

SUPPORTING INFORMATION

Enantiospecific total syntheses of *cis*-cyclopropane fatty acids: dihydromalvalic acid, dihydrosterculic acid, lactobacillic acid, and 9,10-methylenehexadecanoic acid

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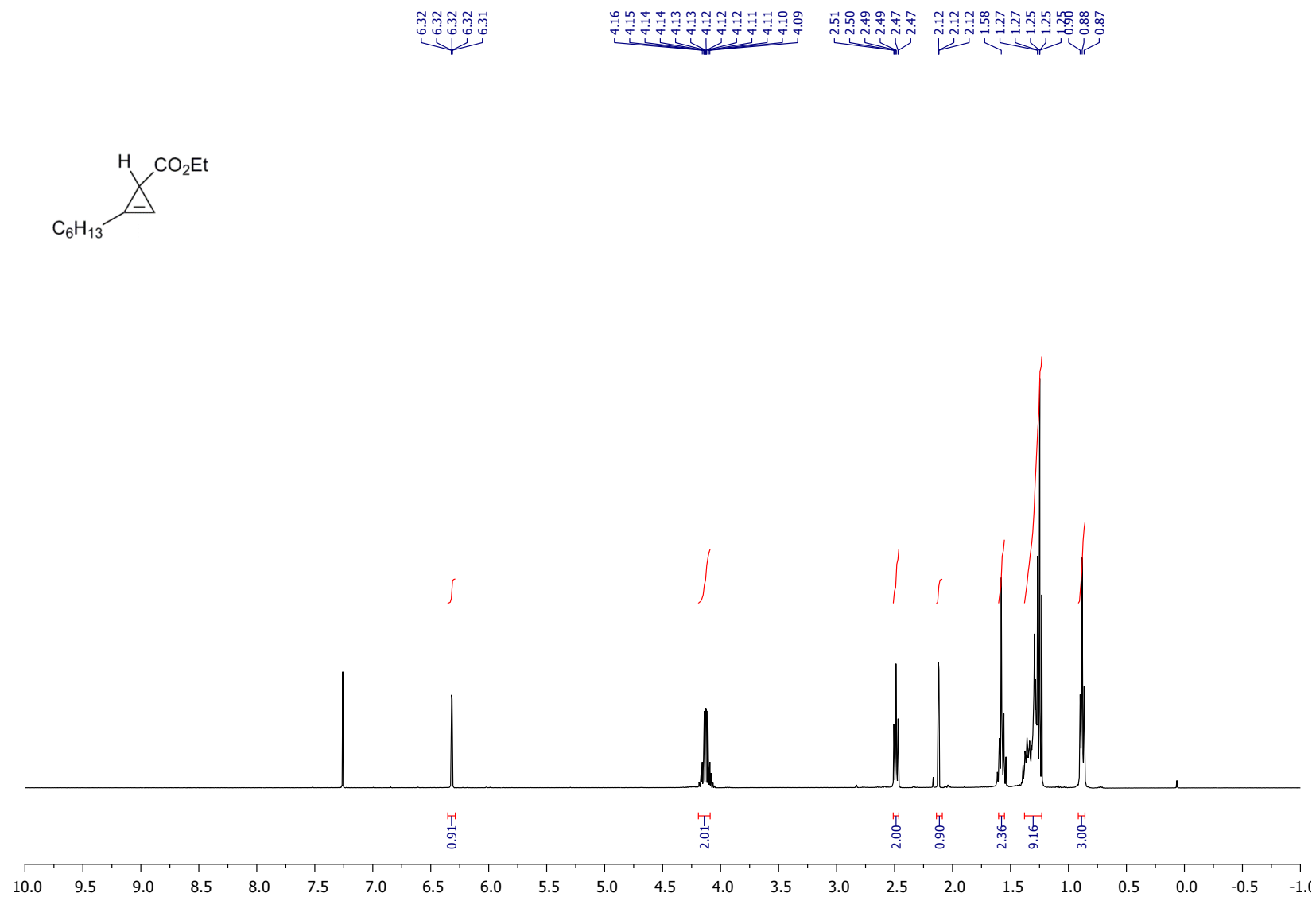
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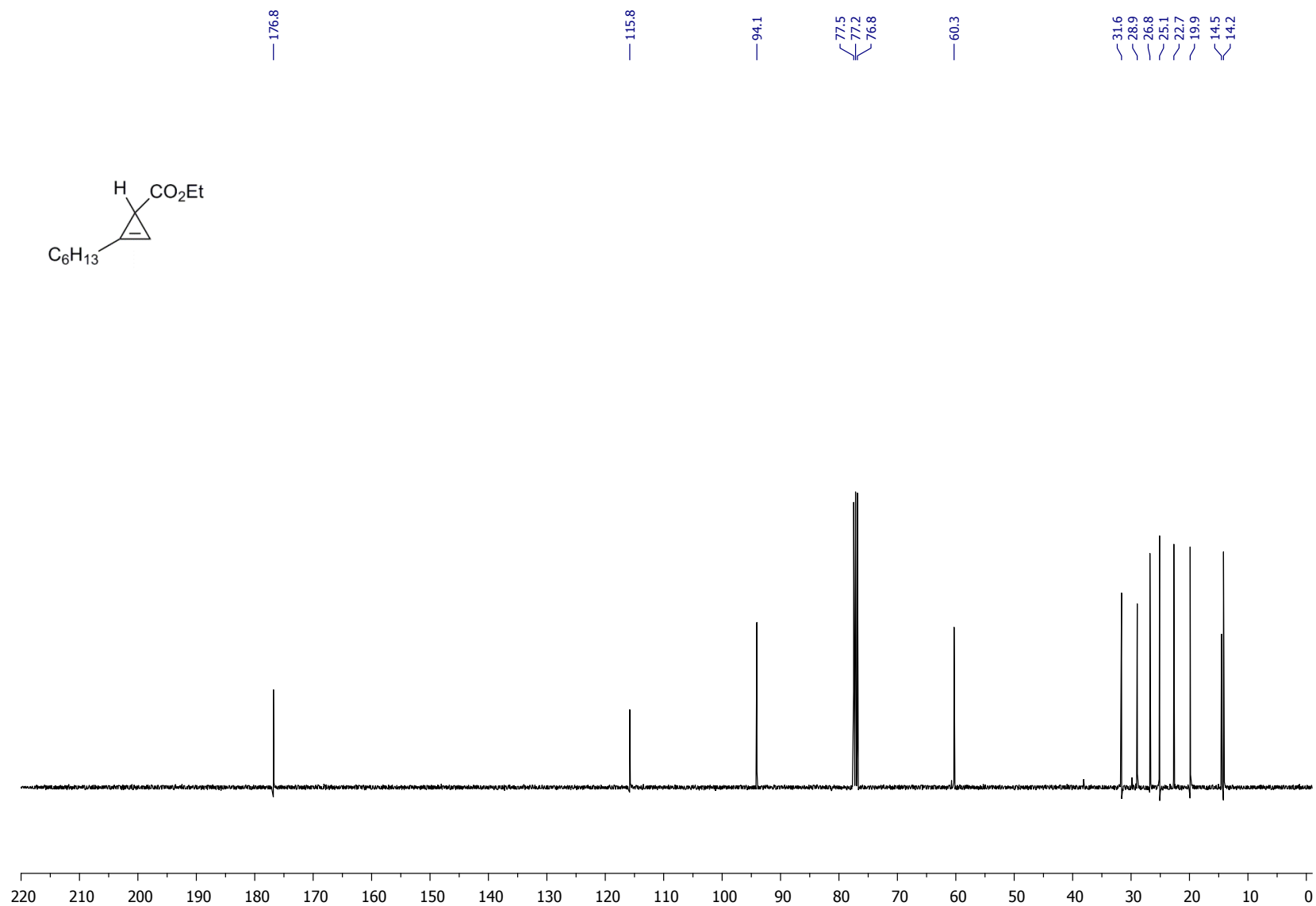
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¹³ C NMR: (9 <i>R</i> ,10 <i>S</i>)-Dihydrosterculic acid ((9<i>R</i>,10<i>S</i>)-3)	S98

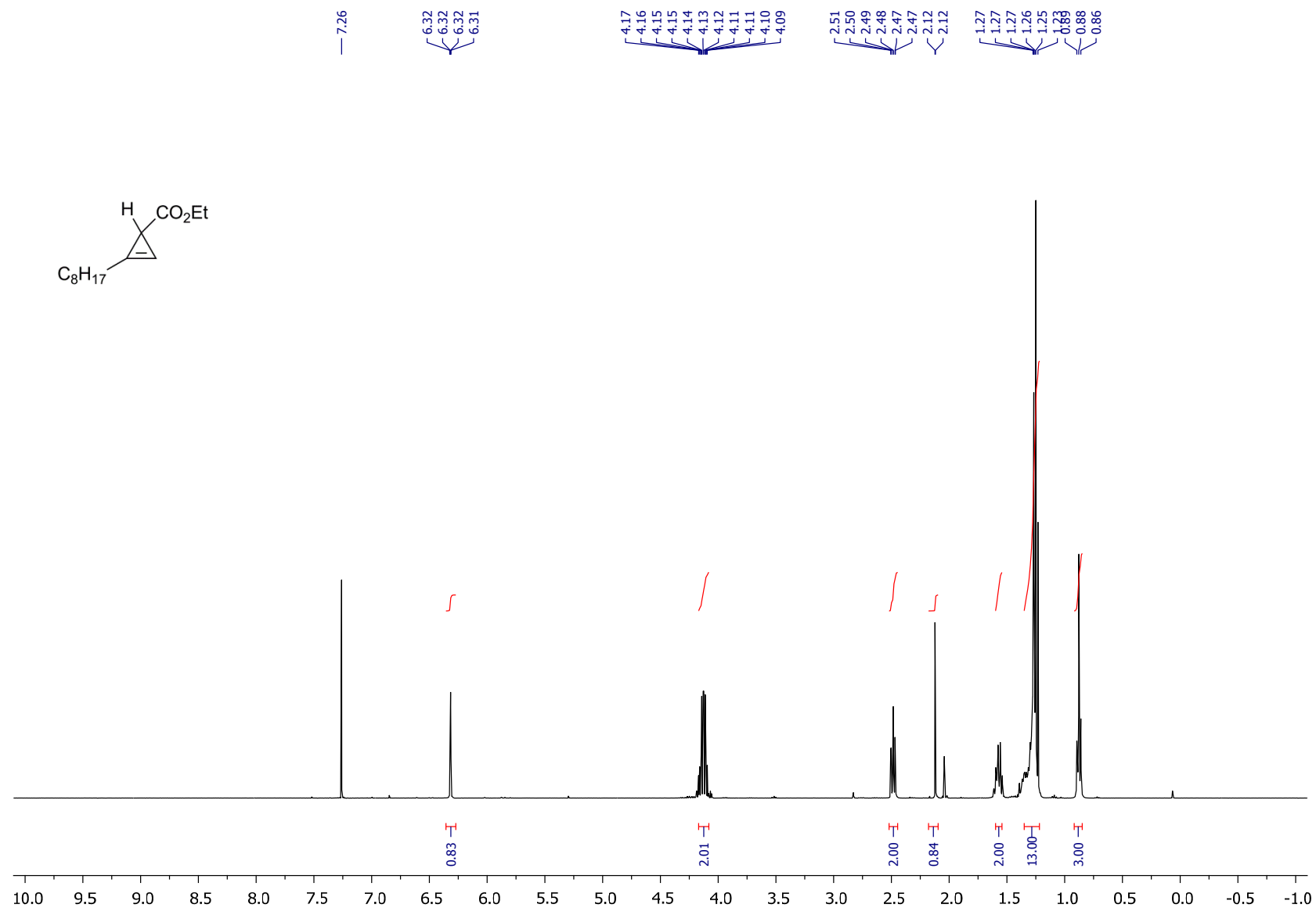
^1H NMR (CDCl_3 , 400 MHz): Ethyl 2-hexylcycloprop-2-ene-1-carboxylate (**6a**)



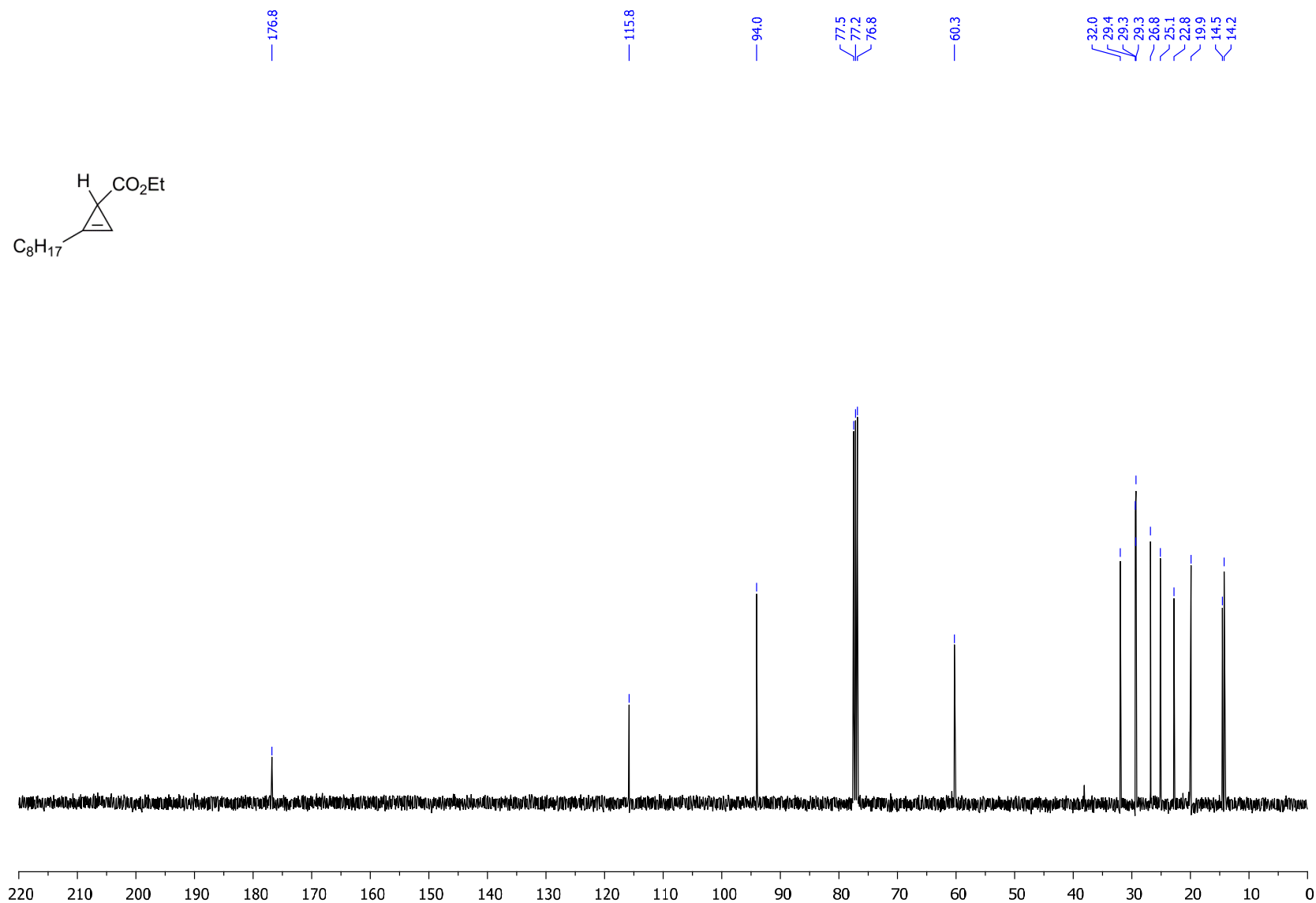
^{13}C NMR (CDCl_3 , 100 MHz): Ethyl 2-hexylcycloprop-2-ene-1-carboxylate (**6a**)



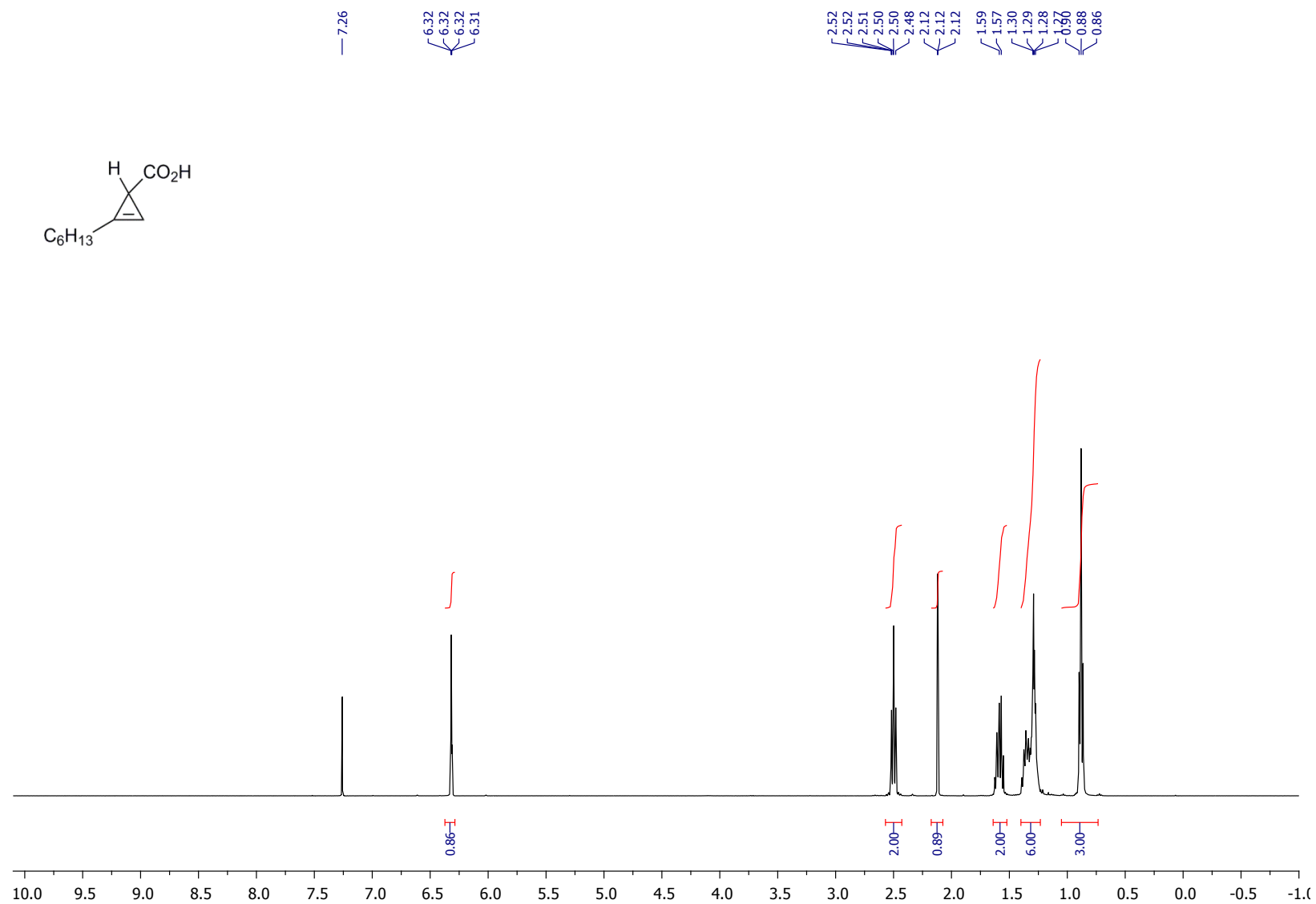
^1H NMR (CDCl_3 , 400 MHz): Ethyl 2-octylcycloprop-2-ene-1-carboxylate (**6b**)



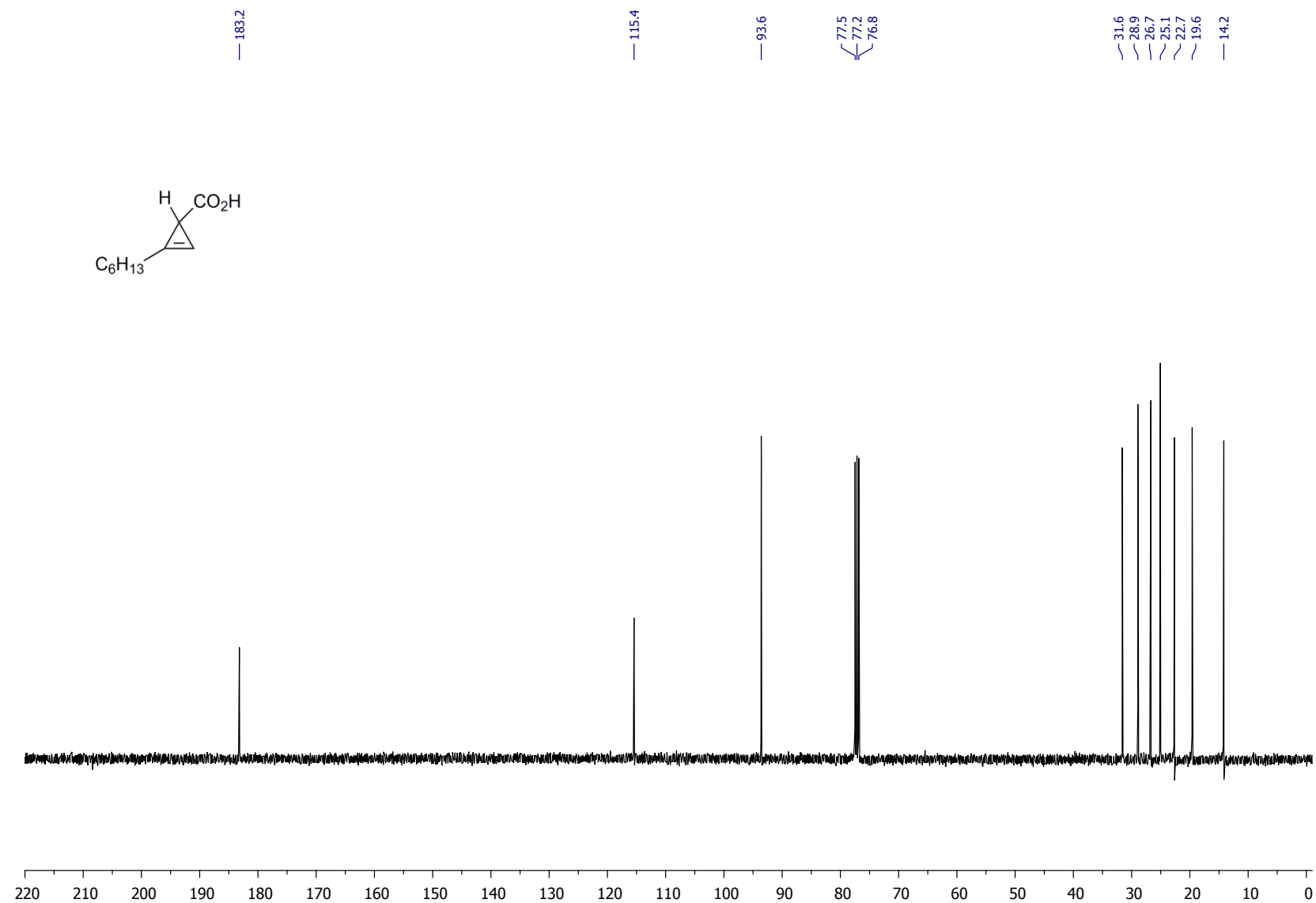
^{13}C NMR (CDCl_3 , 100 MHz): Ethyl 2-octylcycloprop-2-ene-1-carboxylate (**6b**)



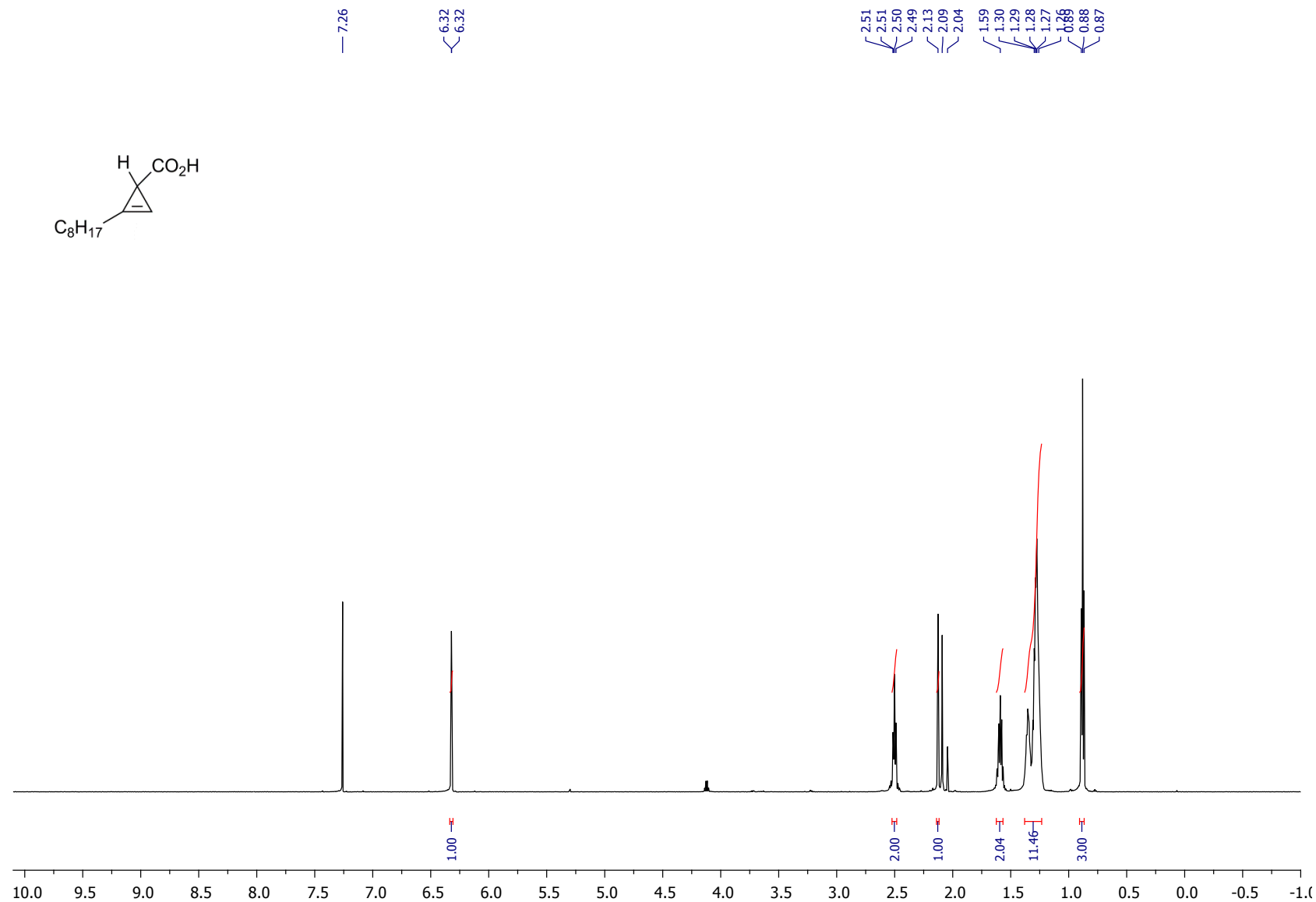
^1H NMR (CDCl_3 , 400 MHz): 2-Hexylcycloprop-2-ene-1-carboxylic acid (**7a**)



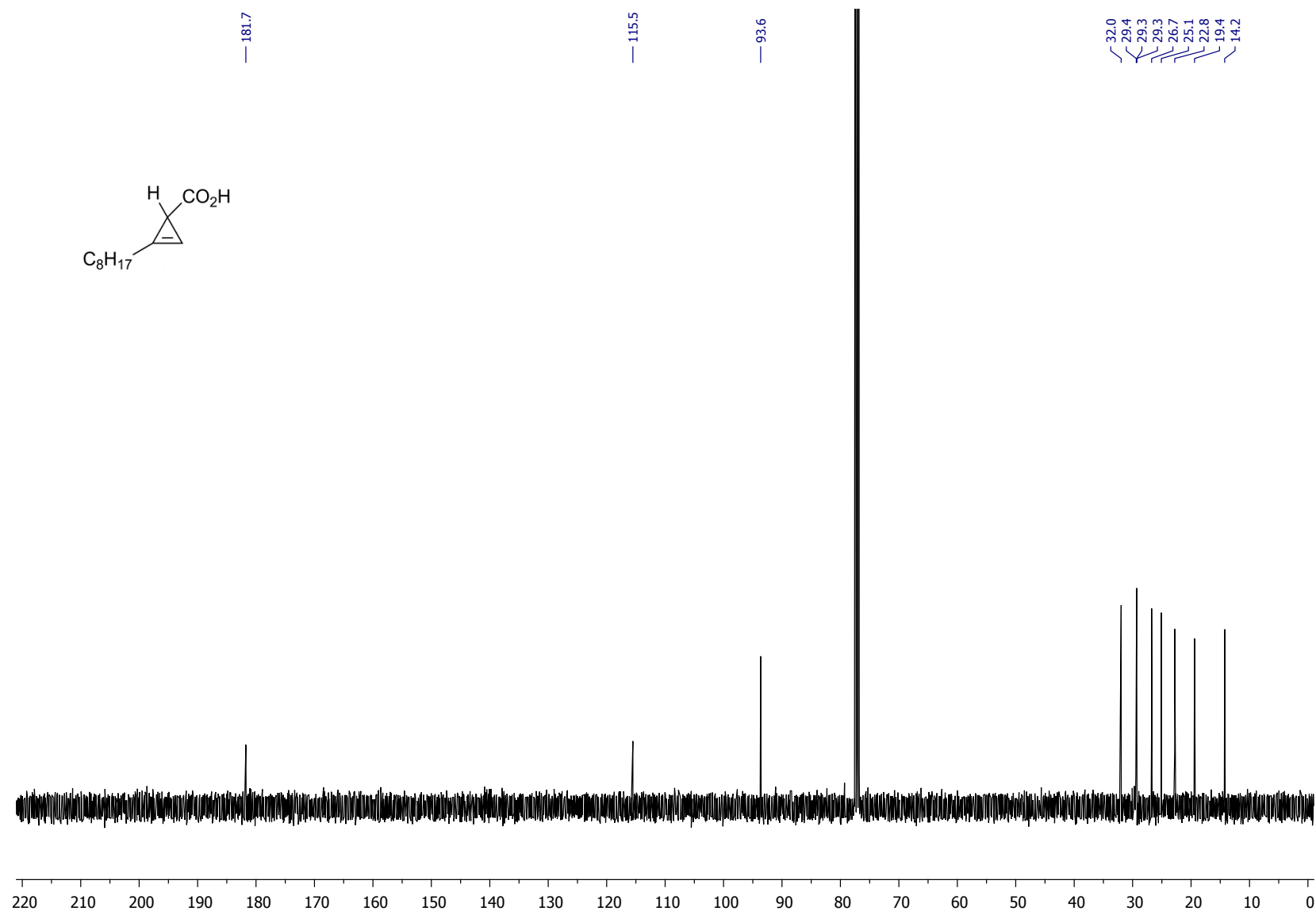
^{13}C NMR (CDCl_3 , 100 MHz): 2-Hexylcycloprop-2-ene-1-carboxylic acid (**7a**)



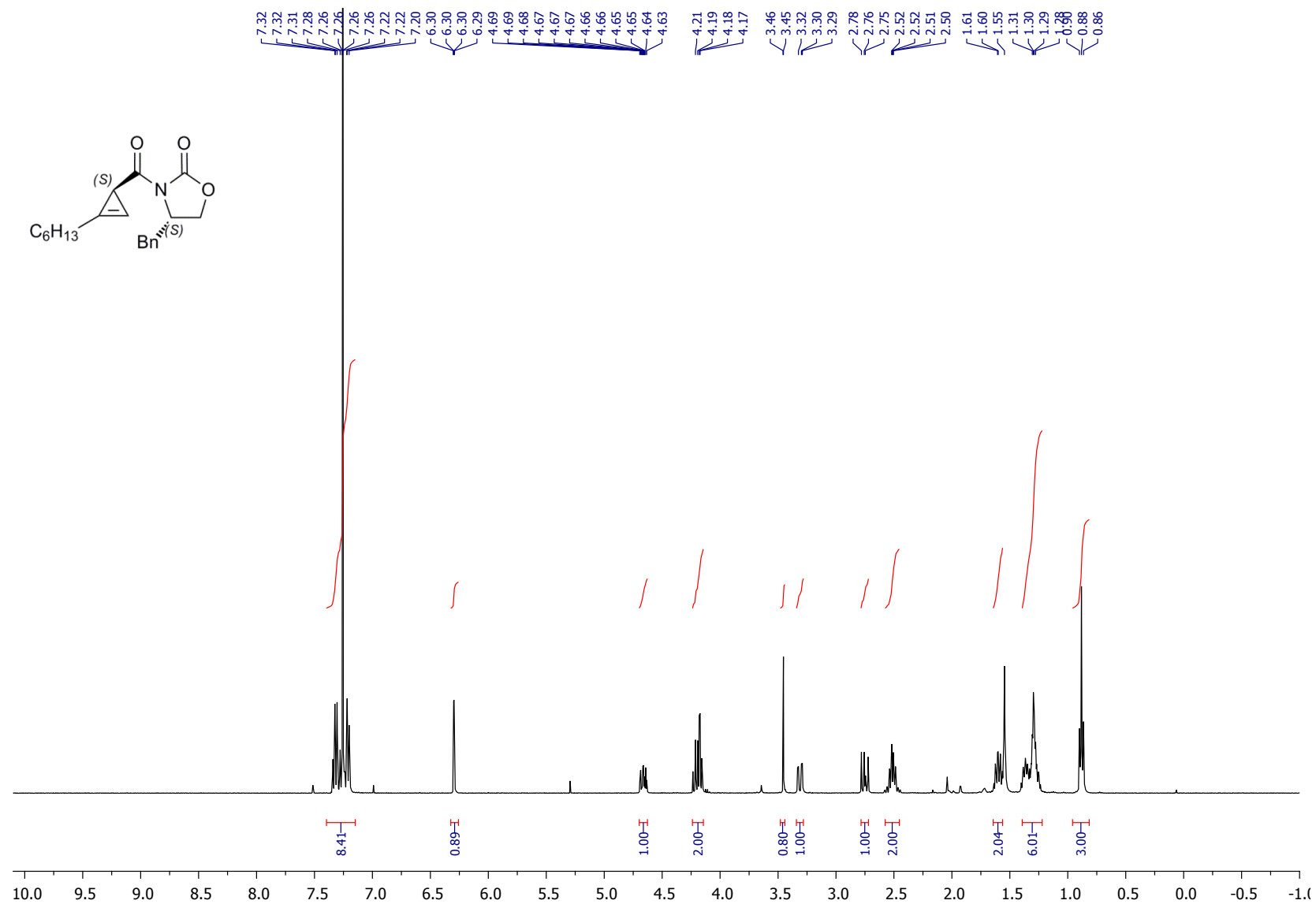
^1H NMR (CDCl_3 , 400 MHz): 2-Octylcycloprop-2-ene-1-carboxylic acid (**7b**)



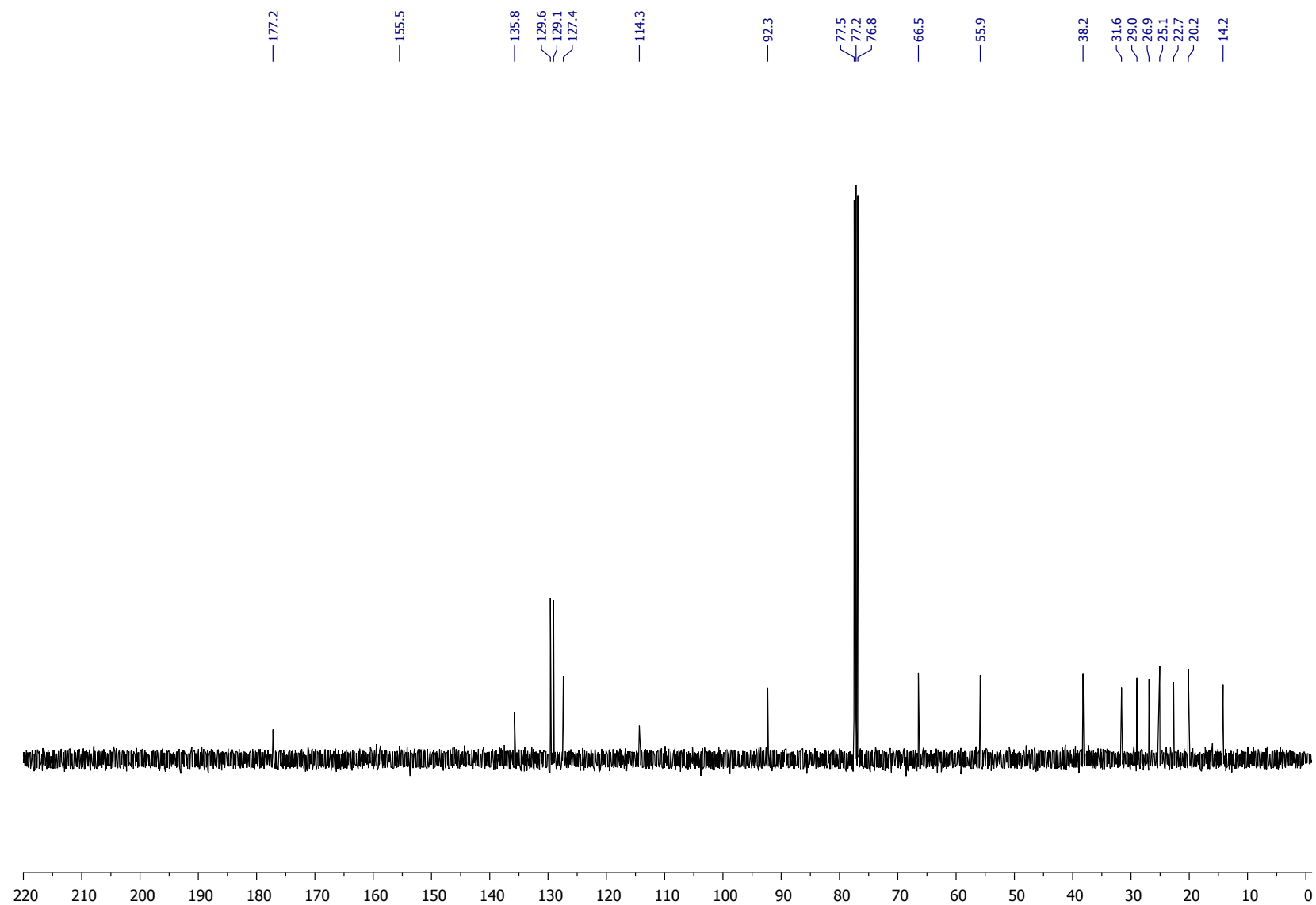
^{13}C NMR (CDCl_3 , 100 MHz): 2-Octylcycloprop-2-ene-1-carboxylic acid (**7b**)

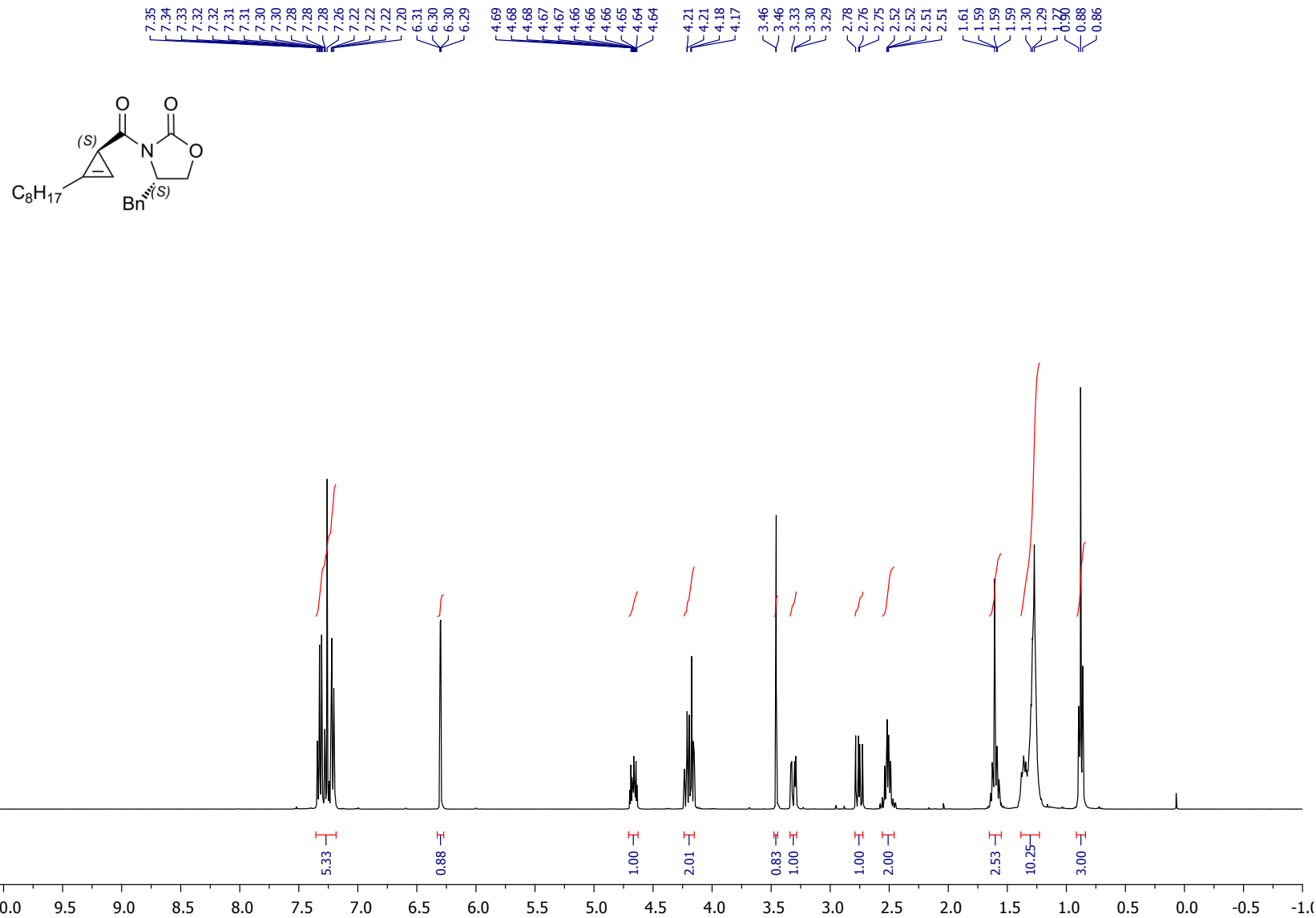


^1H NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*S*)-2-hexylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**8a**)

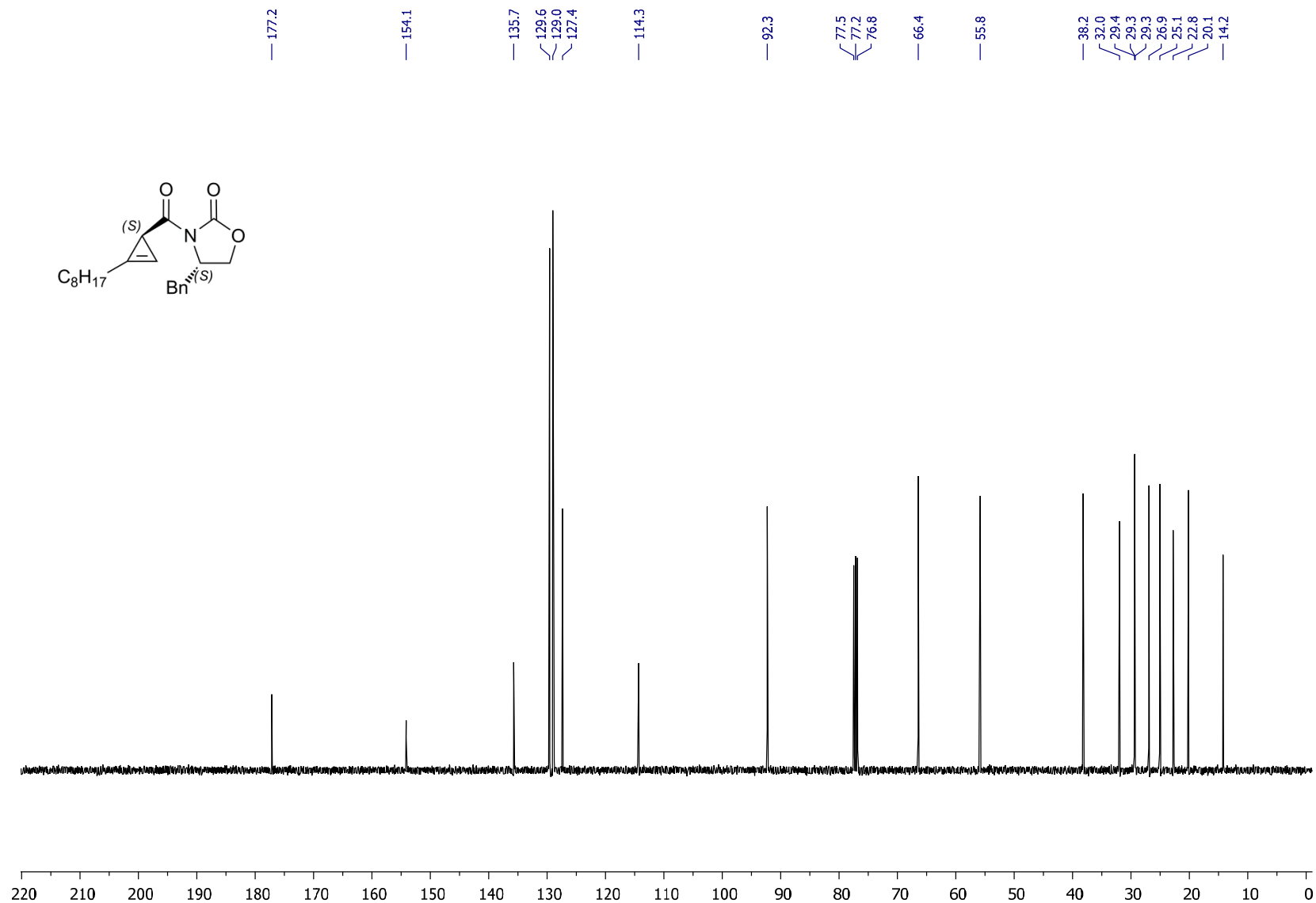


^{13}C NMR (CDCl_3 , 100 MHz): (4*S*)-4-Benzyl-3-[(1*S*)-2-hexylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**8a**)

