Supporting Information

Highly efficient synthesis of substituted 3,4-dihydropyrimidin-2-(1*H*)-ones (DHPMs) catalyzed by $Hf(OTf)_4$: Mechanistic insights into reaction pathways under metal Lewis acid catalysis and solvent-free conditions

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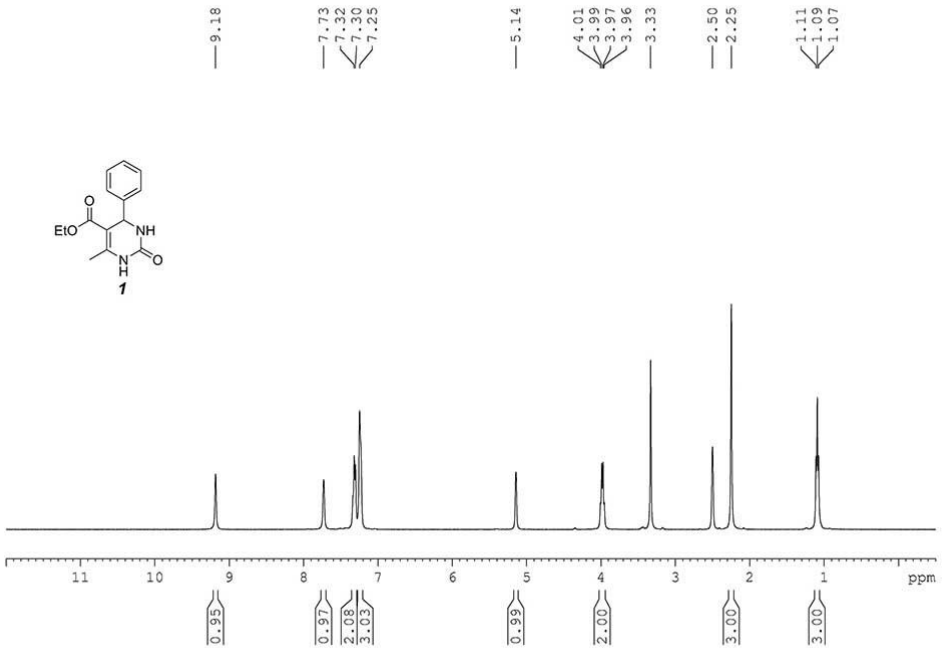

