

Supporting Information for

The asymmetric syntheses of pyrrolizidines, indolizidines and quinolizidines via two sequential tandem ring-closure/*N*-debenzylation processes

Stephen G. Davies,* Ai M. Fletcher, Emma M. Foster, Ian T. T. Houlsby,
Paul M. Roberts, Thomas M. Schofield and James E. Thomson

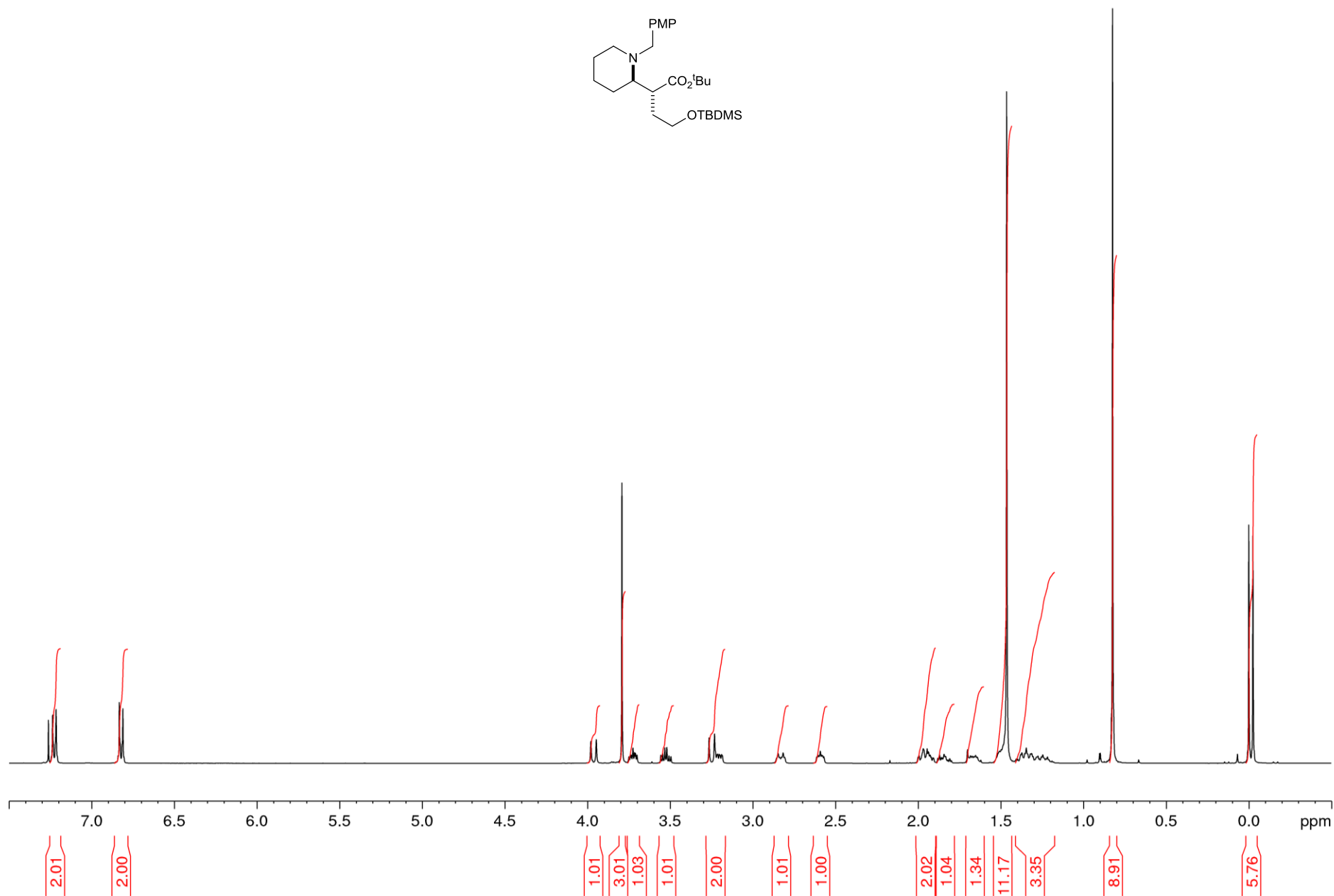
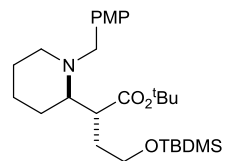
*Department of Chemistry, Chemistry Research Laboratory,
University of Oxford, Mansfield Road, Oxford, OX1 3TA, U.K.*

steve.davies@chem.ox.ac.uk

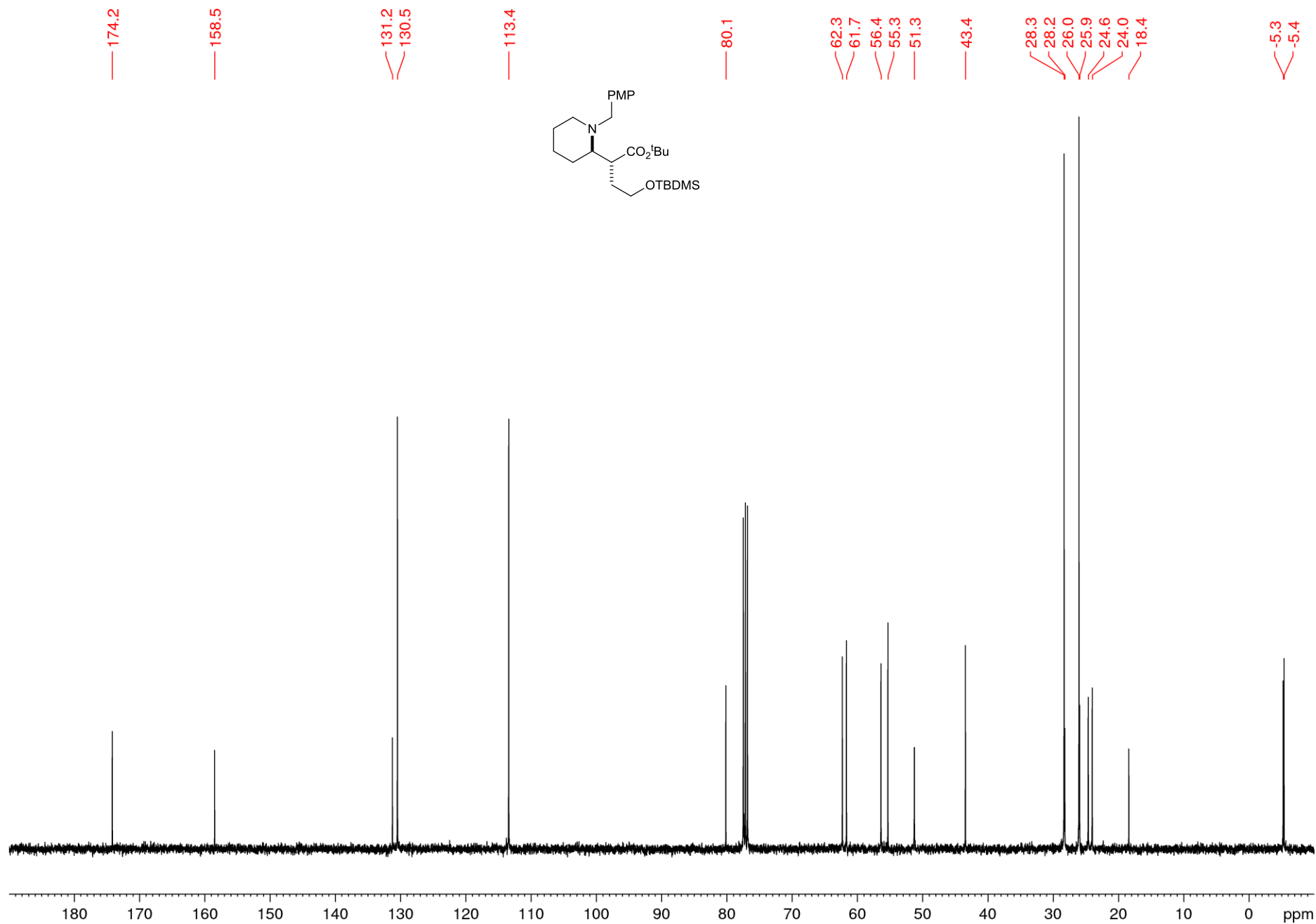
Table of Contents

1. Copies of ^1H and ^{13}C spectra	2–37
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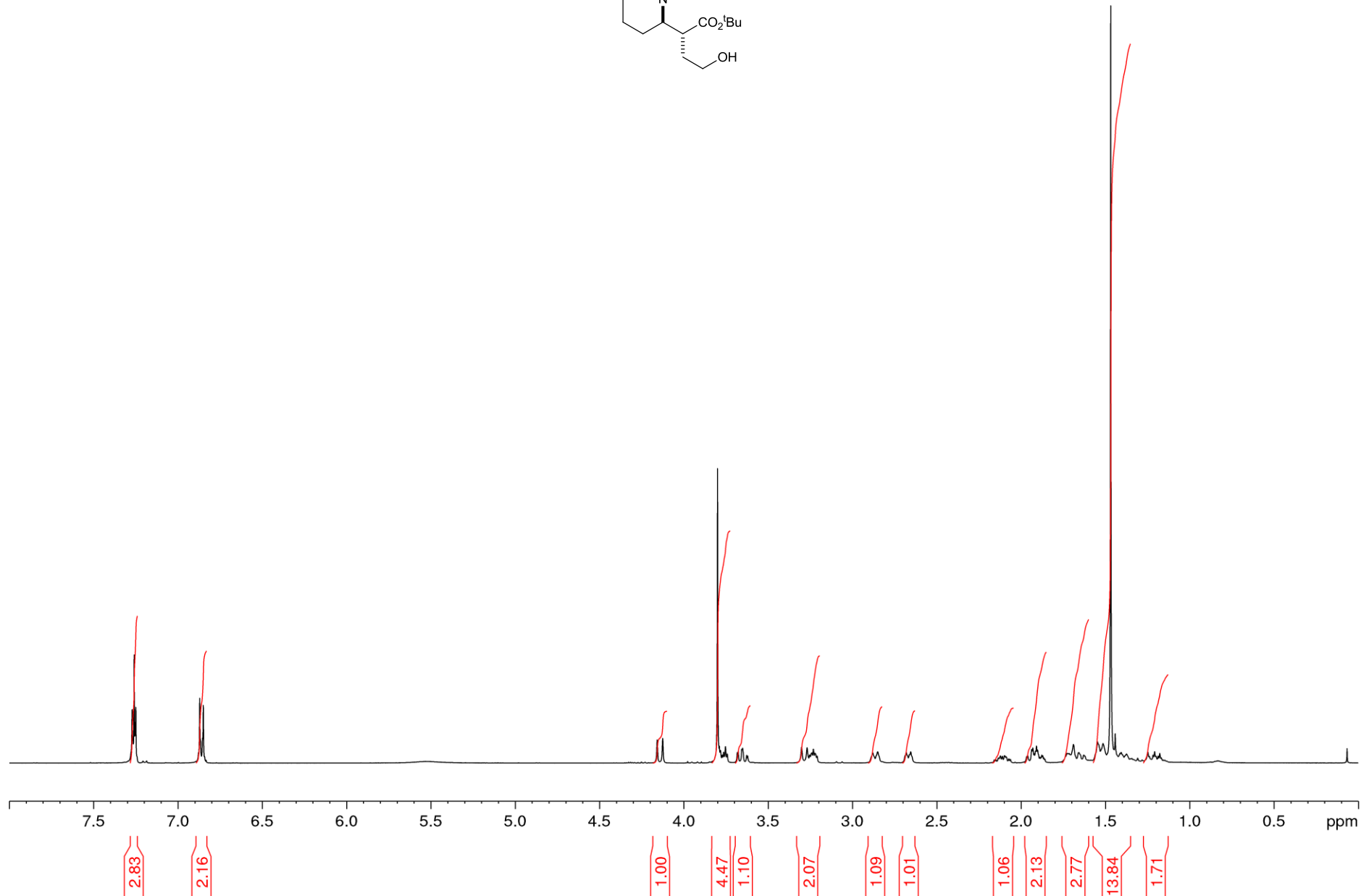
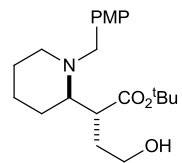
tert-Butyl (*R,R*)-2-[*N*(1')-(*p*-methoxybenzyl)piperidin-2'-yl]-4-(*tert*-butylsilyloxy)butanoate 29 (400 MHz ^1H , CDCl_3)



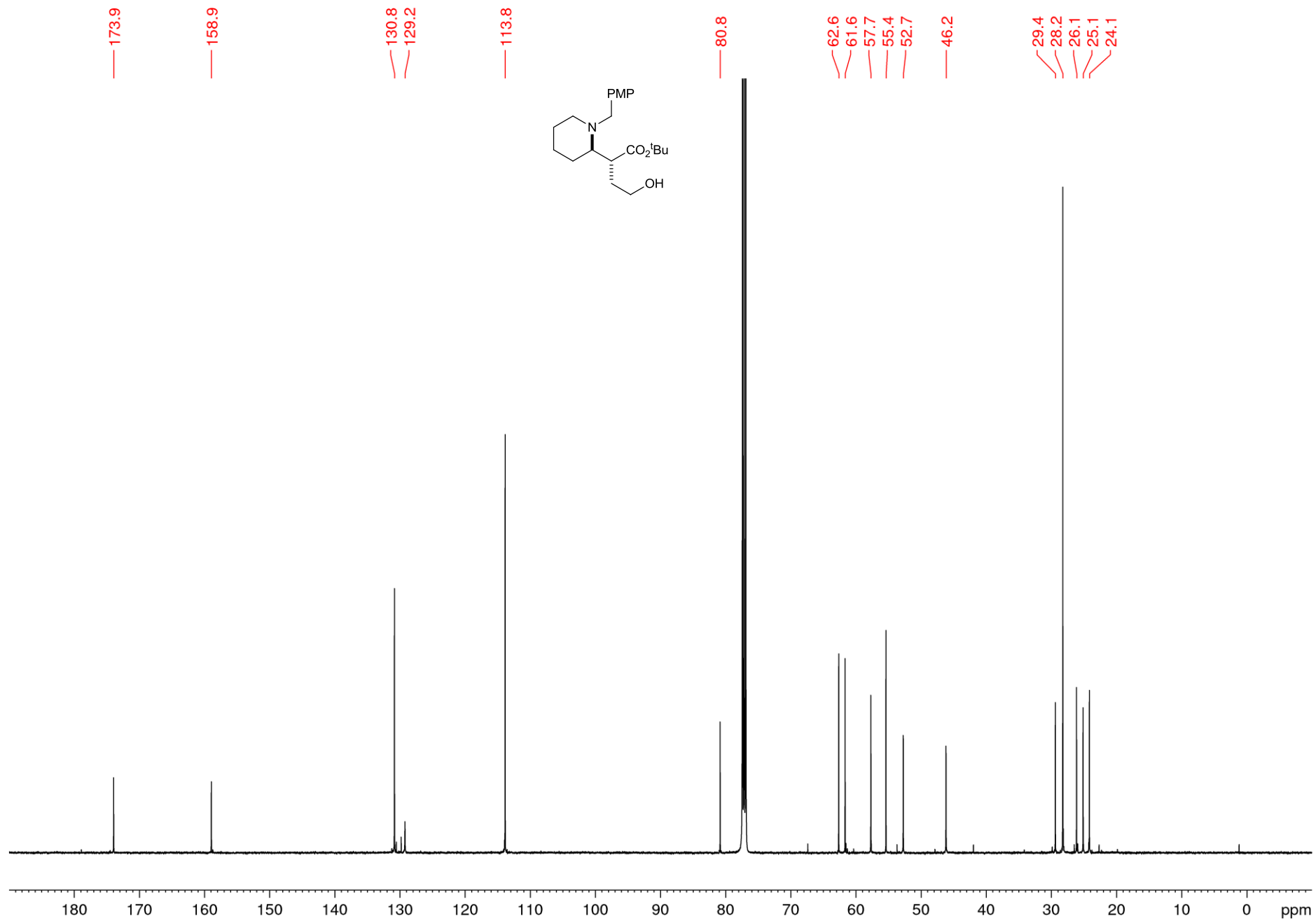
tert-Butyl (*R,R*)-2-[*N*(1')-(*p*-methoxybenzyl)piperidin-2'-yl]-4-(*tert*-butylsilyloxy)butanoate 29 (100 MHz ¹³C, CDCl₃)



