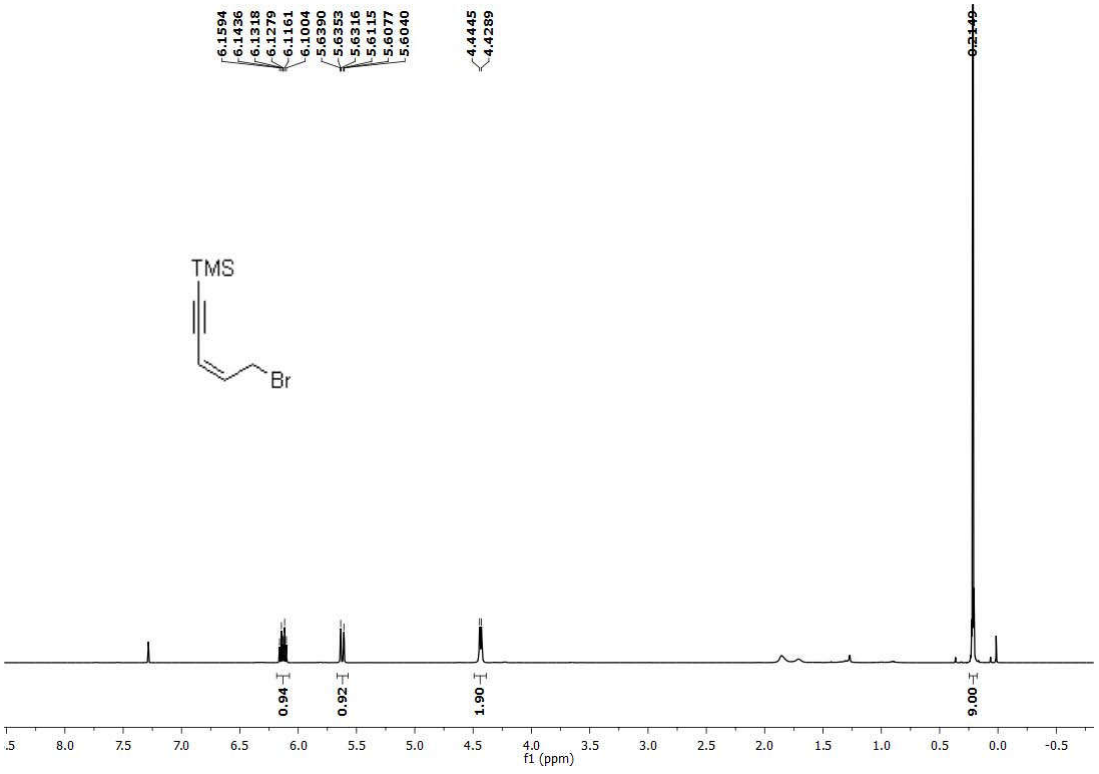

Fig. S1 ^{1}H NMR of **S4** in $CDCl_3$.

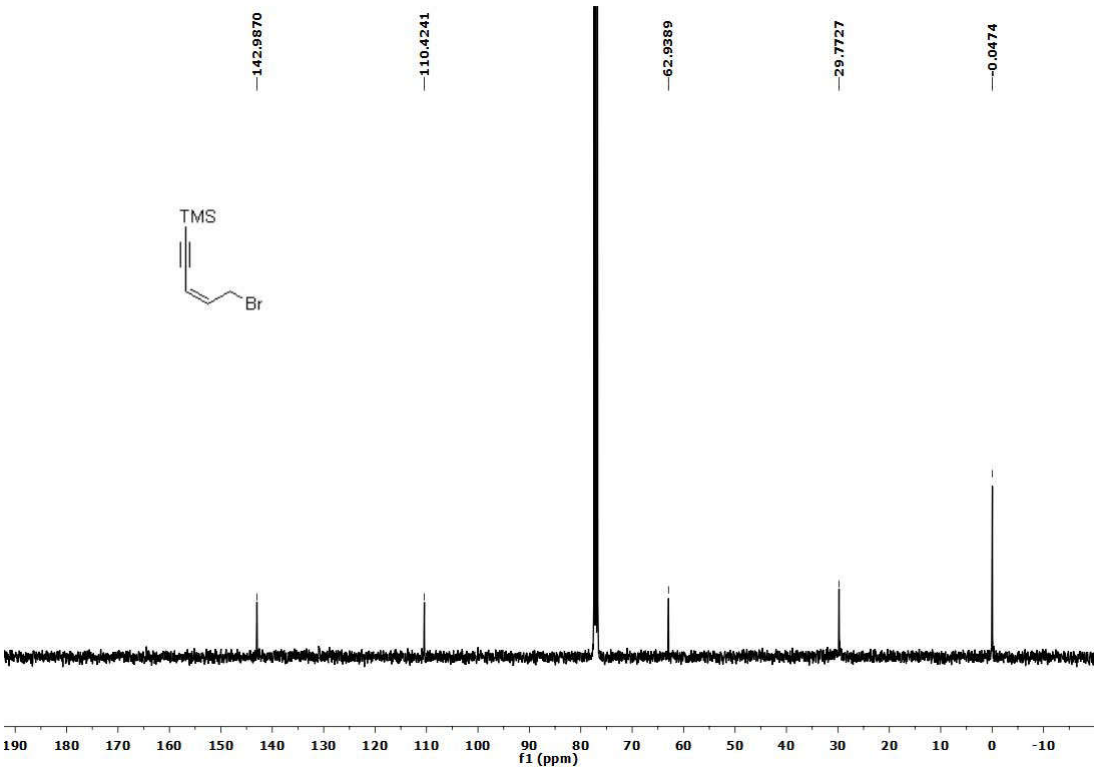

Fig. S2 ^{13}C NMR of **S4** in $CDCl_3$.

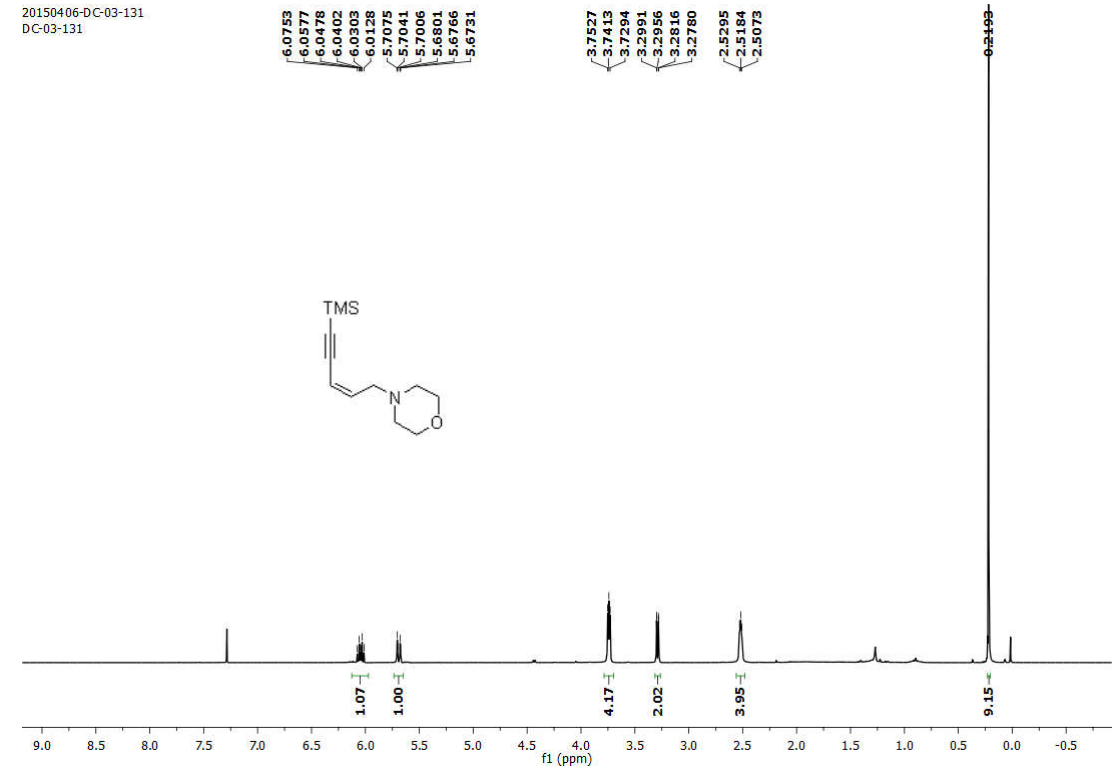

Fig. S3 ^{1}H NMR of **S5** in $CDCl_3$.

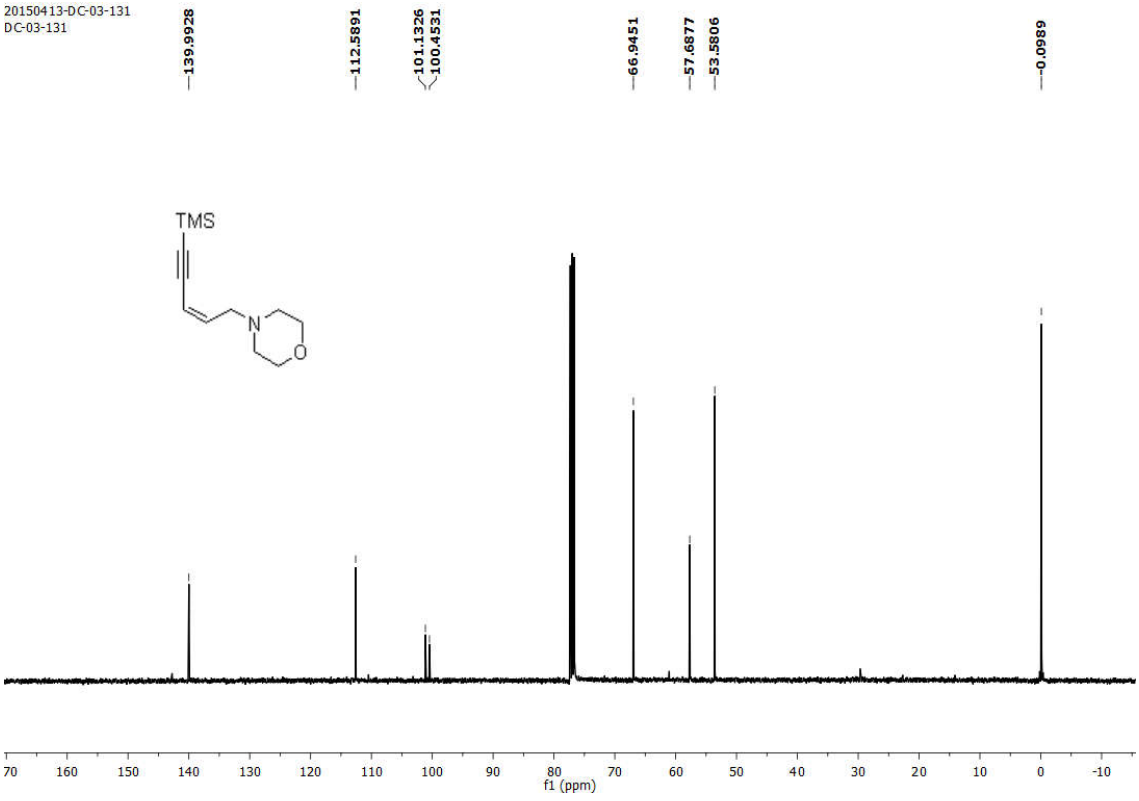

Fig. S4 ^{13}C NMR of **S5** in $CDCl_3$.

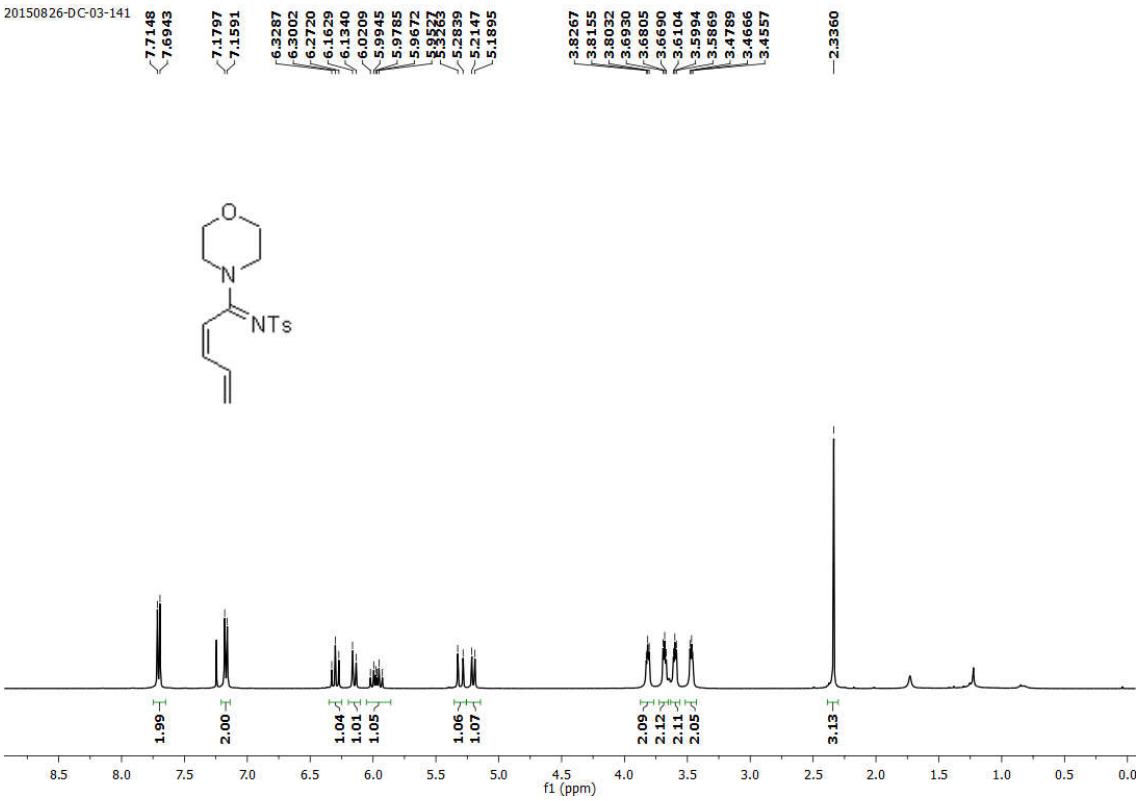

Fig. S5 ^{1}H NMR of **1a** in $CDCl_3$.

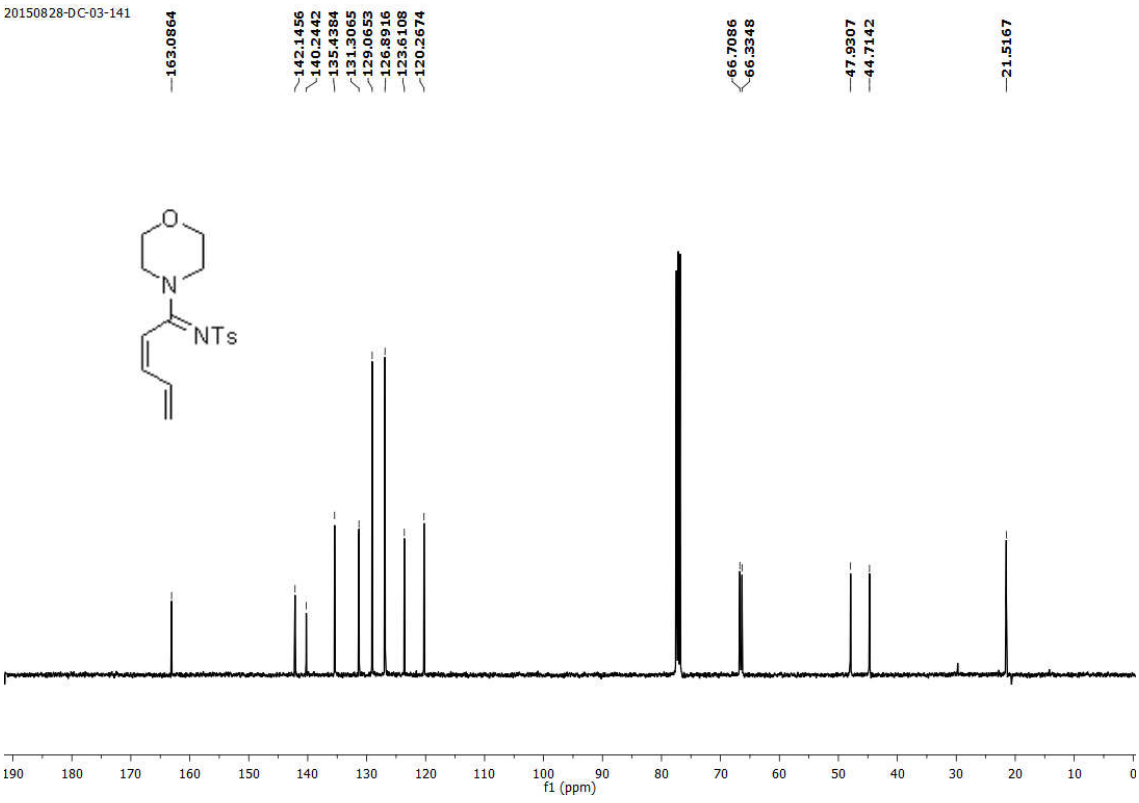

Fig. S6 ^{13}C NMR of **1a** in $CDCl_3$.

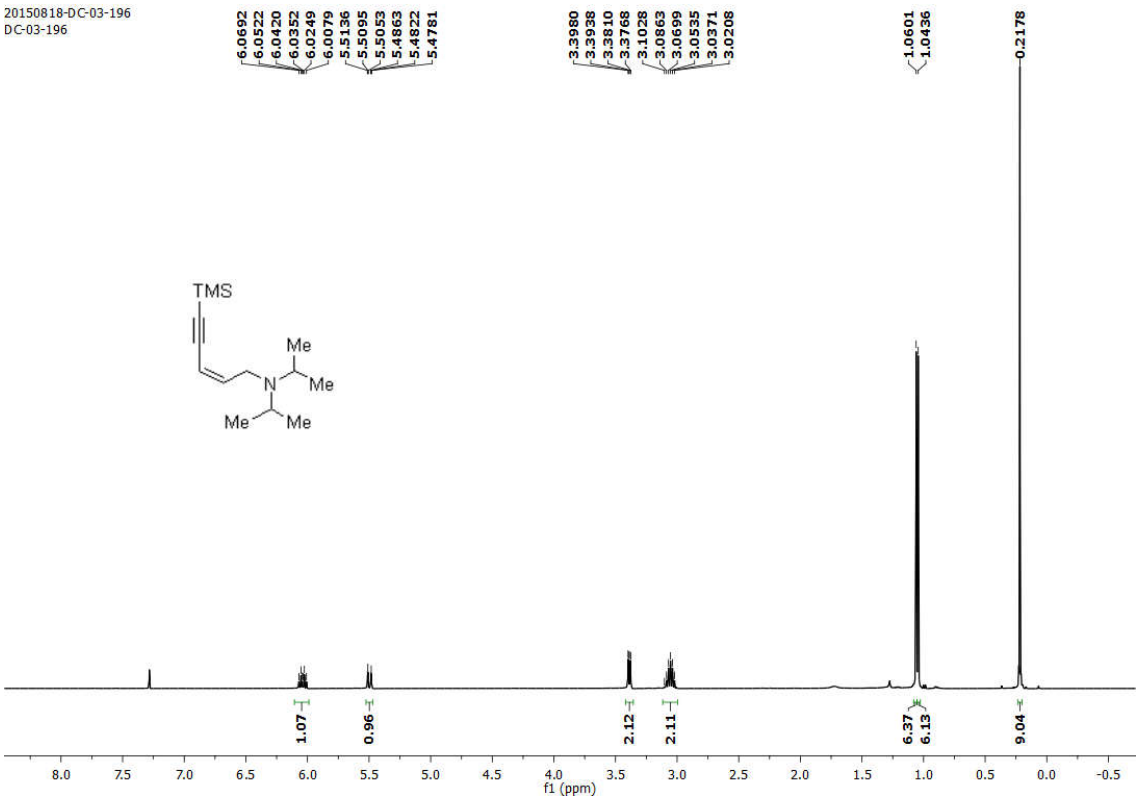

Fig. S7 ^{1}H NMR of **S6** in $CDCl_3$.

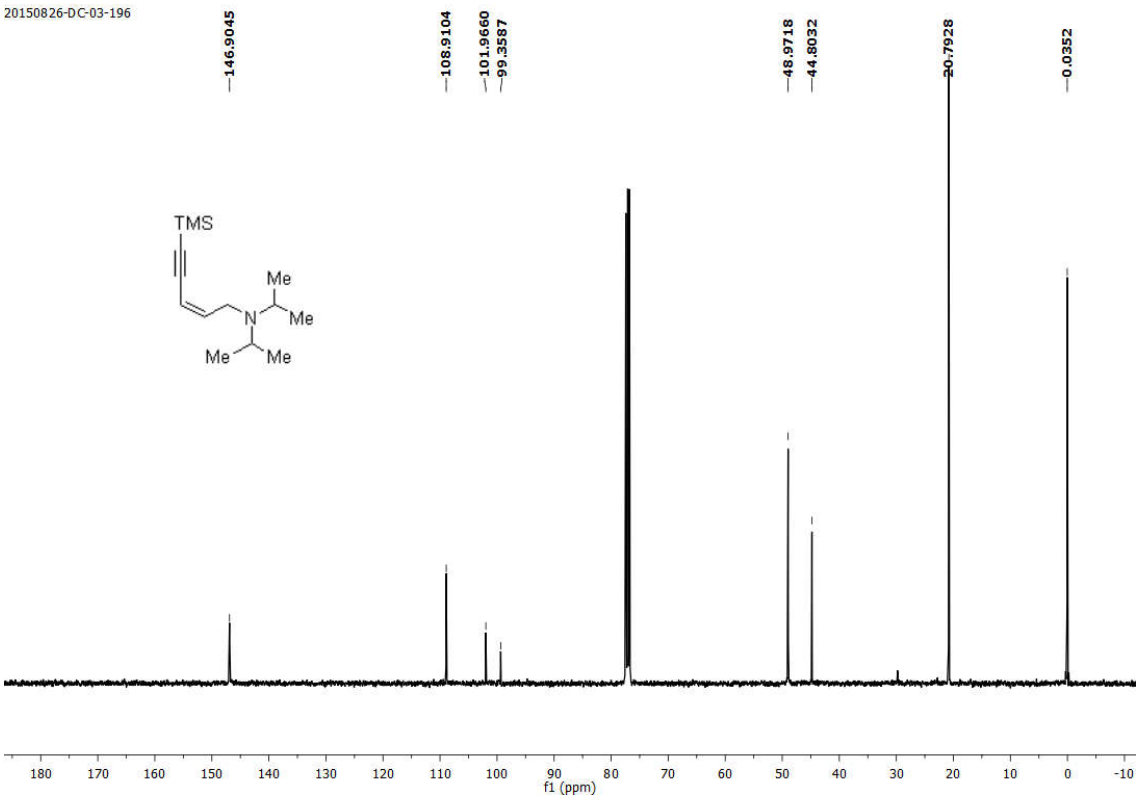

Fig. S8 ^{13}C NMR of **S6** in $CDCl_3$.

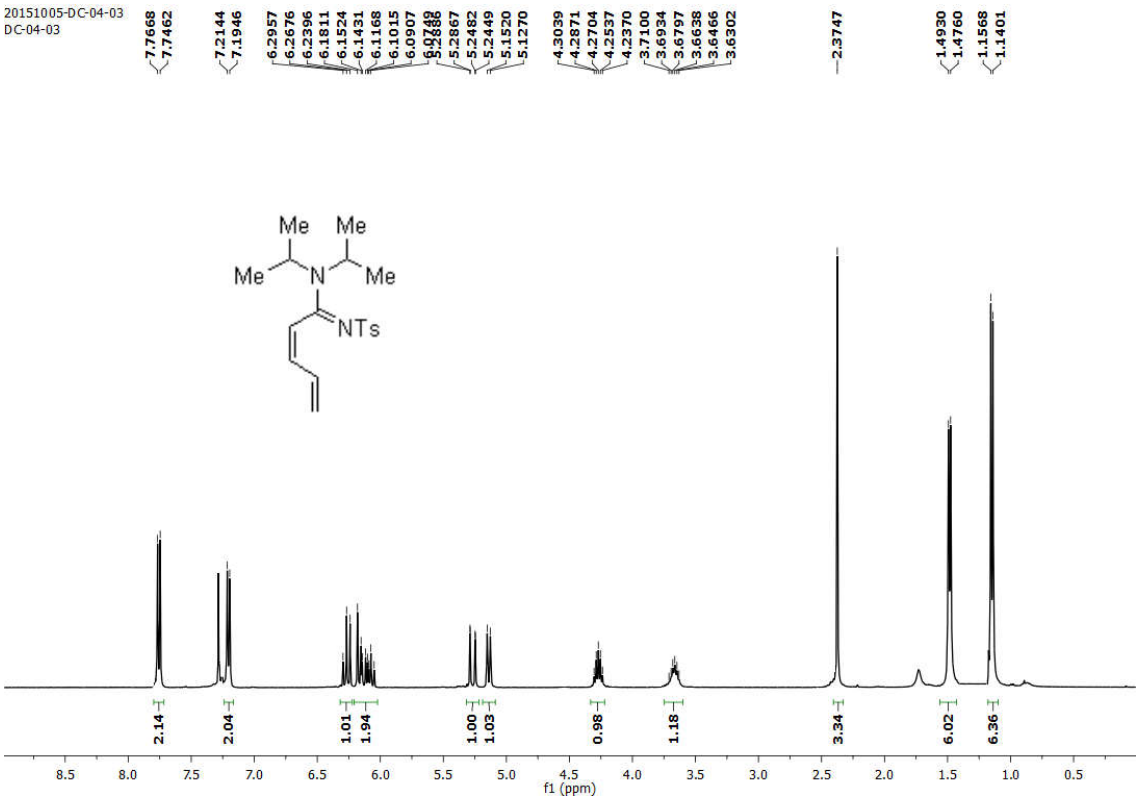

Fig. S9 ^{1}H NMR of **6a** in $CDCl_3$.

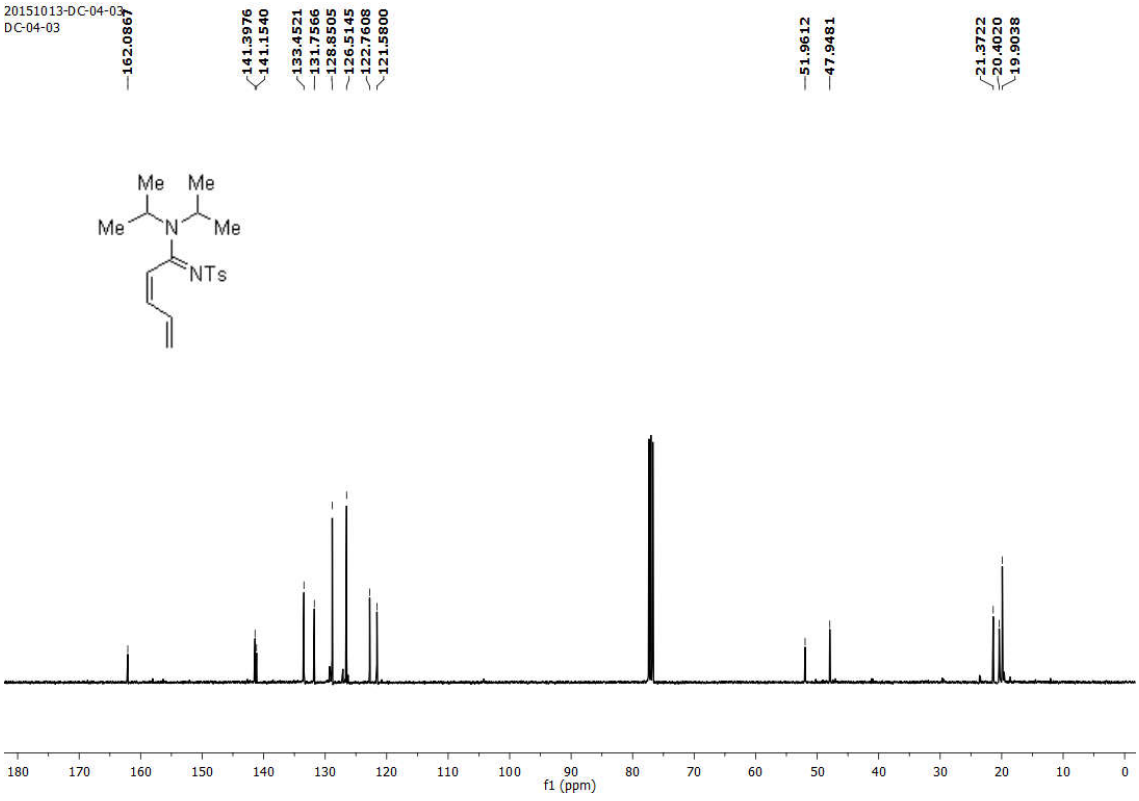

Fig. S10 ^{13}C NMR of **6a** in $CDCl_3$.

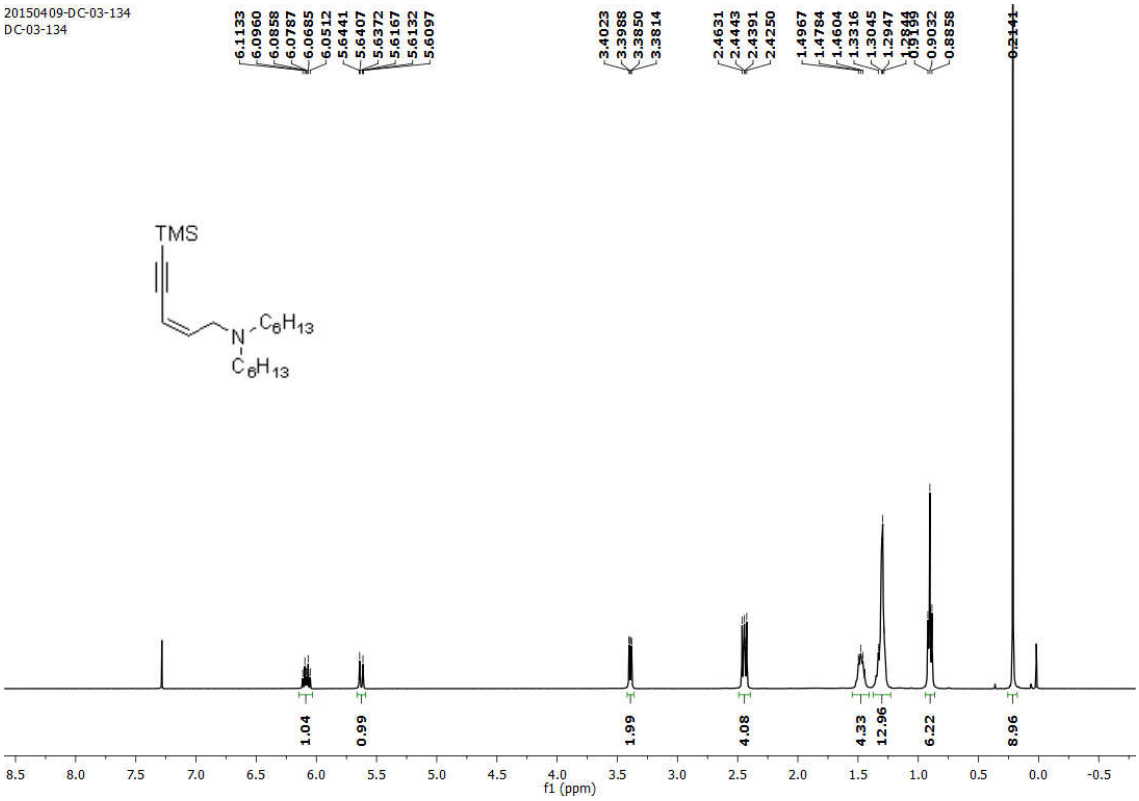

Fig. S11 ^{1}H NMR of **S7** in $CDCl_3$.

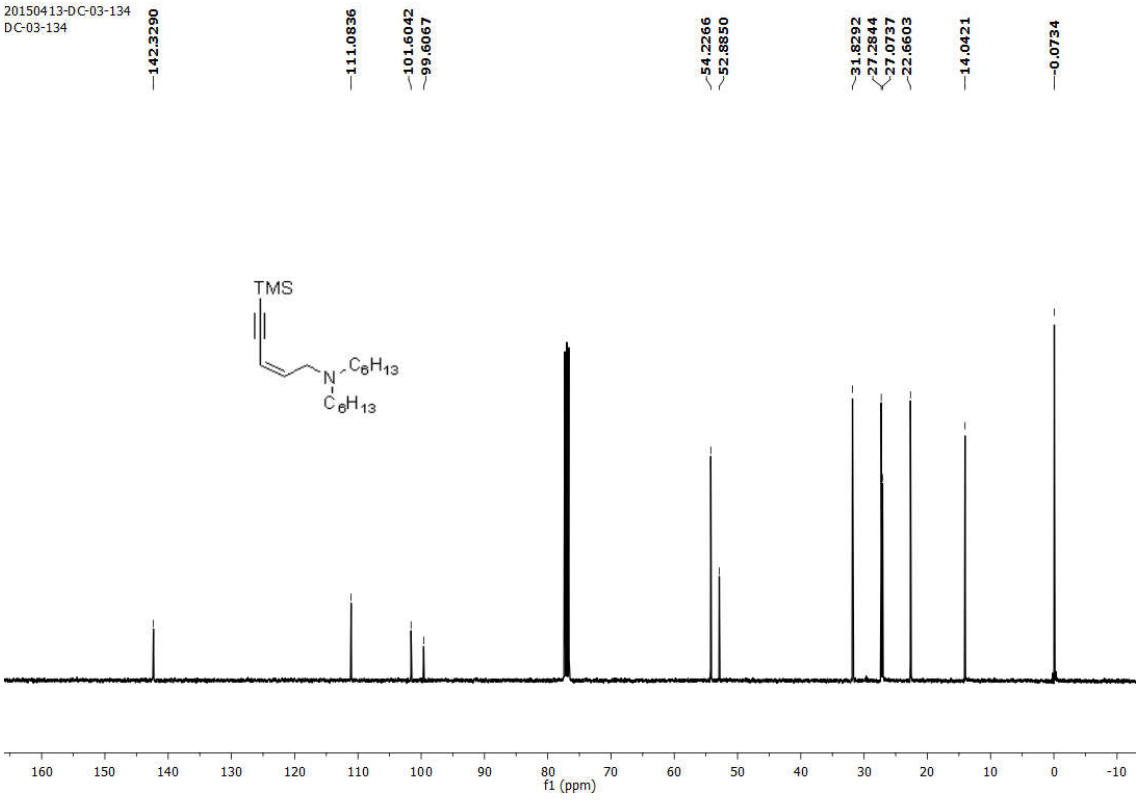

Fig. S12 ^{13}C NMR of **S7** in $CDCl_3$.

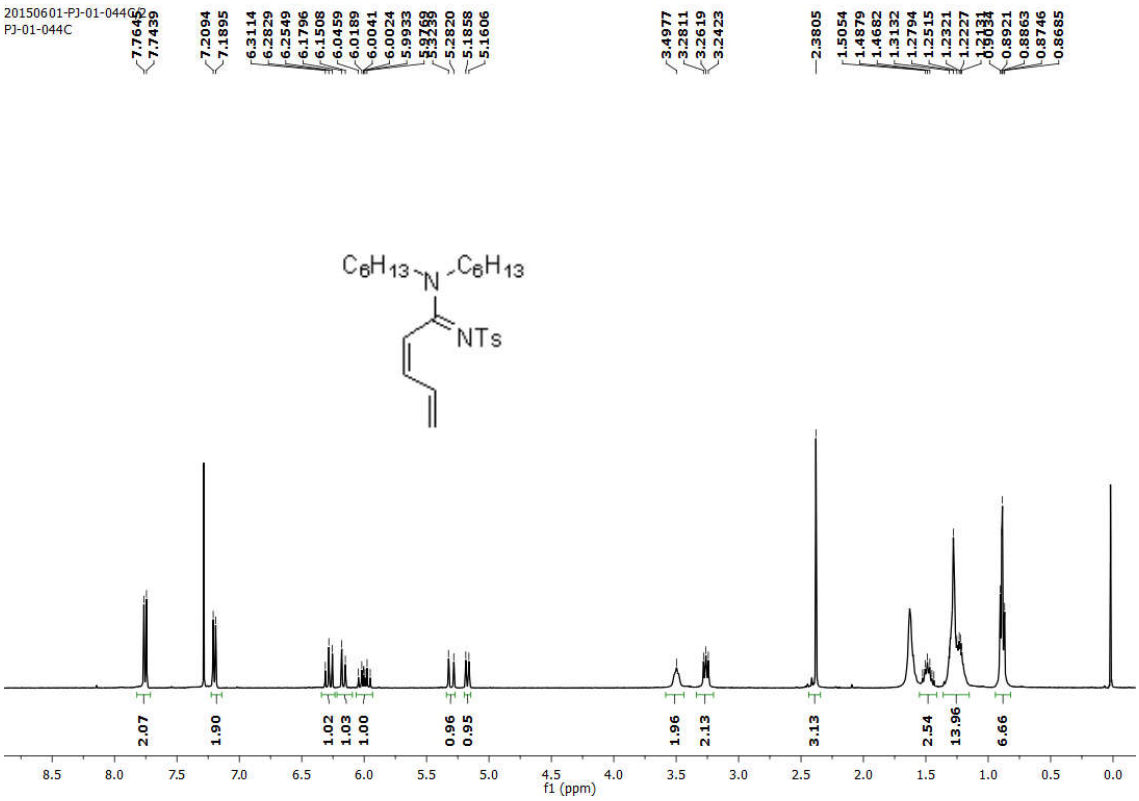

Fig. S13 ^{1}H NMR of **7a** in $CDCl_3$.

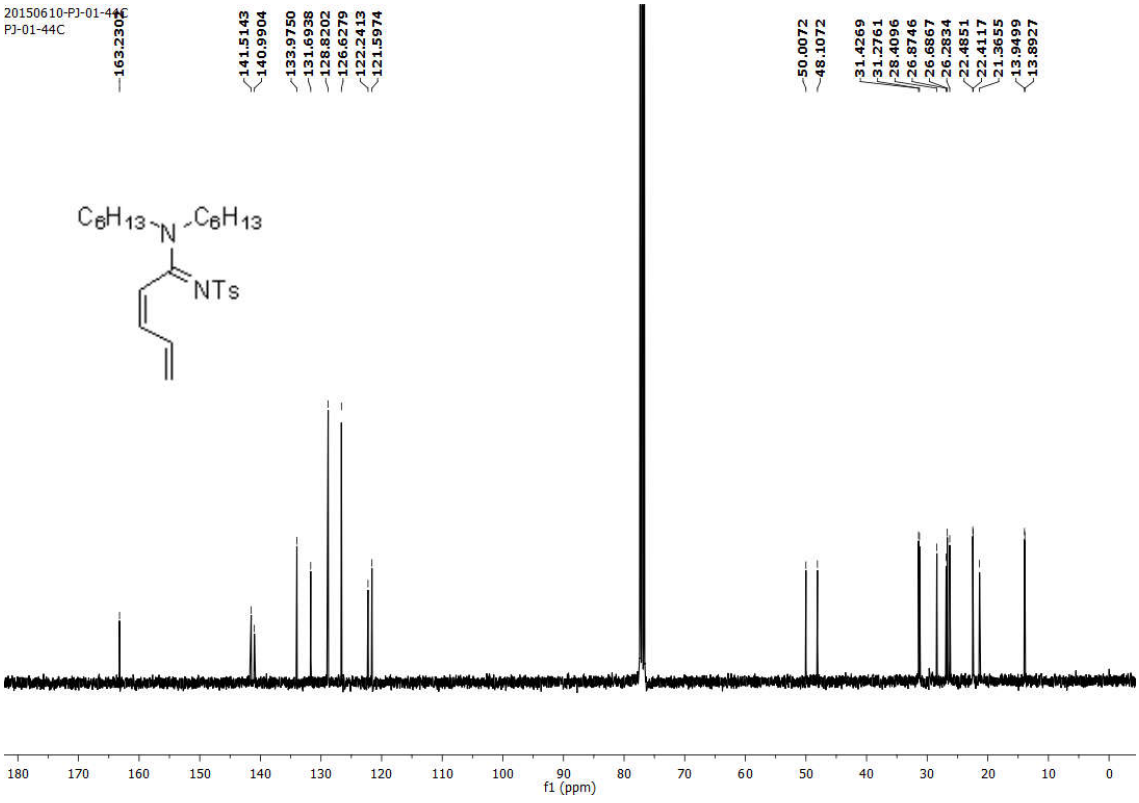

Fig. S14 ^{13}C NMR of **7a** in $CDCl_3$.

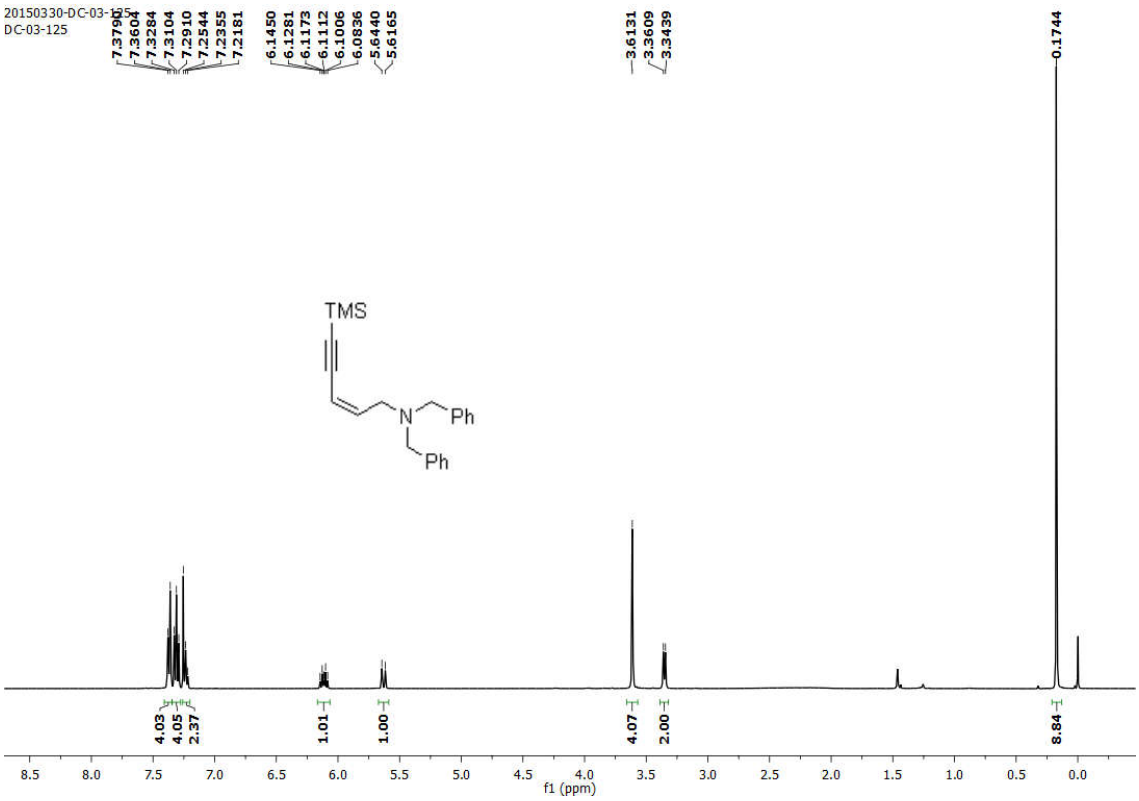

Fig. S15 ^{1}H NMR of **S8** in $CDCl_3$.

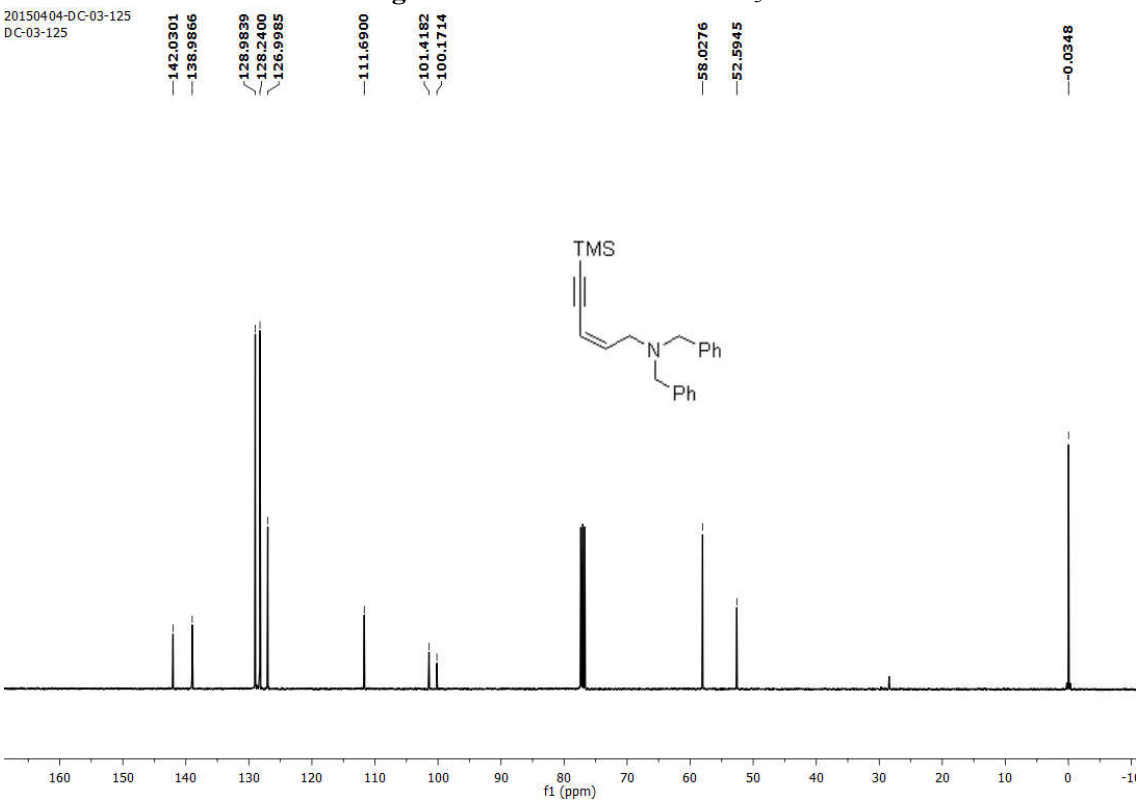

Fig. S16 ^{13}C NMR of **S8** in $CDCl_3$.

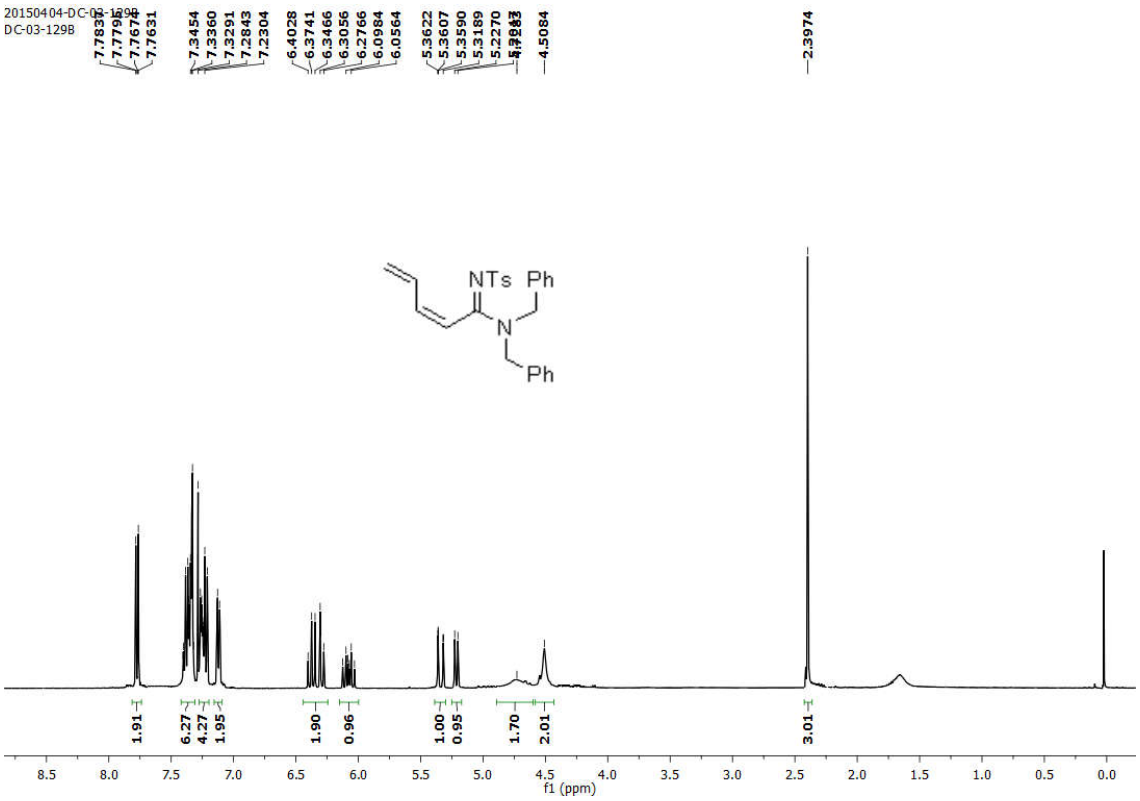

Fig. S17 ^{1}H NMR of **9a** in $CDCl_3$.

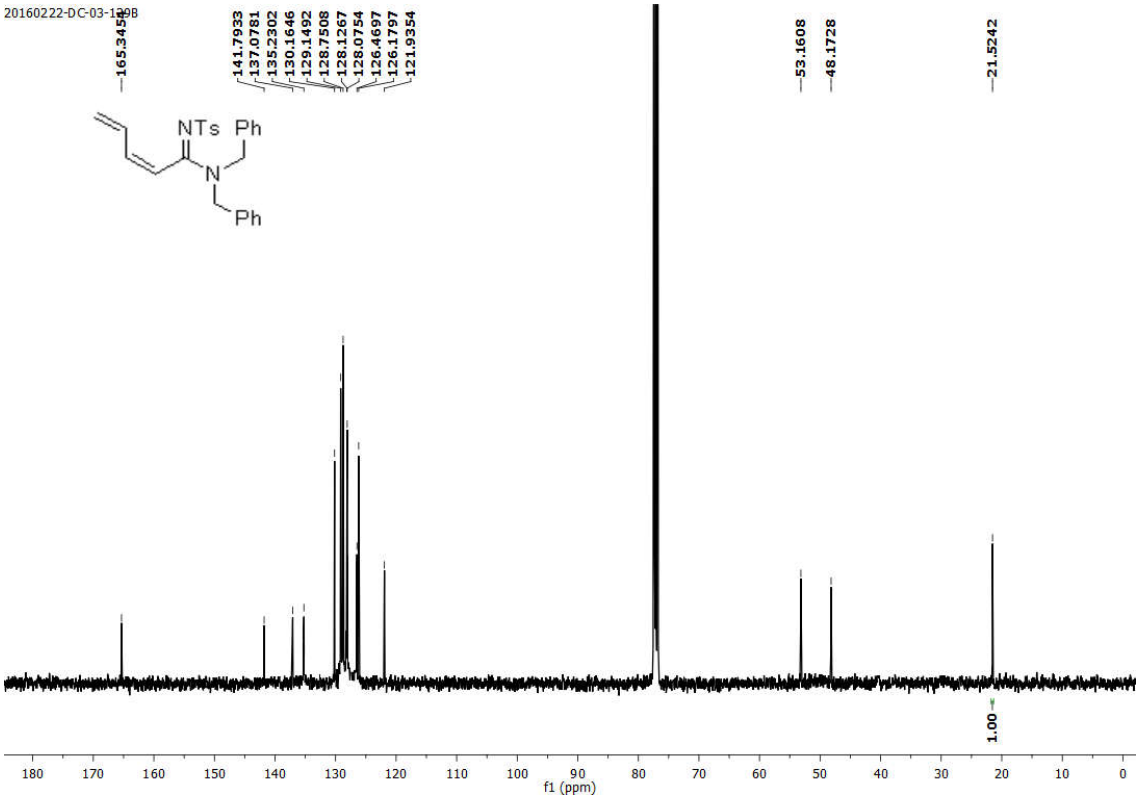

Fig. S18 ^{13}C NMR of **9a** in $CDCl_3$.

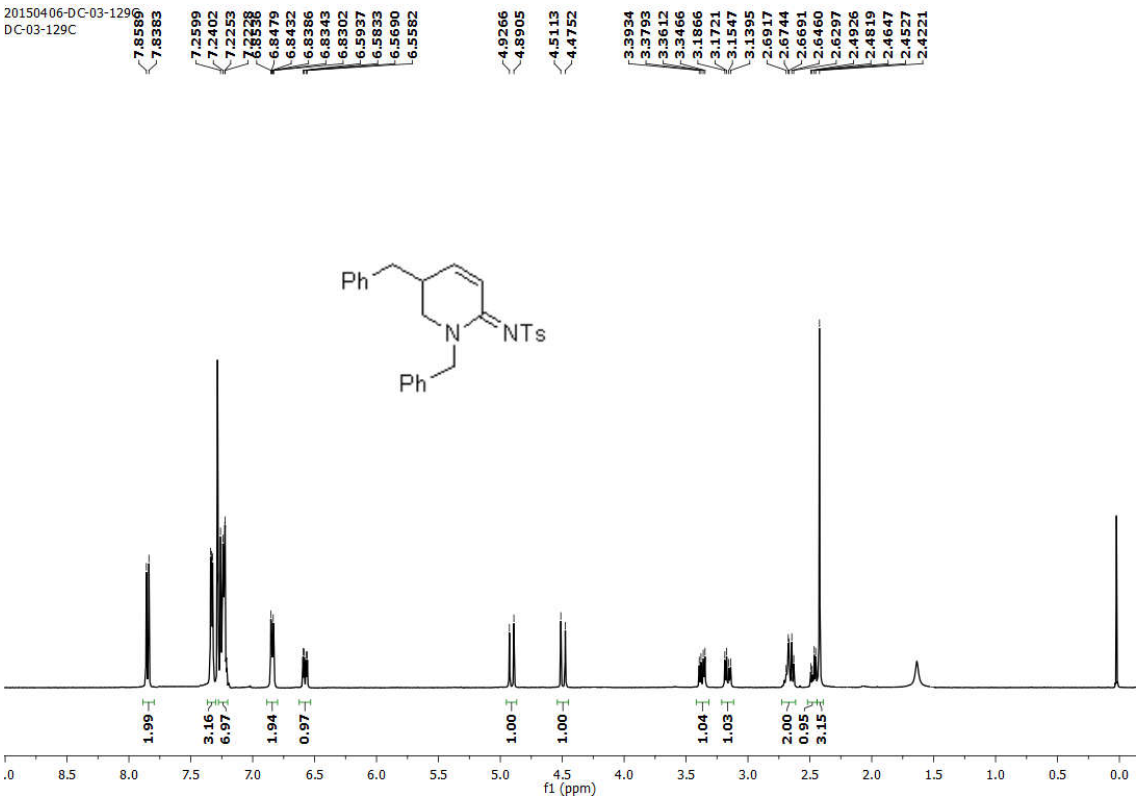

Fig. S19 ^{1}H NMR of **9b** in $CDCl_3$.

