Supporting Information

TCCA-mediated oxidative rearrangement of tetrahydro-β-carbolines: Facile access to spirooxindoles and total synthesis of (±)-coerulescine and (±)-horsfiline

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[!]M. Sathish and A. P. Sakla contributed equally.

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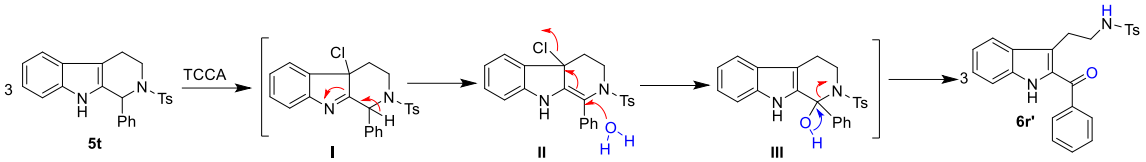
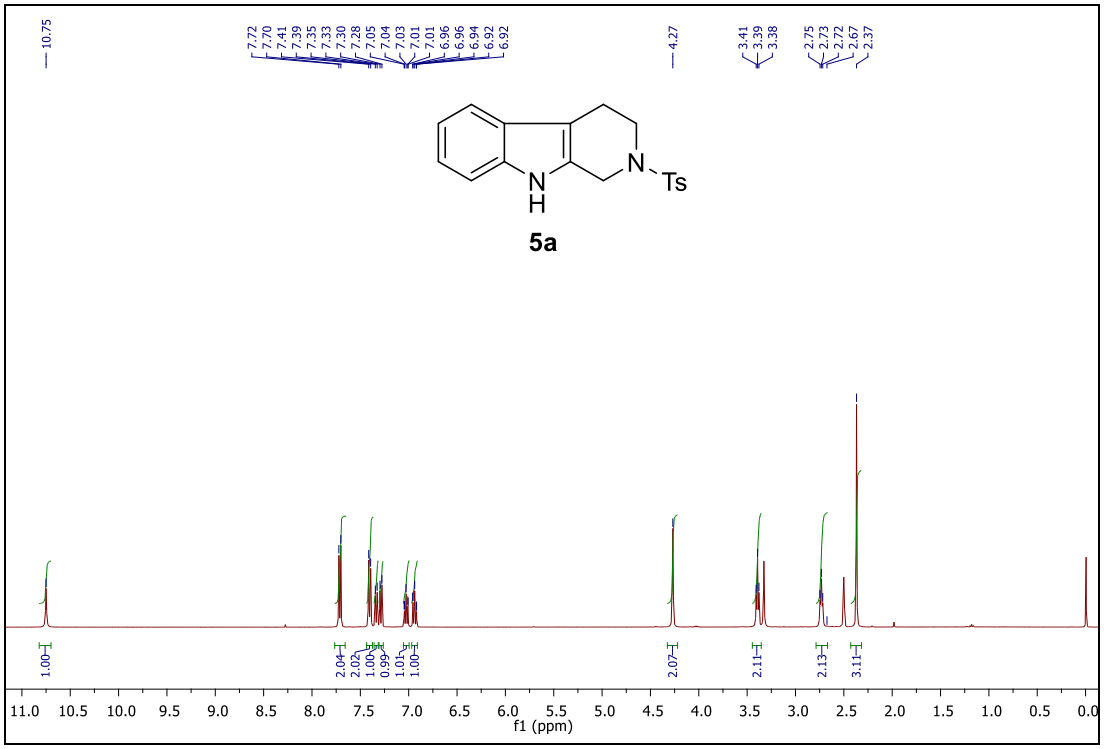
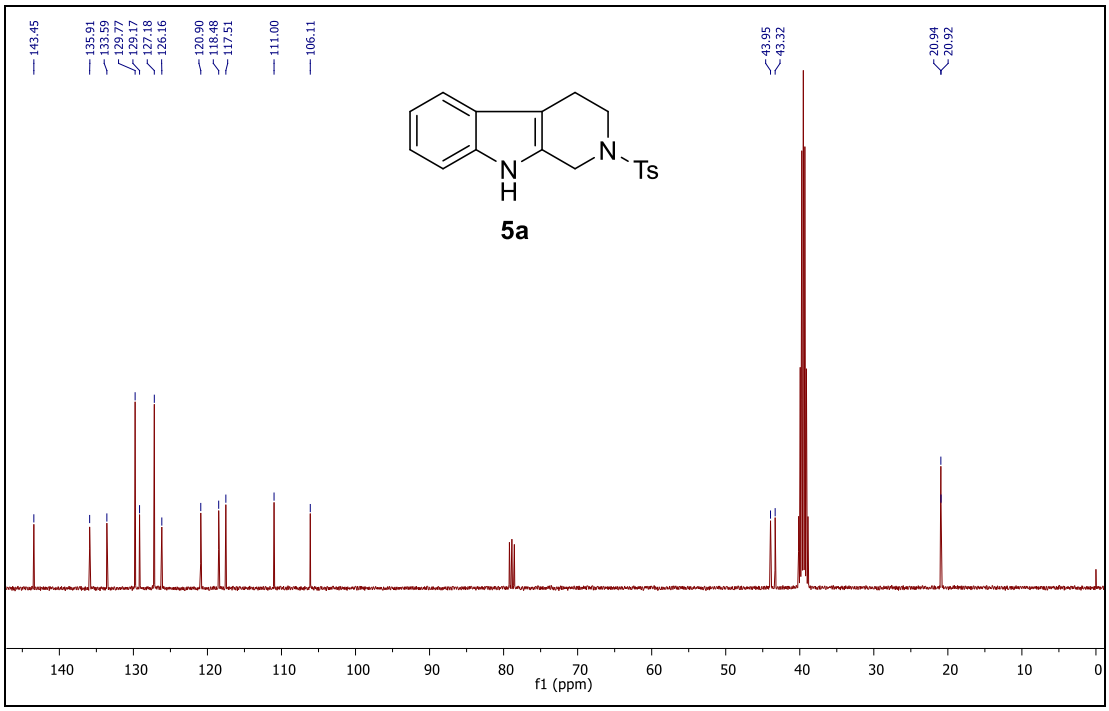


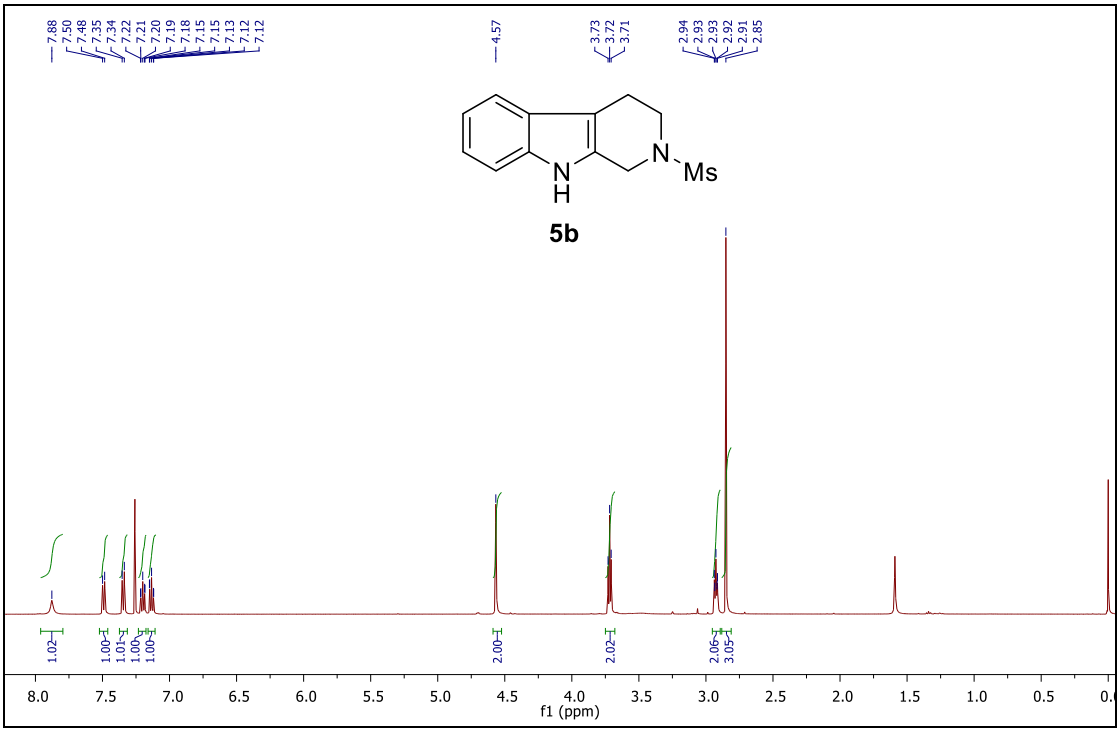
Scheme 1. Plausible reaction mechanism for the formation of **6r'**



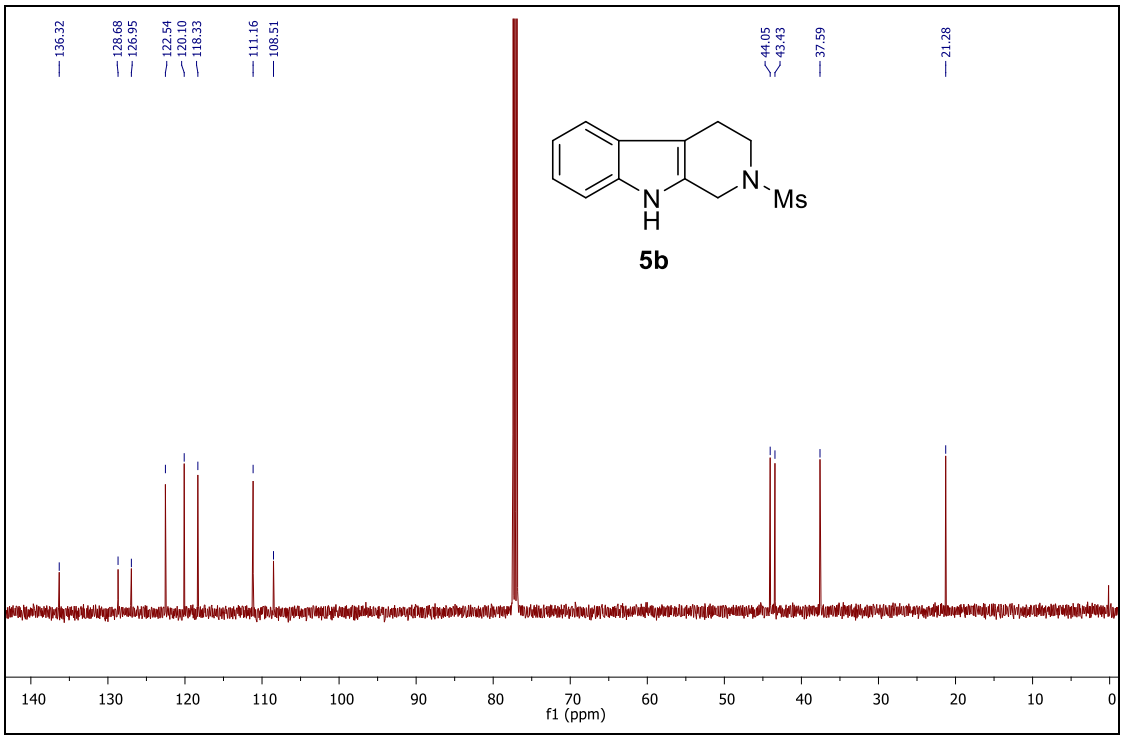
^{1}H NMR (400 MHz, DMSO-d_6) for compound **5a**.



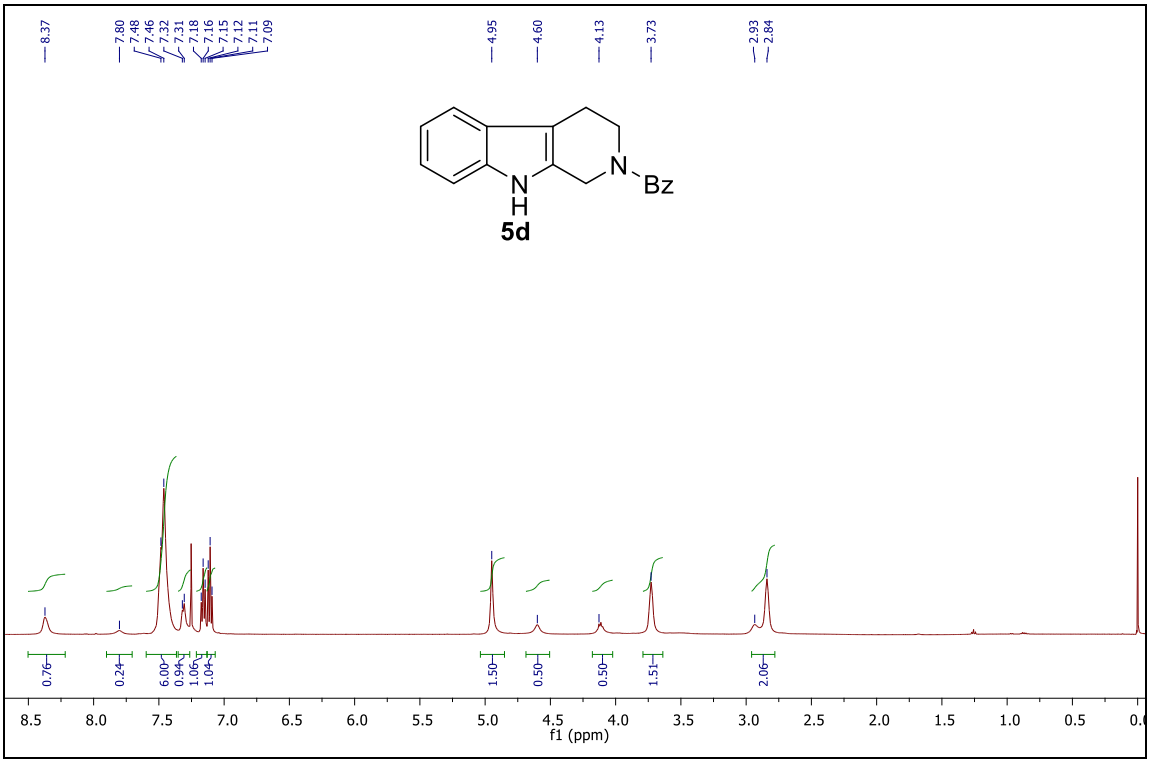
^{13}C NMR (100 MHz, DMSO-d_6) for compound **5a**.



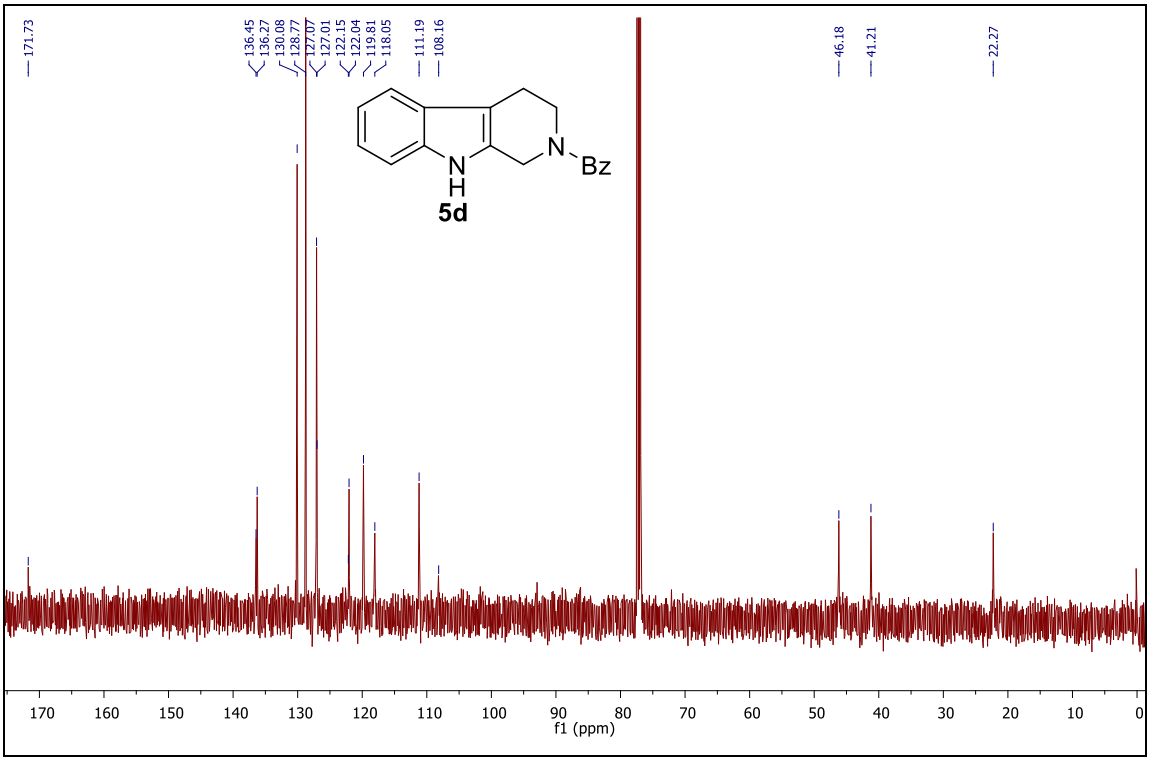
^{1}H NMR (500 MHz, $CDCl_3$) for compound **5b**.



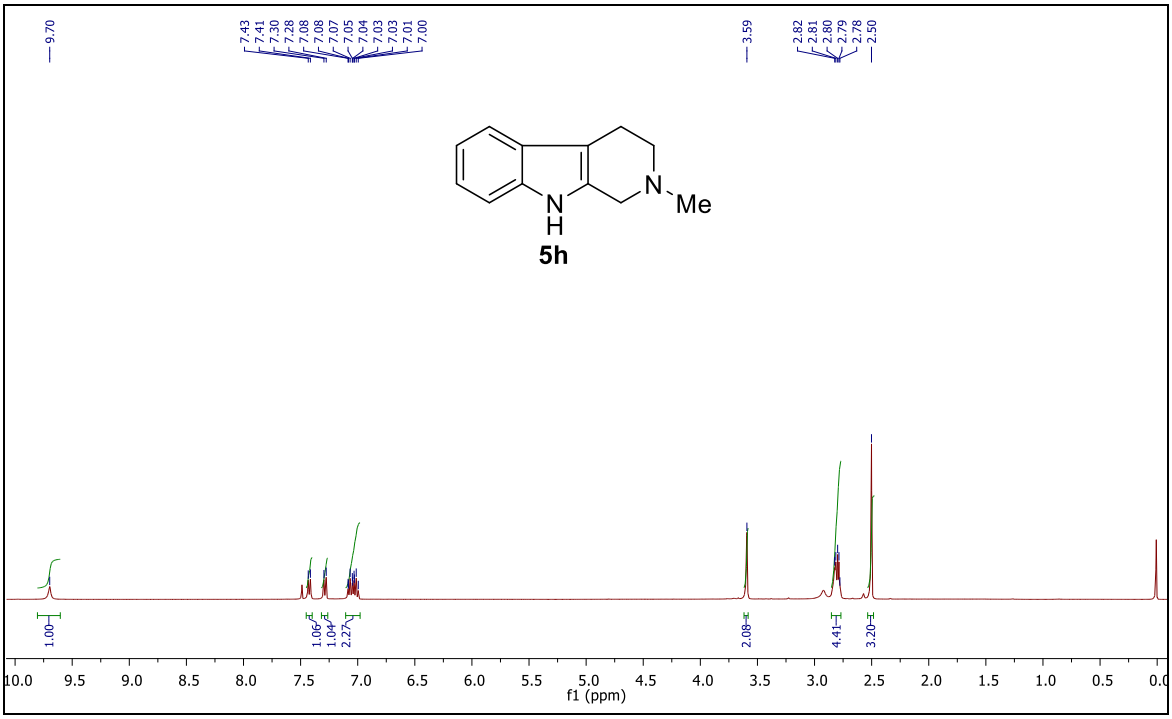
^{13}C NMR (125 MHz, $CDCl_3$) for compound **5b**.



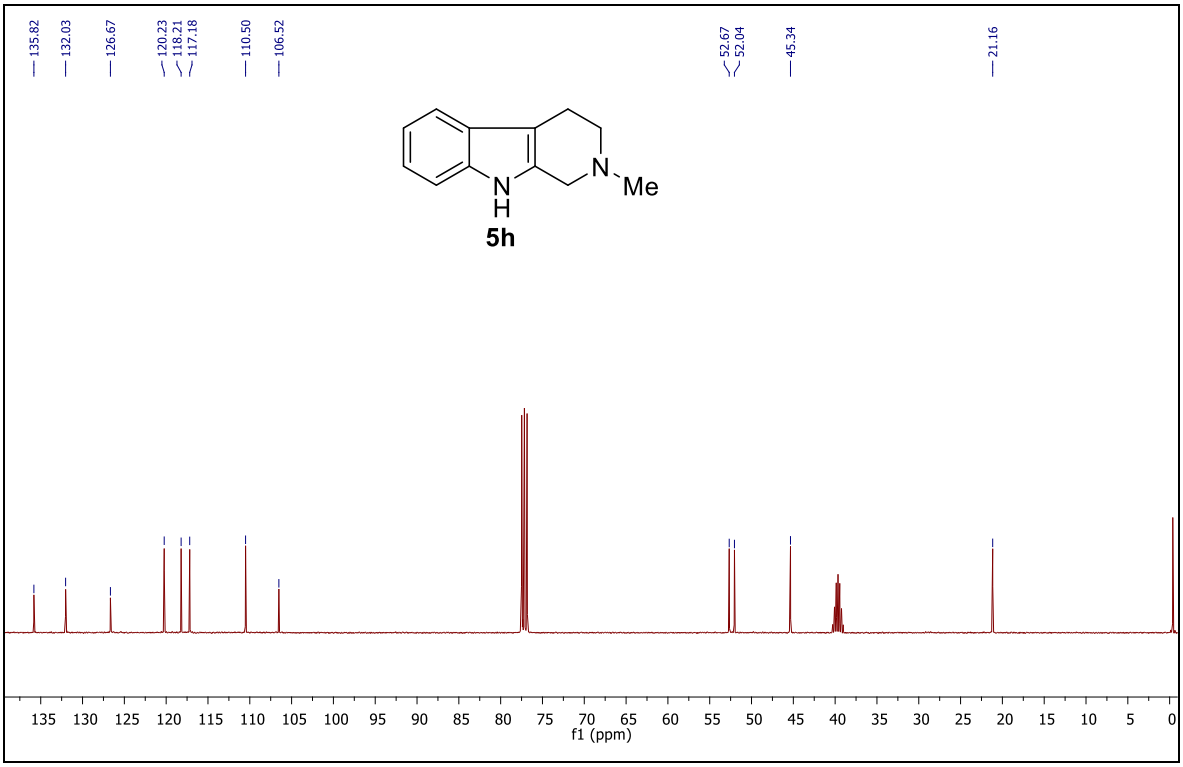
^{1}H NMR (400 MHz, $CDCl_3$) for compound **5d**.



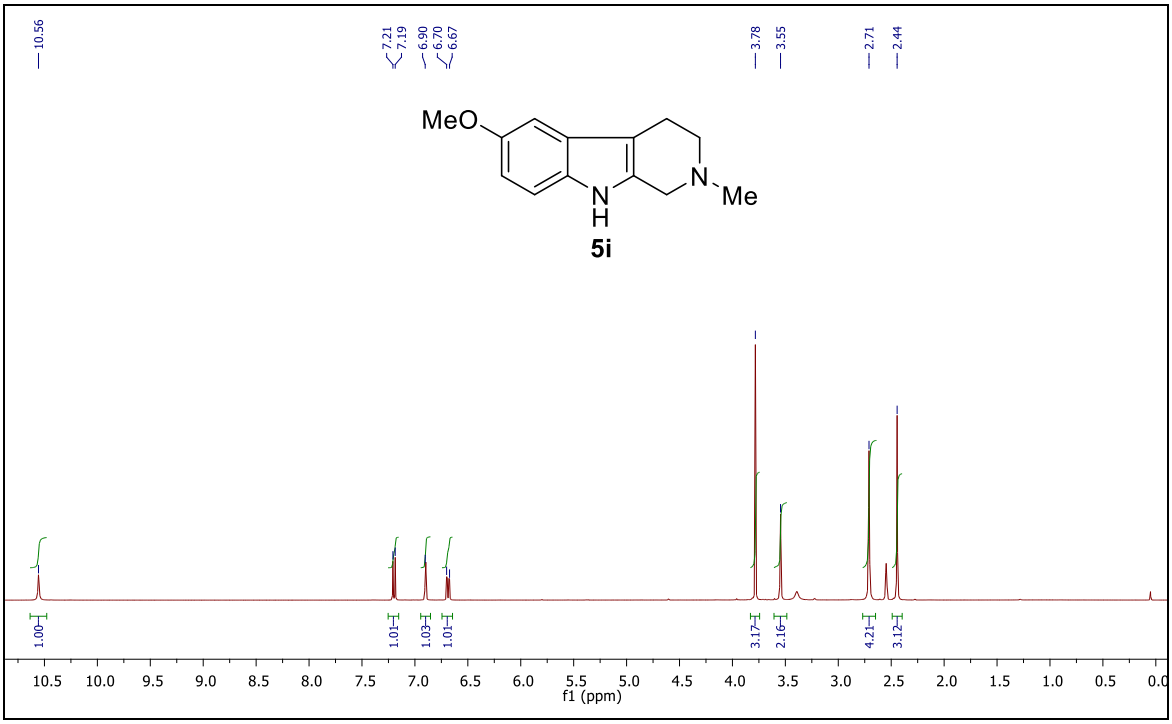
^{13}C NMR (100 MHz, $CDCl_3$) for compound **5d**.



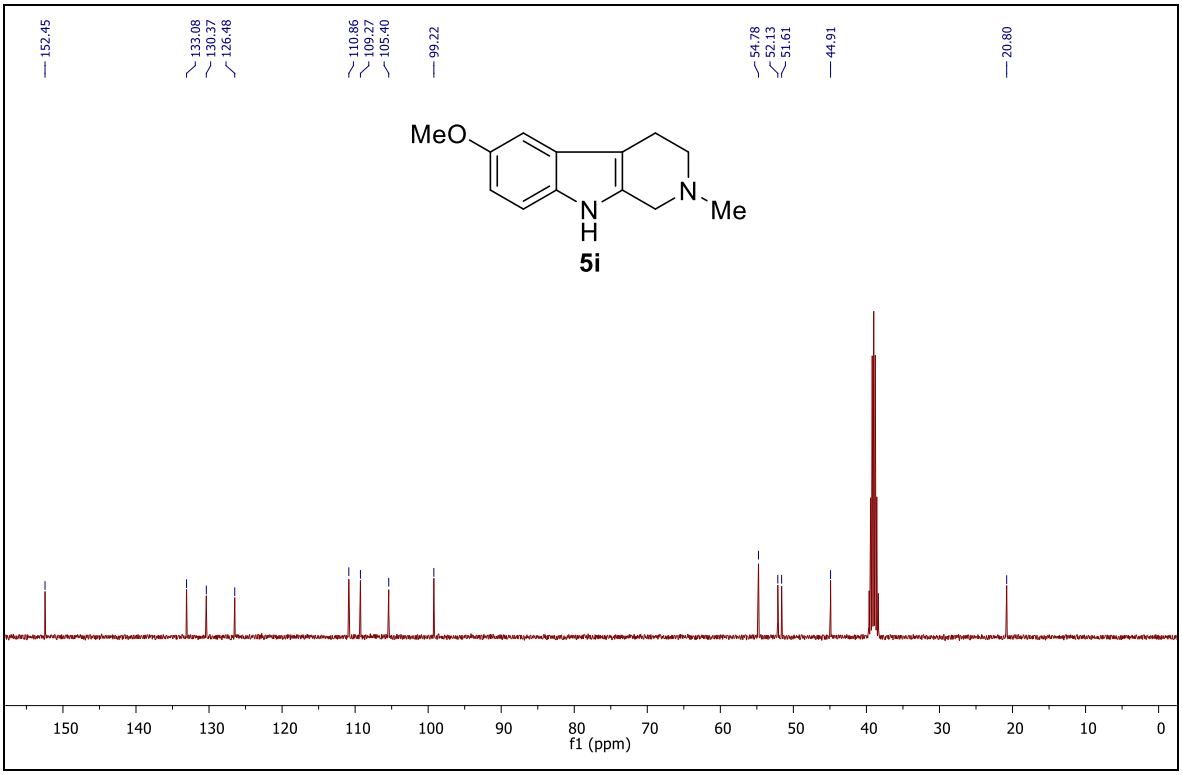
^{1}H NMR (400 MHz, DMSO-d_6 + $CDCl_3$) for compound **5h**.



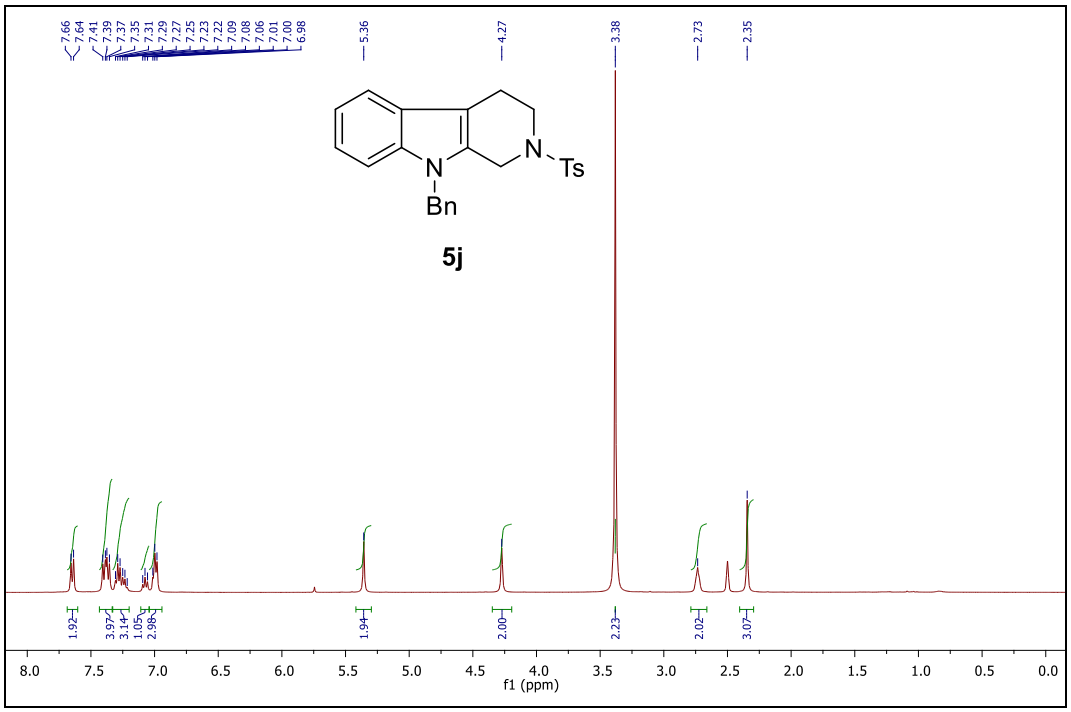
^{13}C NMR (100 MHz, DMSO-d_6 + $CDCl_3$) for compound **5h**.



