Supporting Information

Design, Synthesis and Isomerization Studies of Light-driven Molecular Motors for Single Molecular Imaging

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NMR spectra

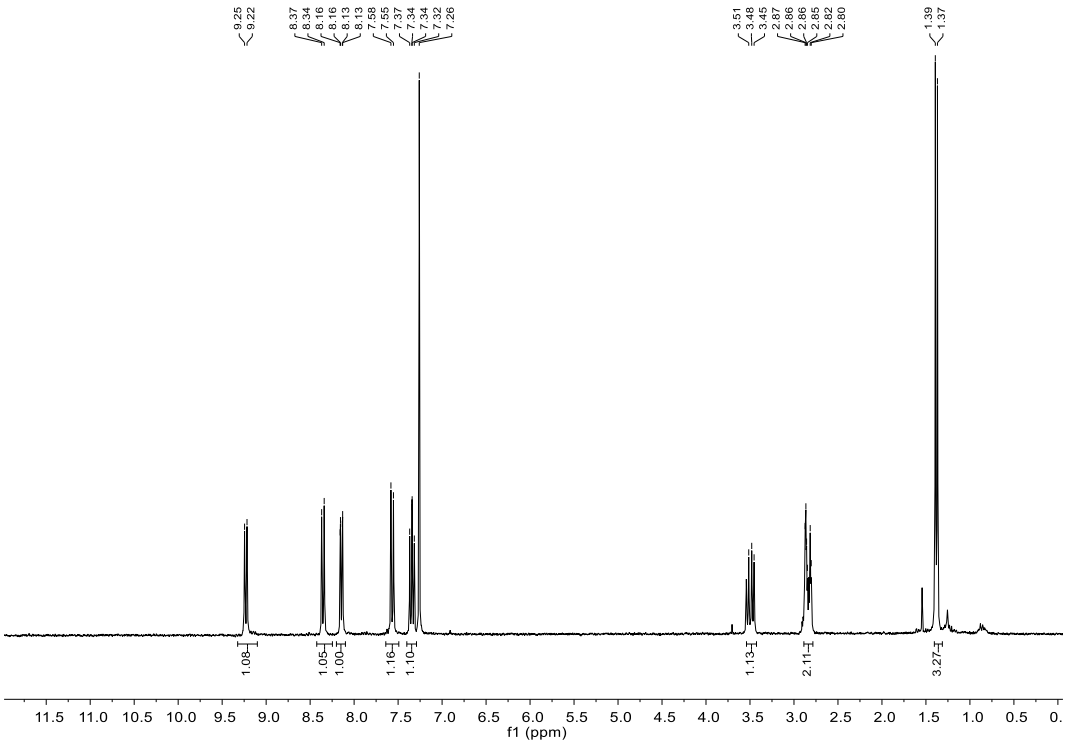

Figure S1. [1]HNMR spectrum (400 MHz, $CDCl_3$) of compound **6**.

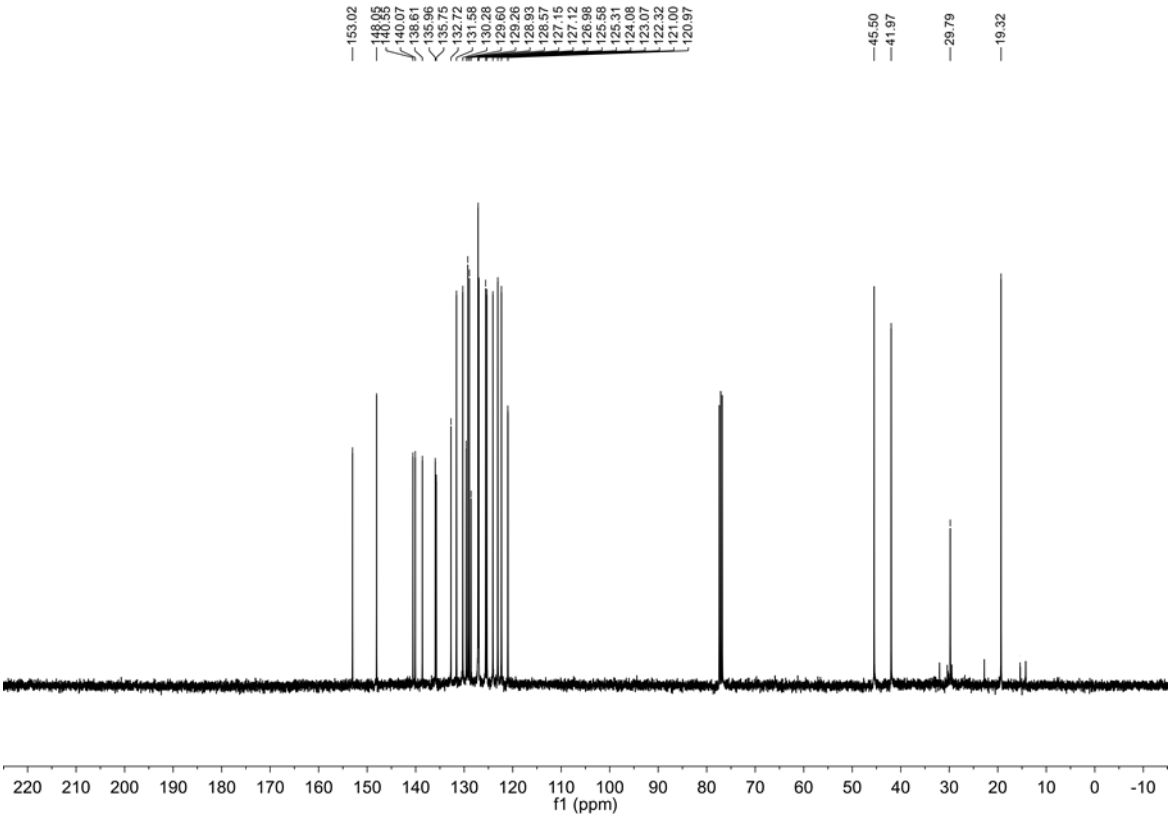

Figure S2. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **6**.