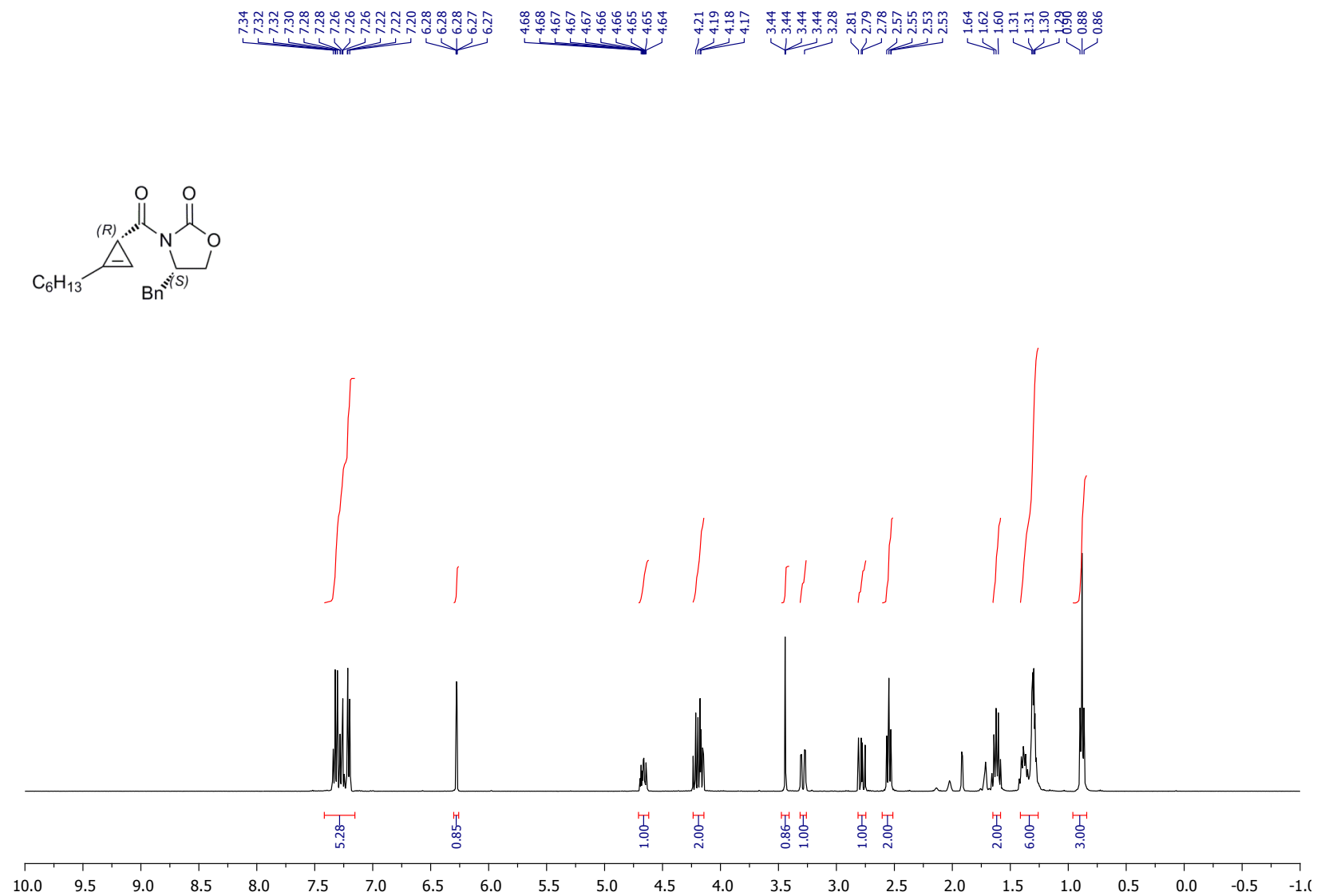


¹H NMR (CDCl₃, 400 MHz): (4*S*)-4-Benzyl-3-[(1*S*)-2-octylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**8b**)

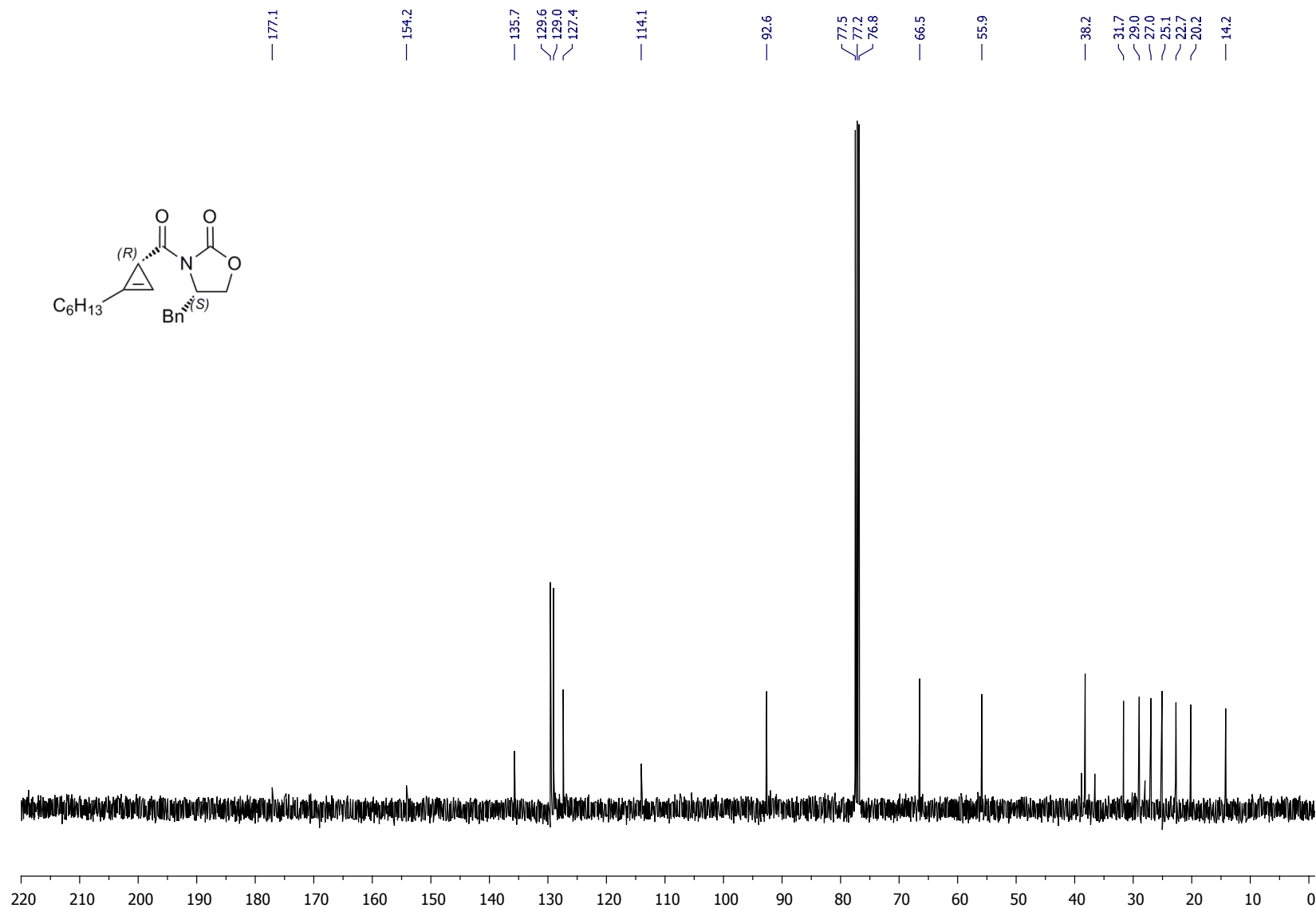
^{13}C NMR (CDCl_3 , 100 MHz): (4*S*)-4-Benzyl-3-[(1*S*)-2-octylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**8b**)



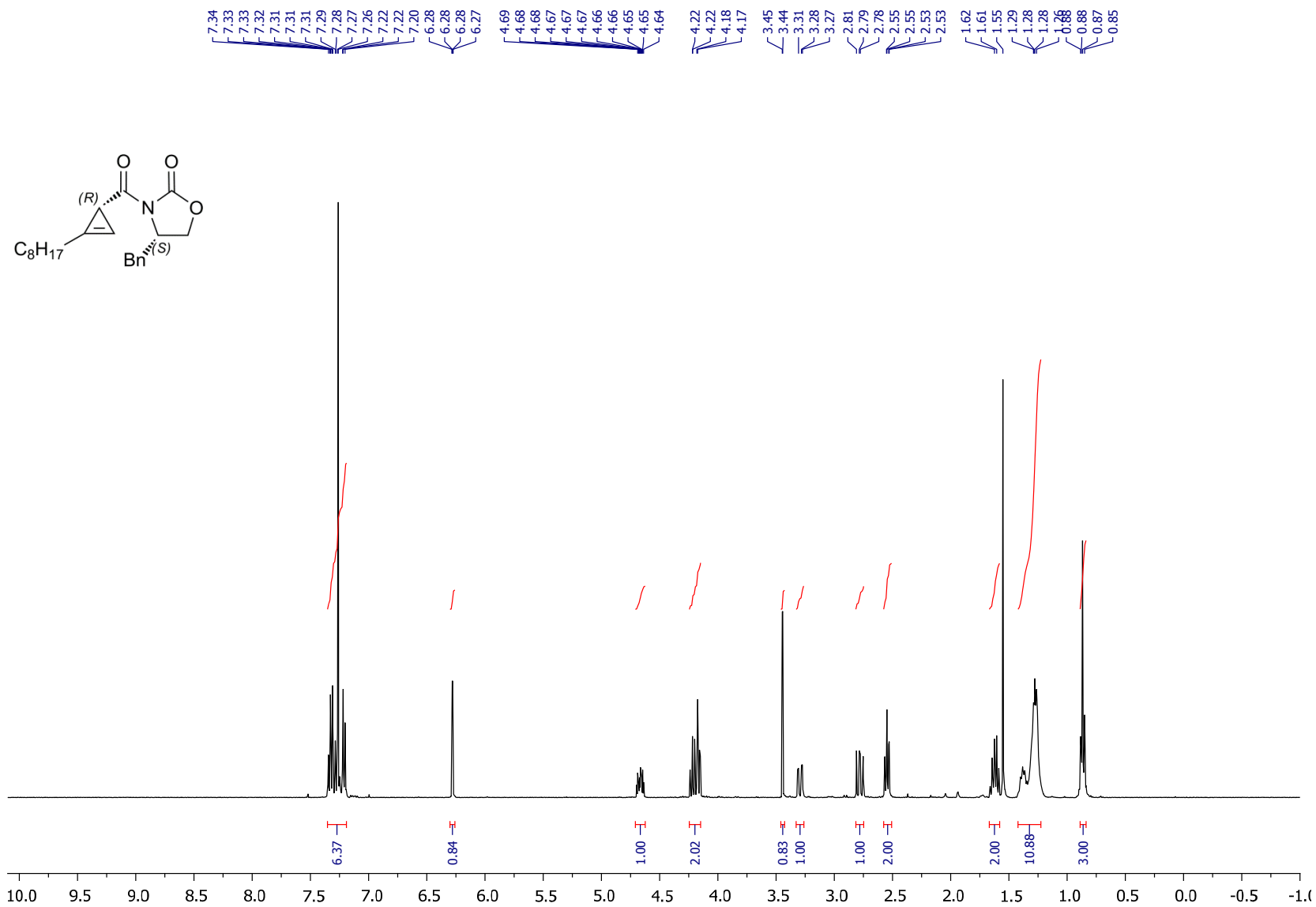
^1H NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*R*)-2-hexylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**9a**)



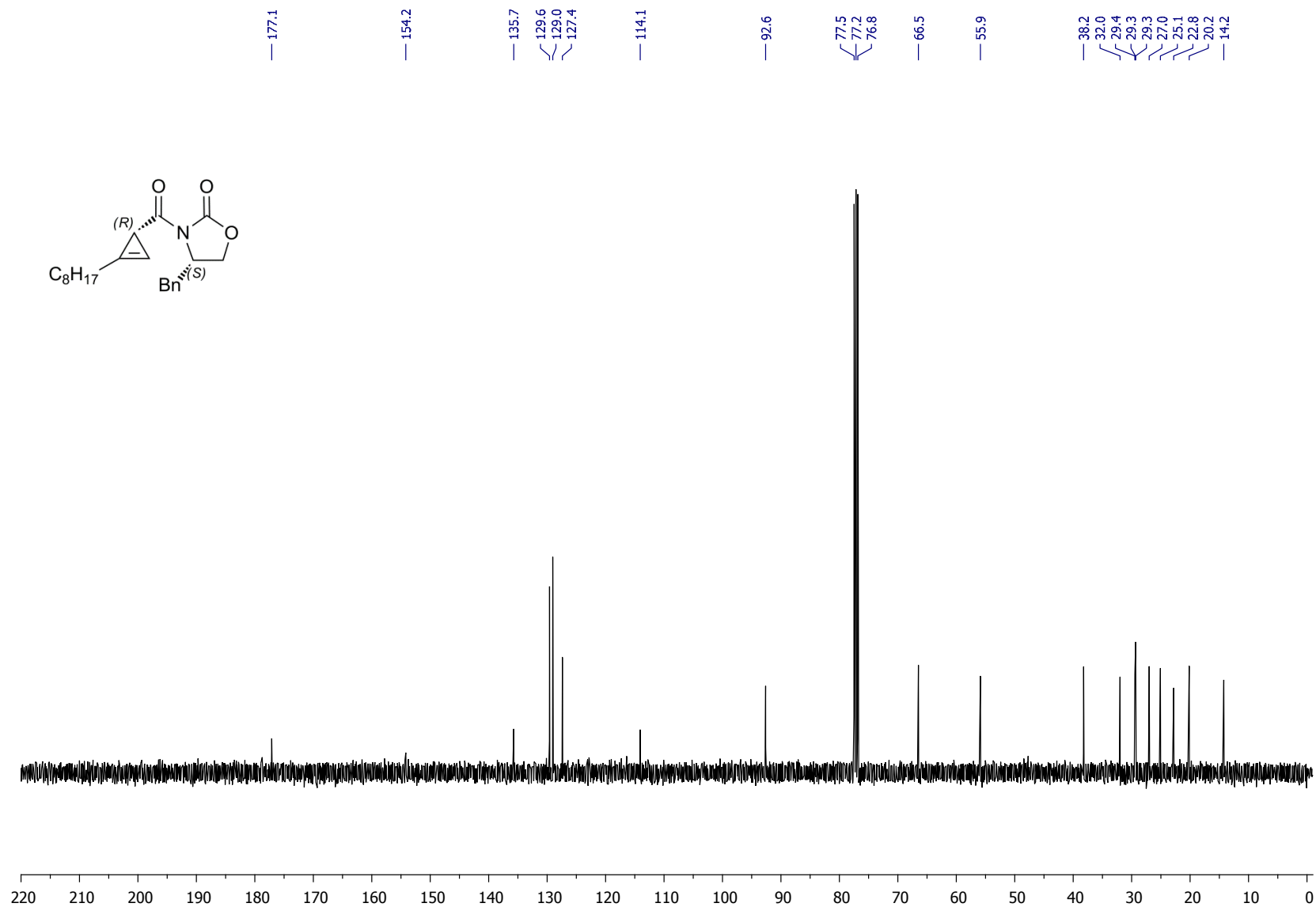
^{13}C NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*R*)-2-hexylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**9a**)



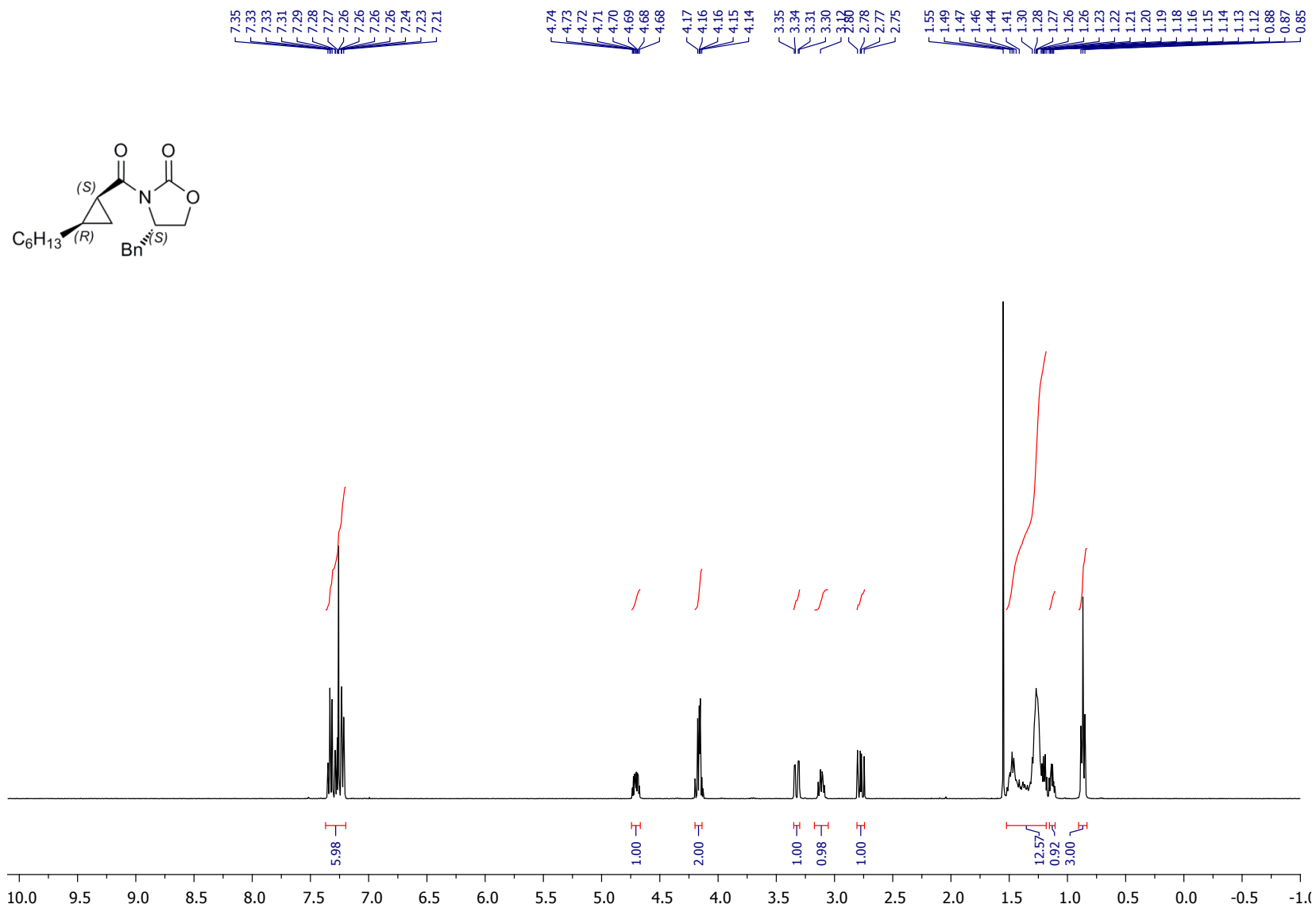
^1H NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*R*)-2-octylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**9b**)



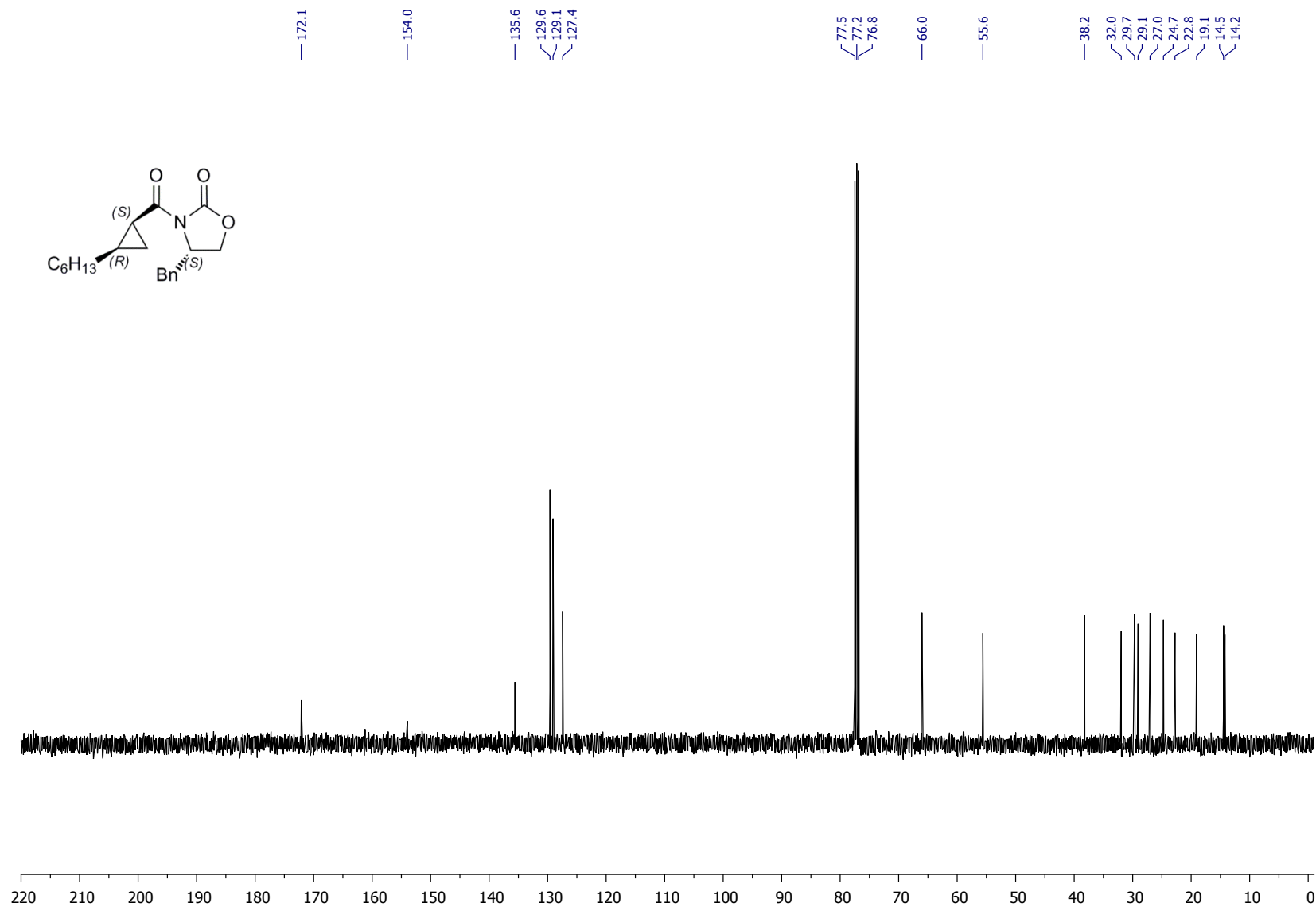
^{13}C NMR (CDCl_3 , 100 MHz): (4*S*)-4-Benzyl-3-[(1*R*)-2-octylcycloprop-2-ene-1-carbonyl]oxazolidin-2-one (**9b**)



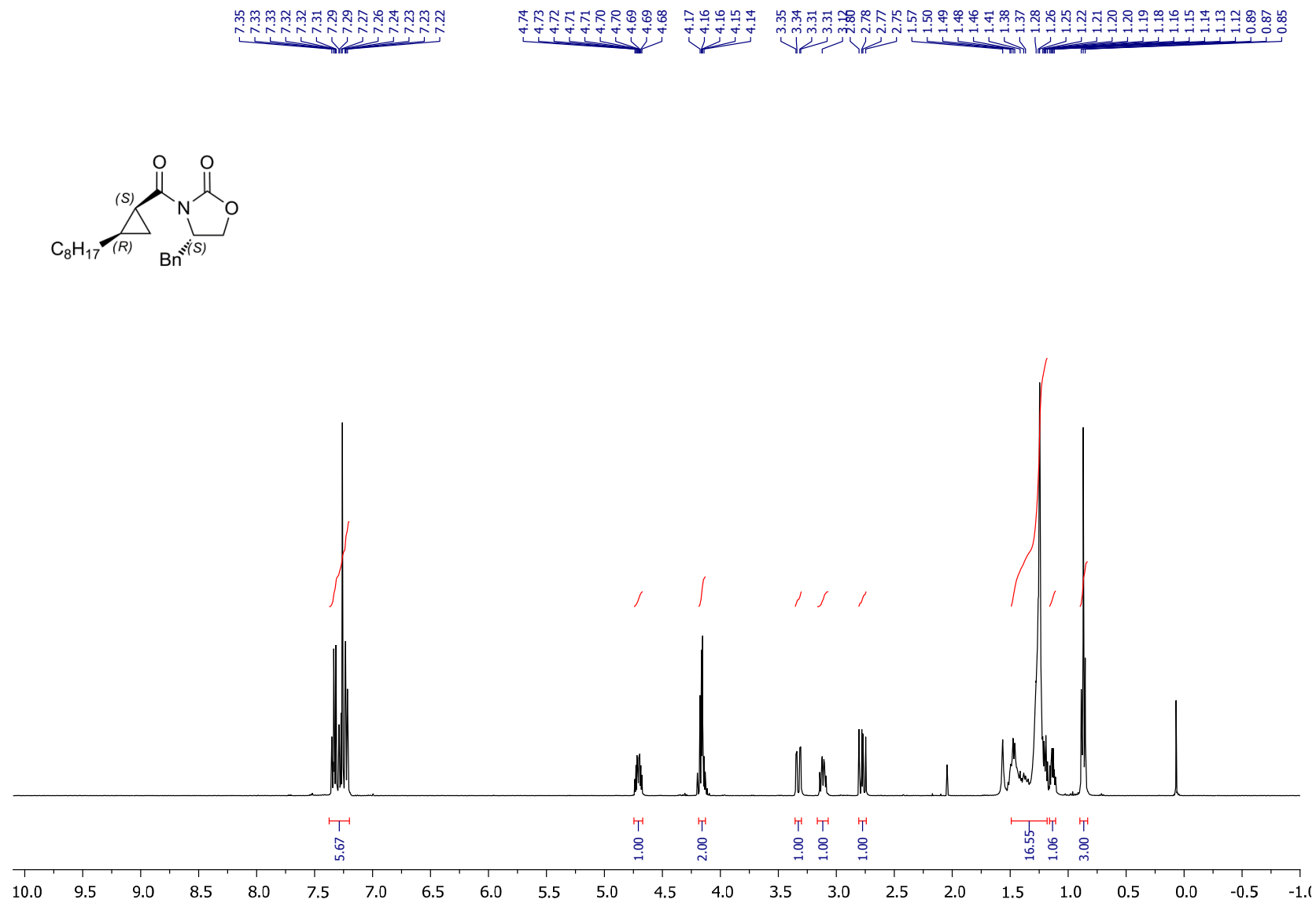
^1H NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*S*,2*R*)-2-hexylcyclopropanecarbonyl]oxazolidin-2-one (**10a**)



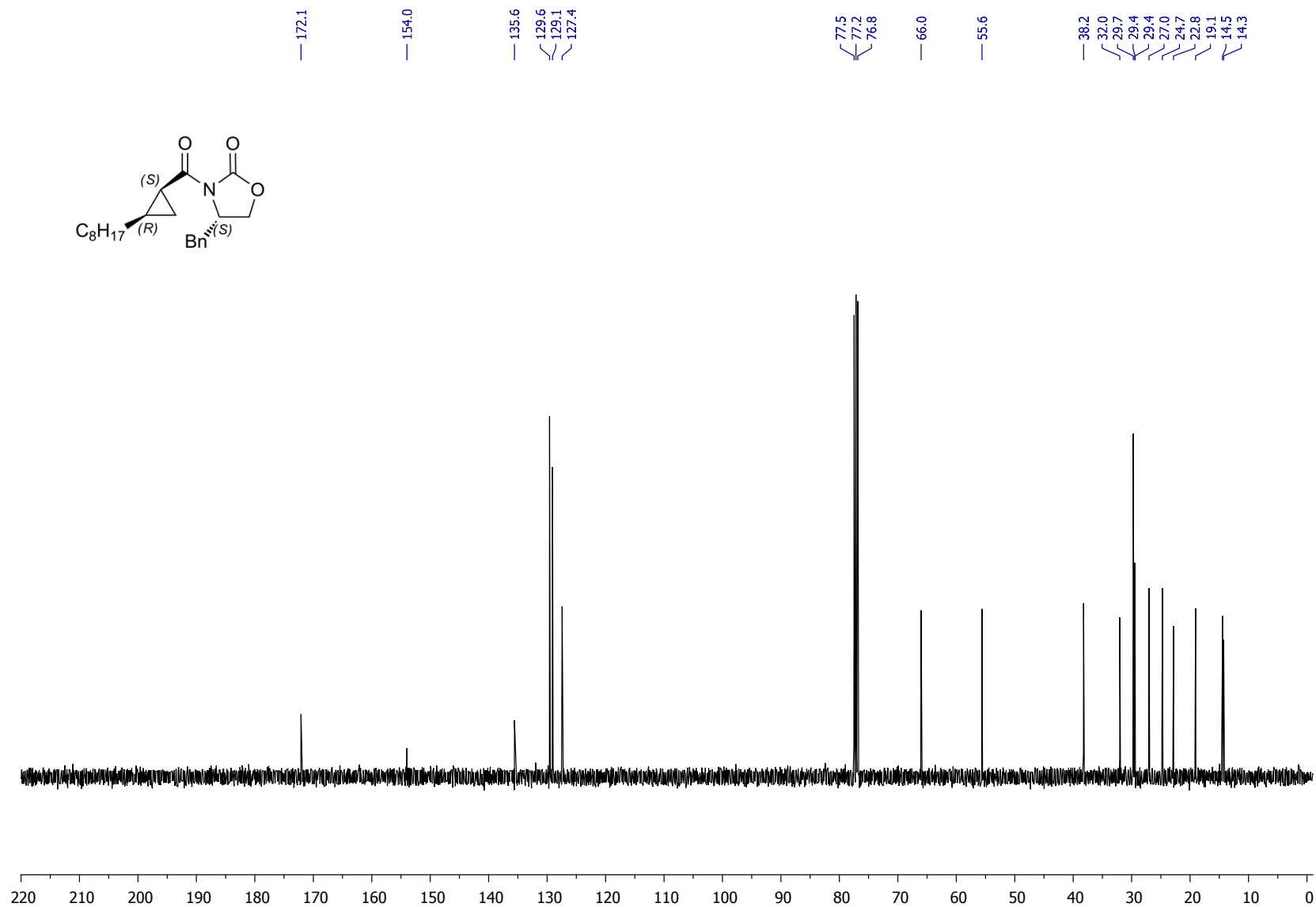
^{13}C NMR (CDCl_3 , 100 MHz): (4*S*)-4-Benzyl-3-[(1*S*,2*R*)-2-hexylcyclopropanecarbonyl]oxazolidin-2-one (**10a**)



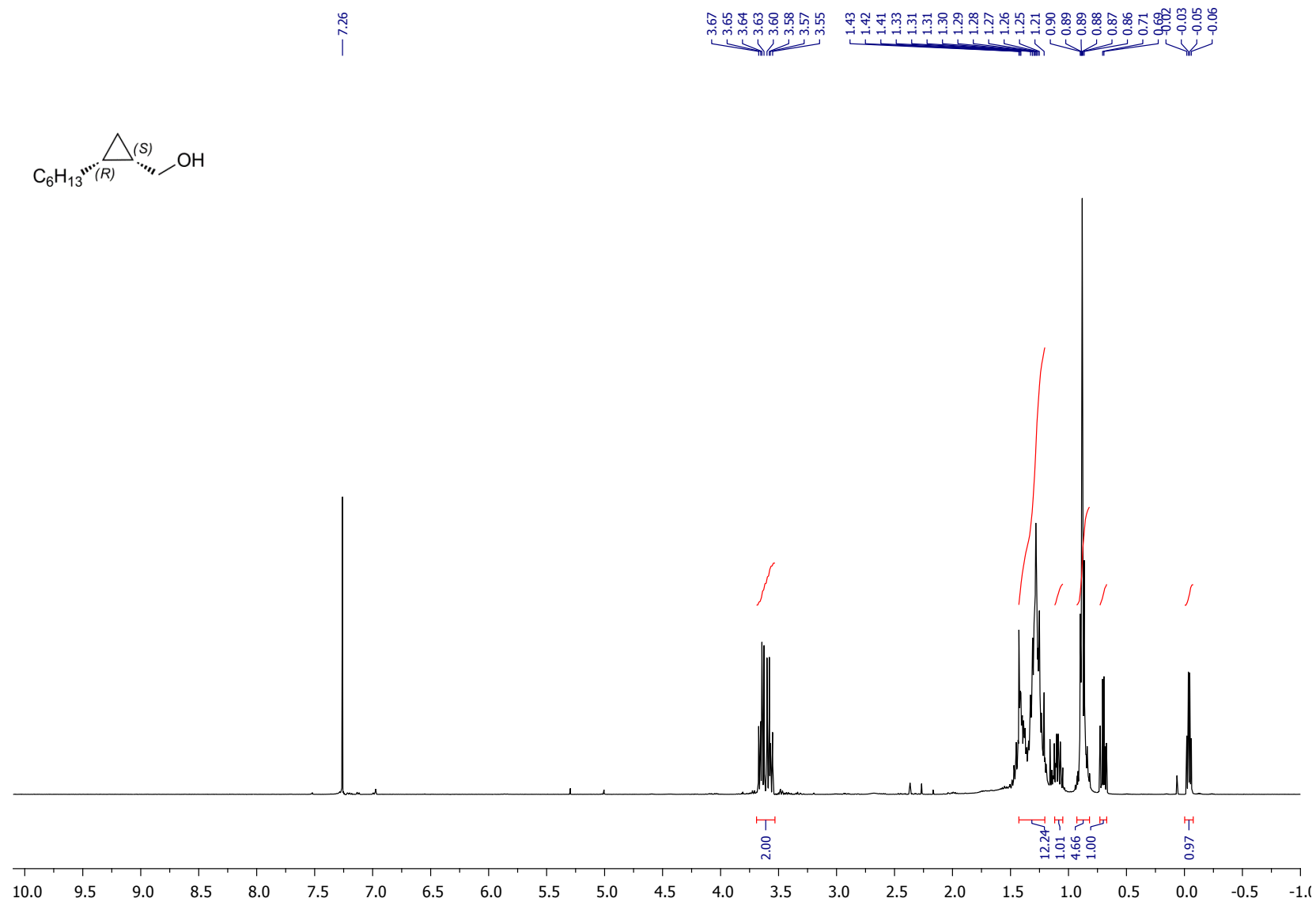
^1H NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*S*,2*R*)-2-octylcyclopropane-1-carbonyl]oxazolidin-2-one (**10b**)



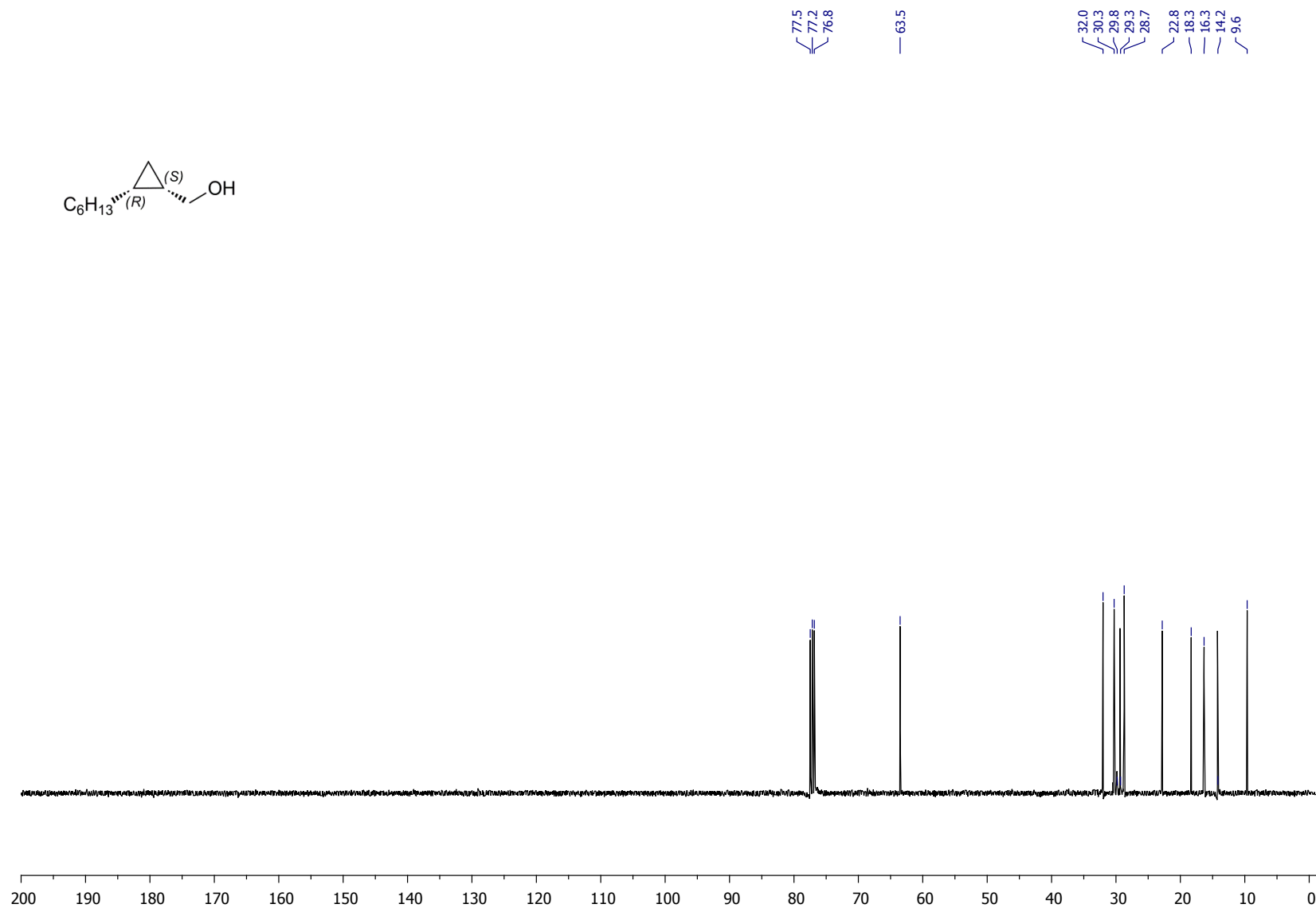
^{13}C NMR (CDCl_3 , 100 MHz): (4*S*)-4-Benzyl-3-[(1*S*,2*R*)-2-octylcyclopropane-1-carbonyl]oxazolidin-2-one (**10b**)



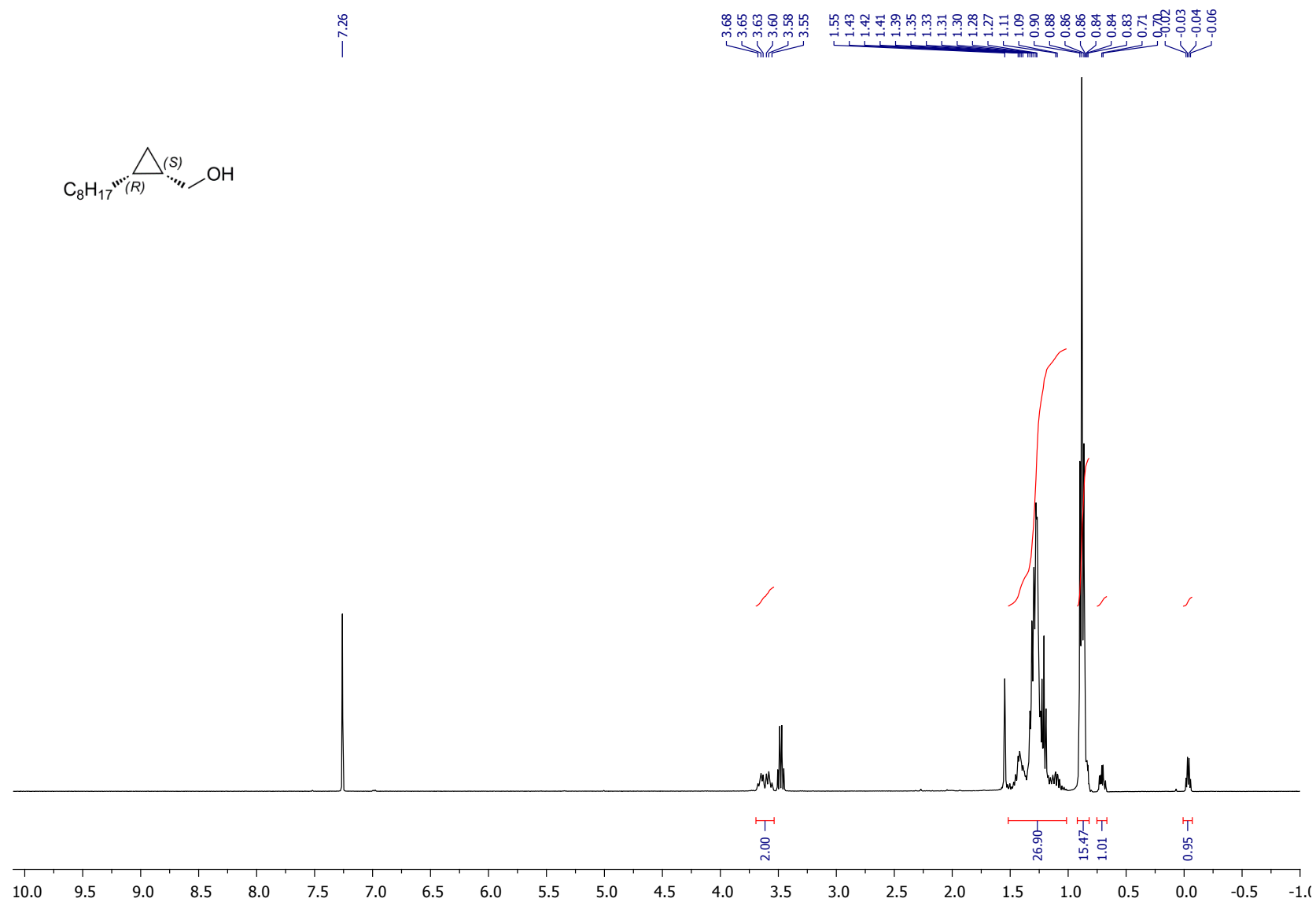
^1H NMR (CDCl_3 , 400 MHz): [(1*S*,2*R*)-2-Hexylcyclopropyl]methanol (**11a**)