Figure S1. ^{1}H-NMR of **1**

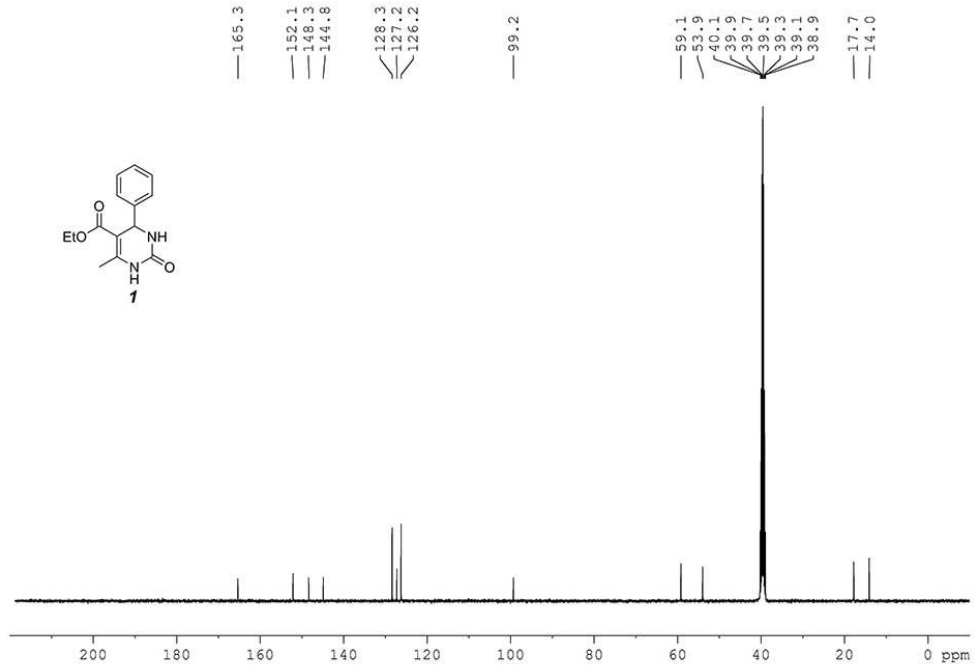

Figure S2. ^{13}C-NMR of **1**

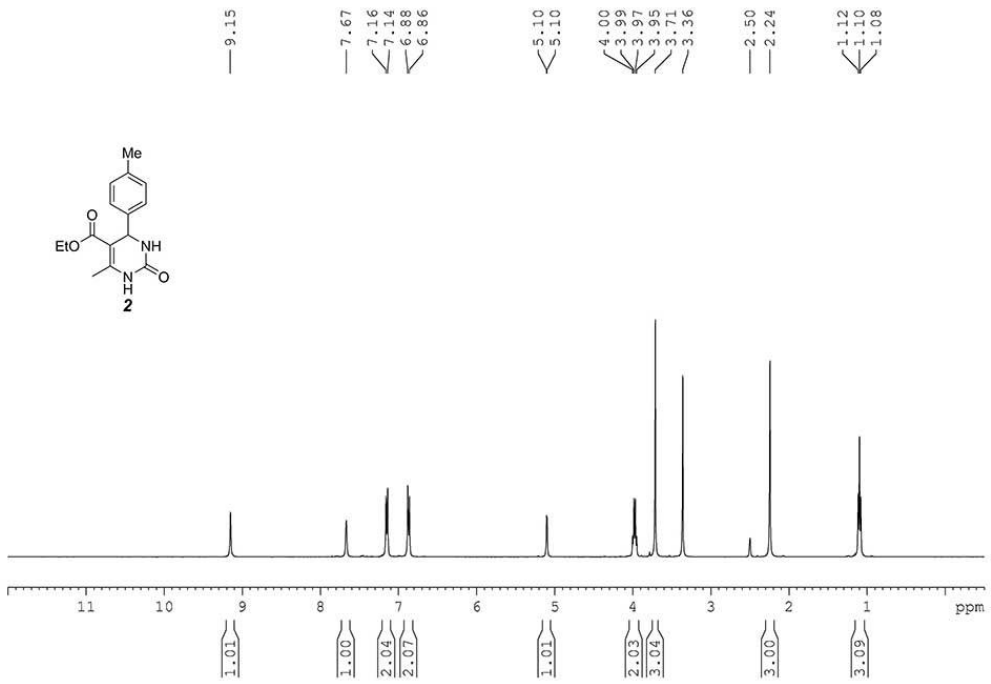

Figure S3. ^{1}H-NMR of **2**

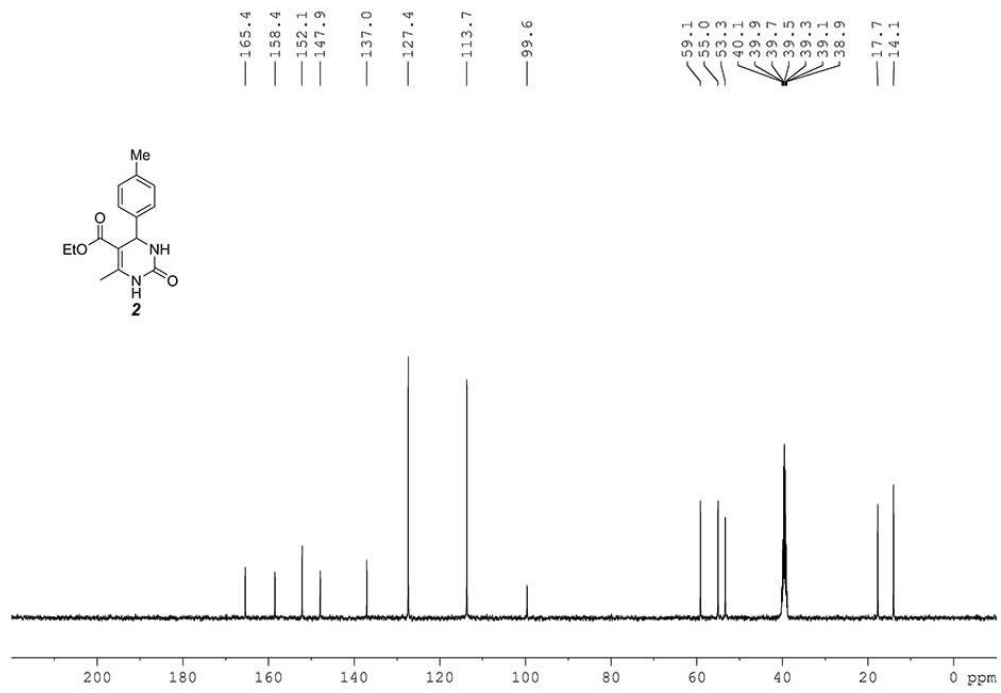

Figure S4. ^{13}C-NMR of **2**

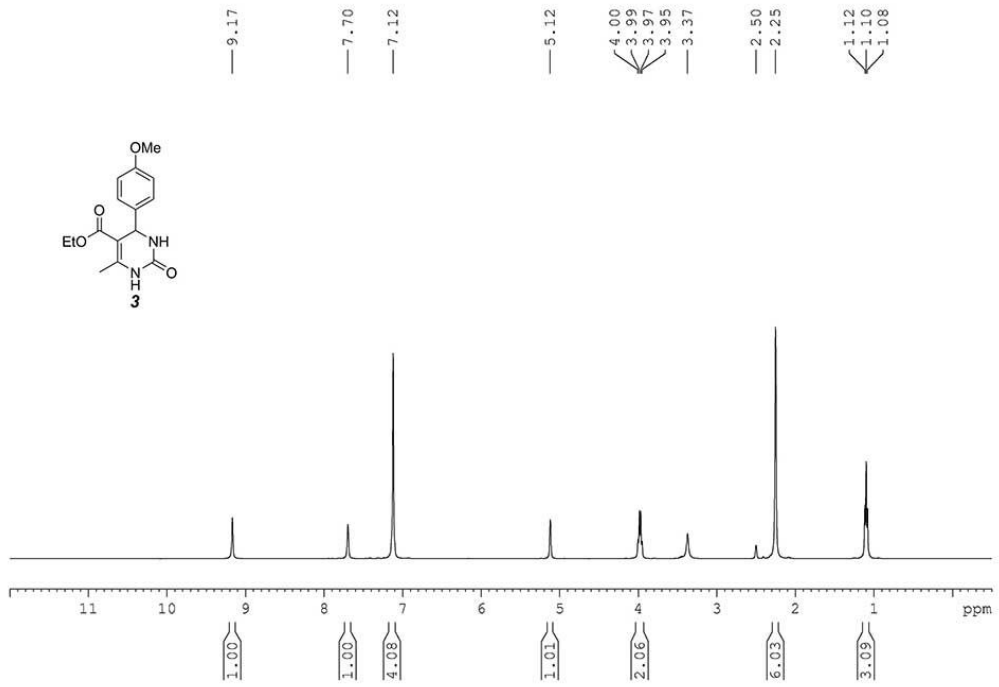

Figure S5. ^{1}H-NMR of **3**

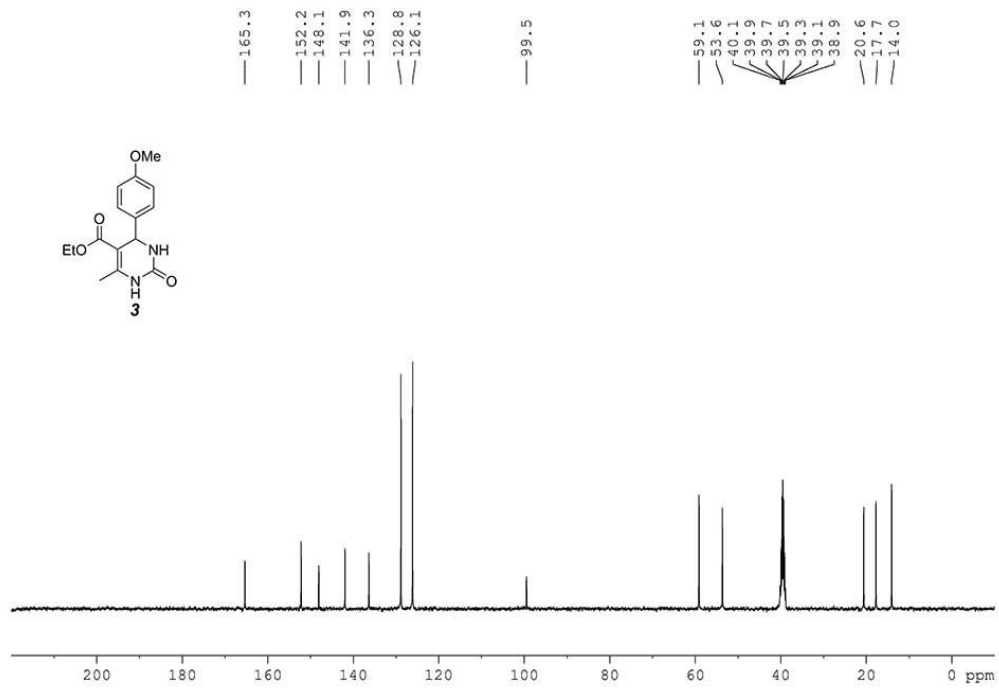

Figure S6. ^{13}C-NMR of **3**

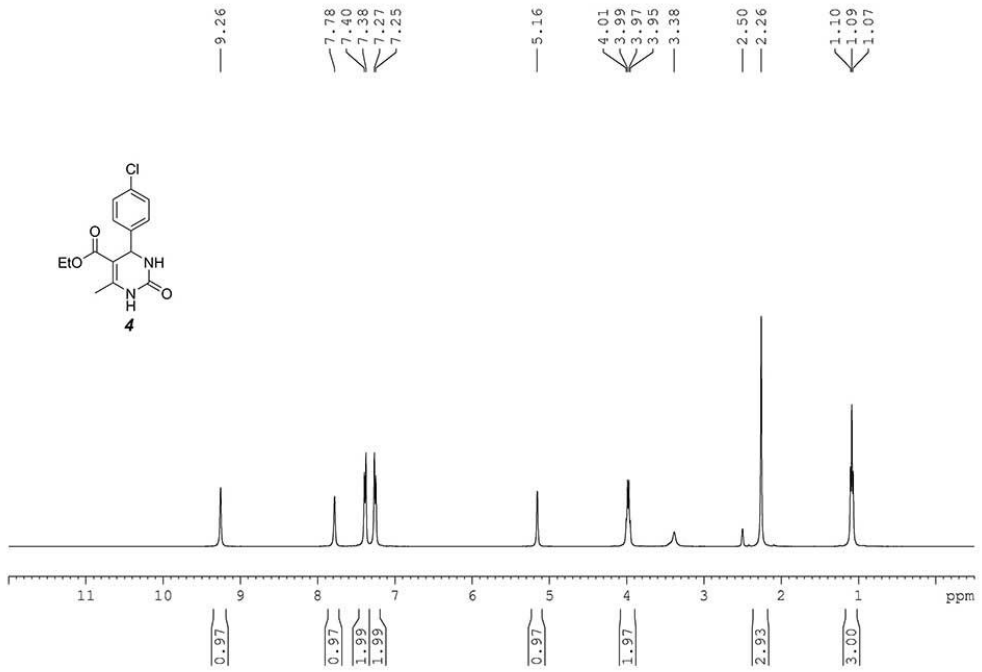

Figure S7. ^{1}H-NMR of **4**

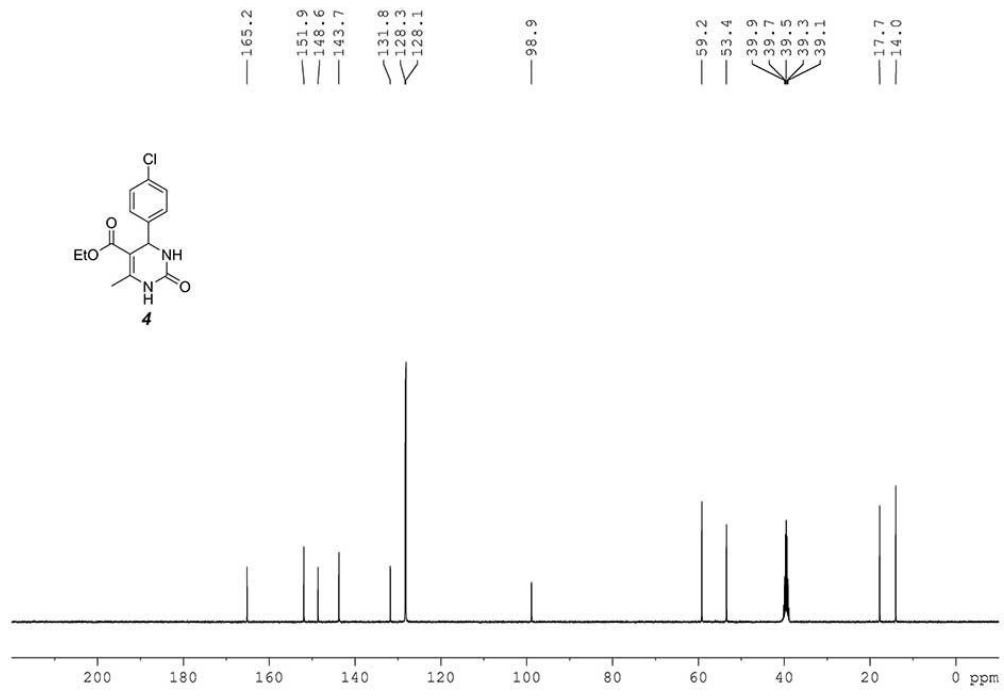