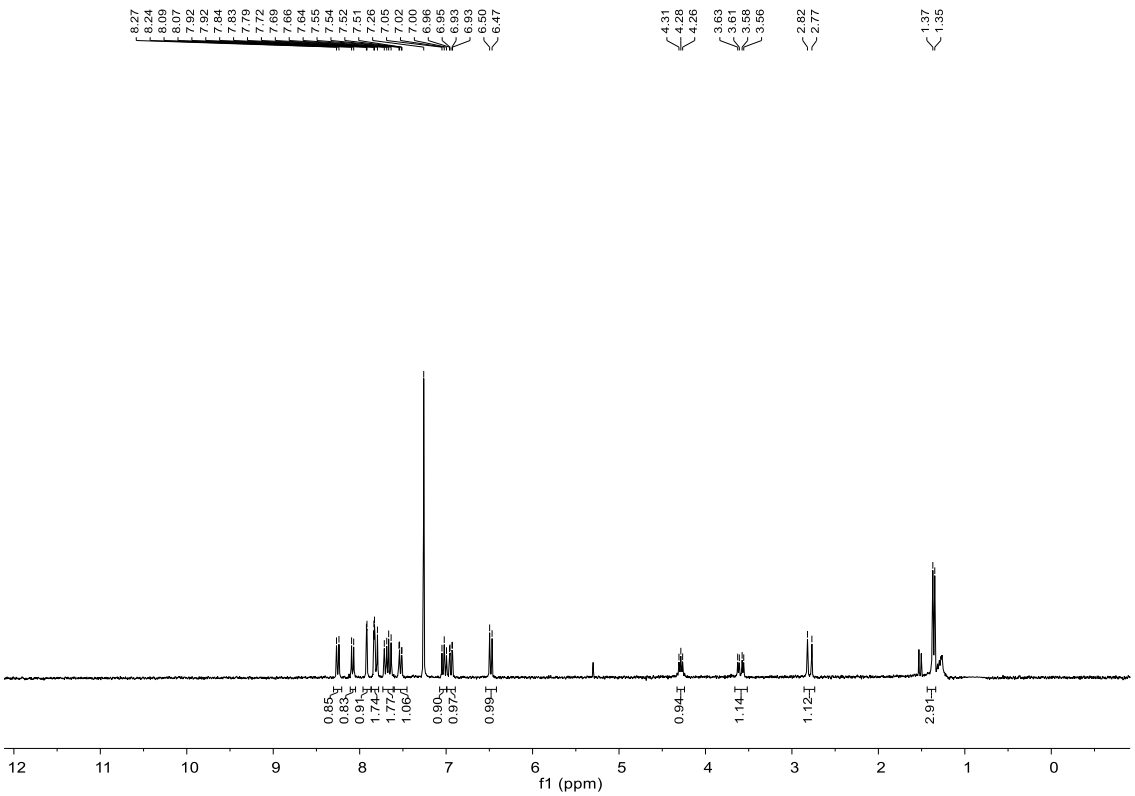

Figure S3. ^{1}HNMR spectrum (400 MHz, $CDCl_3$) of compound **3**.

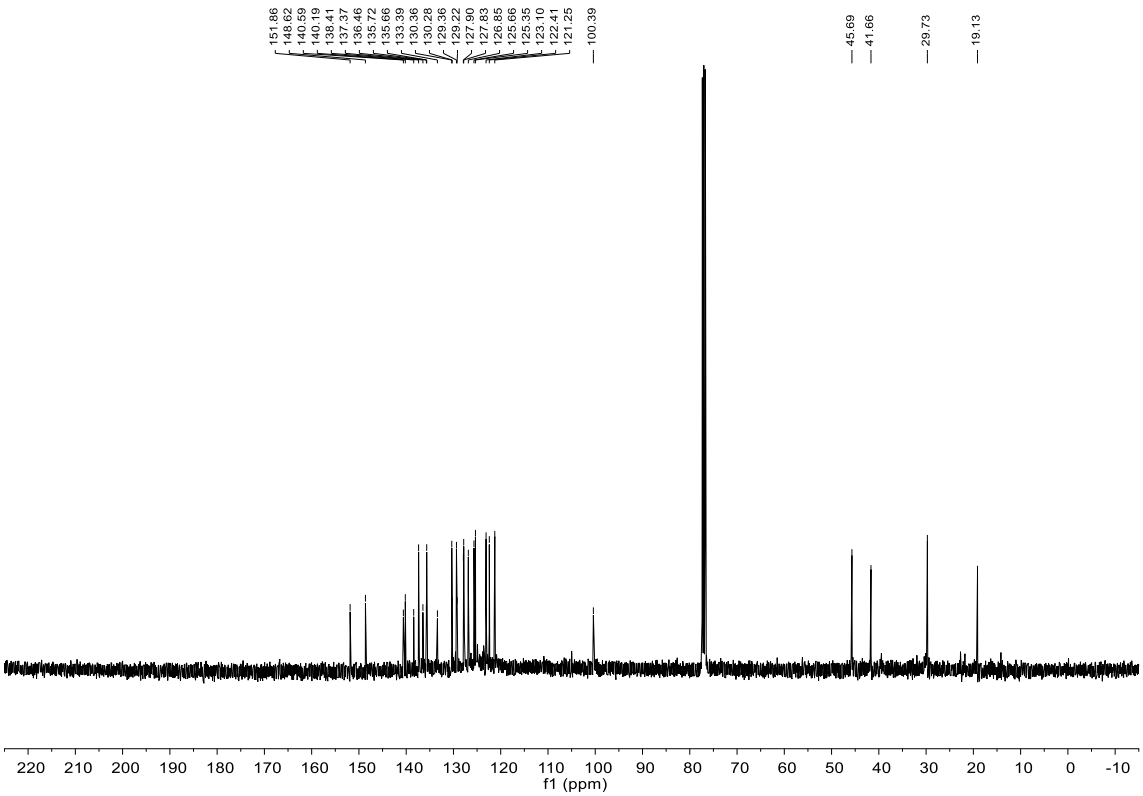

Figure S4. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **3**.

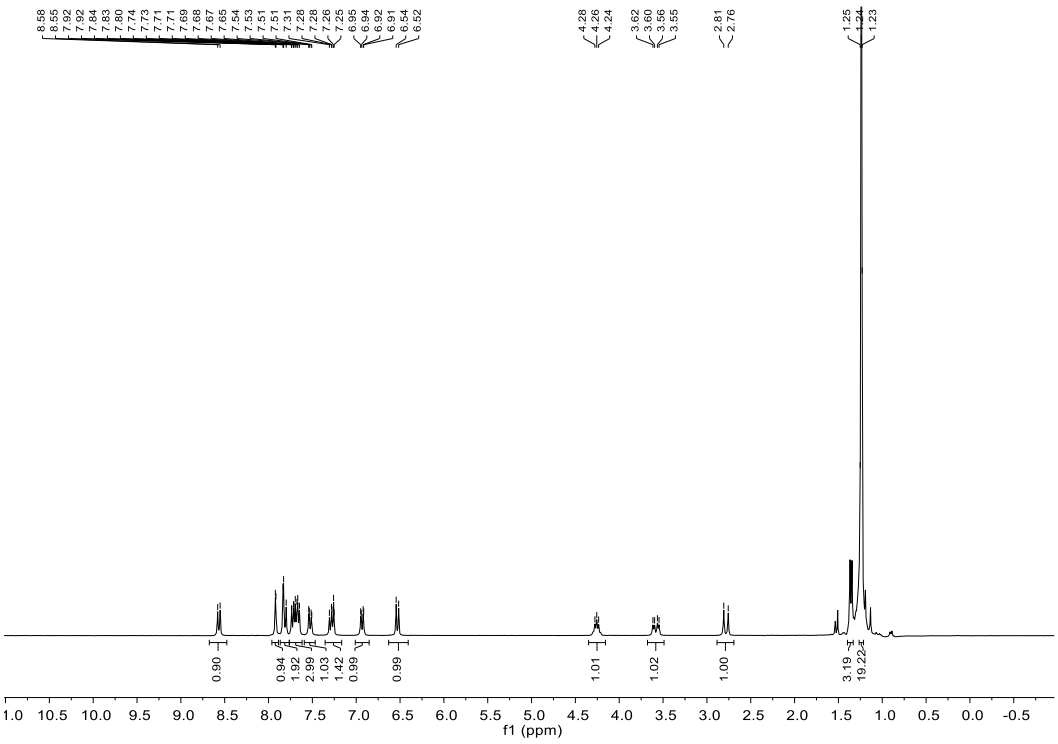

Figure S5. $^{1}HNMR$ spectrum (400 MHz, $CDCl_3$) of compound **8**.

