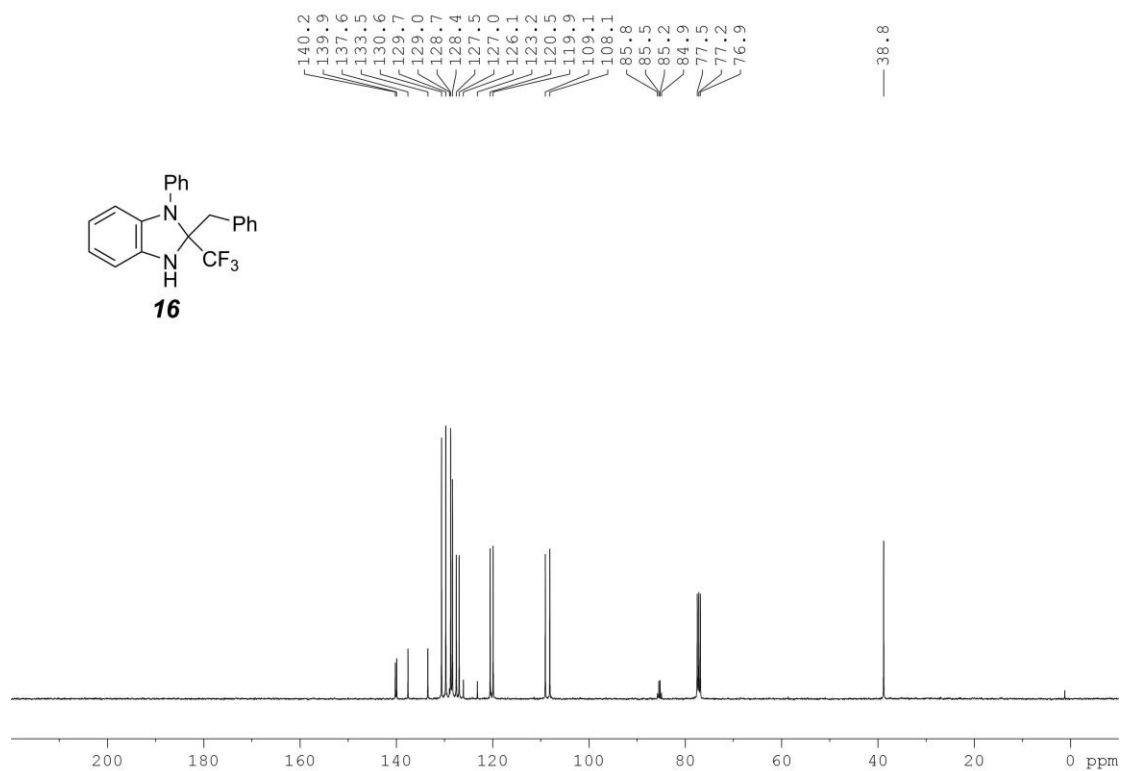


Figure S11. <sup>13</sup>C NMR of **16**

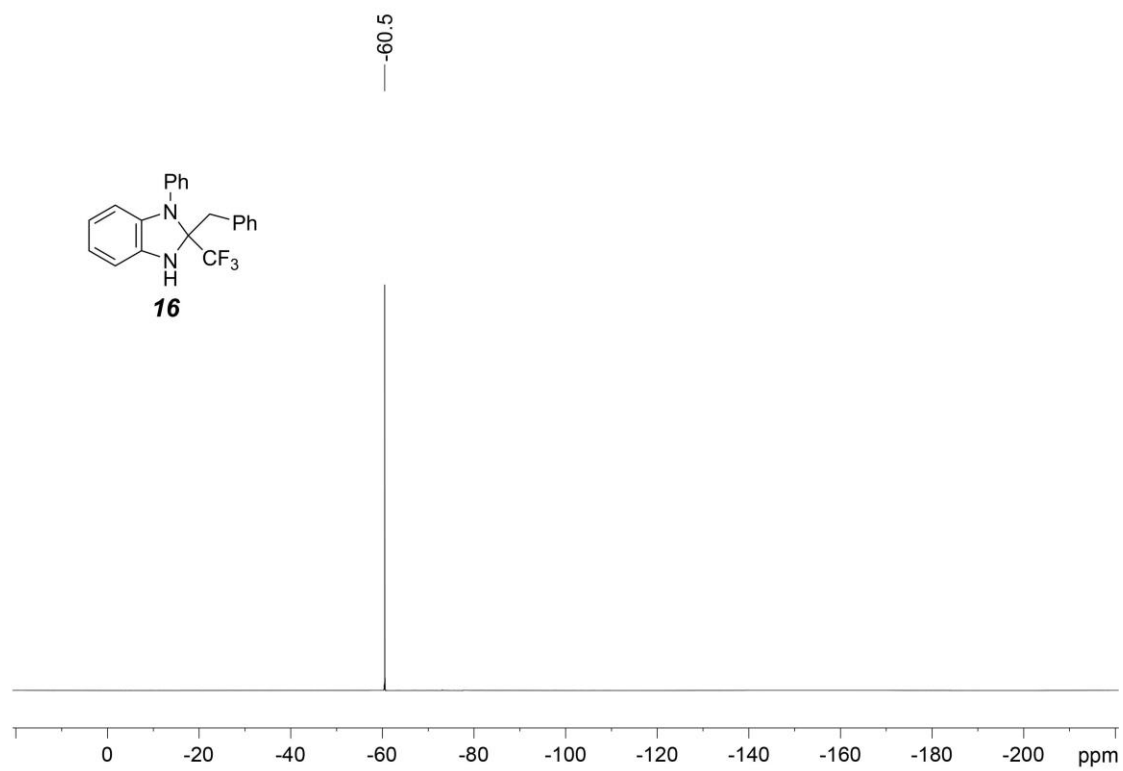


Figure S12. <sup>19</sup>F NMR of **16**

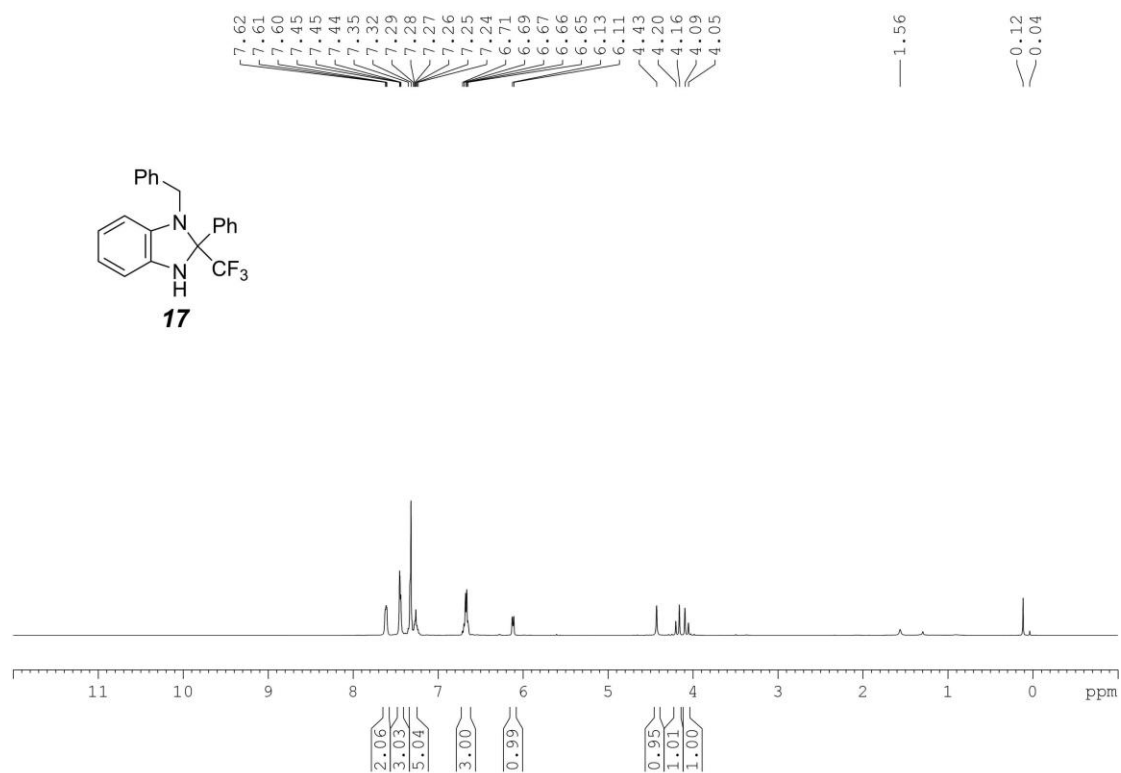


Figure S13. <sup>1</sup>H NMR of **17**

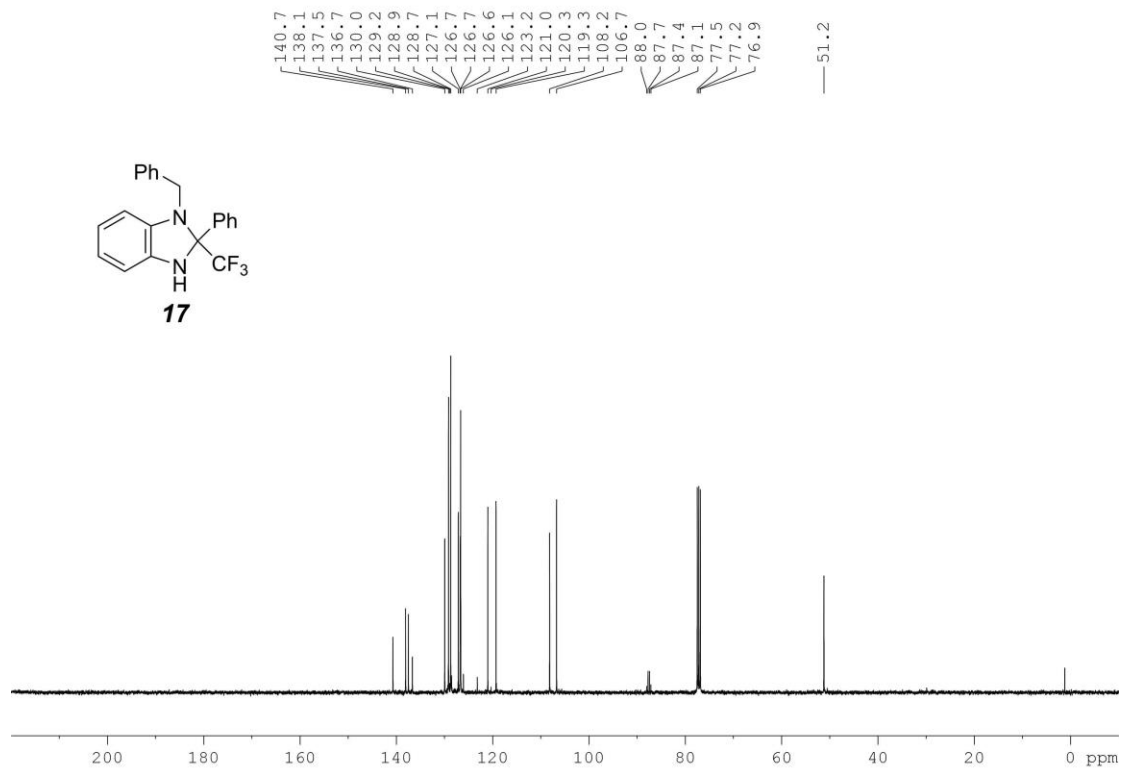


Figure S14. <sup>13</sup>C NMR of **17**



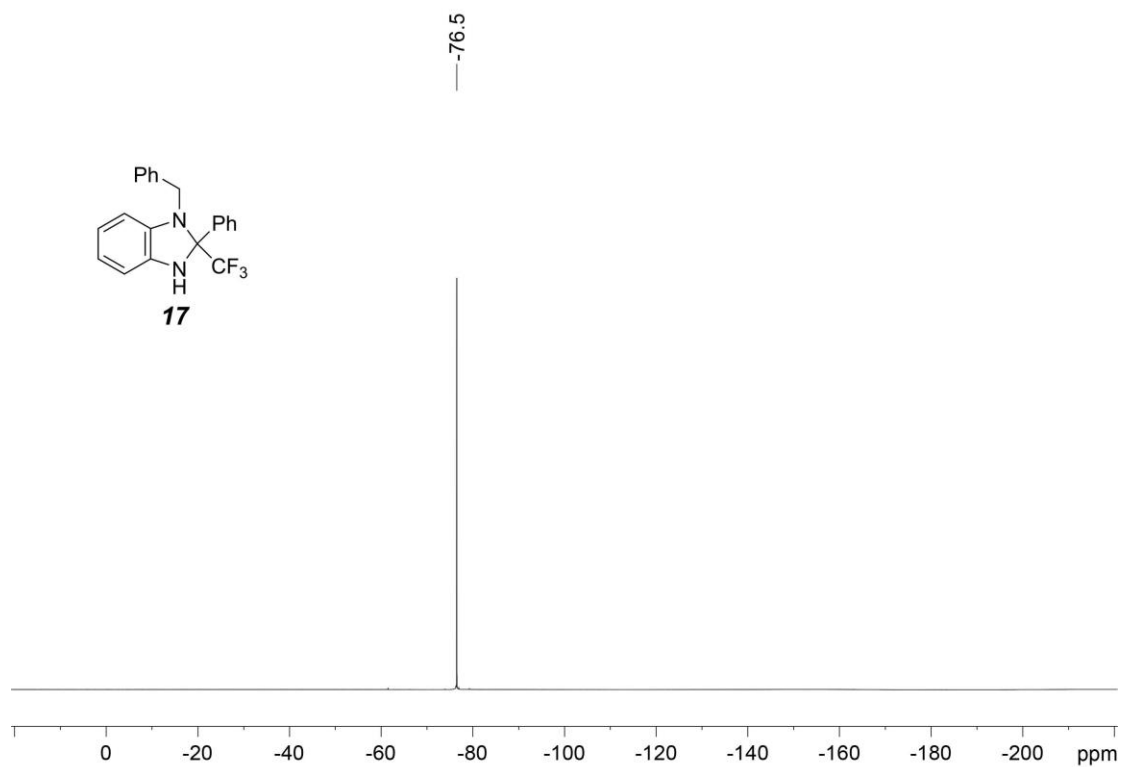