Figure S8. ^{13}C-NMR of **4**

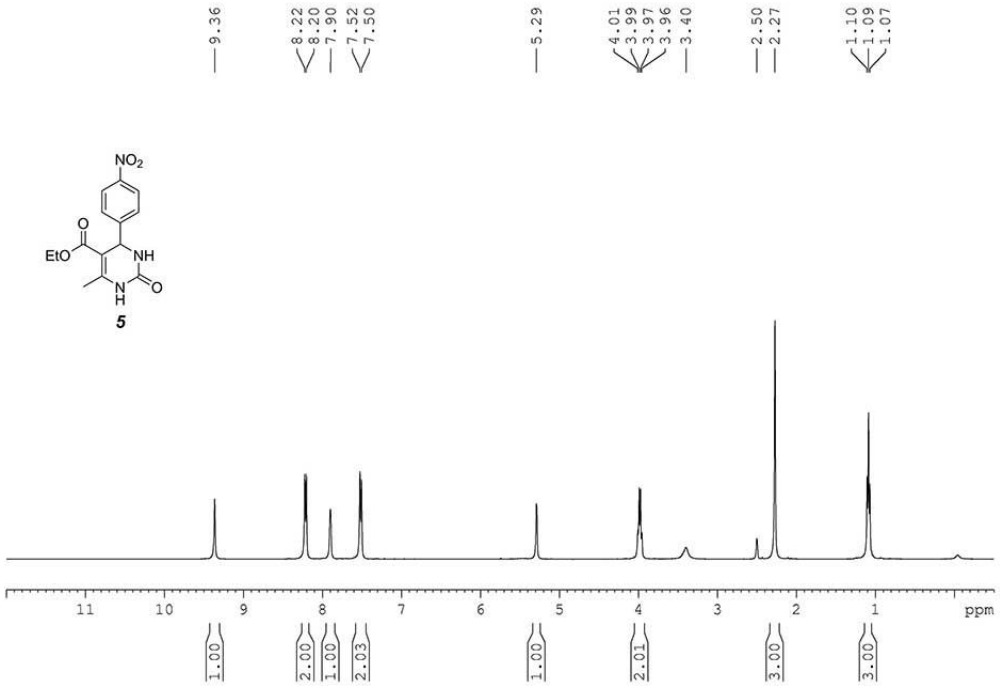

Figure S9. ^{1}H-NMR of **5**

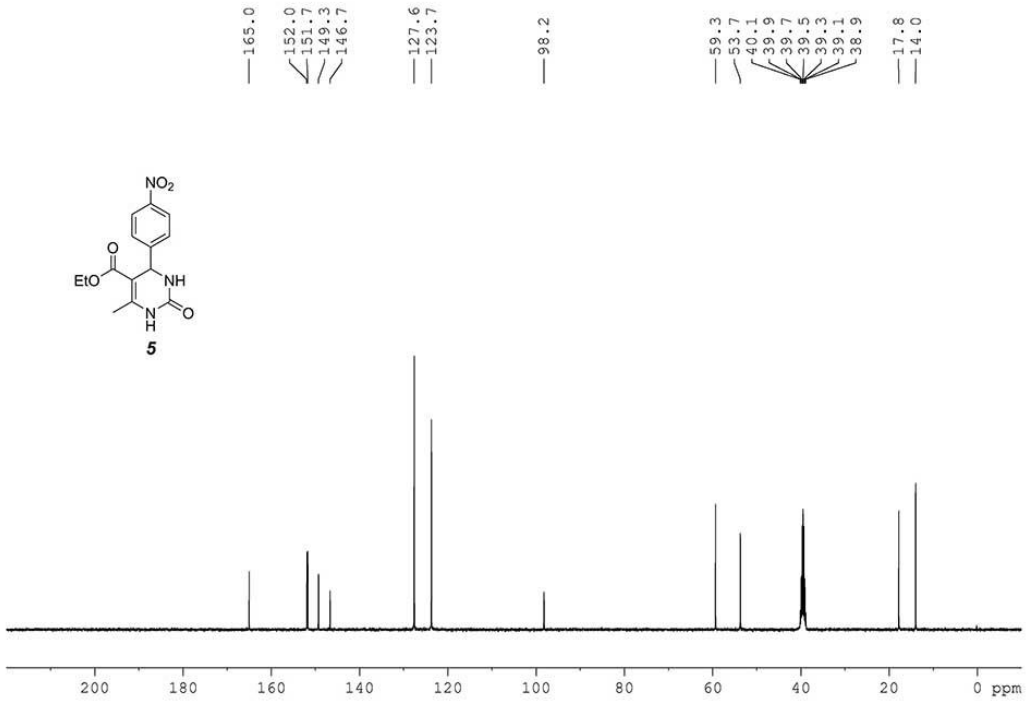

Figure S10. ^{13}C-NMR of **5**

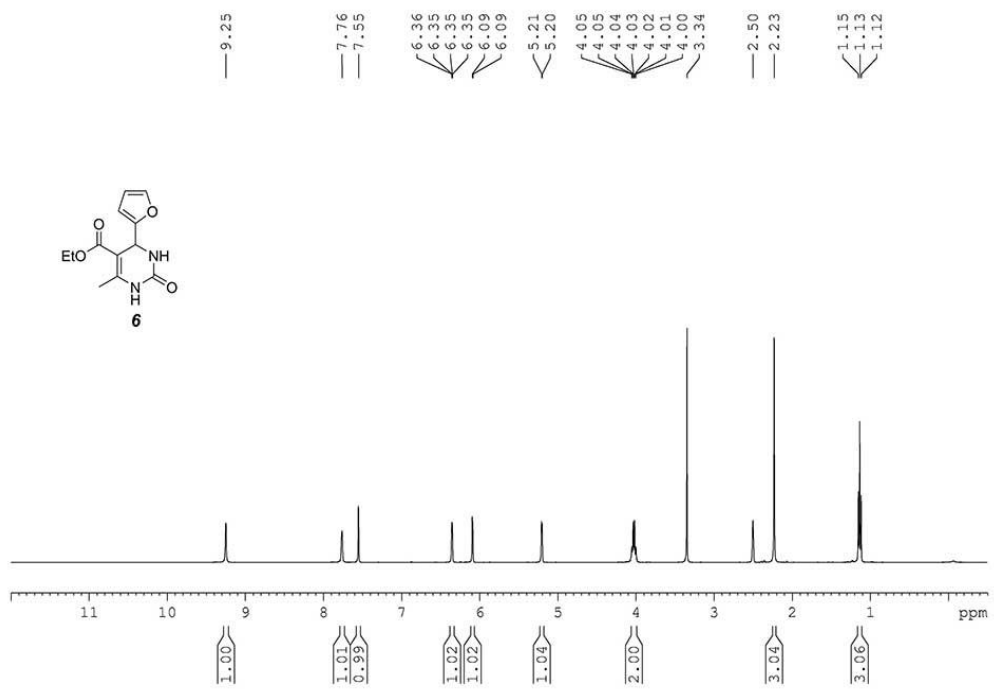

Figure S11. ^{1}H-NMR of **6**

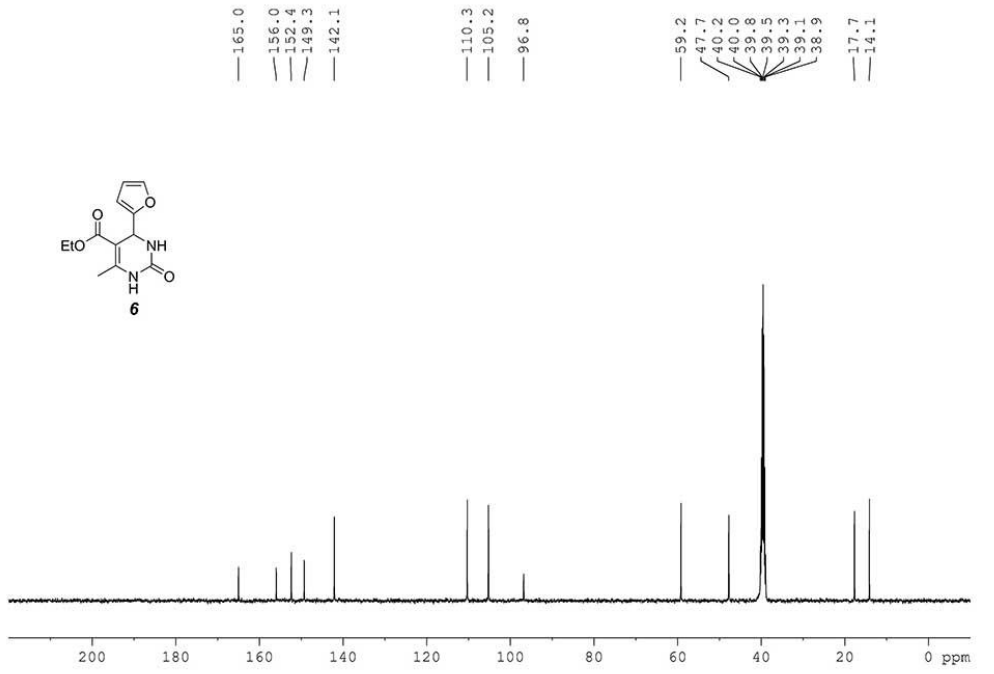

Figure S12. ^{13}C-NMR of **6**

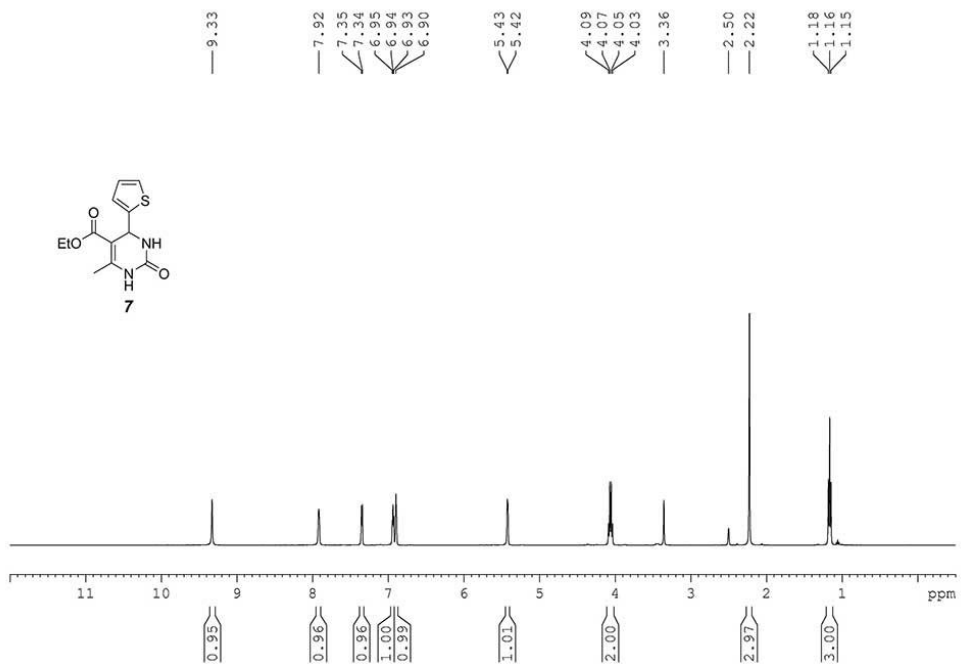

Figure S13. ^{1}H-NMR of **7**

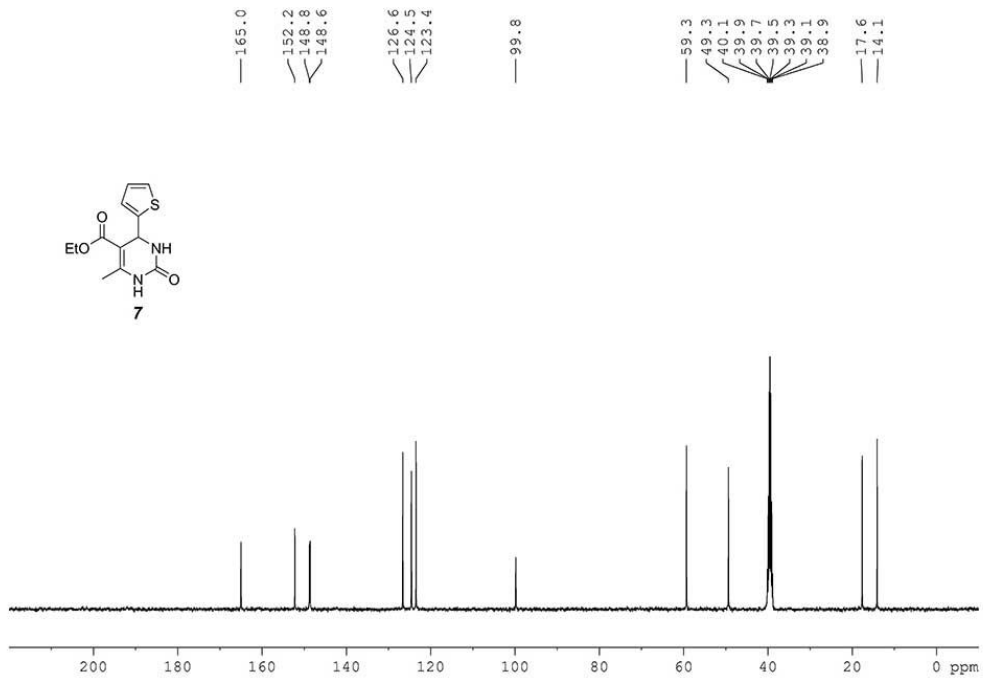

Figure S14. ^{13}C-NMR of **7**

