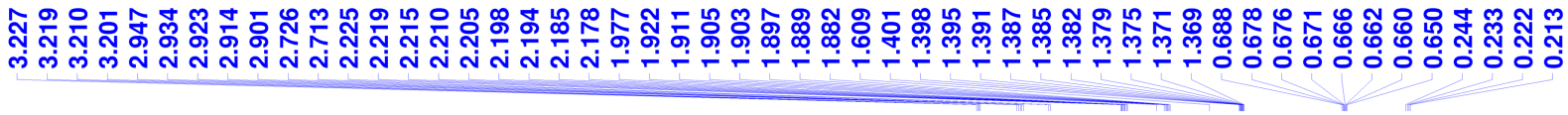
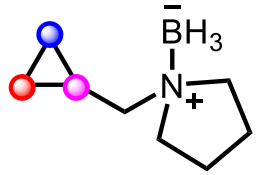
Cyclopropanes to Spirocyclic Amine-Boranes: Merging of C–H Bond Activation and C–C Bond Cleavage

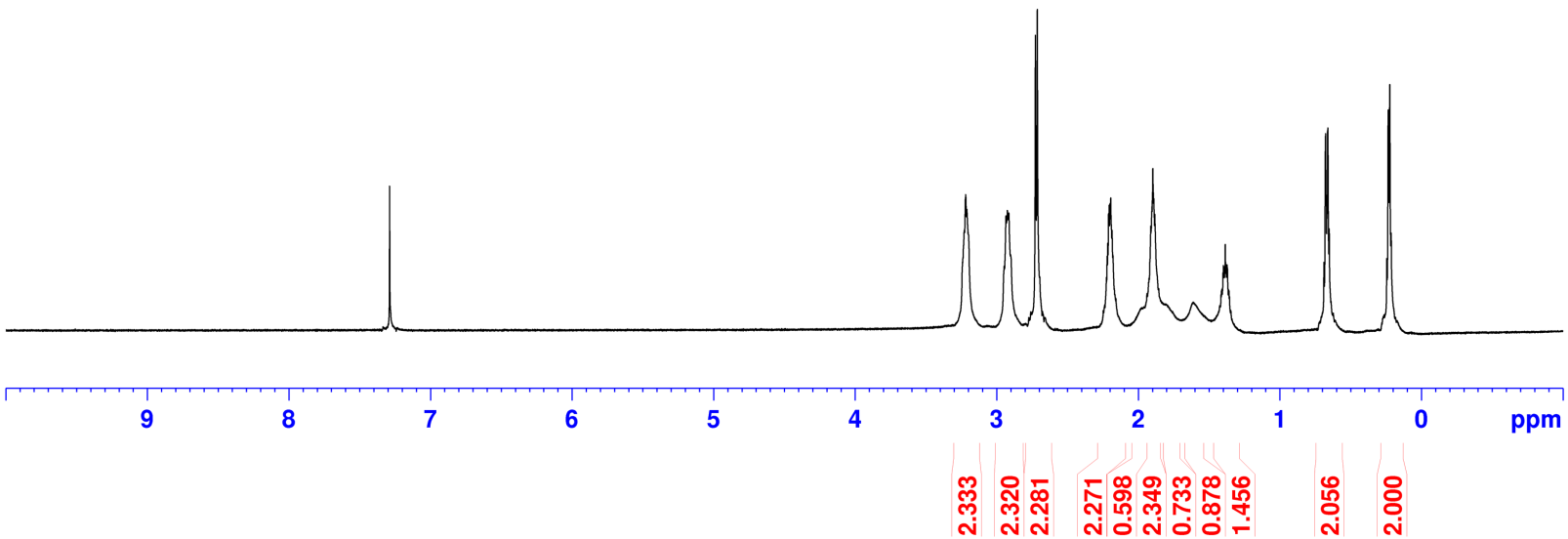
^{1}H, ^{13}C, ^{11}B, ^{11}B{H} NMR Spectra of CABs

1-(Cyclopropylmethyl)pyrrolidine Borane (1a):



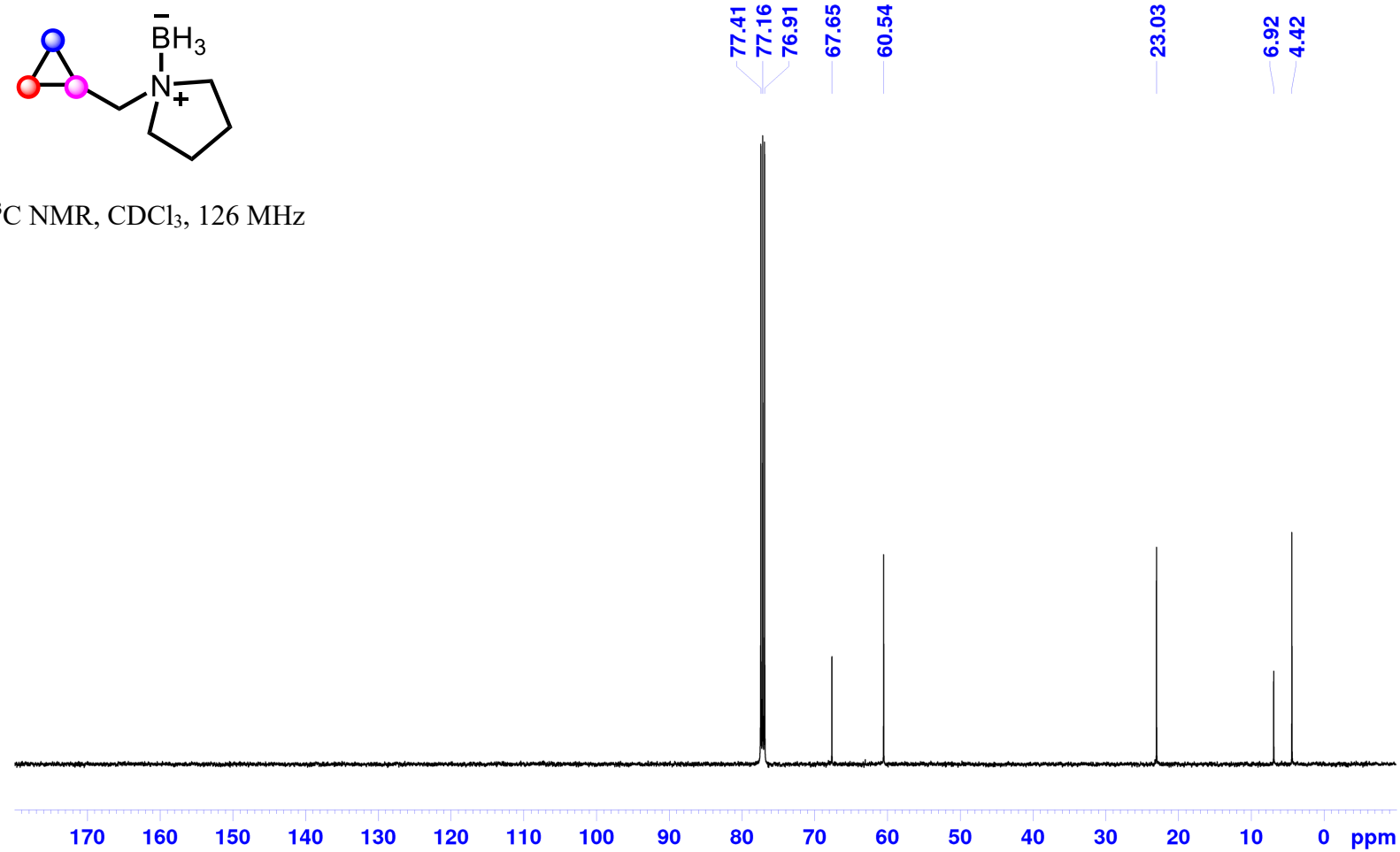


^{1}H NMR, $CDCl_3$, 500 MHz



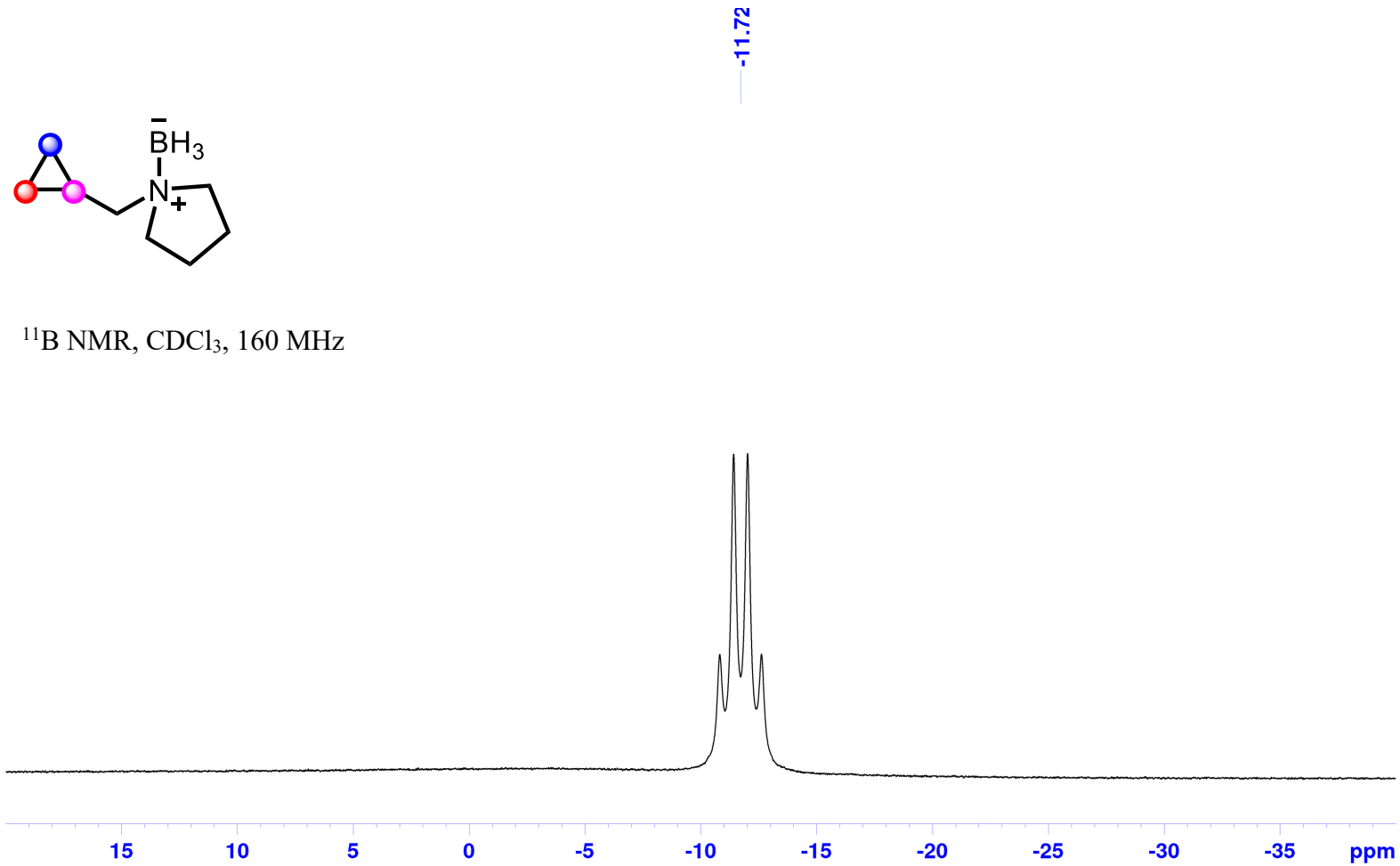
1-(Cyclopropylmethyl)pyrrolidine Borane (1a):

^{13}C NMR, $CDCl_3$, 126 MHz



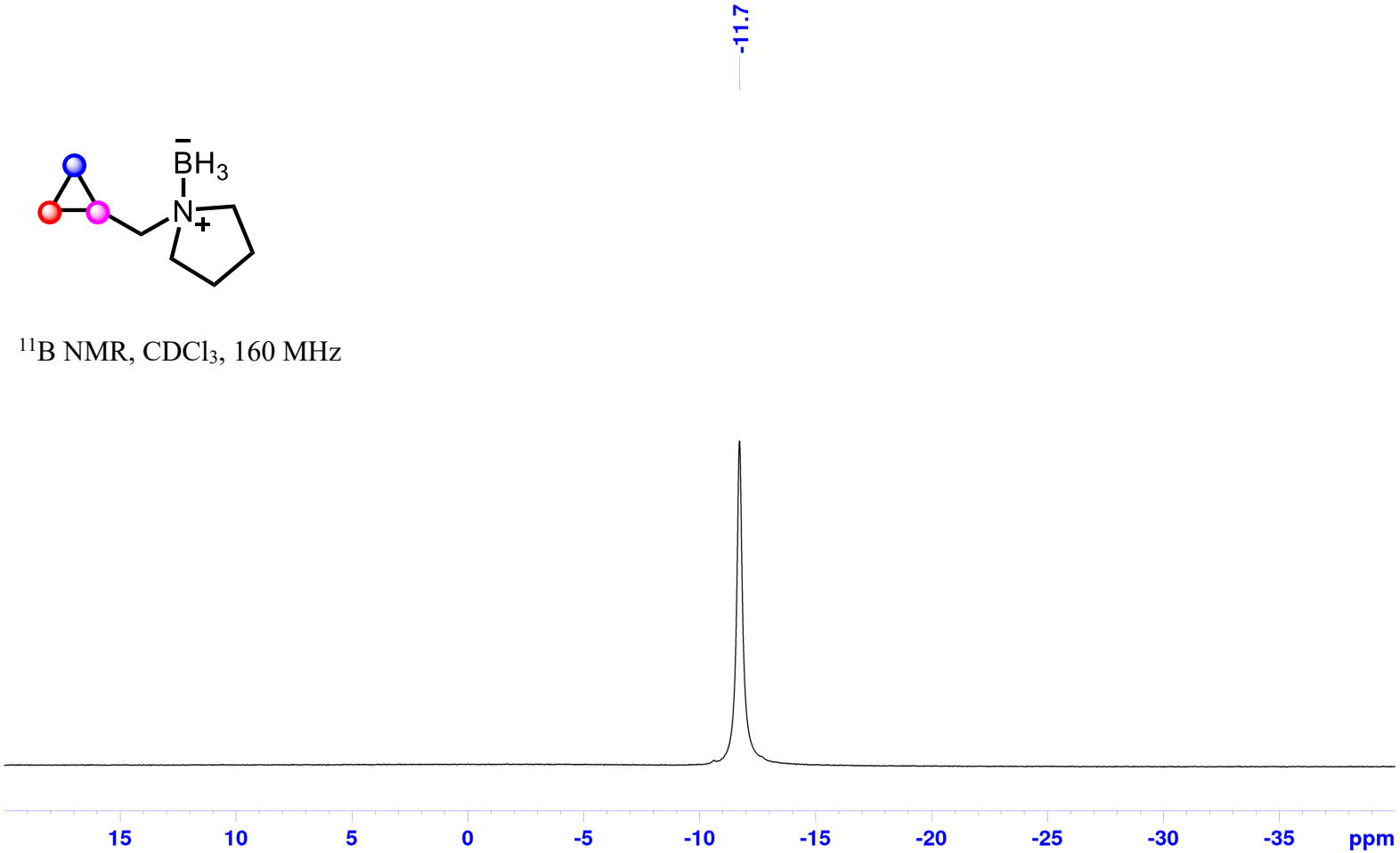
1-(Cyclopropylmethyl)pyrrolidine Borane (1a):

^{11}B NMR, $CDCl_3$, 160 MHz



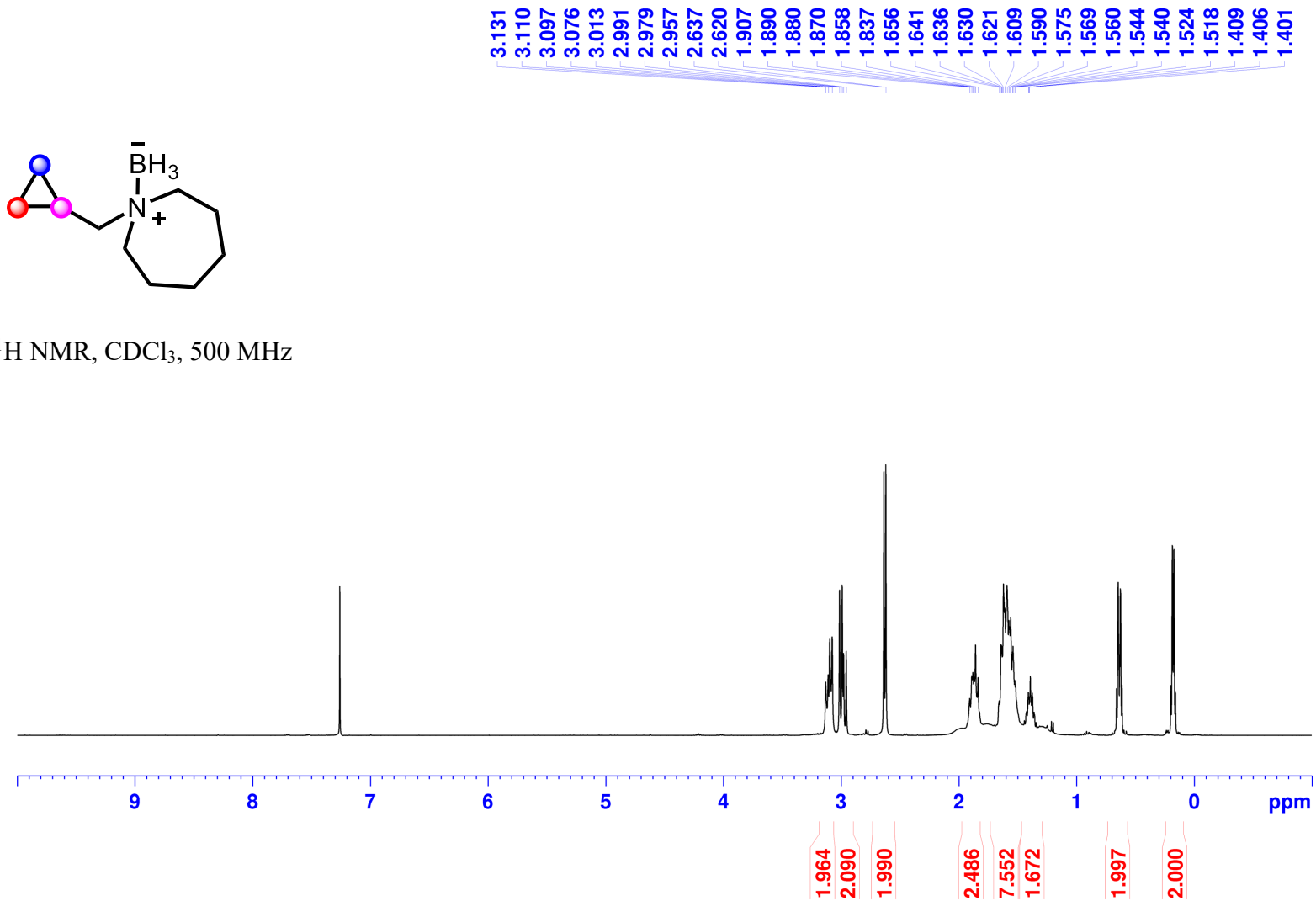
1-(Cyclopropylmethyl)pyrrolidine Borane (1a):

^{11}B NMR, $CDCl_3$, 160 MHz



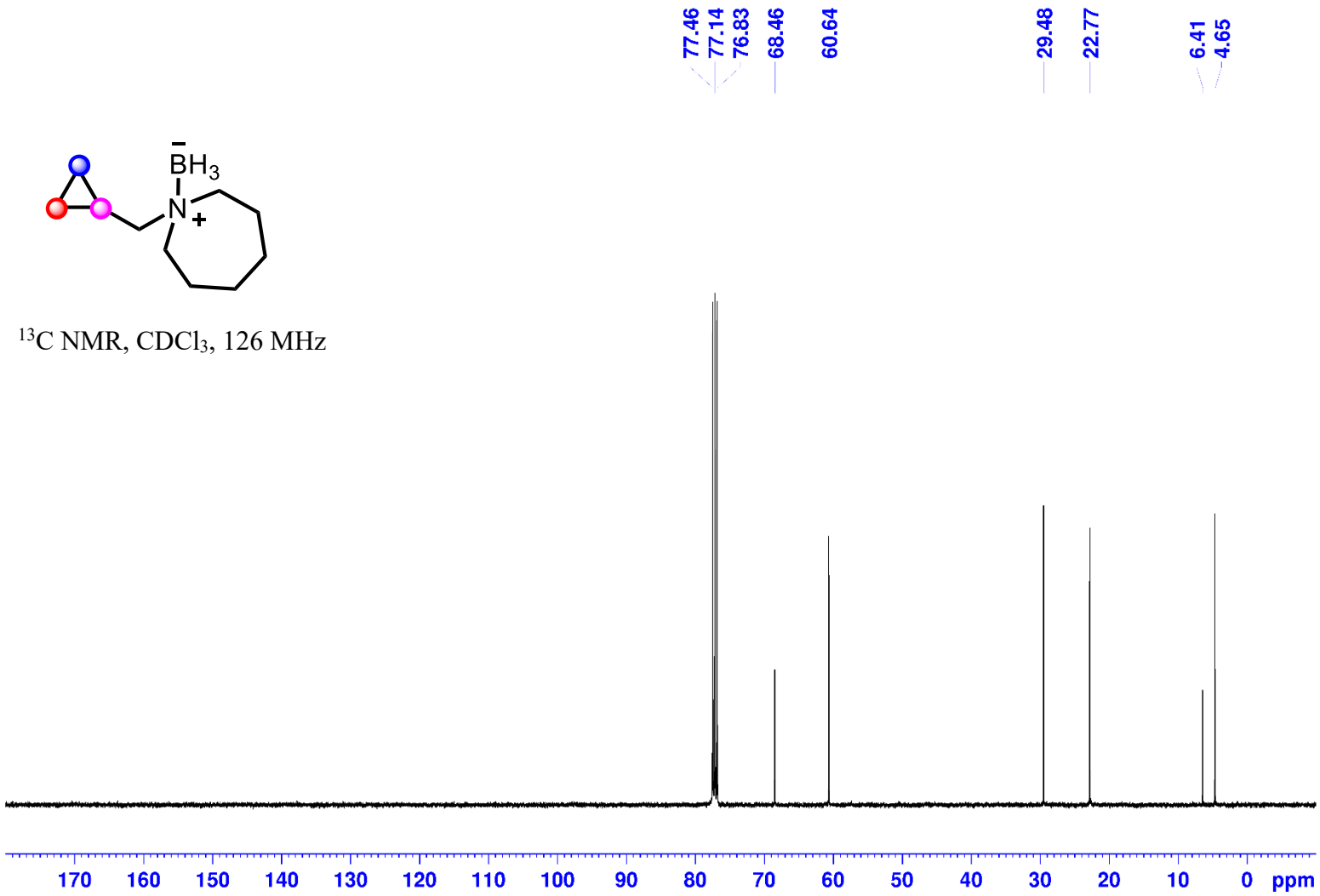
1-(Cyclopropylmethyl)azepane Borane (1b):

^{1}H NMR, $CDCl_3$, 500 MHz



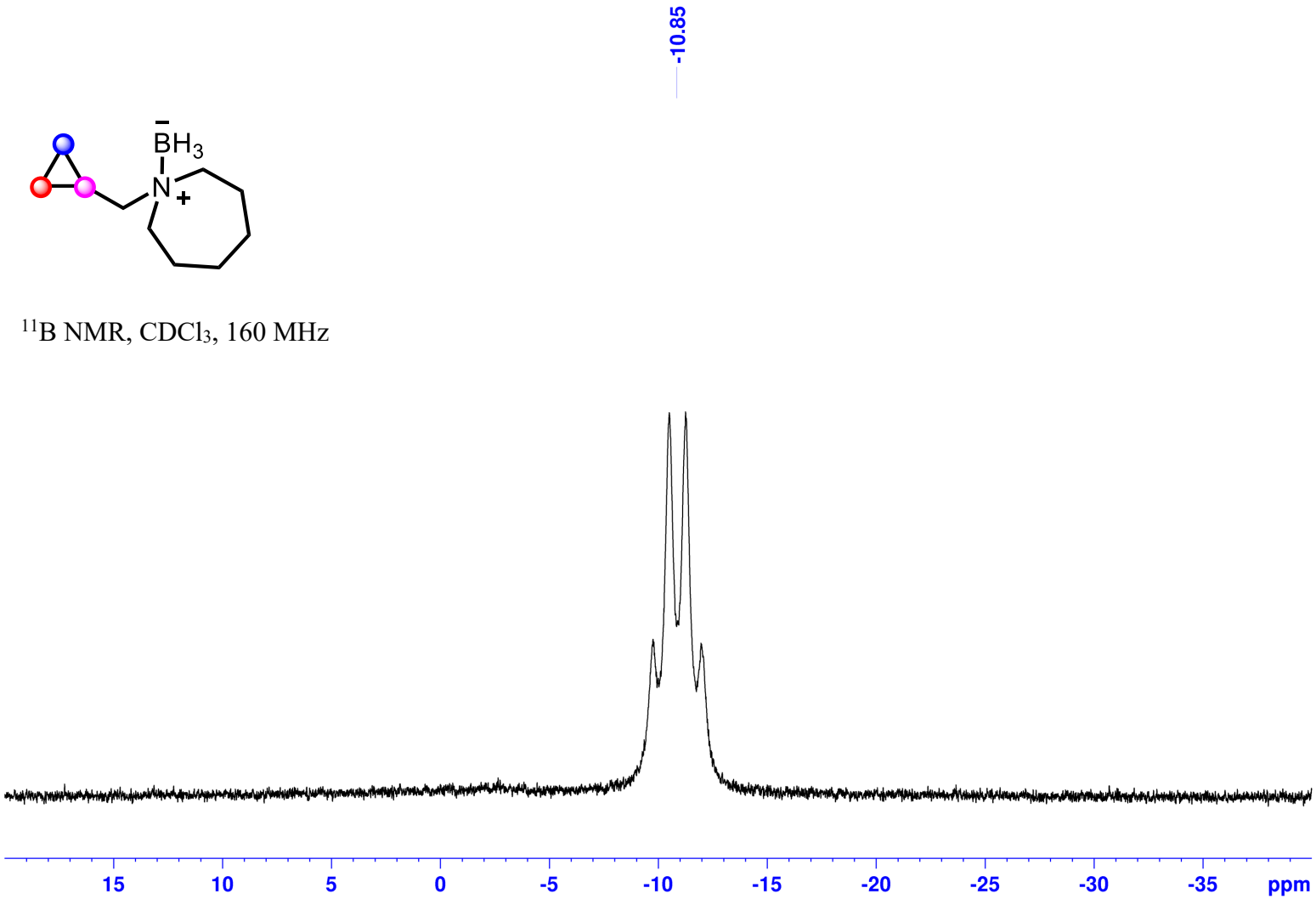
1-(Cyclopropylmethyl)azepane Borane (1b):

^{13}C NMR, $CDCl_3$, 126 MHz



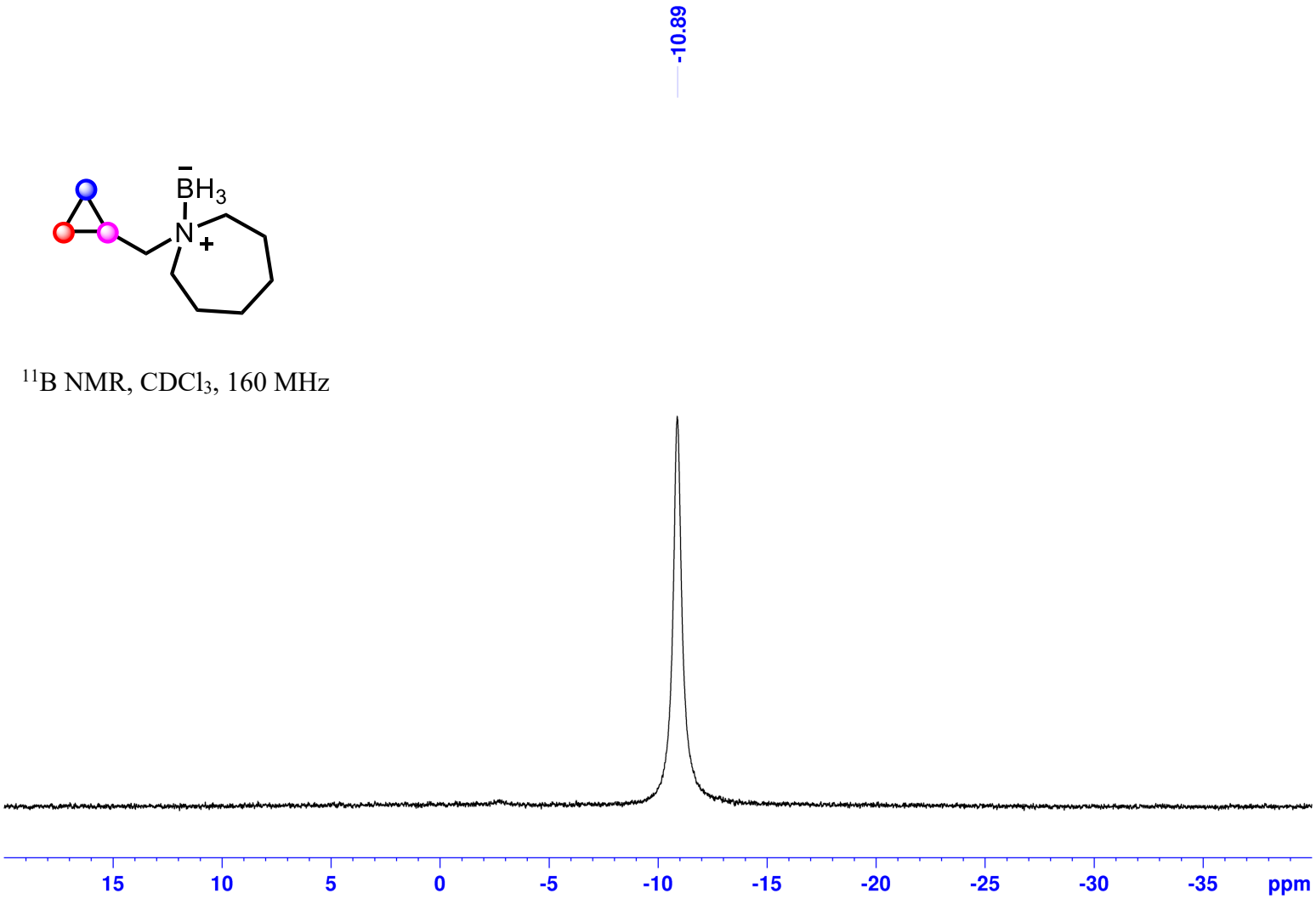
1-(Cyclopropylmethyl)azepane Borane (1b):