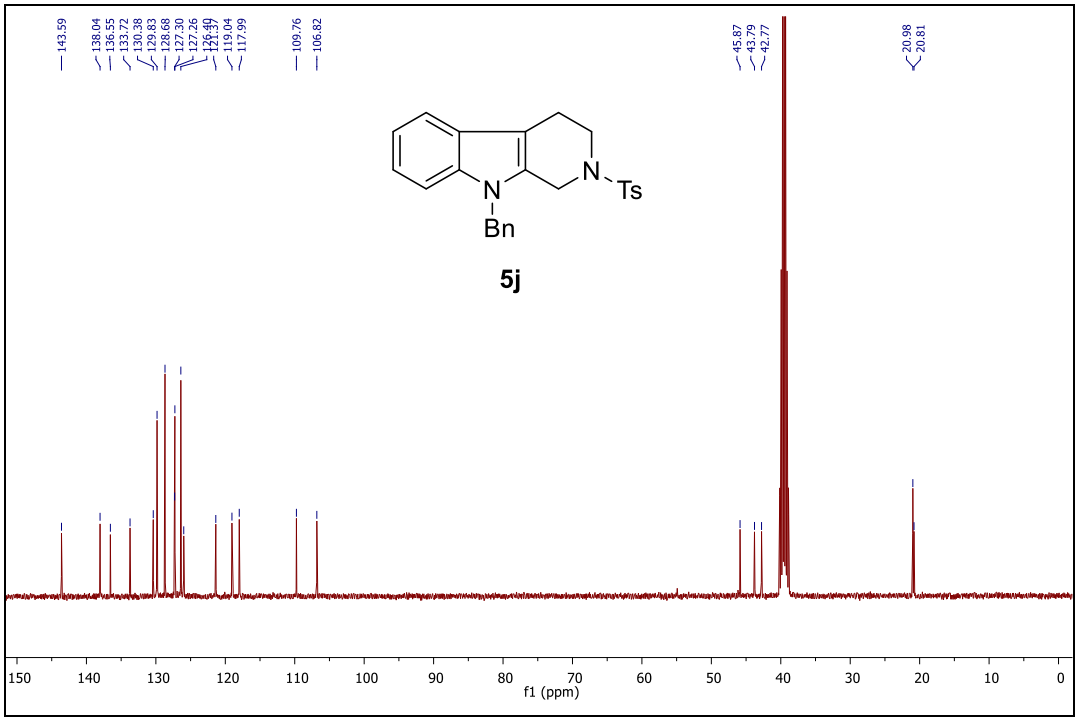
^{1}H NMR (400 MHz, DMSO-d_6) for compound **5i**.



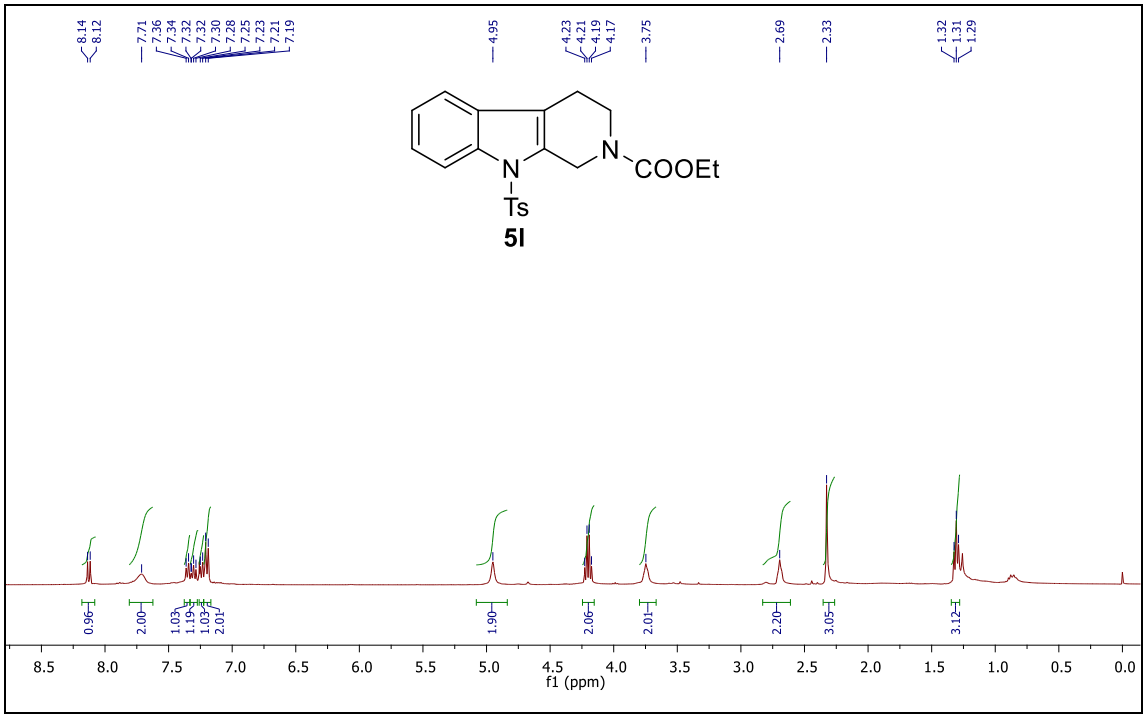
^{13}C NMR (100 MHz, DMSO-d_6) for compound **5i**.



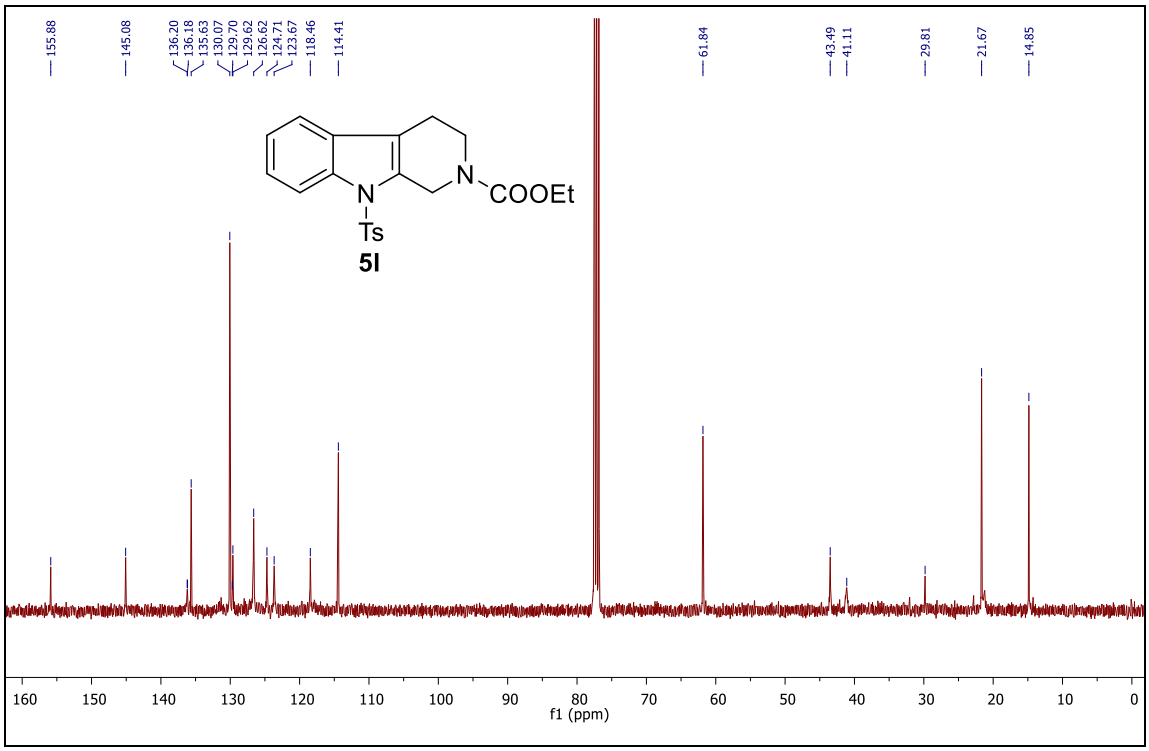
^{1}H NMR (400 MHz, DMSO-d_6) for compound **5j**.



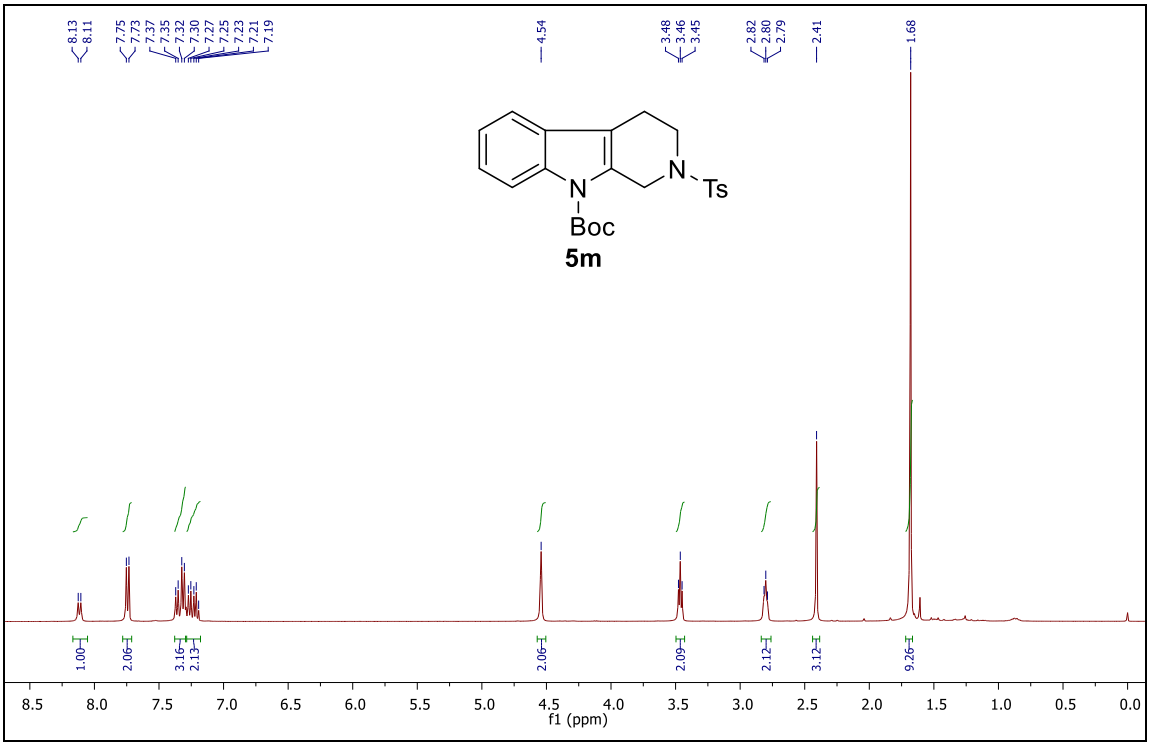
^{13}C NMR (100 MHz, DMSO-d_6) for compound **5j**.



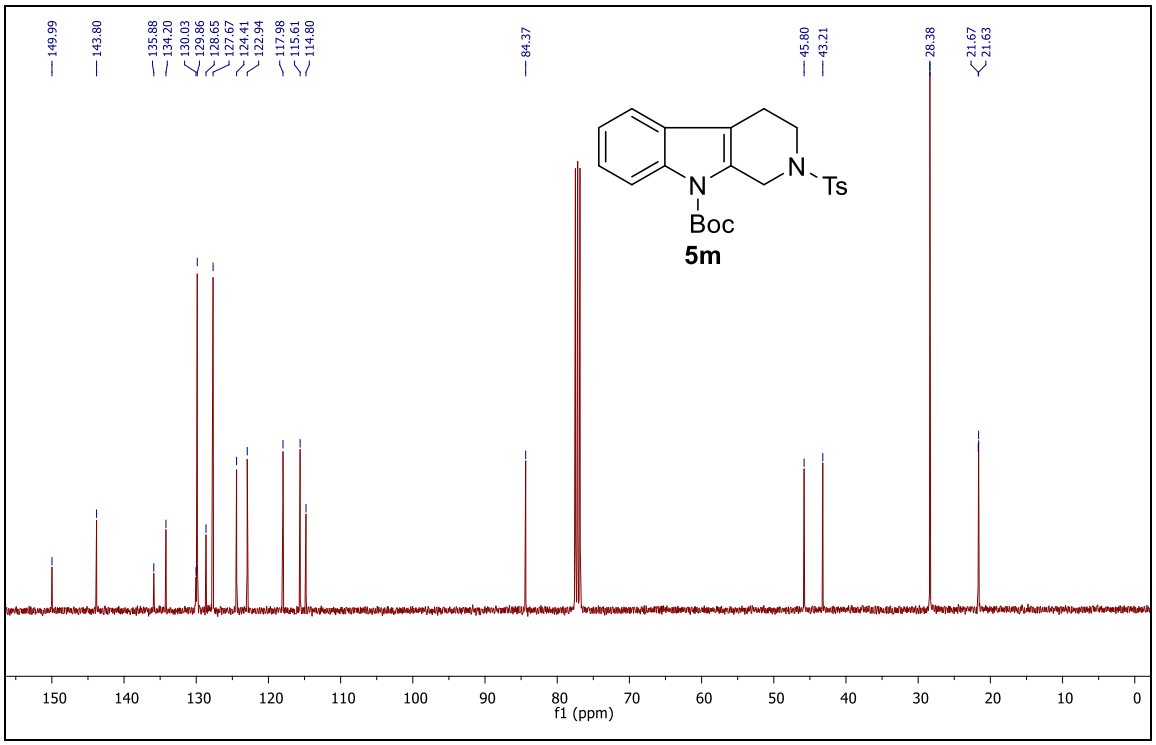
^{1}H NMR (400 MHz, $CDCl_3$) for compound **5l**.



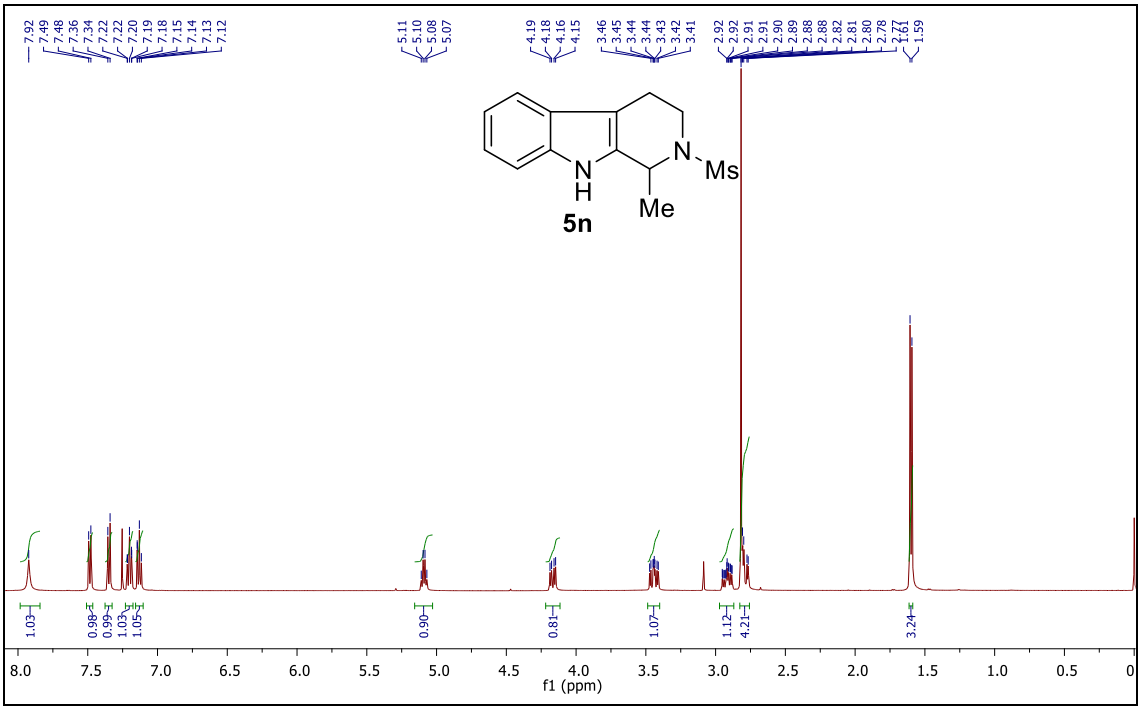
^{13}C NMR (100 MHz, $CDCl_3$) for compound **5l**.



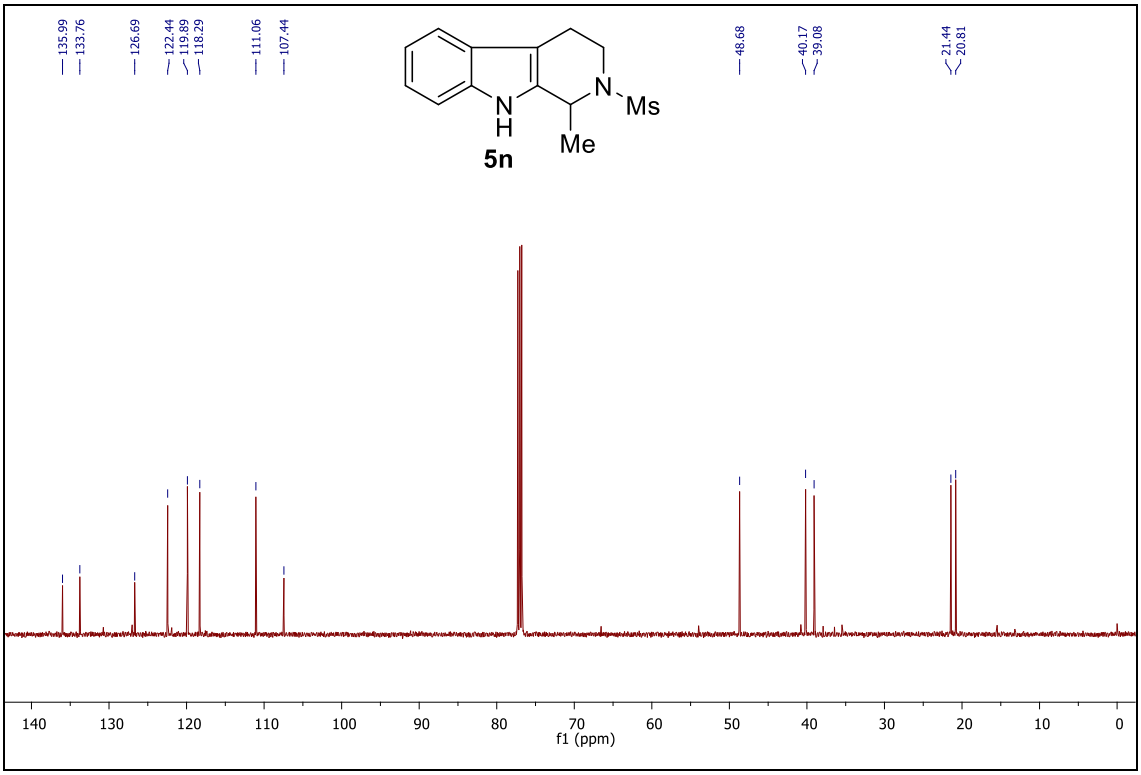
^{1}H NMR (400 MHz, $CDCl_3$) for compound **5m**.



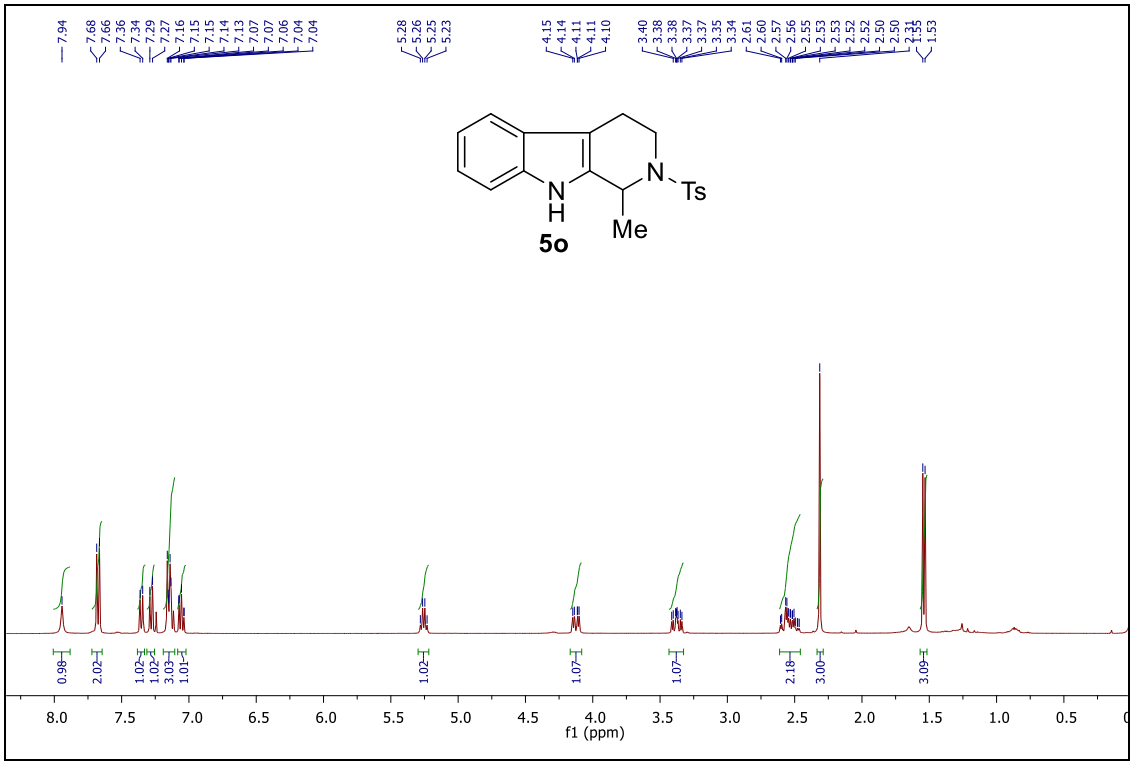
^{13}C NMR (100 MHz, $CDCl_3$) for compound **5m**.



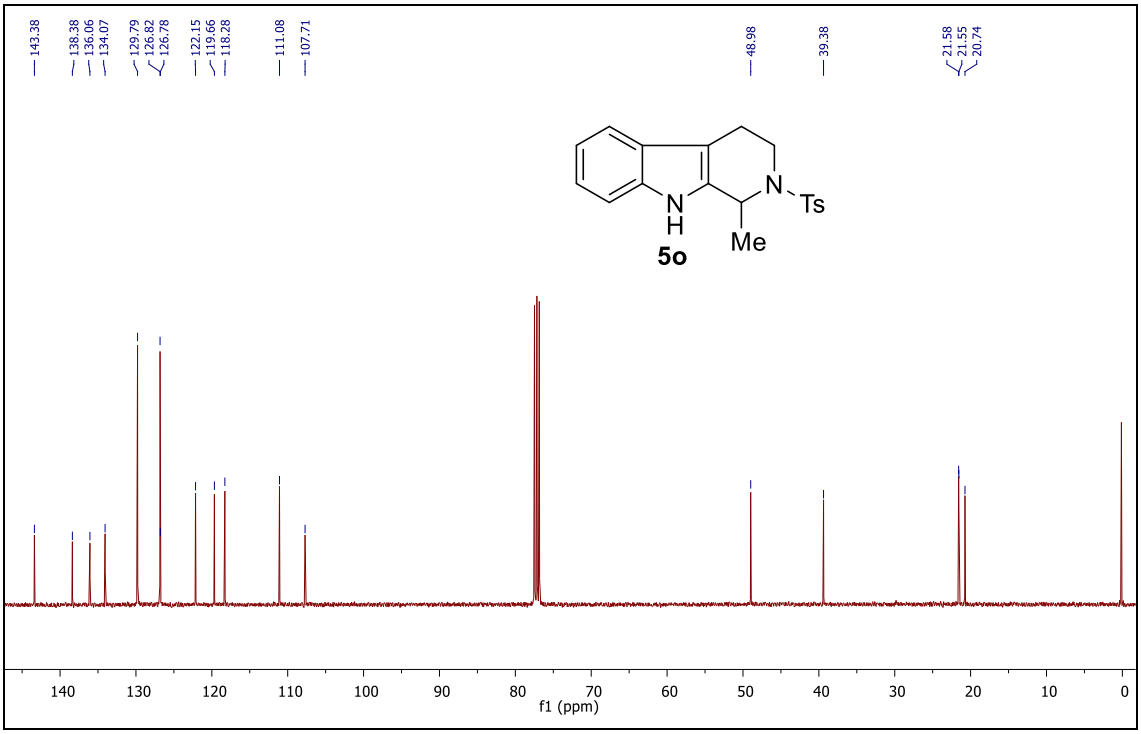
^{1}H NMR (500 MHz, $CDCl_3$) for compound **5n**.



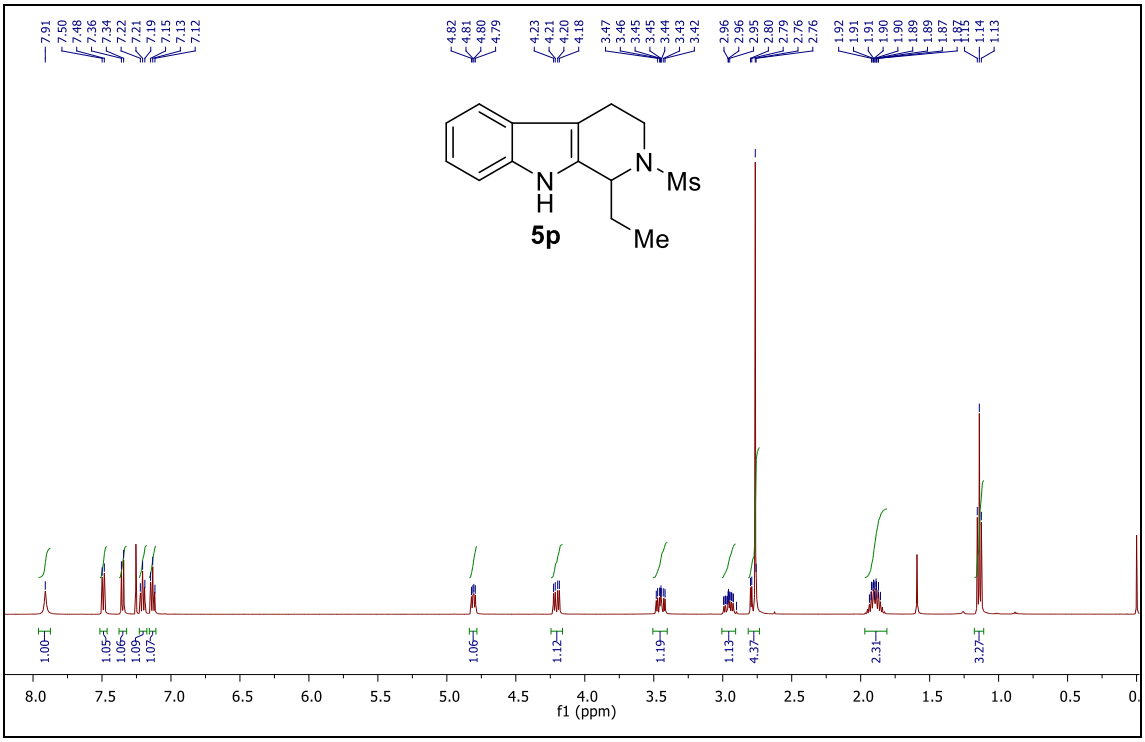
^{13}C NMR (125 MHz, $CDCl_3$) for compound **5n**.



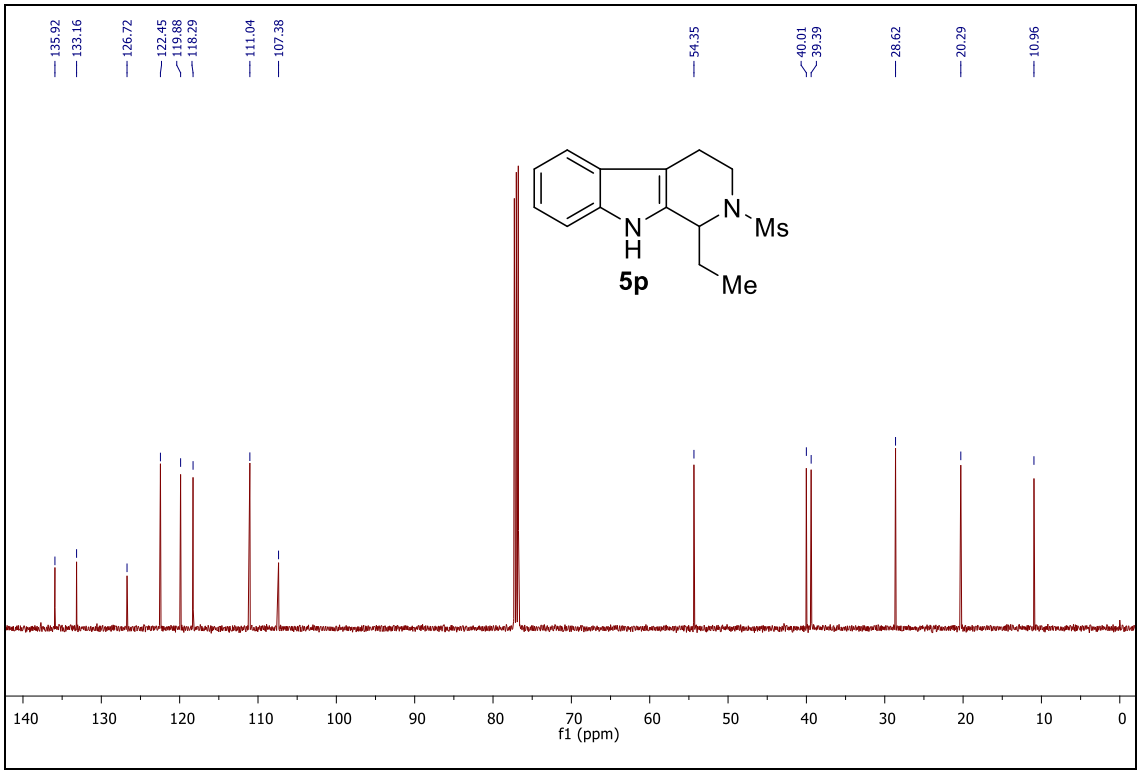
^{1}H NMR (400 MHz, $CDCl_3$) for compound **5o**.



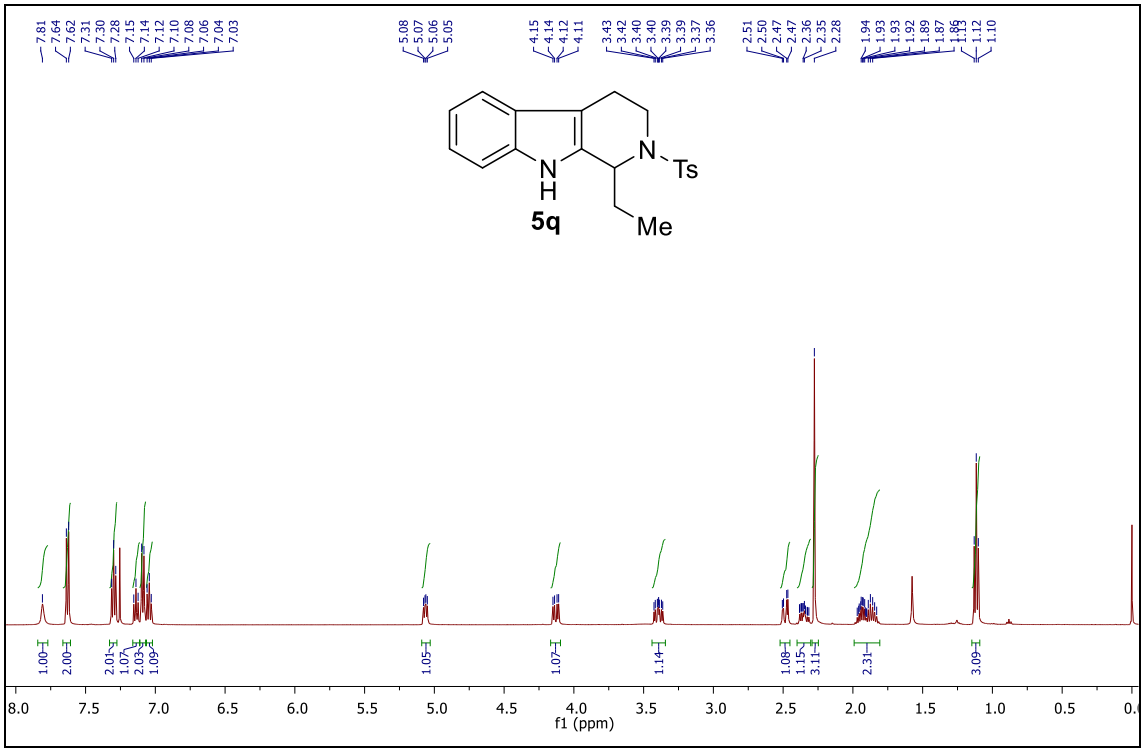
^{13}C NMR (100 MHz, $CDCl_3$) for compound **5o**.