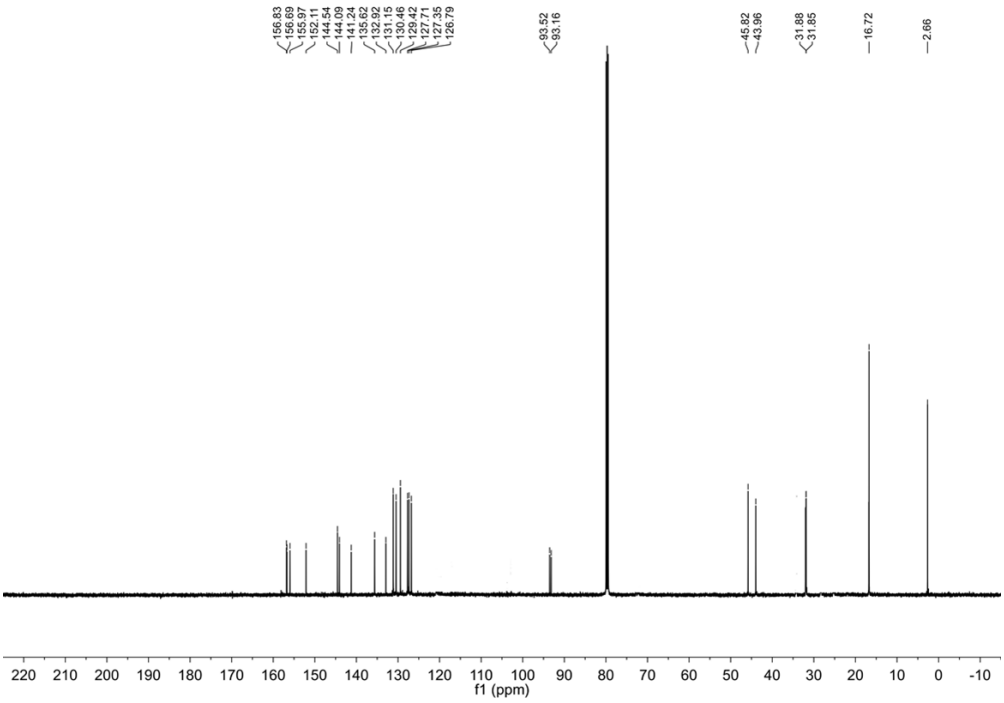

Figure S6. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **8**.

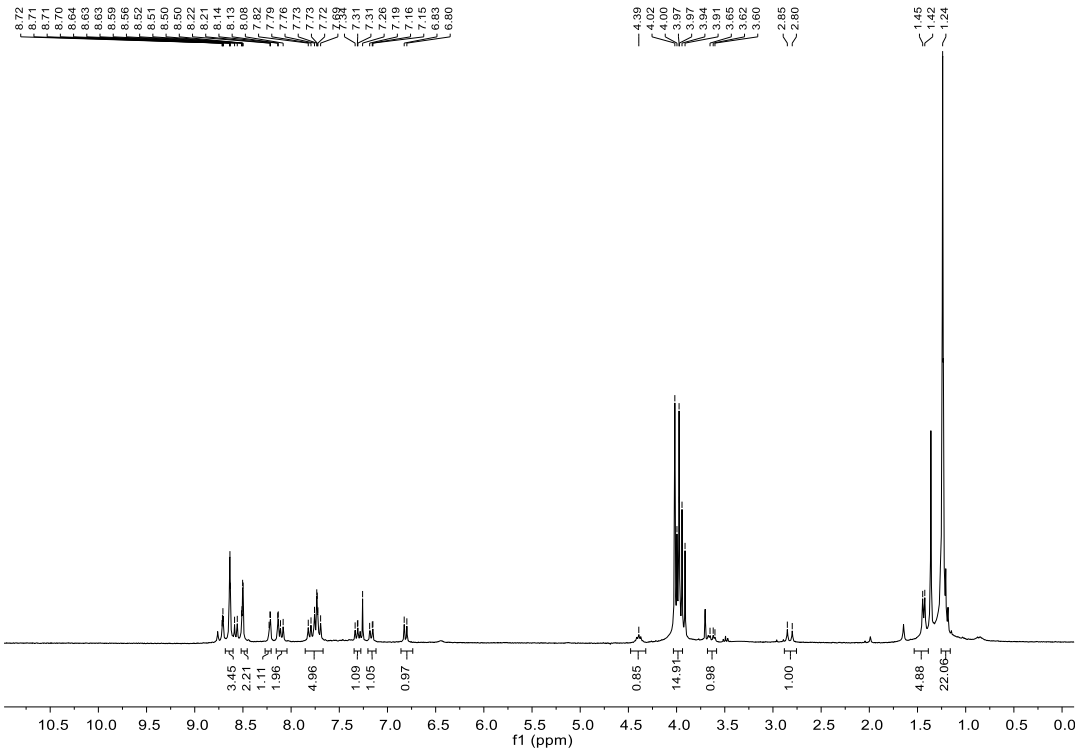

Figure S7. ^{1}HNMR spectrum (400 MHz, $CDCl_3$) of compound **9**.

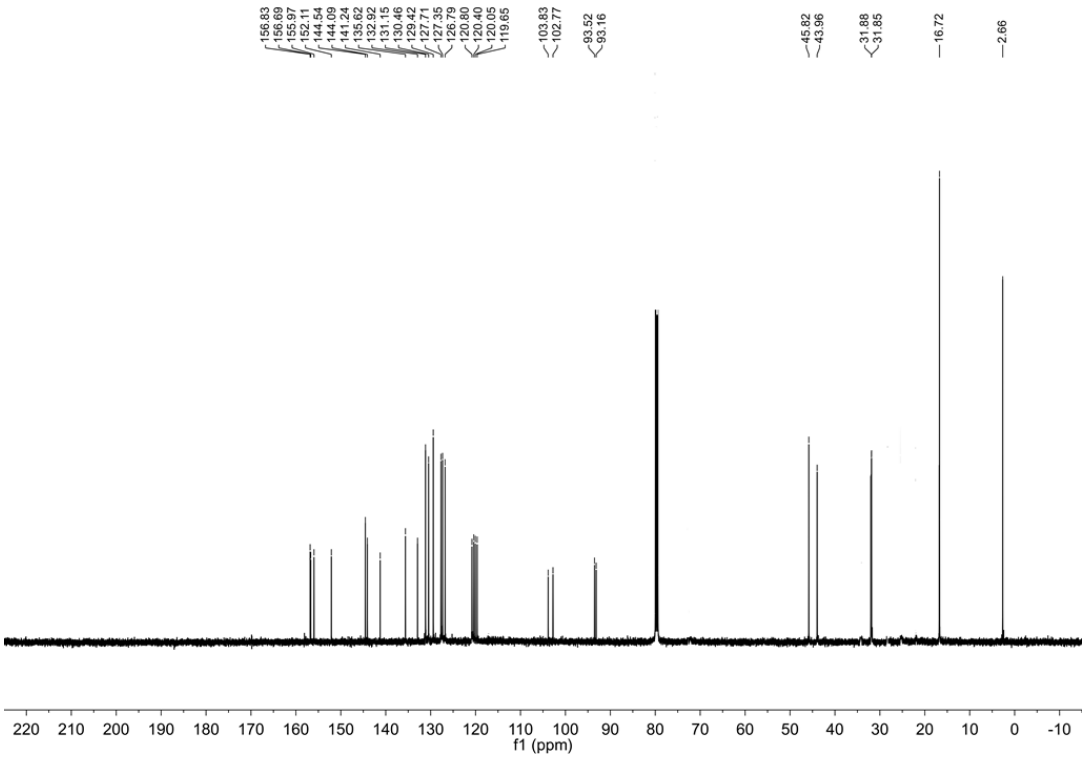

Figure S8. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **9**.