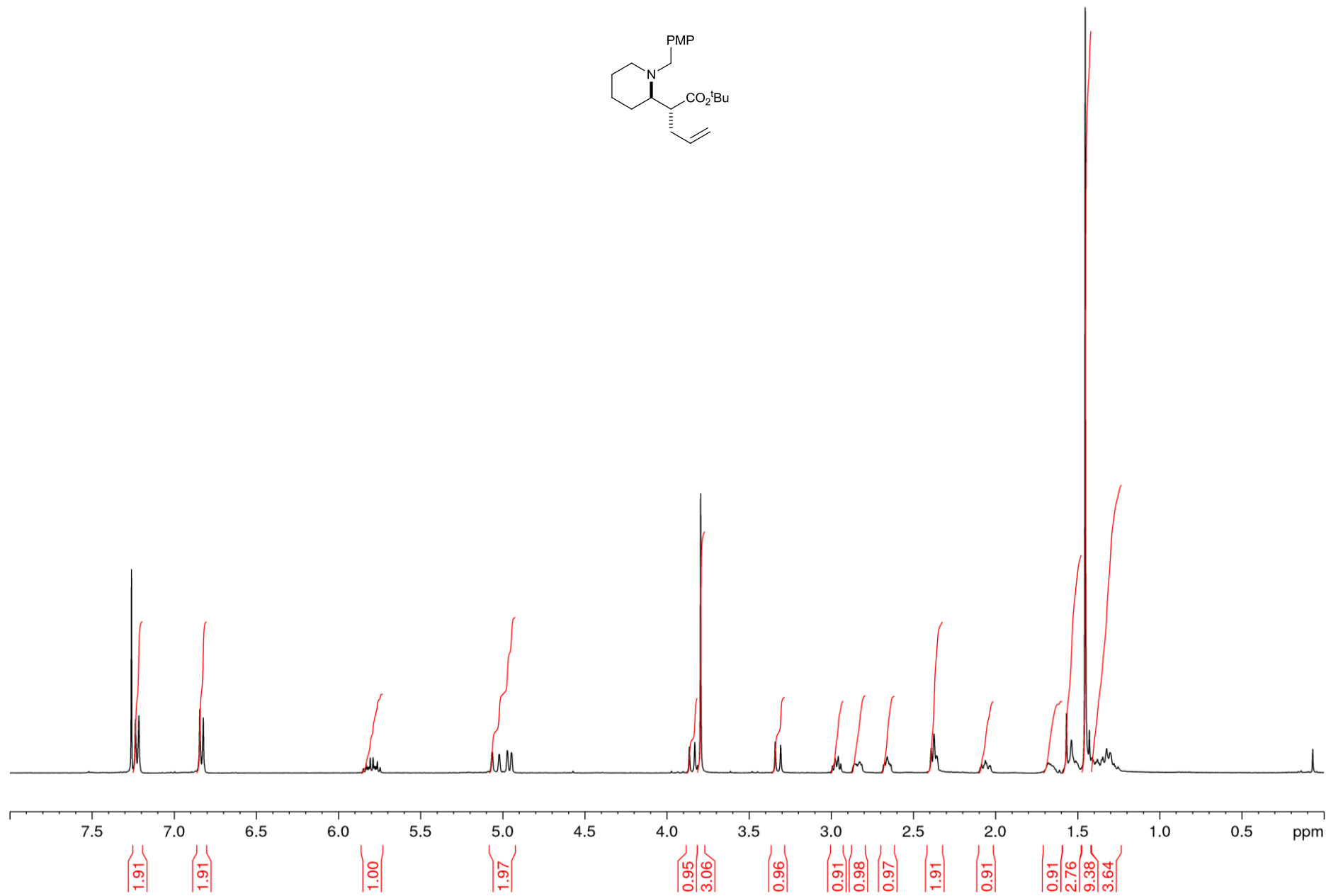
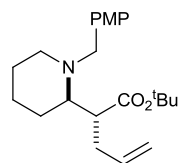
tert-Butyl (*R,R*)-2-[*N*(1')-(*p*-methoxybenzyl)piperidin-2'-yl]-4-hydroxybutanoate **30** (400 MHz ^1H , CDCl_3)



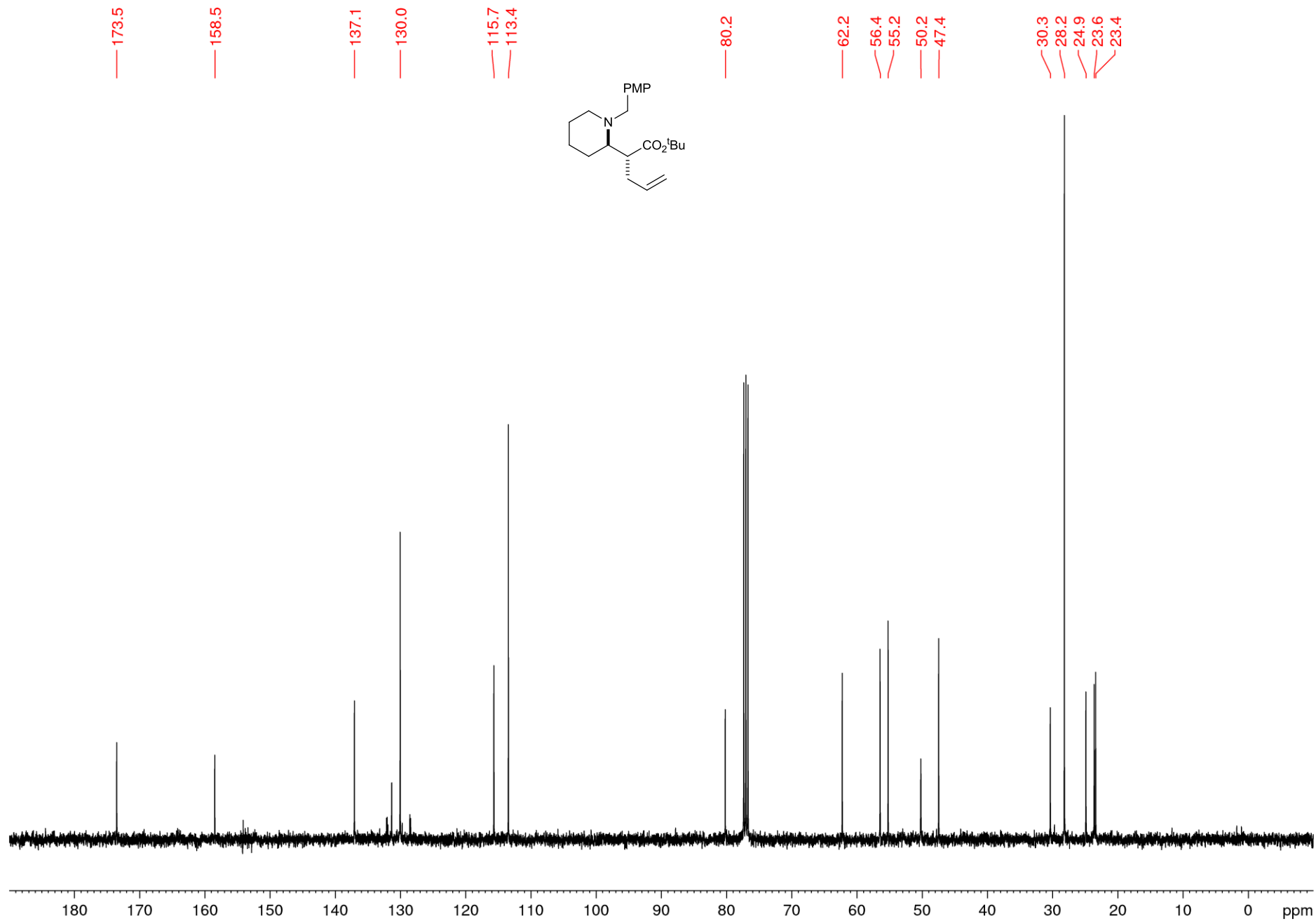
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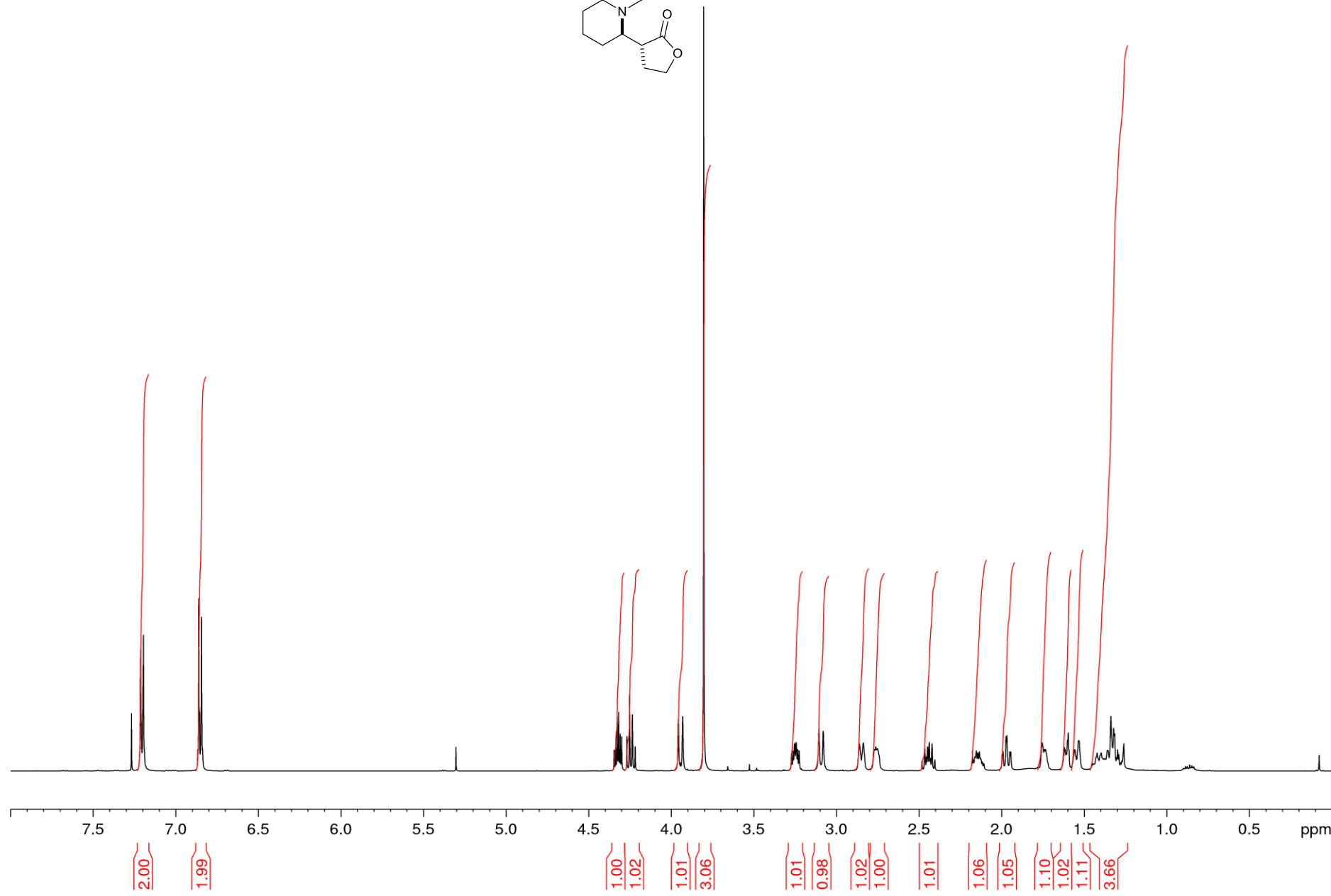
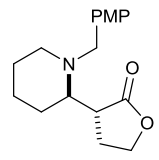
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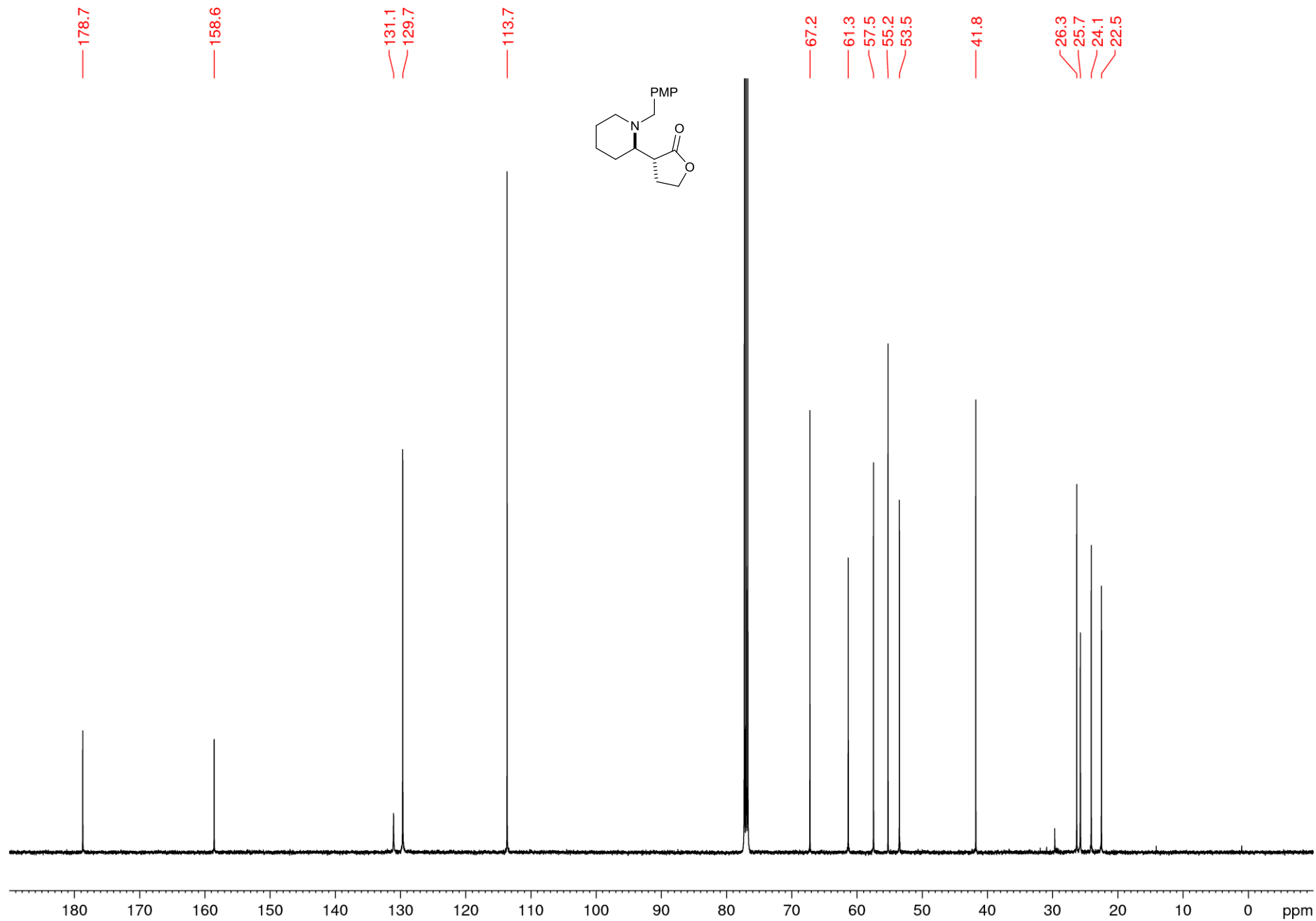
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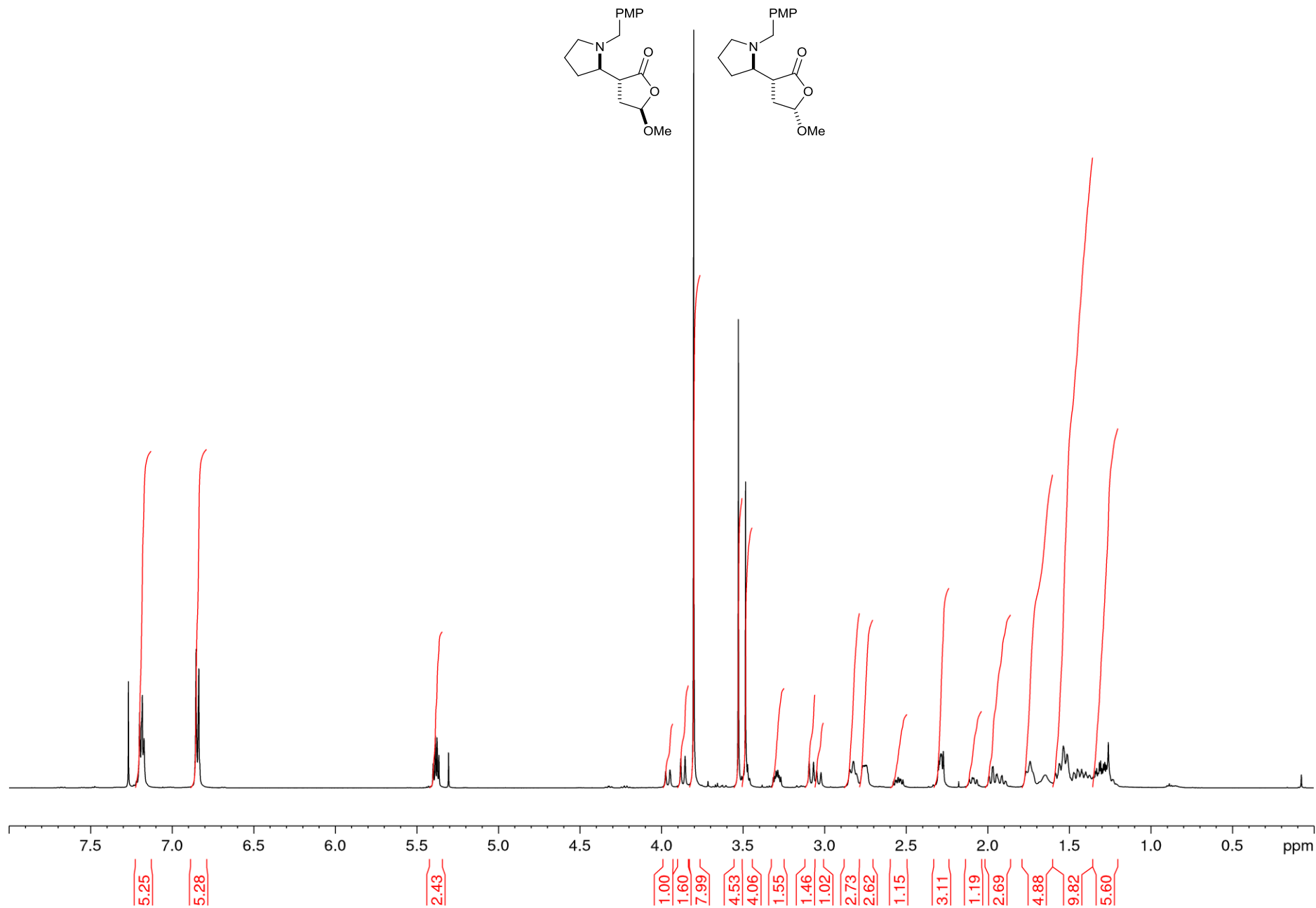
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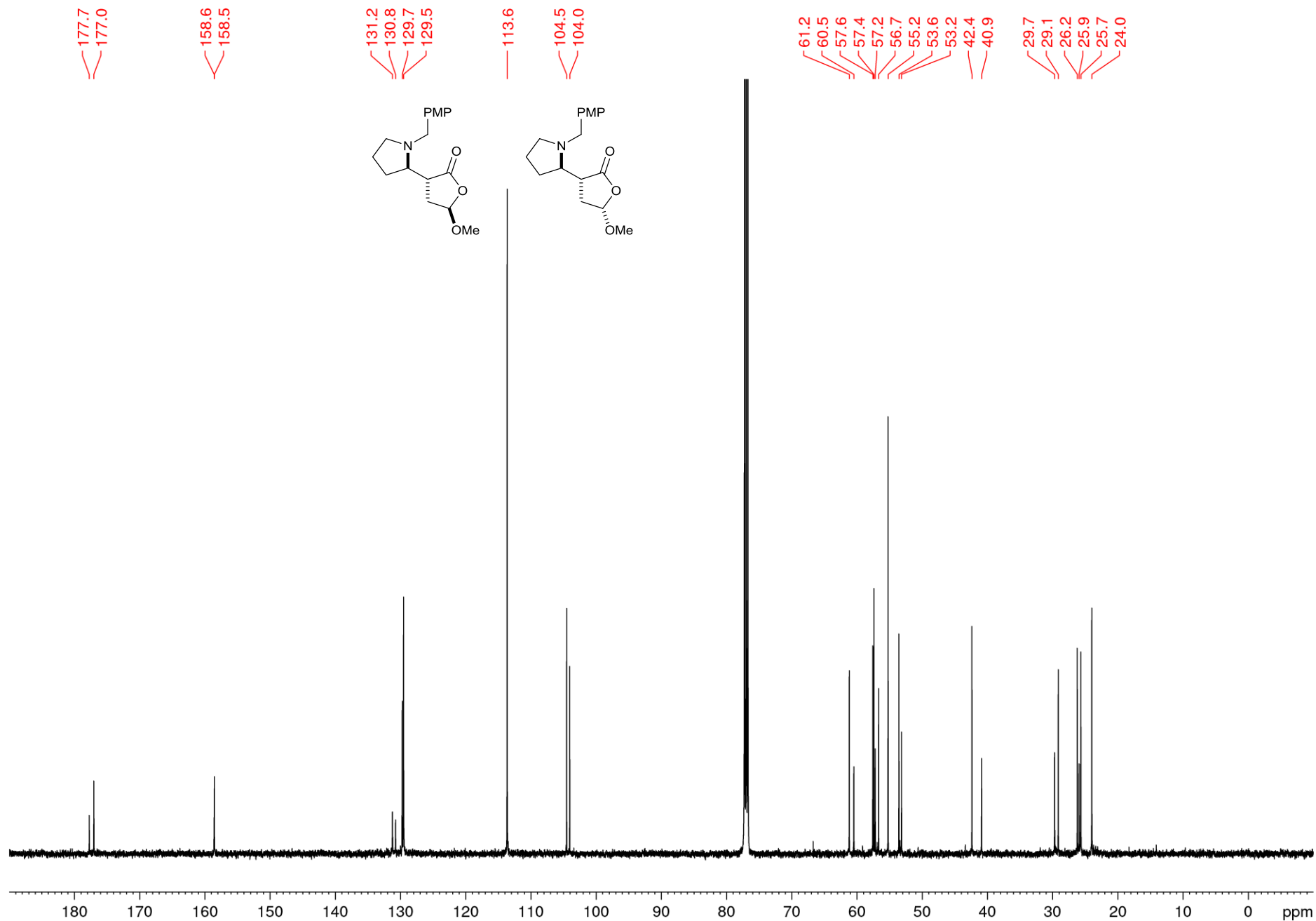
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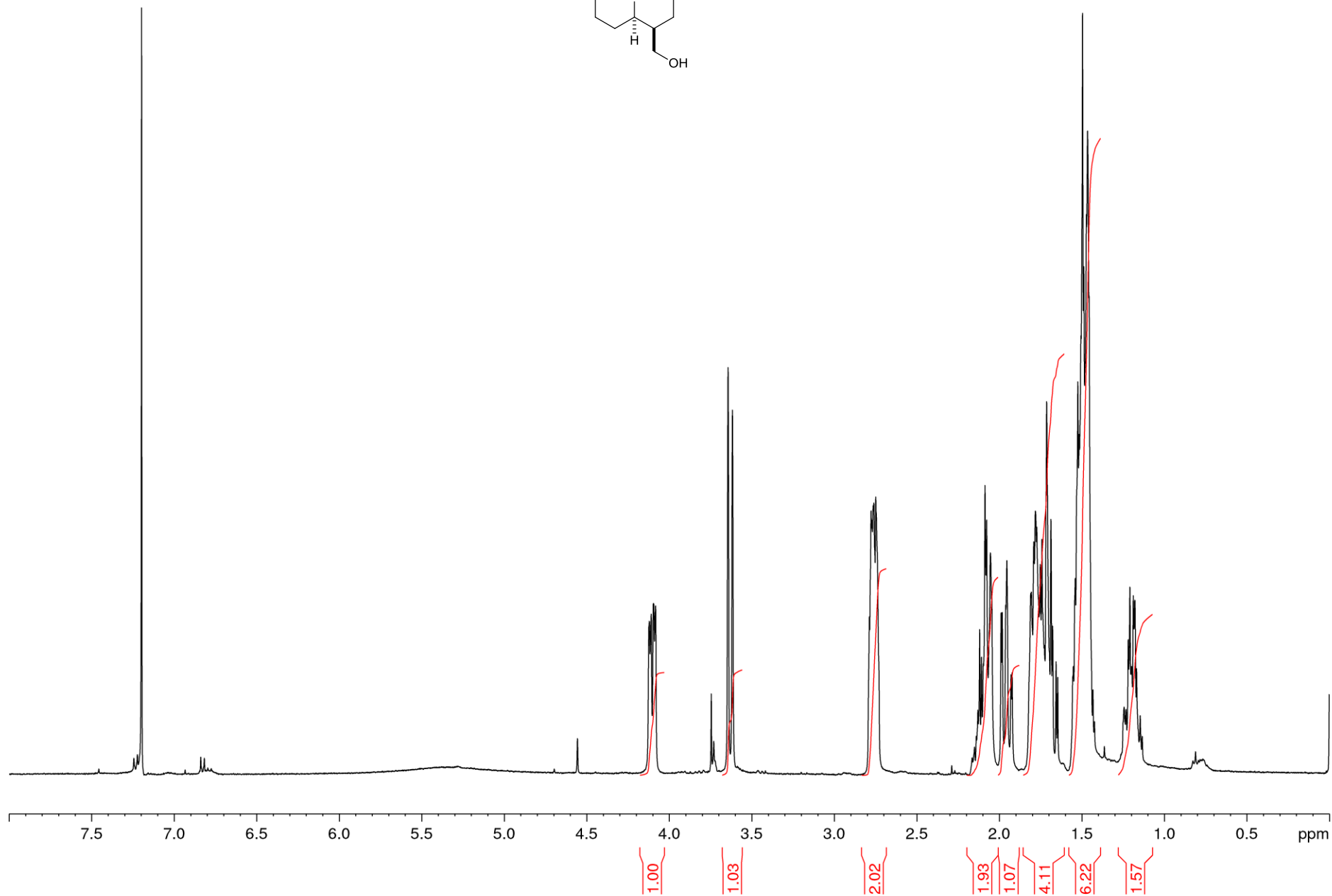
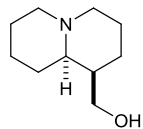
(*R,R,R*)- and (*3R,5R,2'S*)-3-[*N*(1')-(*p*-methoxybenzyl)piperidin-2'-yl]-5-methoxydihydrofuran-2(*3H*)-one 33 and 34 (500 MHz ¹H, CDCl₃)