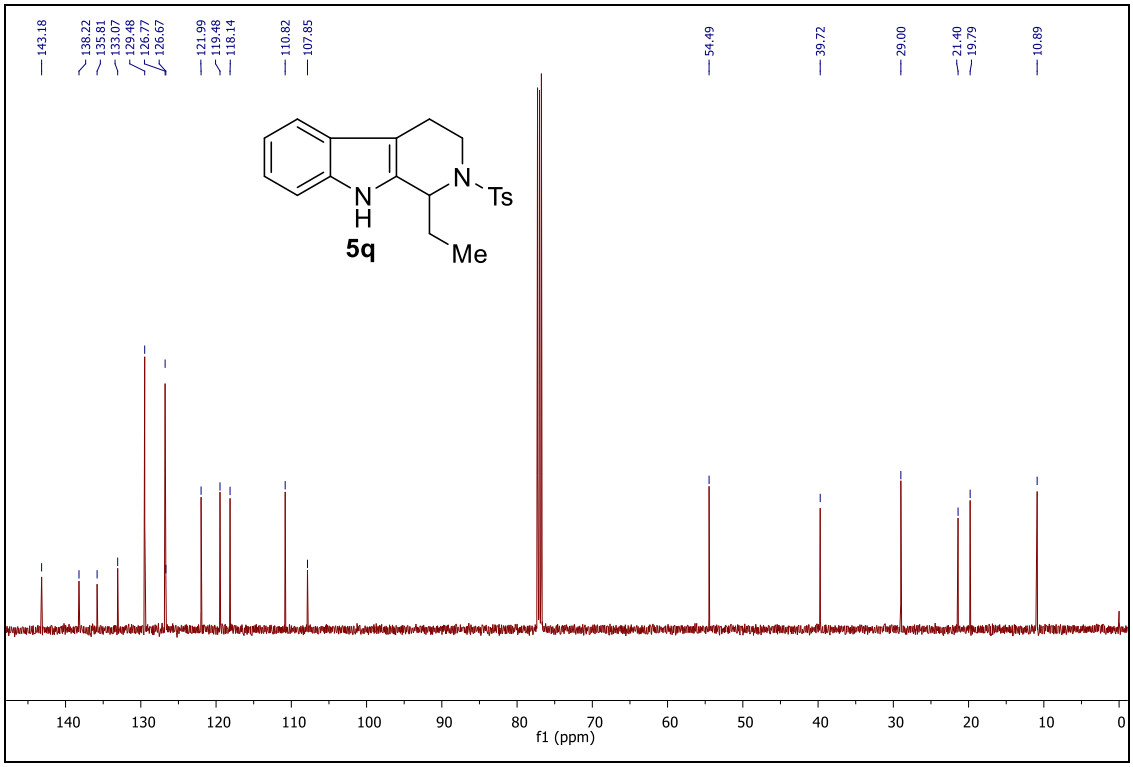
^{1}H NMR (500 MHz, $CDCl_3$) for compound **5p**.



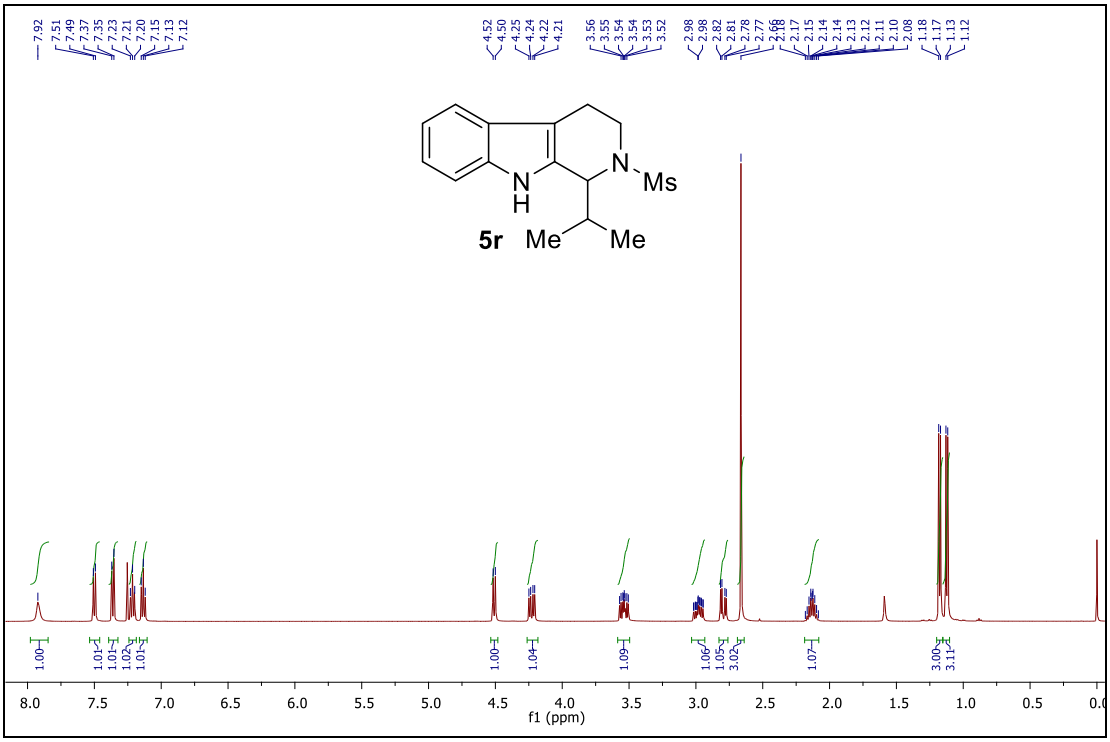
^{13}C NMR (125 MHz, $CDCl_3$) for compound **5p**.



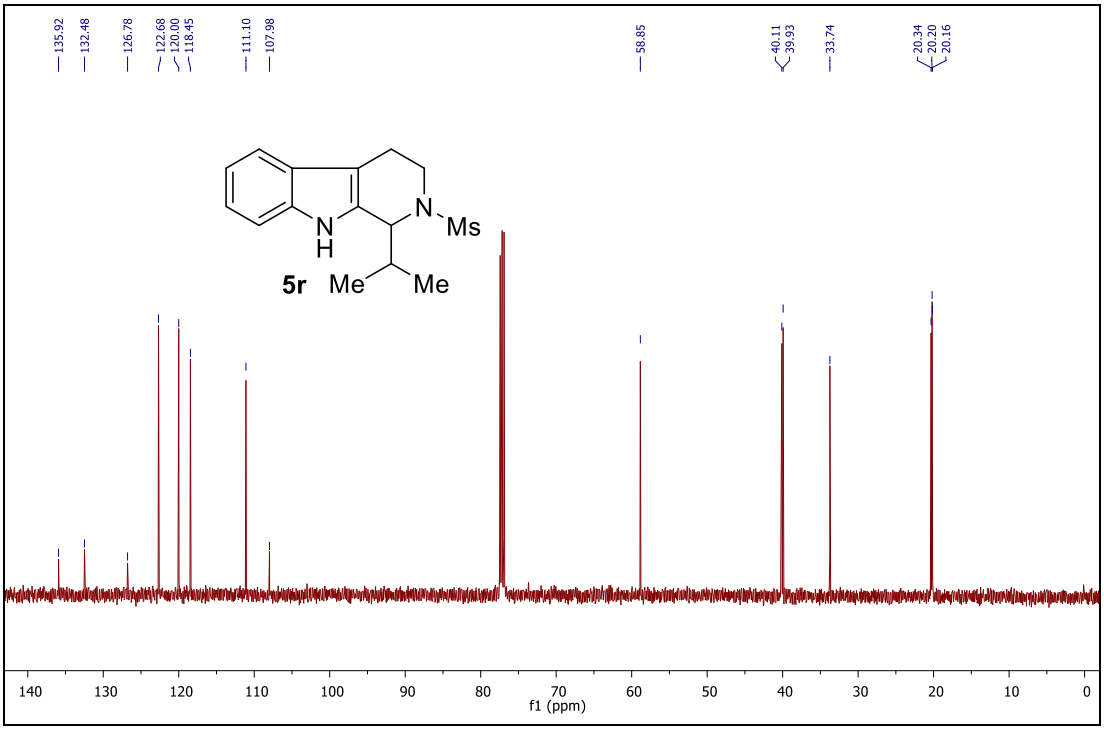
^{1}H NMR (500 MHz, $CDCl_3$) for compound **5q**.



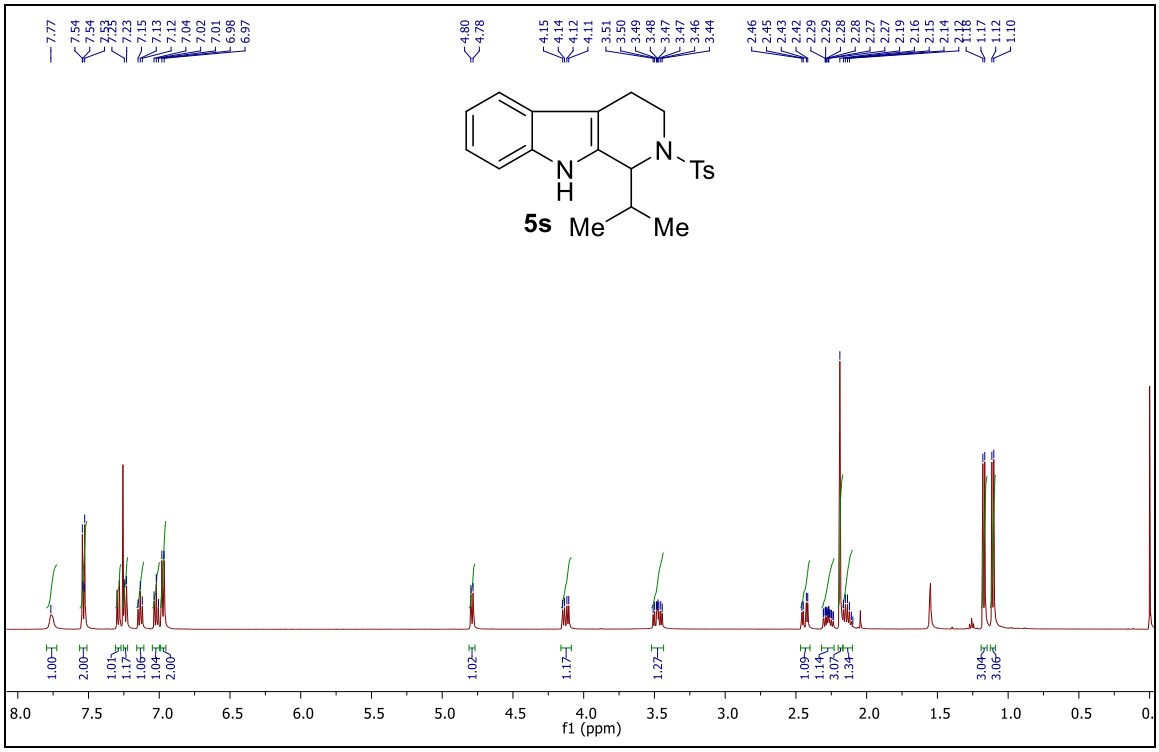
^{13}C NMR (125 MHz, $CDCl_3$) for compound **5q**.



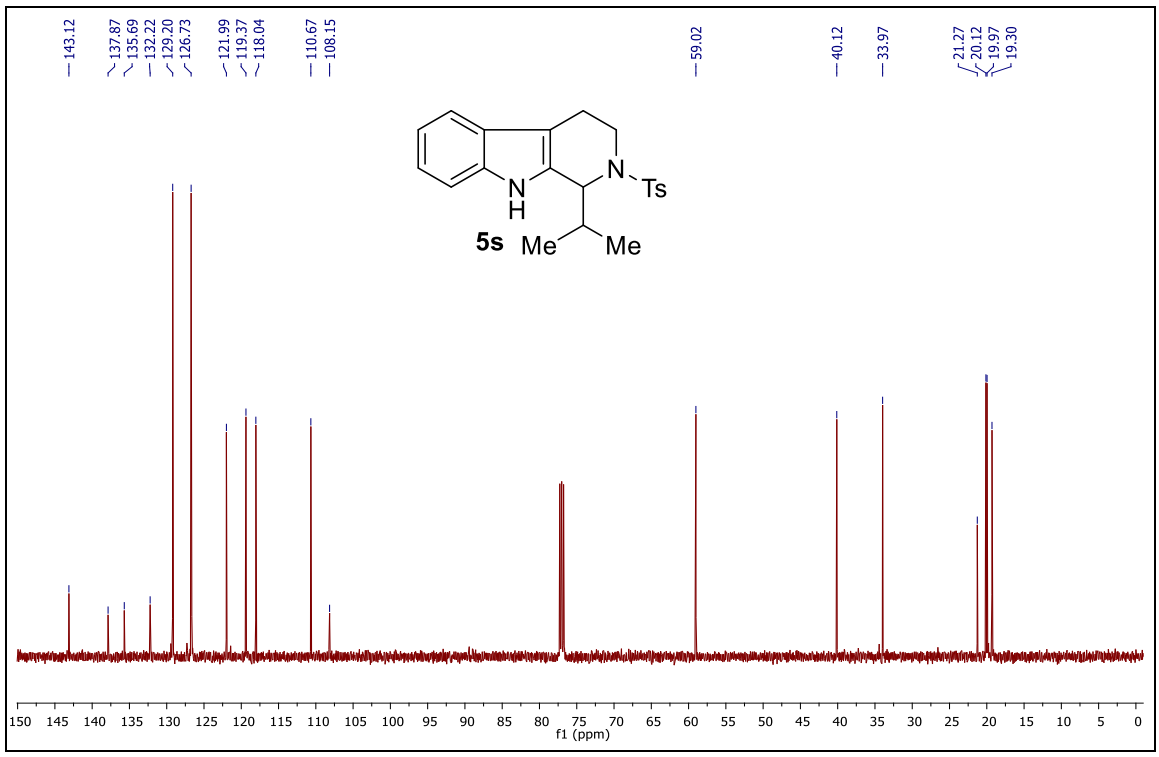
^{1}H NMR (500 MHz, $CDCl_3$) for compound **5r**.



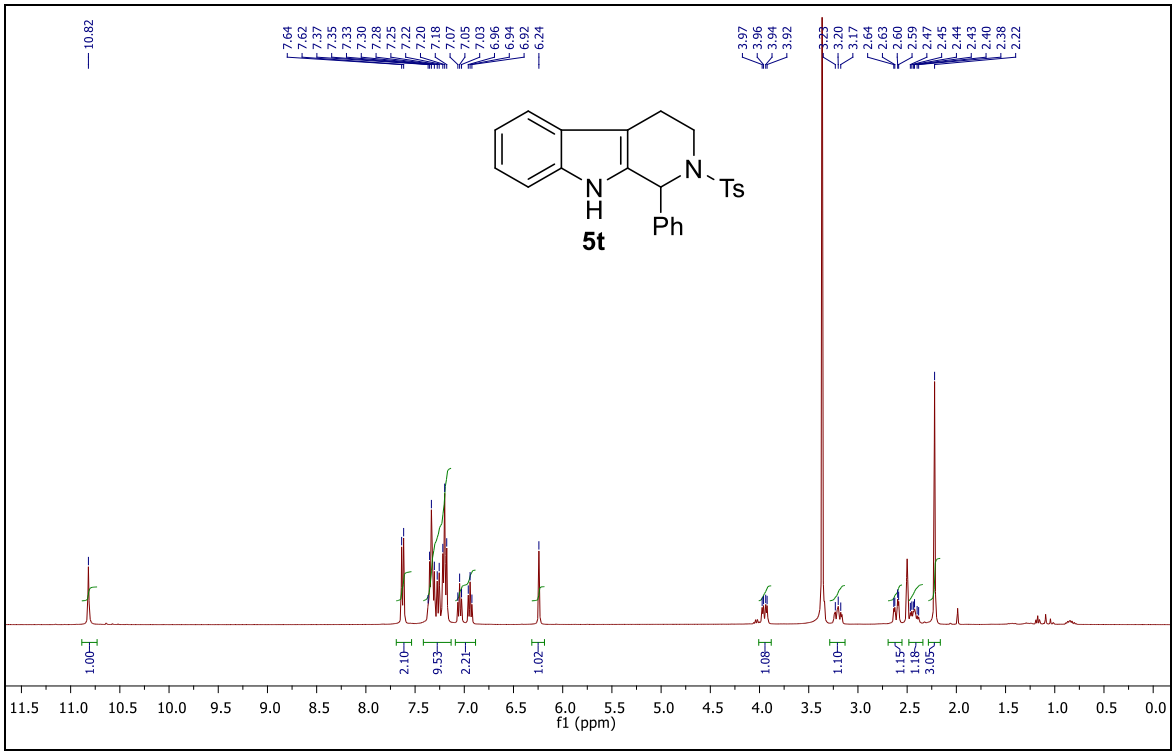
^{13}C NMR (125 MHz, $CDCl_3$) for compound **5r**.



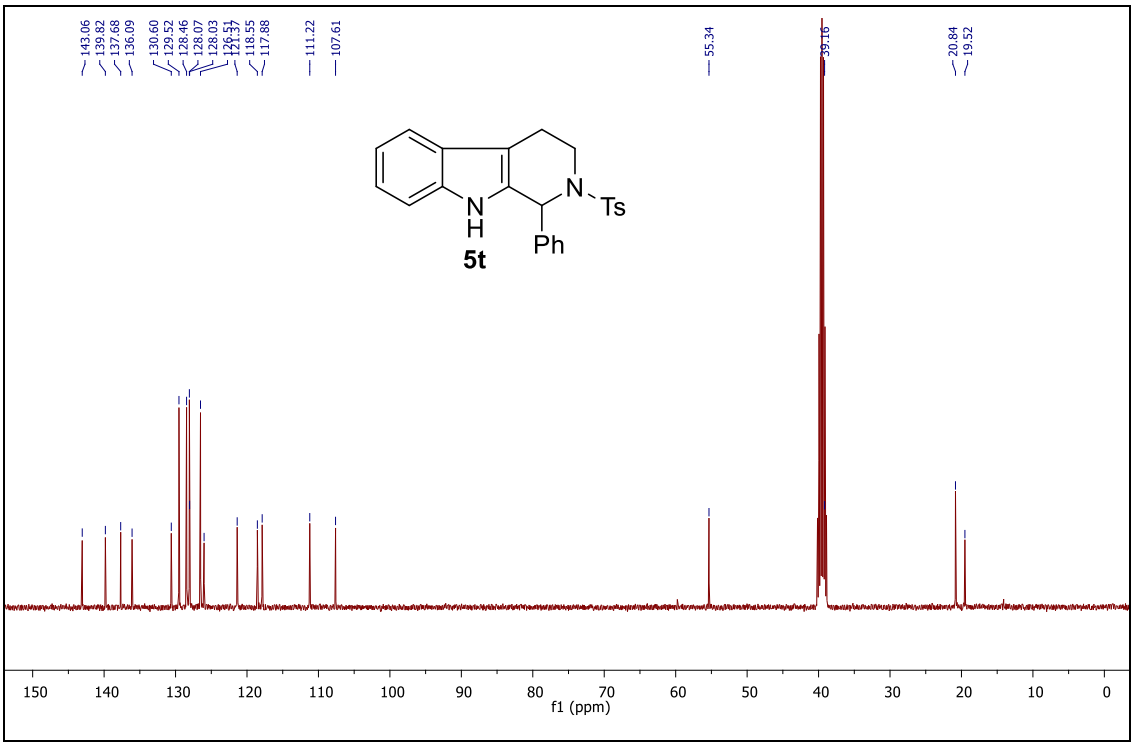
^{1}H NMR (500 MHz, $CDCl_3$) for compound **5s**.



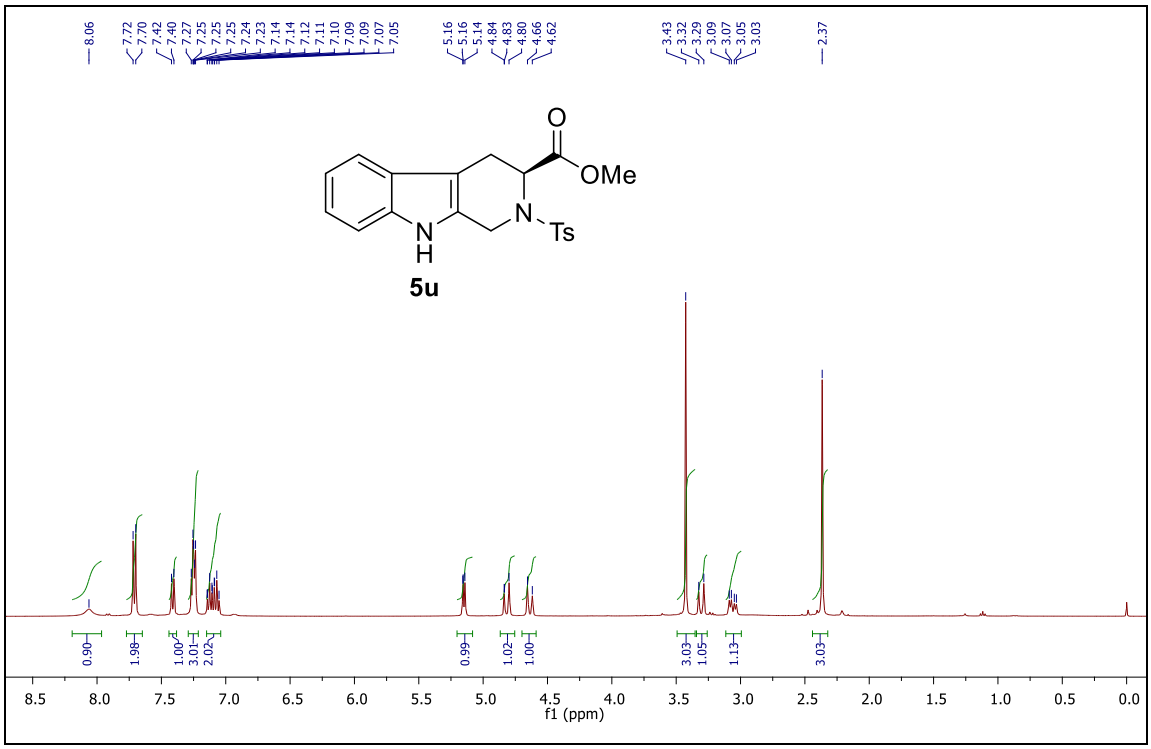
^{13}C NMR (125 MHz, $CDCl_3$) for compound **5s**.



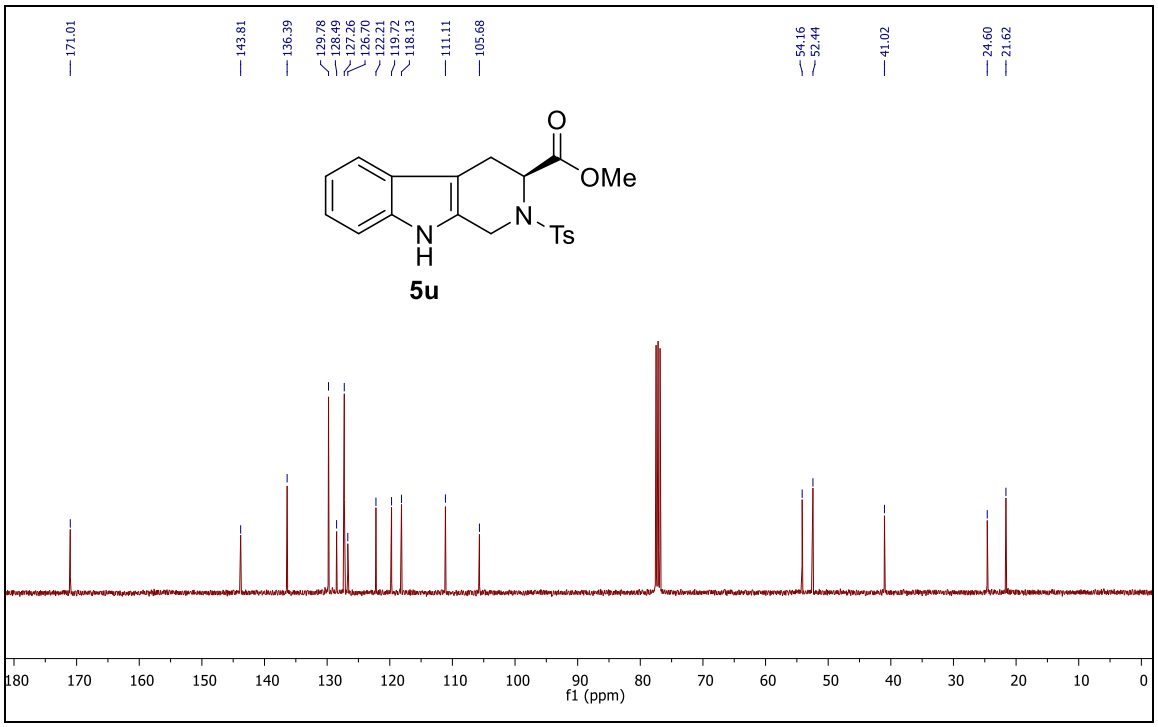
^{1}H NMR (400 MHz, DMSO-d_6) for compound **5t**.



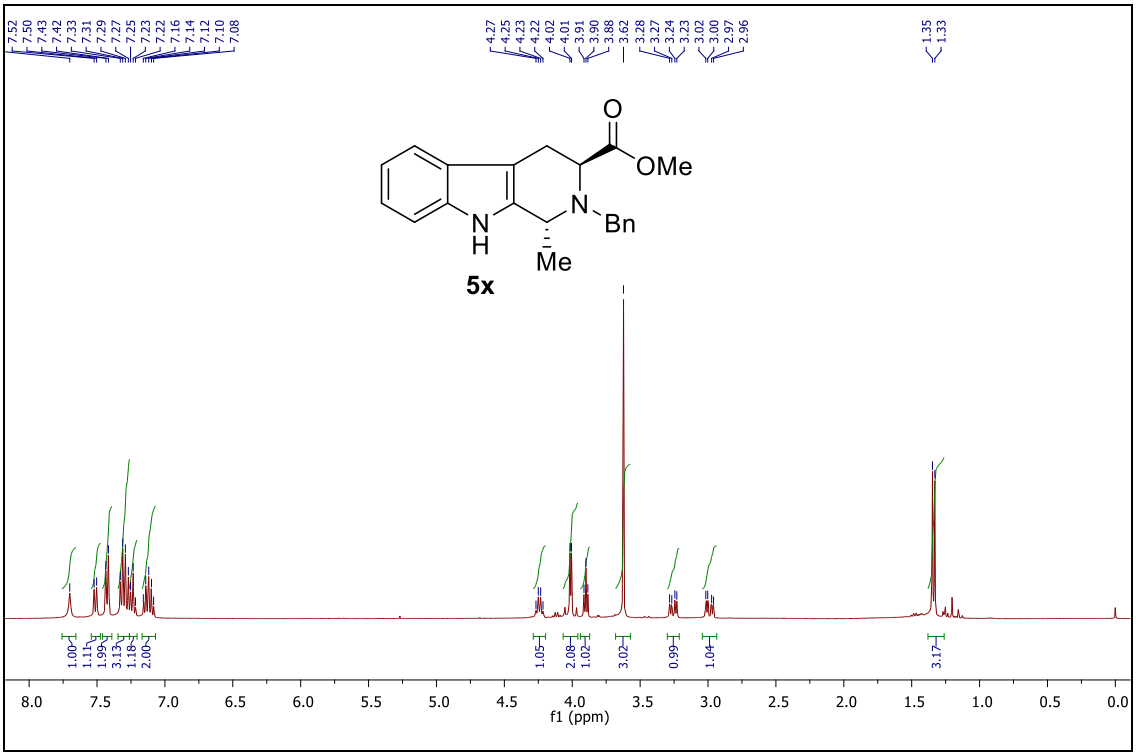
^{13}C NMR (100 MHz, DMSO-d_6) for compound **5t**.



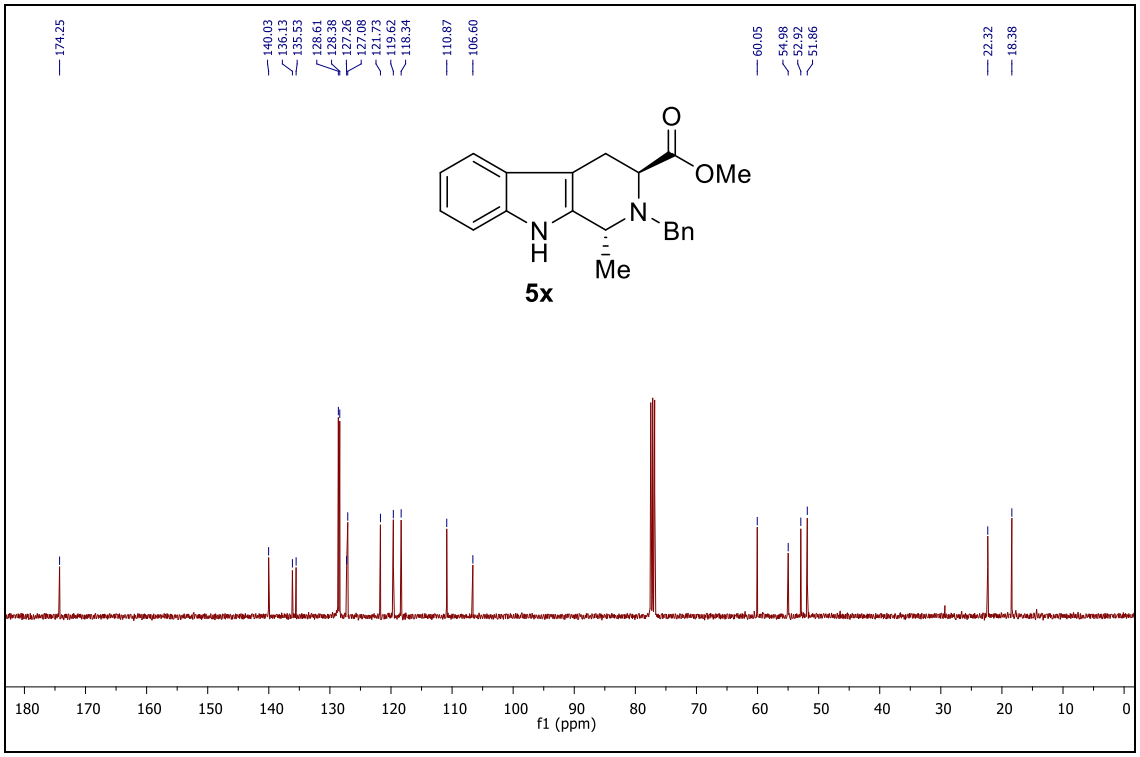
^{1}H NMR (400 MHz, $CDCl_3$) for compound **5u**.



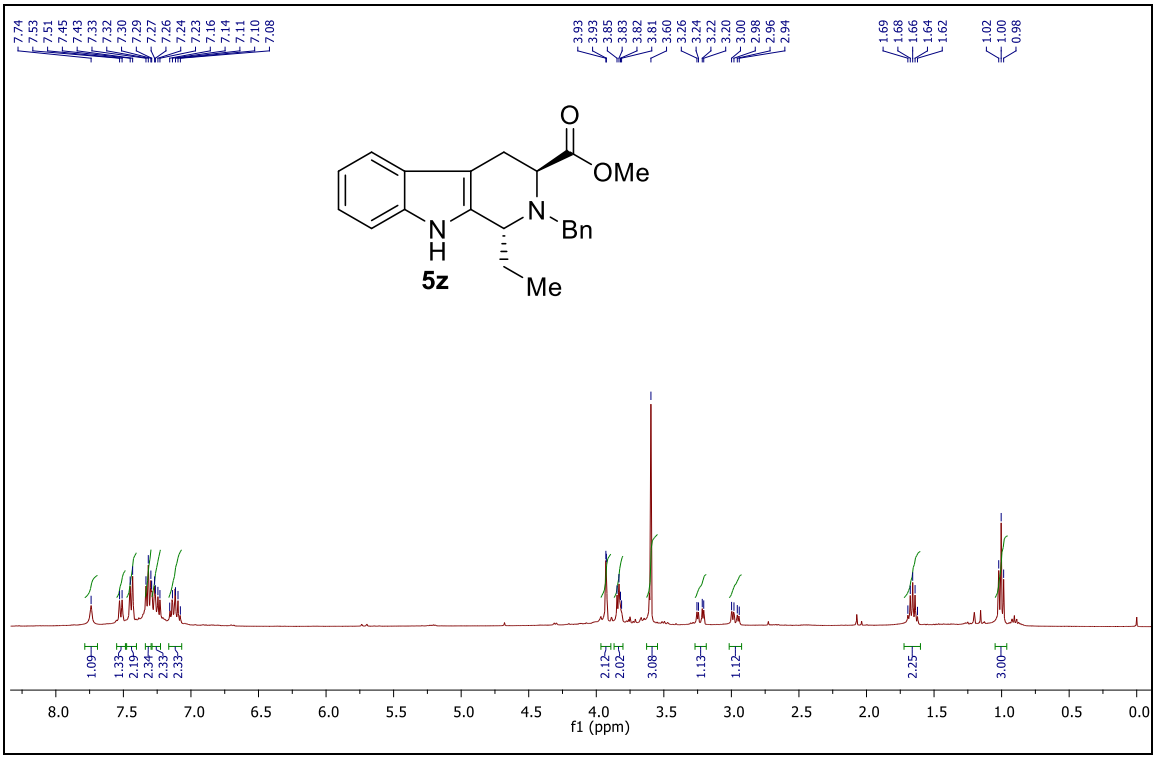
^{13}C NMR (100 MHz, $CDCl_3$) for compound **5u**.