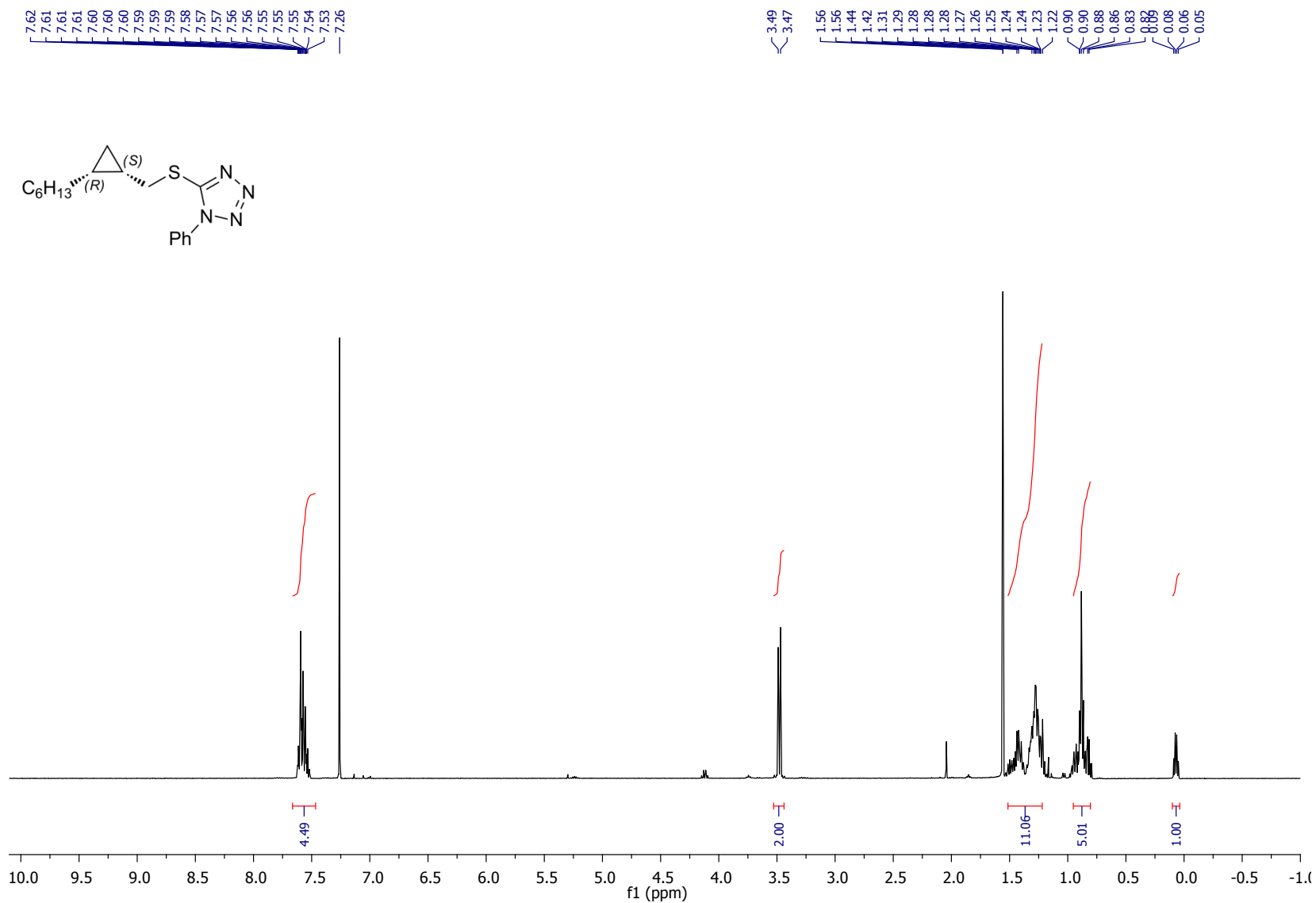
^{13}C NMR (CDCl_3 , 100 MHz): [(1*S*,2*R*)-2-Hexylcyclopropyl]methanol (**11a**)



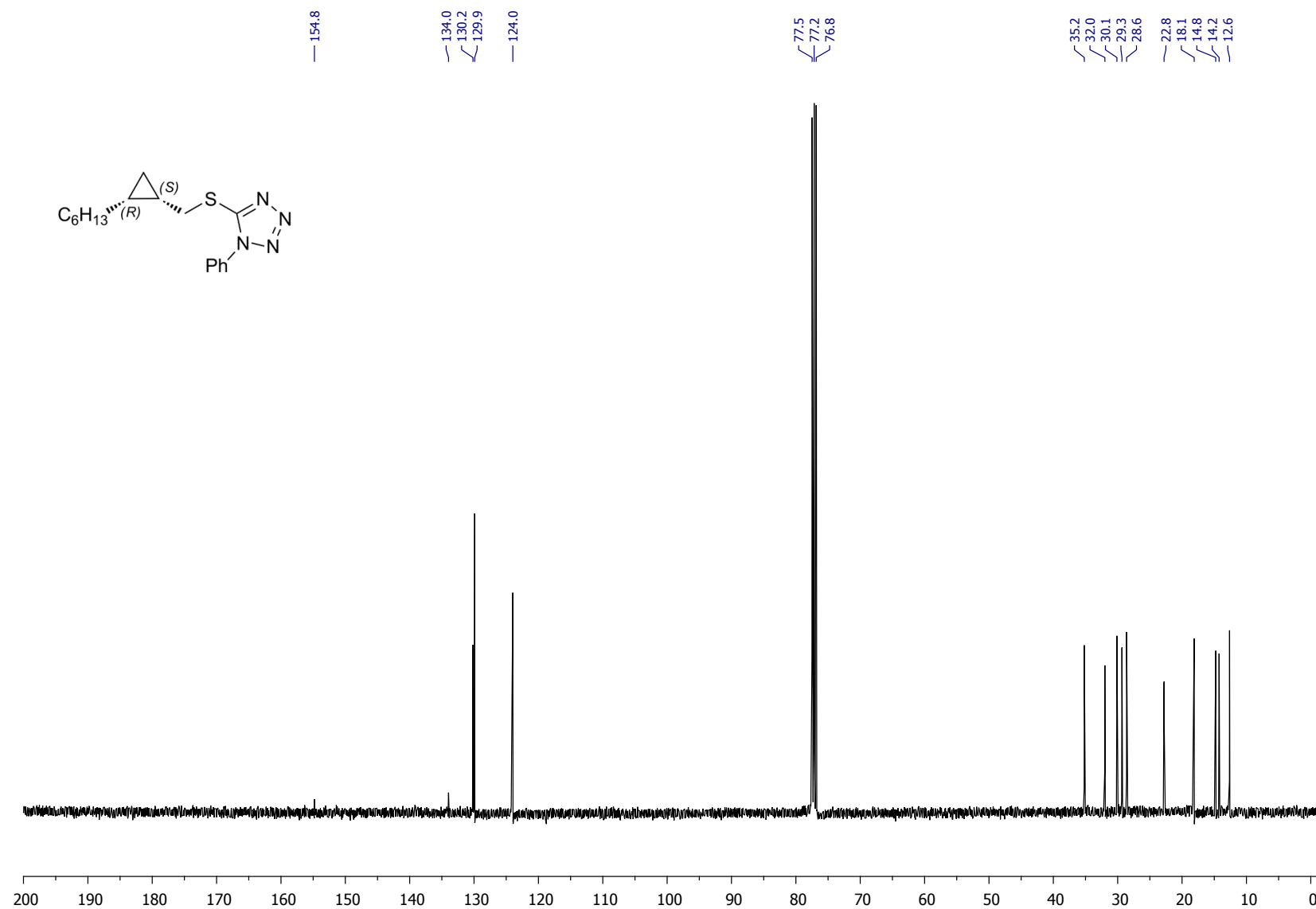
^1H NMR (CDCl_3 , n-pentane/diethyl ether 400 MHz): [(1*S*,2*R*)-2-Octylcyclopropyl]methanol (**11b**)



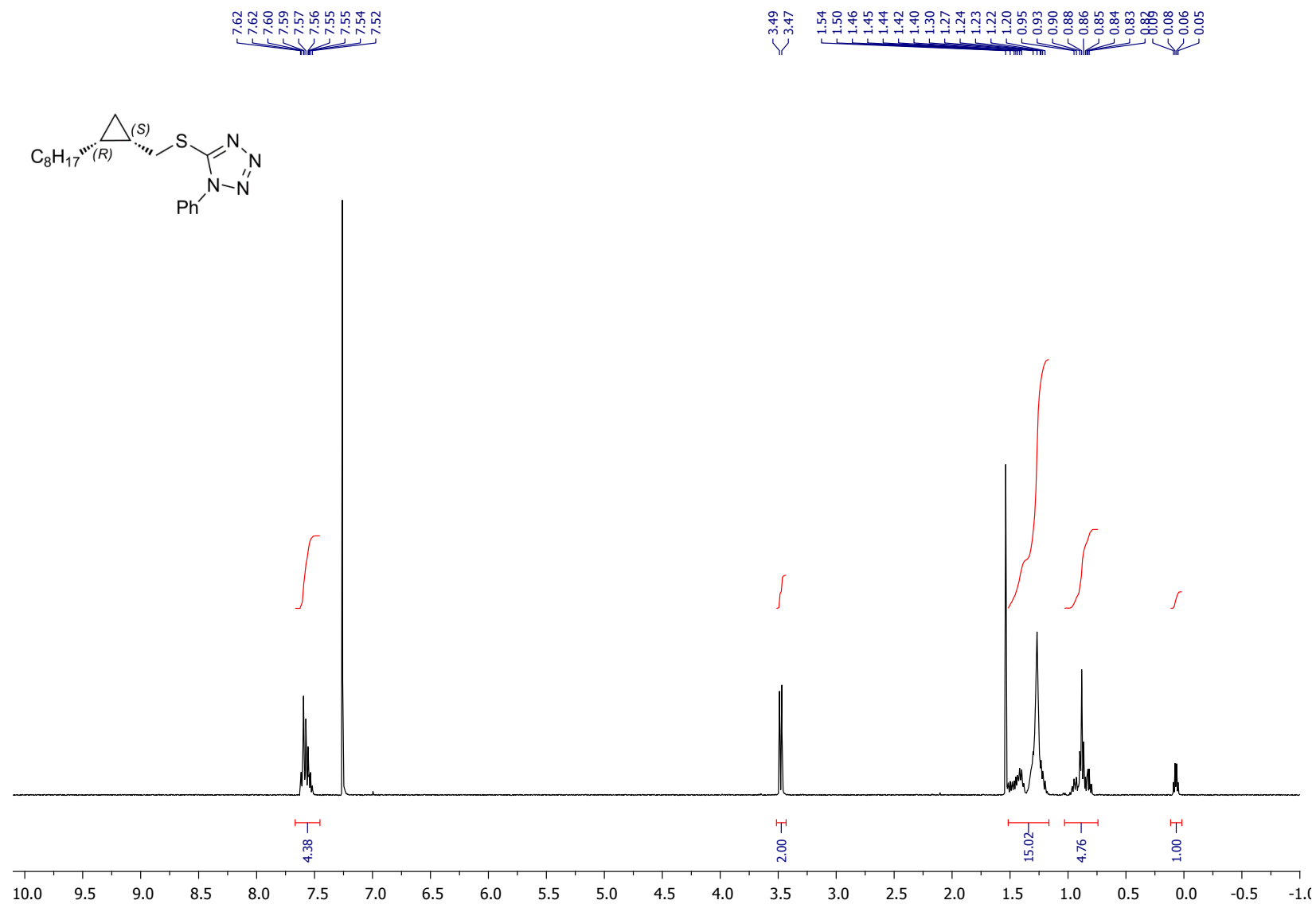
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*S*,2*R*)-2-Hexylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**12a**)



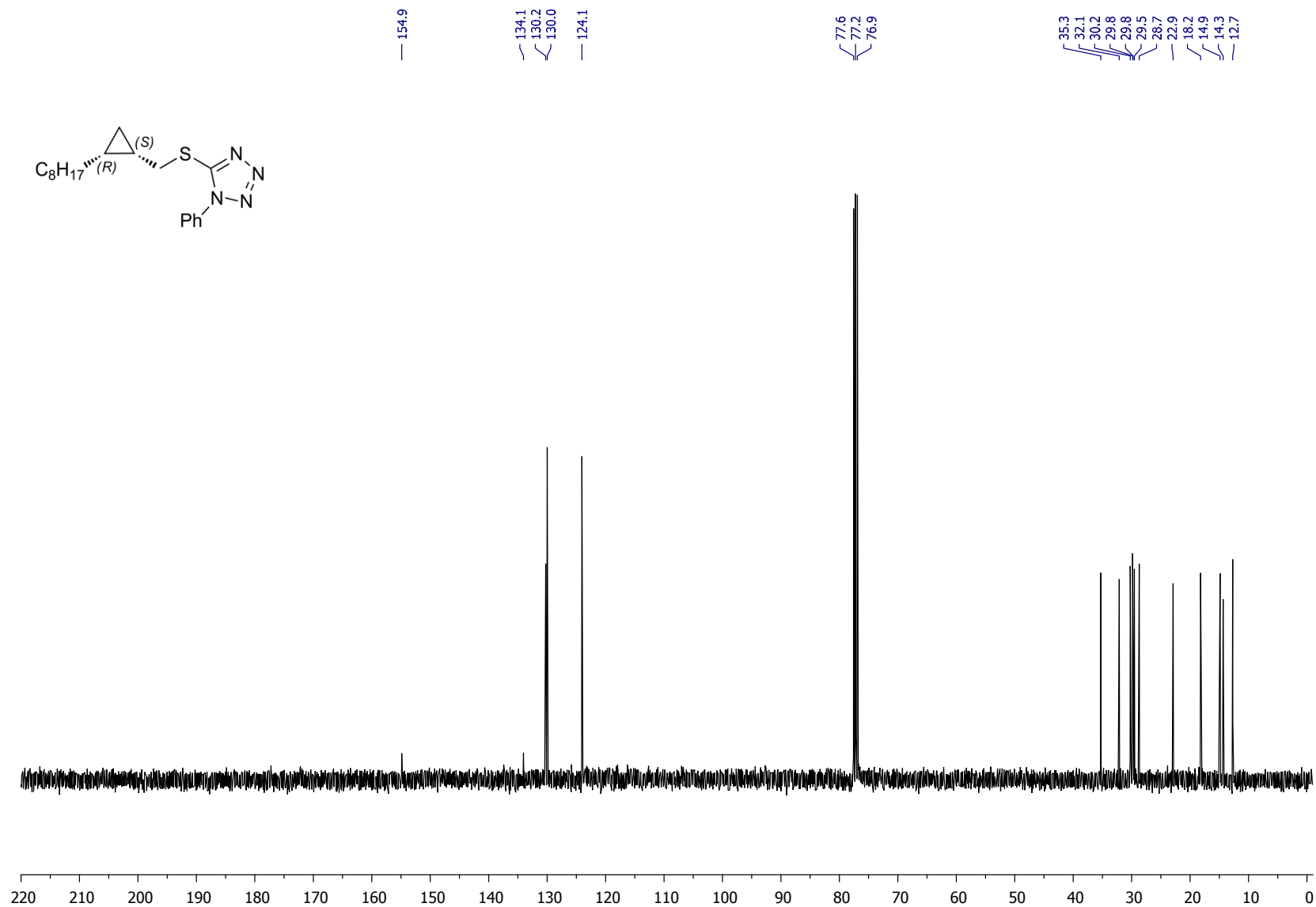
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*S*,2*R*)-2-Hexylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**12a**)



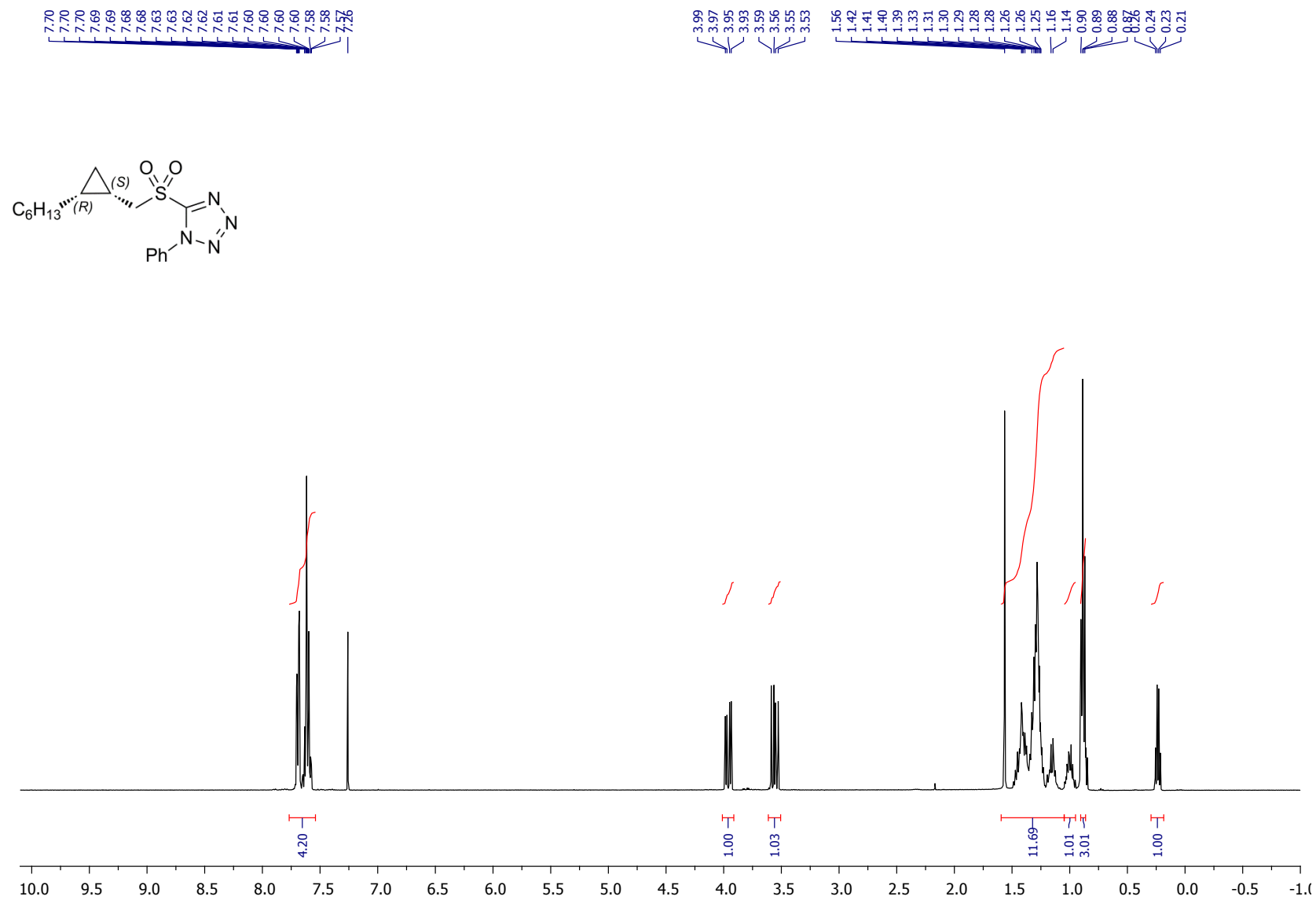
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*S*,2*R*)-2-Octylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**12b**)



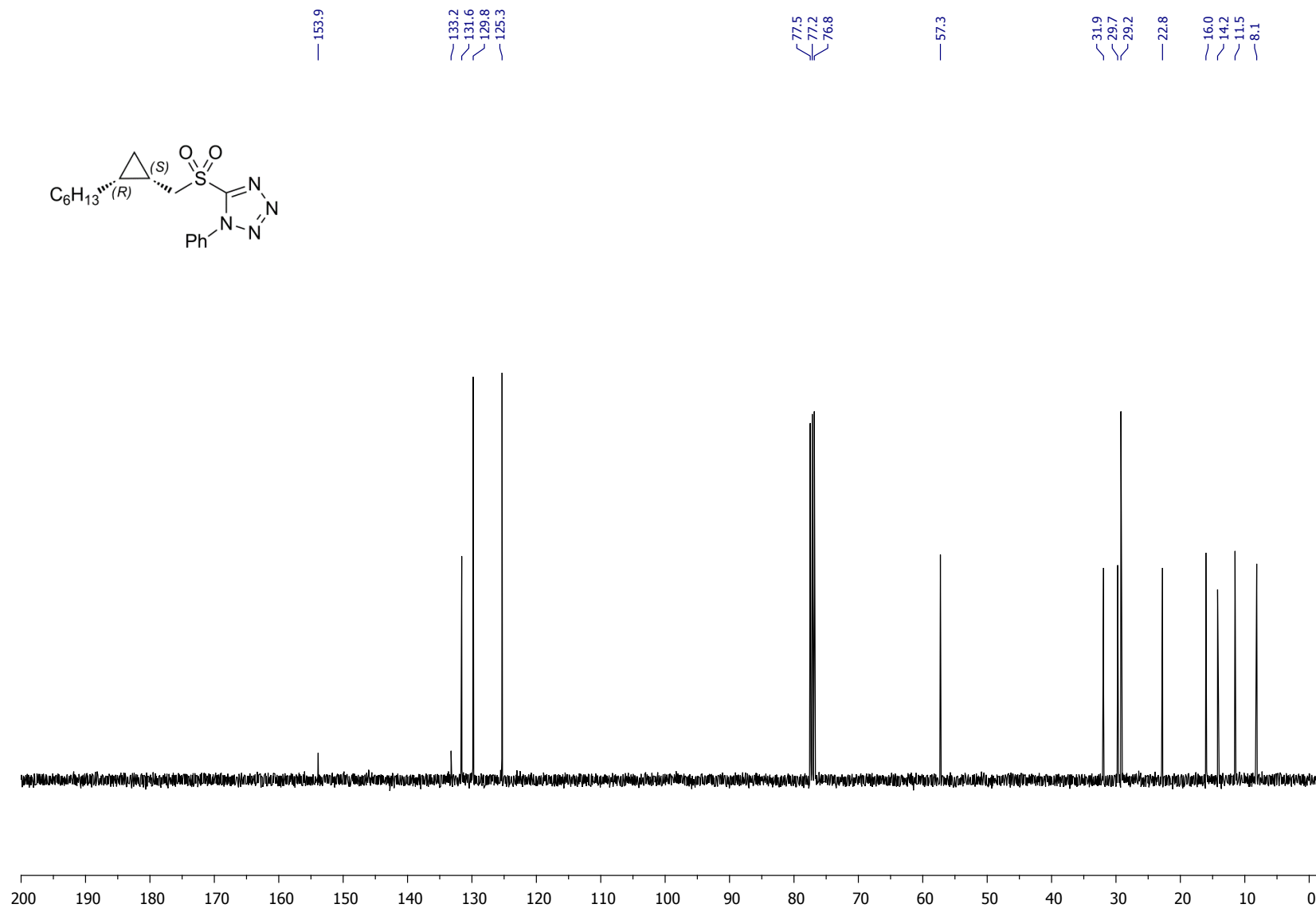
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*S*,2*R*)-2-Octylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**12b**)



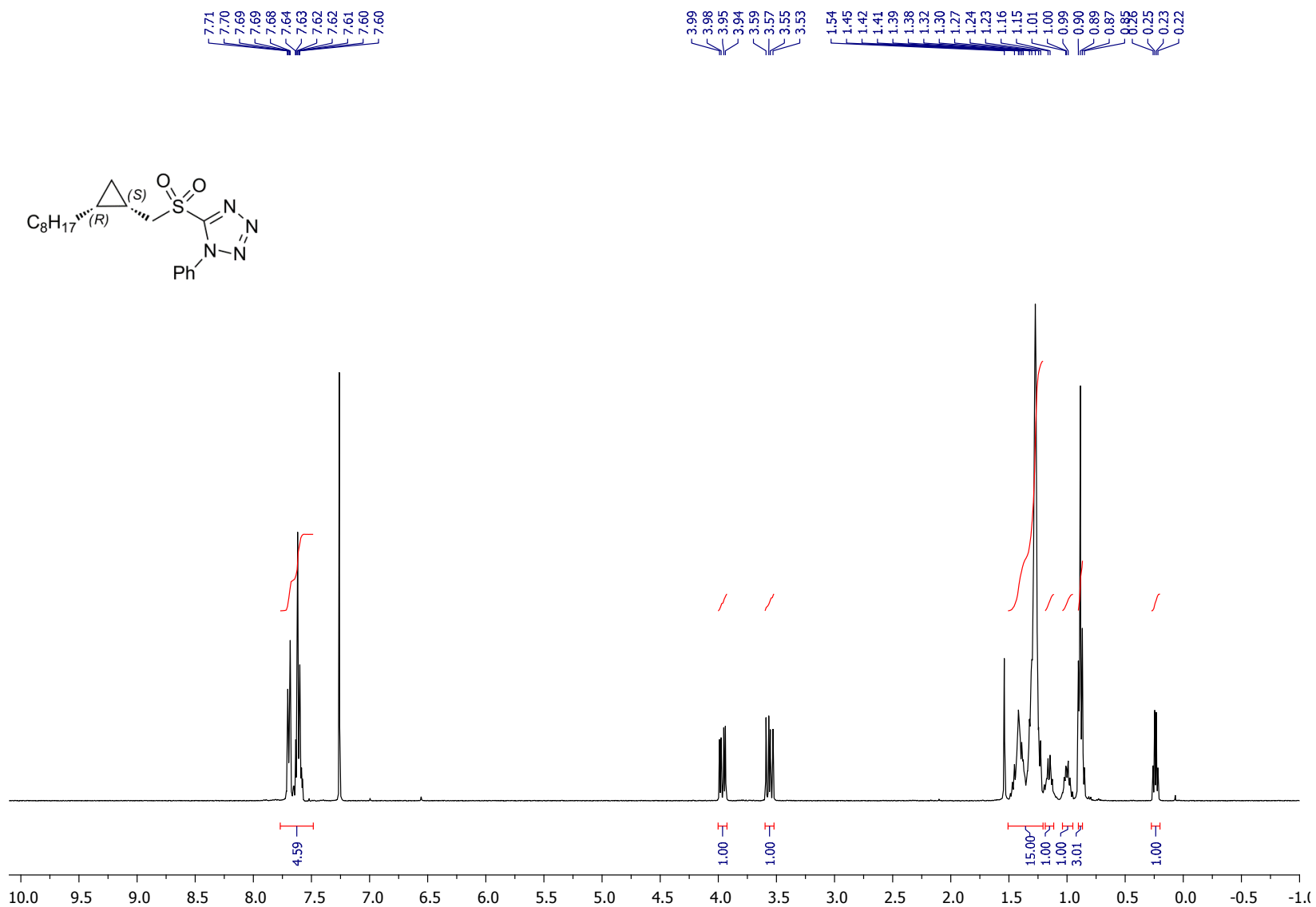
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*S*,2*R*)-2-Hexylcyclopropyl]methyl}sulfonyl)-1-phenyl-1*H*-tetrazole (**13a**)



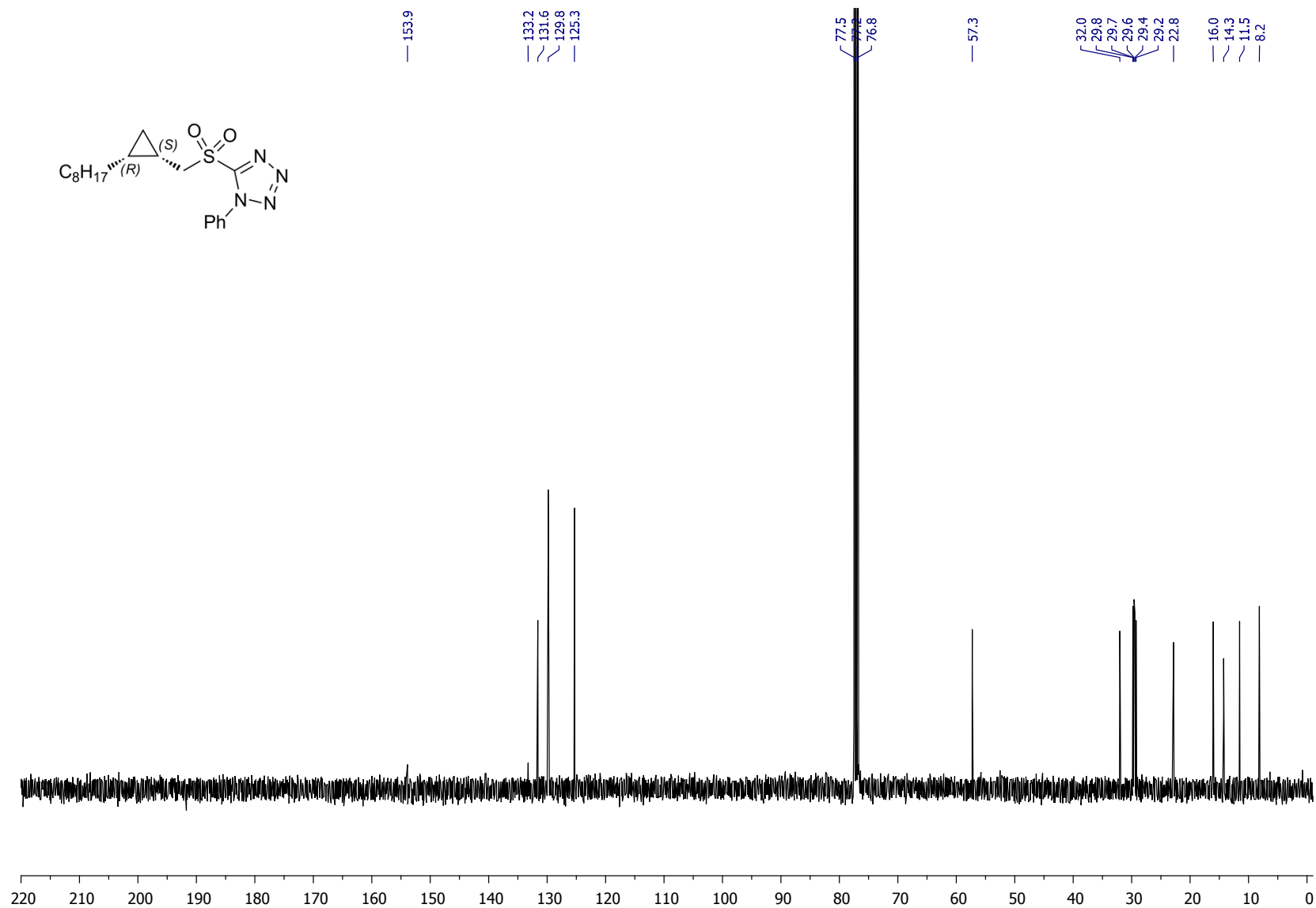
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*S*,2*R*)-2-Hexylcyclopropyl]methyl}sulfonyl)-1-phenyl-1*H*-tetrazole (**13a**)



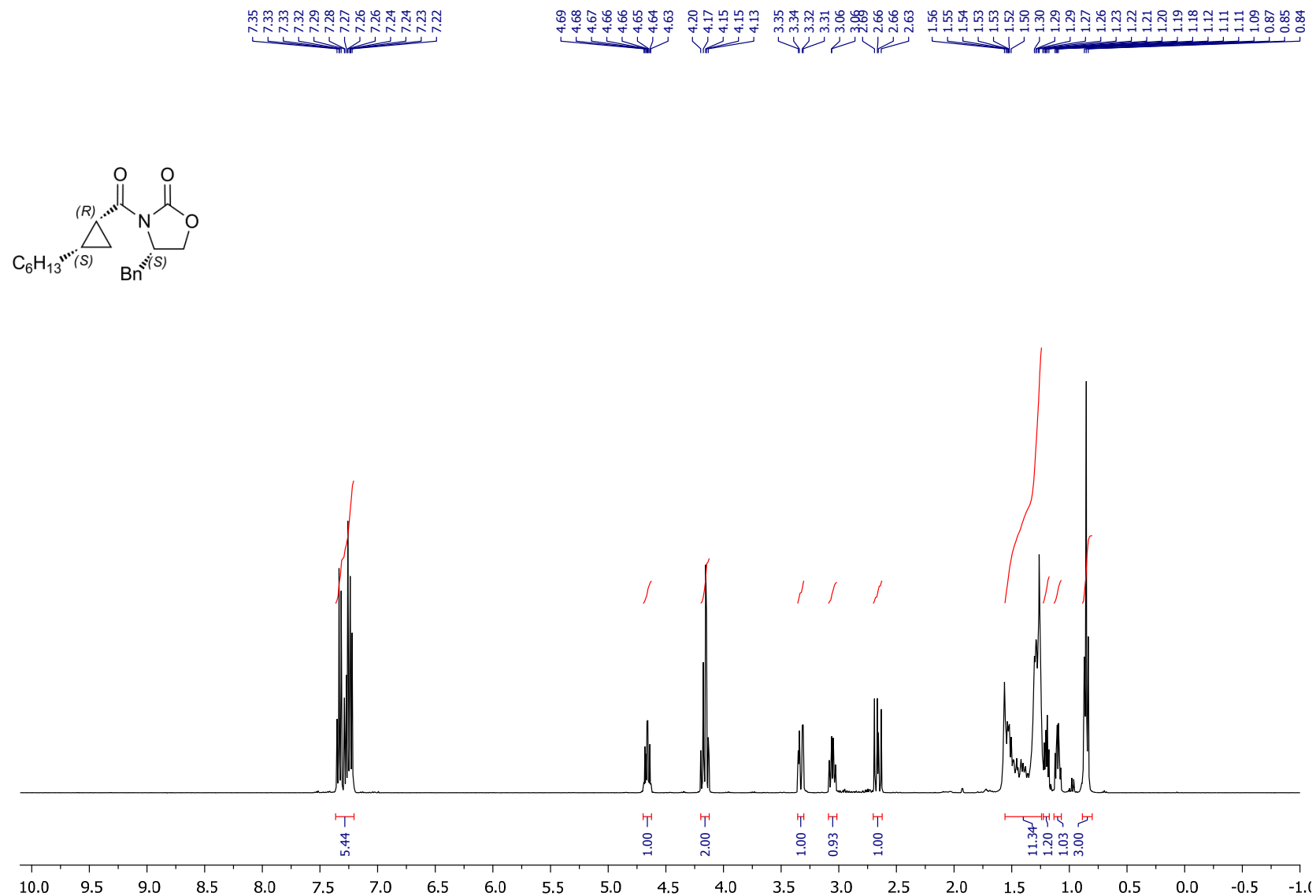
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*S*,2*R*)-2-Octylcyclopropyl]methyl}sulfonyl)-1-phenyl-1*H*-tetrazole (**13b**)



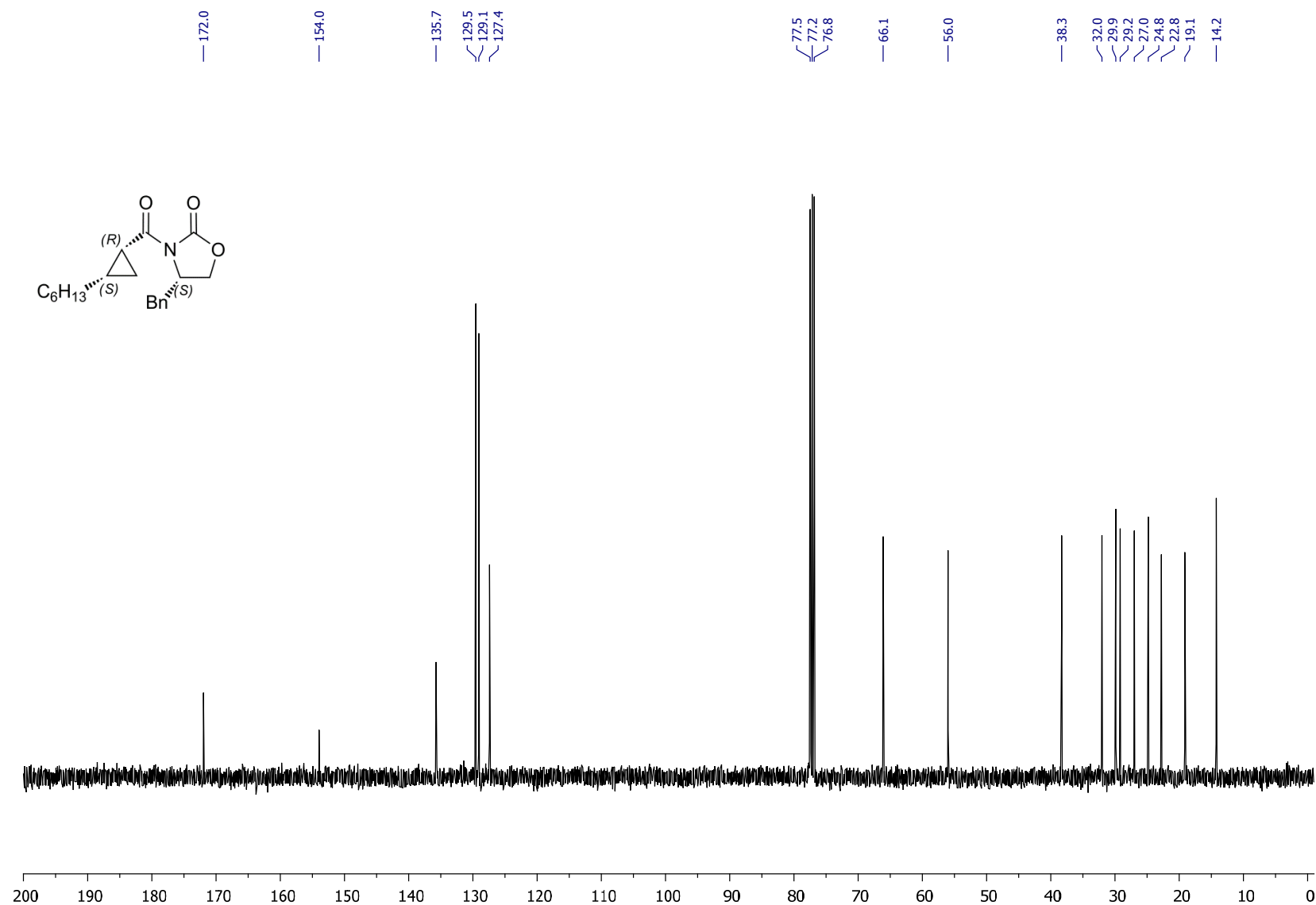
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*S*,2*R*)-2-Octylcyclopropyl]methyl}sulfonyl)-1-phenyl-1*H*-tetrazole (**13b**)



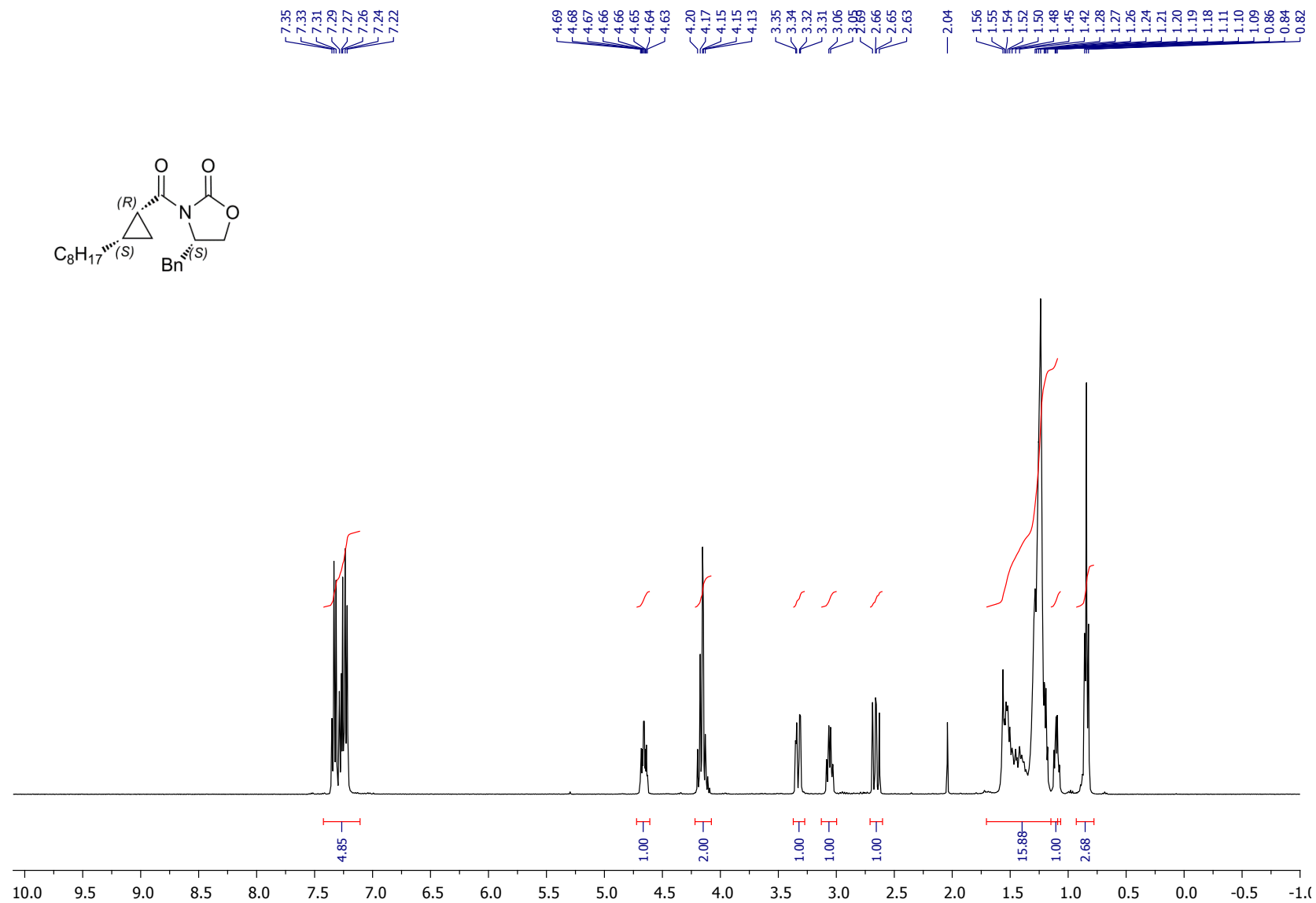
^1H NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*R*,2*S*)-2-hexylcyclopropane-1-carbonyl]oxazolidin-2-one



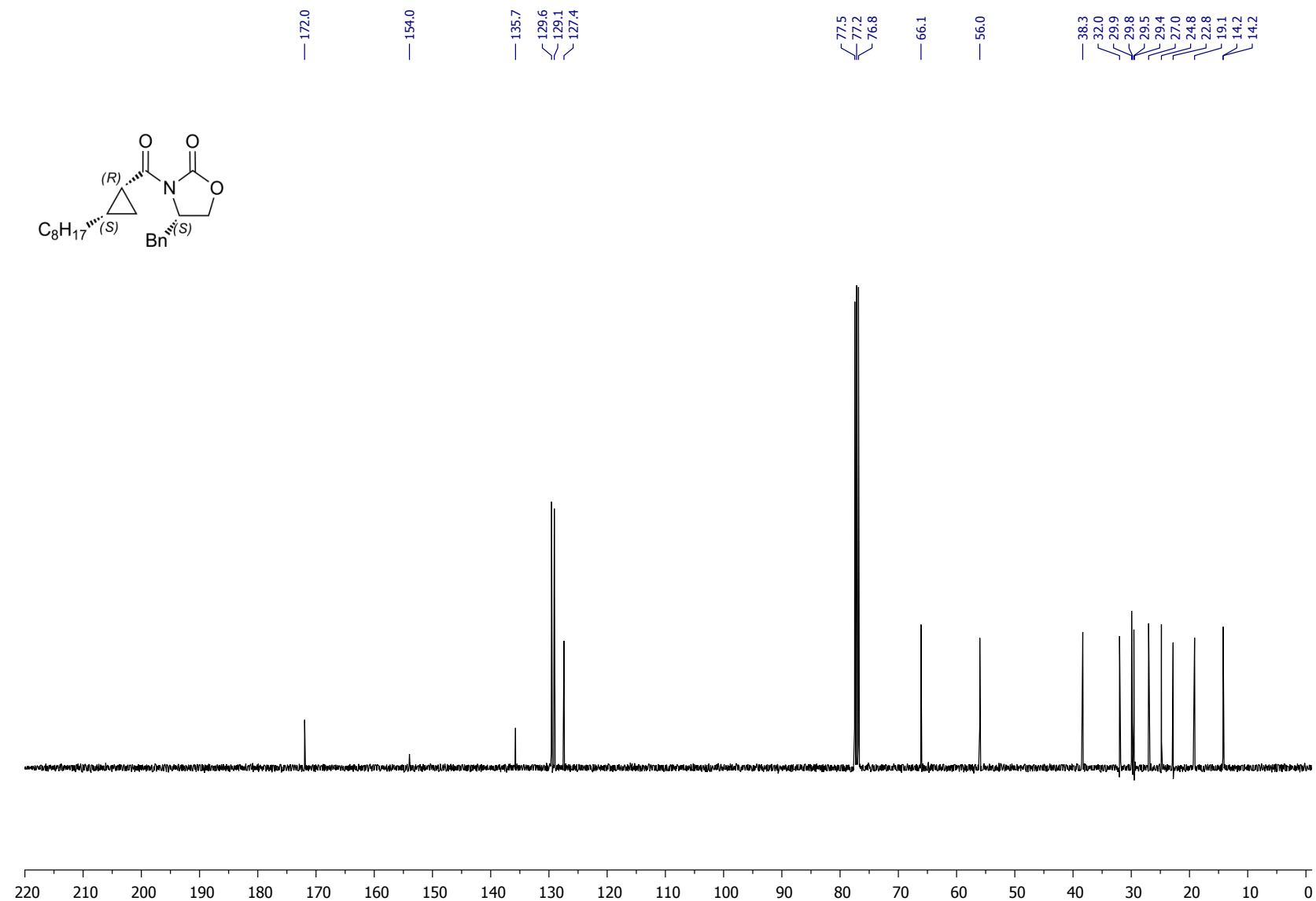
^{13}C NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*R*,2*S*)-2-hexylcyclopropane-1-carbonyl]oxazolidin-2-one (**14a**)