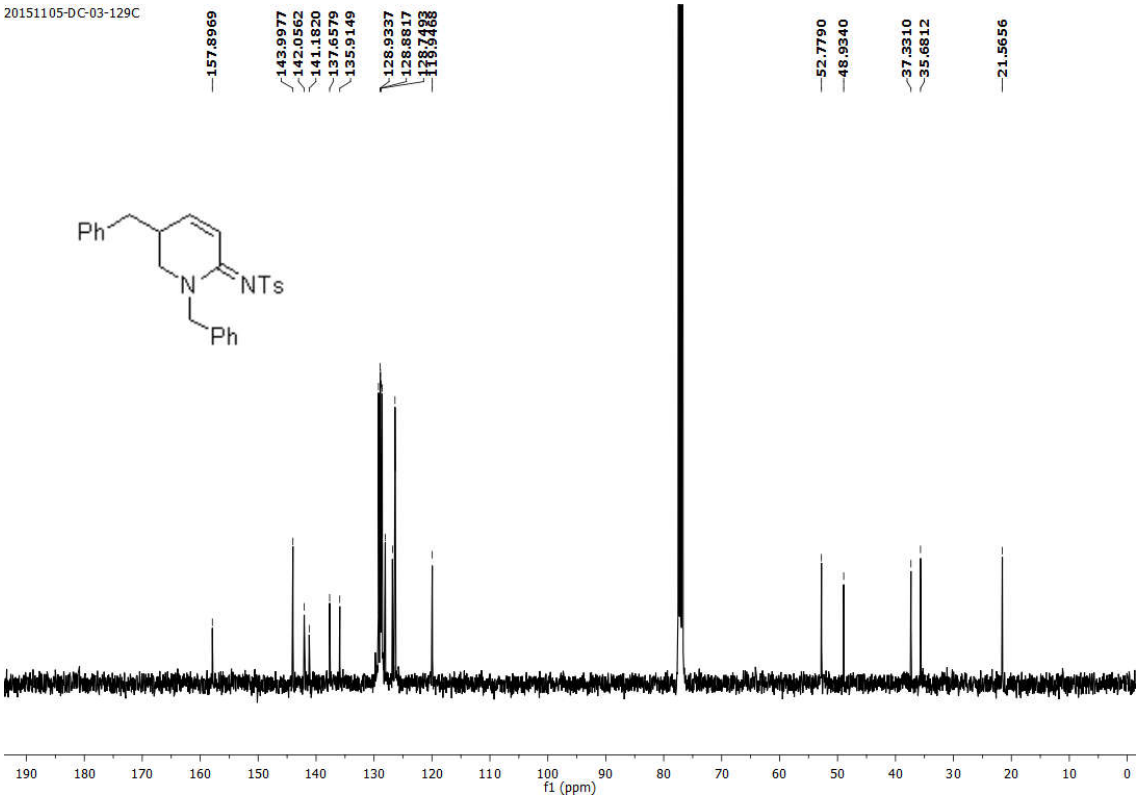

Fig. S20 ^{13}C NMR of **9b** in $CDCl_3$.

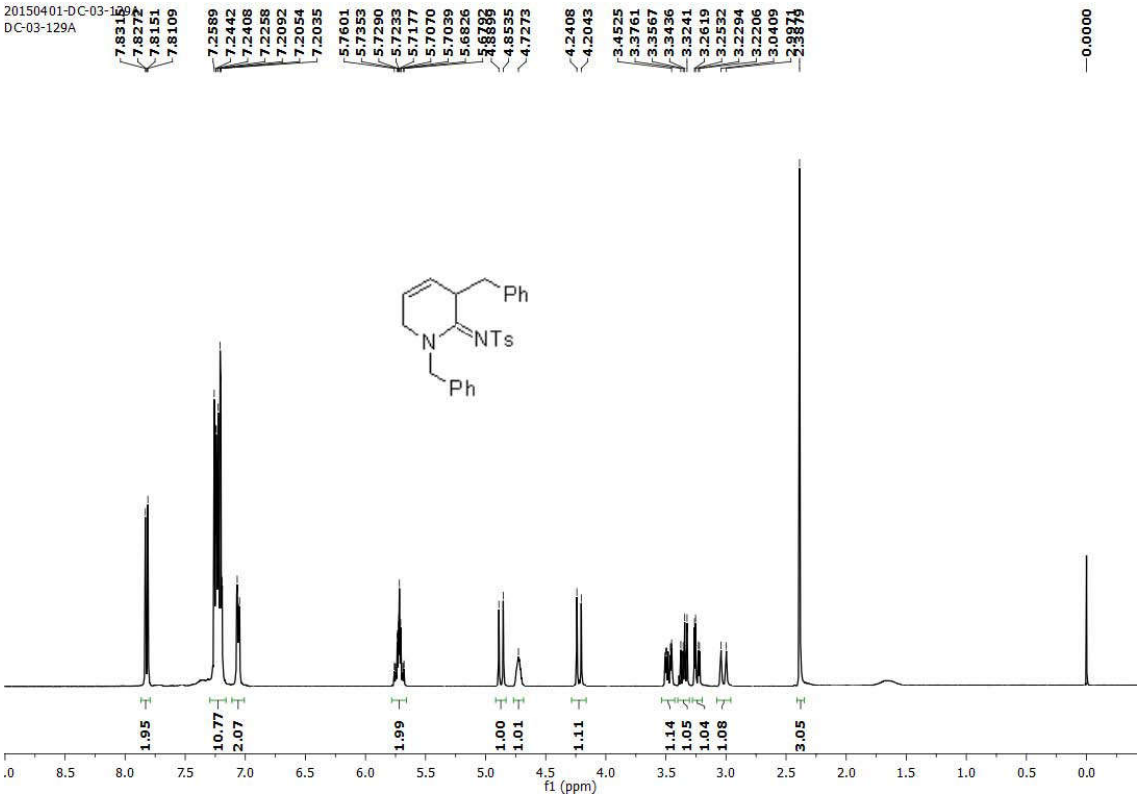

Fig. S21 ^{1}H NMR of **9c** in $CDCl_3$.

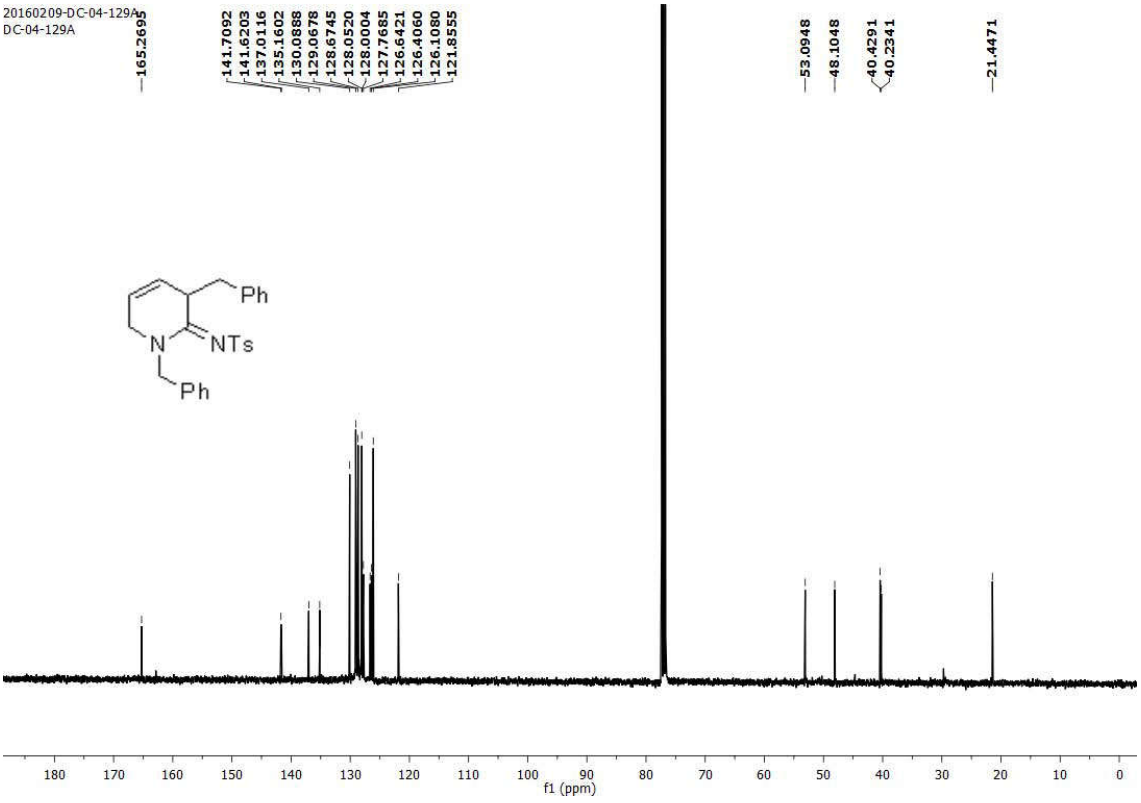

Fig. S22 ^{13}C NMR of **9c** in $CDCl_3$.

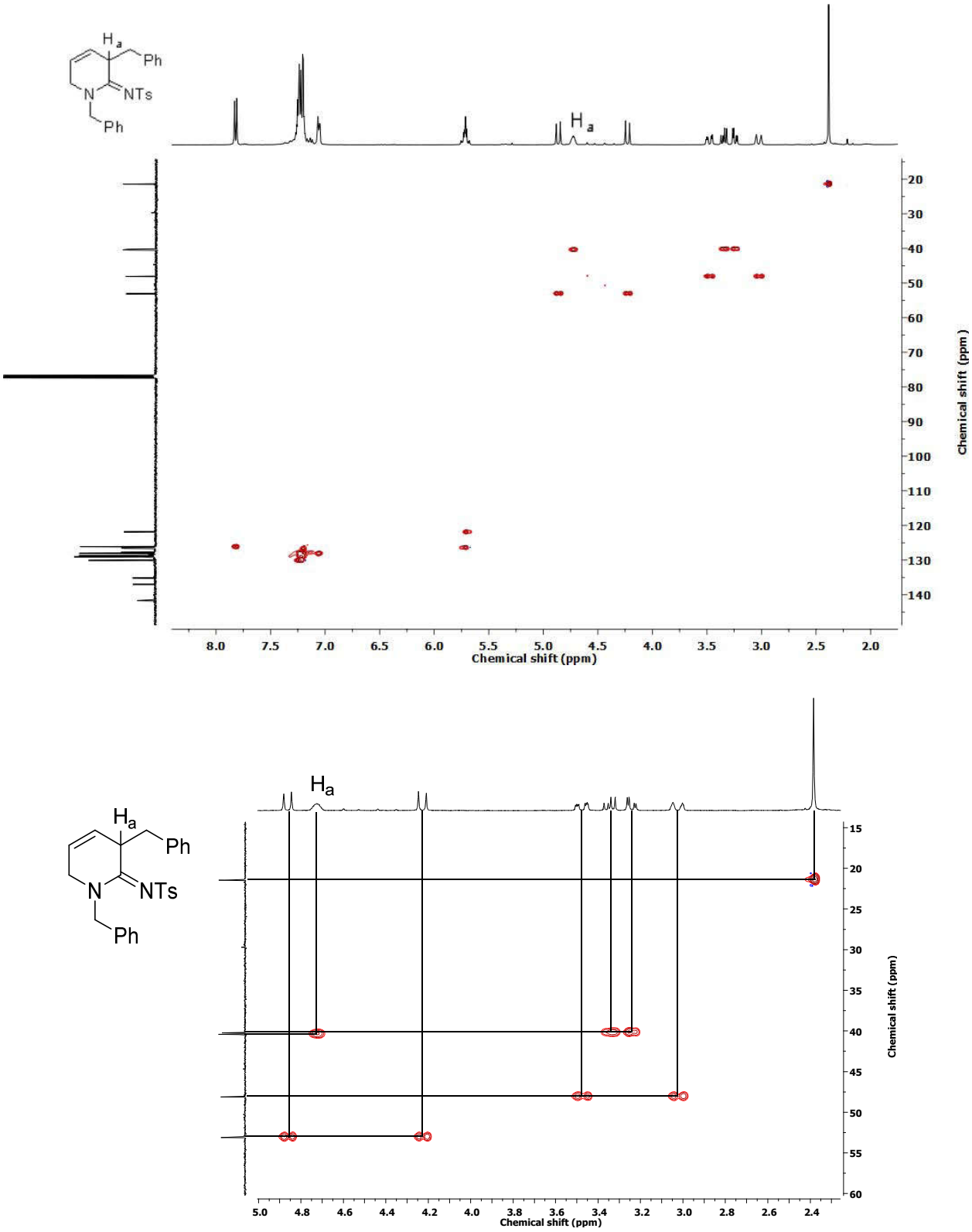

Fig. S23 Hetcor NMR spectrum of **9c** in $CDCl_3$.

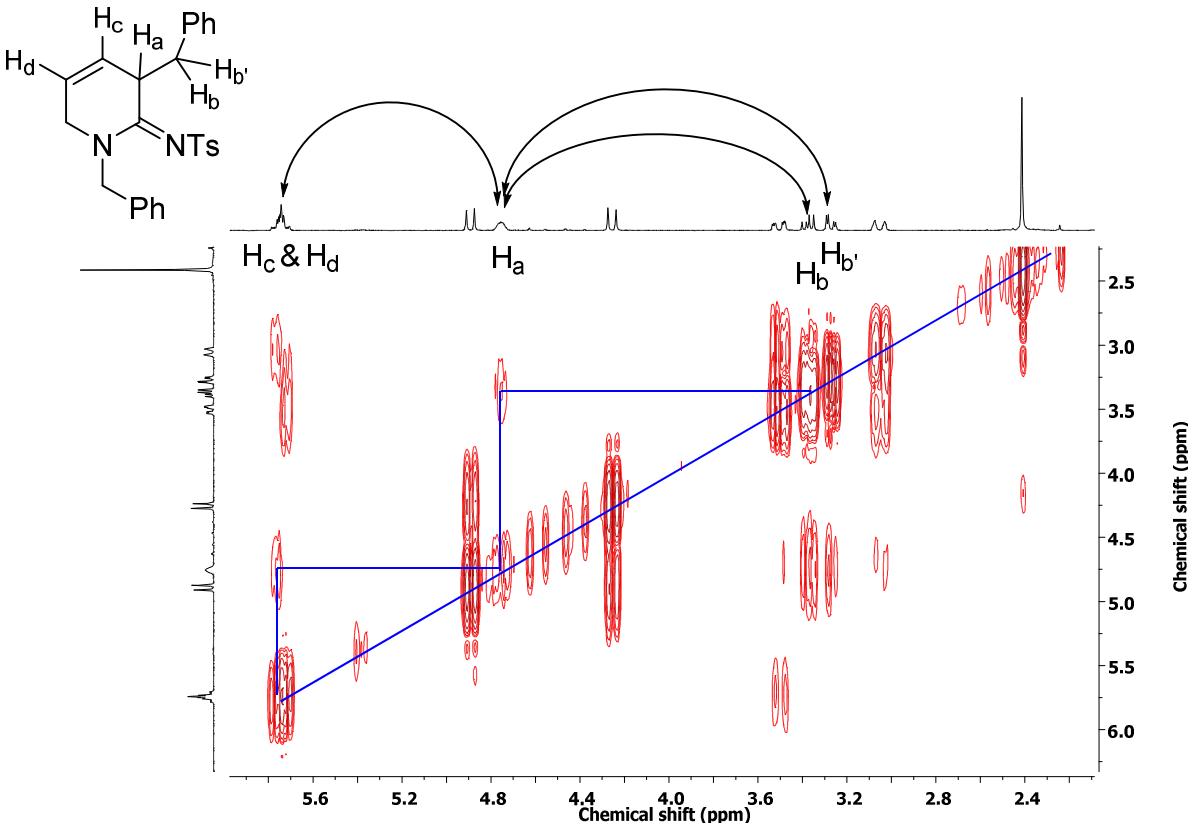

Fig. S24 COSY NMR spectrum of **9c** in $CDCl_3$.

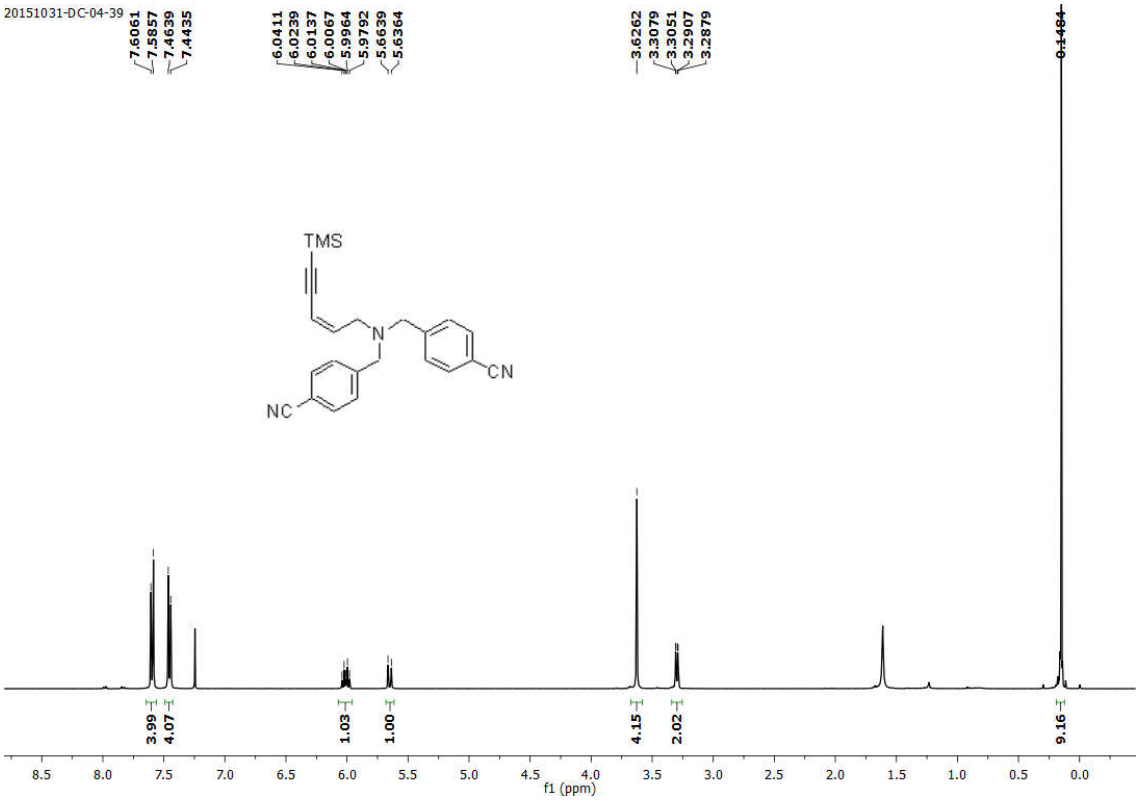

Fig. S25 ^{1}H NMR of **S9** in $CDCl_3$.

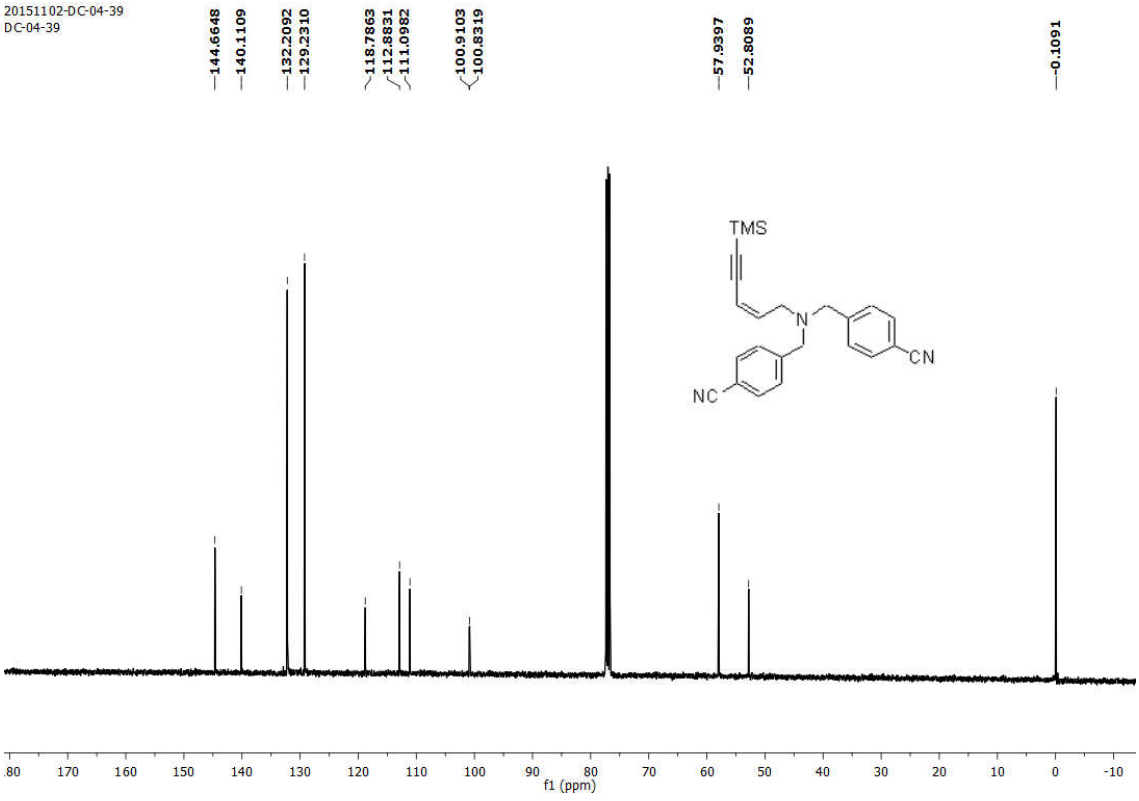

Fig. S26 ^{13}C NMR of **S9** in $CDCl_3$.

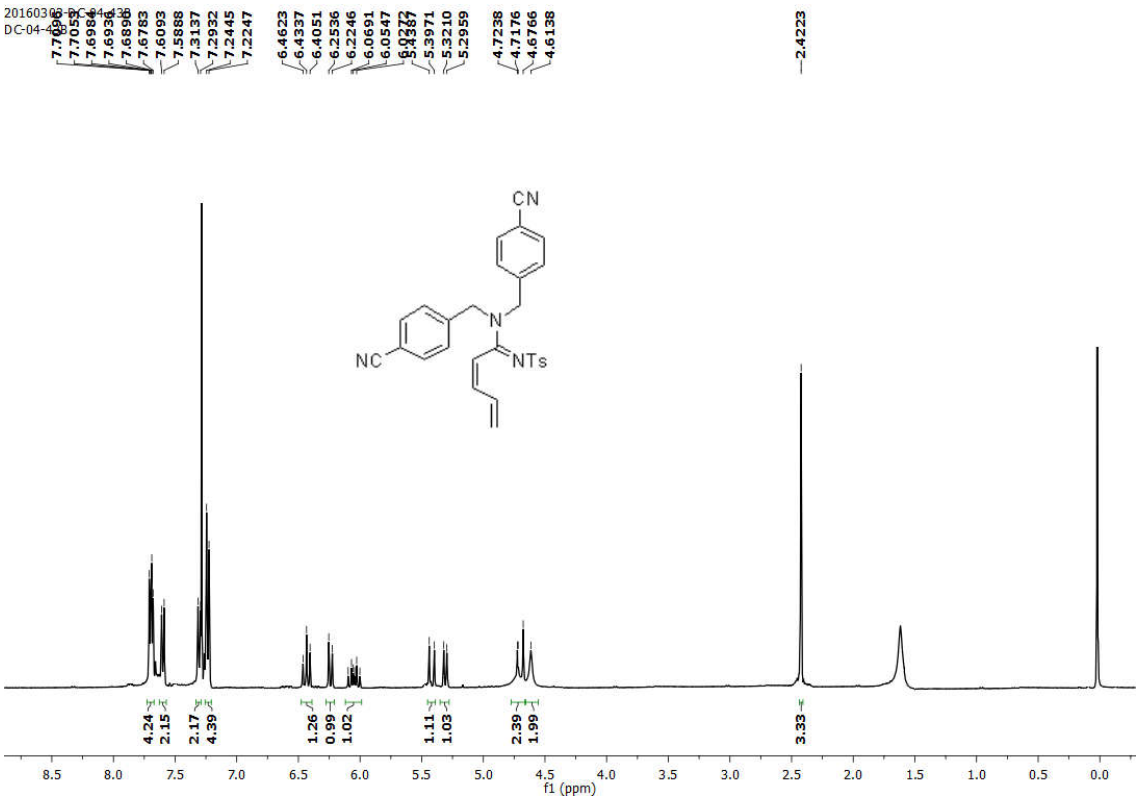

Fig. S27 ^{1}H NMR of **13a** in $CDCl_3$.

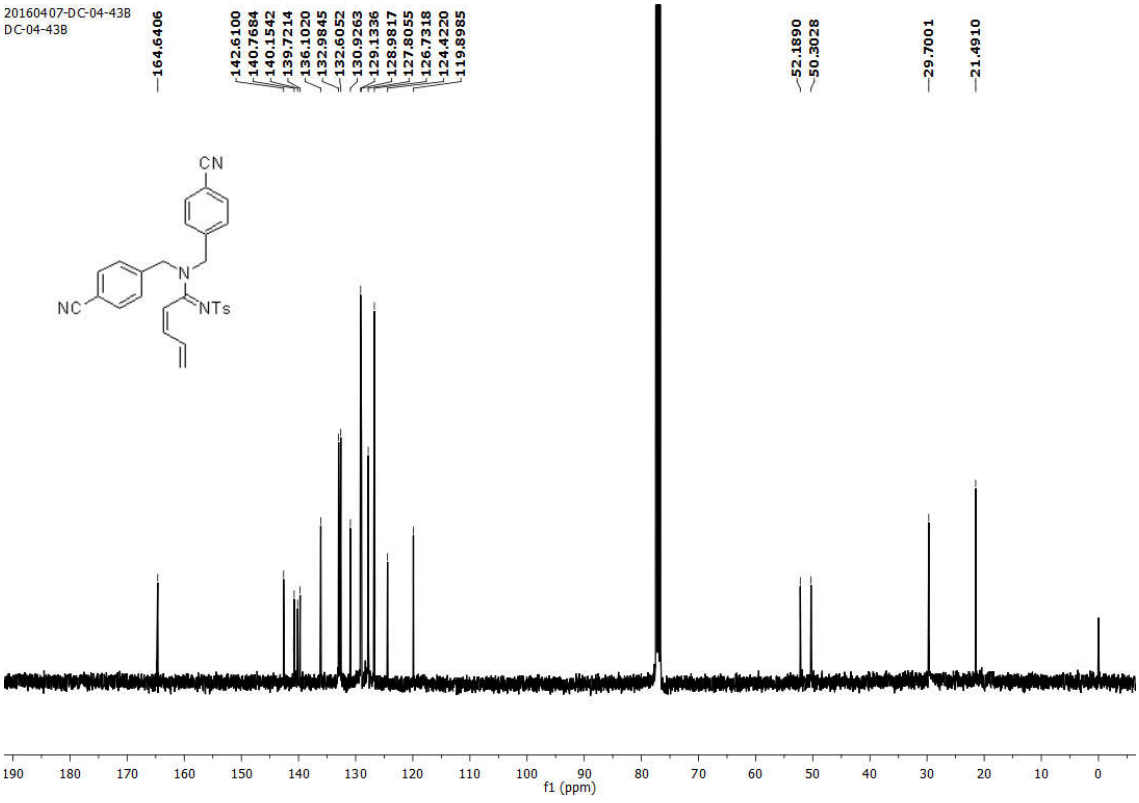

Fig. S28 ^{13}C NMR of **13a** in $CDCl_3$.

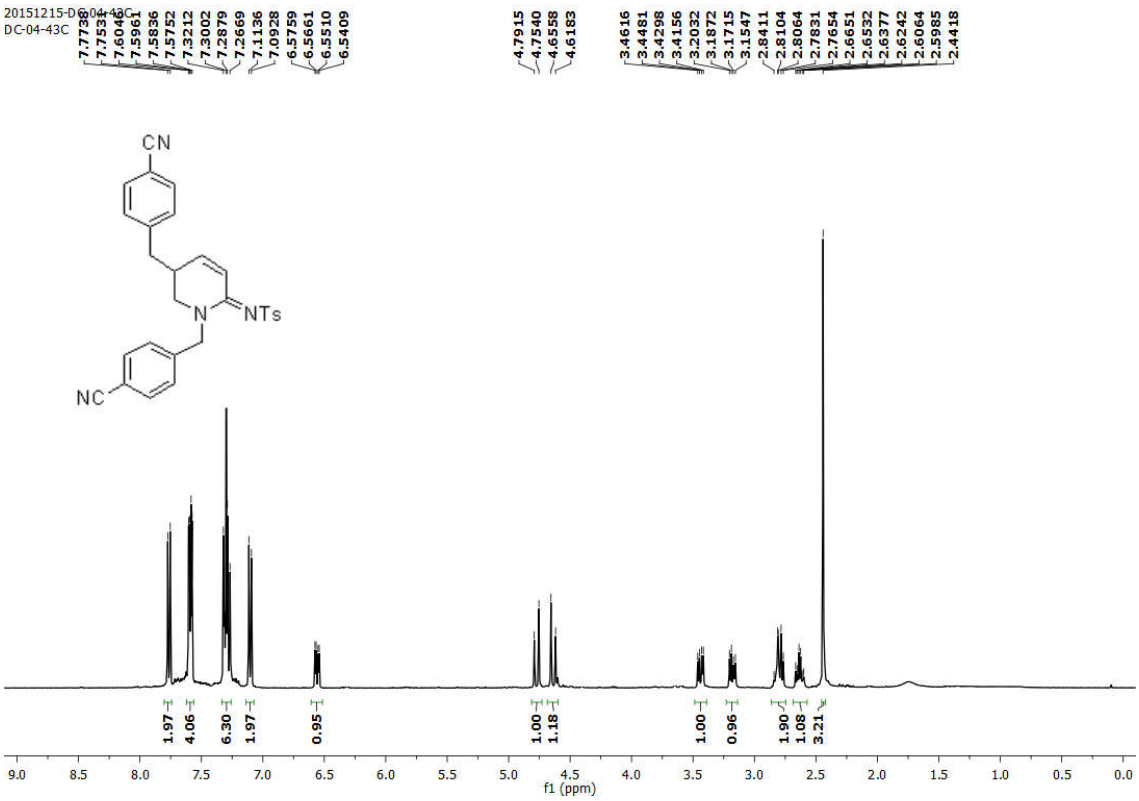

Fig. S29 ^{1}H NMR of **13b** in $CDCl_3$.

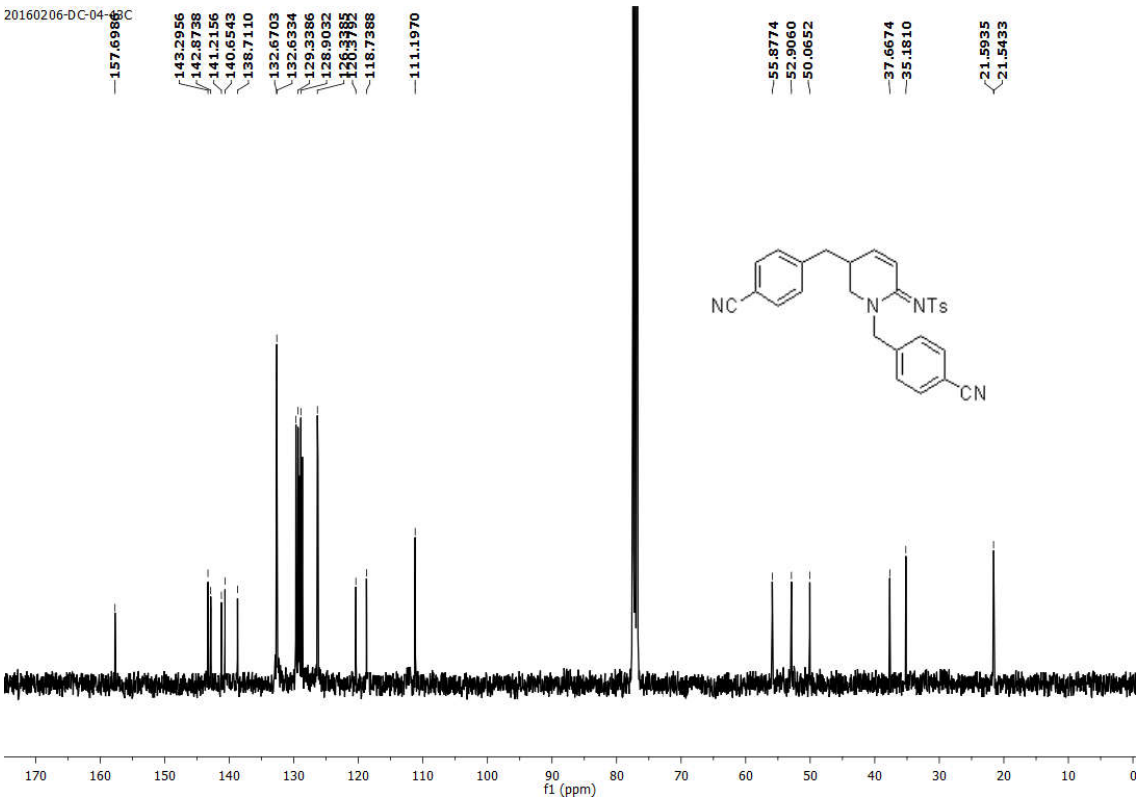

Fig. S30 ^{13}C NMR of **13b** in $CDCl_3$.

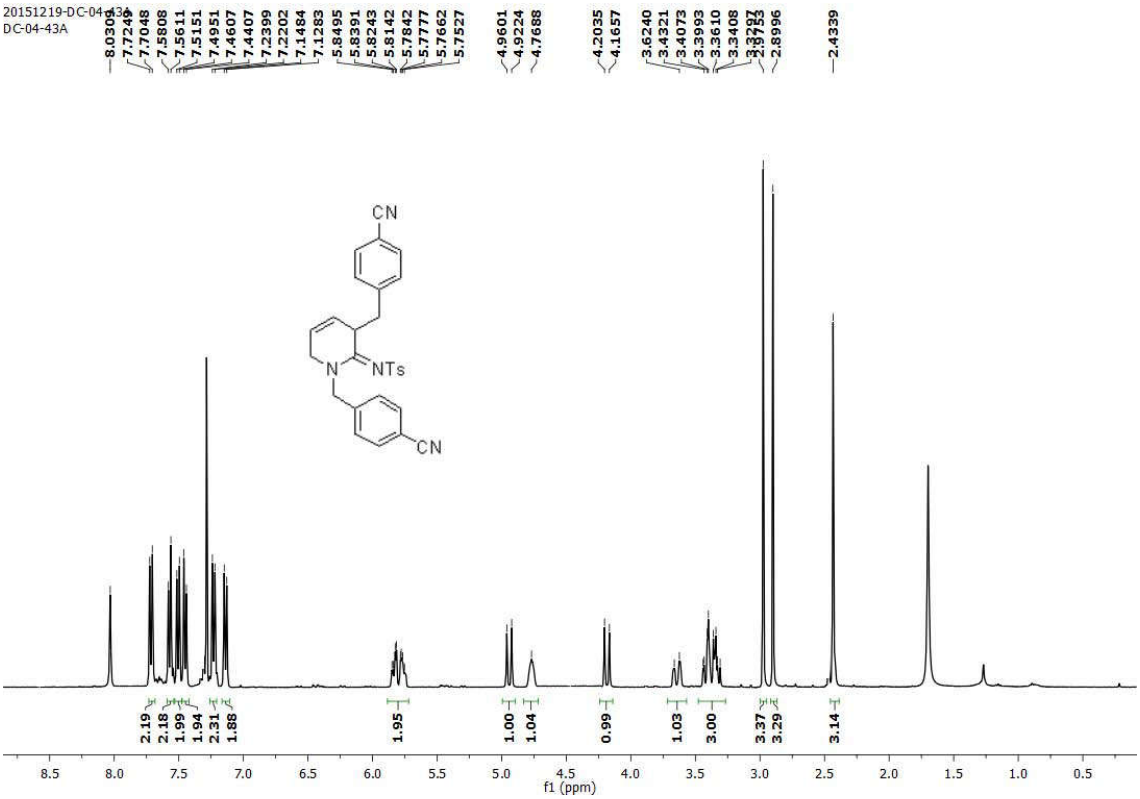

Fig. S31 ^{1}H NMR of **13c** in $CDCl_3$.

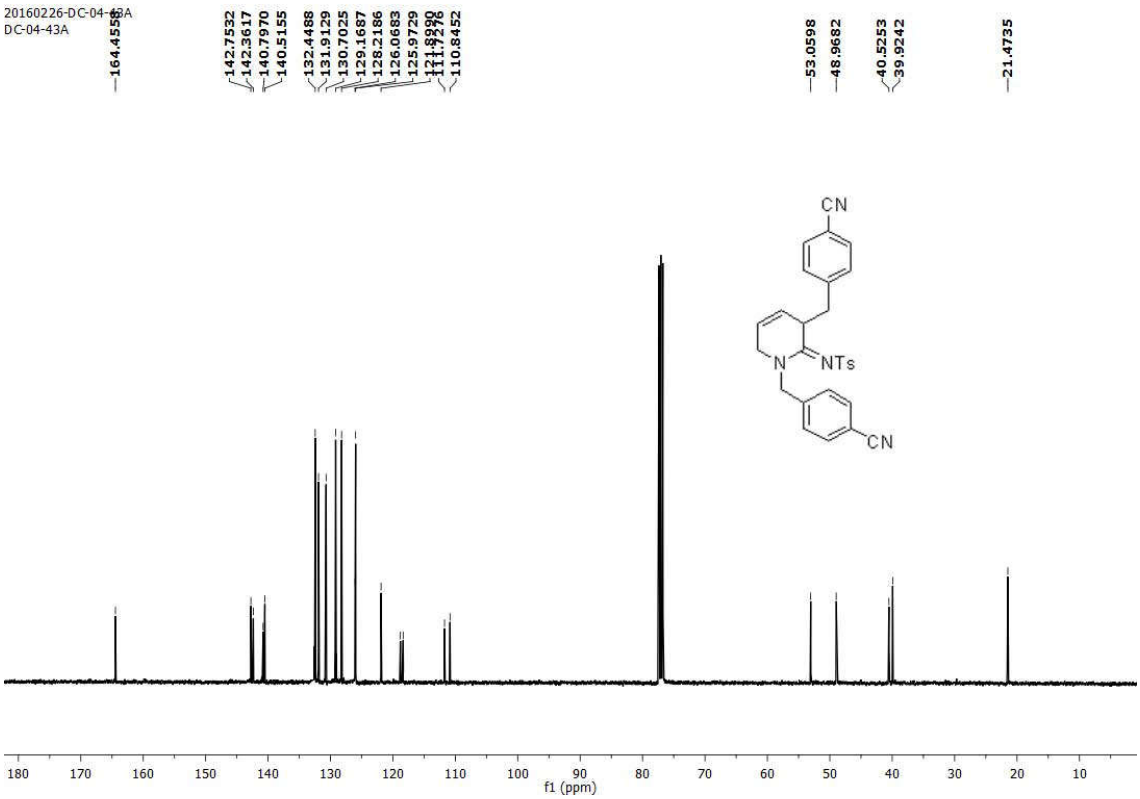

Fig. S32 ^{13}C NMR of **13c** in $CDCl_3$.

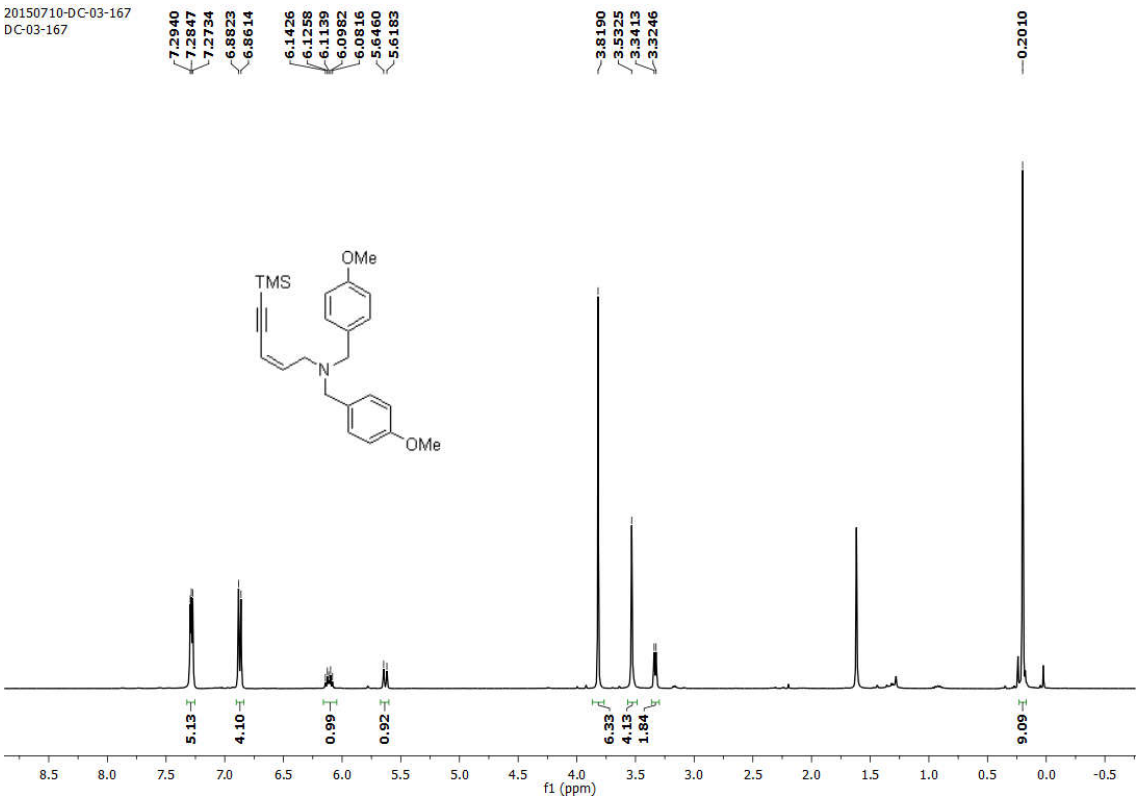

Fig. S33 ^{1}H NMR of **S10** in $CDCl_3$.

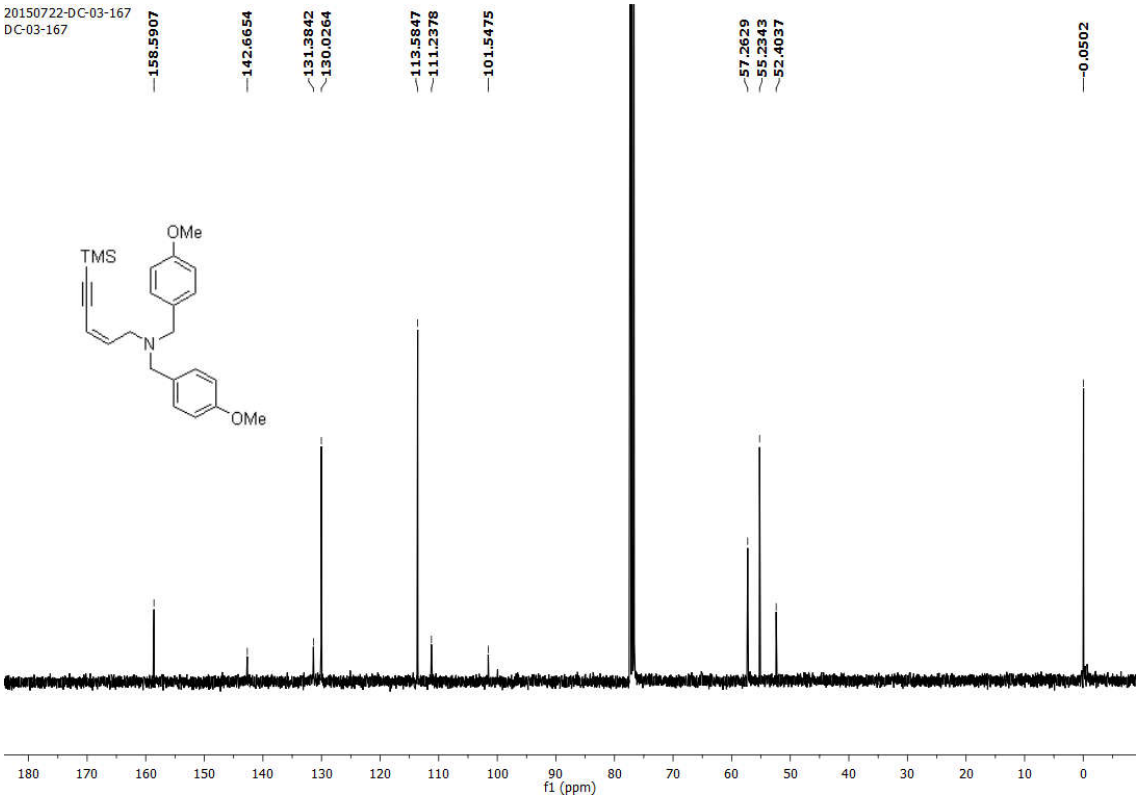

Fig. S34 ^{13}C NMR of **S10** in $CDCl_3$.

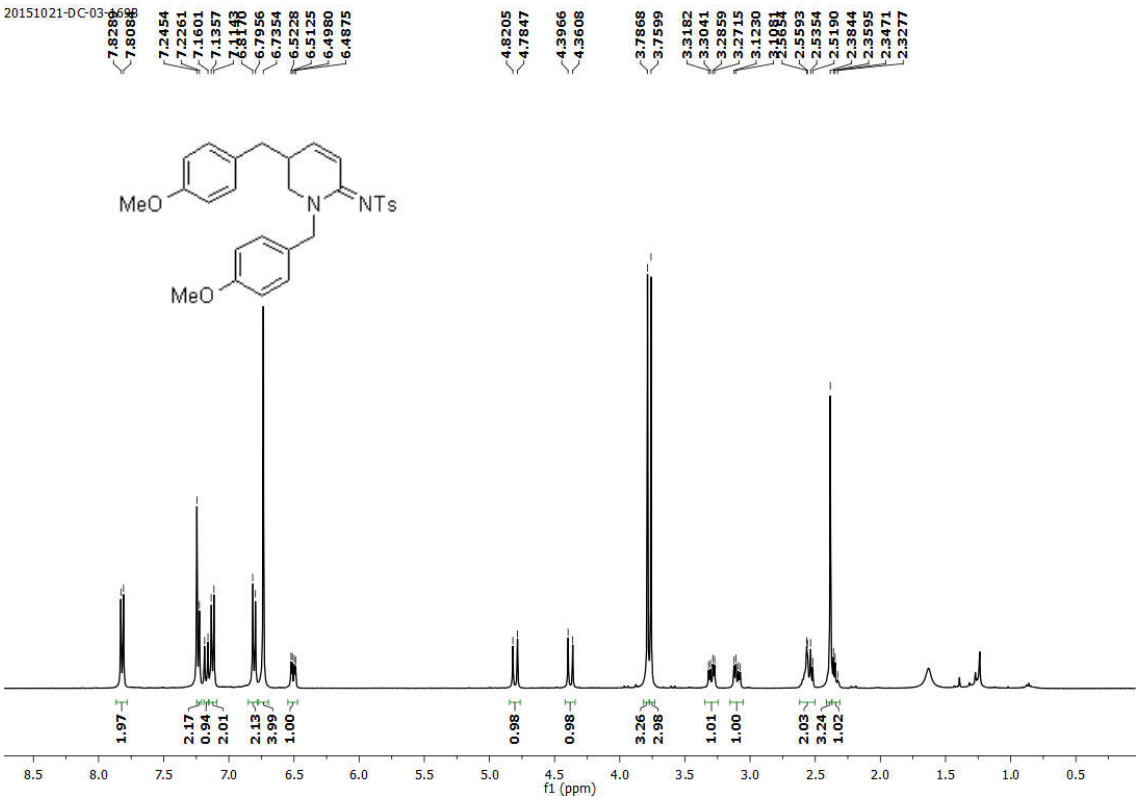

Fig. S35 ^{1}H NMR of **17b** in $CDCl_3$.

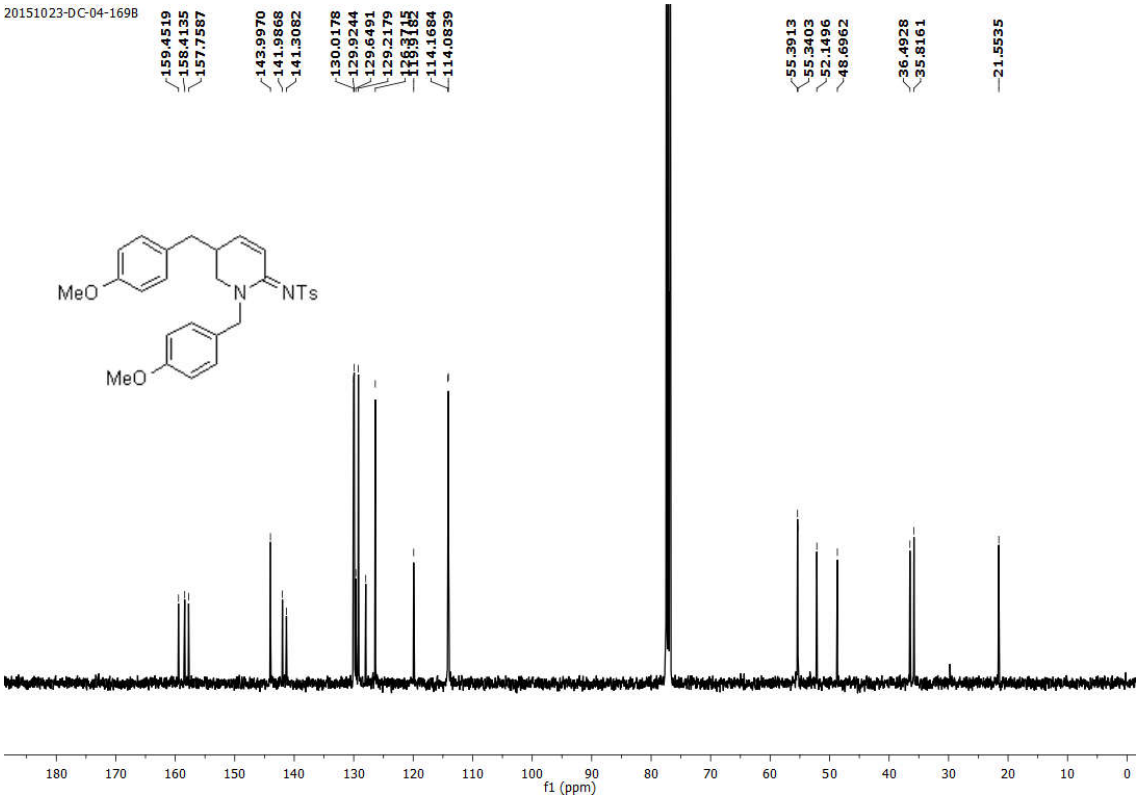

Fig. S36 ^{13}C NMR of **17b** in $CDCl_3$.

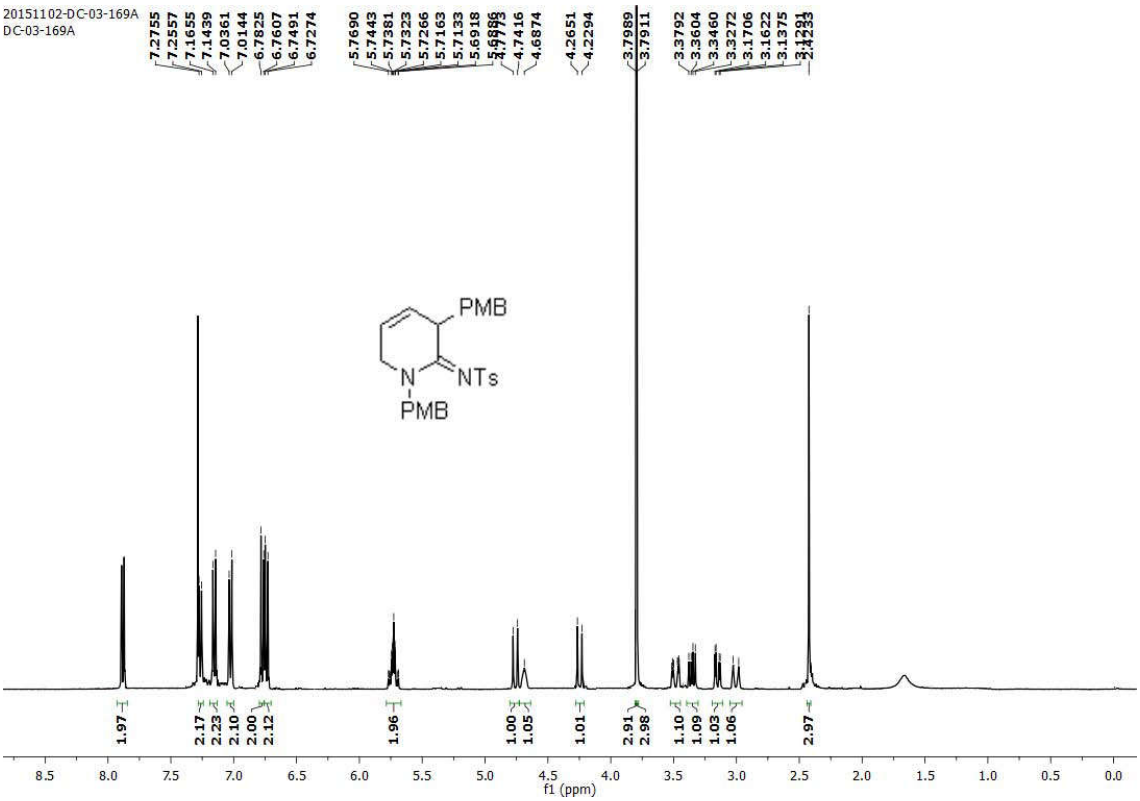

Fig. S37 ^{1}H NMR of **17c** in $CDCl_3$.

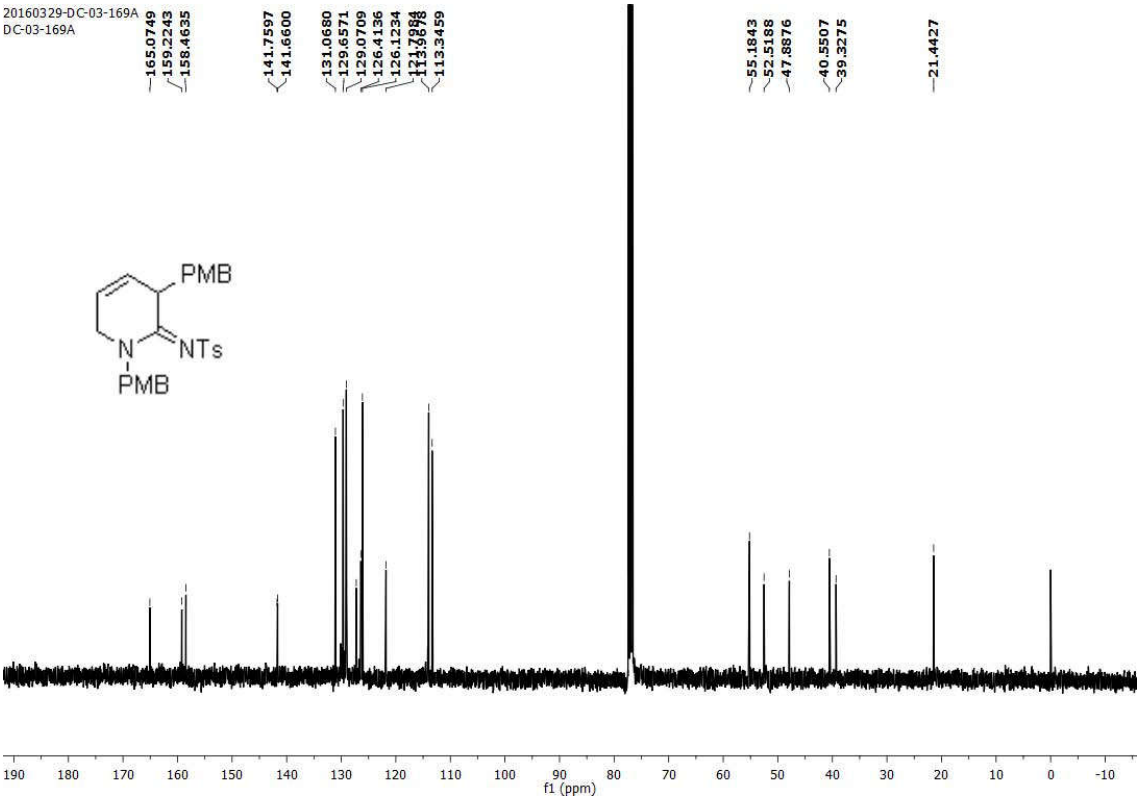

Fig. S38 ^{13}C NMR of **17c** in $CDCl_3$.