^{11}B NMR, $CDCl_3$, 160 MHz



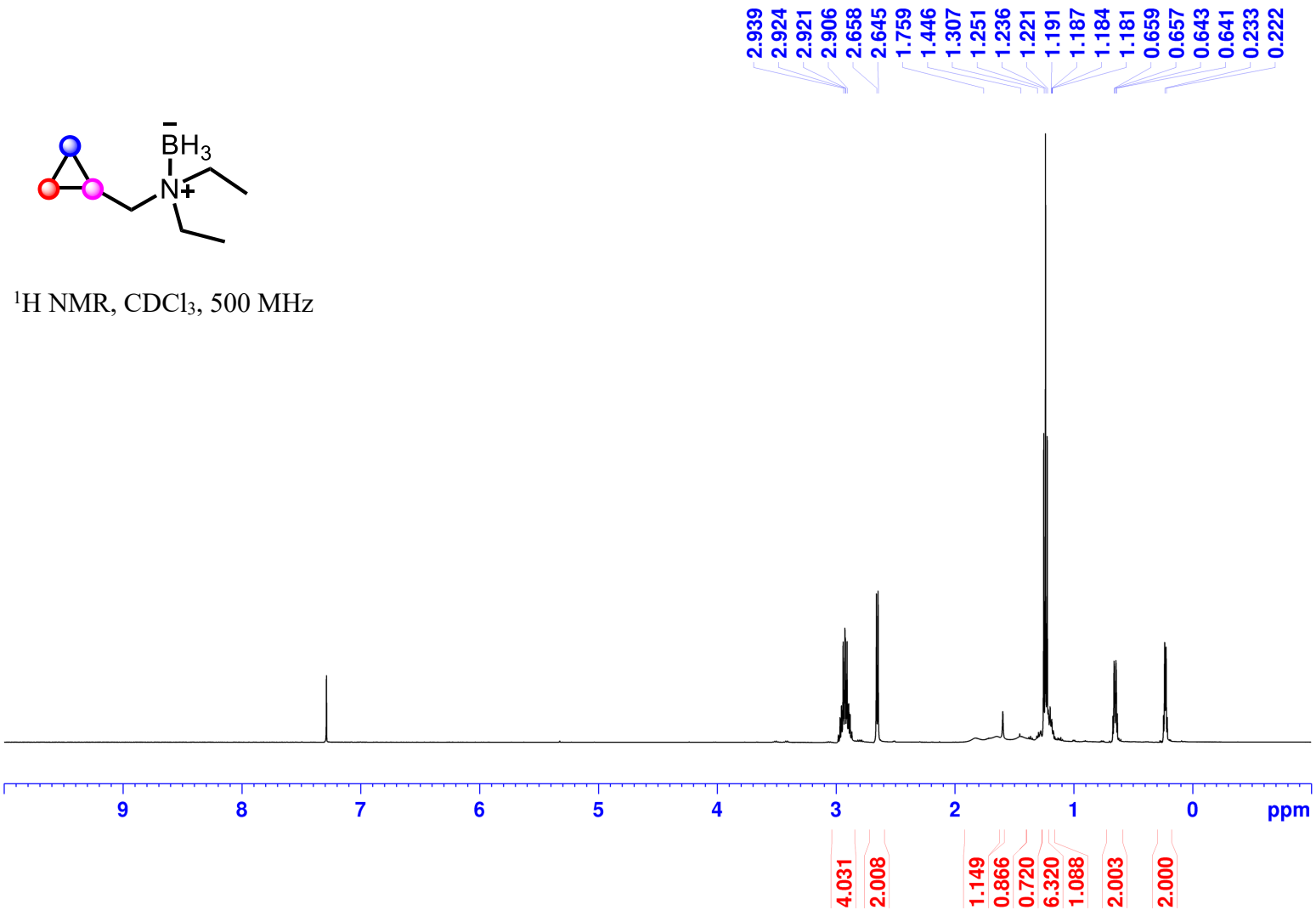
(1-(Cyclopropylmethyl)azepane Borane (1b):

^{11}B NMR, $CDCl_3$, 160 MHz



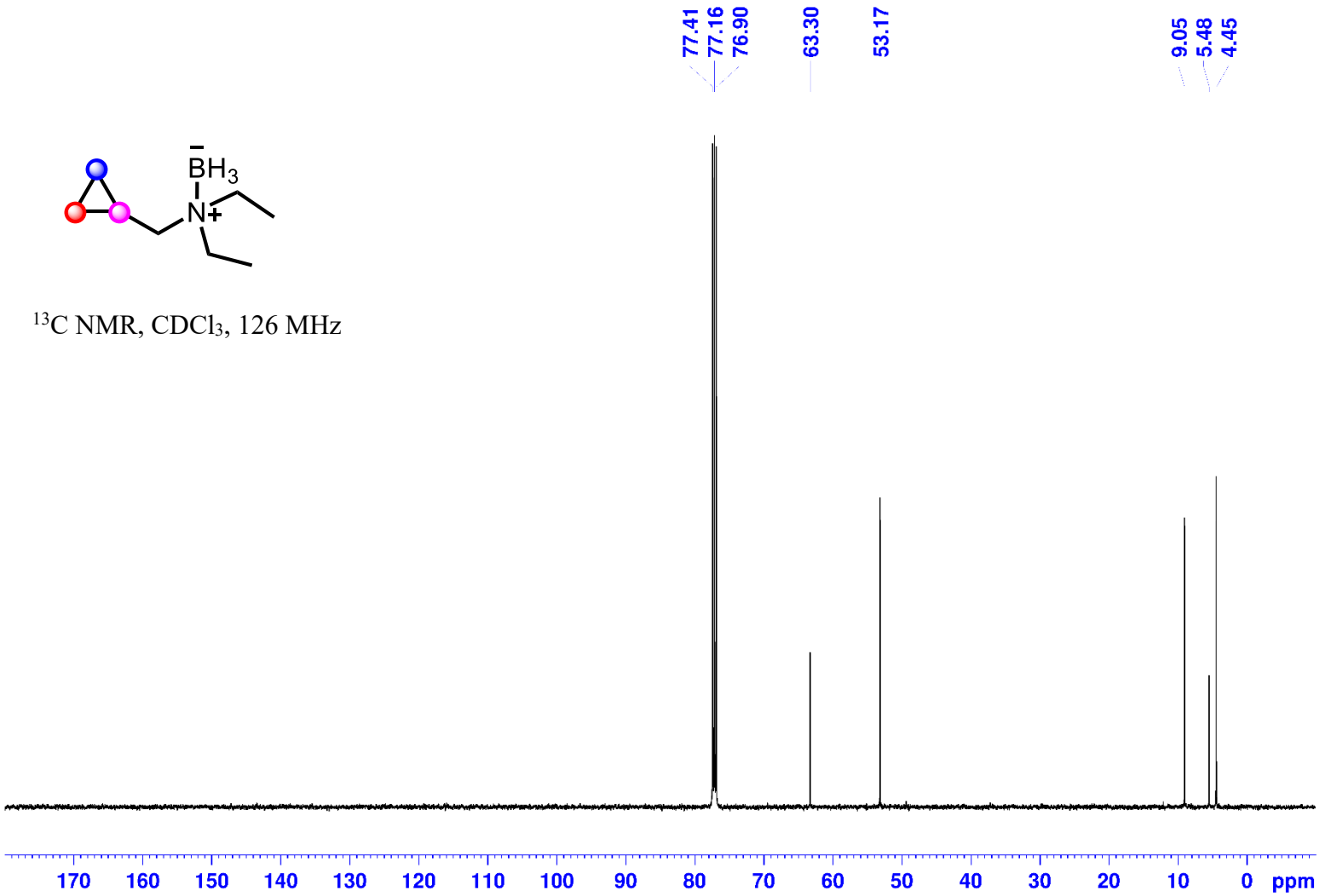
***N*-(Cyclopropylmethyl)-*N*-ethylethanamine Borane (1c):**

^{1}H NMR, $CDCl_3$, 500 MHz



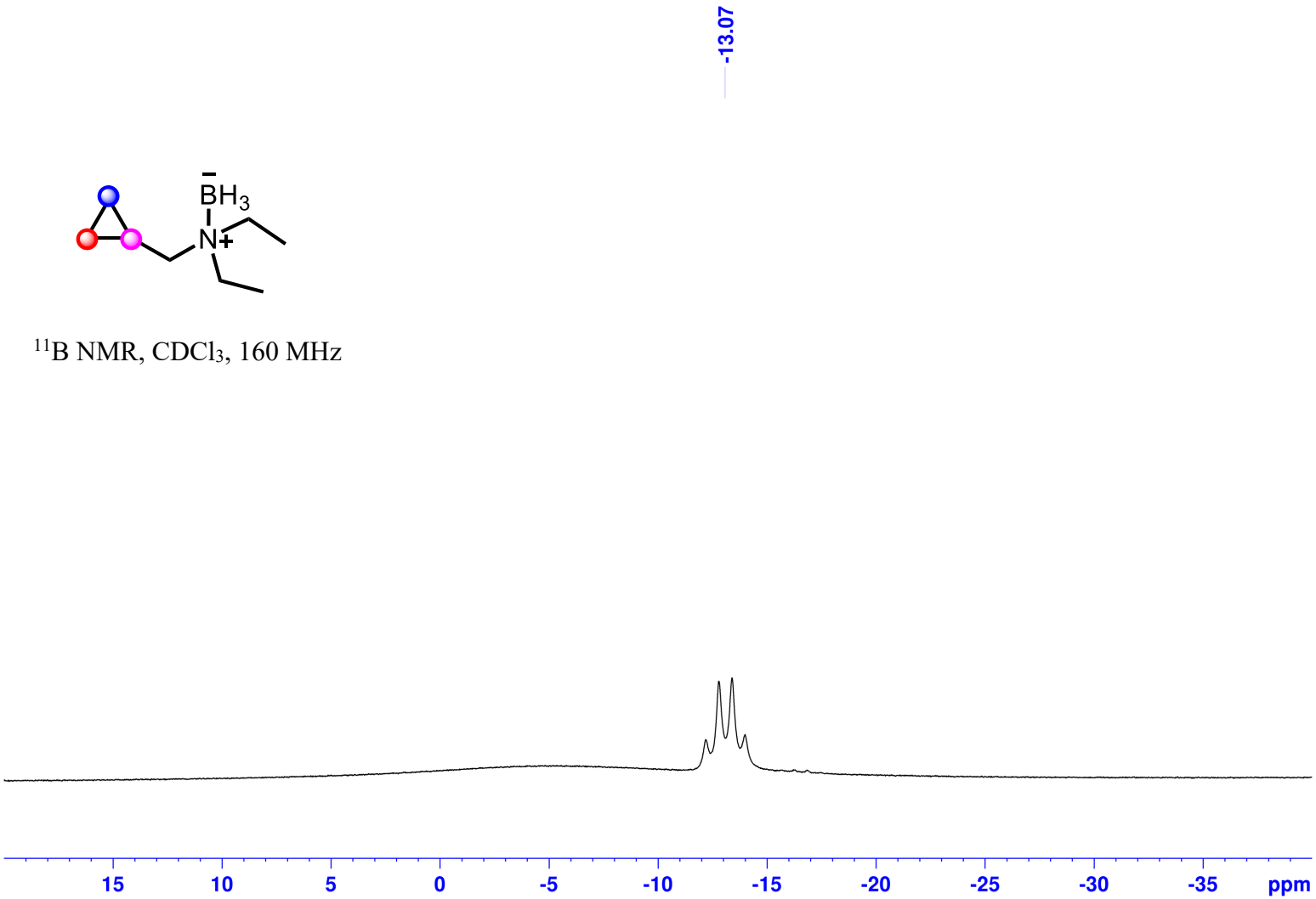
***N*-(Cyclopropylmethyl)-*N*-ethylethanamine Borane (1c):**

^{13}C NMR, $CDCl_3$, 126 MHz



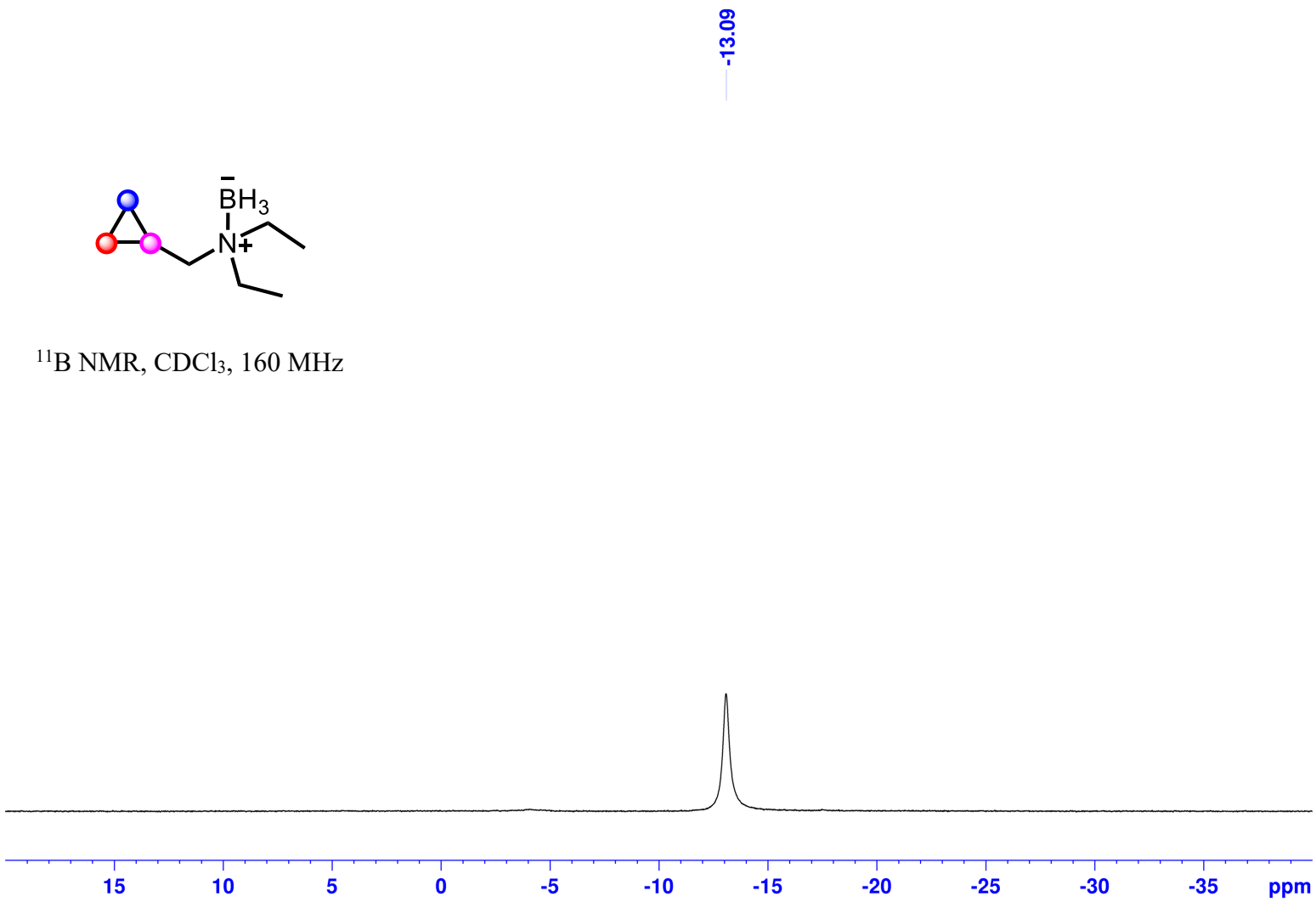
***N*-(Cyclopropylmethyl)-*N*-ethylethanamine Borane (1c):**

^{11}B NMR, $CDCl_3$, 160 MHz

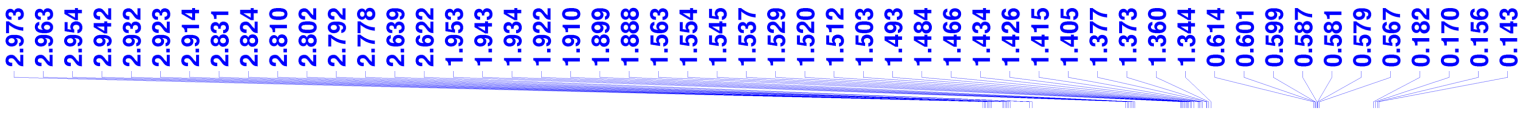


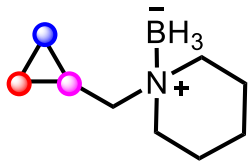
***N*-(Cyclopropylmethyl)-*N*-ethylethanamine Borane (1c):**

^{11}B NMR, $CDCl_3$, 160 MHz

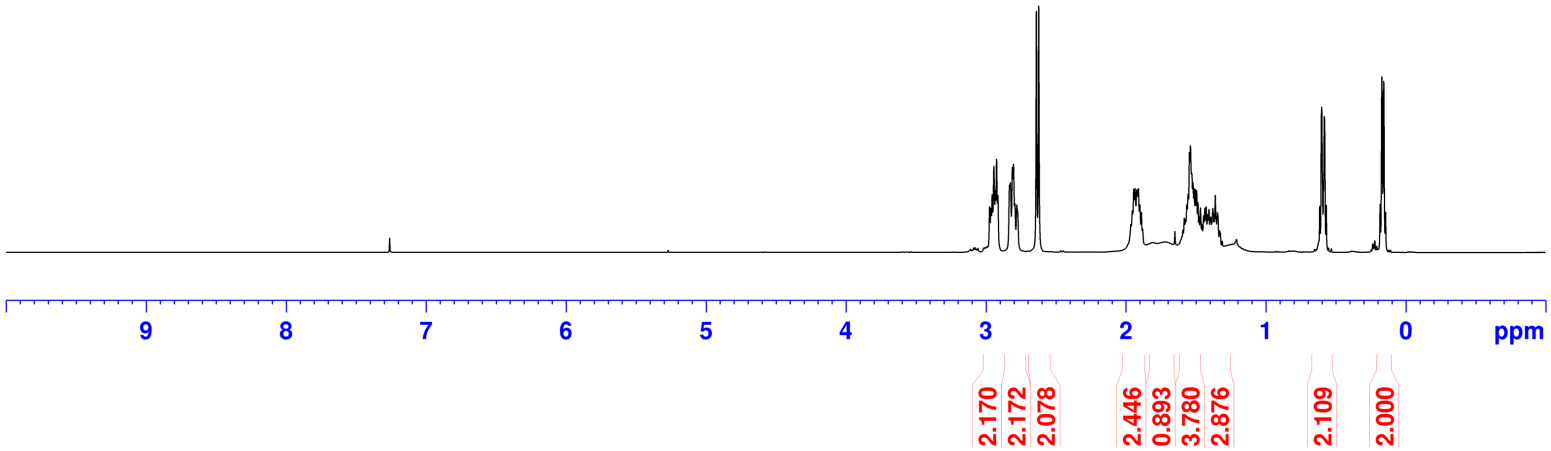


1-(Cyclopropylmethyl)piperidine Borane (1d) :



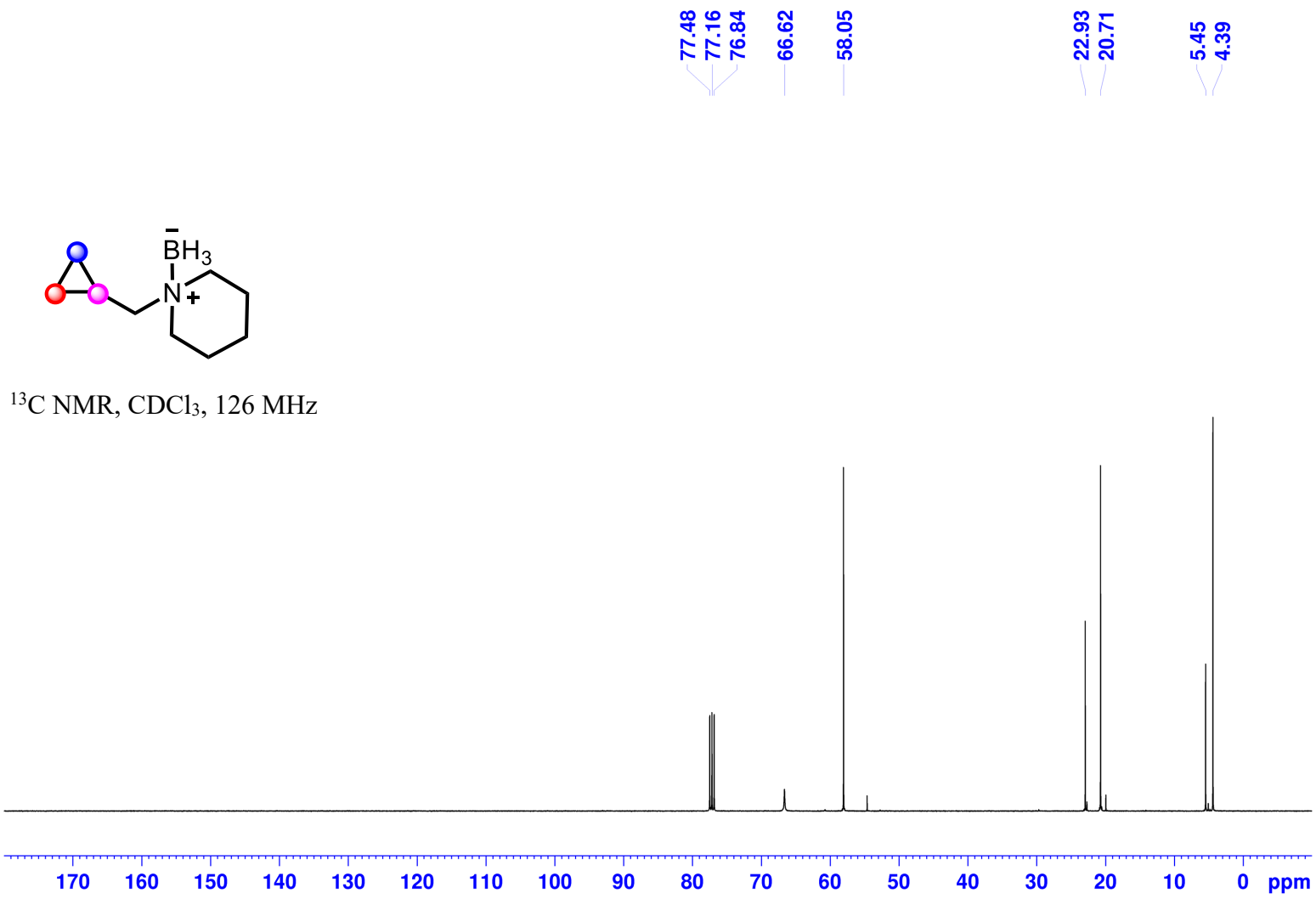


^{1}H NMR, $CDCl_3$, 500 MHz



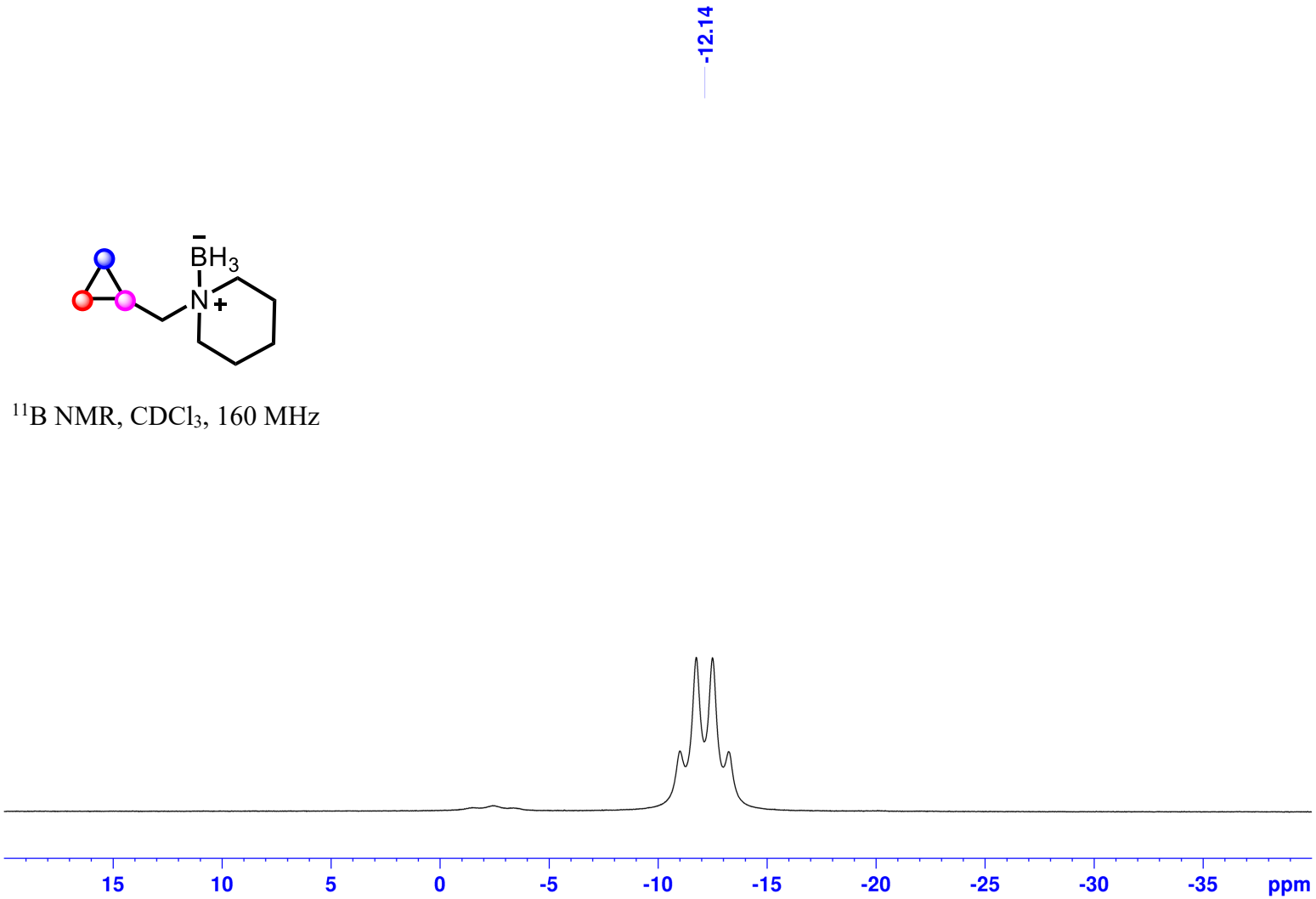
1-(Cyclopropylmethyl)piperidine Borane (1d) :

^{13}C NMR, $CDCl_3$, 126 MHz



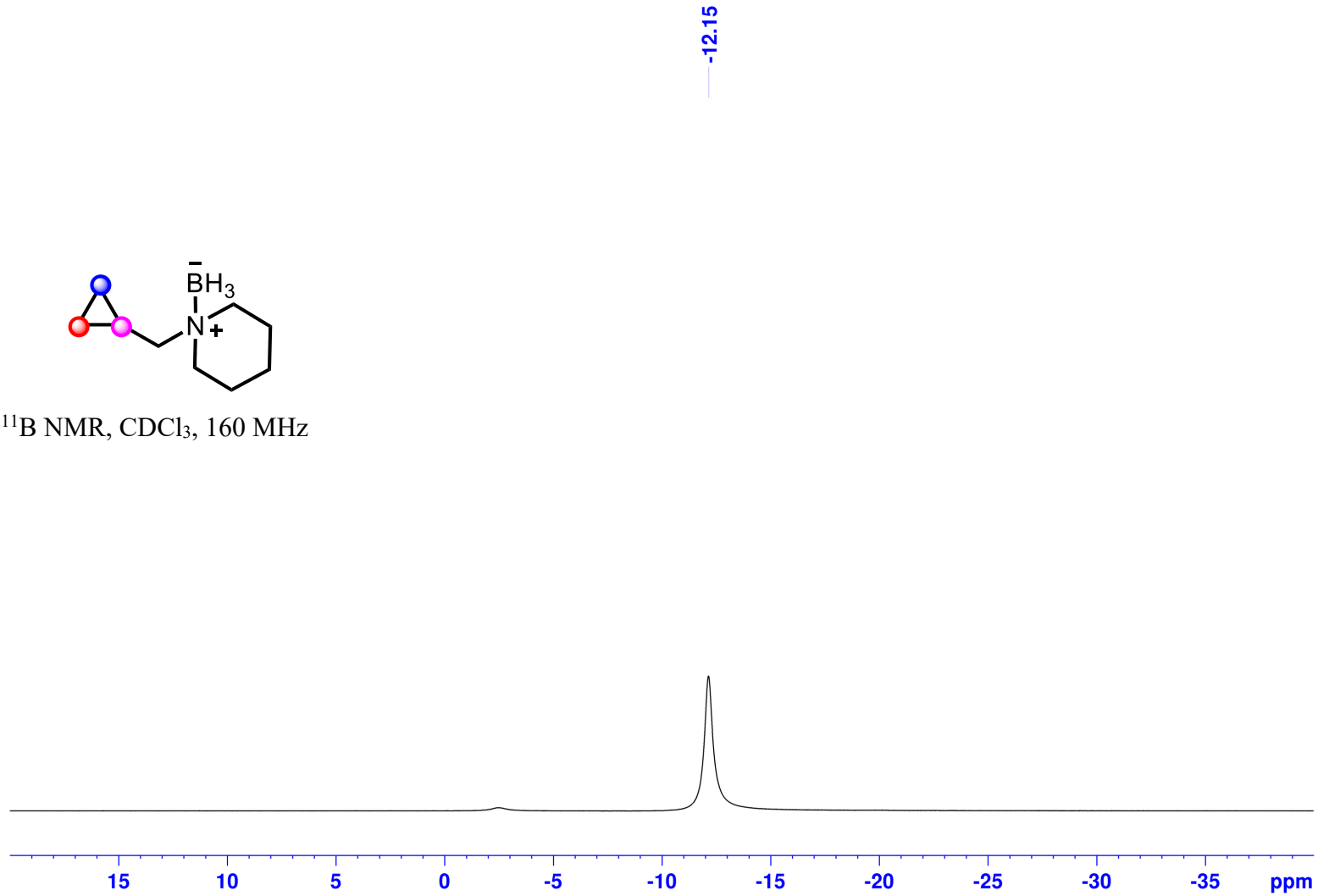
1-(Cyclopropylmethyl)piperidine Borane (1d) :

^{11}B NMR, $CDCl_3$, 160 MHz

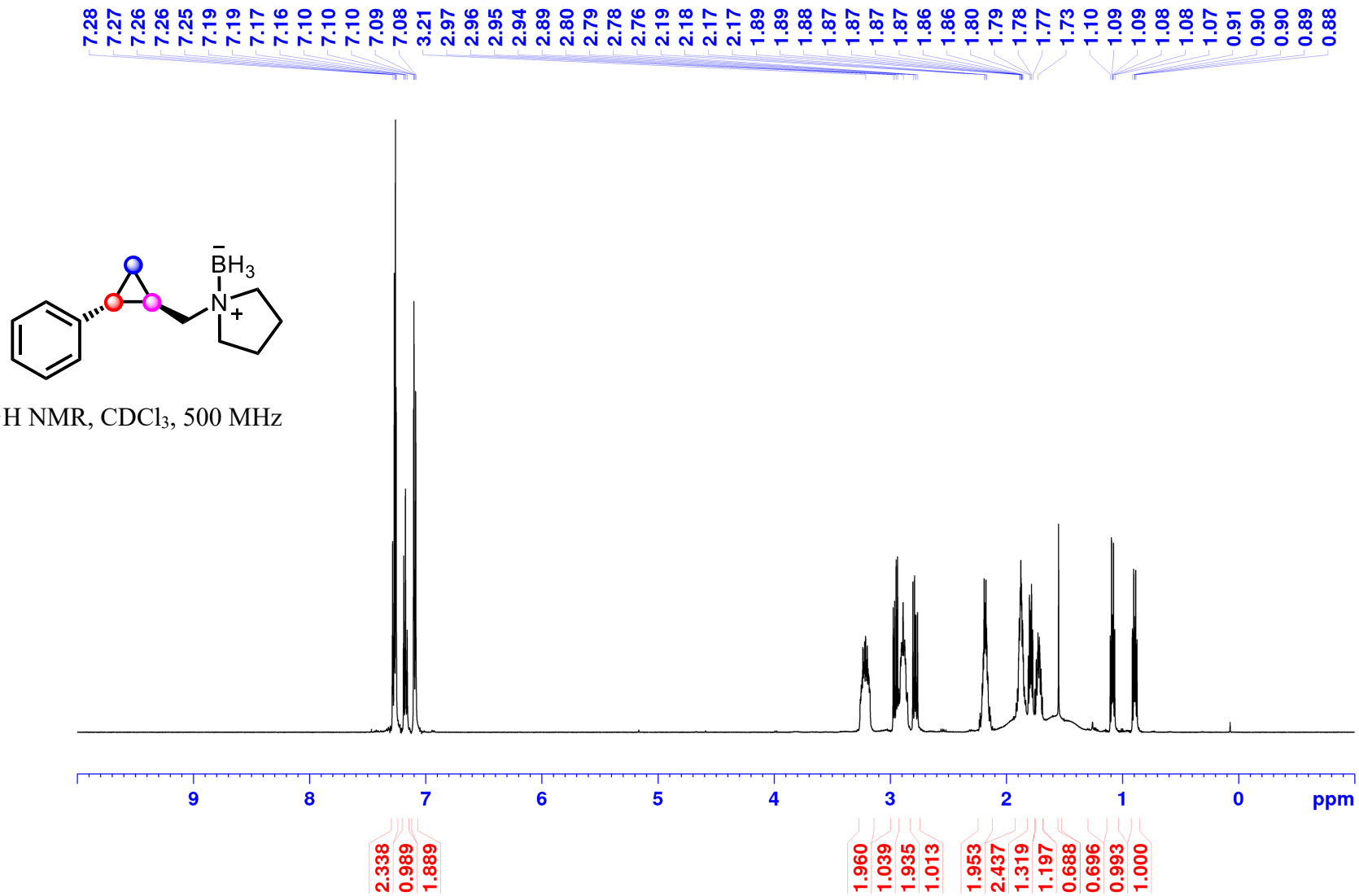


1-(Cyclopropylmethyl)piperidine Borane (1d) :

