Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.

Divergent, Stereoselective Access to Heterocyclic α,α–Quaternary– and β ^{2,3,3}–Amino Acid Derivatives from a N-Pmp-protected Orn-Derived β–Lactam

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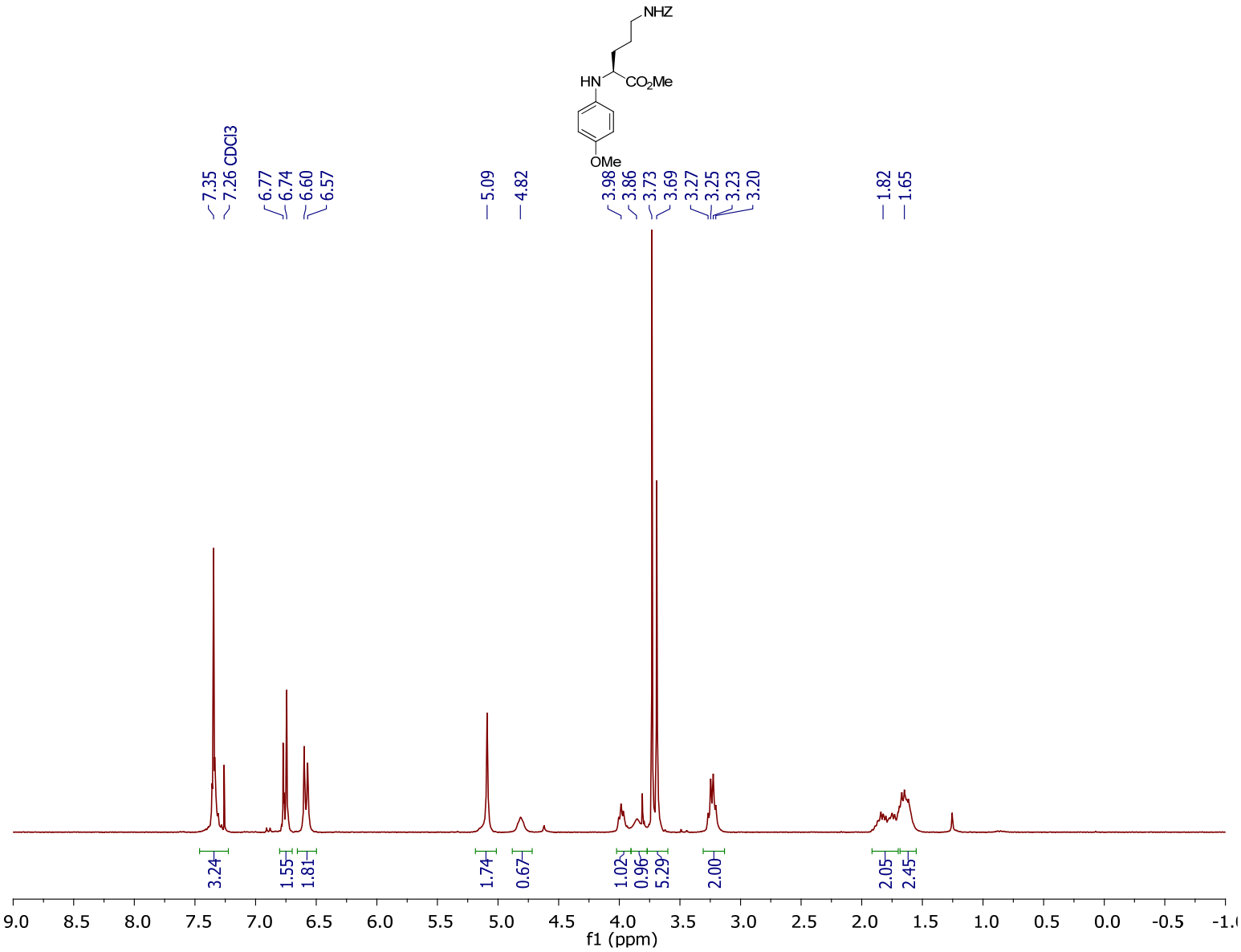
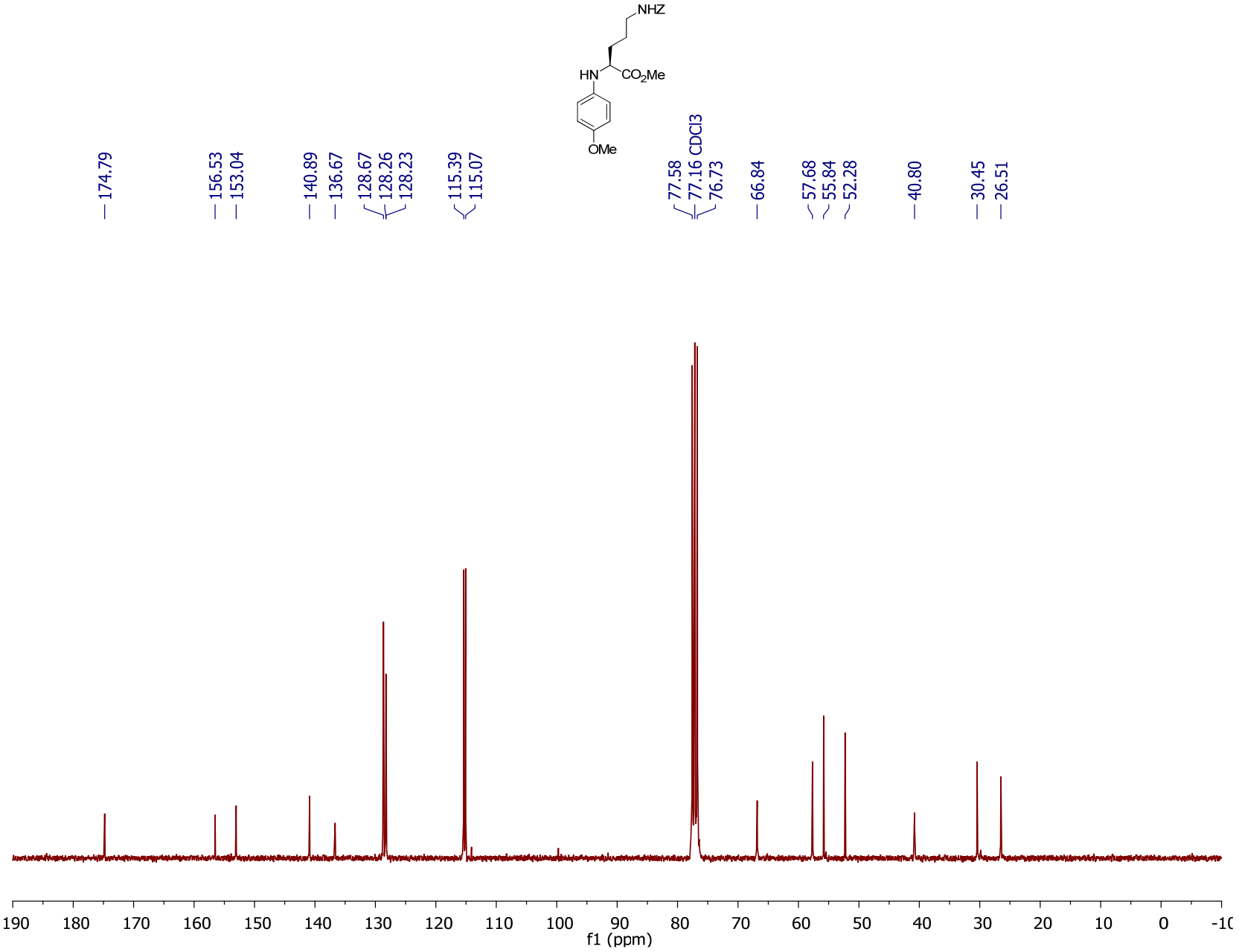
Supporting Information

^{1}H and ^{13}C-NMR spectra.