Figure S15. <sup>19</sup>F NMR of **17**

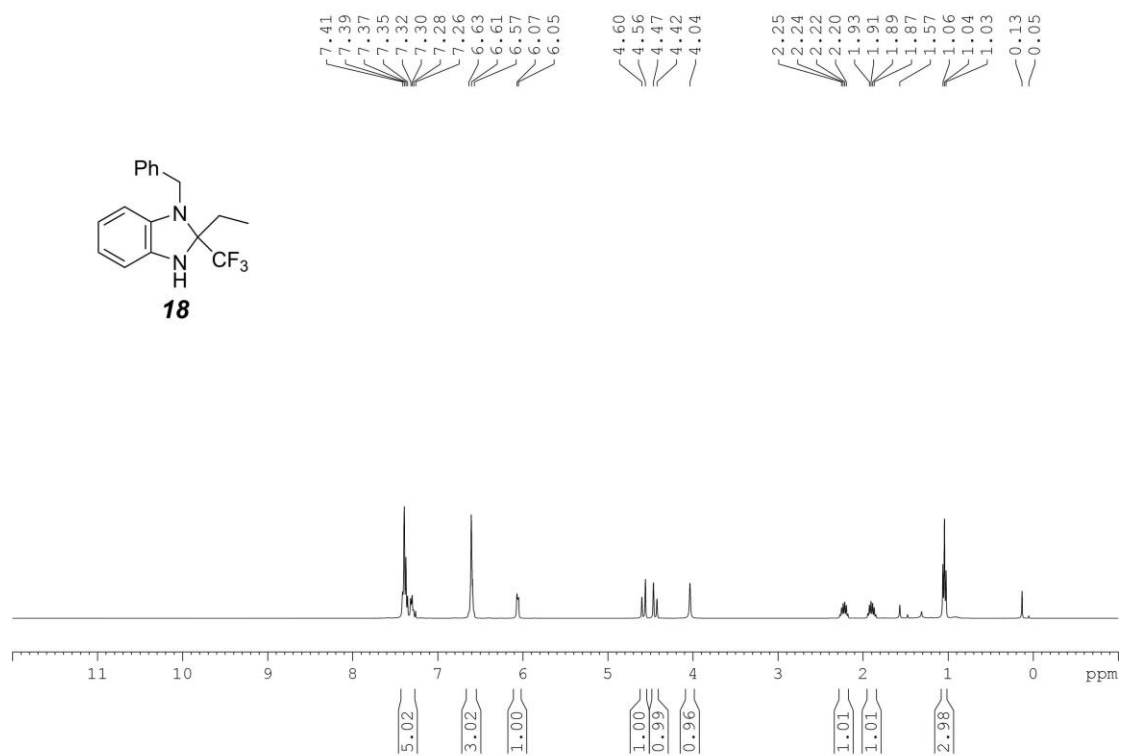


Figure S16. <sup>1</sup>H NMR of **18**

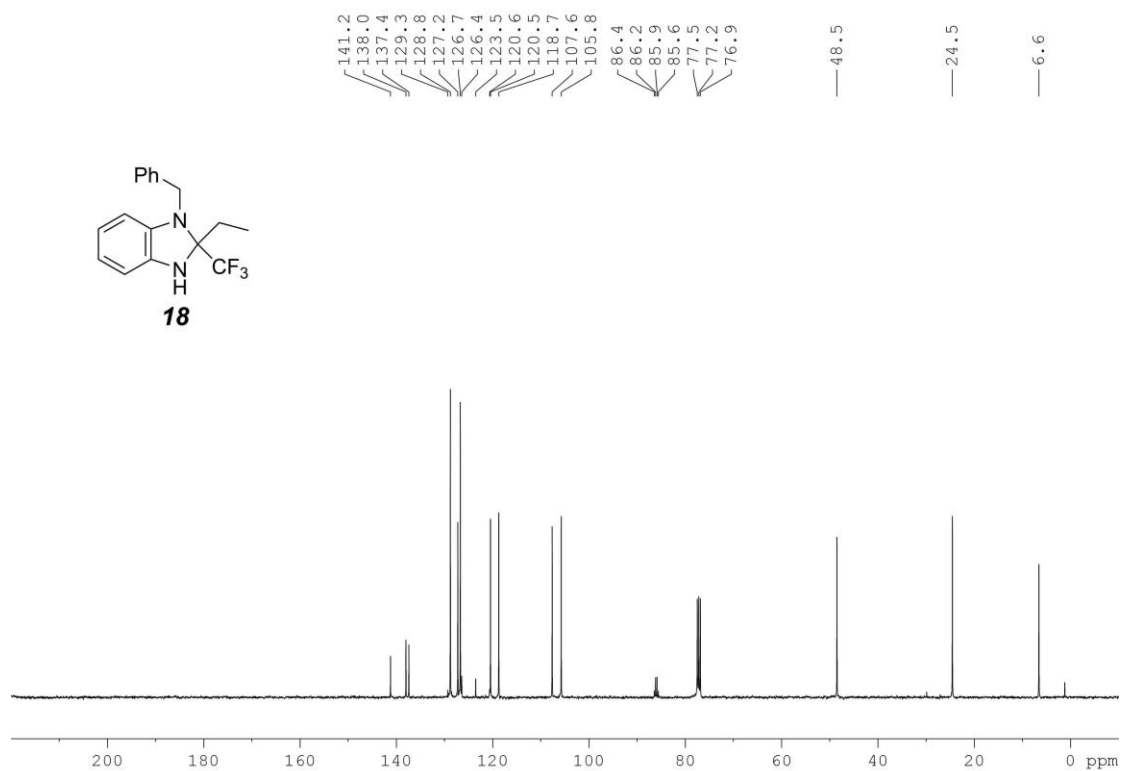


Figure S17. <sup>13</sup>C NMR of **18**

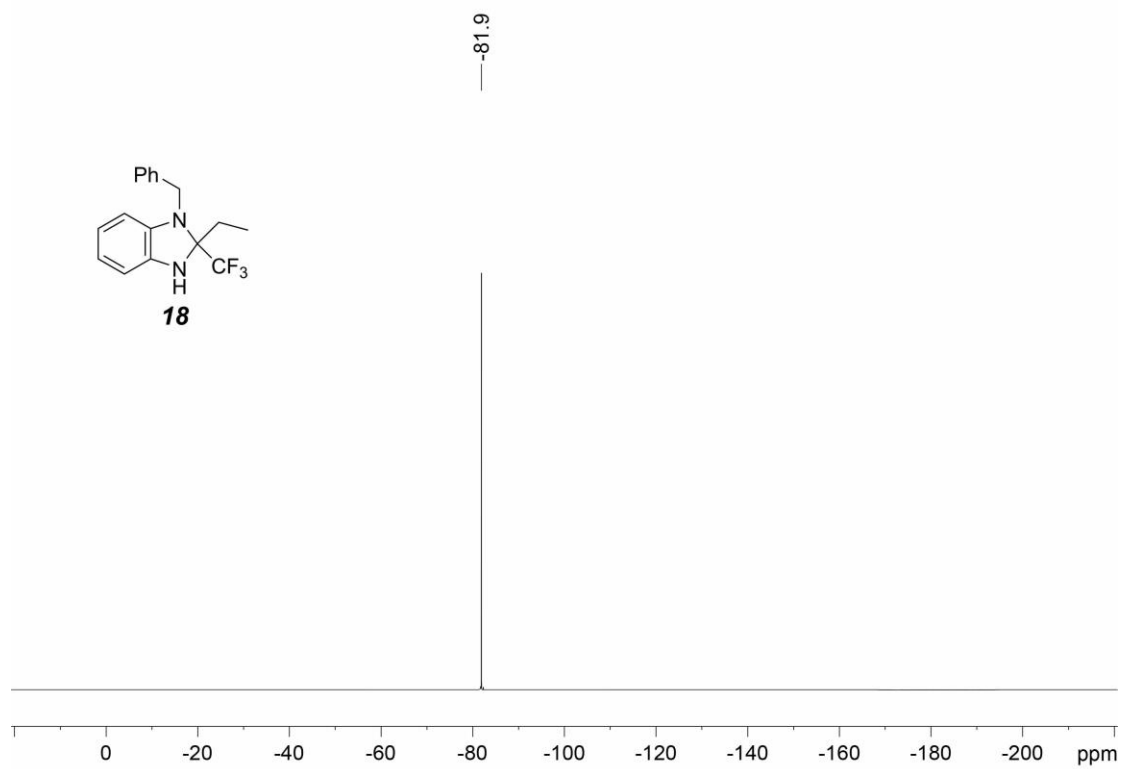


Figure S18. <sup>19</sup>F NMR of **18**

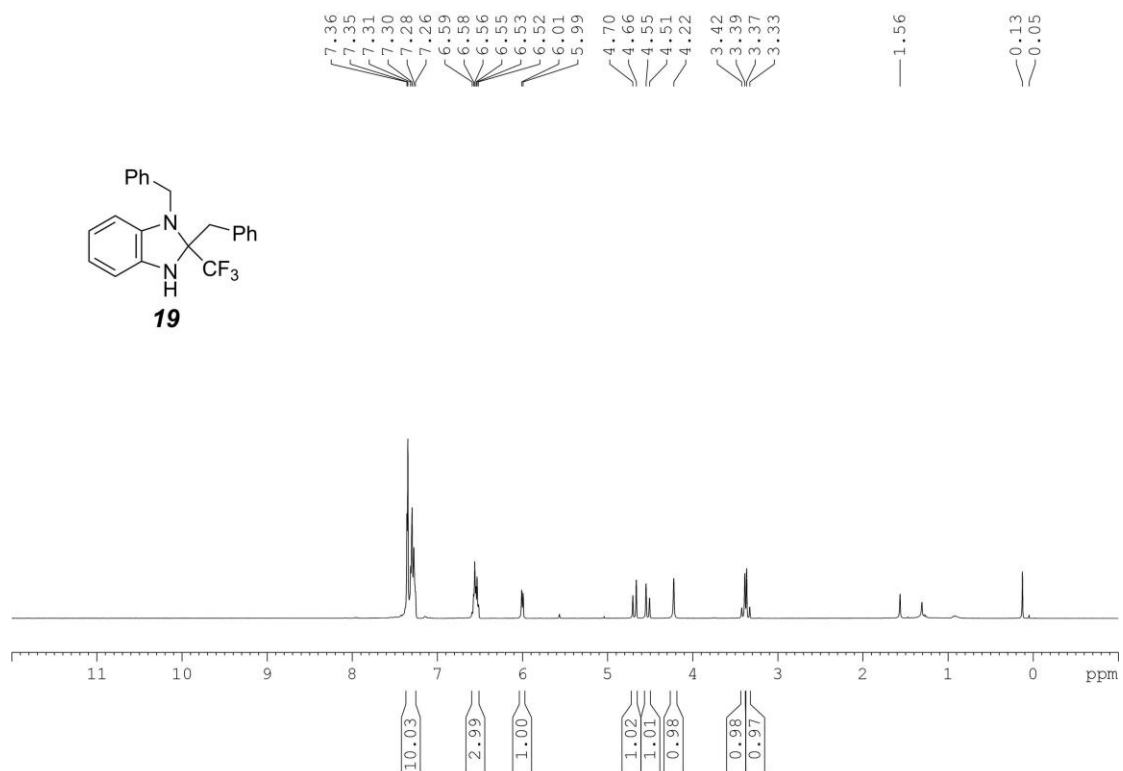


Figure S19. <sup>1</sup>H NMR of **19**

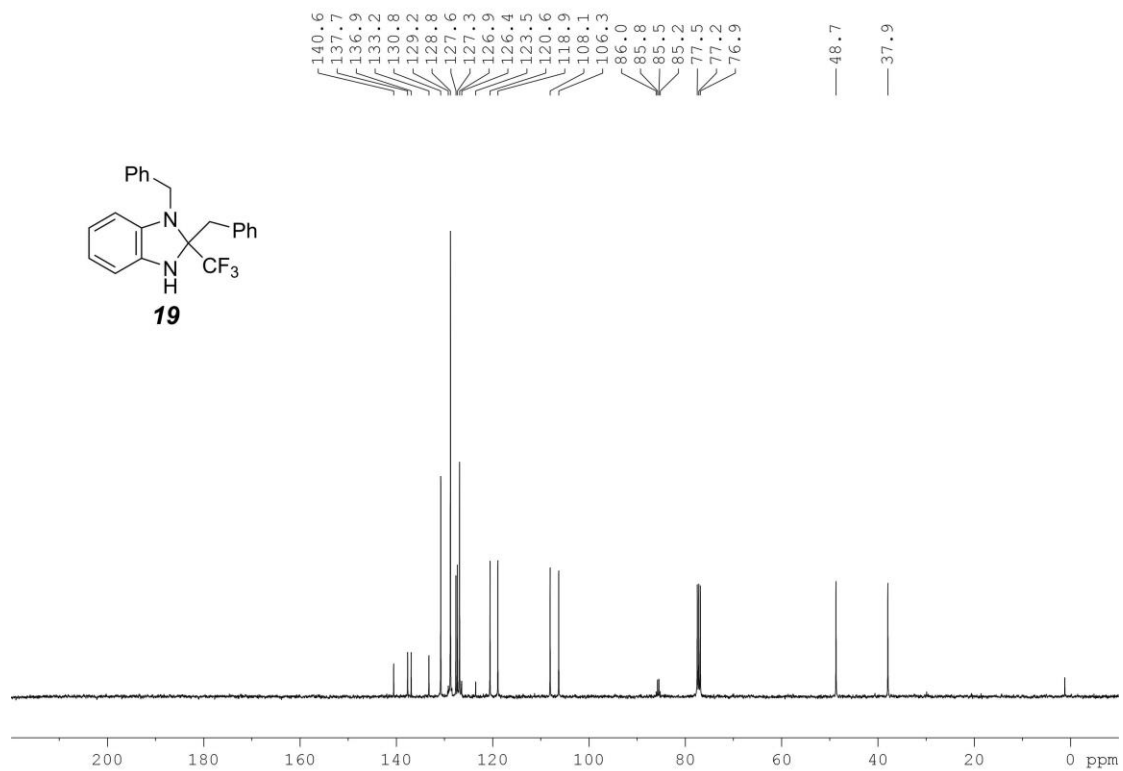