^{11}B NMR, $CDCl_3$, 160 MHz

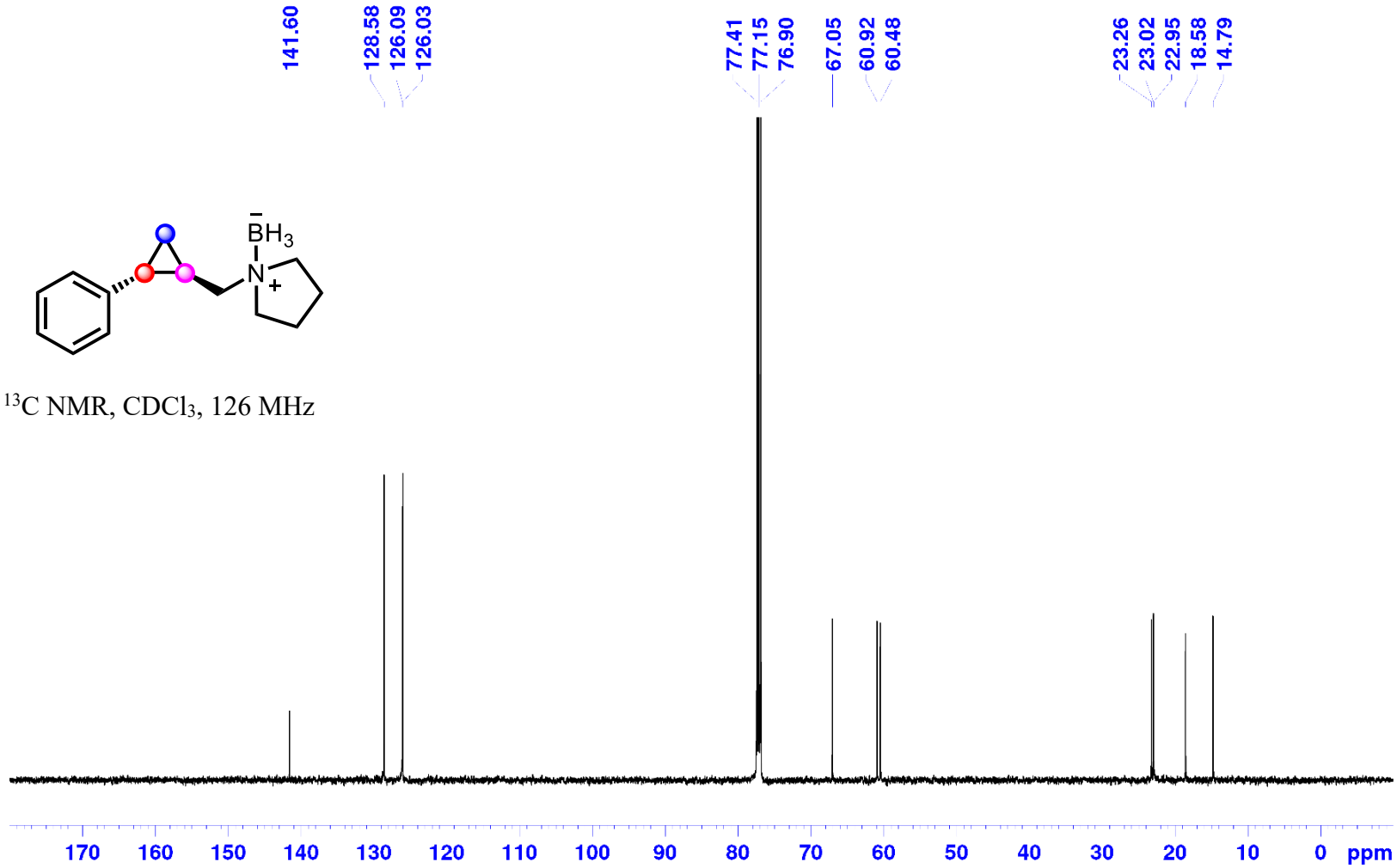


1-((2-Phenylcyclopropyl)methyl)pyrrolidine Borane (1e):



^{1}H NMR, $CDCl_3$, 500 MHz

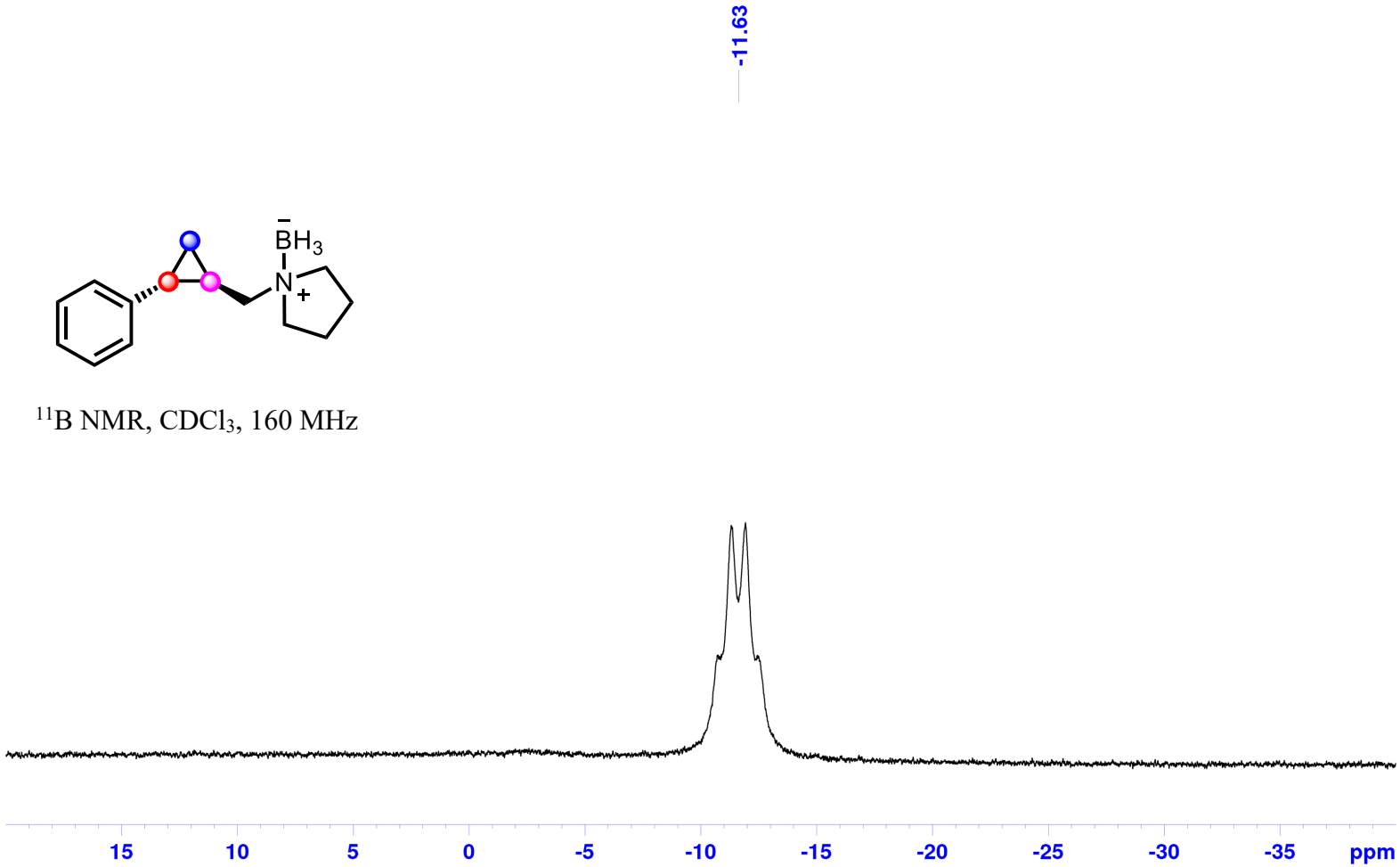
1-((2-Phenylcyclopropyl)methyl)pyrrolidine Borane (1e):



^{13}C NMR, $CDCl_3$, 126 MHz

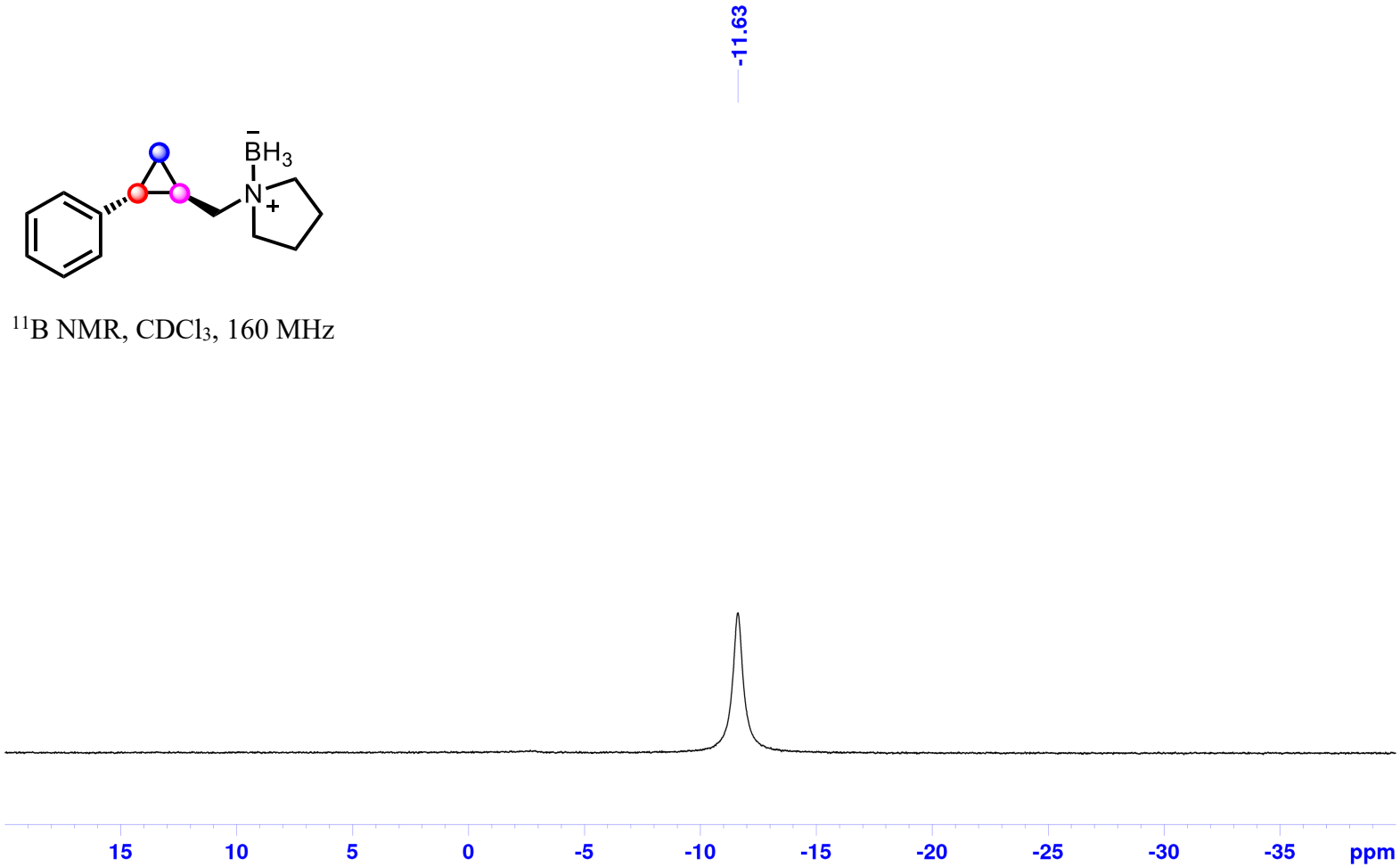
1-((2-Phenylcyclopropyl)methyl)pyrrolidine Borane (1e):

^{11}B NMR, $CDCl_3$, 160 MHz

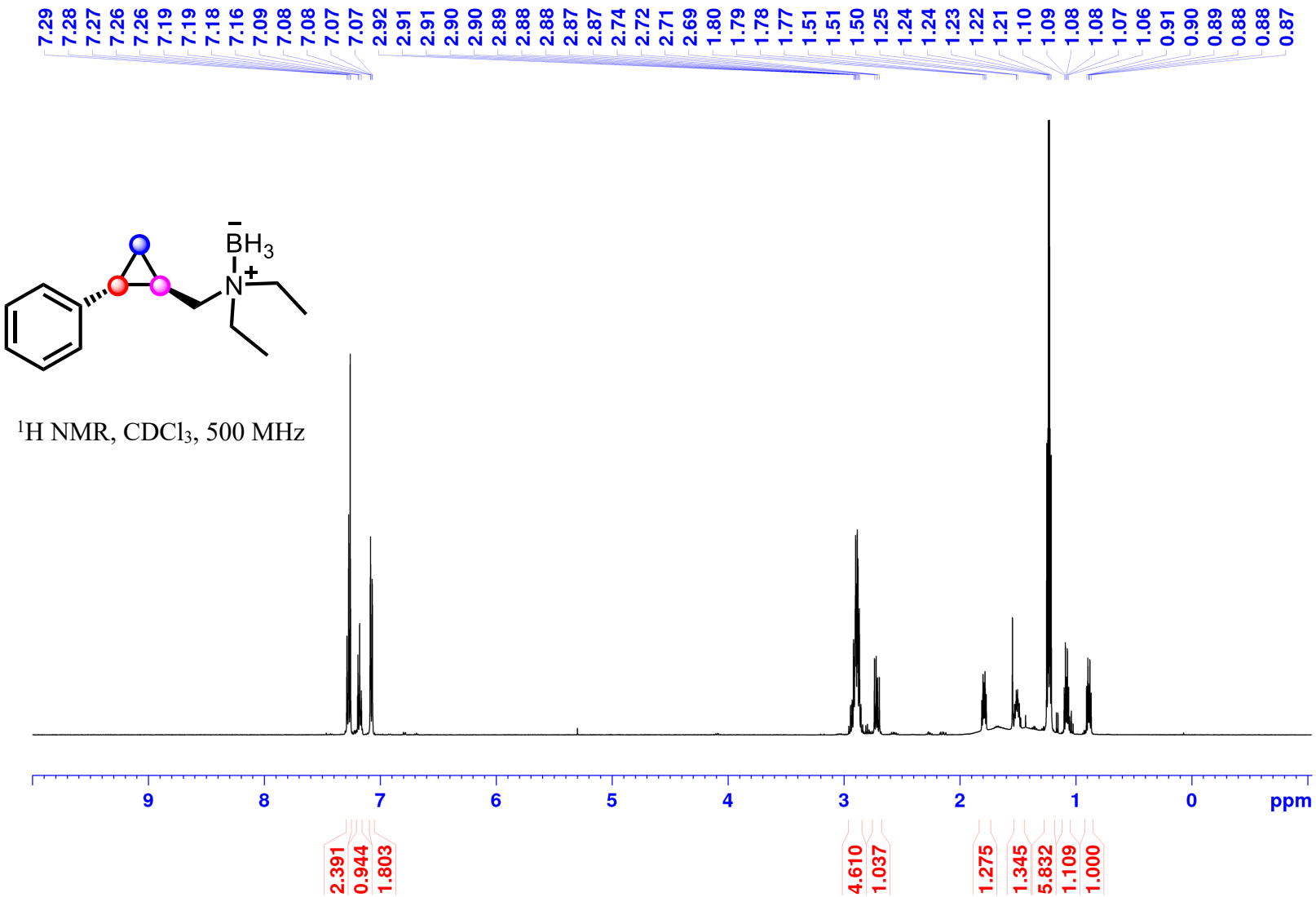


1-((2-Phenylcyclopropyl)methyl)pyrrolidine Borane (1e):

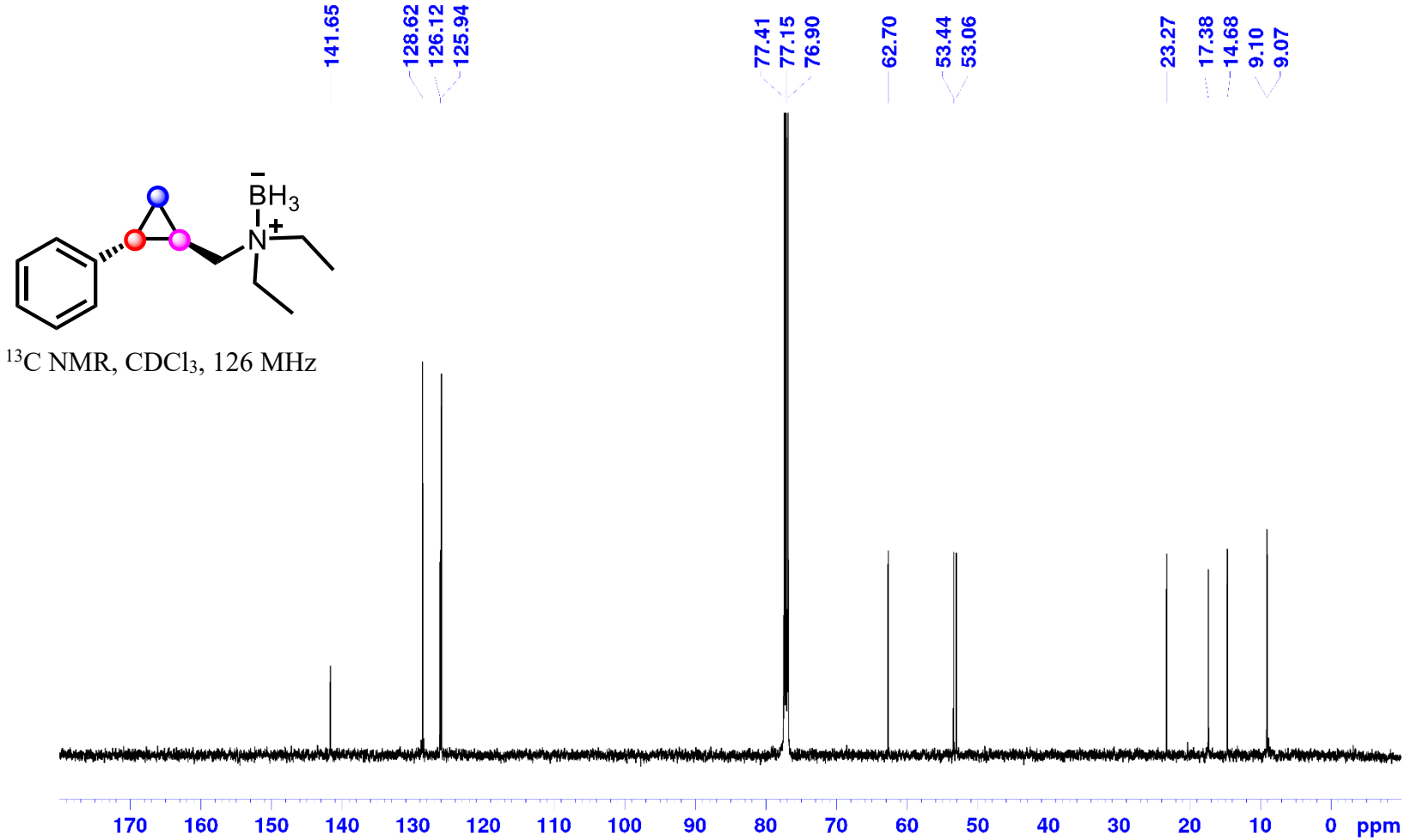
^{11}B NMR, $CDCl_3$, 160 MHz



***N*-Ethyl-*N*-((2-phenylcyclopropyl)methyl)ethanamine Borane (1f):**



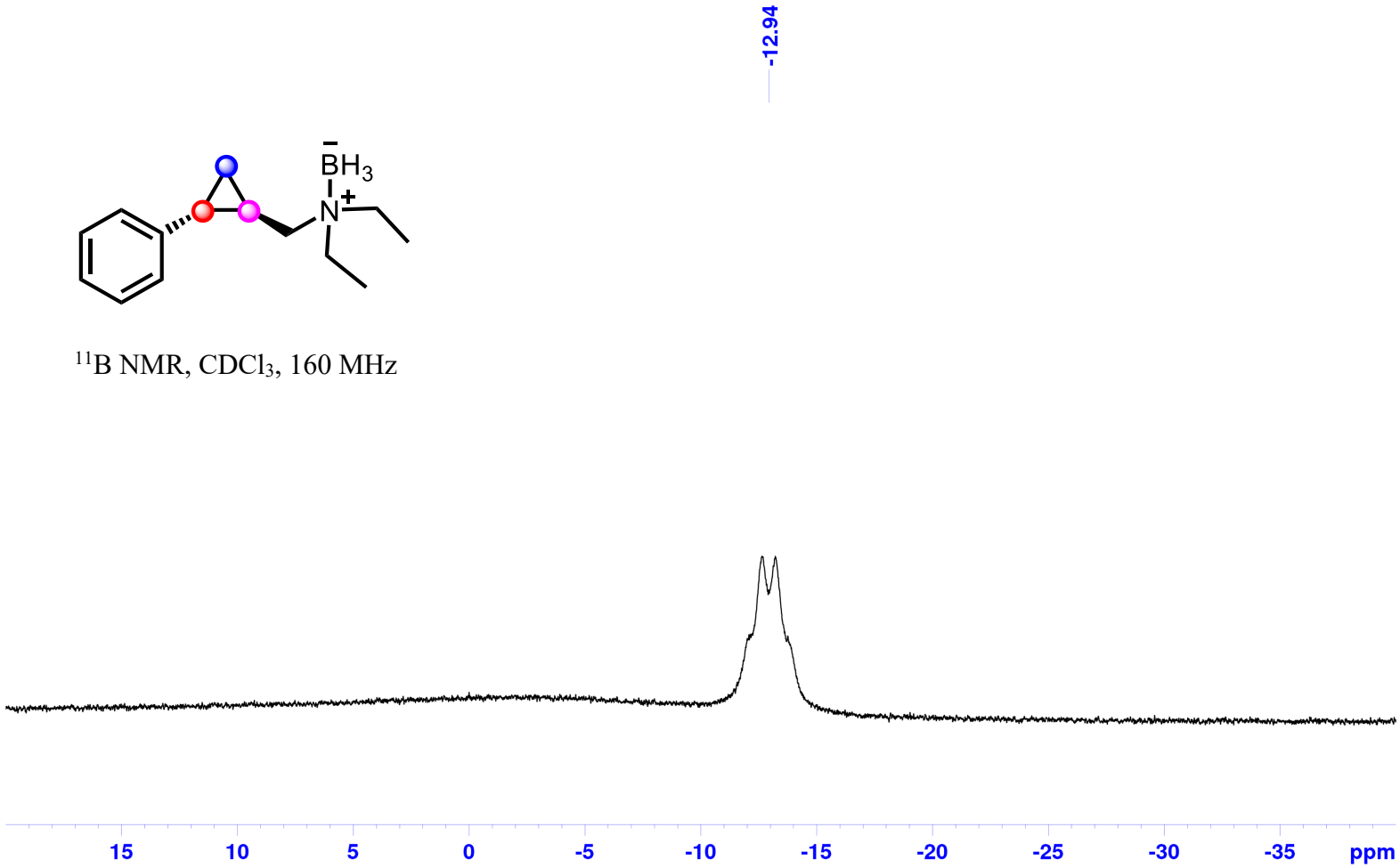
***N*-Ethyl-*N*-((2-phenylcyclopropyl)methyl)ethanamine Borane (1f):**



^{13}C NMR, $CDCl_3$, 126 MHz

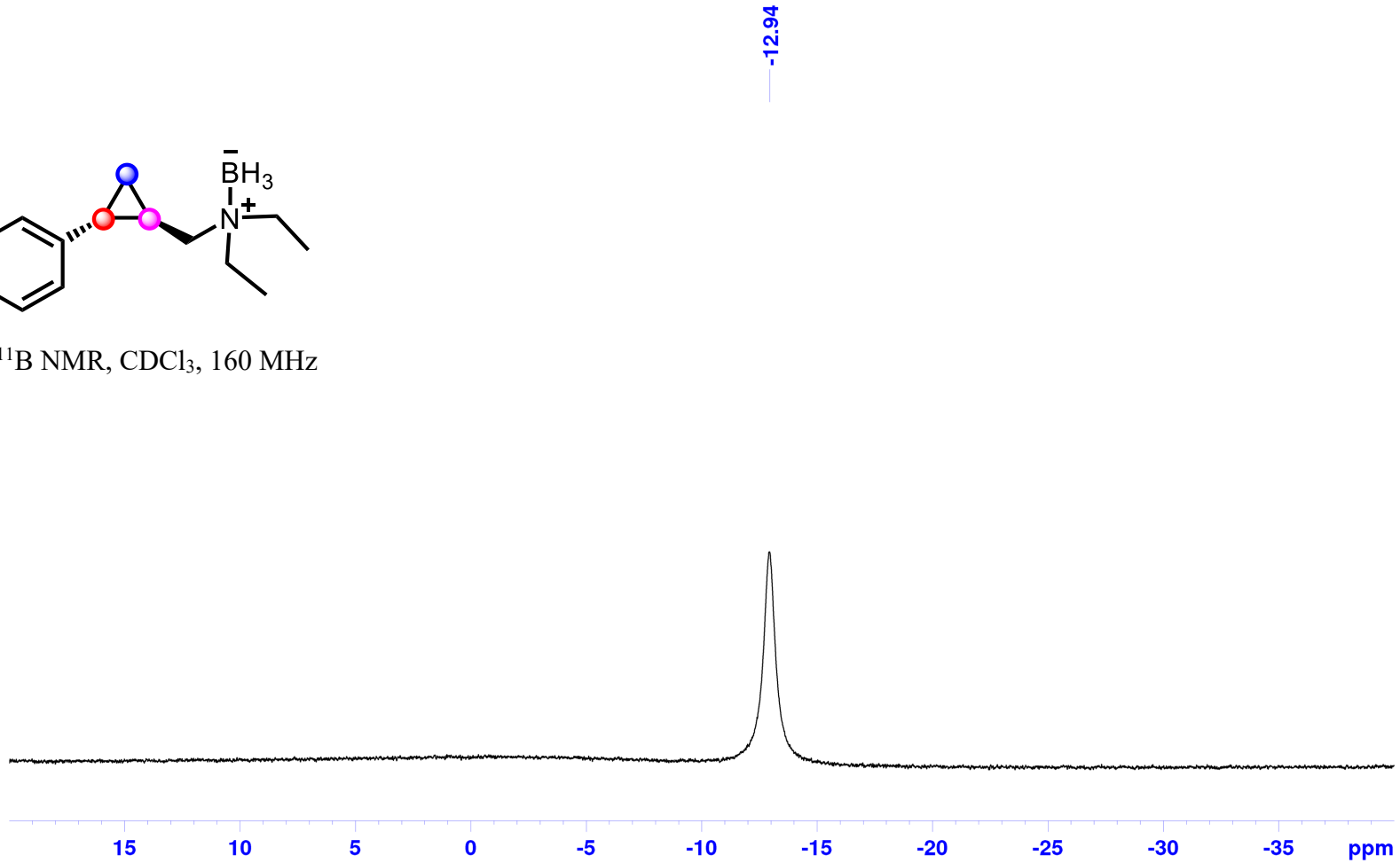
***N*-Ethyl-*N*-((2-phenylcyclopropyl)methyl)ethanamine Borane (1f):**