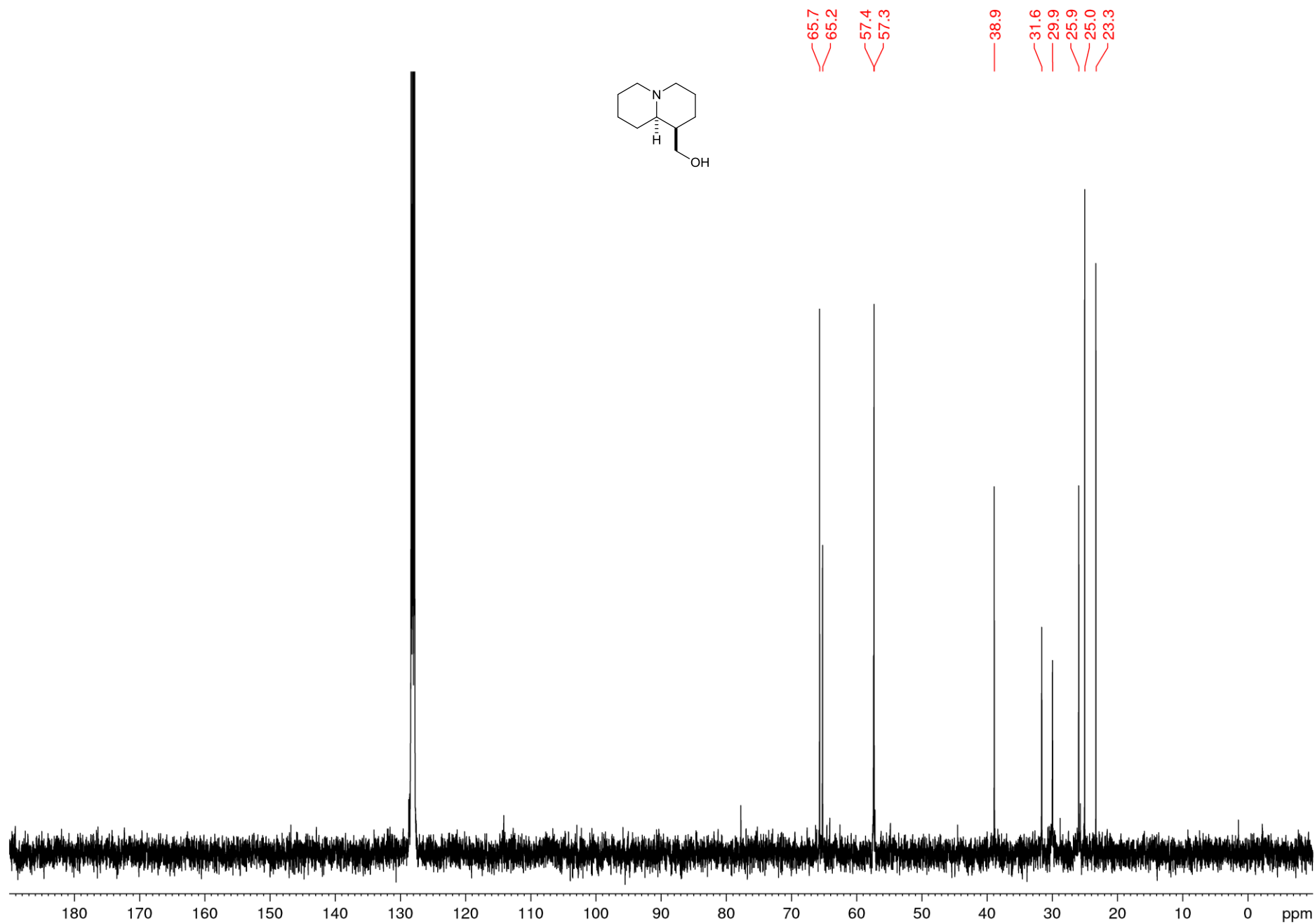
(*R,R,R*)- and (*3R,5R,2'S*)-3-[*N*(1')-(*p*-methoxybenzyl)piperidin-2'-yl]-5-methoxydihydrofuran-2(*3H*)-one 33 and 34 (125 MHz ^{13}C , CDCl_3)



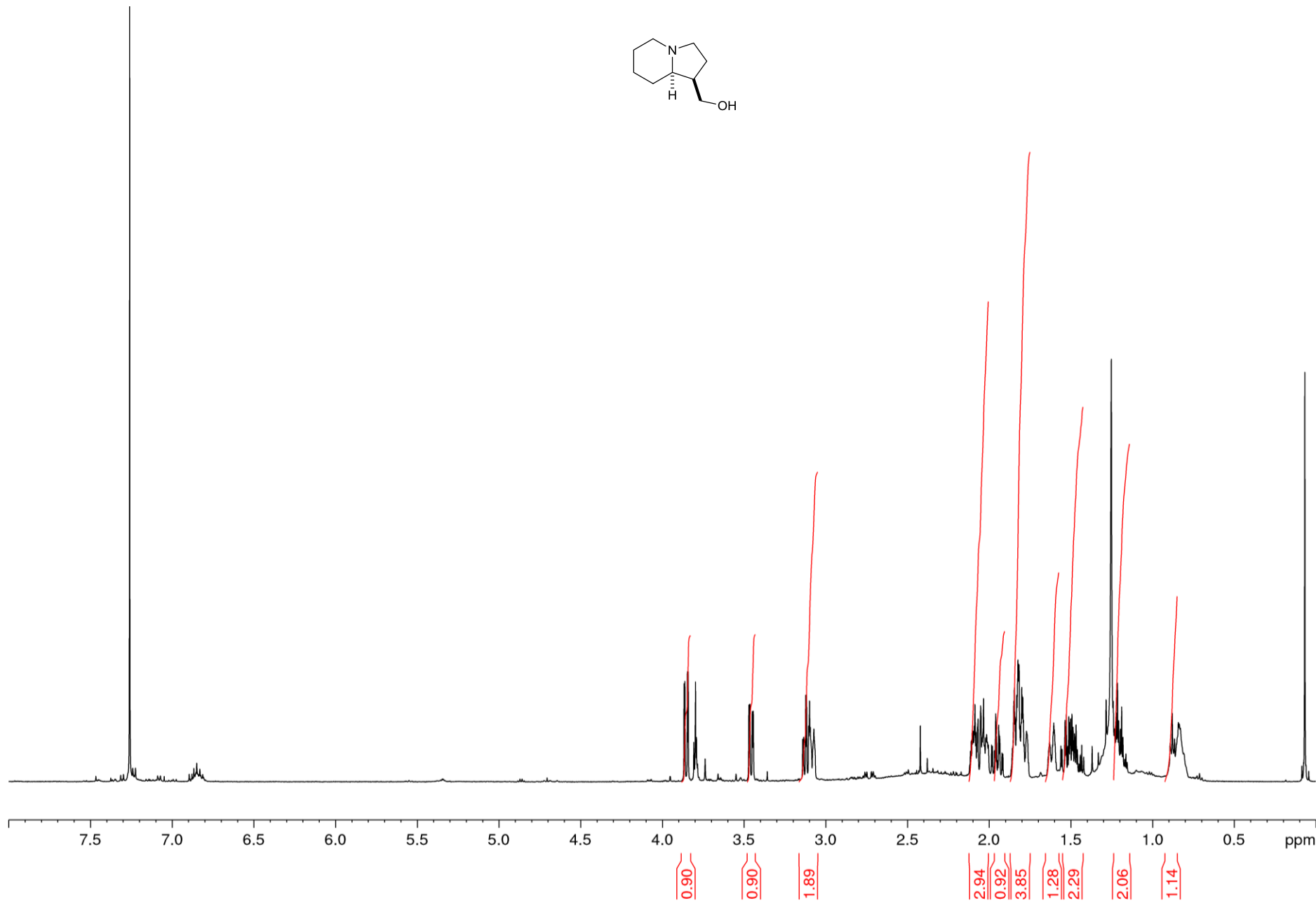
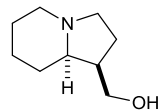
(*R,R*)-1-(Hydroxymethyl)octahydro-1*H*-quinolizidine [(-)-lupinine] 14 (400 MHz ^1H , CDCl_3)