Figure S20. <sup>13</sup>C NMR of **19**

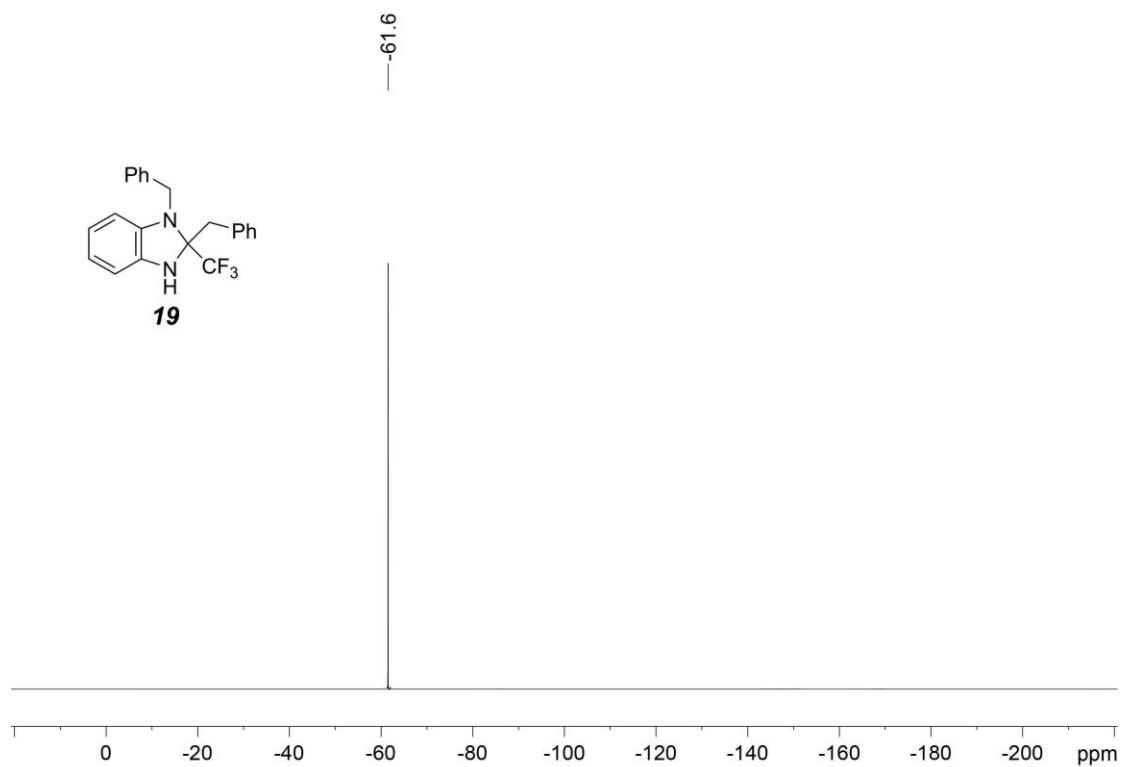


Figure S21. <sup>19</sup>F NMR of **19**

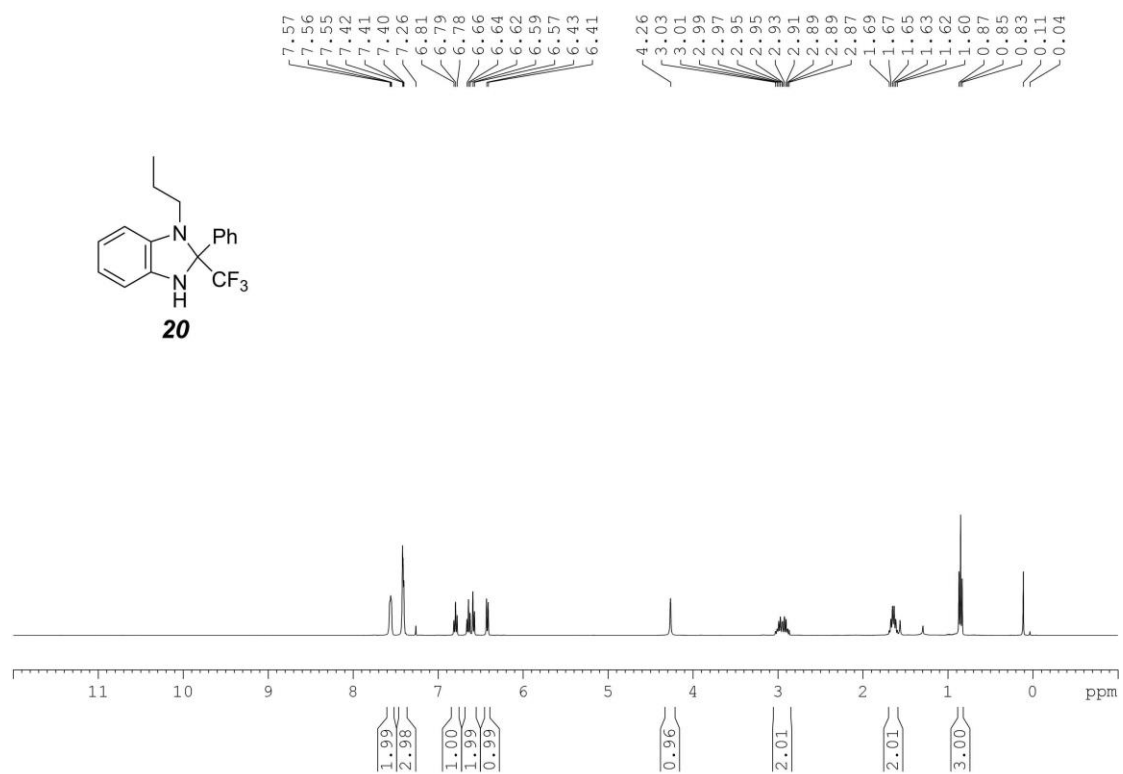


Figure S22. <sup>1</sup>H NMR of **20**

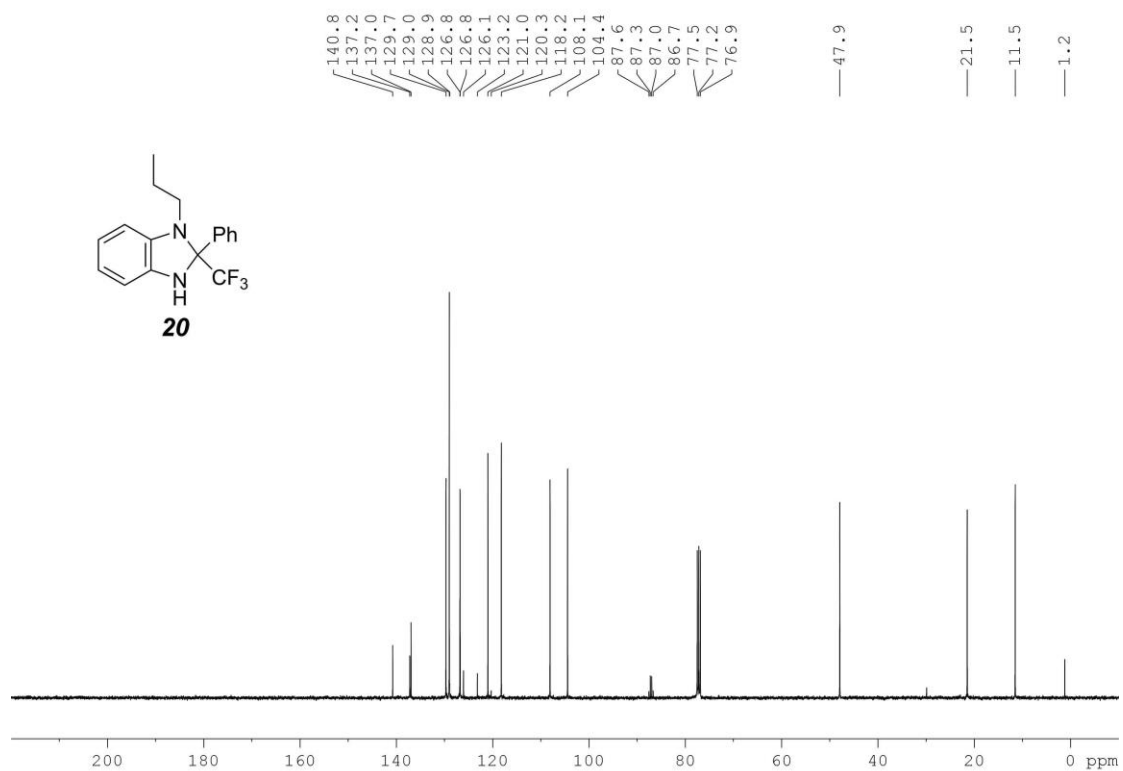


Figure S23. <sup>13</sup>C NMR of **20**

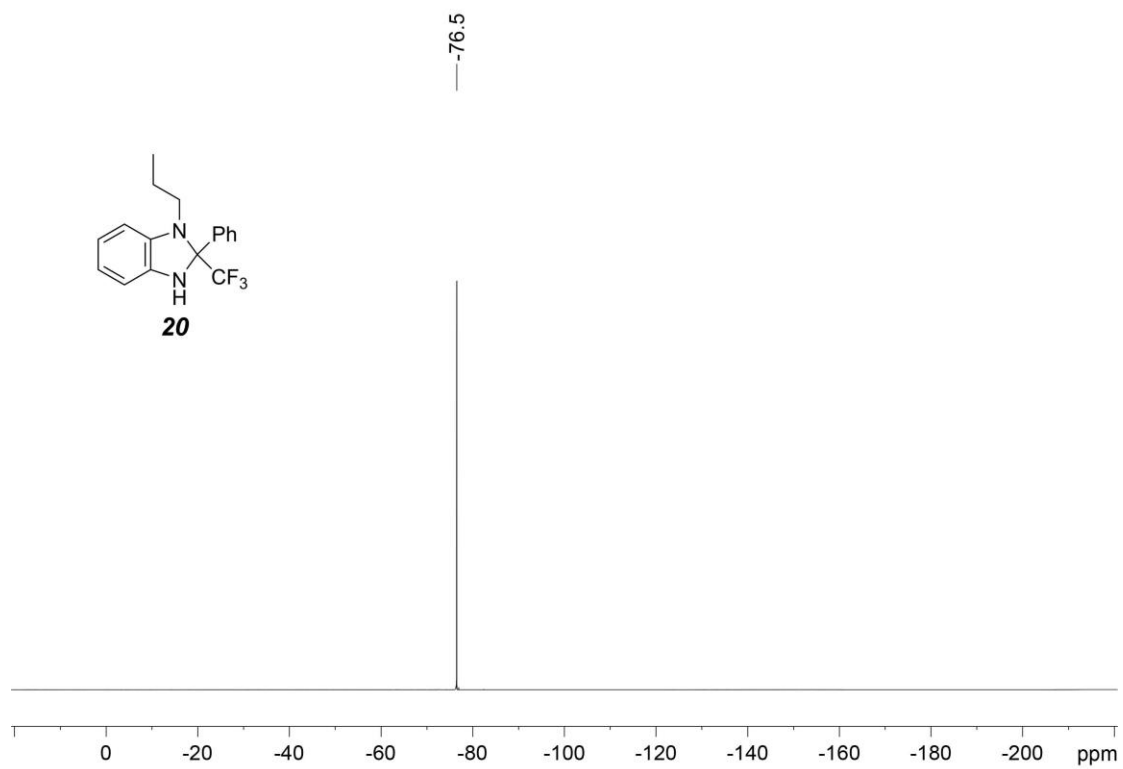


Figure S24. <sup>19</sup>F NMR of **20**

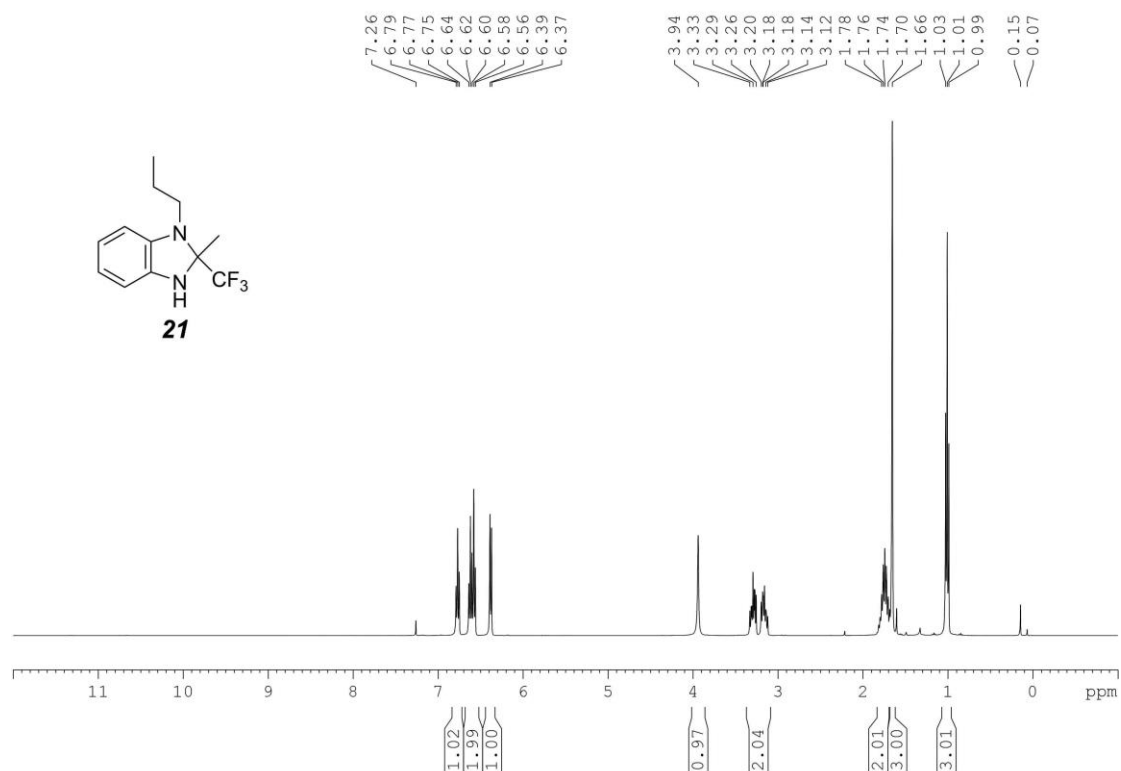