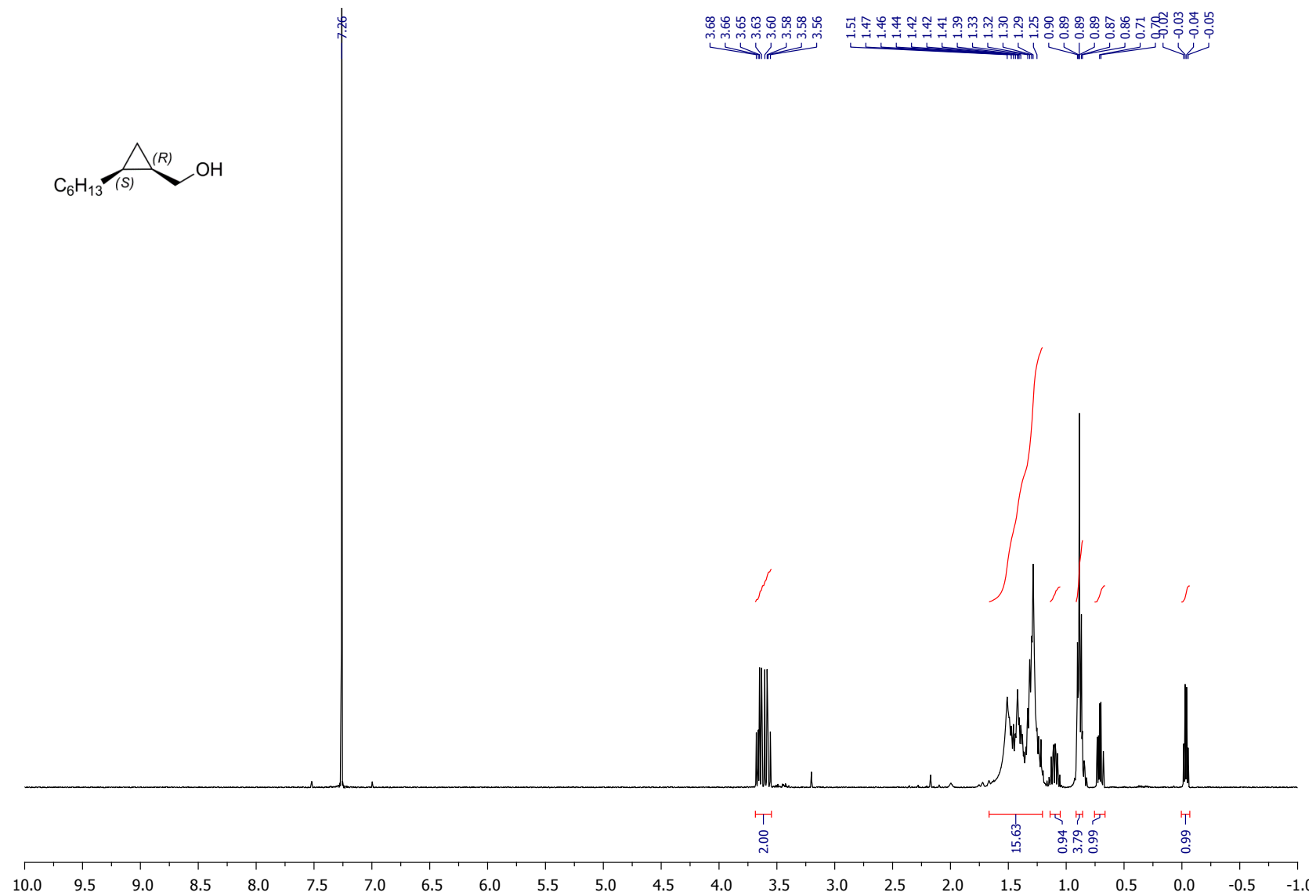
^1H NMR (CDCl_3 , 400 MHz): (4*S*)-4-Benzyl-3-[(1*R*,2*S*)-2-octylcyclopropane-1-carbonyl]oxazolidin-2-one (**14b**)



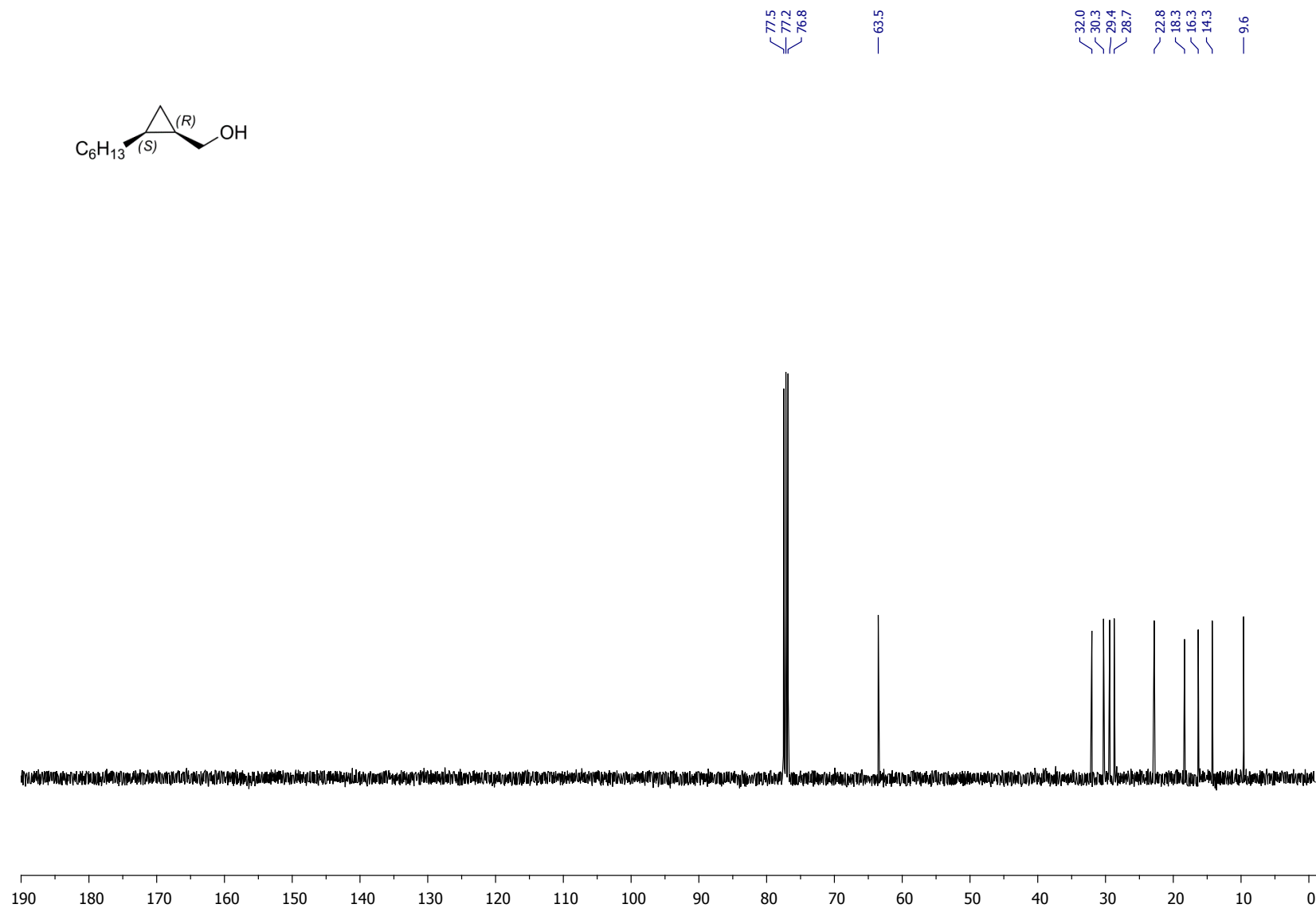
^{13}C NMR (CDCl_3 , 100 MHz): (4*S*)-4-Benzyl-3-[(1*R*,2*S*)-2-octylcyclopropane-1-carbonyl]oxazolidin-2-one (**14b**)



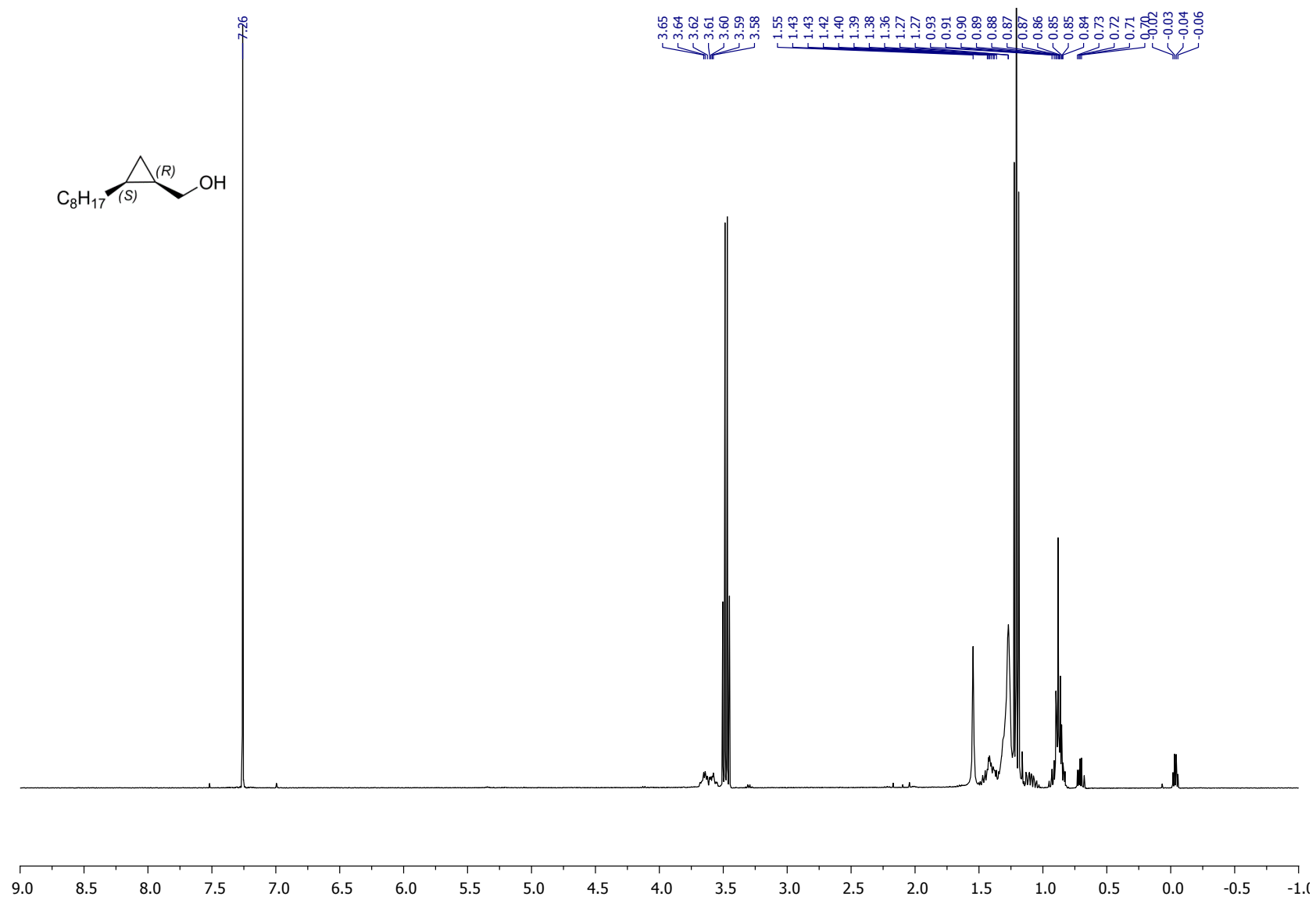
^1H NMR (CDCl_3 , 400 MHz): [(1*R*,2*S*)-2-Hexylcyclopropyl]methanol (**15a**)



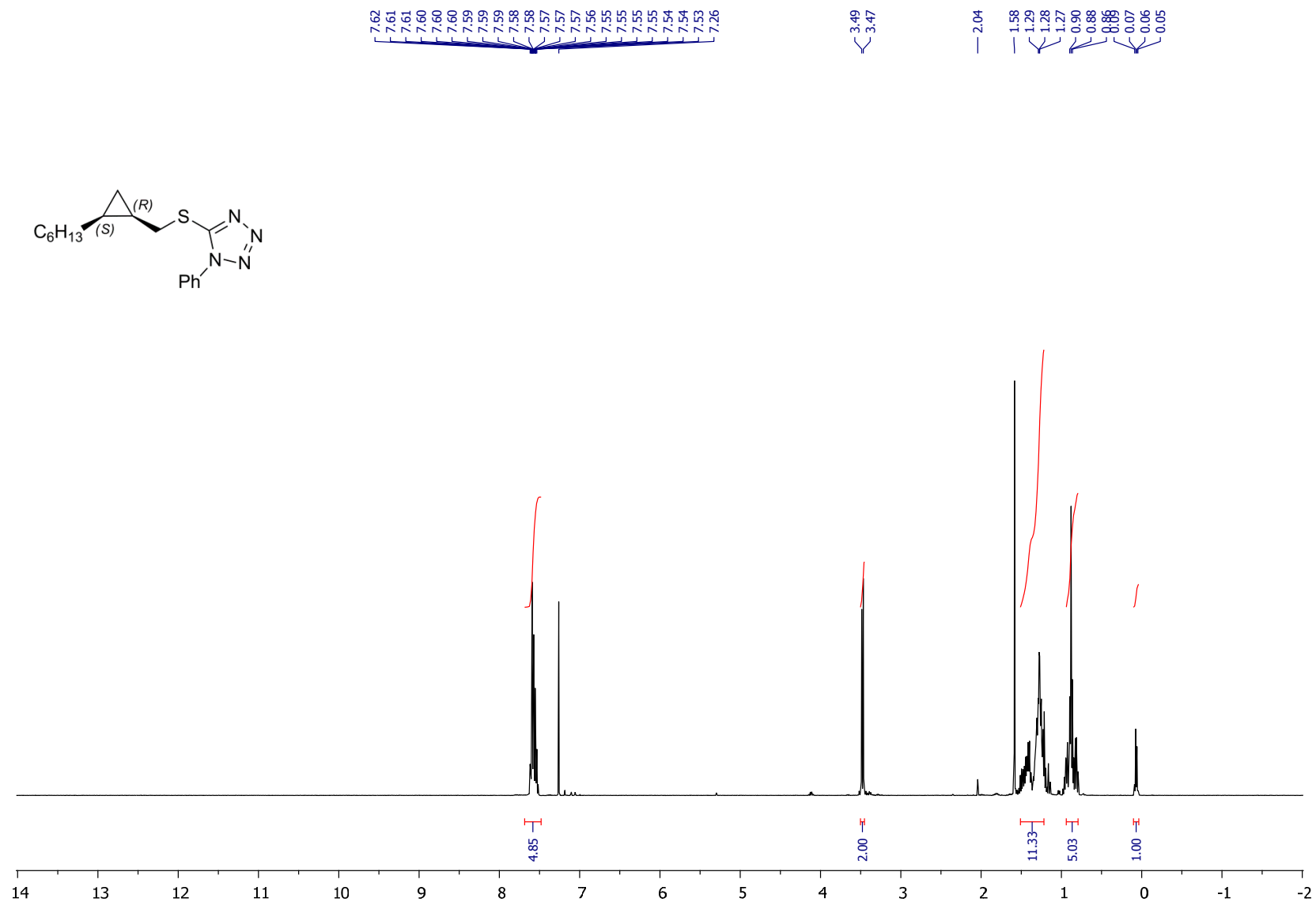
^{13}C NMR (CDCl_3 , 100 MHz): [(1*R*,2*S*)-2-Hexylcyclopropyl]methanol (**15a**)



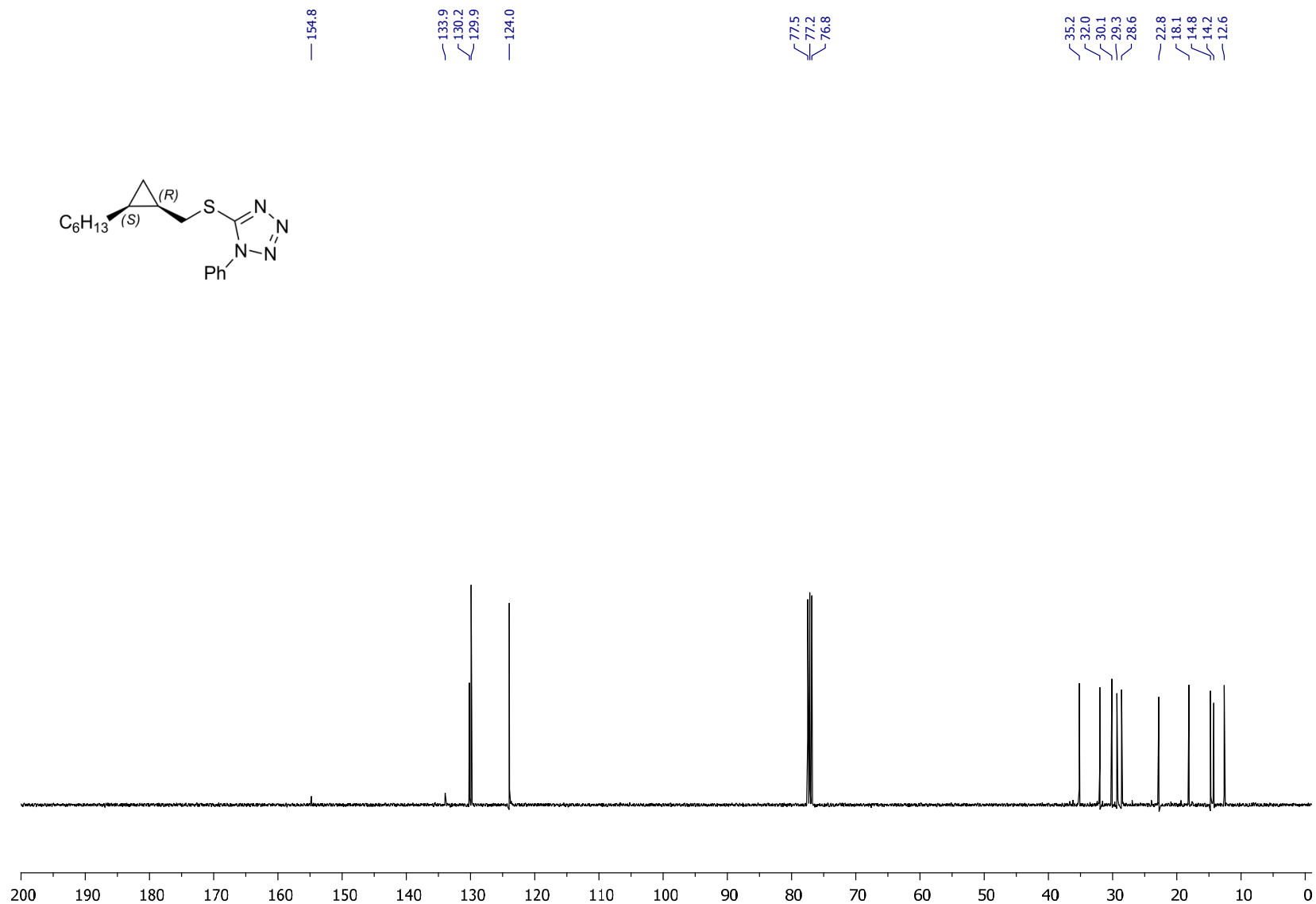
^1H NMR (CDCl_3 , n-pentane/diethylether 400 MHz): [(1*R*,2*S*)-2-Octylcyclopropyl]methanol (**15b**)



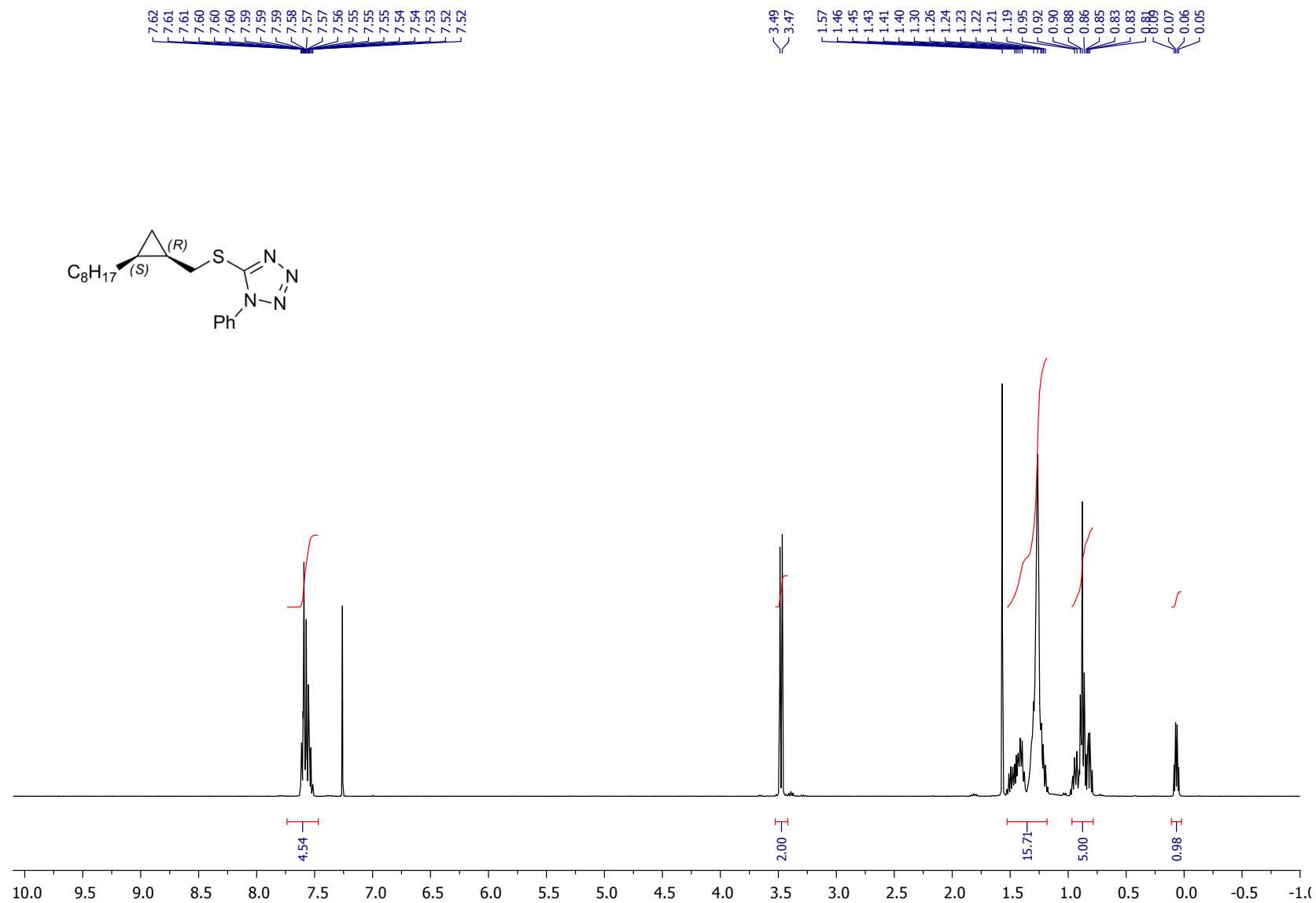
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*R*,2*S*)-2-Hexylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**16a**)



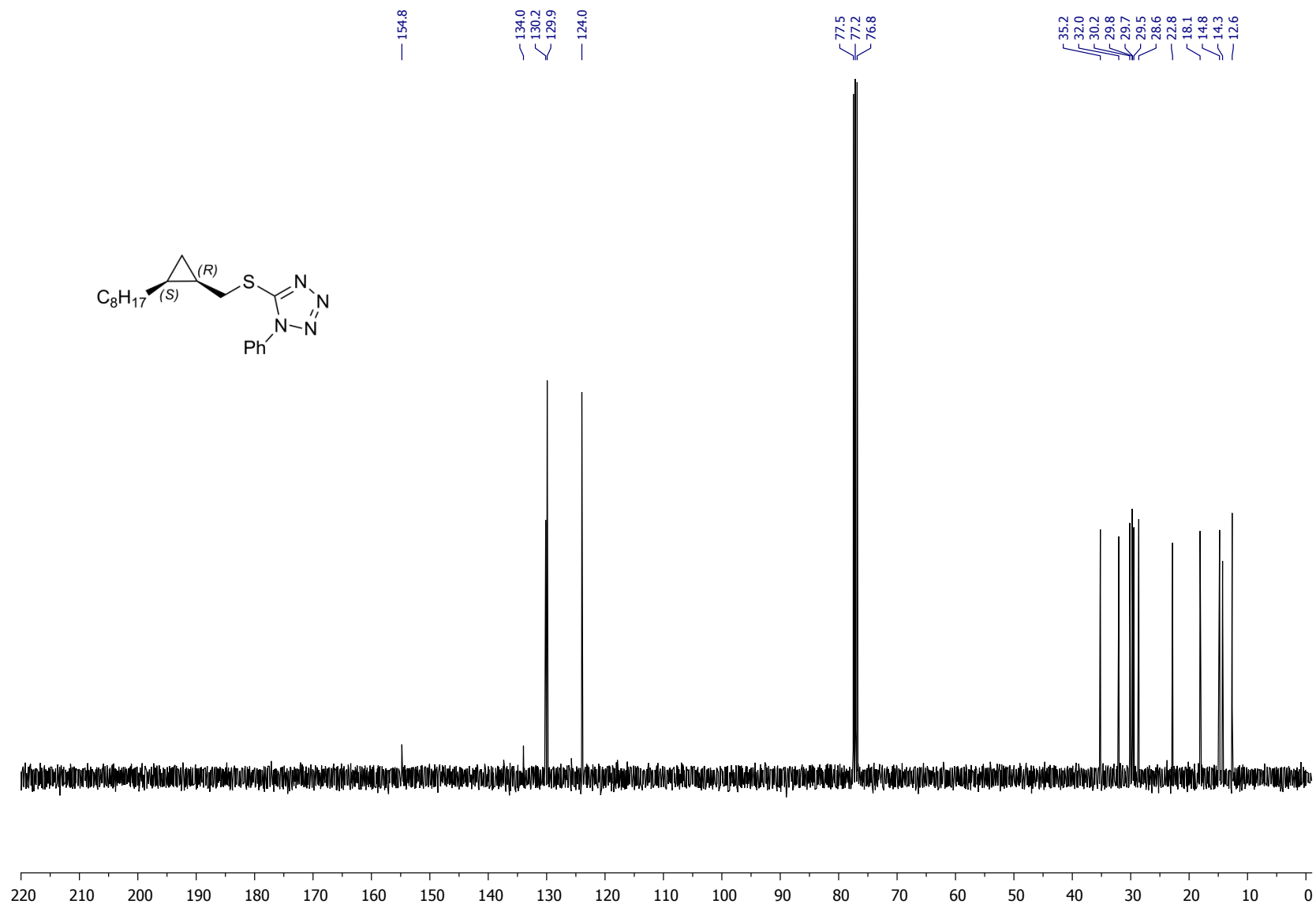
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*R*,2*S*)-2-Hexylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**16a**)



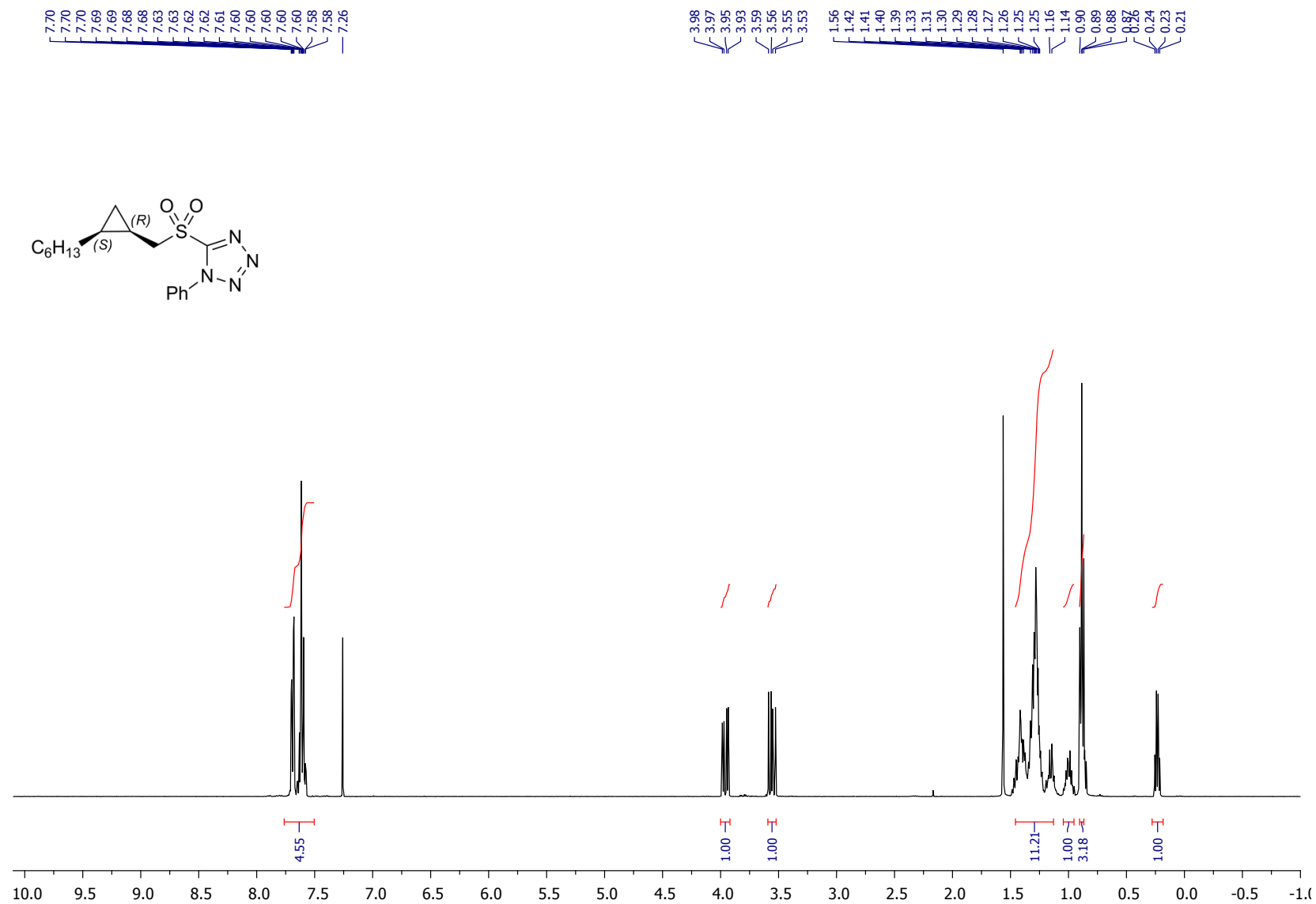
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*R*,2*S*)-2-Octylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**16b**)



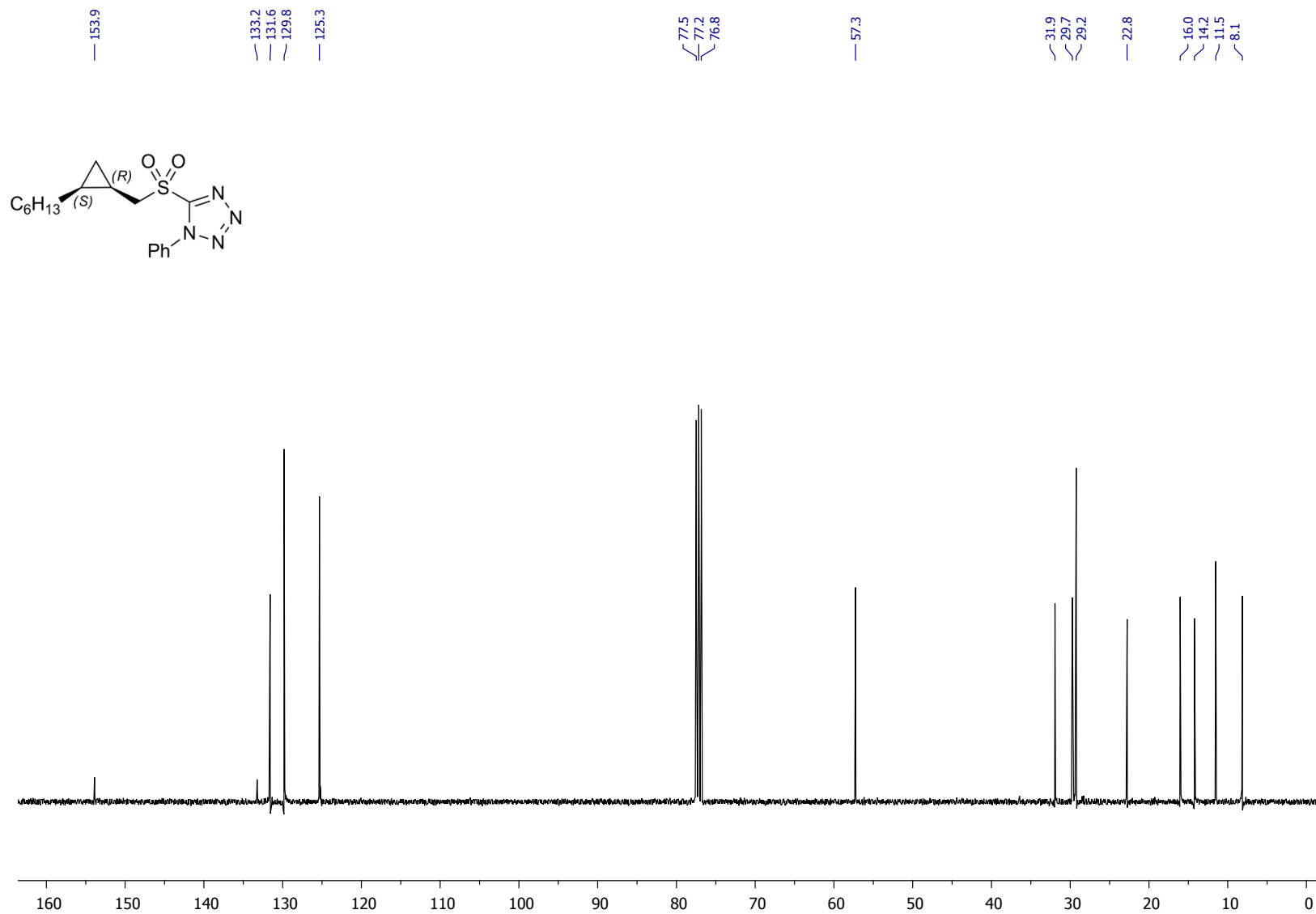
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*R*,2*S*)-2-Octylcyclopropyl]methyl}thio)-1-phenyl-1*H*-tetrazole (**16b**)



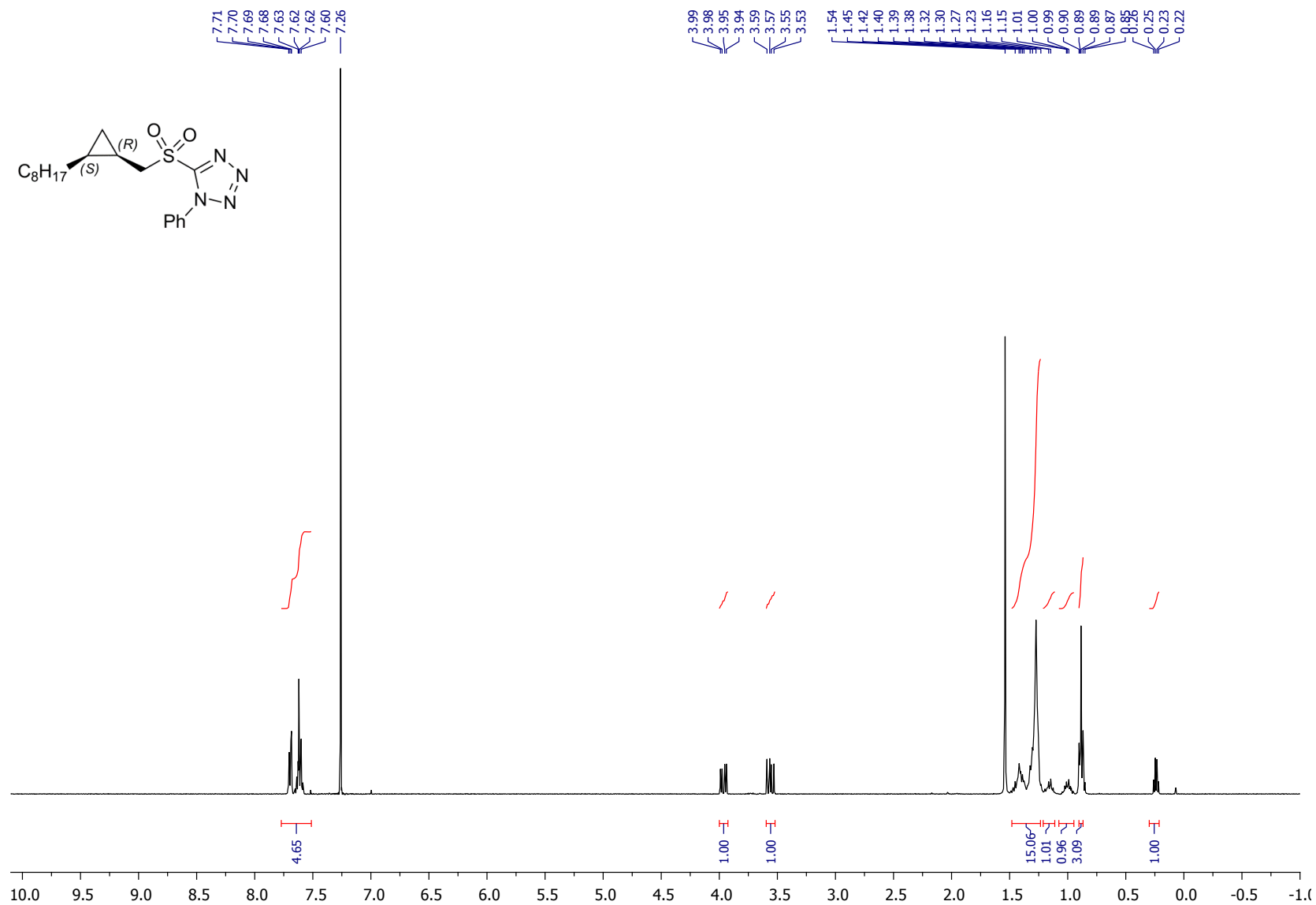
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*R*,2*S*)-2-Hexylcyclopropyl]methyl}sulfonyl)-1-phenyl-1*H*-tetrazole (**17a**)



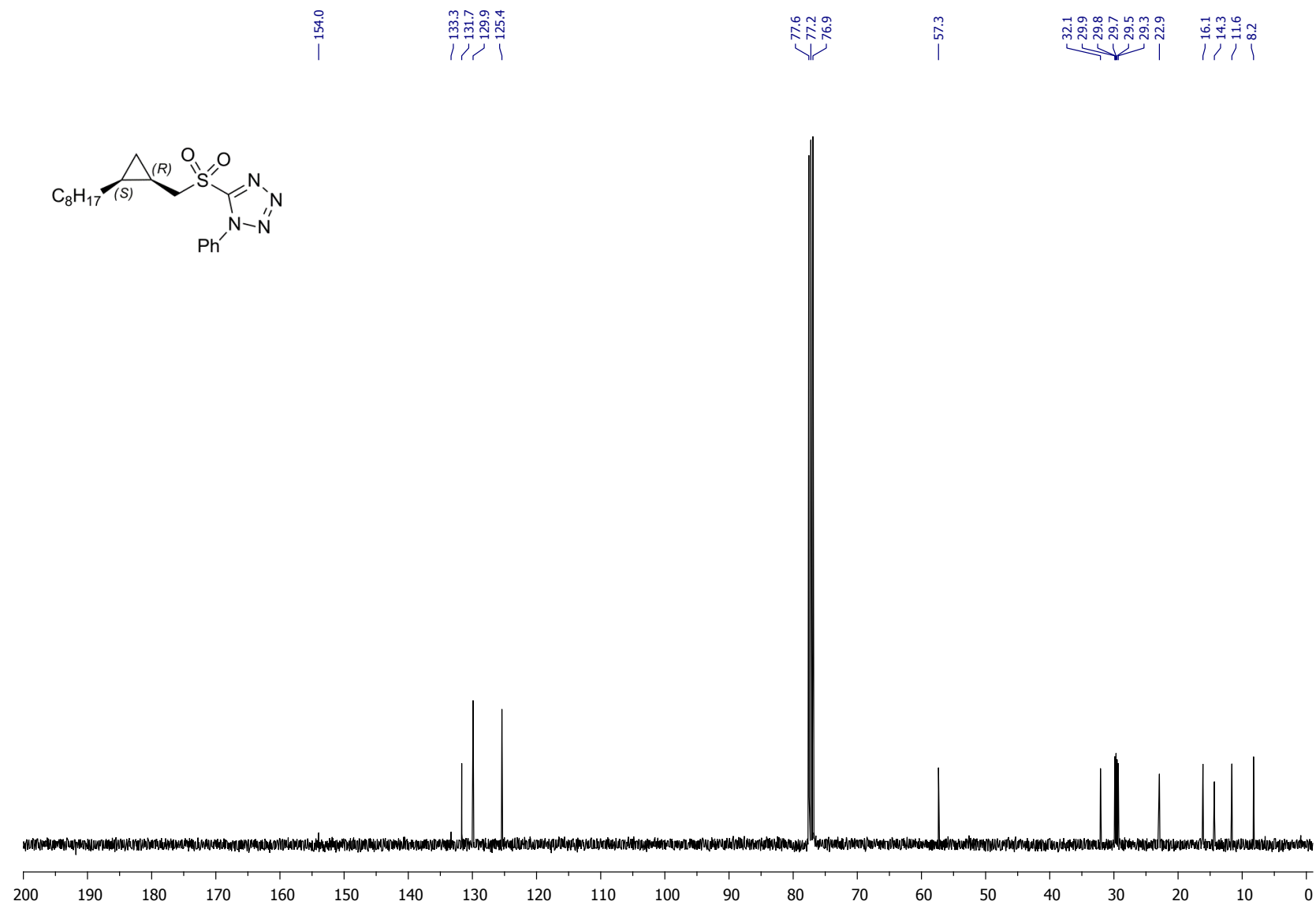
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*R*,2*S*)-2-Hexylcyclopropyl]methyl} sulfonyl)-1-phenyl-1*H*-tetrazole (**17a**)



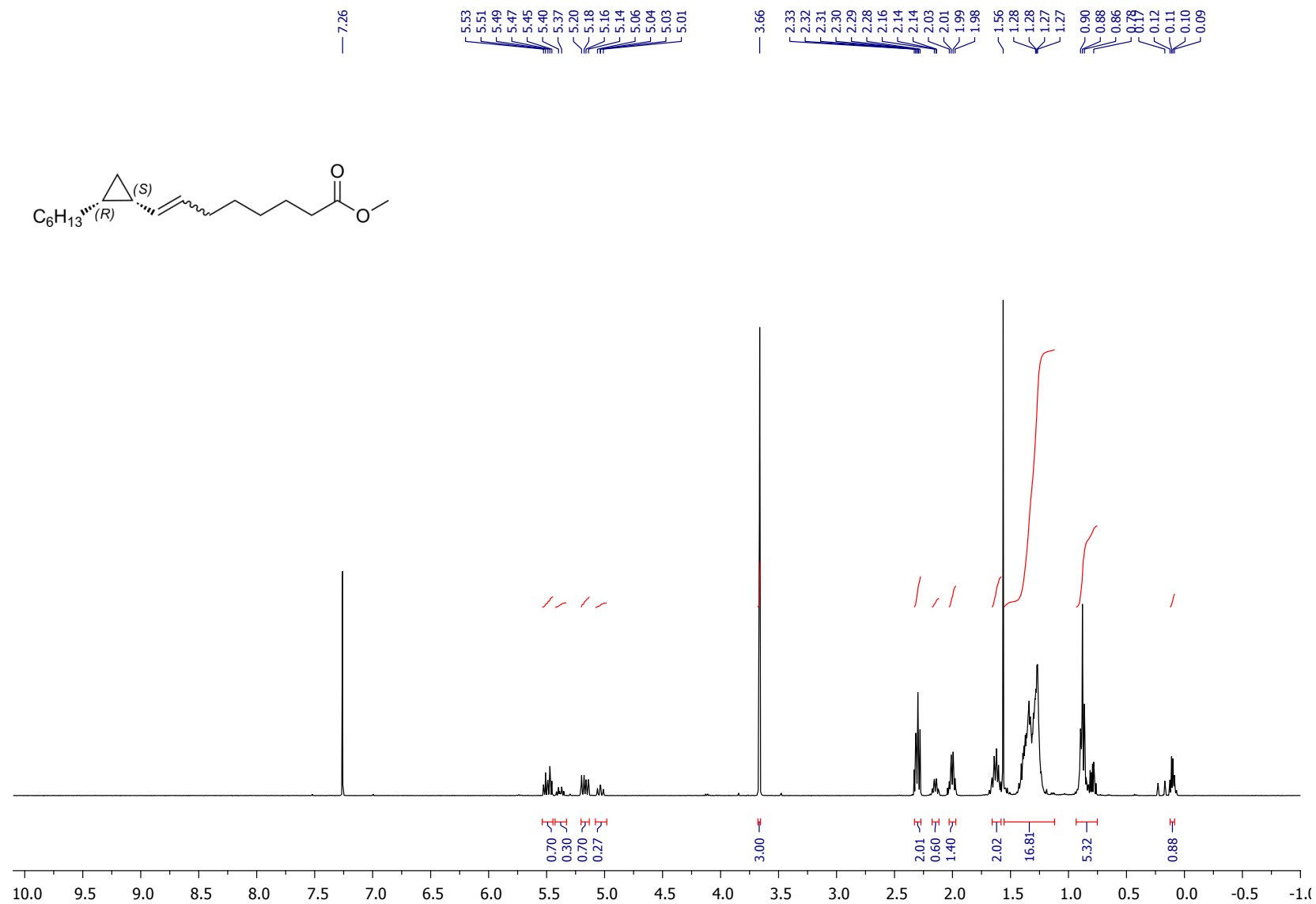
^1H NMR (CDCl_3 , 400 MHz): 5-({[(1*R*,2*S*)-2-Octylcyclopropyl]methyl}sulfonyl)-1-phenyl-1*H*-tetrazole (**17b**)