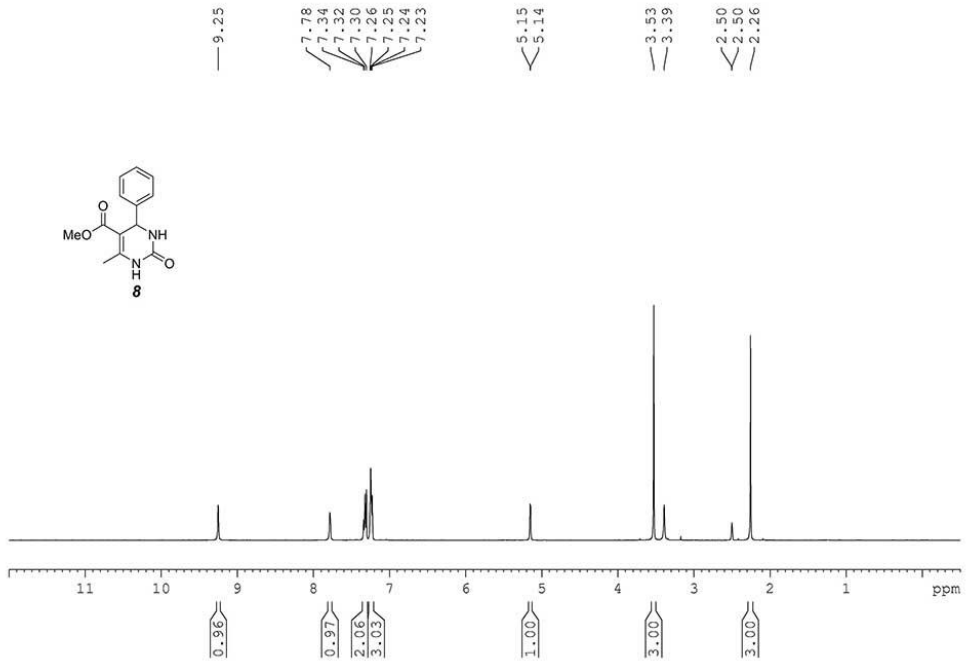

Figure S15. ^{1}H-NMR of **8**

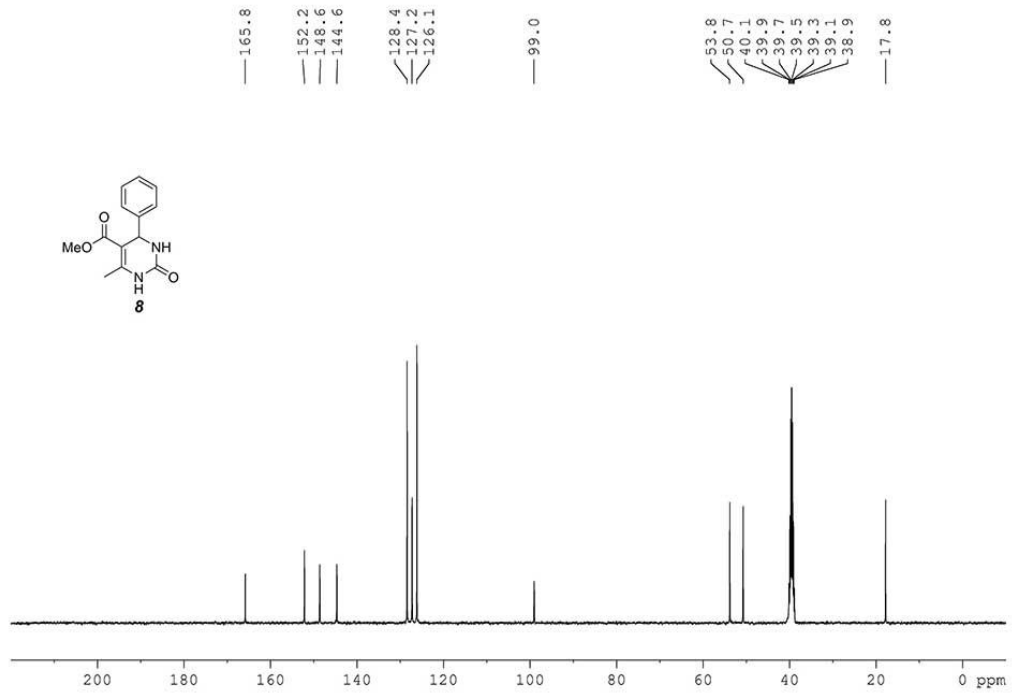

Figure S16. ^{13}C-NMR of **8**

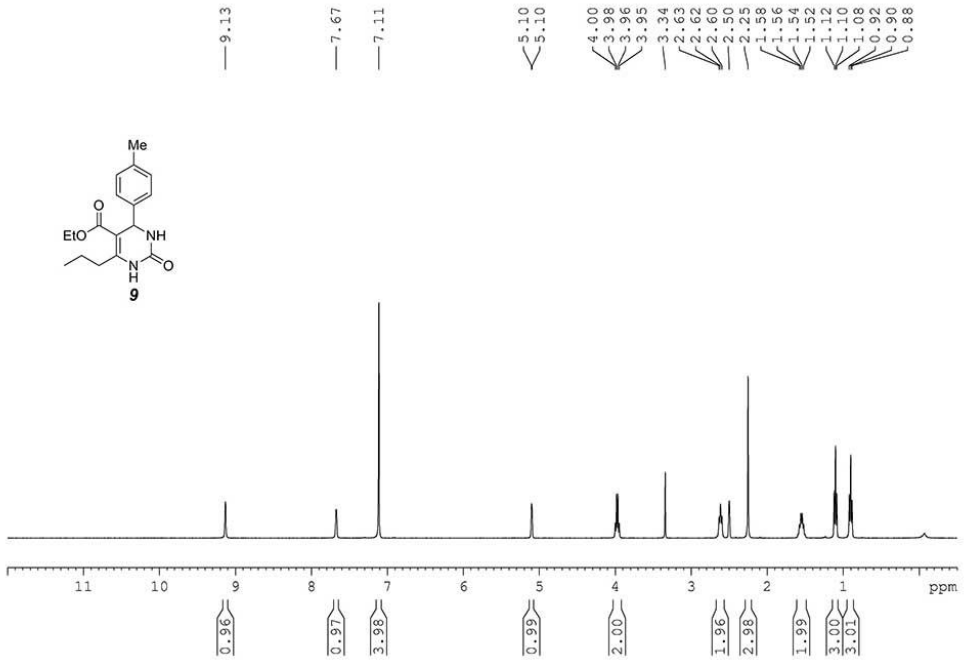

Figure S17. ^{1}H-NMR of **9**

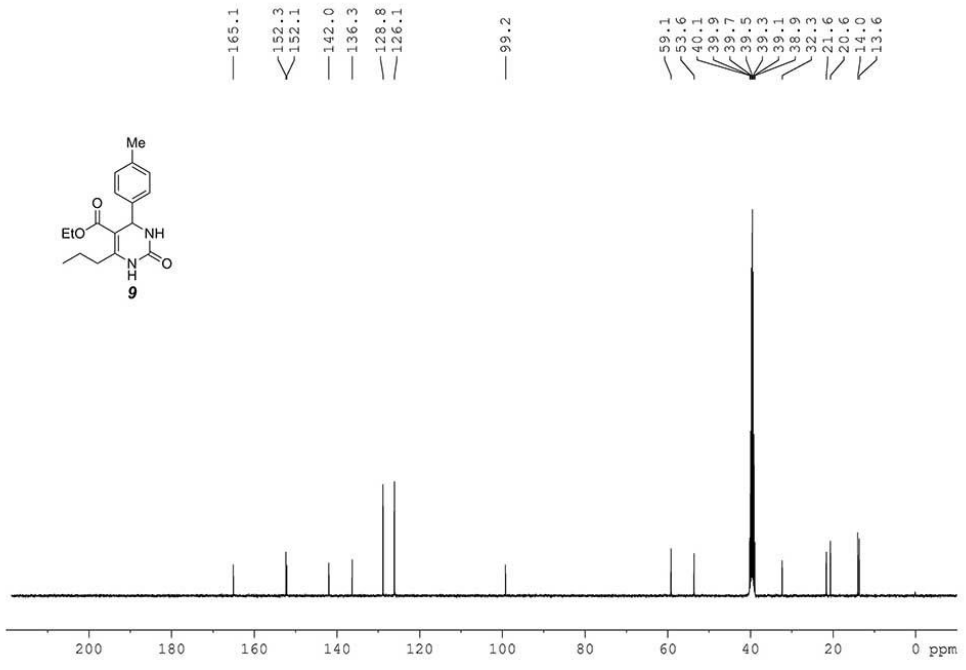

Figure S18. ^{13}C-NMR of **9**

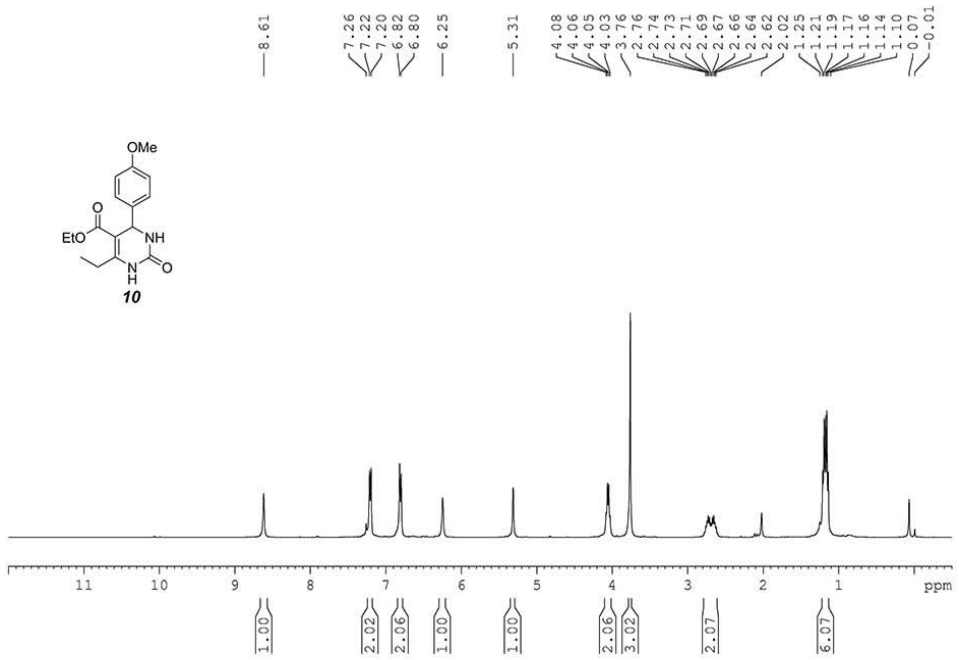

Figure S19. [1]H-NMR of **10**

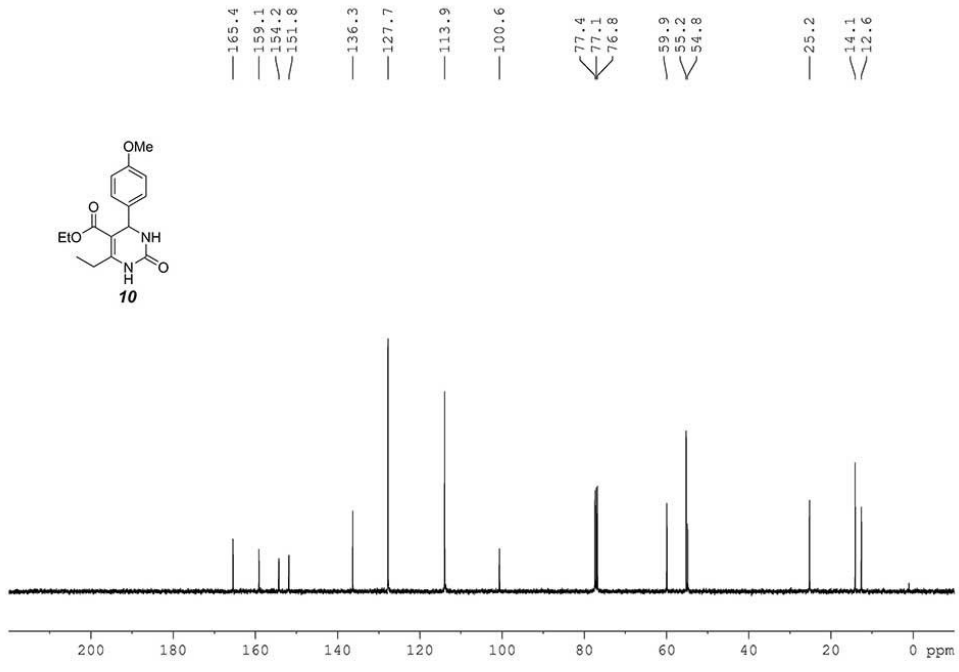

Figure S20. [13]C-NMR of **10**

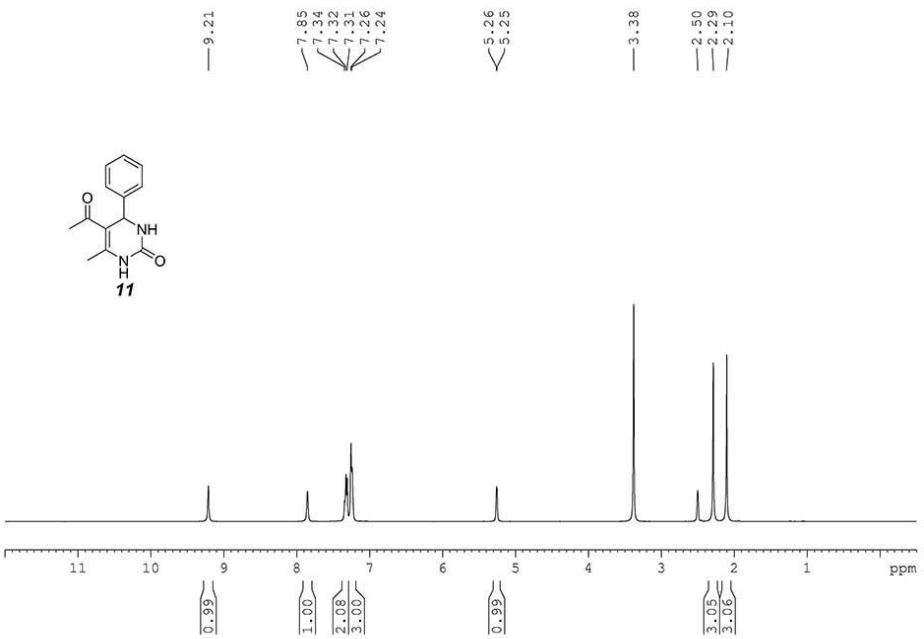

Figure S21. ^{1}H-NMR of **11**