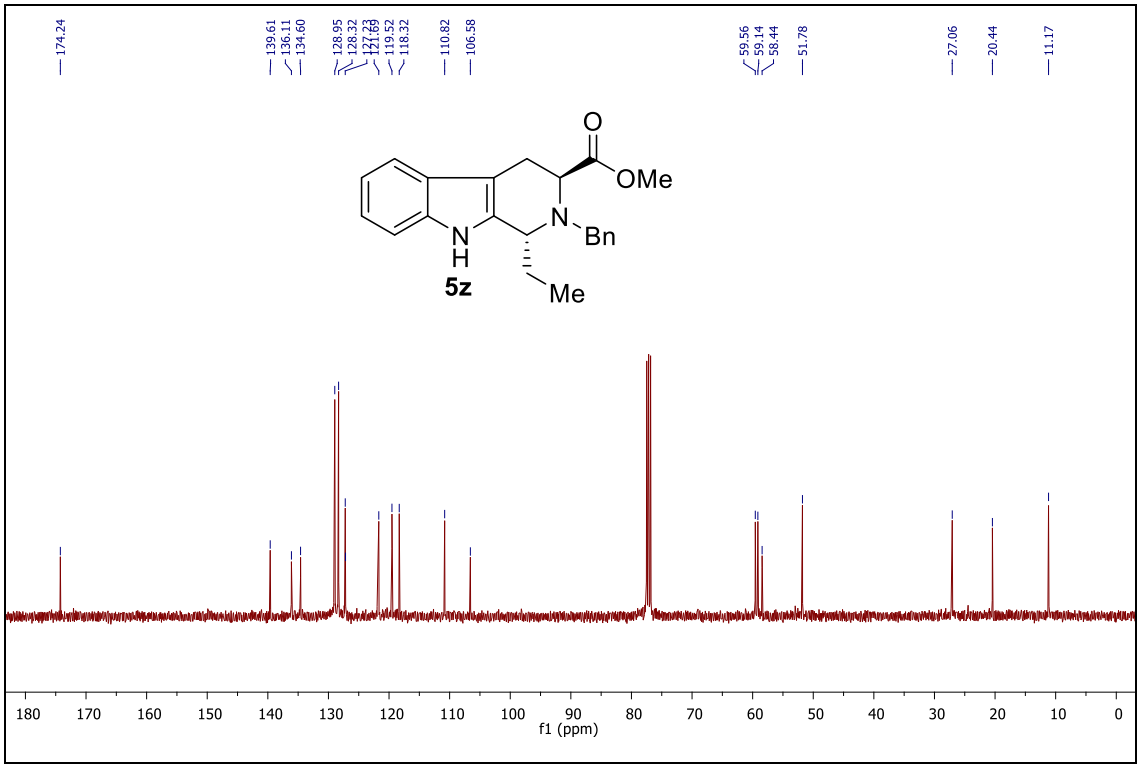
^{1}H NMR (400 MHz, $CDCl_3$) for compound **5x**.



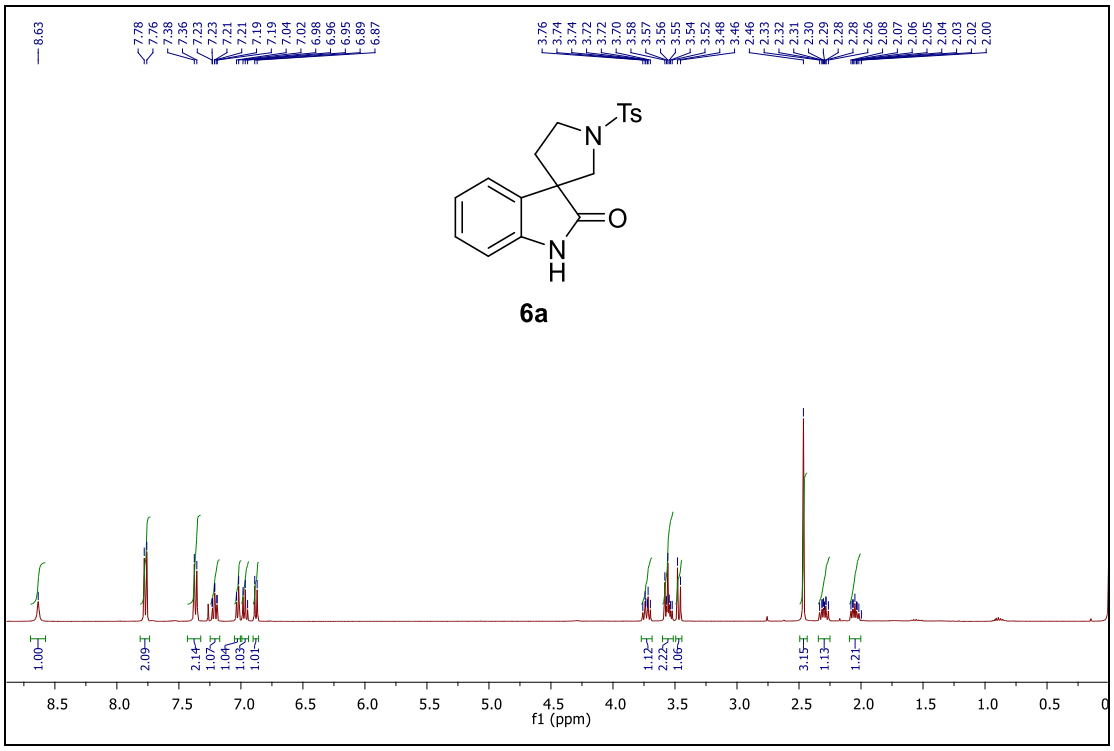
^{13}C NMR (100 MHz, $CDCl_3$) for compound **5x**.



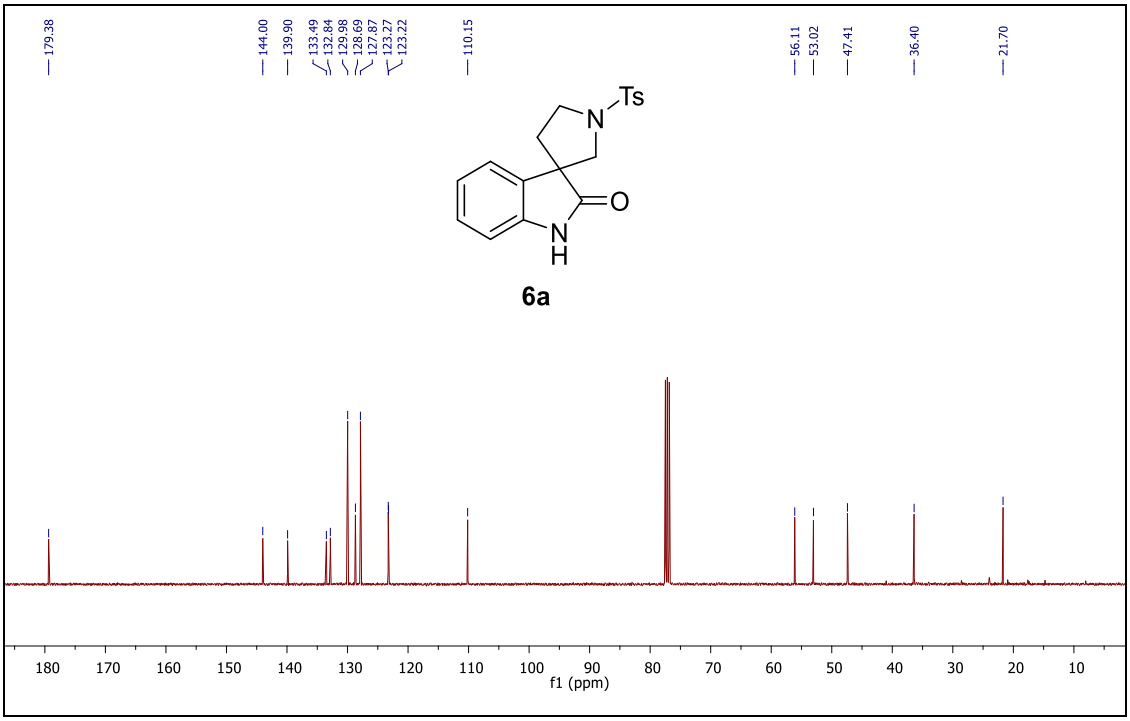
^{1}H NMR (400 MHz, $CDCl_3$) for compound **5z**.



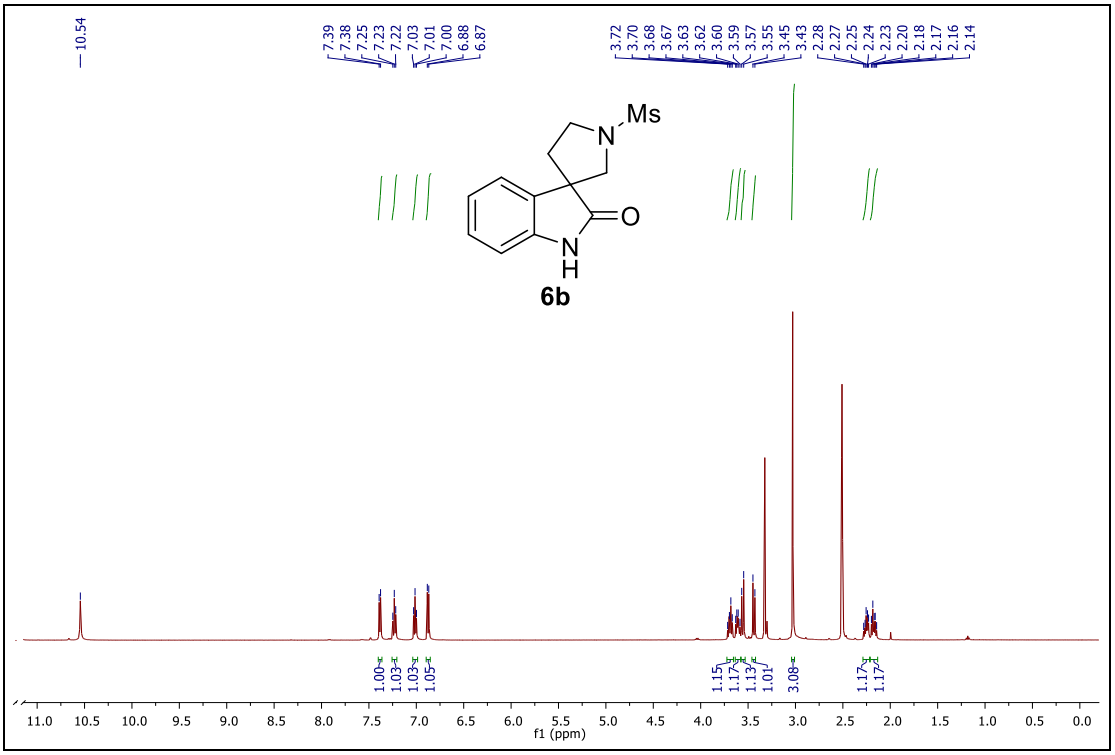
^{13}C NMR (100 MHz, $CDCl_3$) for compound **5z**.



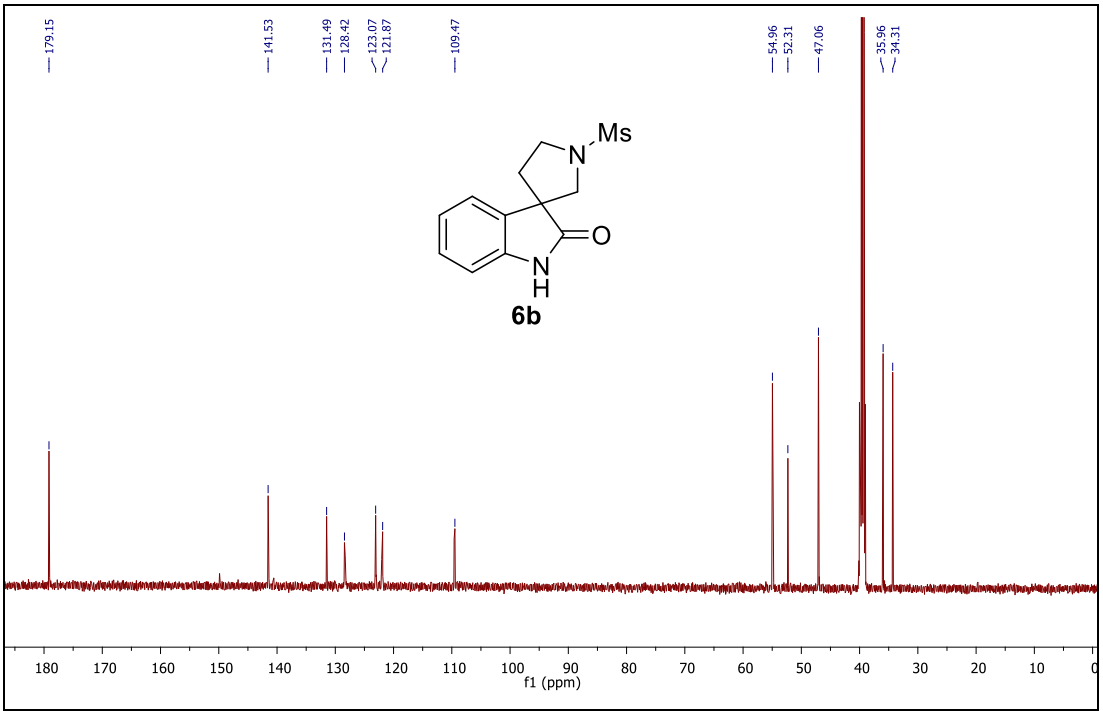
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6a**.



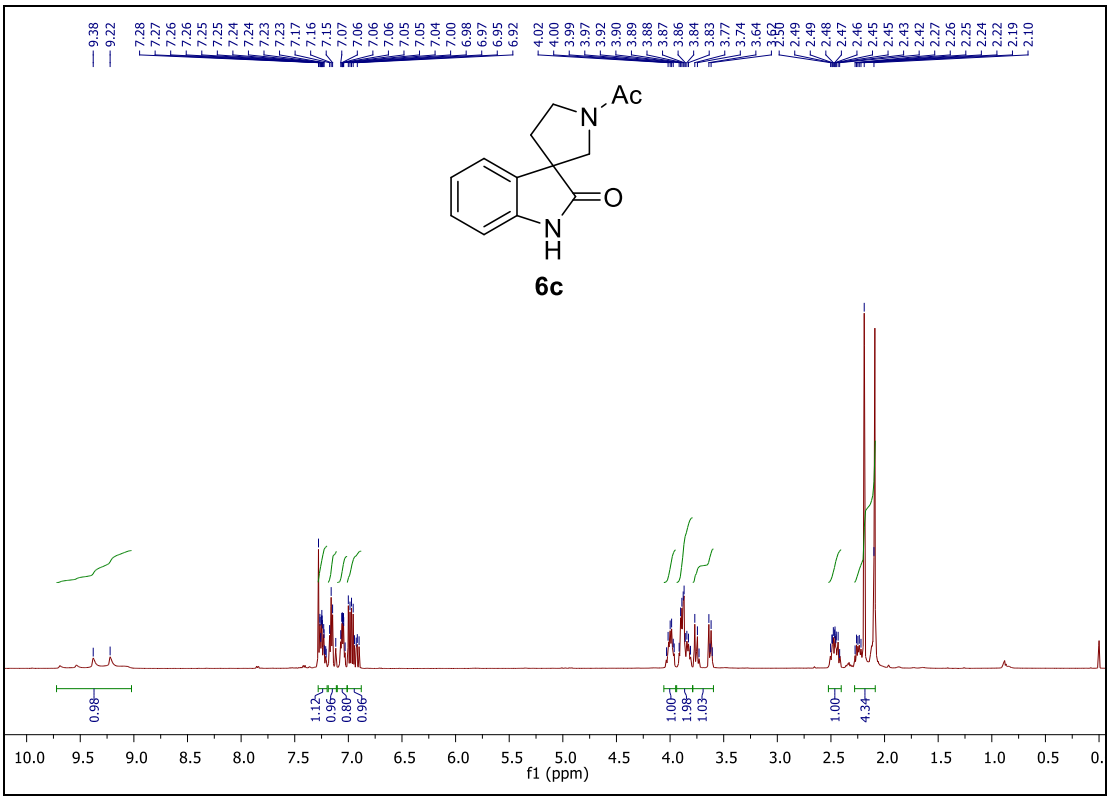
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6a**.



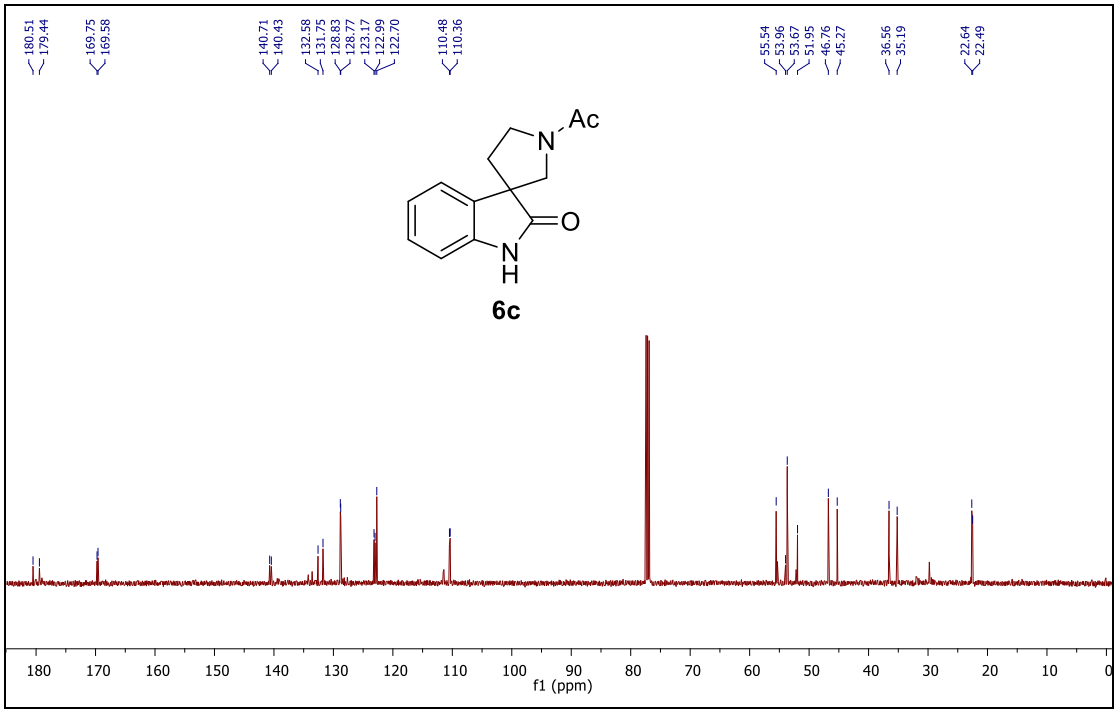
^{1}H NMR (500 MHz, DMSO-d_6) for compound **6b**.



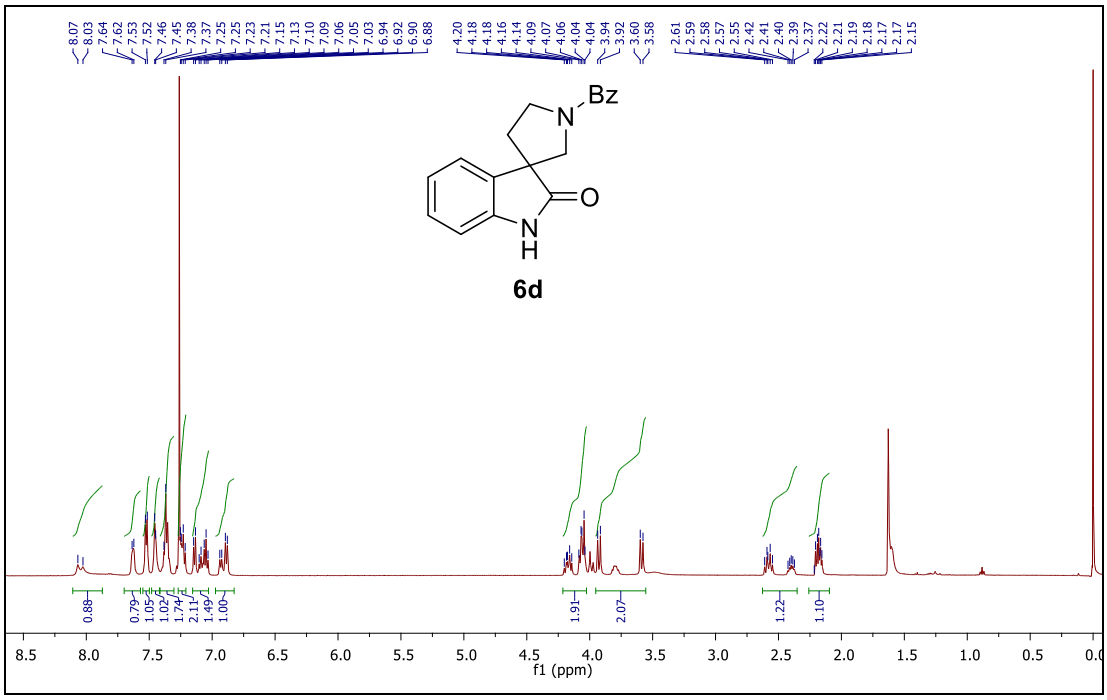
^{13}C NMR (125 MHz, DMSO-d_6) for compound **6b**.



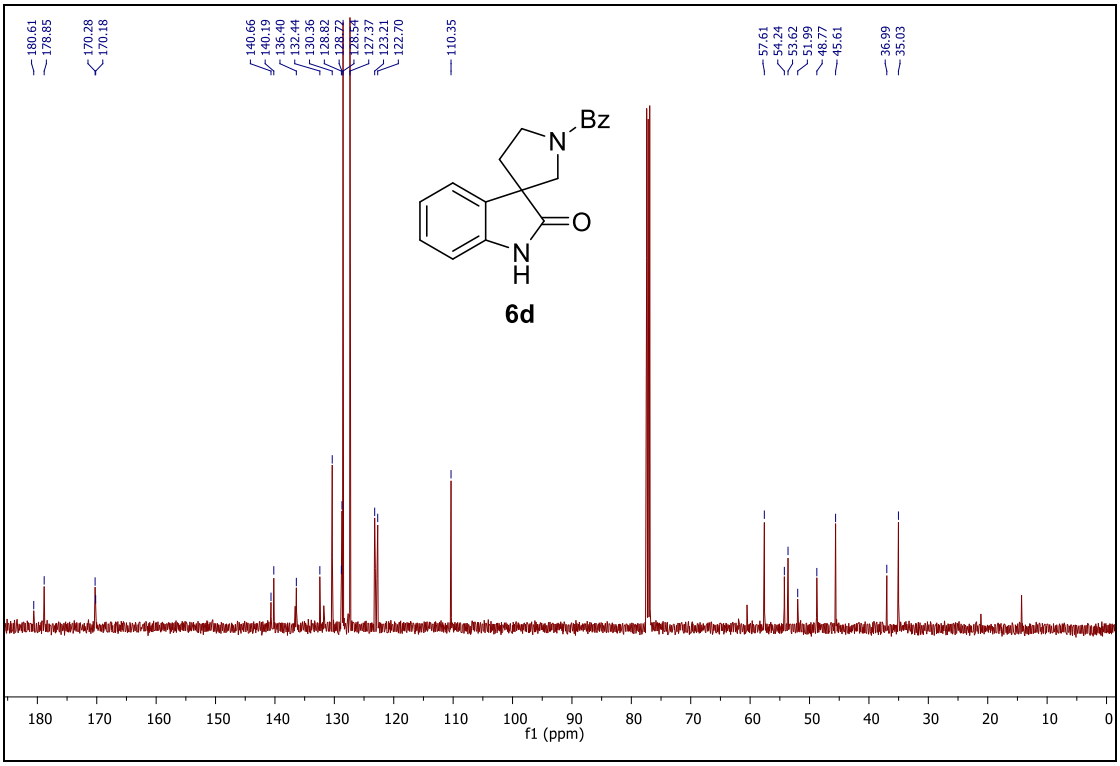
^{1}H NMR (500 MHz, $CDCl_3$) for compound **6c.**



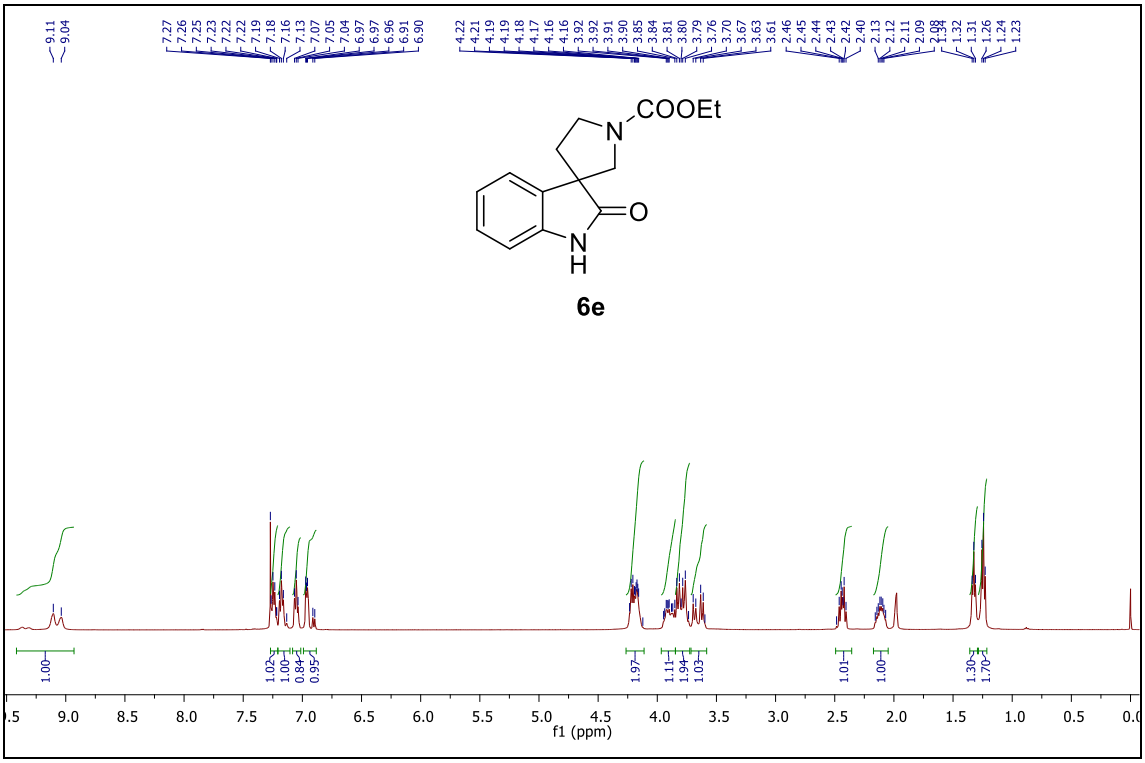
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6c**.



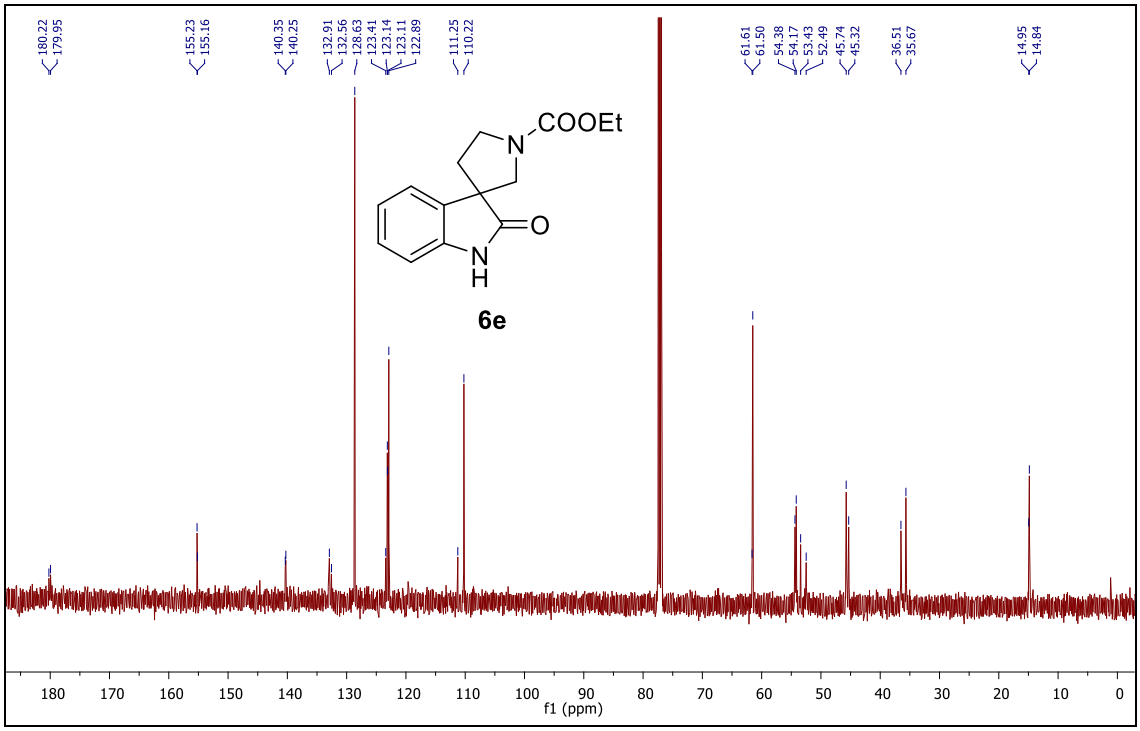
^{1}H NMR (500 MHz, $CDCl_3$) for compound **6d**.



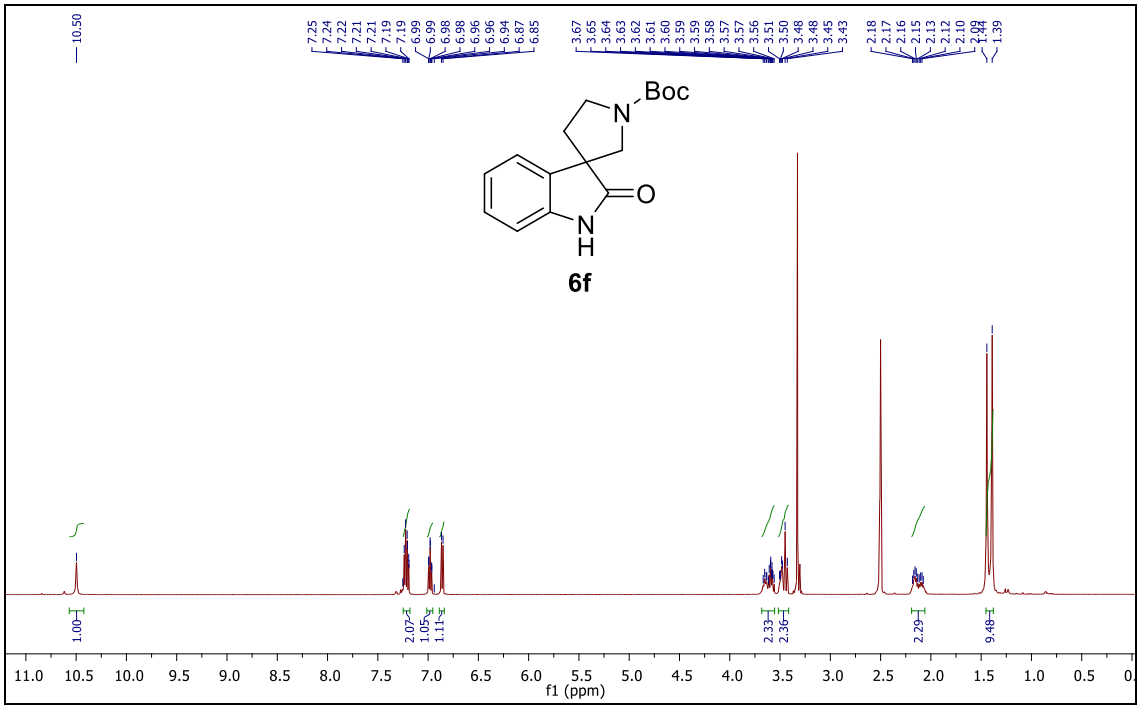
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6d**.