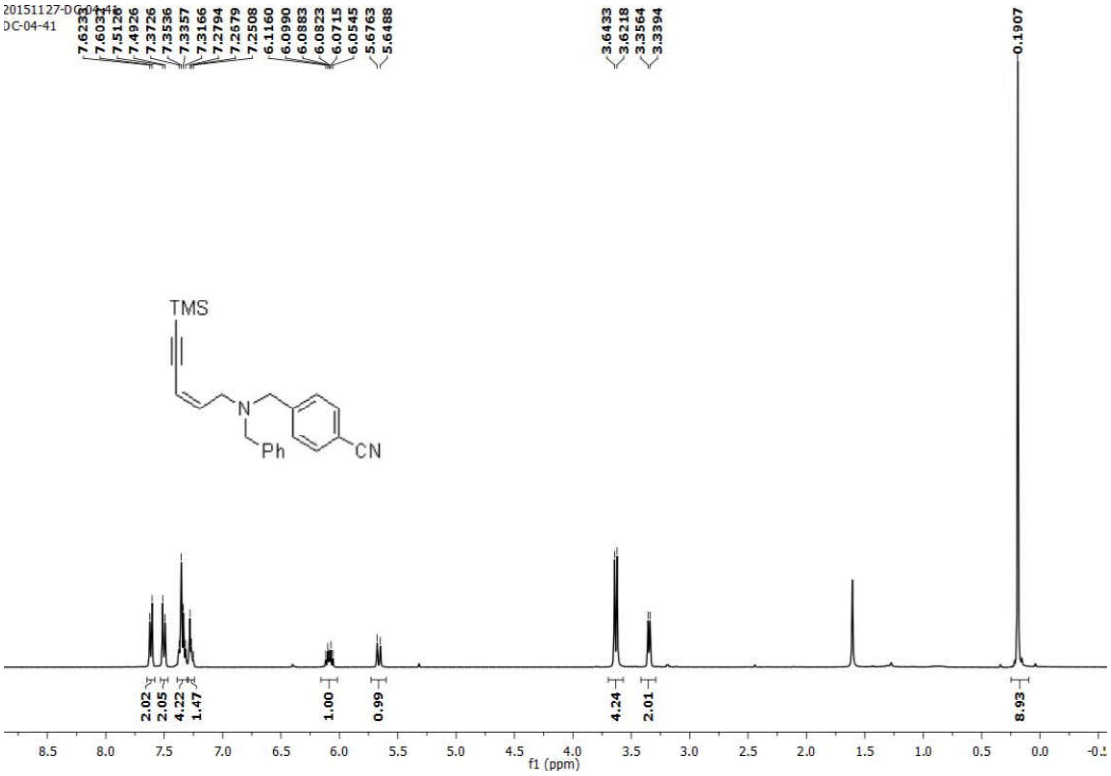

Fig. S39 ^{1}H NMR of **S11** in $CDCl_3$.

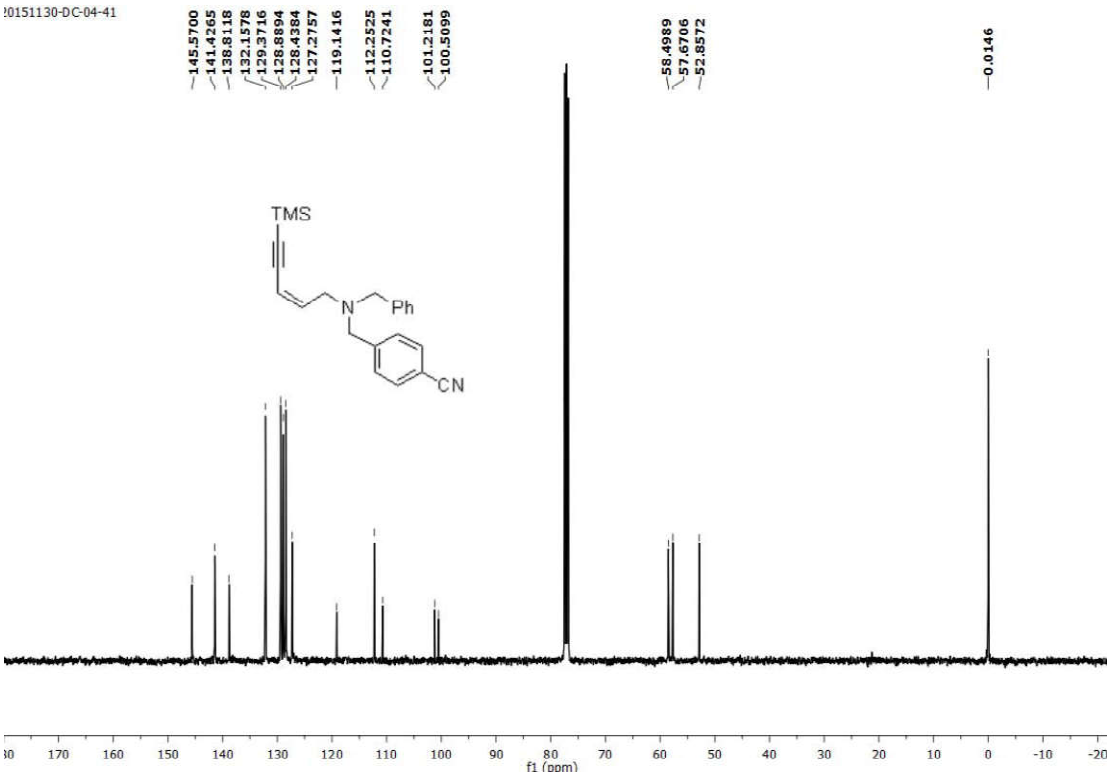

Fig. S40 ^{13}C NMR of **S11** in $CDCl_3$.

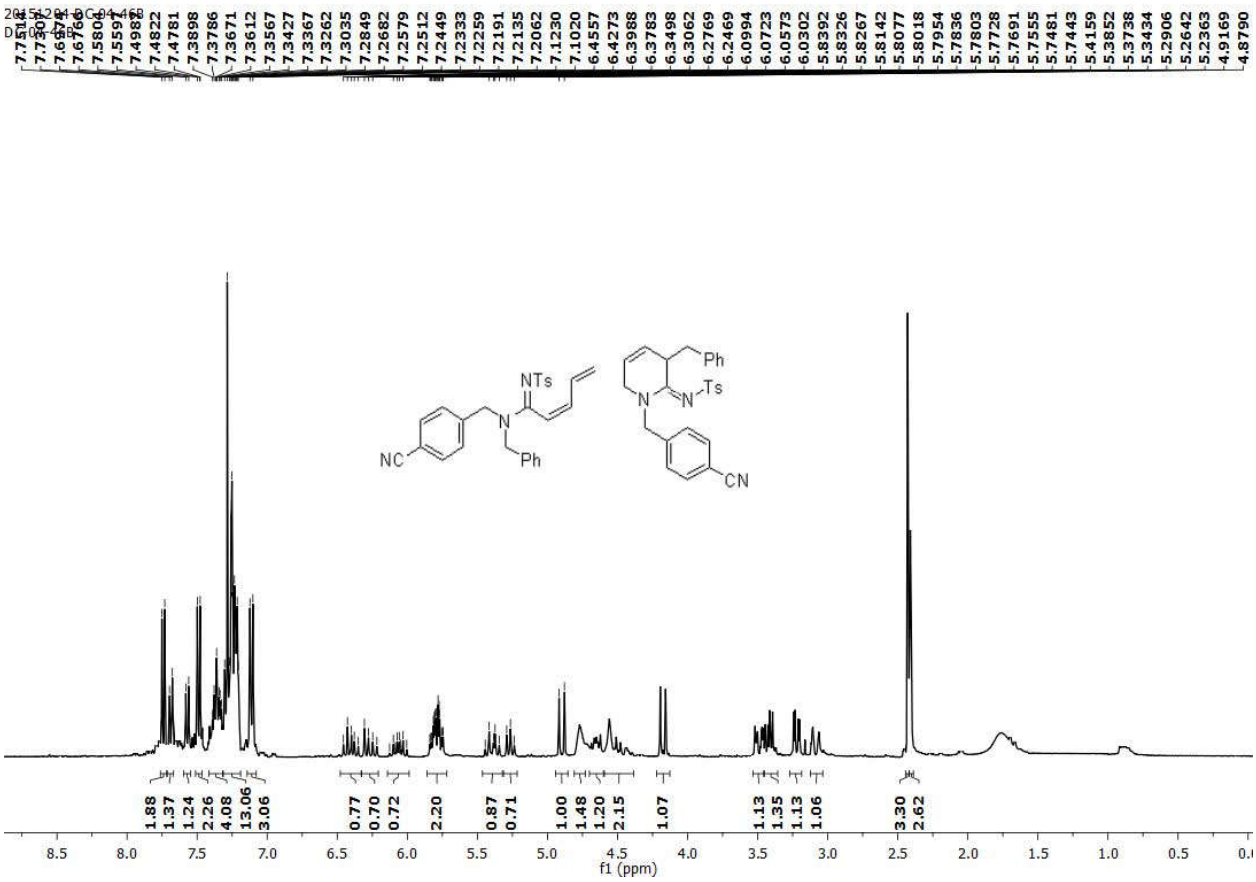

Fig. S41 ^{1}H NMR of mixture of **21a** and **21c** in $CDCl_3$.

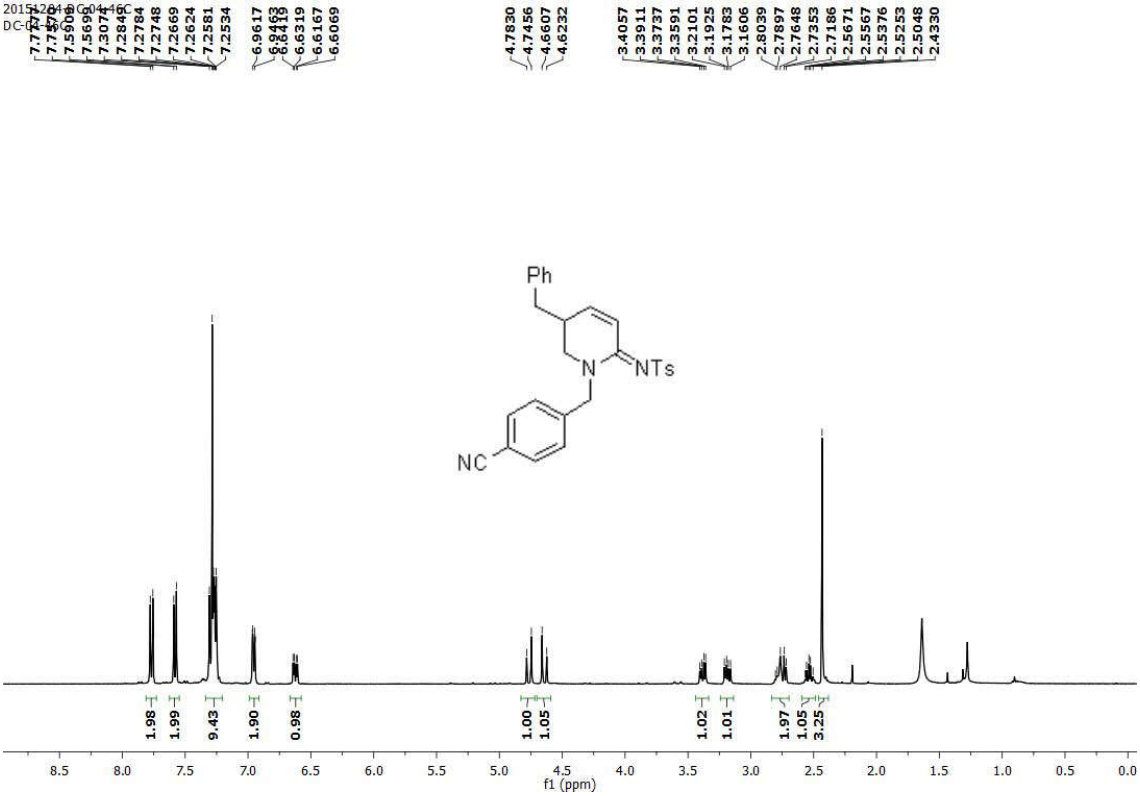

Fig. S42 ^{1}H NMR of **21b** in $CDCl_3$.

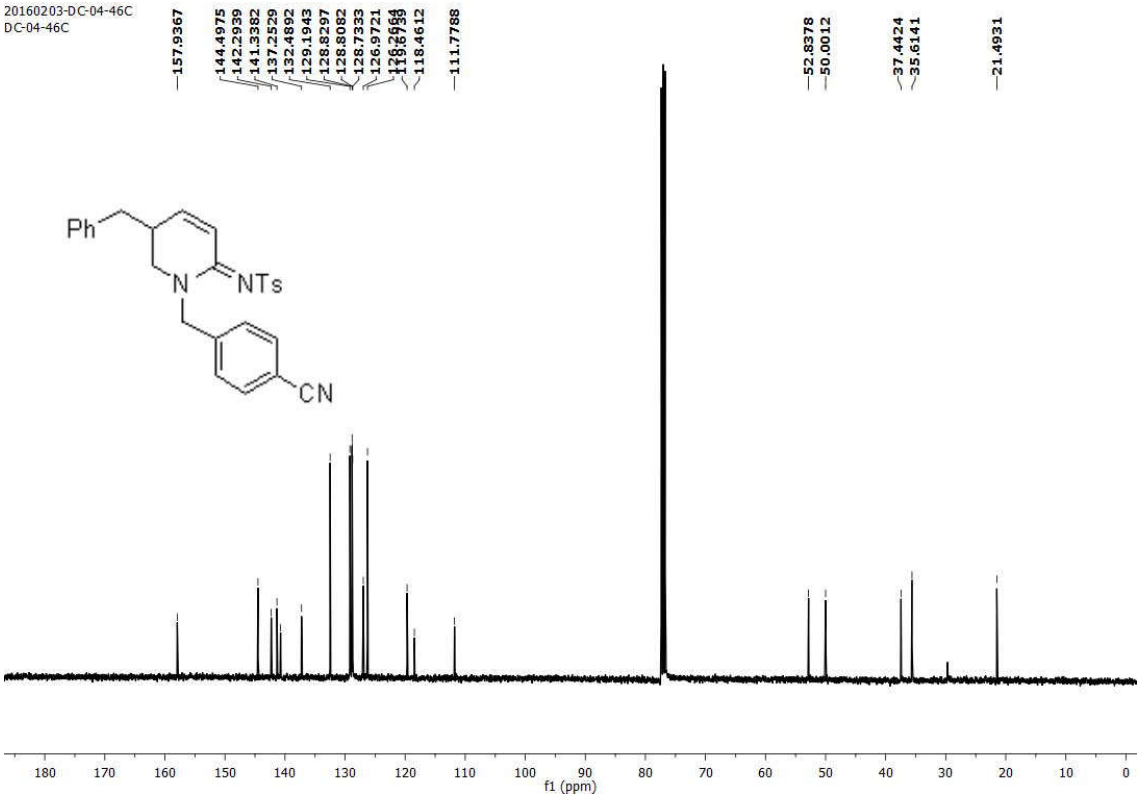

Fig. S43 ^{13}C NMR of **21b** in $CDCl_3$.

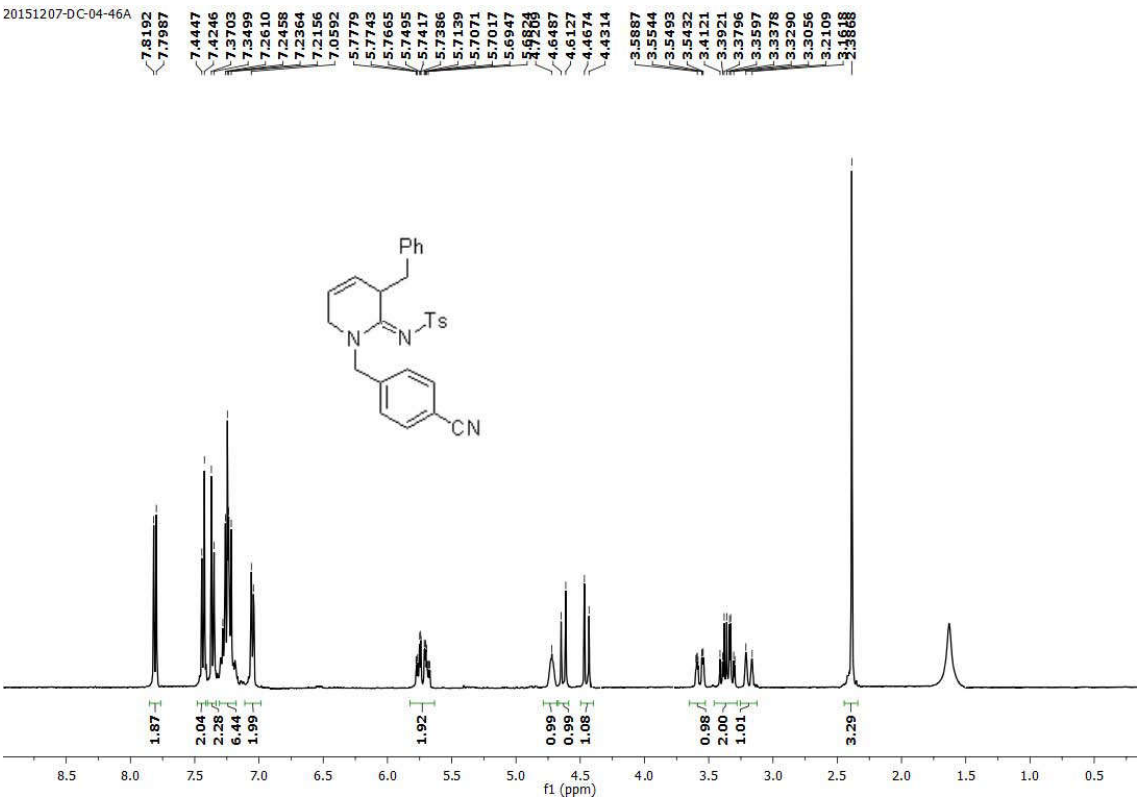

Fig. S44 ^{1}H NMR of **21c** in $CDCl_3$.

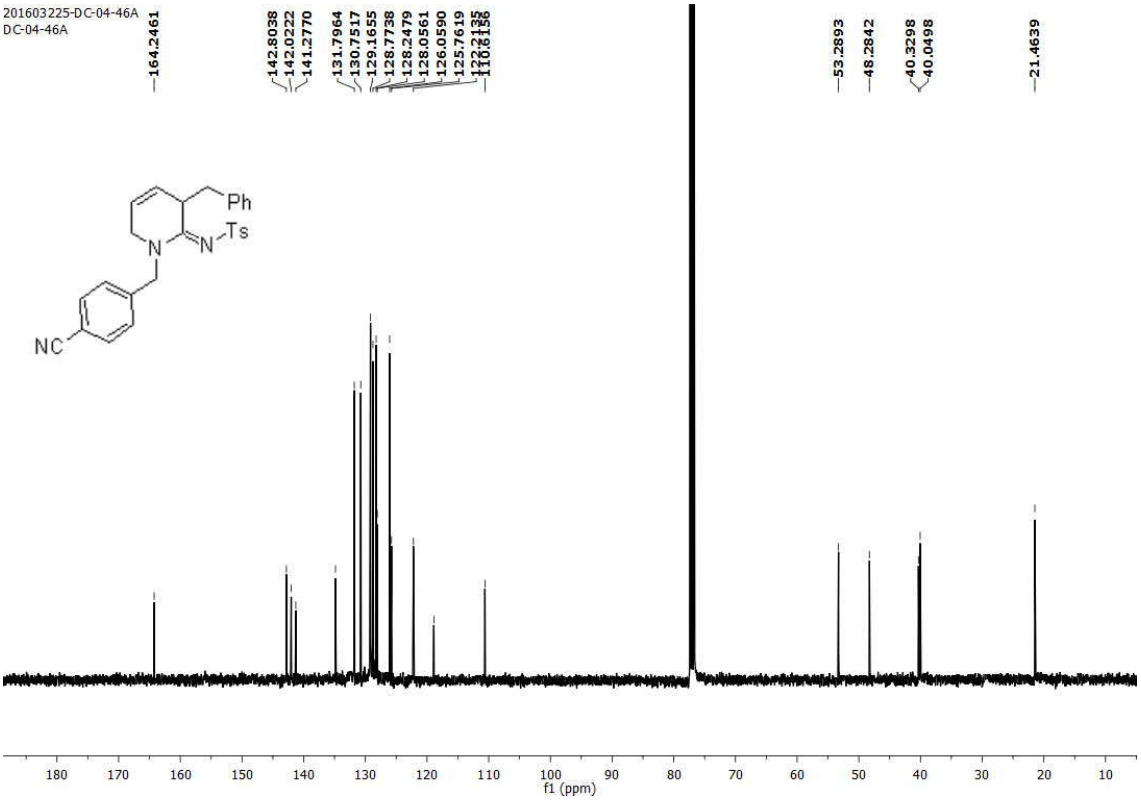

Fig. S45 ^{13}C NMR of **21c** in $CDCl_3$.

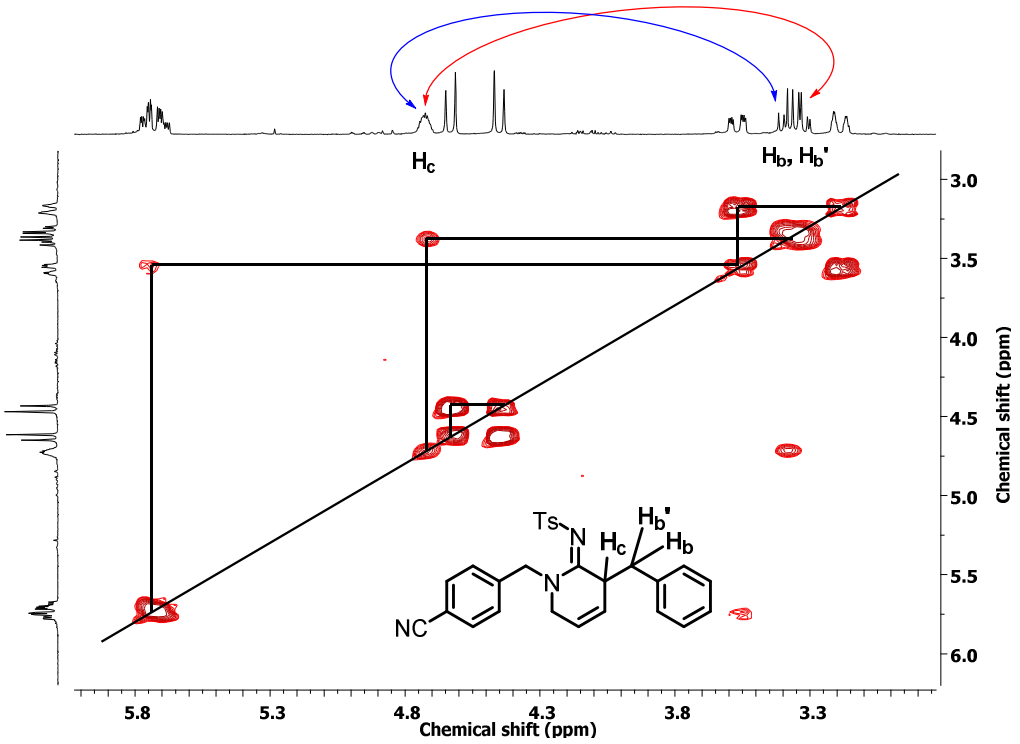

Fig. S46 COSY NMR spectrum of **21c** in $CDCl_3$.

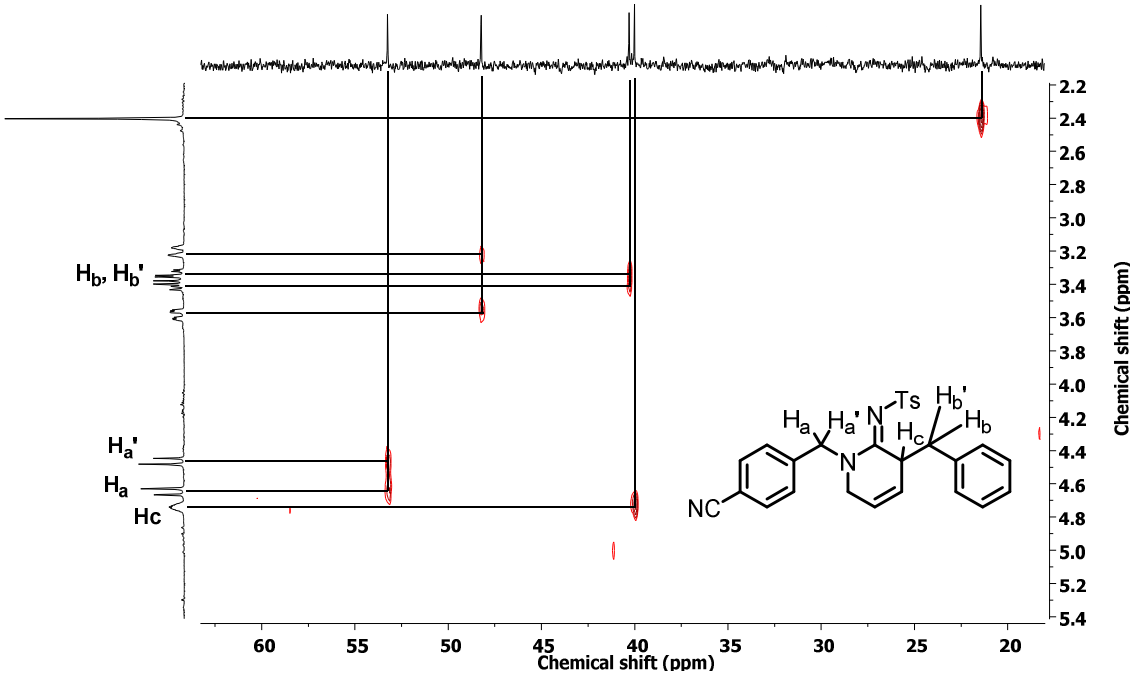

Fig. S47 Hetcor NMR spectrum of **21c** in $CDCl_3$.

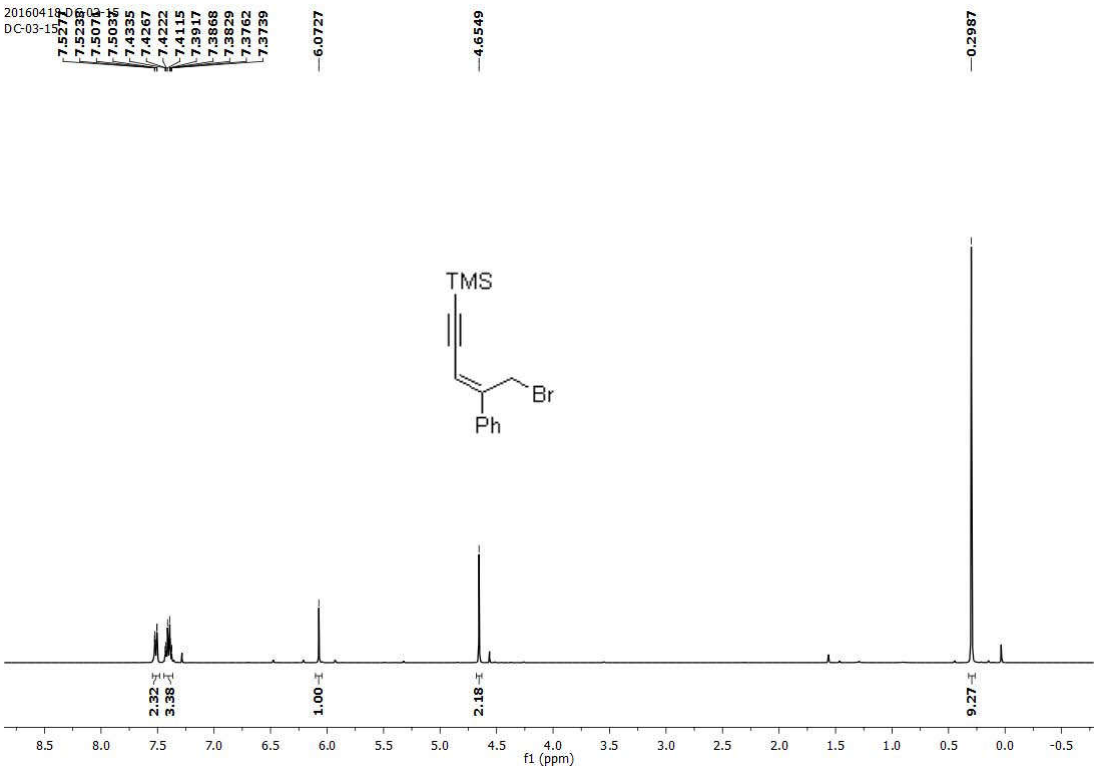

Fig. S48 ^{1}H NMR of **S15** in $CDCl_3$.

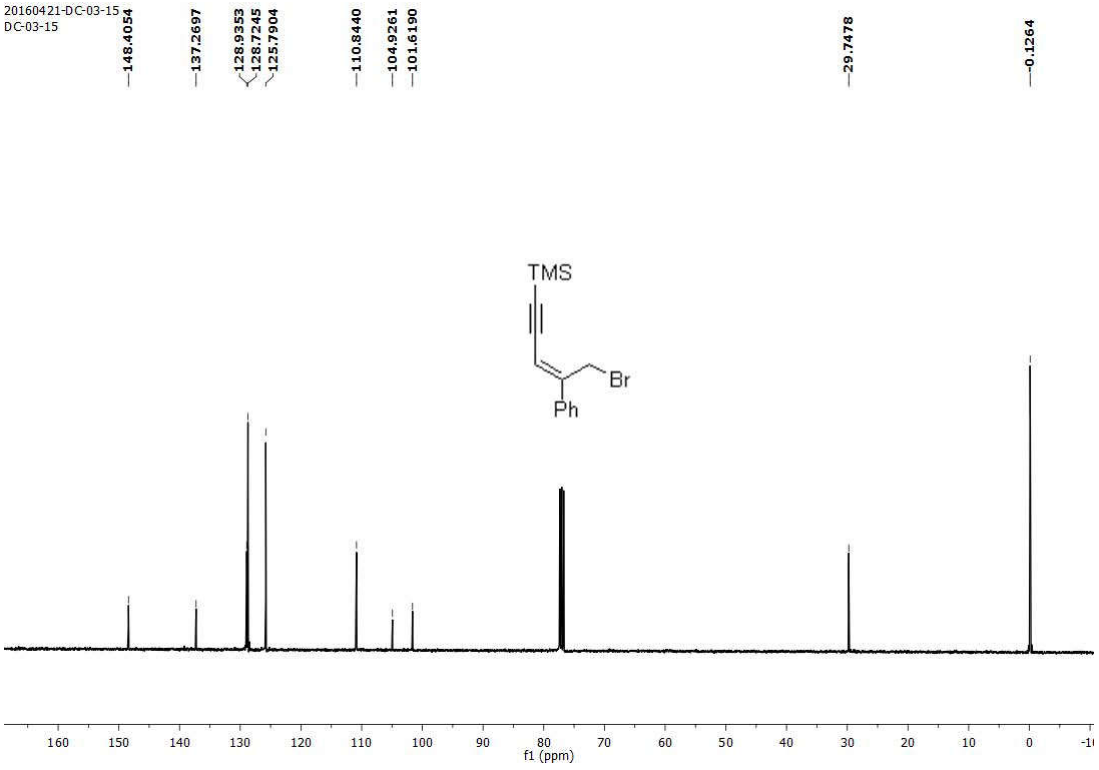

Fig. S49 ^{13}C NMR of **S15** in $CDCl_3$.

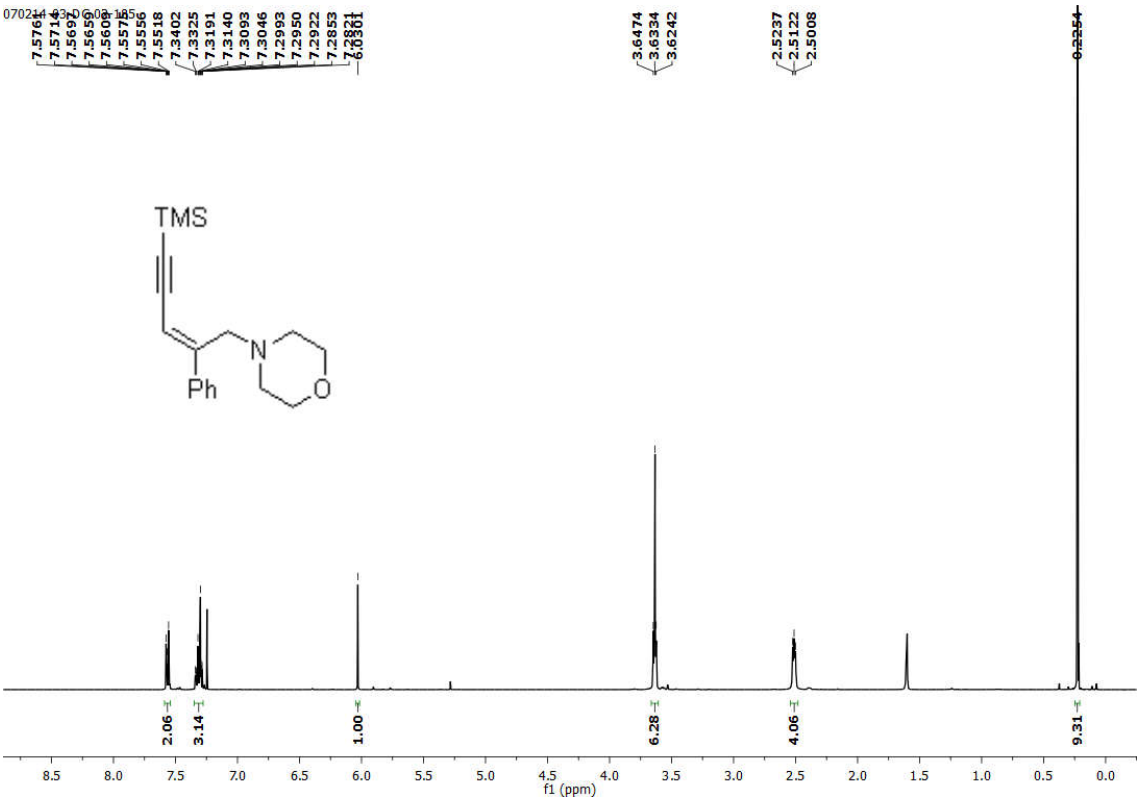

Fig. S50 ^{1}H NMR of **S15** in $CDCl_3$.

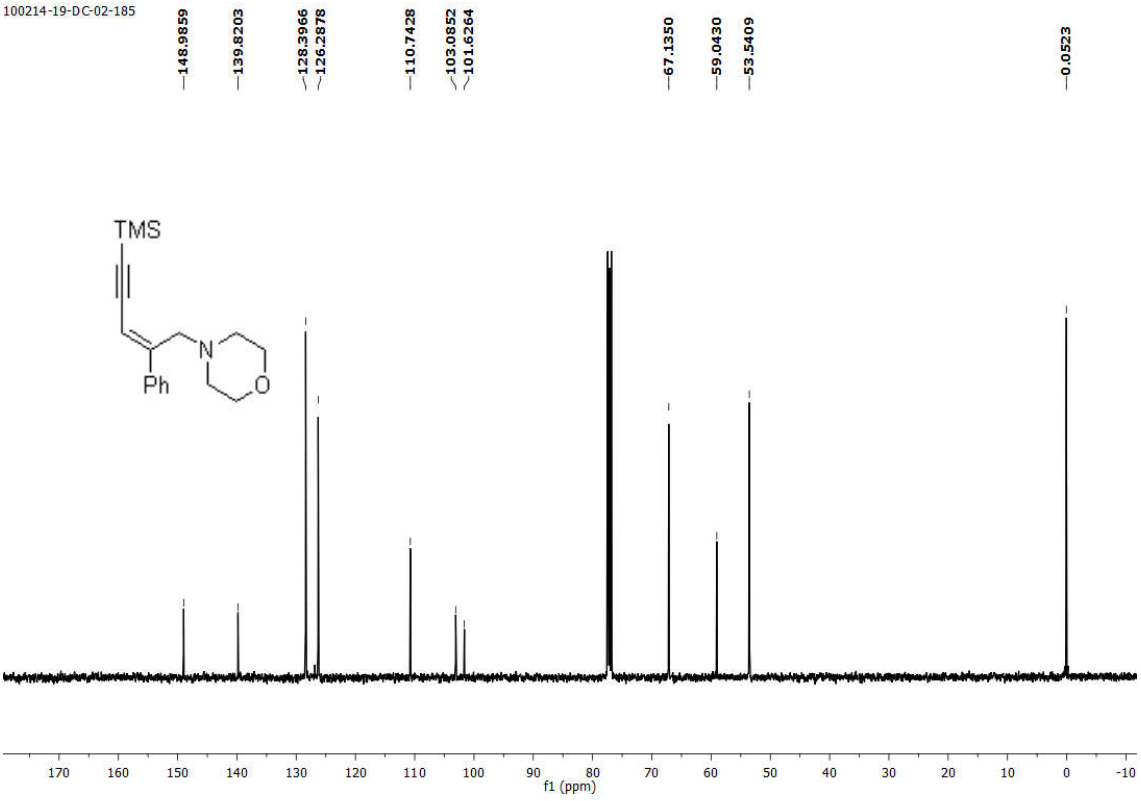

Fig. S51 ^{13}C NMR of **S15** in $CDCl_3$.

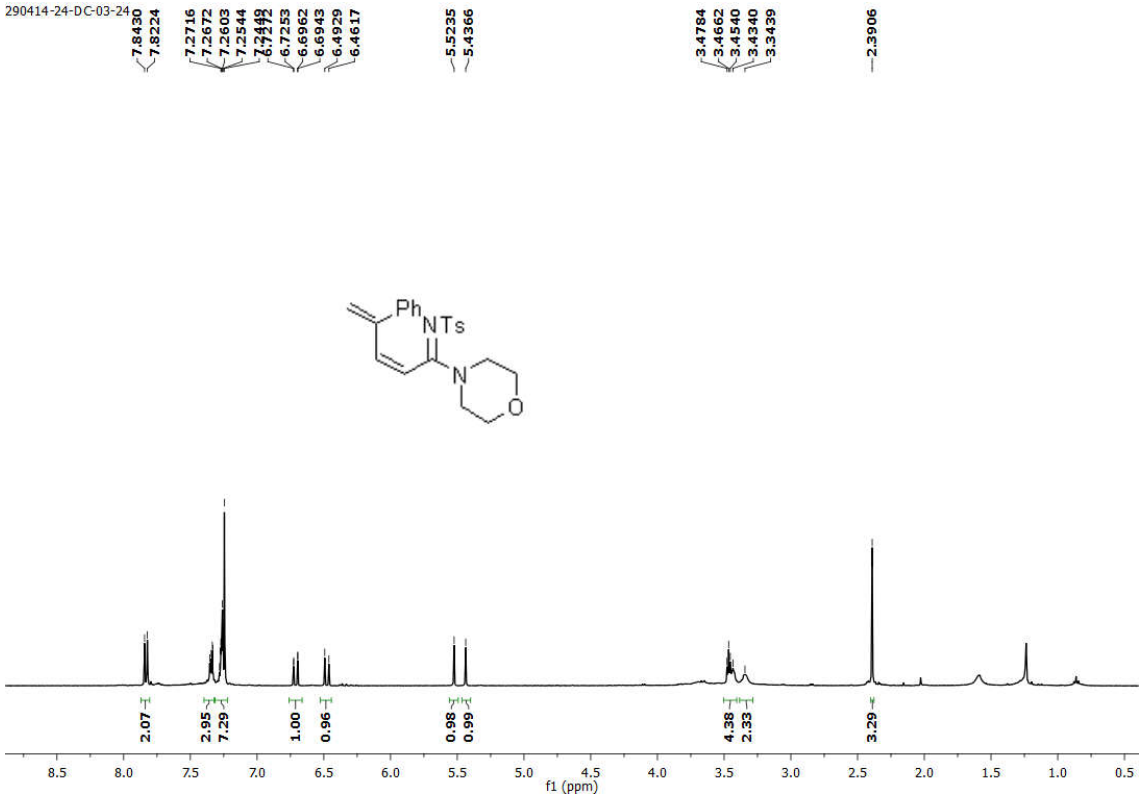

Fig. S52 ^{1}H NMR of **2a** in $CDCl_3$.

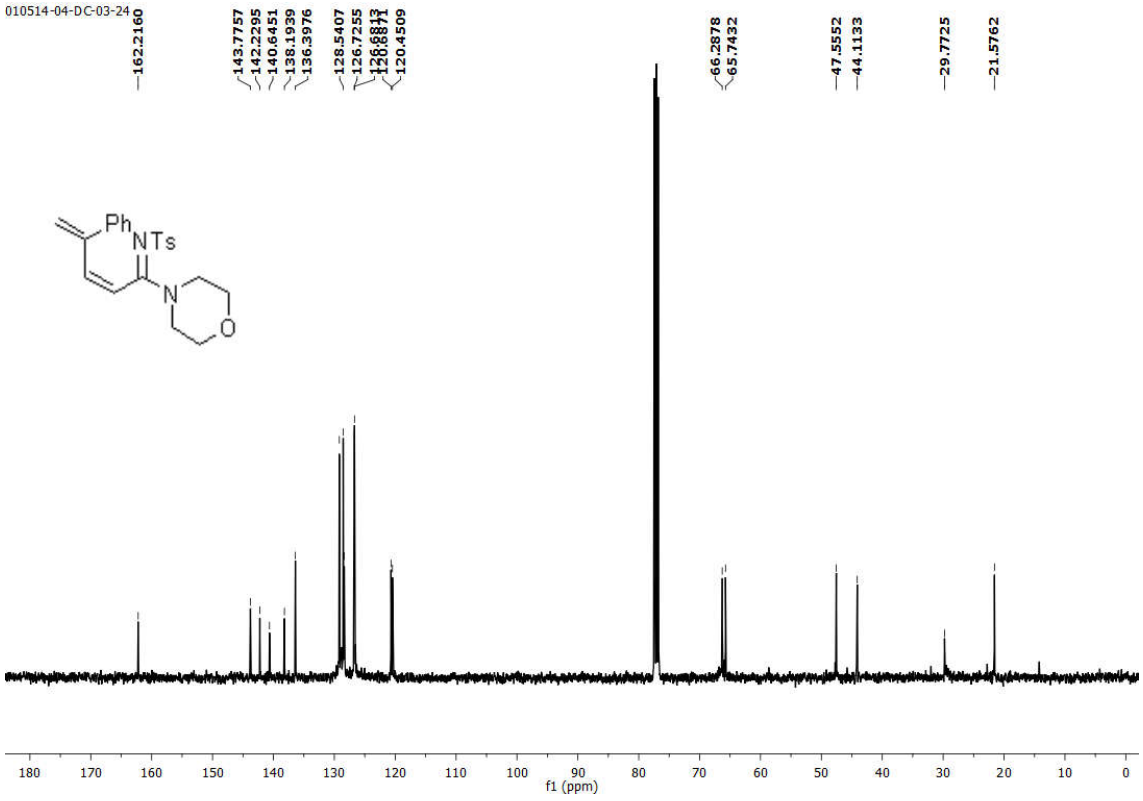

Fig. S53 ^{13}C NMR of **2a** in $CDCl_3$.

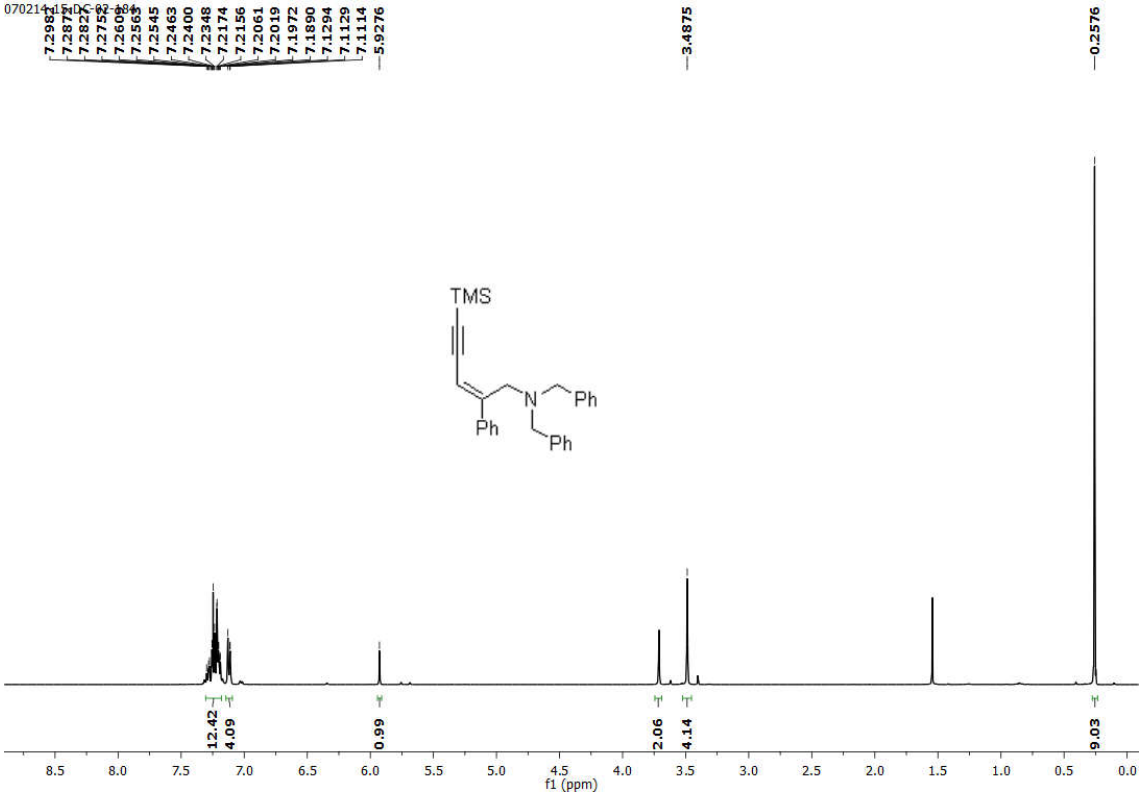

Fig. S54 ^{1}H NMR of **S16** in $CDCl_3$.

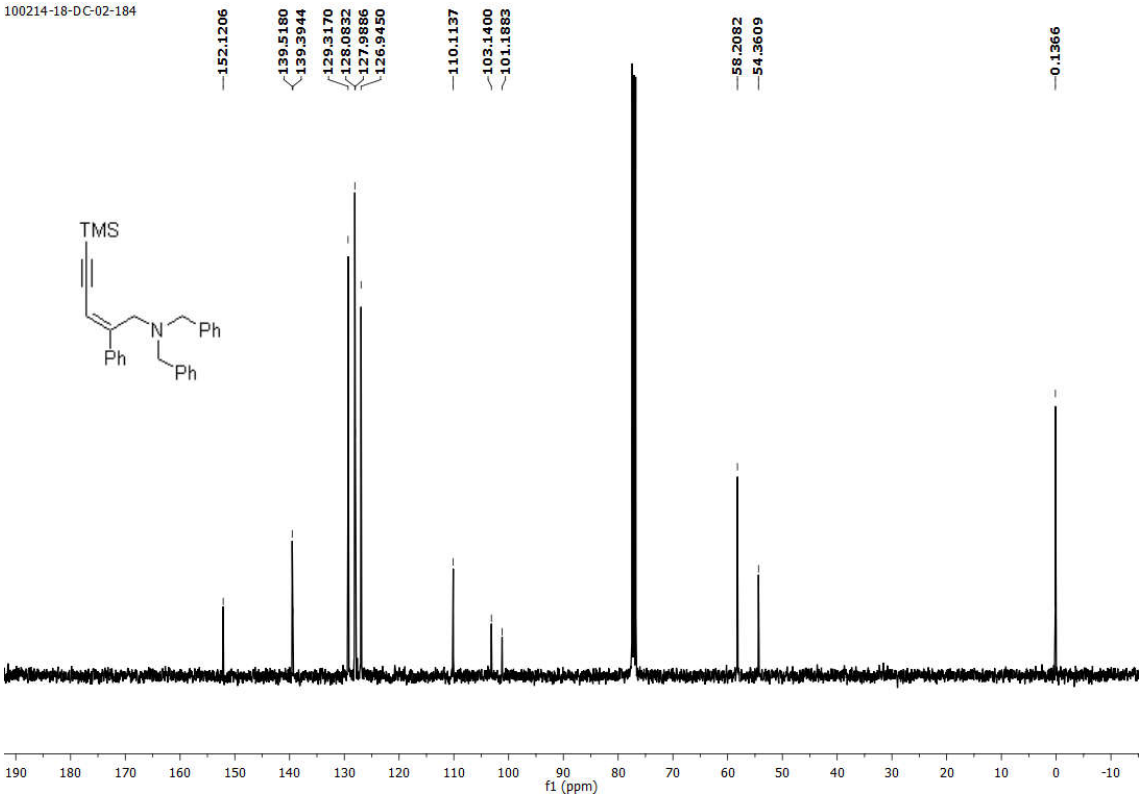

Fig. S55 ^{13}C NMR of **S16** in $CDCl_3$.

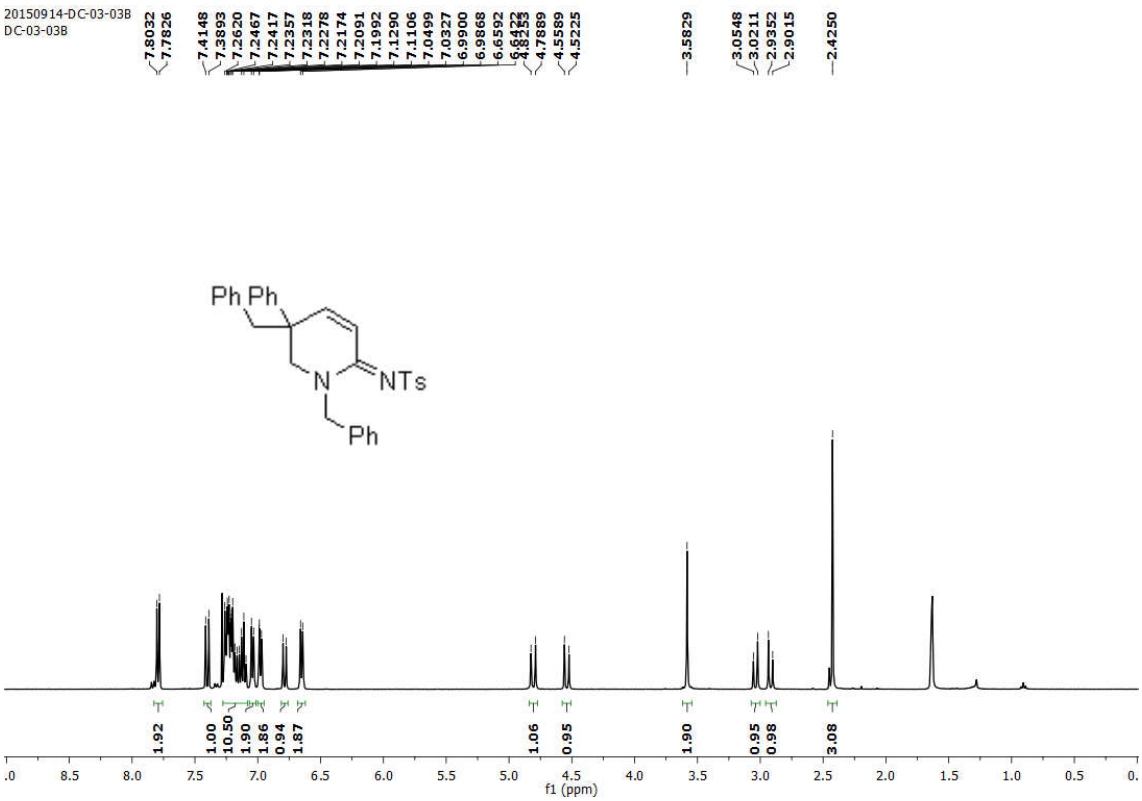

Fig. S56 ^{1}H NMR of **10b** in $CDCl_3$.

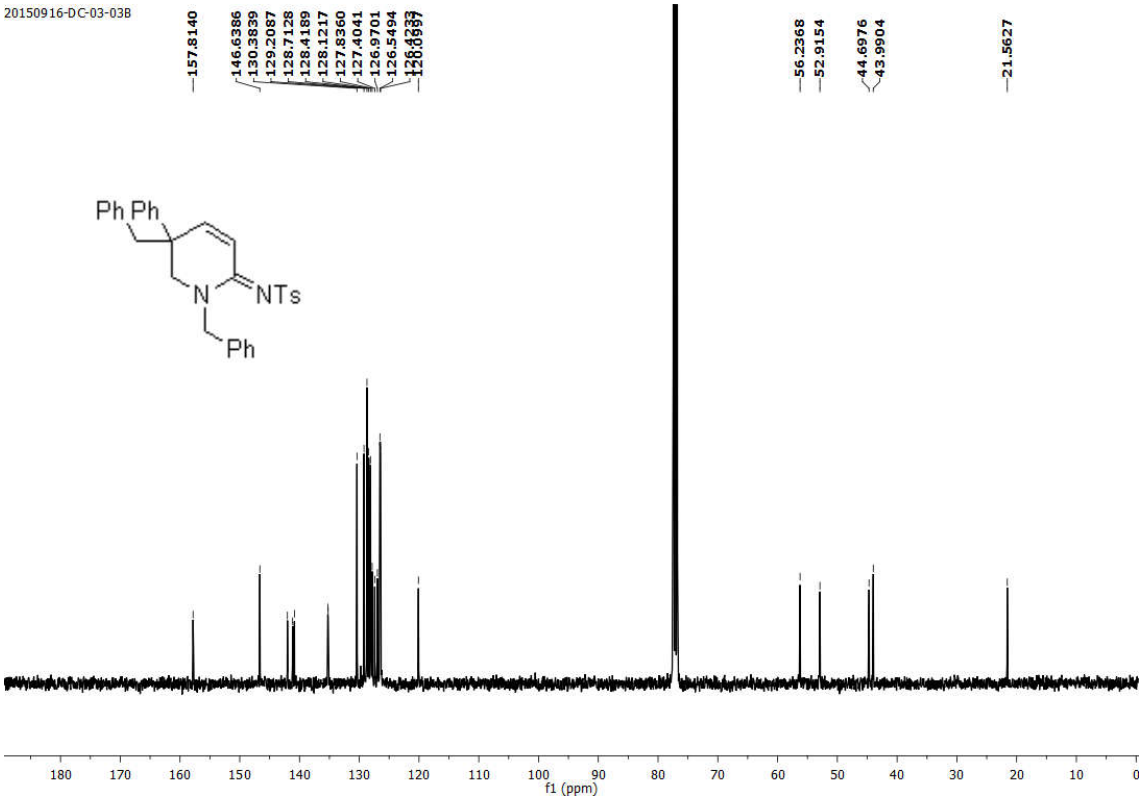

Fig. S57 ^{13}C NMR of **10b** in $CDCl_3$.

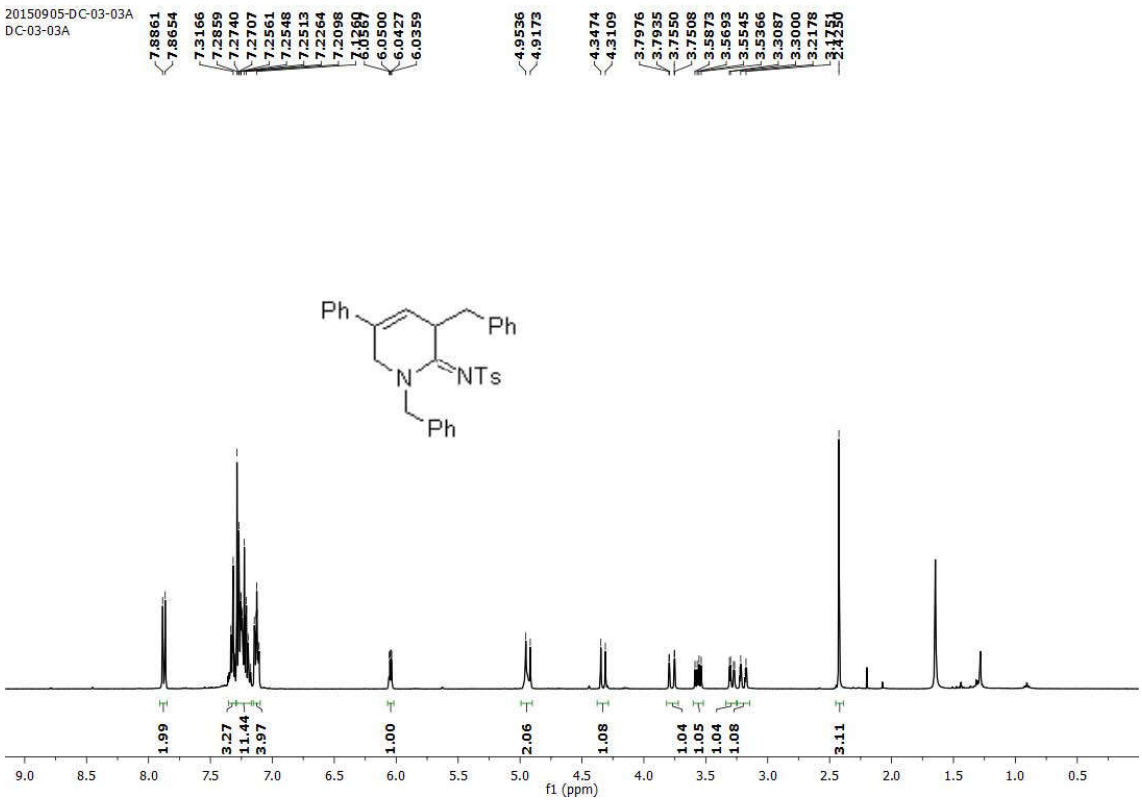

Fig. S58 ^{1}H NMR of **10c** in $CDCl_3$.