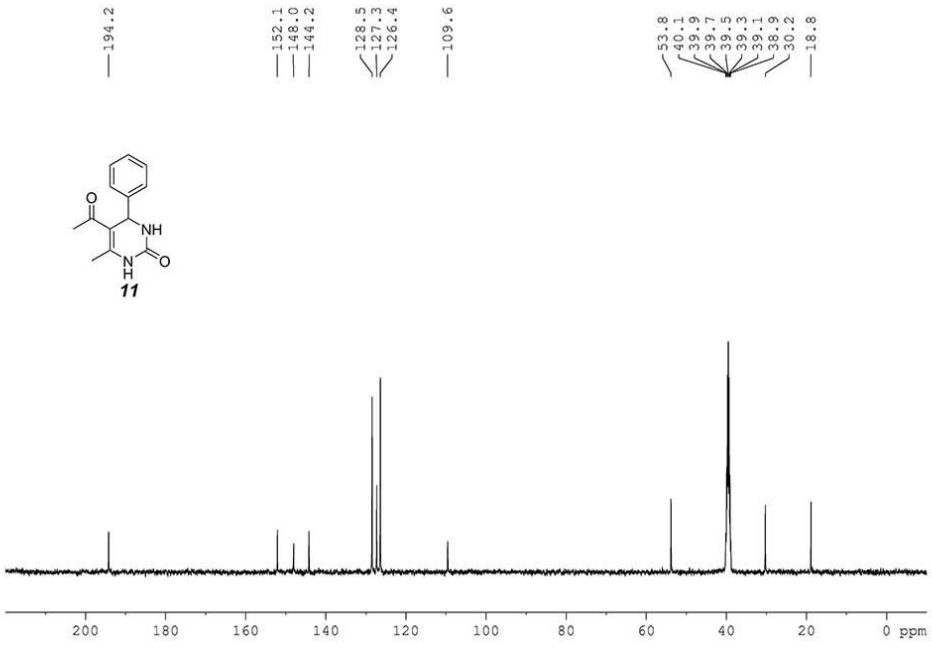

Figure S22. ^{13}C-NMR of **11**

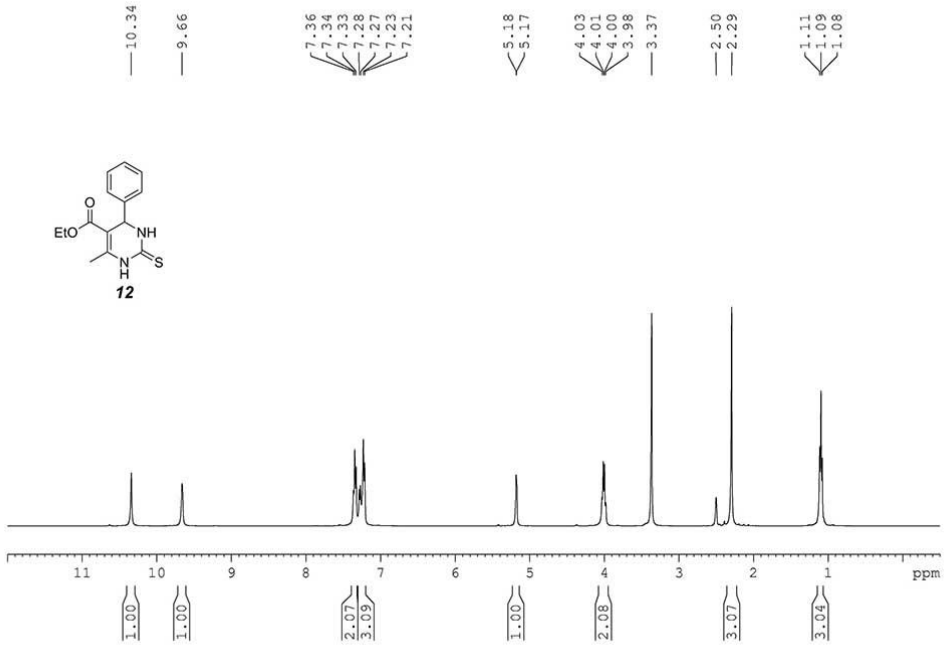

Figure S23. ^{1}H-NMR of **12**

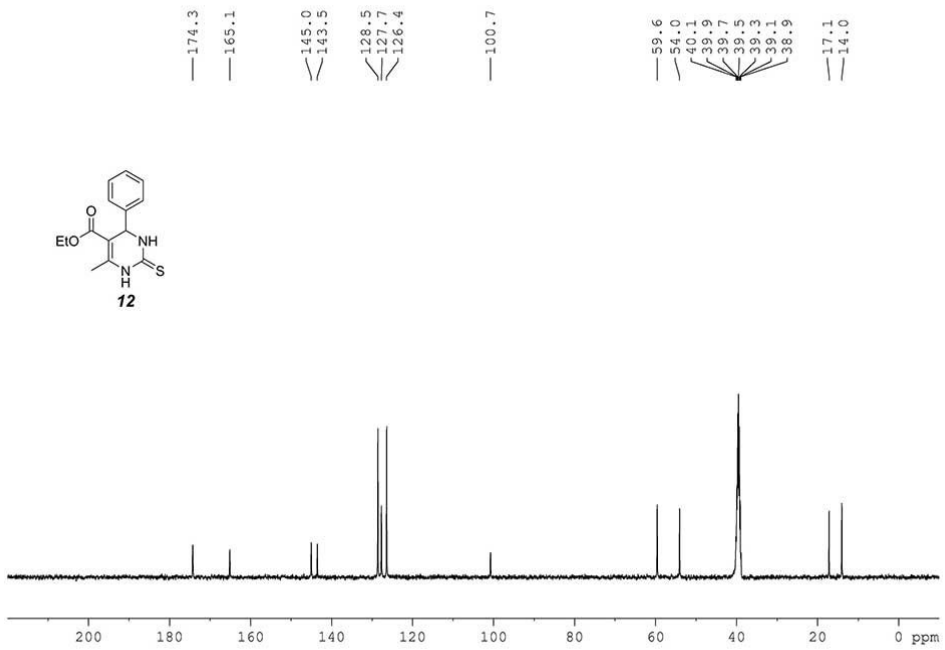

Figure S24. ^{13}C-NMR of **12**

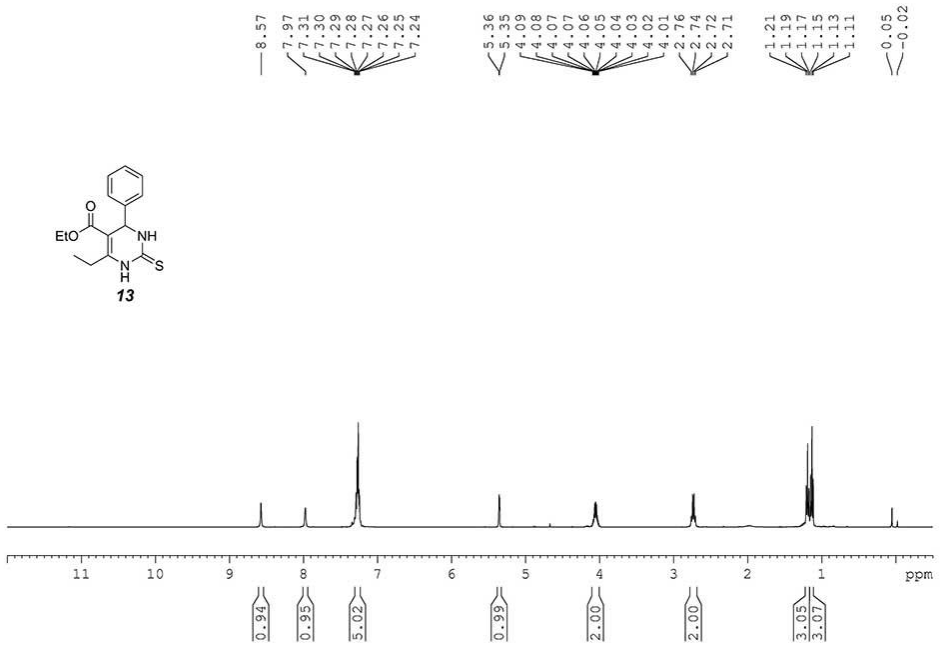

Figure S25. [1]H-NMR of **13**

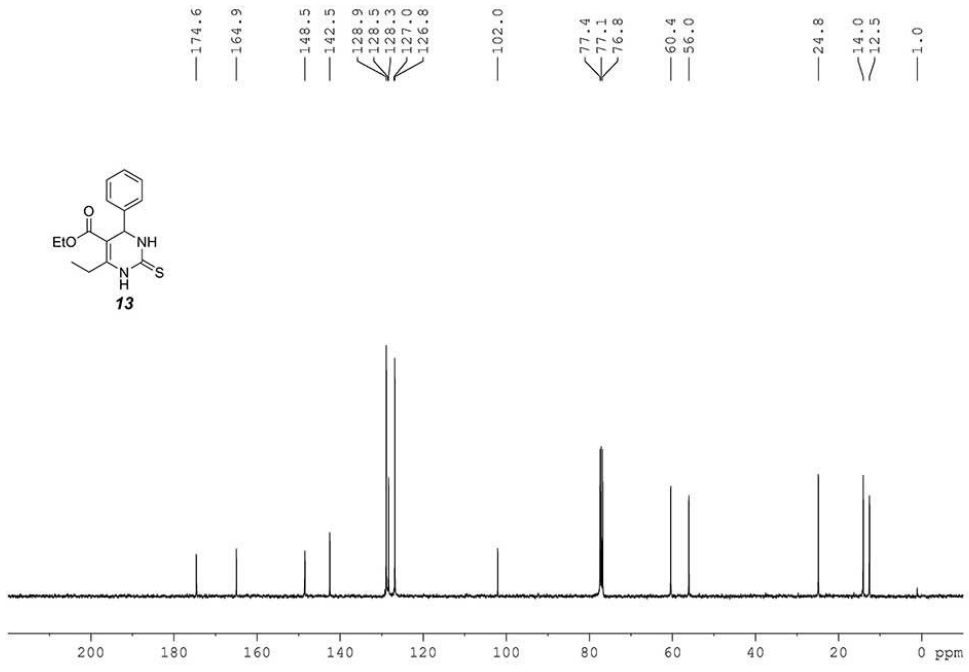

Figure S26. [13]C-NMR of **13**

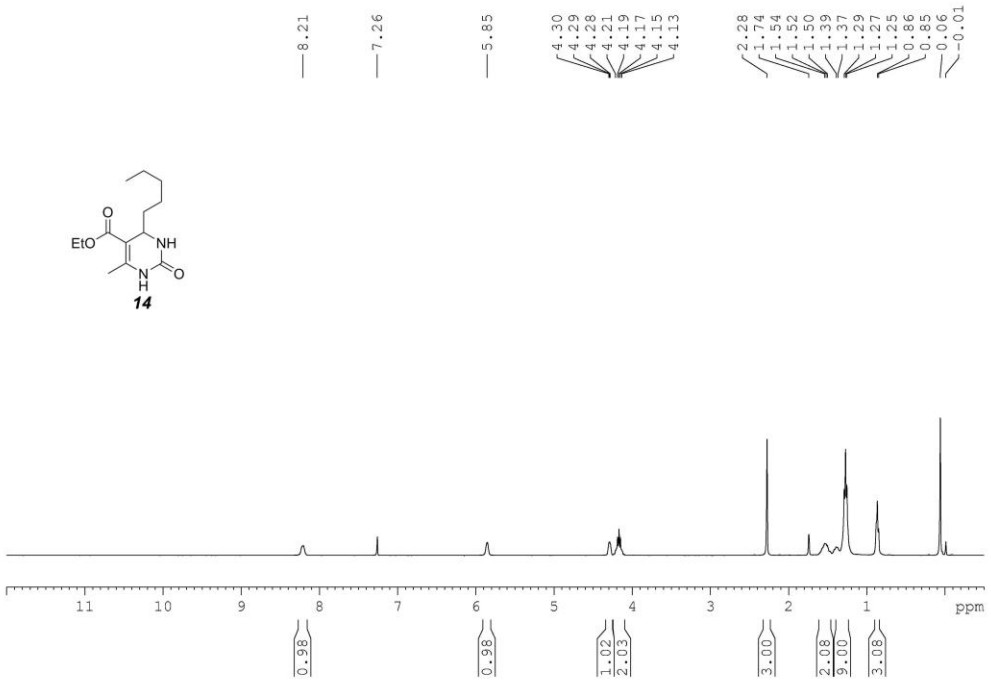

Figure S27. [1]H-NMR of **14**

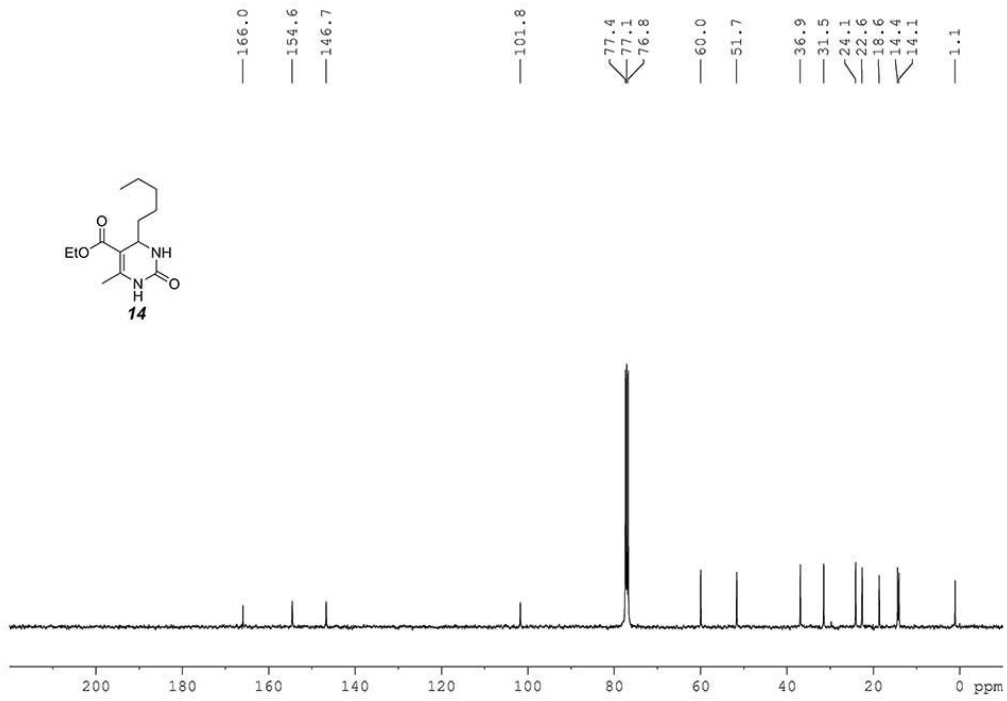