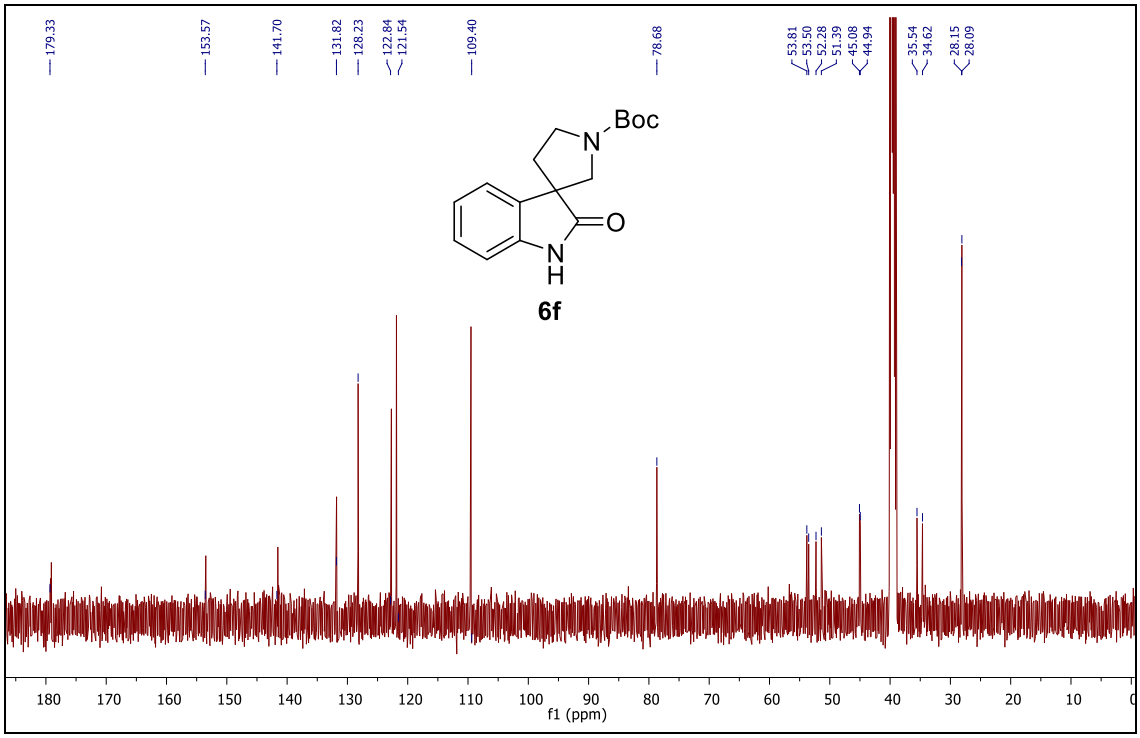
^{1}H NMR (500 MHz, $CDCl_3$) for compound **6e**.



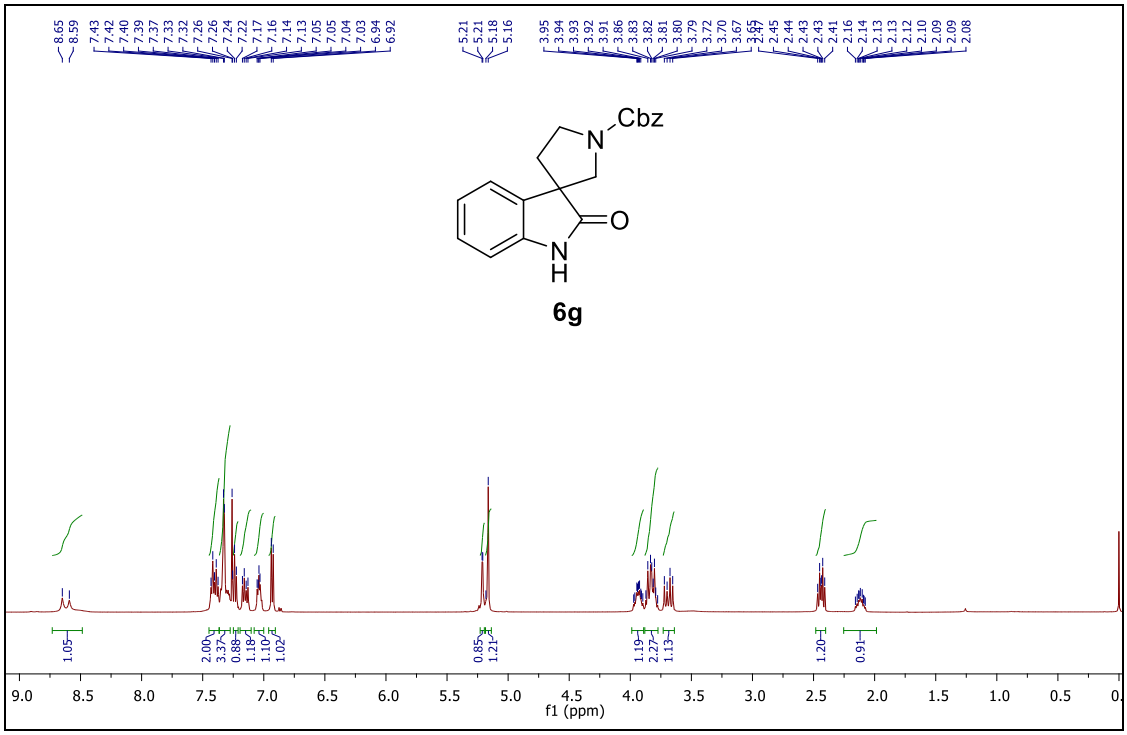
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6e**.



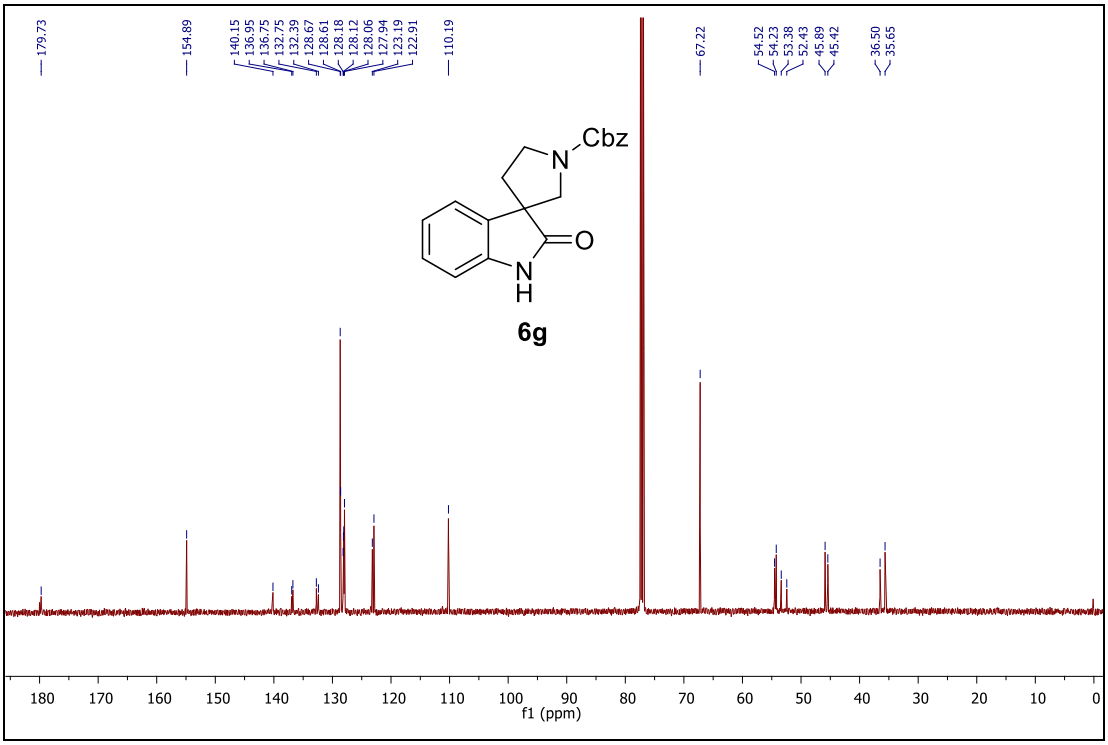
^{1}H NMR (500 MHz, DMSO-d_6) for compound **6f**.



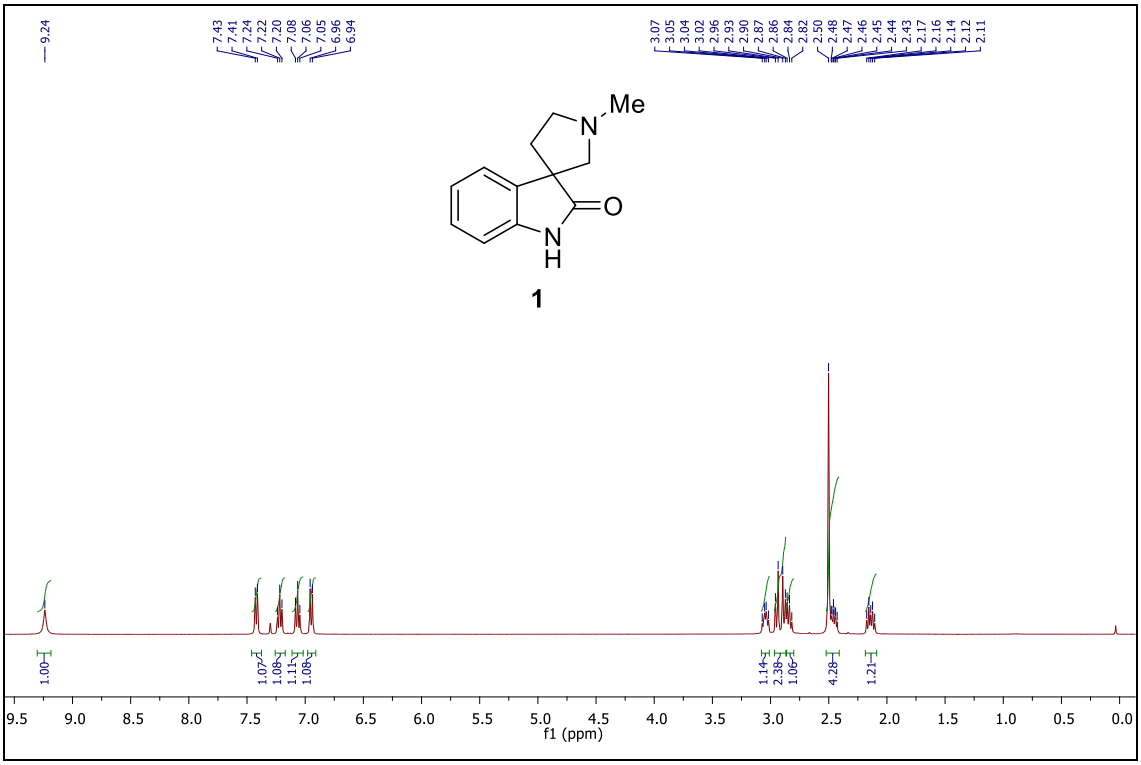
^{13}C NMR (125 MHz, DMSO-d_6) for compound **6f**.



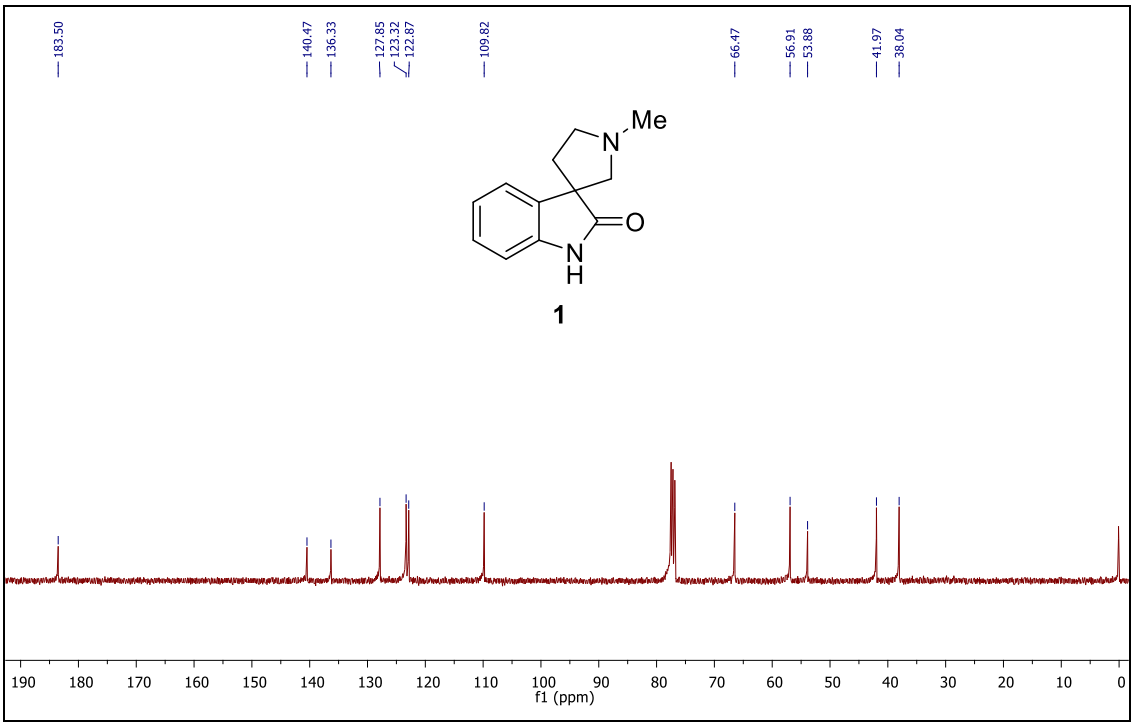
^{1}H NMR (500 MHz, $CDCl_3$) for compound **6g**.



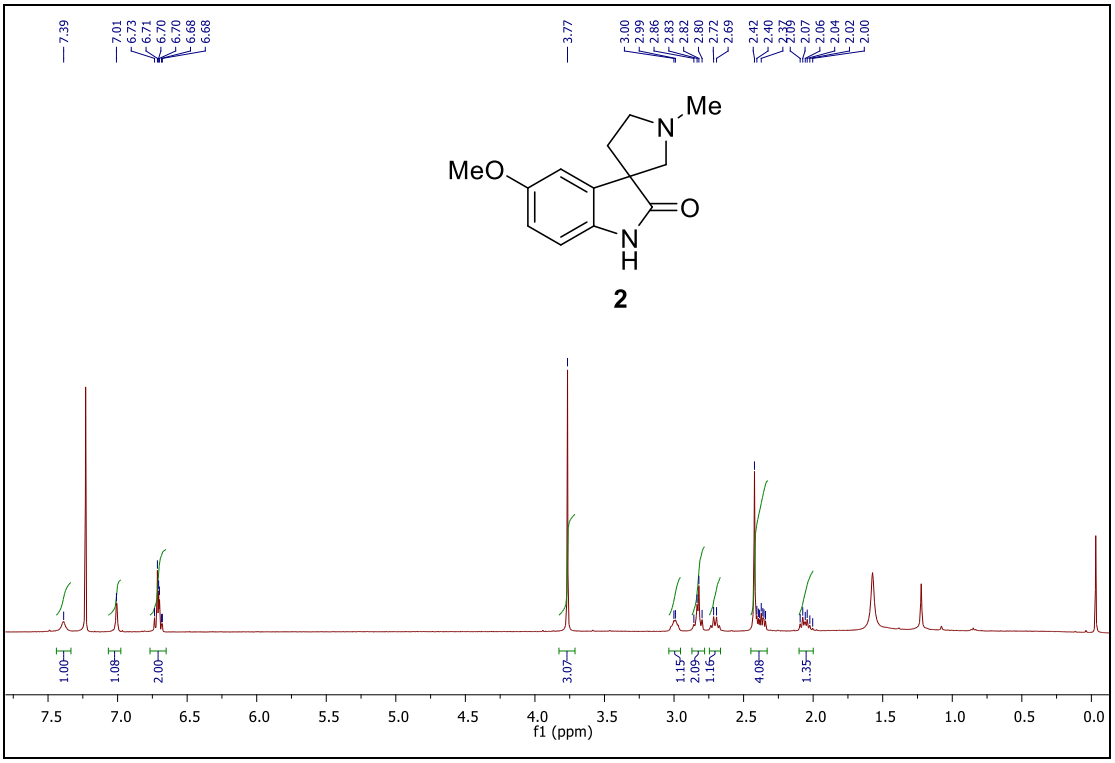
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6g**.



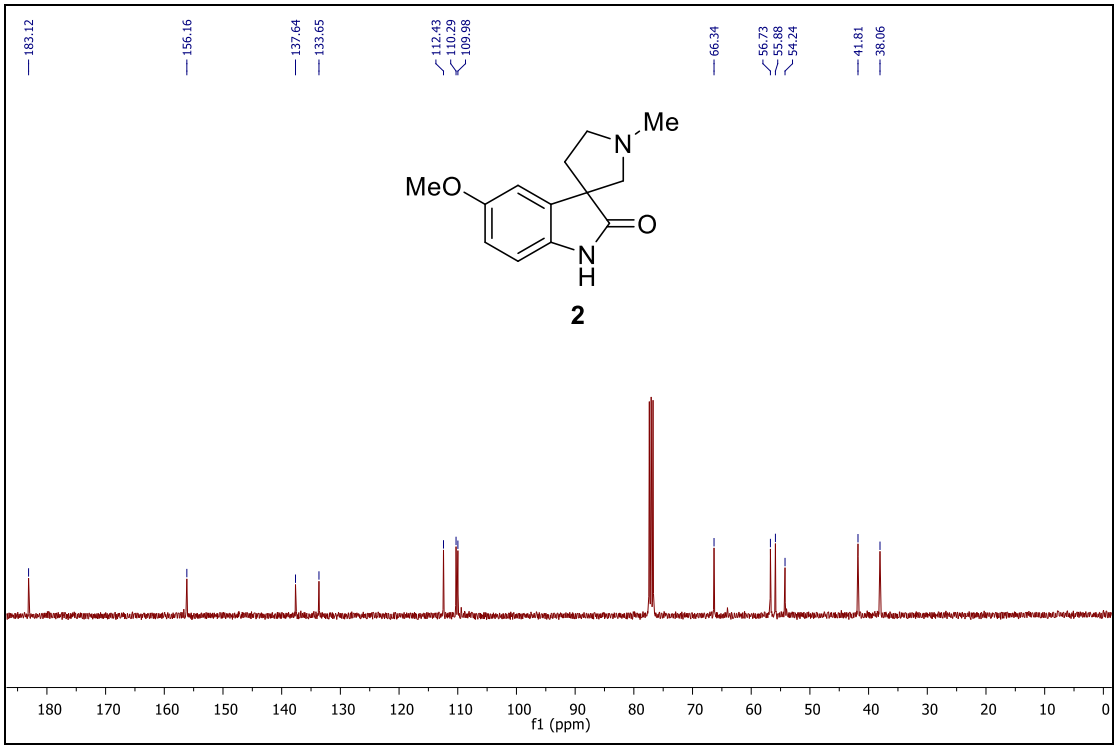
^{1}H NMR (400 MHz, $CDCl_3$) for compound **1**.



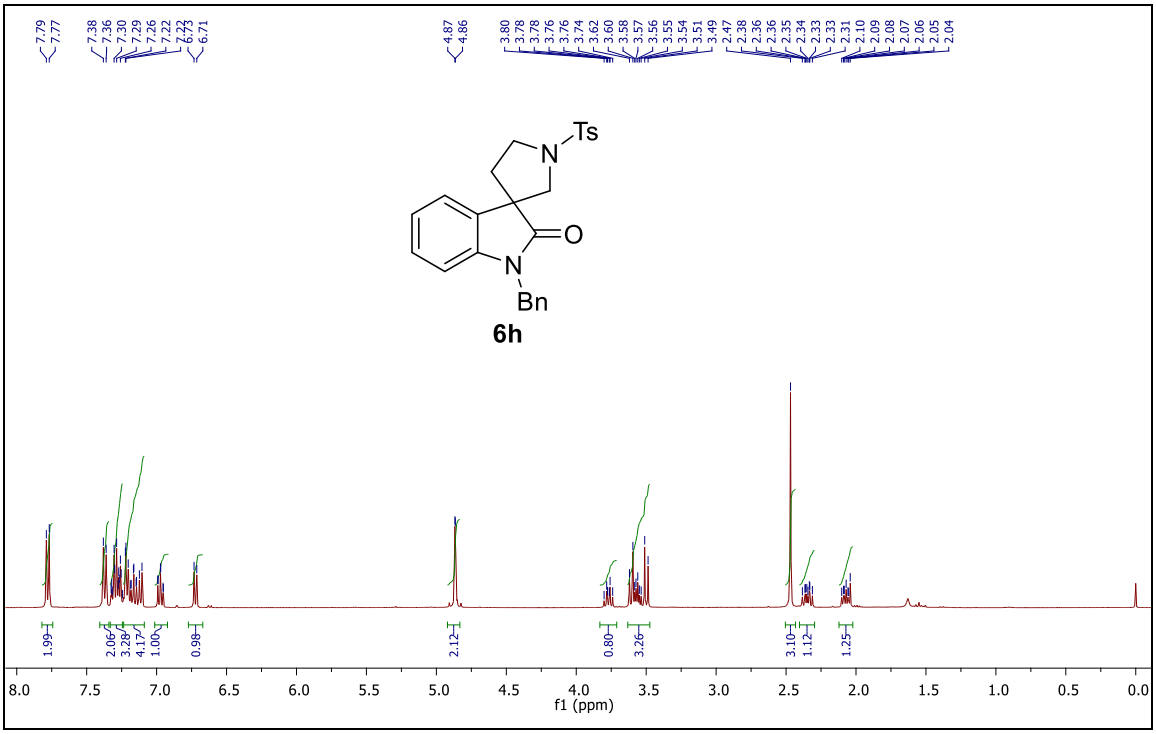
^{13}C NMR (100 MHz, $CDCl_3$) for compound **1**.



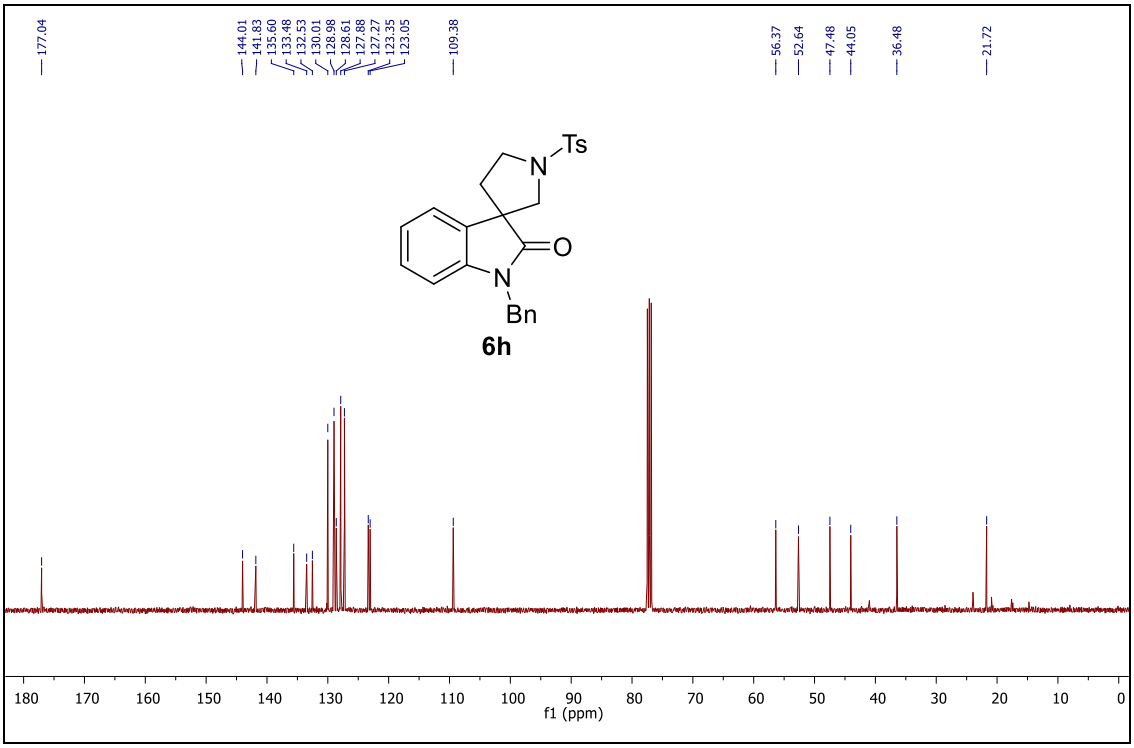
^{1}H NMR (400 MHz, $CDCl_3$) for compound **2**.



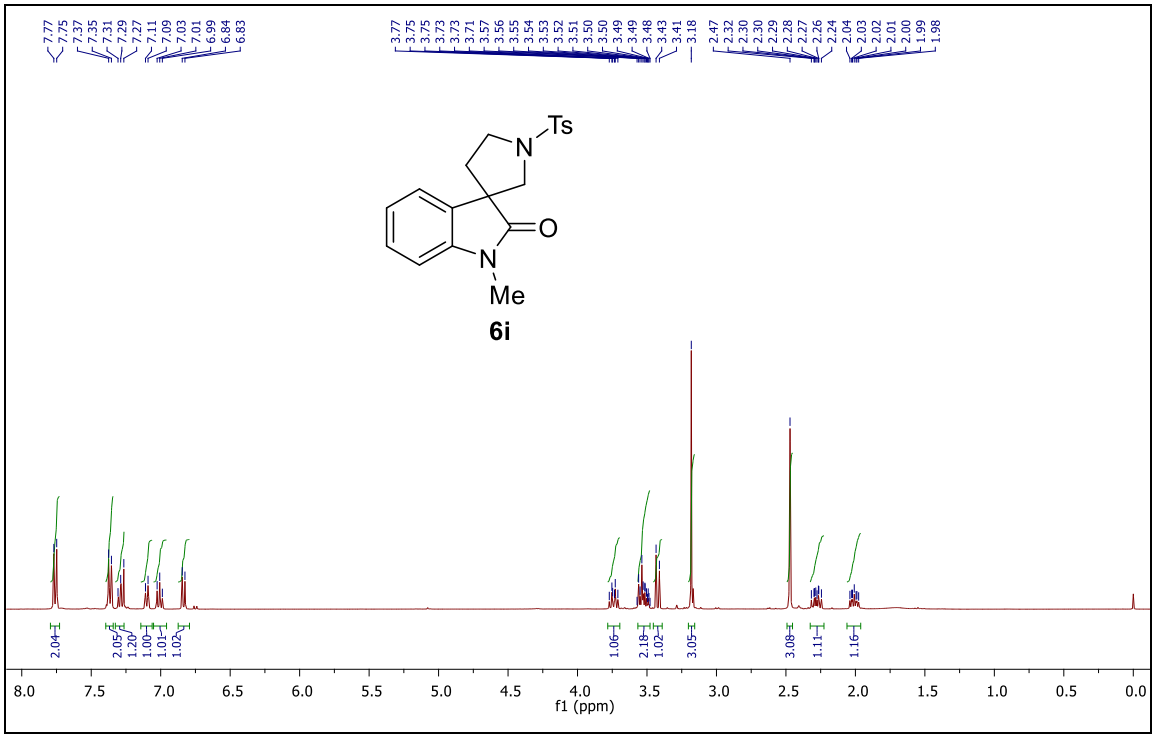
^{13}C NMR (100 MHz, $CDCl_3$) for compound **2**.



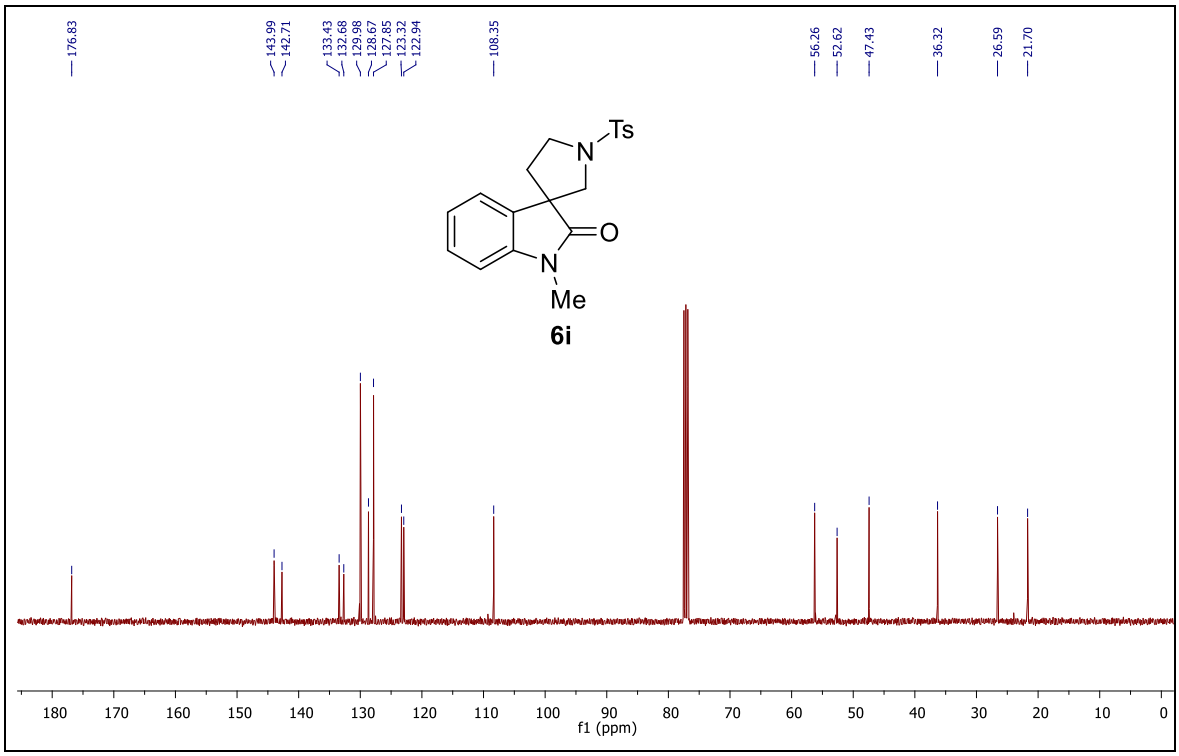
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6h**.



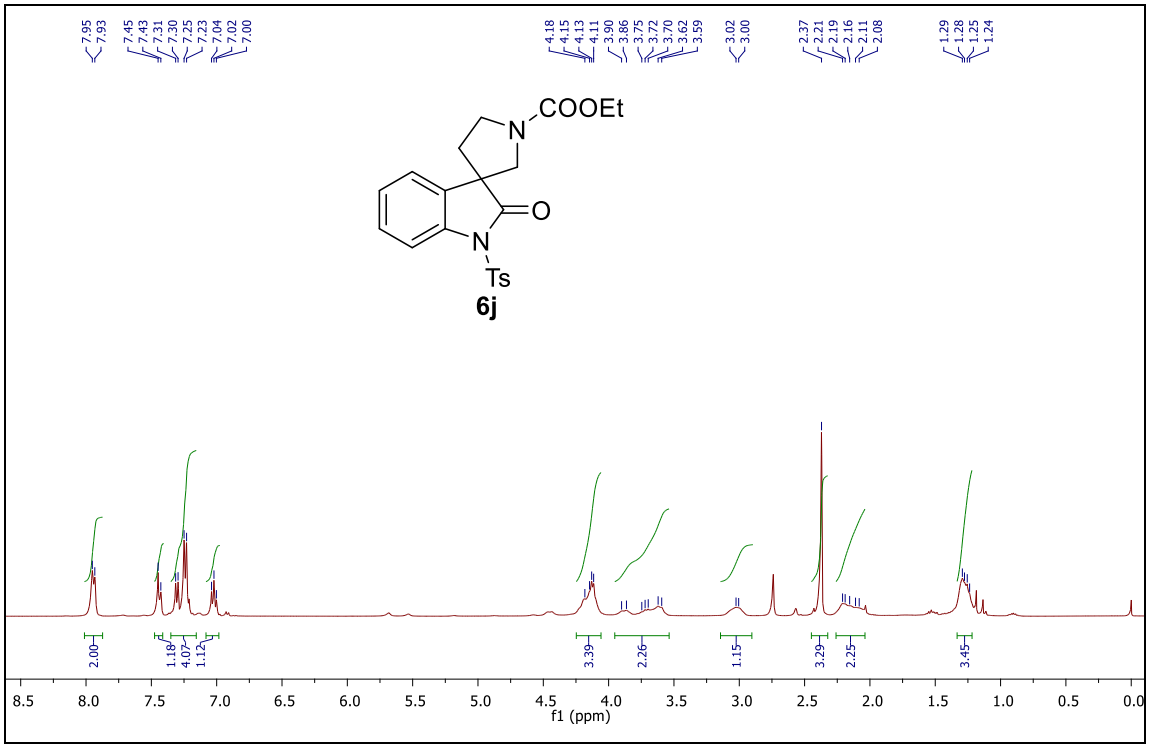
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6h**.