Figure S25.  $^1\text{H}$  NMR of **21**

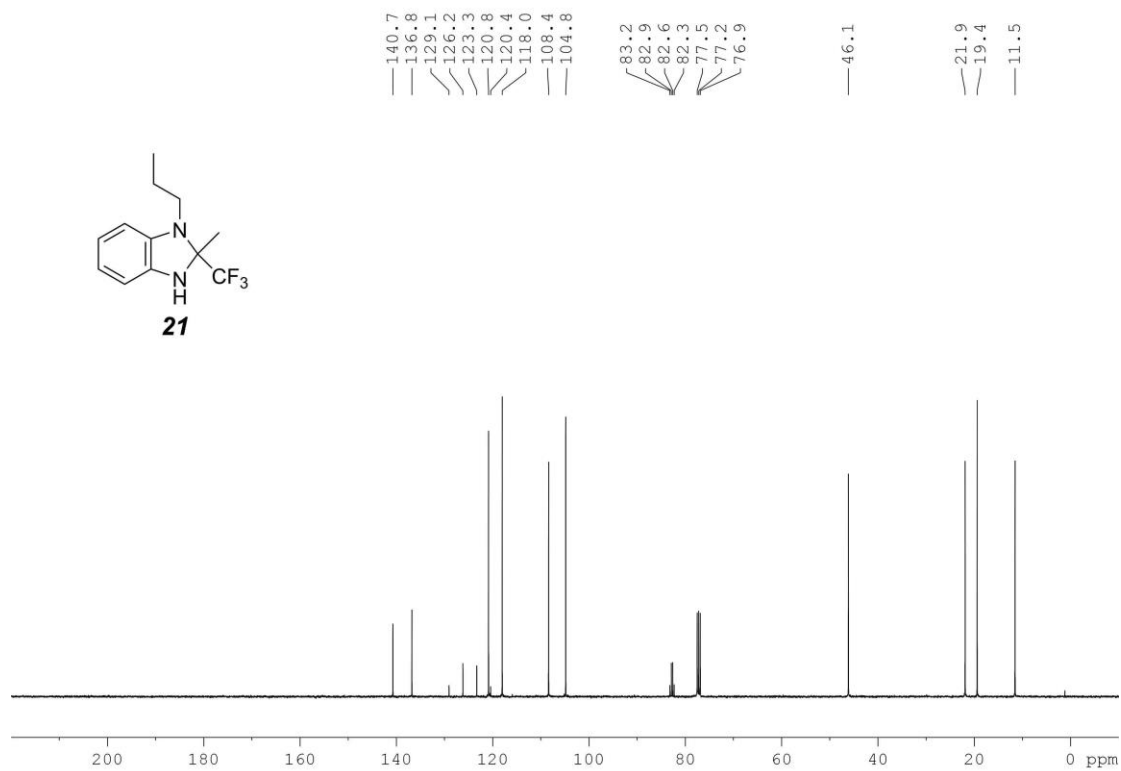


Figure S26.  $^{13}\text{C}$  NMR of **21**

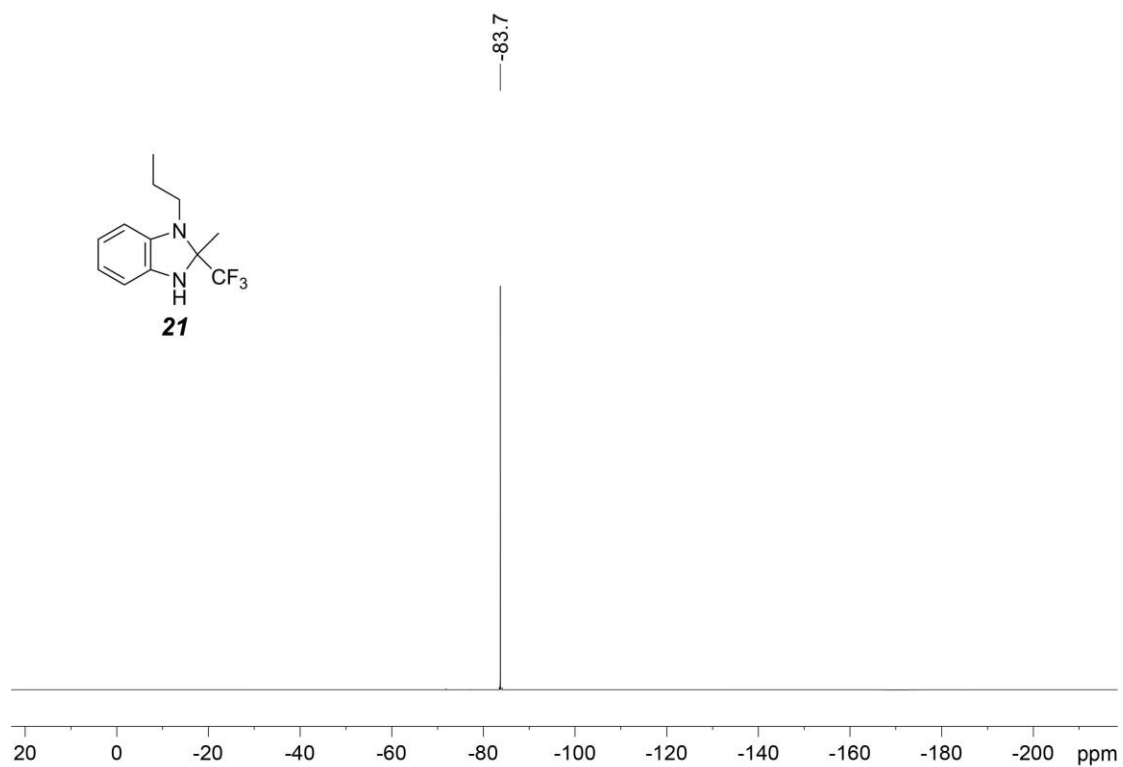


Figure S27. <sup>19</sup>F NMR of **21**

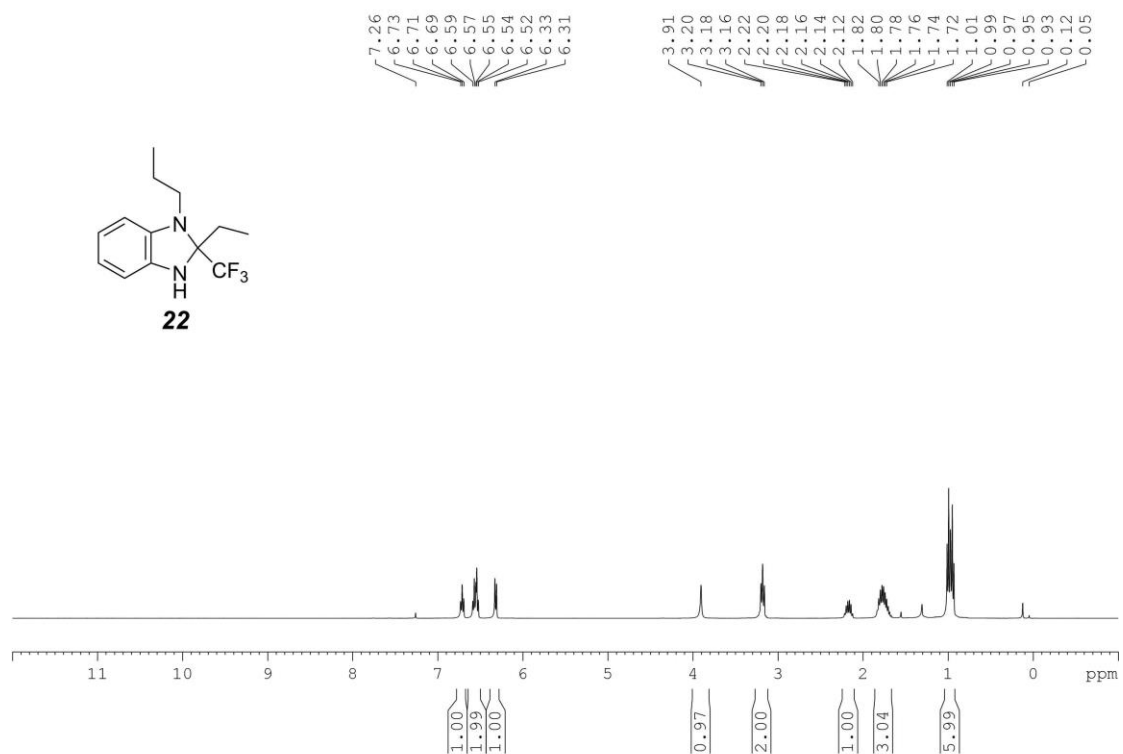


Figure S28. <sup>1</sup>H NMR of **22**

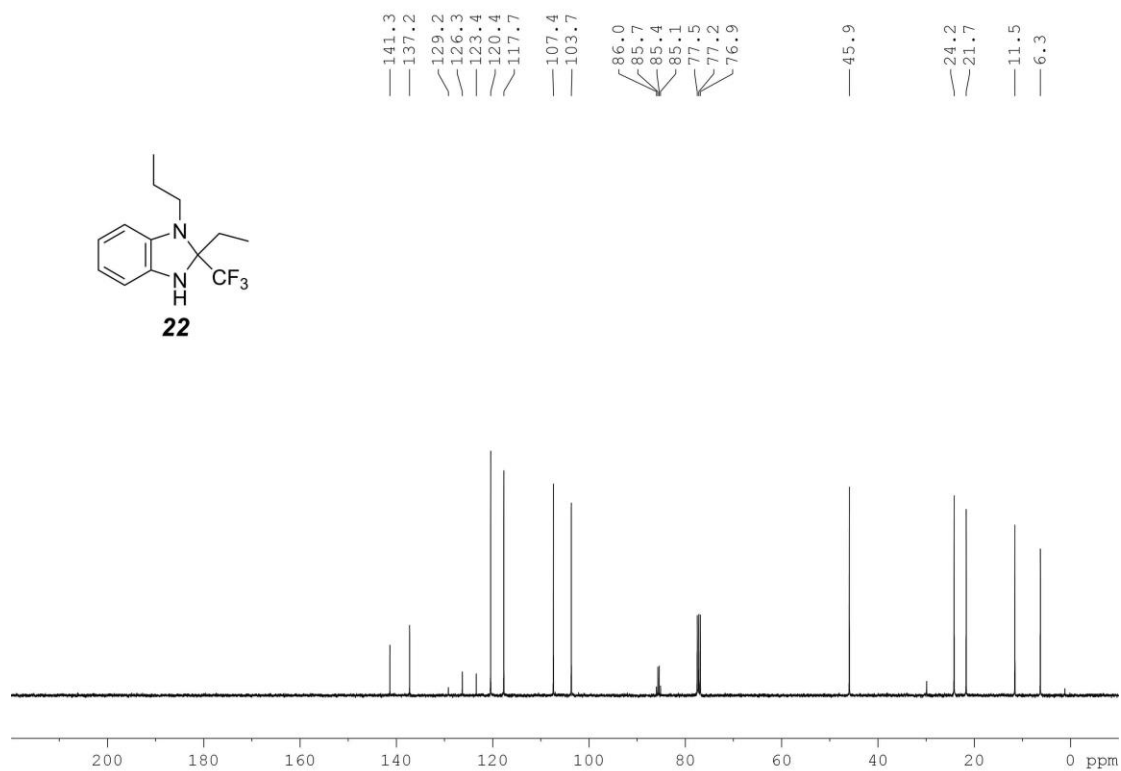


Figure S29.  $^{13}\text{C}$  NMR of **22**