^{11}B NMR, $CDCl_3$, 160 MHz

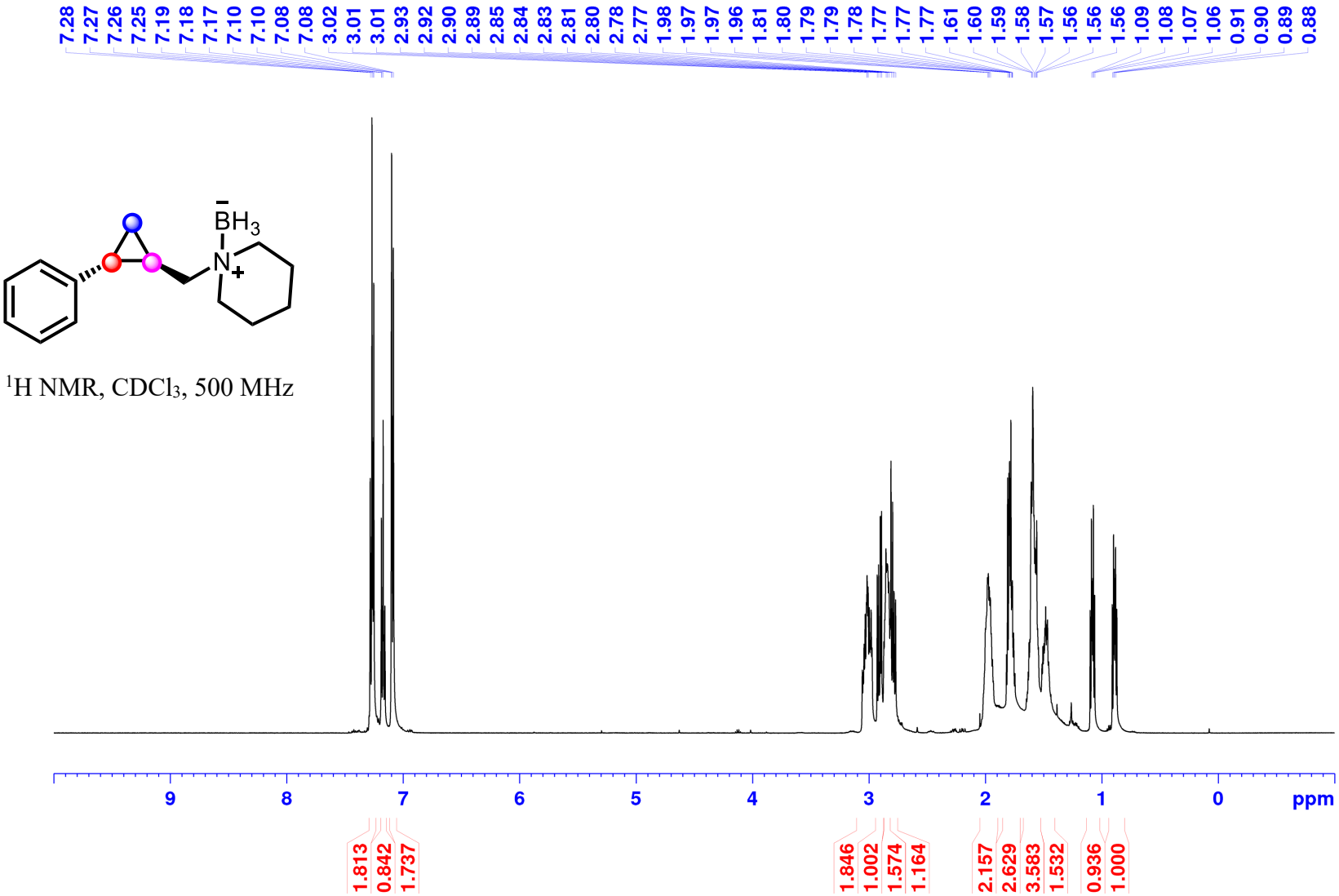


***N*-Ethyl-*N*-((2-phenylcyclopropyl)methyl)ethanamine Borane (1f):**

^{11}B NMR, $CDCl_3$, 160 MHz

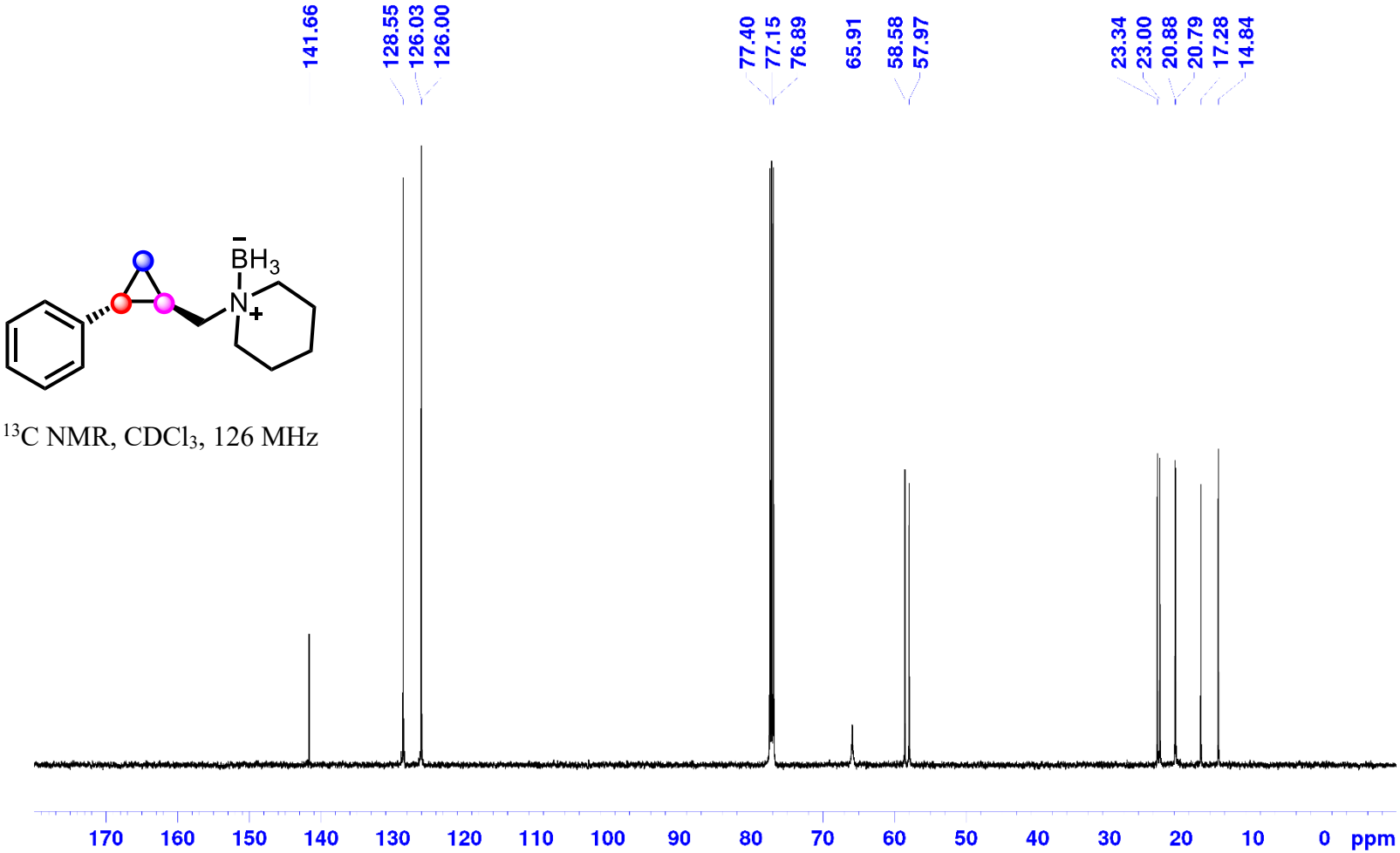


1-((2-Phenylcyclopropyl)methyl)piperidine Borane (1g):



^{1}H NMR, $CDCl_3$, 500 MHz

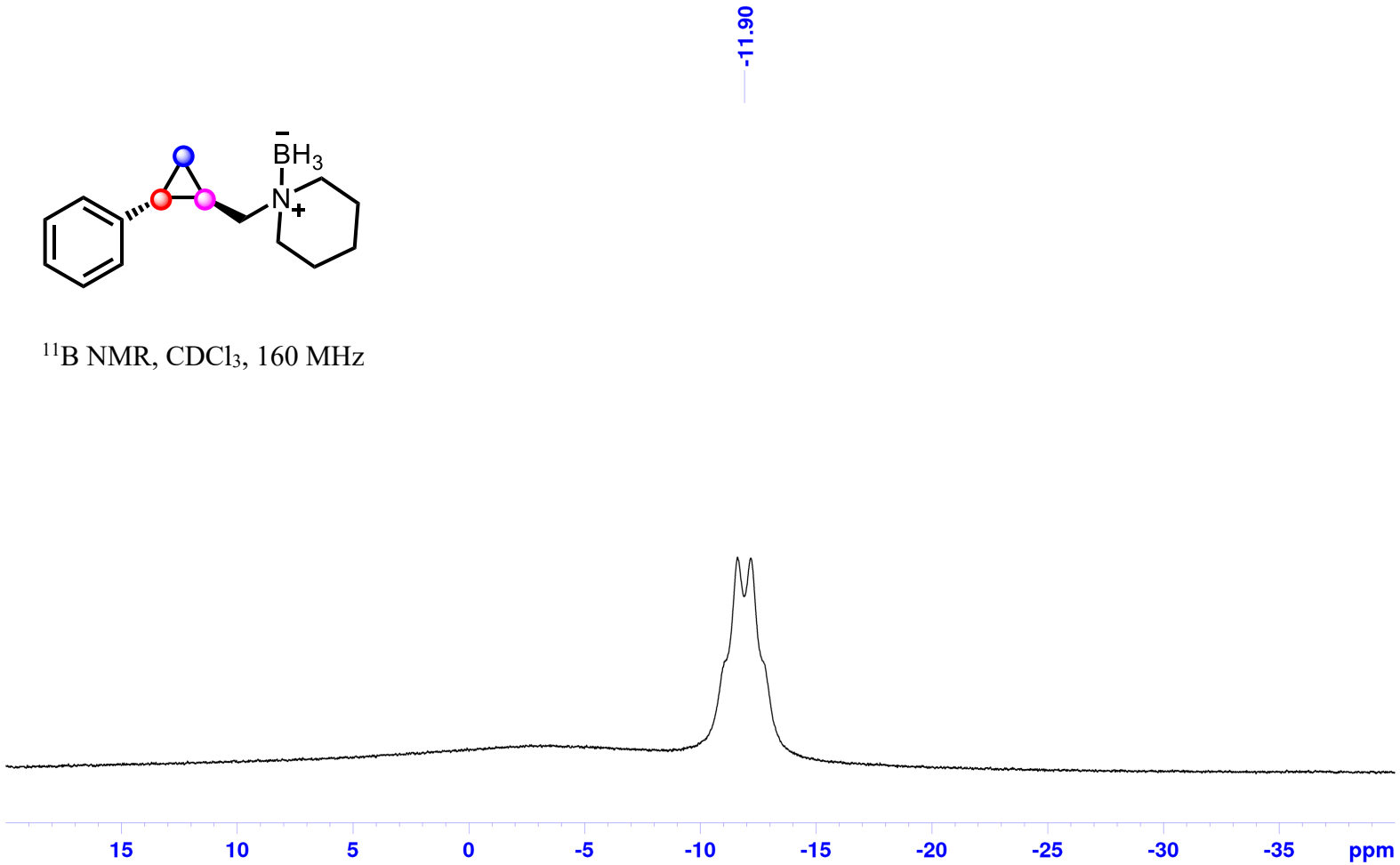
1-((2-Phenylcyclopropyl)methyl)piperidine Borane (1g):



^{13}C NMR, $CDCl_3$, 126 MHz

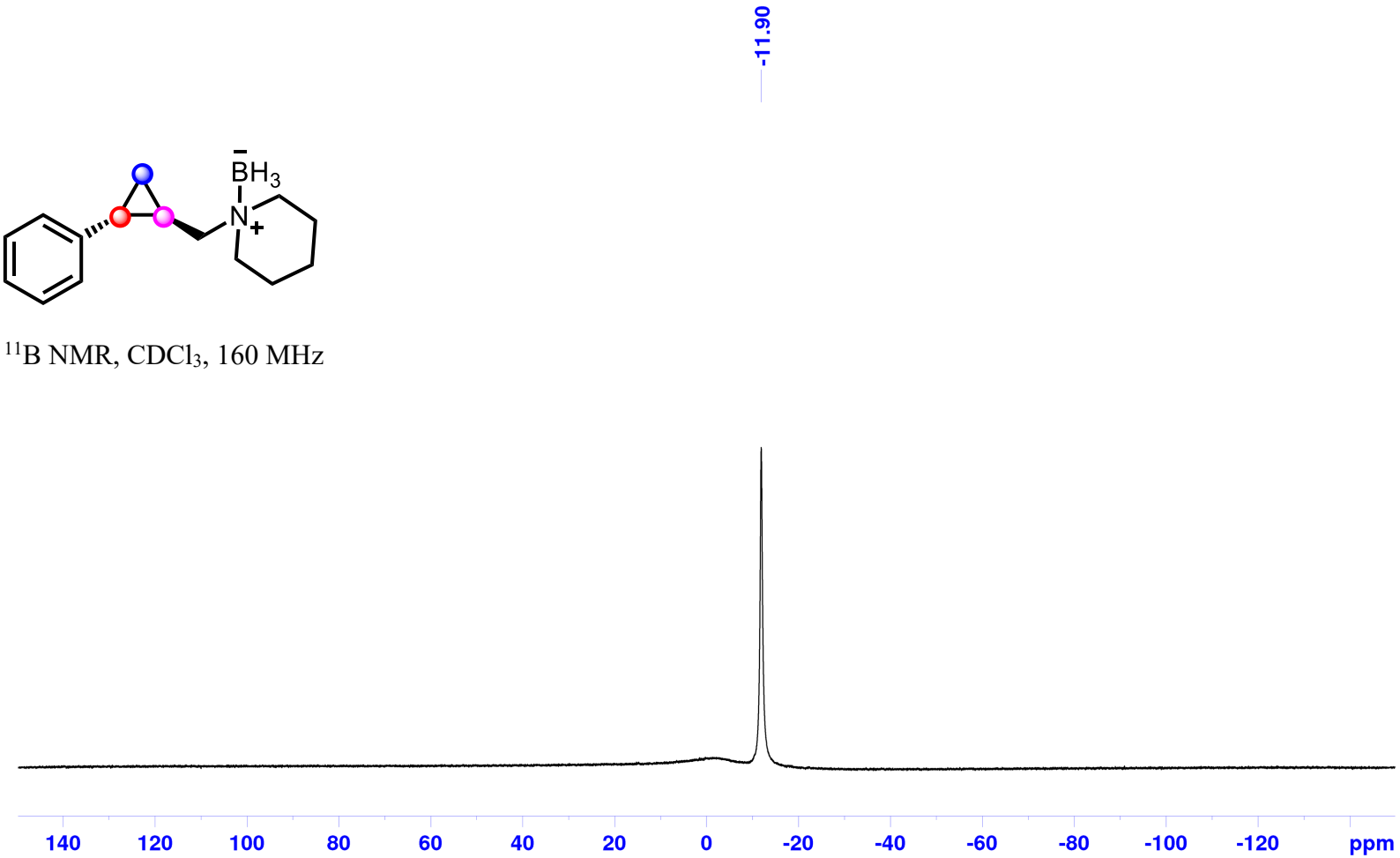
1-((2-Phenylcyclopropyl)methyl)piperidine Borane (1g):

^{11}B NMR, $CDCl_3$, 160 MHz

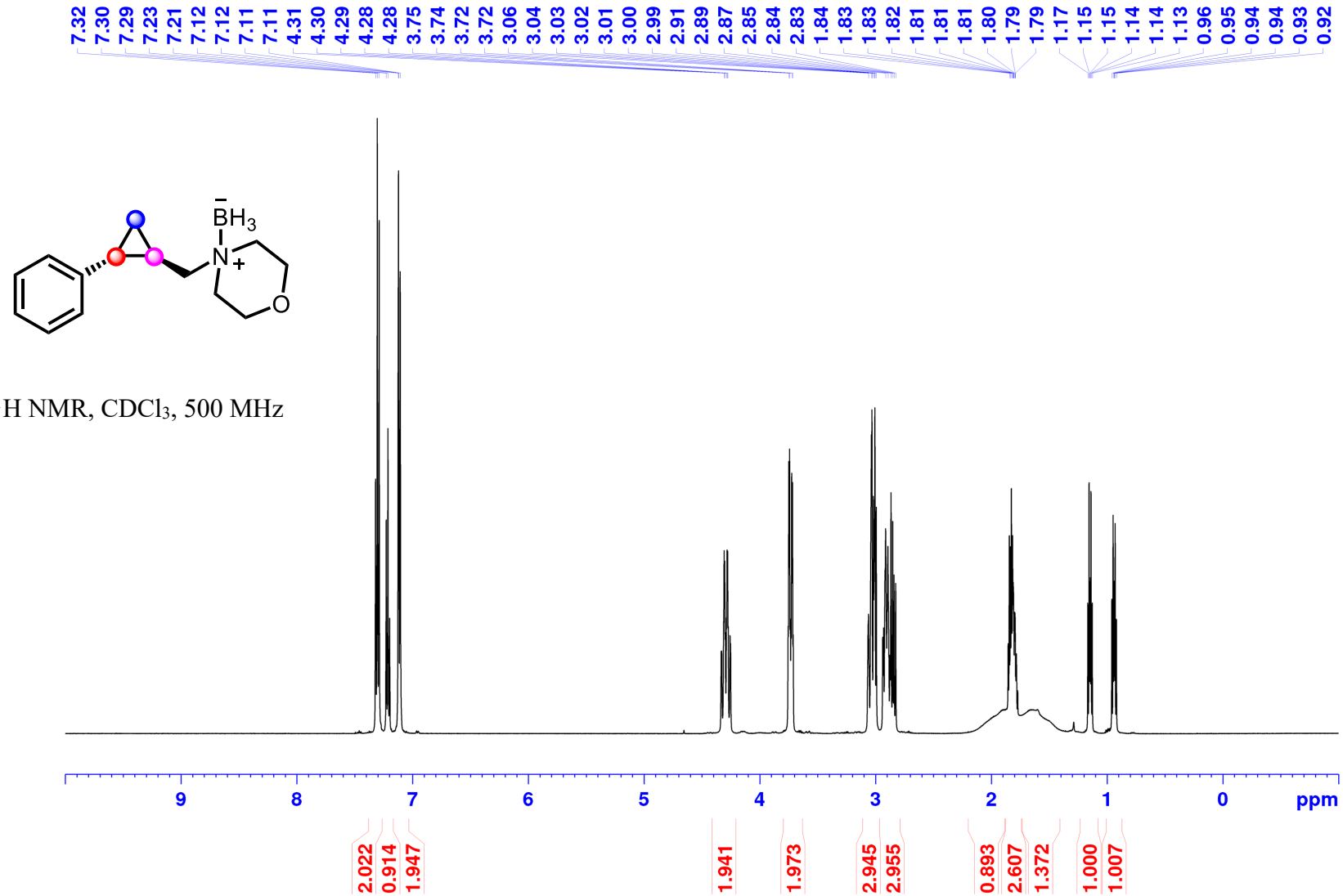


1-((2-Phenylcyclopropyl)methyl)piperidine Borane (1g):

^{11}B NMR, $CDCl_3$, 160 MHz

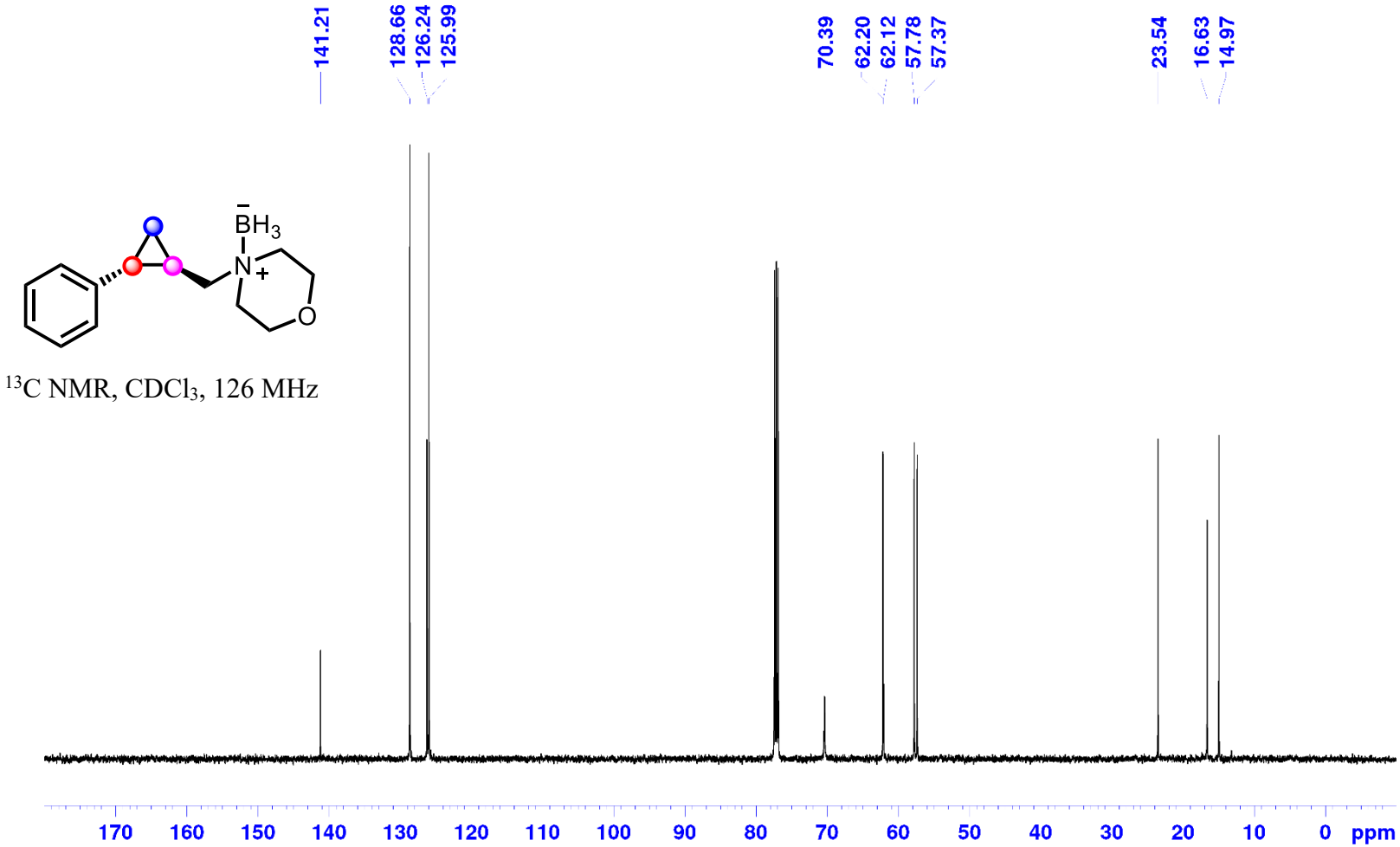


4-((2-Phenylcyclopropyl)methyl)morpholine Borane (1h):



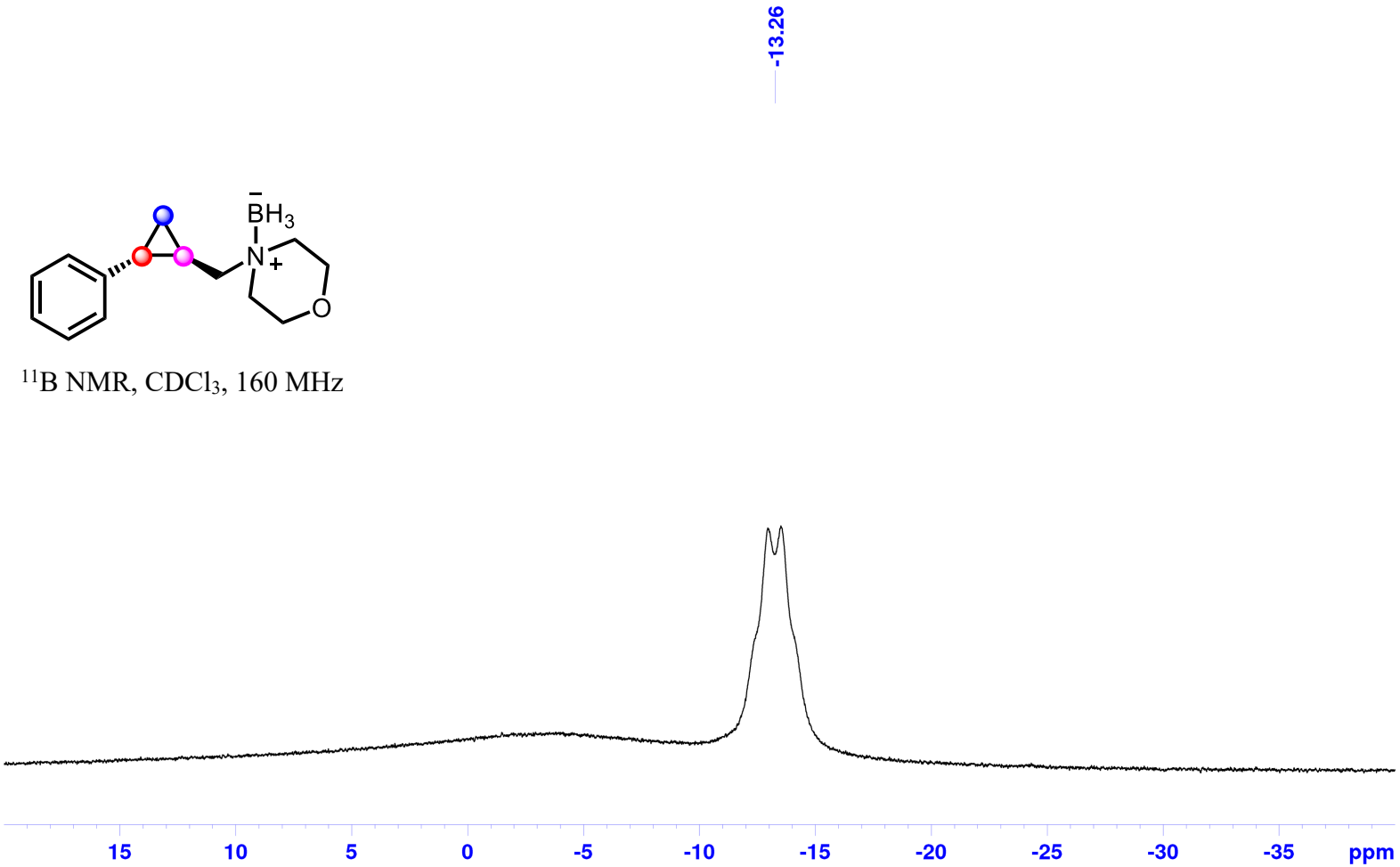
^{1}H NMR, $CDCl_3$, 500 MHz

4-((2-Phenylcyclopropyl)methyl)morpholine Borane (1h):



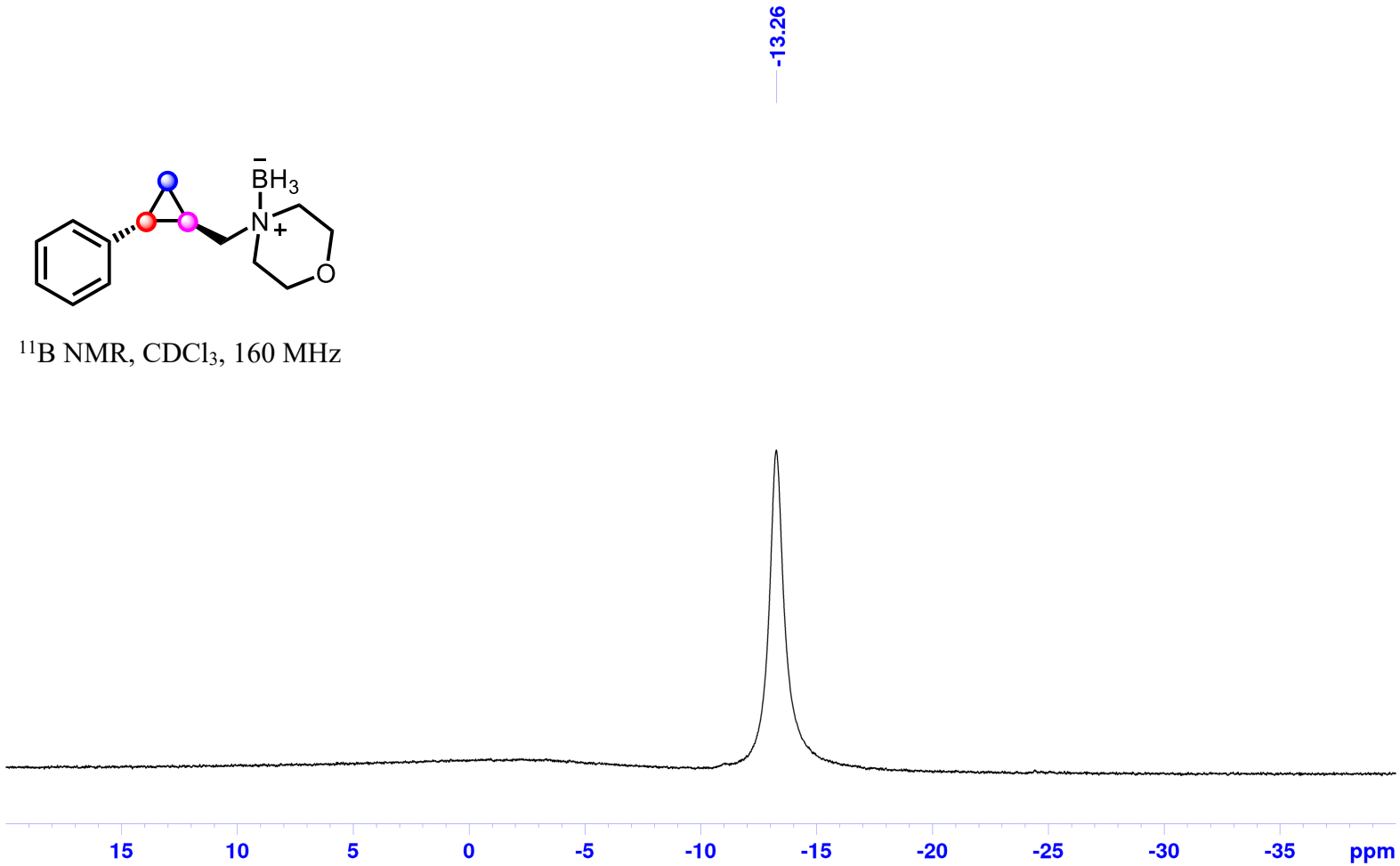
4-((2-Phenylcyclopropyl)methyl)morpholine Borane (1h):

^{11}B NMR, $CDCl_3$, 160 MHz

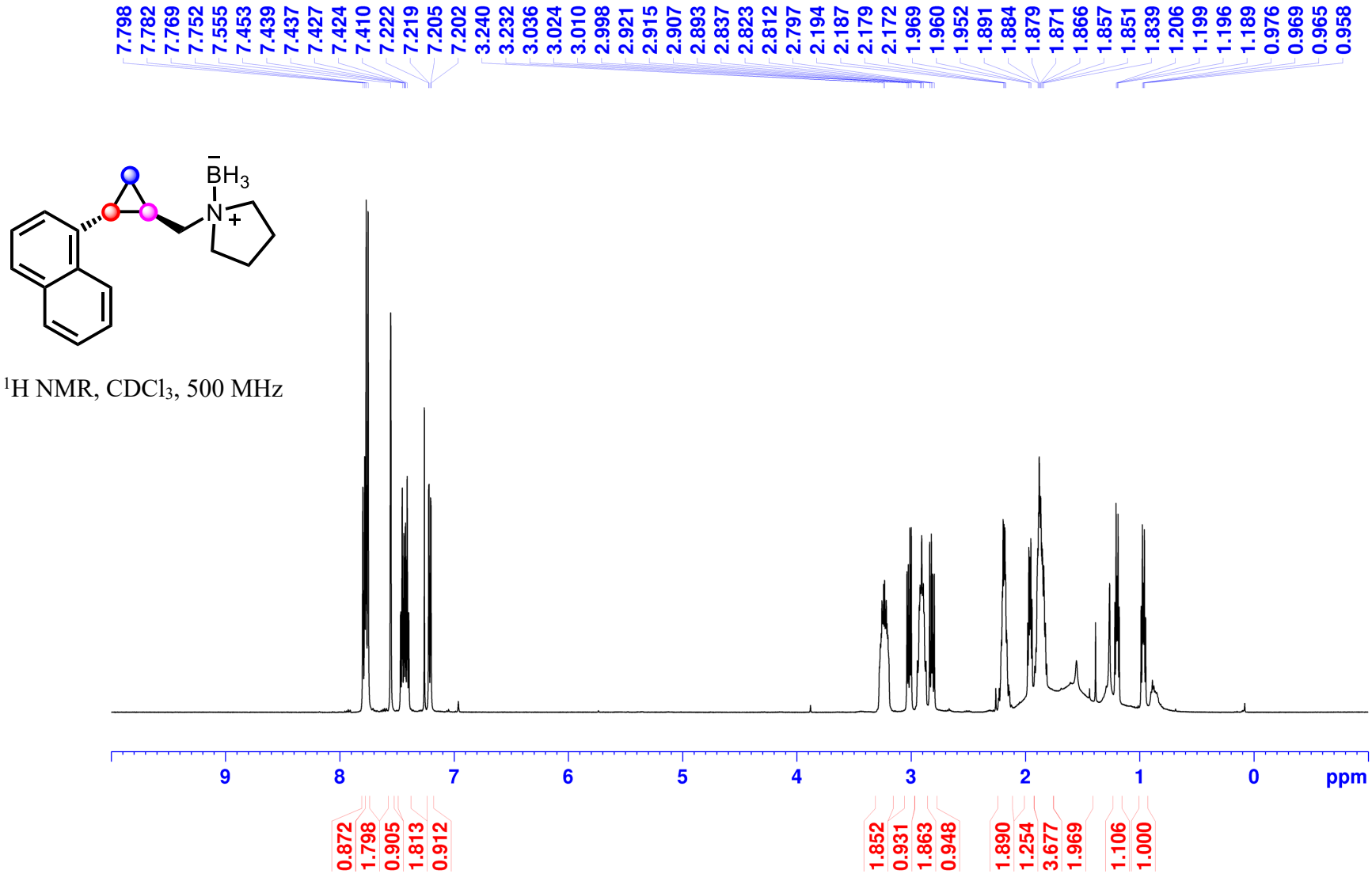


4-((2-Phenylcyclopropyl)methyl)morpholine Borane (1h):