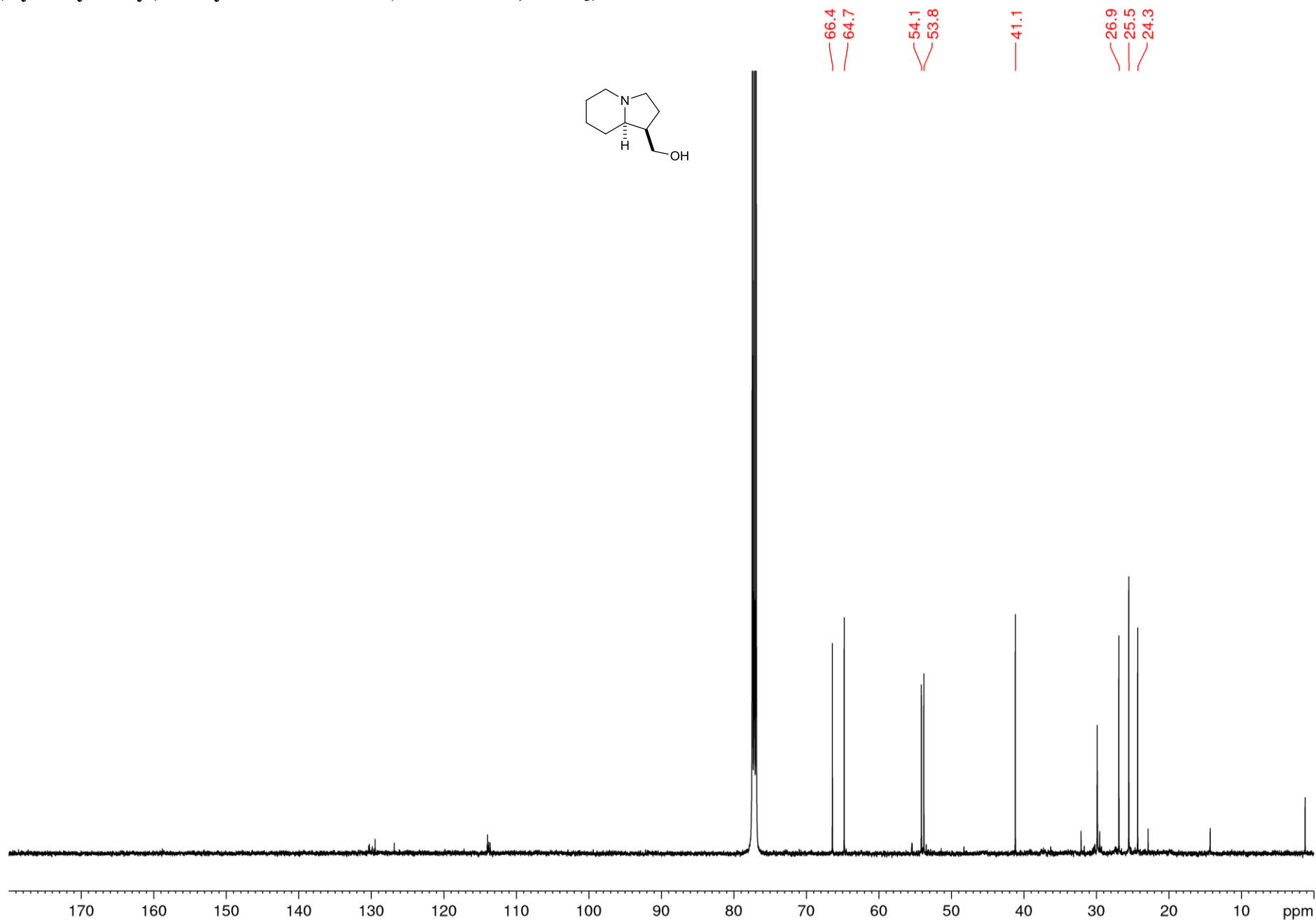
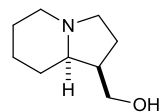
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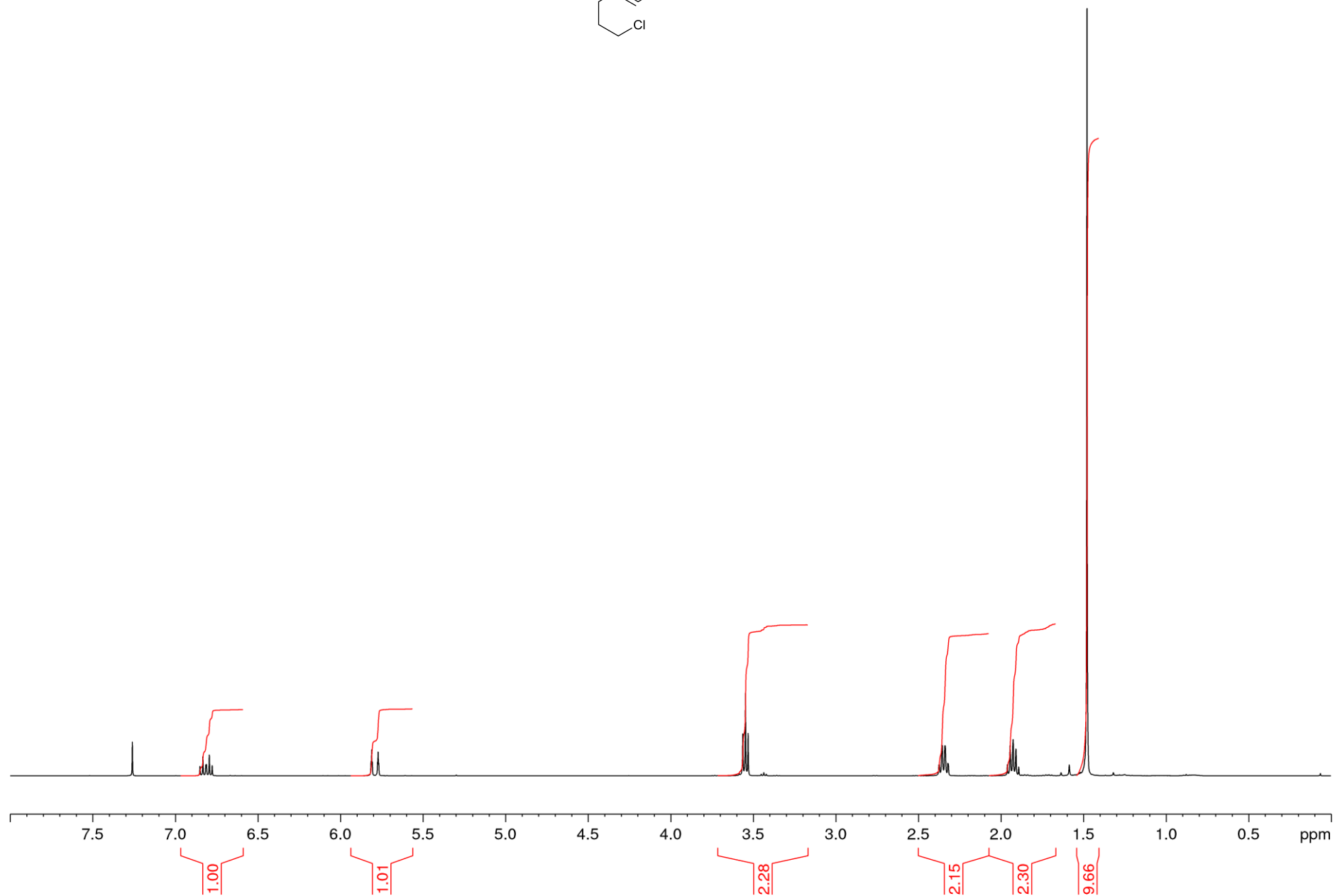
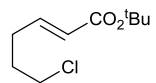
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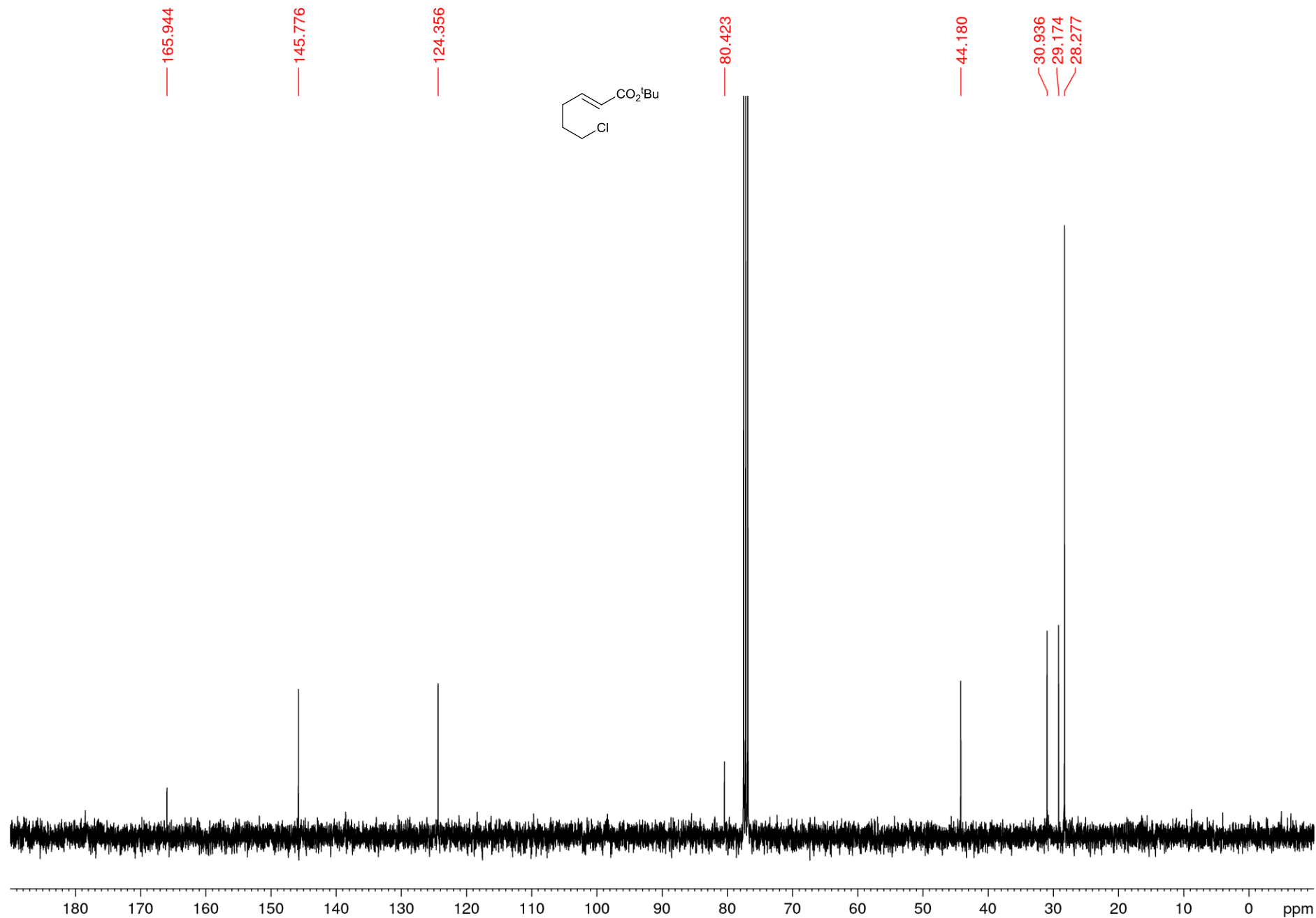
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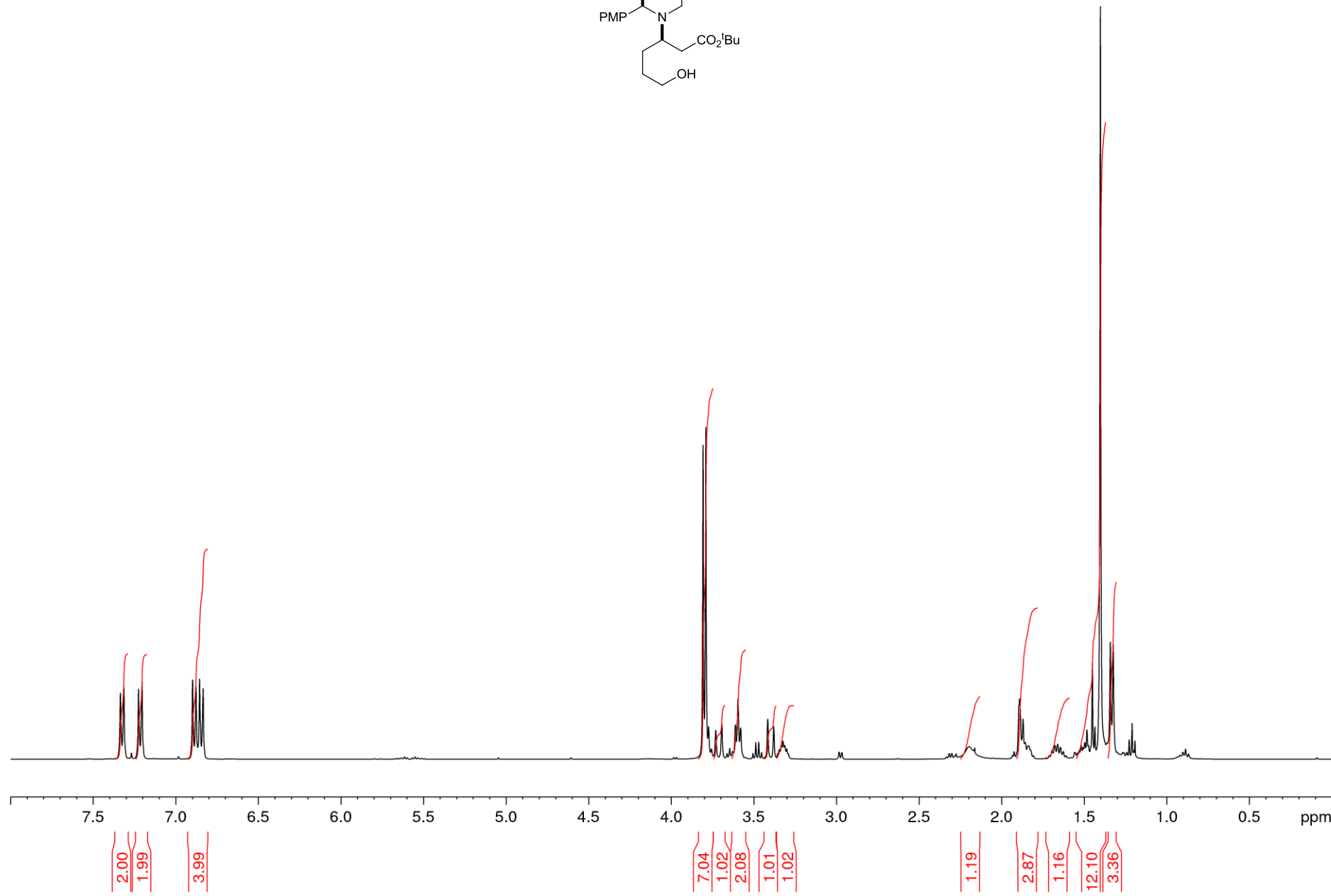
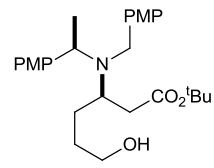
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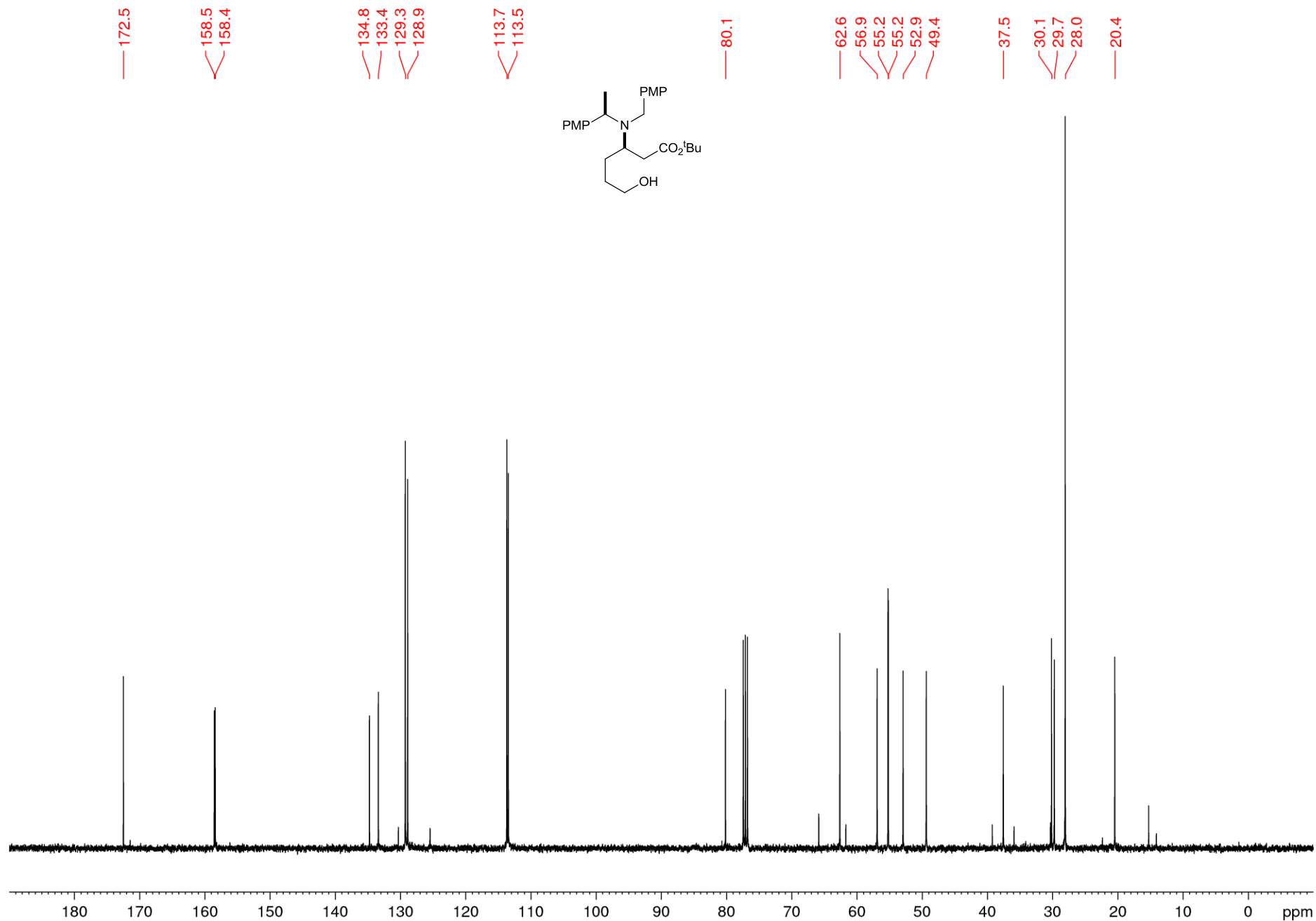
tert-Butyl (*E*)-6-chlorohex-2-enoate **39** (100 MHz ^{13}C , CDCl_3)