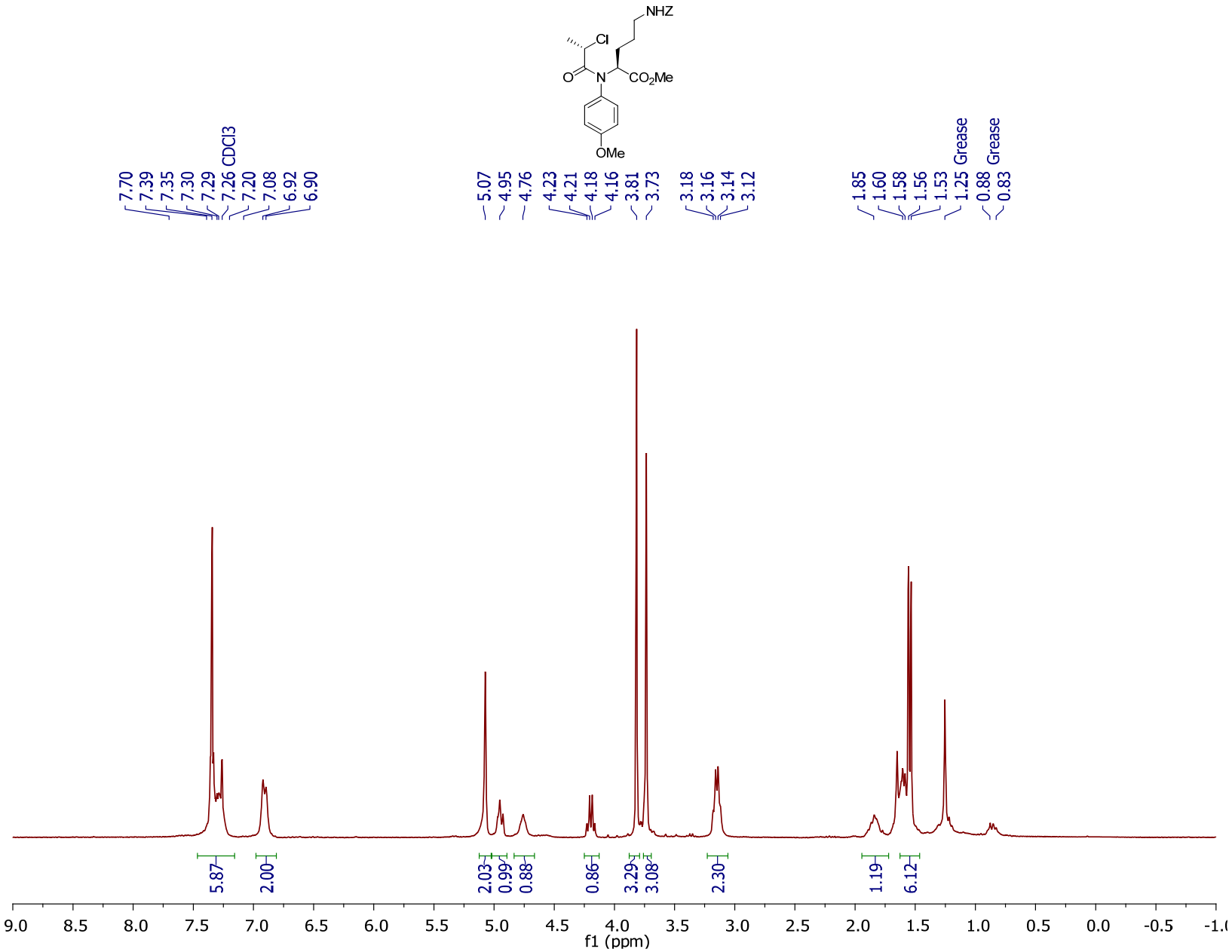
^{1}H-NMR (300 MHz, $CDCl_3$). *N-p*-methoxyphenyl-Orn(Z)-OMe (5).



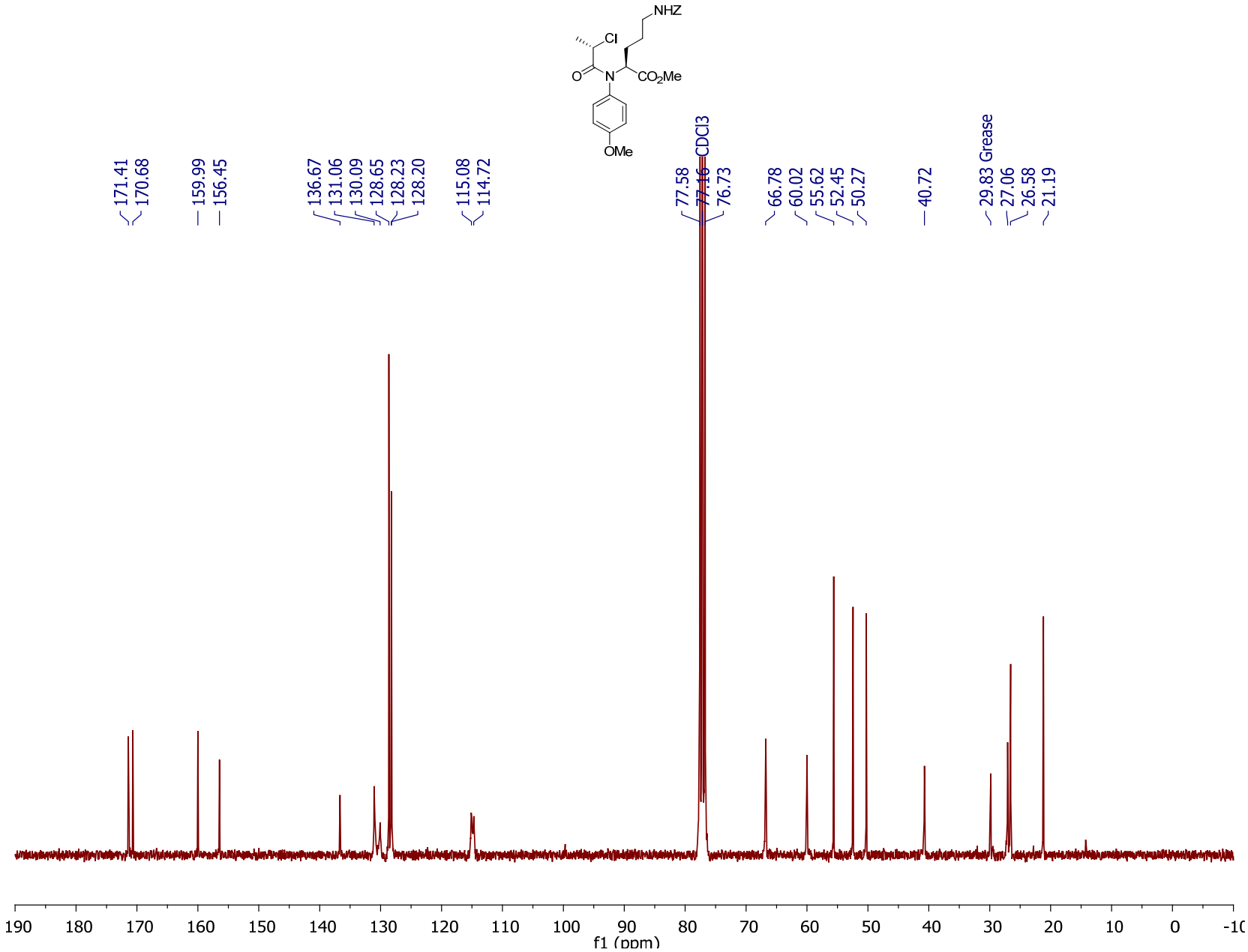
^{13}C-NMR (75 MHz, $CDCl_3$). *N-p*-methoxyphenyl-Orn(Z)-OMe (5).



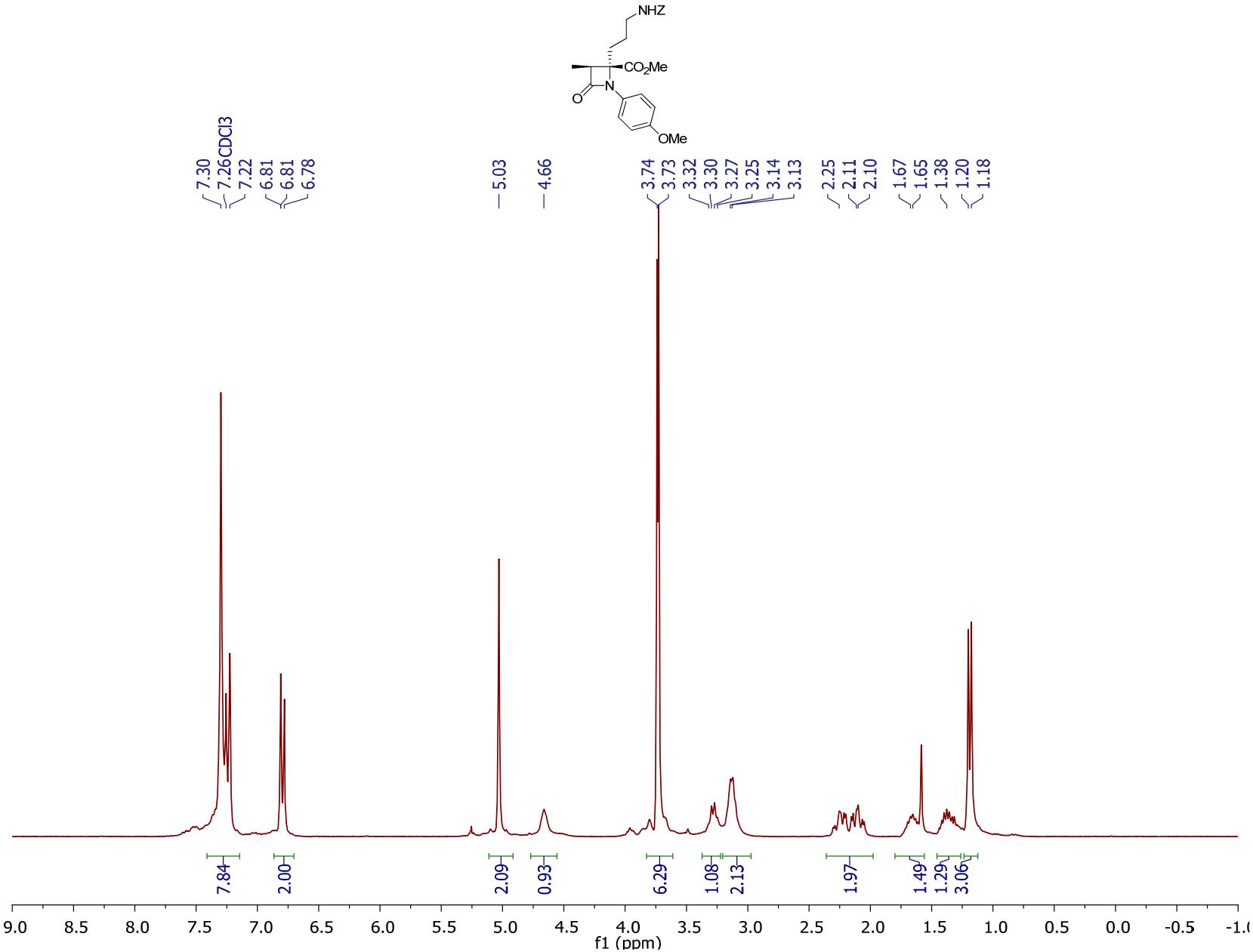
^{1}H-NMR (300 MHz, $CDCl_3$). *N*-[(*S*)-2-Chloropropionyl]-*N*-Pmp-L-Orn(Z)-OMe (6).