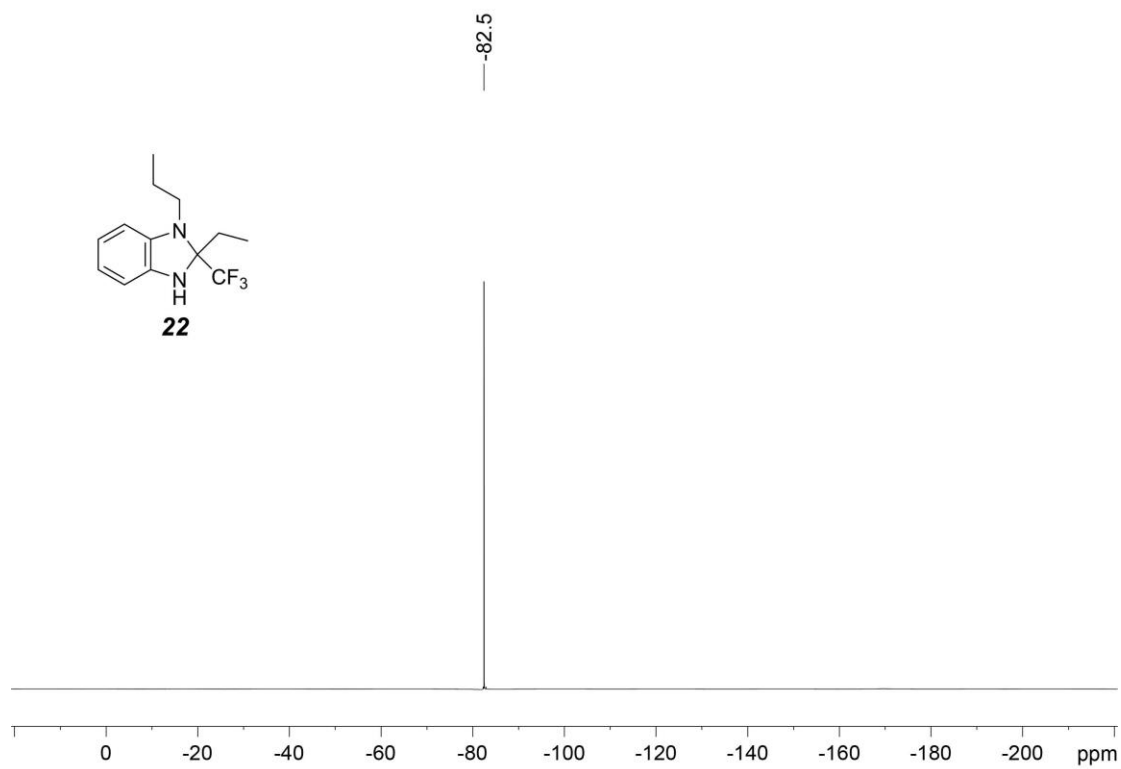


Figure S30.  $^{19}\text{F}$  NMR of **22**



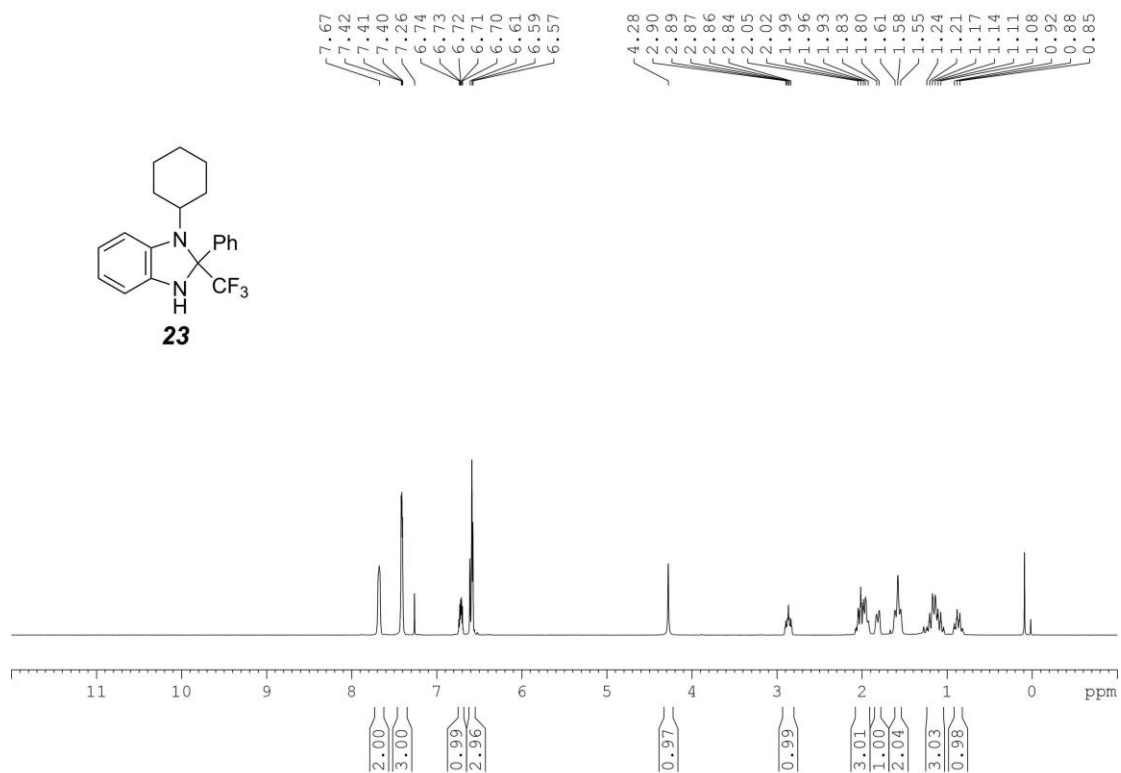


Figure S31.  $^1\text{H}$  NMR of **23**

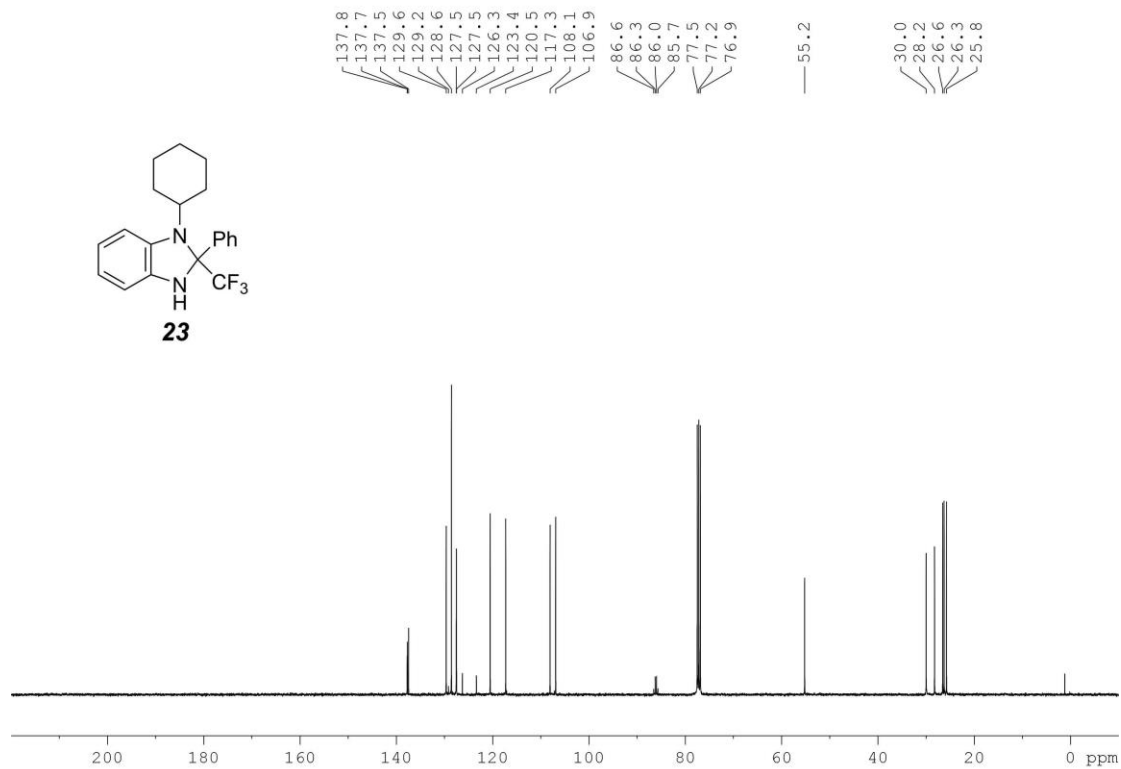


Figure S32.  $^{13}\text{C}$  NMR of **23**

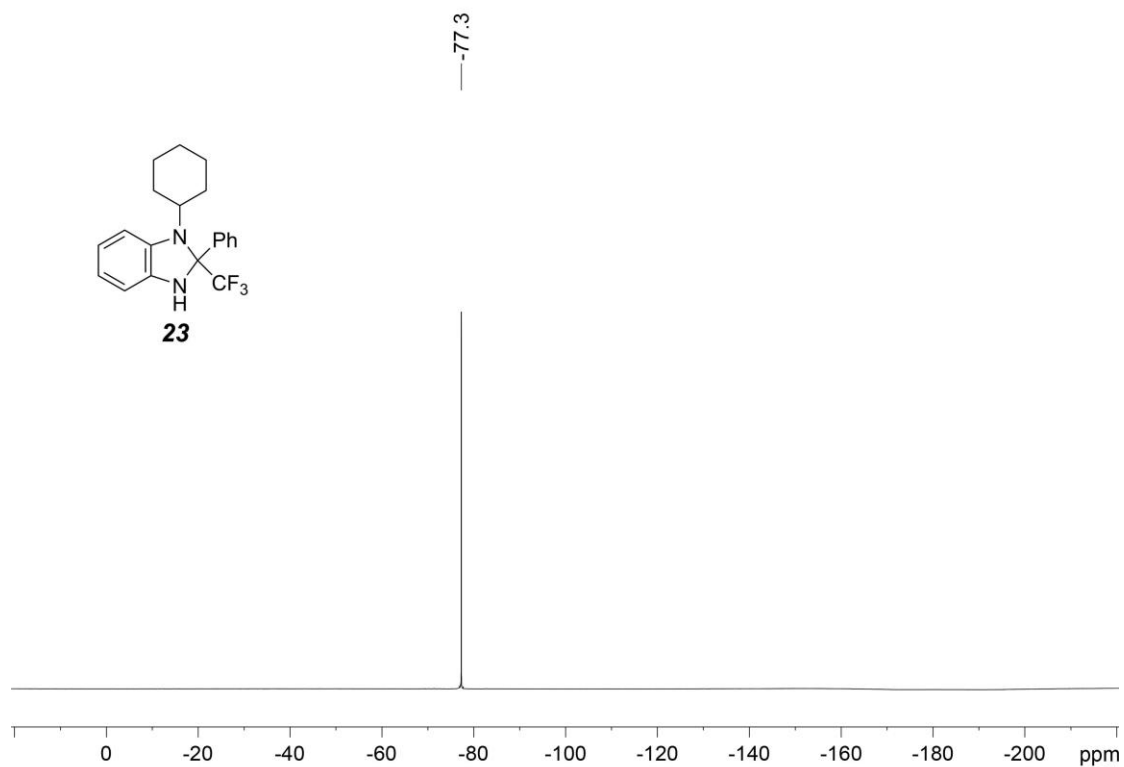


Figure S33.  $^{19}\text{F}$  NMR of **23**

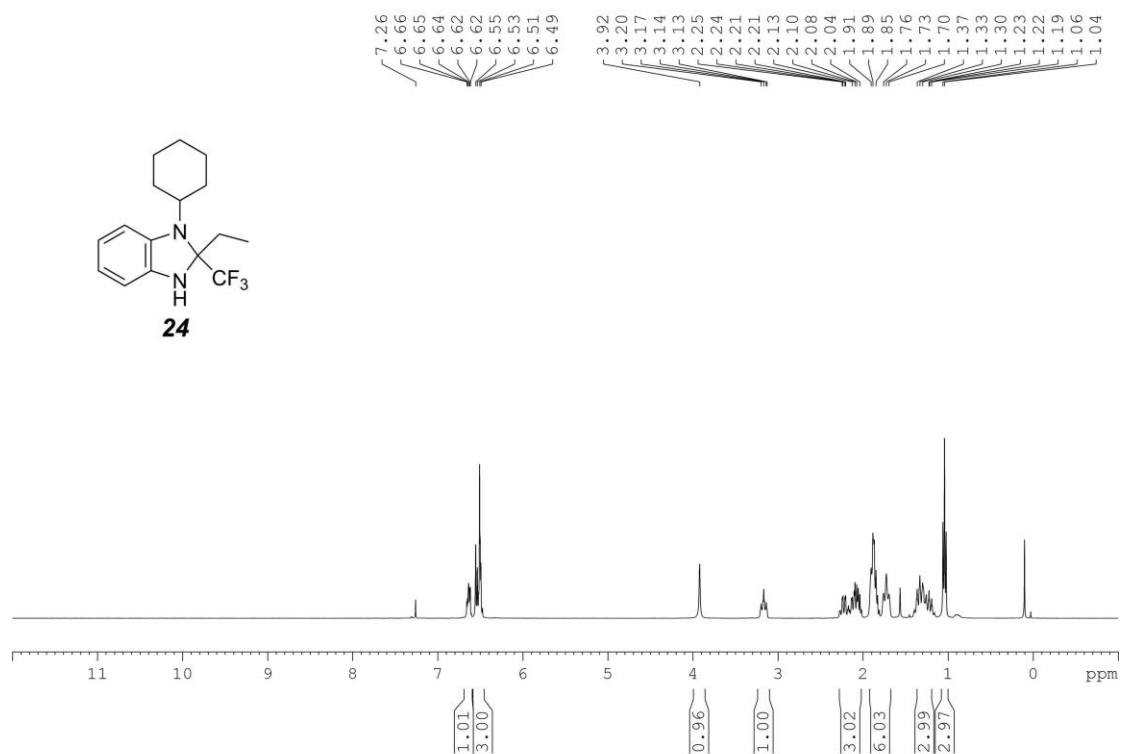