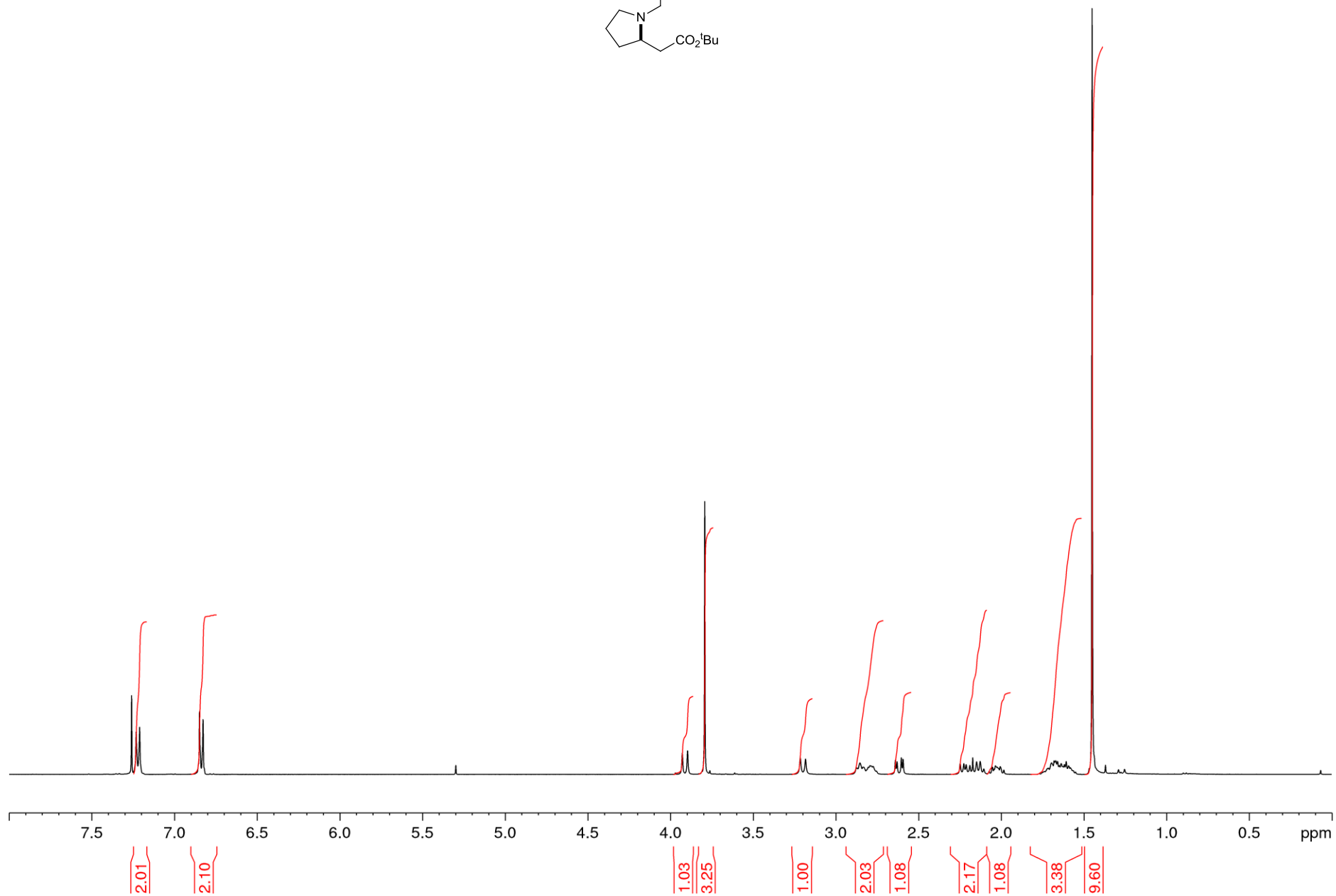
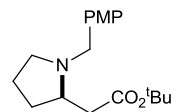
tert-Butyl (*R,R*)-3-[*N*-(*p*-methoxybenzyl)-*N*-(α -methyl-*p*-methoxybenzyl)amino]-6-hydroxyhexanoate 42 (400 MHz ^1H , CDCl_3)



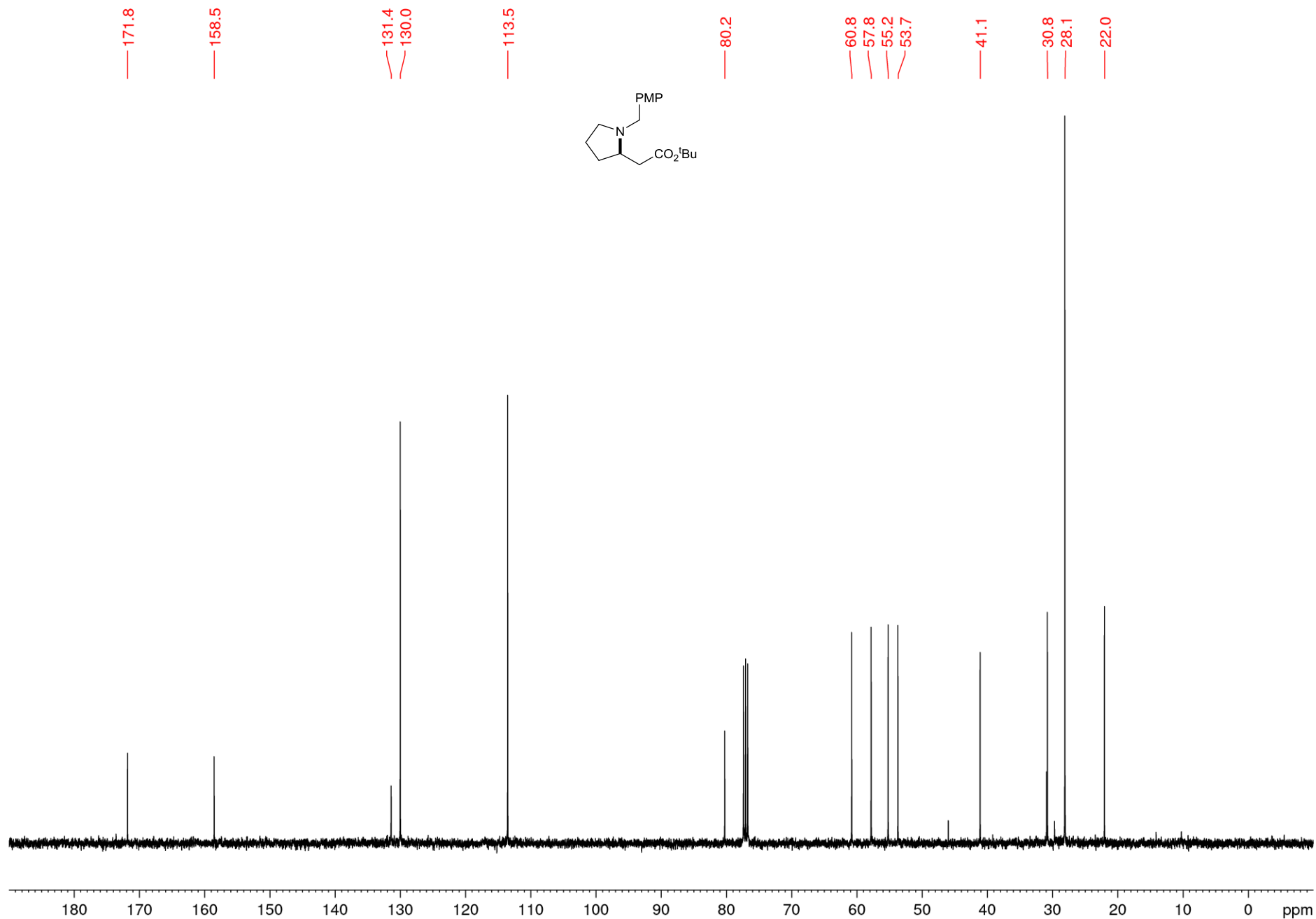
tert-Butyl (*R,R*)-3-[*N*-(*p*-methoxybenzyl)-*N*-(α -methyl-*p*-methoxybenzyl)amino]-6-hydroxyhexanoate 42 (100 MHz ^{13}C , CDCl_3)



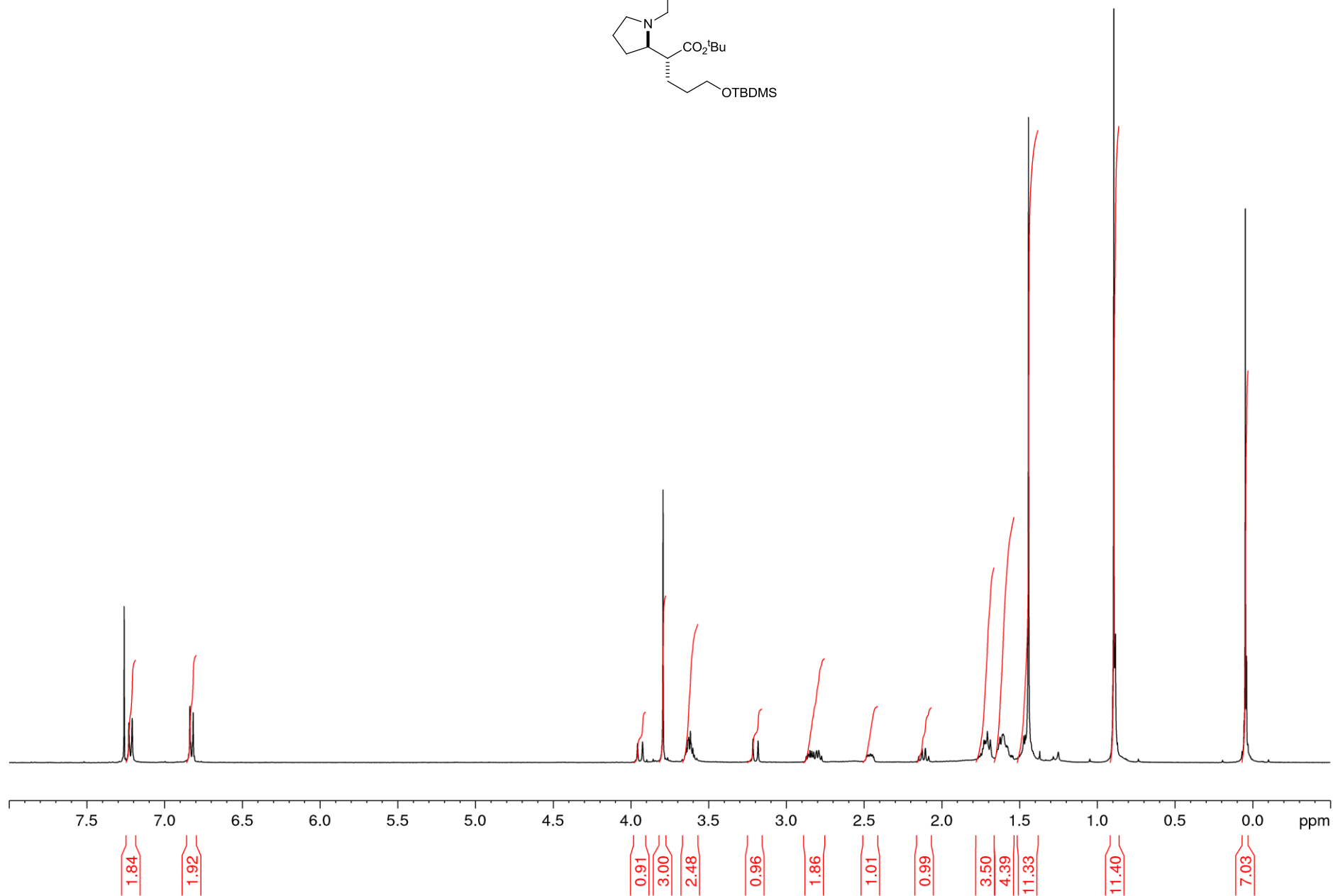
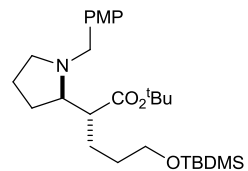
tert-Butyl (*R*)-2-[*N*(1')-(*p*-methoxybenzyl)pyrrolidin-2'-yl]acetate **45** (400 MHz ^1H , CDCl_3)



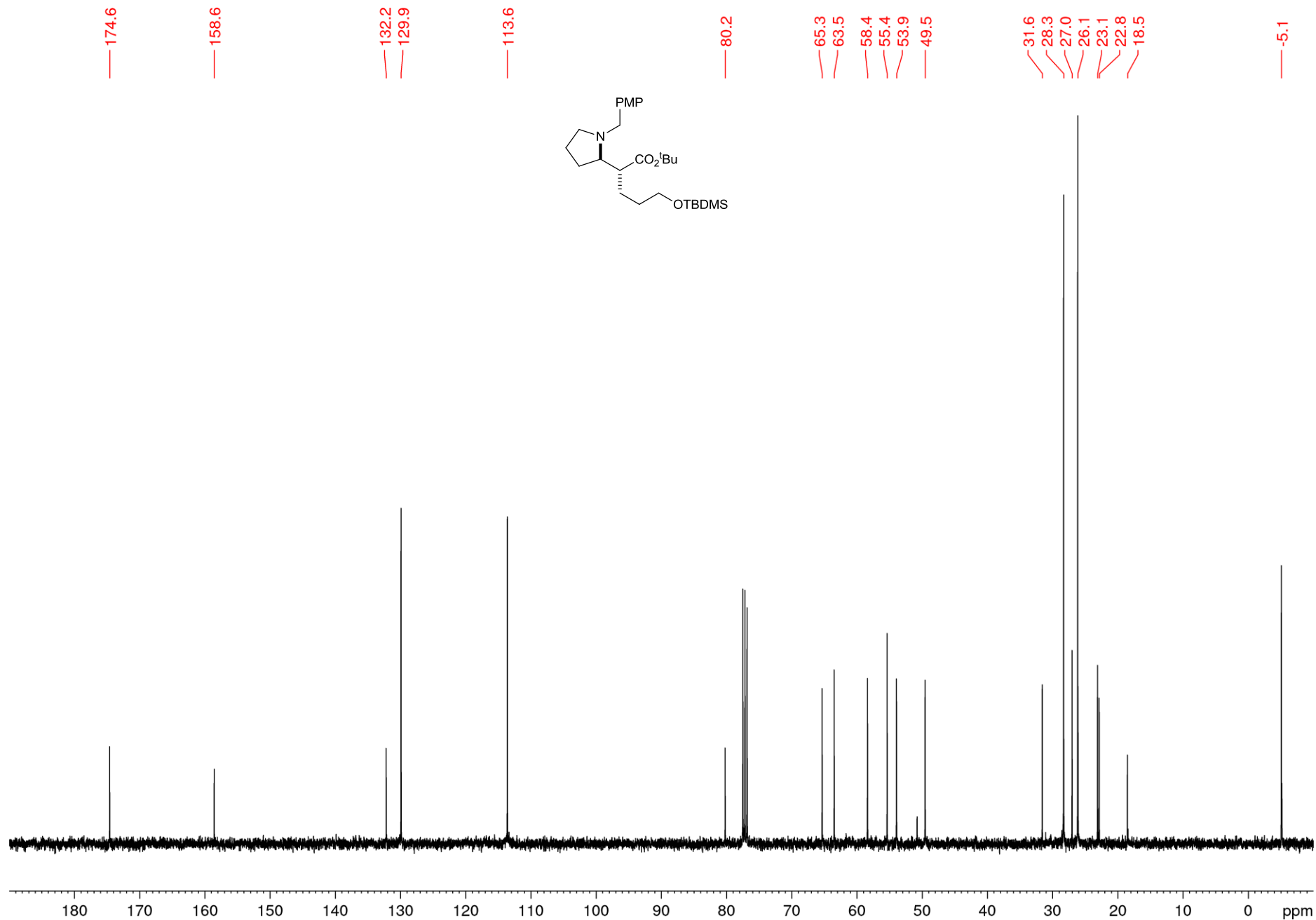
tert-Butyl (*R*)-2-[*N*(1')-(*p*-methoxybenzyl)pyrrolidin-2'-yl]acetate **45** (100 MHz ^{13}C , CDCl_3)