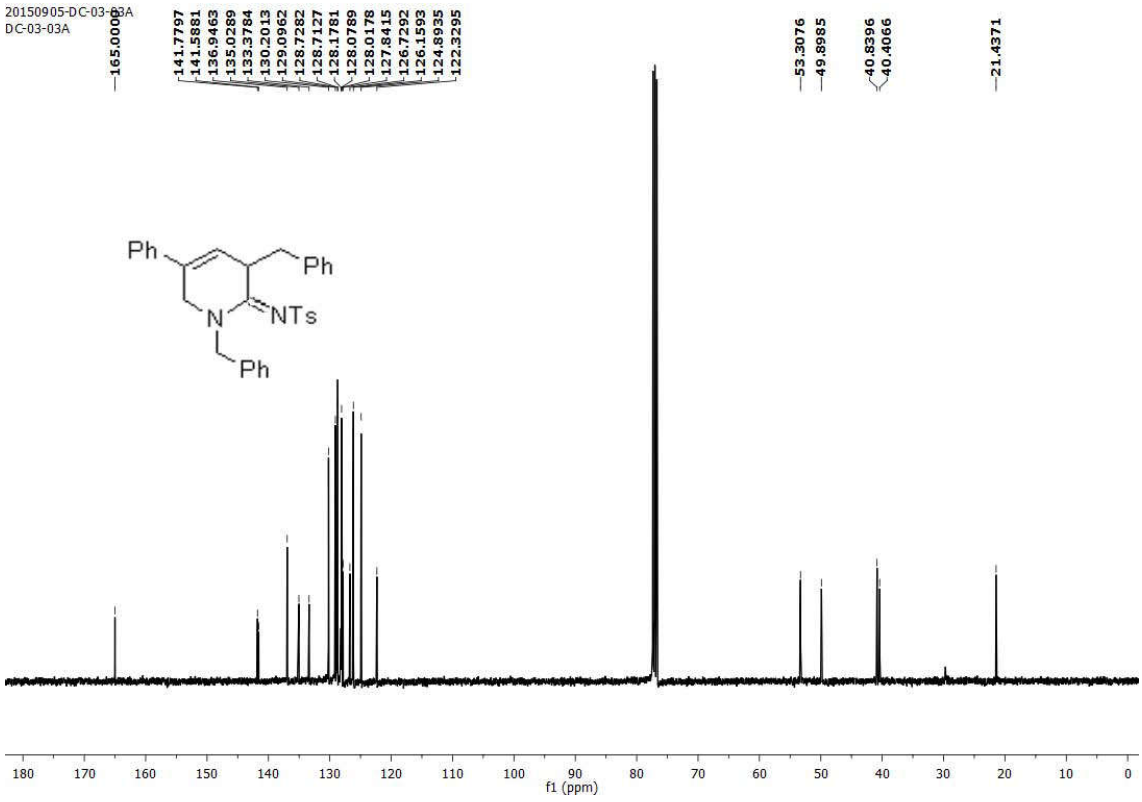

Fig. S59 ^{13}C NMR of **10c** in $CDCl_3$.

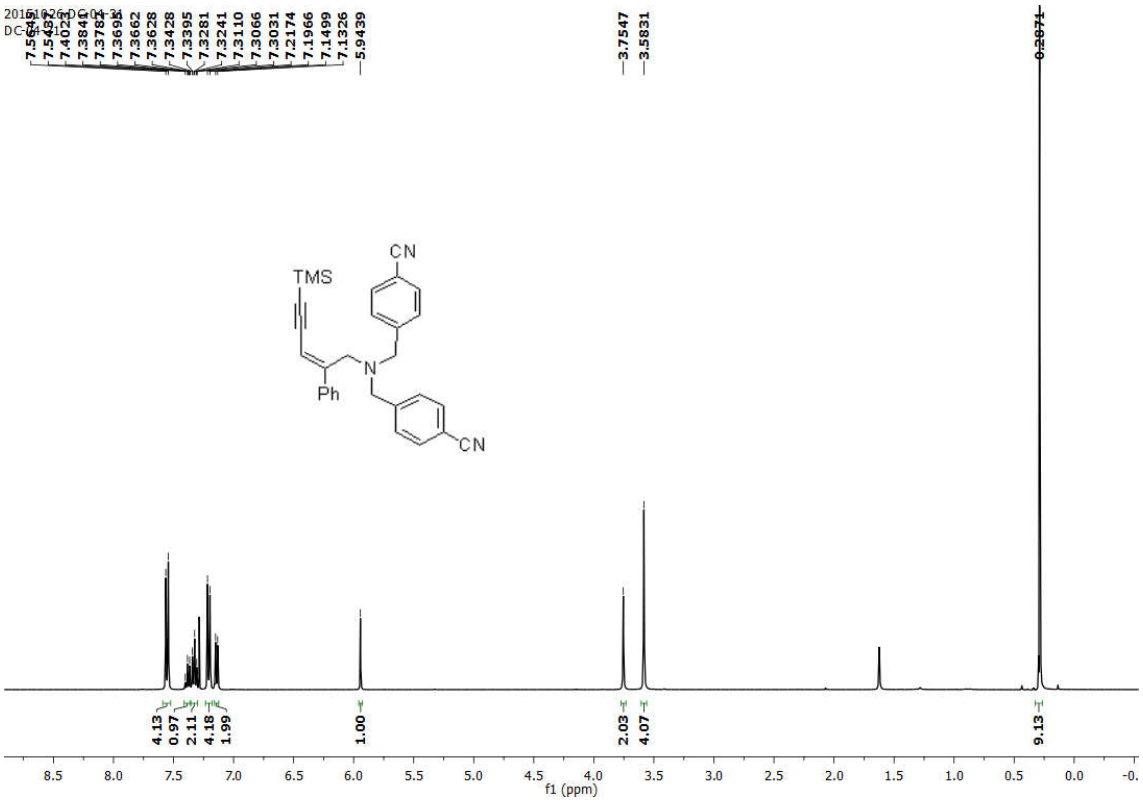

Fig. S60 ^{1}H NMR of **S17** in $CDCl_3$.

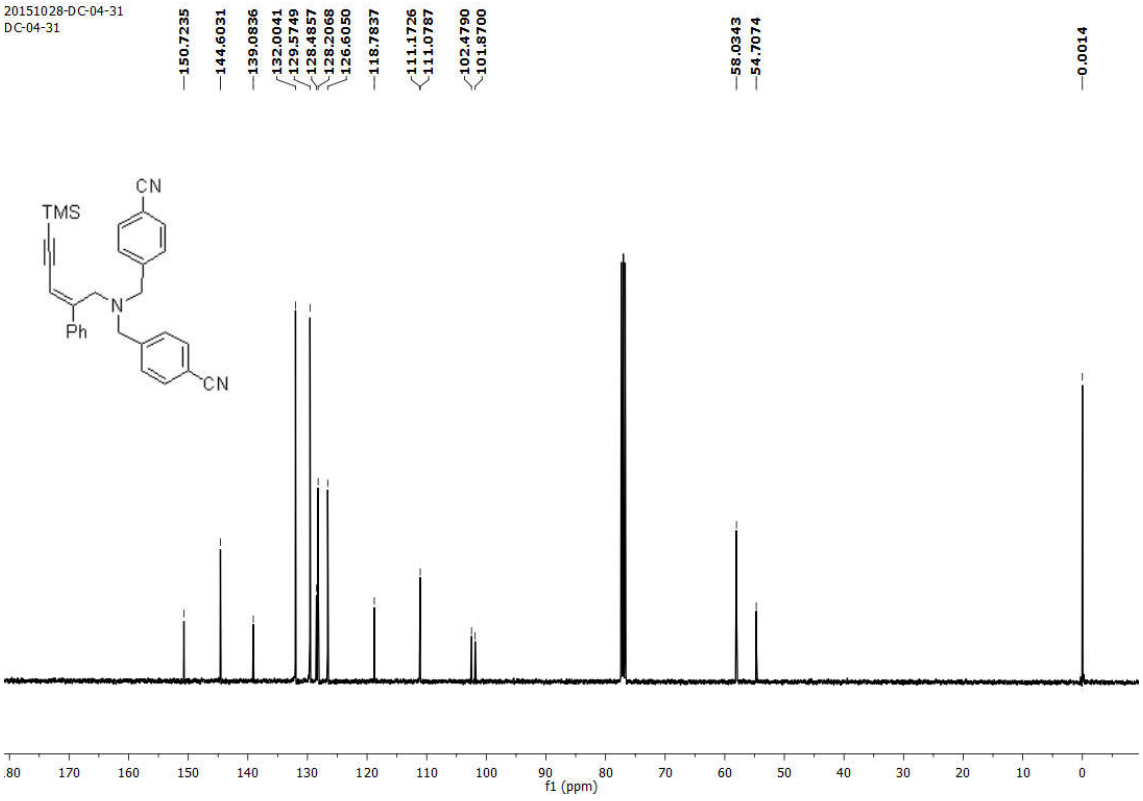

Fig. S61 ^{13}C NMR of **S17** in $CDCl_3$.

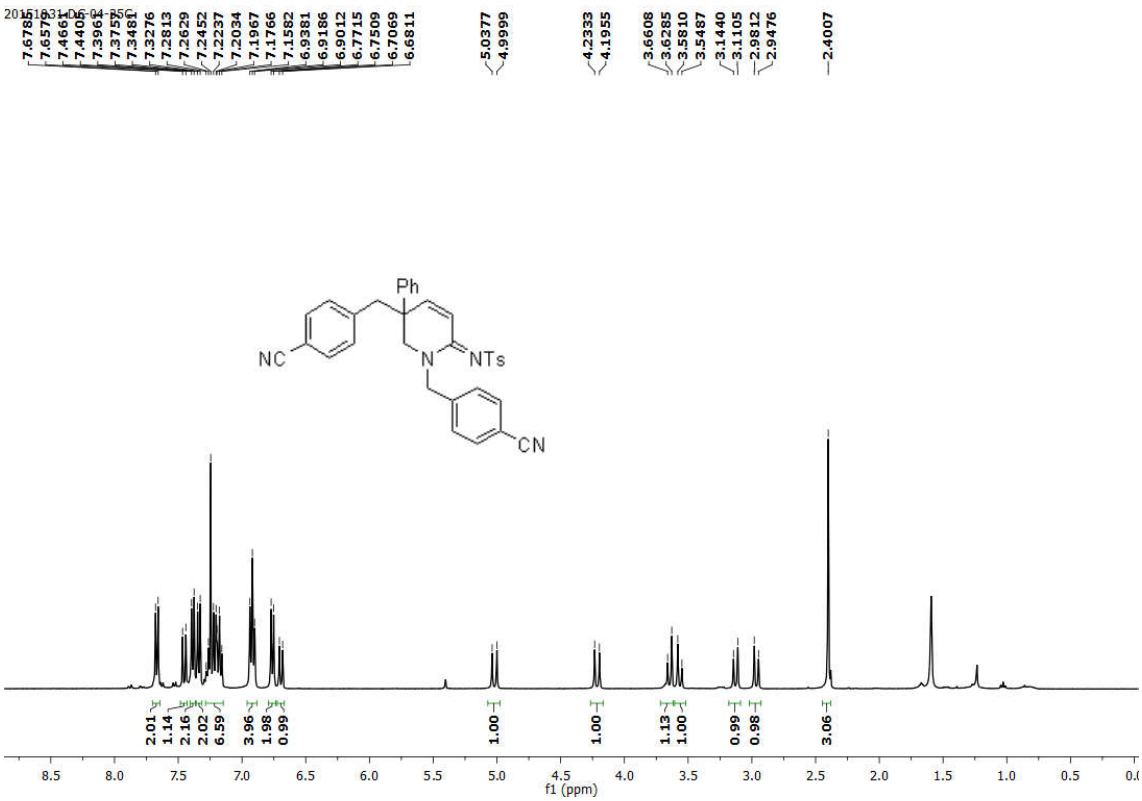

Fig. S62 ^{1}H NMR of **14b** in $CDCl_3$.

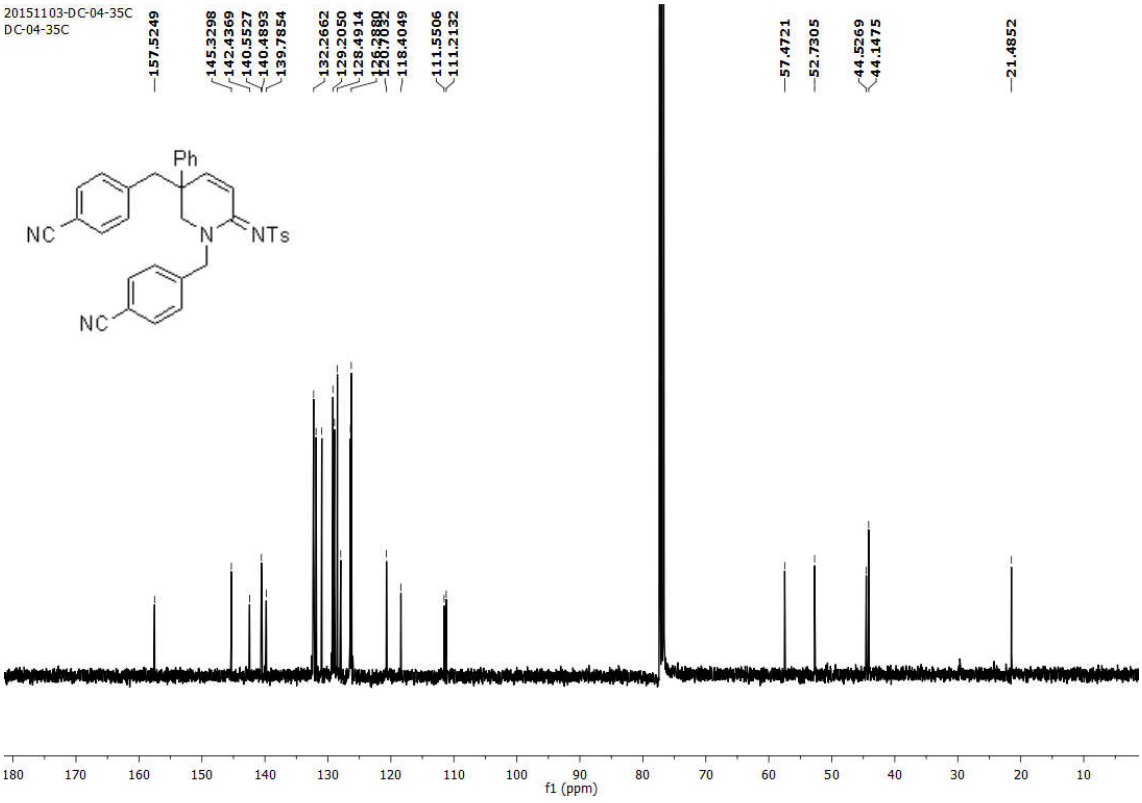

Fig. S63 ^{13}C NMR of **14b** in $CDCl_3$.

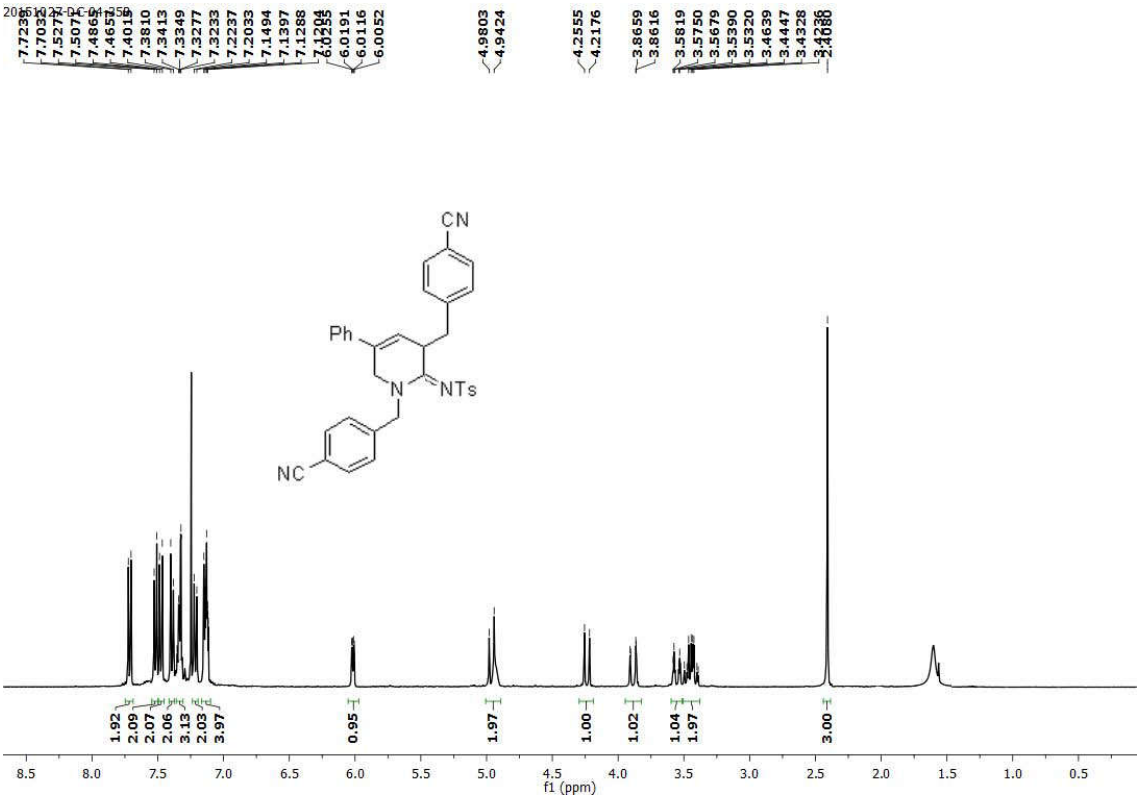

Fig. S64 ^{1}H NMR of **14c** in $CDCl_3$.

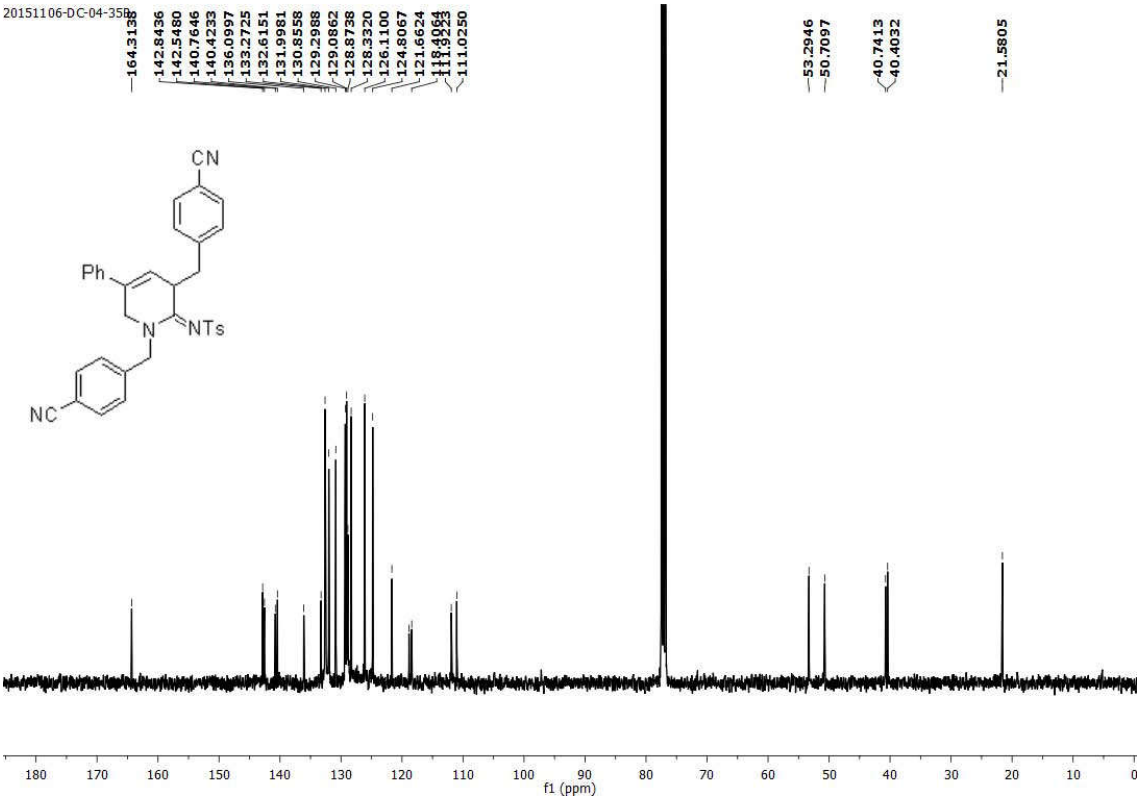

Fig. S65 ^{13}C NMR of **14c** in $CDCl_3$.

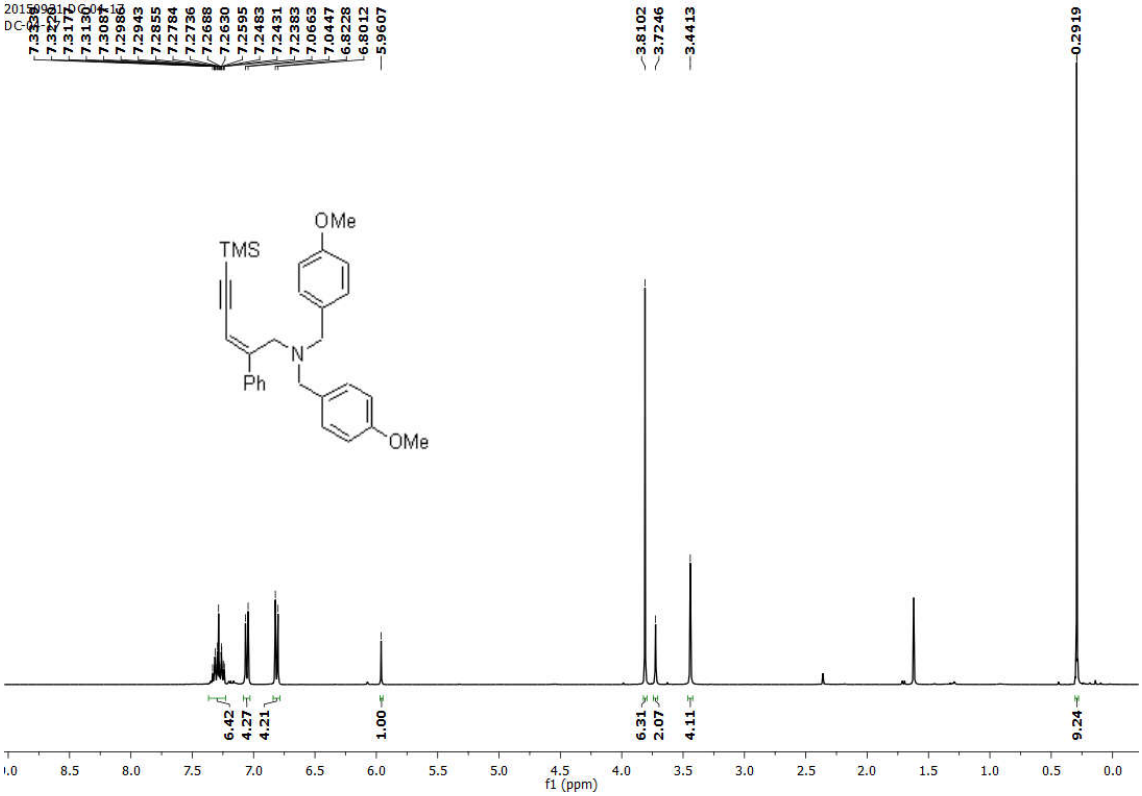

Fig. S66 ^{1}H NMR of **S18** in $CDCl_3$.

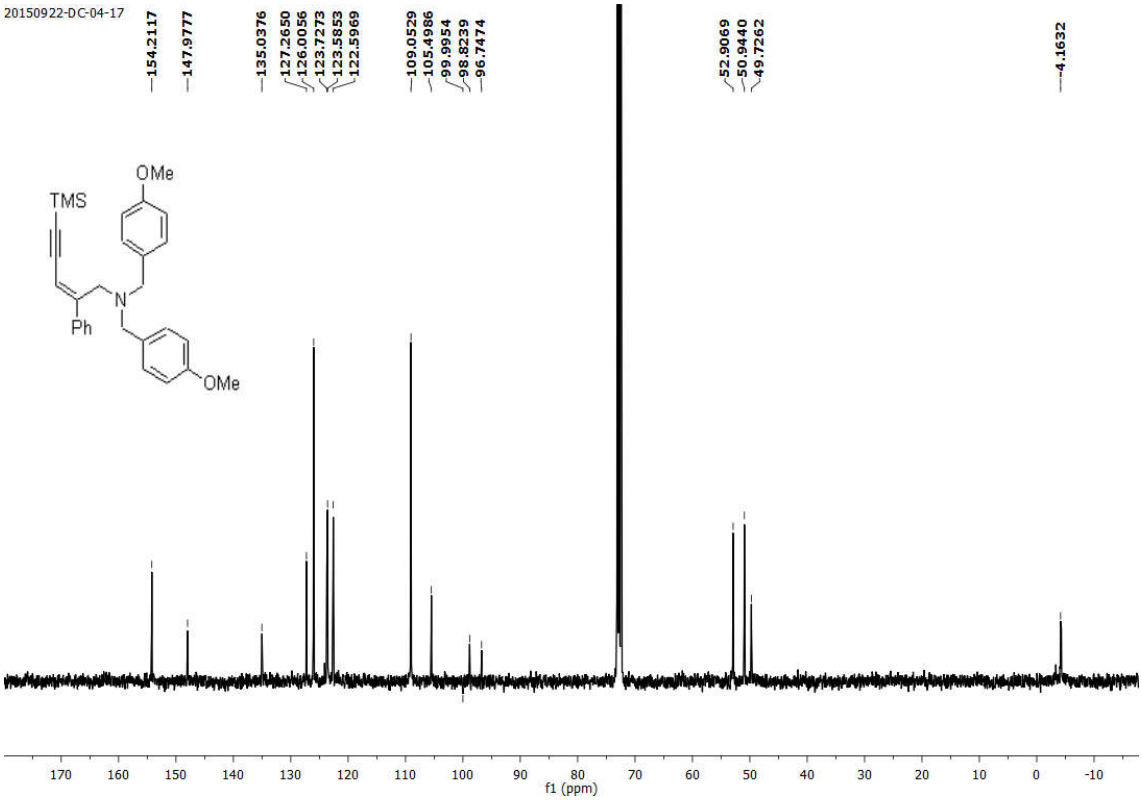

Fig. S67 ^{13}C NMR of **S18** in $CDCl_3$.

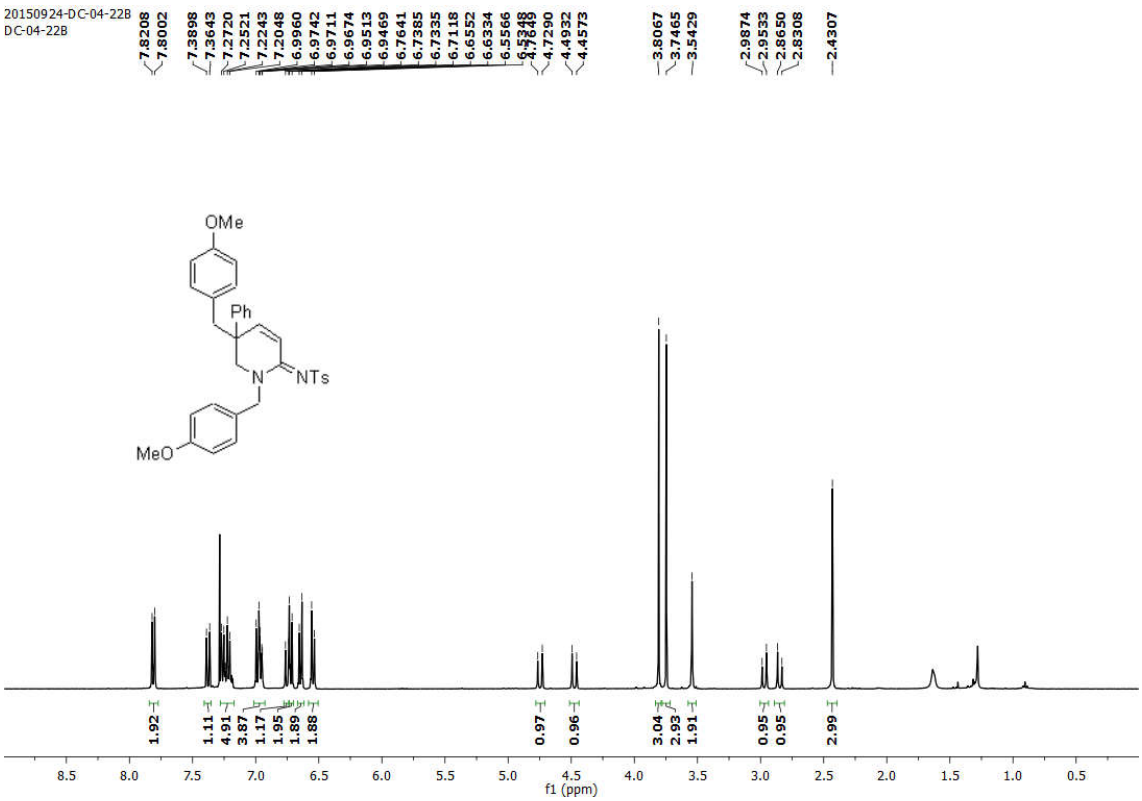

Fig. S68 ^{1}H NMR of **18b** in $CDCl_3$.

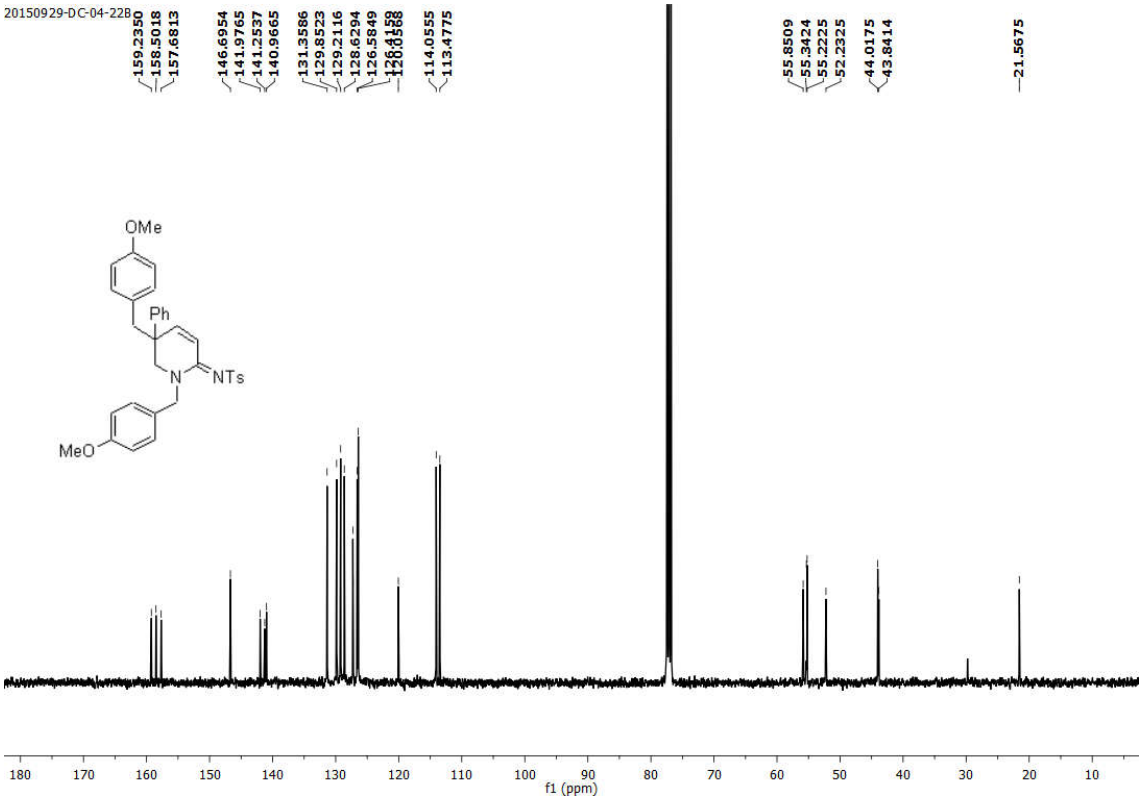

Fig. S69 ^{13}C NMR of **18b** in $CDCl_3$.

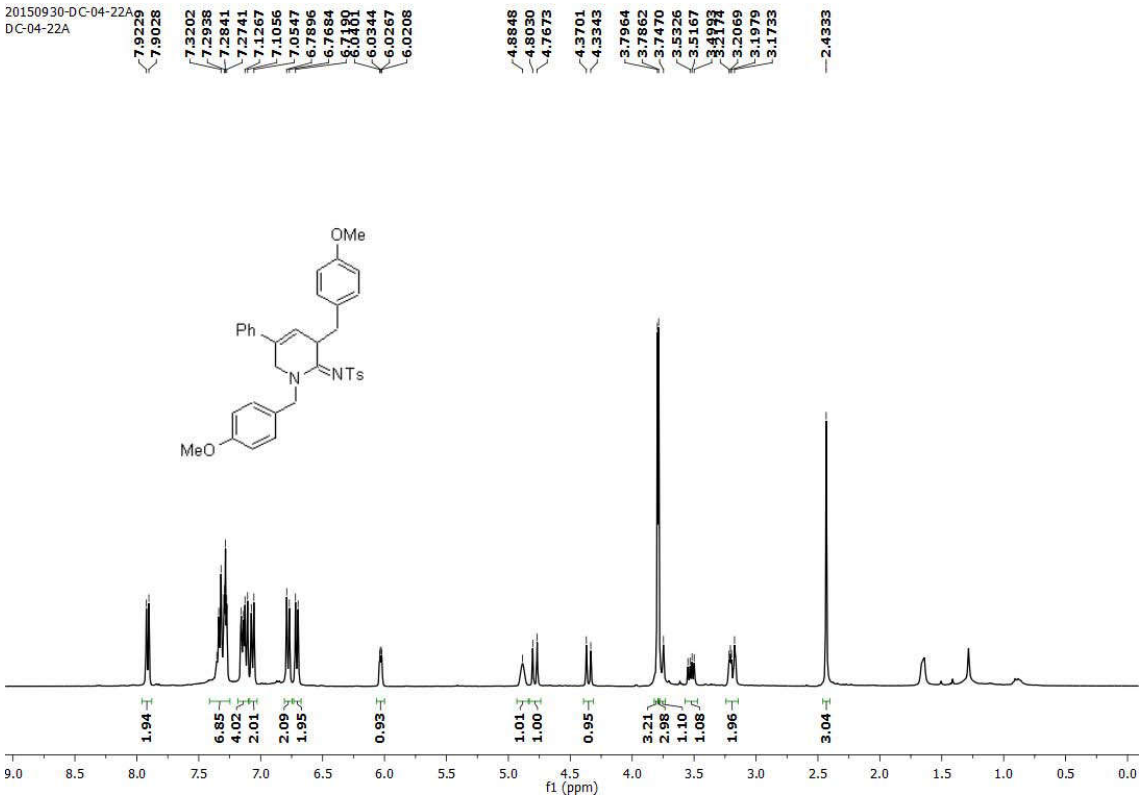

Fig. S70 ^{1}H NMR of **18c** in $CDCl_3$.

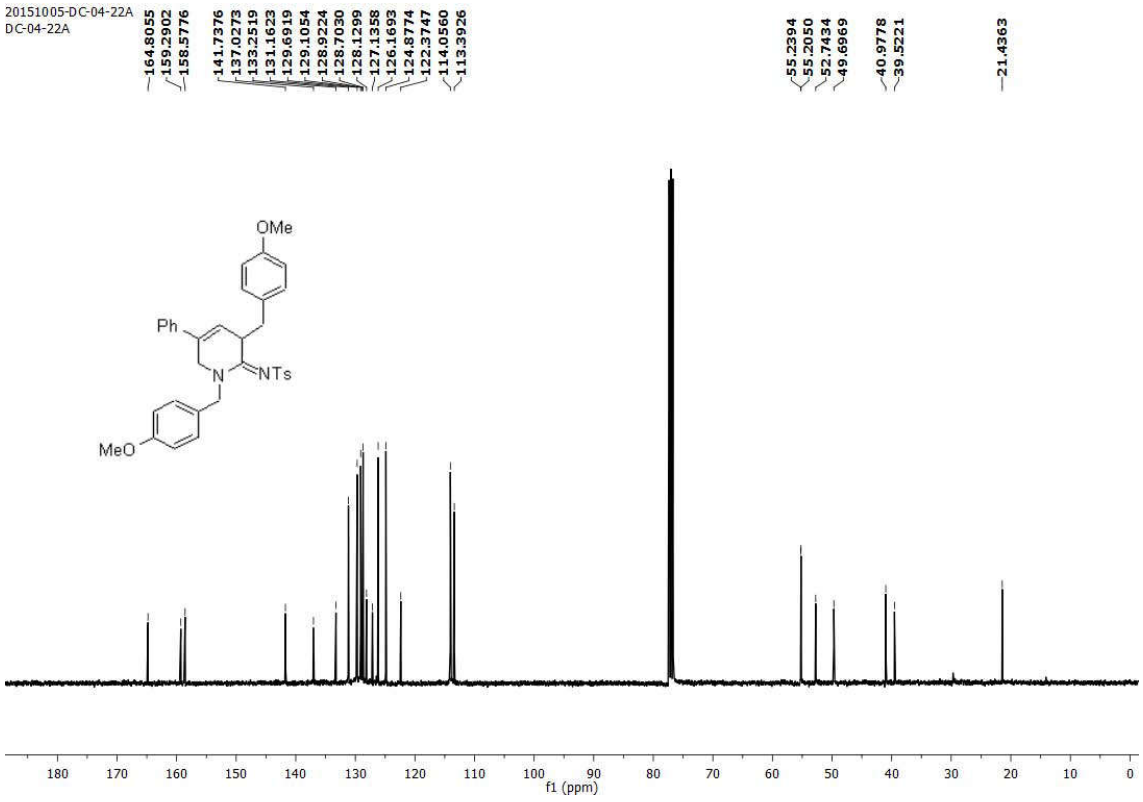

Fig. S71 ^{13}C NMR of **18c** in $CDCl_3$.

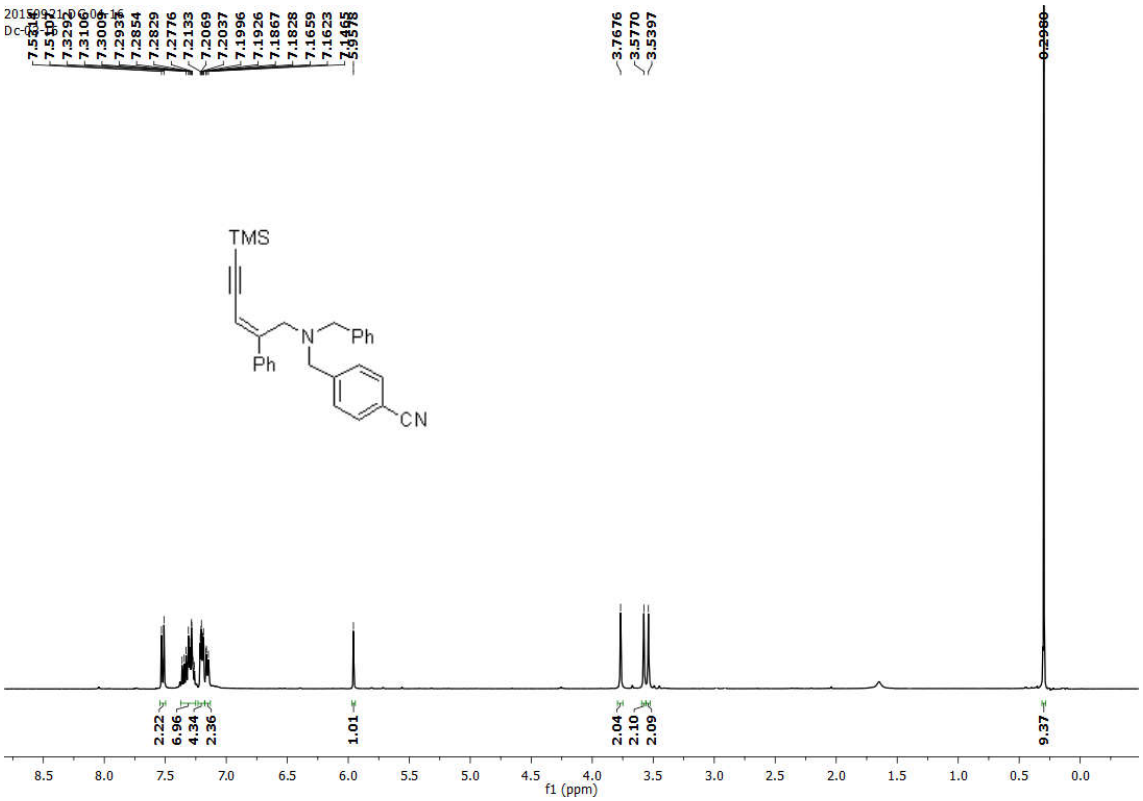

Fig. S72 ^{1}H NMR of **S19** in $CDCl_3$.

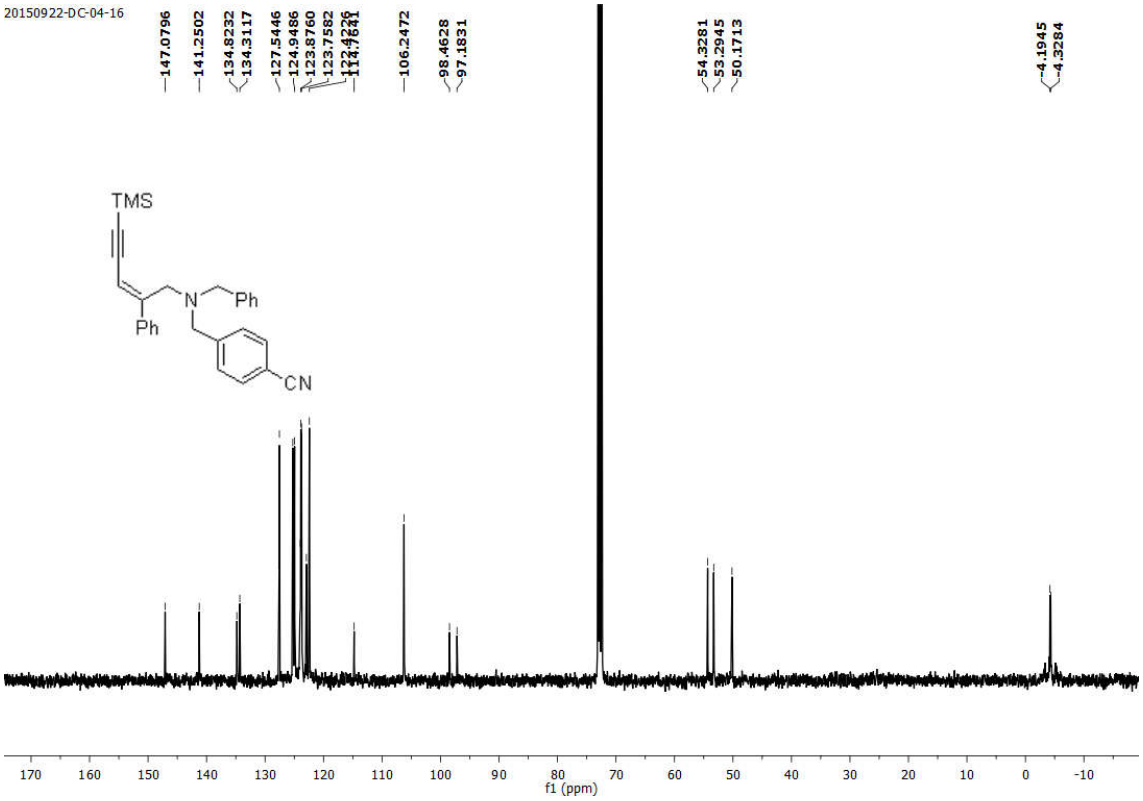

Fig. S73 ^{13}C NMR of **S19** in $CDCl_3$.

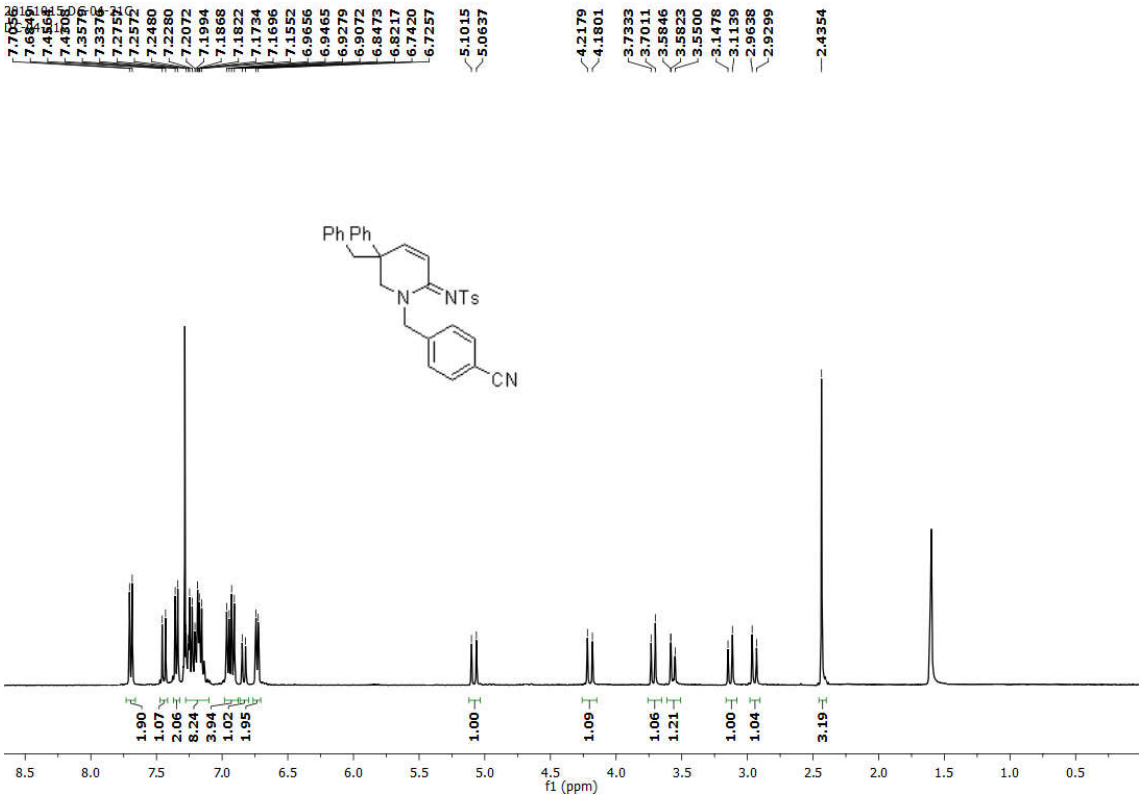

Fig. S74 ^{1}H NMR of **22b** in $CDCl_3$.

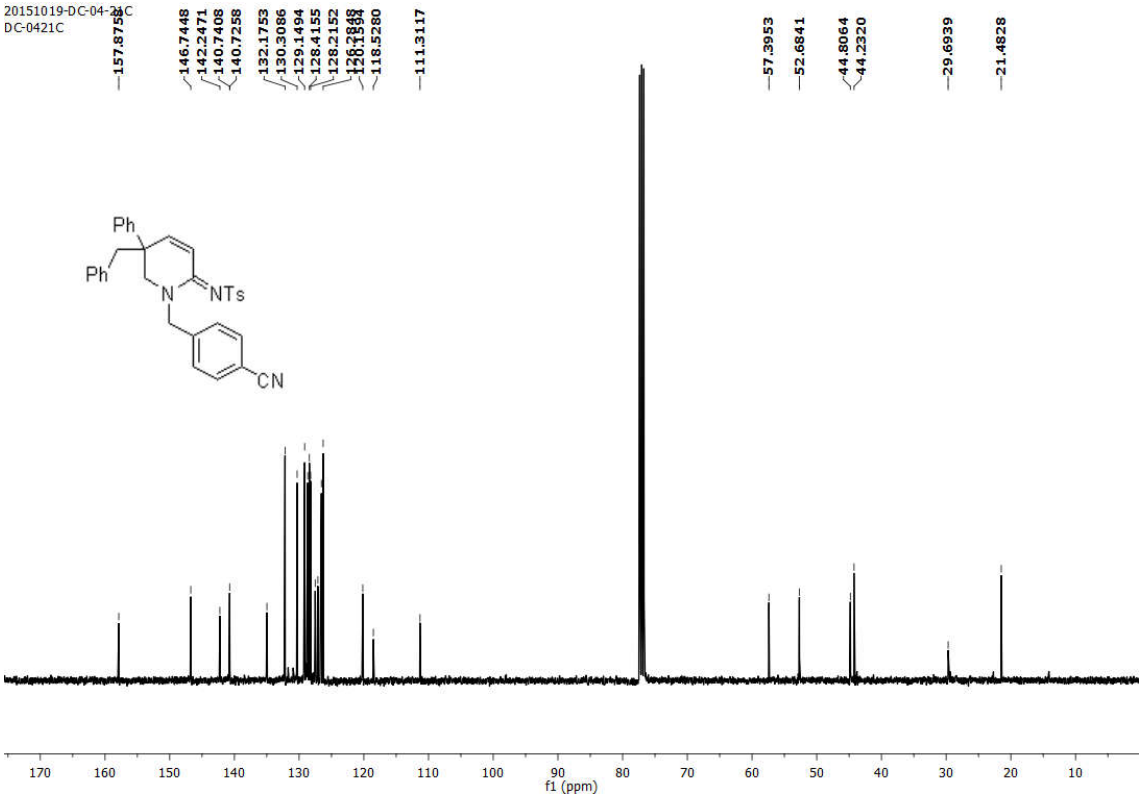

Fig. S75 ^{13}C NMR of **22b** in $CDCl_3$.

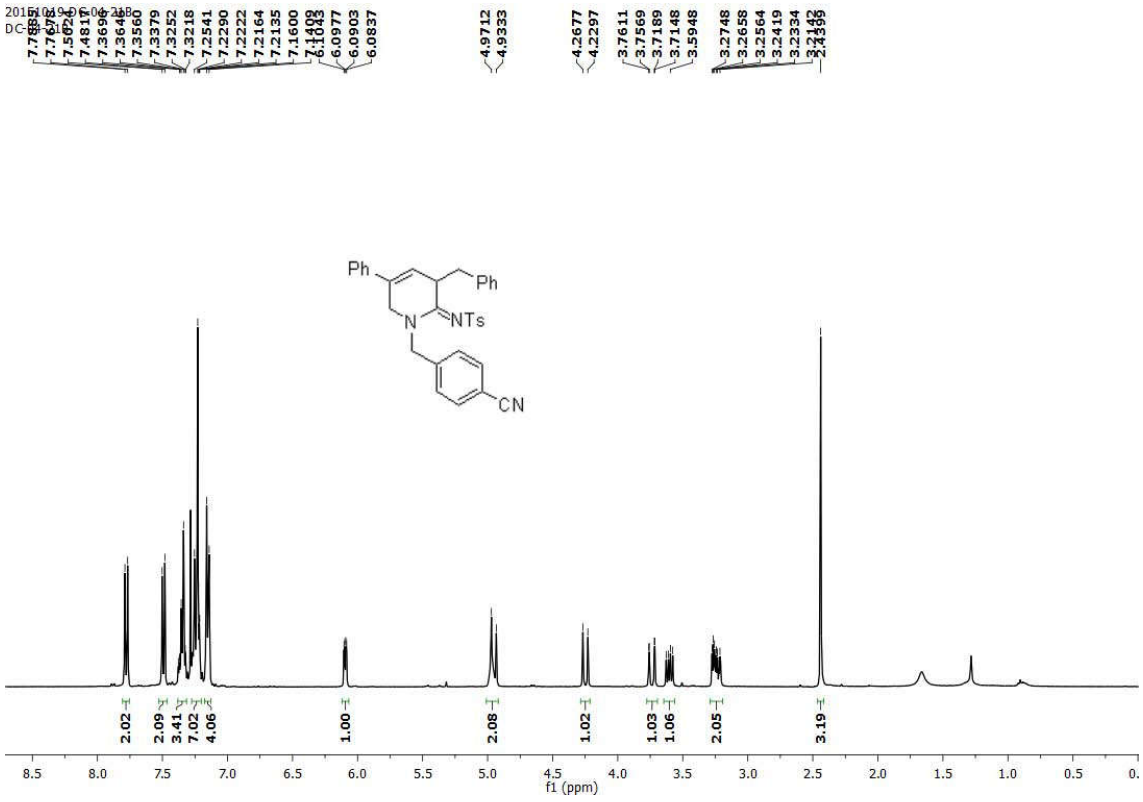

Fig. S76 ^{1}H NMR of **22c** in $CDCl_3$.

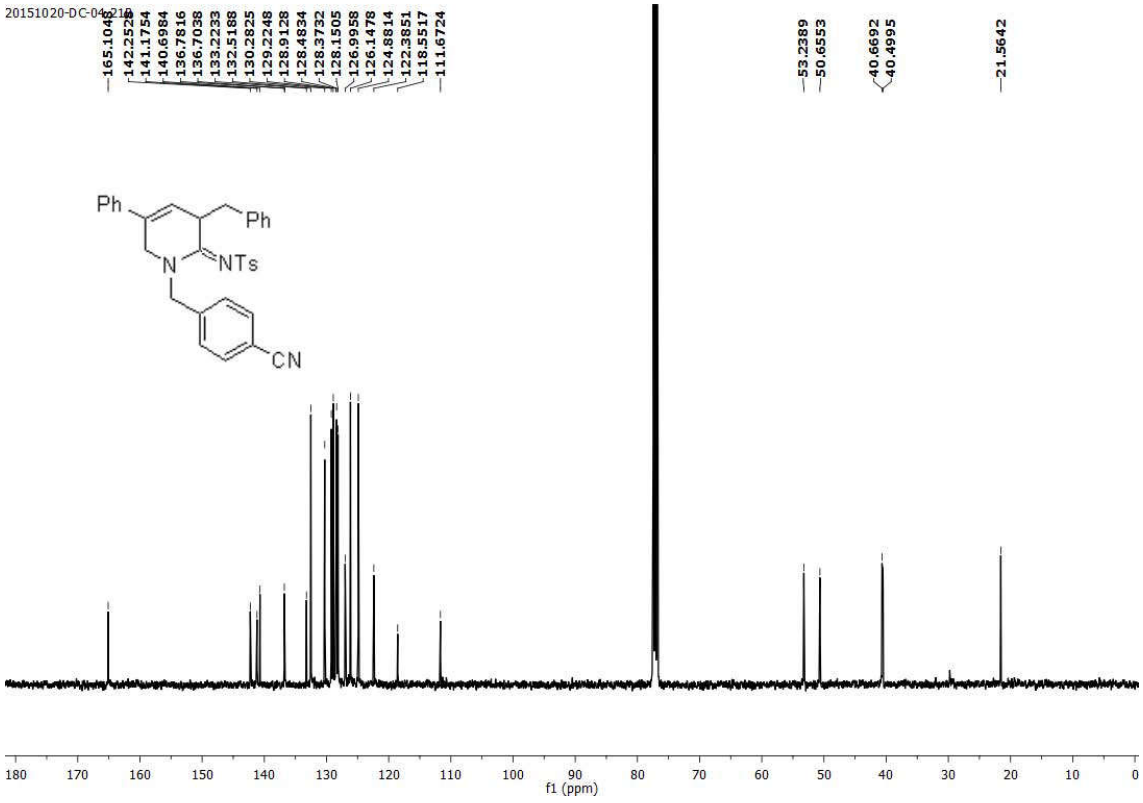

Fig. S77 ^{13}C NMR of **22c** in $CDCl_3$.