Figure S28. [13]C-NMR of **14**

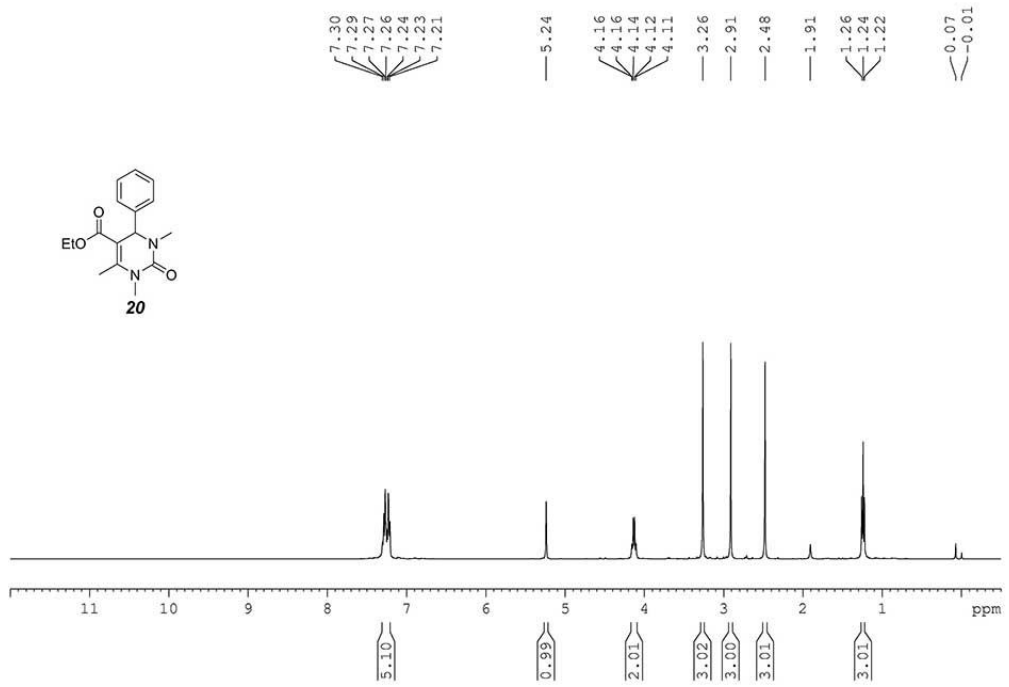

Figure S29. ^{1}H-NMR of **20**

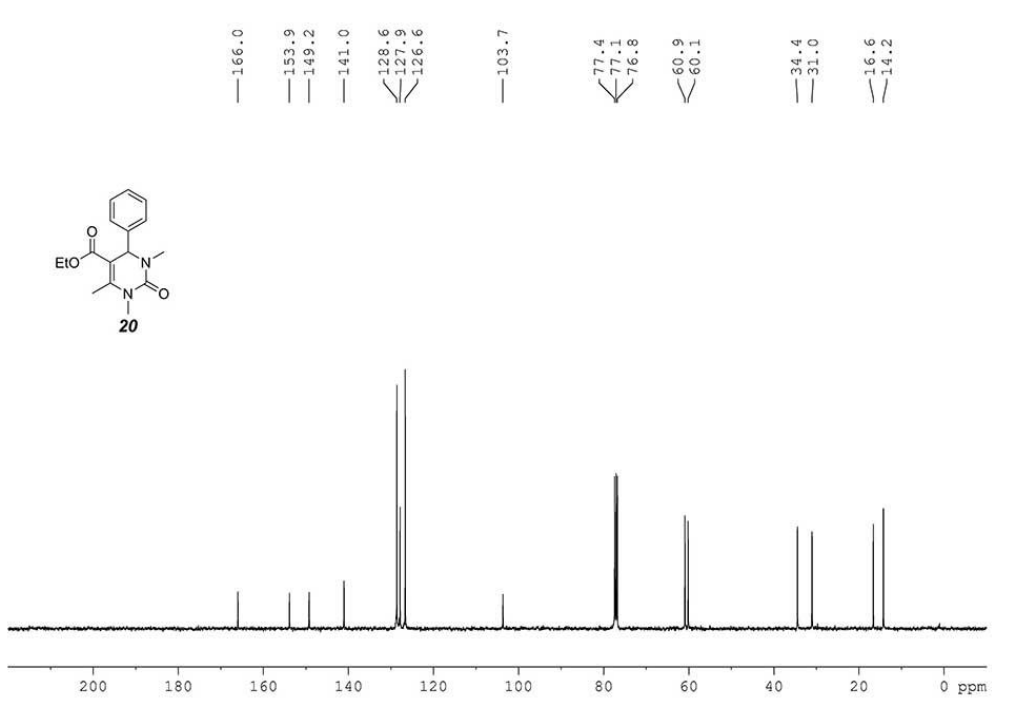

Figure S30. ^{13}C-NMR of **20**

2. The NMR spectra of compounds (15-17, 19, and 21).

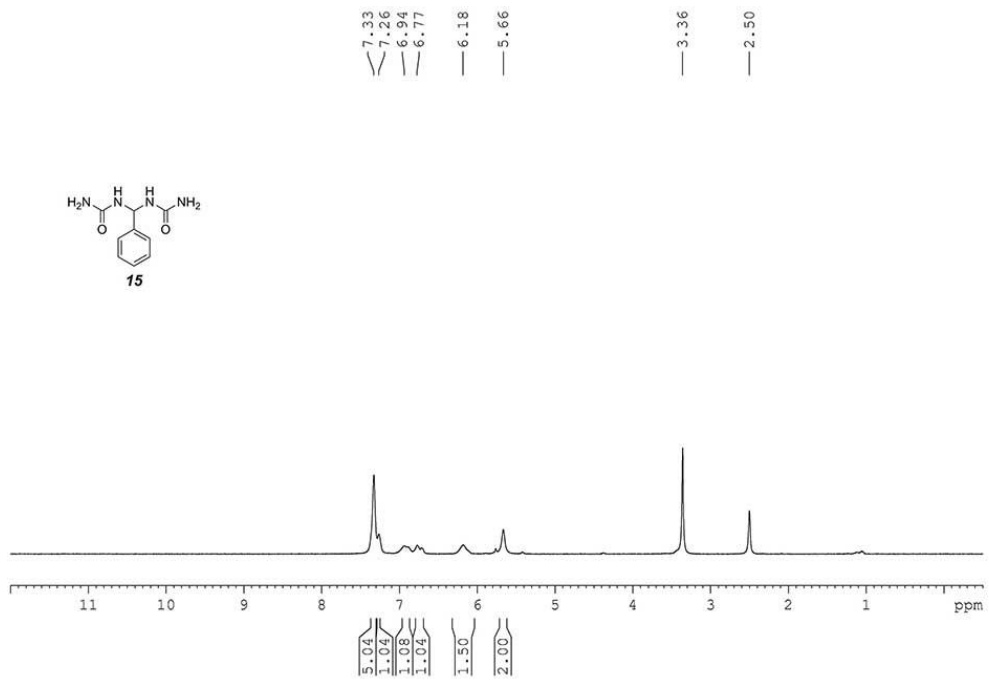

Figure S31. ^{1}H-NMR of **15**

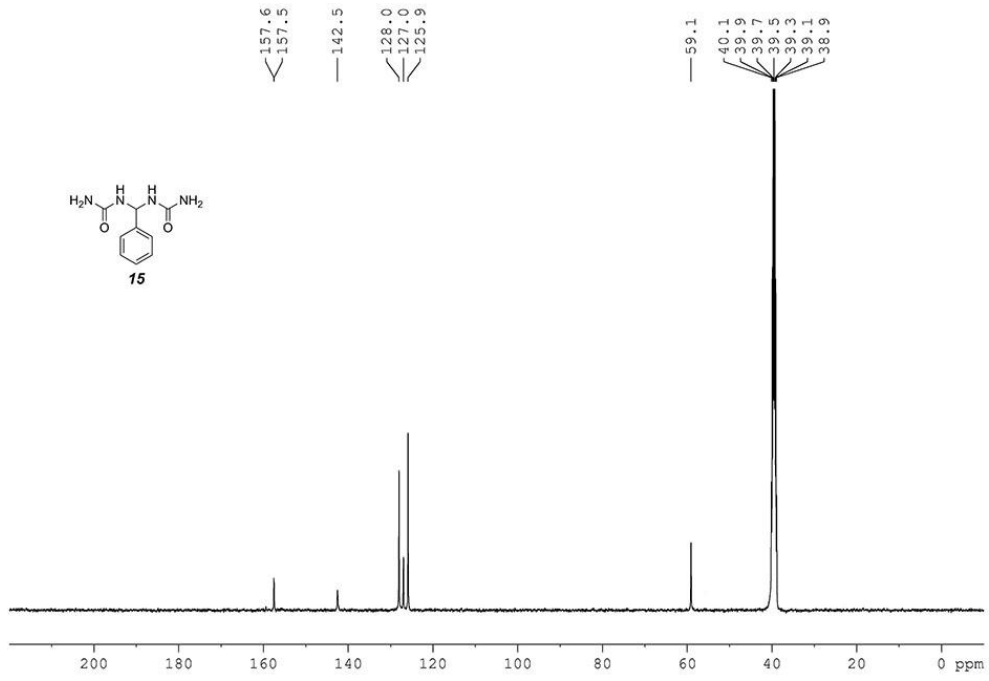

Figure S32. ^{13}C-NMR of **15**

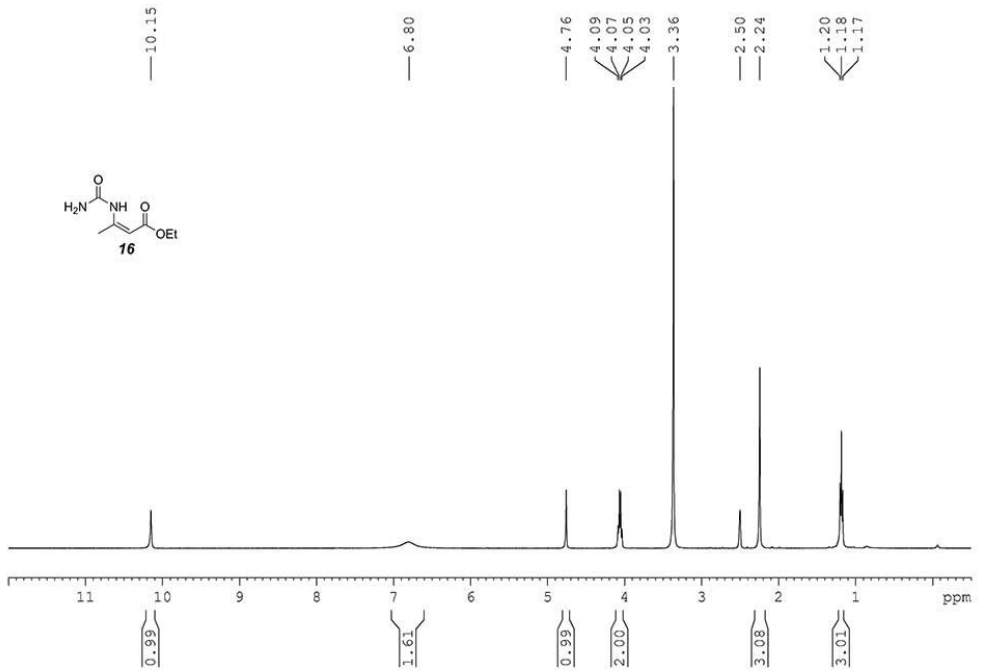

Figure S33. ^{1}H-NMR of **16**

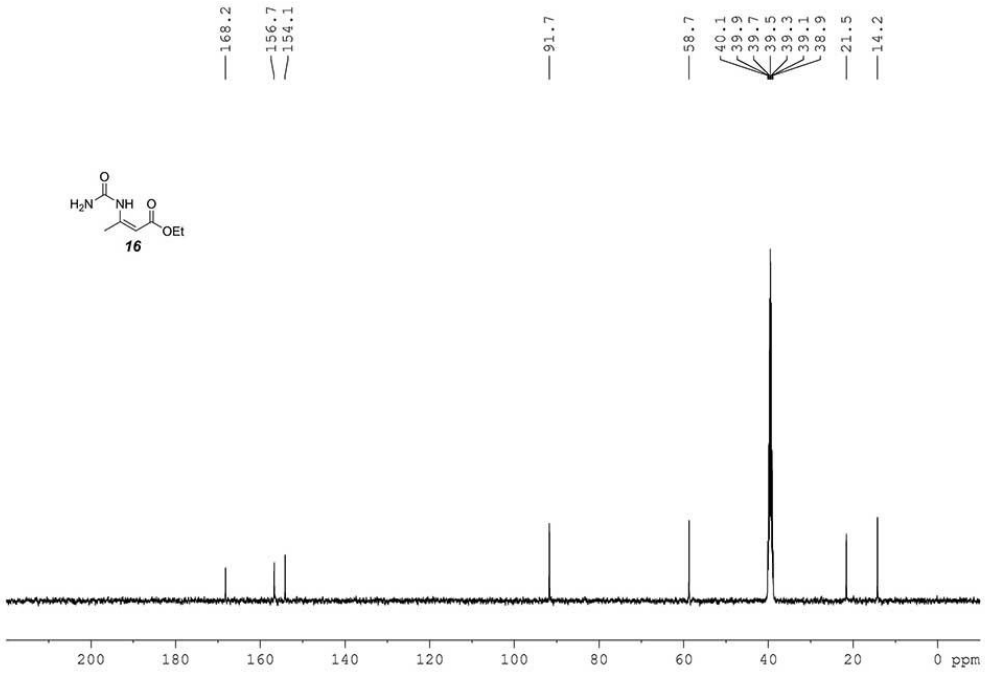