^{13}C-NMR (75 MHz, $CDCl_3$). *N*-[(*S*)-2-Chloropropionyl]-*N*-Pmp-L-Orn(Z)-OMe (6)



^{1}H-NMR (300 MHz, $CDCl_3$). (3*S*,4*S*)-4-[3'-(Benzyloxycarbonyl)amino]propyl-4-methoxycarbonyl-1-*p*-methoxyphenyl-3-methyl-2-oxoazetidine (7).



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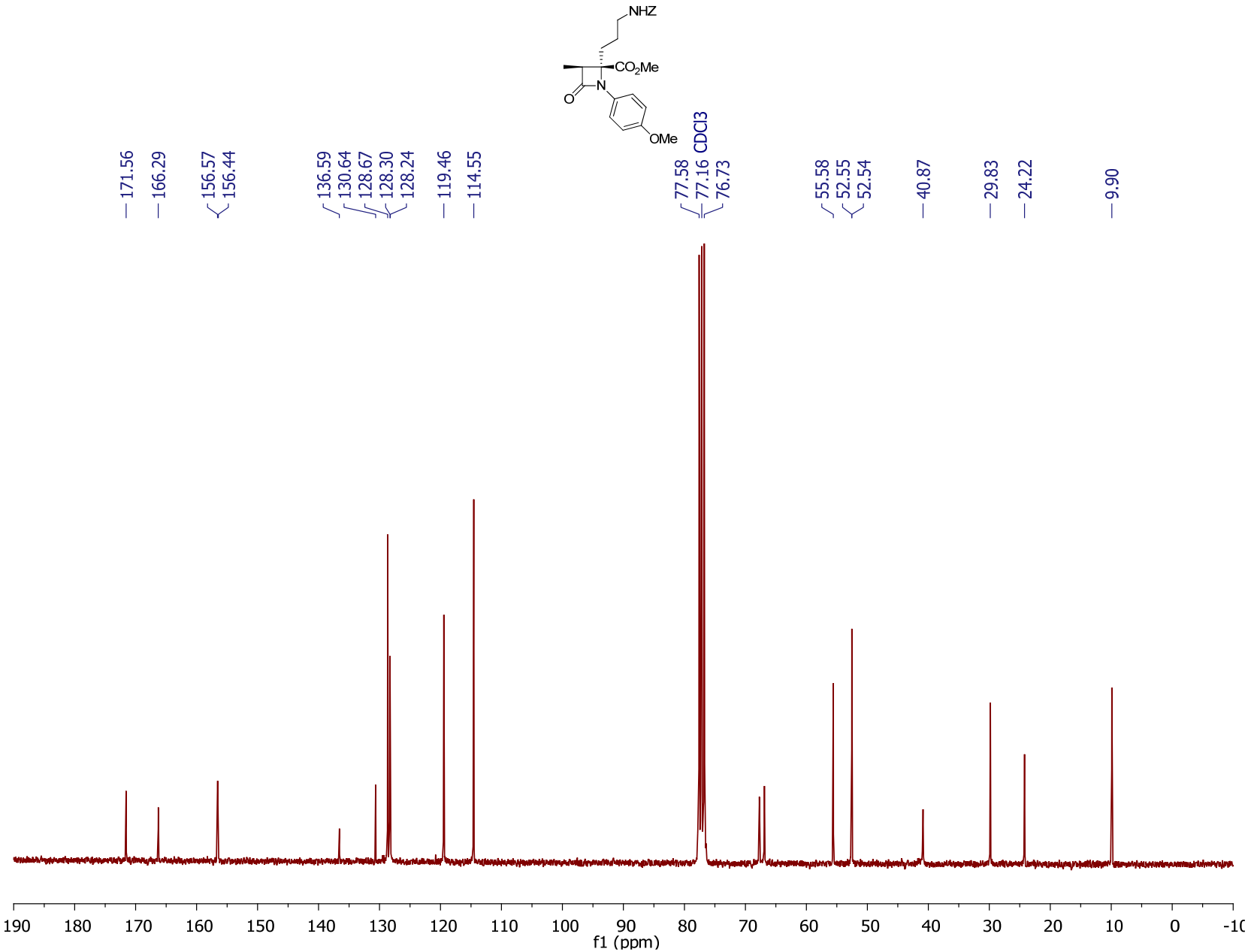
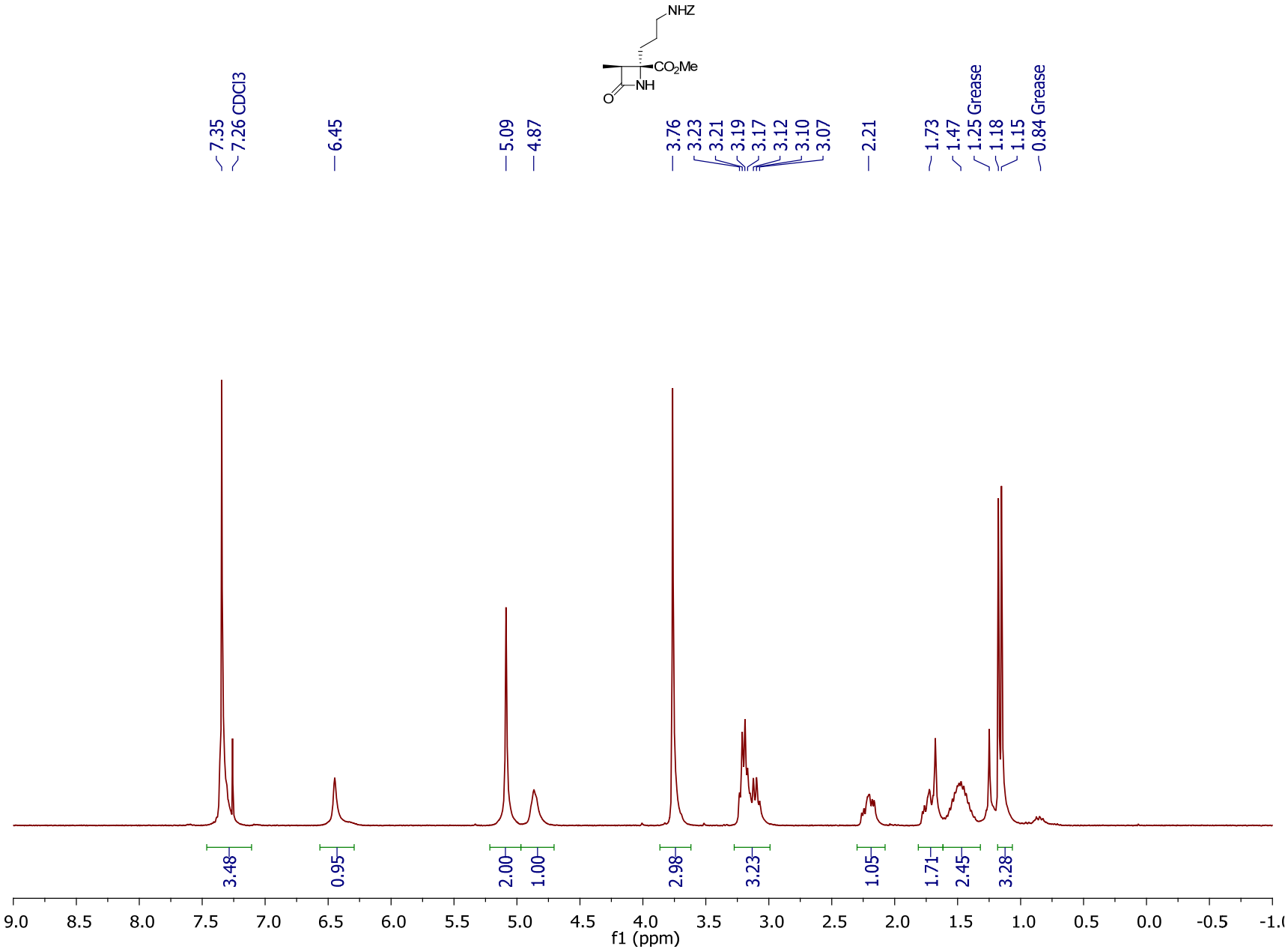


^{1}H-NMR (300 MHz, $CDCl_3$). (3*S*,4*S*)-4-[3'-(Benzyloxycarbonyl)amino]propyl-4-methoxycarbonyl-3-methyl-2-oxoazetidine (8).