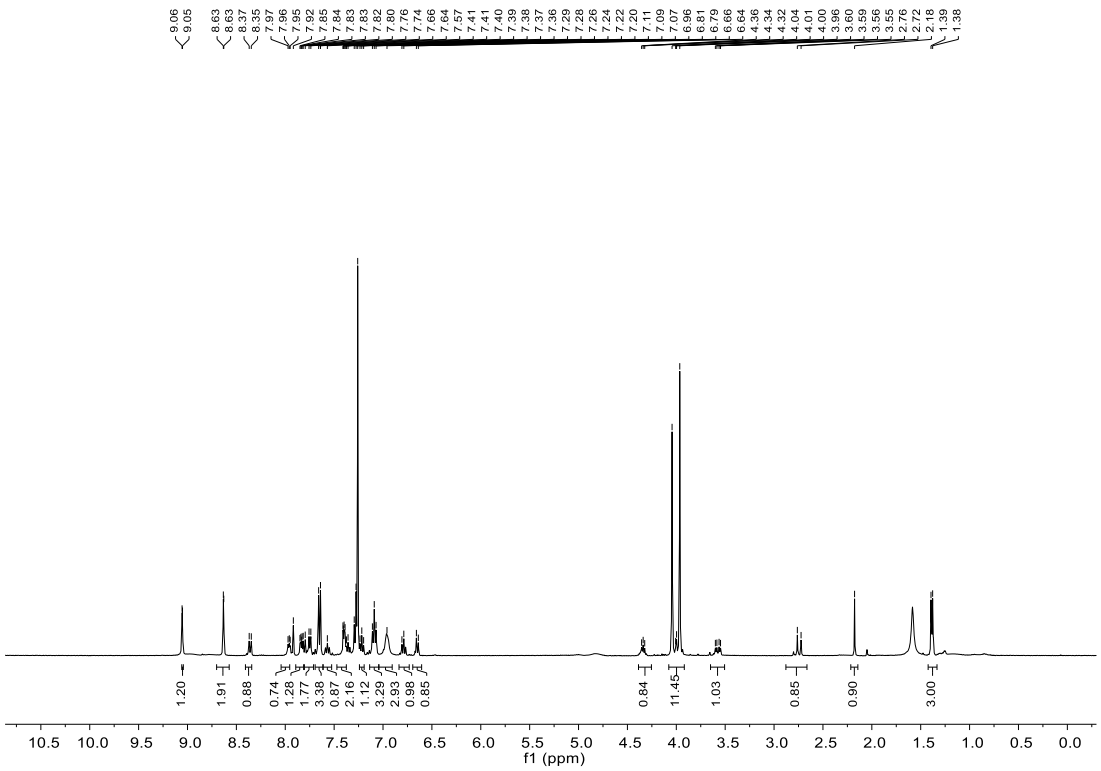

Figure S9. ^{1}HNMR spectrum (400 MHz, $CDCl_3$) of compound **10**.

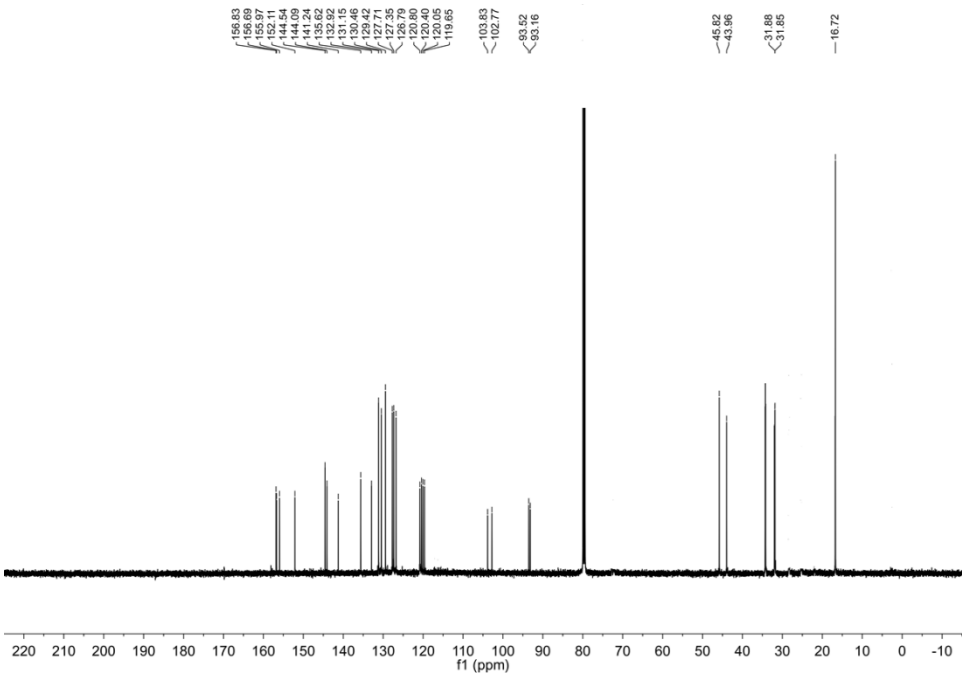

Figure S10. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **10**.