Figure S34.  $^1\text{H}$  NMR of **24**

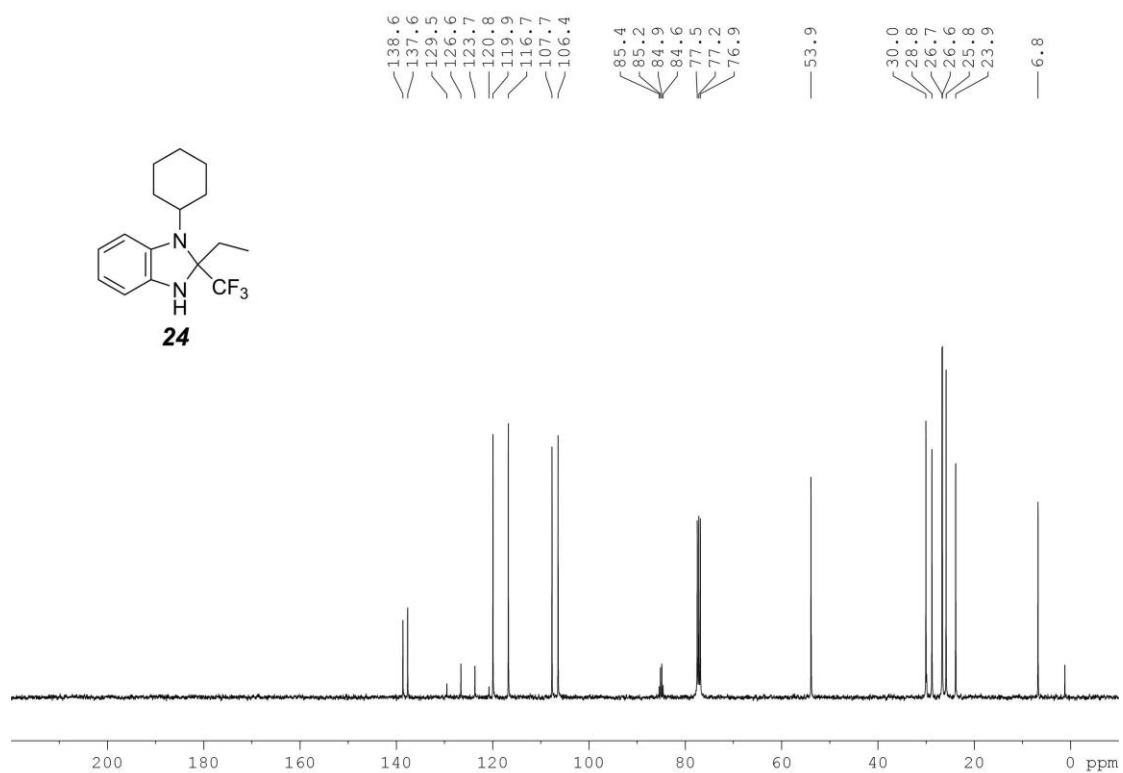


Figure S35. <sup>13</sup>C NMR of **24**

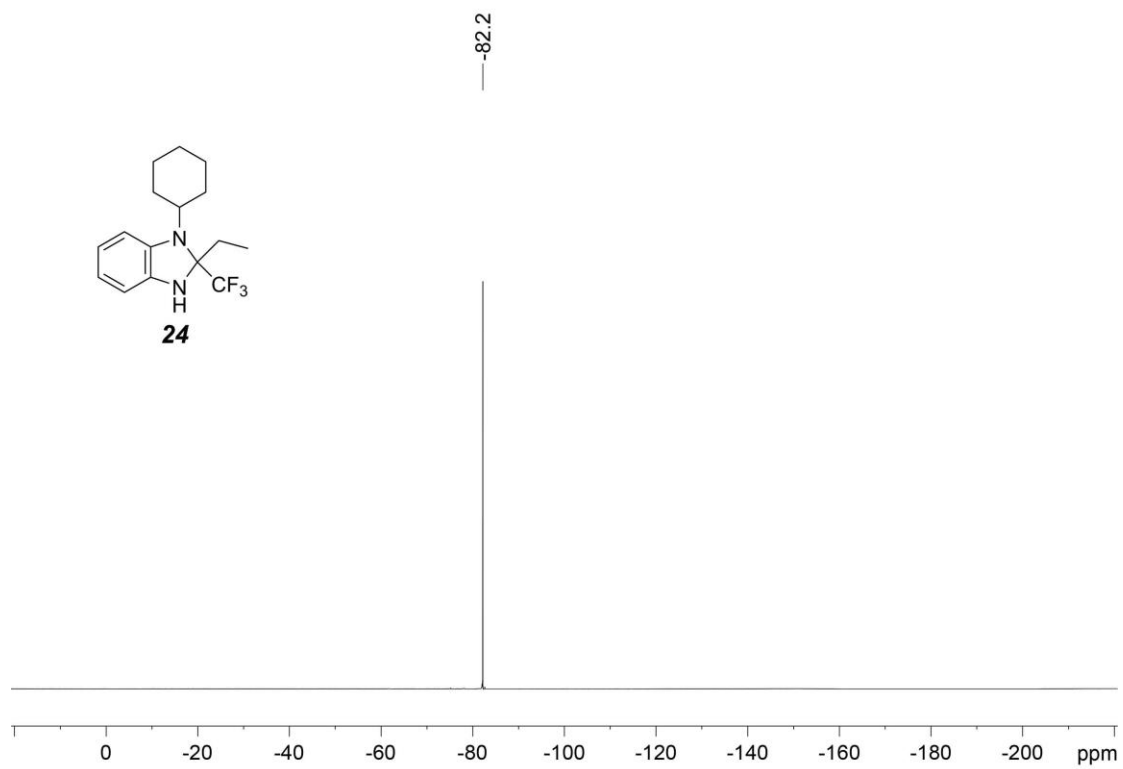


Figure S36. <sup>19</sup>F NMR of **24**

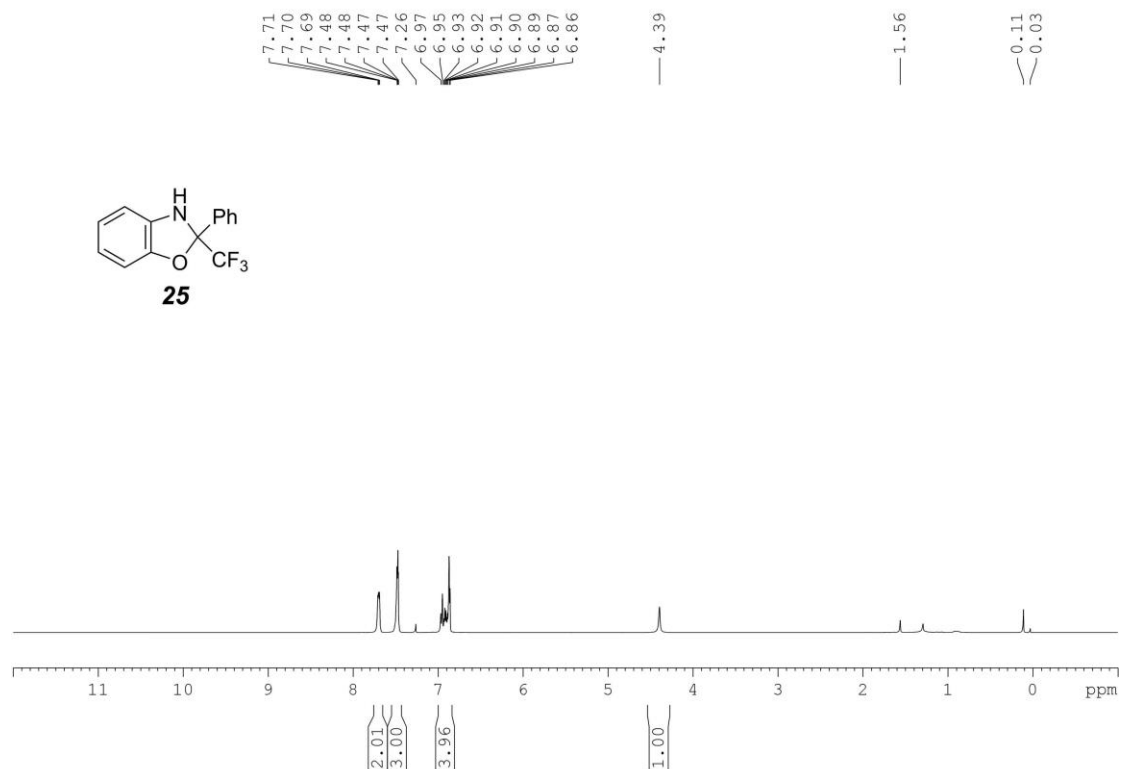


Figure S37. <sup>1</sup>H NMR of **25**

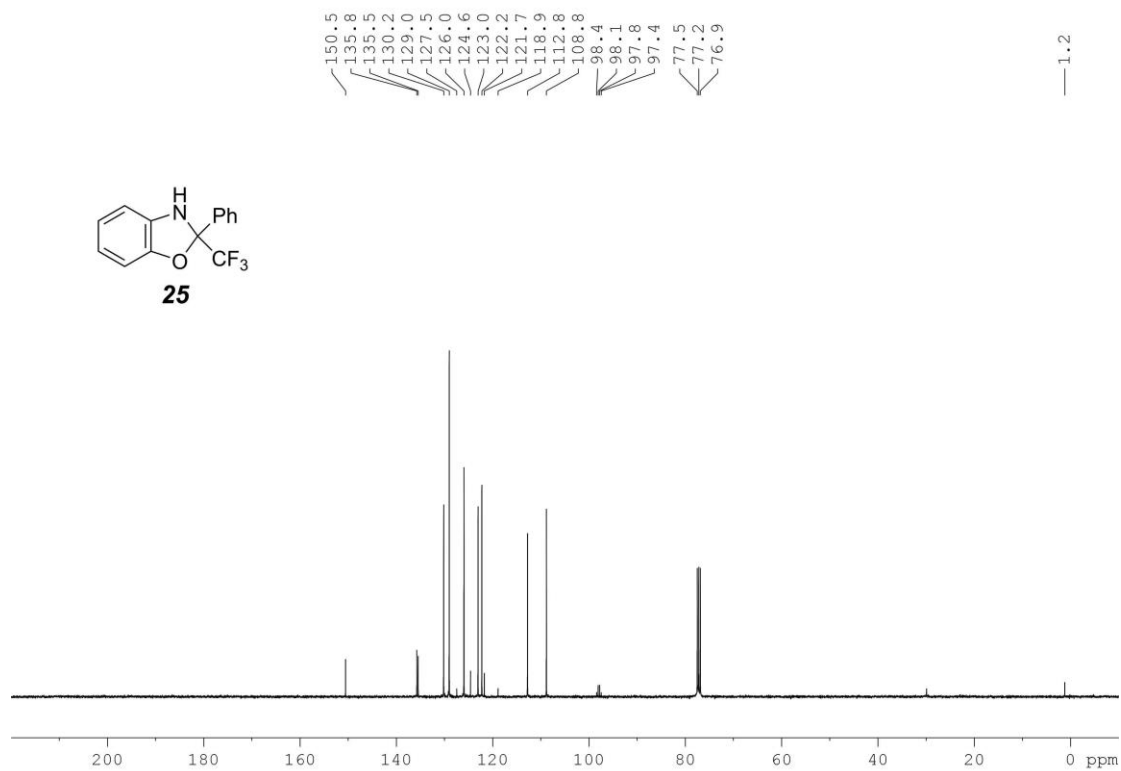


Figure S38. <sup>13</sup>C NMR of **25**

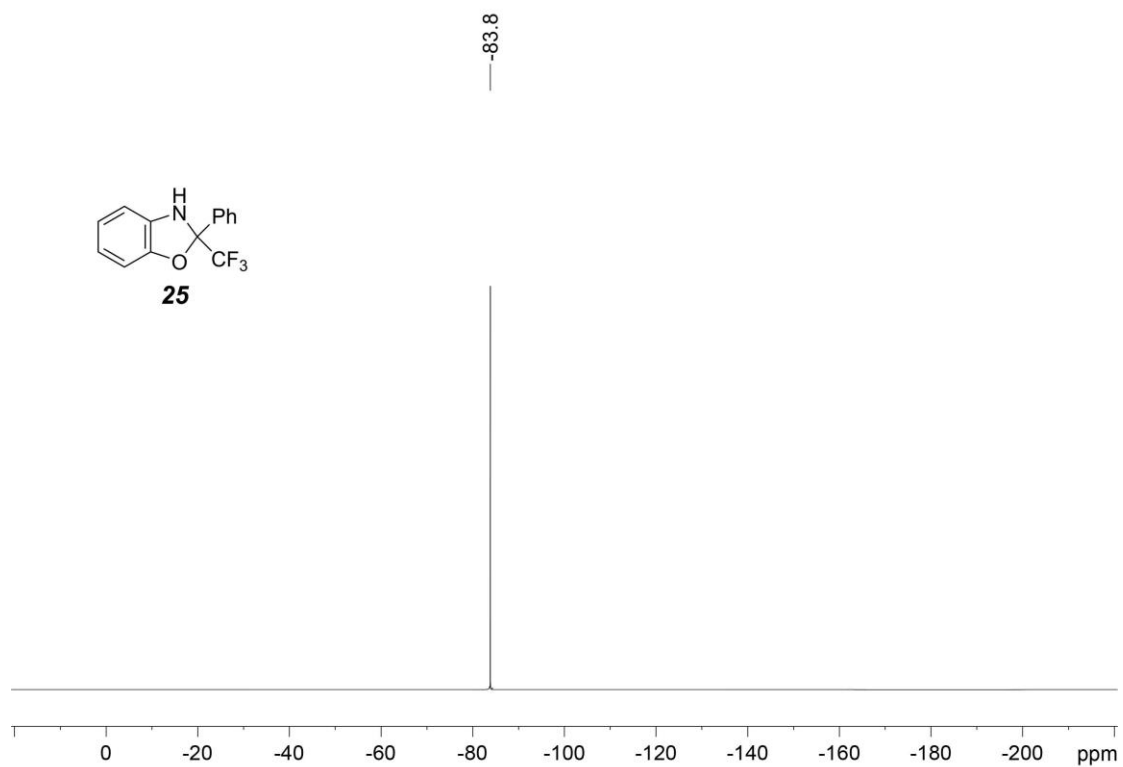