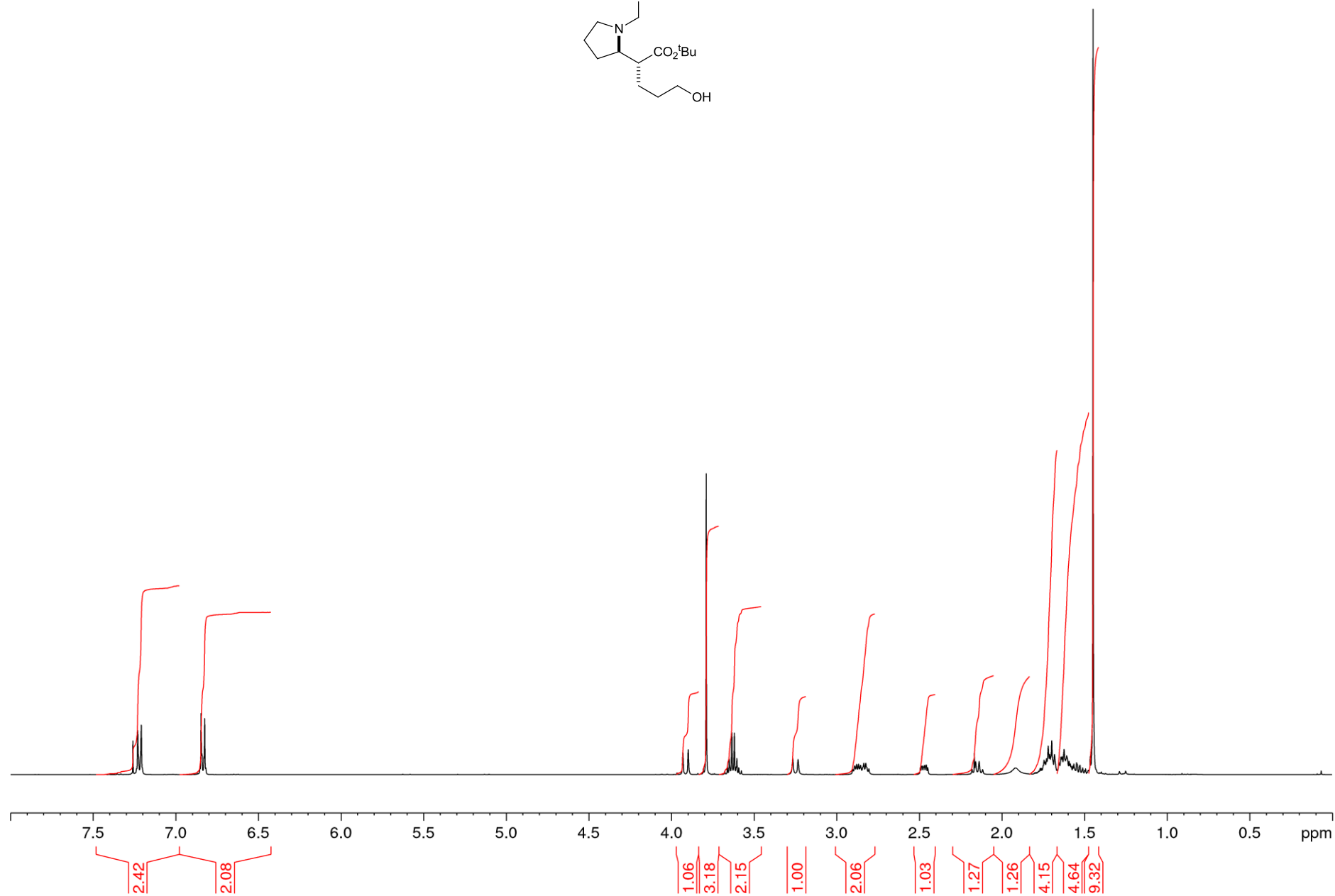
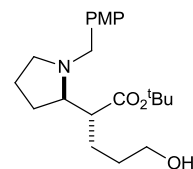
tert-Butyl (*R,R*)-2-[*N*(1')-(*p*-methoxybenzyl)pyrrolidin-2'-yl]-5-(*tert*-butyldimethylsiloxy)pentanoate **46** (400 MHz ^1H , CDCl_3)



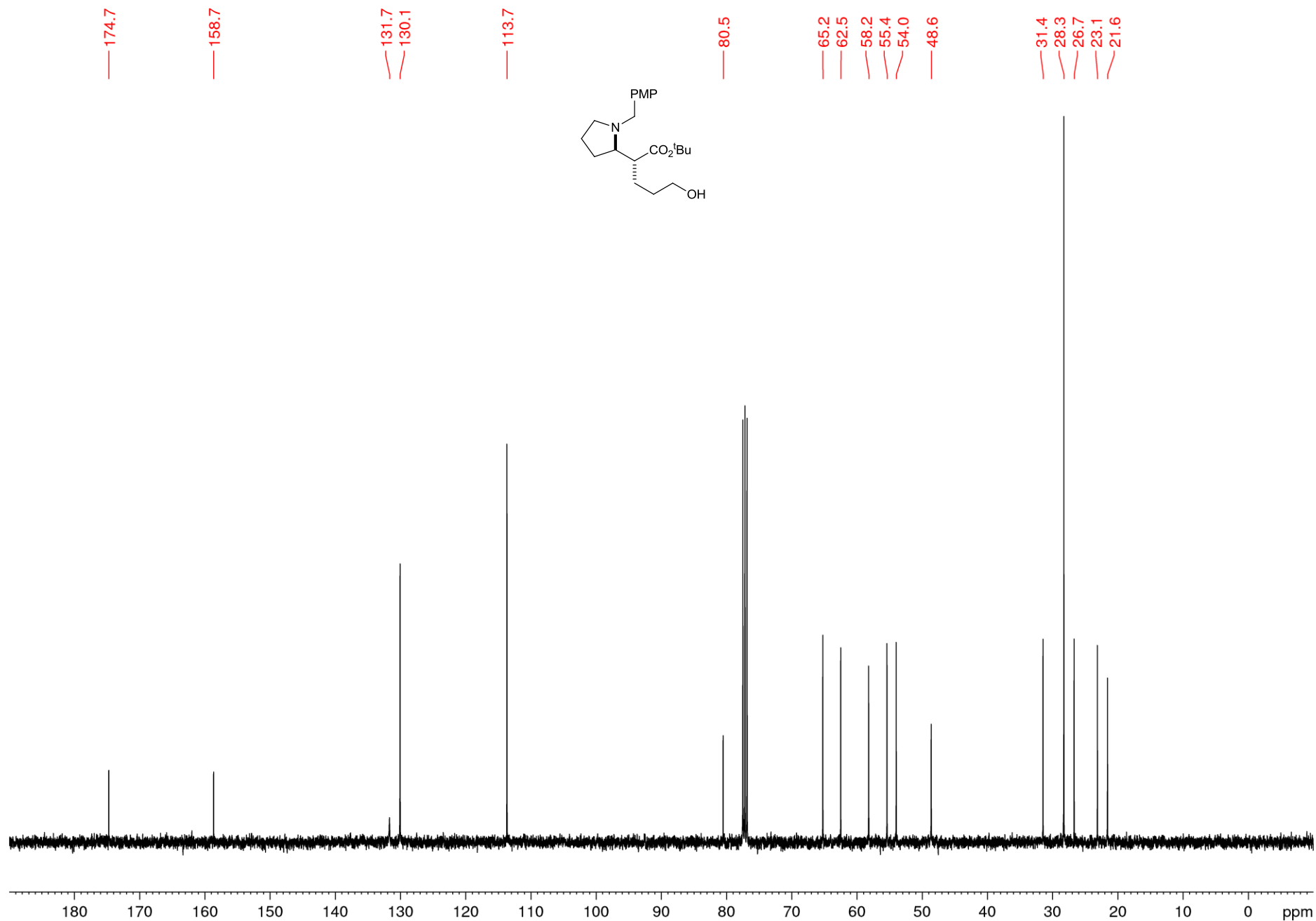
tert-Butyl (*R,R*)-2-[*N*(1')-(*p*-methoxybenzyl)pyrrolidin-2'-yl]-5-(*tert*-butyldimethylsiloxy)pentanoate **46** (100 MHz ^{13}C , CDCl_3)



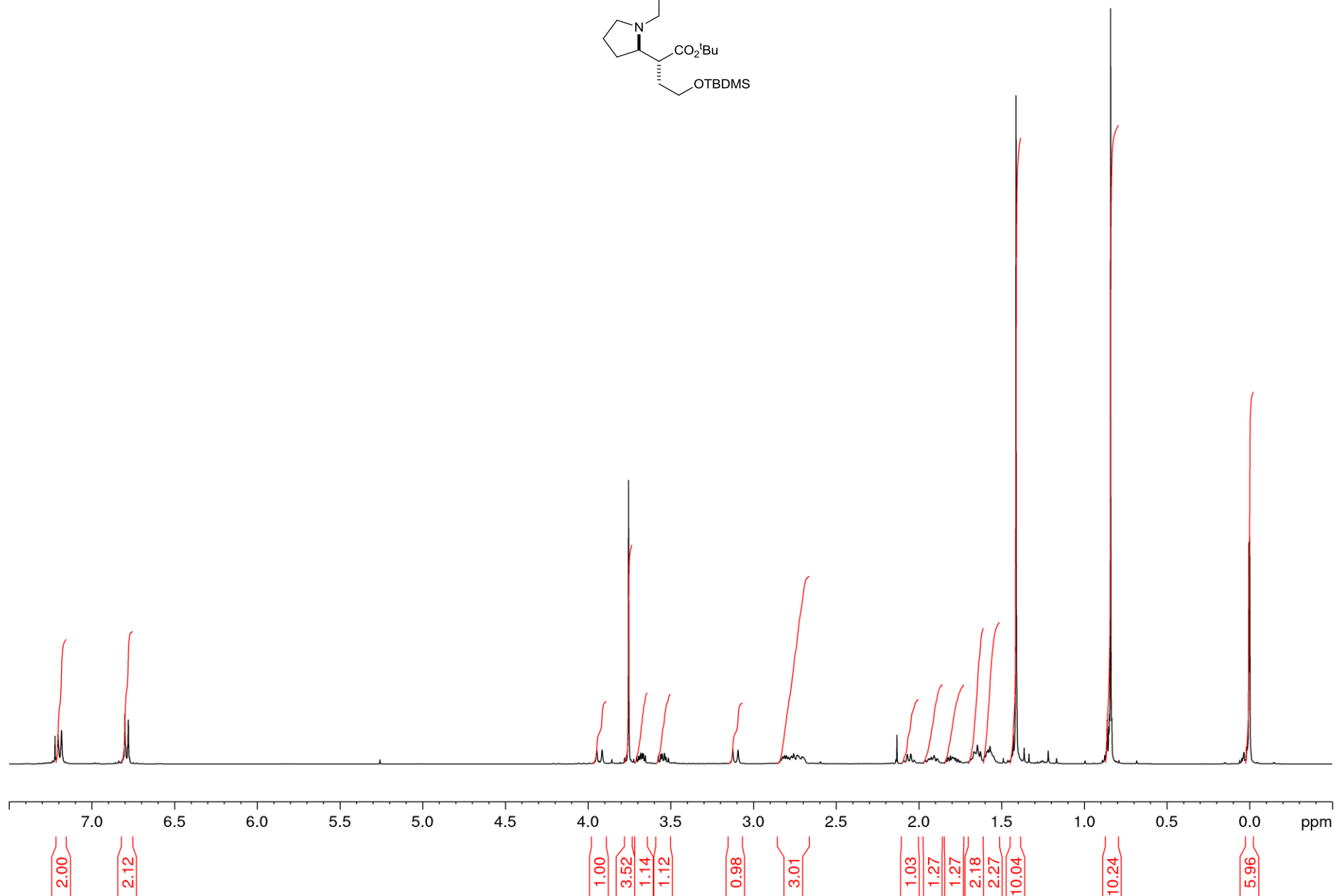
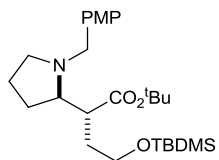
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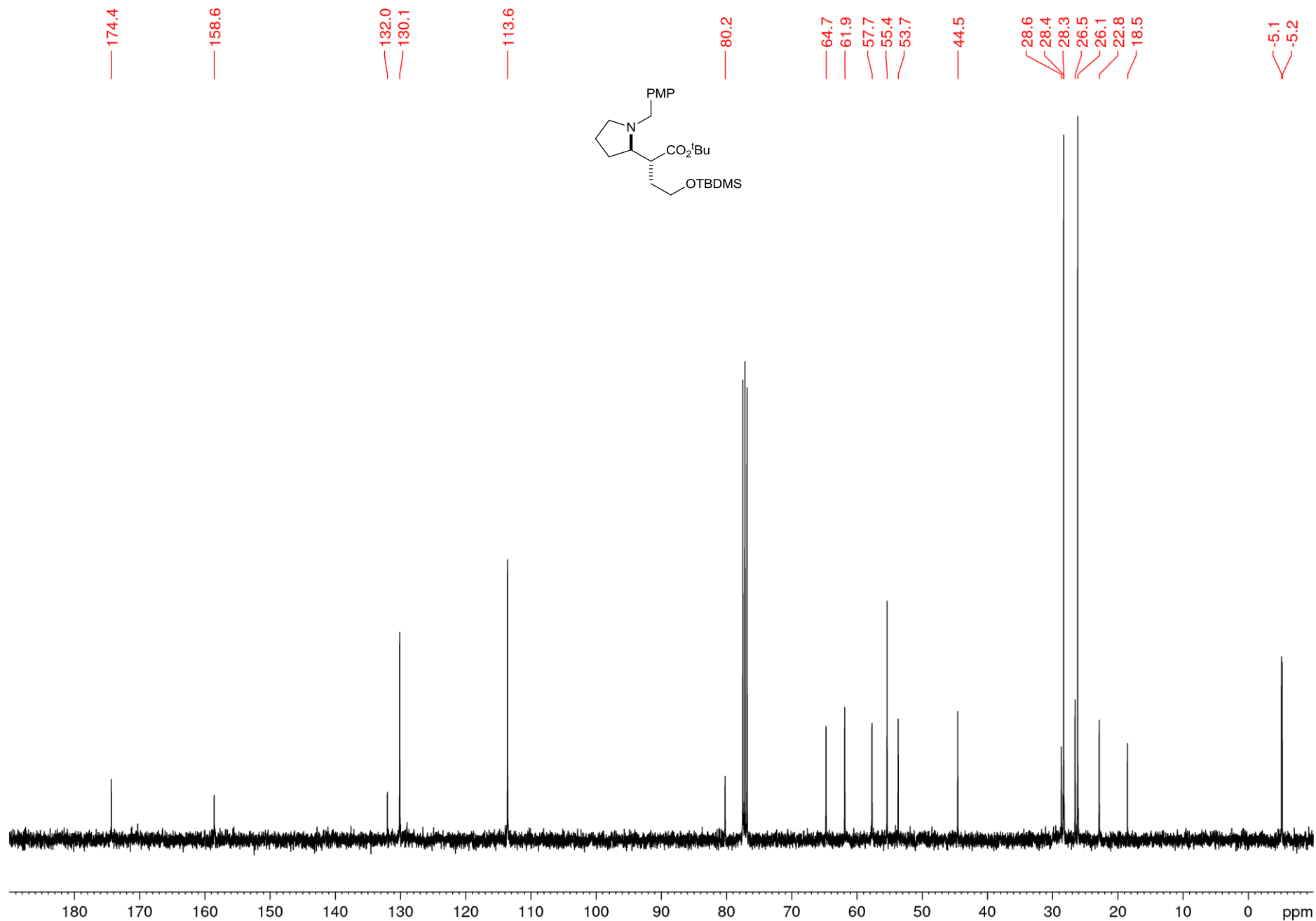
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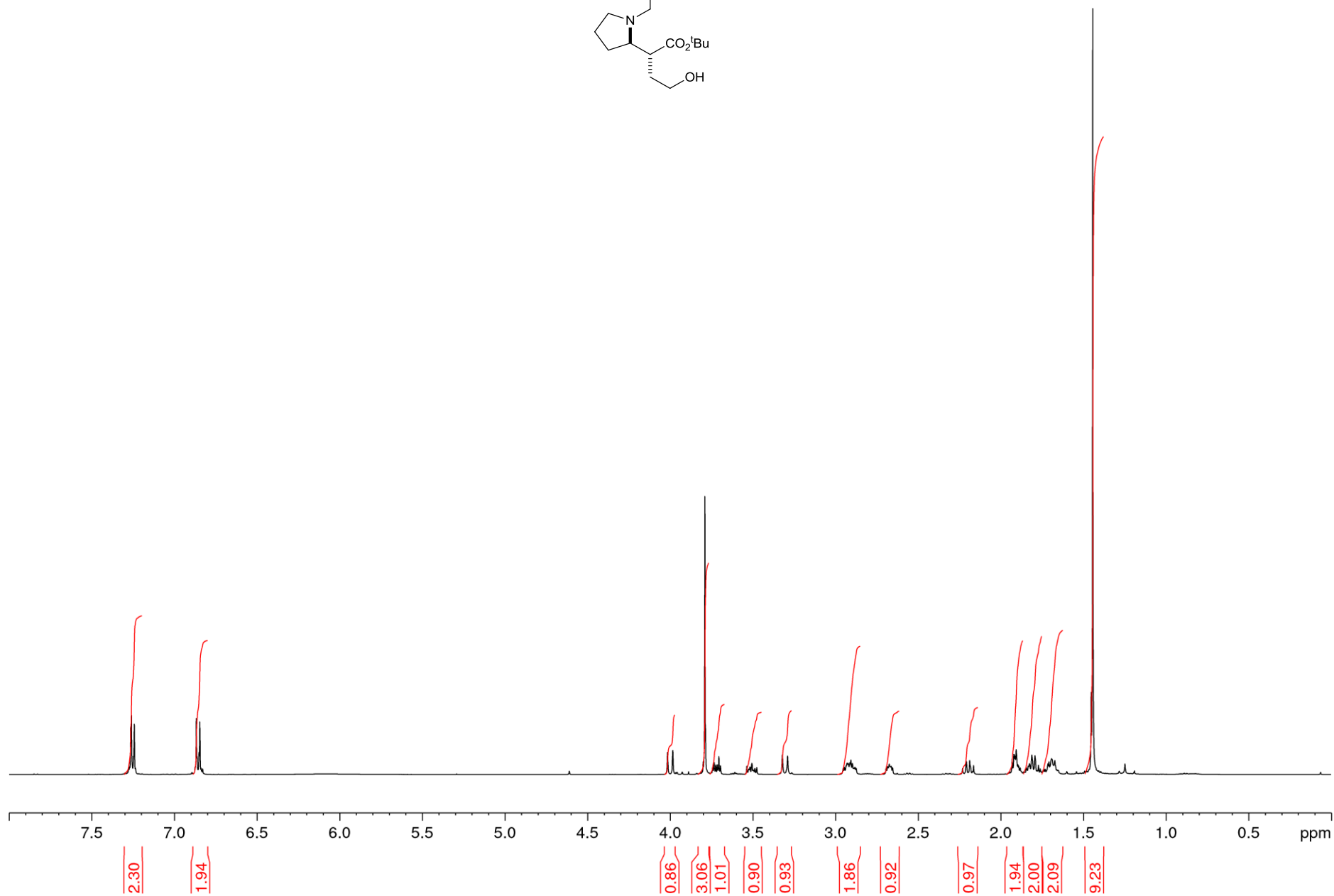
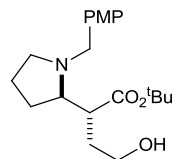
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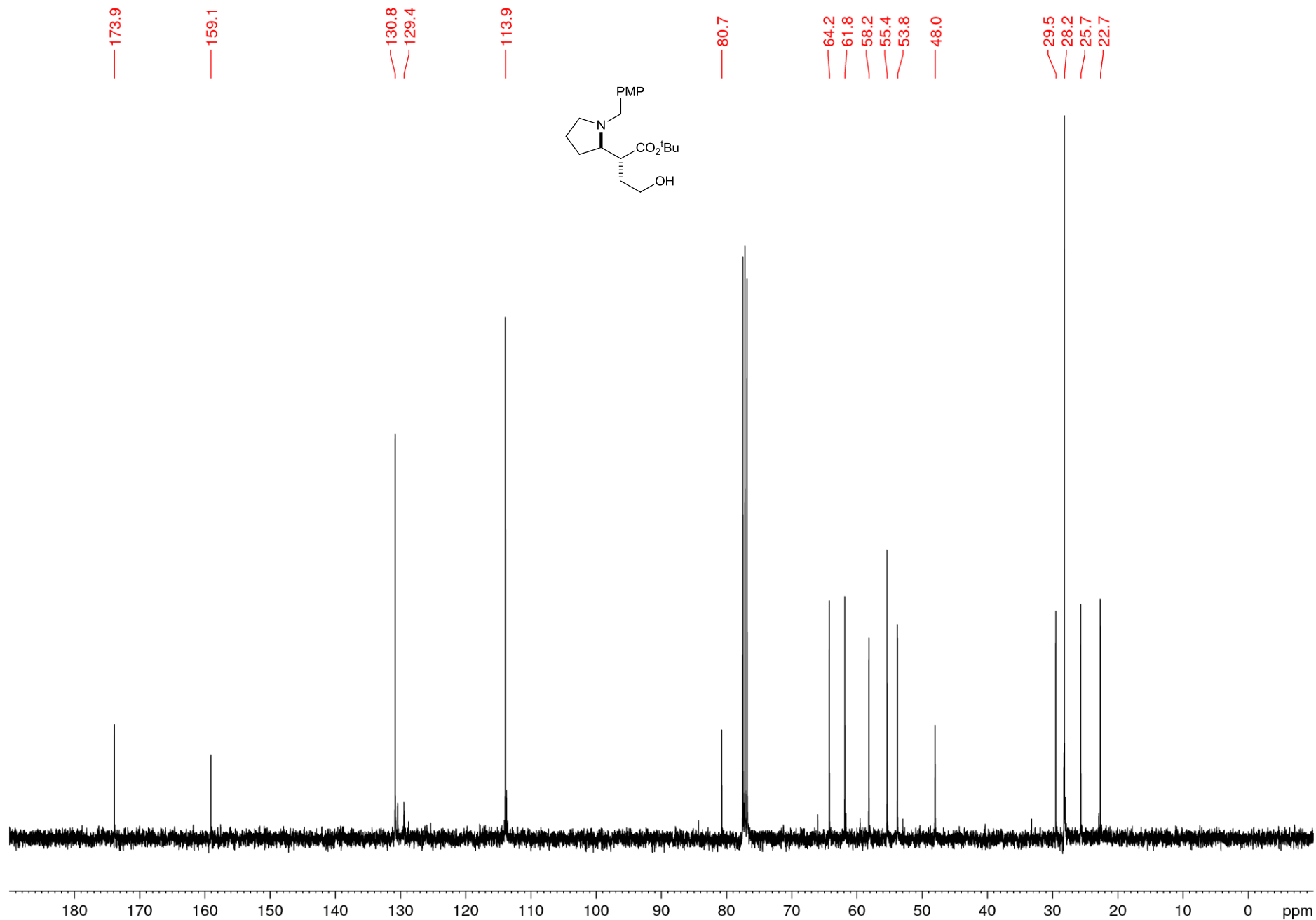
tert-Butyl (*R,R*)-2-[*N*(1')-(*p*-methoxybenzyl)pyrrolidin-2'-yl]-4-(*tert*-butyldimethylsiloxy)butanoate **48** (100 MHz ^{13}C , CDCl_3)