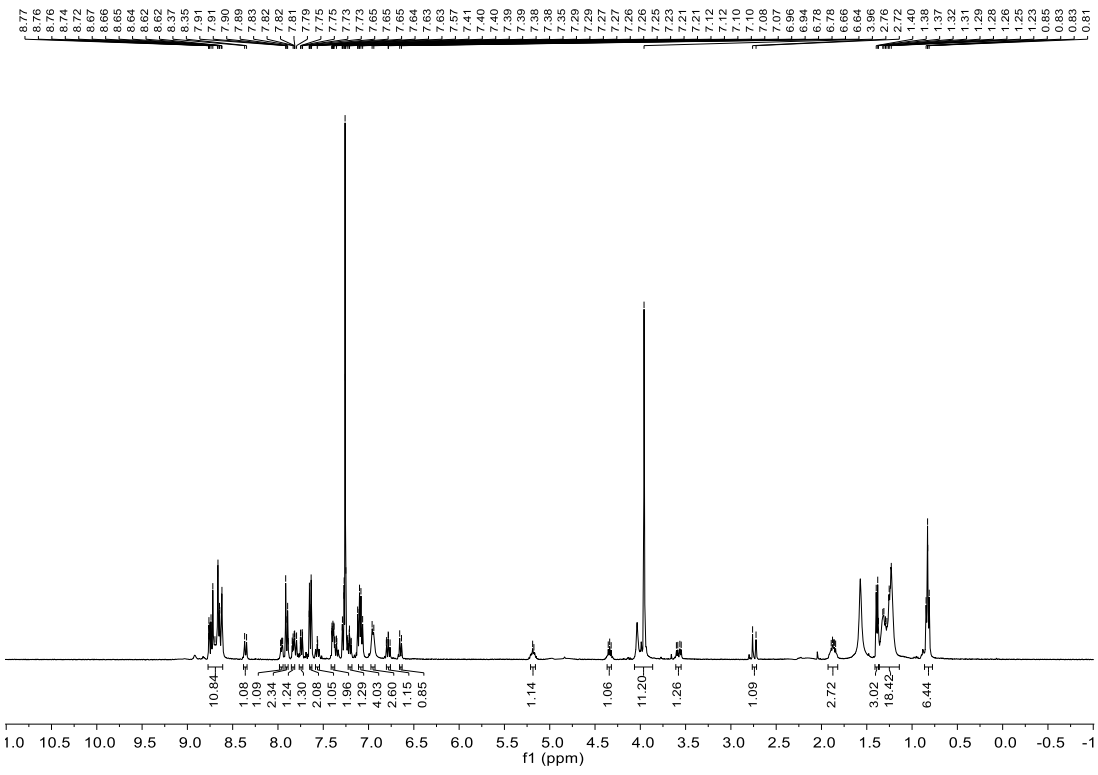

Figure S11. ^{1}HNMR spectrum (400 MHz, $CDCl_3$) of compound **11**.

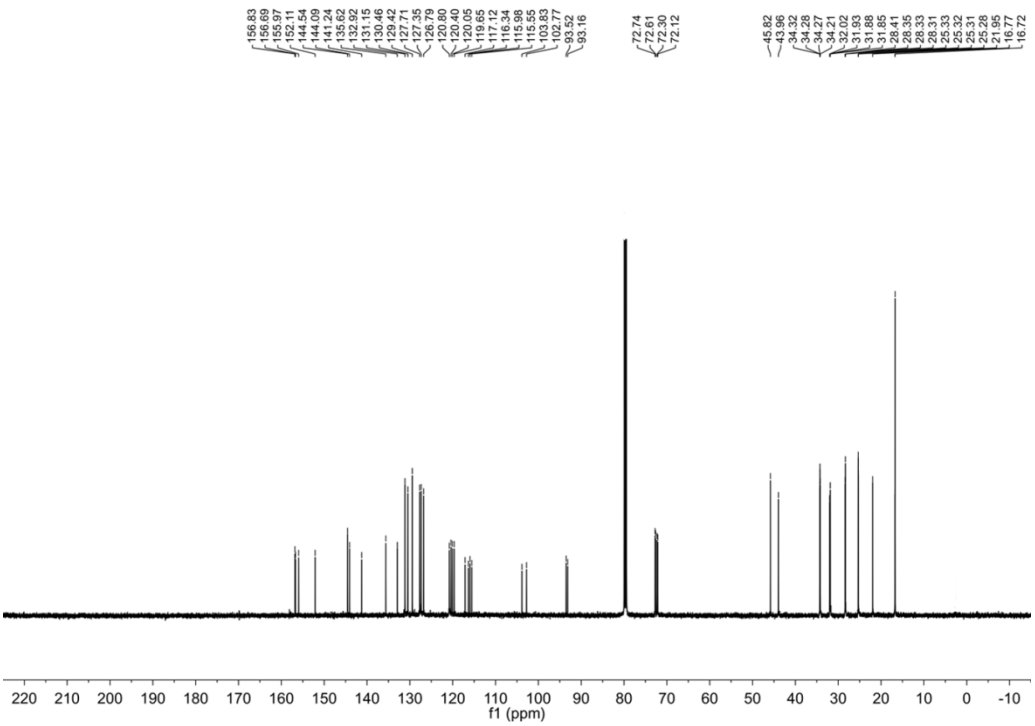

Figure S12. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **11**.

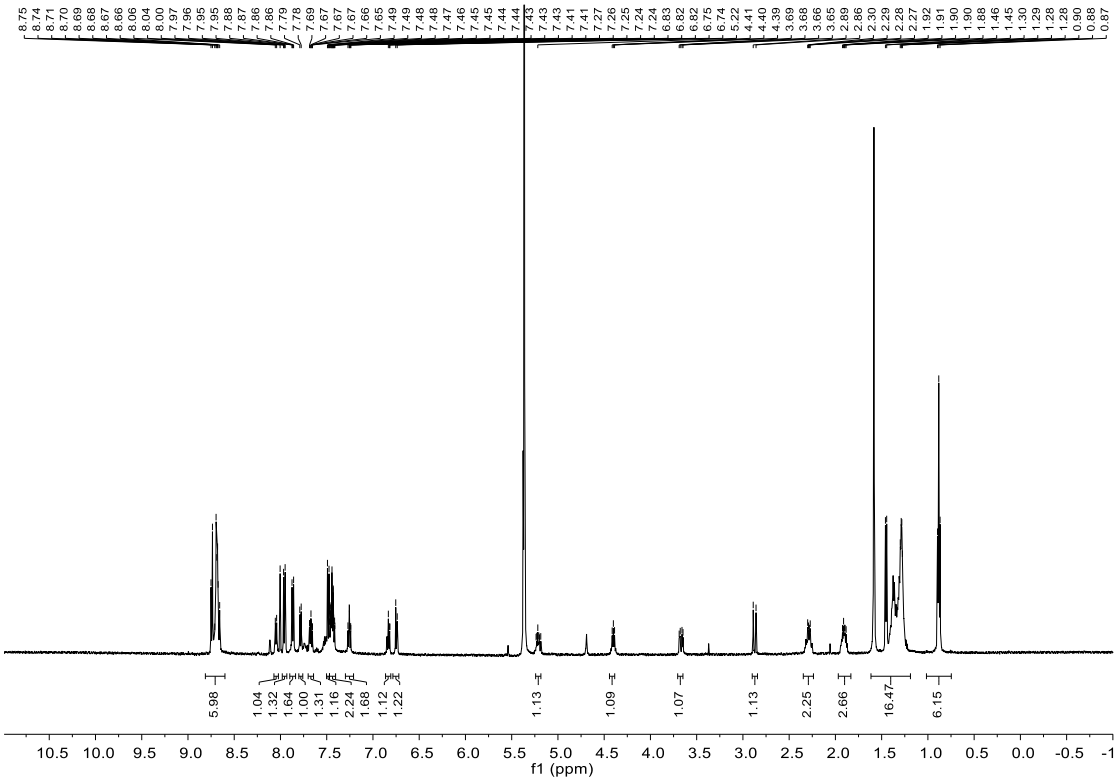

Figure S13. ^{1}HNMR spectrum (500 MHz, CD_2Cl_2) of compound **1a**.