^{11}B NMR, $CDCl_3$, 160 MHz

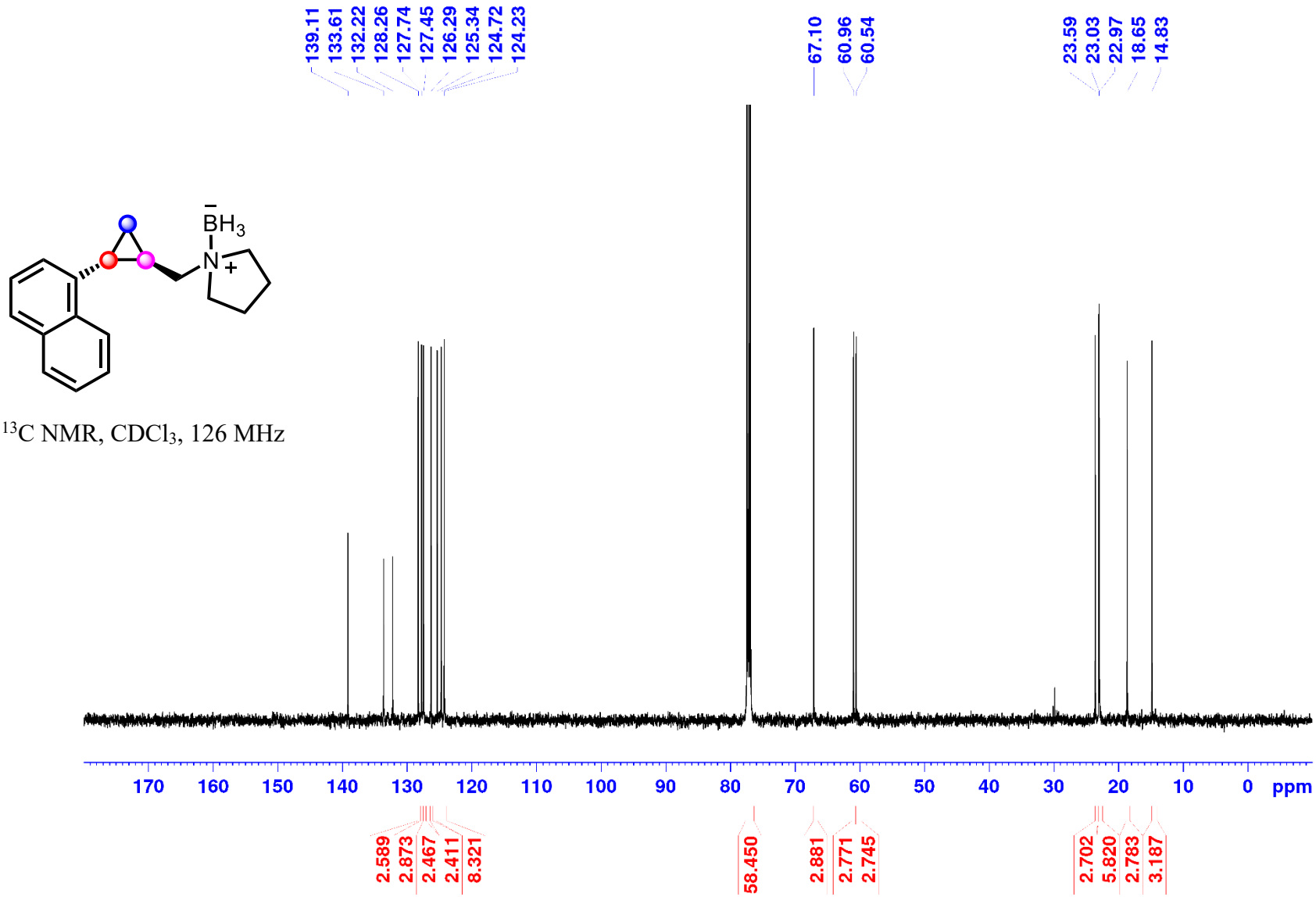


1-(λ4-Boraneyl)-1-((2-mesitylcyclopropyl)methyl)pyrrolidin-1-ium (1i):



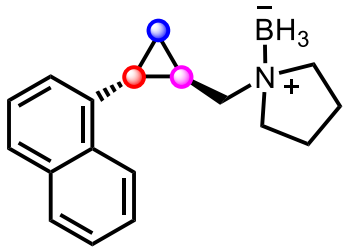
^{1}H NMR, $CDCl_3$, 500 MHz

1-((2-(Naphthalen-1-yl)cyclopropyl)methyl)pyrrolidine Borane (1i):

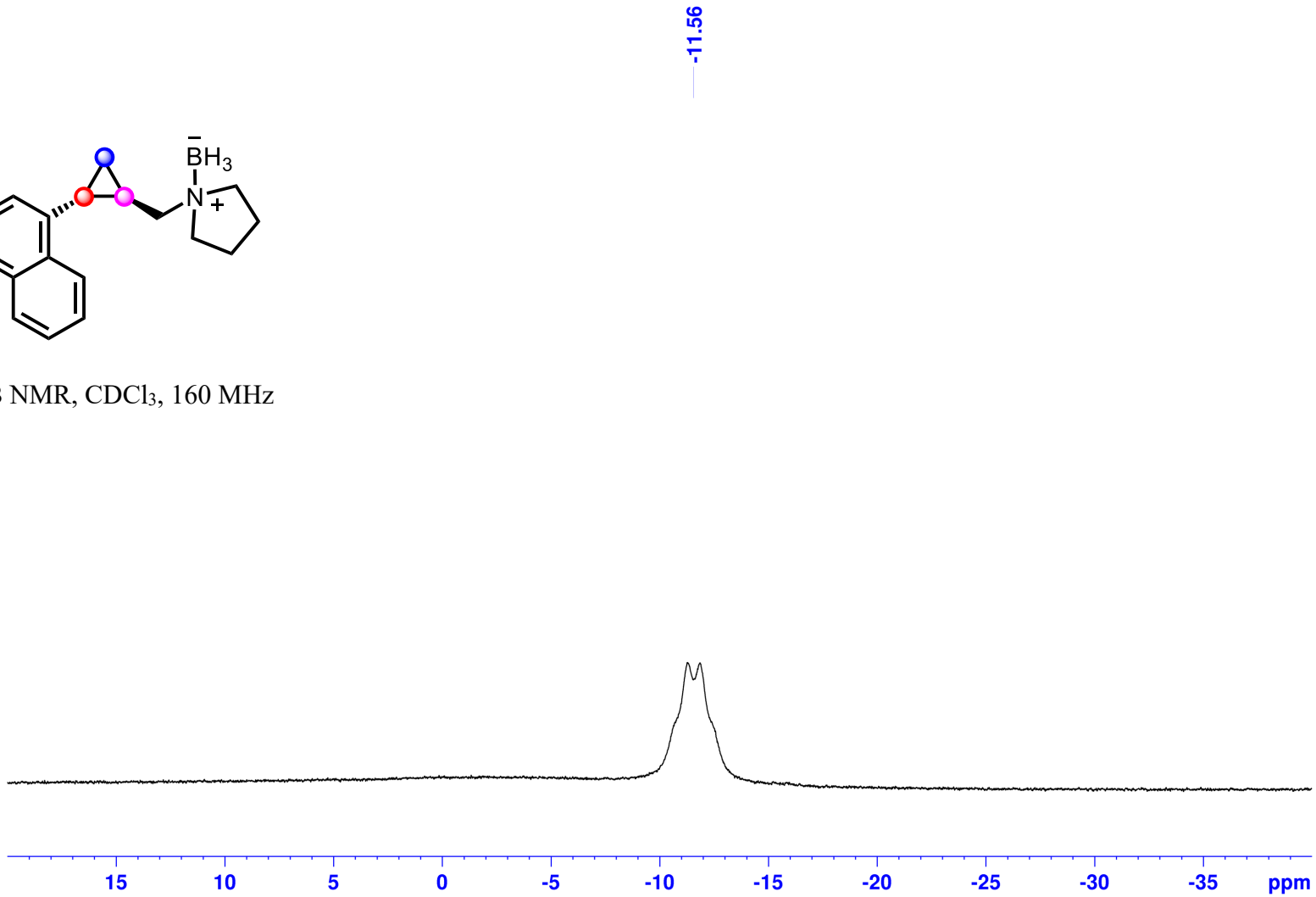


^{13}C NMR, $CDCl_3$, 126 MHz

1-((2-(Naphthalen-1-yl)cyclopropyl)methyl)pyrrolidine Borane (1i):

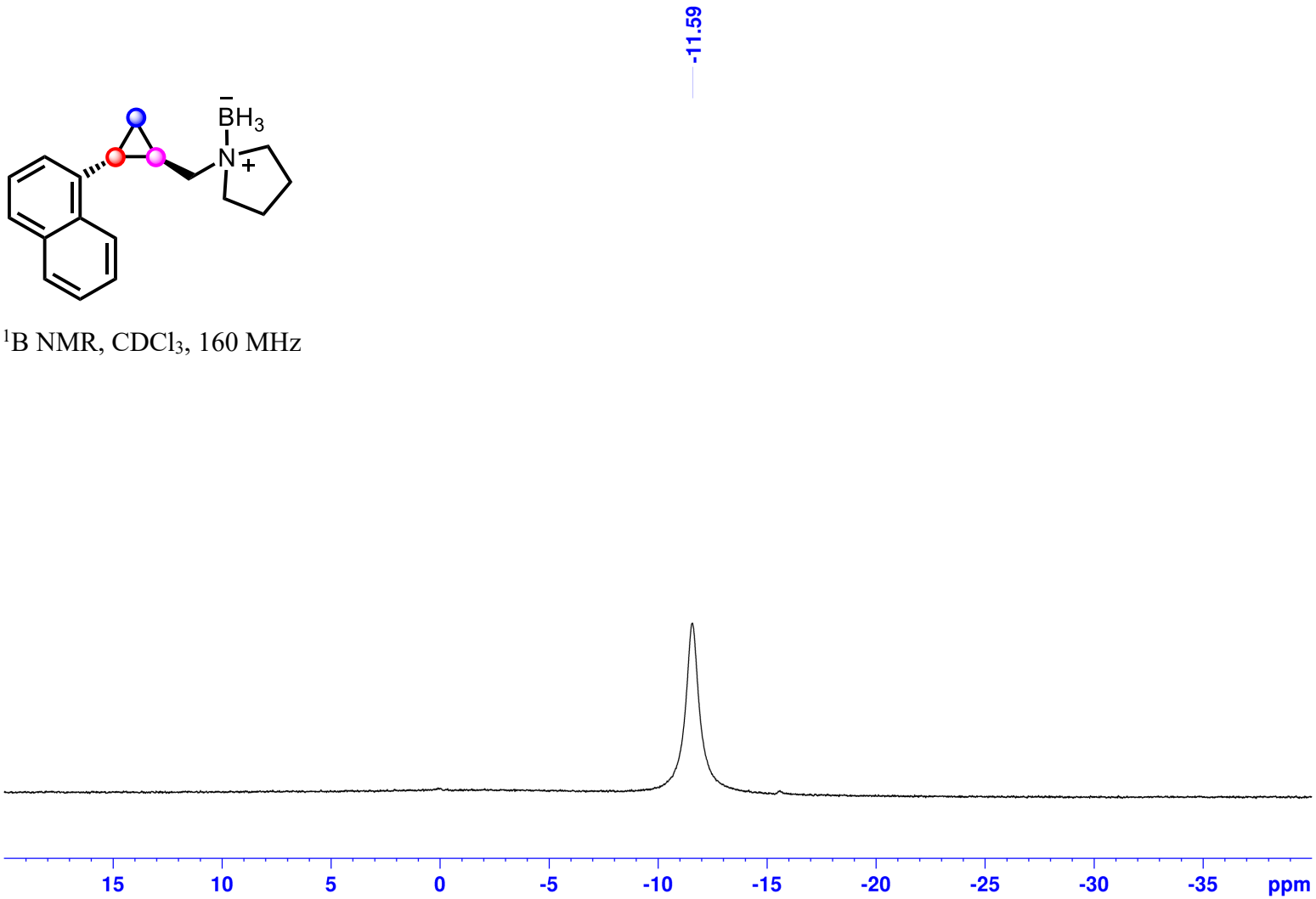


^{11}B NMR, $CDCl_3$, 160 MHz

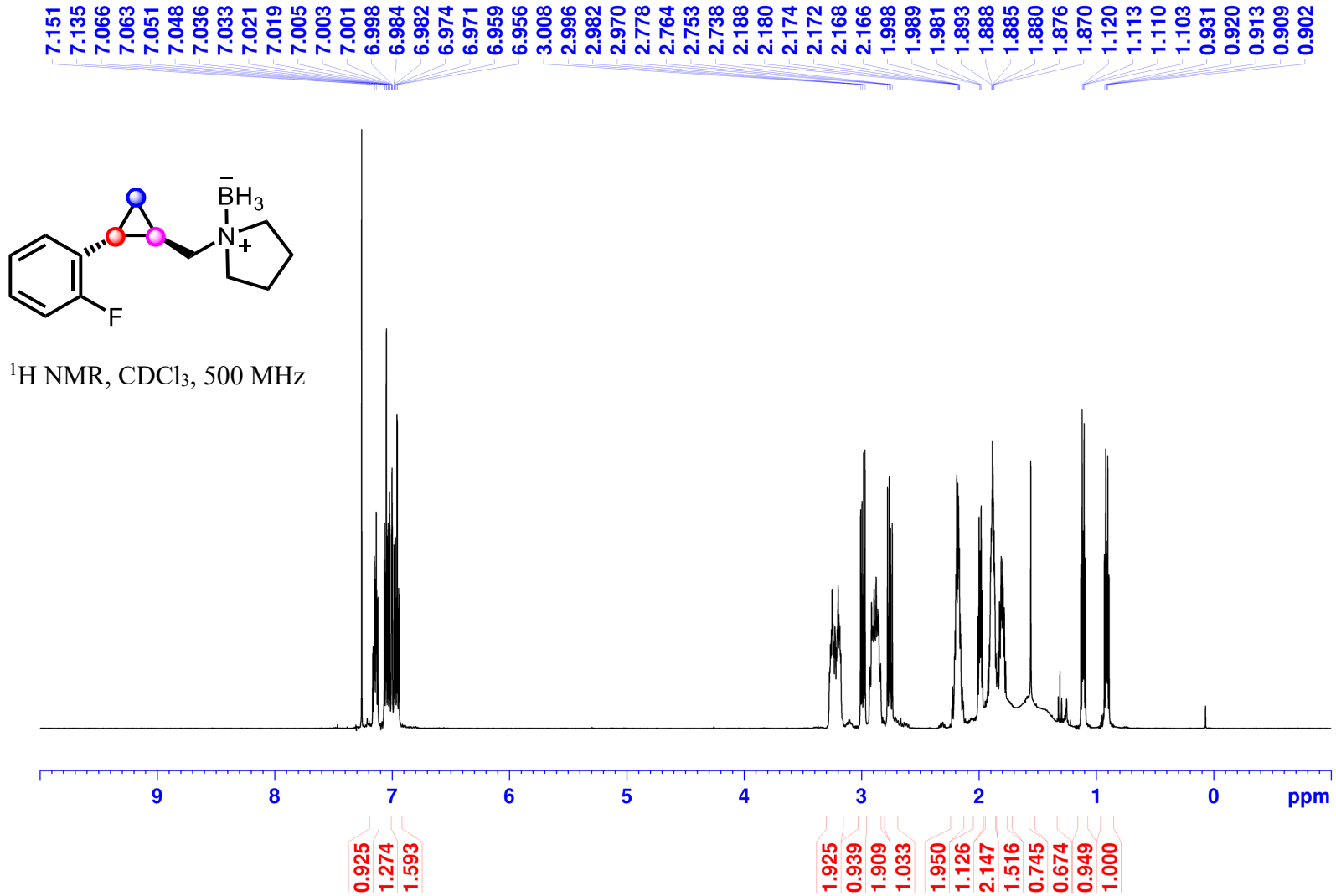


1-((2-(Naphthalen-1-yl)cyclopropyl)methyl)pyrrolidine Borane (1i):

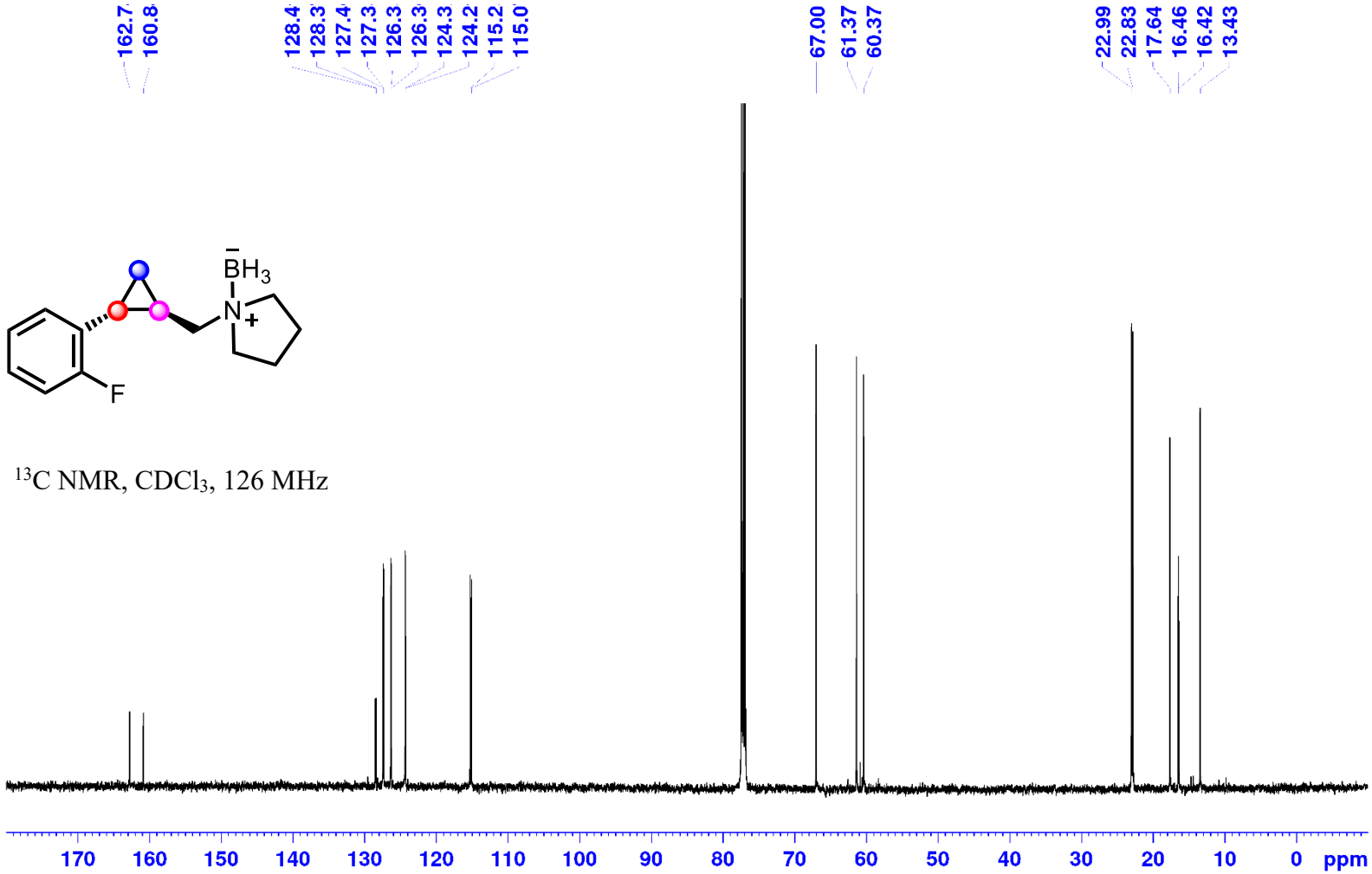
^{11}B NMR, $CDCl_3$, 160 MHz



1-((2-(2-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1j) :

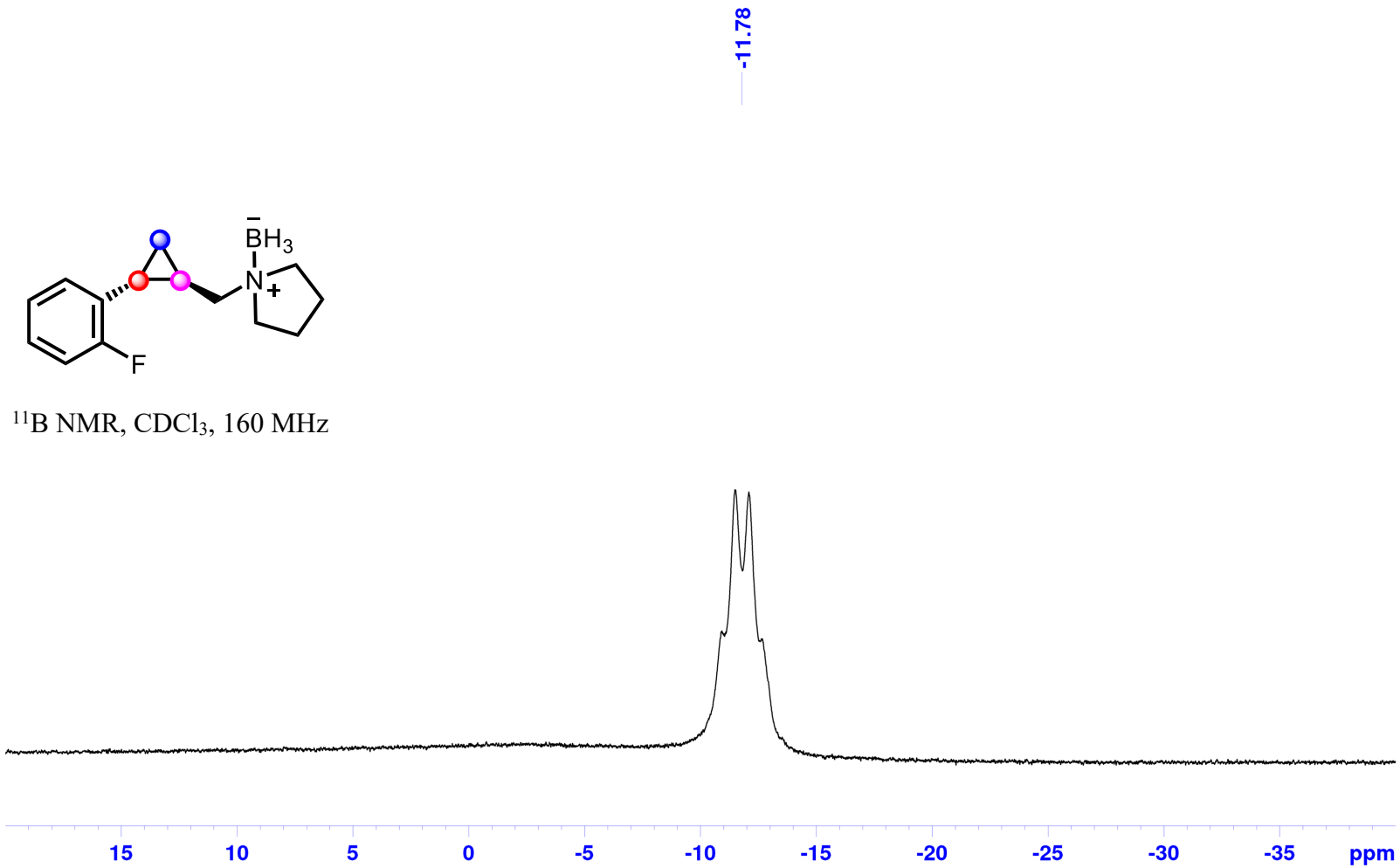


1-((2-(2-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1j) :



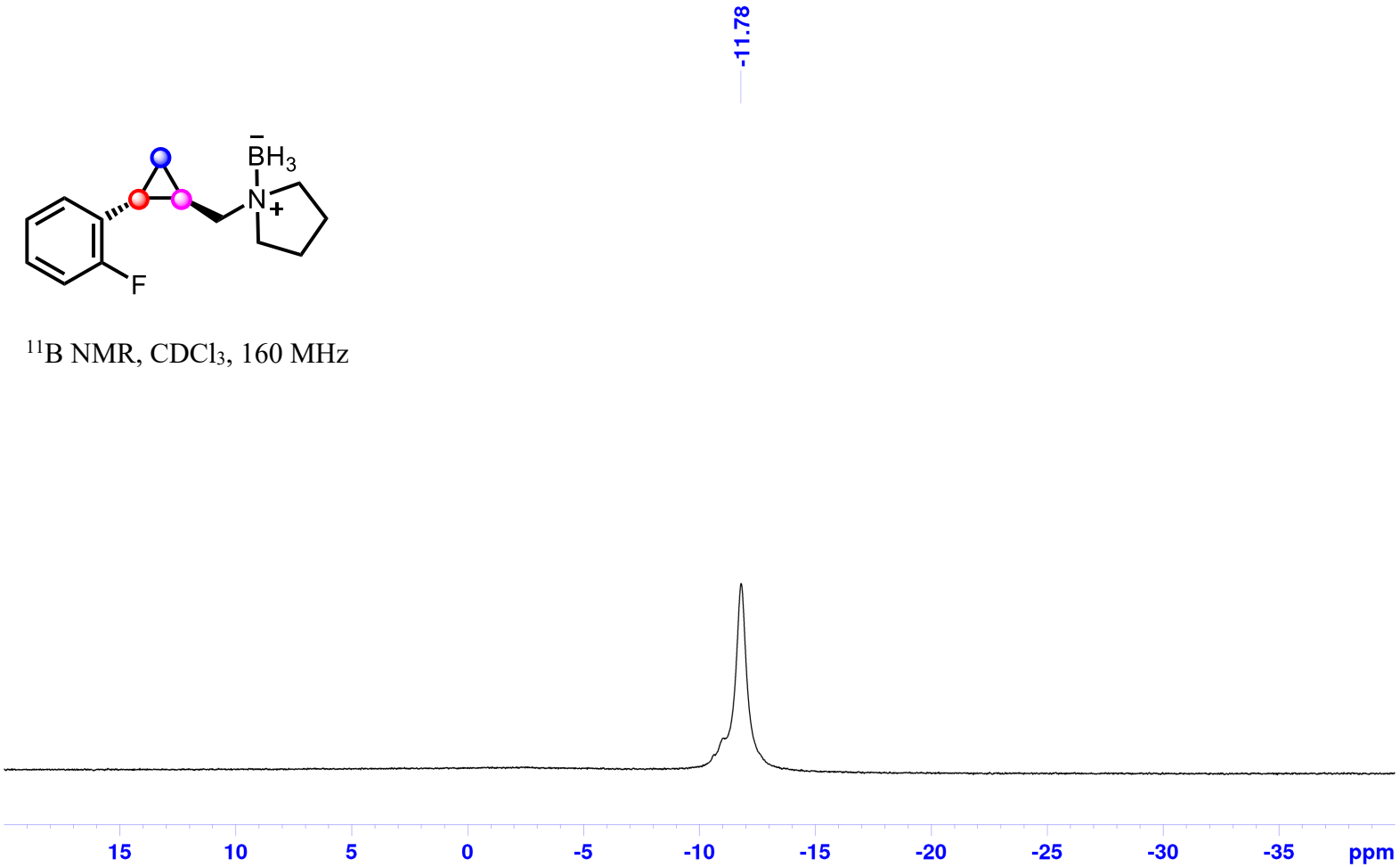
1-((2-(2-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1j) :

^{11}B NMR, $CDCl_3$, 160 MHz

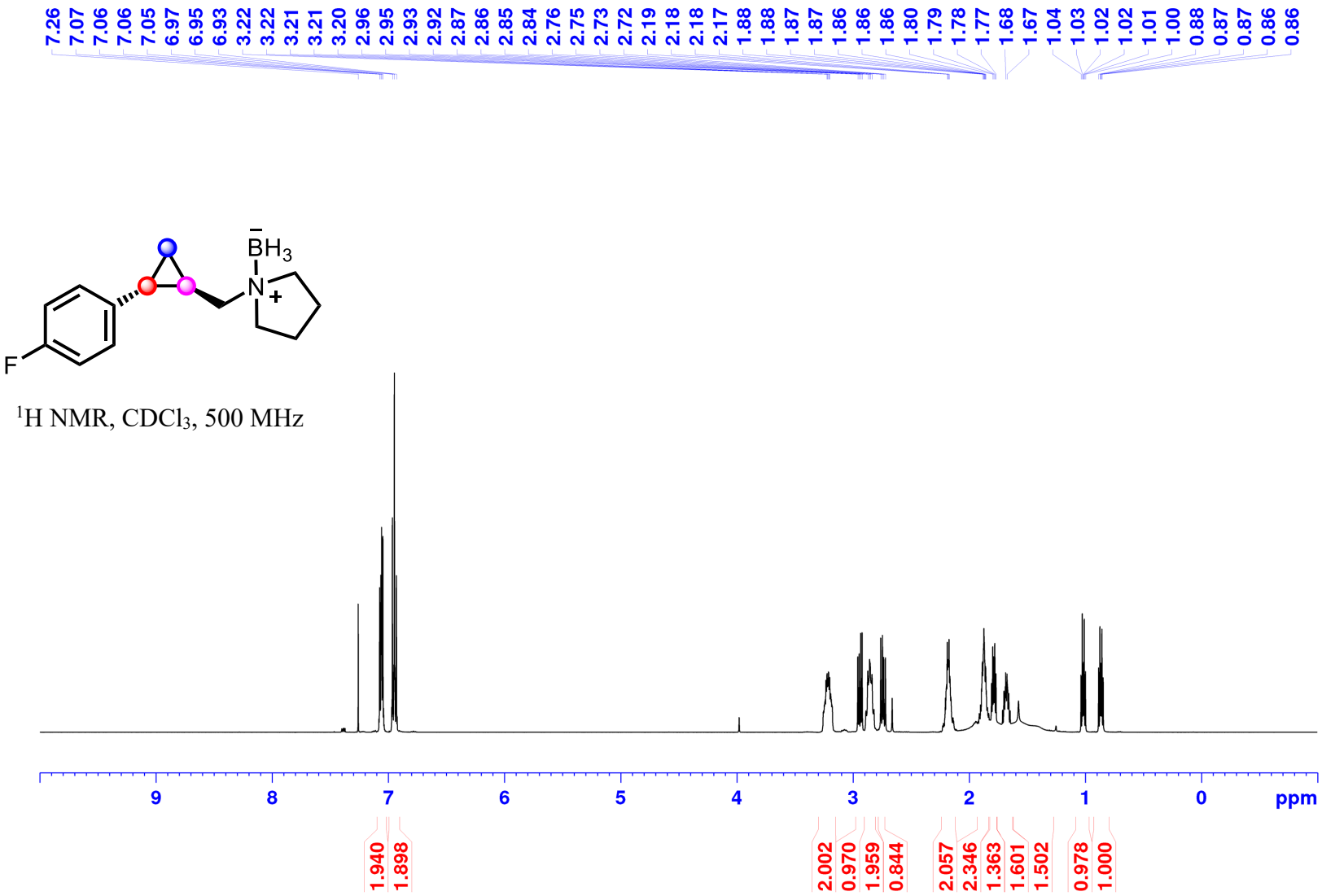


1-((2-(2-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1j) :