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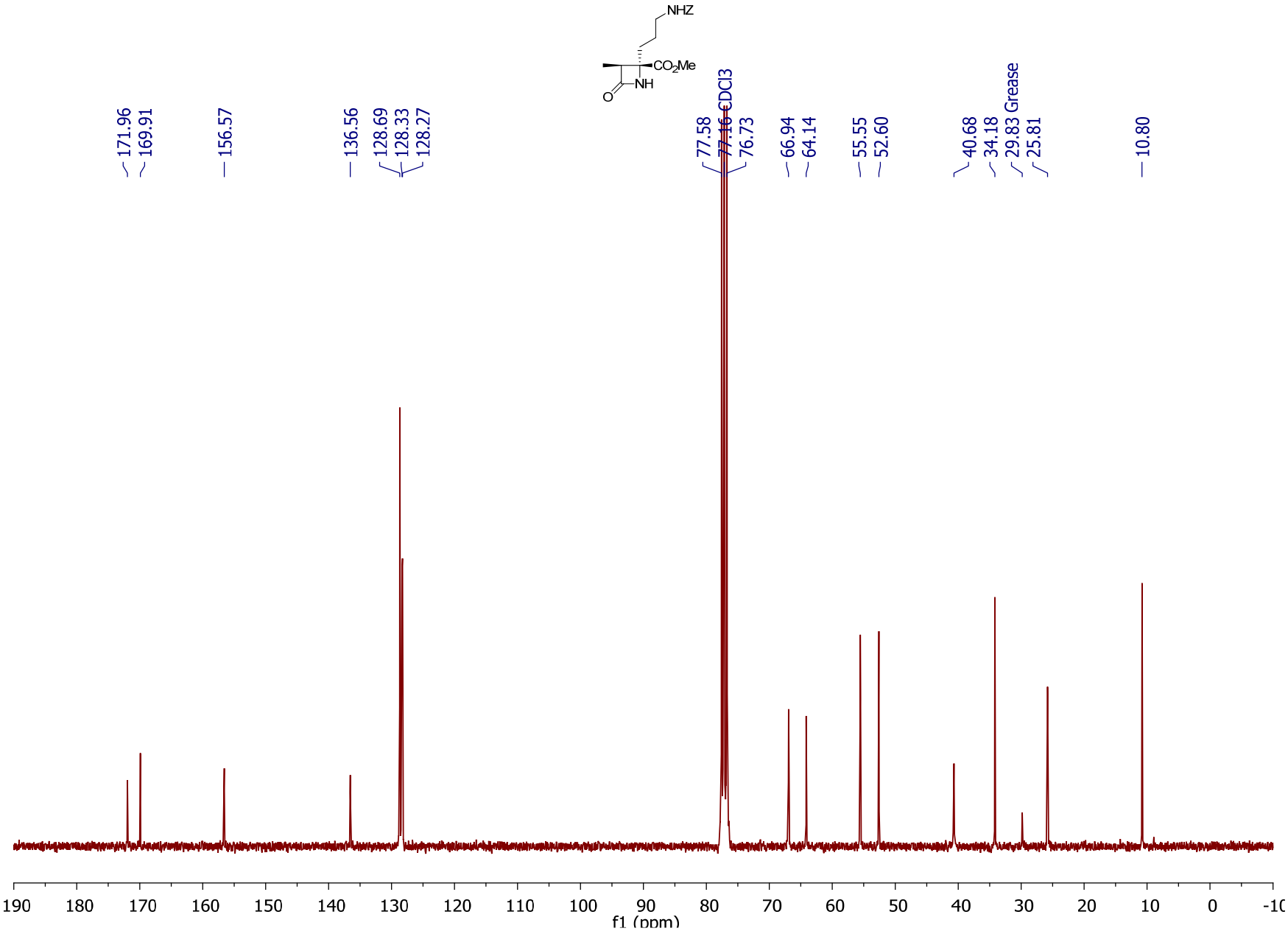
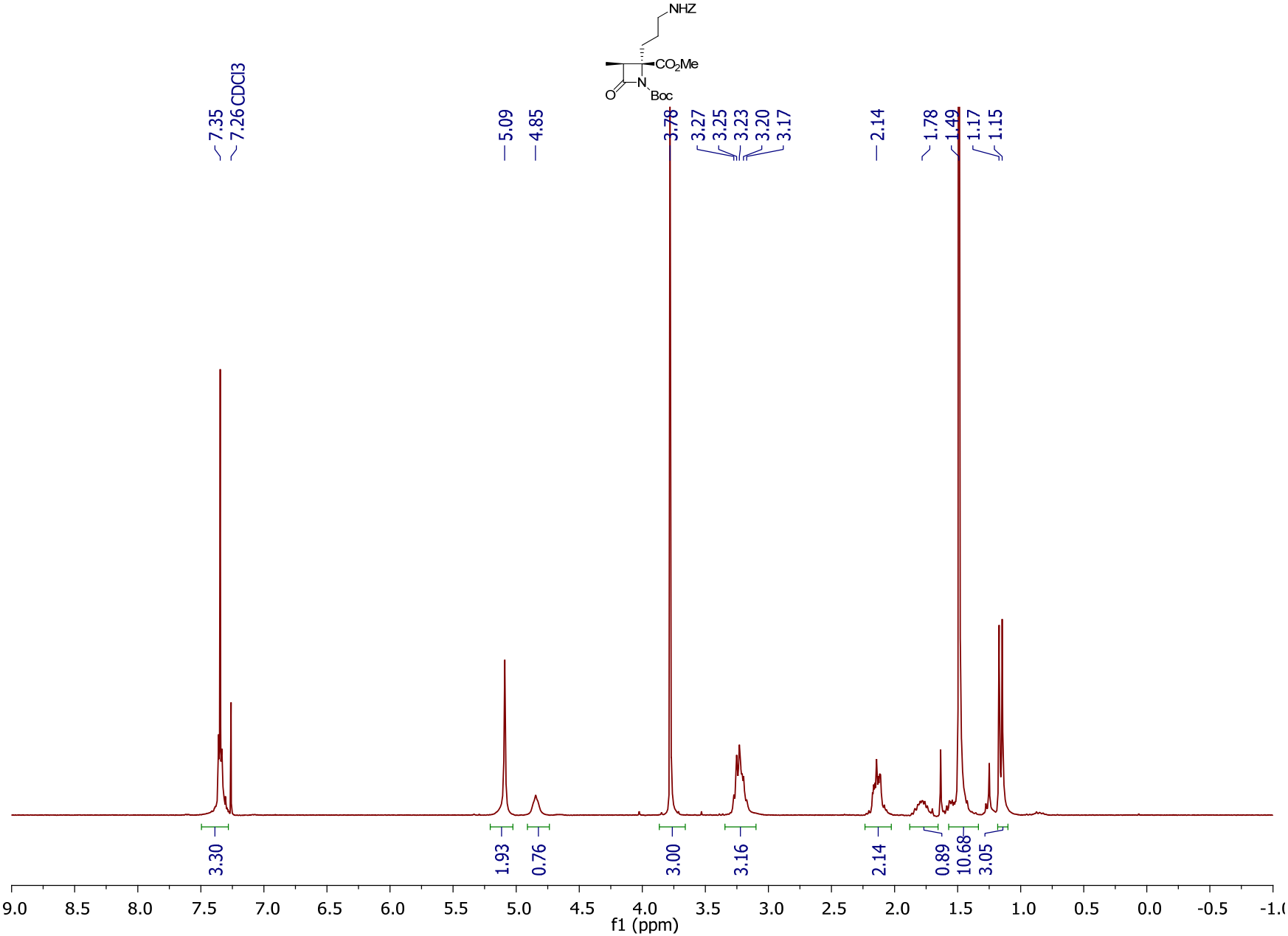


^{1}H-NMR (300 MHz, $CDCl_3$). (3*S*,4*S*)-4-[3'-(Benzyloxycarbonyl)amino]propyl-1-*tert*-butoxycarbonyl-4-methoxycarbonyl-3-methyl-2-oxoazetidine (9).