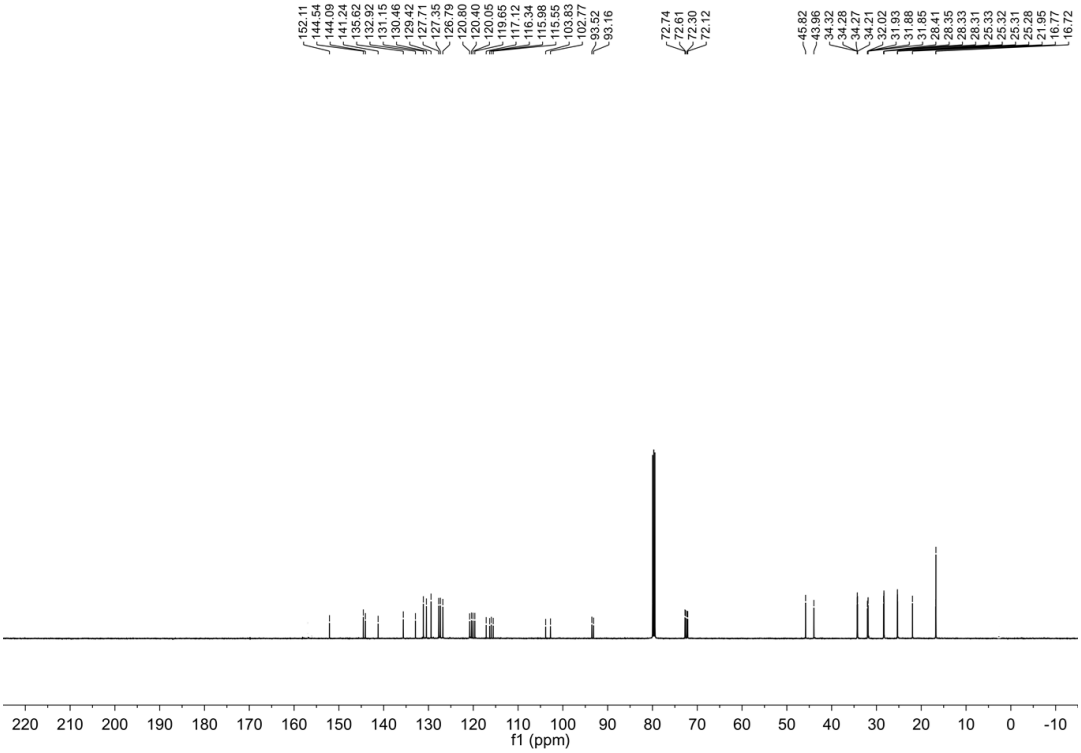

Figure S14. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **1a**.

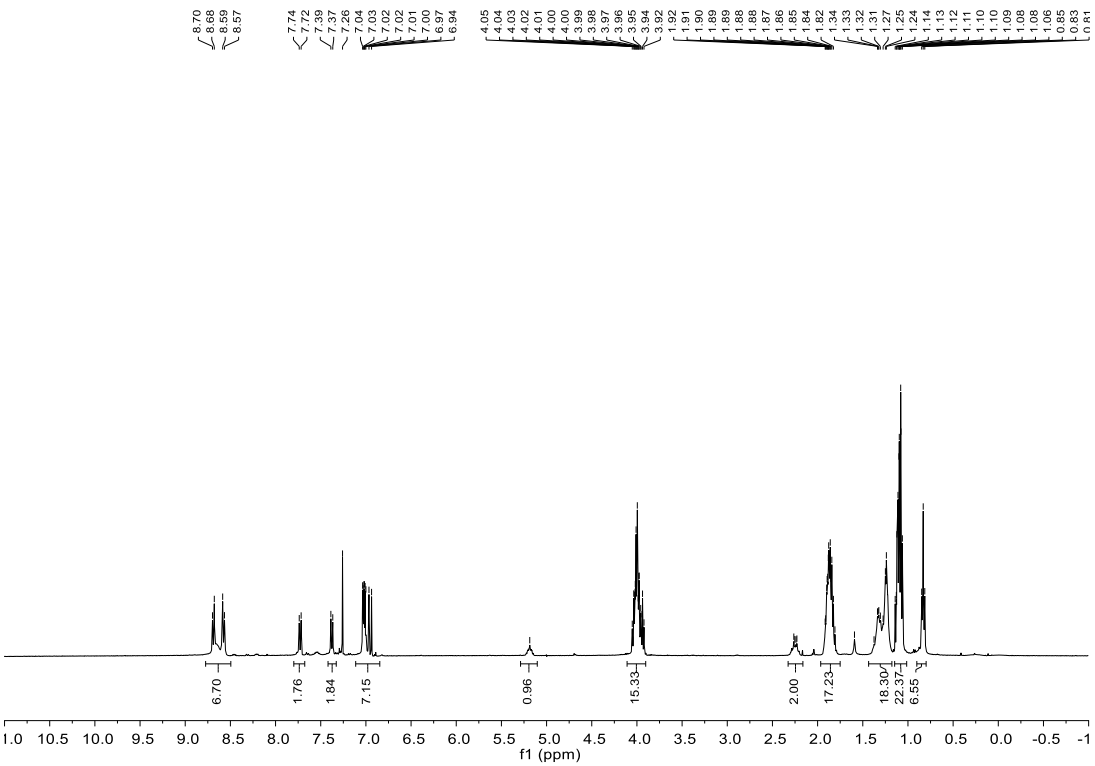

Figure S15. $^{1}HNMR$ spectrum (400 MHz, $CDCl_3$) of compound **13**.

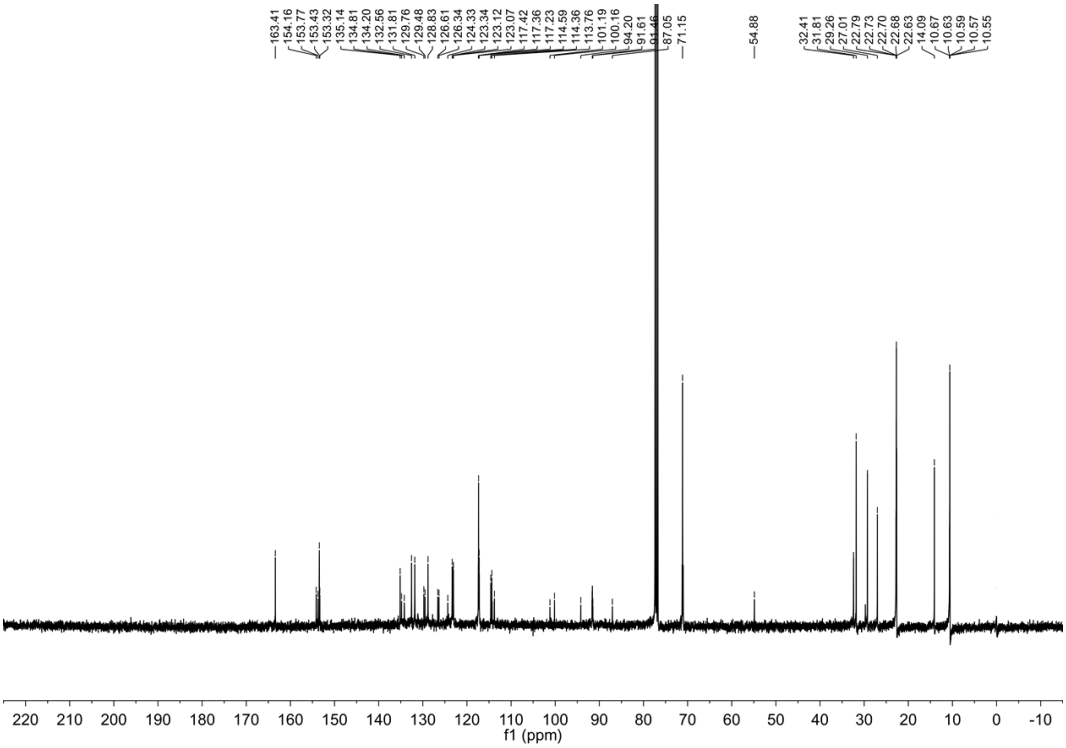

Figure S16. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **13**.