Figure S34. ^{13}C-NMR of **16**

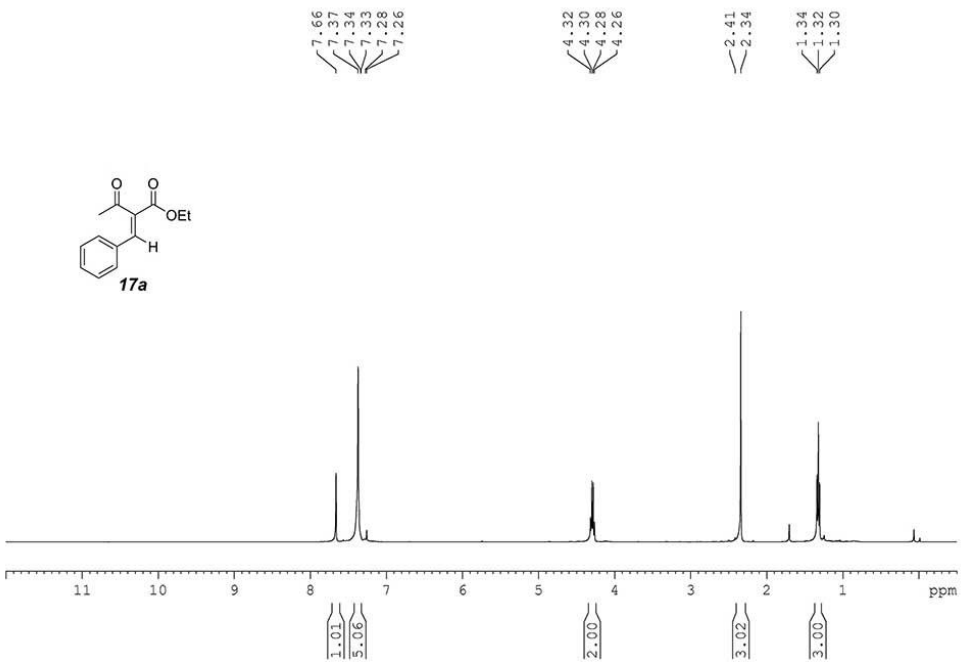

Figure S35. [1]H-NMR of **17a**

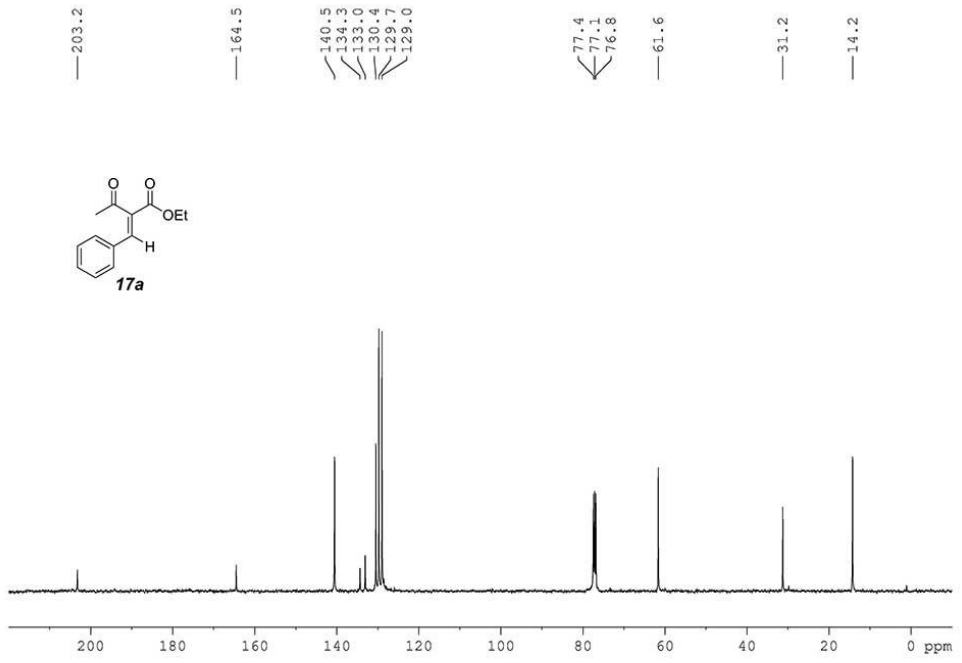

Figure S36. [13]C-NMR of **17a**

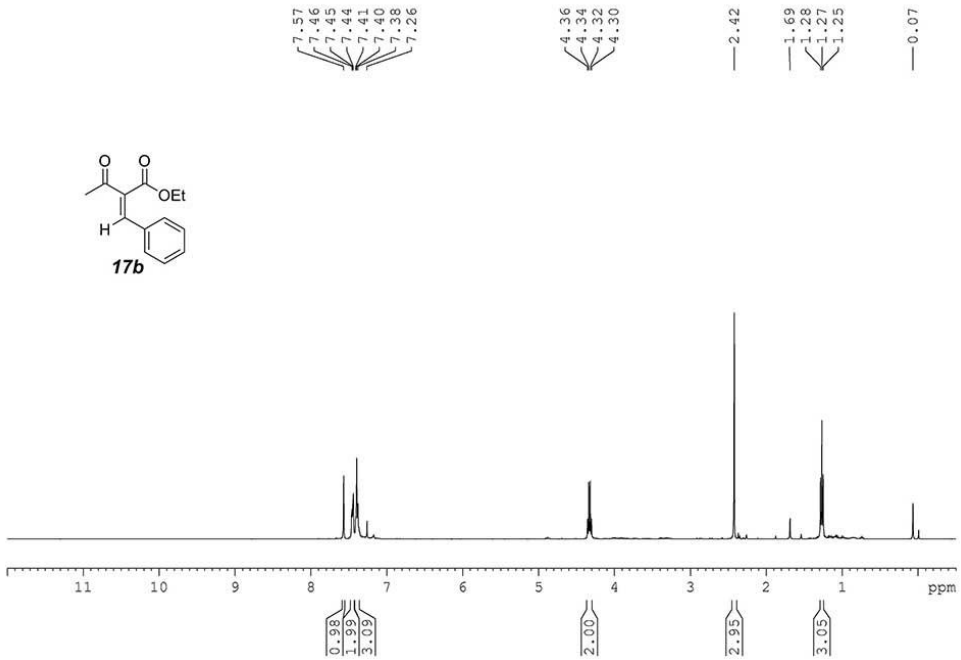

Figure S37. [1]H-NMR of **17b**

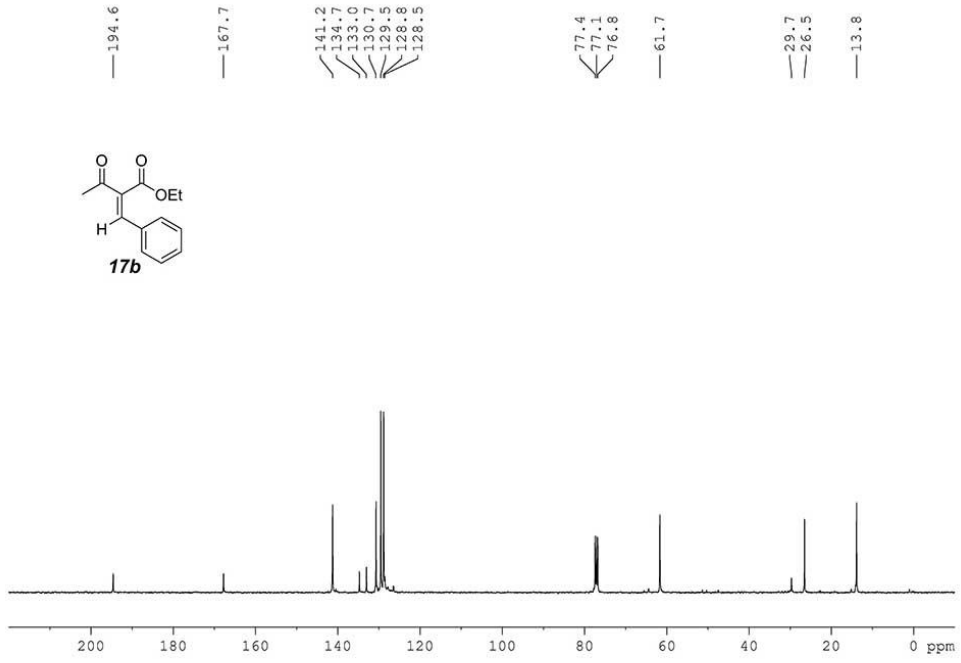

Figure S38. [13]C-NMR of **17b**

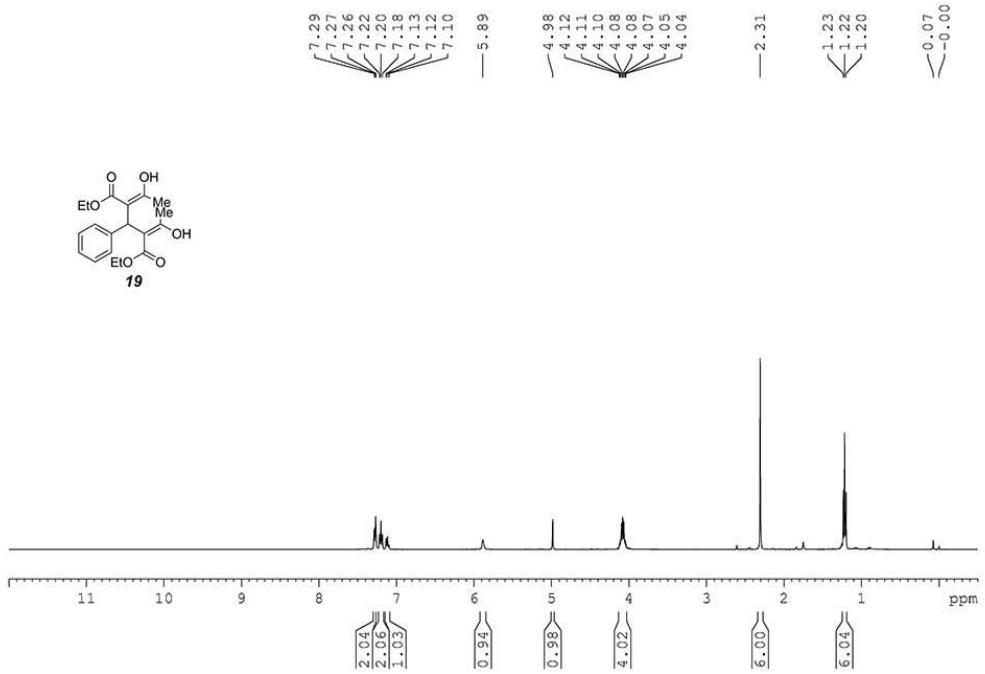

Figure S39. [1]H-NMR of **19**

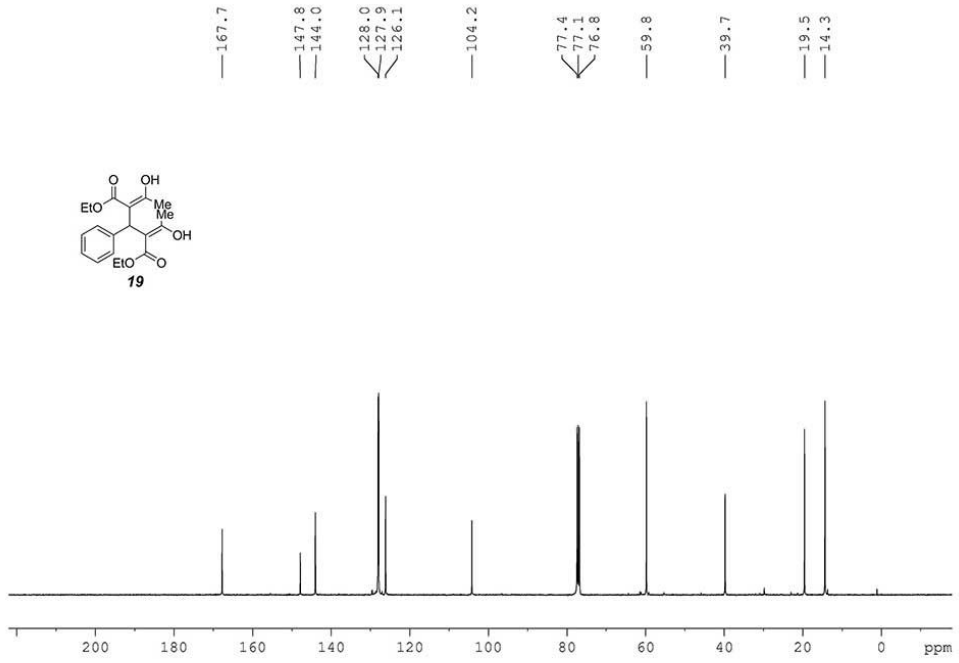

Figure S40. [13]C-NMR of **19**

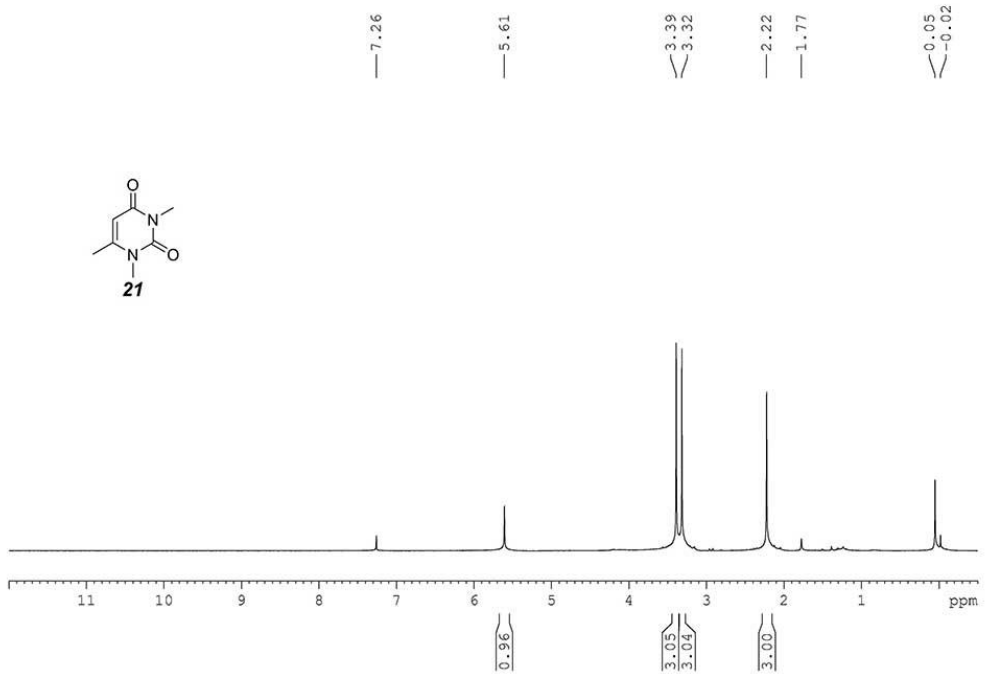