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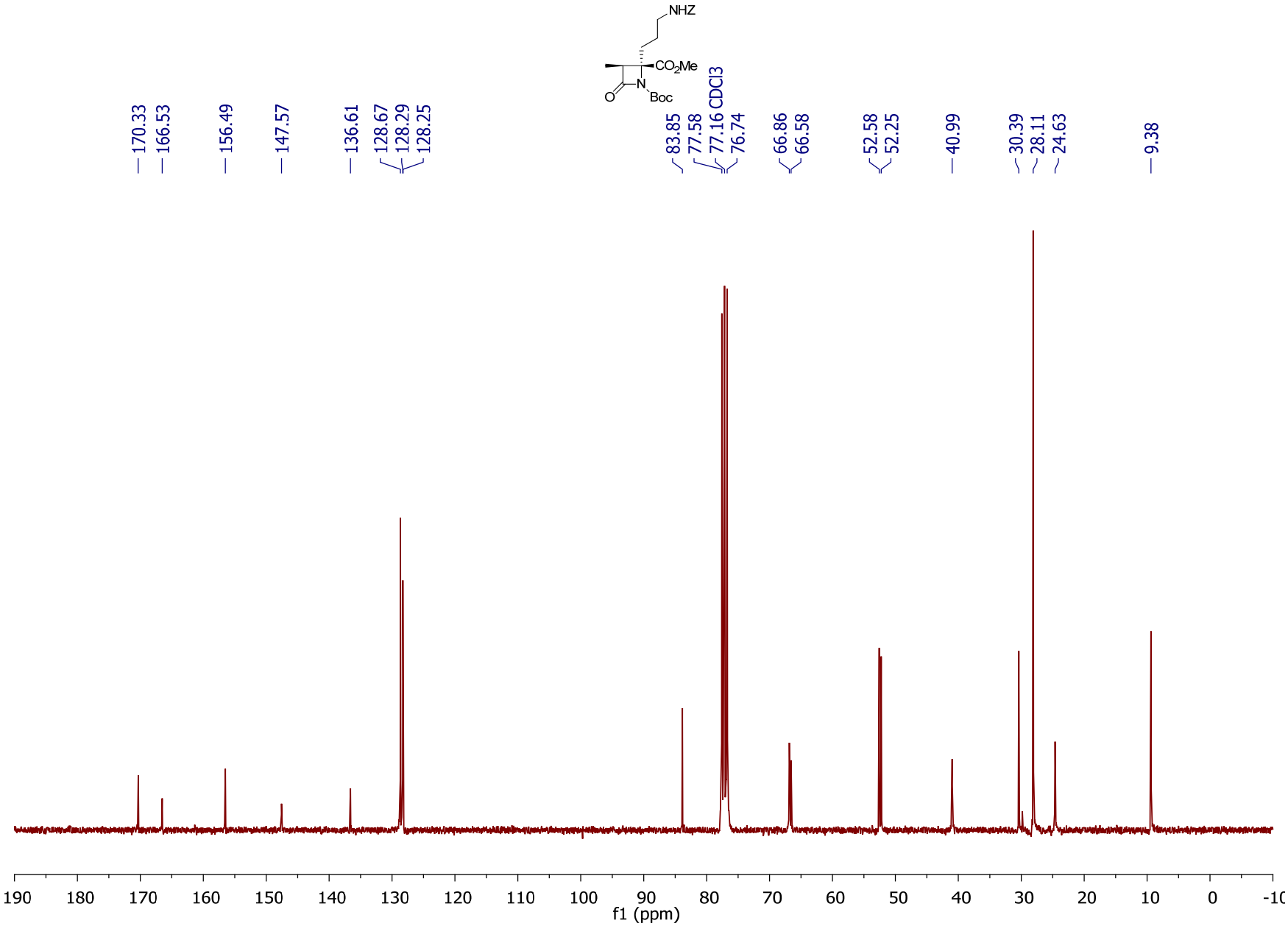
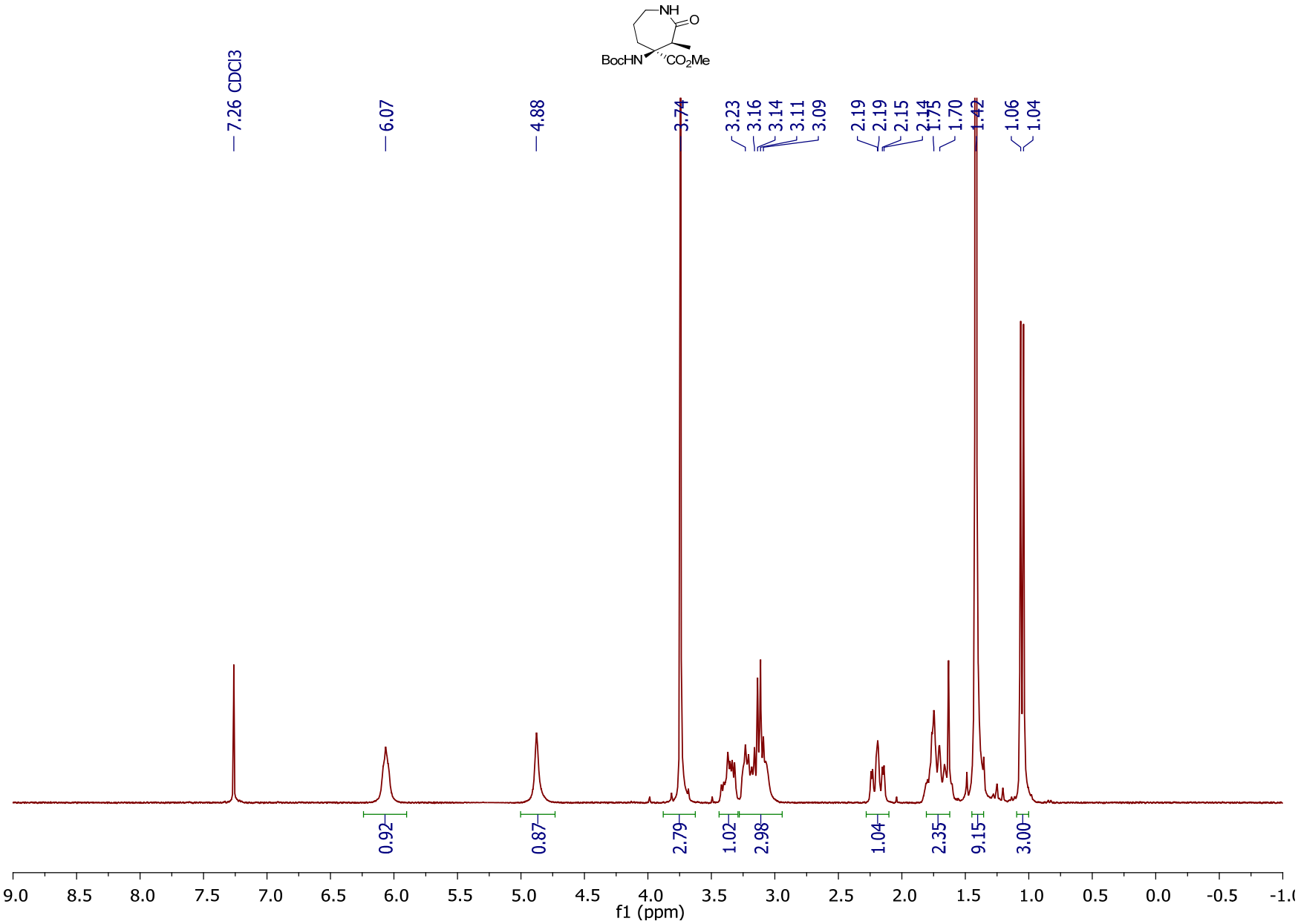


^{1}H-NMR (300 MHz, $CDCl_3$). (3*S*,4*S*)-4-(*tert*-Butoxycarbonyl)amino-4-methoxycarbonyl-3-methyl-2-oxoazepane (10).