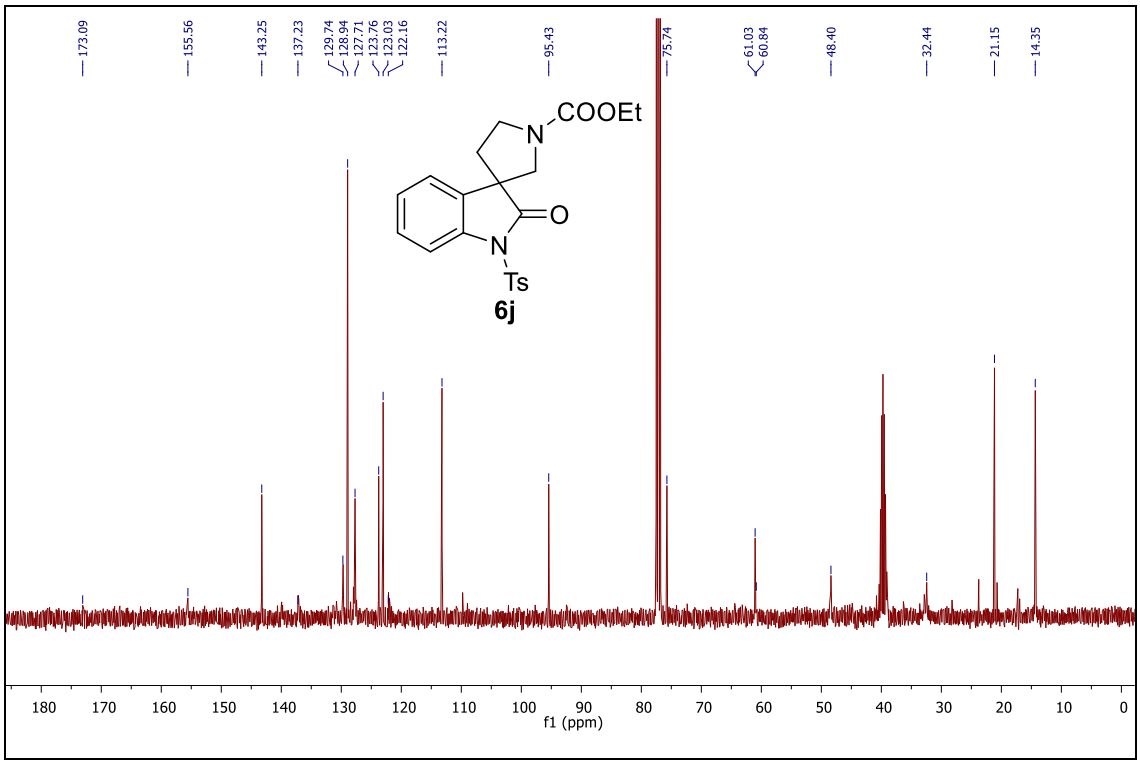
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6i**.



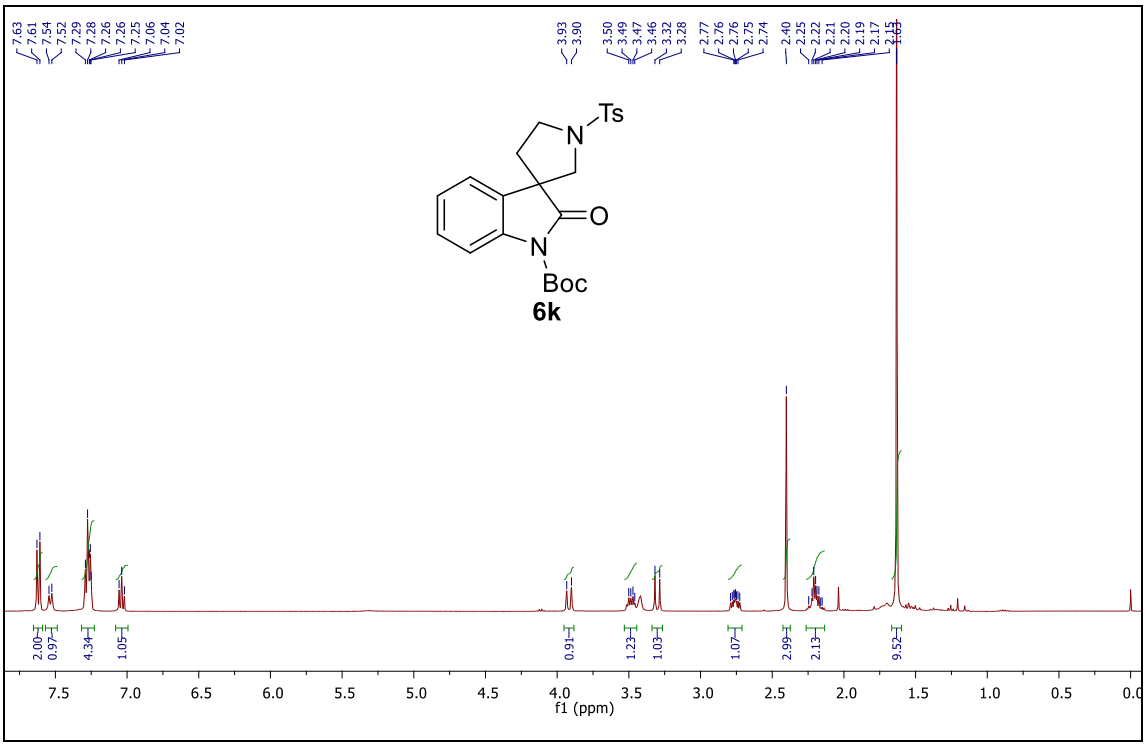
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6i**.



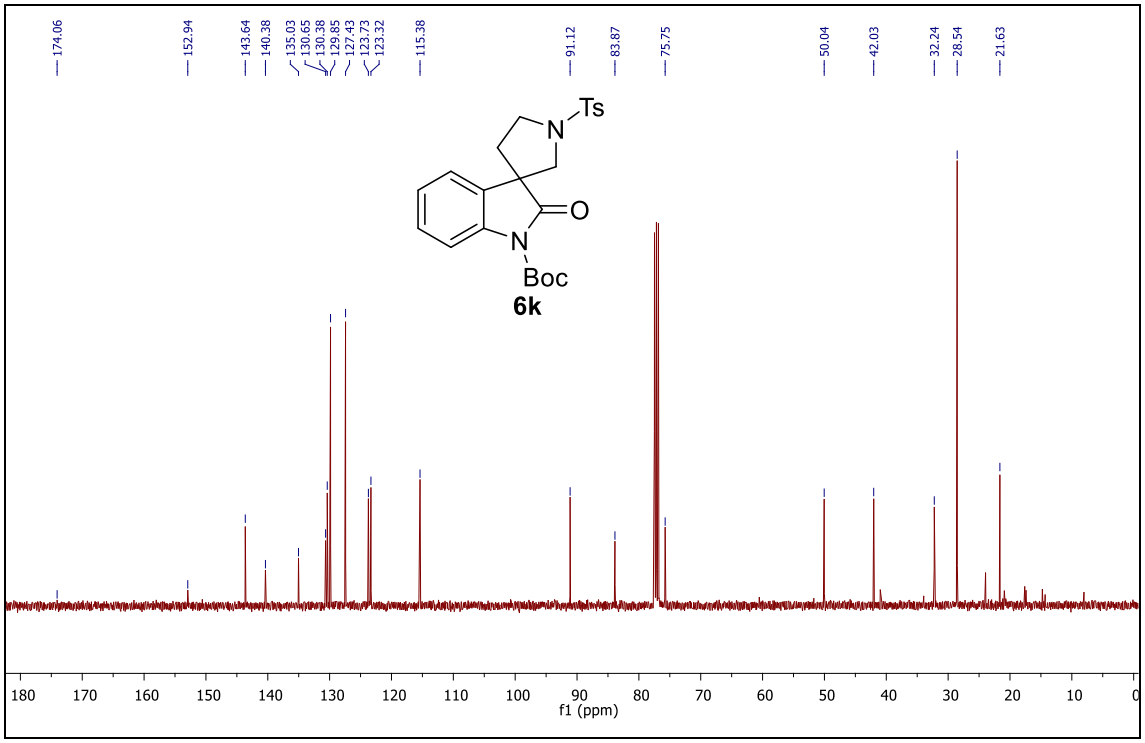
^{1}H NMR (400 MHz, $CDCl_3$ + DMSO-d_6) for compound **6j**.



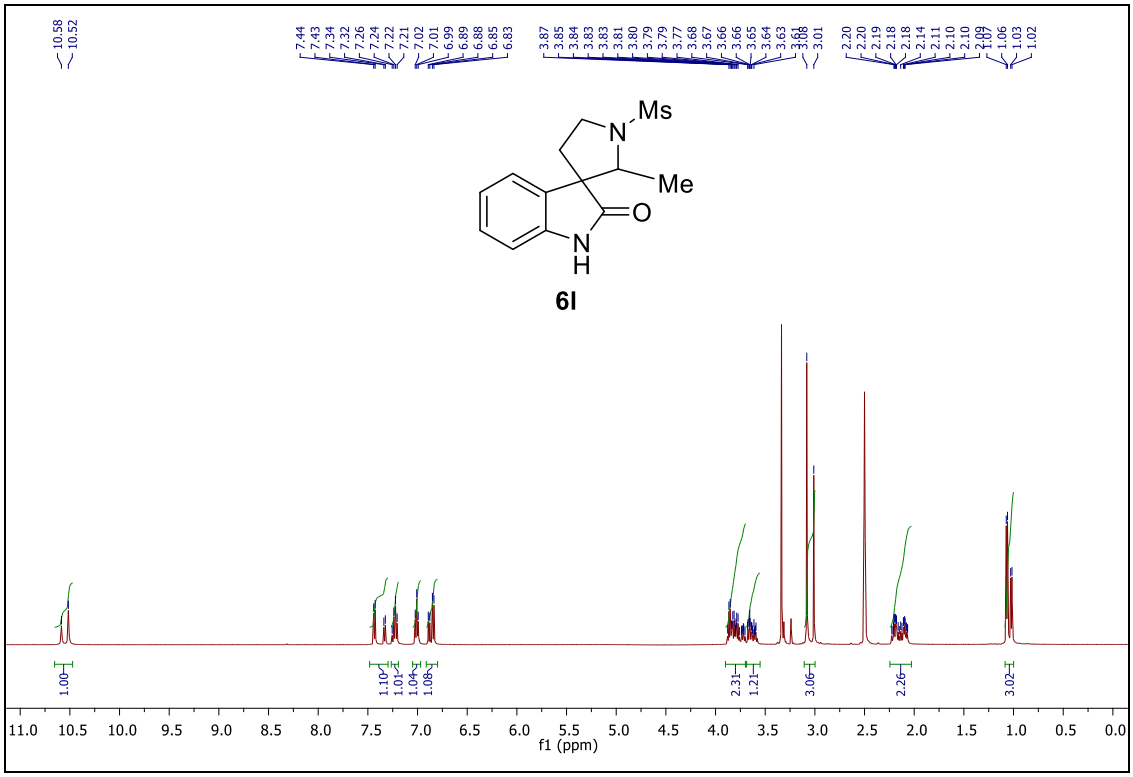
^{13}C NMR (100 MHz, $CDCl_3$ + DMSO-d_6) for compound **6j**.



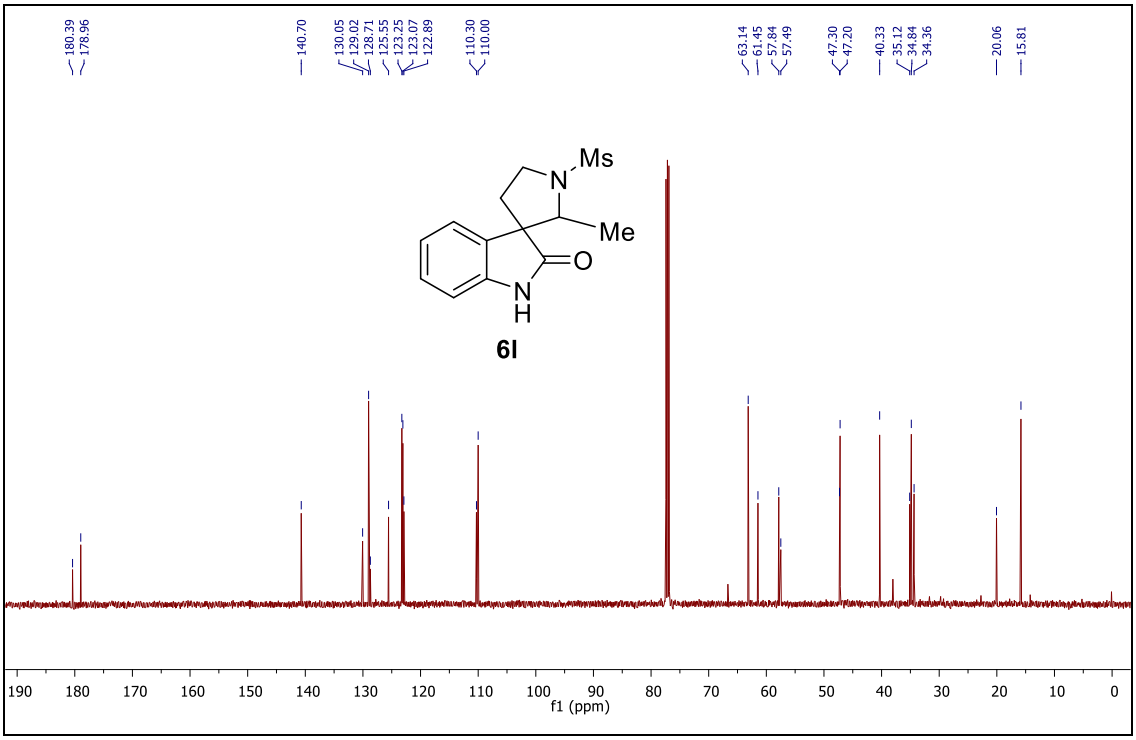
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6k**.



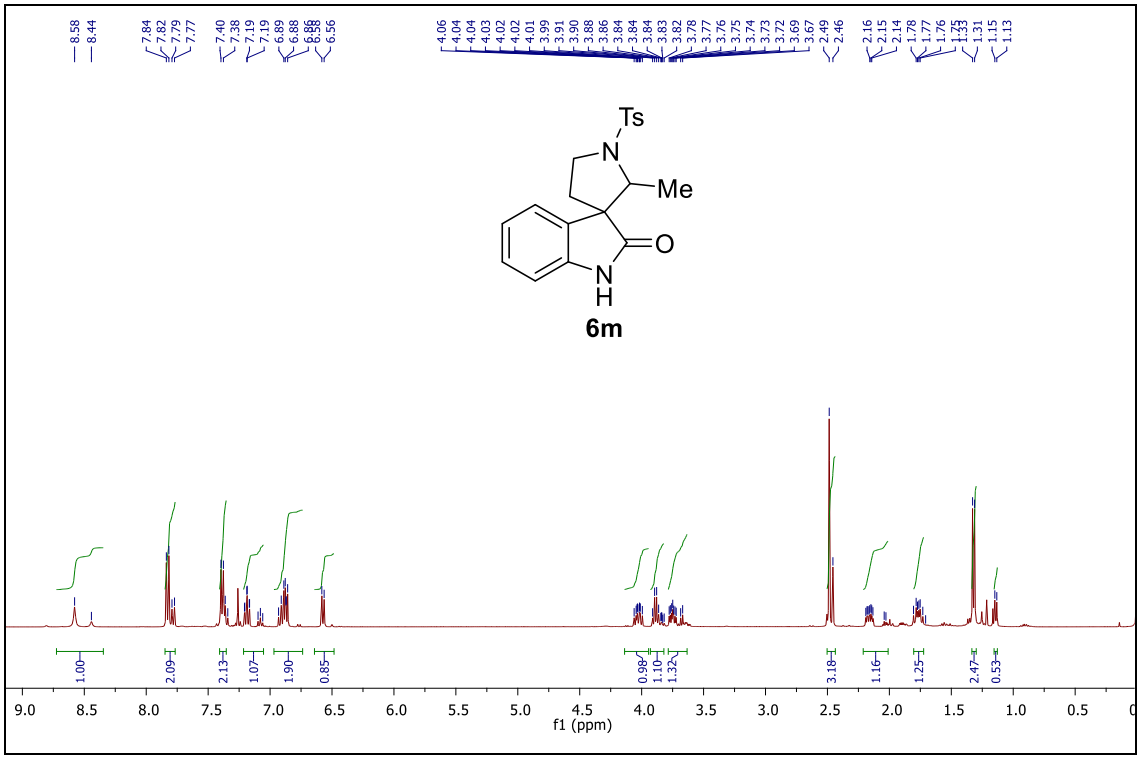
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6k**.



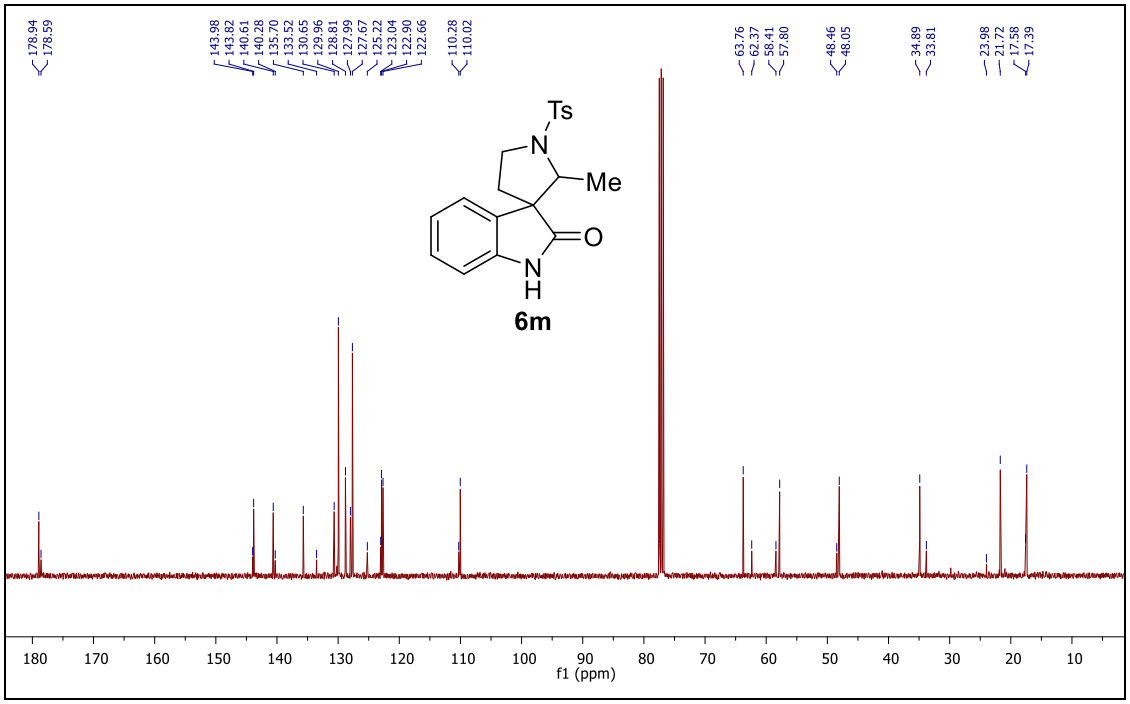
^{1}H NMR (500 MHz, DMSO-d_6) for compound **6l**.



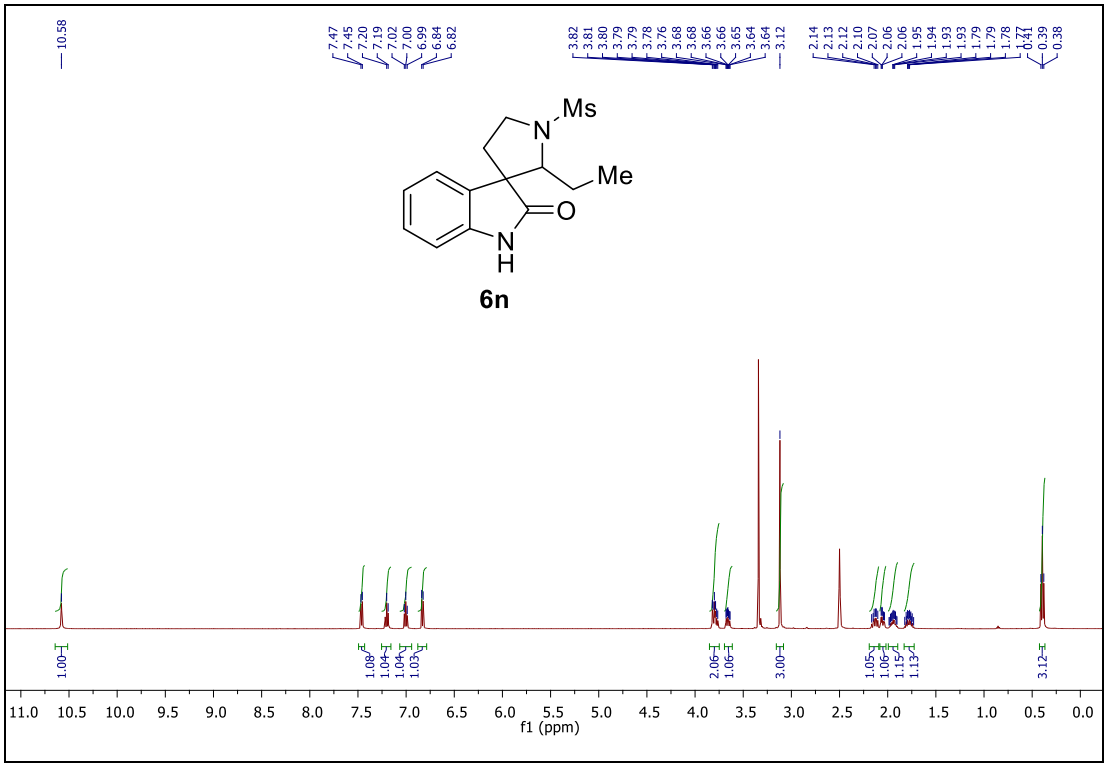
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6l**.



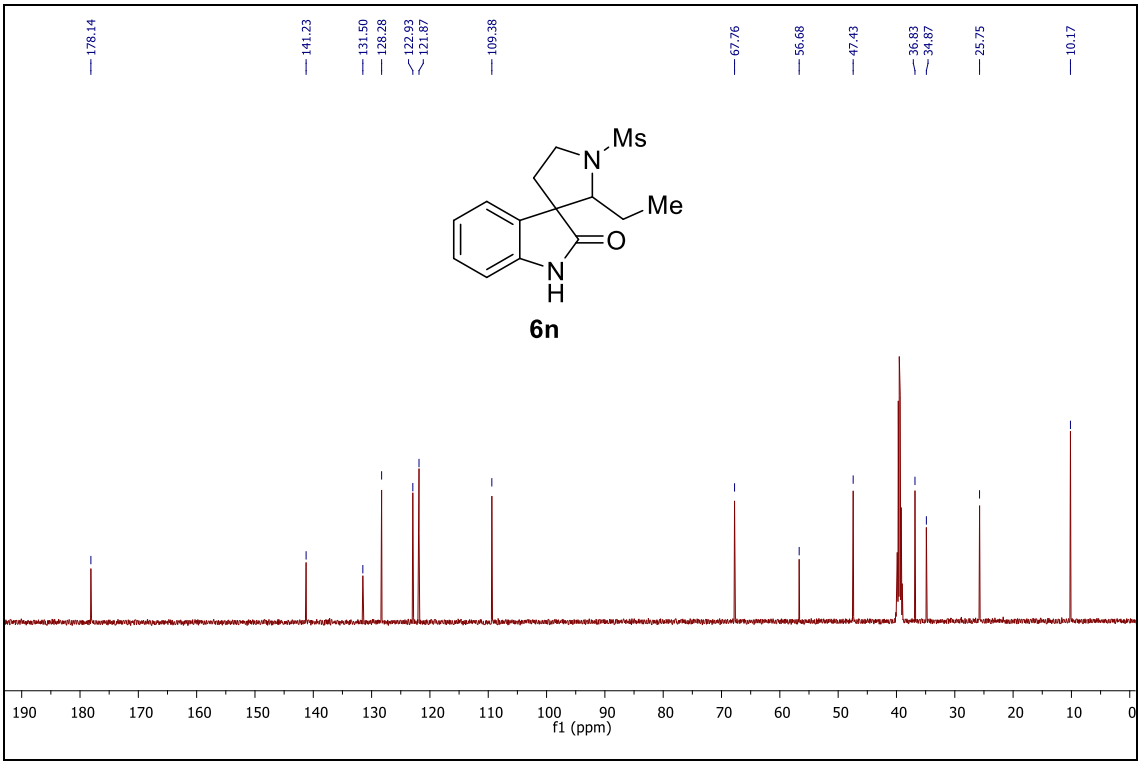
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6m**.



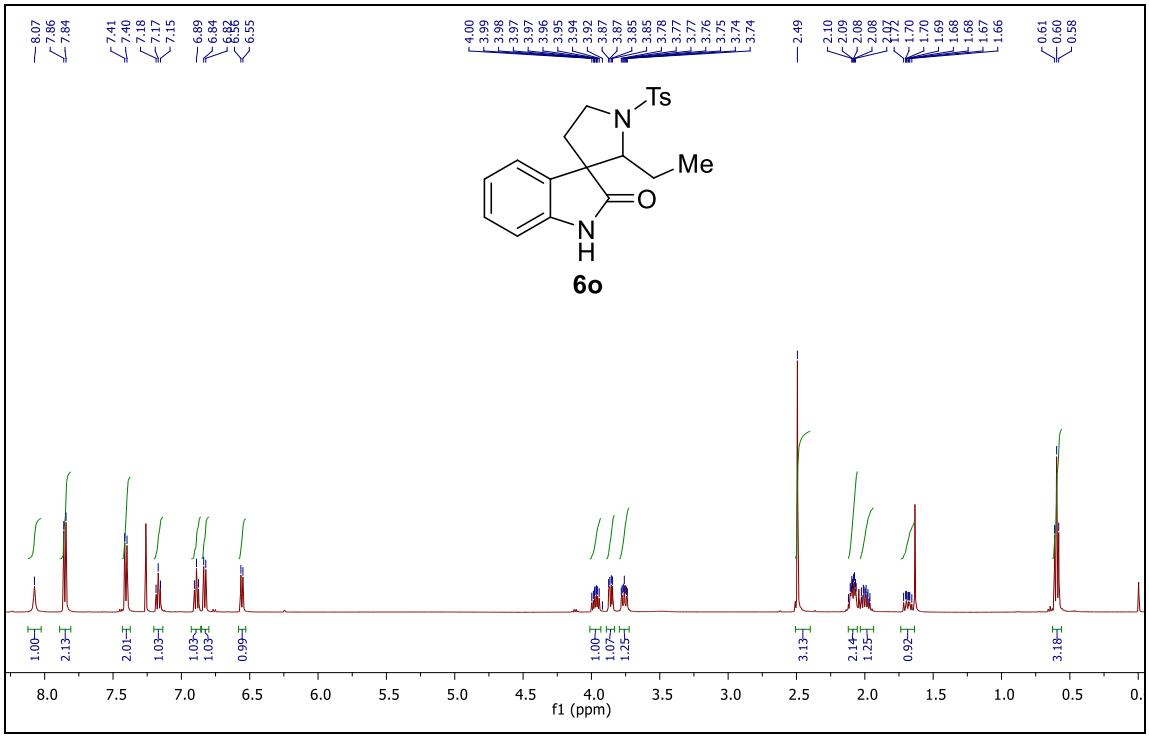
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6m**.



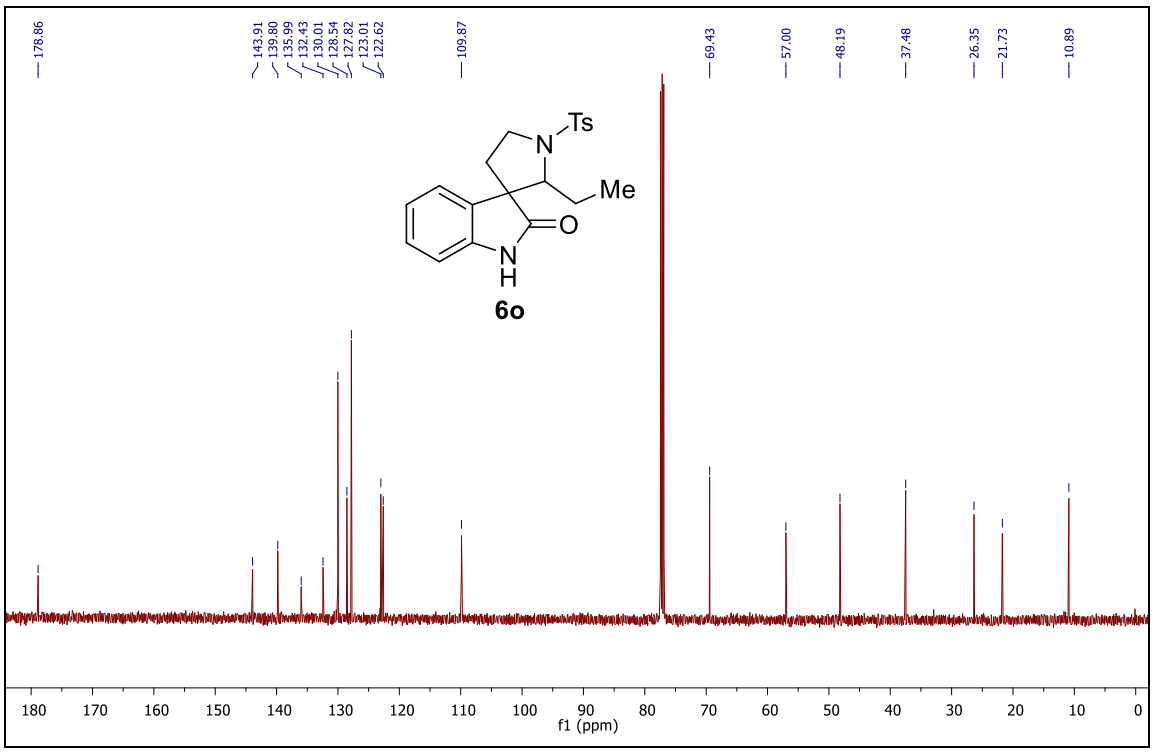
^{1}H NMR (500 MHz, DMSO-d_6) for compound **6n**.