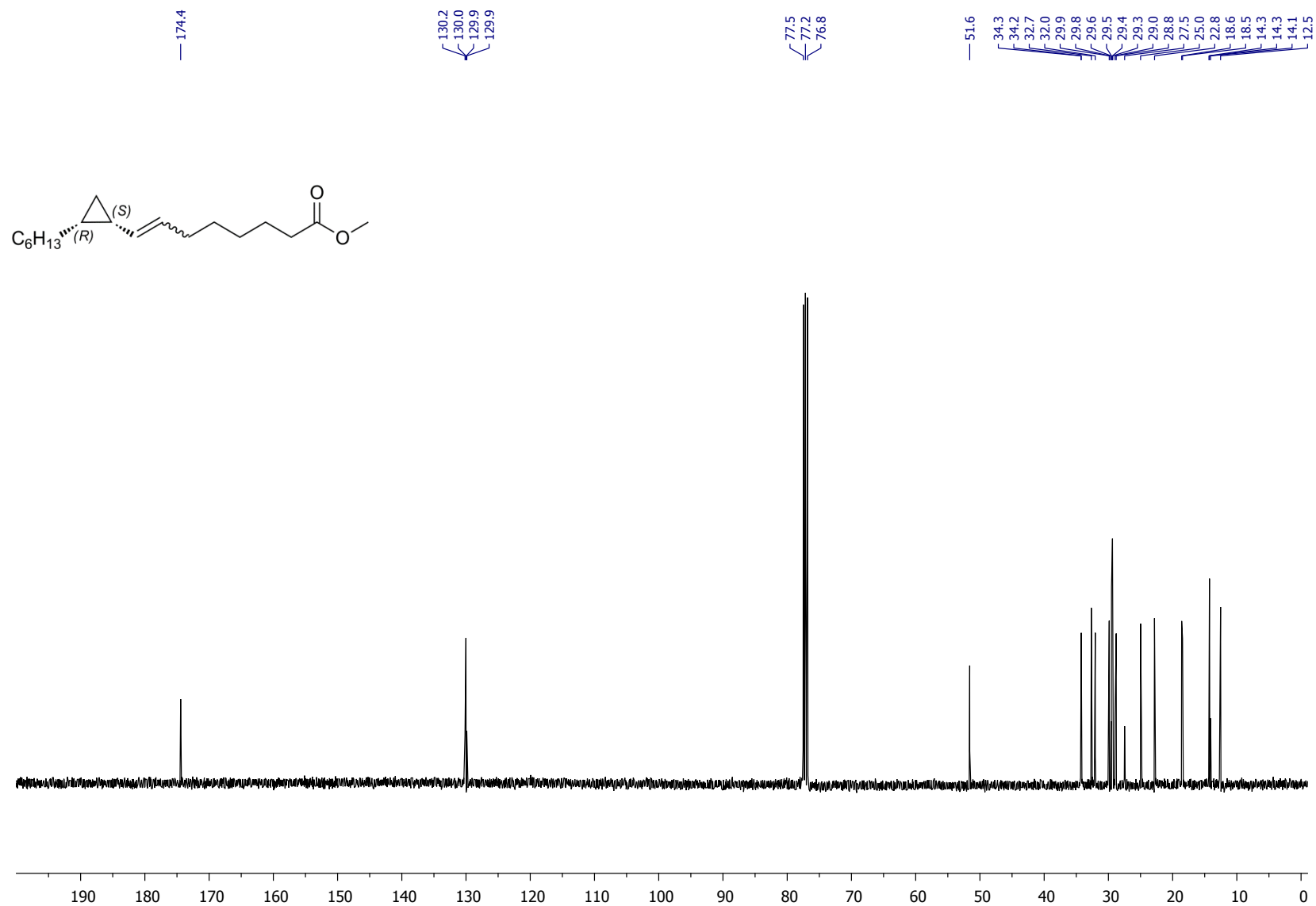
^{13}C NMR (CDCl_3 , 100 MHz): 5-({[(1*R*,2*S*)-2-Octylcyclopropyl]methyl}sulfonyl)-1-phenyl-1*H*-tetrazole (**17b**)



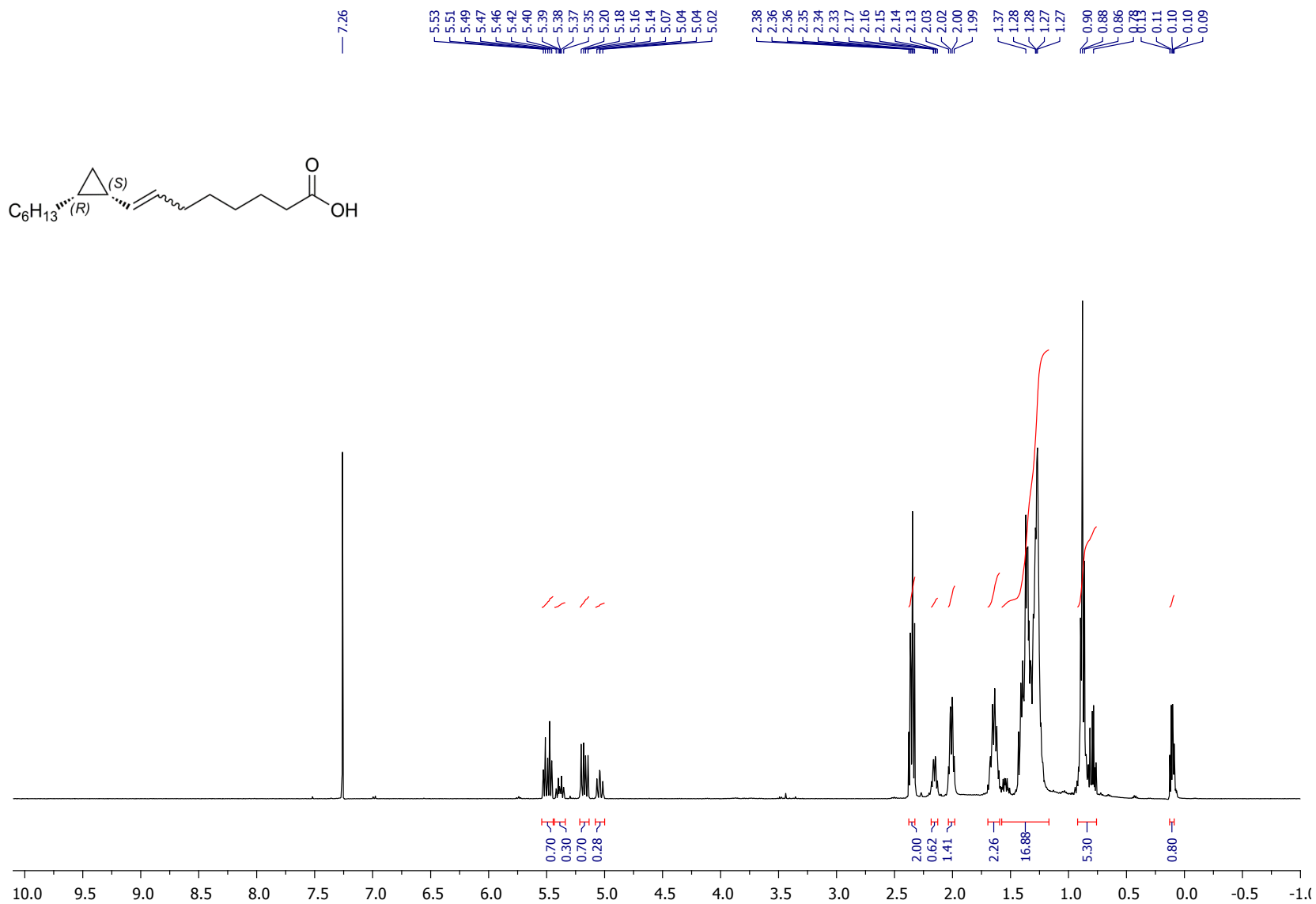
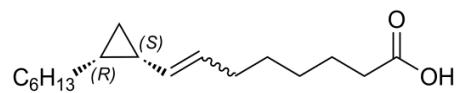
^1H NMR (CDCl_3 , 400 MHz): Methyl 8-[(1*S*,2*R*)-2-hexylcyclopropyl]oct-7-enoate (**19**)



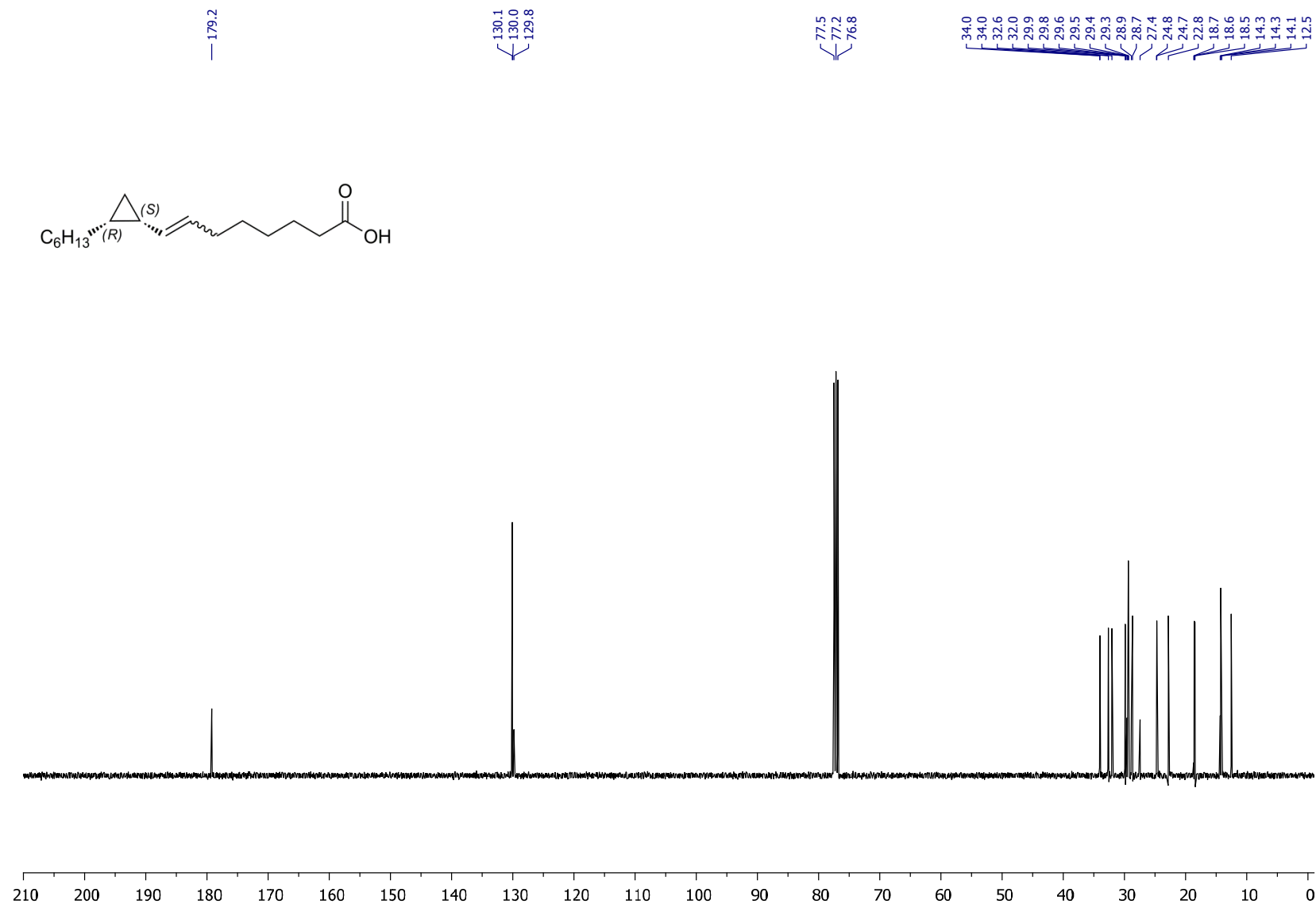
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 8-[(1*S*,2*R*)-2-hexylcyclopropyl]oct-7-enoate (**19**)



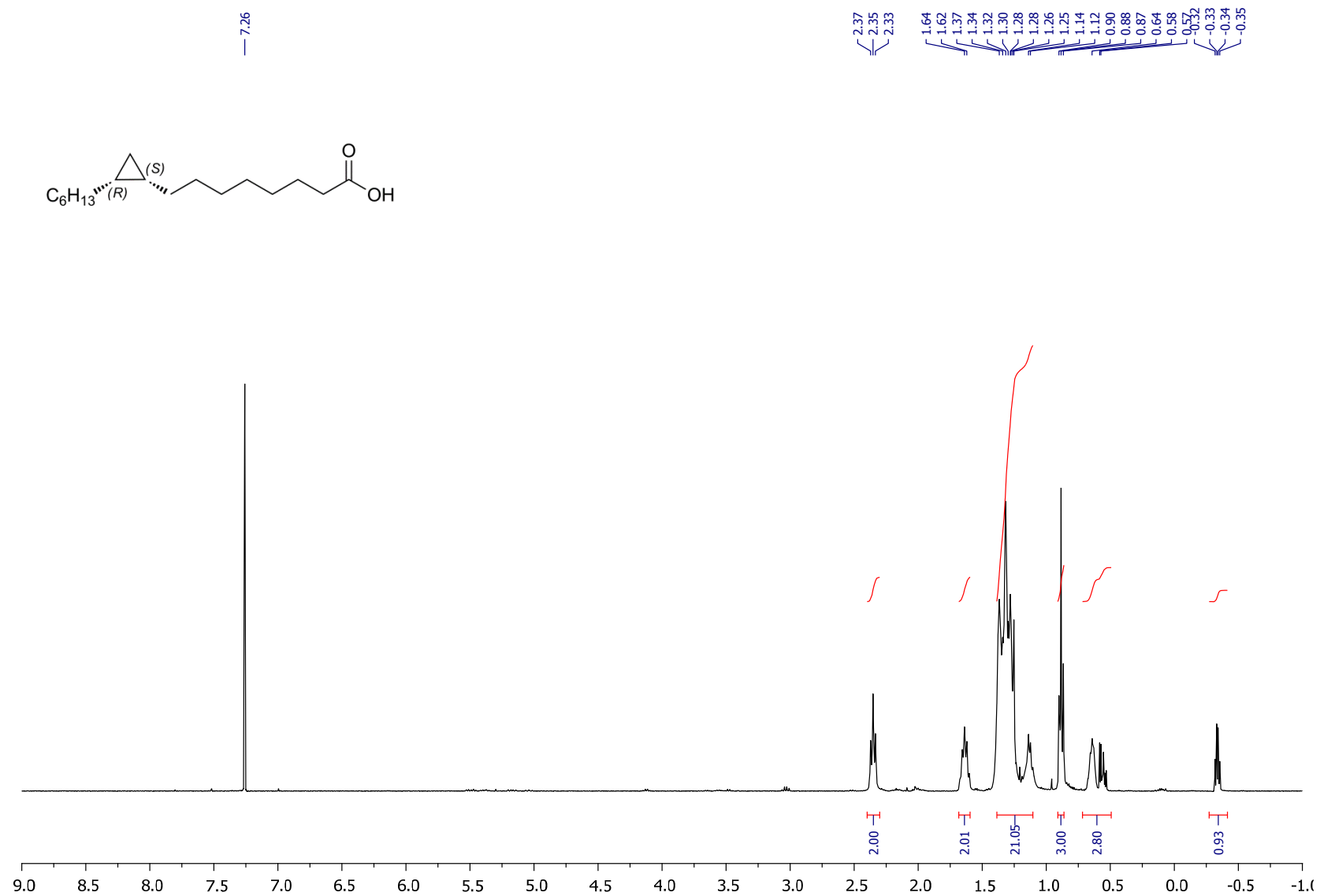
^1H NMR (CDCl_3 , 400 MHz): 8-((1*S*,2*R*)-2-Hexylcyclopropyl)oct-7-enoic acid (**20**)



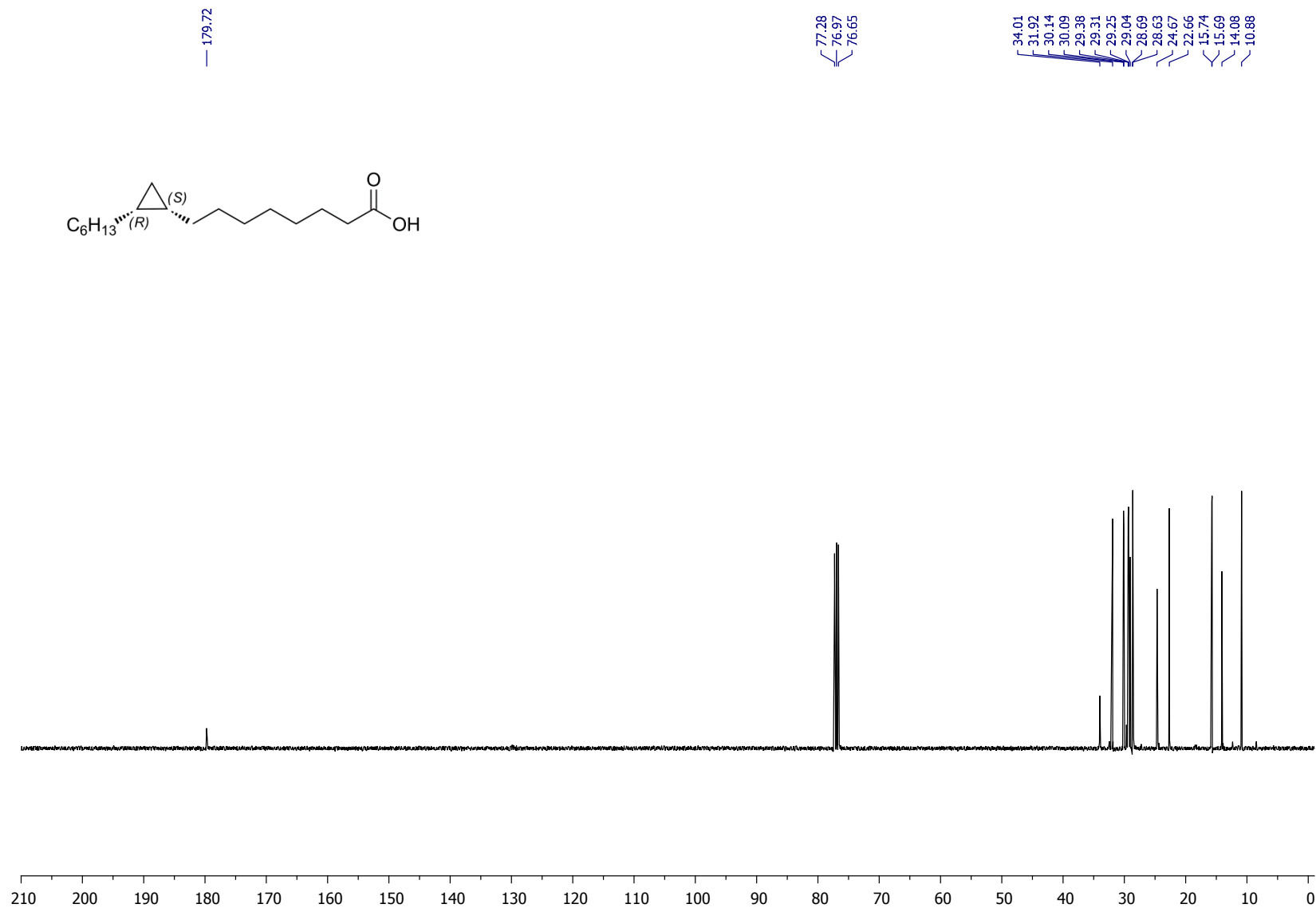
^{13}C NMR (CDCl_3 , 100 MHz): 8-((1*S*,2*R*)-2-Hexylcyclopropyl)oct-7-enoic acid (**20**)



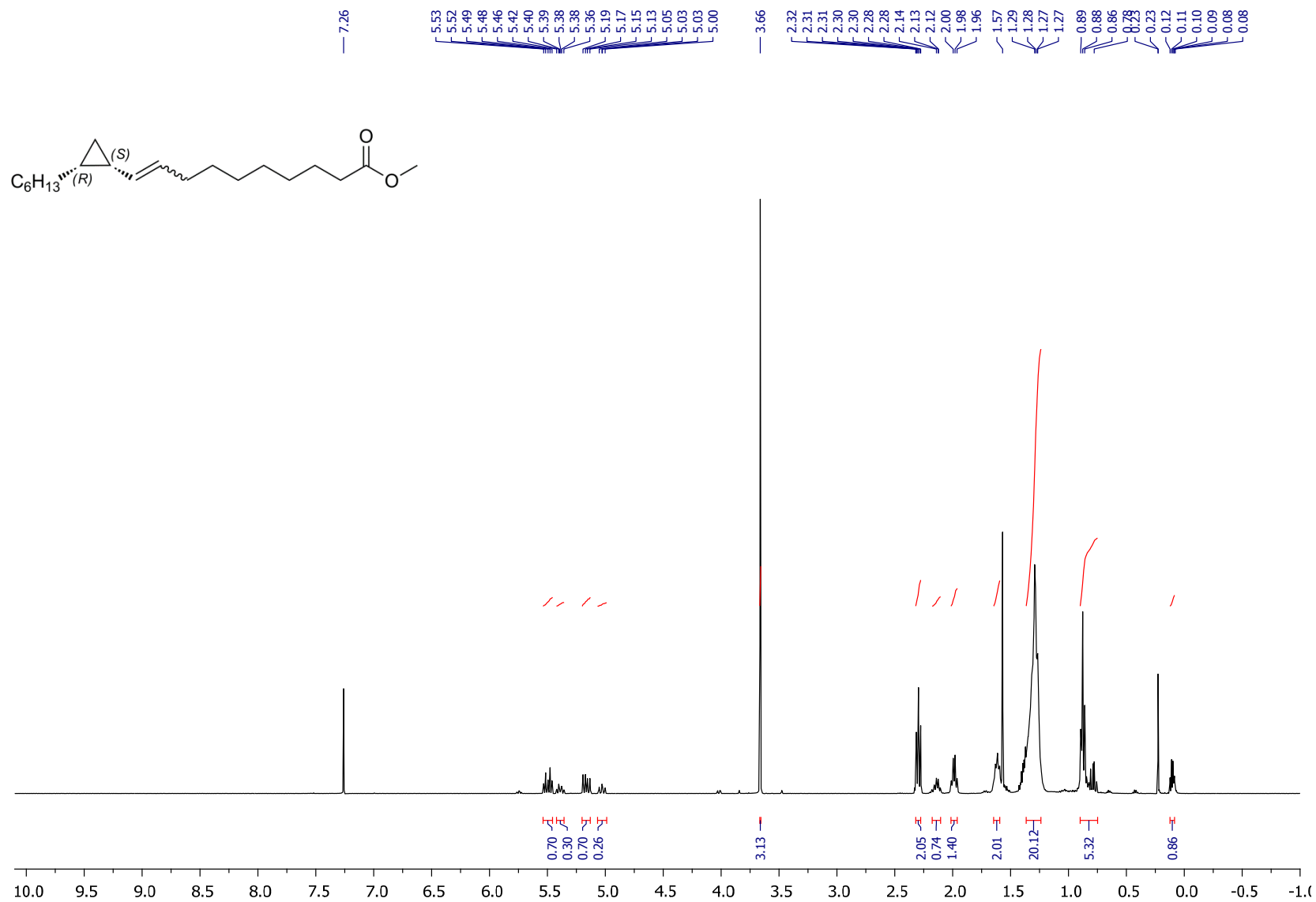
^1H NMR (CDCl_3 , 400 MHz): (9*S*,10*R*)-*cis*-Methylenehexadecanoic acid ((9*S*,10*R*)-1)



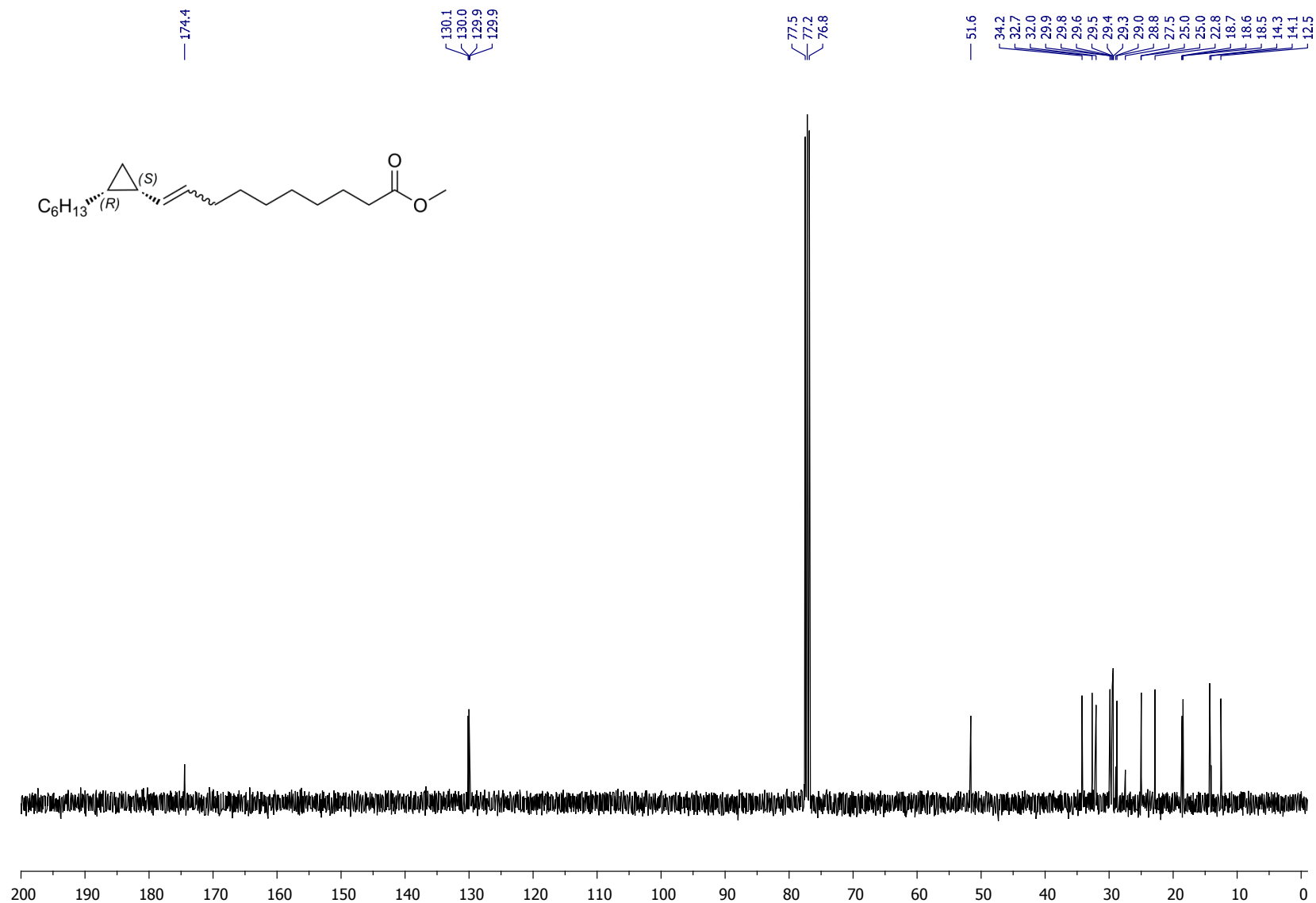
^1H NMR (CDCl_3 , 400 MHz): (9*S*,10*R*)-*cis*-Methylenehexadecanoic acid ((**9*S*,10*R***)-**1**)



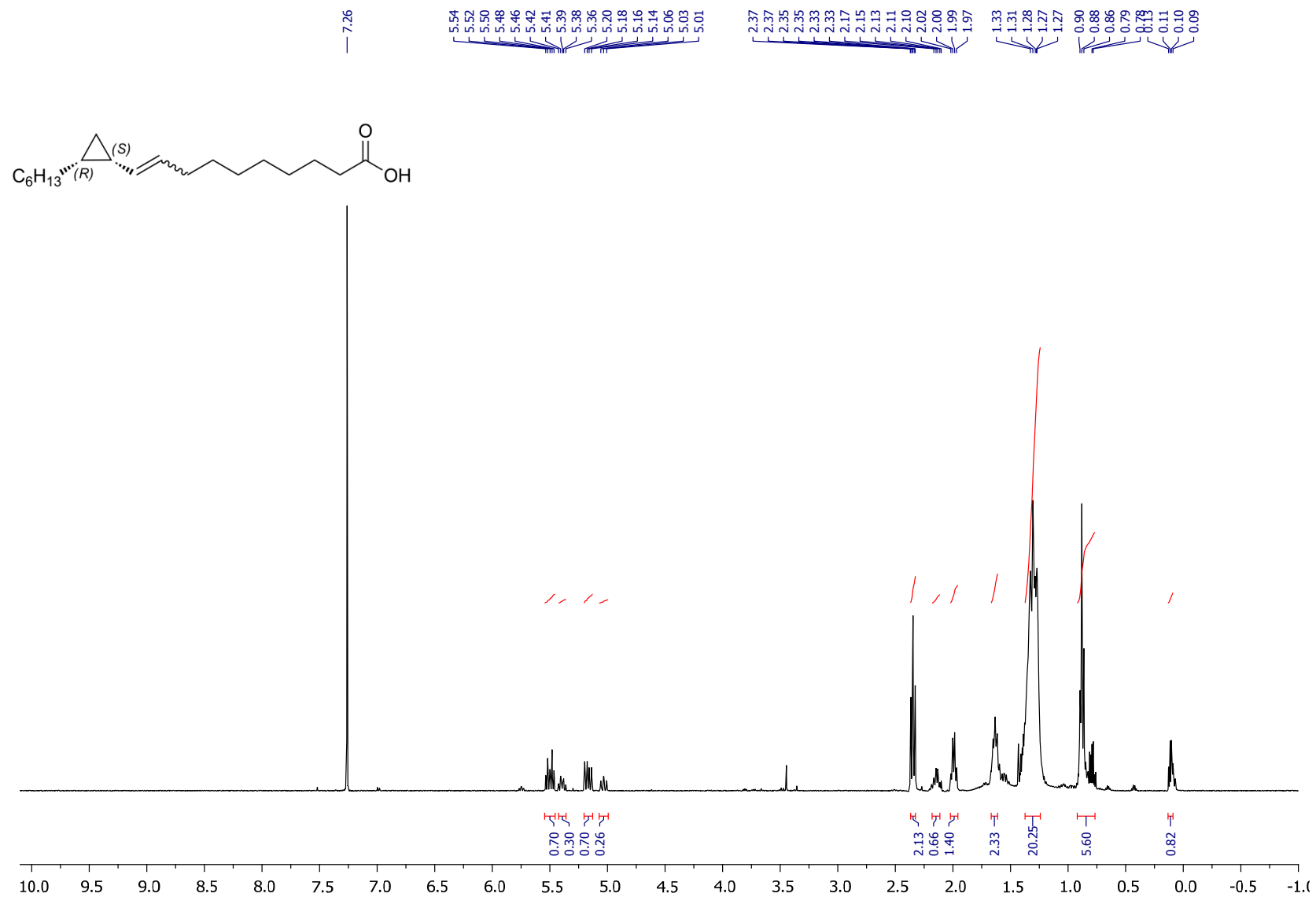
^1H NMR (CDCl_3 , 400 MHz): Methyl 10-((1*S*,2*R*)-2-hexylcyclopropyl)dec-9-enoate (**22**)



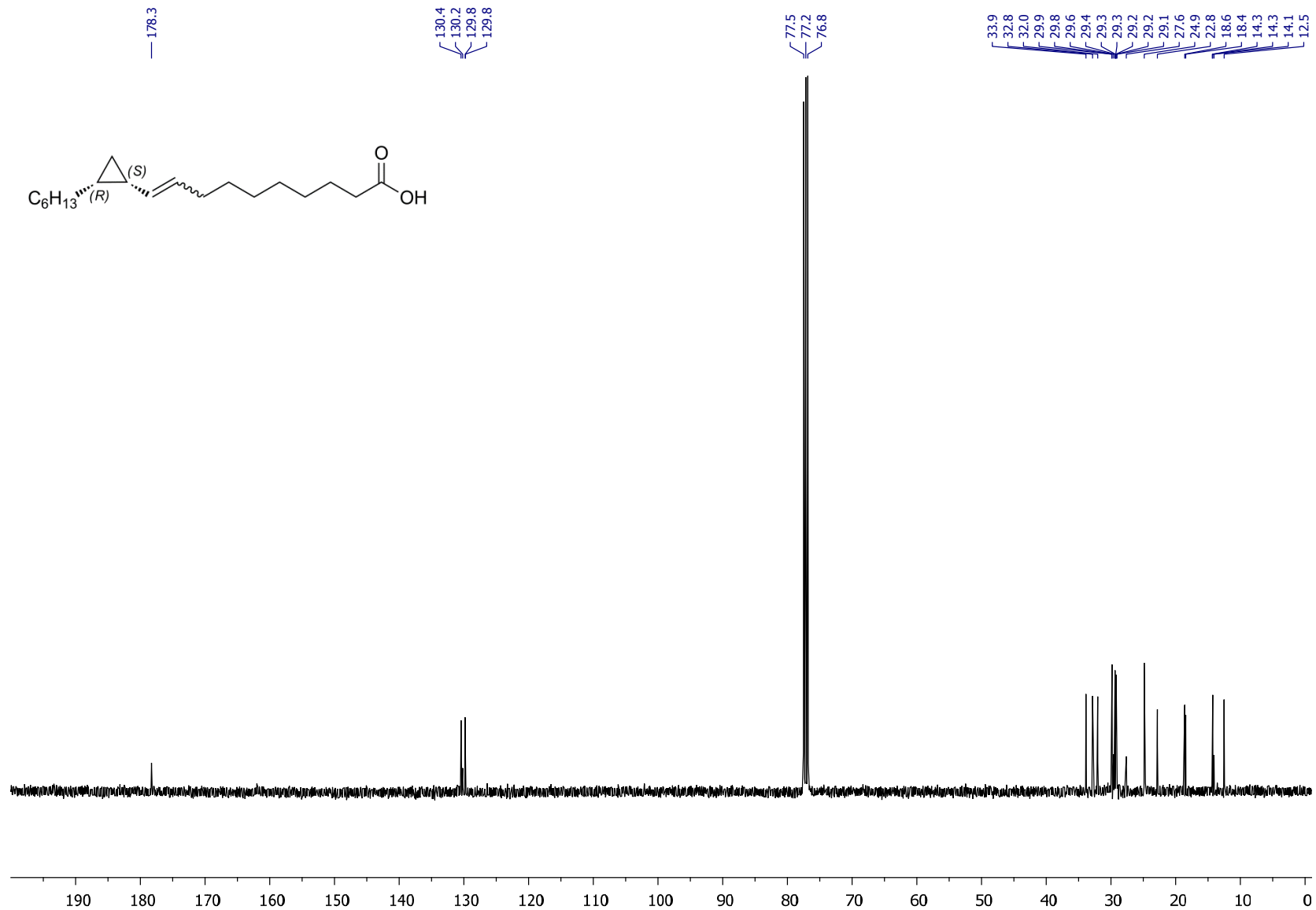
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 10-((1*S*,2*R*)-2-hexylcyclopropyl)dec-9-enoate (**22**)



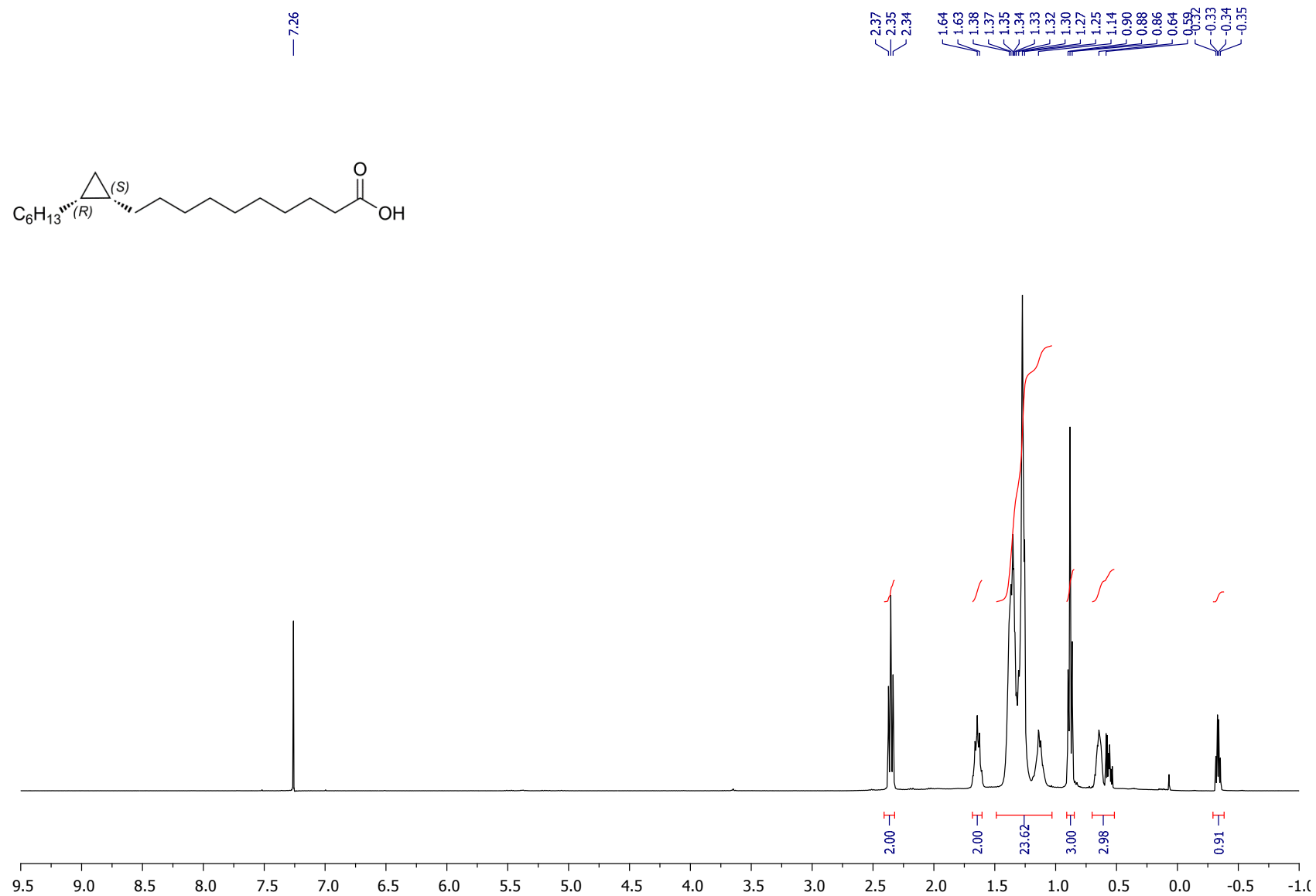
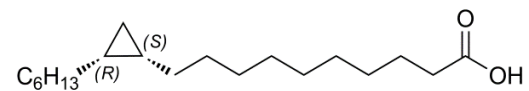
^1H NMR (CDCl_3 , 400 MHz): 10-((1*S*,2*R*)-2-Hexylcyclopropyl)dec-9-enoic acid (**23**)



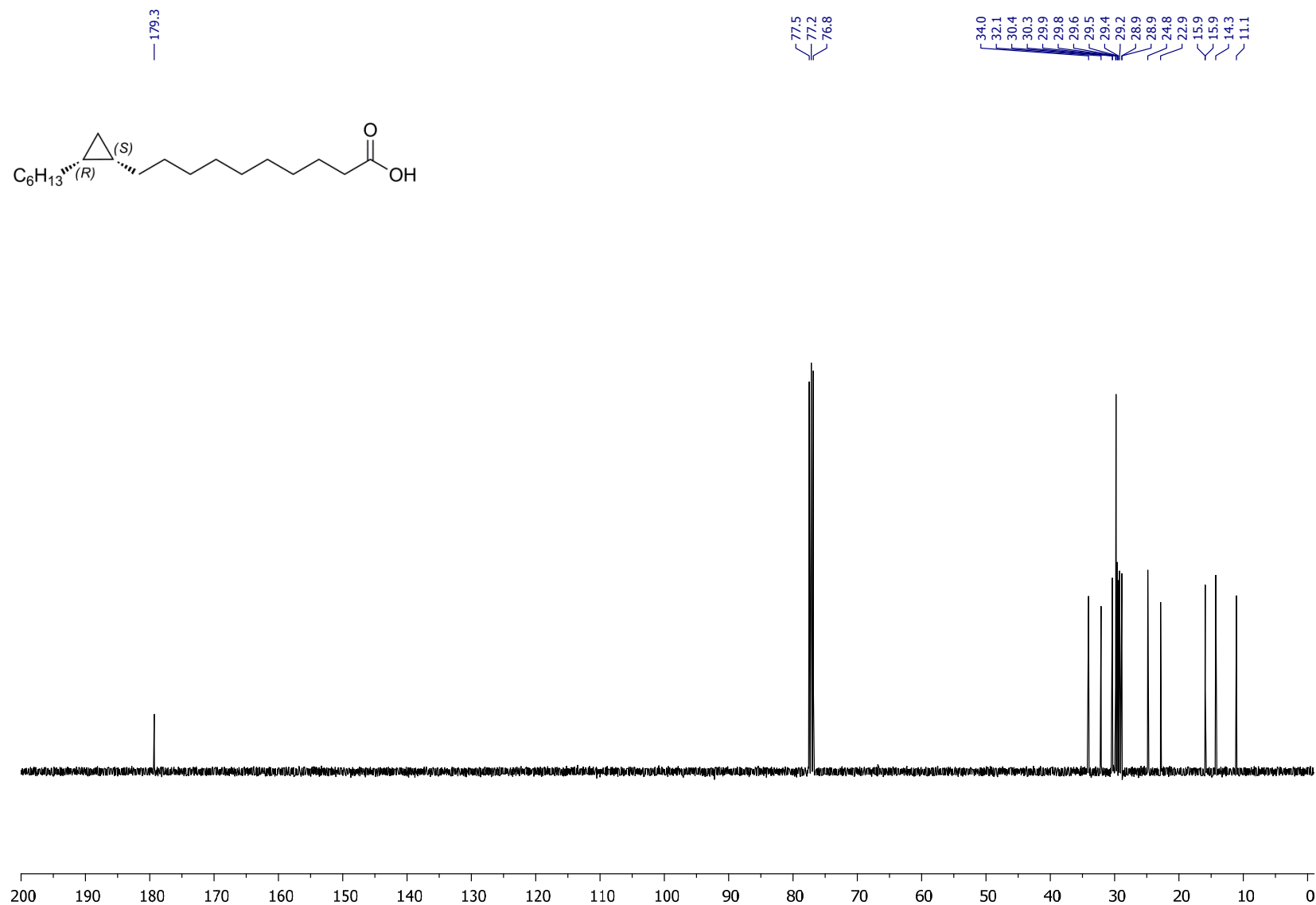
^{13}C NMR (CDCl_3 , 100 MHz): 10-((1*S*,2*R*)-2-Hexylcyclopropyl)dec-9-enoic acid (**23**)