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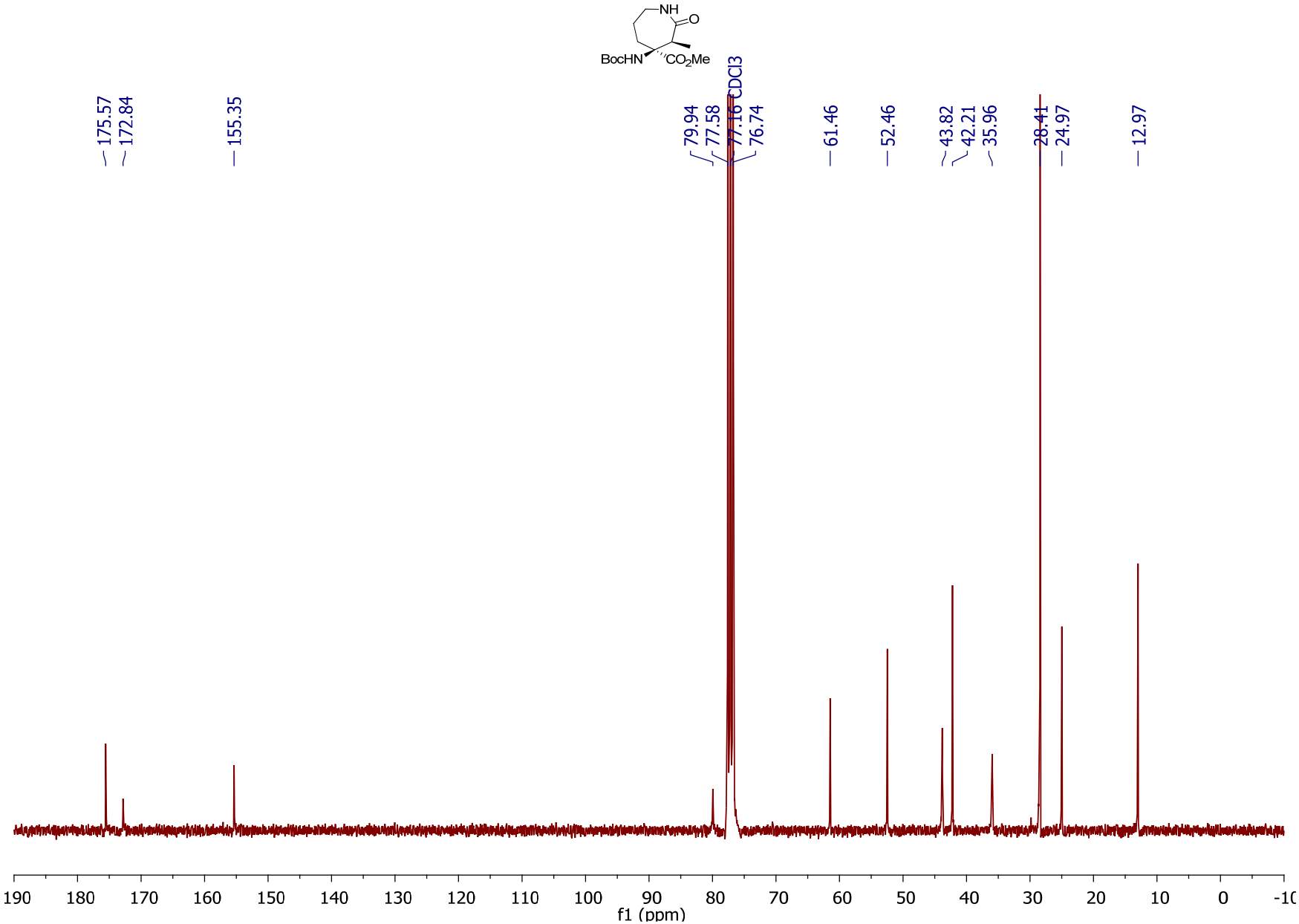
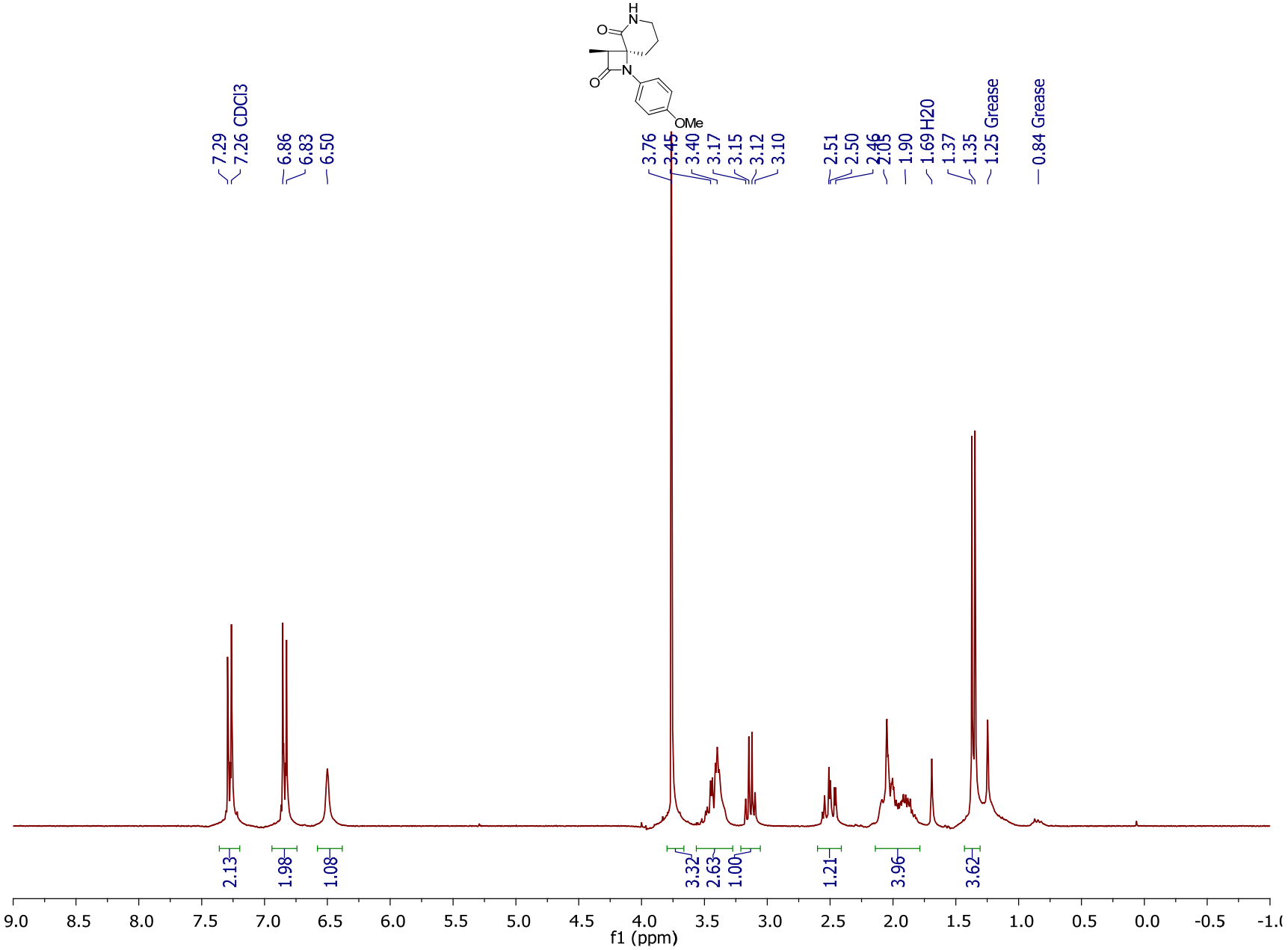


^{1}H-NMR (300 MHz, $CDCl_3$). (3*S*,4*S*)-1-*p*-Methoxyphenyl-1,6-diazaspiro[3.5]nonane-2,5-dione (11).