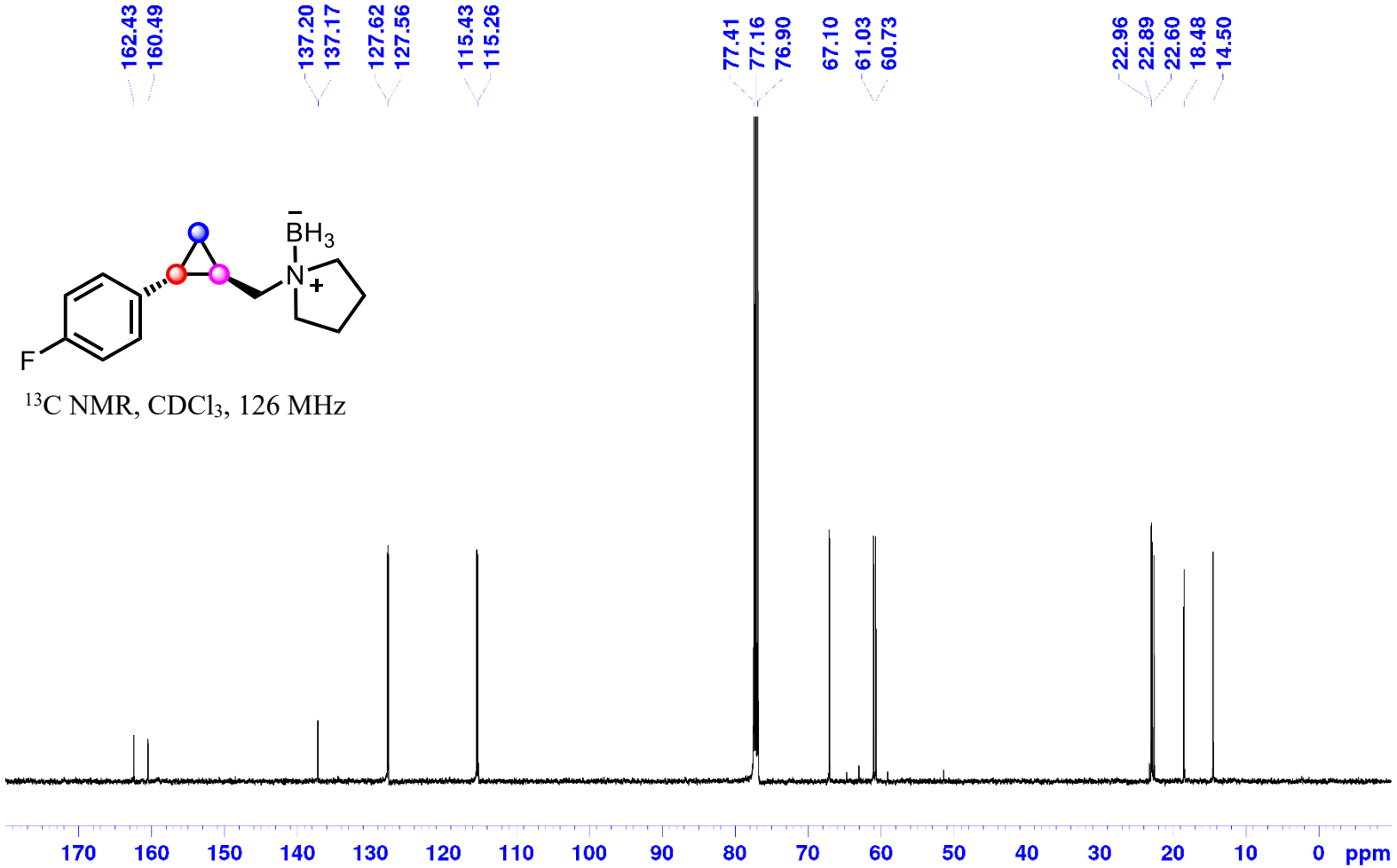
^{11}B NMR, $CDCl_3$, 160 MHz



1-((2-(4-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1k):



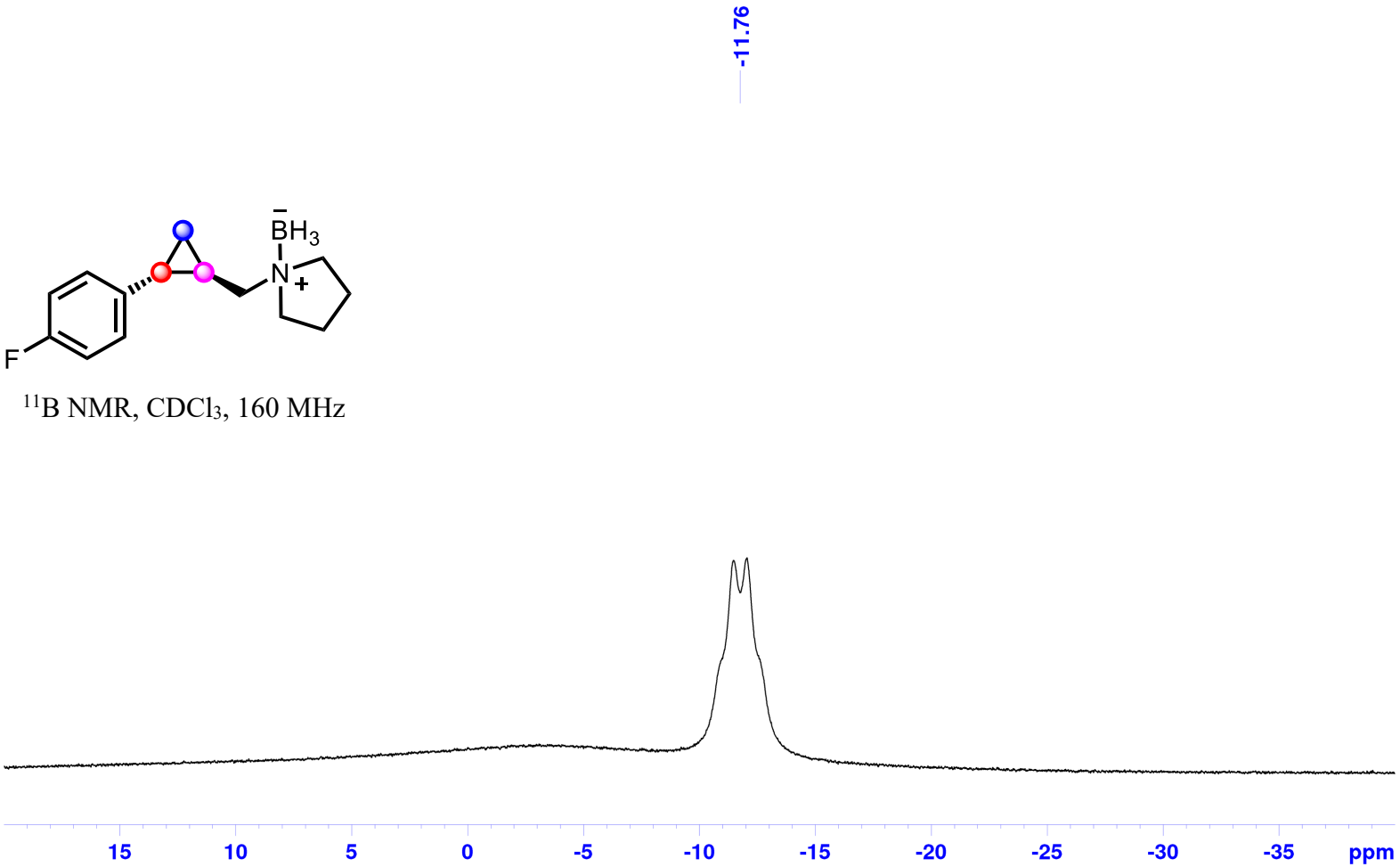
1-((2-(4-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1k):



^{13}C NMR, $CDCl_3$, 126 MHz

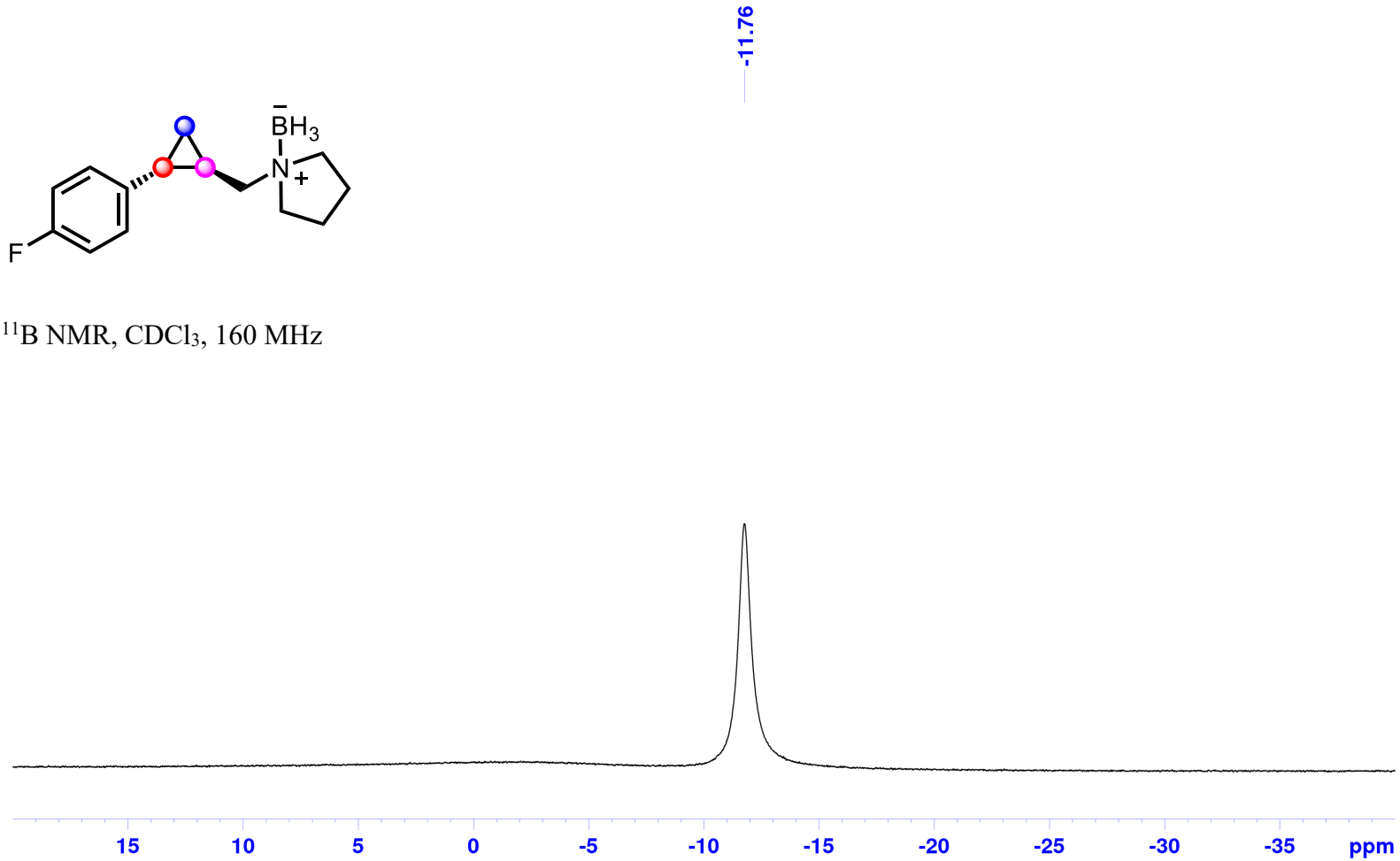
1-((2-(4-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1k):

^{11}B NMR, $CDCl_3$, 160 MHz



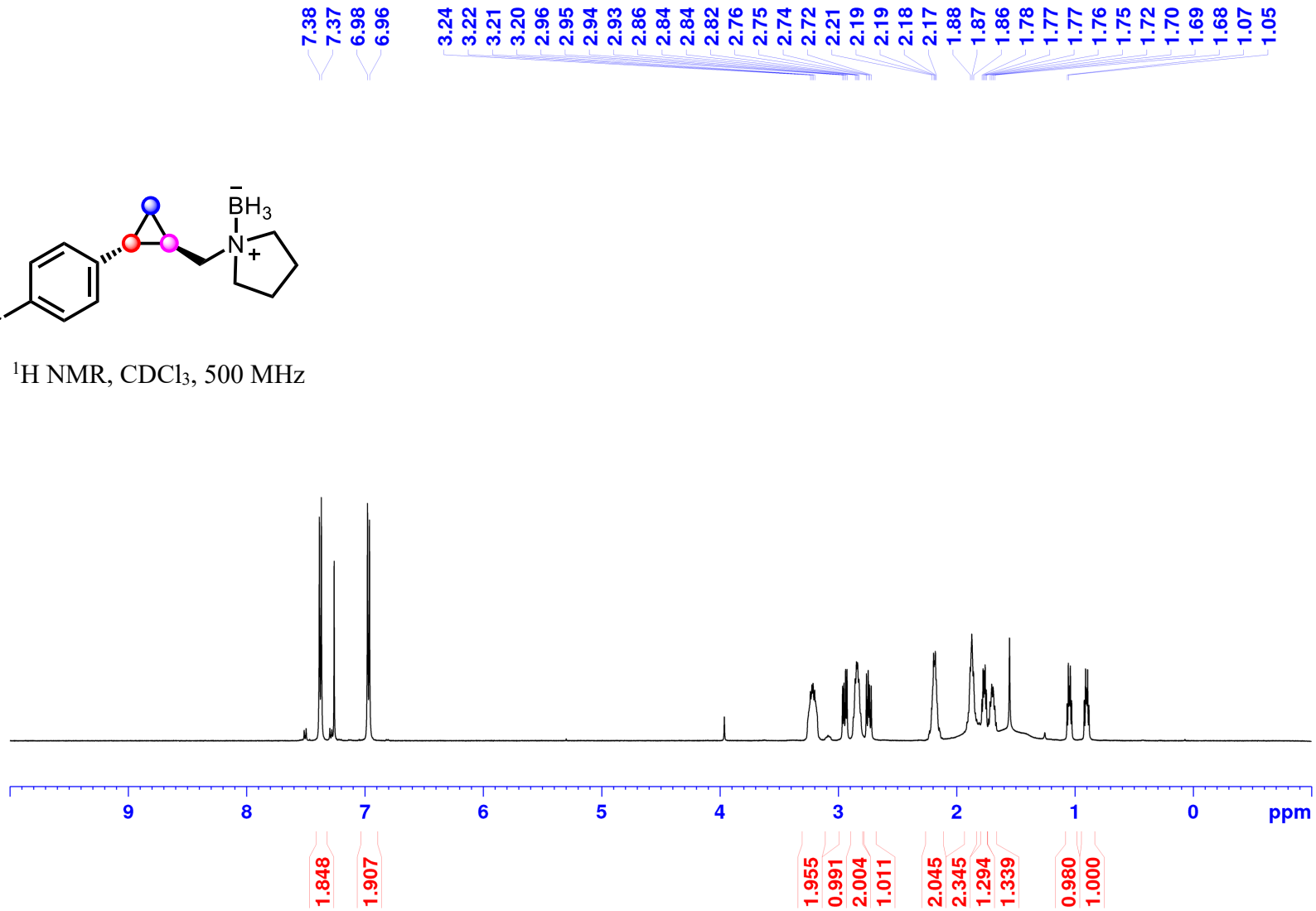
1-((2-(4-Fluorophenyl)cyclopropyl)methyl)pyrrolidine Borane (1k):

^{11}B NMR, $CDCl_3$, 160 MHz

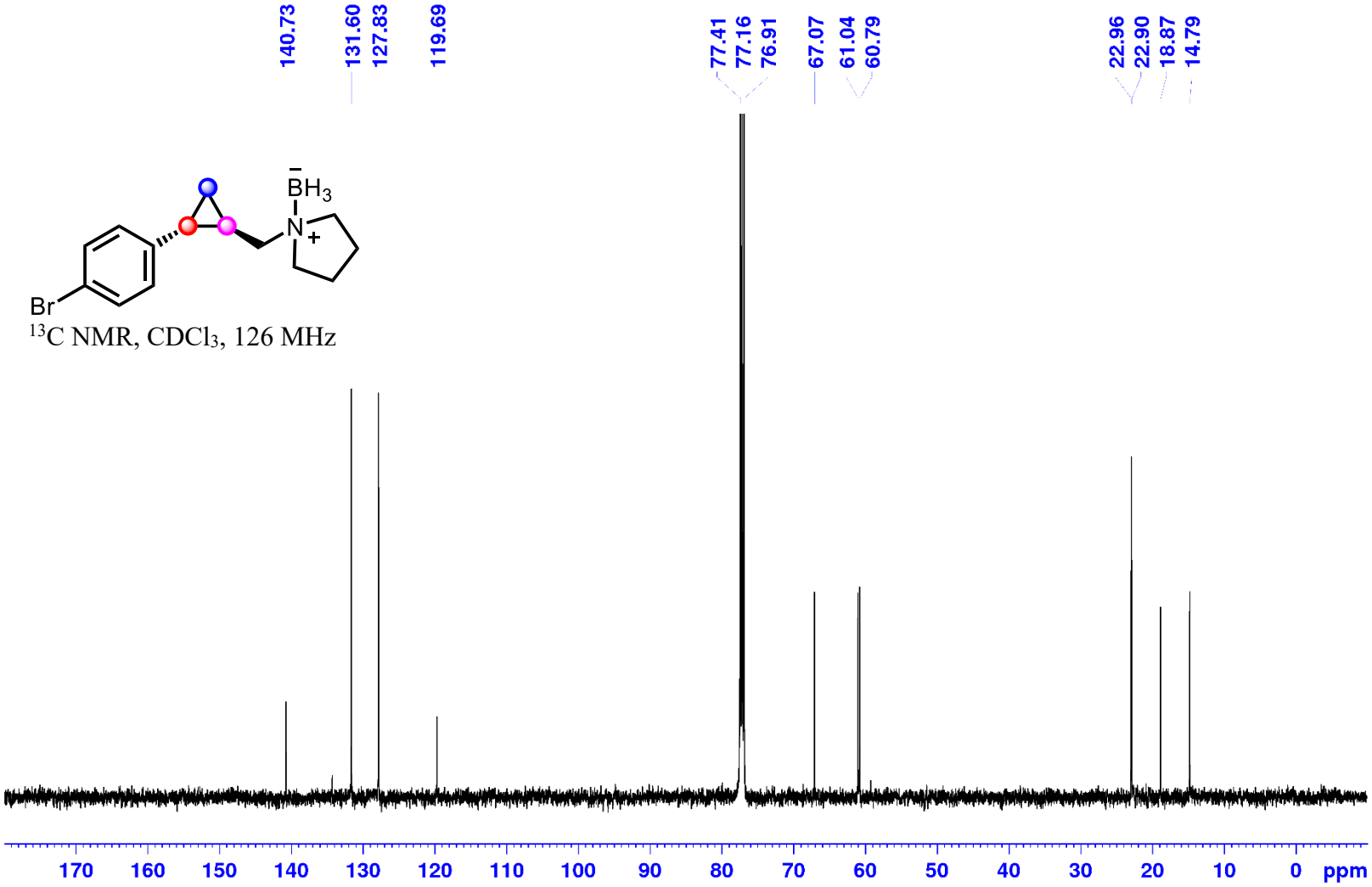


1-((2-(4-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1l):

^{1}H NMR, $CDCl_3$, 500 MHz

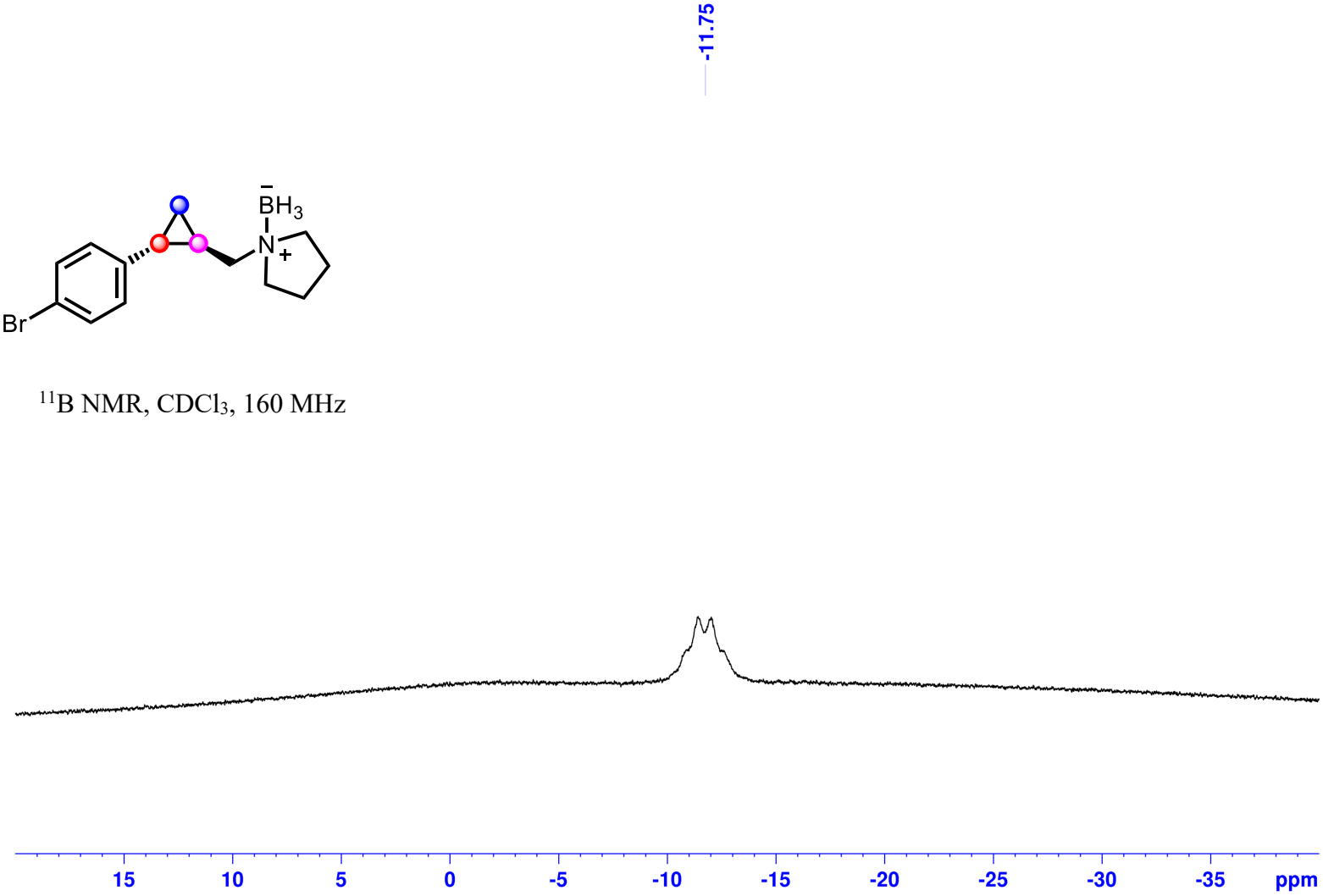


1-((2-(4-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1l):



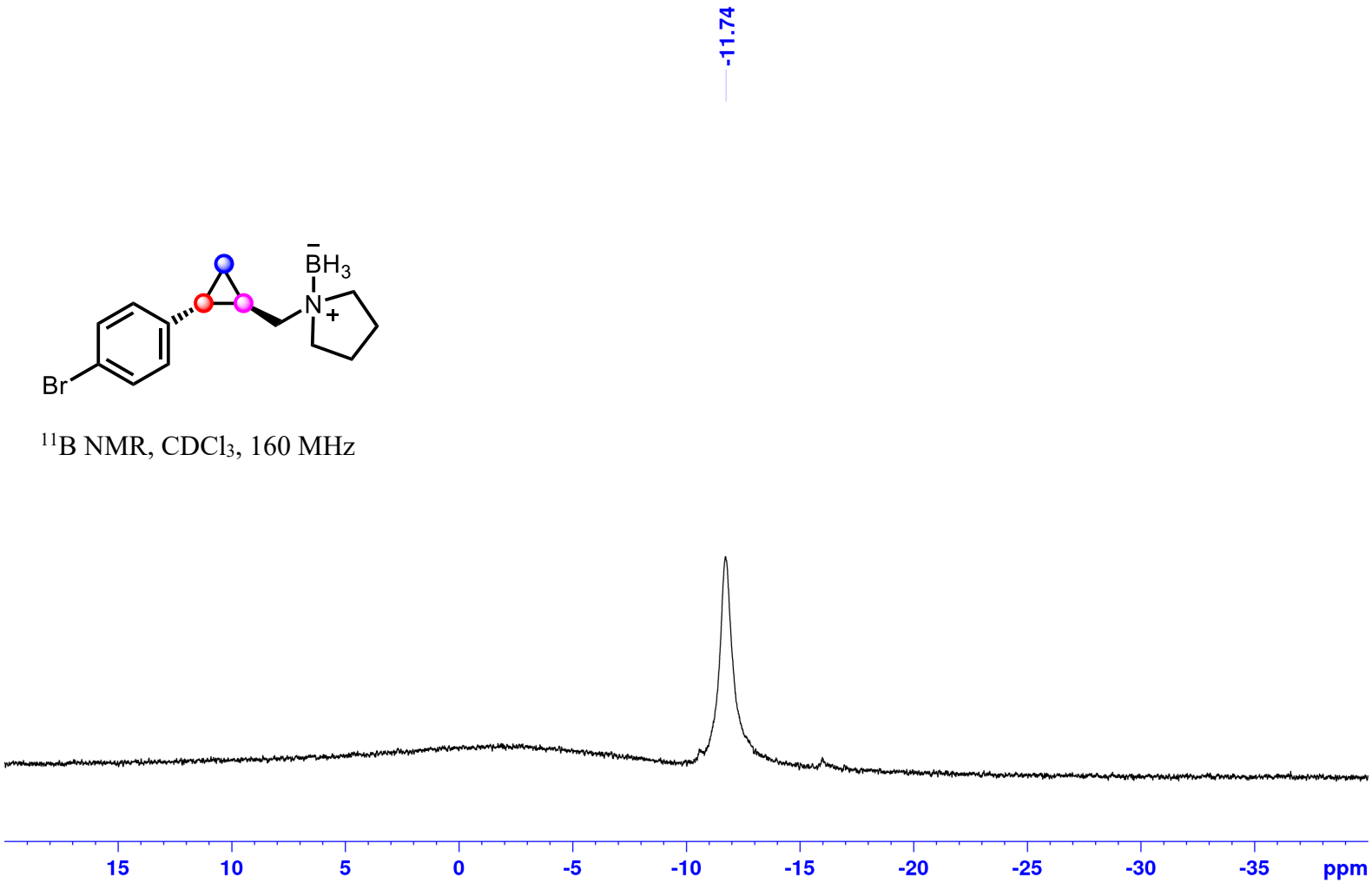
1-((2-(4-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1l):

^{11}B NMR, $CDCl_3$, 160 MHz

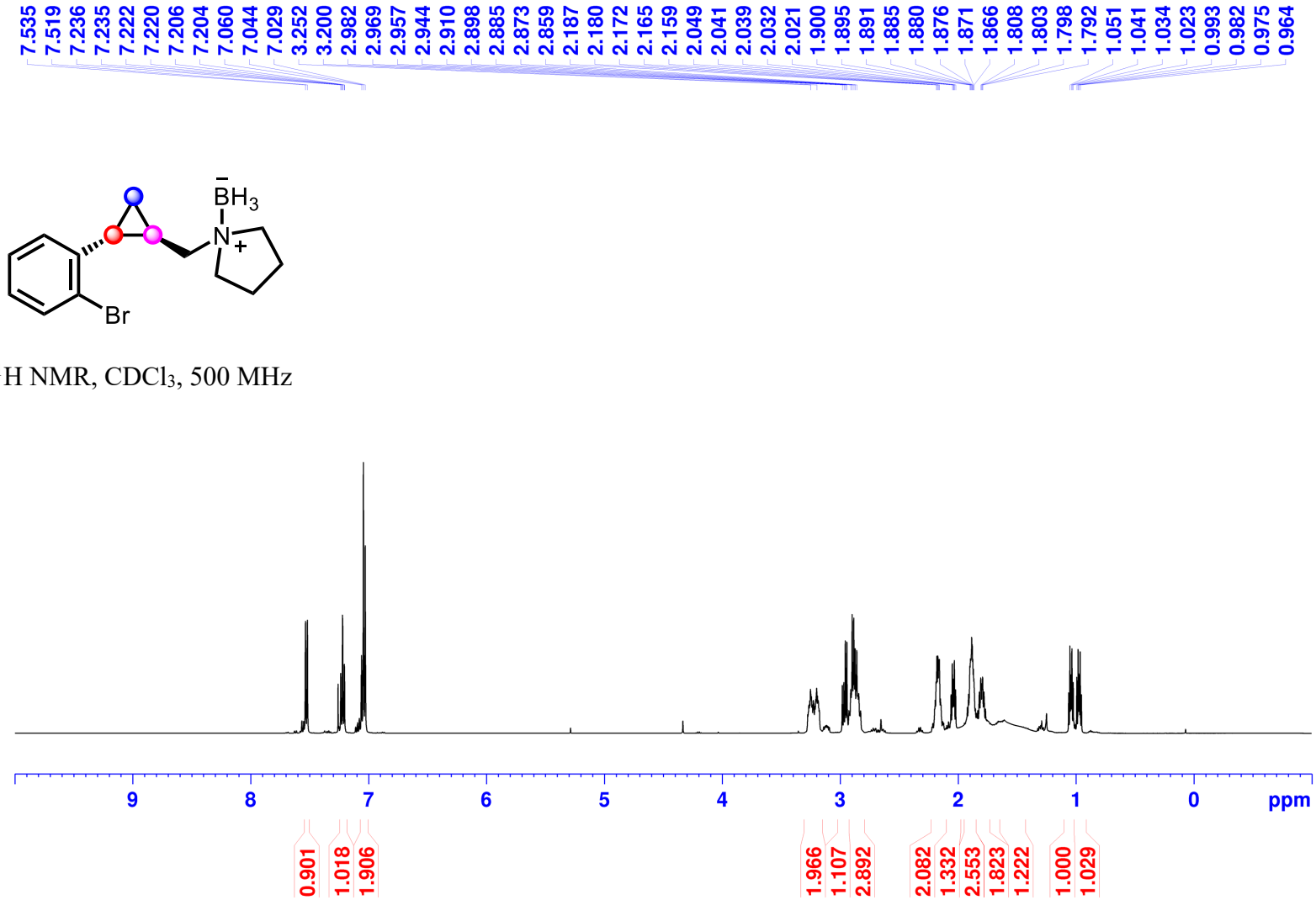


1-((2-(4-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1l):

^{11}B NMR, $CDCl_3$, 160 MHz

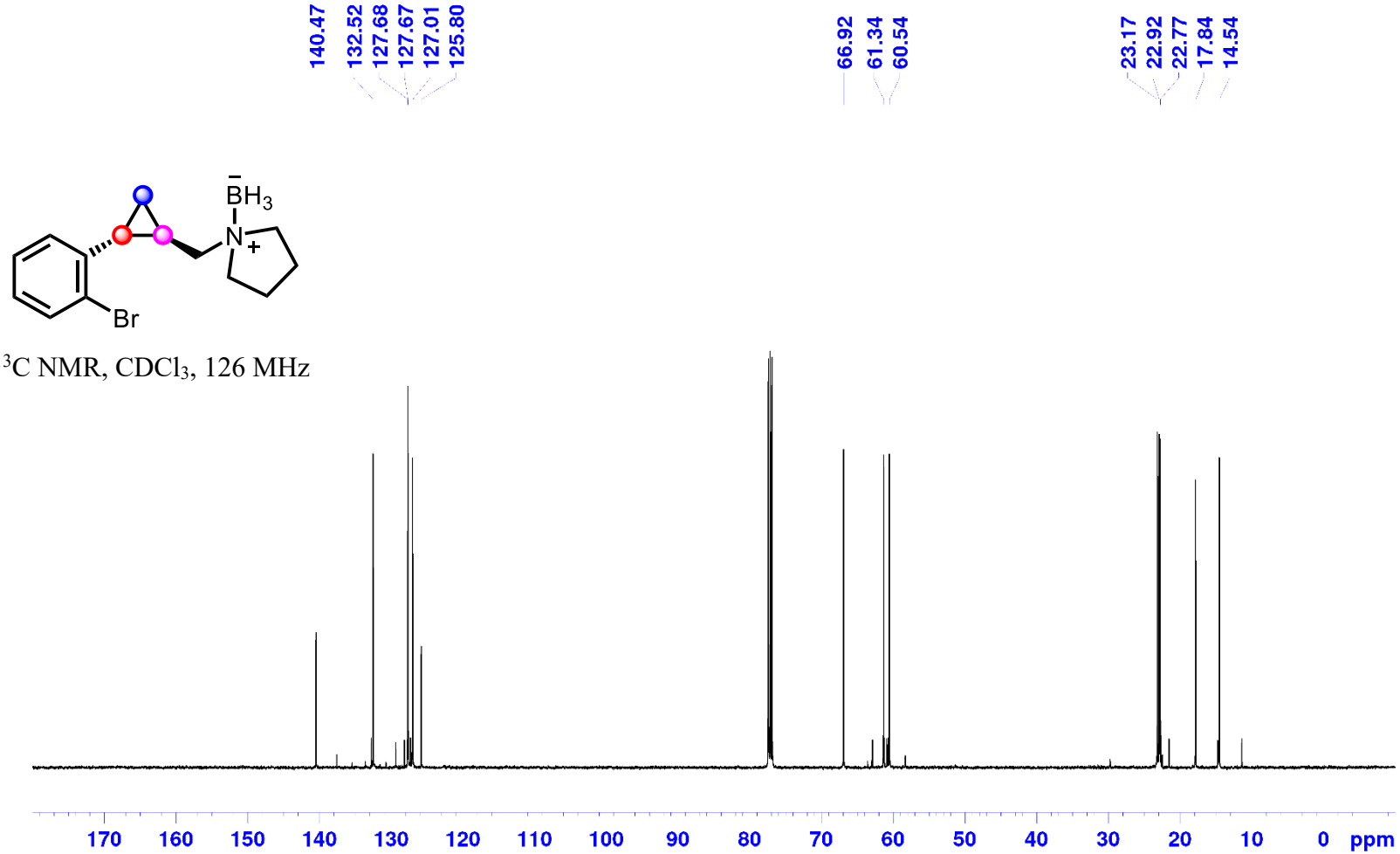


1-((2-(2-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1m):