Figure S39. <sup>19</sup>F NMR of **25**

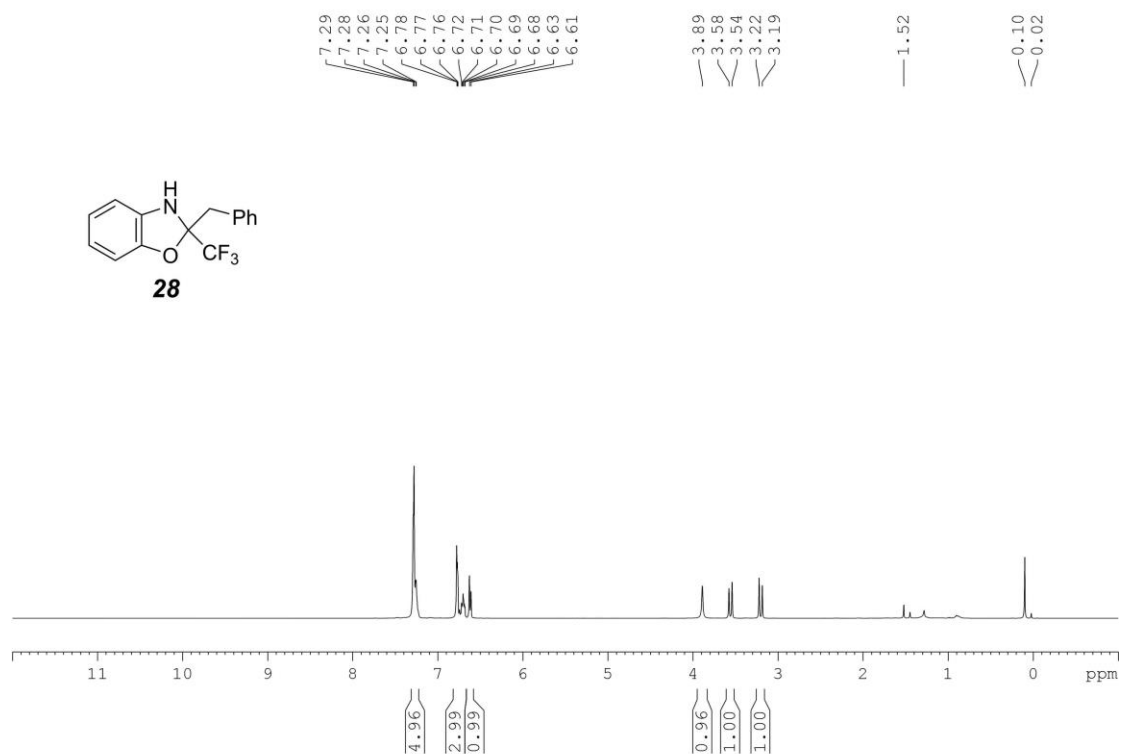


Figure S40. <sup>1</sup>H NMR of **28**

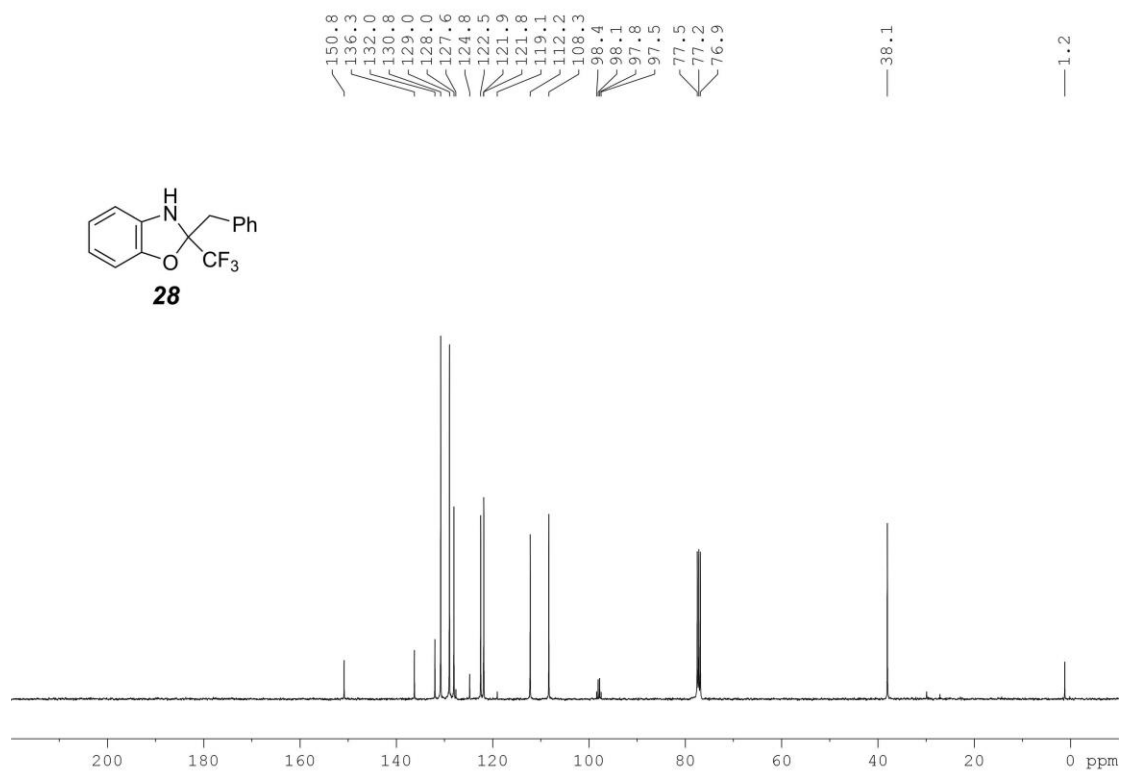


Figure S41. <sup>13</sup>C NMR of **28**

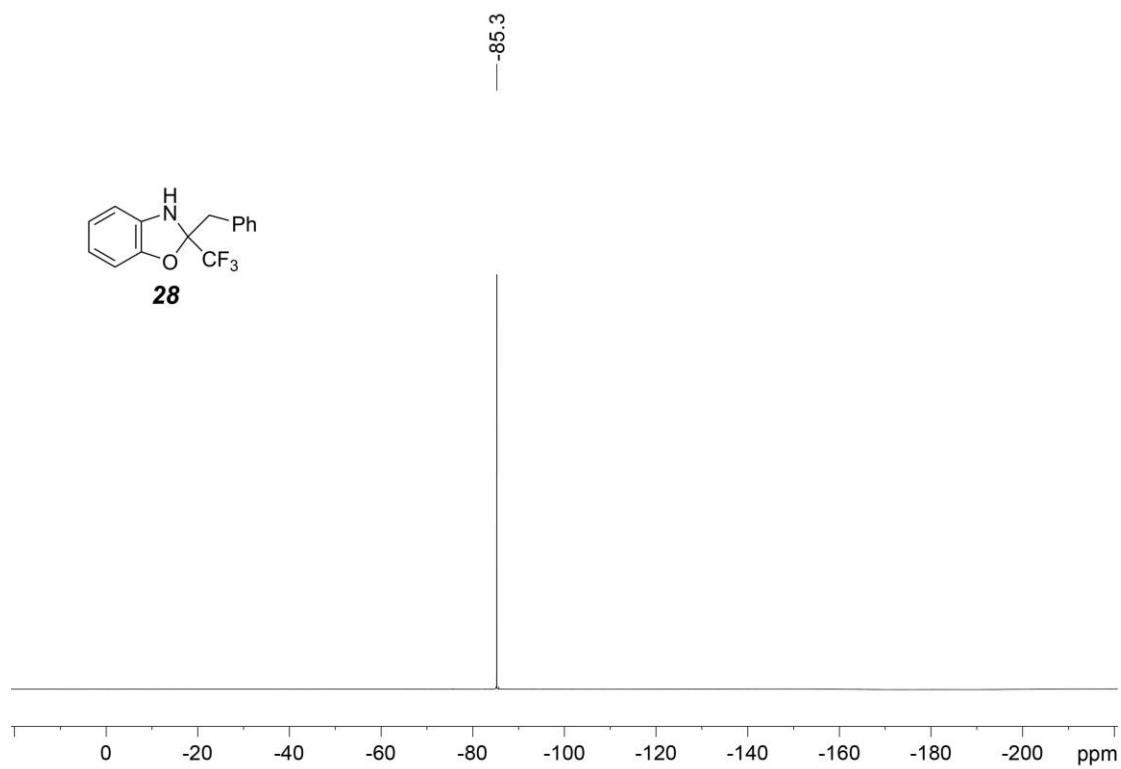


Figure S42. <sup>19</sup>F NMR of **28**

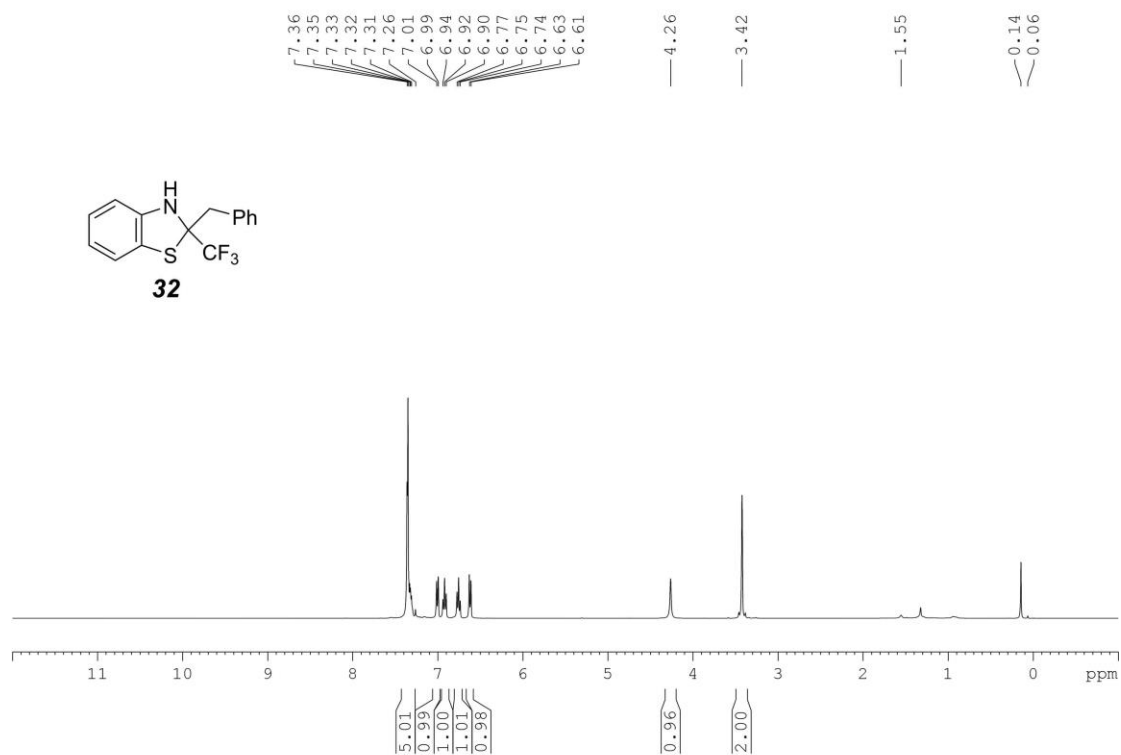


Figure S43. <sup>1</sup>H NMR of **32**