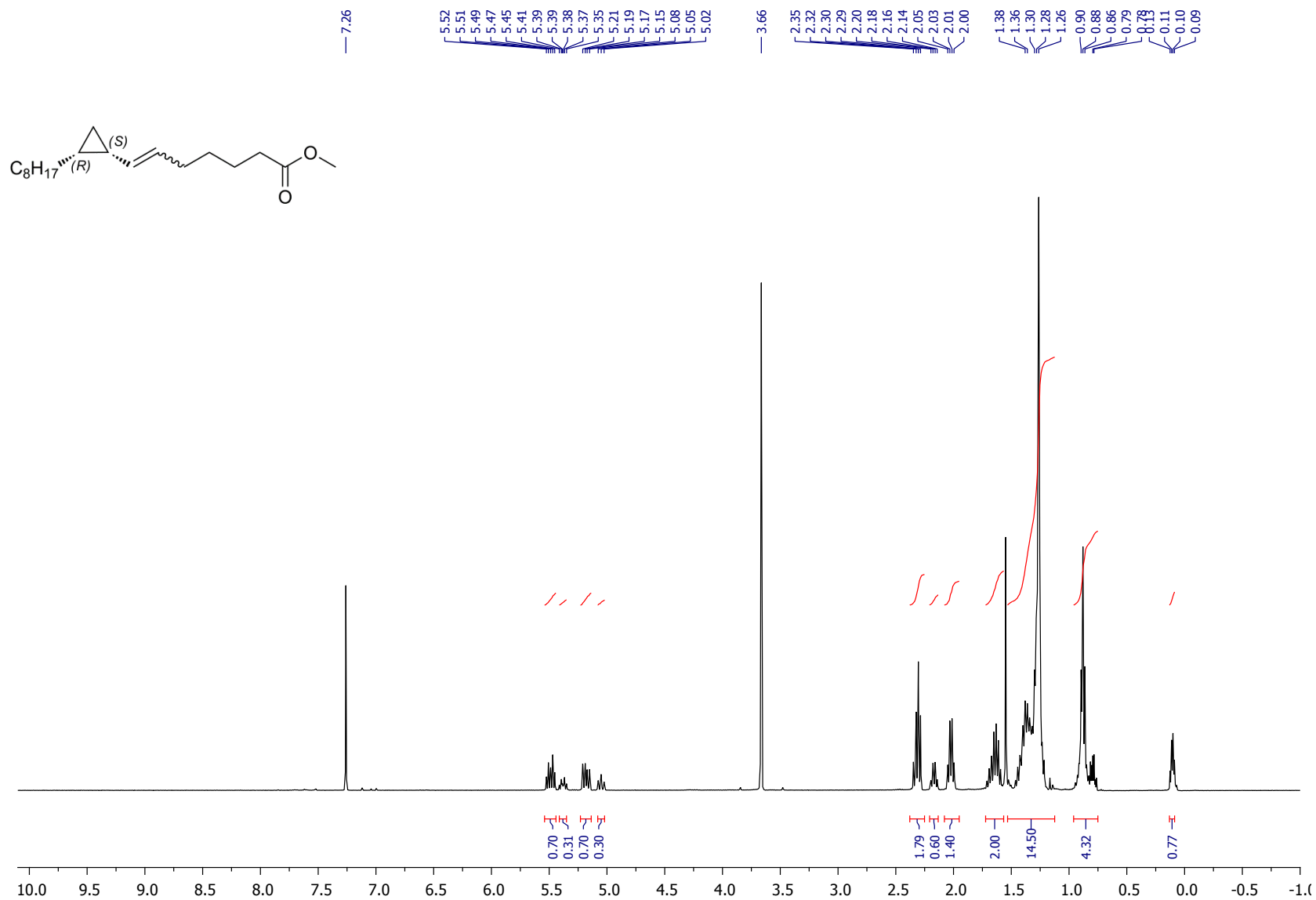
^1H NMR (CDCl_3 , 400 MHz): (11*S*,12*R*)-Lactobacillic acid ((11*S*,12*R*)-4)



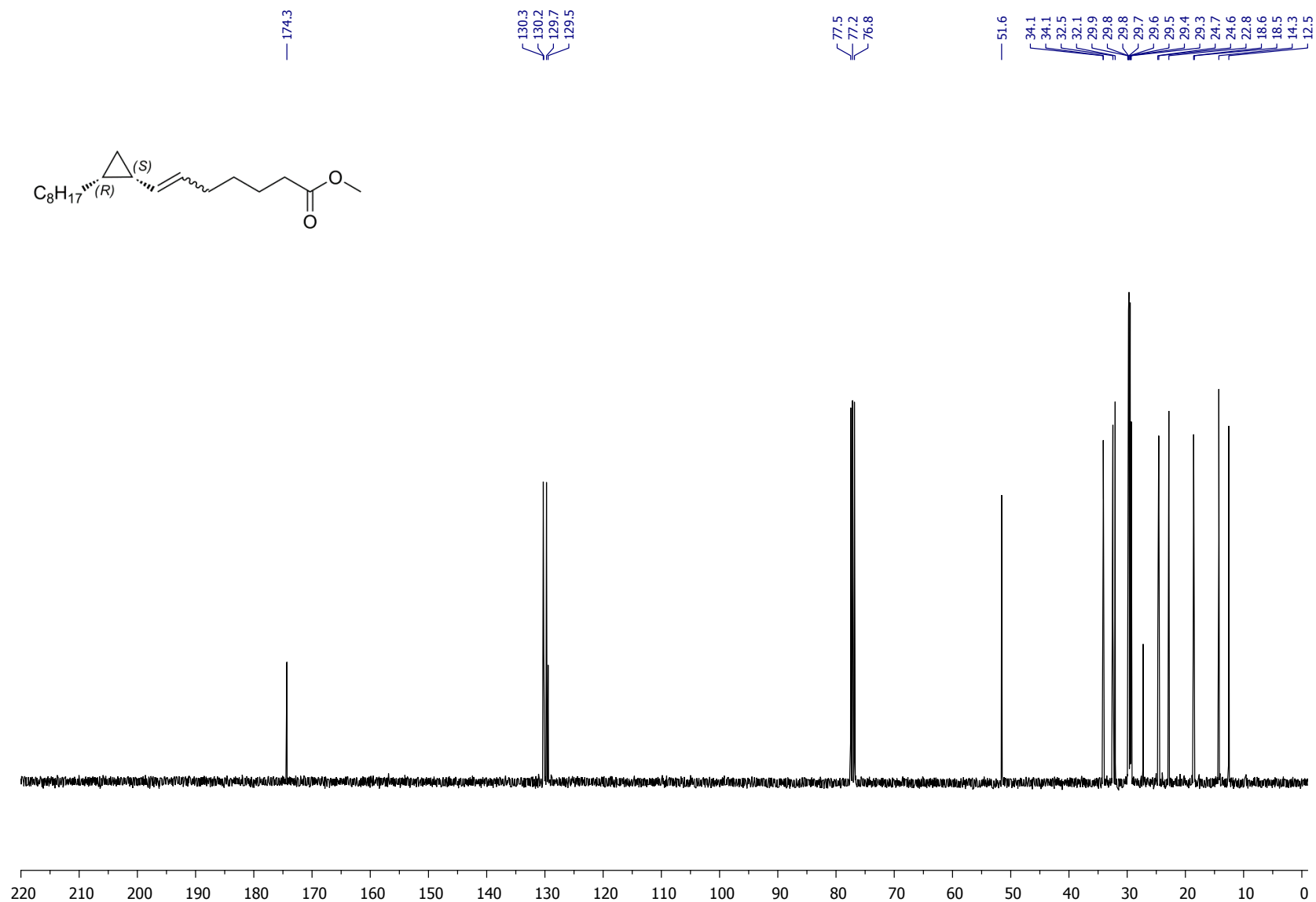
^{13}C NMR (CDCl_3 , 400 MHz): (11*S*,12*R*)-Lactobacillic acid ((11*S*,12*R*)-4)



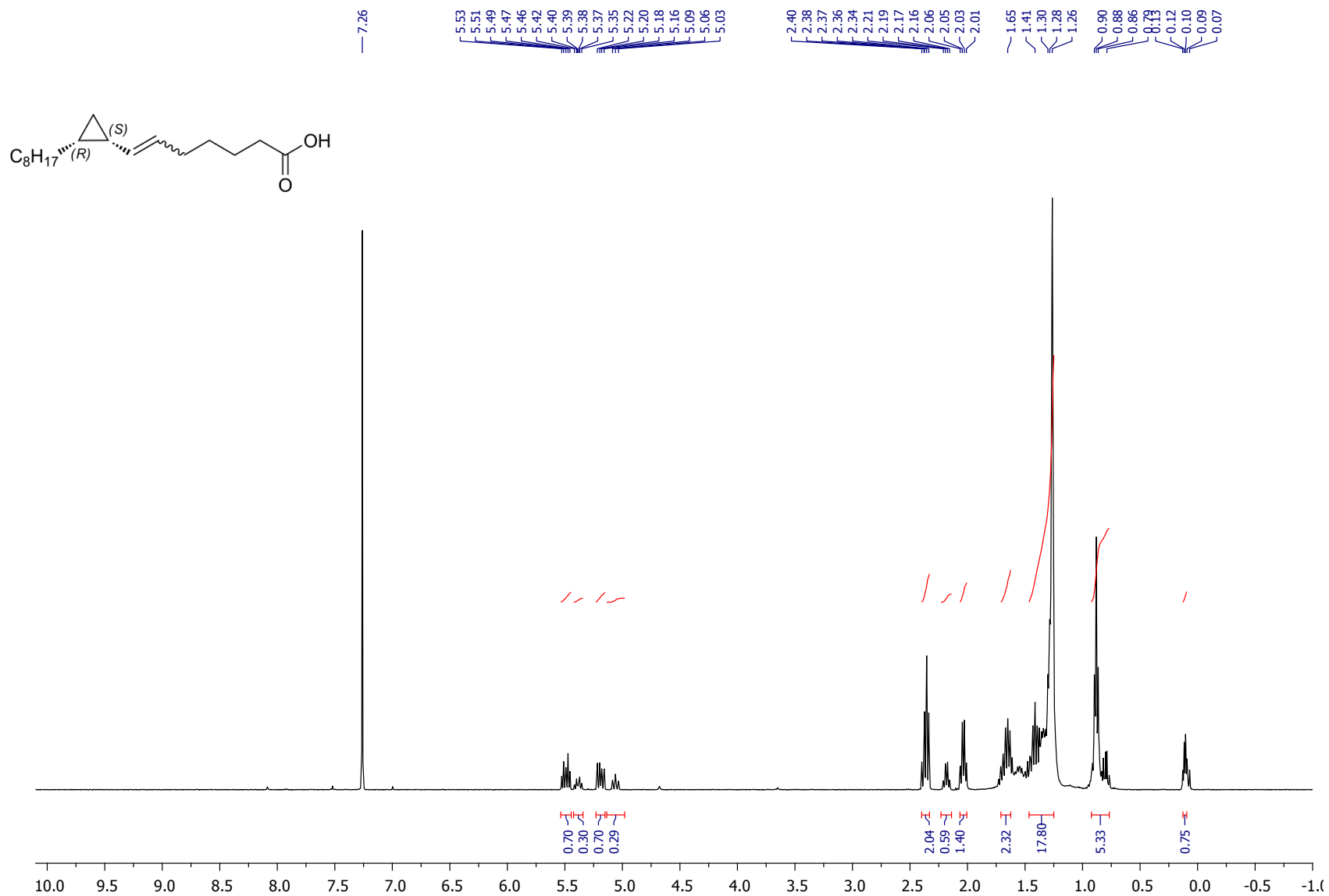
^1H NMR (CDCl_3 , 400 MHz): Methyl 7-[(1*S*,2*R*)-2-octylcyclopropyl]hept-6-enoate (**25**)



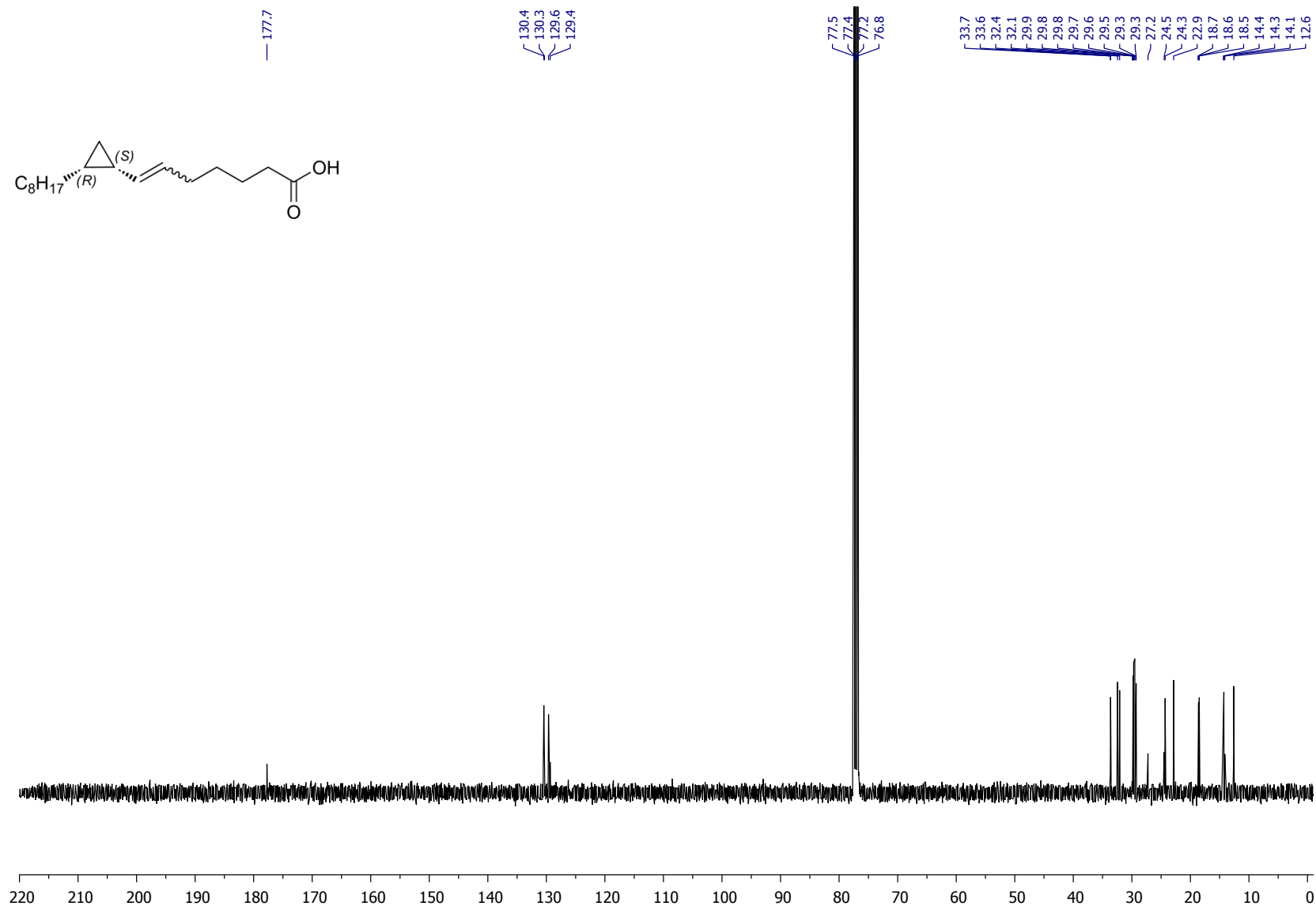
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 7-[(1*S*,2*R*)-2-octylcyclopropyl]hept-6-enoate (**25**)



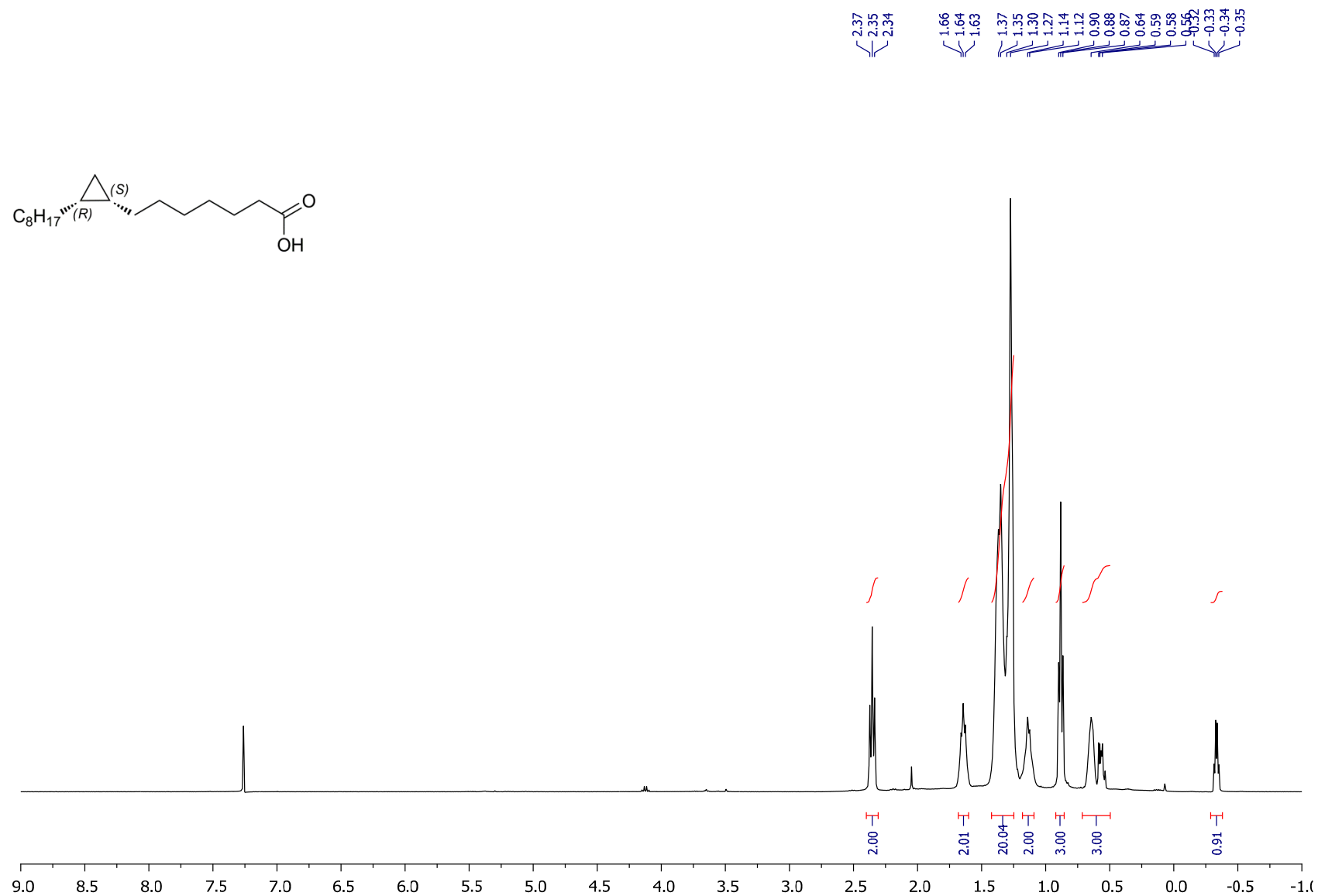
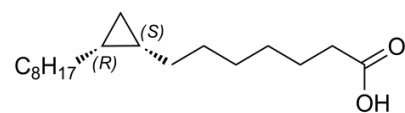
^1H NMR (CDCl_3 , 400 MHz): 7-[(1*S*,2*R*)-2-Octylcyclopropyl]hept-6-enoic acid (**26**)



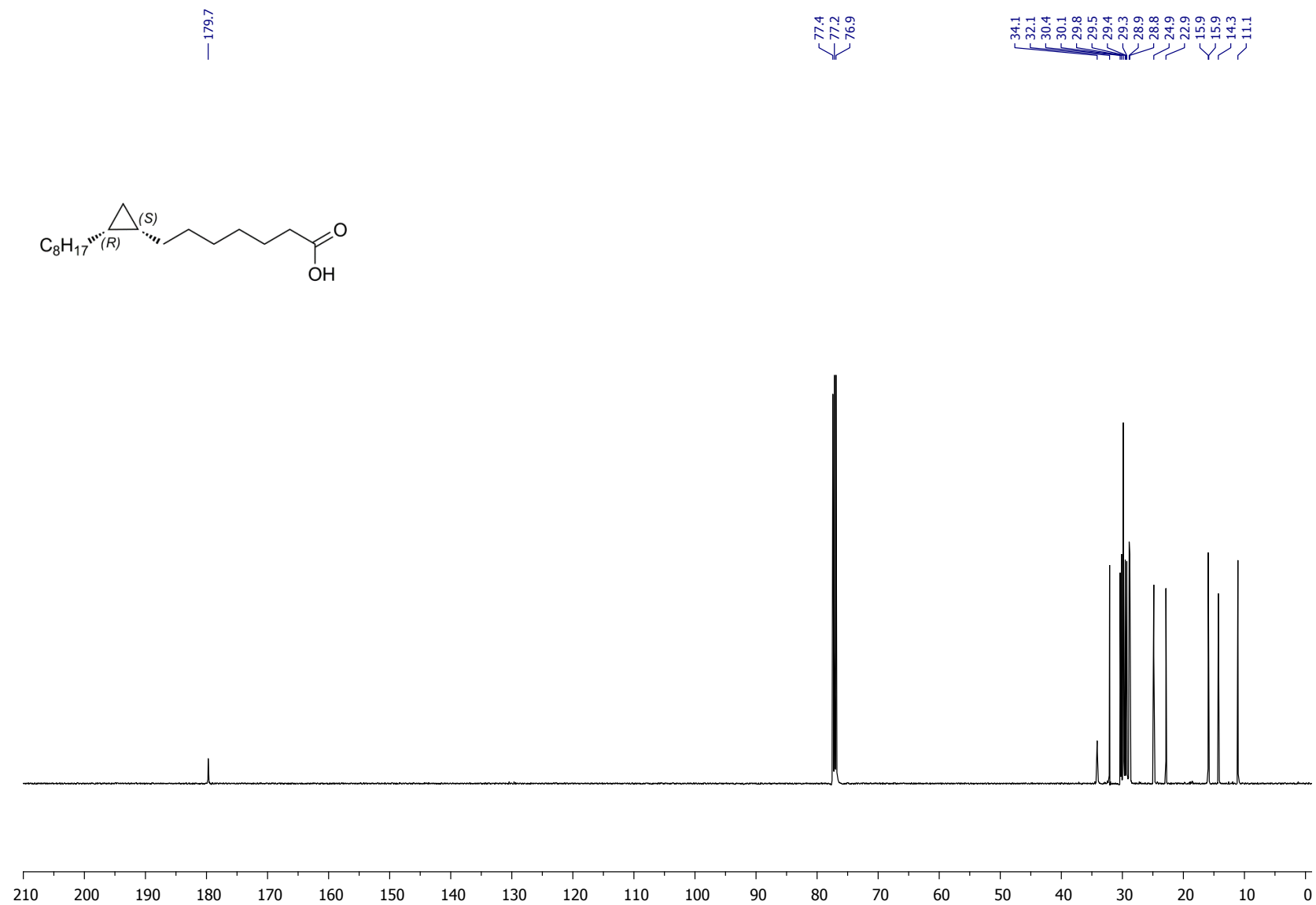
^1H NMR (CDCl_3 , 400 MHz): 7-[(1*S*,2*R*)-2-Octylcyclopropyl]hept-6-enoic acid (**26**)



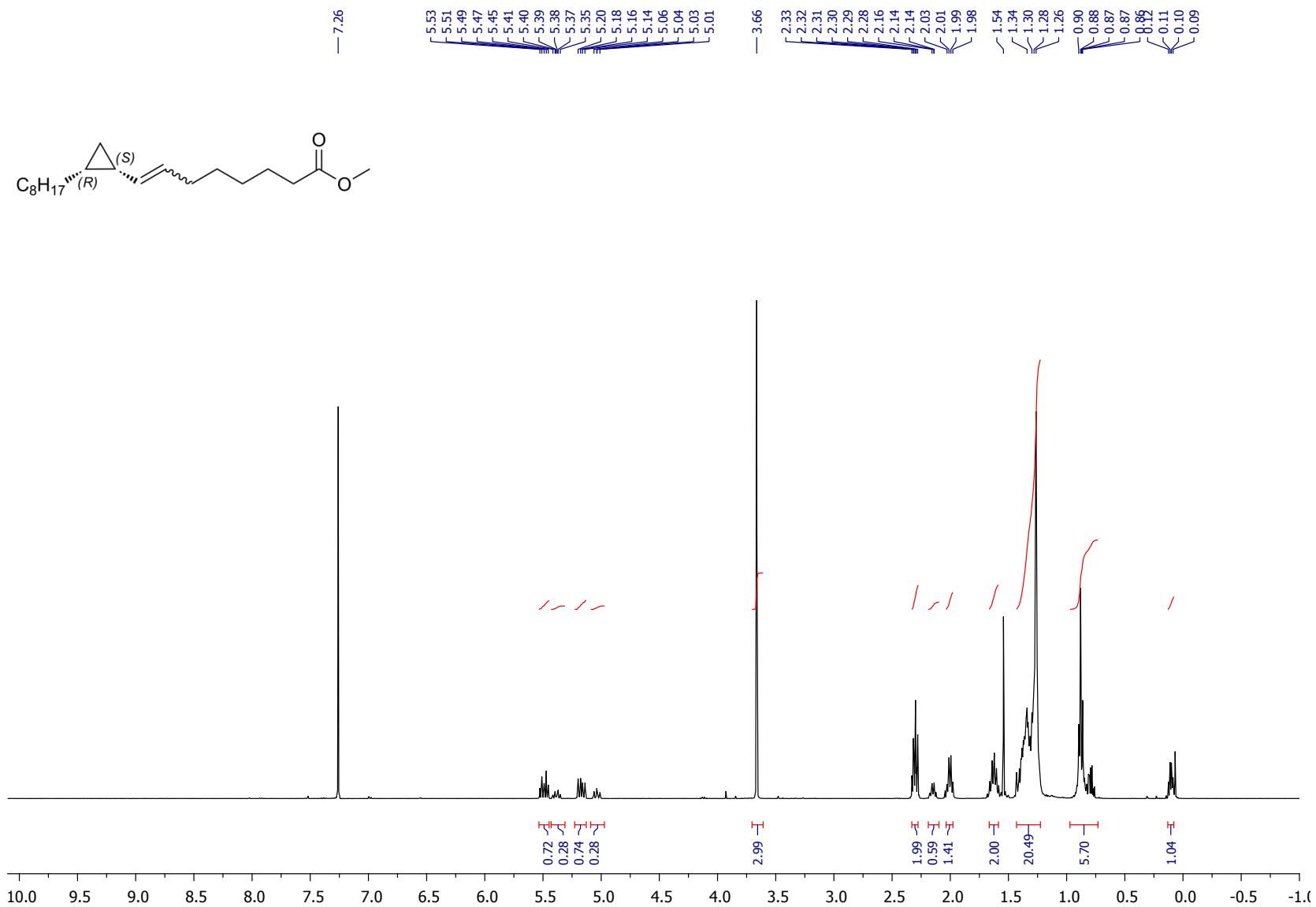
^1H NMR (CDCl_3 , 400 MHz): (8*S*,9*R*)-Dihydromalvalic acid ((8*S*,9*R*)-2)



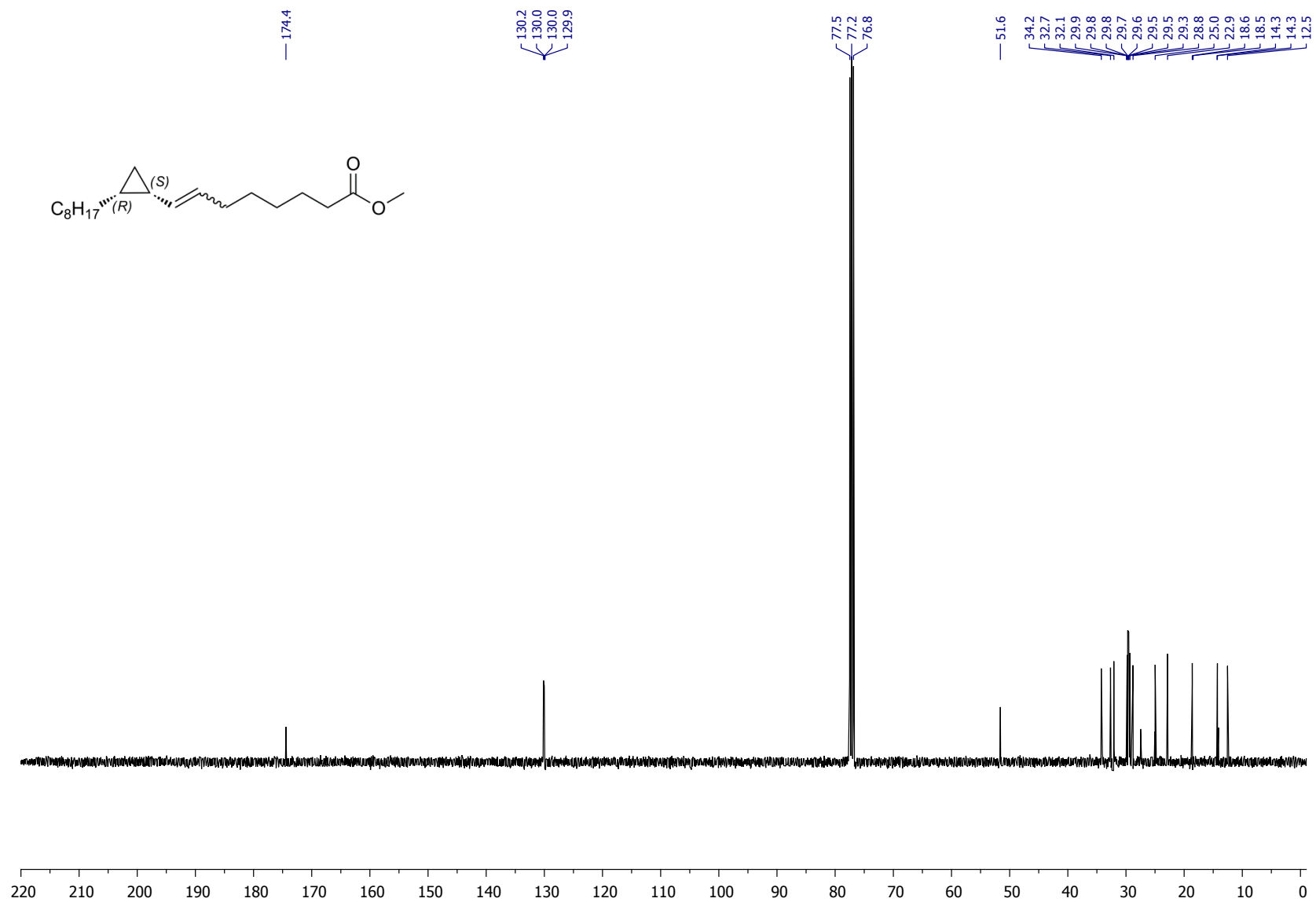
^{13}C NMR (CDCl_3 , 100 MHz): (8*S*,9*R*)-Dihydromalvalic acid ((**8*S*,9*R***)-**2**)



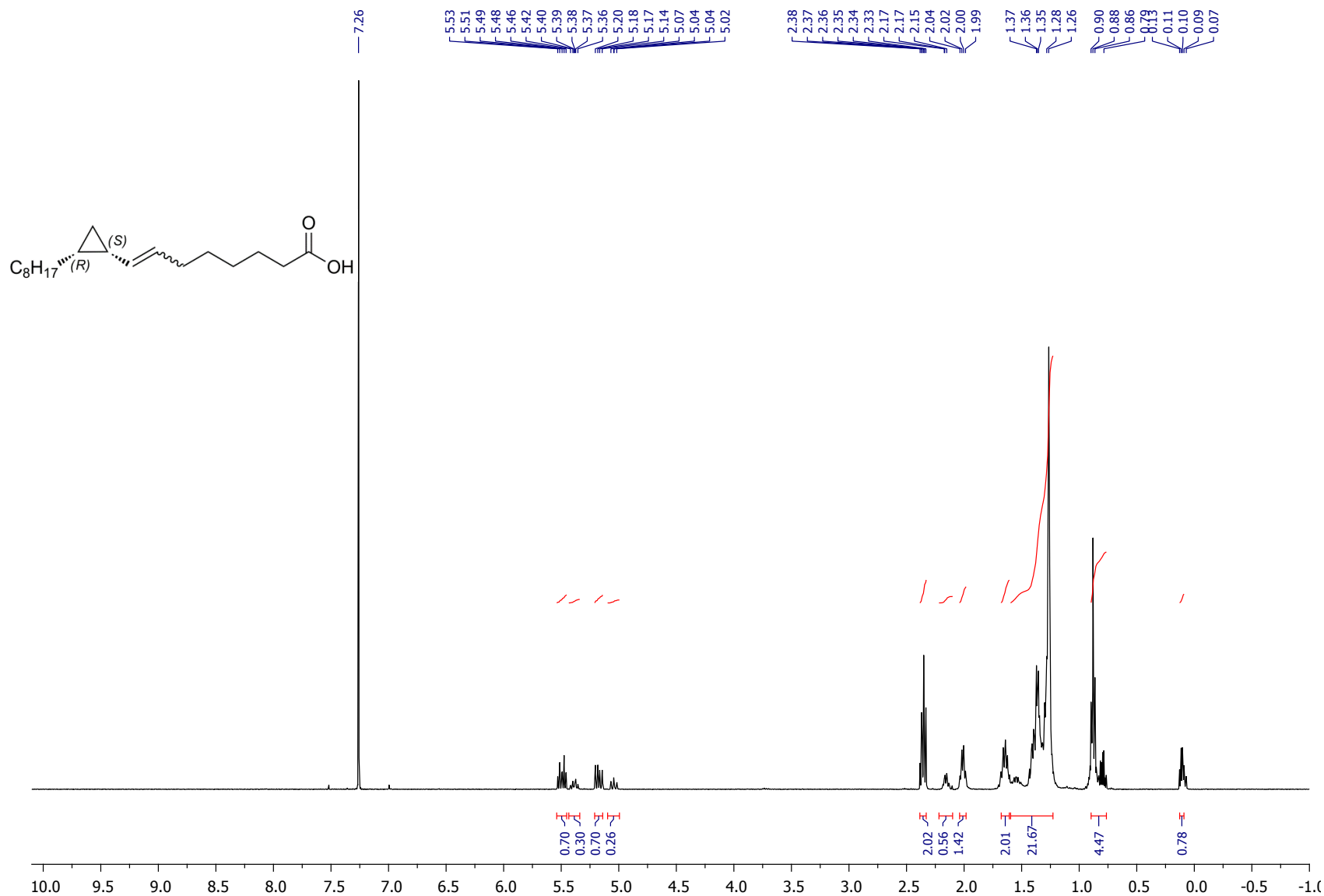
^1H NMR (CDCl_3 , 400 MHz): Methyl 8-[(1*S*,2*R*)-2-octylcyclopropyl]oct-7-enoate (**27**)



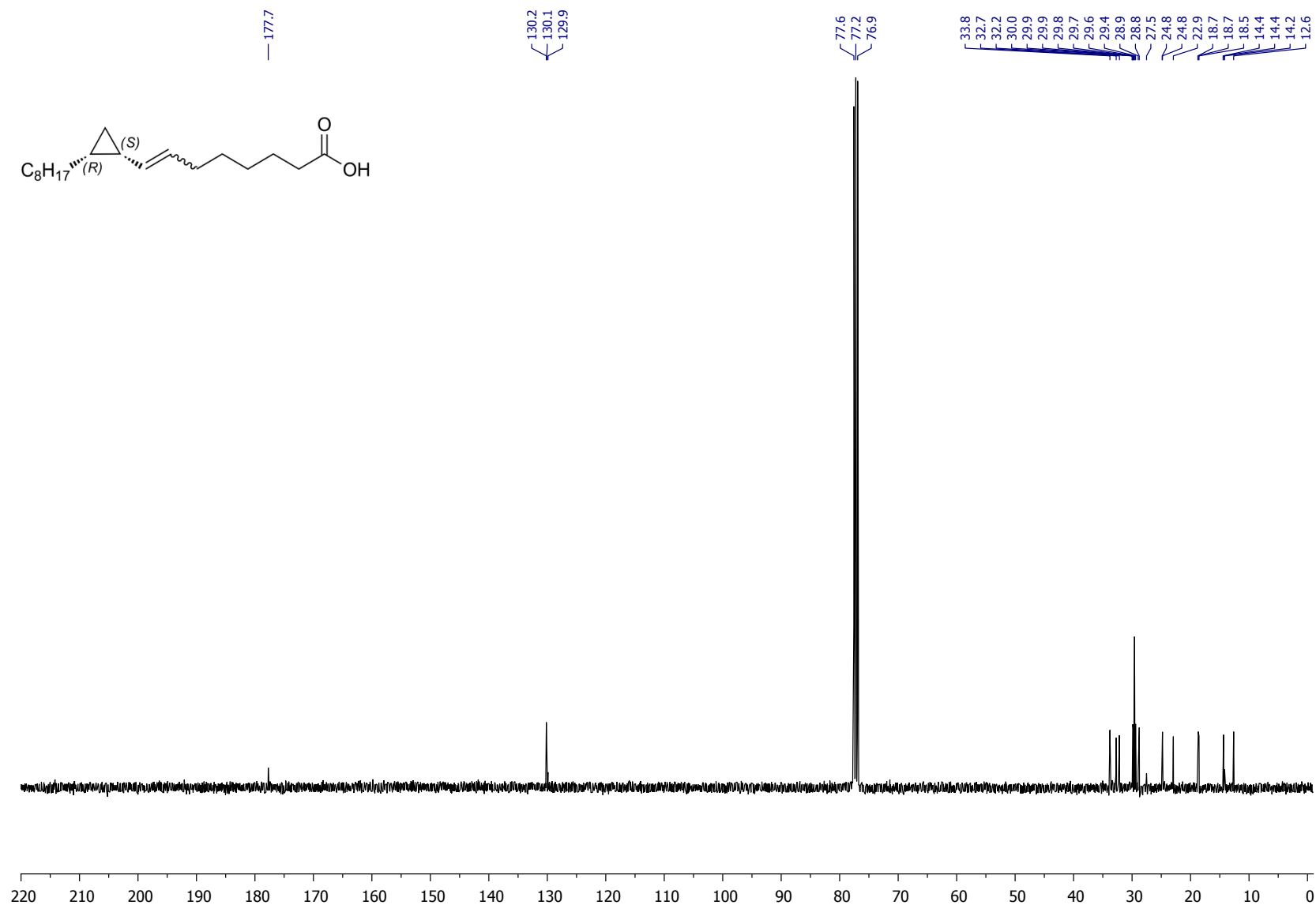
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 8-[(1*S*,2*R*)-2-octylcyclopropyl]oct-7-enoate (**27**)



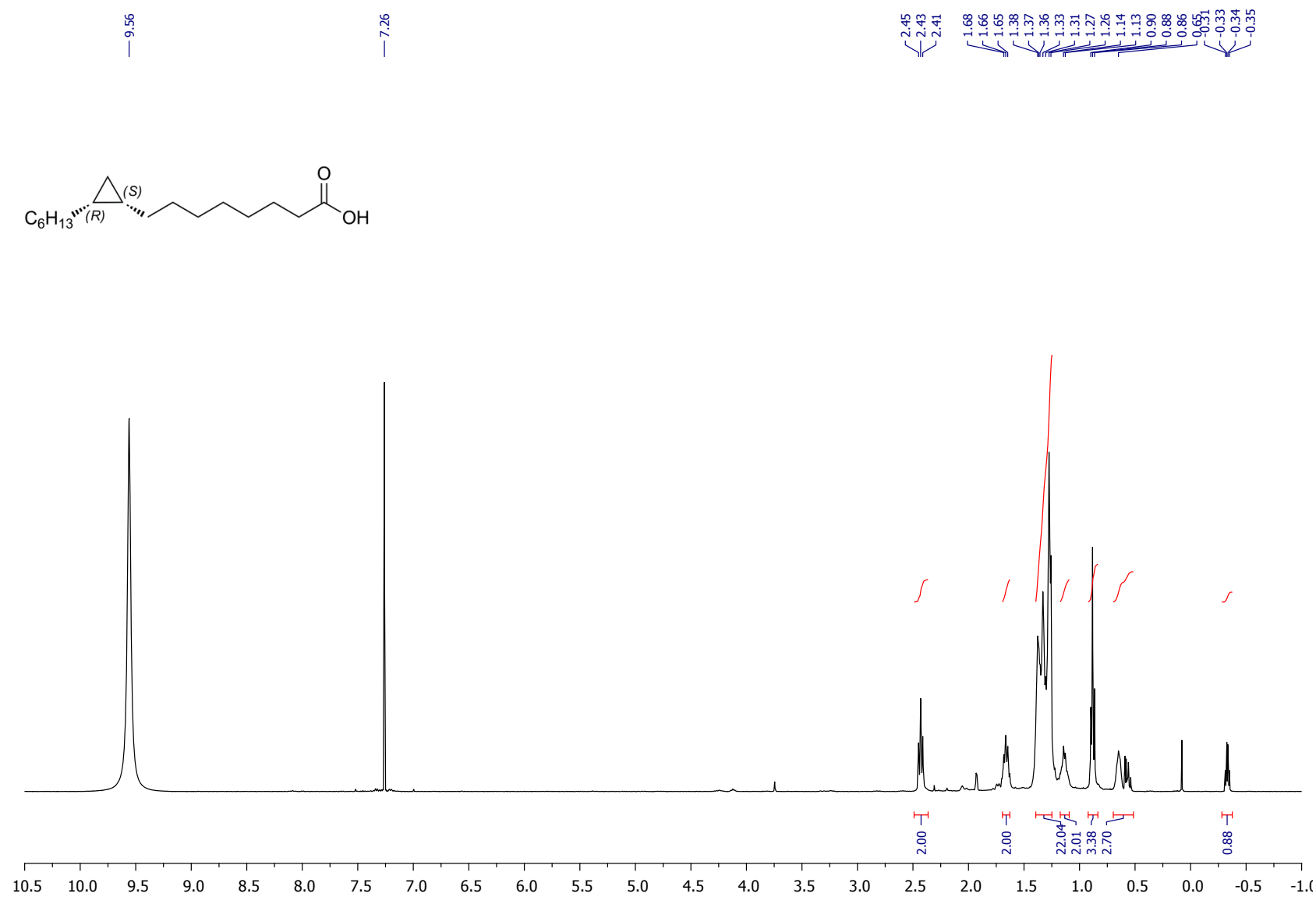
^1H NMR (CDCl_3 , 400 MHz): 8-[(1S,2R)-2-Octylcyclopropyl]oct-7-enoic acid (**28**)



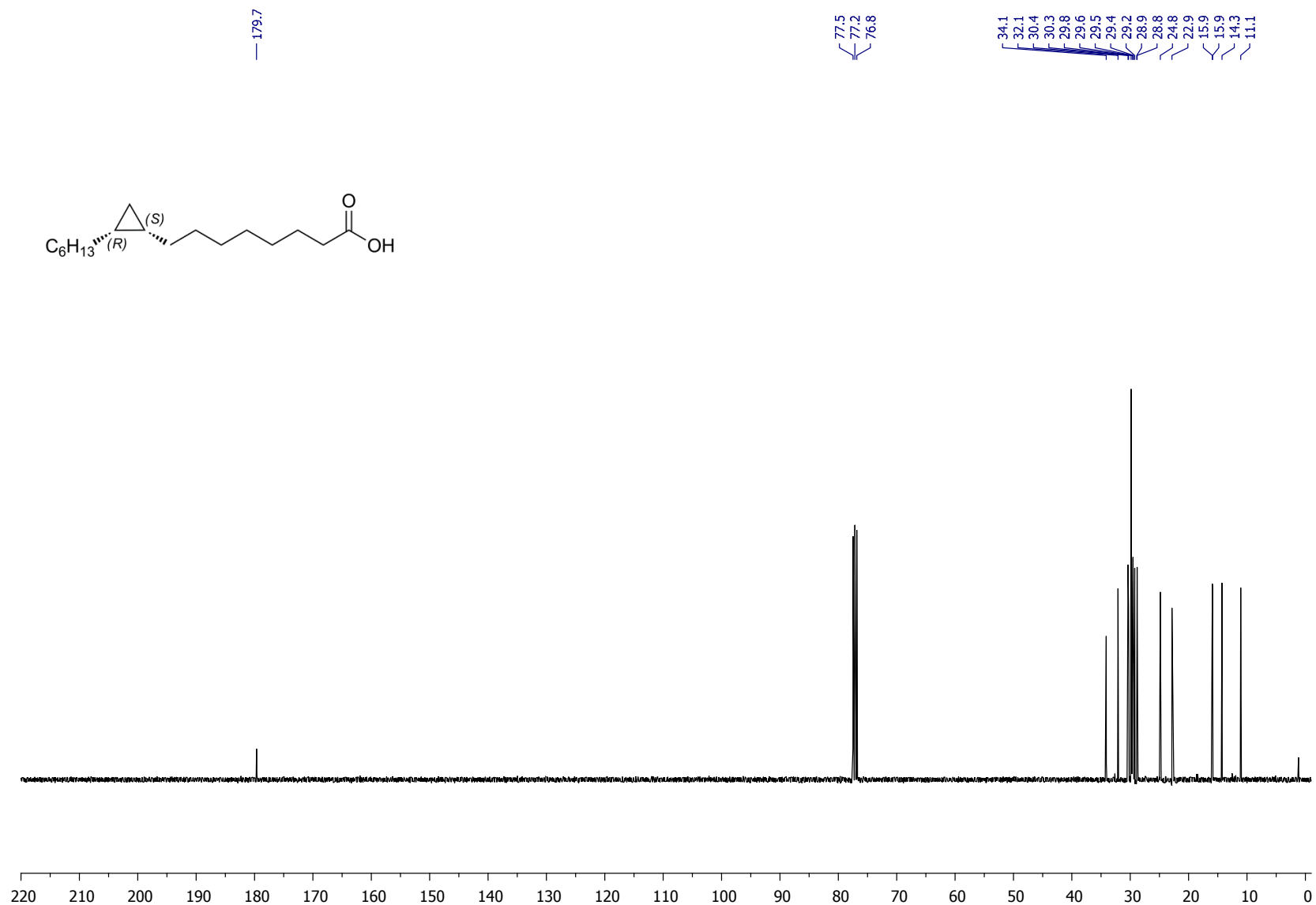
^{13}C NMR (CDCl_3 , 100 MHz): 8-[(1S,2R)-2-Octylcyclopropyl]oct-7-enoic acid (**28**)