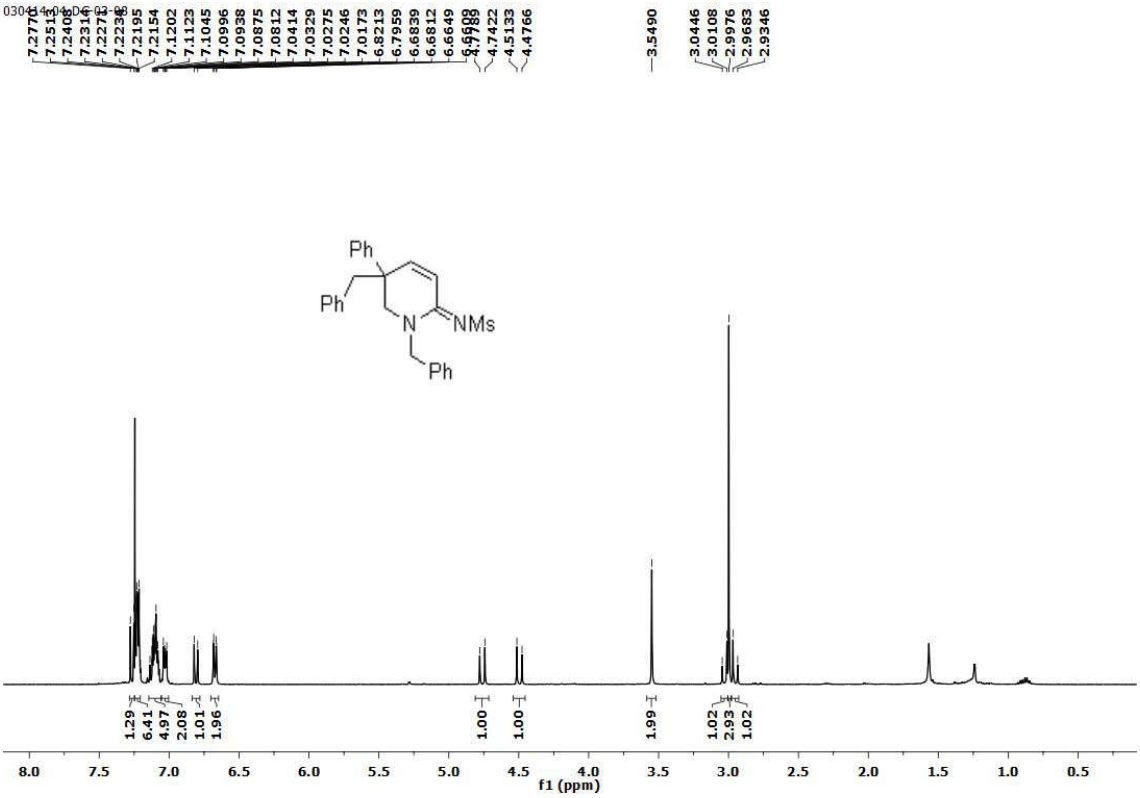

Fig. S78 ^{1}H NMR of **25b** in $CDCl_3$.

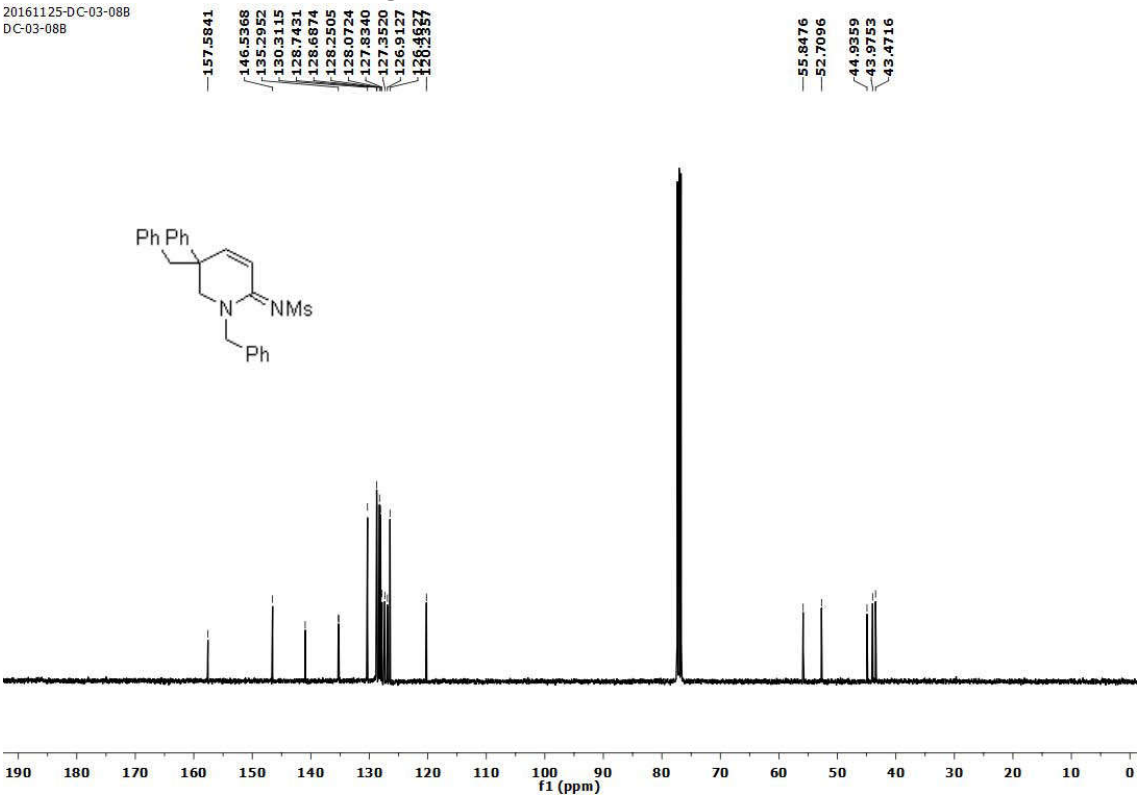

Fig. S79 ^{13}C NMR of **25b** in $CDCl_3$.

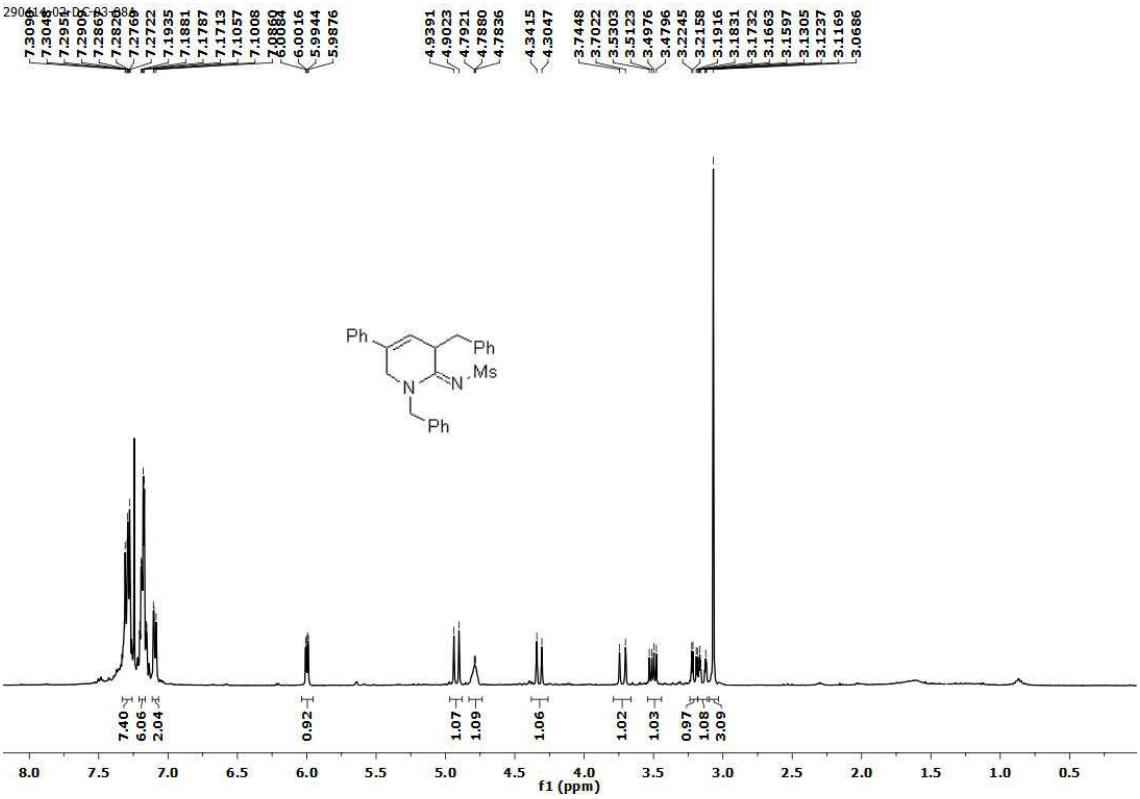

Fig. S80 ^{1}H NMR of **25c** in $CDCl_3$.

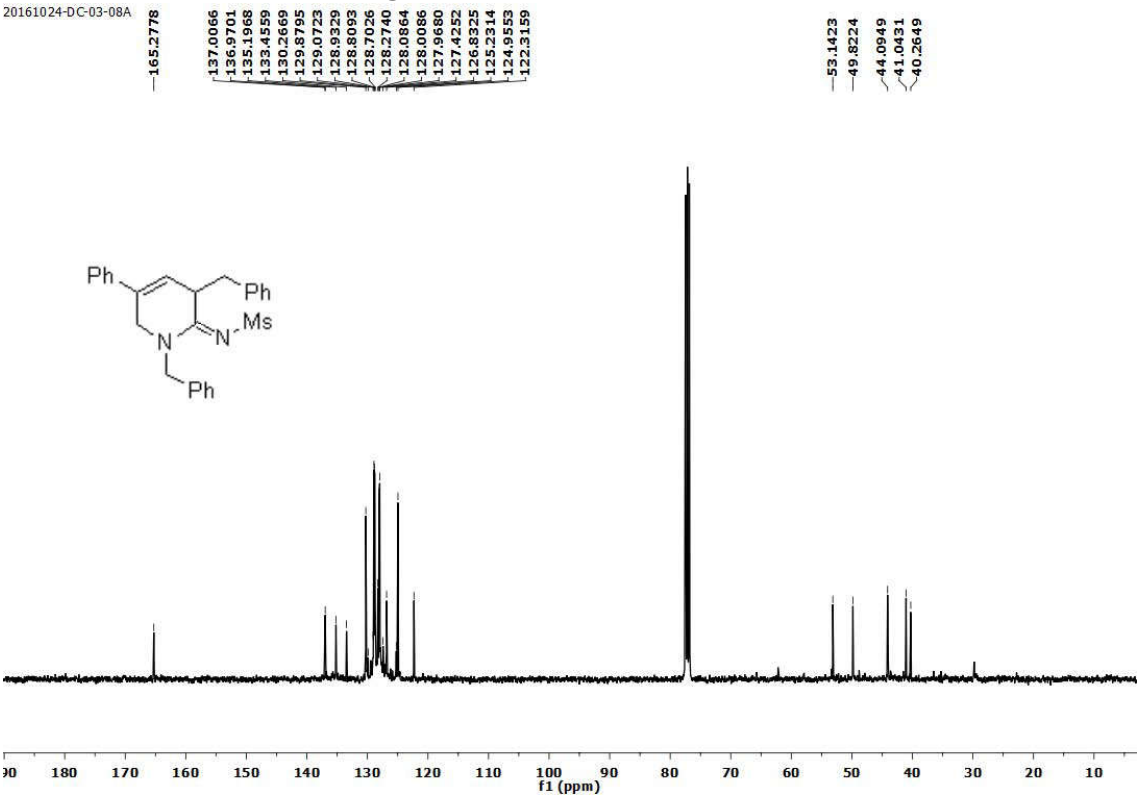

Fig. S81 ^{13}C NMR of **25c** in $CDCl_3$.

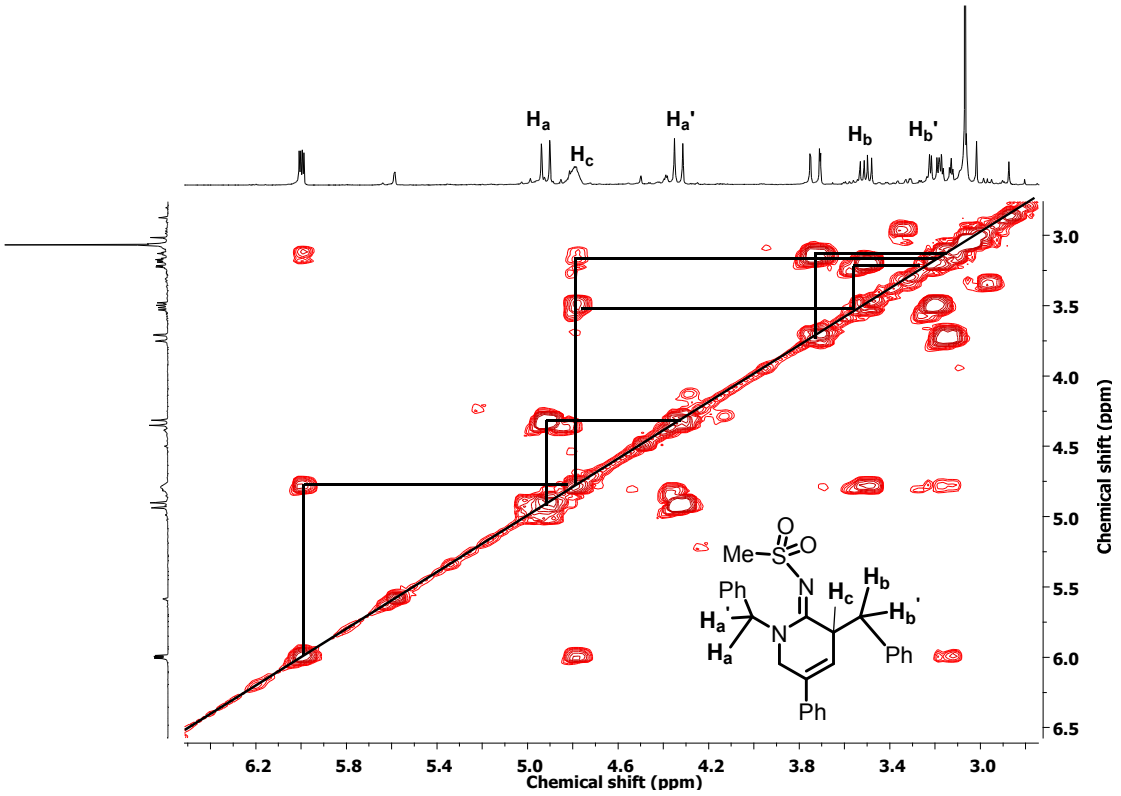

Fig. S82 COSY NMR spectrum of **25c** in $CDCl_3$.

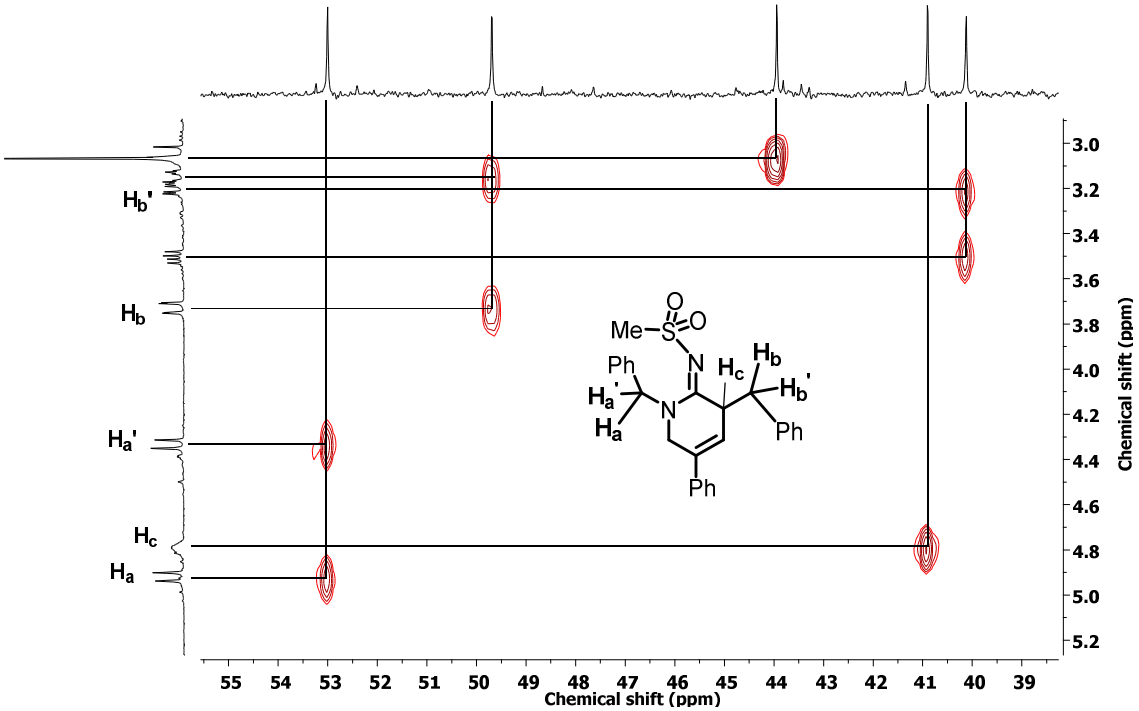

Fig. S83 Hetcor NMR spectrum of **25c** in $CDCl_3$.

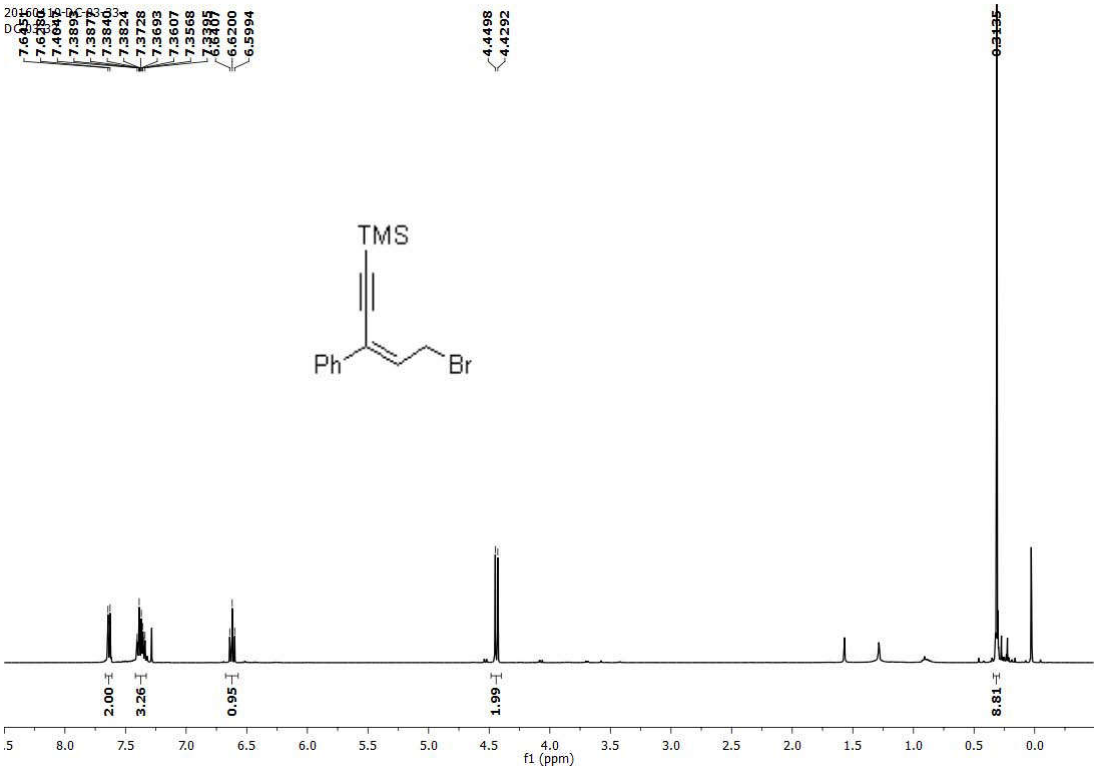

Fig. S84 ^{1}H NMR of **S24** in $CDCl_3$.

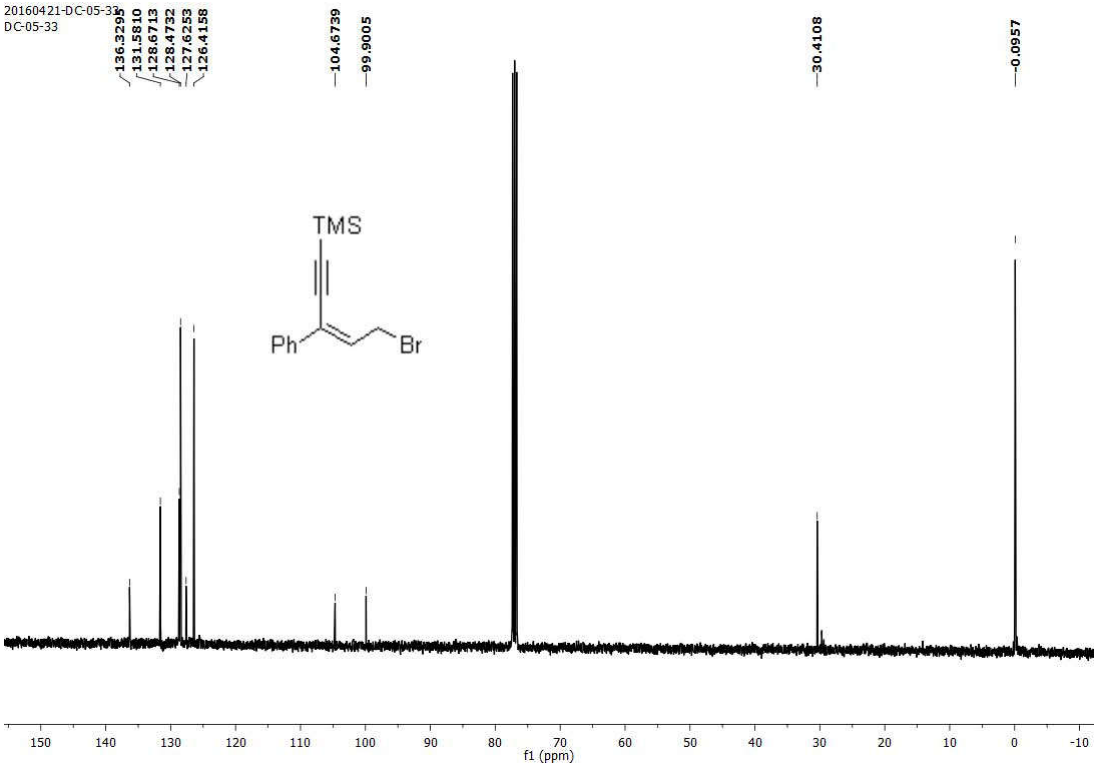

Fig. S85 ^{13}C NMR of **S24** in $CDCl_3$.

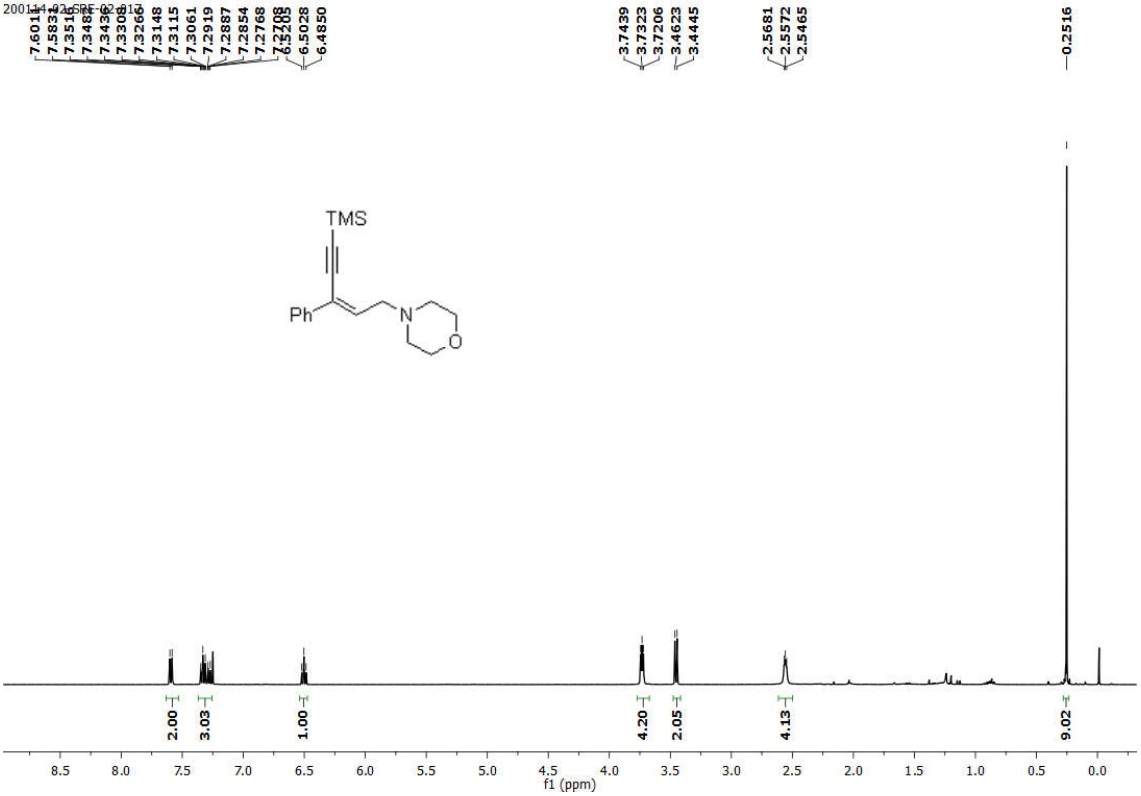

Fig. S86 ^{1}H NMR of **S24** in $CDCl_3$.

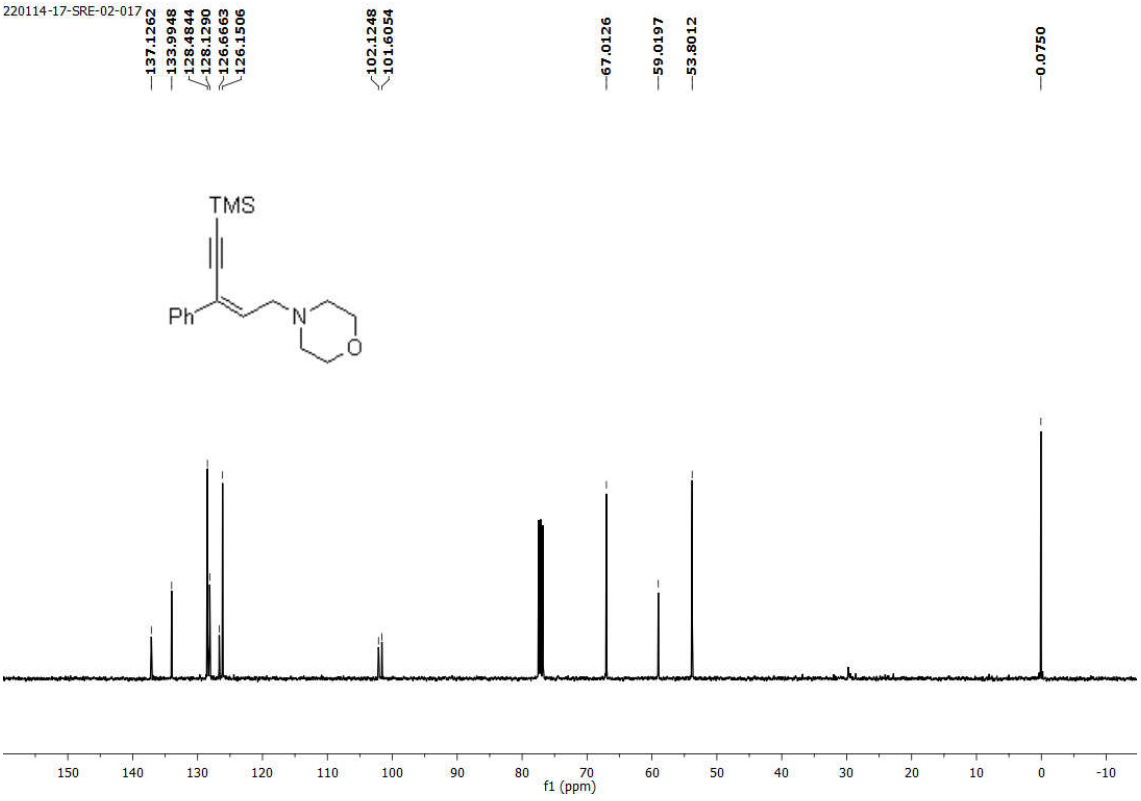

Fig. S87 ^{13}C NMR of **S24** in $CDCl_3$.

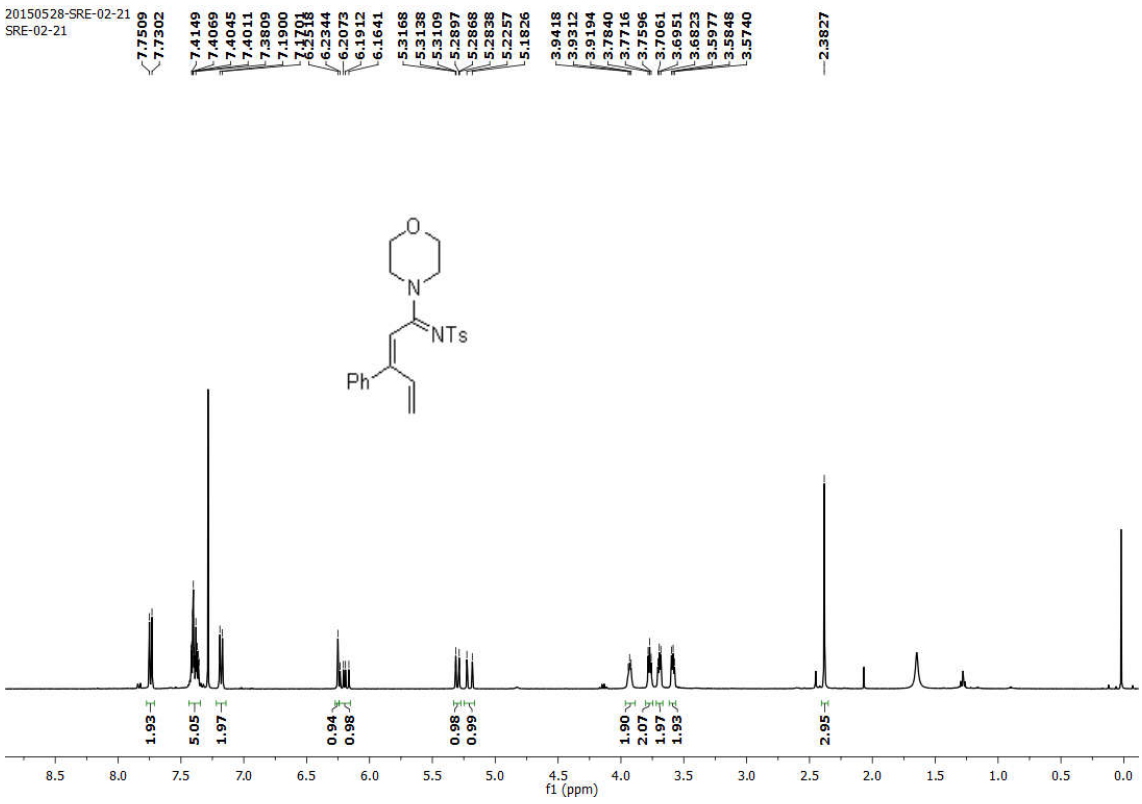

Fig. S88 ^{1}H NMR of **3a** in $CDCl_3$.

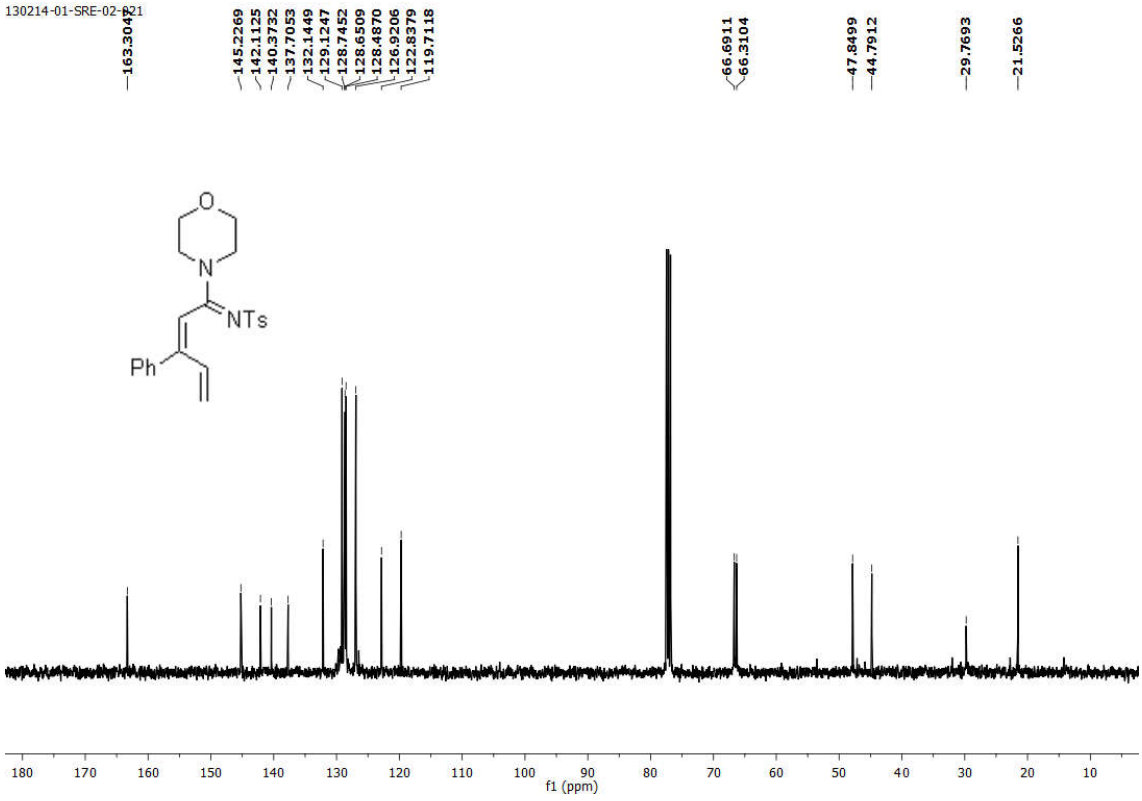

Fig. S89 ^{13}C NMR of **3a** in $CDCl_3$

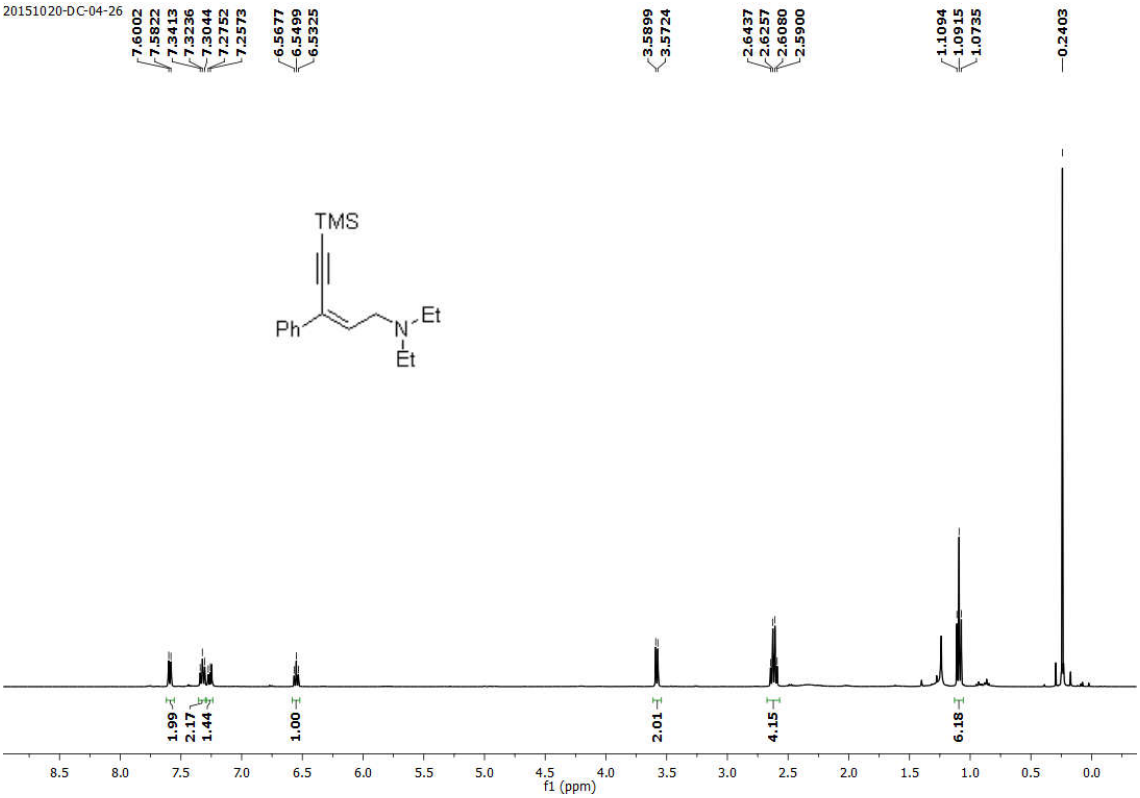

Fig. S90 ^{1}H NMR of **S25** in $CDCl_3$.

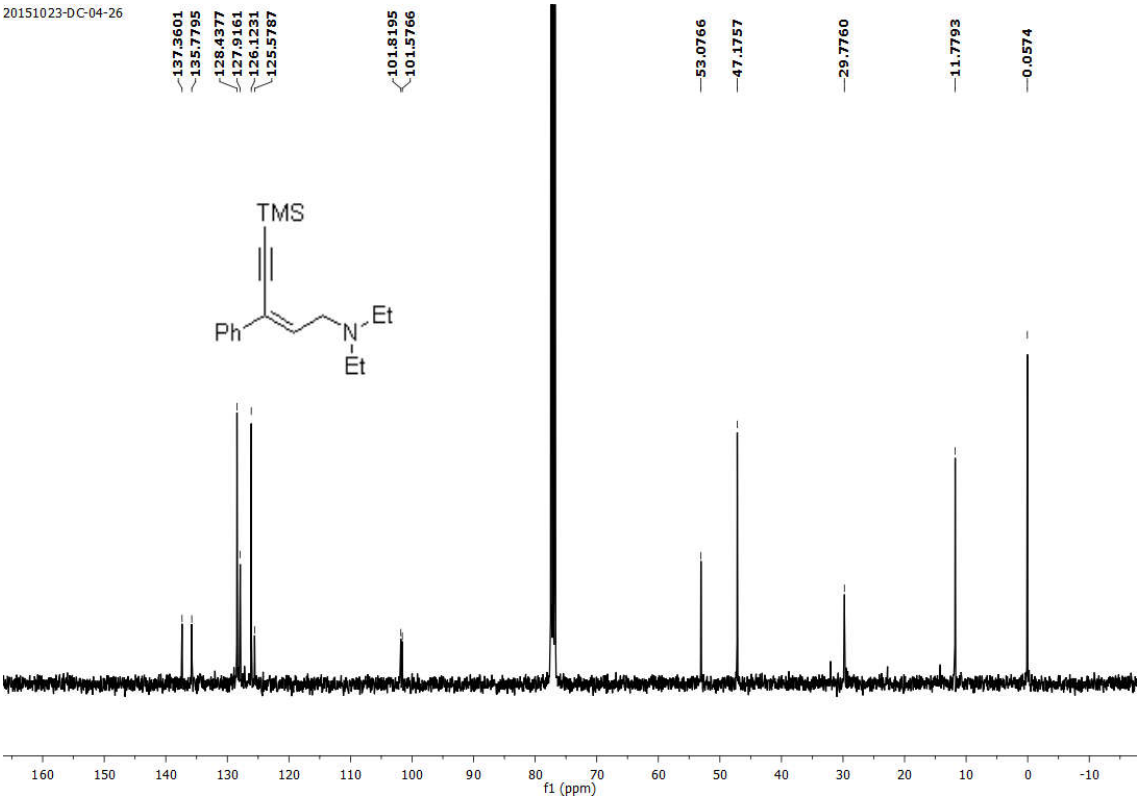

Fig. S91 ^{13}C NMR of **S25** in $CDCl_3$.

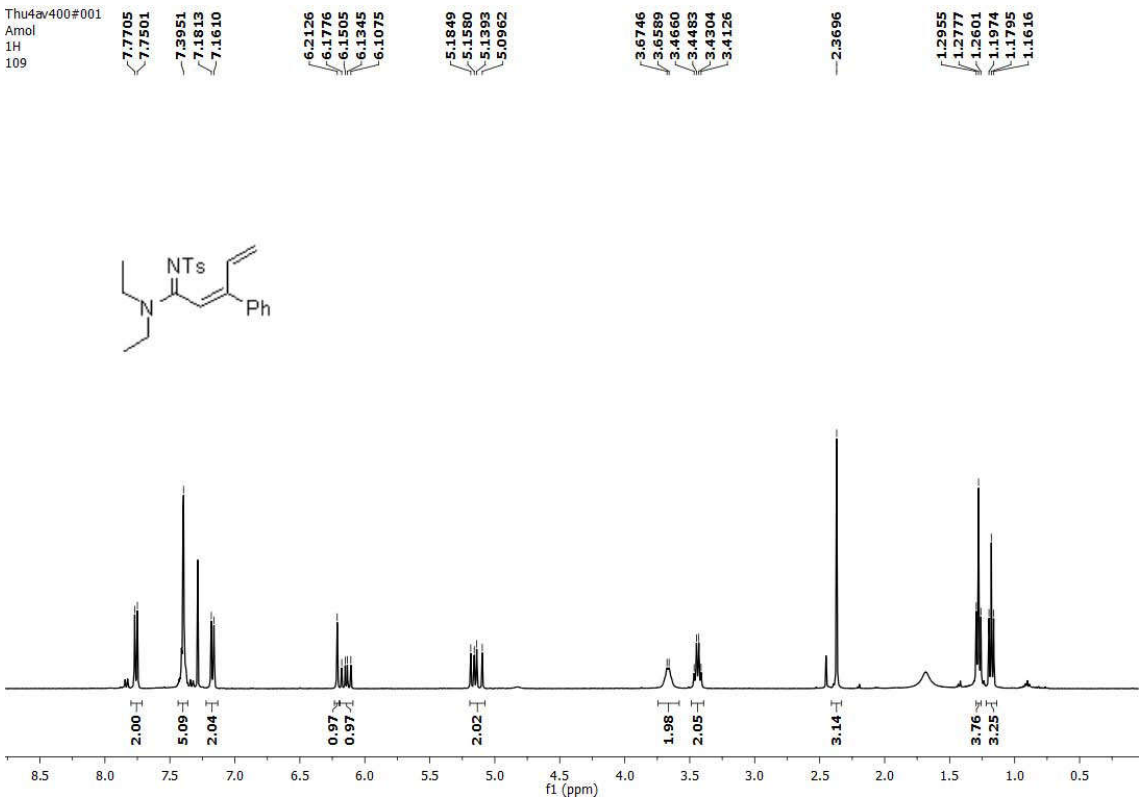

Fig. S92 ^{1}H NMR of **5a** in $CDCl_3$.

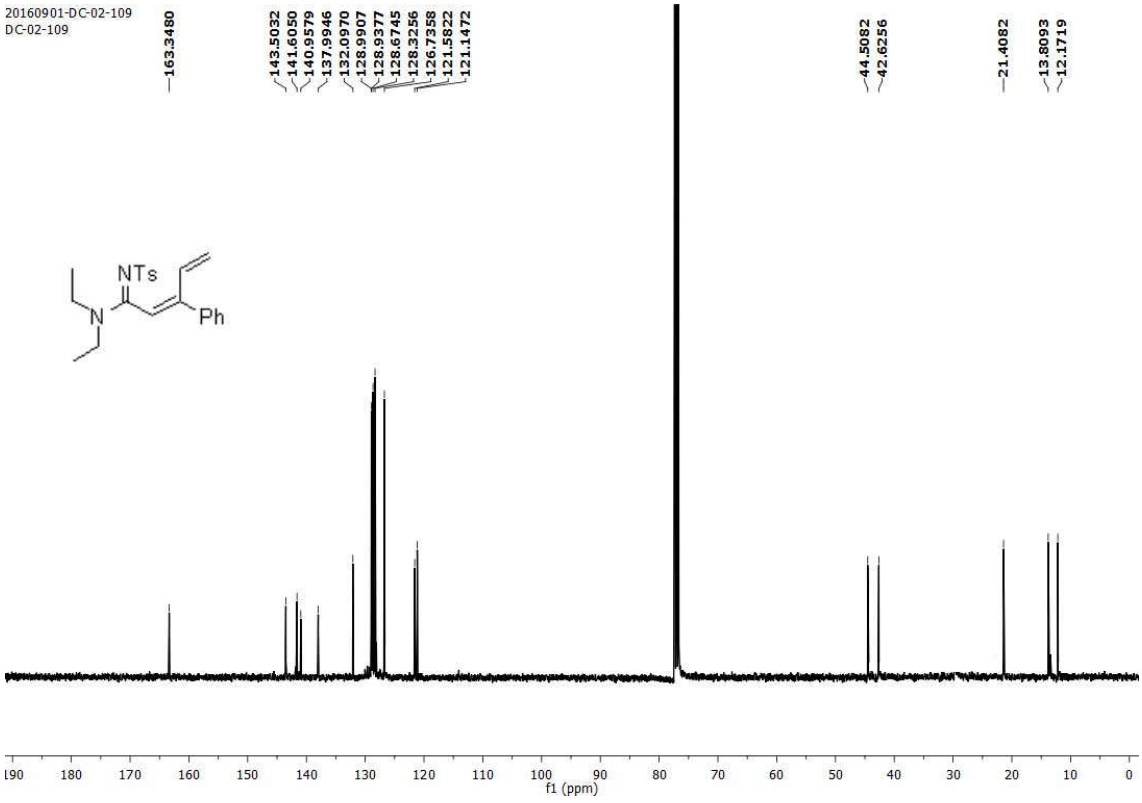

Fig. S93 ^{13}C NMR of **5a** in $CDCl_3$.

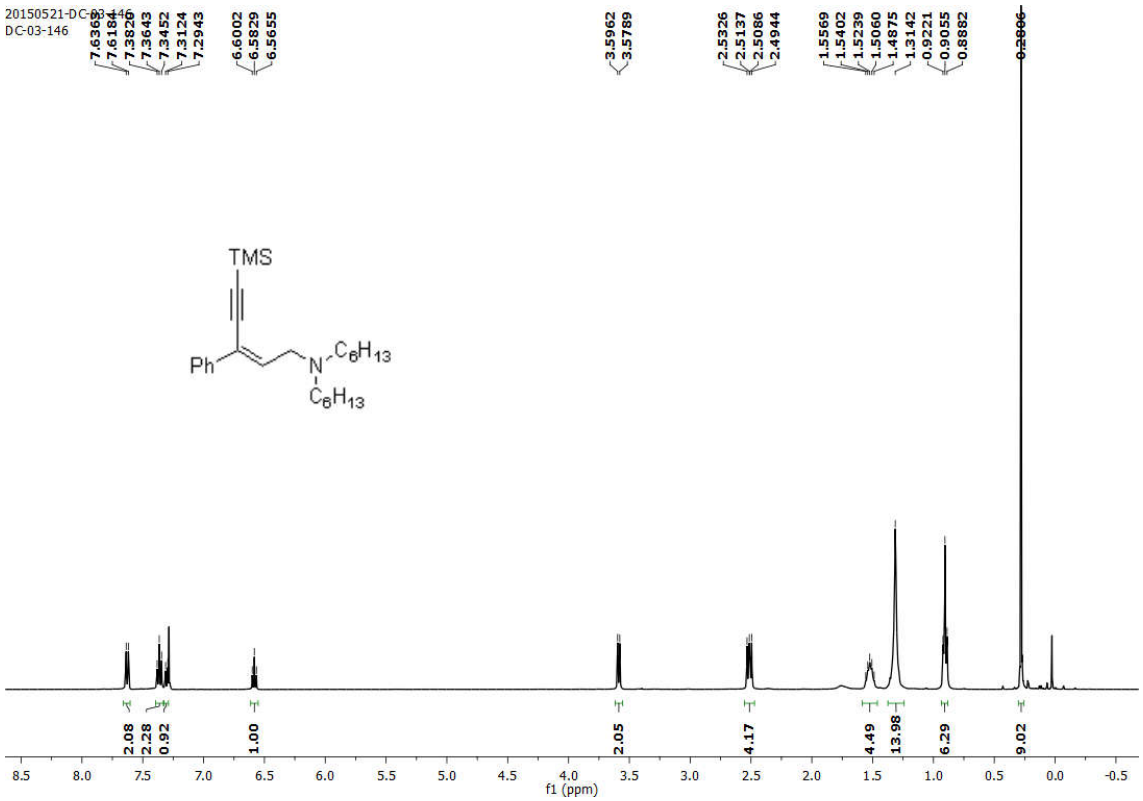

Fig. S94 ^{1}H NMR of **S26** in $CDCl_3$.

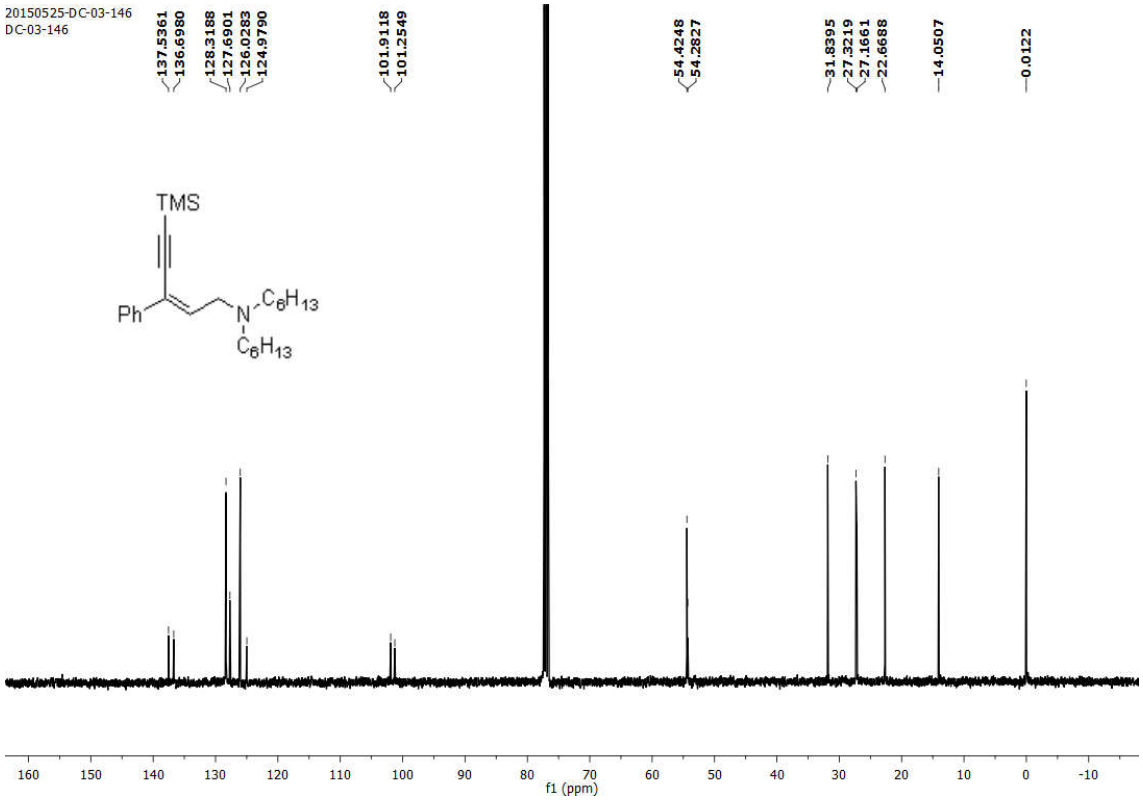

Fig. S95 ^{13}C NMR of **S26** in $CDCl_3$.

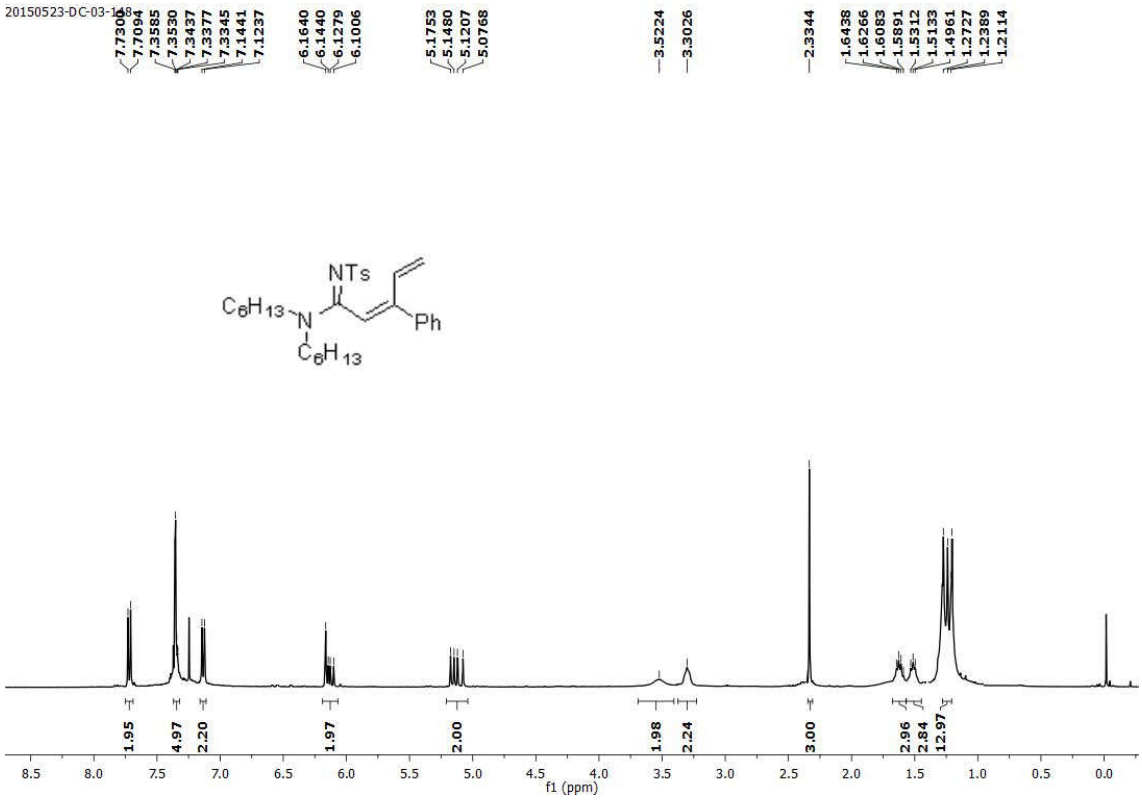

Fig. S96 ^{1}H NMR of **8a** in $CDCl_3$.