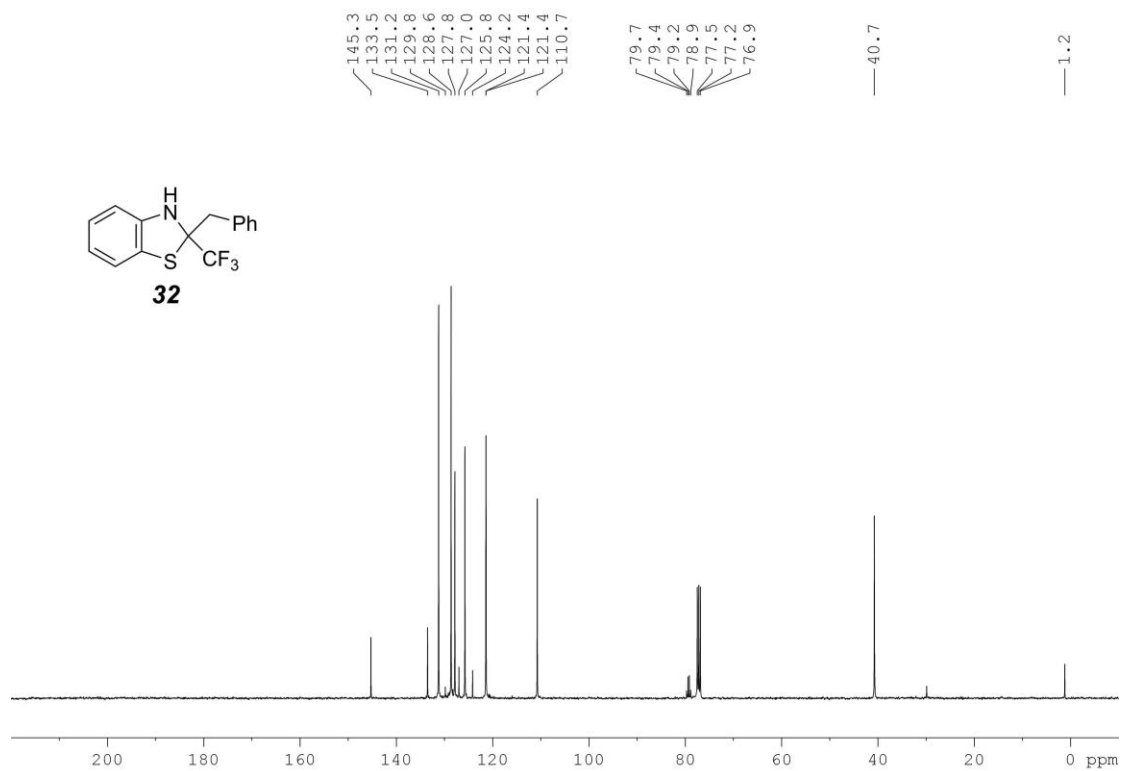


Figure S44. <sup>13</sup>C NMR of **32**

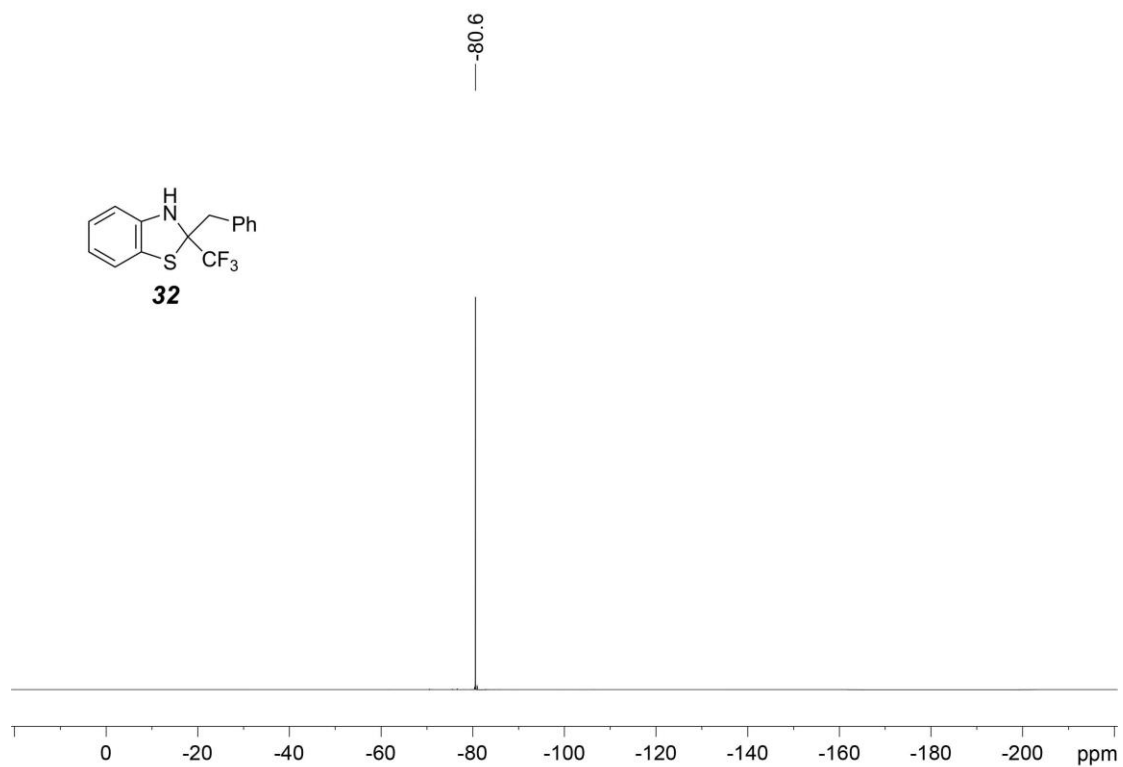


Figure S45. <sup>19</sup>F NMR of **32**

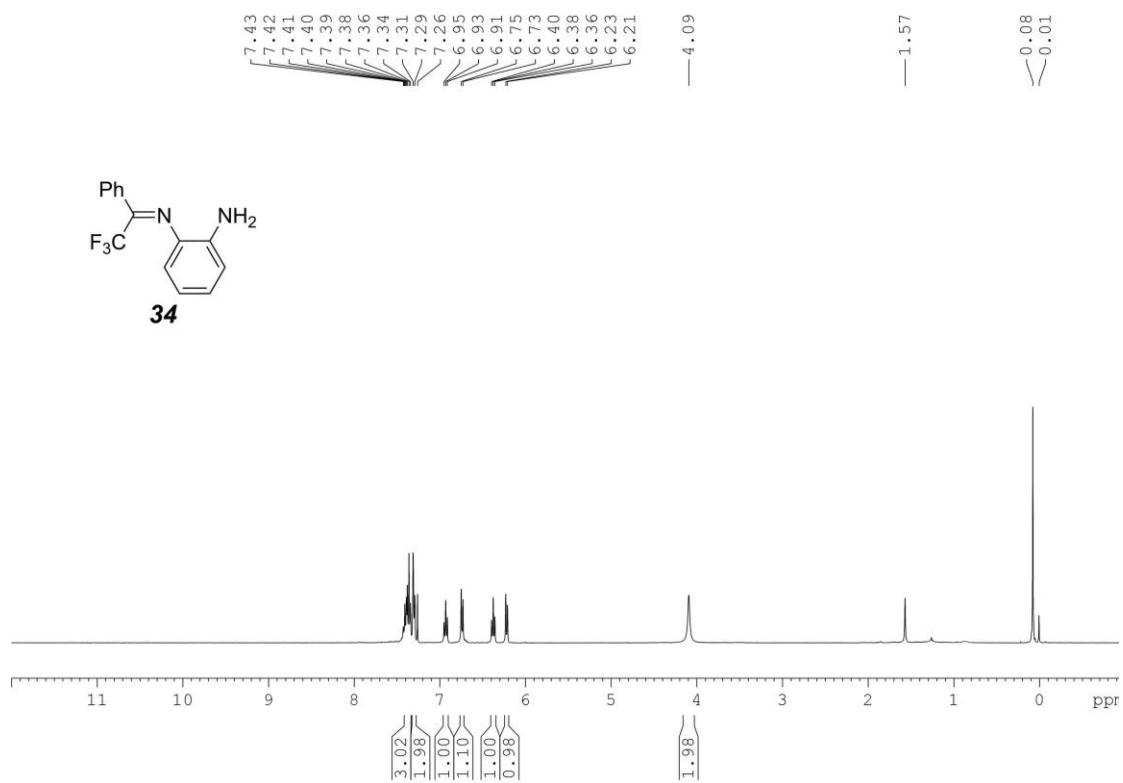


Figure S46. <sup>1</sup>H NMR of **34**



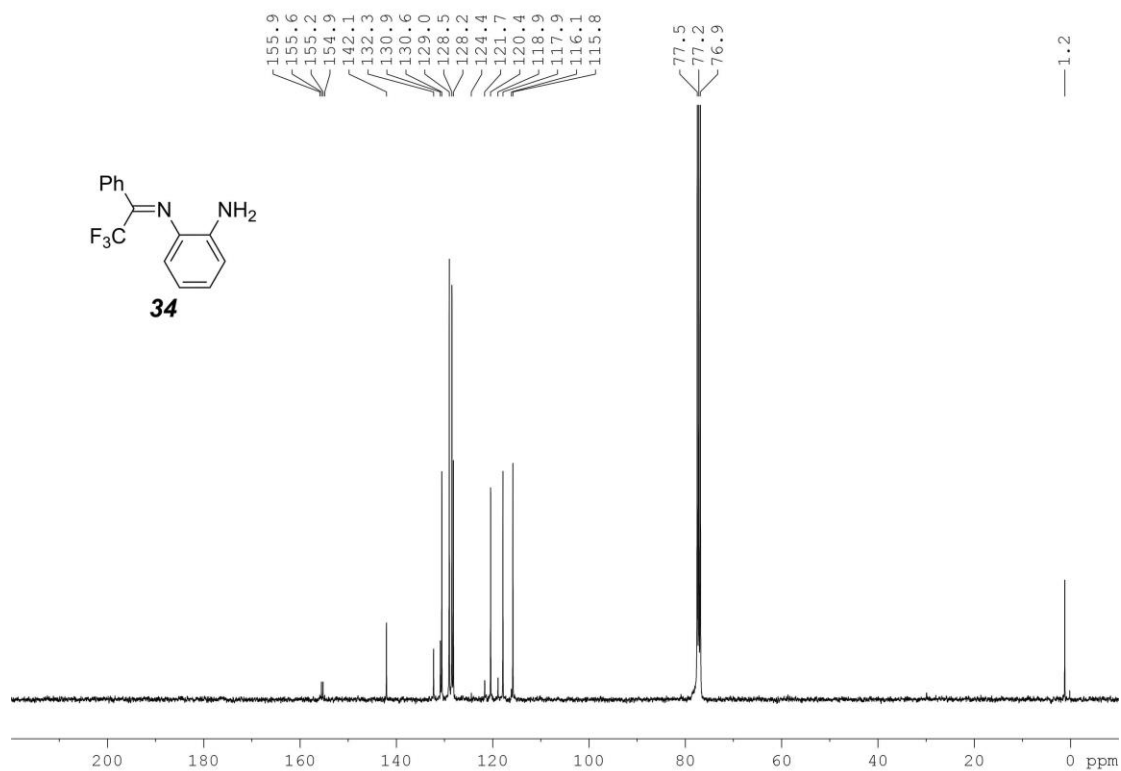


Figure S47. <sup>13</sup>C NMR of **34**

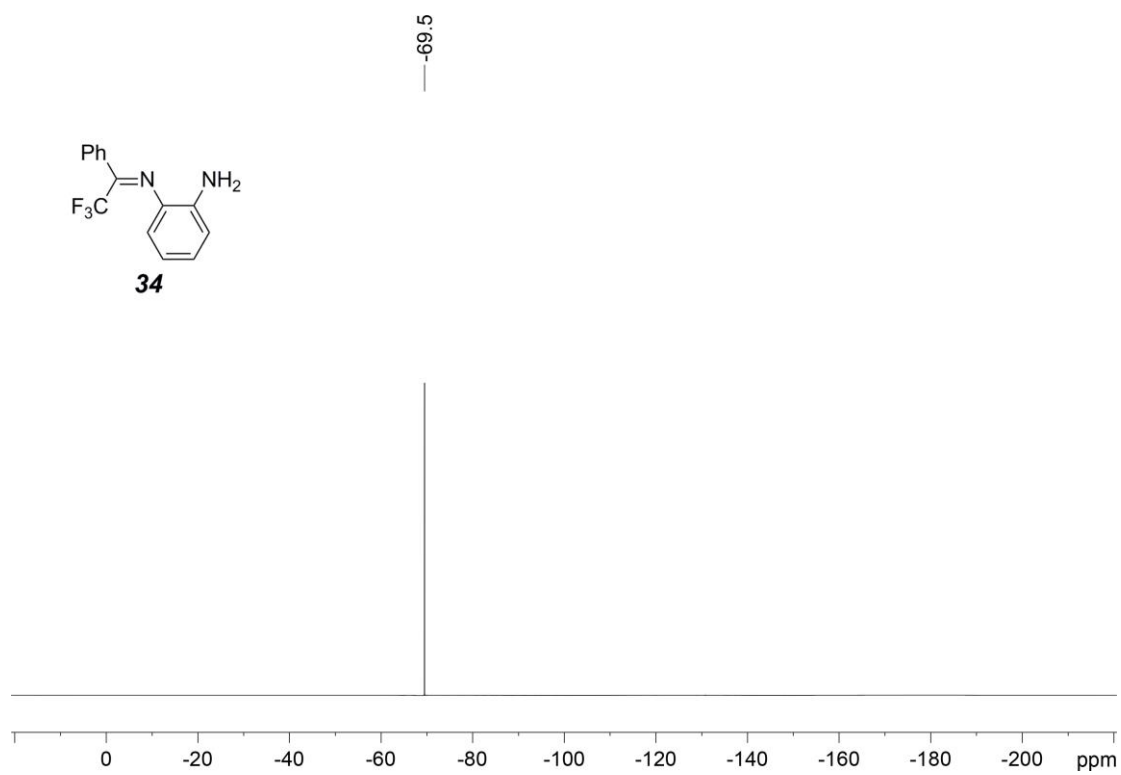


Figure S48. <sup>19</sup>F NMR of **34**