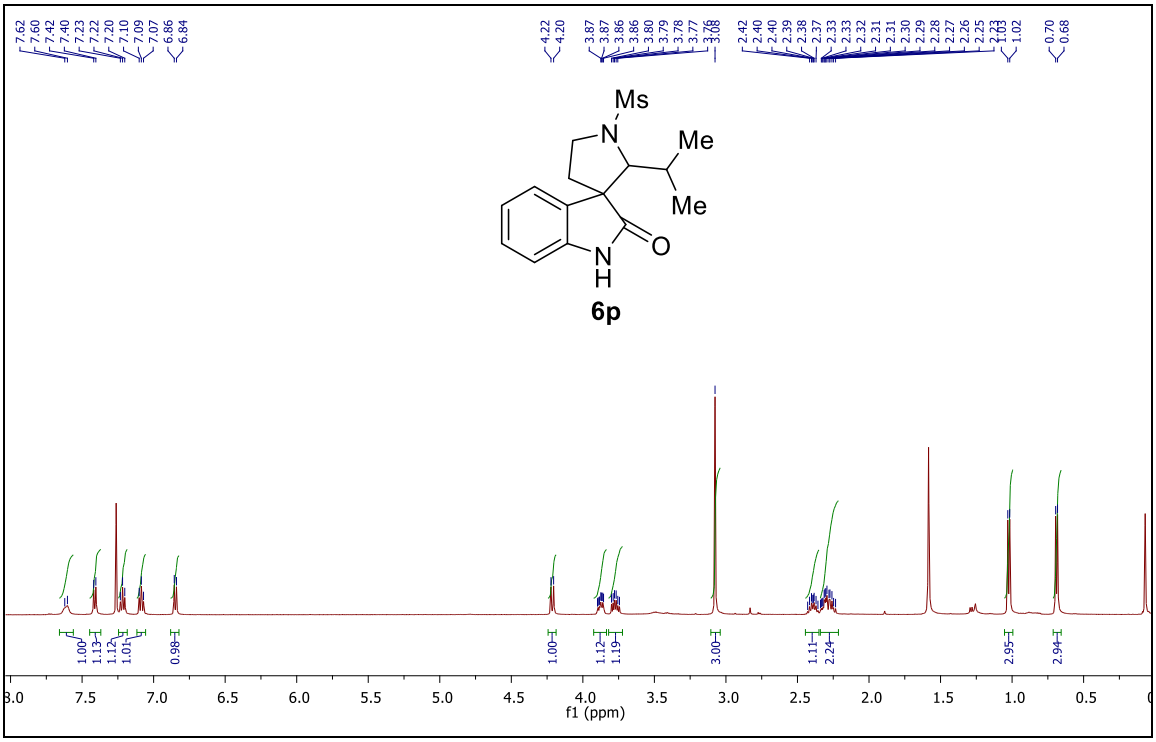
^{13}C NMR (125 MHz, DMSO-d_6) for compound **6n**.



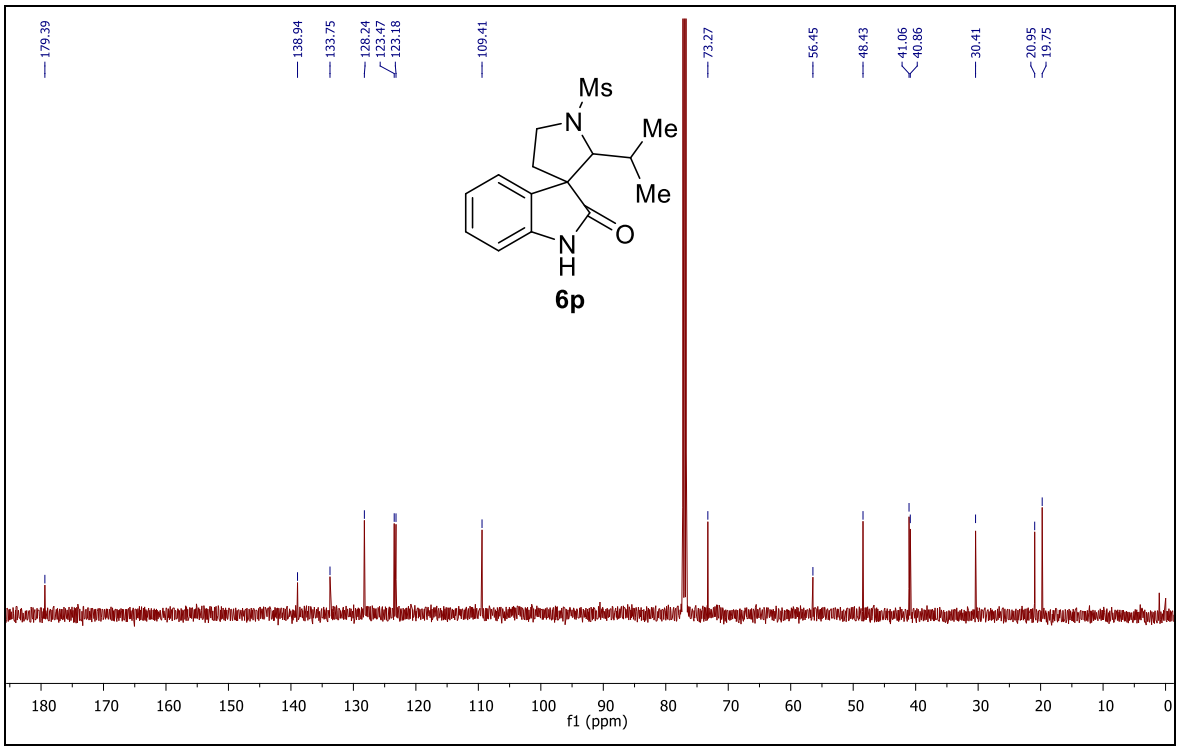
^{1}H NMR (500 MHz, $CDCl_3$) for compound **6o**.



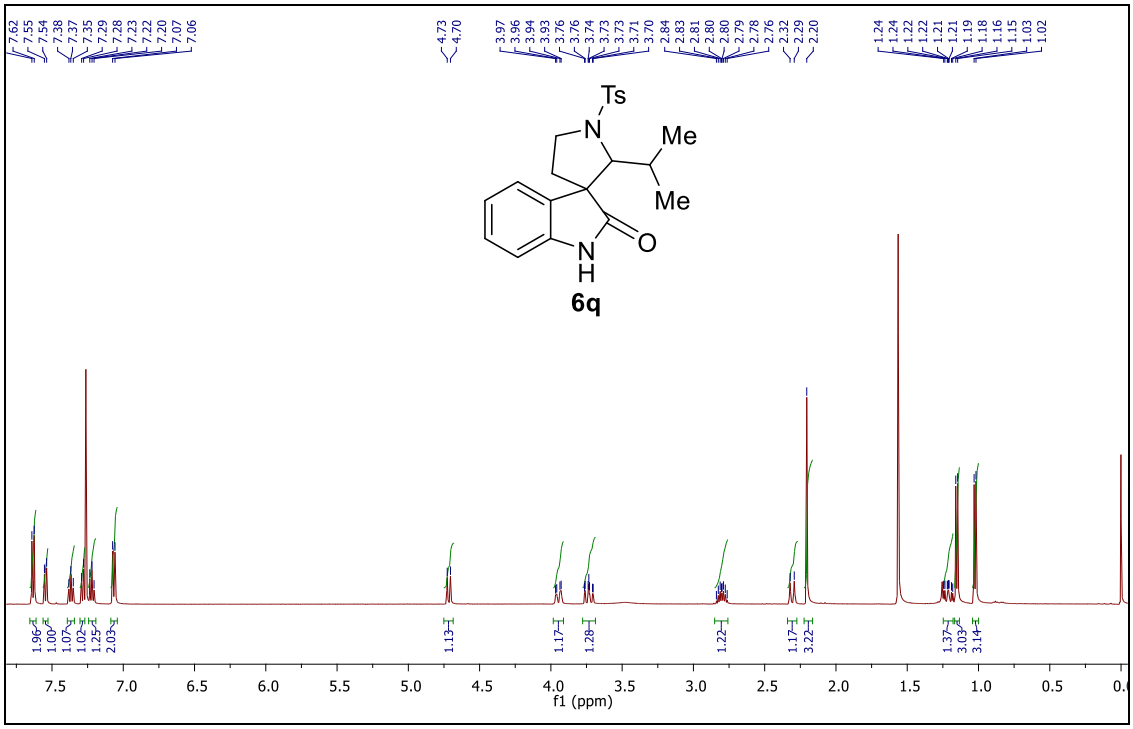
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6o**.



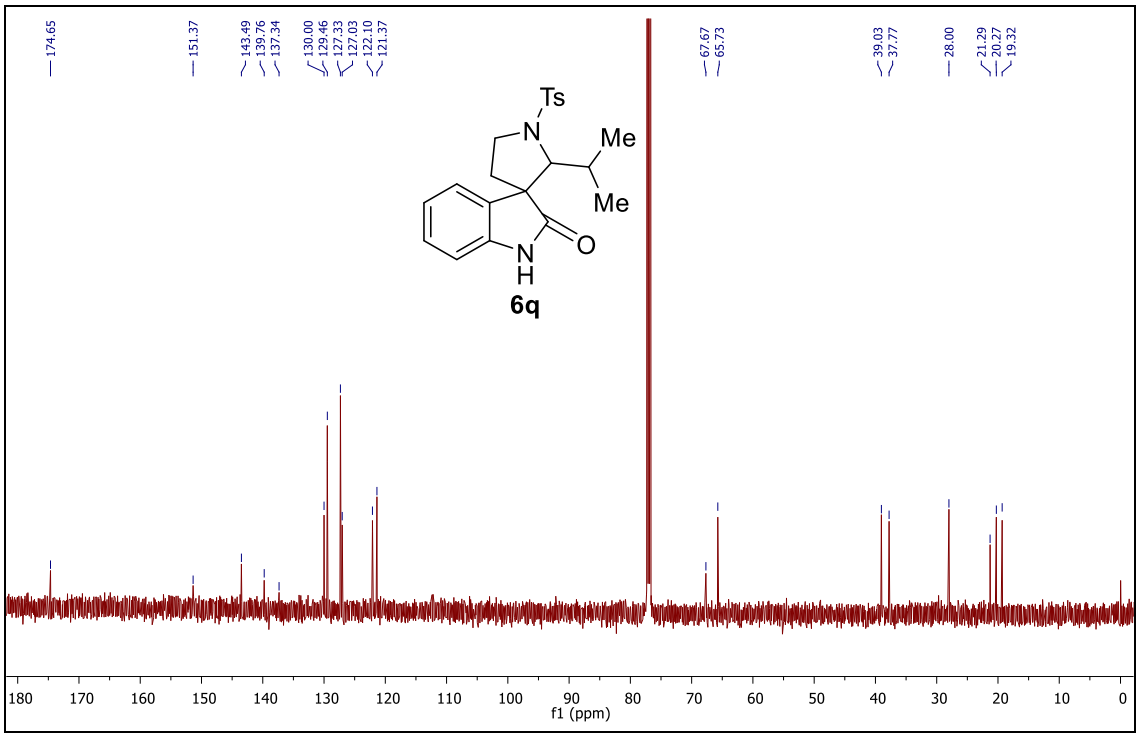
^{1}H NMR (500 MHz, $CDCl_3$) for compound **6p**.



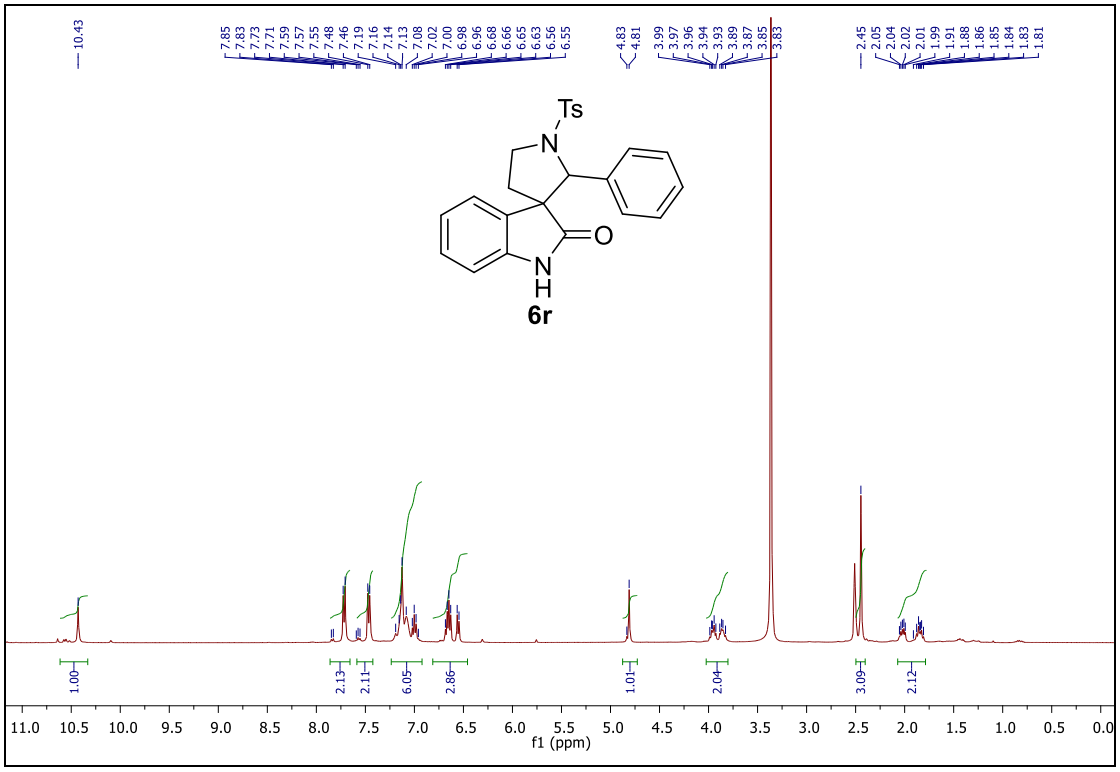
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6p**.



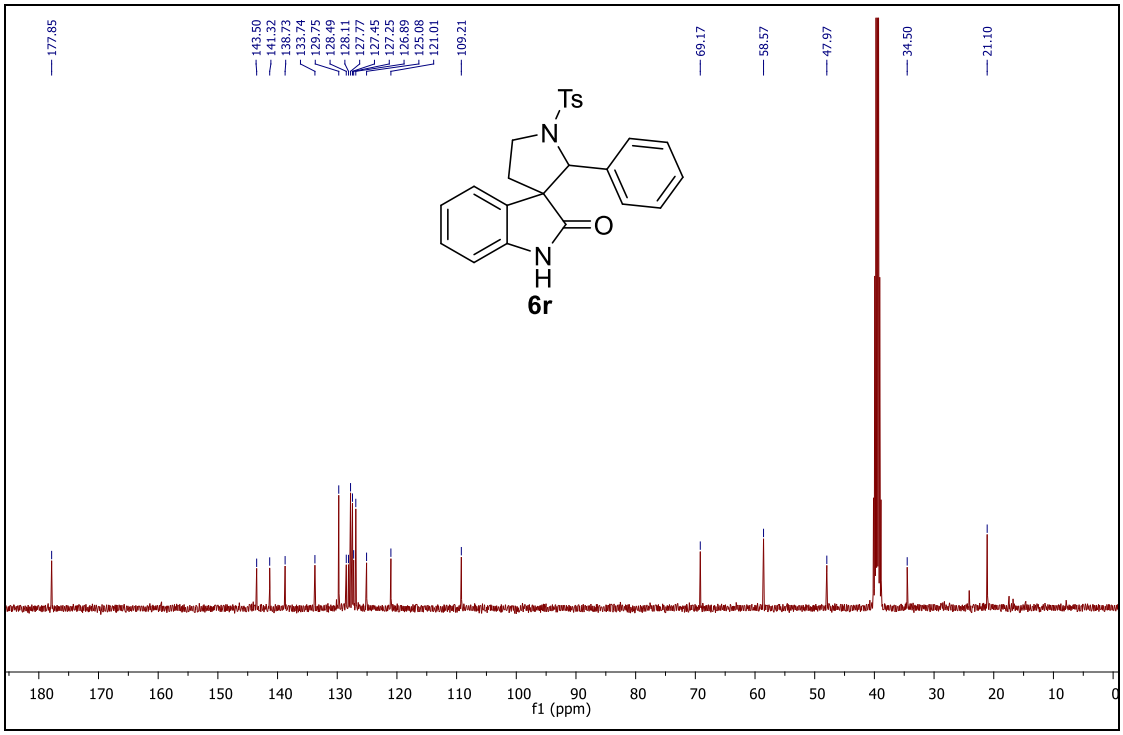
^{1}H NMR (500 MHz, $CDCl_3$) for compound **6q**.



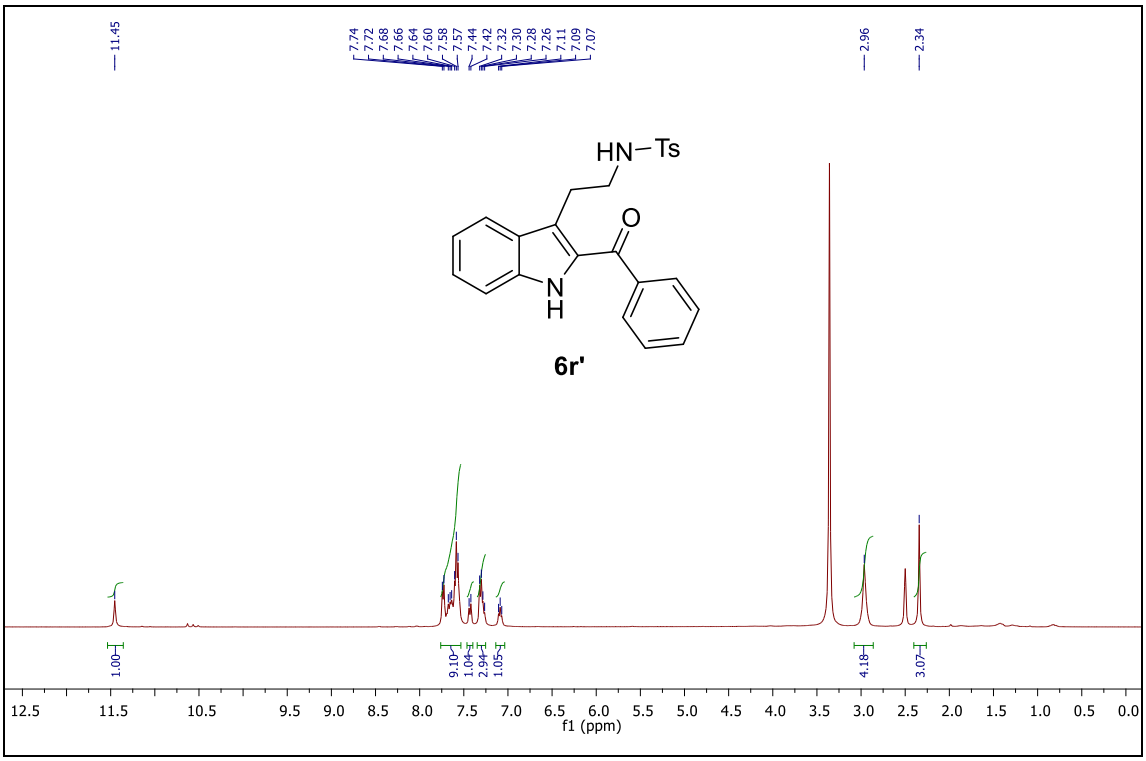
^{13}C NMR (125 MHz, $CDCl_3$) for compound **6q**.



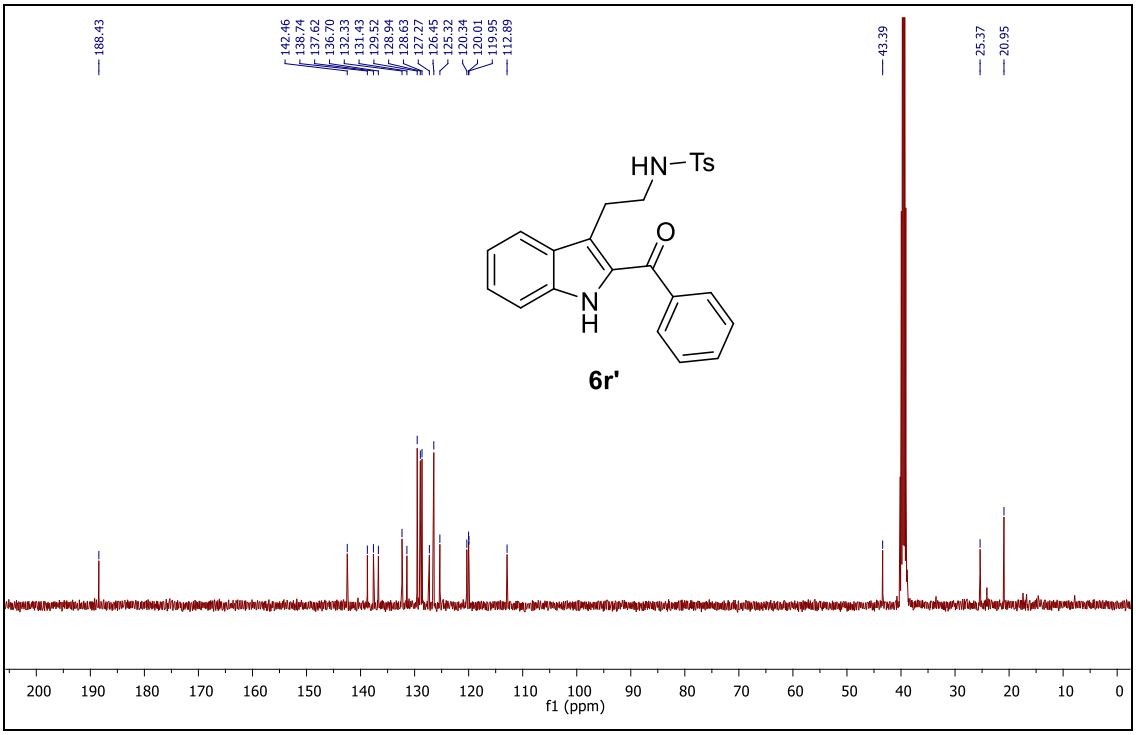
^{1}H NMR (400 MHz, DMSO-d_6) for compound **6r**.



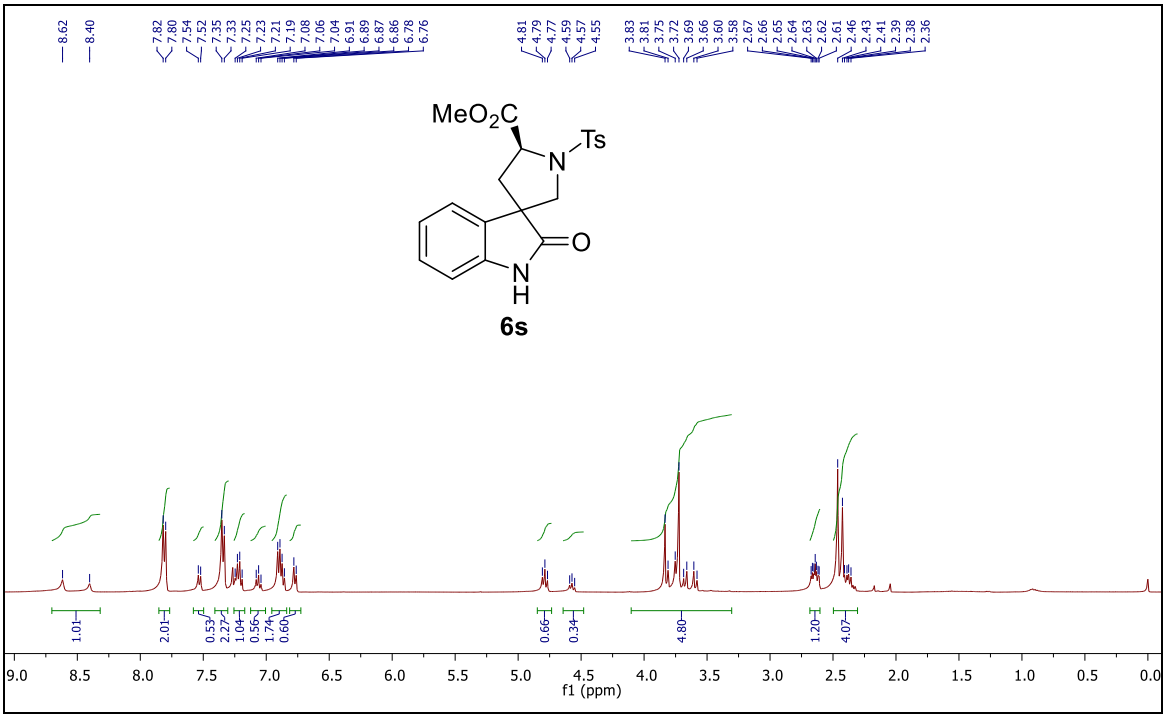
^{13}C NMR (100 MHz, DMSO-d_6) for compound **6r**.



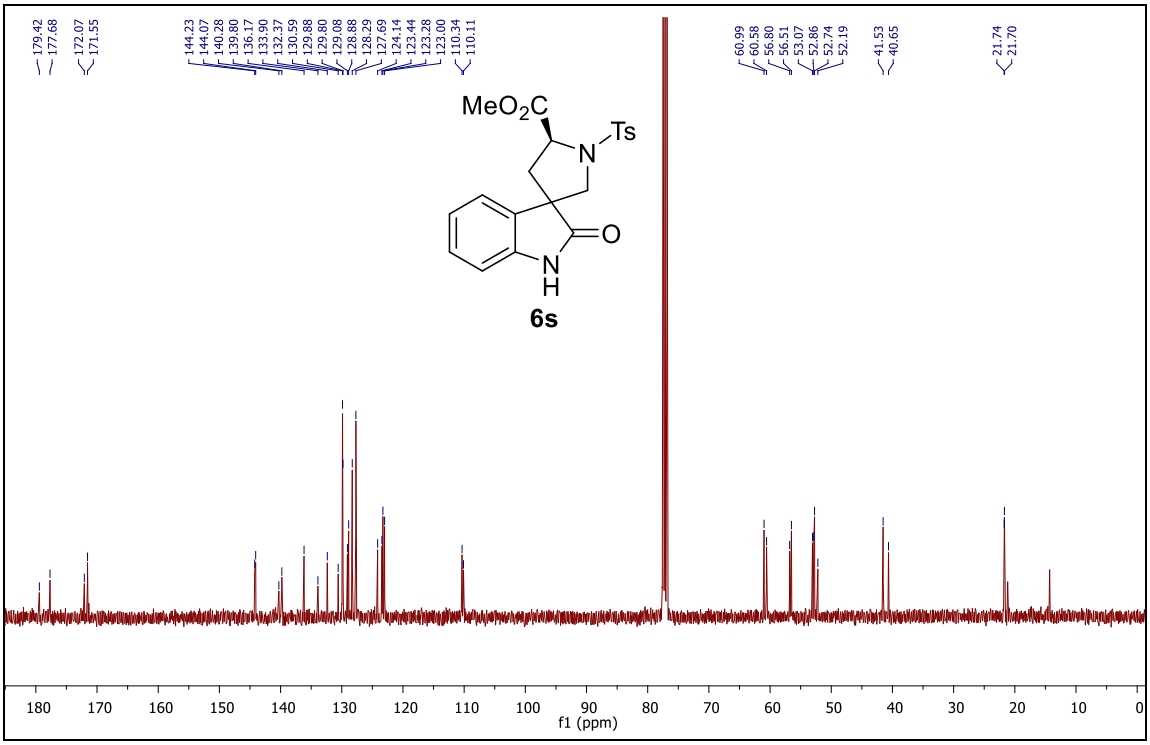
^{1}H NMR (400 MHz, DMSO-d_6) for compound **6r'**.



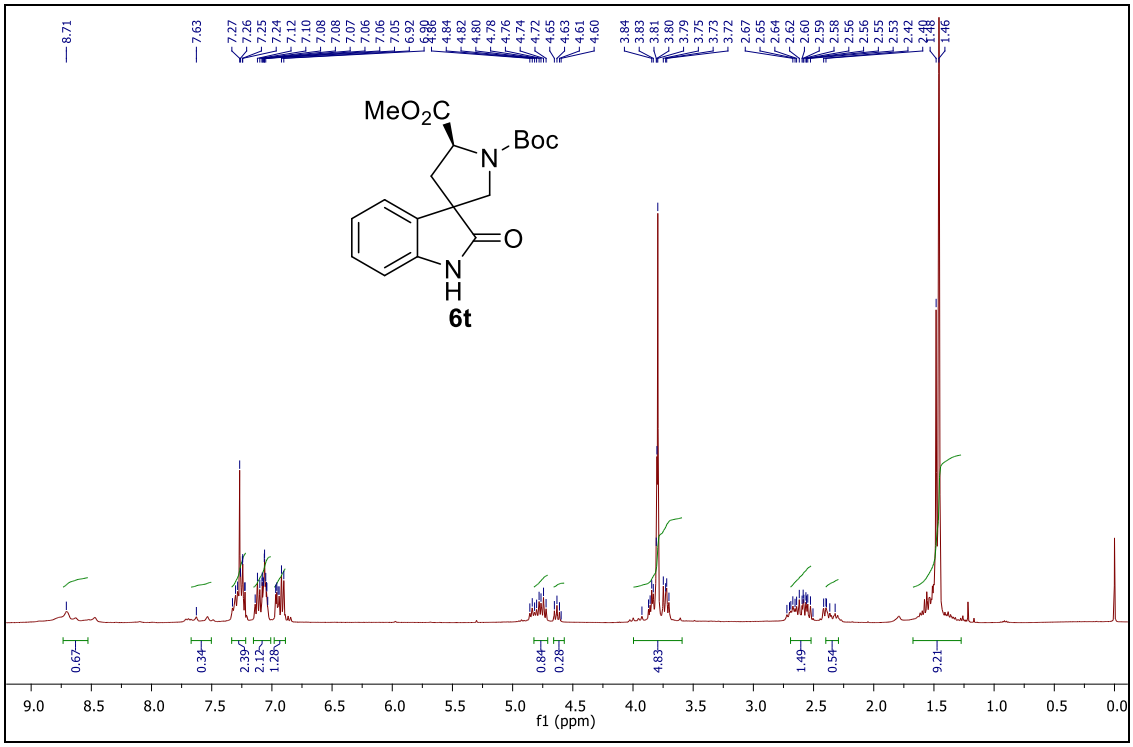
^{13}C NMR (100 MHz, DMSO-d_6) for compound **6r'**.



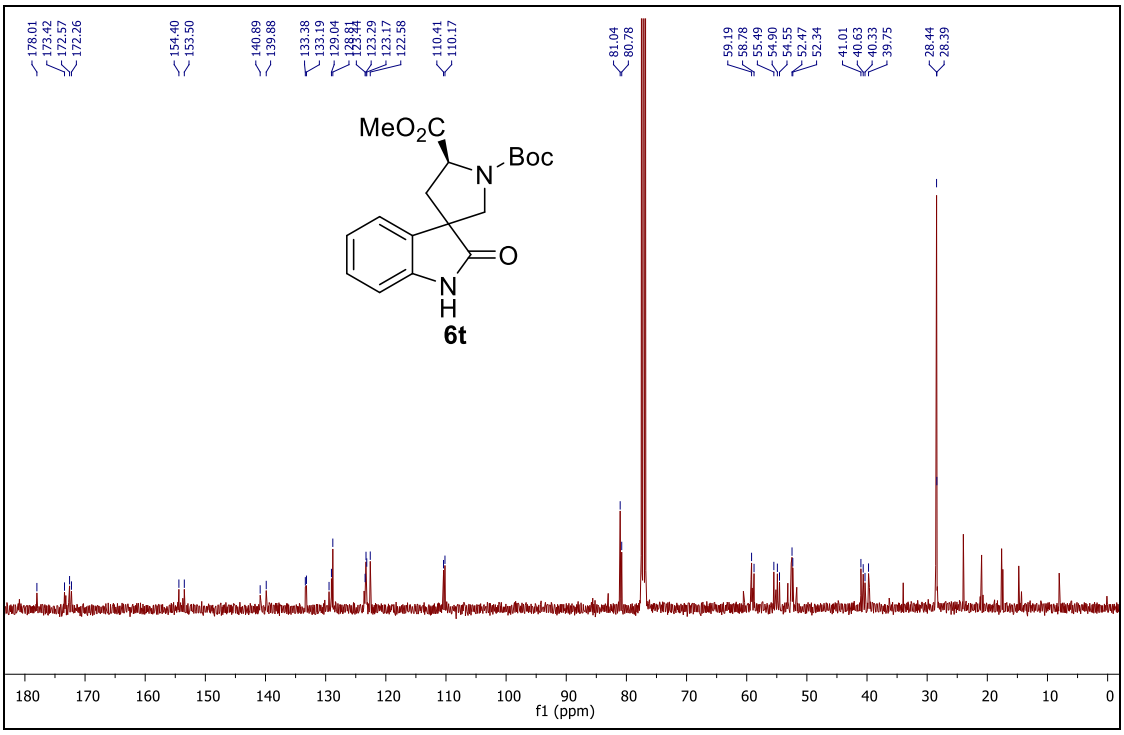
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6s**.