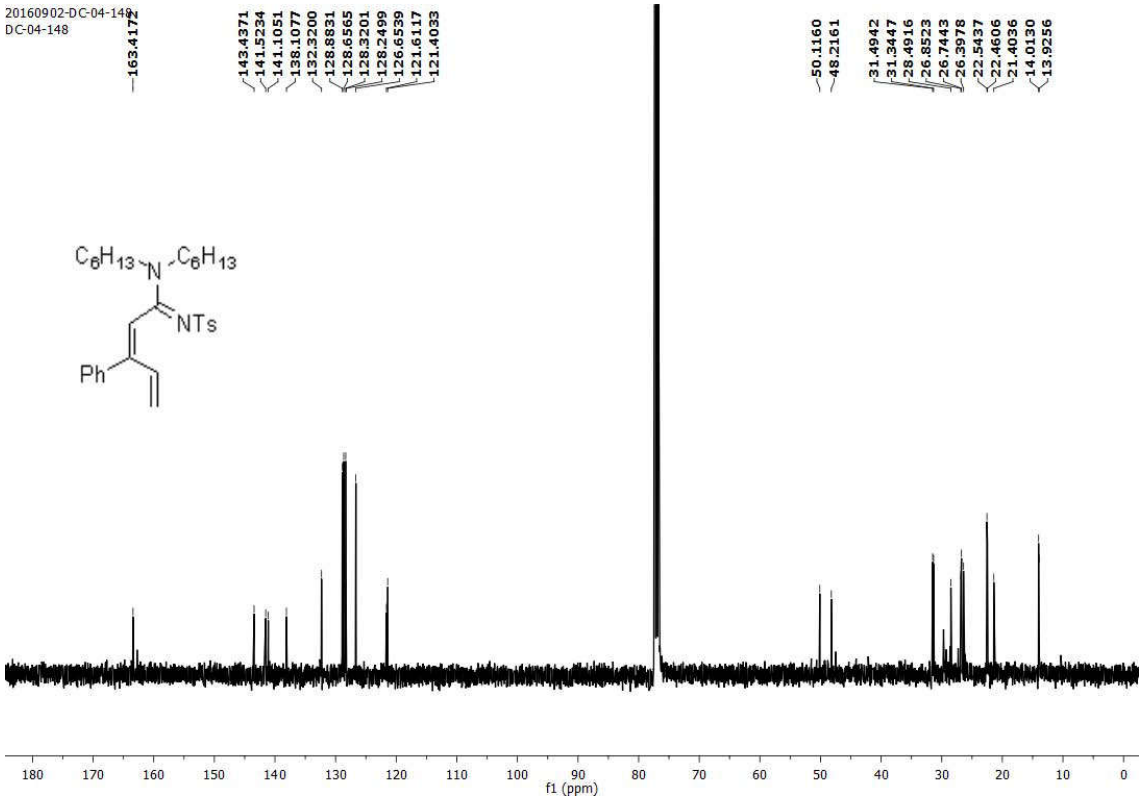

Fig. S97 ^{13}C NMR of **8a** in $CDCl_3$.

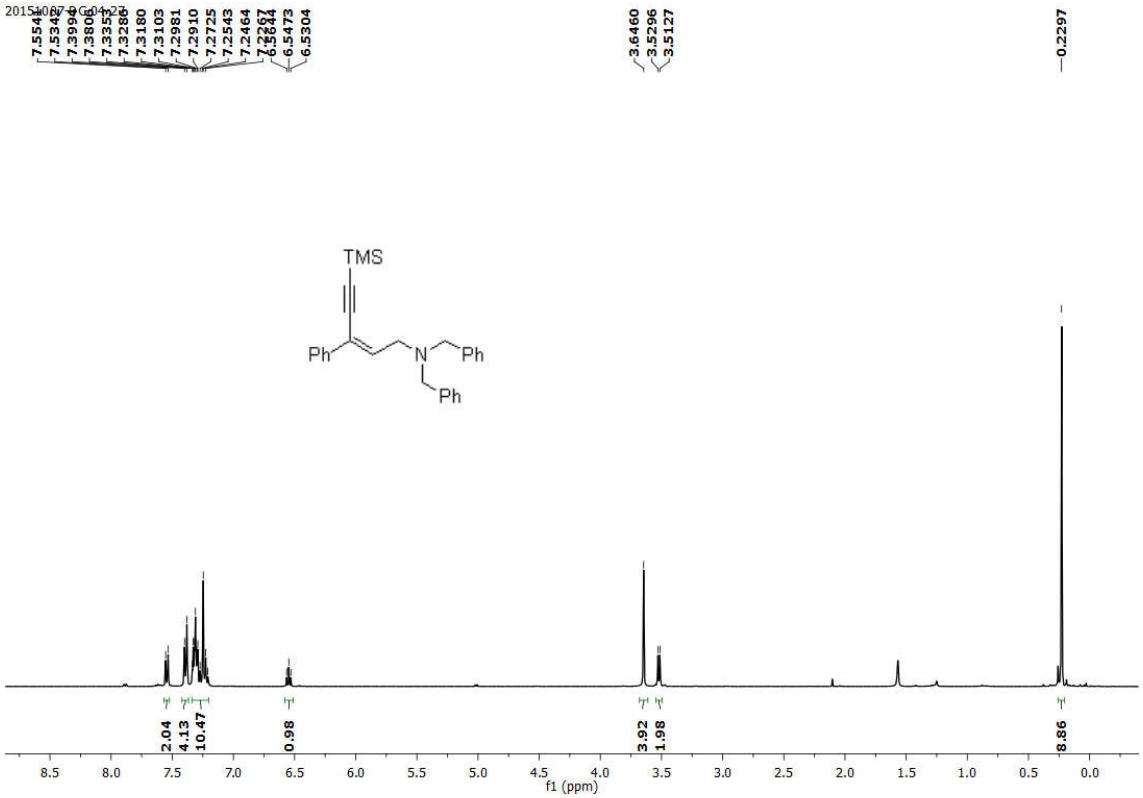

Fig. S98 ^{1}H NMR of **S27** in $CDCl_3$.

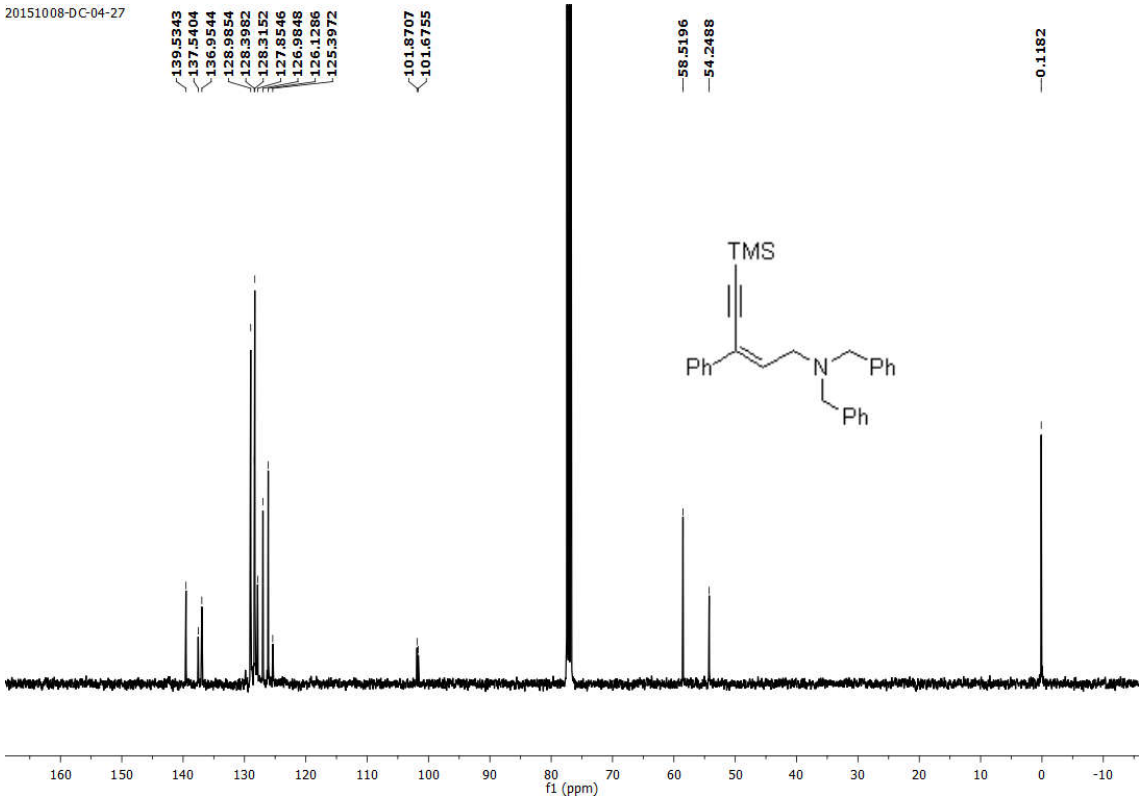

Fig. S99 ^{13}C NMR of **S27** in $CDCl_3$.

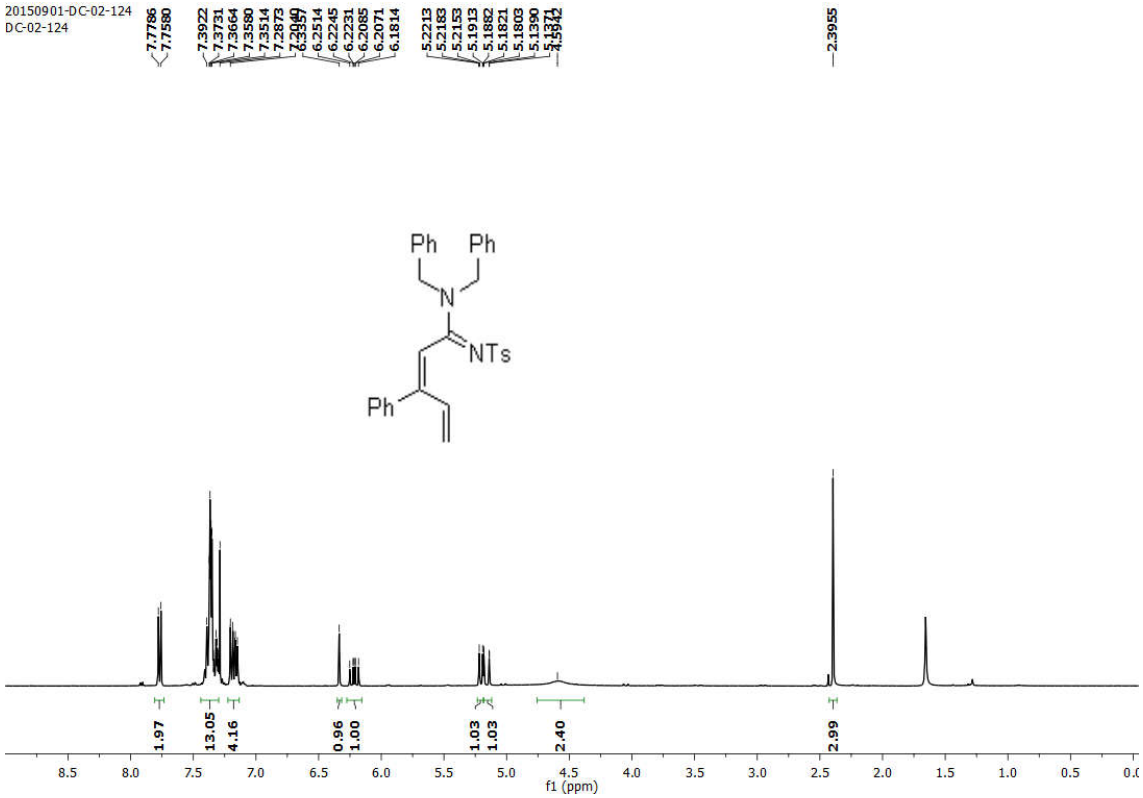

Fig. S100 ^{1}H NMR of **11a** in $CDCl_3$.

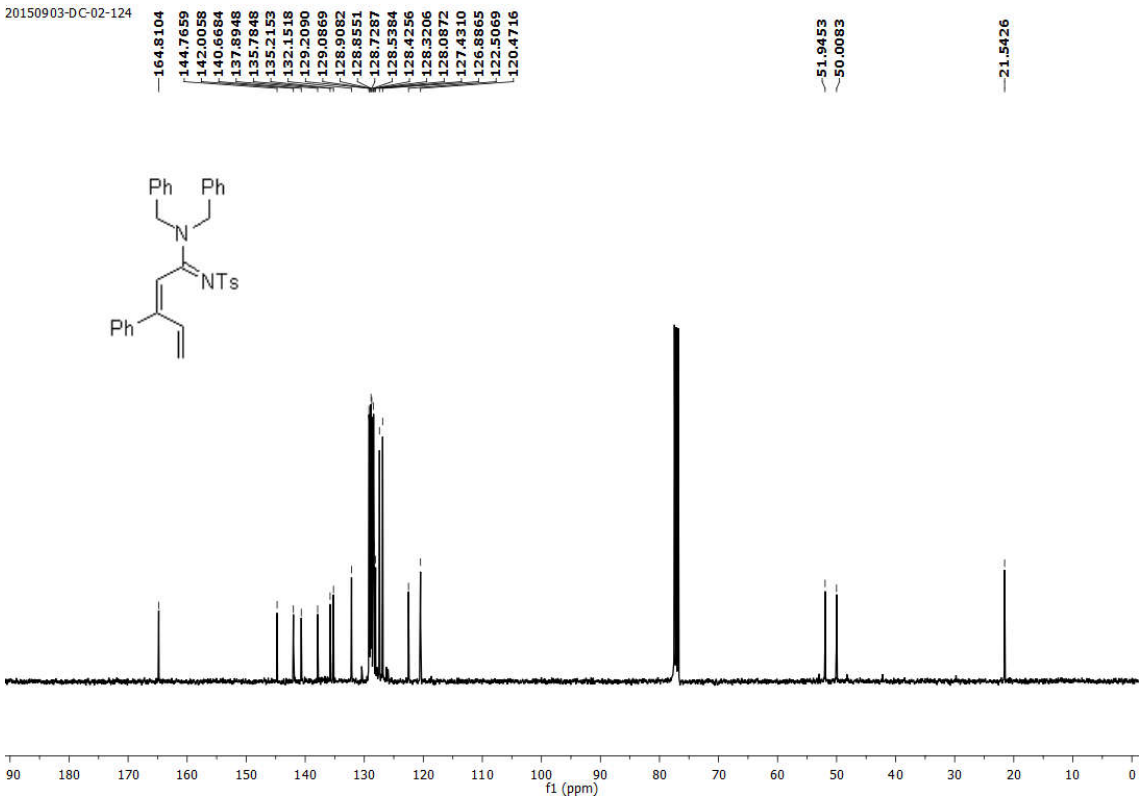

Fig. S101 ^{13}C NMR of **11a** in $CDCl_3$.

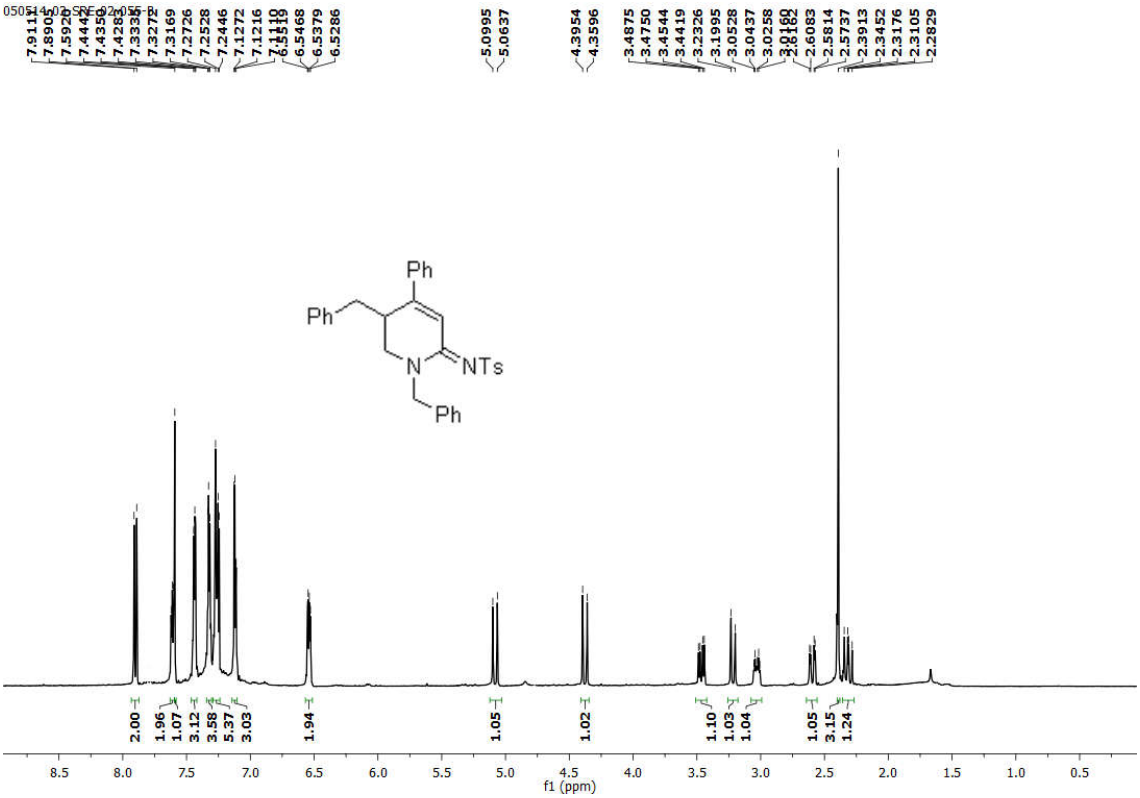

Fig. S102 ^{1}H NMR of **11b** in $CDCl_3$.

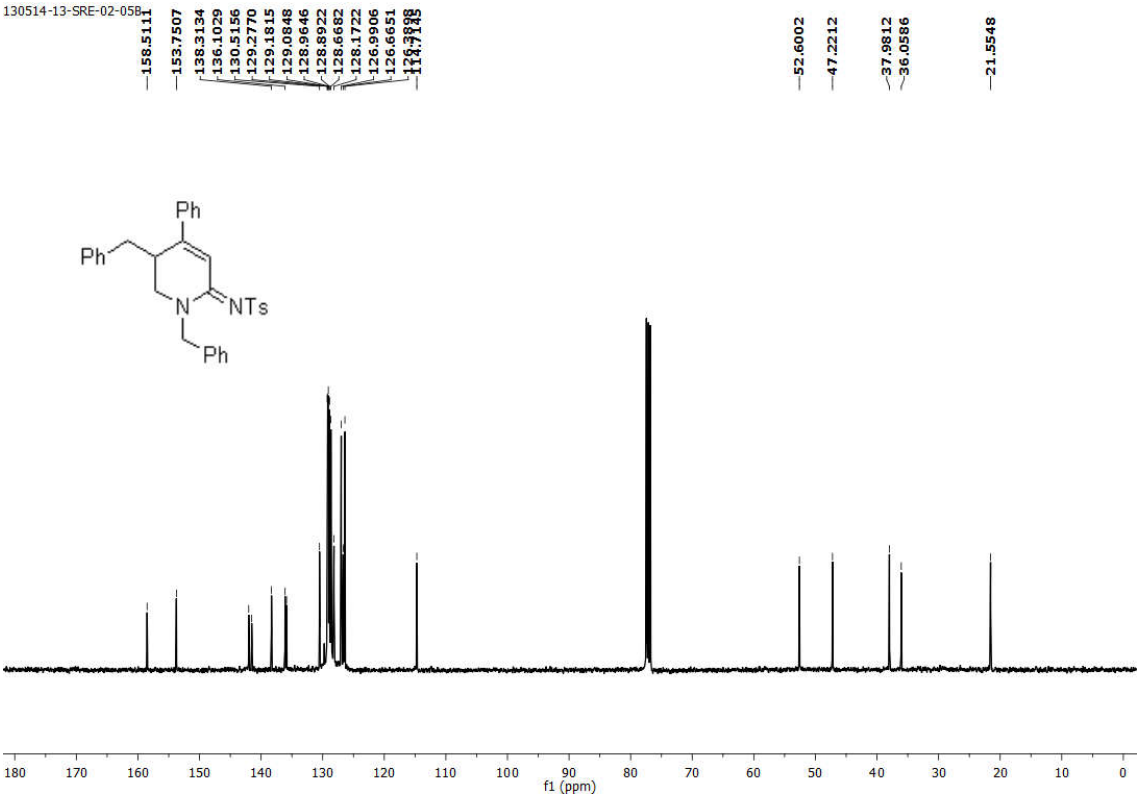

Fig. S103 ^{13}C NMR of **11b** in $CDCl_3$.

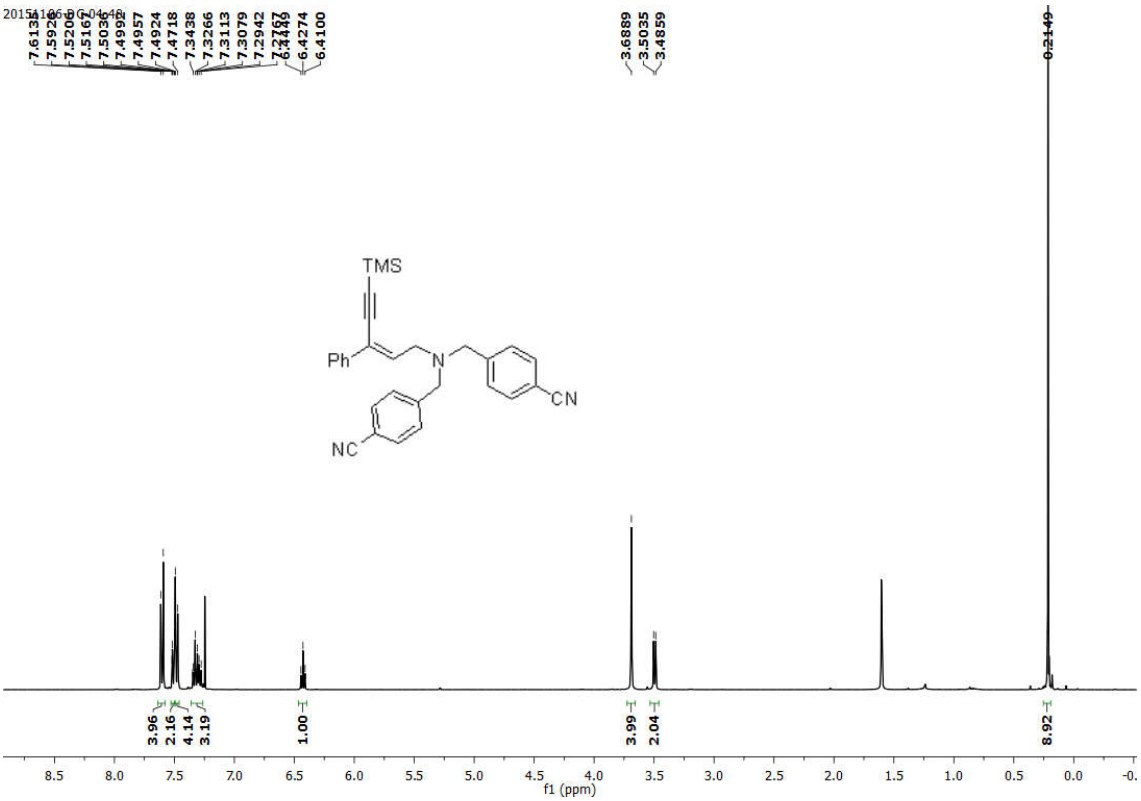

Fig. S104 ^{1}H NMR of **S28** in $CDCl_3$.

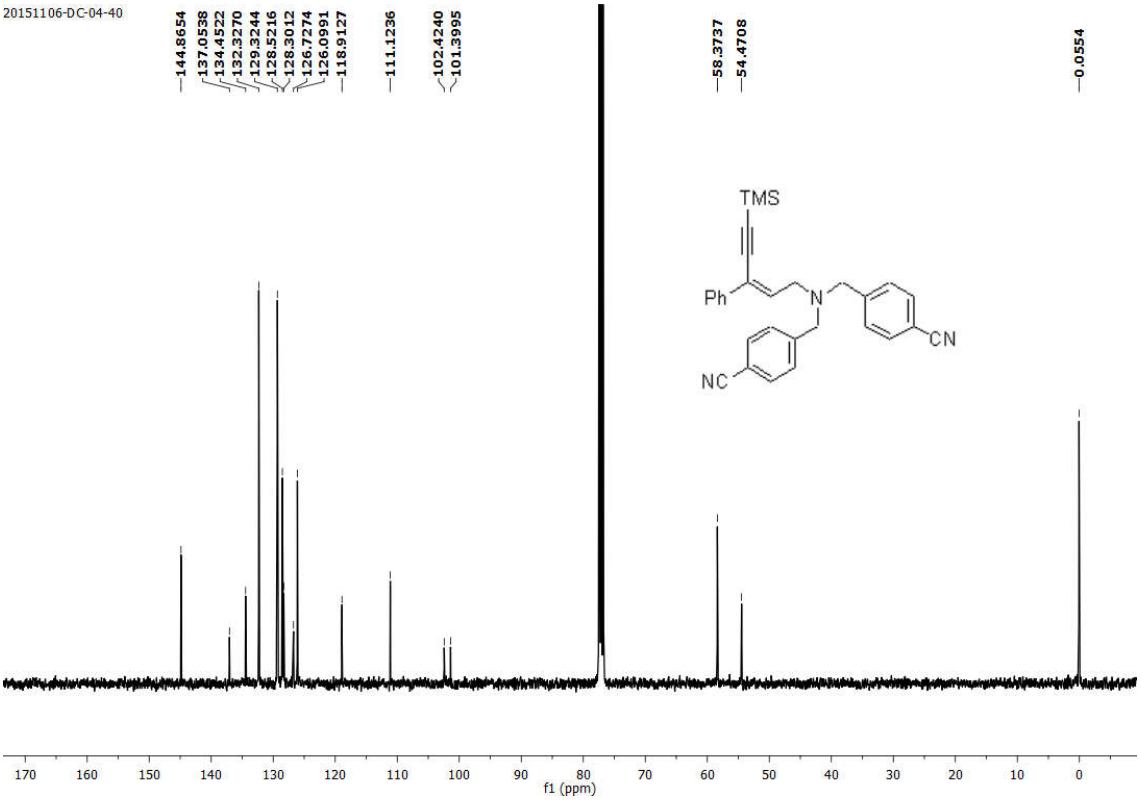

Fig. S105 ^{13}C NMR of **S28** in $CDCl_3$.

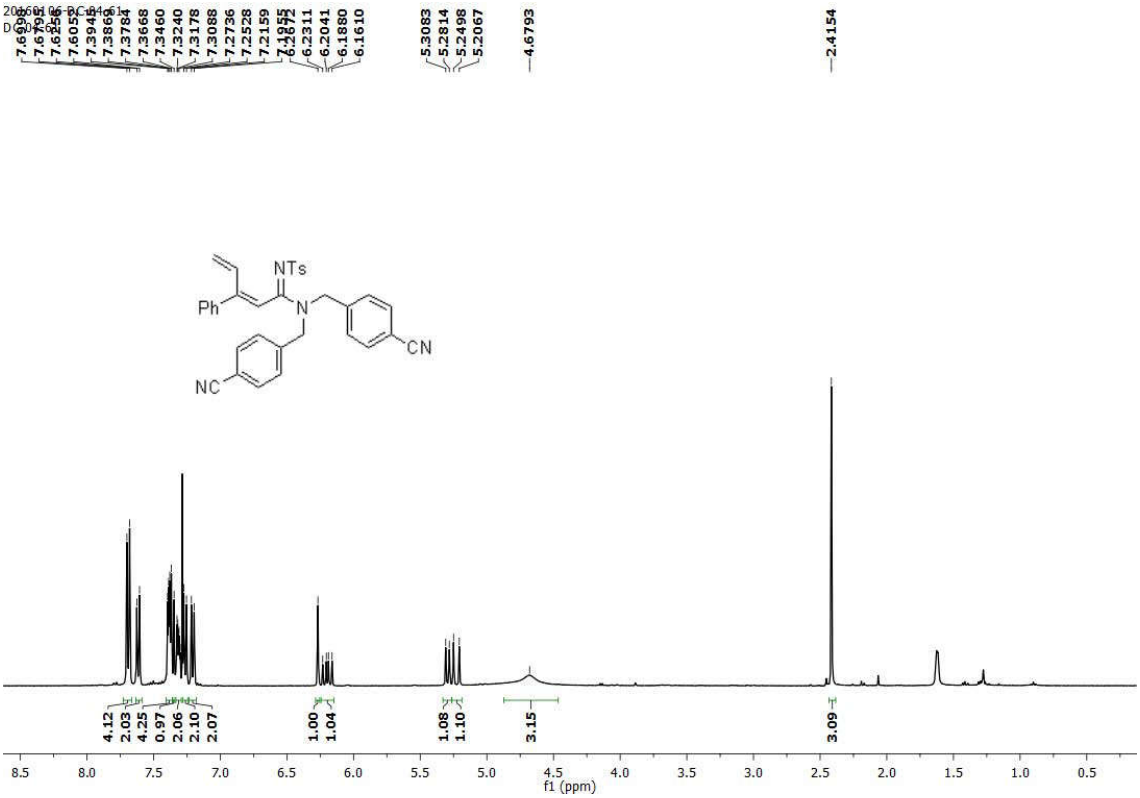

Fig. S106 ^{1}H NMR of **15a** in $CDCl_3$.

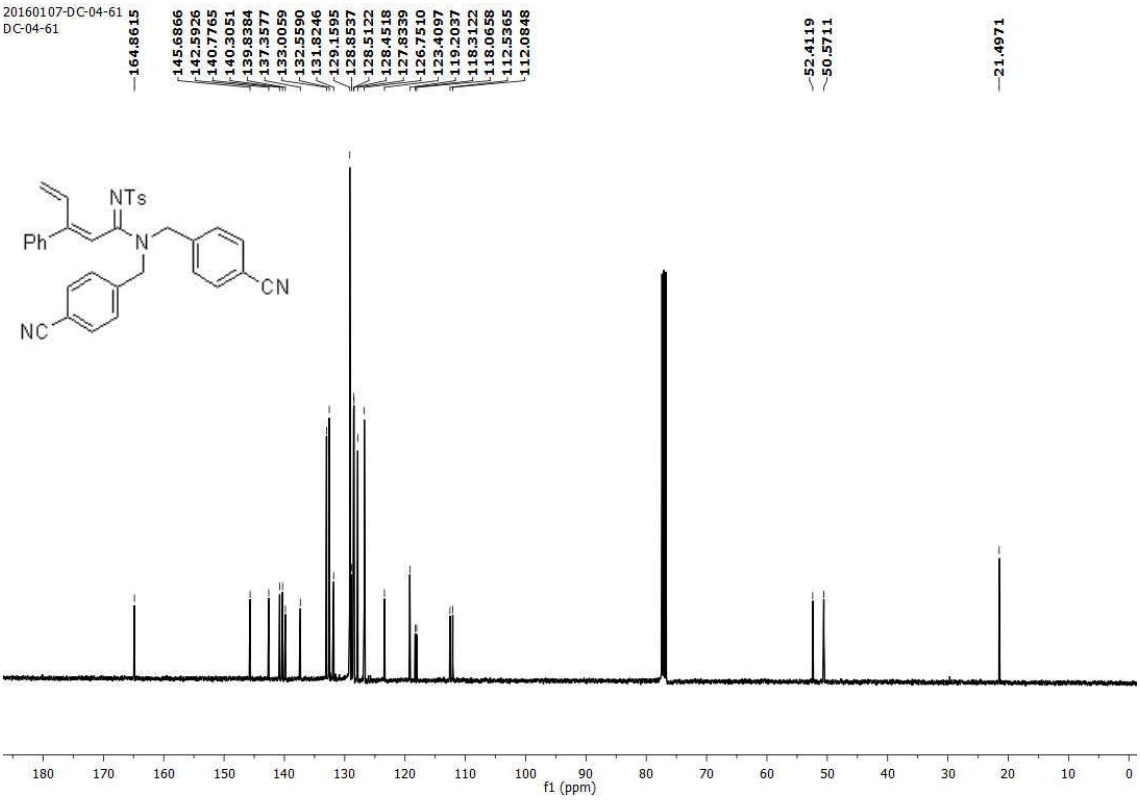

Fig. S107 ^{13}C NMR of **15a** in $CDCl_3$.

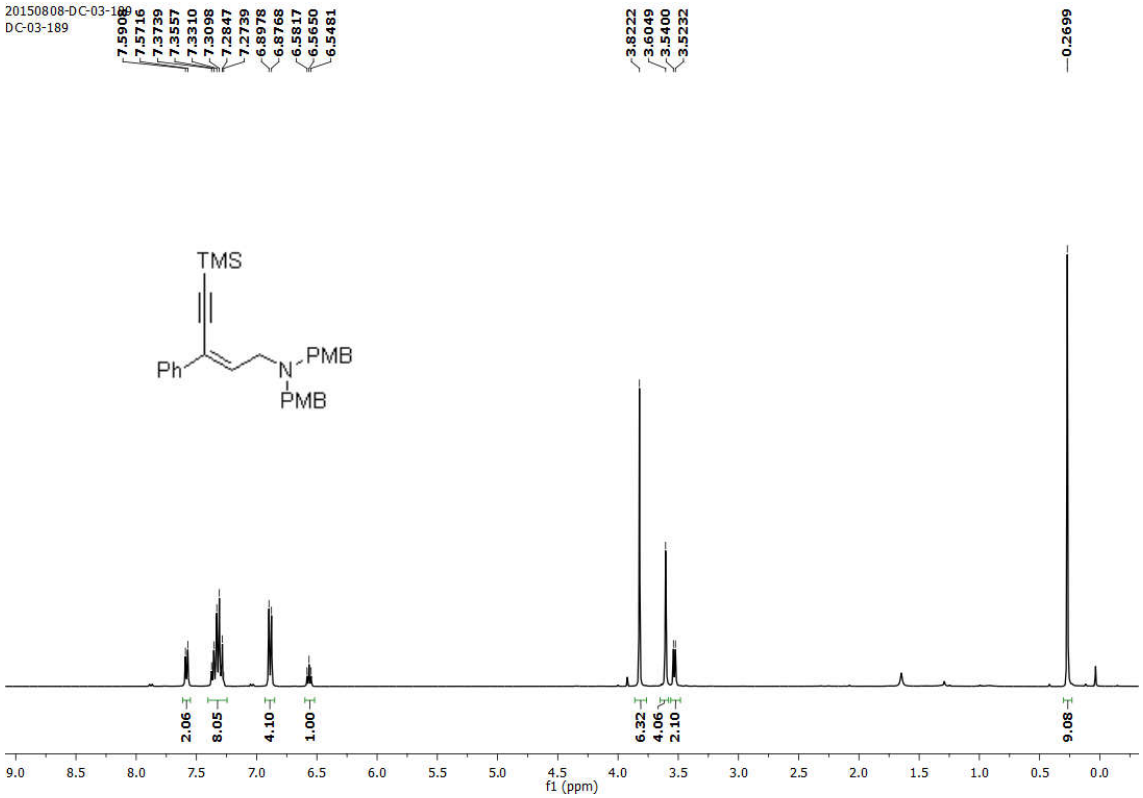

Fig. S108 ^{1}H NMR of **S29** in $CDCl_3$.

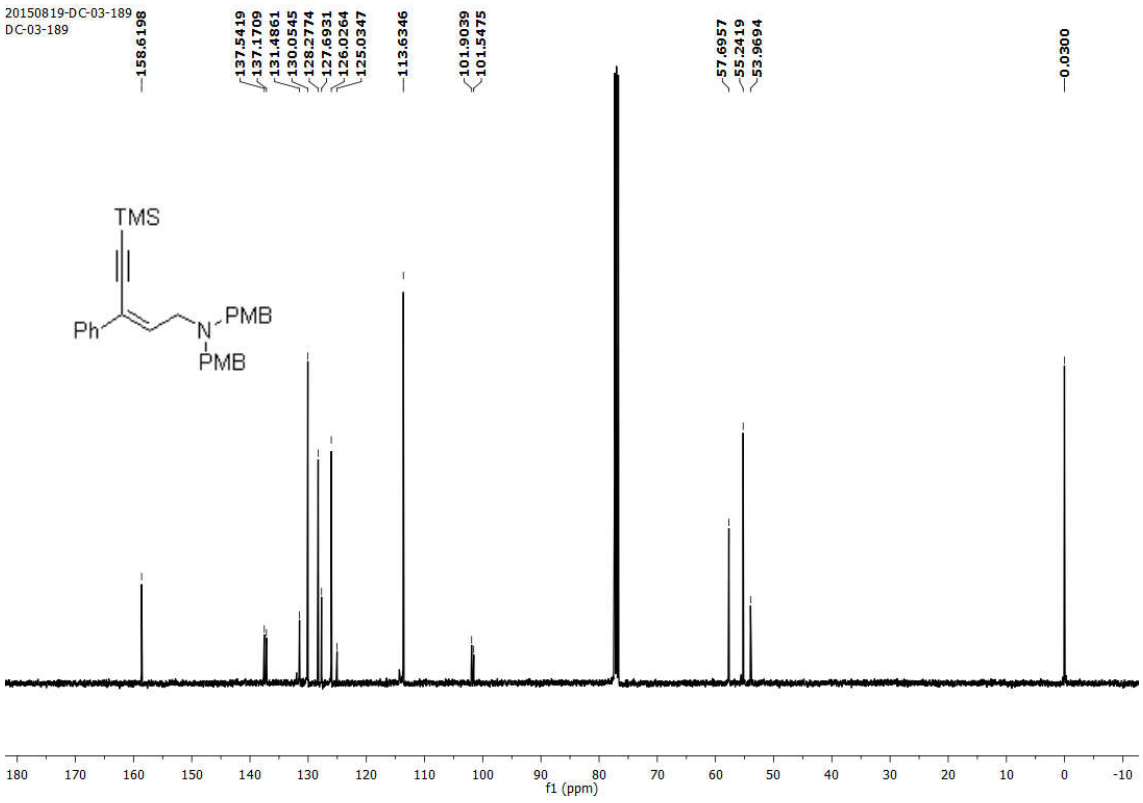

Fig. S109 ^{13}C NMR of **S29** in $CDCl_3$.

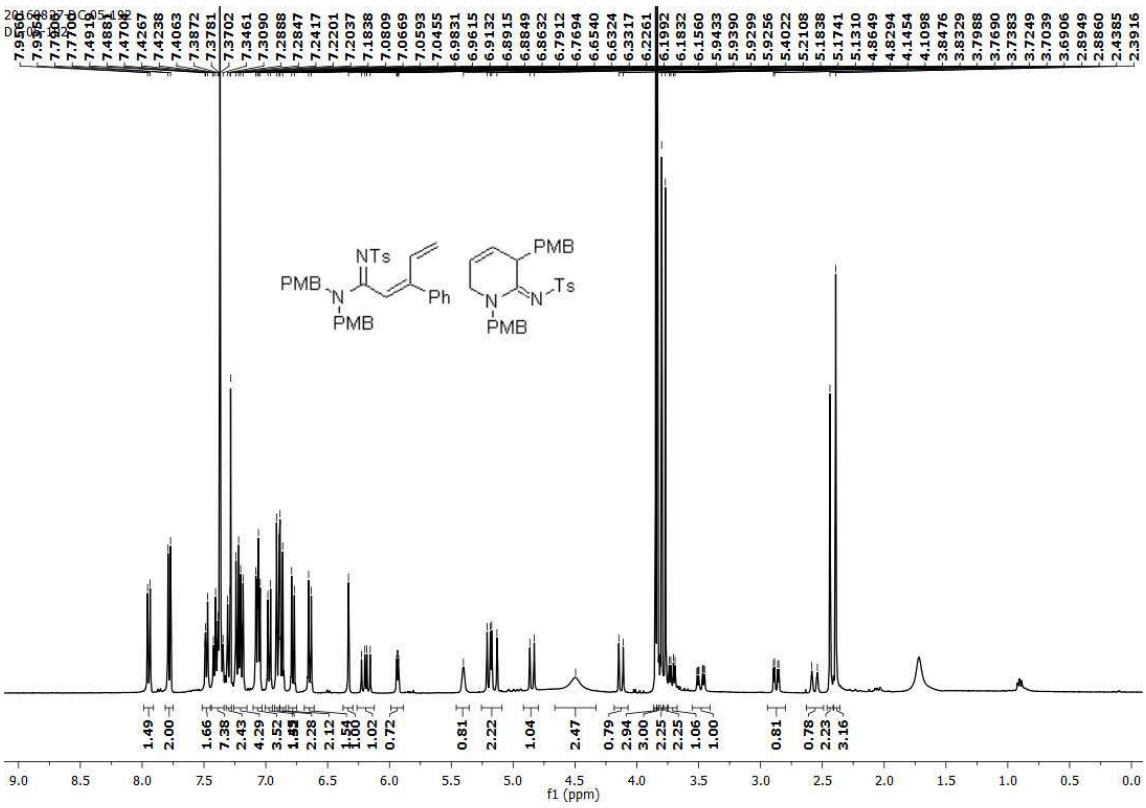

Fig. S110 ^{1}H NMR of mixture of **19a** and **19c** in $CDCl_3$.

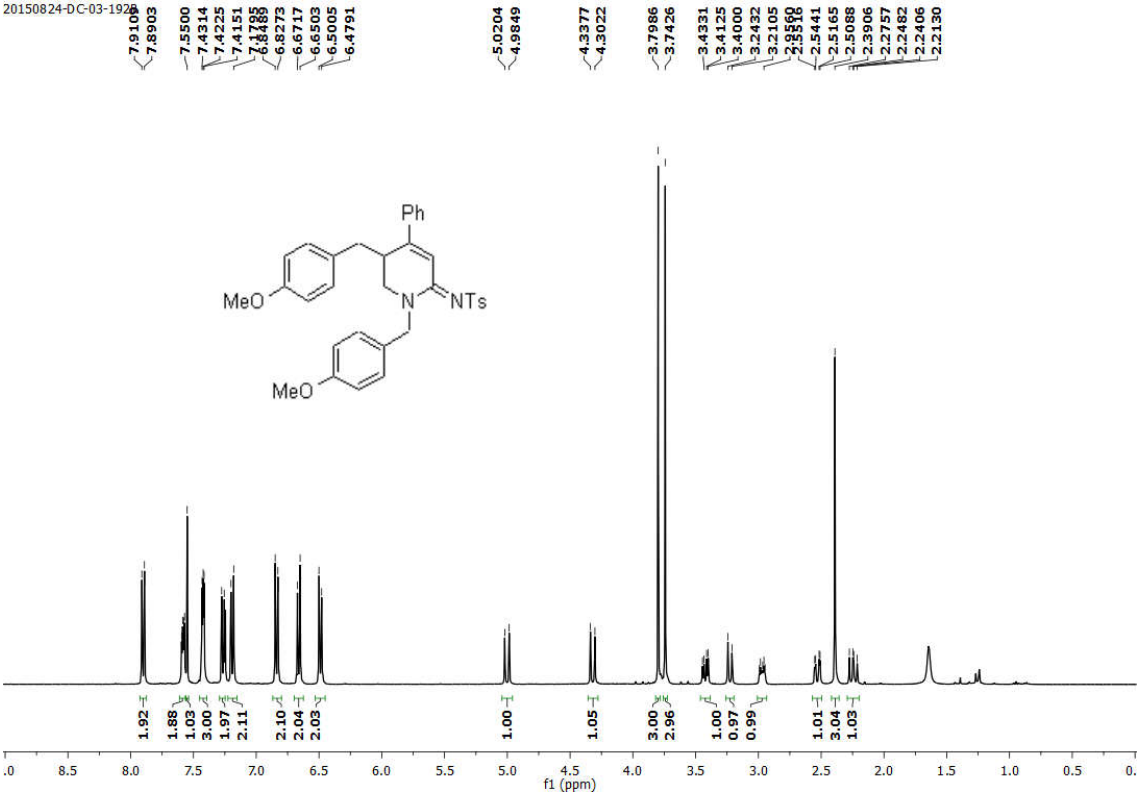

Fig. S111 ^{1}H NMR of **19b** in $CDCl_3$.

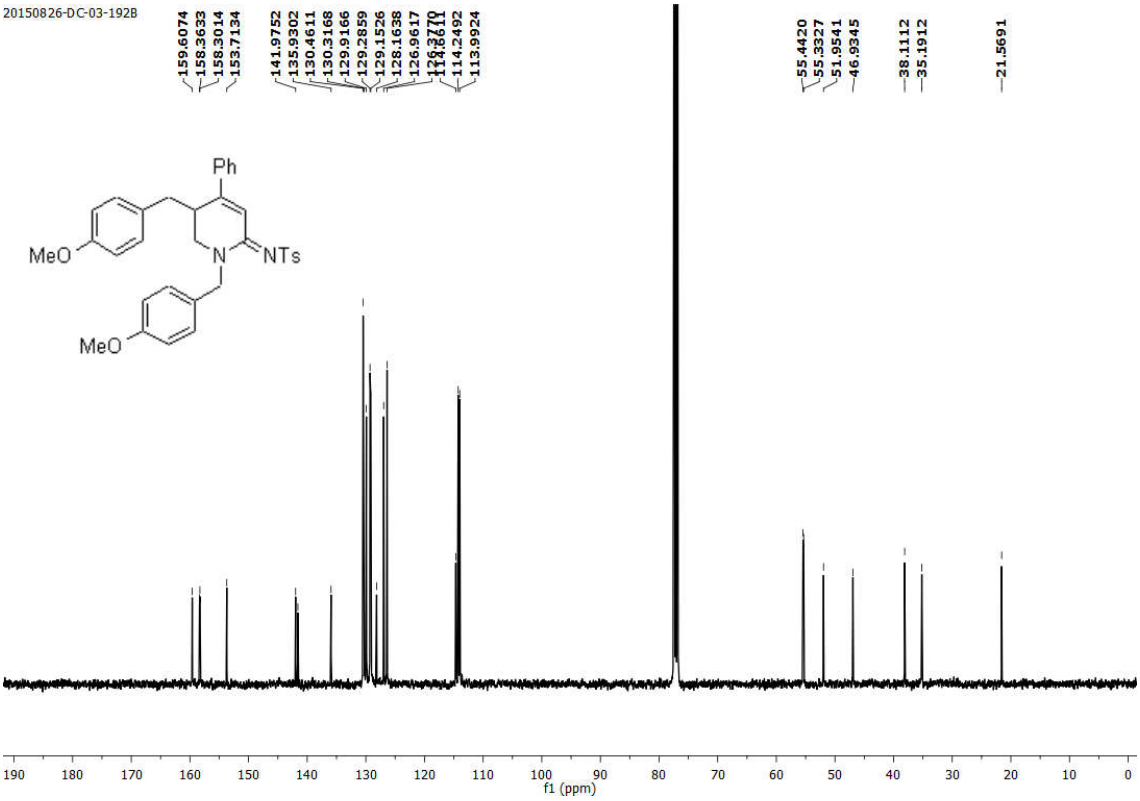

Fig. S112 ^{13}C NMR of **19b** in $CDCl_3$.

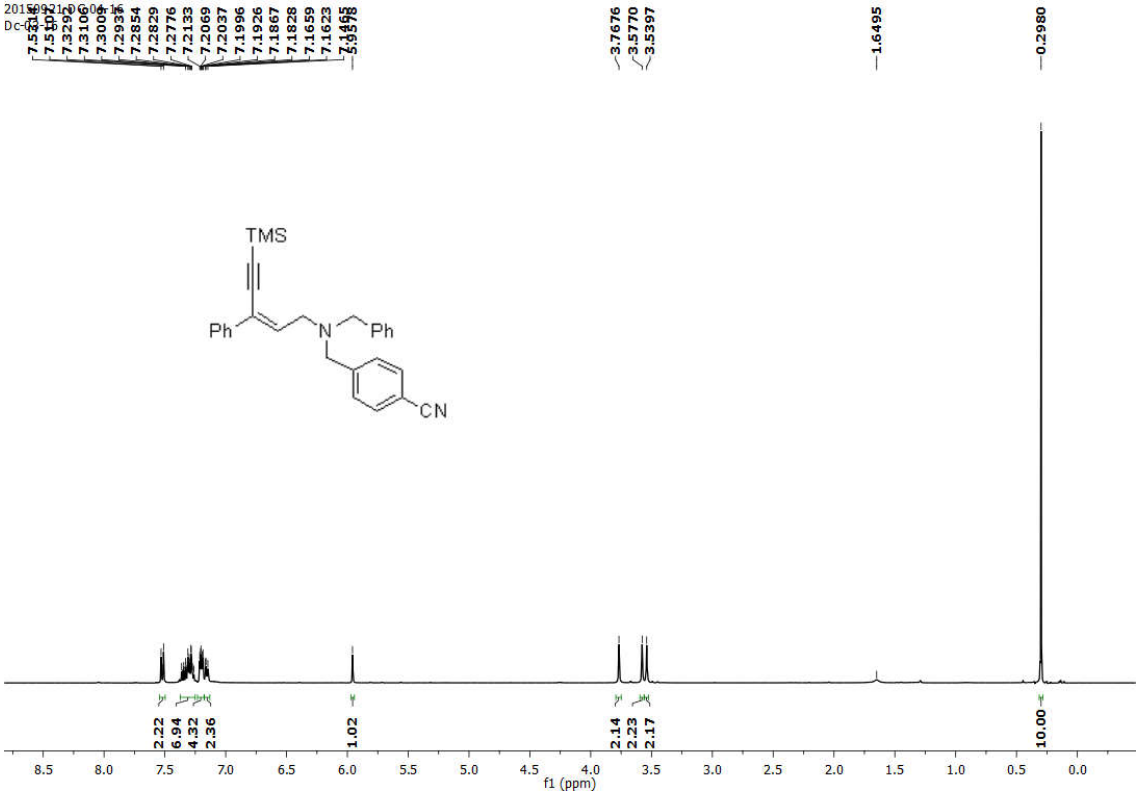

Fig. S113 ^{1}H NMR of **S30** in $CDCl_3$.

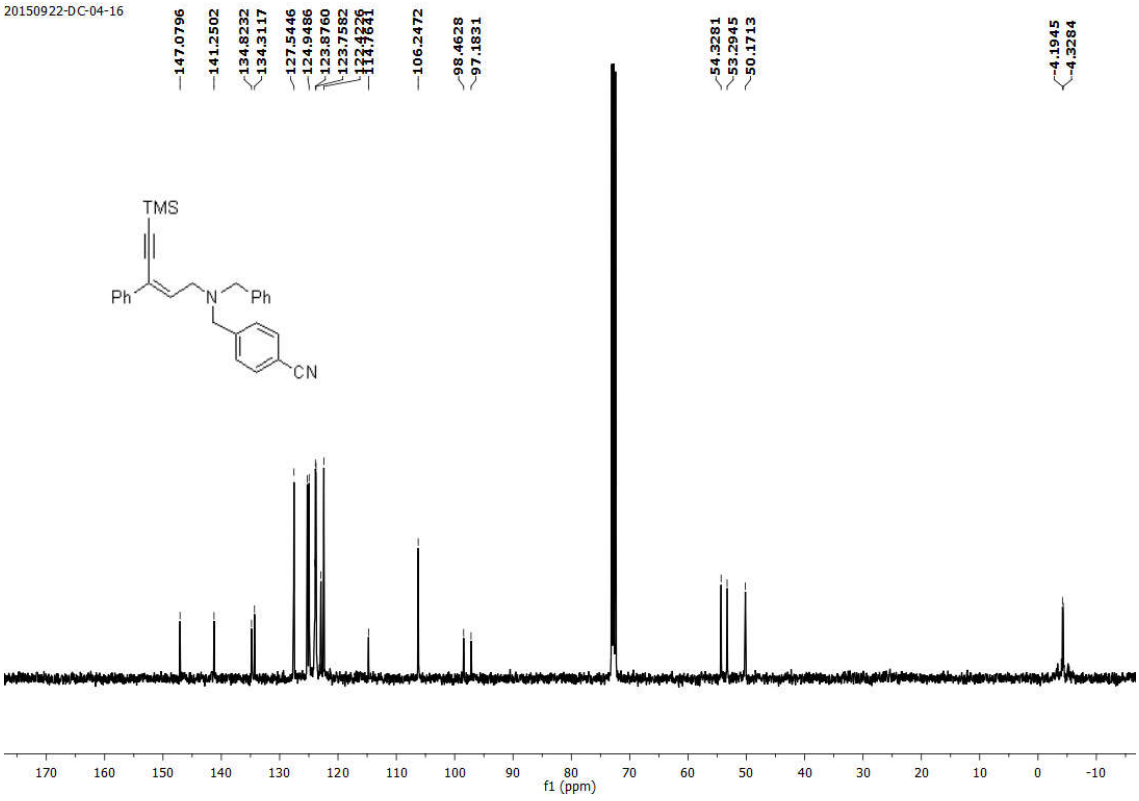

Fig. S114 ^{13}C NMR of **S30** in $CDCl_3$.

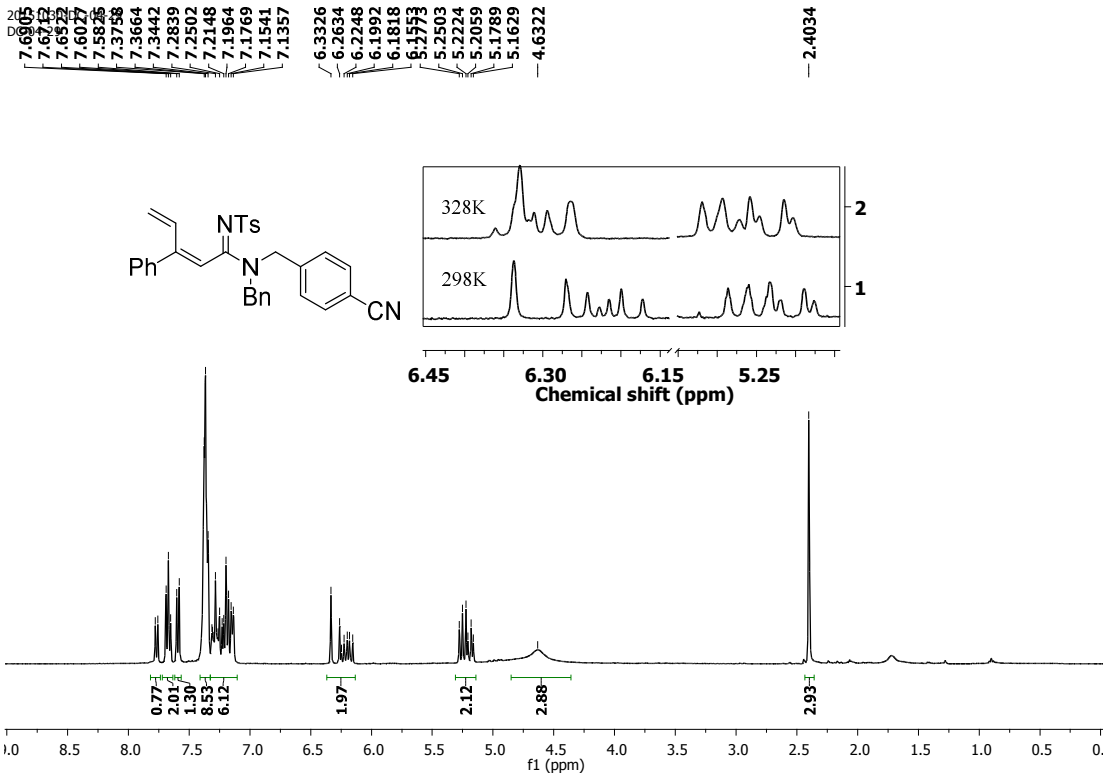

Fig. S115 ^{1}H NMR of **23a** in $CDCl_3$. Inset shows the comparison between ^{1}H NMRs recorded at 298K and 328K.The data indicate the presence of rotational isomers for the compound.