^{1}H NMR, $CDCl_3$, 500 MHz

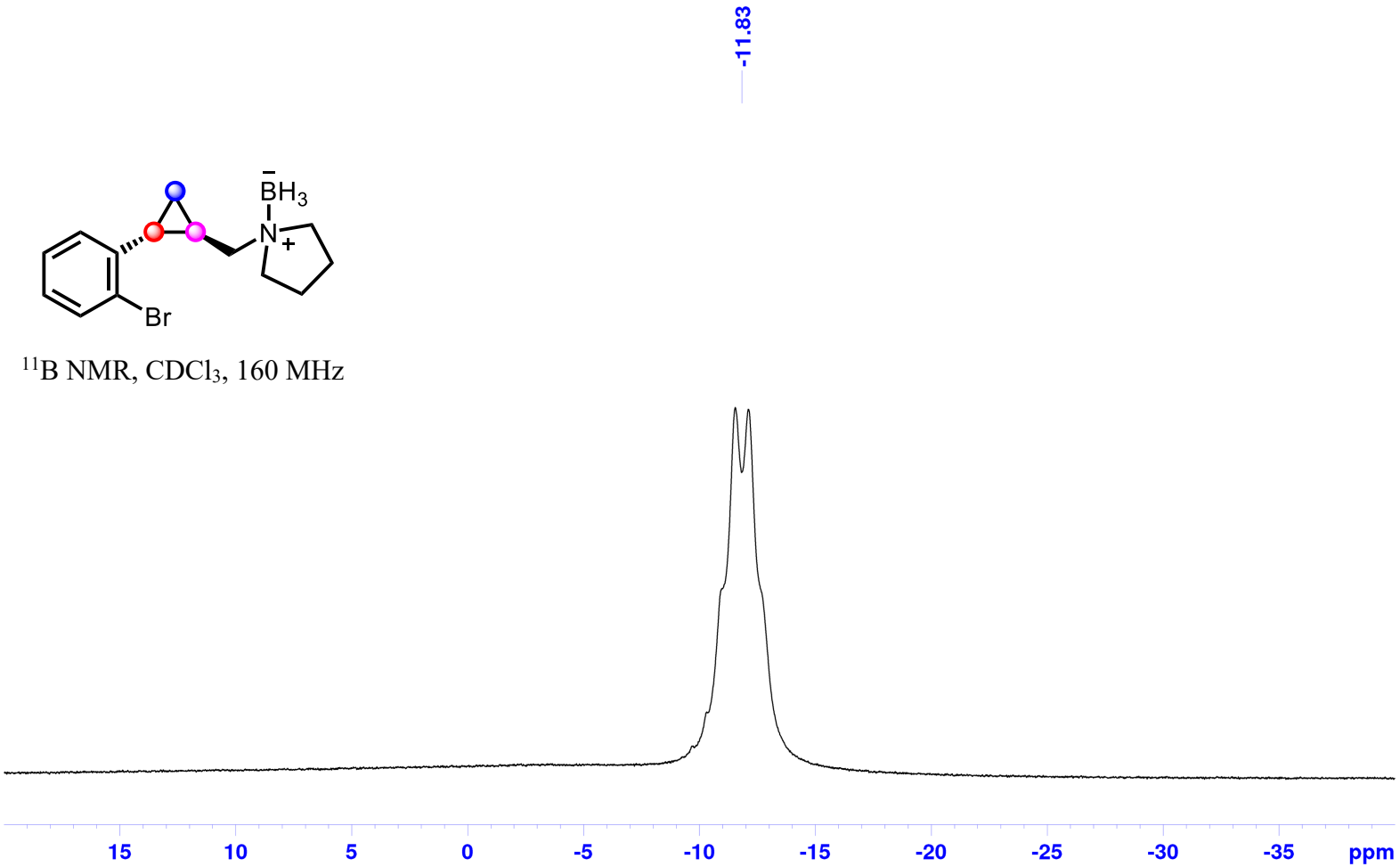
1-((2-(2-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1m):



^{13}C NMR, $CDCl_3$, 126 MHz

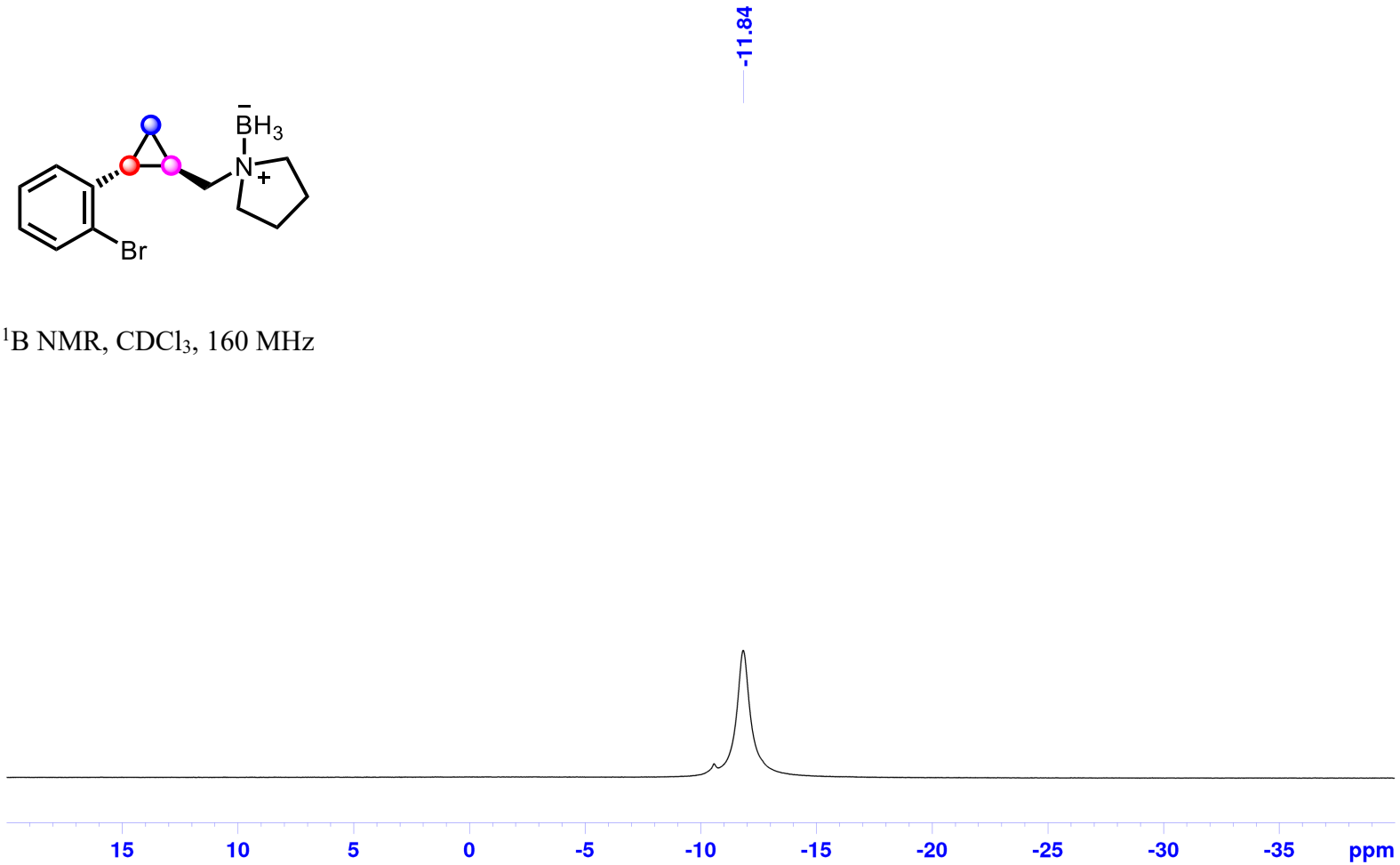
1-((2-(2-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1m):

^{11}B NMR, $CDCl_3$, 160 MHz

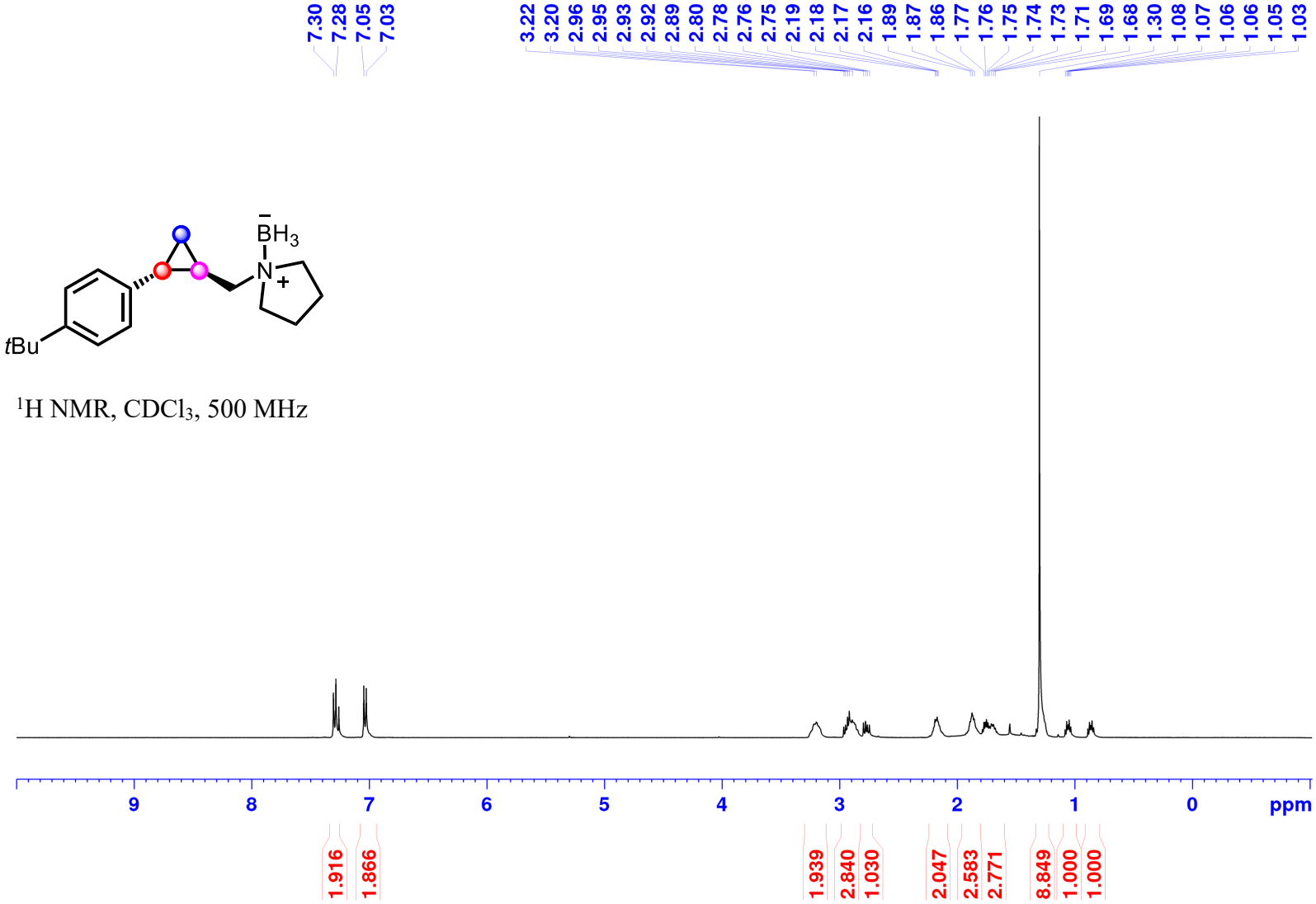


1-((2-(2-Bromophenyl)cyclopropyl)methyl)pyrrolidine Borane (1m):

^{11}B NMR, $CDCl_3$, 160 MHz

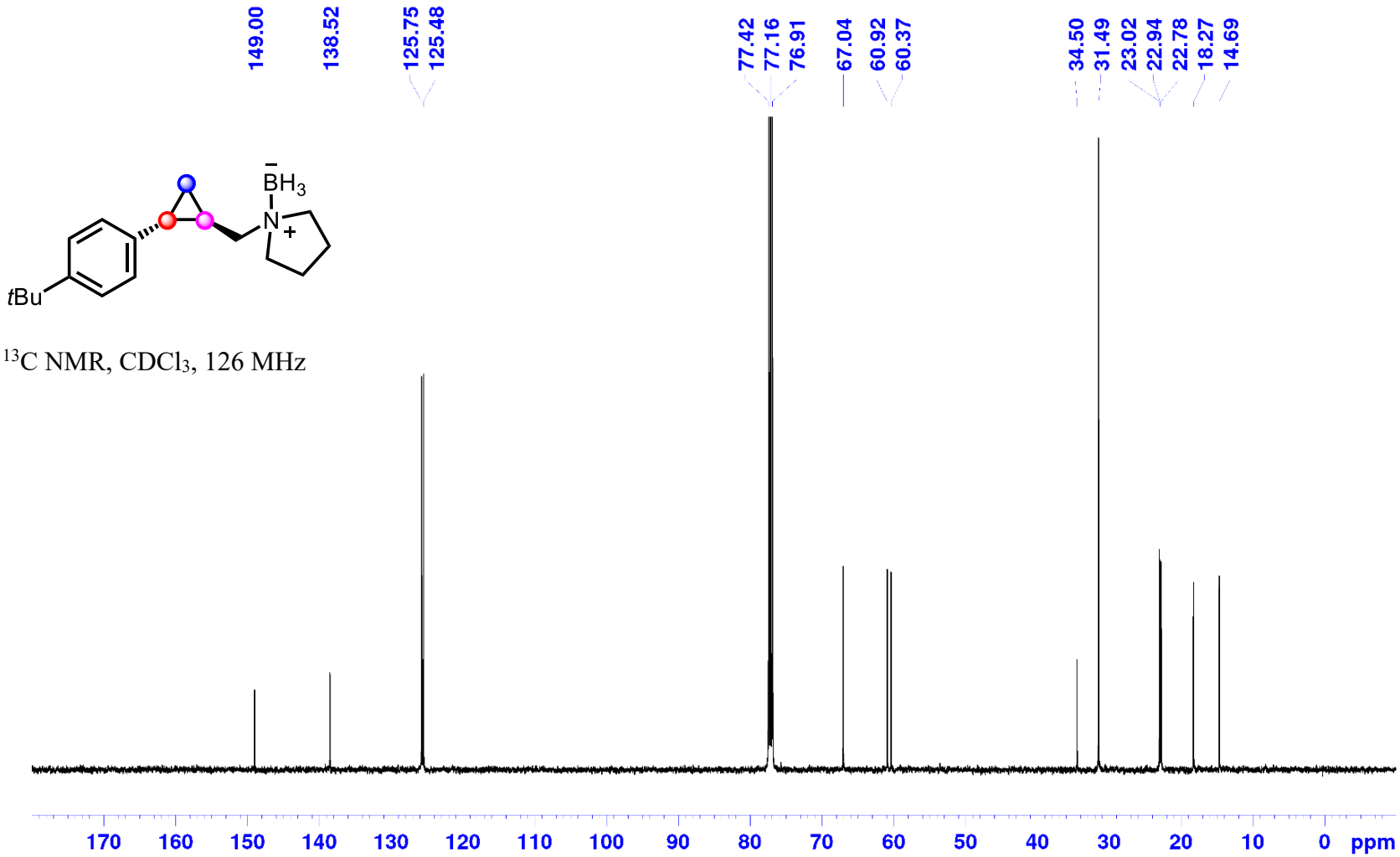


1-((2-(4-(*tert*-Butyl)phenyl)cyclopropyl)methyl)pyrrolidine Borane (1n):



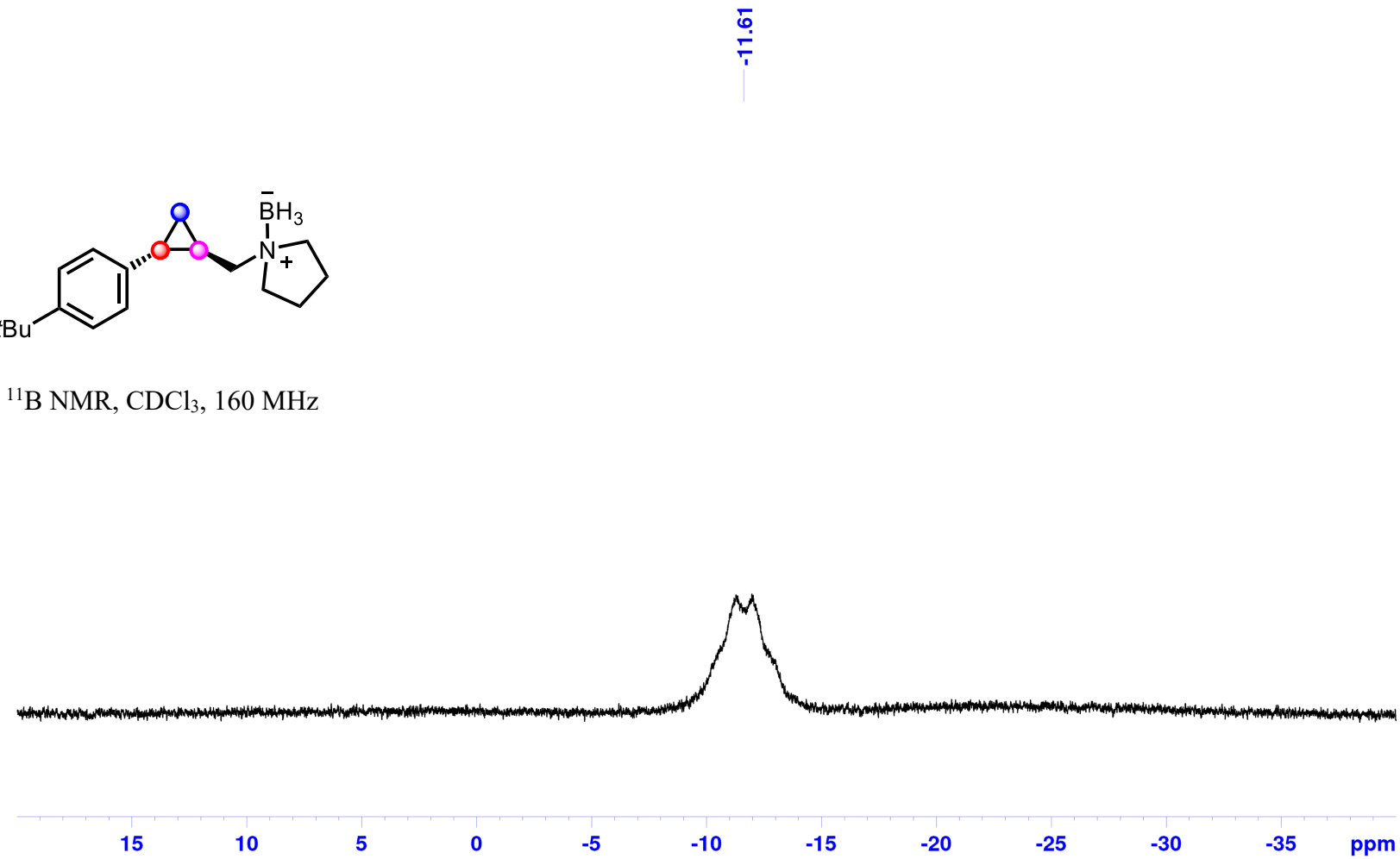
^{1}H NMR, $CDCl_3$, 500 MHz

1-((2-(4-(*tert*-Butyl)phenyl)cyclopropyl)methyl)pyrrolidine Borane (1n):



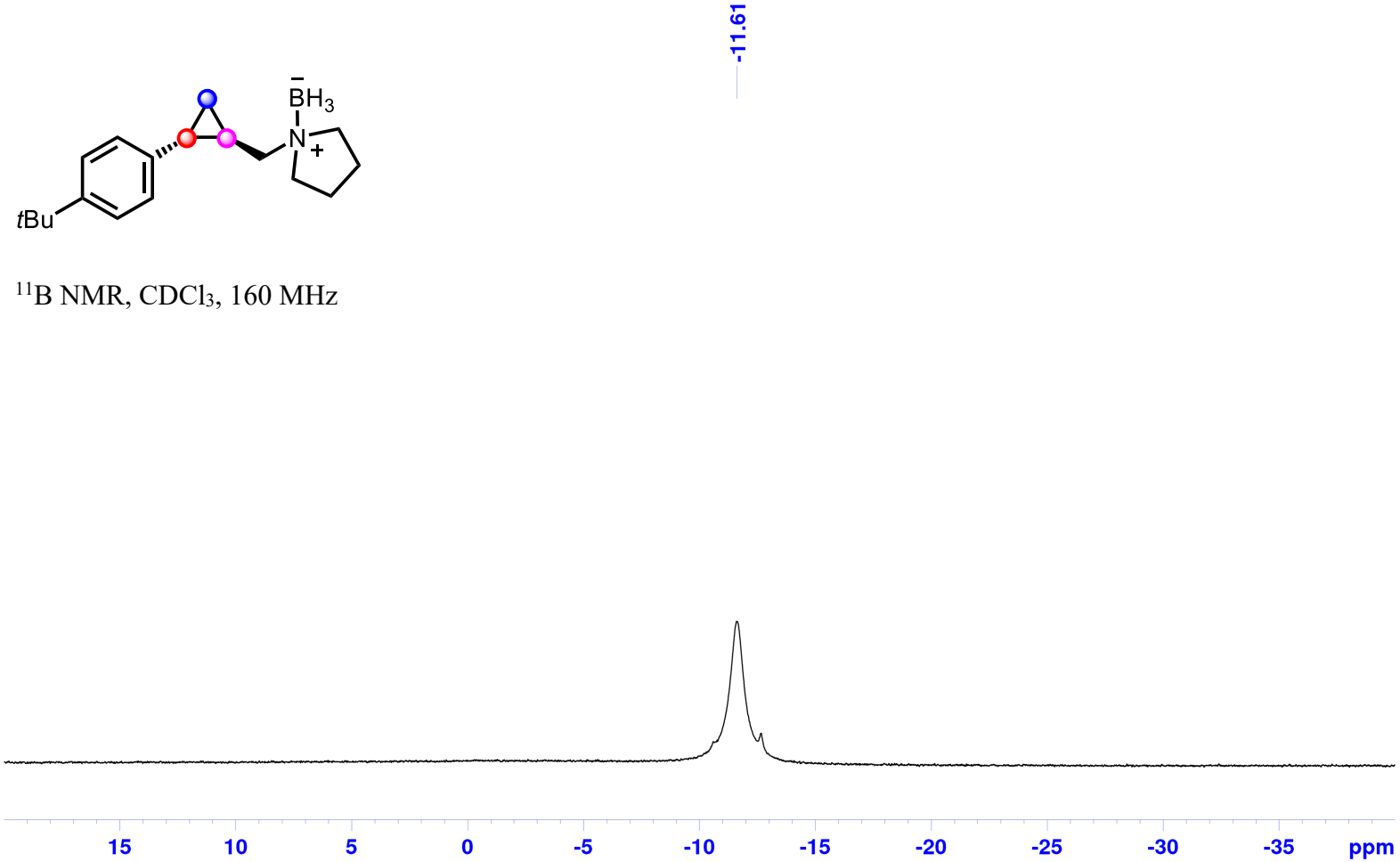
1-((2-(4-(*tert*-Butyl)phenyl)cyclopropyl)methyl)pyrrolidine Borane (1n):

^{11}B NMR, $CDCl_3$, 160 MHz



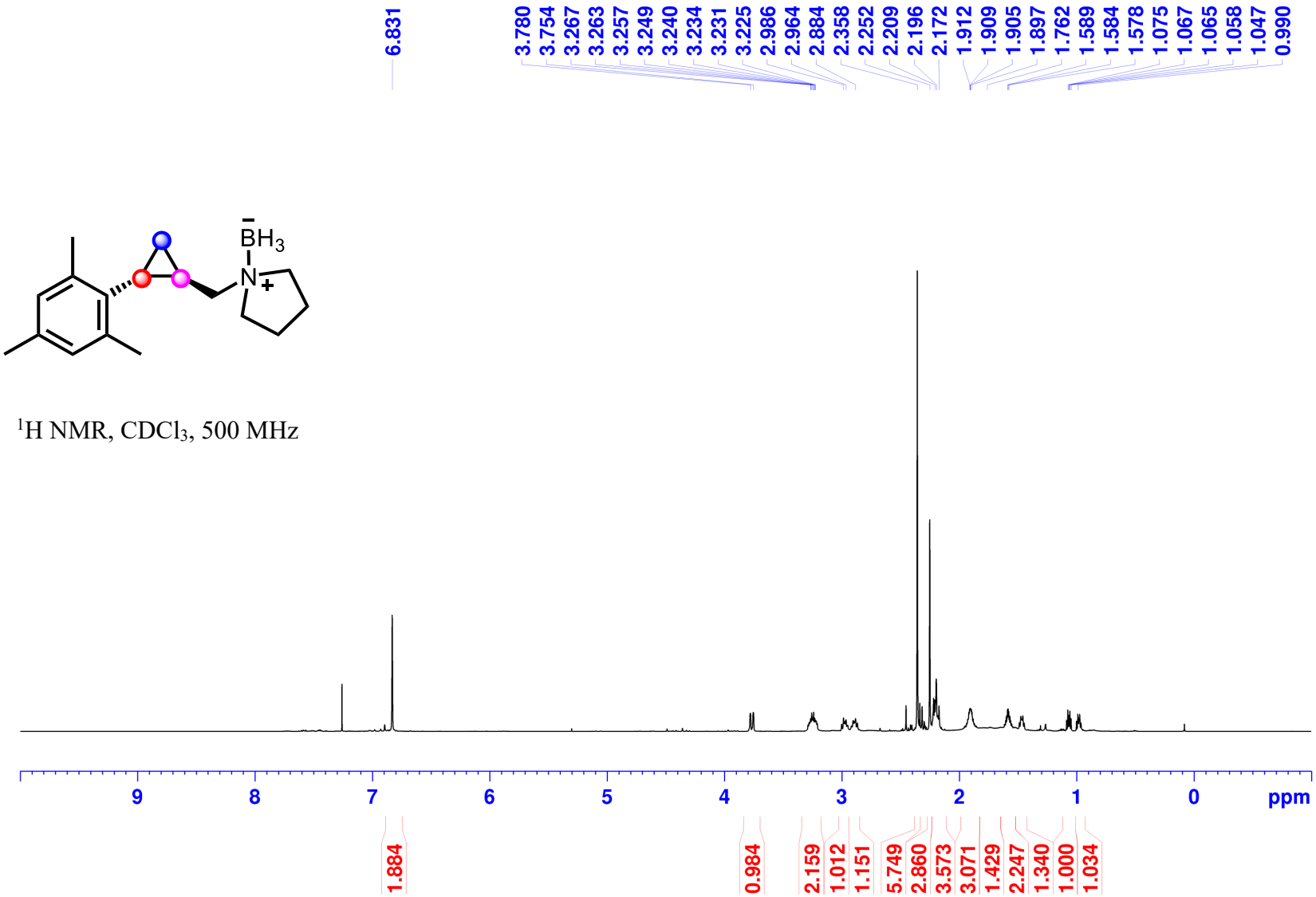
1-((2-(4-(*tert*-Butyl)phenyl)cyclopropyl)methyl)pyrrolidine Borane (1n):

^{11}B NMR, $CDCl_3$, 160 MHz

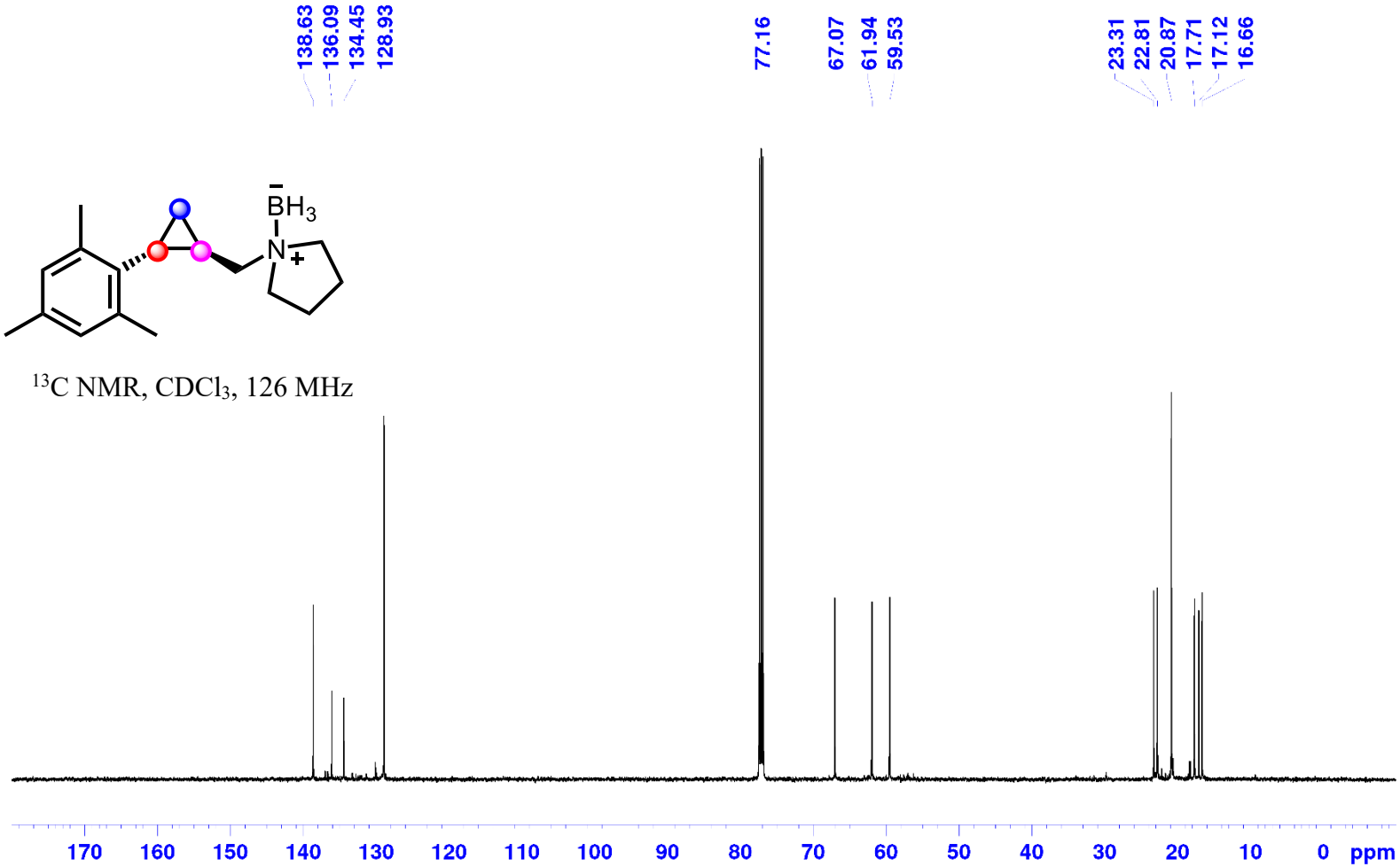


1-((2-Mesitylcyclopropyl)methyl)pyrrolidine Borane (1o):