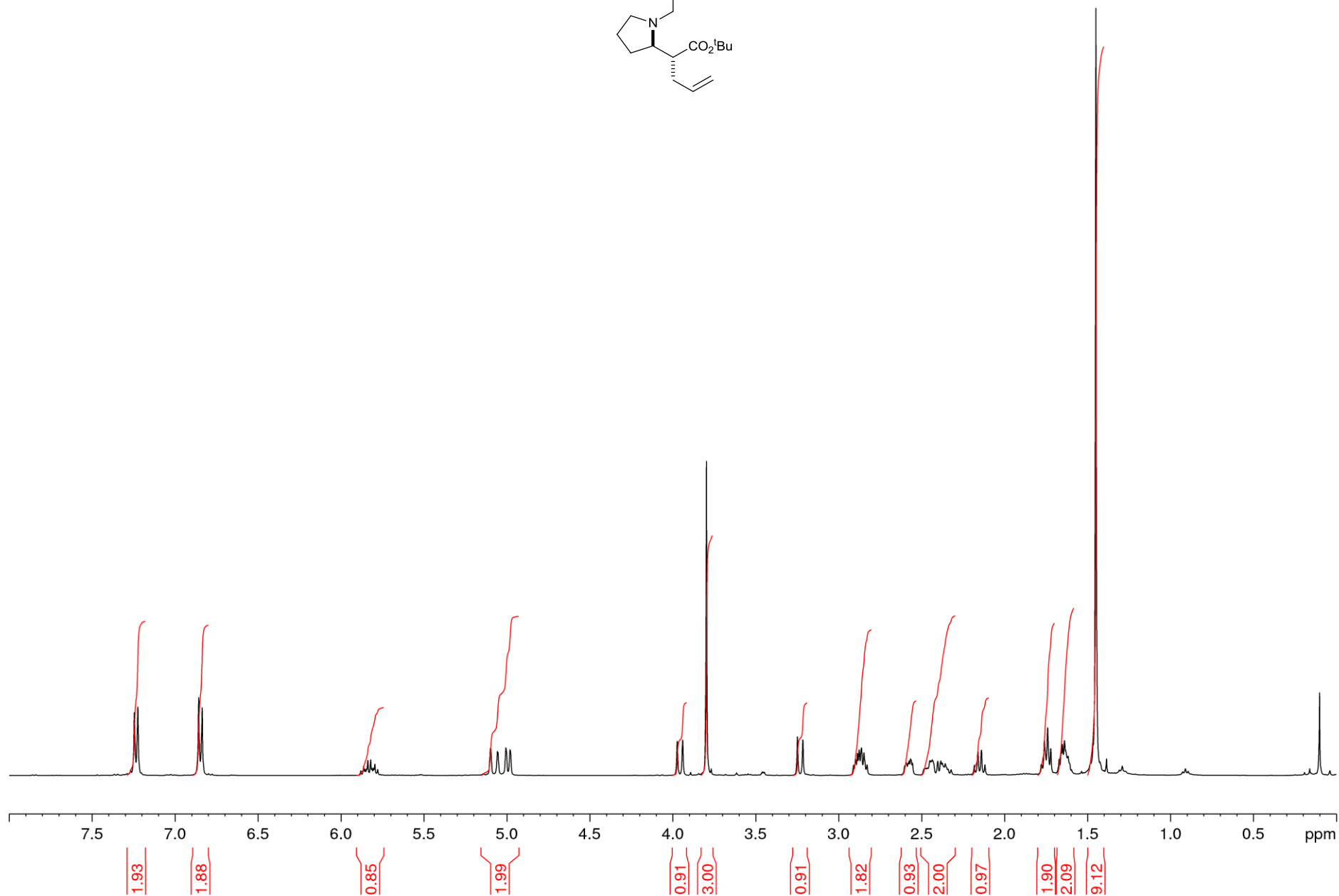
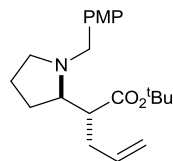
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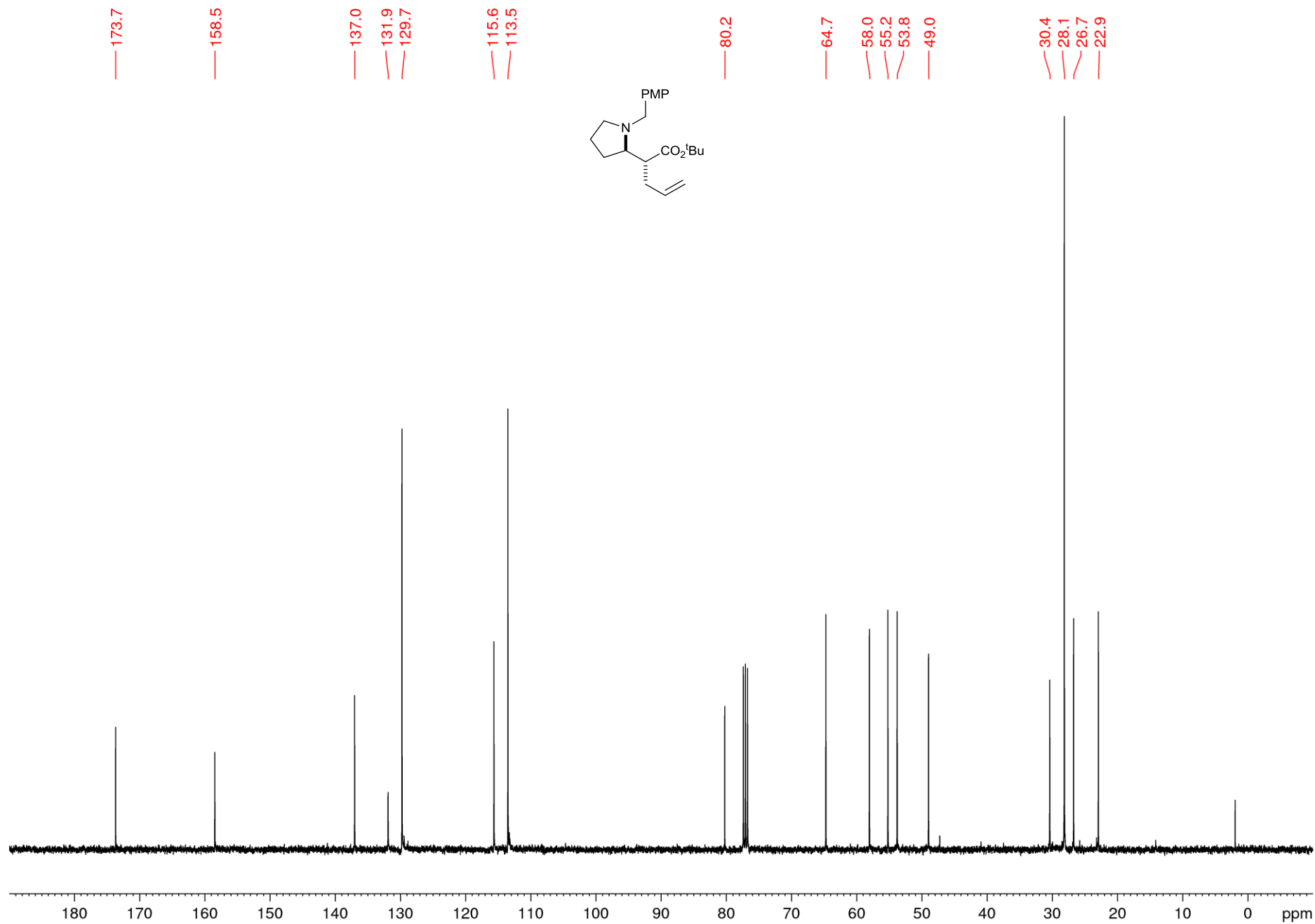
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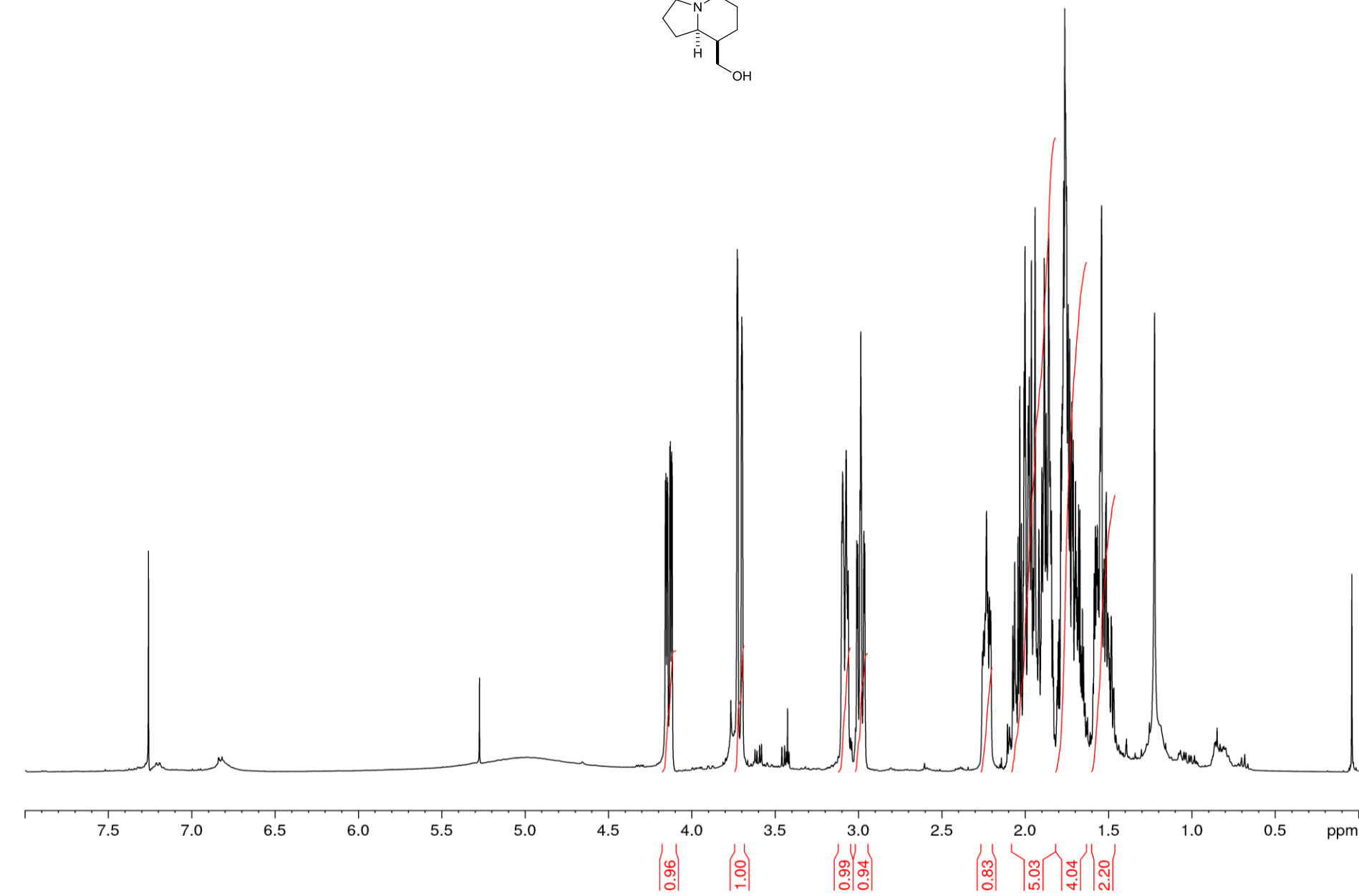
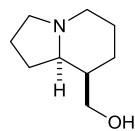
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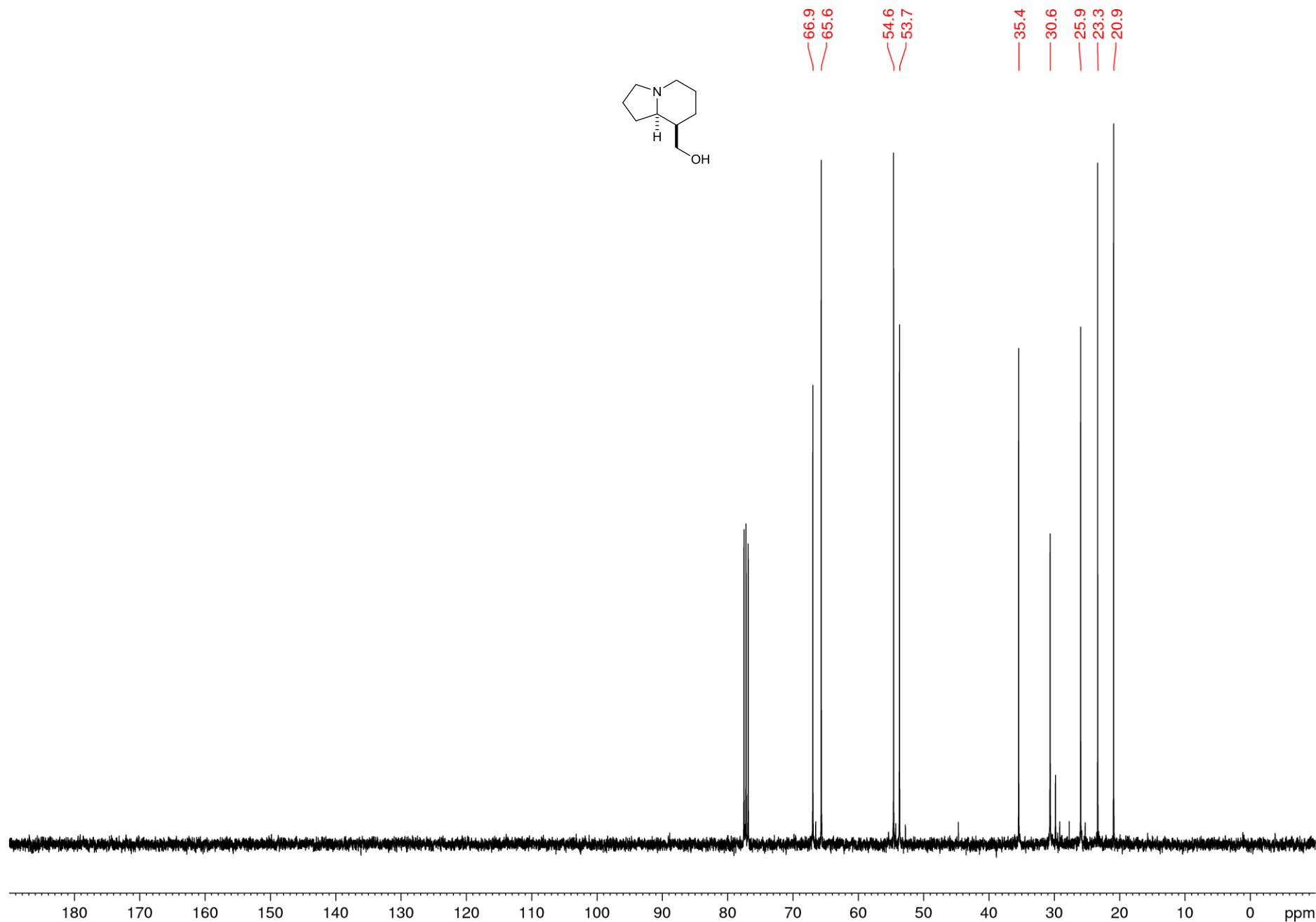
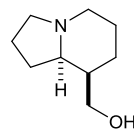
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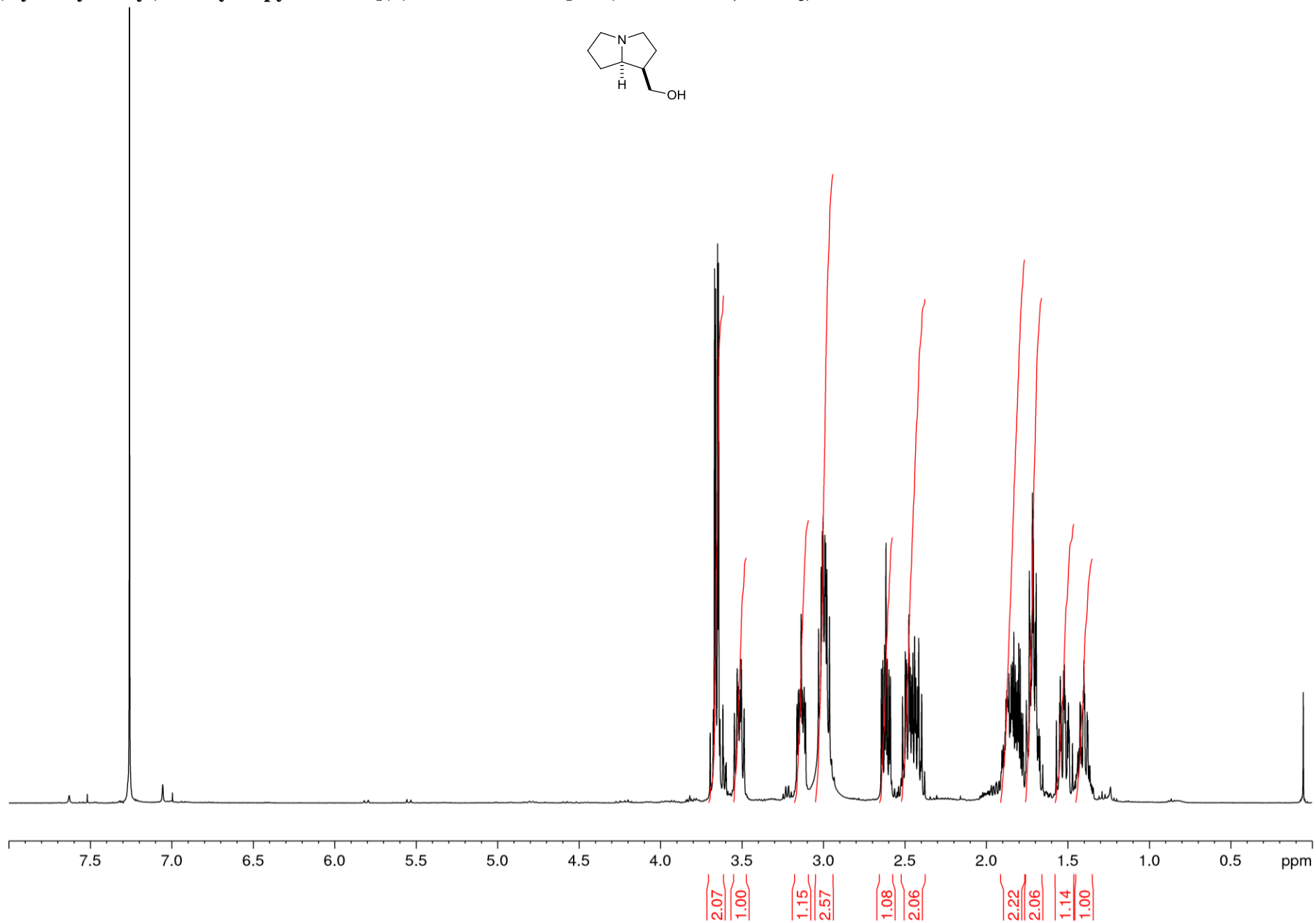
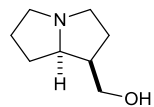
(*R,R*)-1-(Hydroxymethyl)octahydro-1*H*-indolizidine [(+)-5-*epi*-tashiromine] 16 (400 MHz ^1H , CDCl_3)