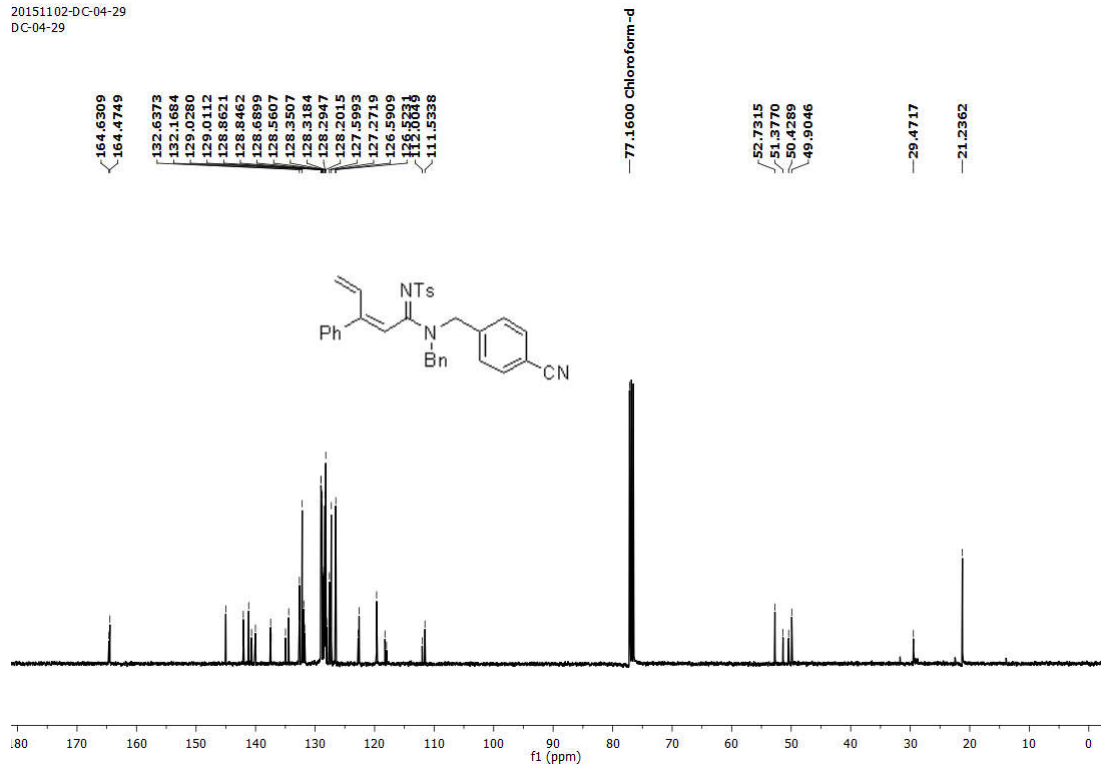

Fig. S116 ^{13}C NMR of **23a** in $CDCl_3$.

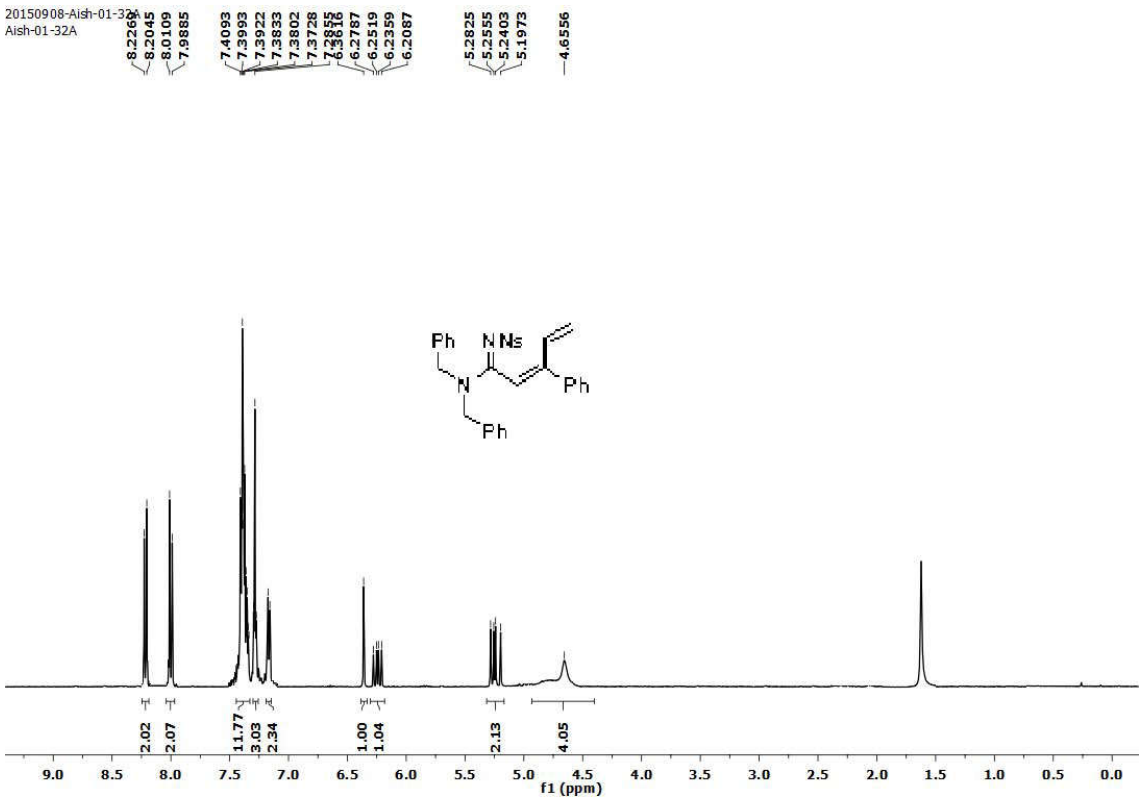

Fig. S117 ^{1}H NMR of **26a** in $CDCl_3$.

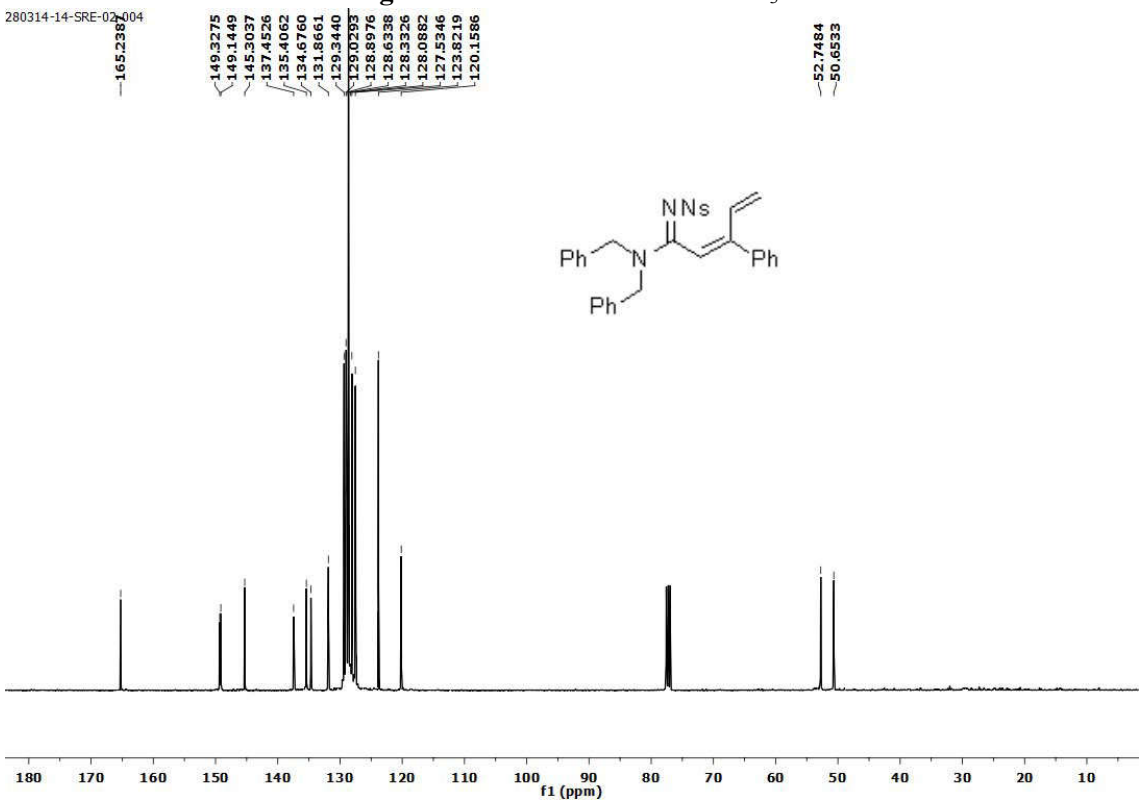

Fig. S118 ^{13}C NMR of **26a** in $CDCl_3$.

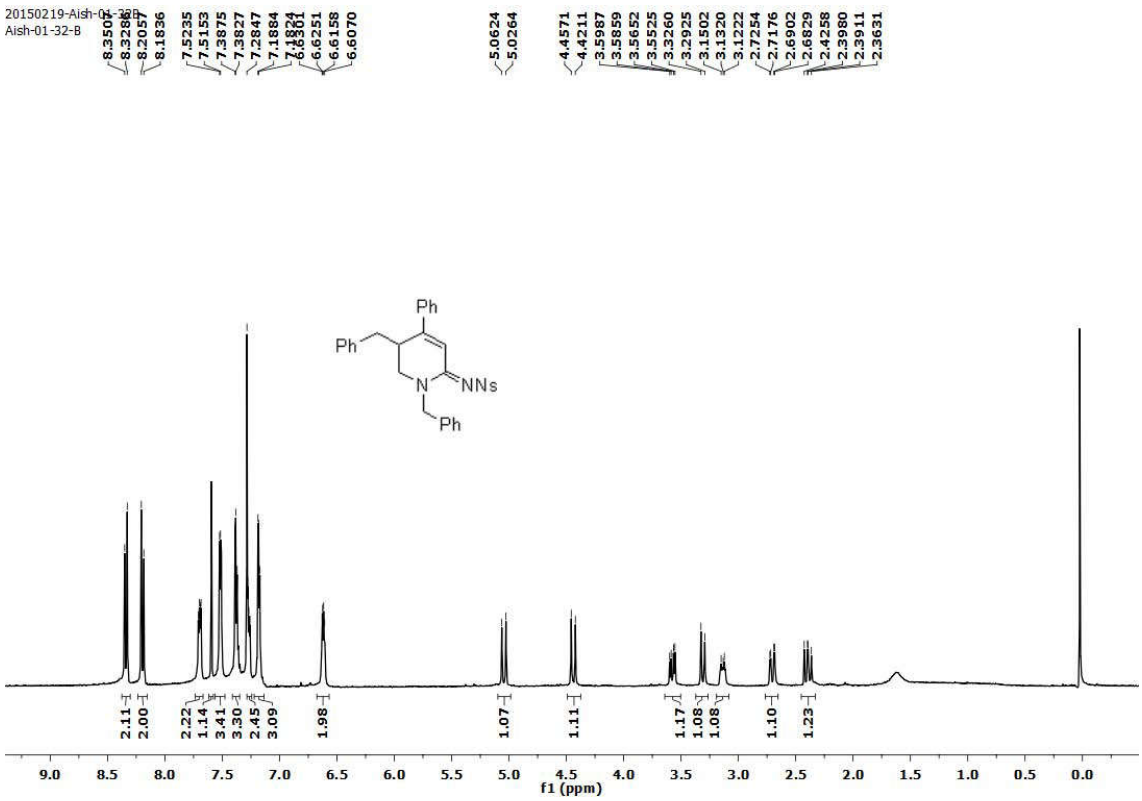

Fig. S119 ^{1}H NMR of **26b** in $CDCl_3$.

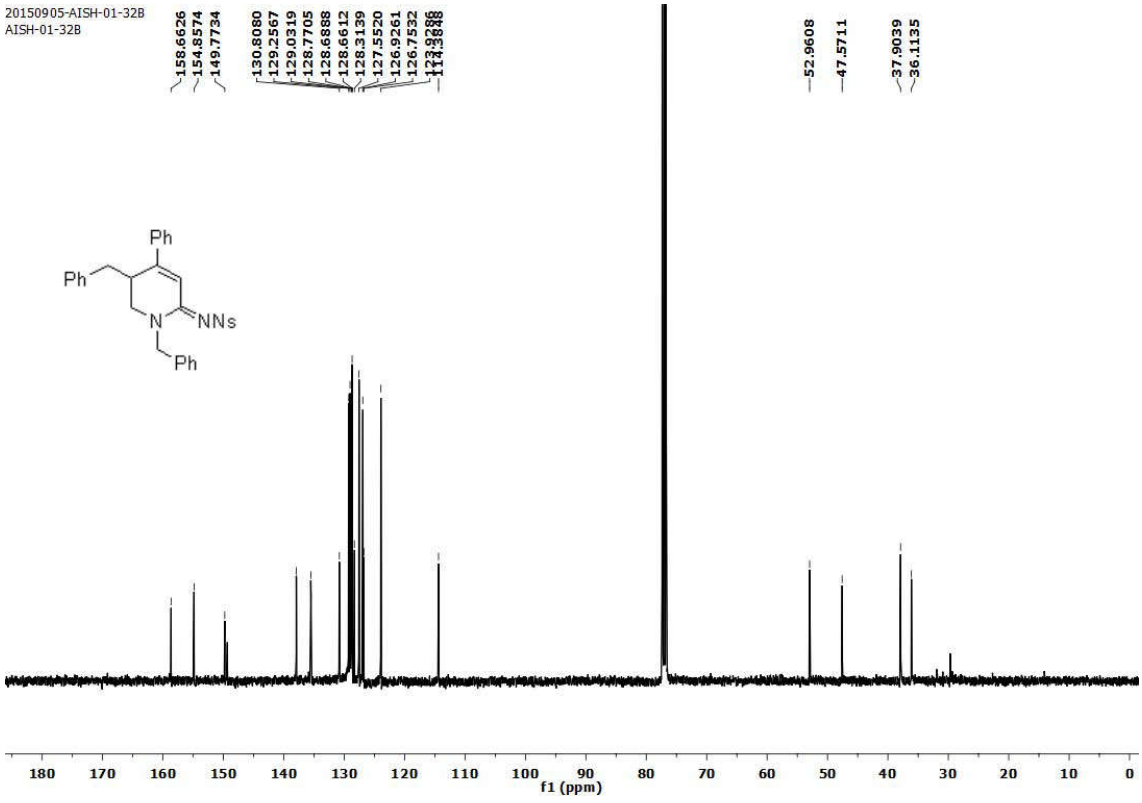

Fig. S120 ^{13}C NMR of **26b** in $CDCl_3$.

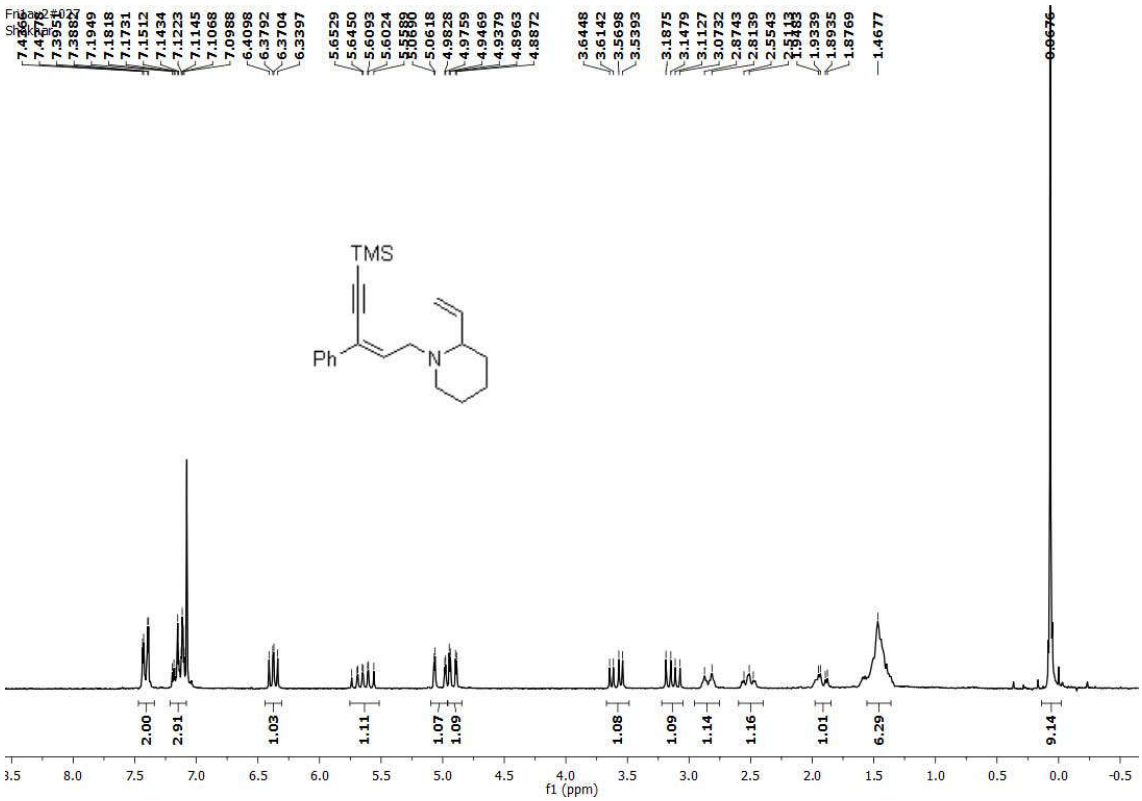

Fig. S121 ^{1}H NMR of **28** in $CDCl_3$.

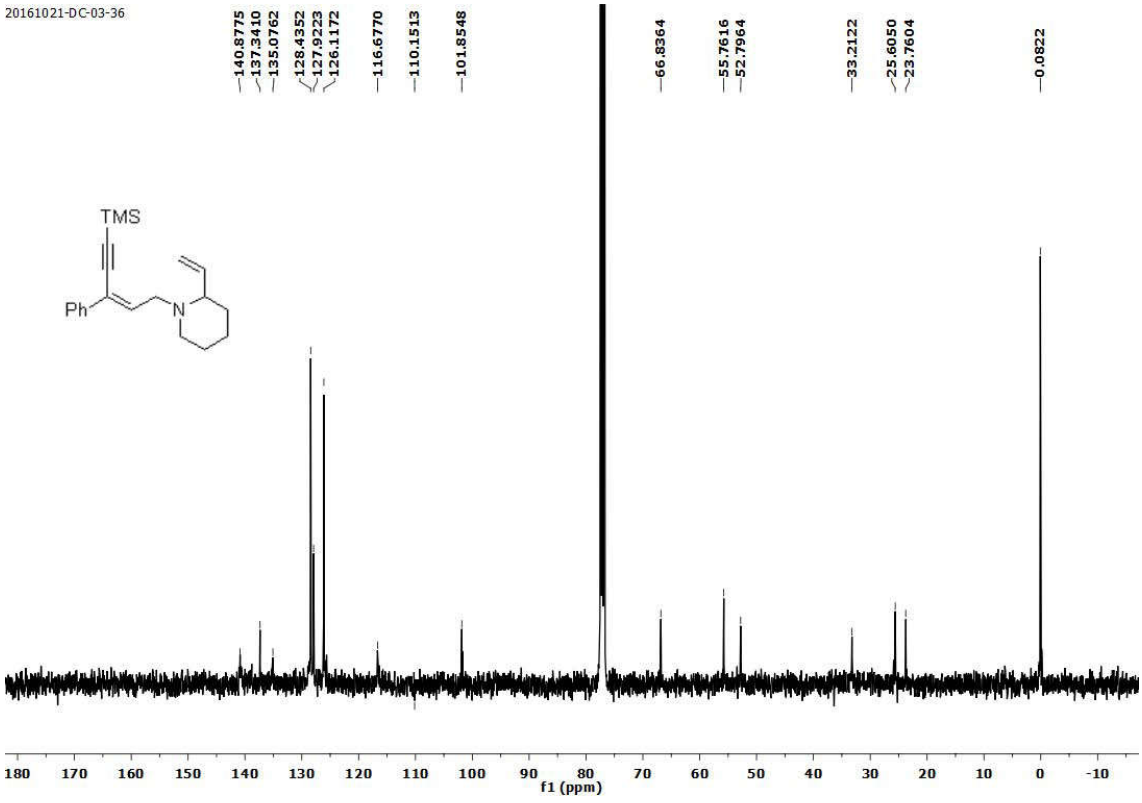

Fig. S122 ^{13}C NMR of **28** in $CDCl_3$.

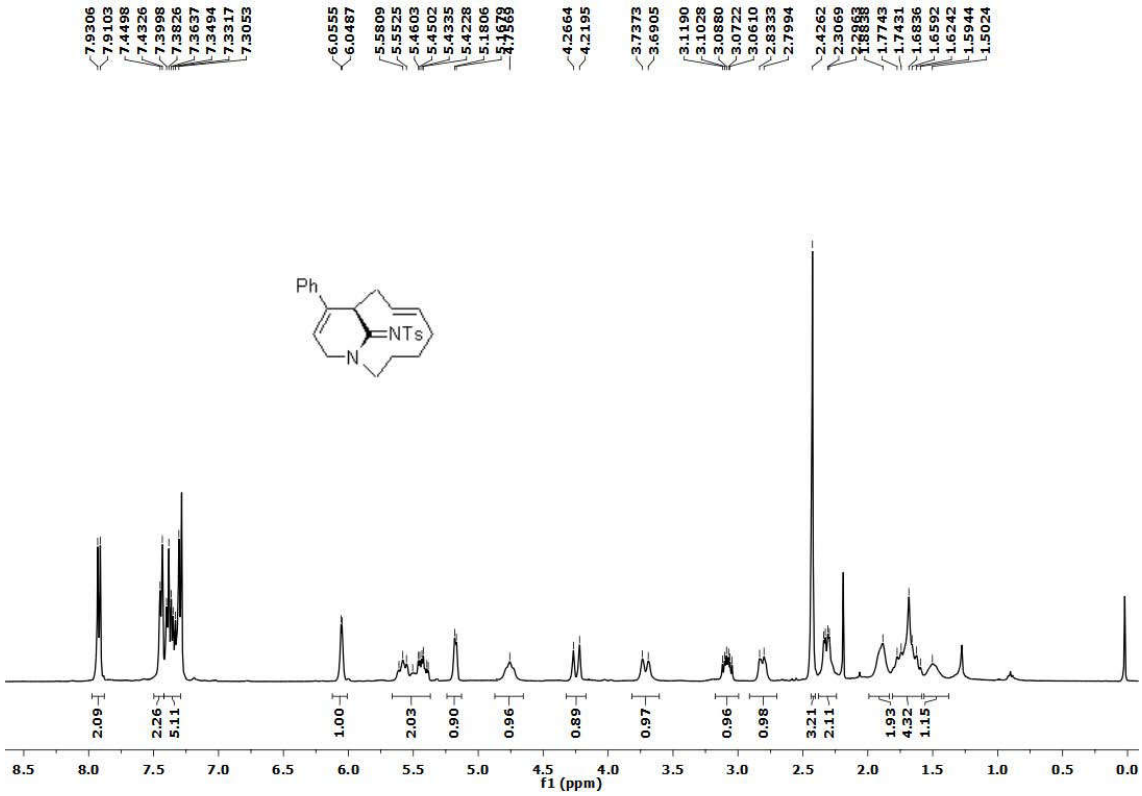

Fig. S123 ^{1}H NMR of **28a** in $CDCl_3$.

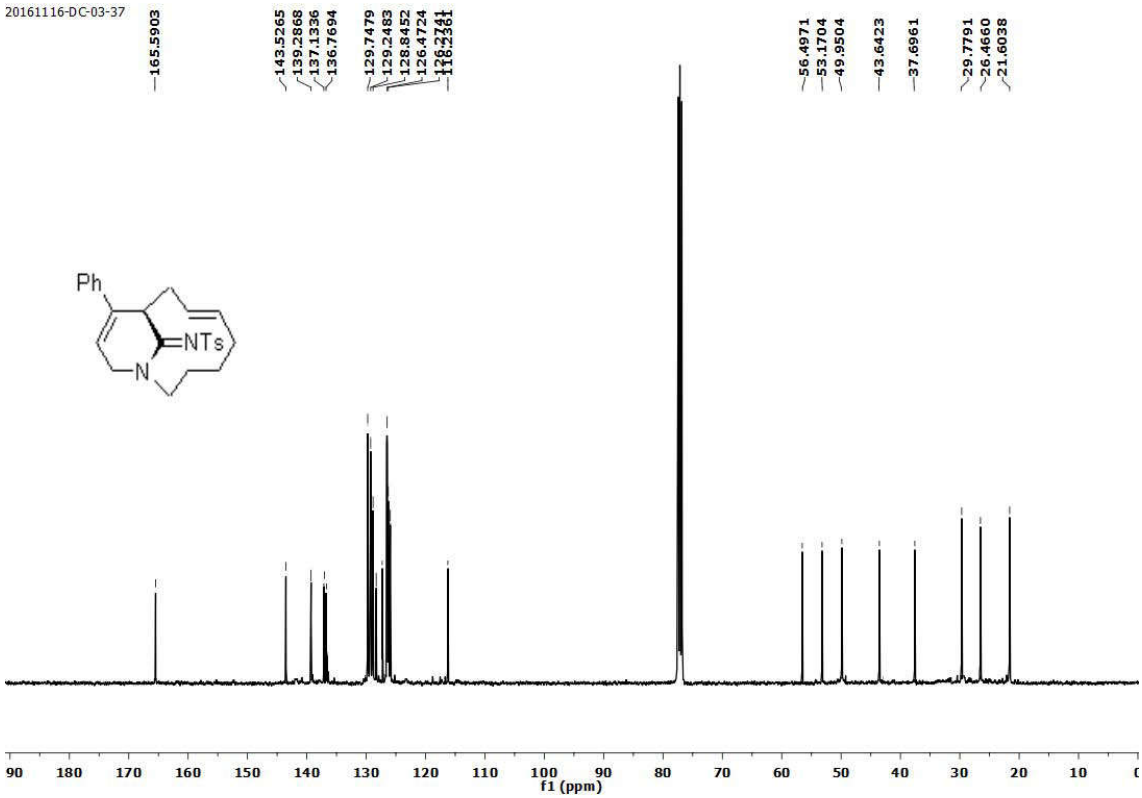

Fig. S124 ^{13}C NMR of **28a** in $CDCl_3$.

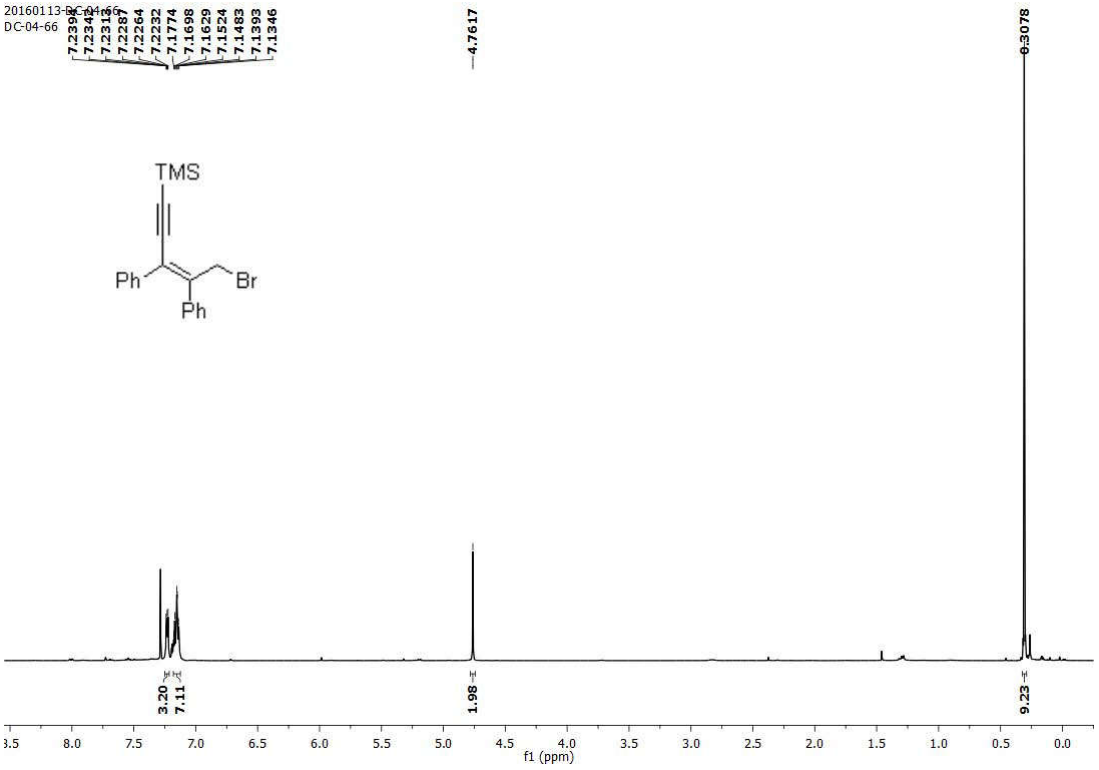

Fig. S125 ^{1}H NMR of **S35** in $CDCl_3$.

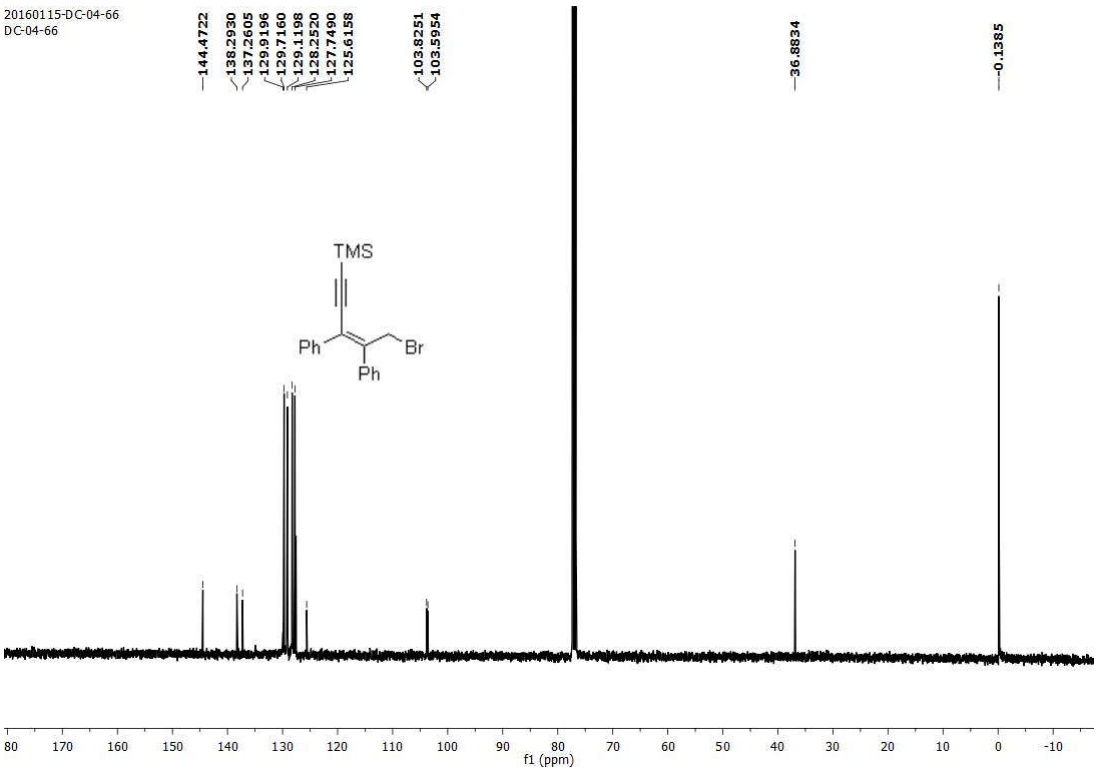

Fig. S126 ^{13}C NMR of **S35** in $CDCl_3$.

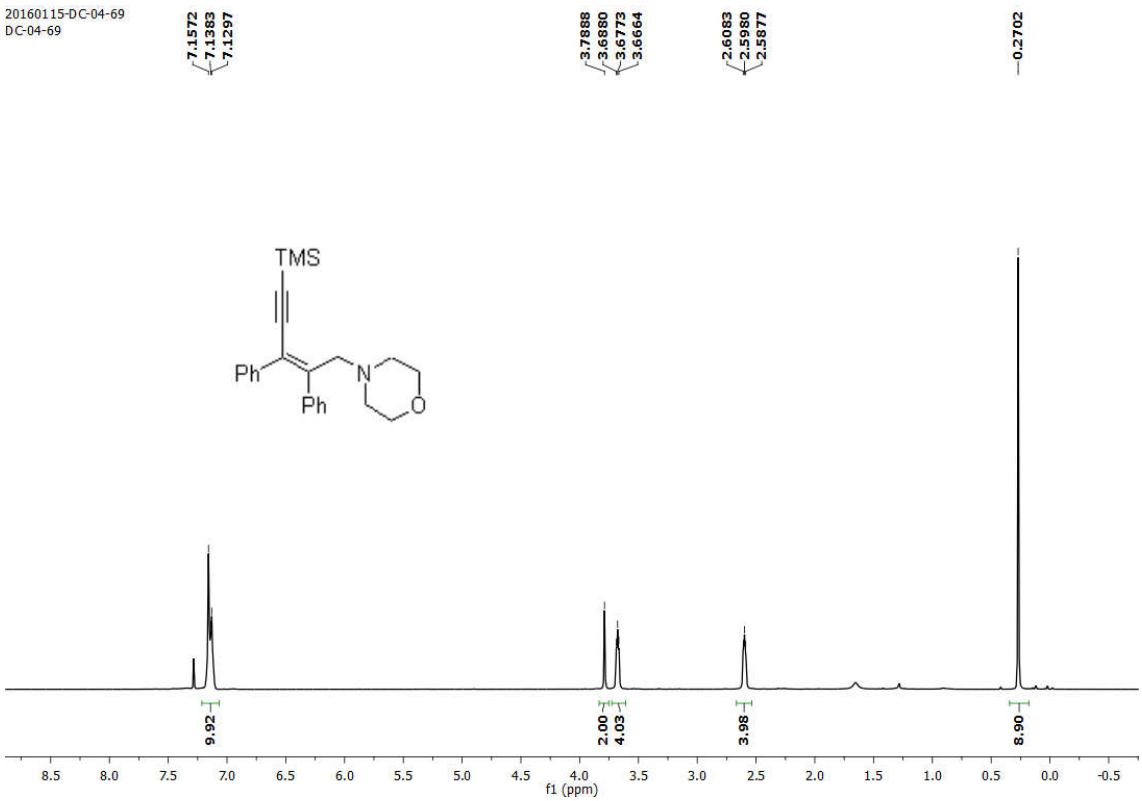

Fig. S127 ^{1}H NMR of **S35** in $CDCl_3$.

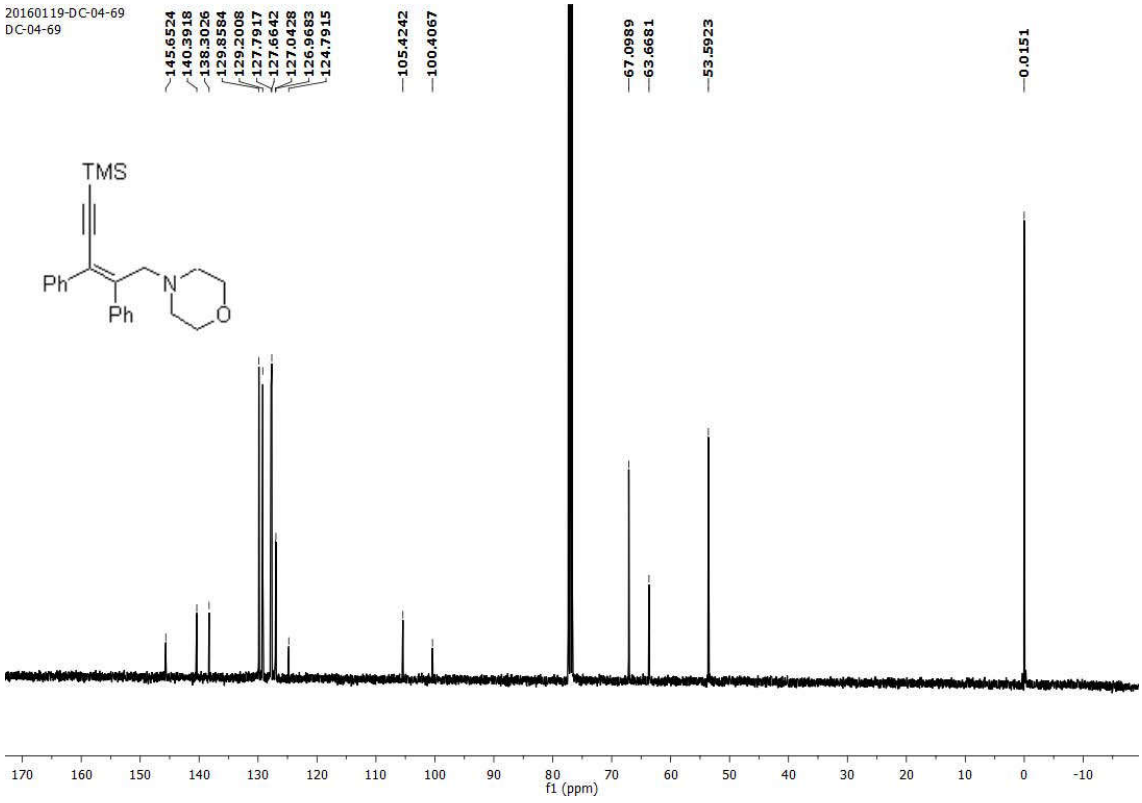

Fig. S128 ^{13}C NMR of **S35** in $CDCl_3$.

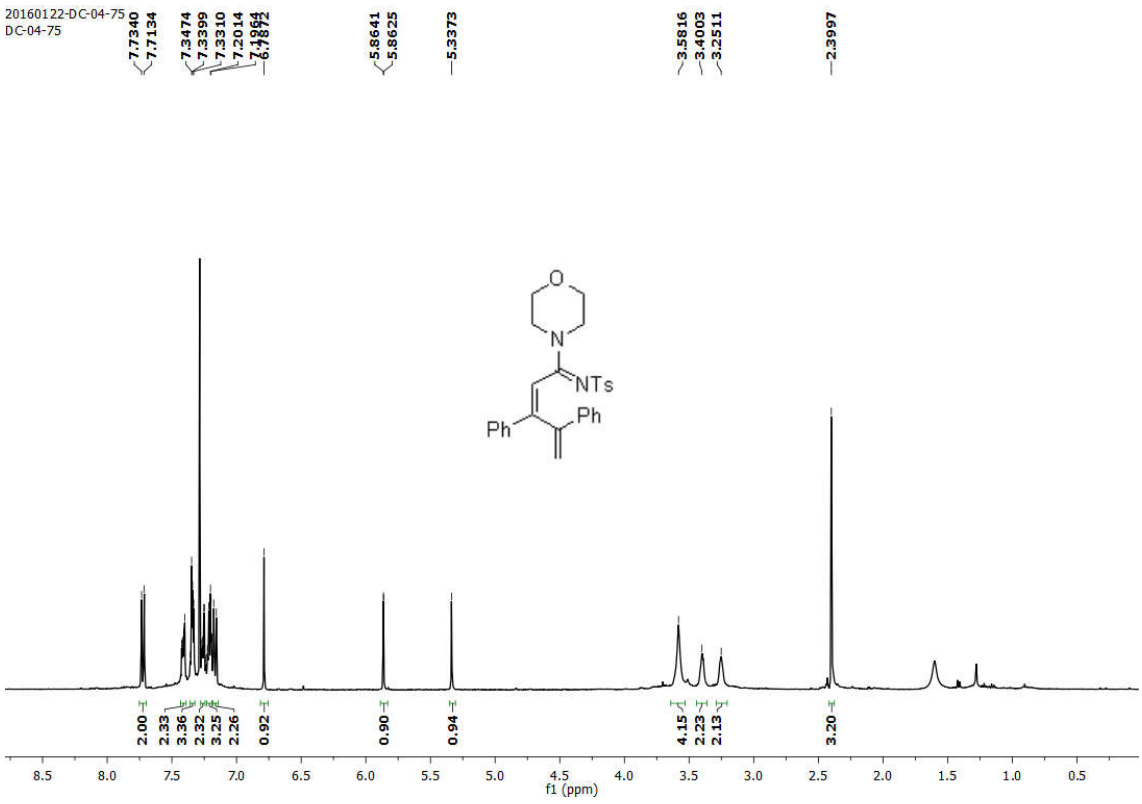

Fig. S129 ^{1}H NMR of **4a** in $CDCl_3$.

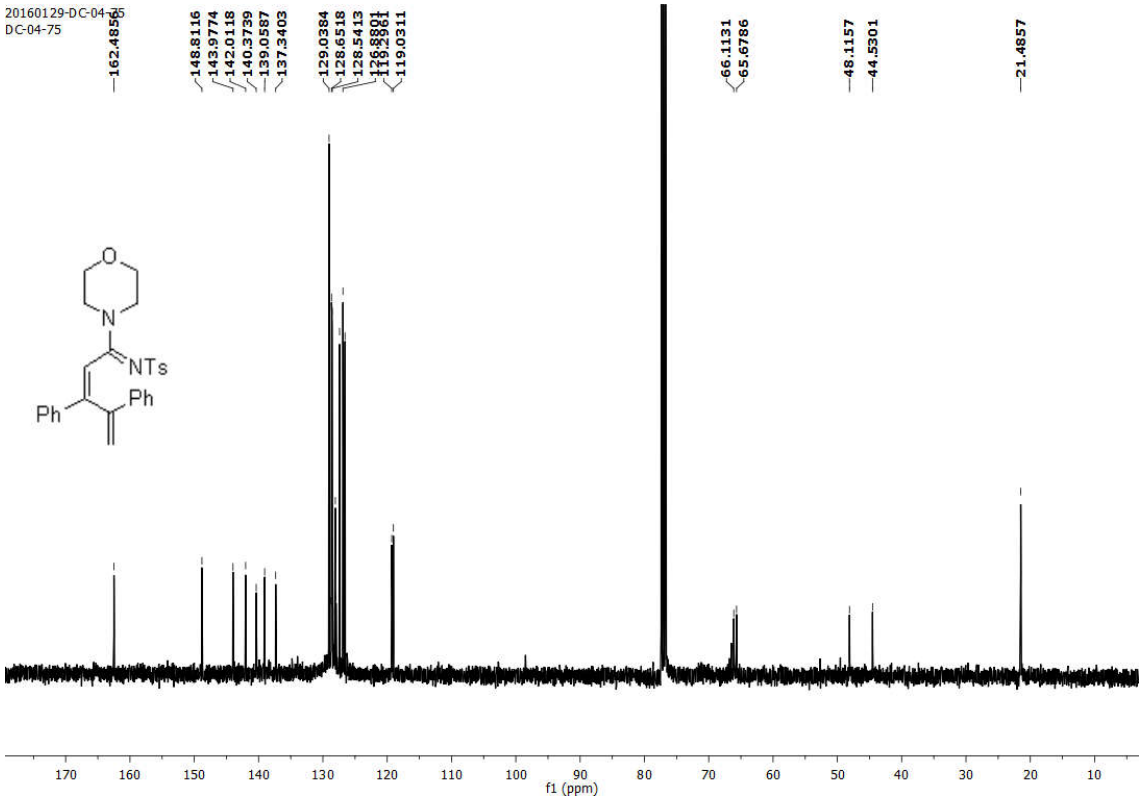

Fig. S130 ^{13}C NMR of **4a** in $CDCl_3$.

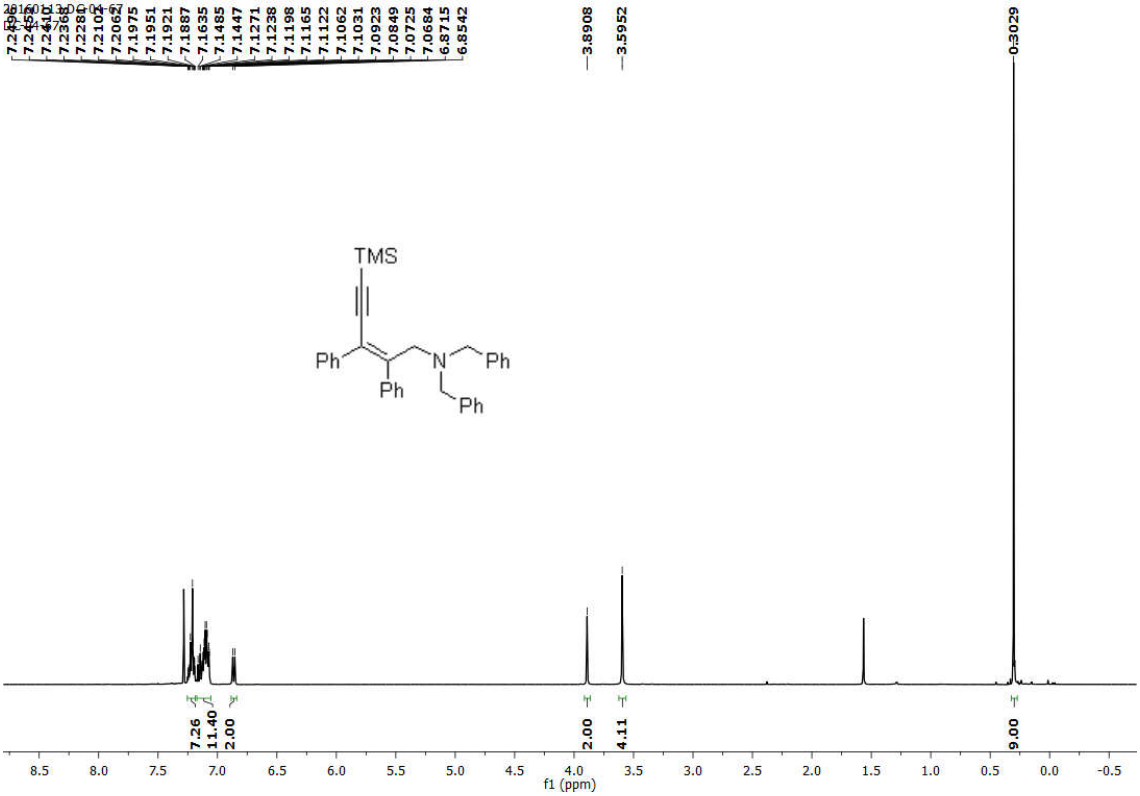

Fig. S131 ^{1}H NMR of **S36** in $CDCl_3$.

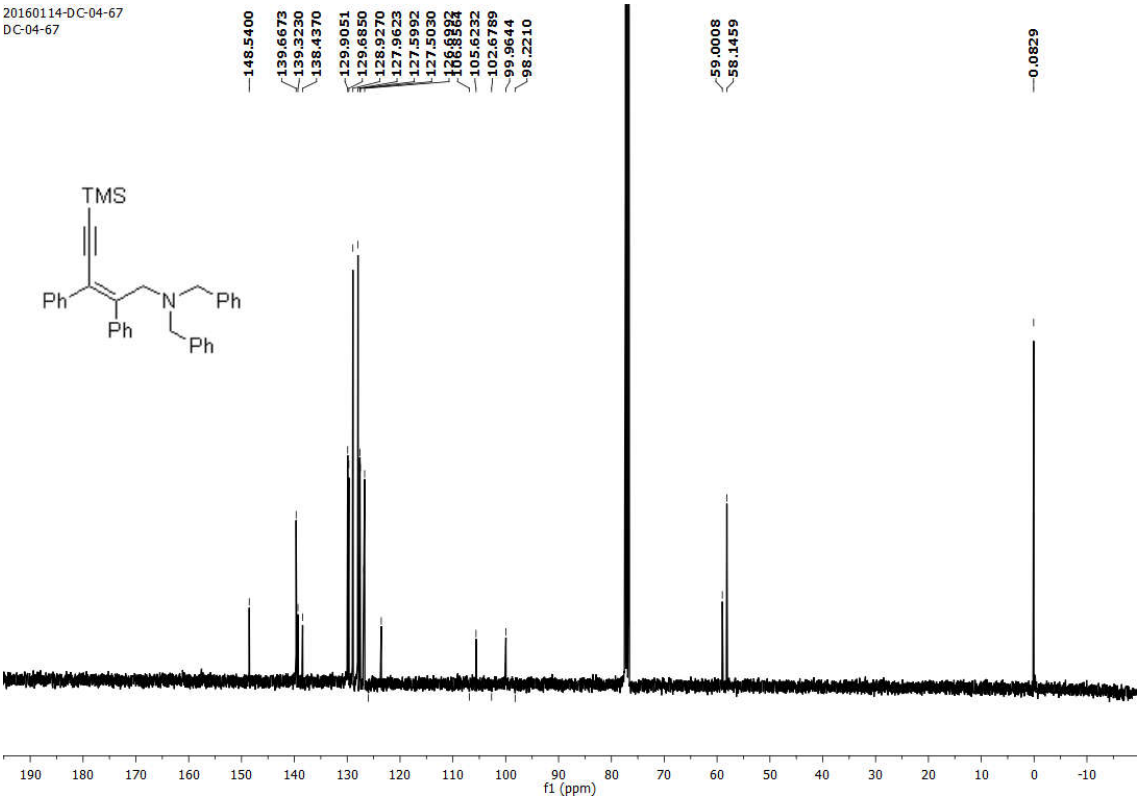

Fig. S132 ^{13}C NMR of **S36** in $CDCl_3$.

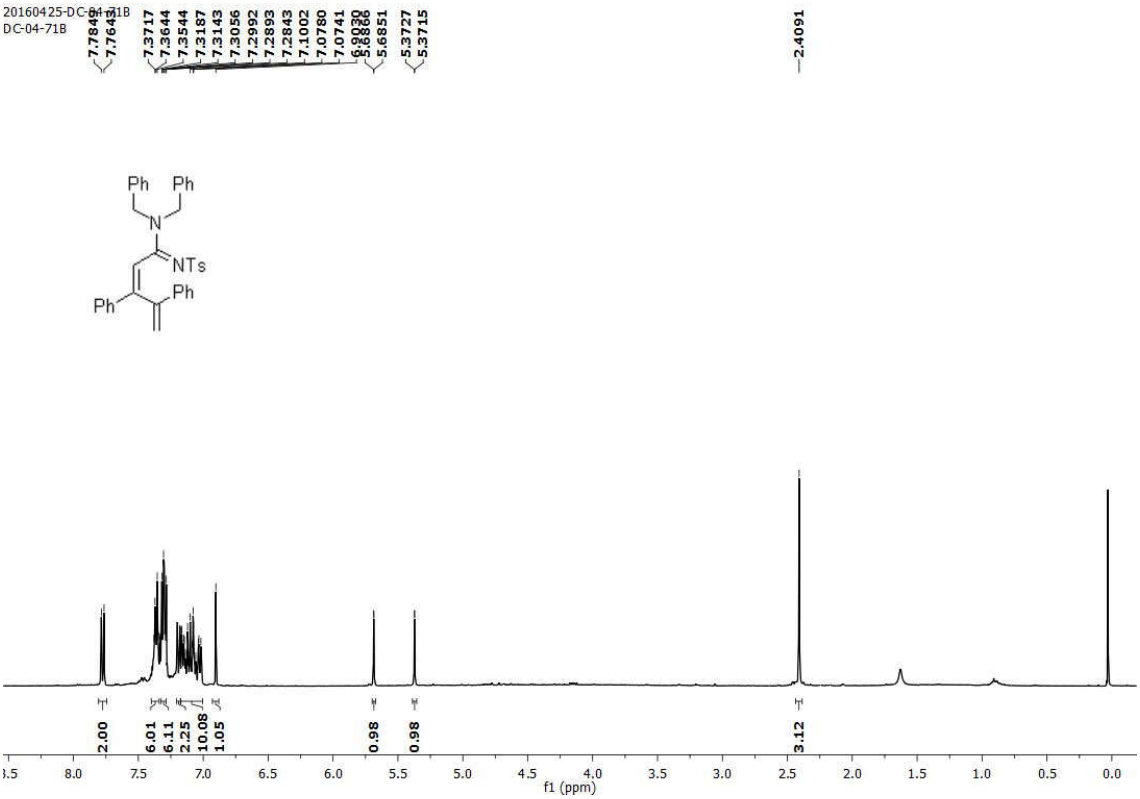

Fig. S133 ^{1}H NMR of **12a** in $CDCl_3$.

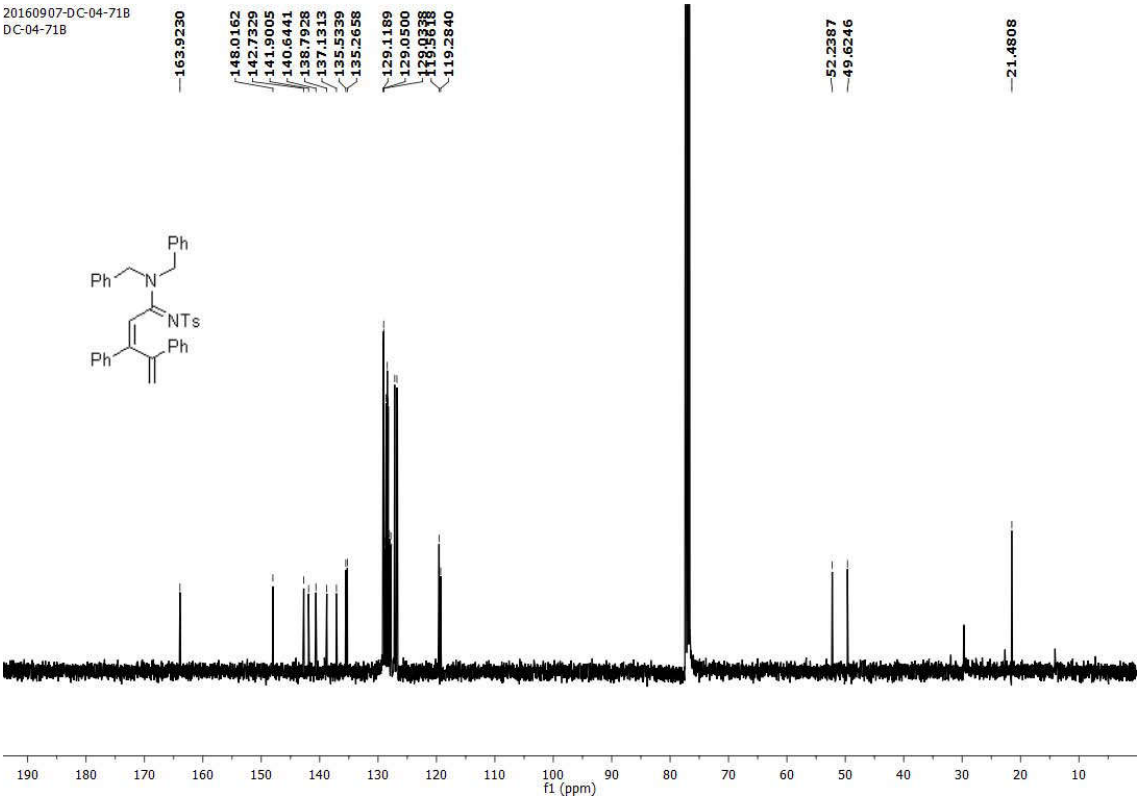

Fig. S134 ^{13}C NMR of **12a** in $CDCl_3$.

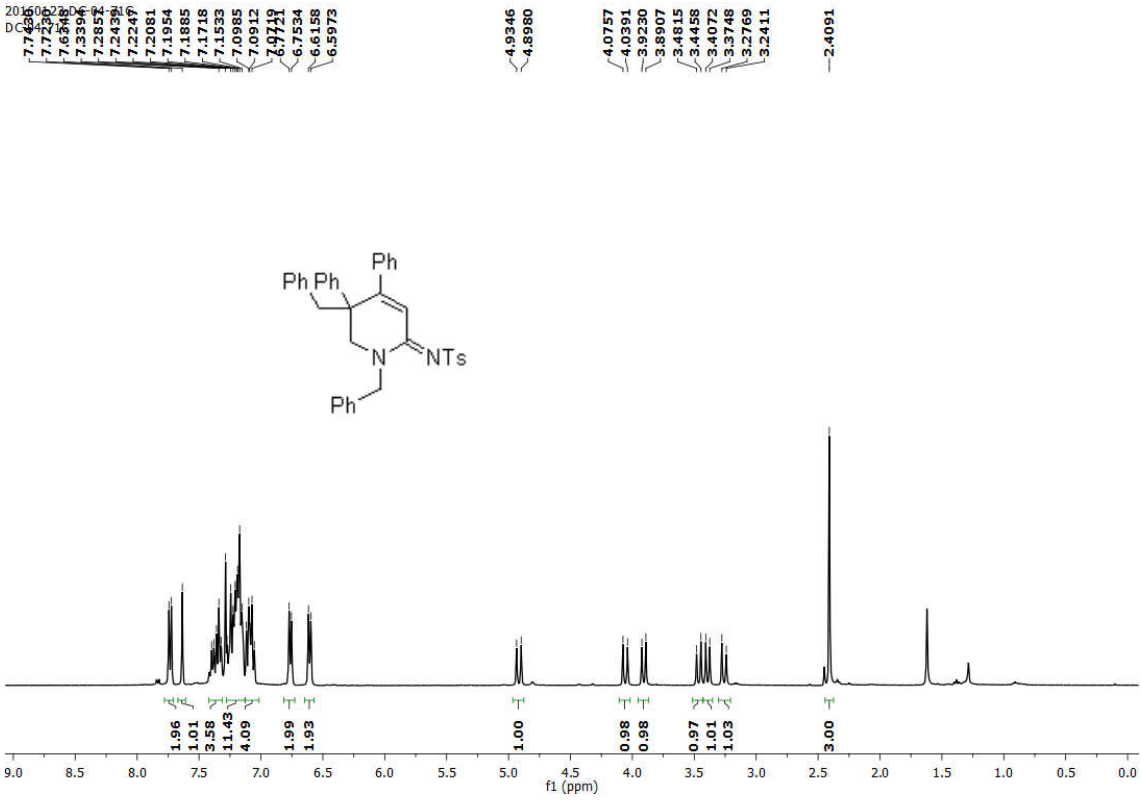

Fig. S135 ^{1}H NMR of **12b** in $CDCl_3$.