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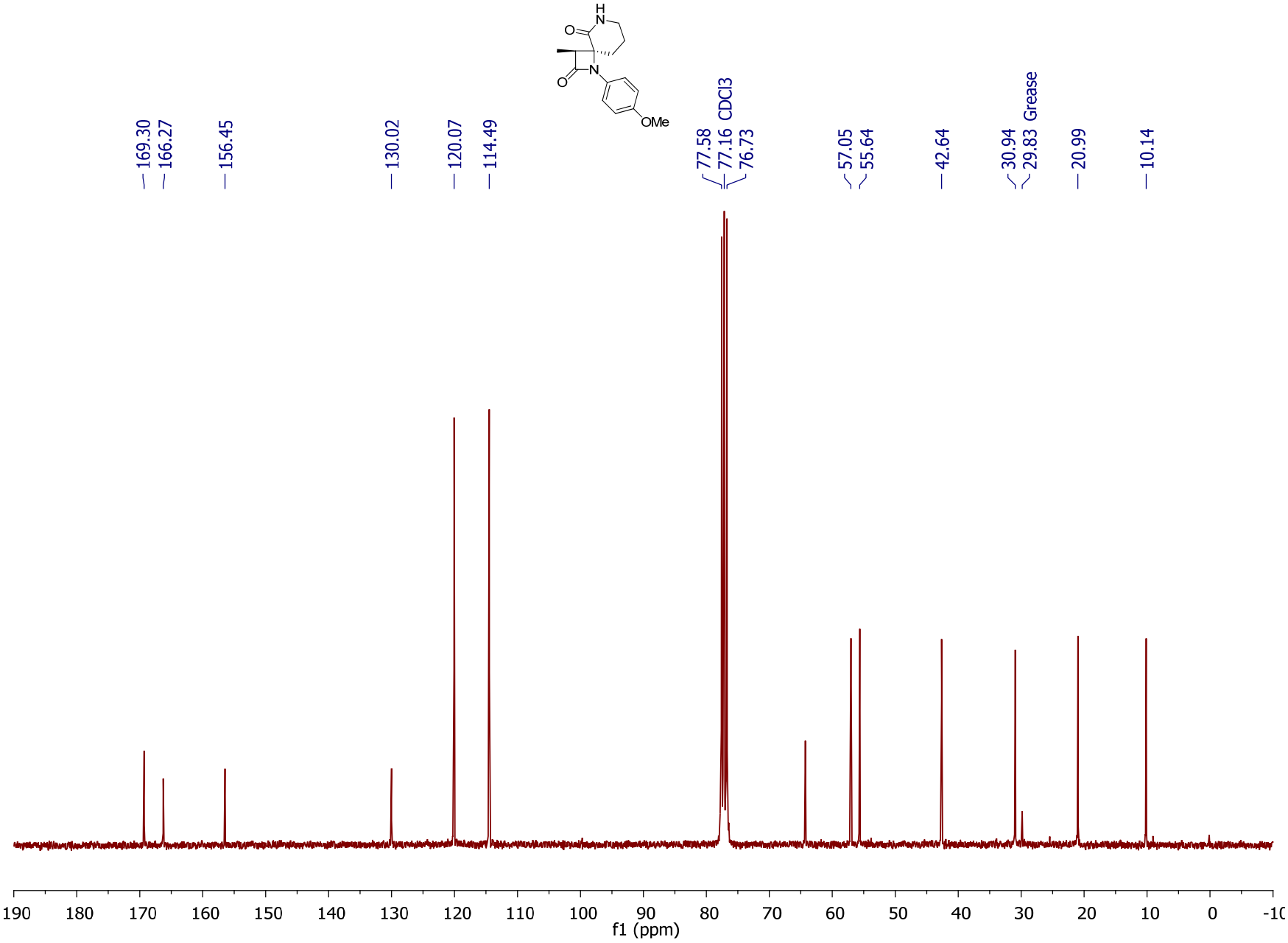
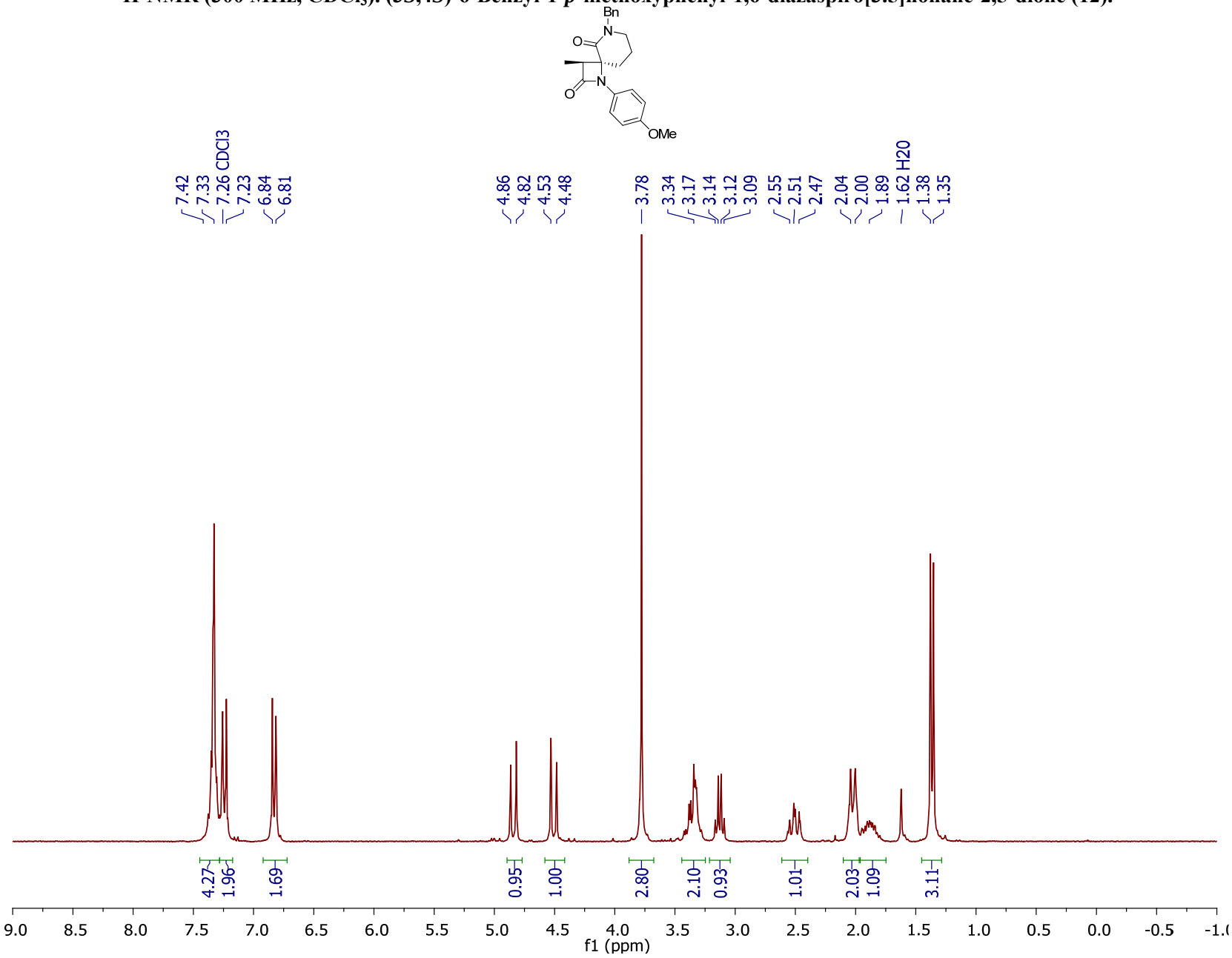
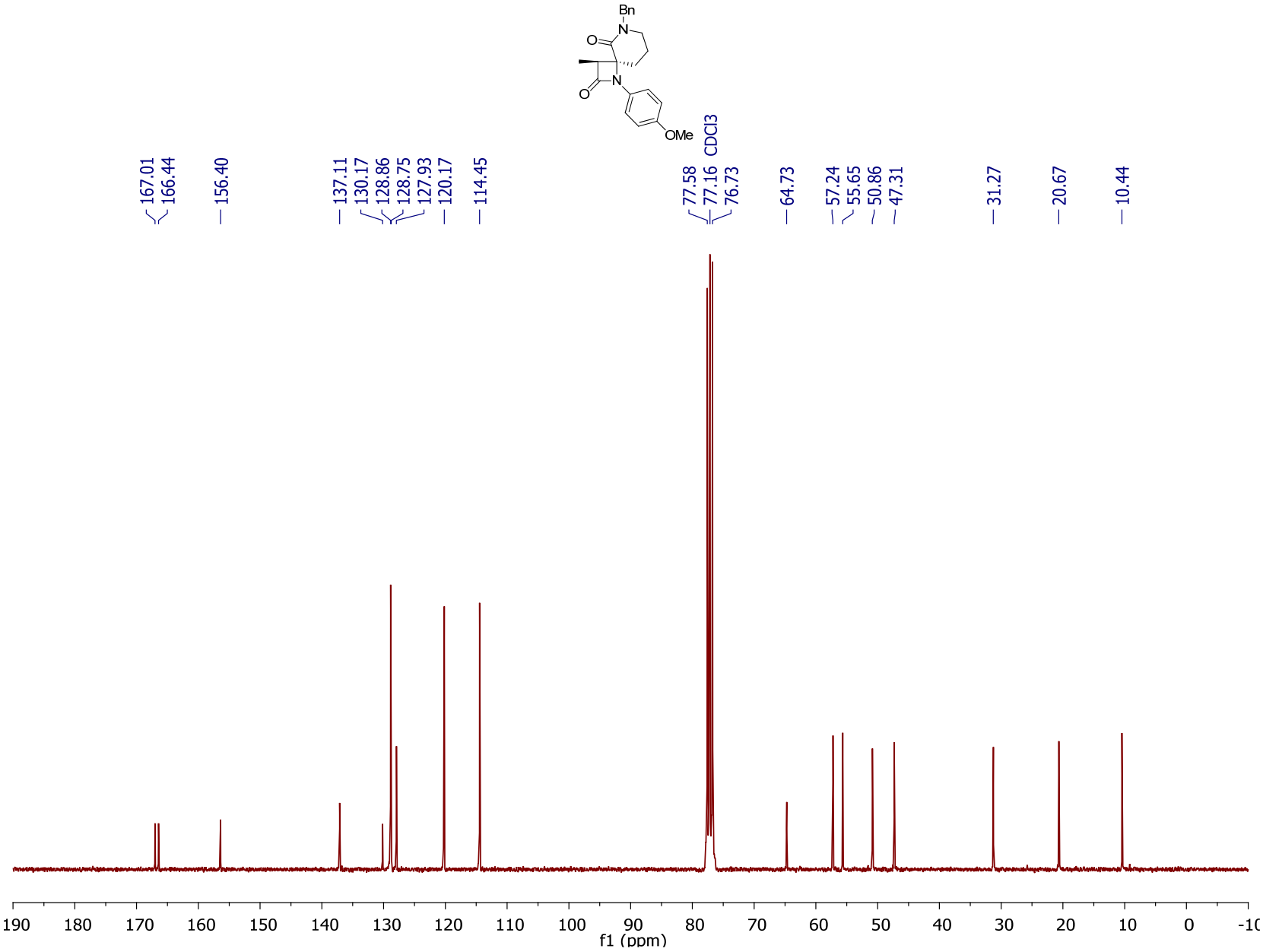


^{1}H-NMR (300 MHz, $CDCl_3$). (3*S*,4*S*)-6-Benzyl-1-*p*-methoxyphenyl-1,6-diazaspiro[3.5]nonane-2,5-dione (12).



^{13}C-NMR (75 MHz, $CDCl_3$). (3*S*,4*S*)-6-Benzyl-1-*p*-methoxyphenyl-1,6-diazaspiro[3.5]nonane-2,5-dione (12).