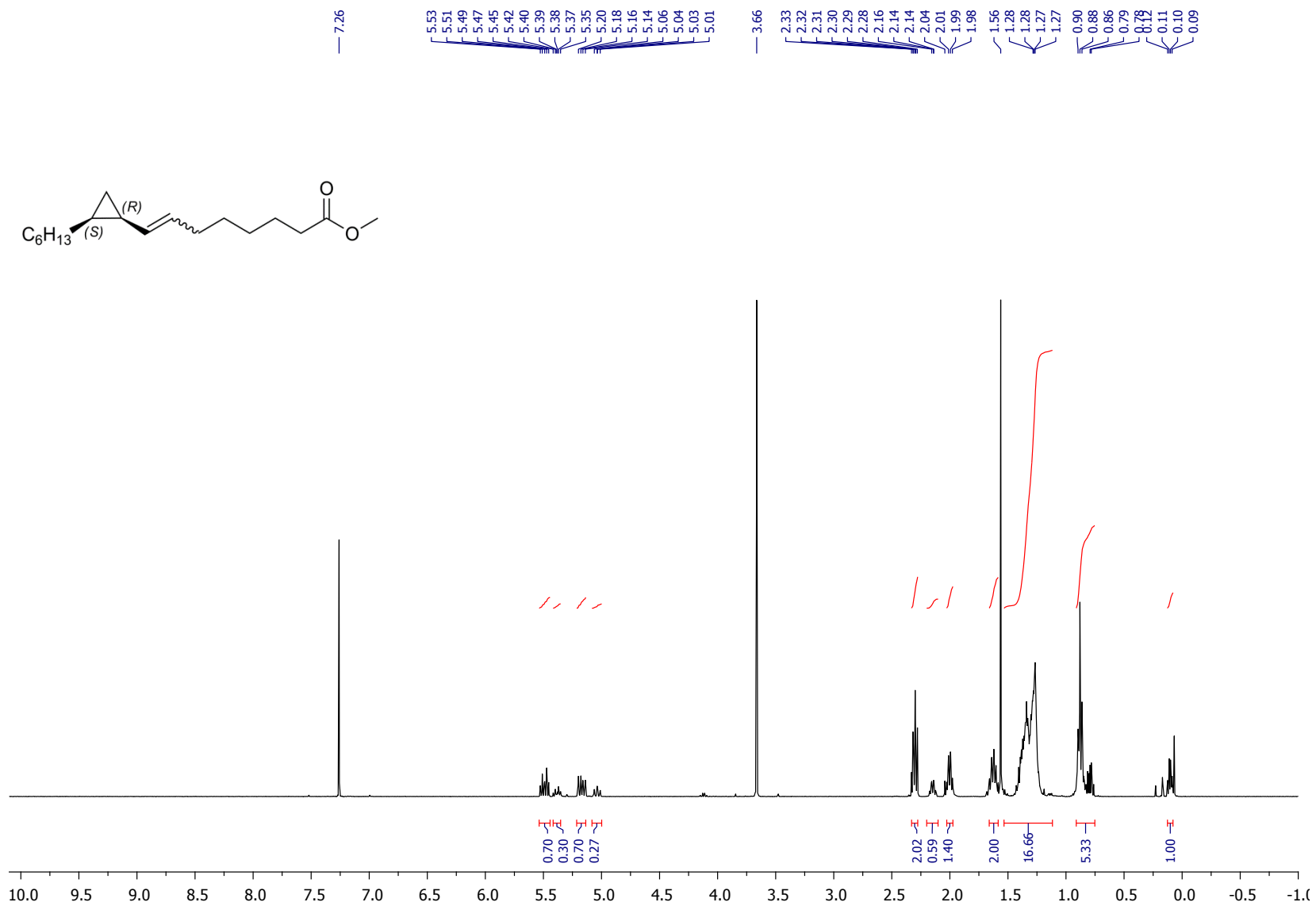
^1H NMR (CDCl_3 , 1% TFA, 400 MHz): (9*S*,10*R*)-Dihydrosterculic acid ((**9*S*,10*R***)-**3**)



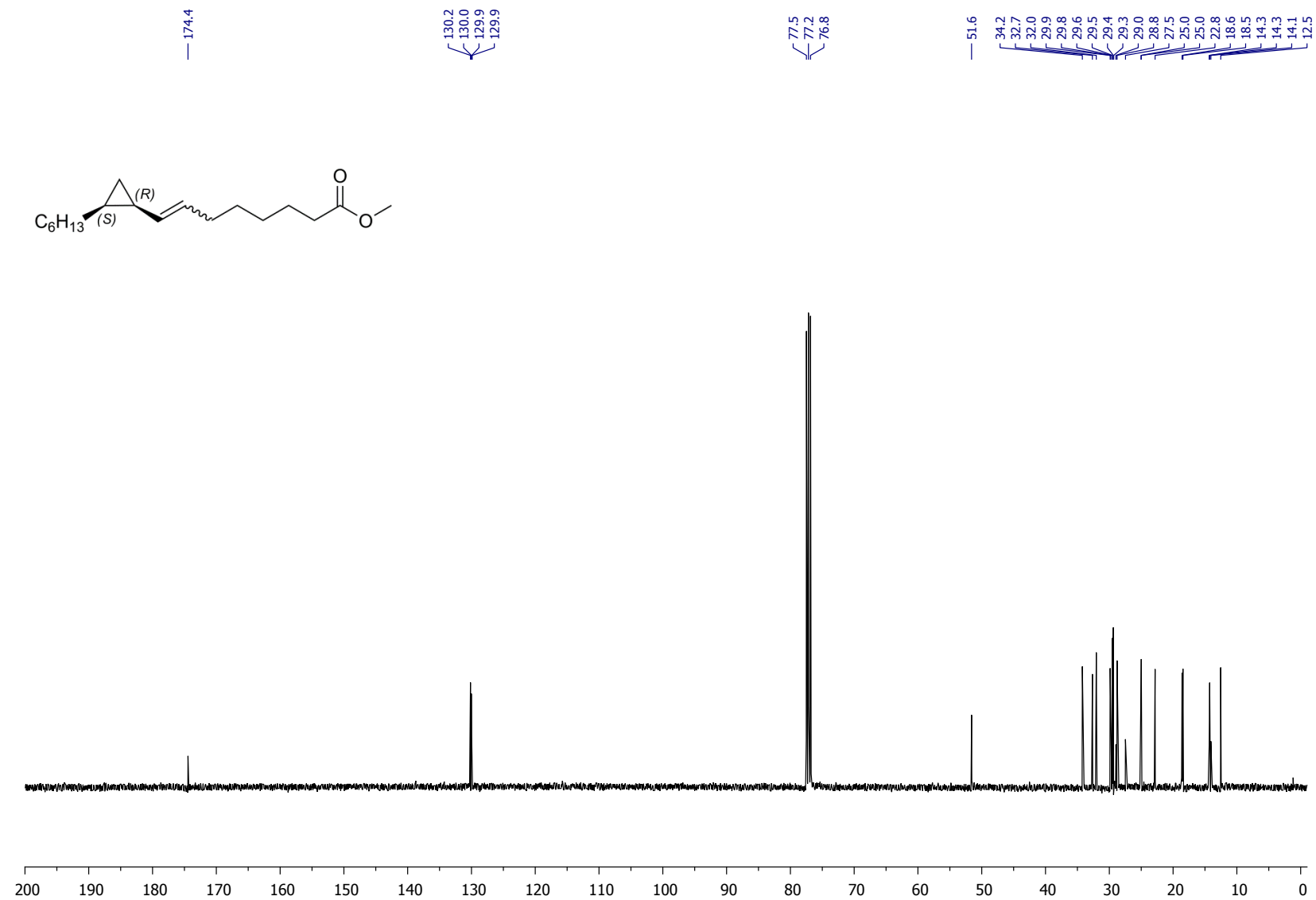
^{13}C NMR (CDCl_3 , 100 MHz): (9*S*,10*R*)-Dihydrosterculic acid ((**9*S*,10*R***)-**3**)



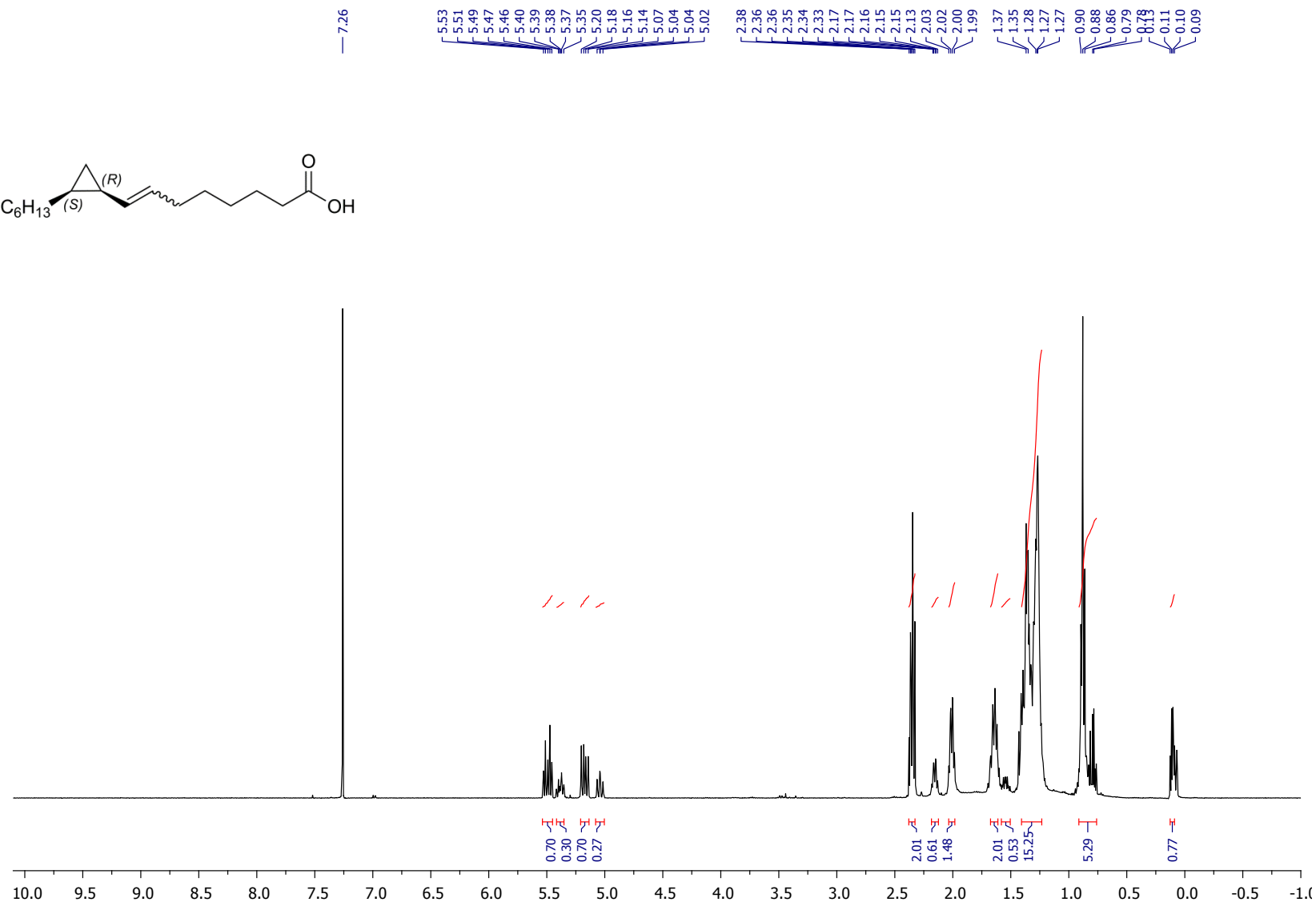
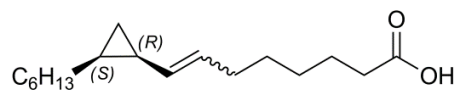
^1H NMR (CDCl_3 , 400 MHz): Methyl 8-[(1*R*,2*S*)-2-hexylcyclopropyl]oct-7-enoate (**29**)



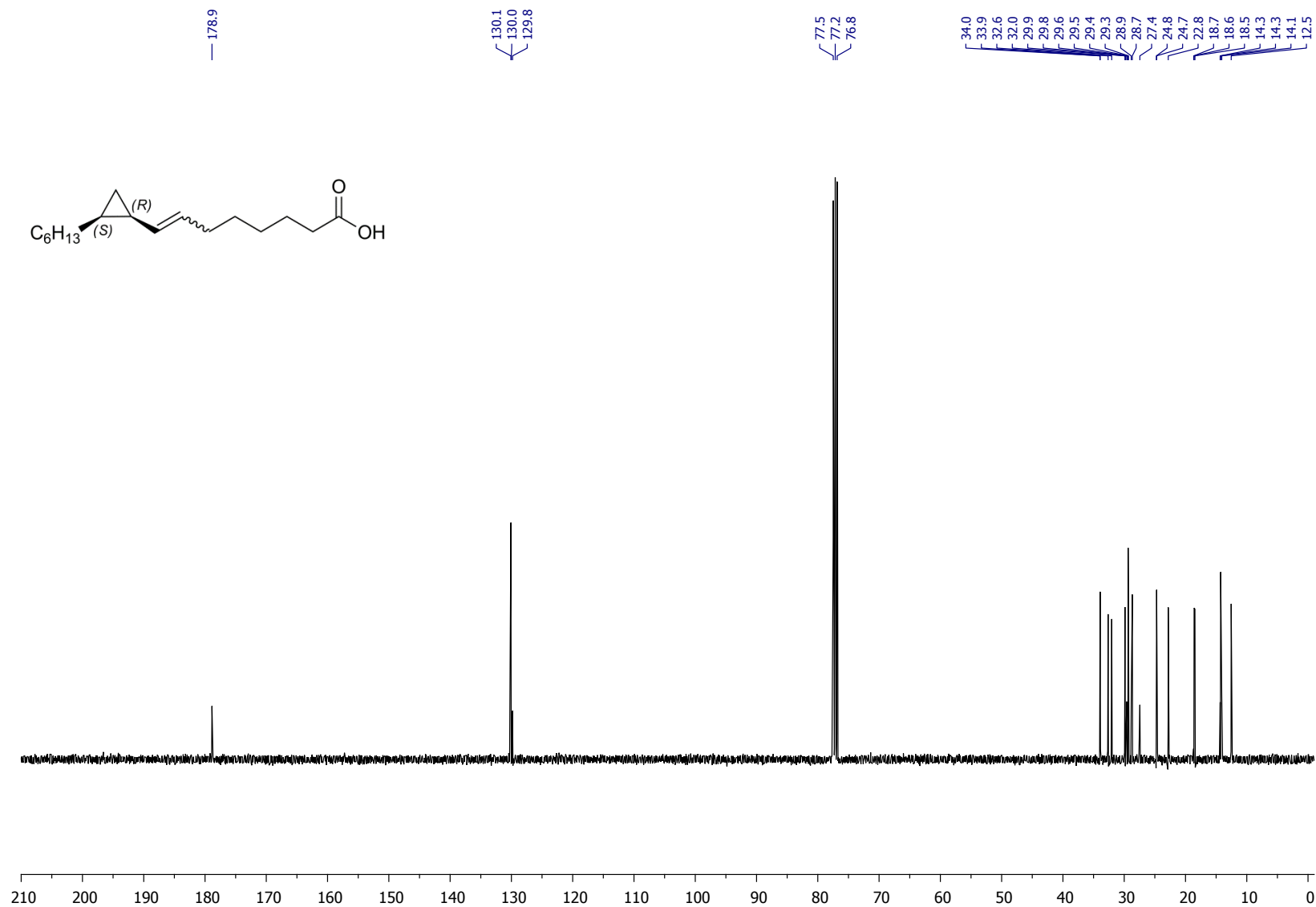
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 8-[(1*R*,2*S*)-2-hexylcyclopropyl]oct-7-enoate (**29**)



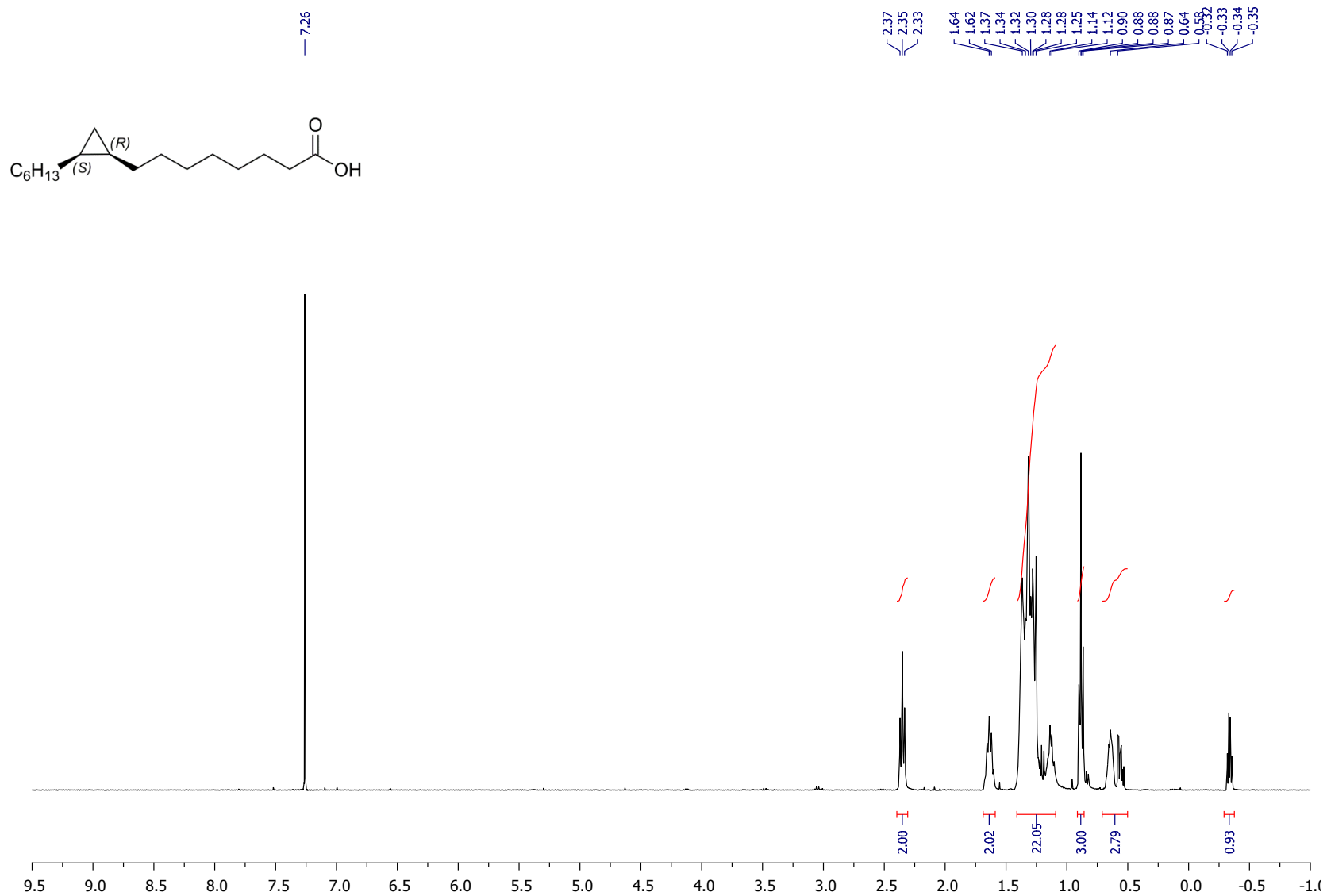
^1H NMR (CDCl_3 , 400 MHz): 8-[(1*R*,2*S*)-2-Hexylcyclopropyl]oct-7-enoic acid (**30**)



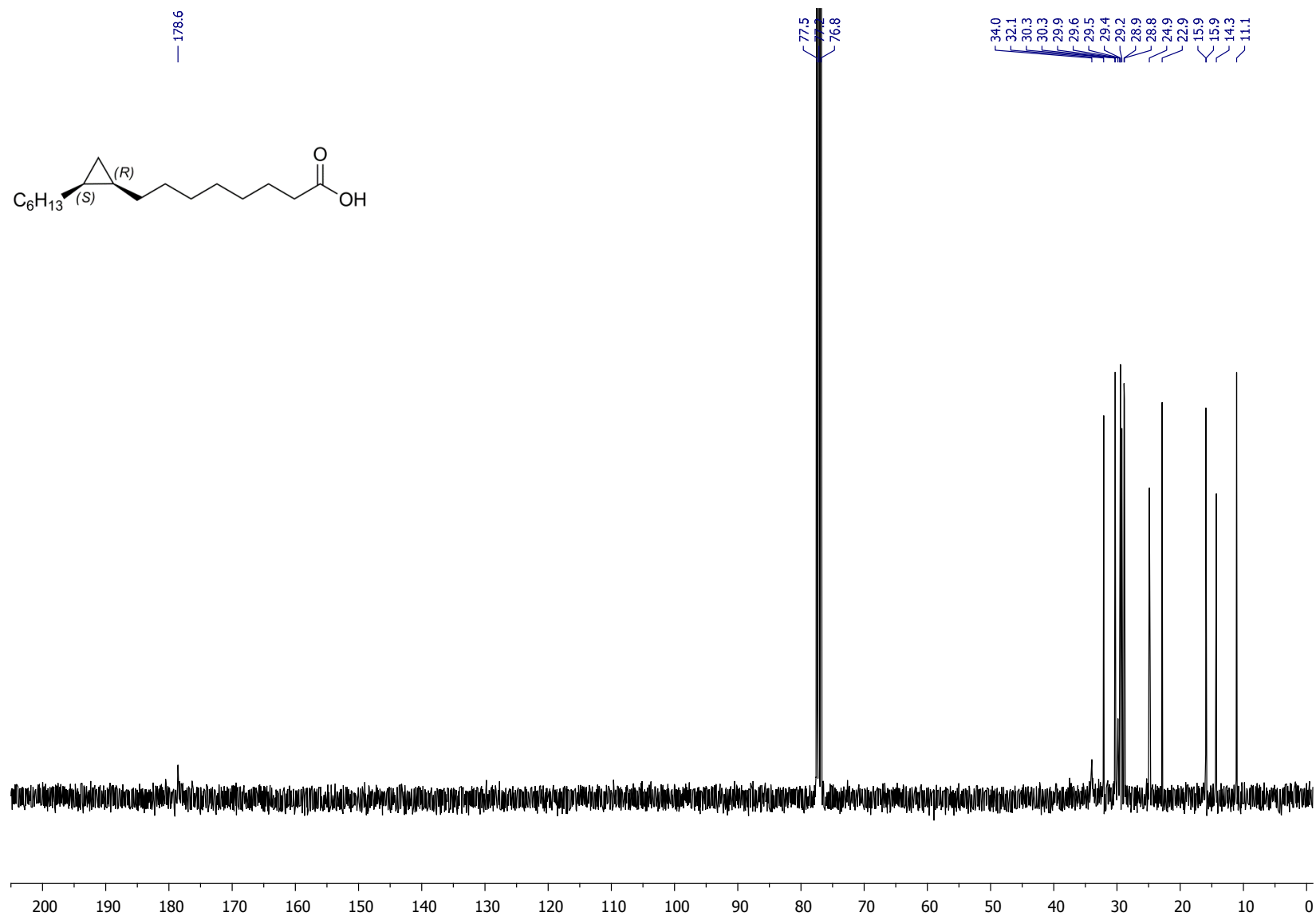
^{13}C NMR (CDCl_3 , 100 MHz): 8-[(1*R*,2*S*)-2-Hexylcyclopropyl]oct-7-enoic acid (**30**)



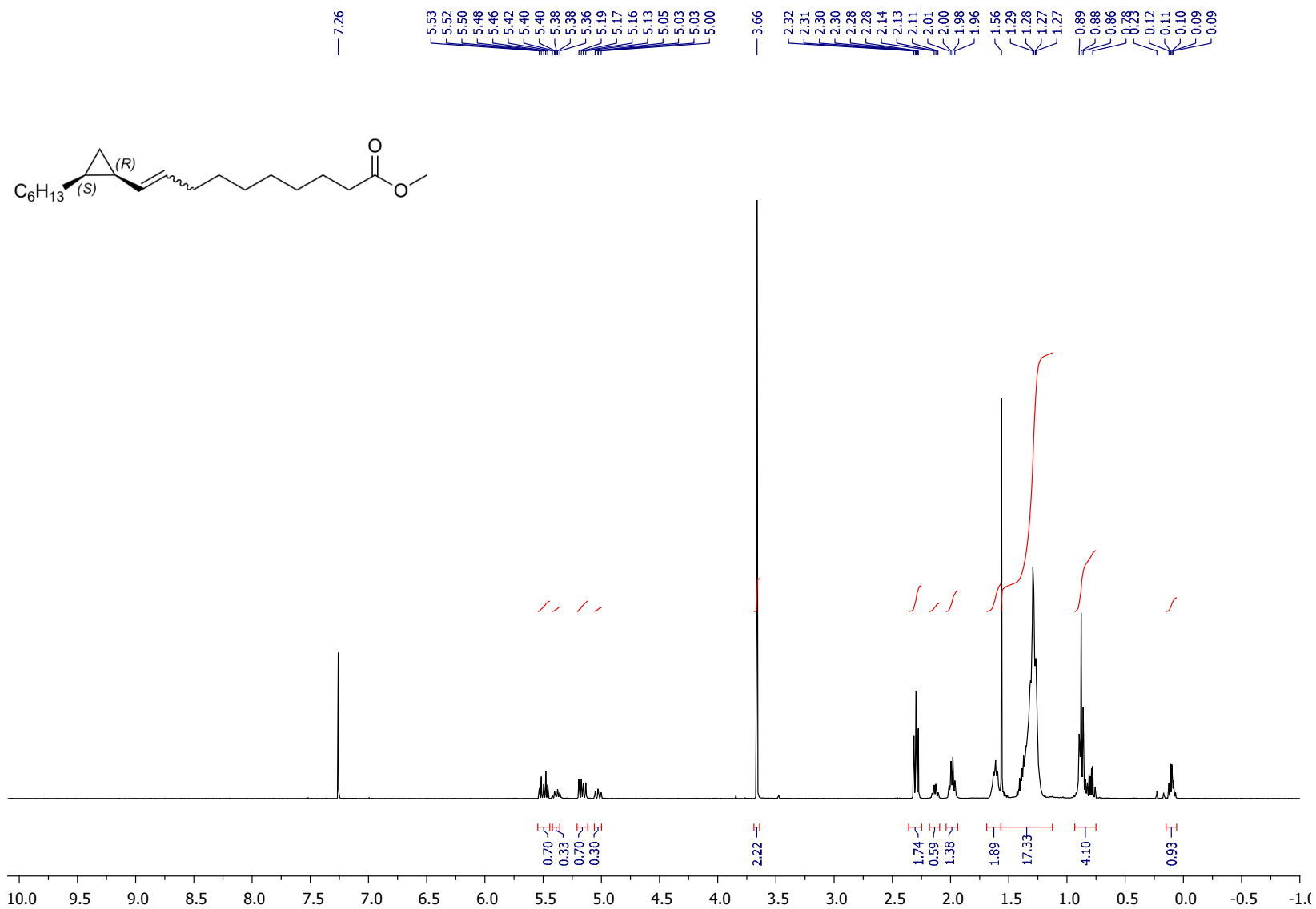
^1H NMR (CDCl_3 , 400 MHz): (9*R*,10*S*)-*cis*-Methylenehexadecanoic acid ((9*R*,10*S*)-1)



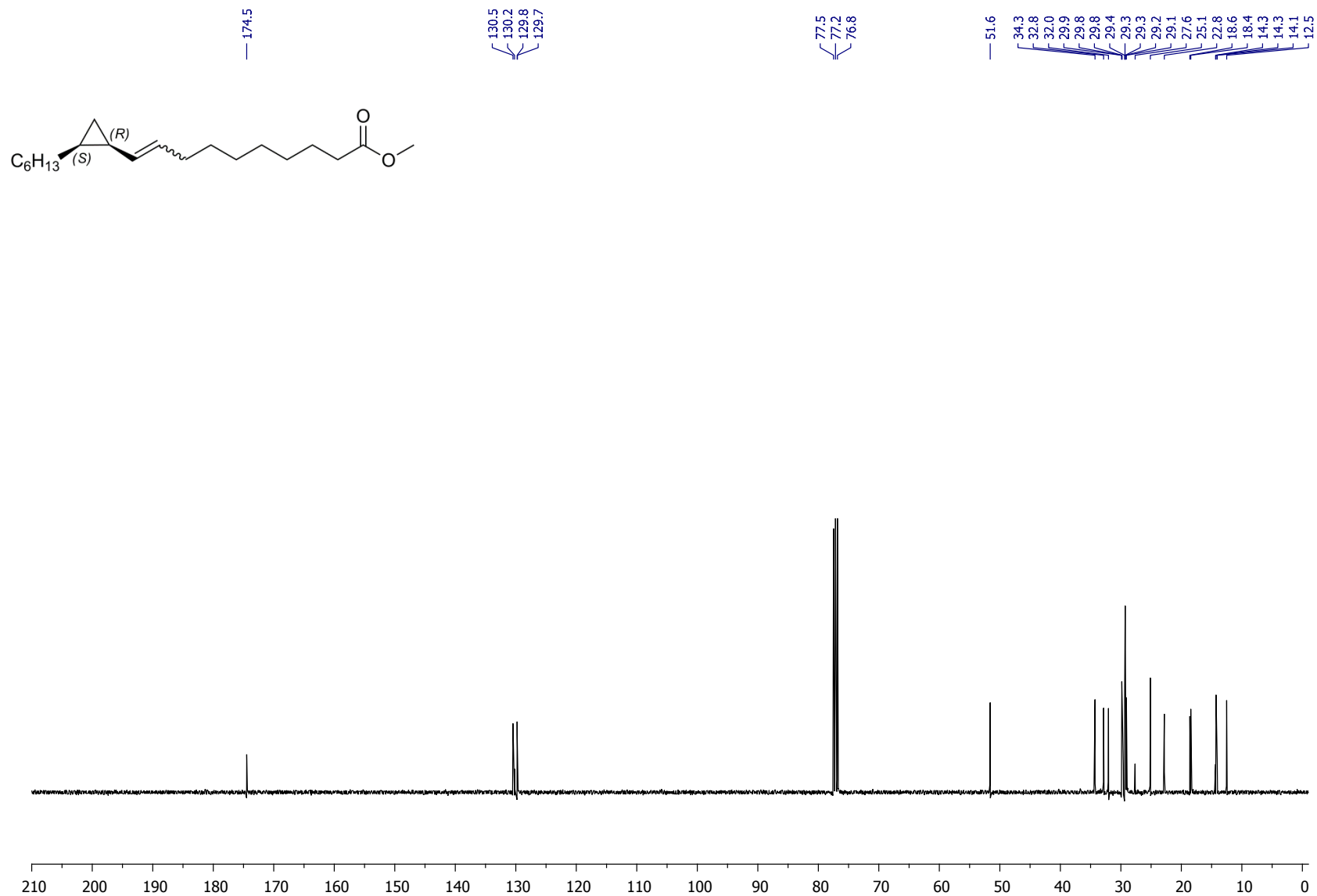
^{13}C NMR (CDCl_3 , 100 MHz): (9*R*,10*S*)-*cis*-Methylenehexadecanoic acid ((**9*R***,**10*S***)-1)



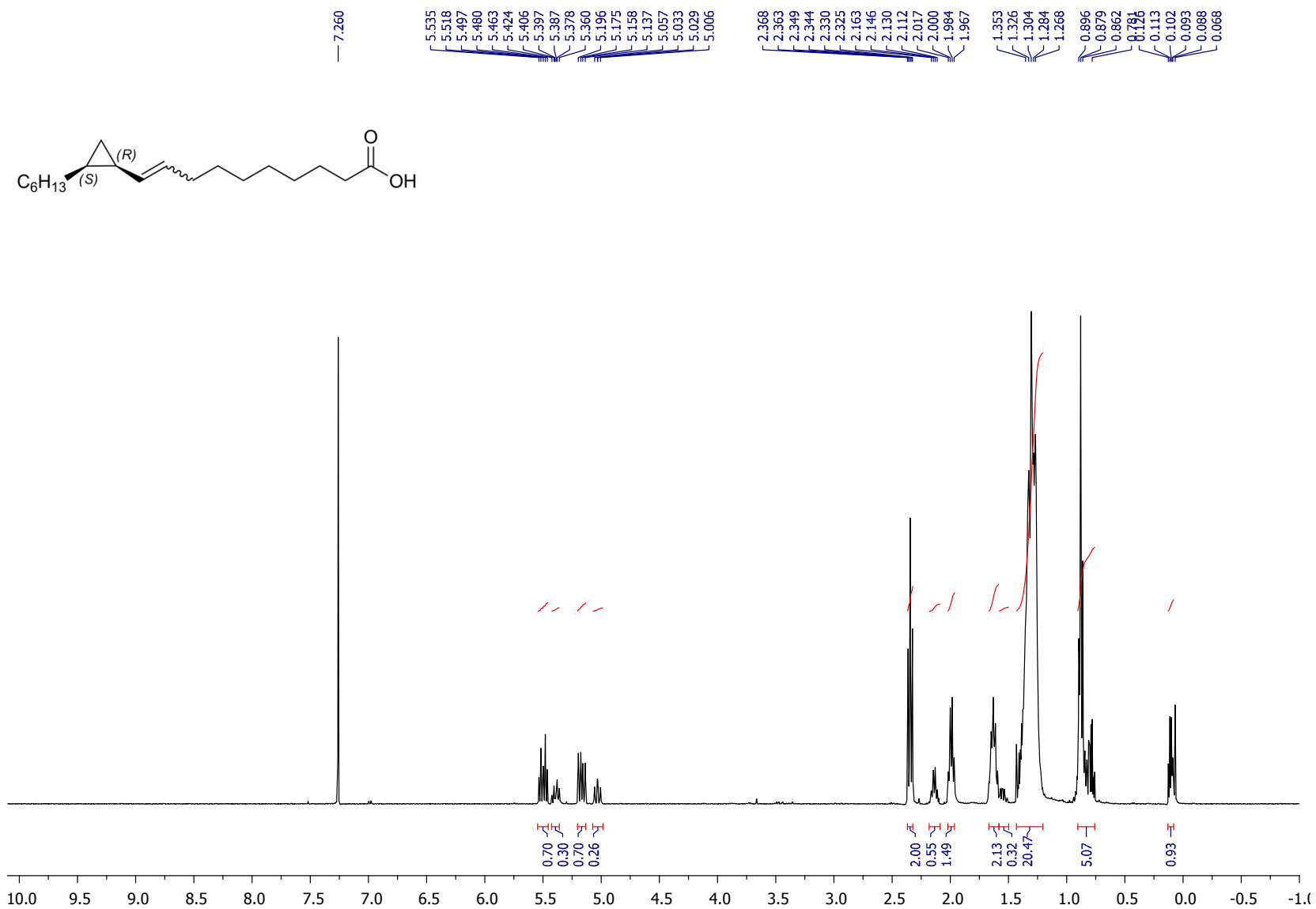
^1H NMR (CDCl_3 , 400 MHz): Methyl 10-[(1*R*,2*S*)-2-hexylcyclopropyl]dec-9-enoate (**31**)



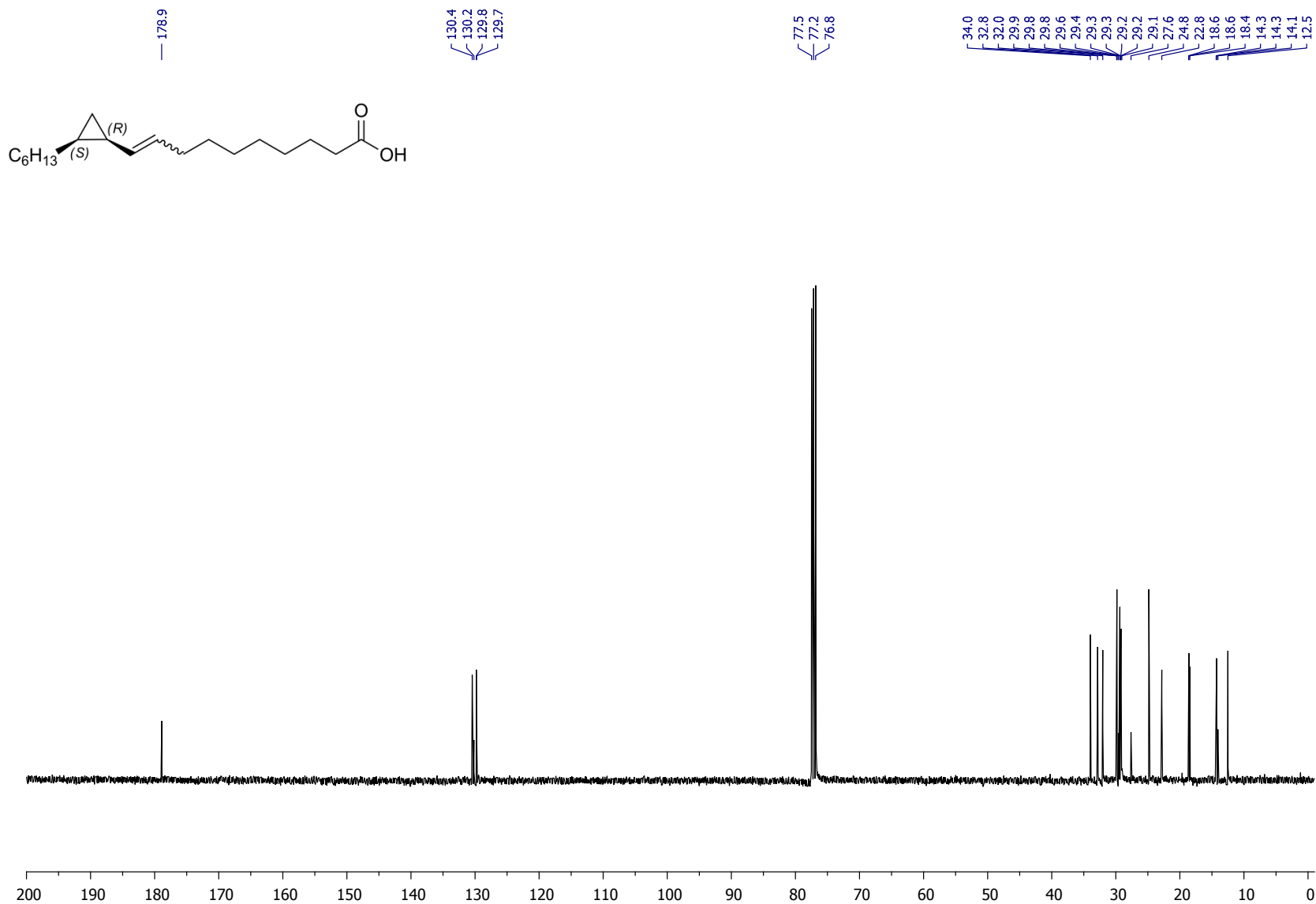
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 10-[(1*R*,2*S*)-2-hexylcyclopropyl]dec-9-enoate (**31**)



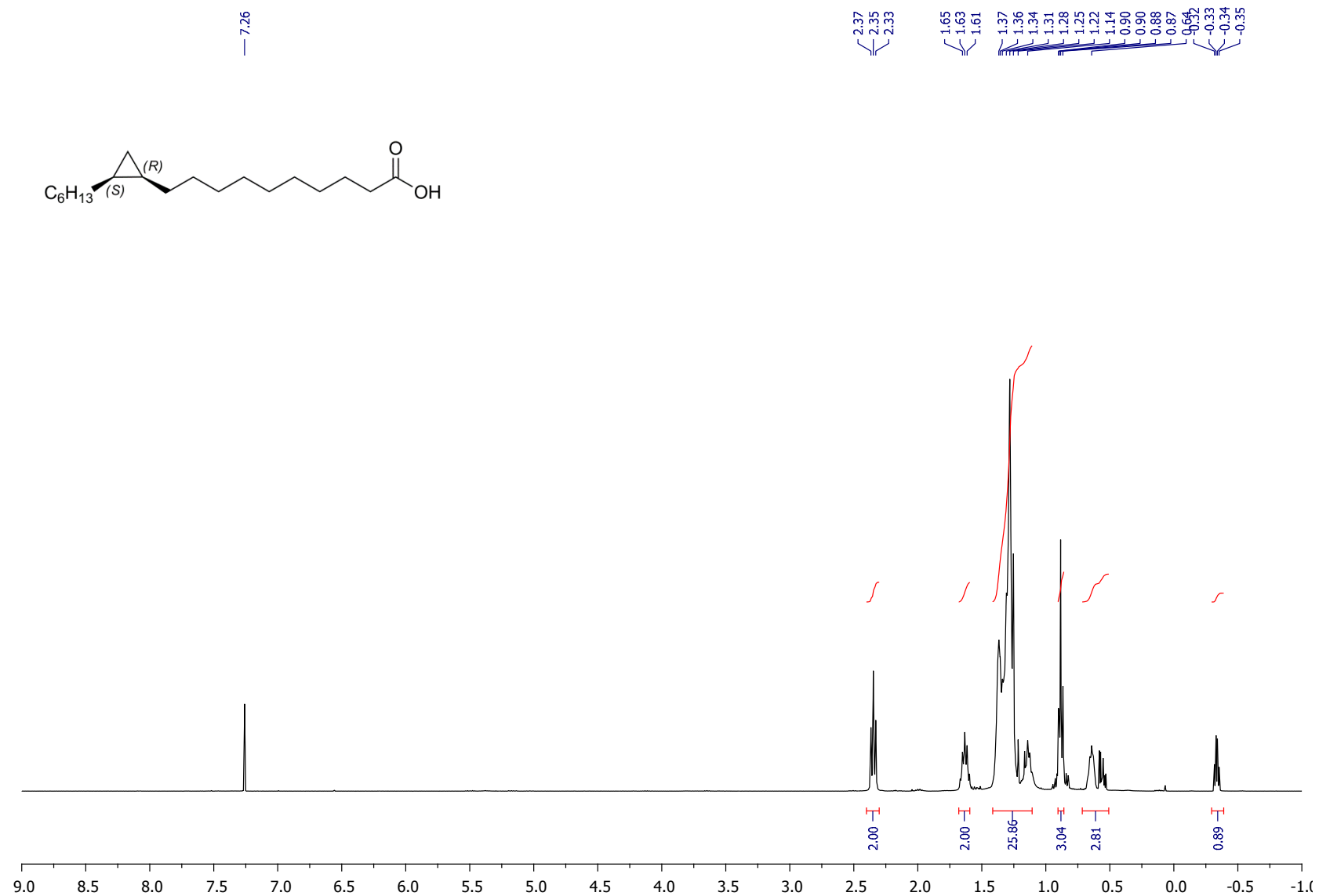
^1H NMR (CDCl_3 , 400 MHz): 10-[(1*R*,2*S*)-2-Hexylcyclopropyl]dec-9-enoic acid (**32**)



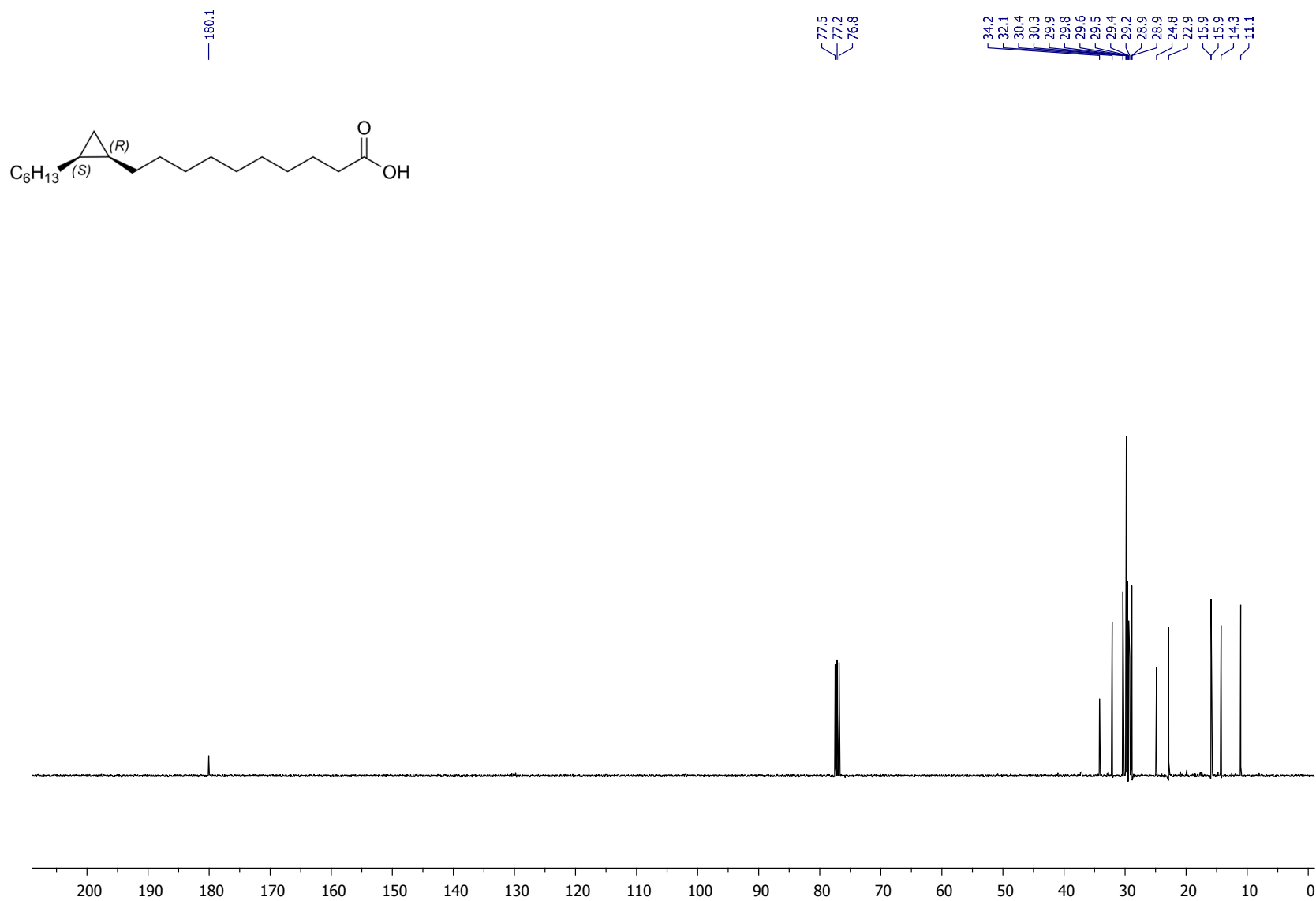
^{13}C NMR (CDCl_3 , 100 MHz): 10-[(1*R*,2*S*)-2-Hexylcyclopropyl]dec-9-enoic acid (**32**)