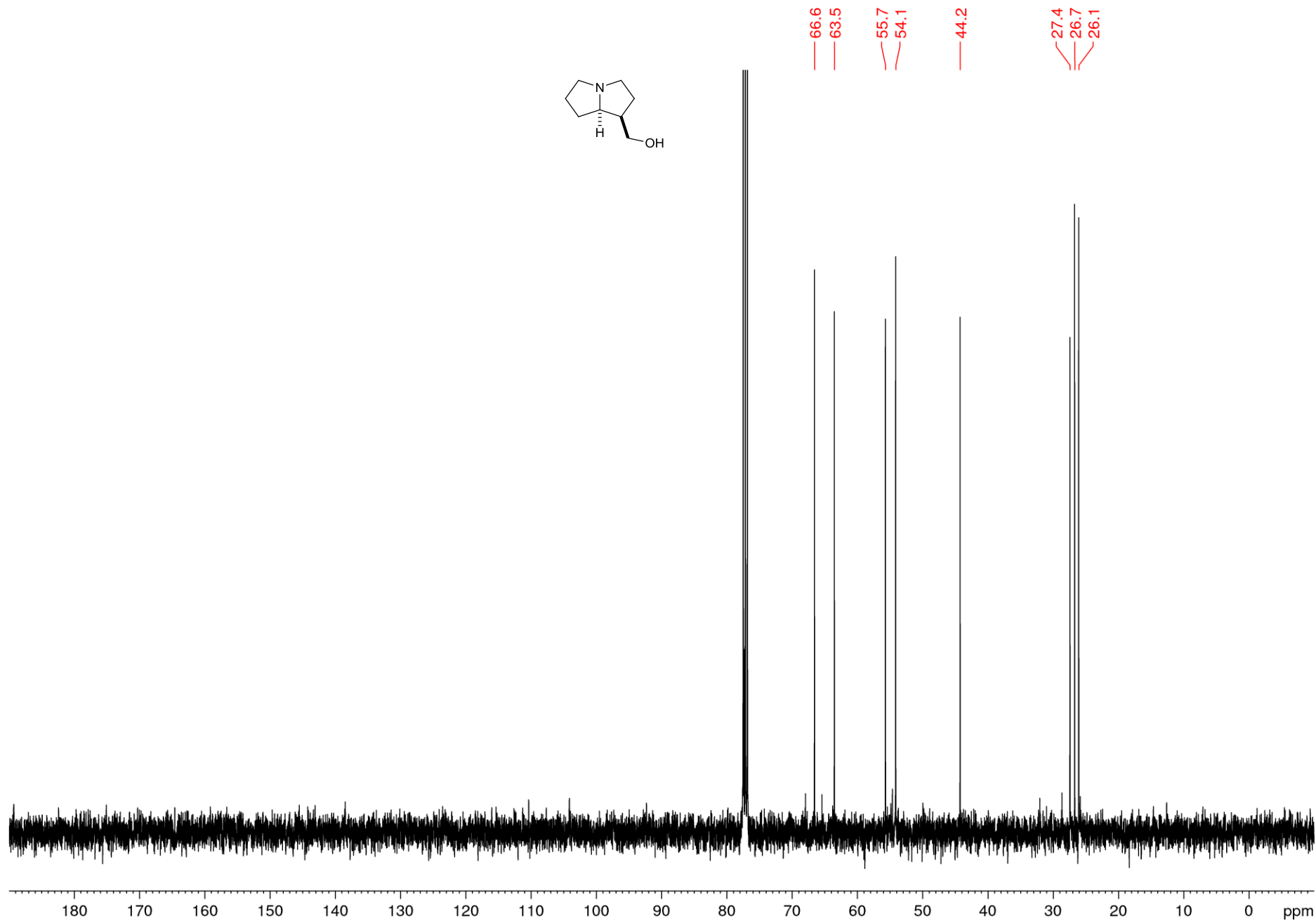
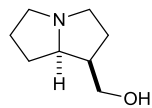
(*R,R*)-1-(Hydroxymethyl)octahydro-1*H*-indolizidine [(+)-5-*epi*-tashiromine] 16 (100 MHz ^{13}C , CDCl_3)



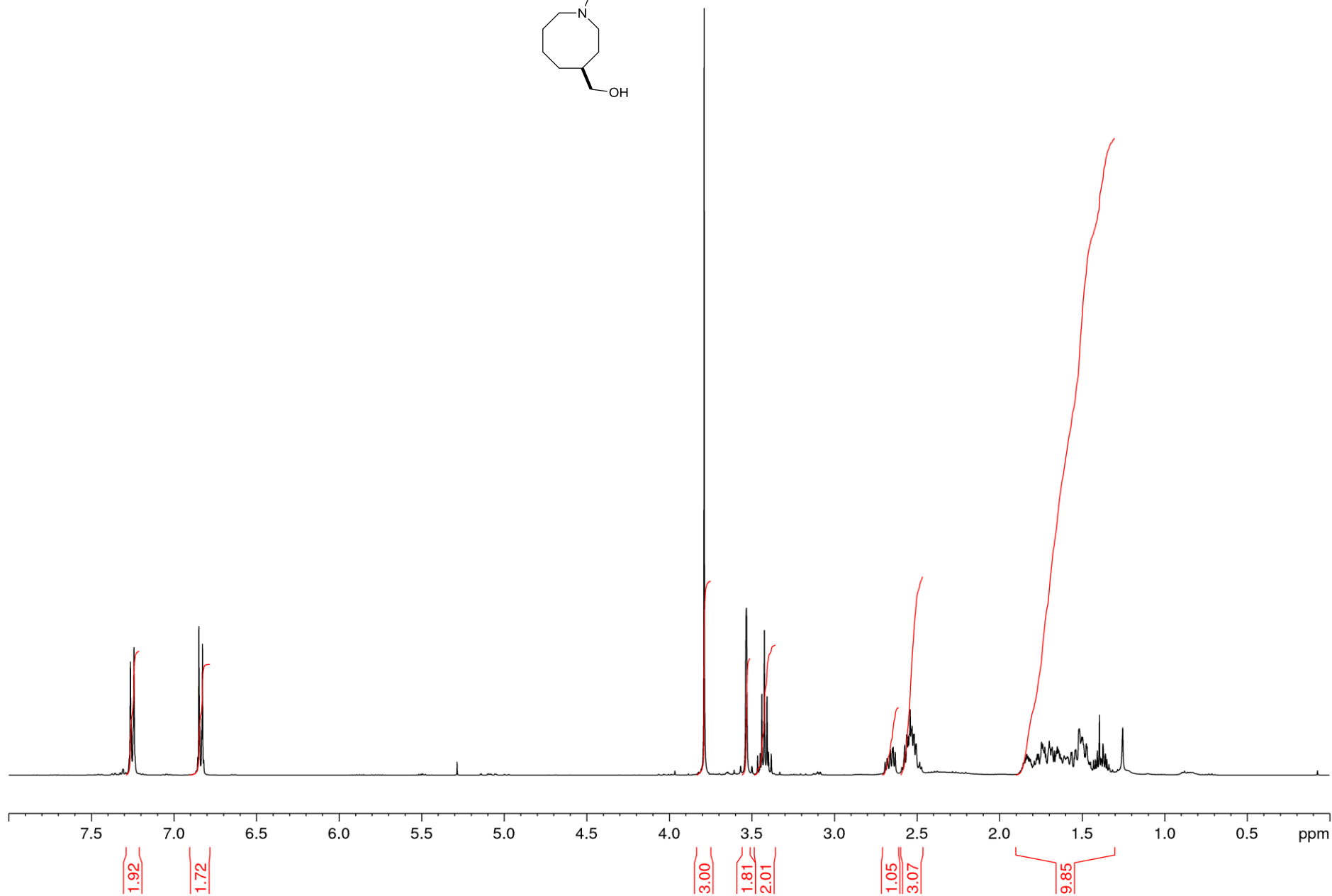
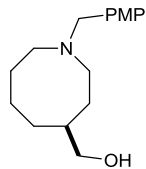
(*R,R*)-1-(Hydroxymethyl)hexahydropyrrolizine [(+)-isoretronecanol] 15 (400 MHz ^1H , CDCl_3)



(*R,R*)-1-(Hydroxymethyl)hexahydropyrrolizine [(+)-isoretronecanol] 15 (100 MHz ^{13}C , CDCl_3)



(S)-N(1)-Benzyl-4-(hydroxymethyl)azocane 52 (400 MHz ^1H , CDCl_3)



(S)-N(1)-Benzyl-4-(hydroxymethyl)azocane 52 (100 MHz ^{13}C , CDCl_3)