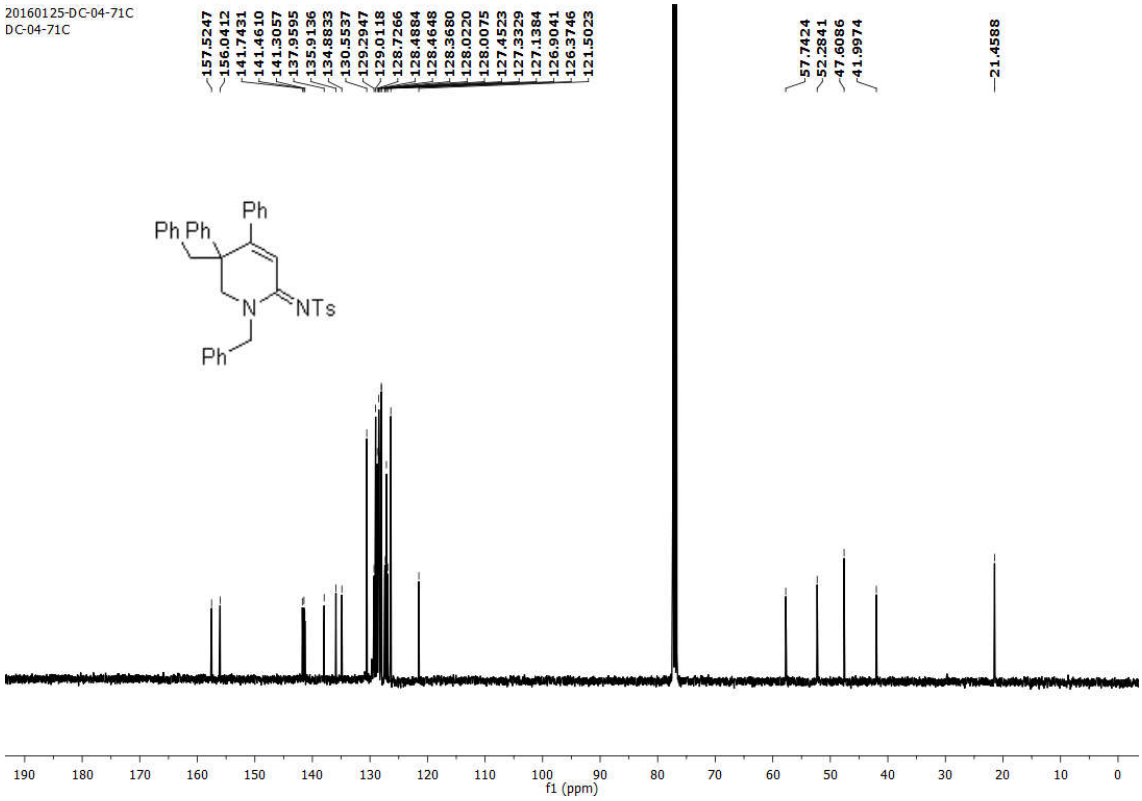

Fig. S136 ^{13}C NMR of **12b** in $CDCl_3$.

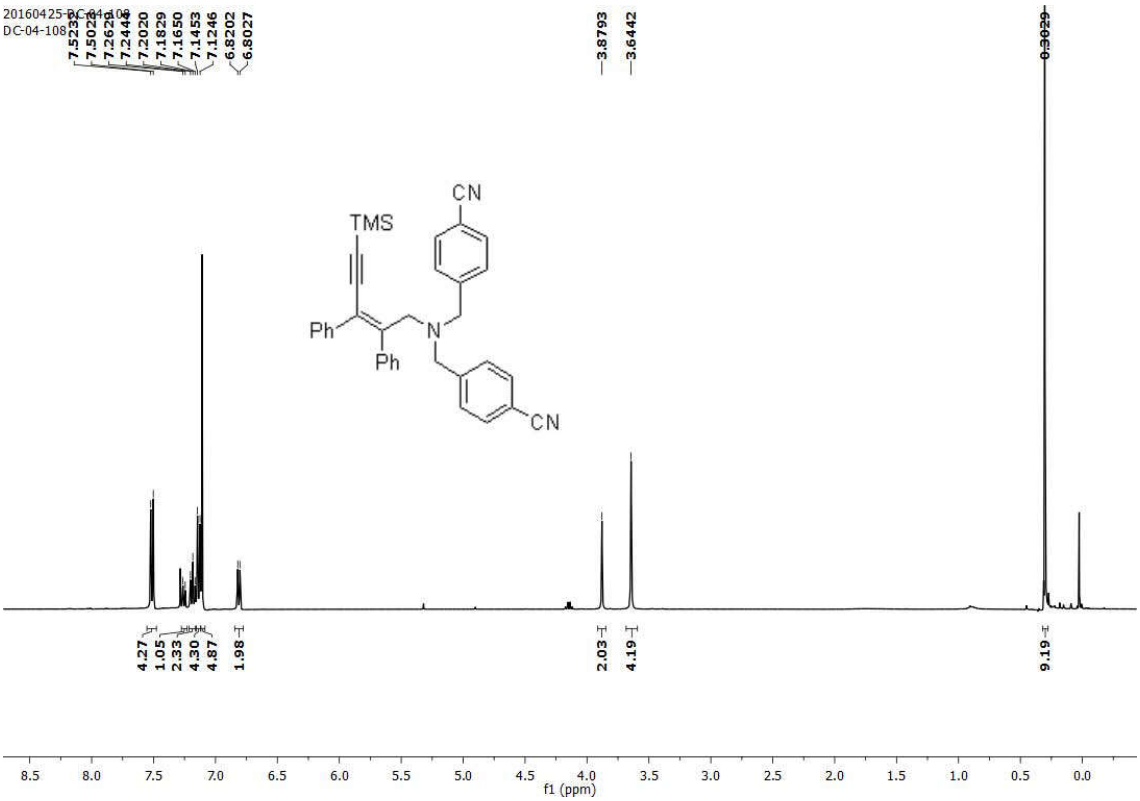

Fig. S137 ^{1}H NMR of **S37** in $CDCl_3$.

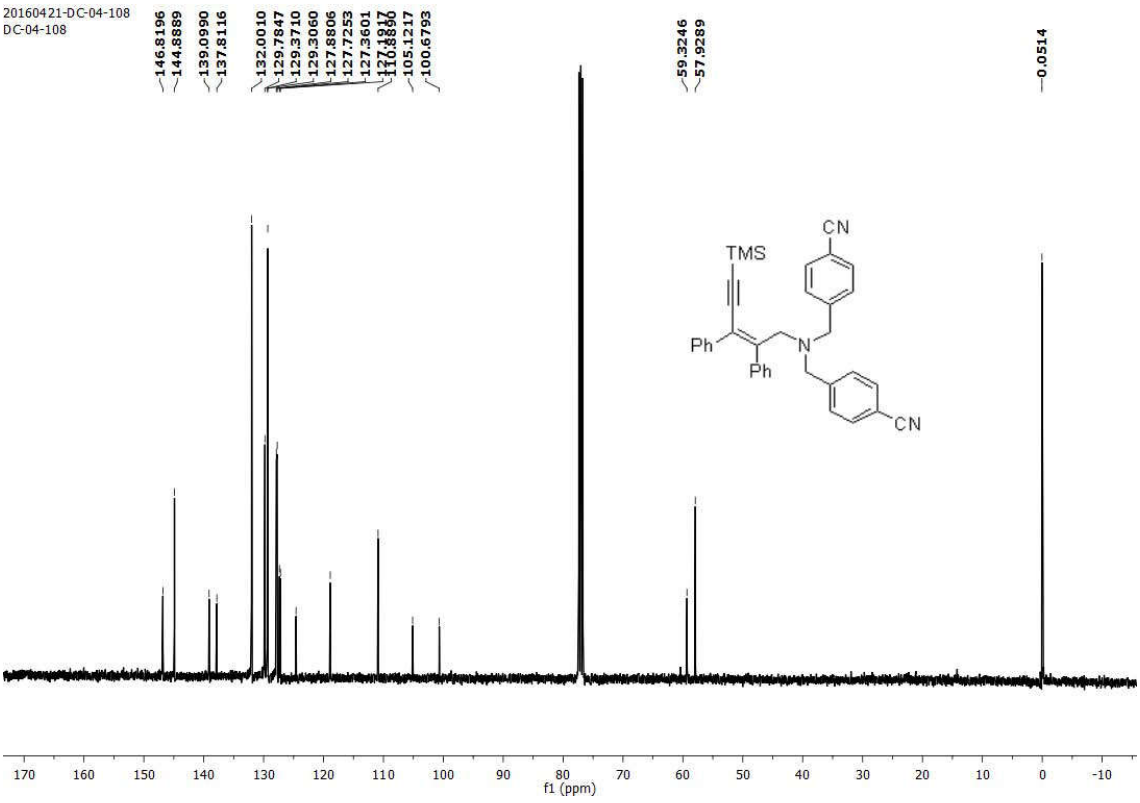

Fig. S138 ^{13}C NMR of **S37** in $CDCl_3$.

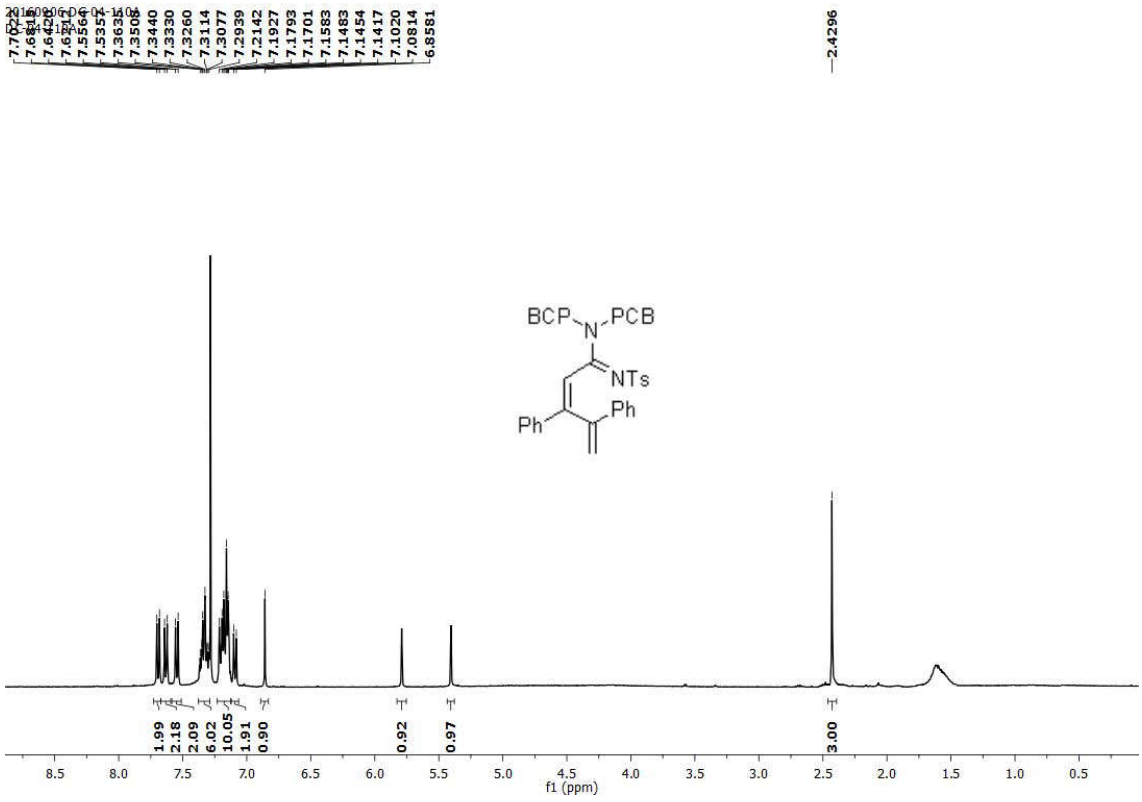

Fig. S139 ^{1}H NMR **16a** in $CDCl_3$.

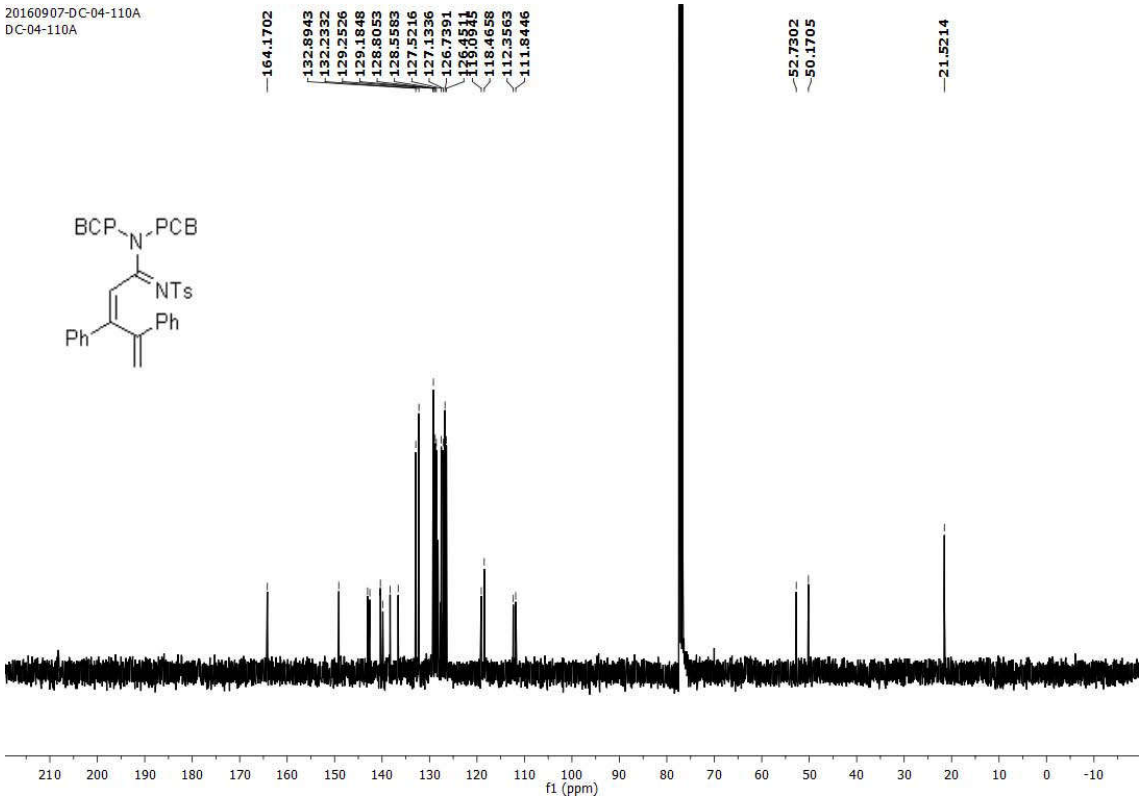

Fig. S140 ^{13}C NMR of **16a** in $CDCl_3$.

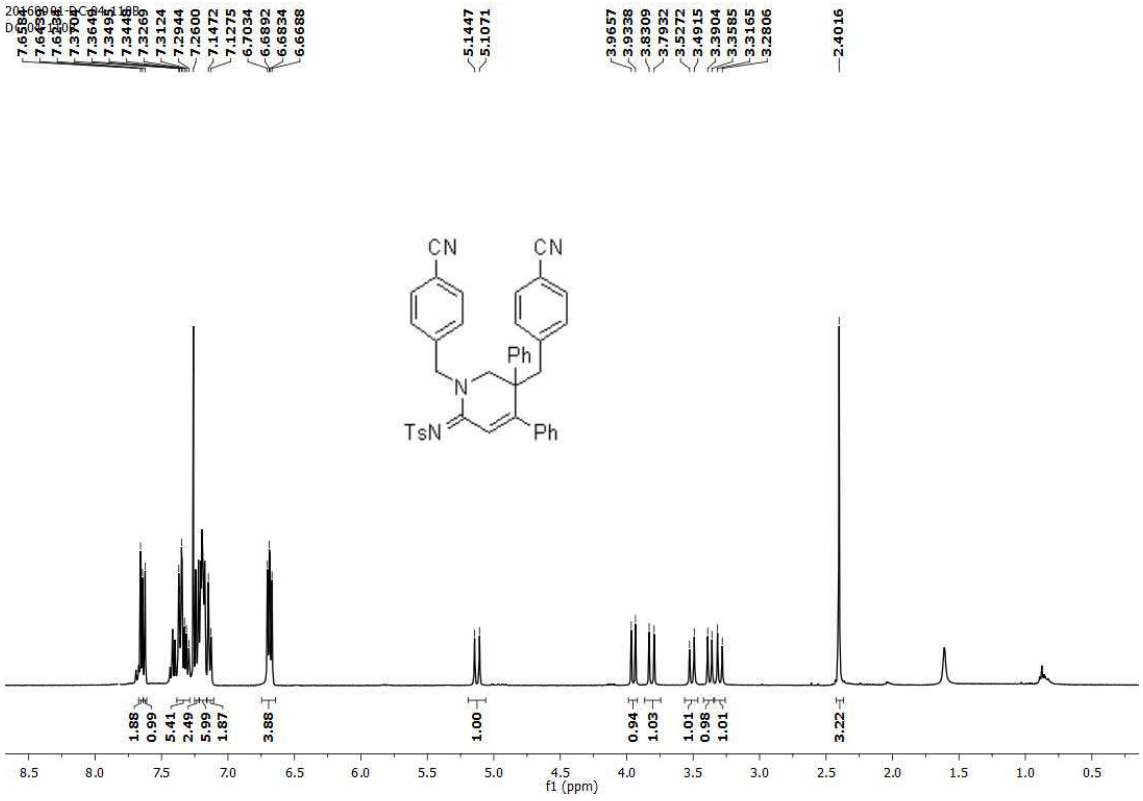

Fig. S141 ^{1}H NMR of **16b** in $CDCl_3$.

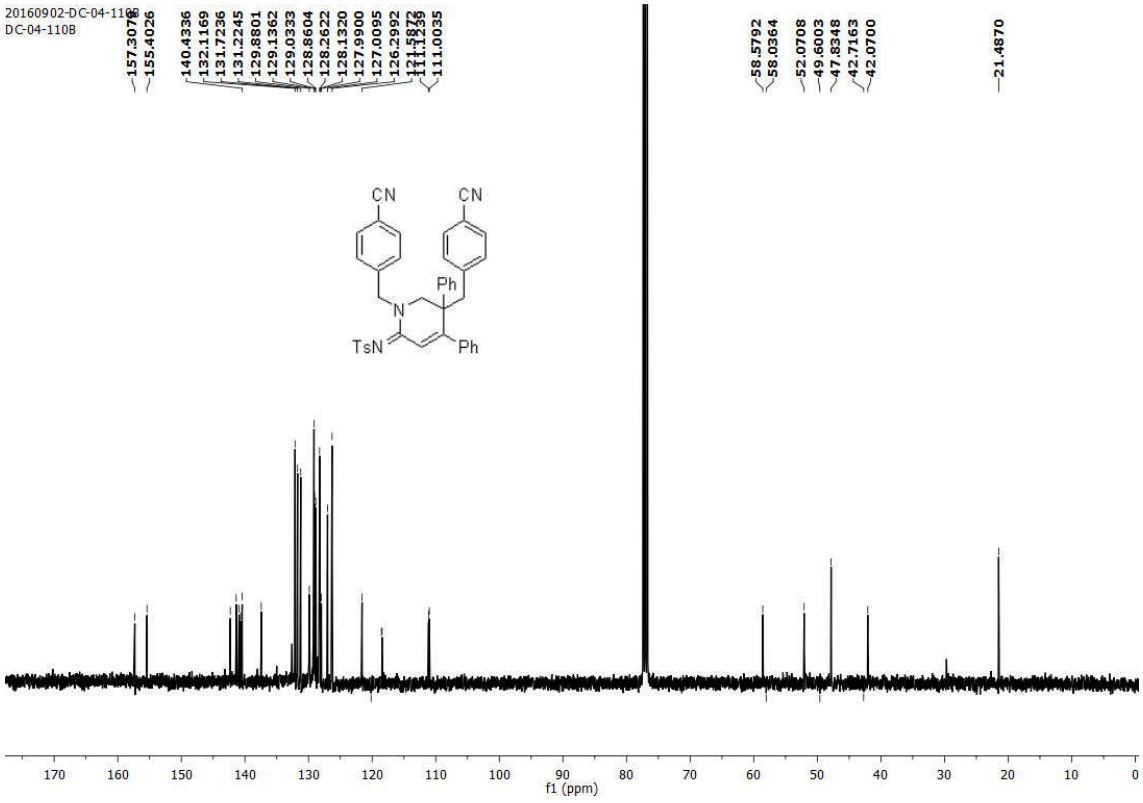

Fig. S142 ^{13}C NMR of **16b** in $CDCl_3$.

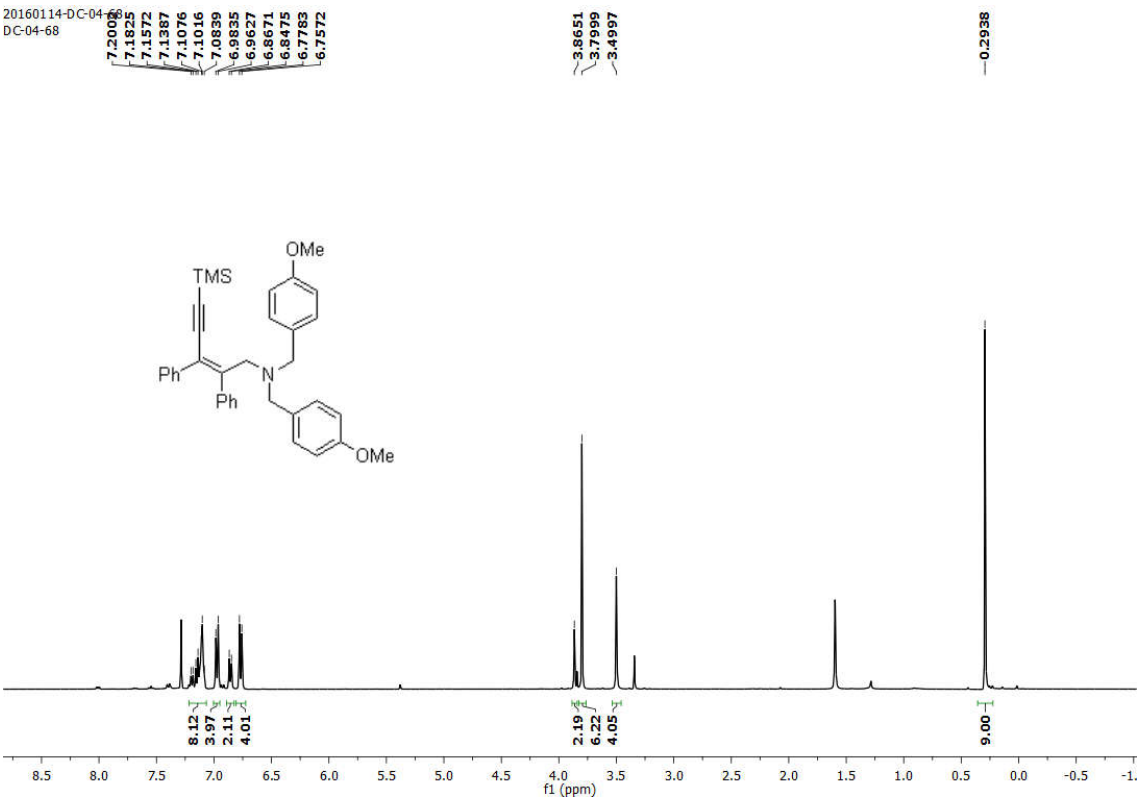

Fig. S143 ^{1}H NMR of **S38** in $CDCl_3$.

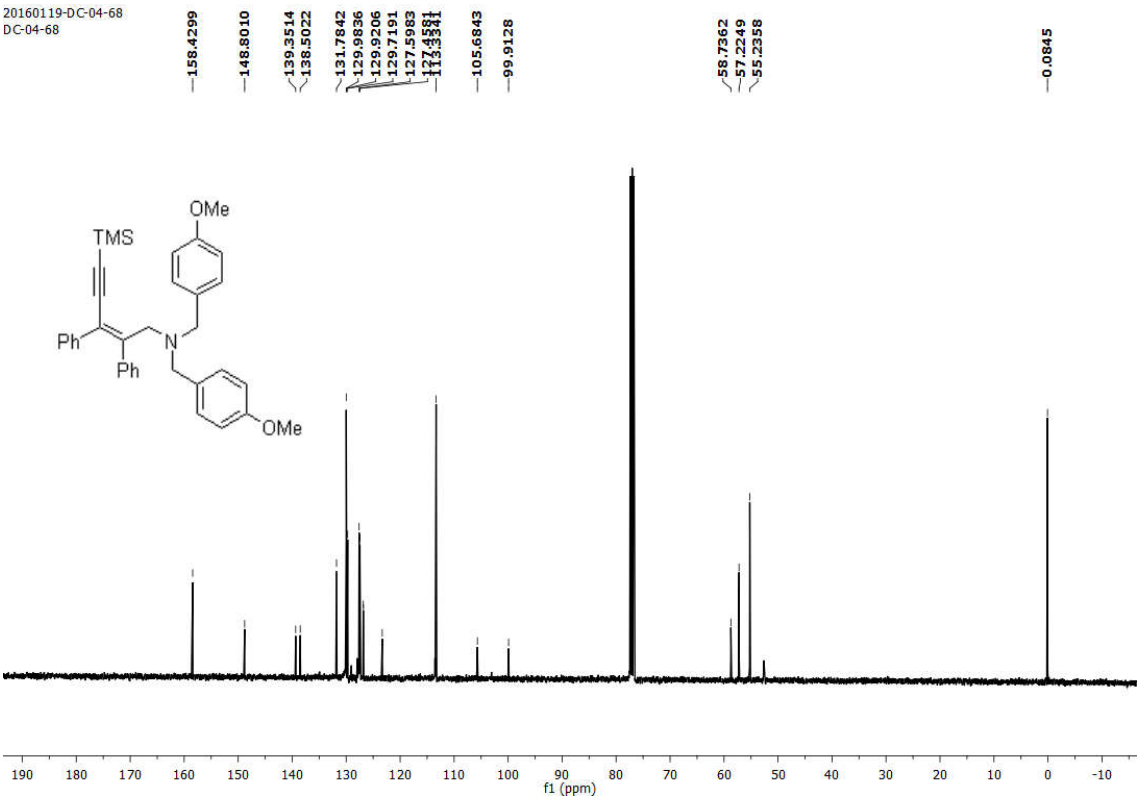

Fig. S144 ^{13}C NMR of **38** in $CDCl_3$.

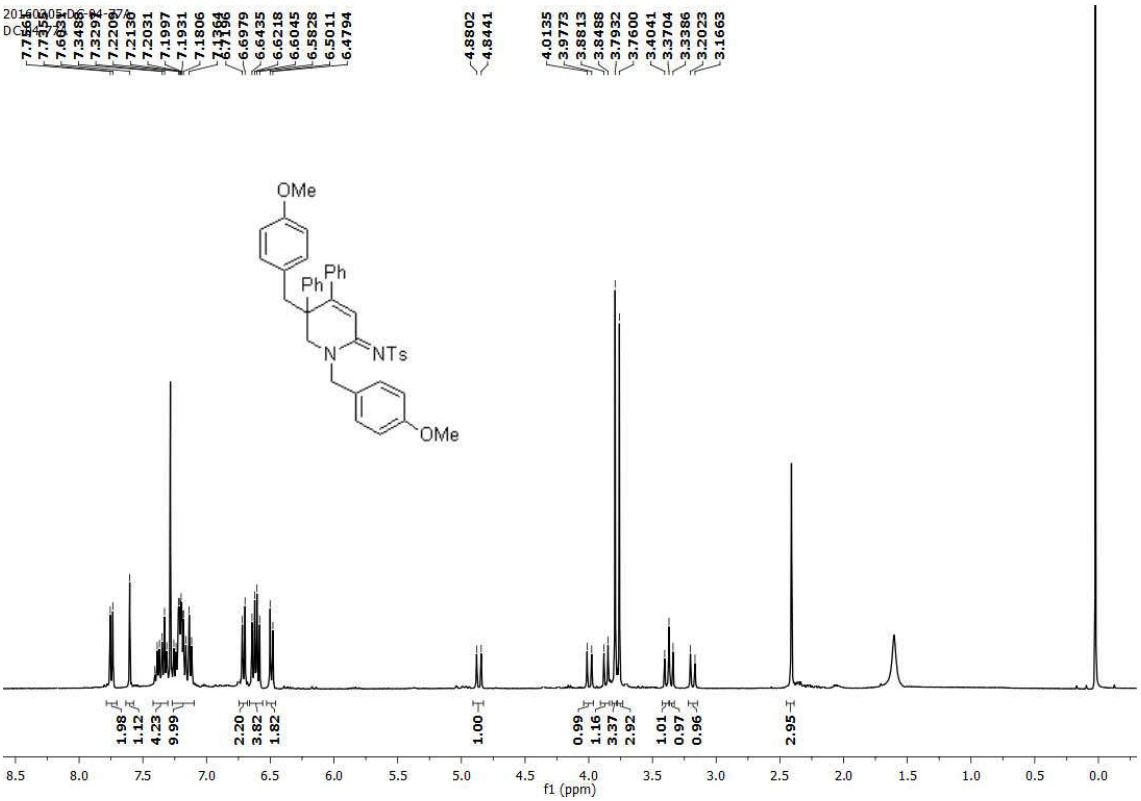

Fig. S145 ^{1}H NMR of **20b** in $CDCl_3$.

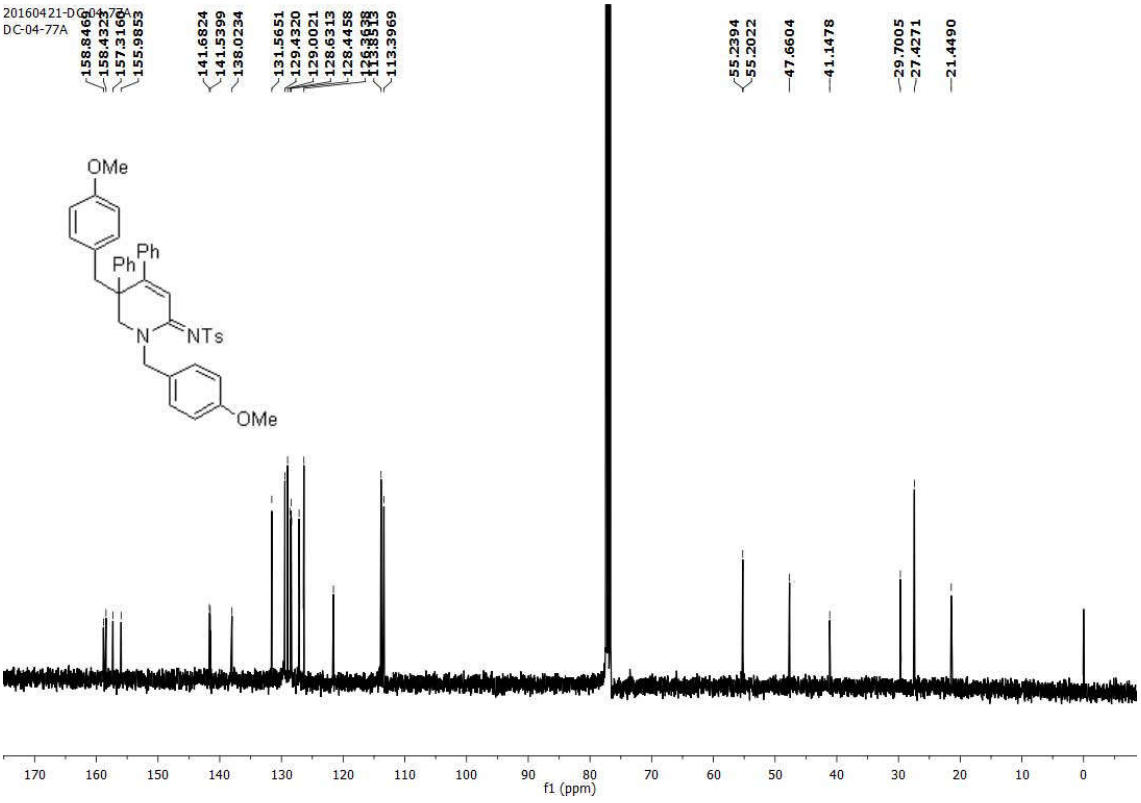

Fig. S146 ^{13}C NMR of **20b** in $CDCl_3$.

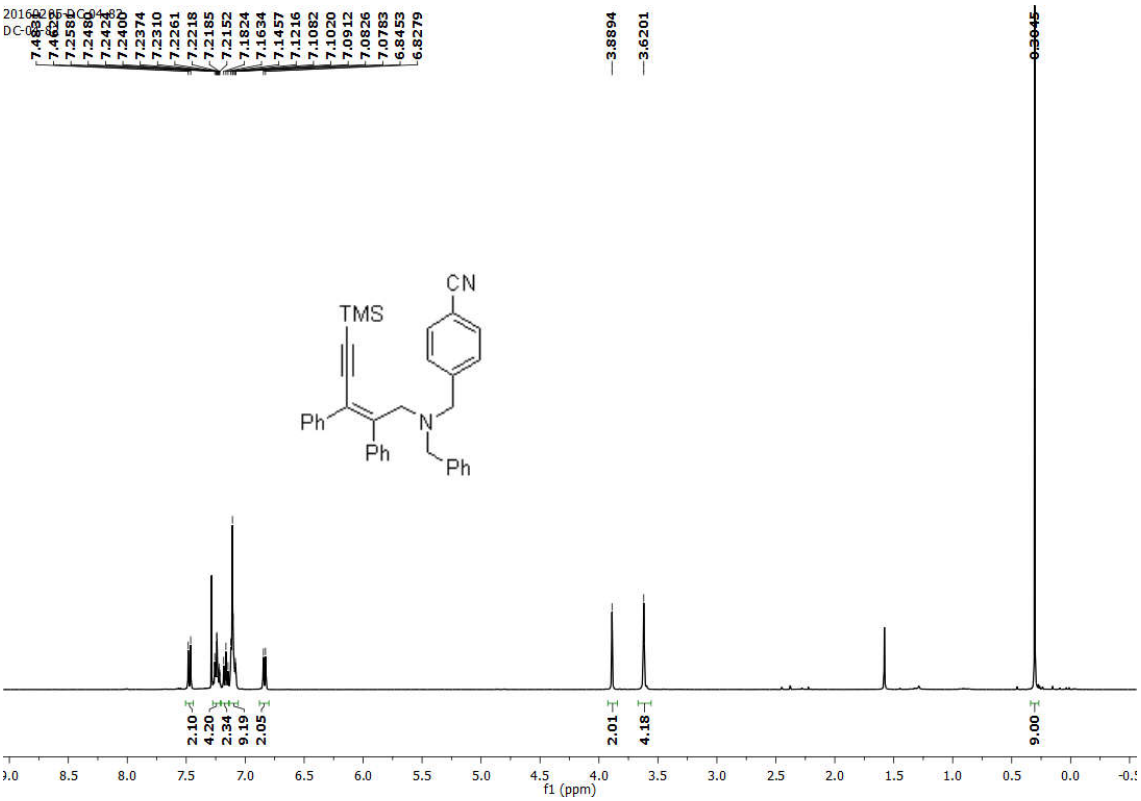

Fig. S147 ^{1}H NMR of **S39** in $CDCl_3$.

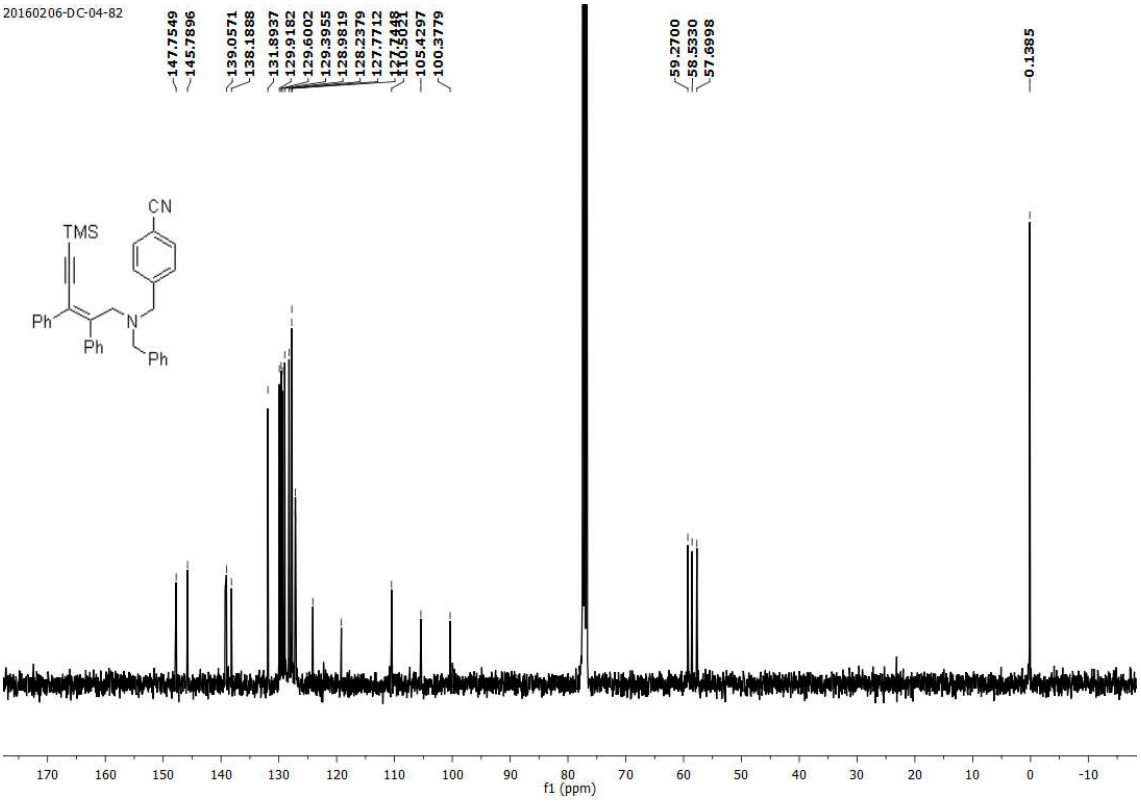

Fig. S148 ^{13}C NMR of **S39** in $CDCl_3$.

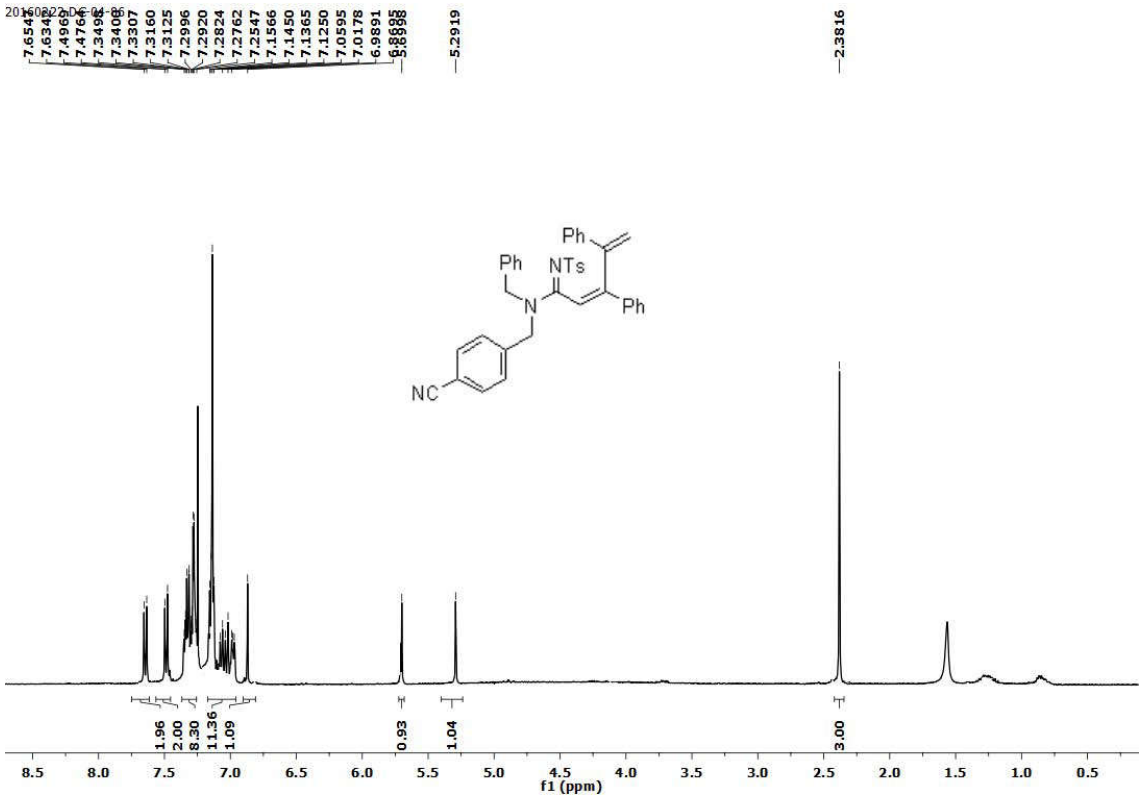

Fig. S149 ^{1}H NMR of **24a** in $CDCl_3$.

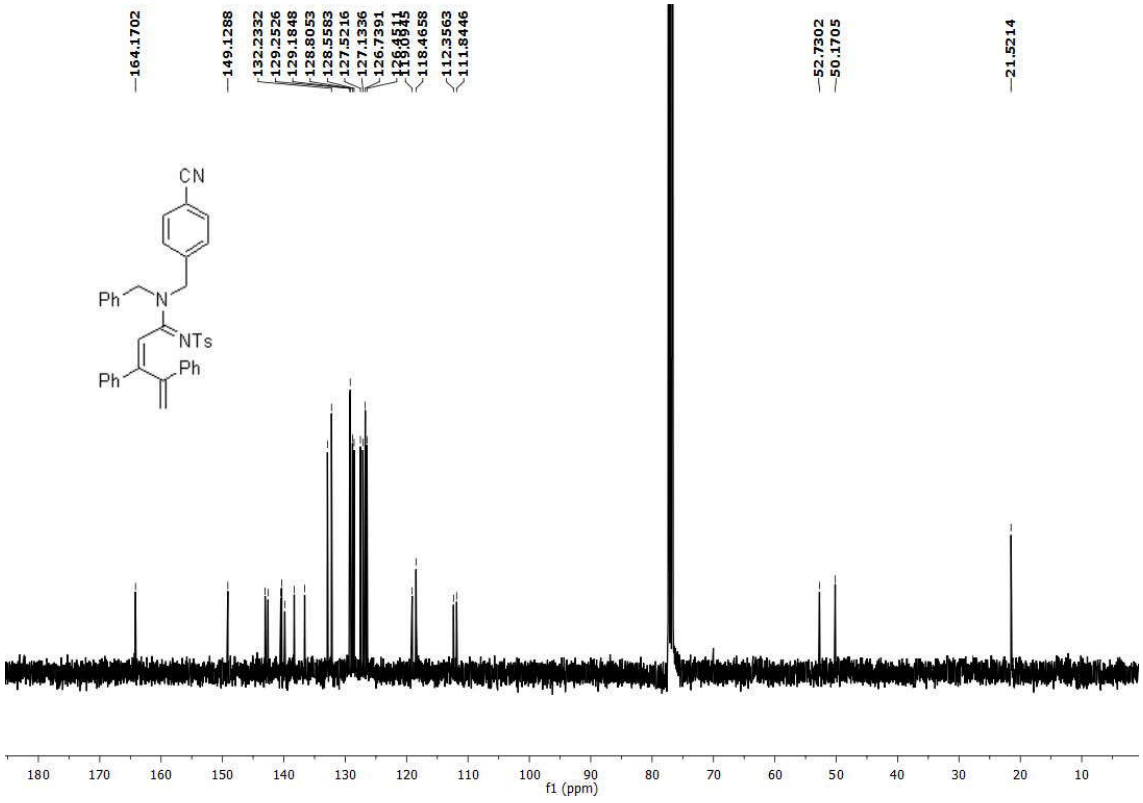

Fig. S150 ^{13}C NMR of **24a** in $CDCl_3$.

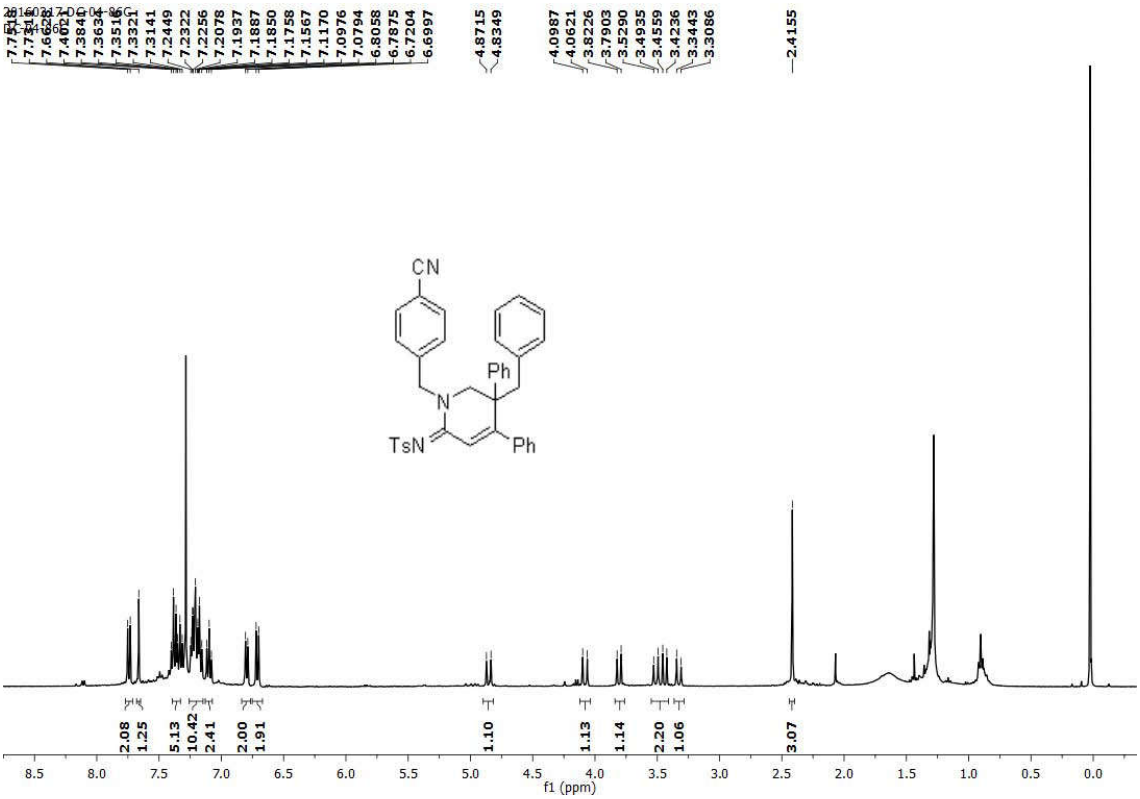

Fig. S151 ^{1}H NMR of **24b** in $CDCl_3$.

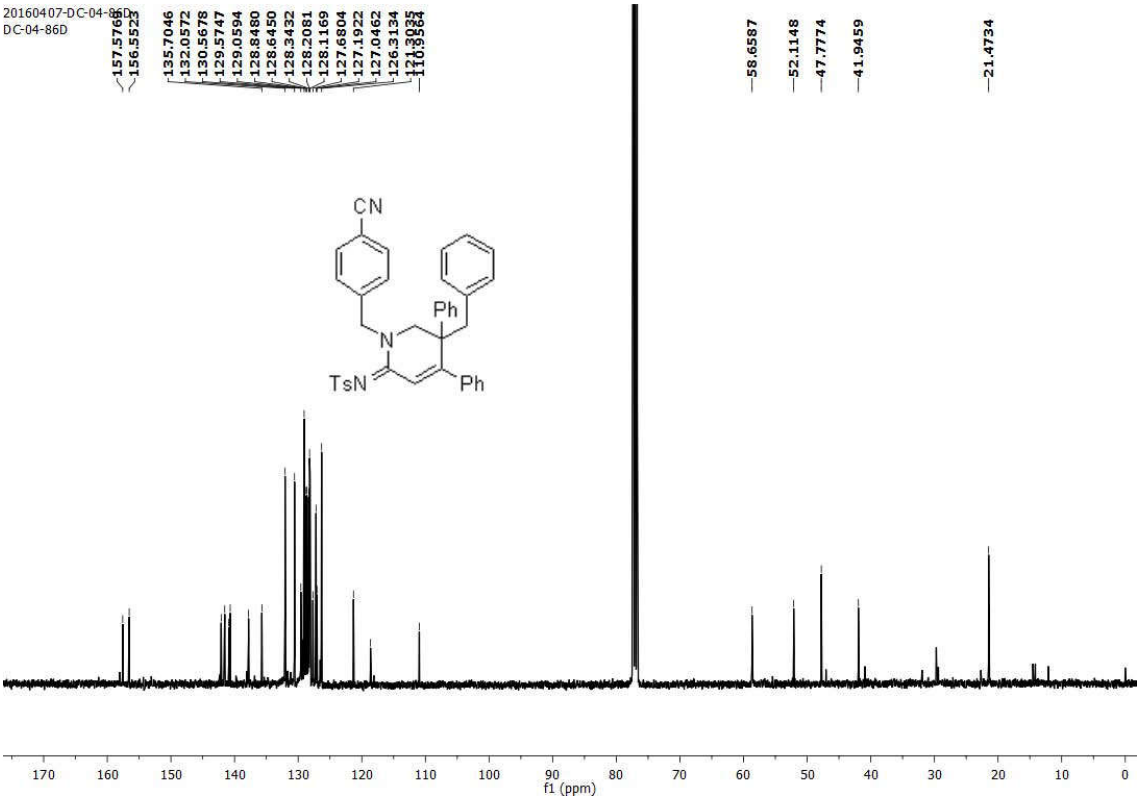

Fig. S152 ^{13}C NMR of **24b** in $CDCl_3$.

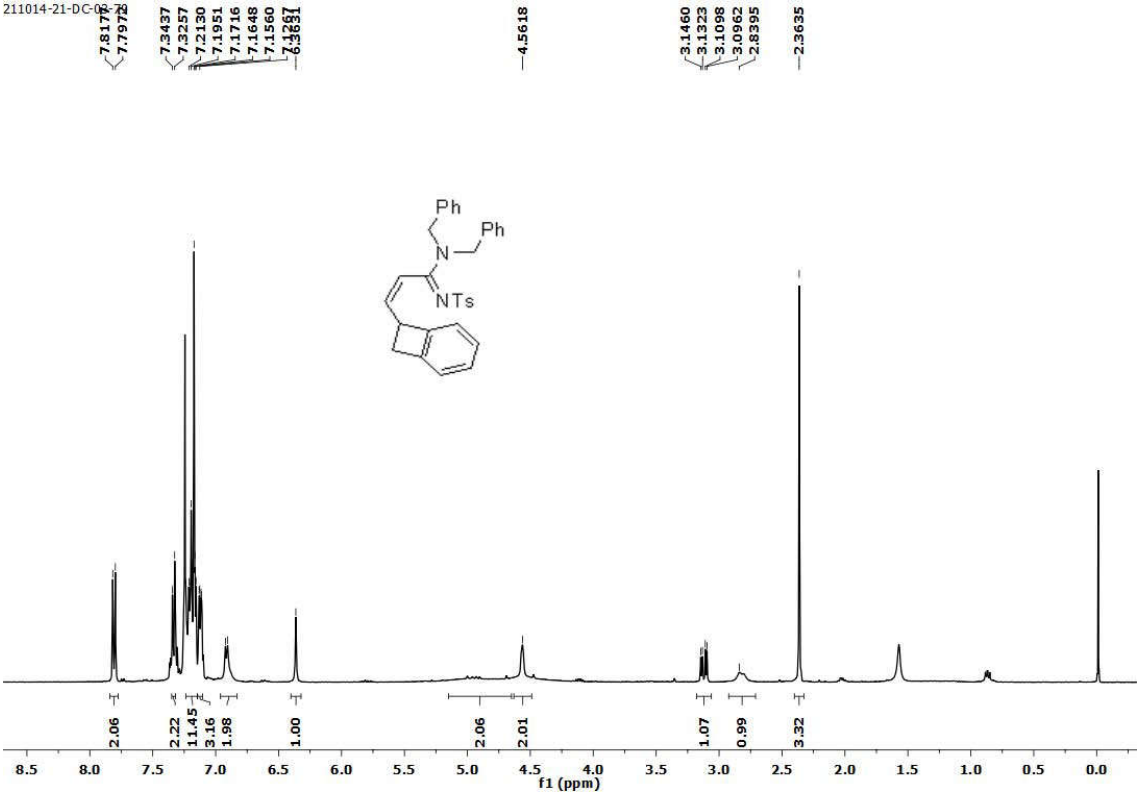

Fig. S153 ^{1}H NMR of **30** in $CDCl_3$.

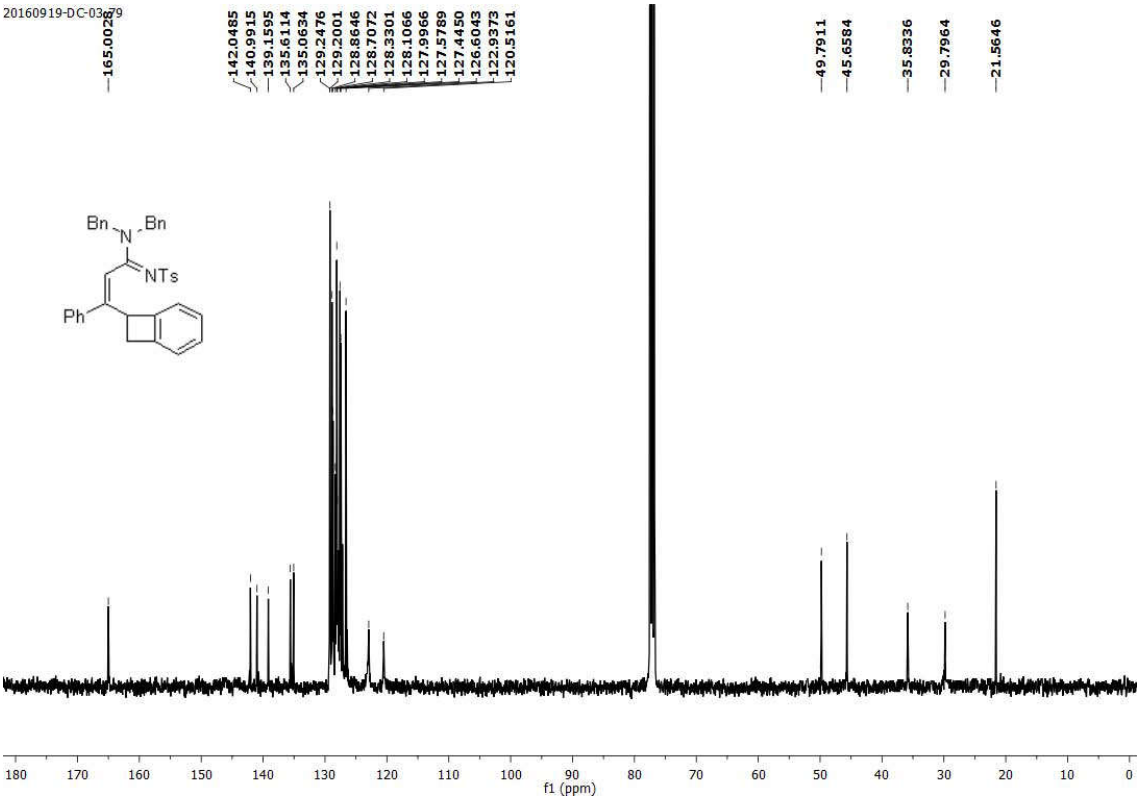

Fig. S154 ^{13}C NMR of **30** in $CDCl_3$.