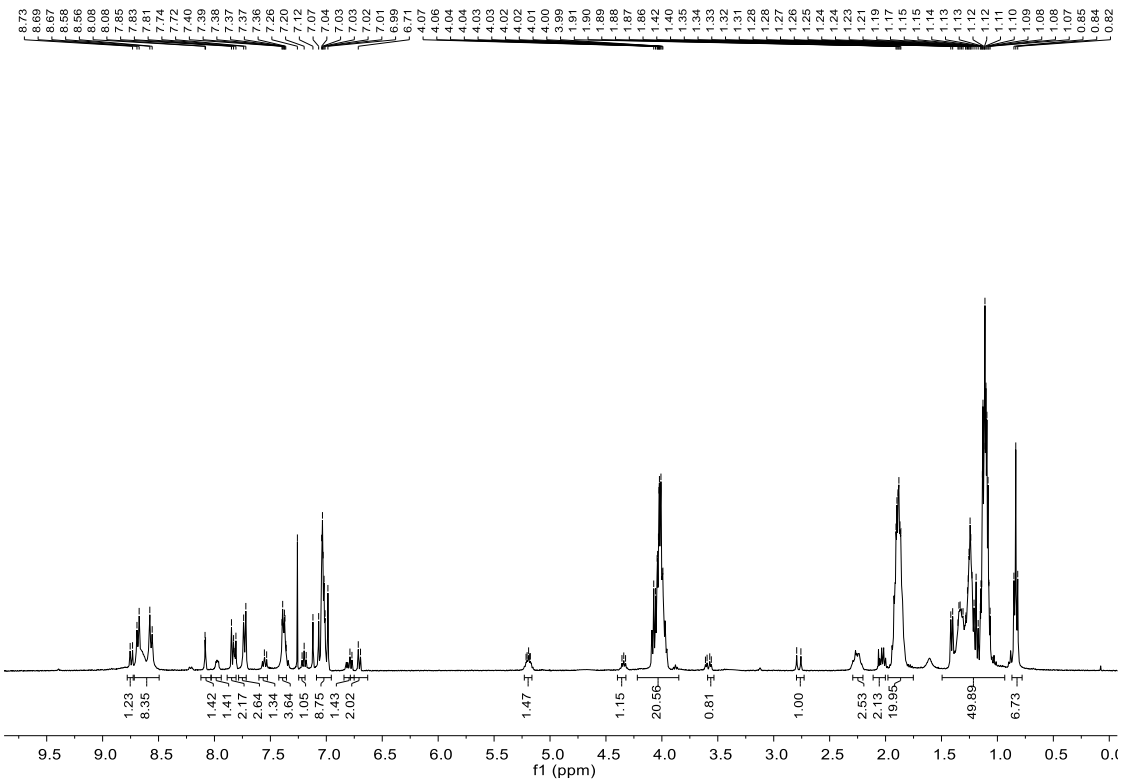

Figure S17. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **14**.

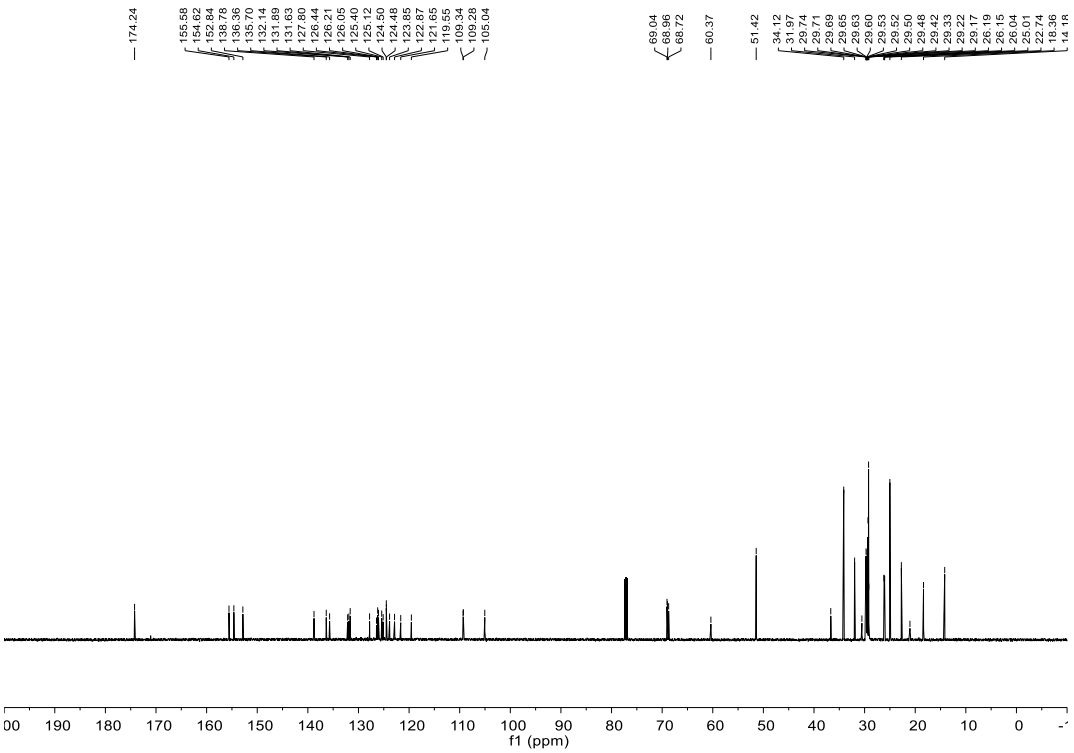

Figure S18. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **14**.