Figure S41. ^{1}H-NMR of **21**

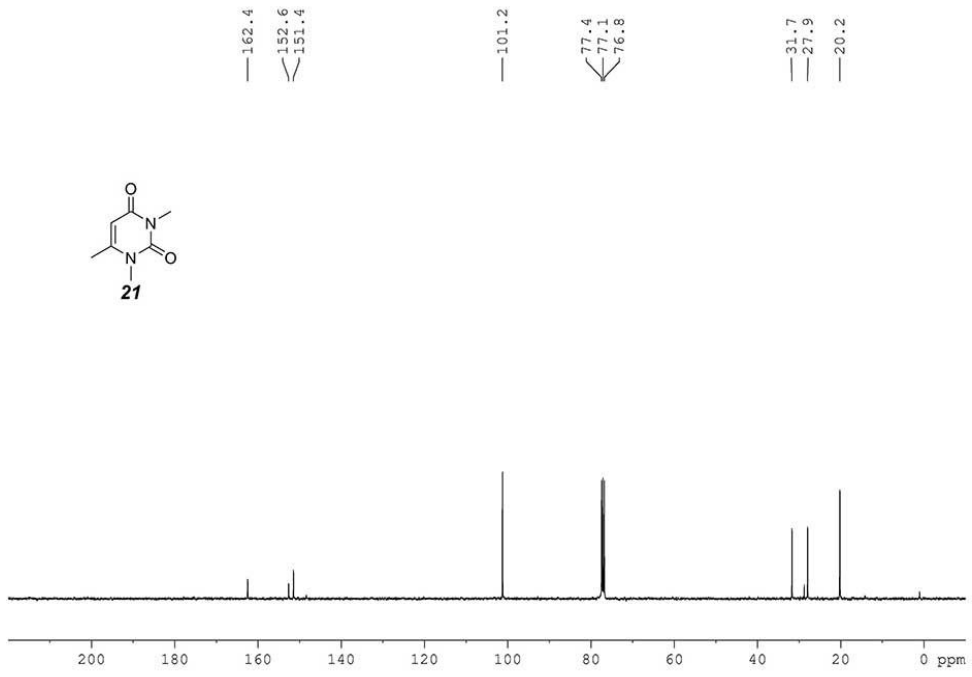

Figure S42. ^{13}C-NMR of **21**

3. The ^{1}H-NMR tracing of the H-D exchange reactions of methyl acetoacetate in MeOH-d_4

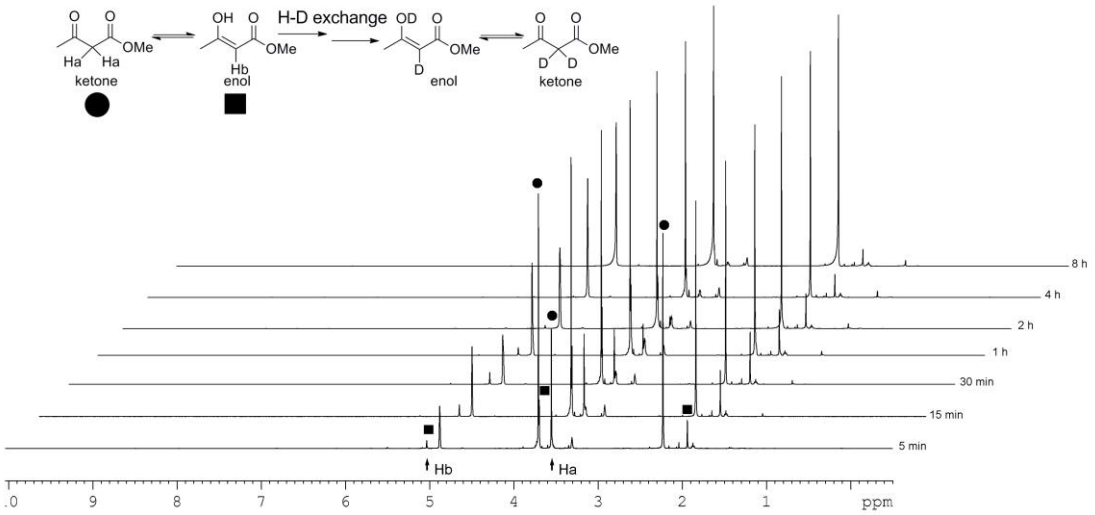

Figure S43. ^{1}H-NMR of H-D exchange reaction of methyl acetoacetate in MeOH-d_4 without $Hf(OTf)_4$

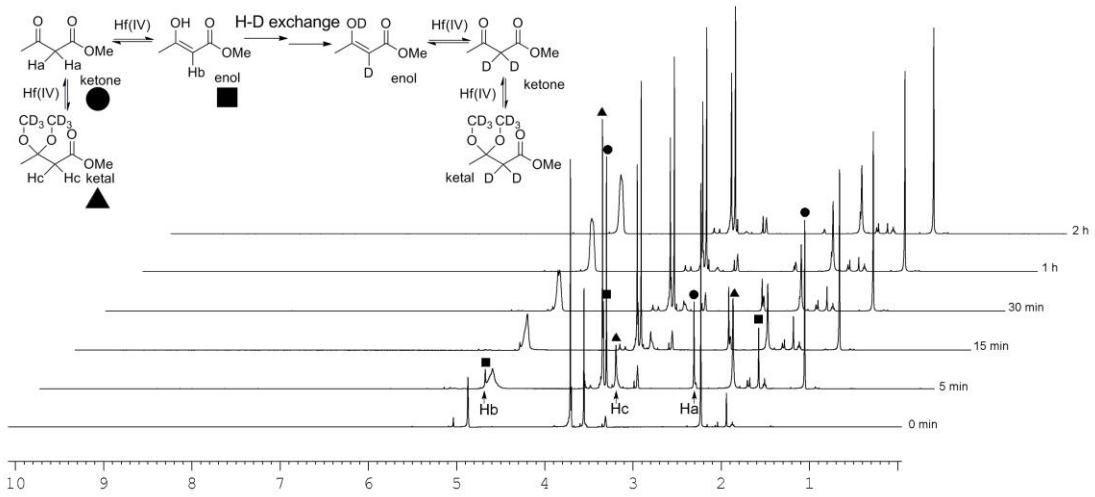

Figure S44. ^{1}H-NMR of H-D exchange reaction of methyl acetoacetate in MeOH-d_4 with 5 mol% $Hf(OTf)_4$