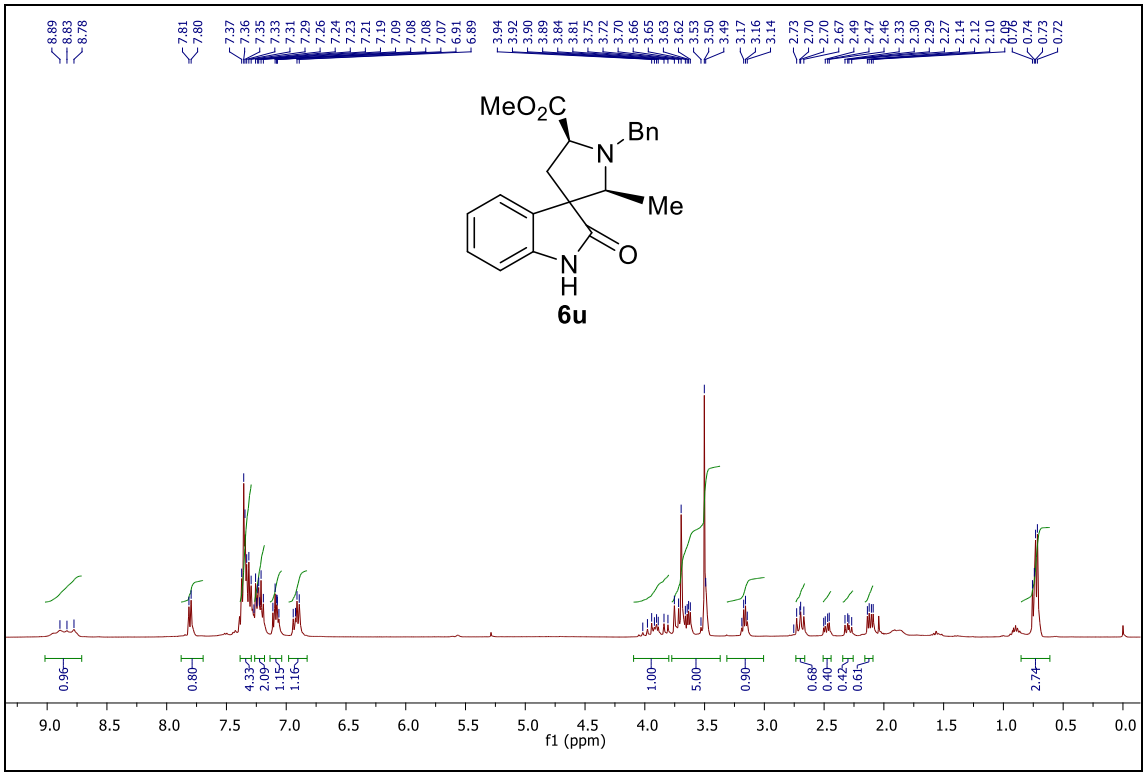
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6s**.



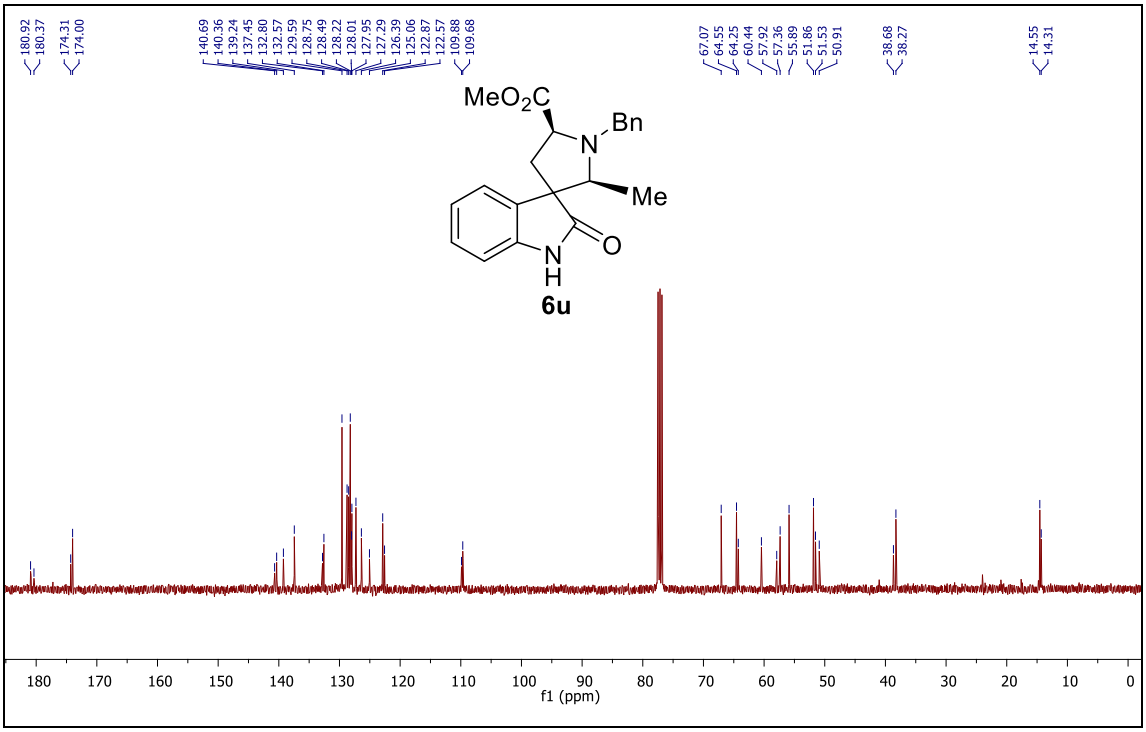
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6t**.



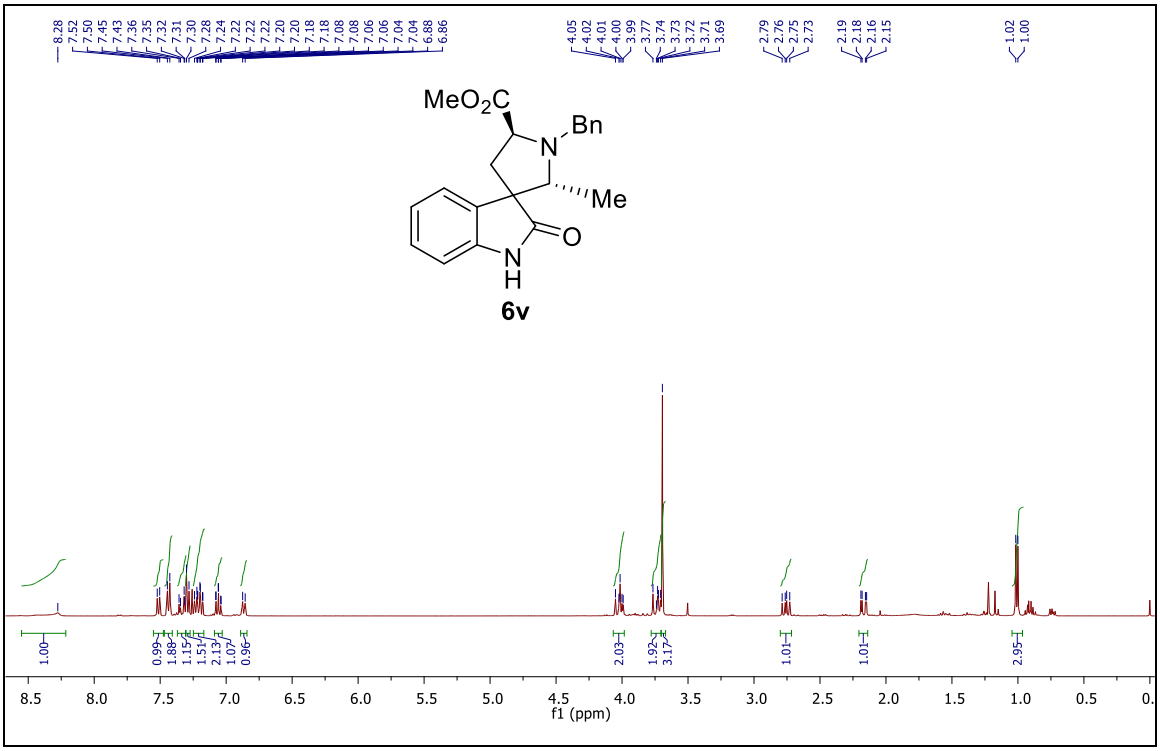
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6t**.



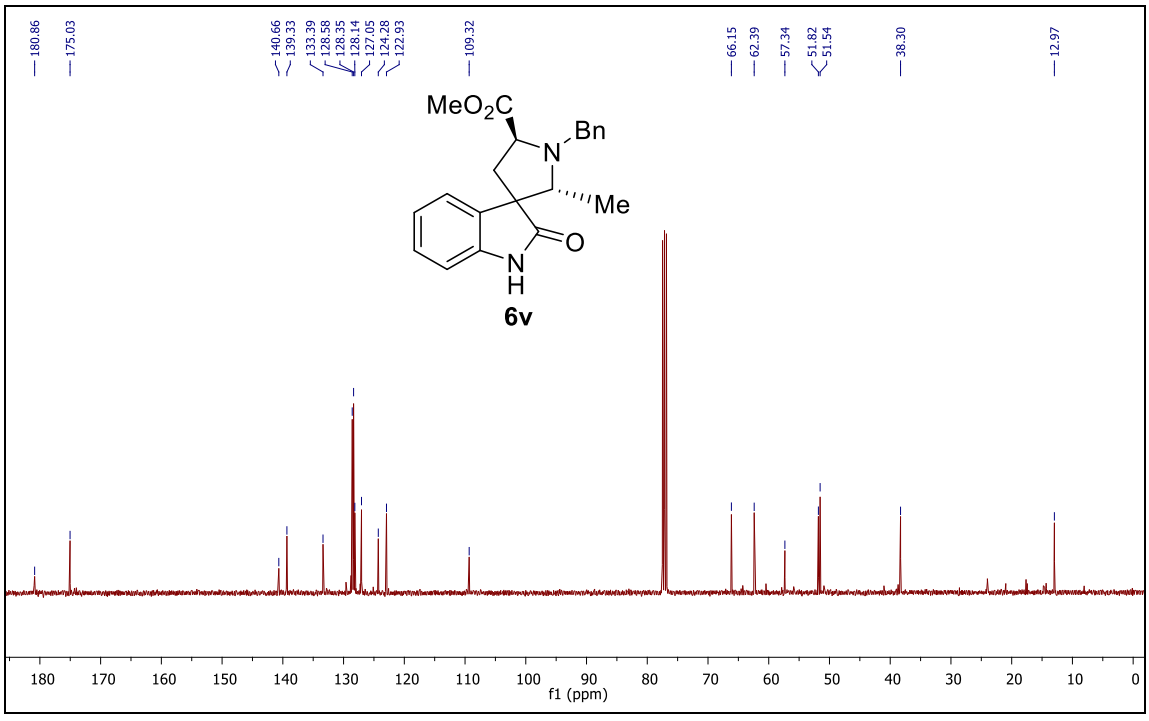
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6u**.



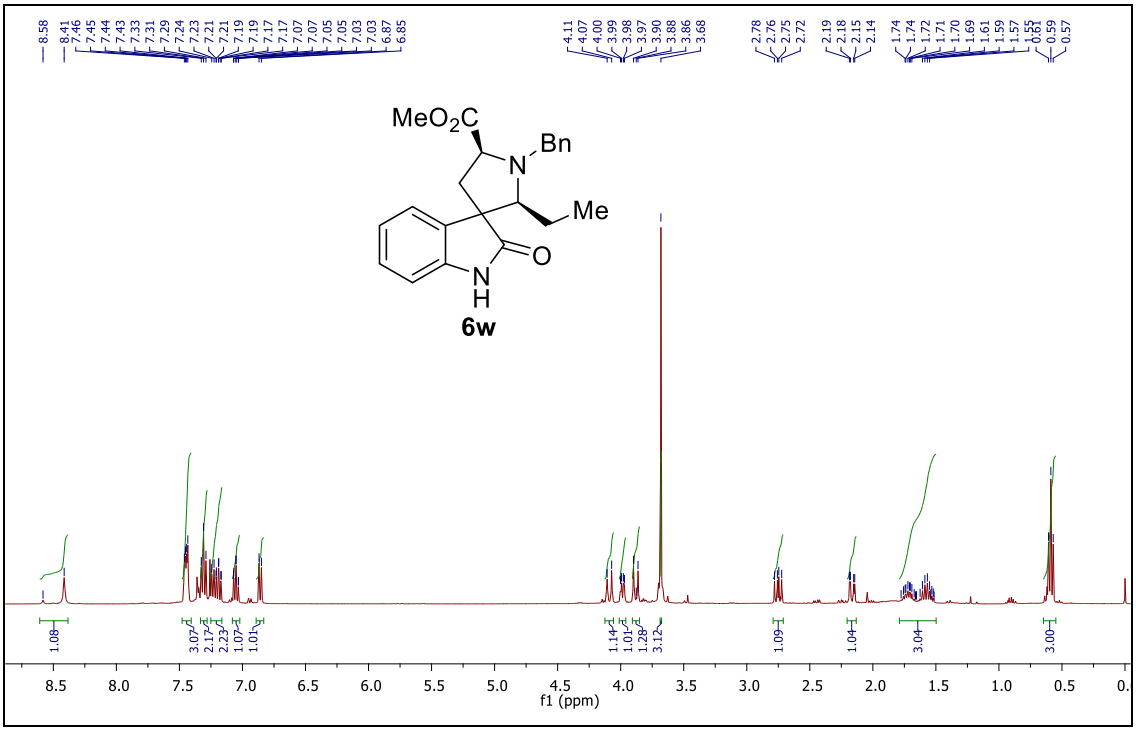
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6u**.



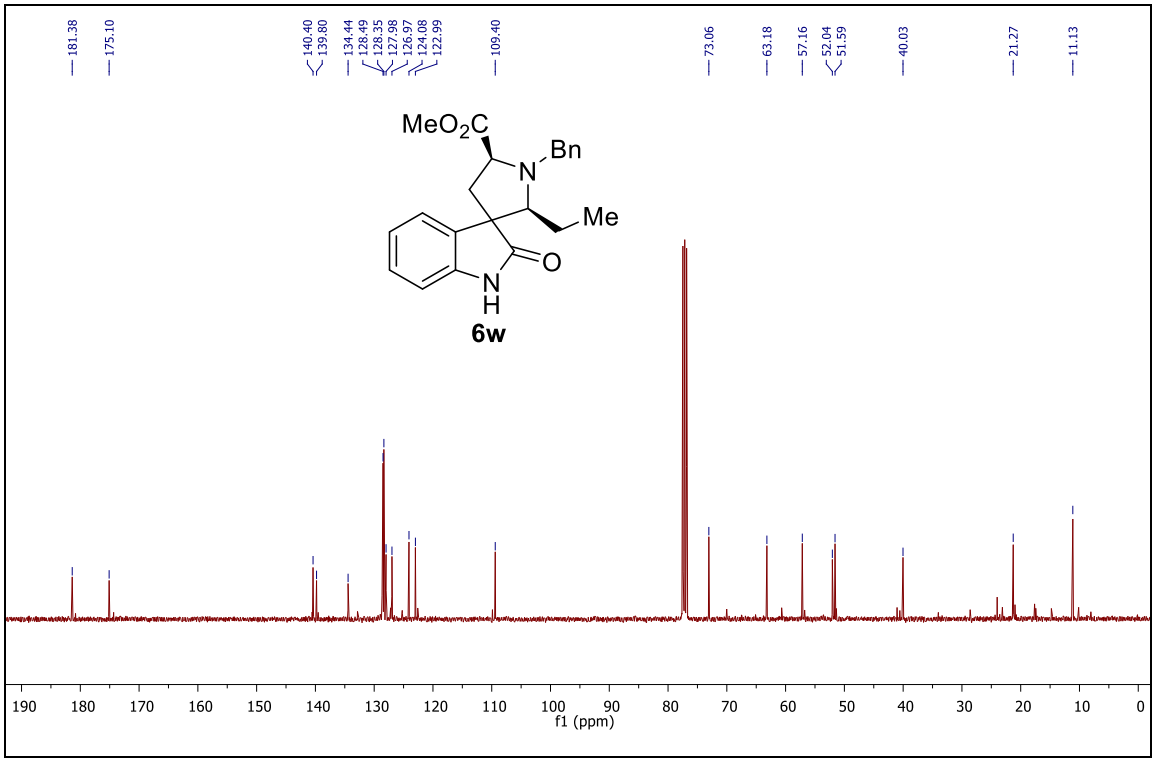
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6v**.



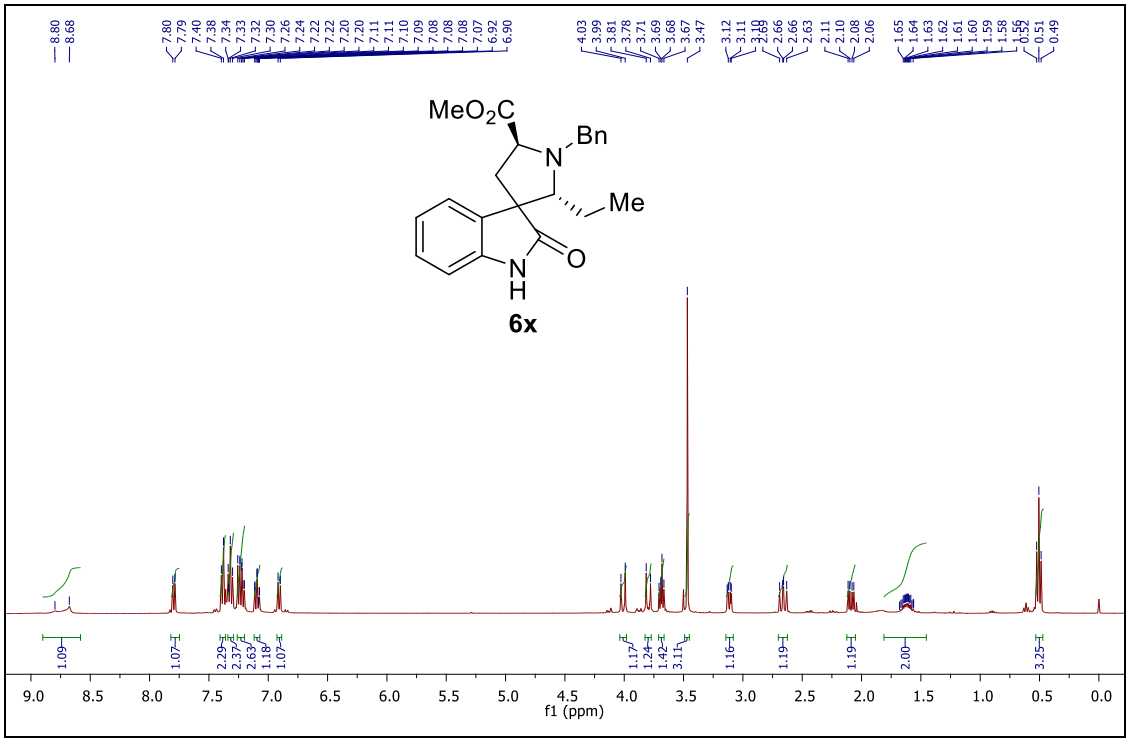
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6v**.



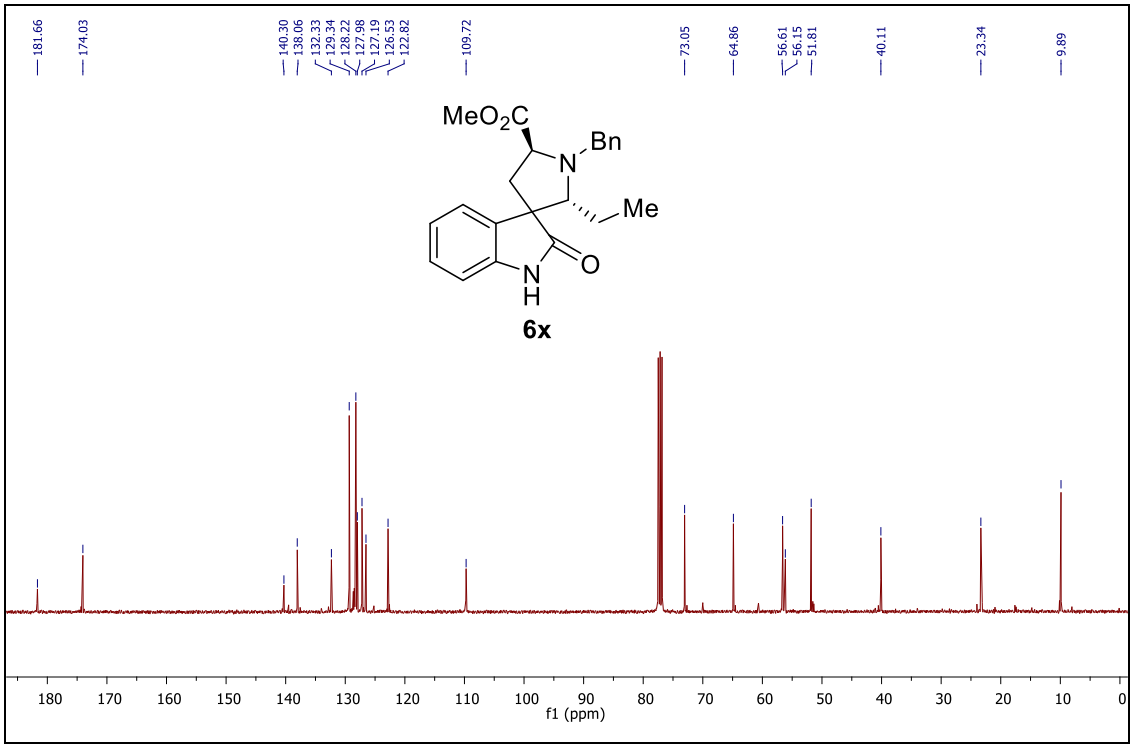
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6w**.



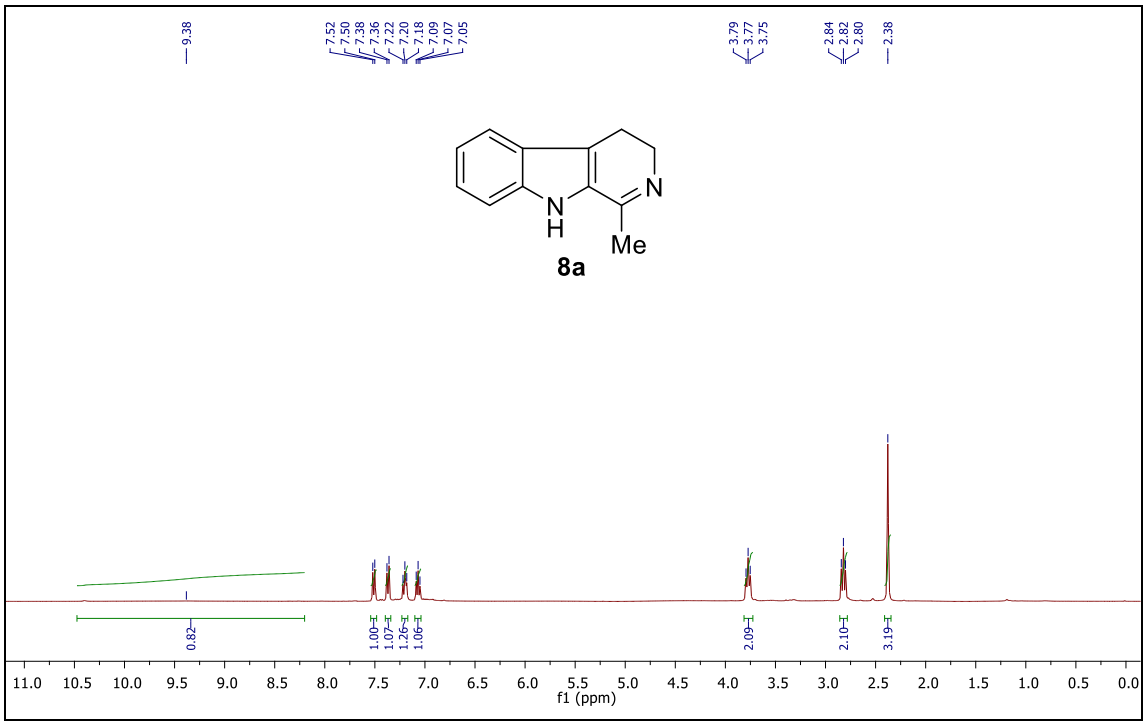
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6w**.



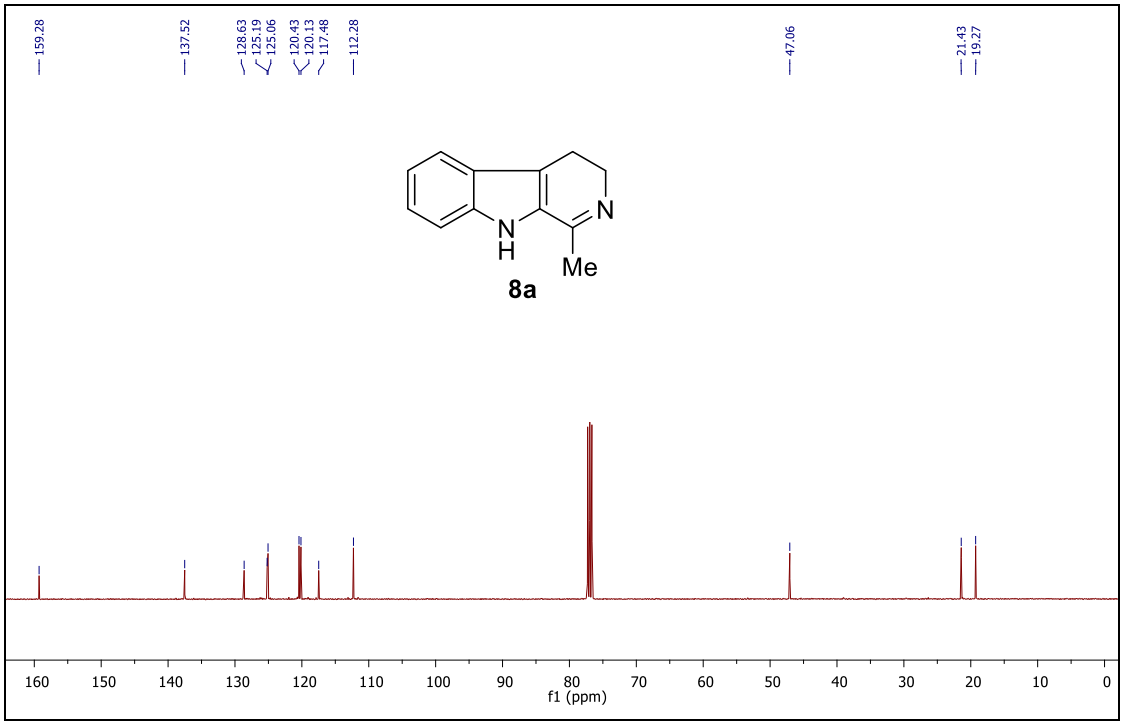
^{1}H NMR (400 MHz, $CDCl_3$) for compound **6x**.



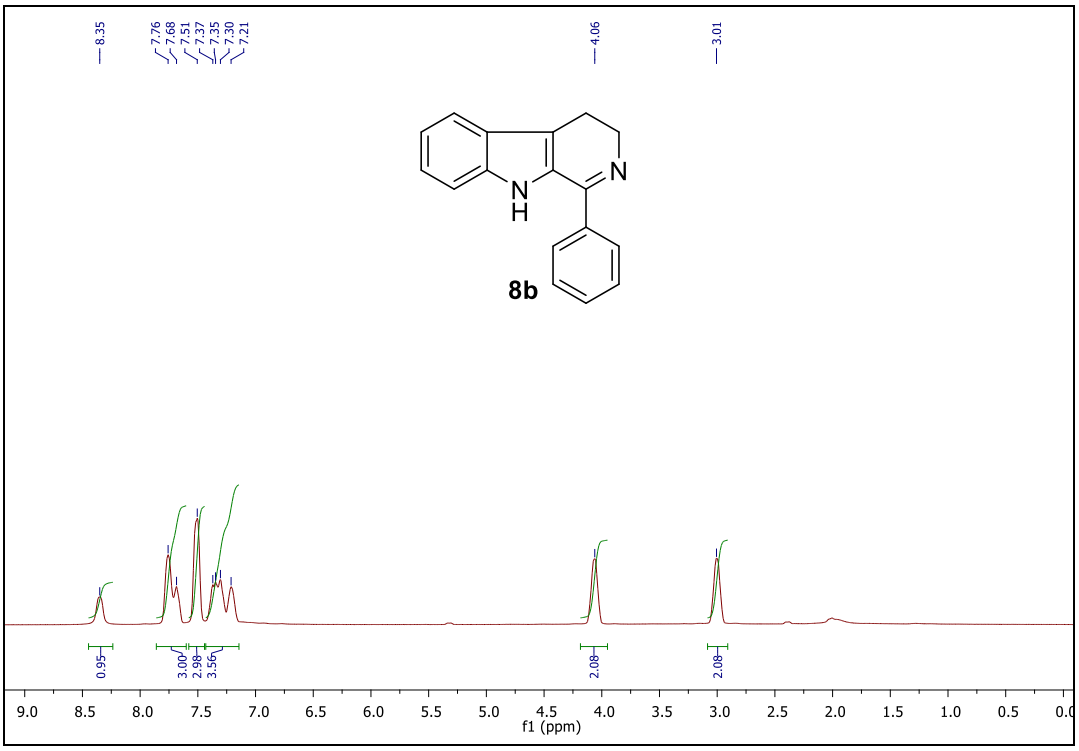
^{13}C NMR (100 MHz, $CDCl_3$) for compound **6x**.



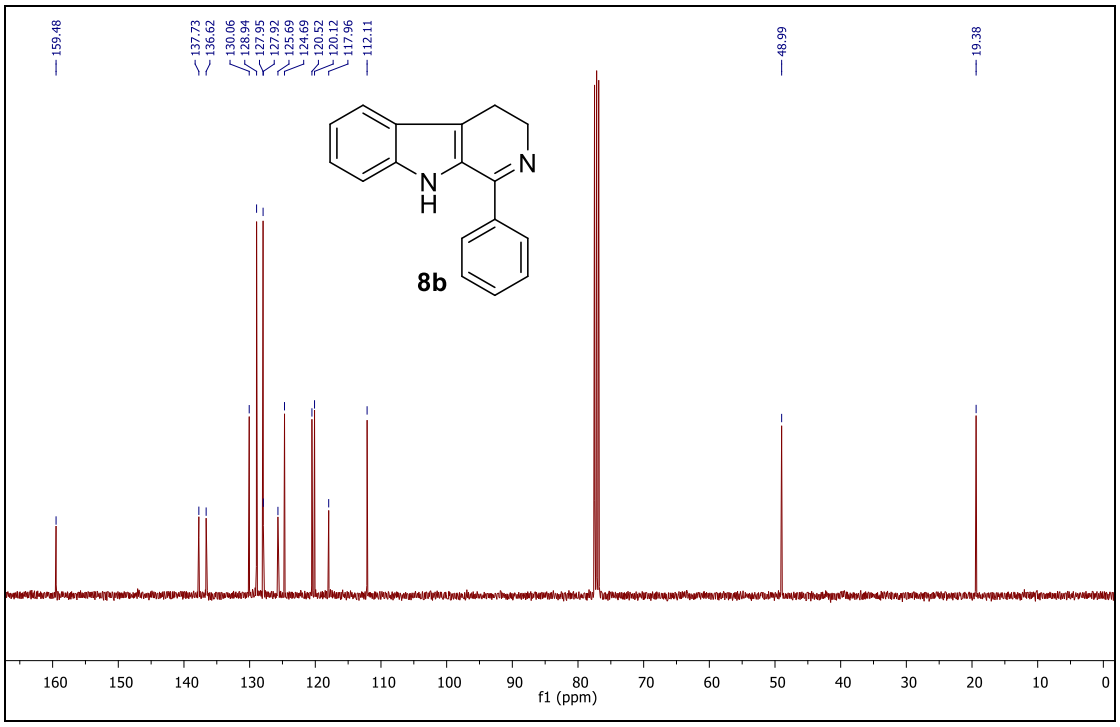
^{1}H NMR (400 MHz, $CDCl_3$) for compound **8a**.



^{13}C NMR (100 MHz, $CDCl_3$) for compound **8a**.



^{1}H NMR (400 MHz, $CDCl_3$) for compound **8b.**



^{13}C NMR (100 MHz, $CDCl_3$) for compound **8b**.