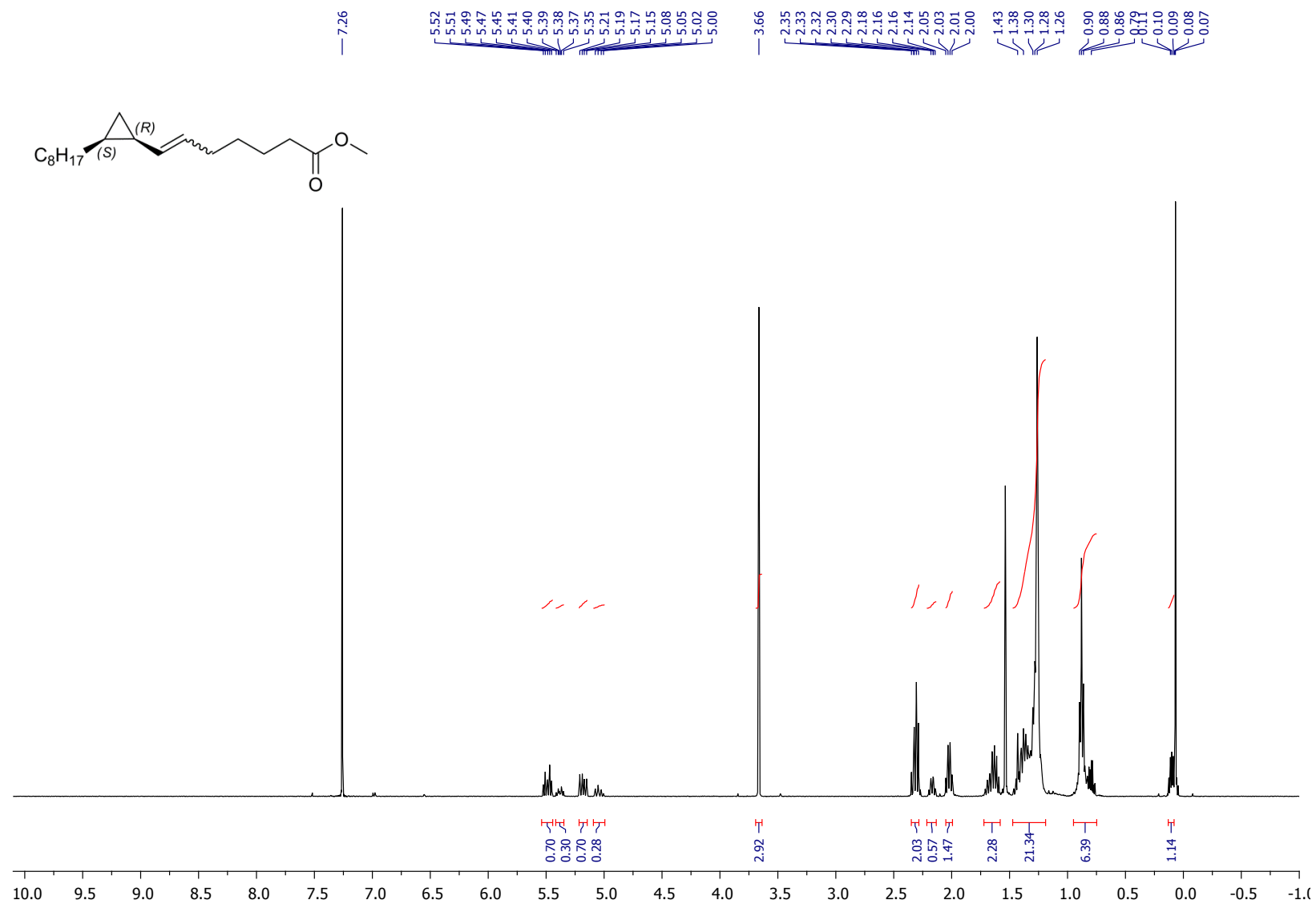
^1H NMR (CDCl_3 , 400 MHz): (11*R*,12*S*)-Lactobacillic acid ((**11*R***,**12*S***)-4)



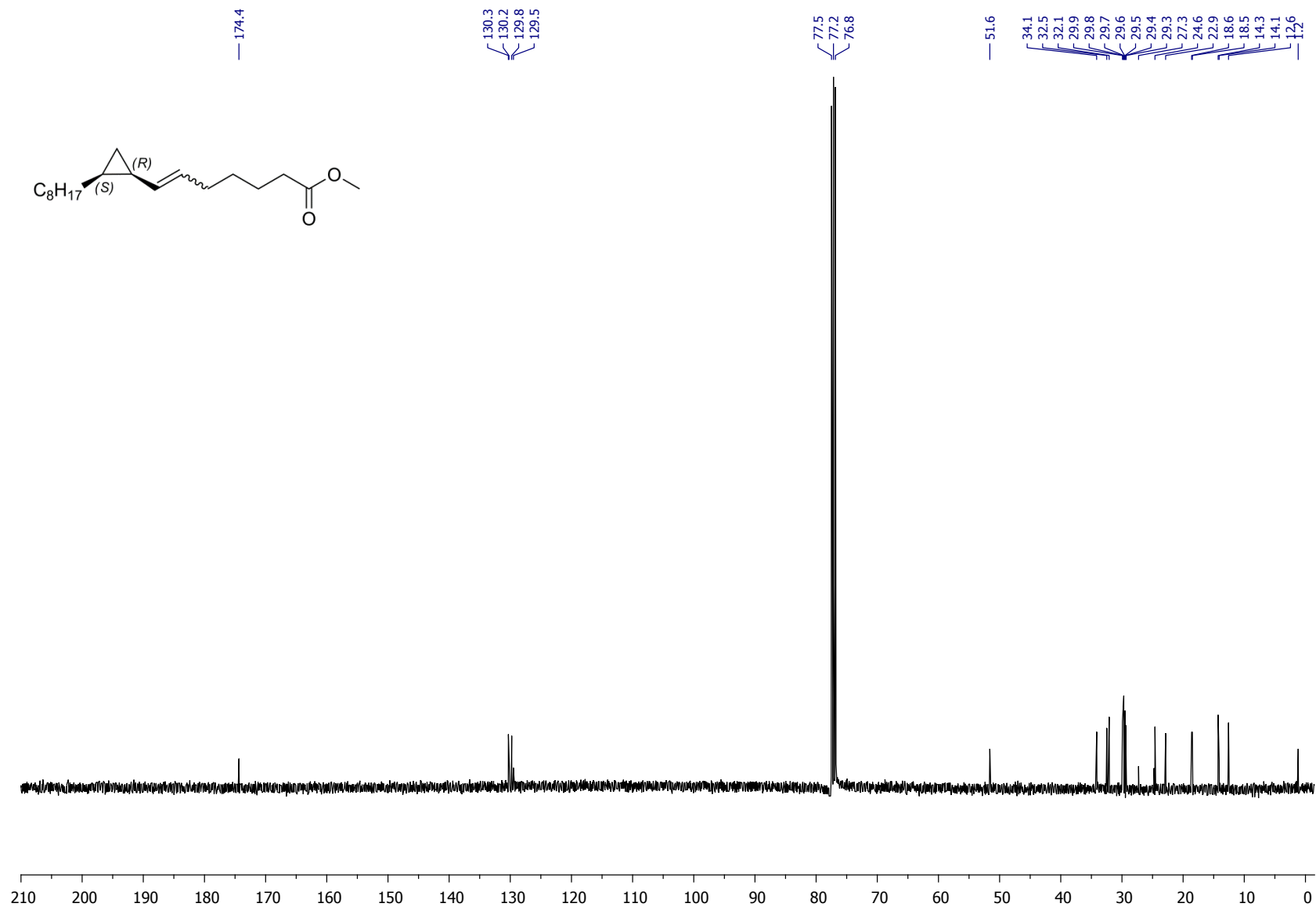
^{13}C NMR (CDCl_3 , 100 MHz): (11*R*,12*S*)-Lactobacillic acid ((**11*R*,12*S***)-4)



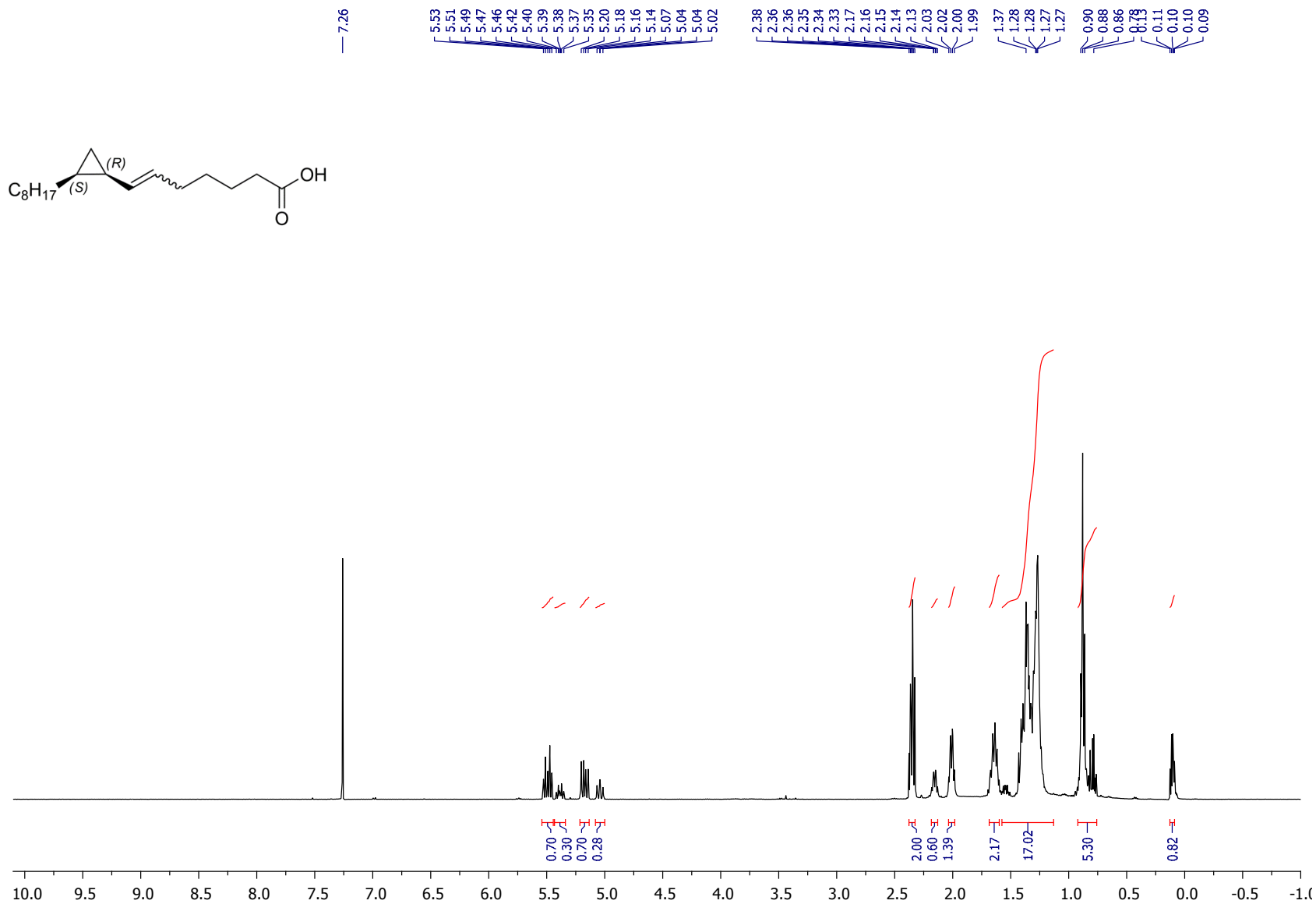
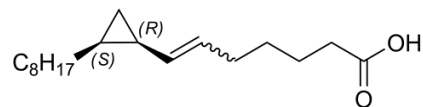
^1H NMR (CDCl_3 , 400 MHz): Methyl 7-[(1*R*,2*S*)-2-octylcyclopropyl]hept-6-enoate (**33**)



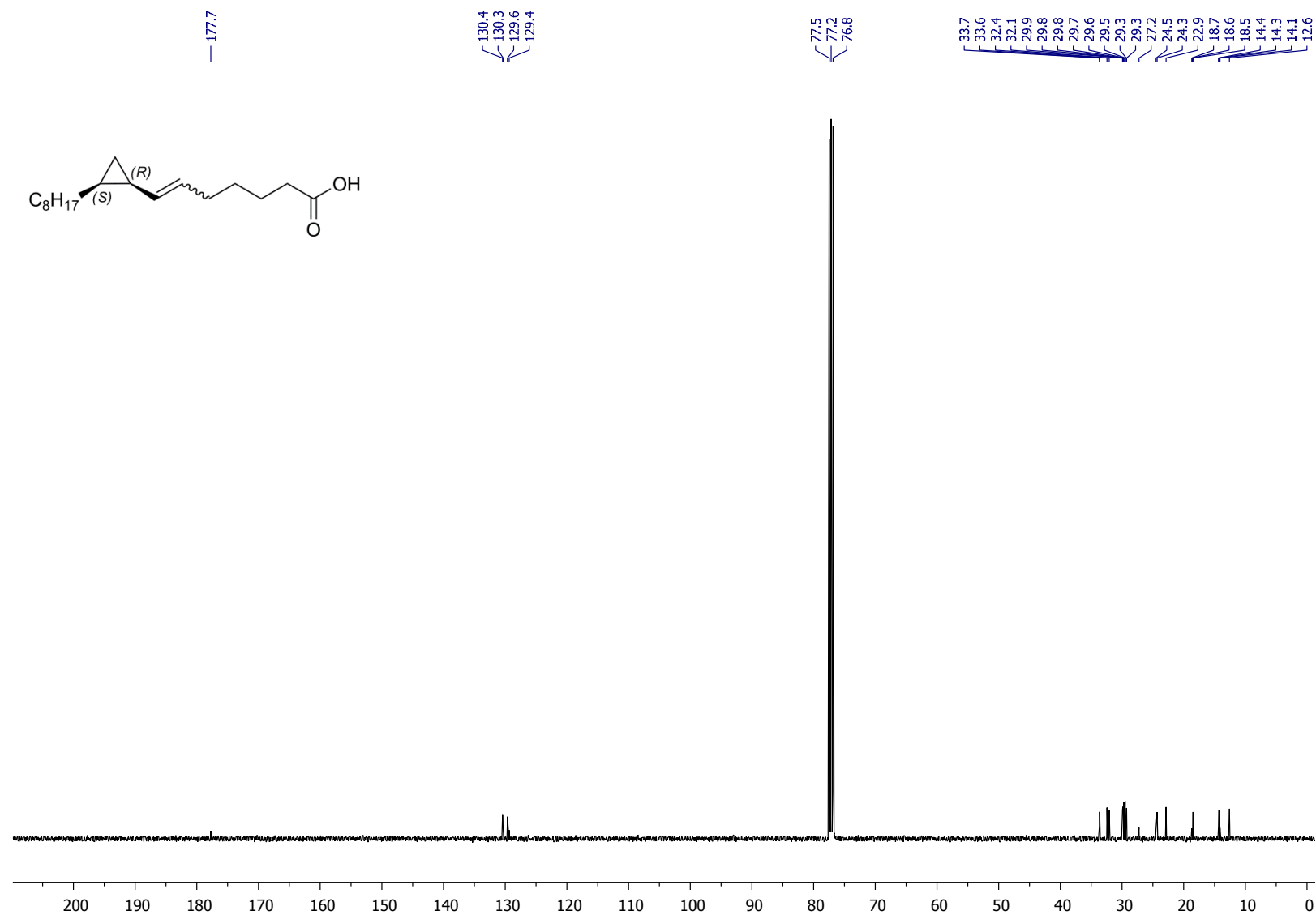
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 7-[(1*R*,2*S*)-2-octylcyclopropyl]hept-6-enoate (**33**)



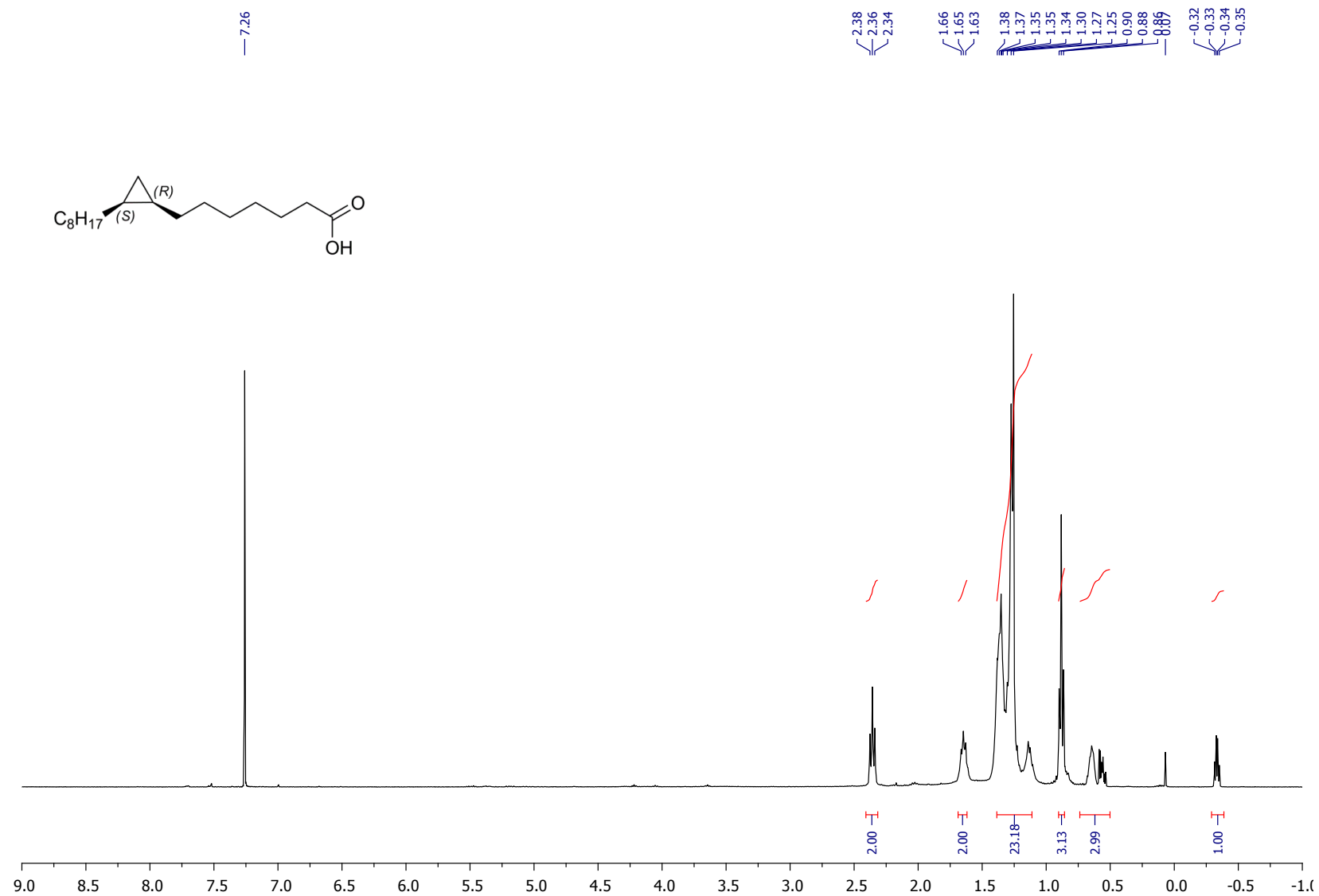
^1H NMR (CDCl_3 , 400 MHz): 7-[(1*R*,2*S*)-2-Octylcyclopropyl]hept-6-enoic acid (**34**)



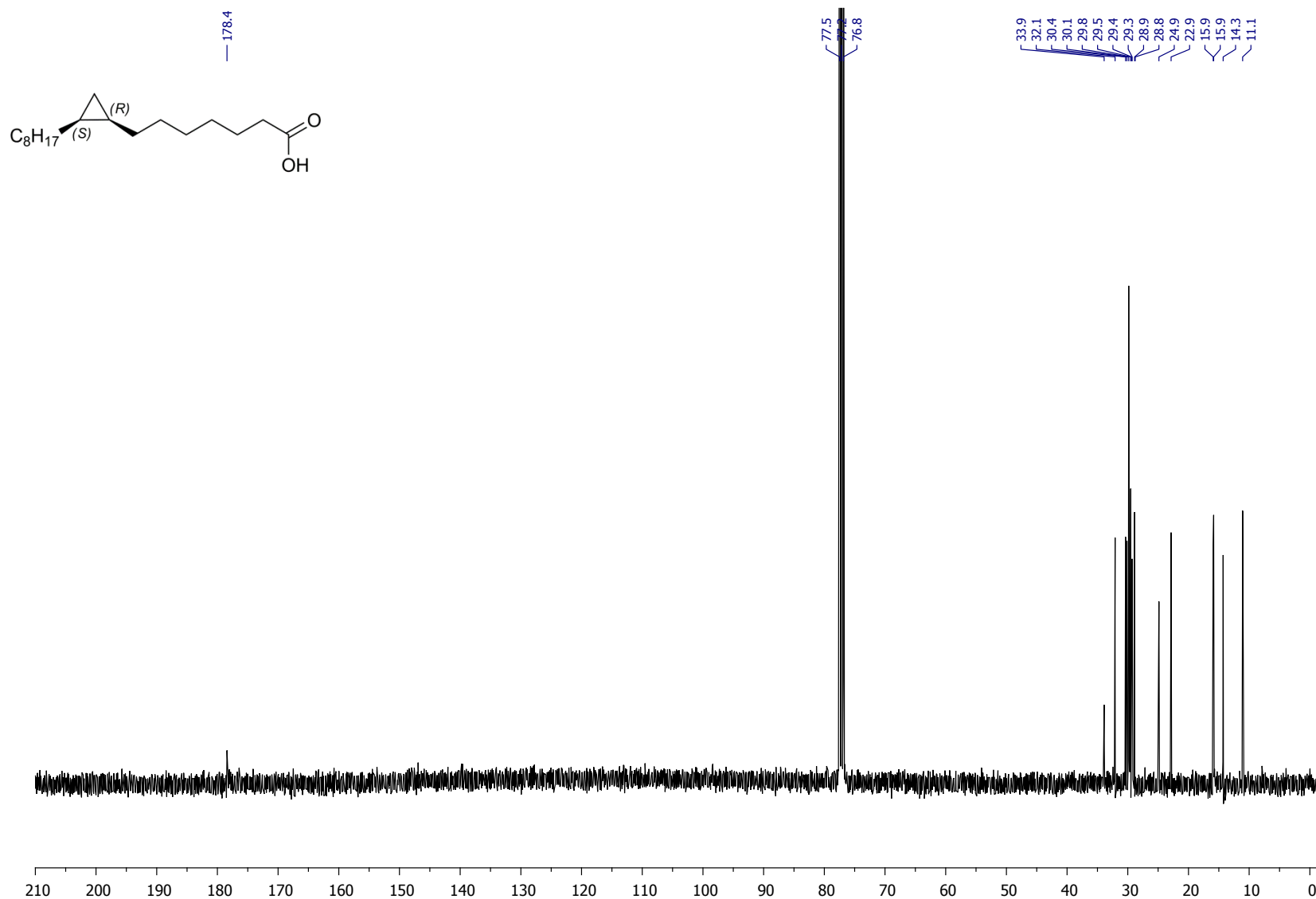
^{13}C NMR (CDCl_3 , 100 MHz): 7-[(1*R*,2*S*)-2-Octylcyclopropyl]hept-6-enoic acid (**34**)



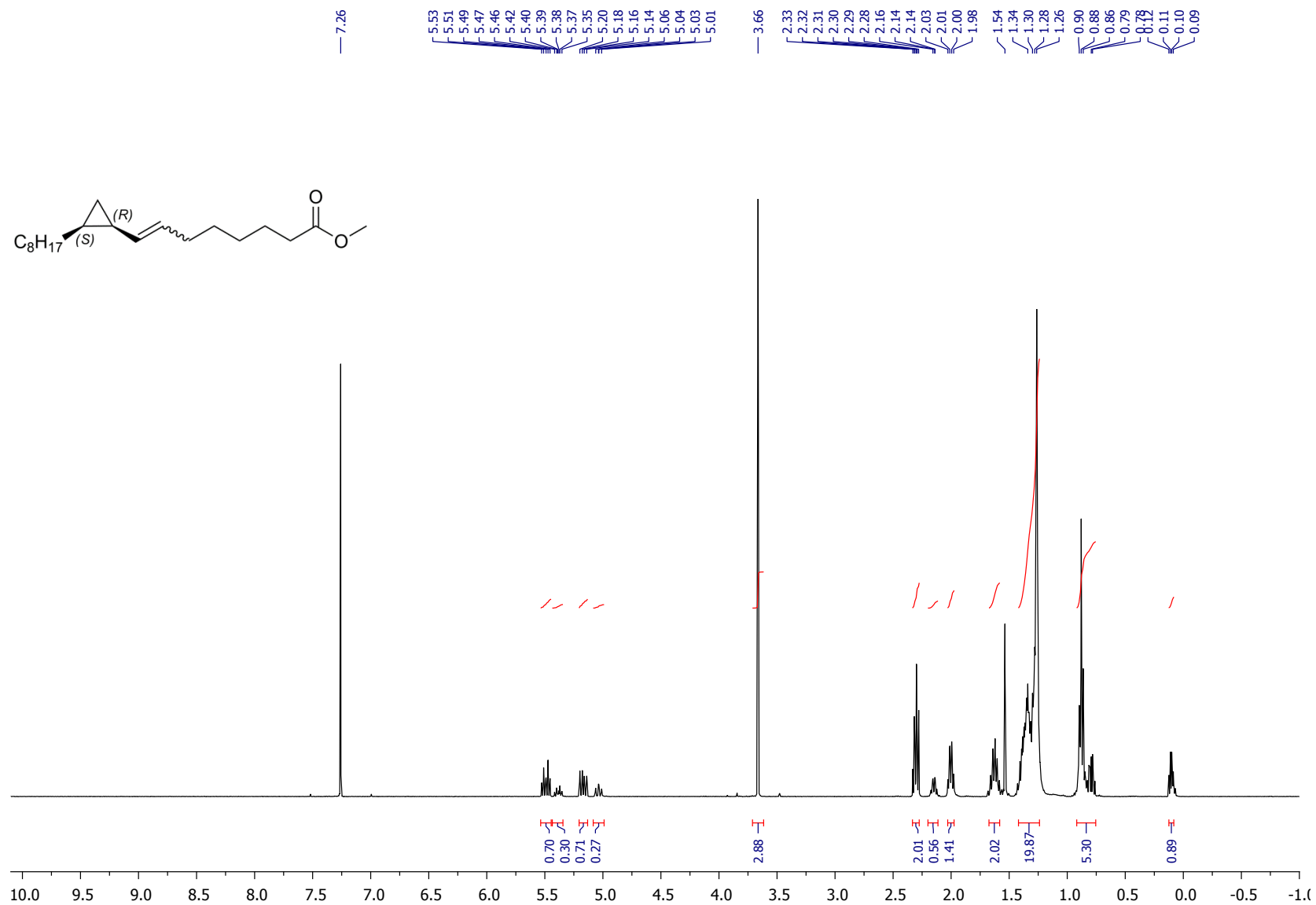
^1H NMR (CDCl_3 , 400 MHz): (8*R*,9*S*)-Dihydromalvalic acid ((8*R*,9*S*)-2)



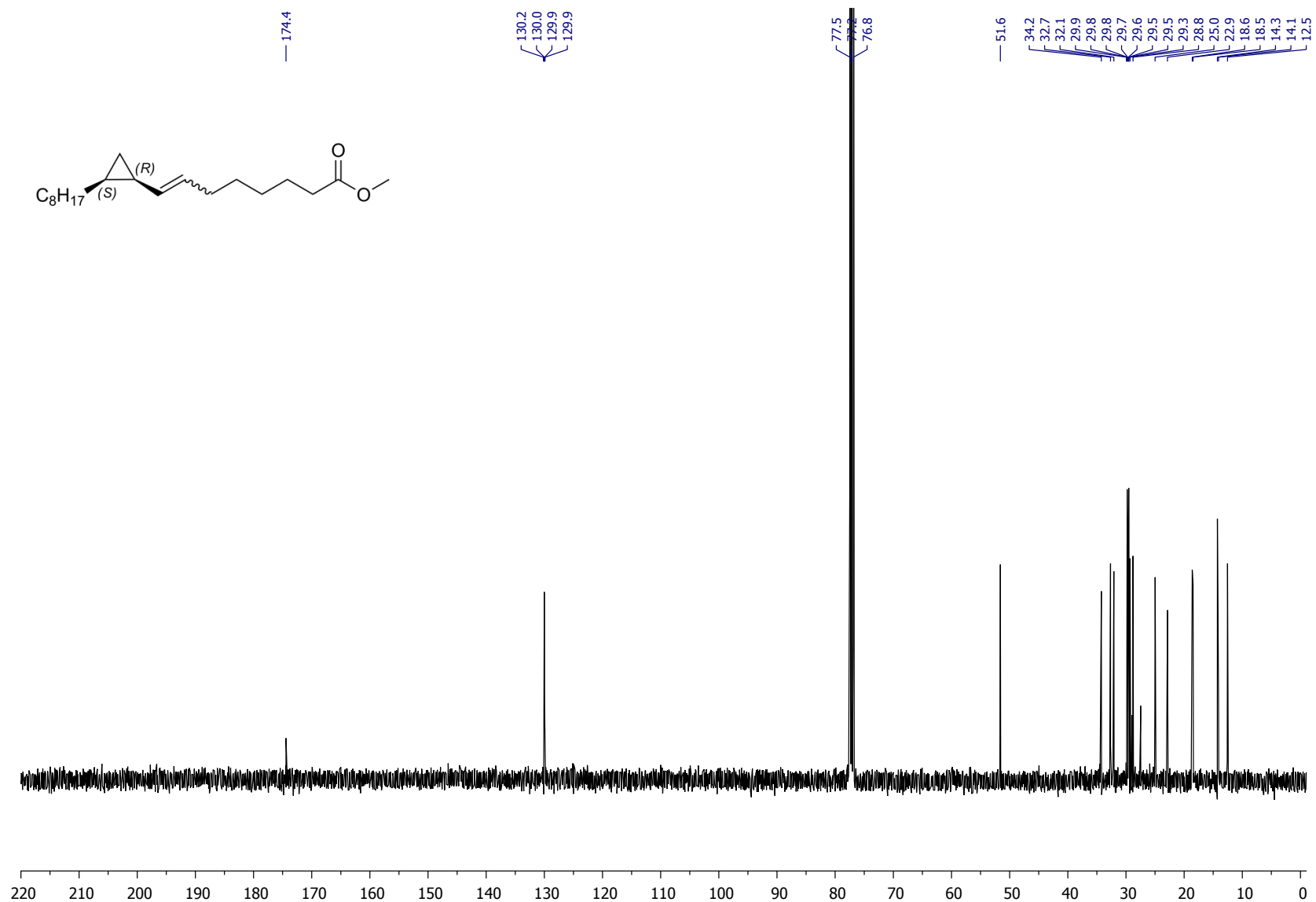
^{13}C NMR (CDCl_3 , 100 MHz): (8*R*,9*S*)-Dihydromalvalic acid ((8*R*,9*S*)-2)



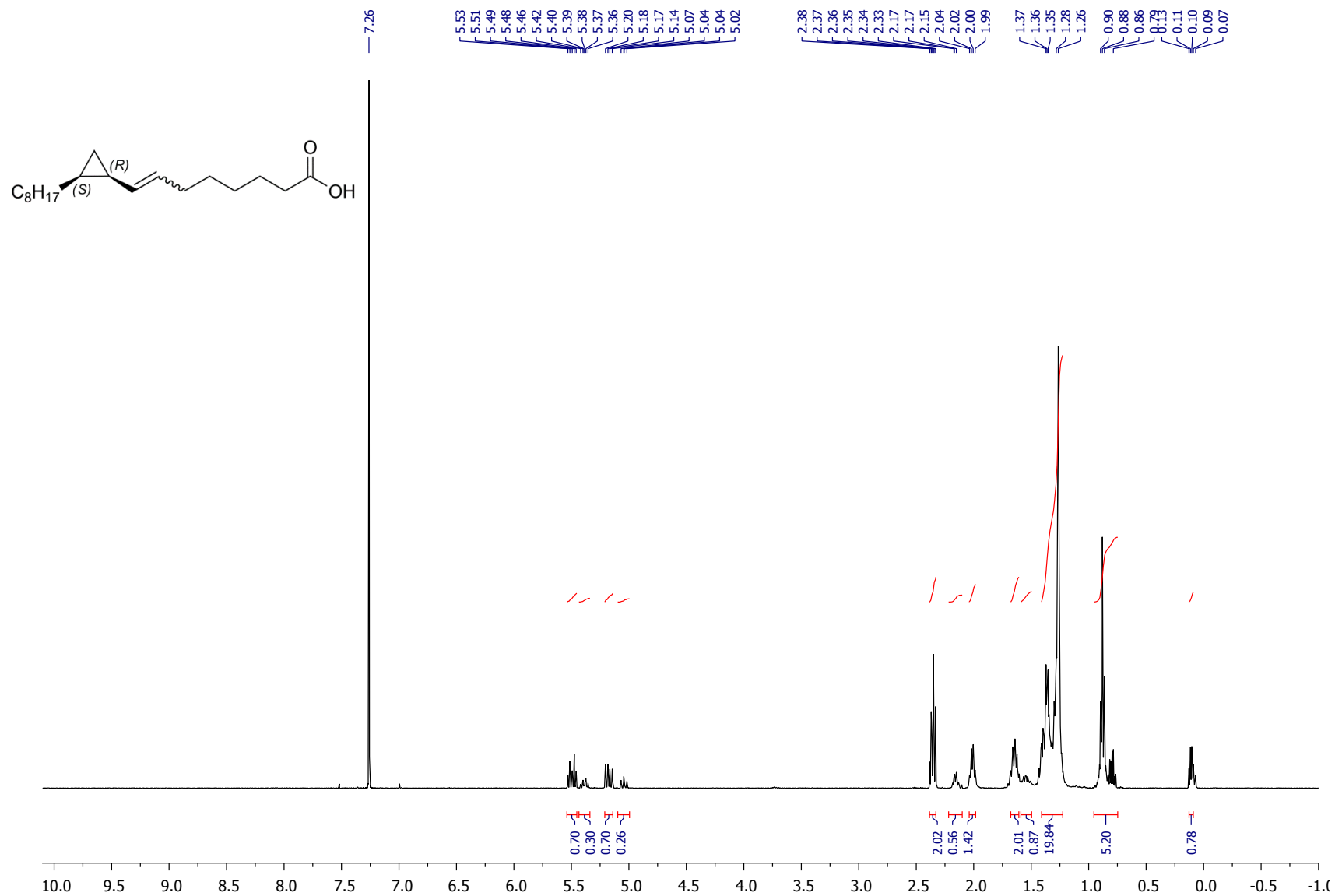
^1H NMR (CDCl_3 , 400 MHz): Methyl 8-[(1*R*,2*S*)-2-octylcyclopropyl]oct-7-enoate (**35**)



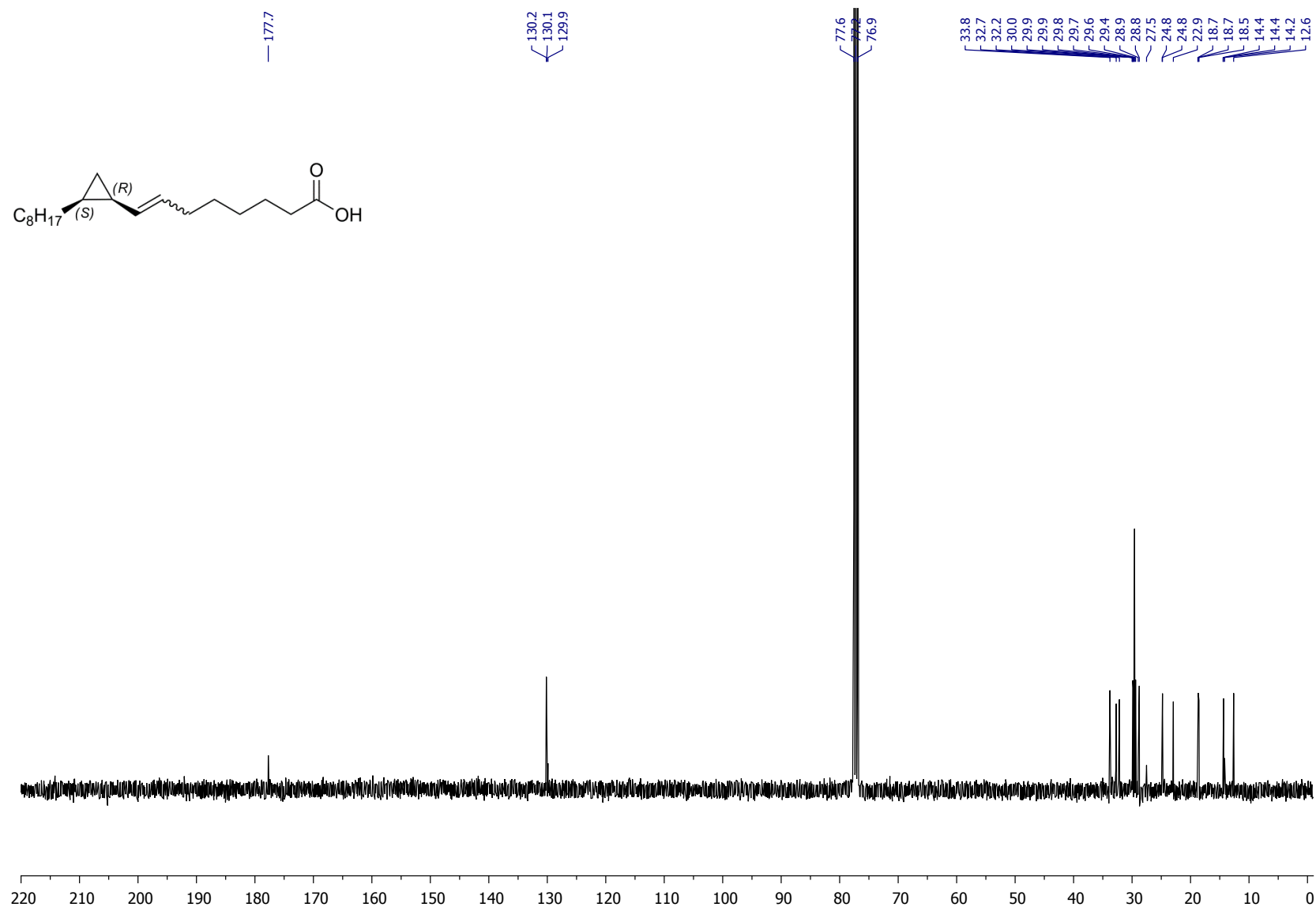
^{13}C NMR (CDCl_3 , 100 MHz): Methyl 8-[(1*R*,2*S*)-2-octylcyclopropyl]oct-7-enoate (**35**)



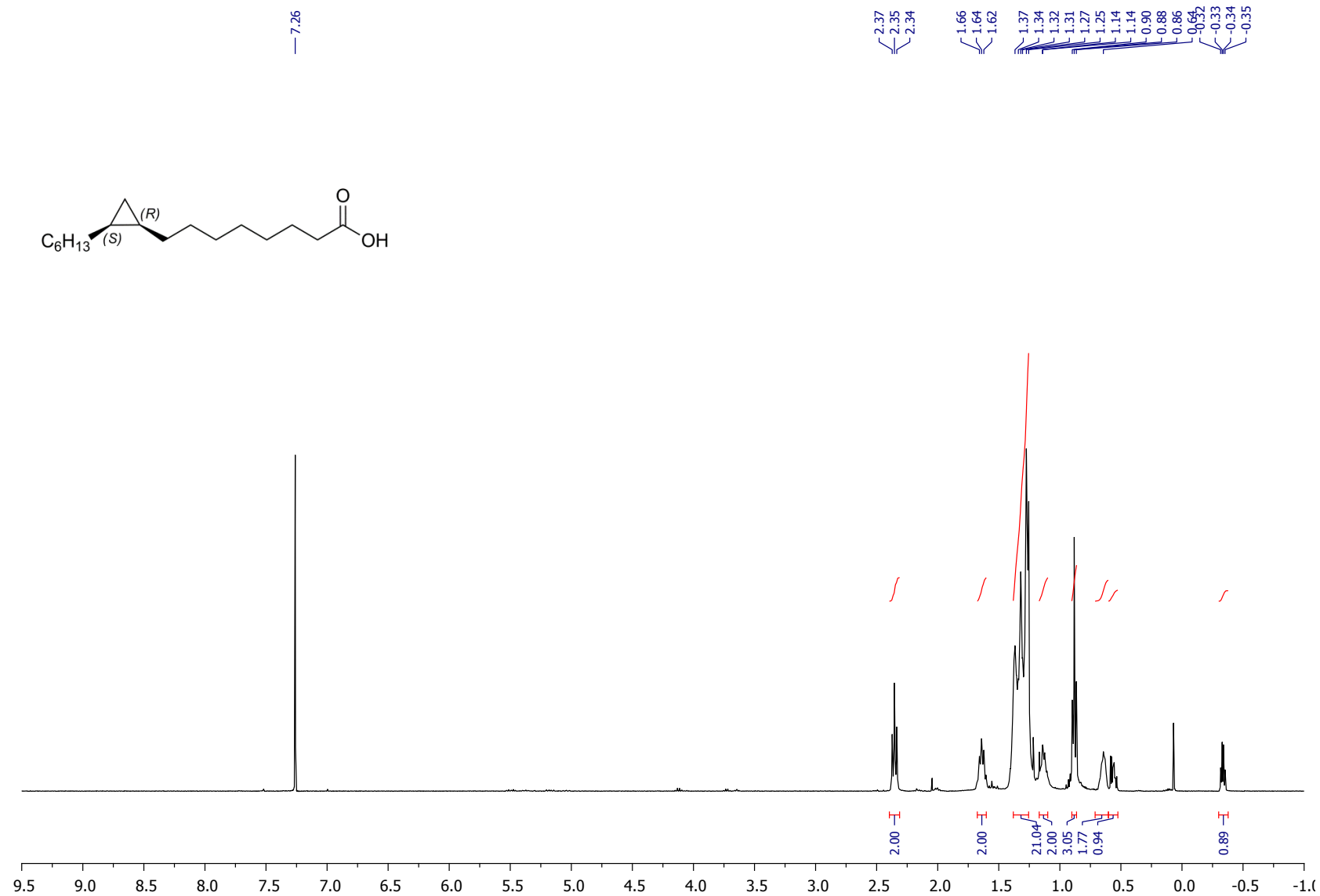
^1H NMR (CDCl_3 , 400 MHz): 8-[(1*R*,2*S*)-2-Octylcyclopropyl]oct-7-enoic acid (**36**)



^{13}C NMR (CDCl_3 , 100 MHz): 8-[(1*R*,2*S*)-2-Octylcyclopropyl]oct-7-enoic acid (**36**)



^1H NMR (CDCl_3 , 400 MHz): (9*R*,10*S*)-Dihydrosterculic acid ((**9*R*,10*S***)-3)



^{13}C NMR (CDCl_3 , 100 MHz): (9*R*,10*S*)-Dihydrosterculic acid ((**9*R*,10*S***)-3)