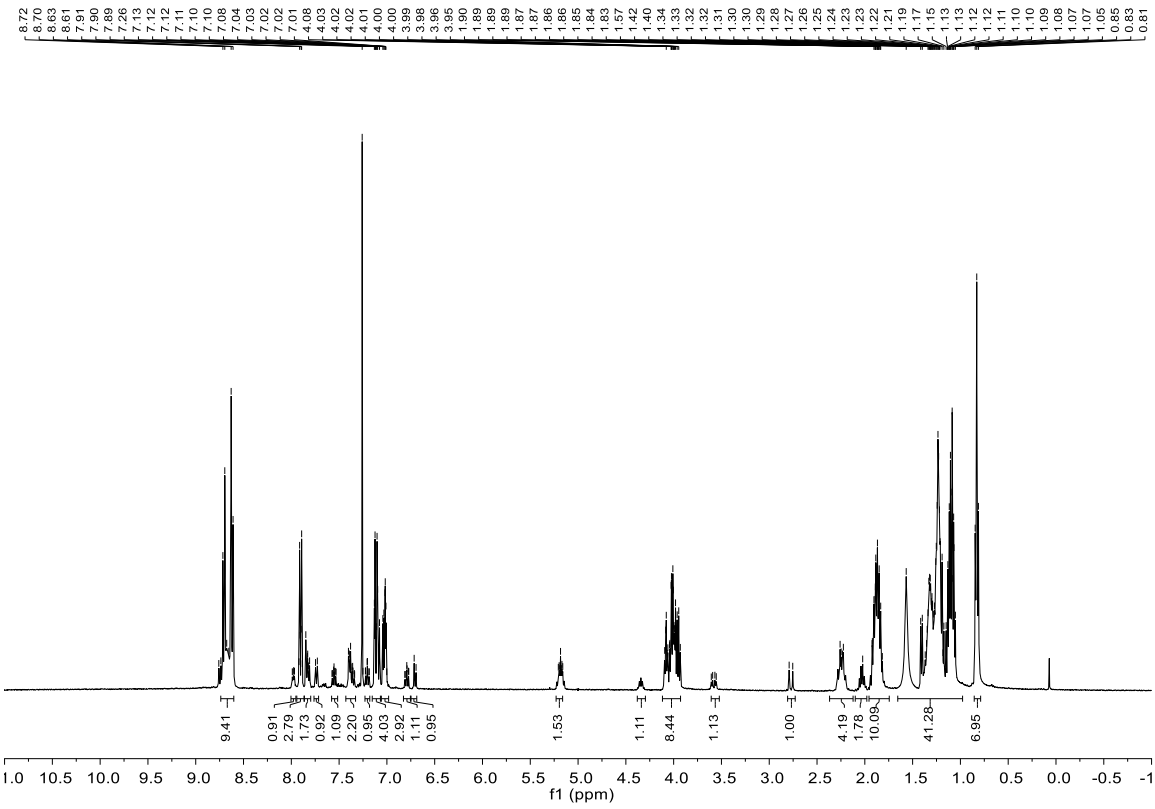

Figure S19. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **1b**.

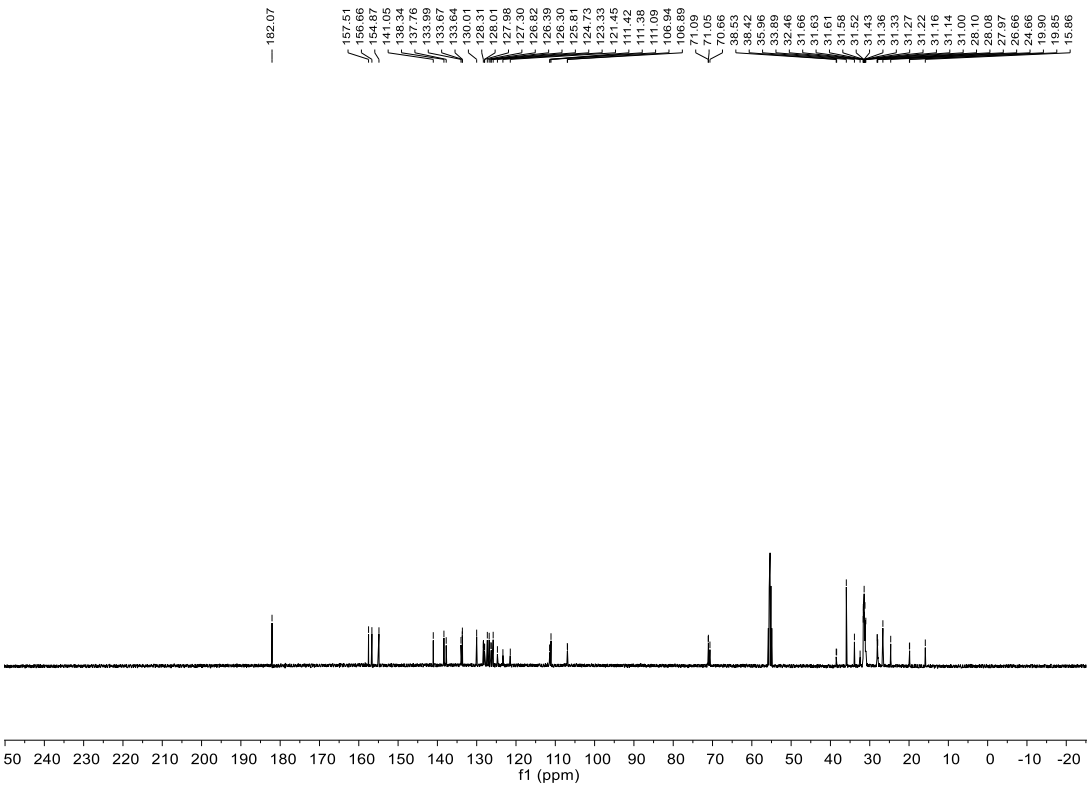

Figure S20. ^{13}C NMR spectrum (126 MHz, CD_2Cl_2) of compound **1b**.

Kinetic studies of thermal helix inversion step of motor 1b

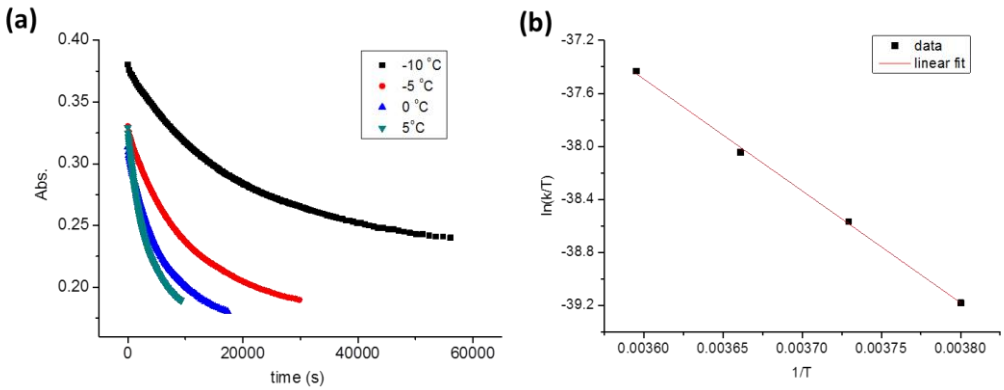

Figure S21. Kinetic studies of thermal helix inversion step of **1b**. (a) UV-vis absorption changes of motors **1b** during thermal helix inversion at 510 nm at four different temperatures (5 ℃, 0 ℃, -5 ℃, -10 ℃). (b) Eyring analysis of thermal helix inversion of unstable **1b** to stable **1b**.

The thermal helix inversion of unstable **1b** to stable **1b** was followed by monitoring the UV-vis absorption change at 510 nm (Figure S1a) with respect to time at four different temperatures (5 ℃, 0 ℃, -5 ℃, -10 °C). From these data, Gibbs free energy of activation ($\Delta^{\ddagger}G°$ = 84.5 kJ/mol) , the half-life ($t_{1/2}$ = 148 s) at room temperature (20 ℃) could be obtained by means of an Eyring analysis (Figure S1b), as well as the enthalpy of activation ($\Delta^{\ddagger}H°$ = 72.8 kJ/mol) and entropy of activation ($\Delta^{\ddagger}S°$ = -41.5 J/K.mol).