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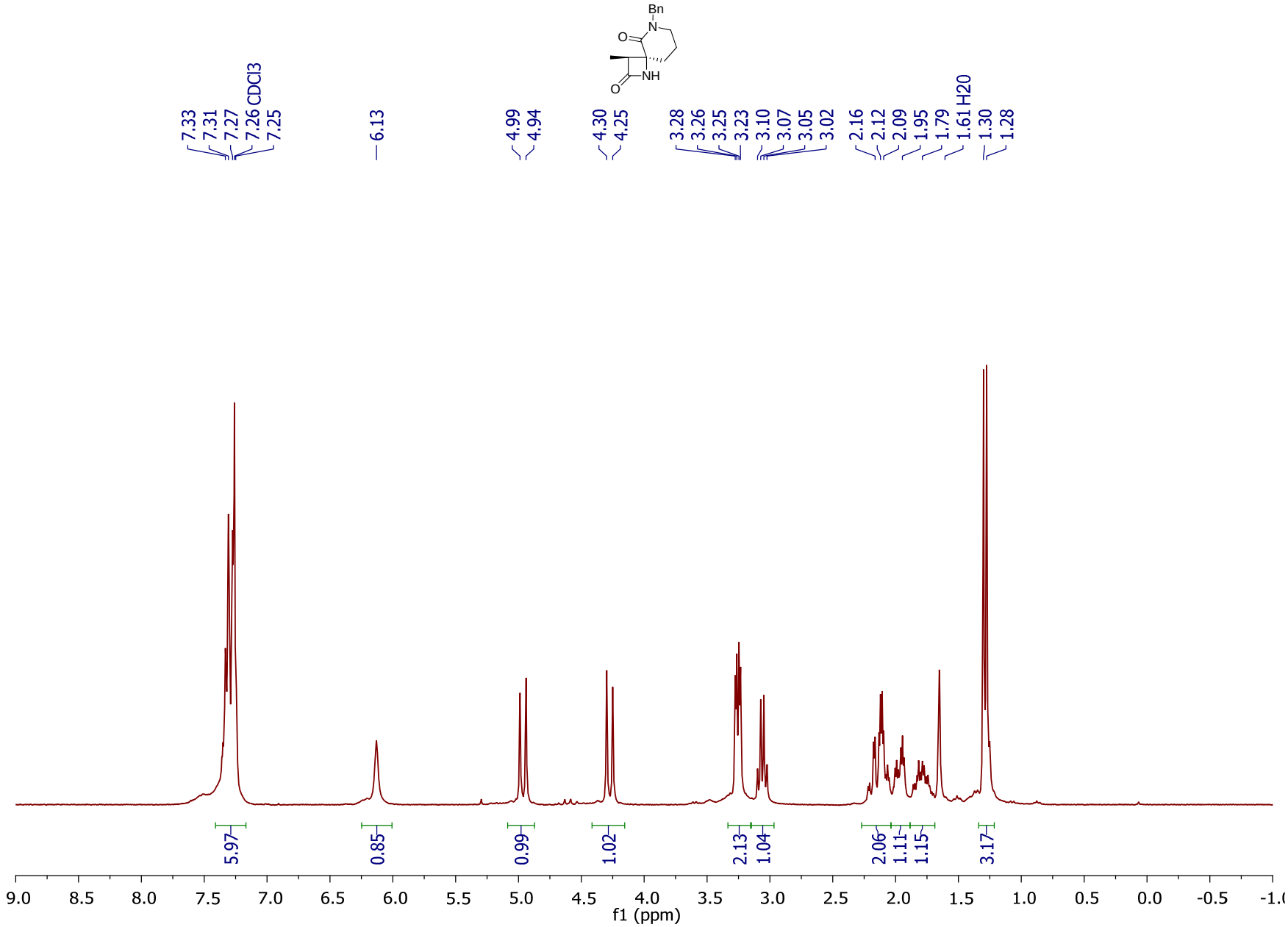
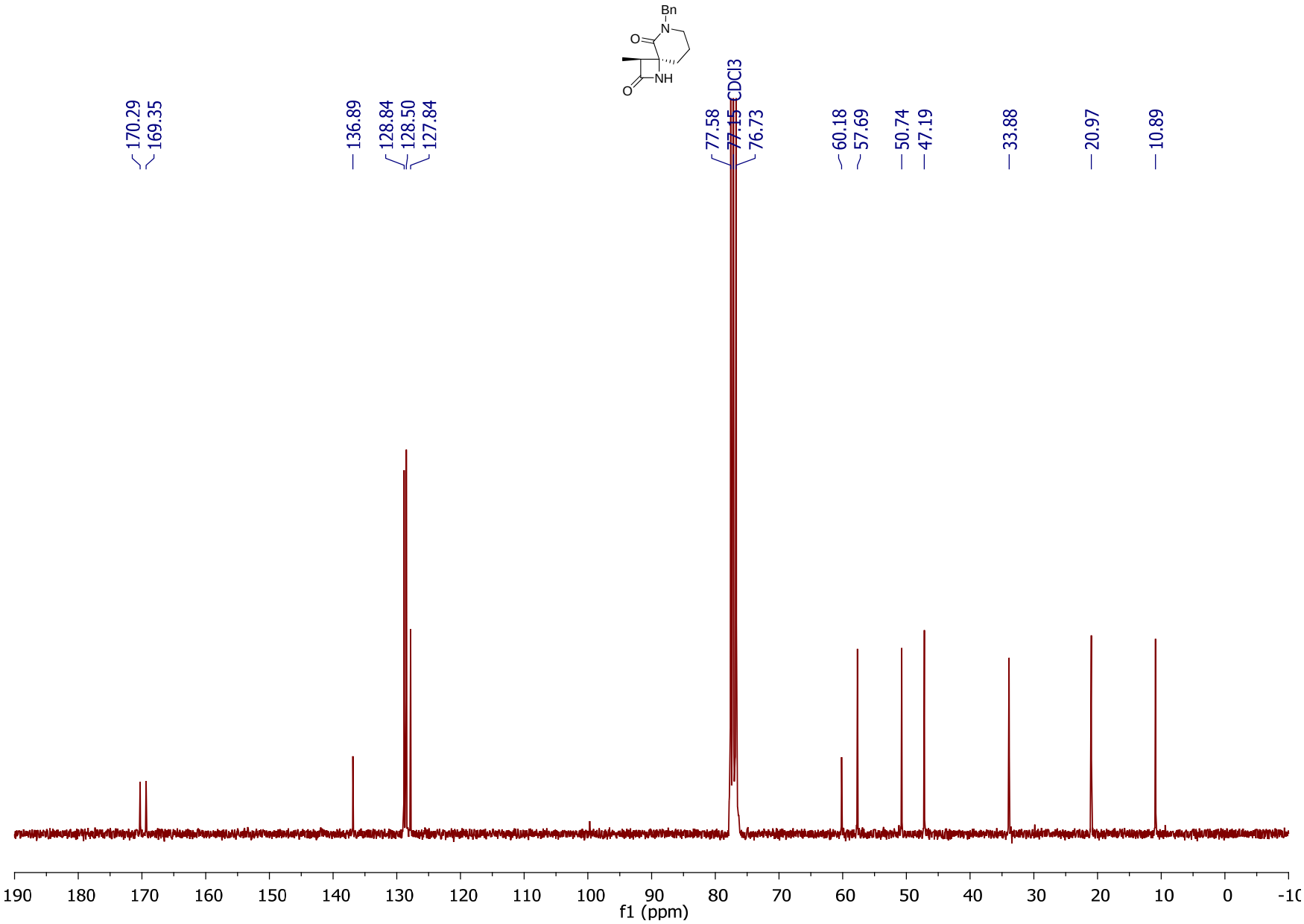
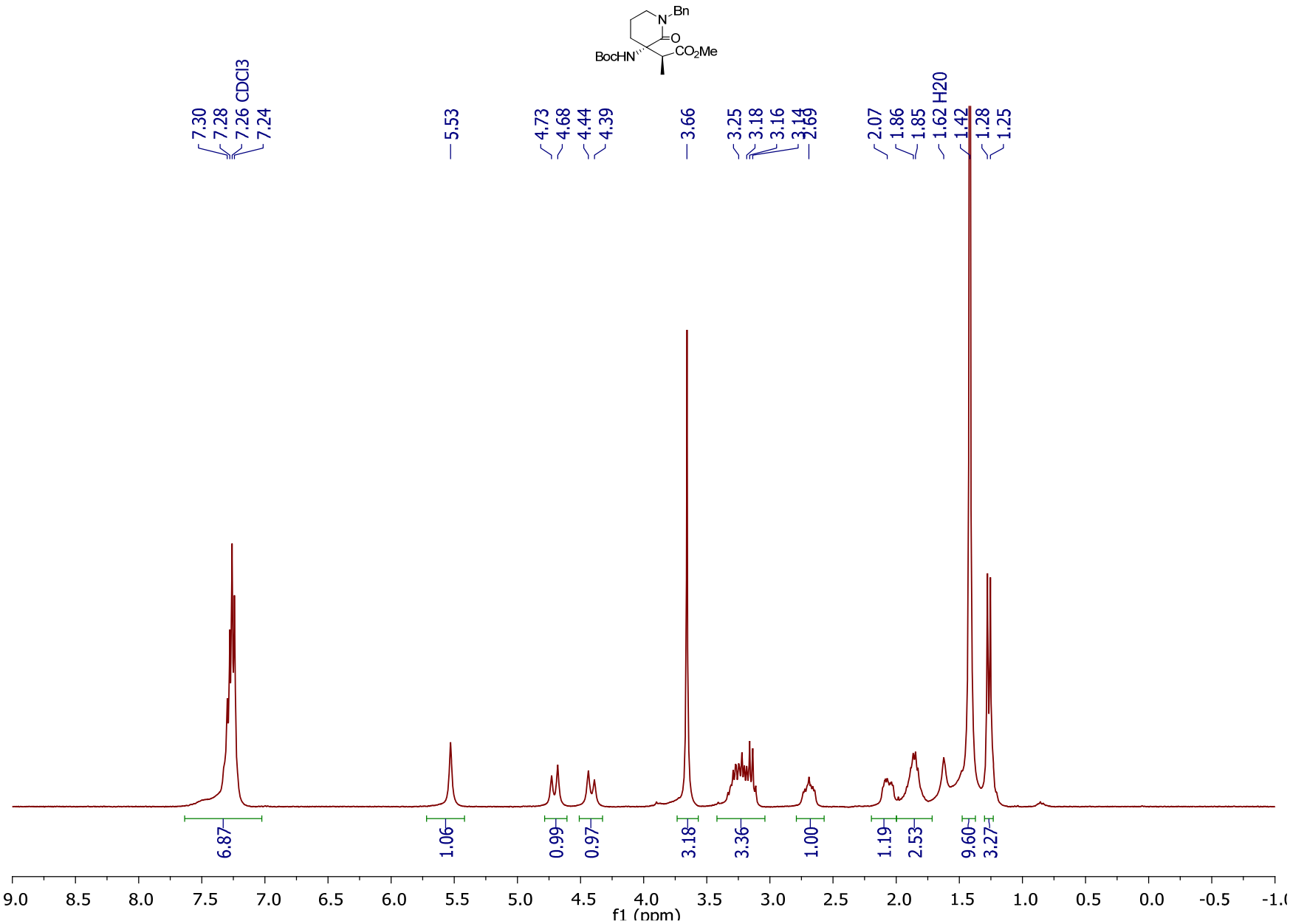


^{13}C-NMR (75 MHz, $CDCl_3$). (3*S*,4*S*)-6-Benzyl-1,6-diazaspiro[3.5]nonane-2,5-dione (13).



^{1}H-NMR (300 MHz, $CDCl_3$).Methyl (2*S*,3*S*)-3-*tert*-butoxycarbonylamino-2-methyl-3-(1'-benzyl-2'-oxopiperidin-3'-yl)propionate (14).



^{13}C-NMR (75 MHz, $CDCl_3$). Methyl (2*S*,3*S*)-3-*tert*-butoxycarbonylamino-2-methyl-3-(1'-benzyl-2'-oxopiperidin-3'-yl)propionate (14).