^{1}H NMR, $CDCl_3$, 500 MHz

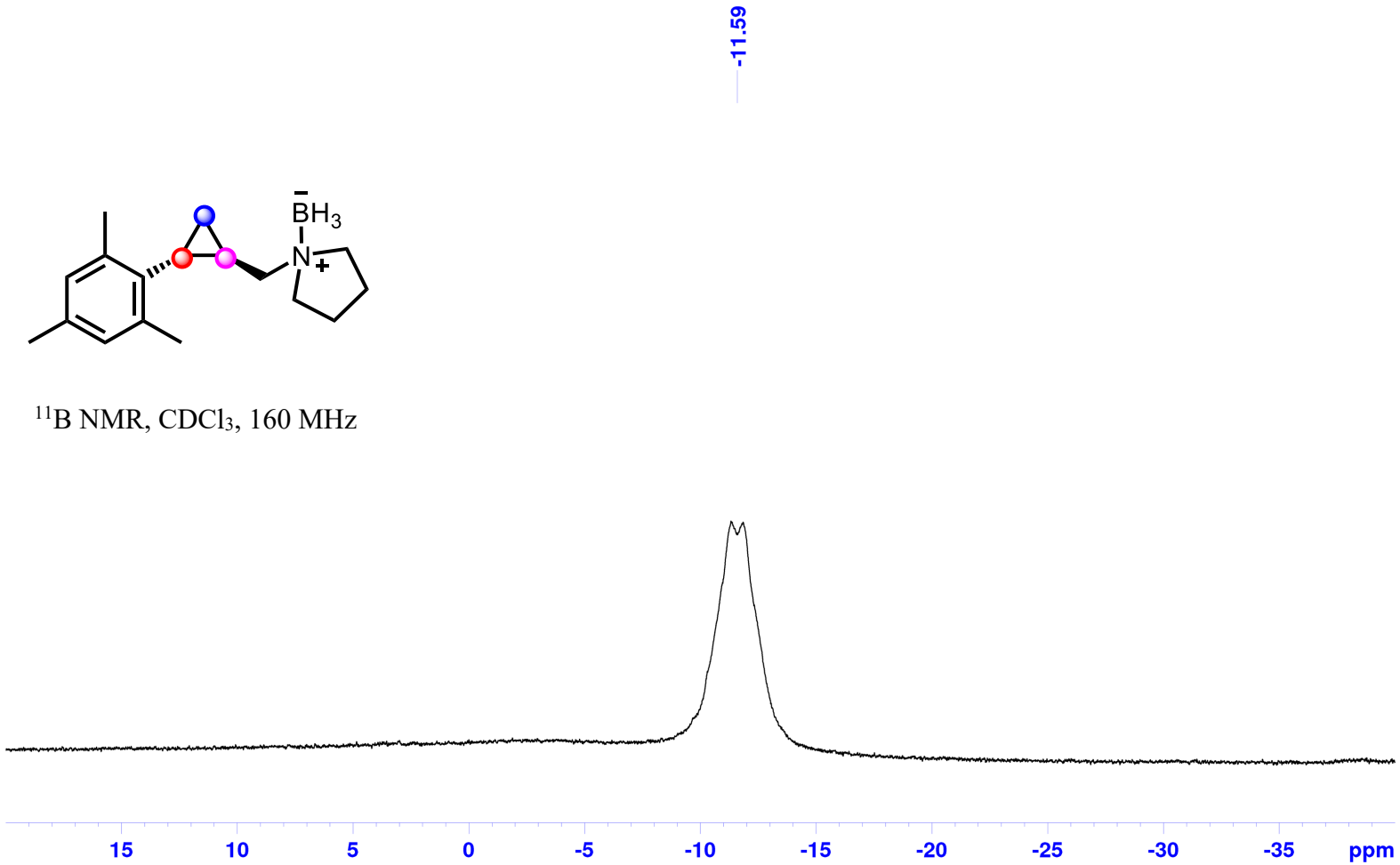


1-((2-Mesitylcyclopropyl)methyl)pyrrolidine Borane (1o):



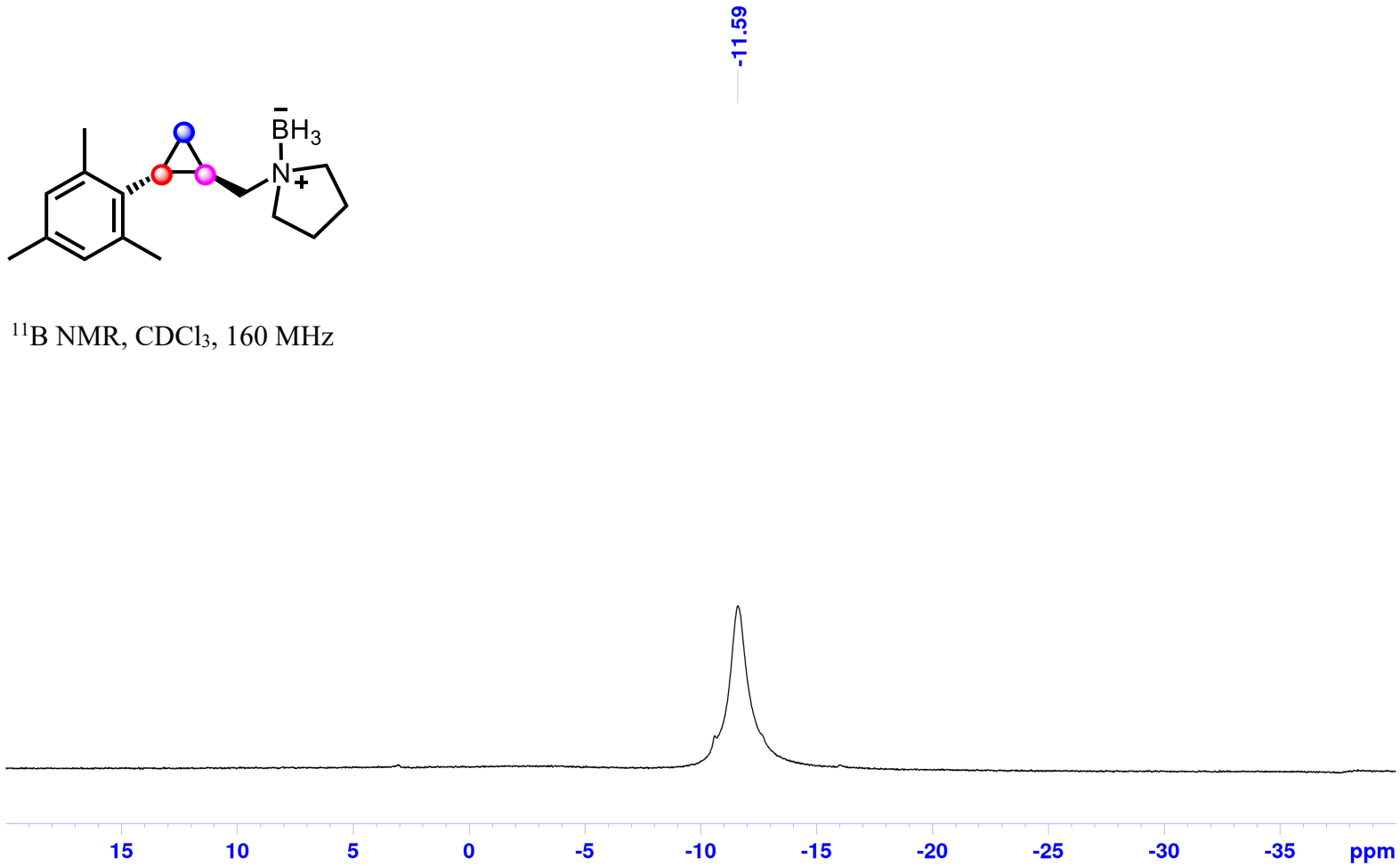
1-((2-Mesitylcyclopropyl)methyl)pyrrolidine Borane (1o):

^{11}B NMR, $CDCl_3$, 160 MHz

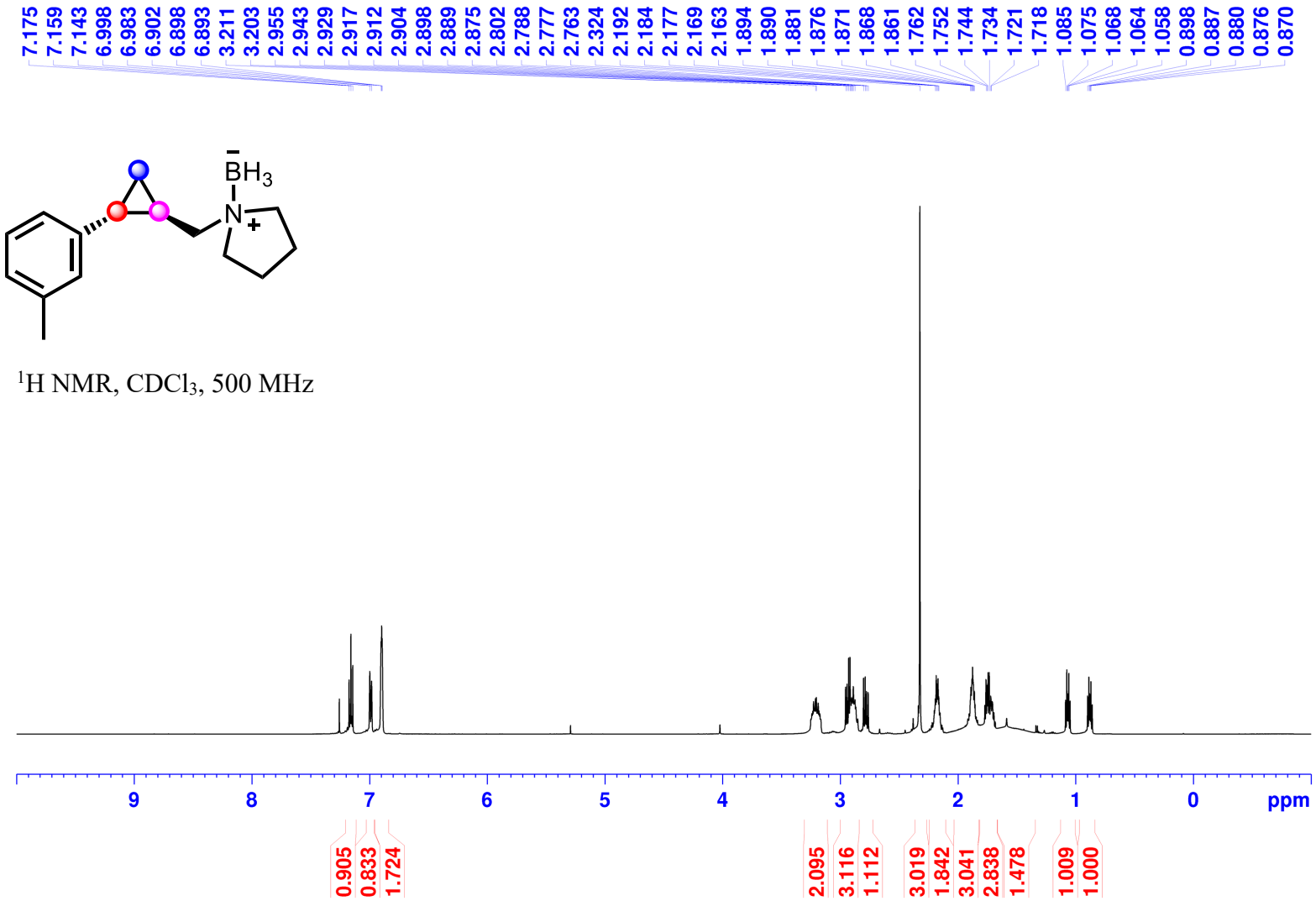


1-((2-Mesitylcyclopropyl)methyl)pyrrolidine Borane (1o):

^{11}B NMR, $CDCl_3$, 160 MHz

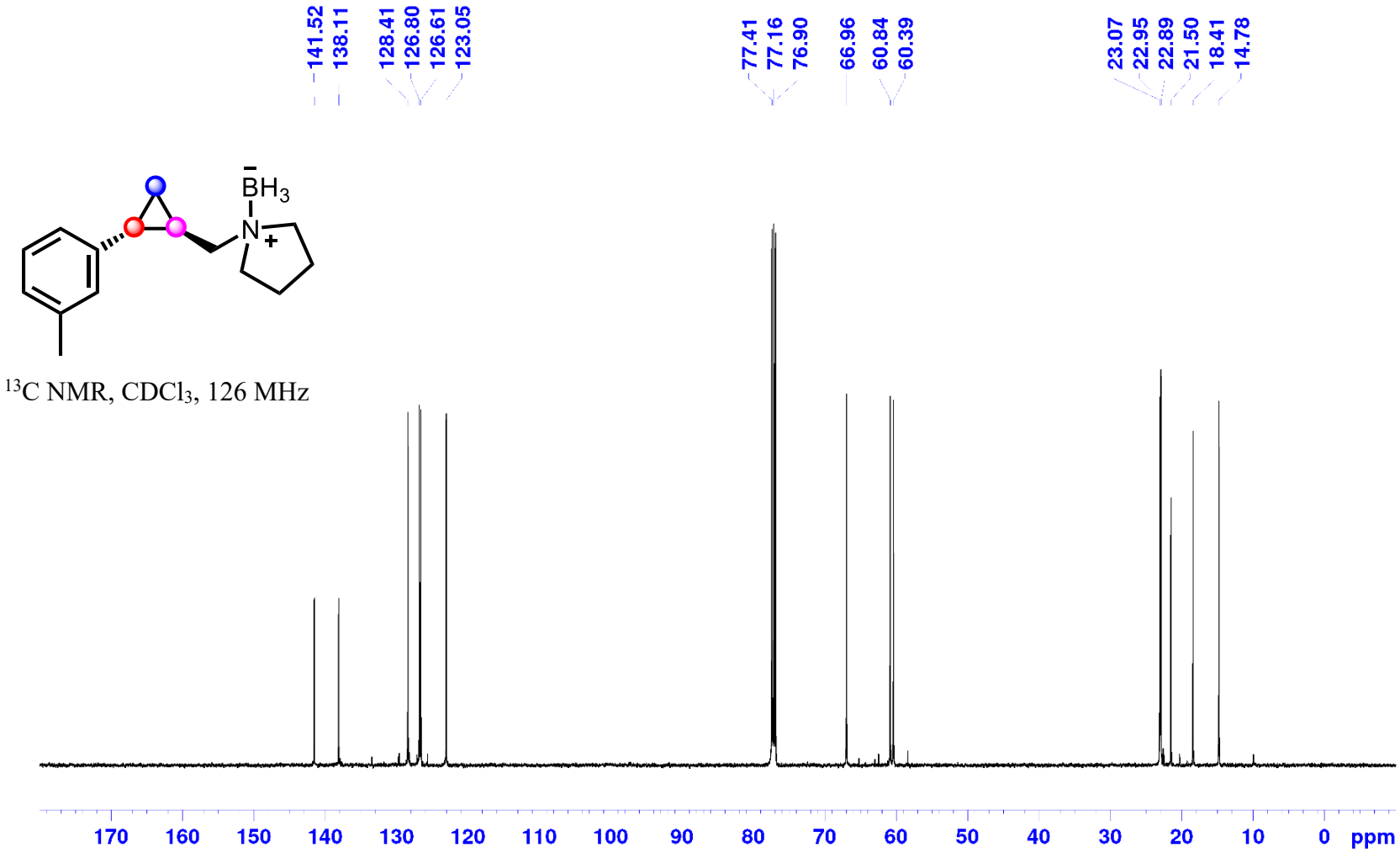


1-((2-(*m*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1p):



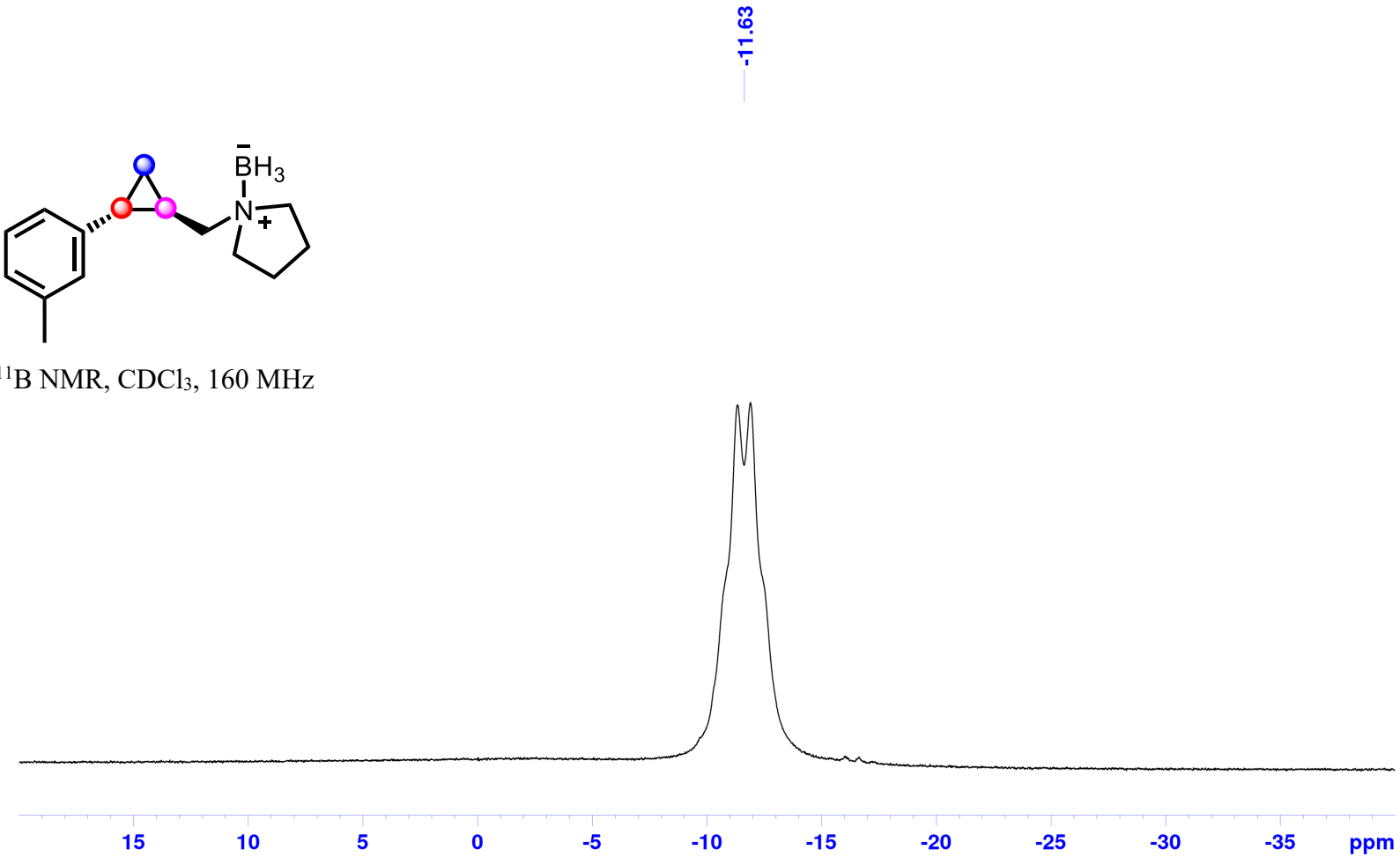
^{1}H NMR, $CDCl_3$, 500 MHz

1-((2-(*m*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1p):



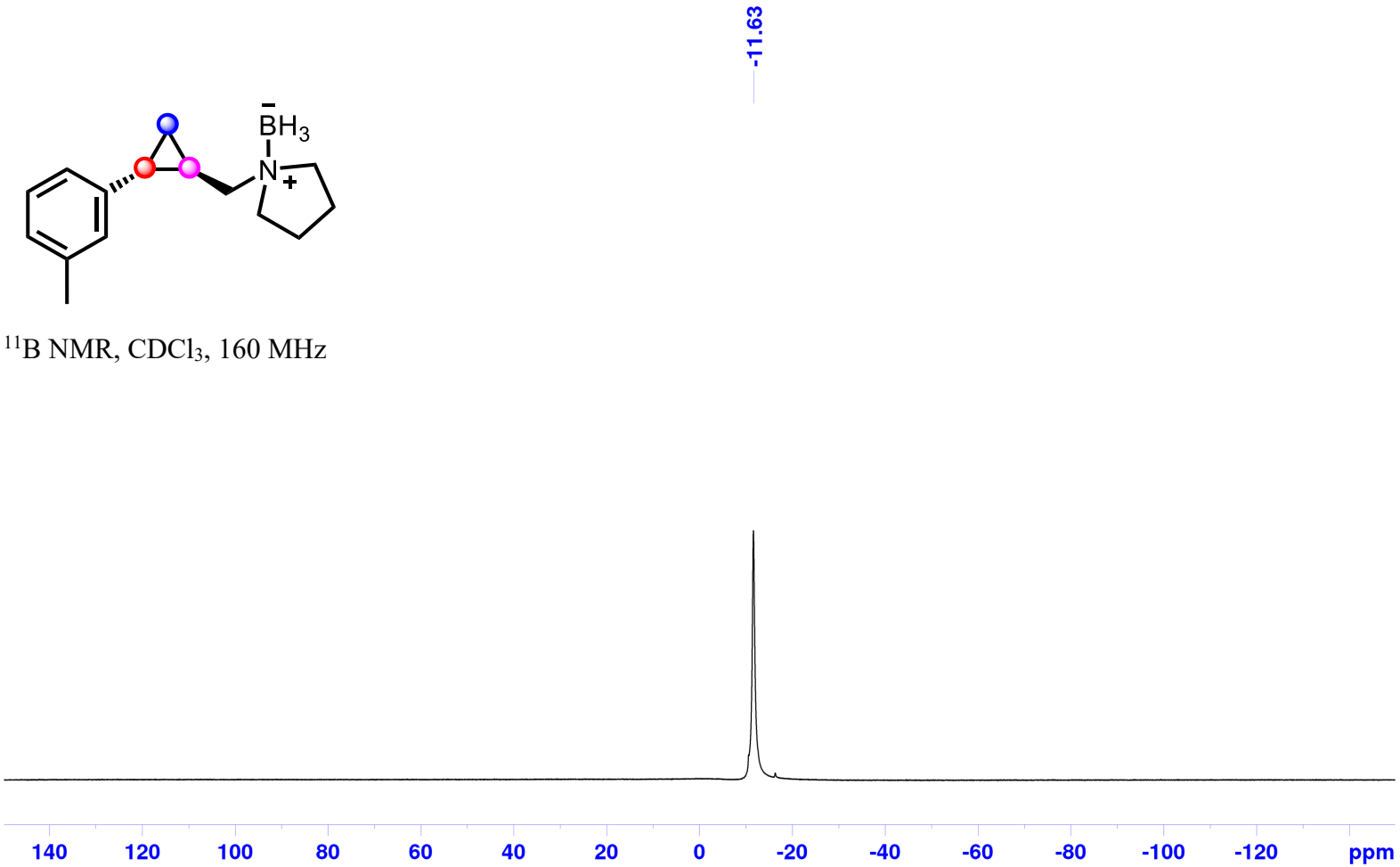
1-((2-(*m*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1p):

^{11}B NMR, $CDCl_3$, 160 MHz

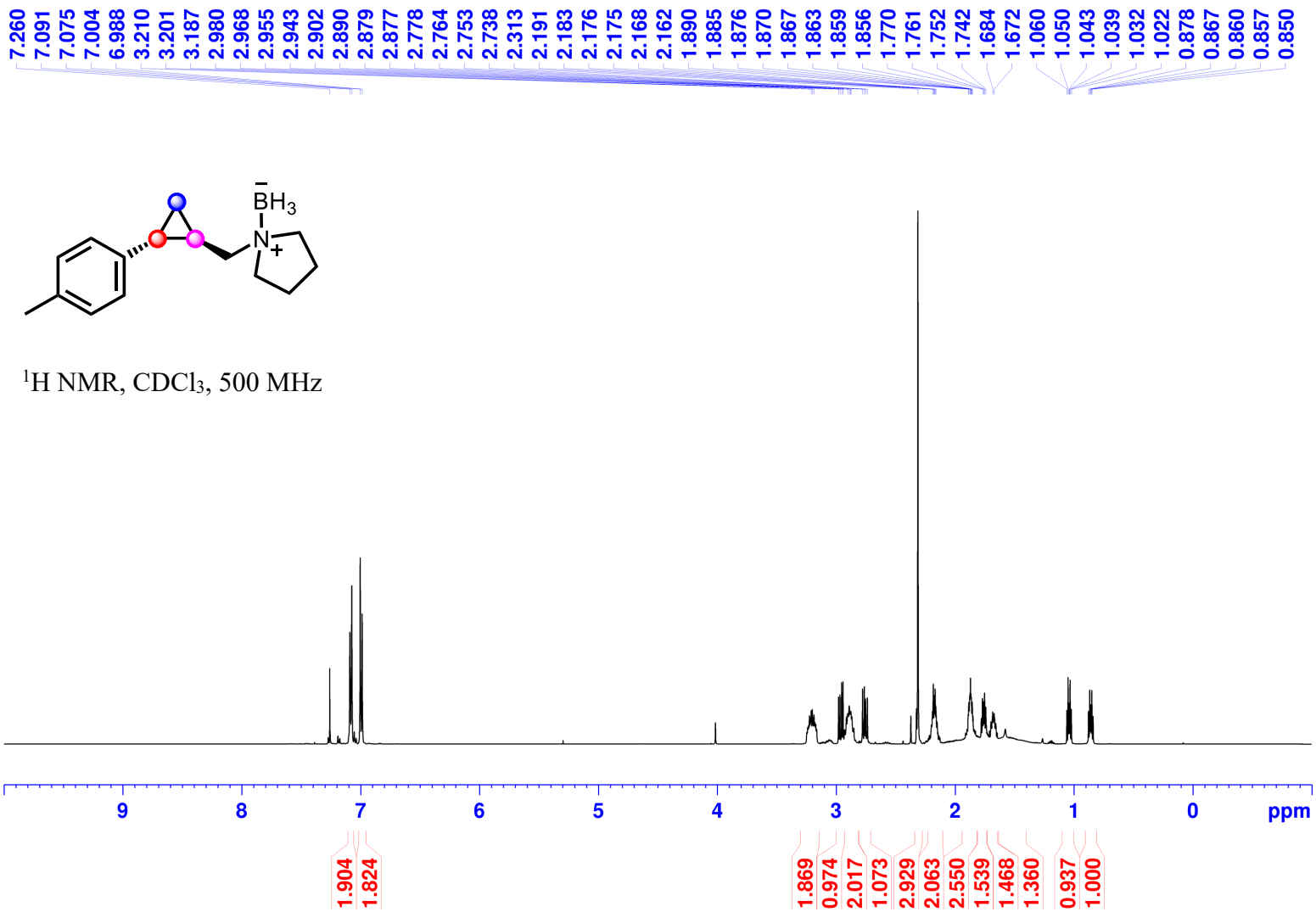


1-((2-(*m*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1p):

^{11}B NMR, $CDCl_3$, 160 MHz

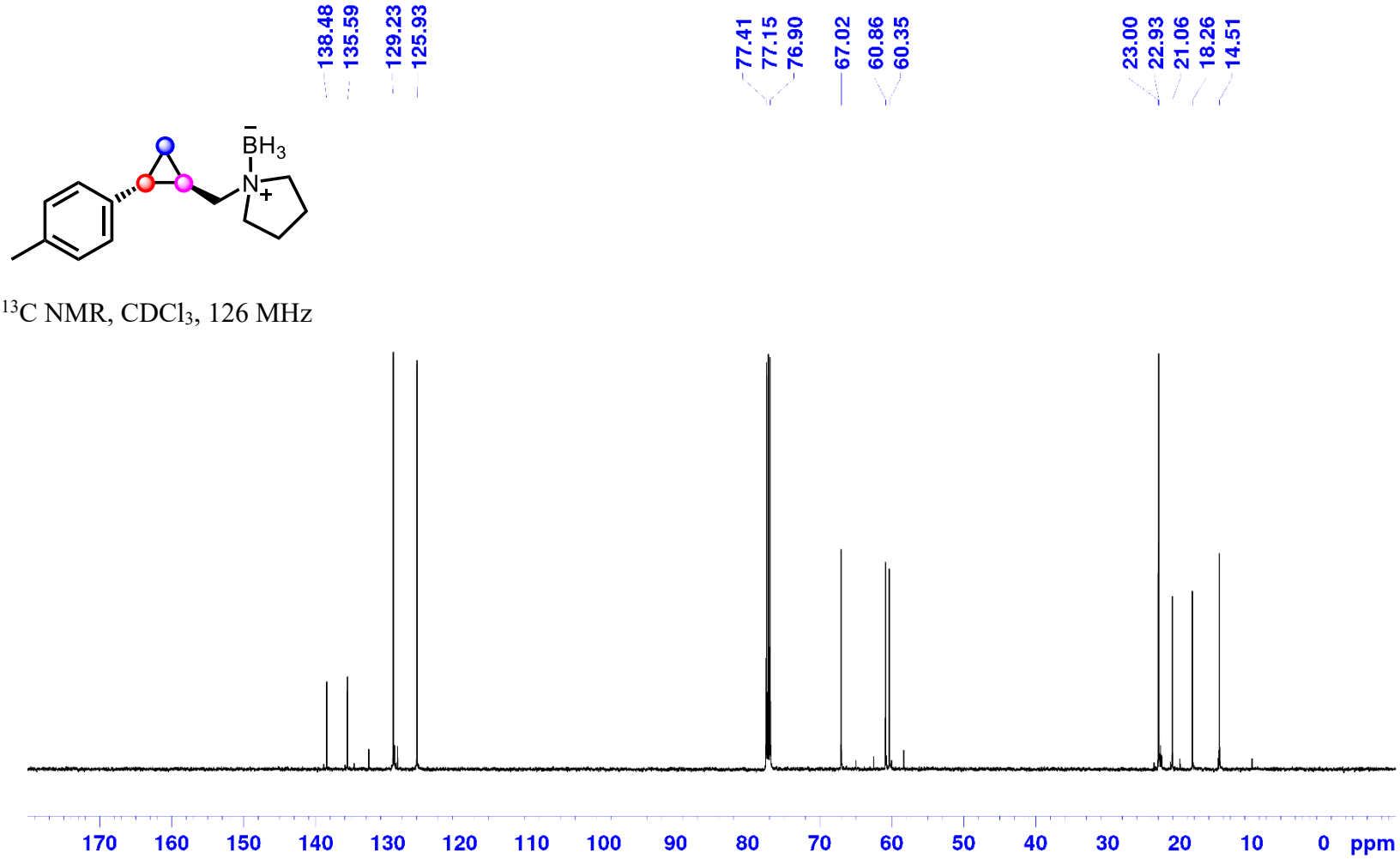


1-((2-(*p*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1q):



^{1}H NMR, $CDCl_3$, 500 MHz

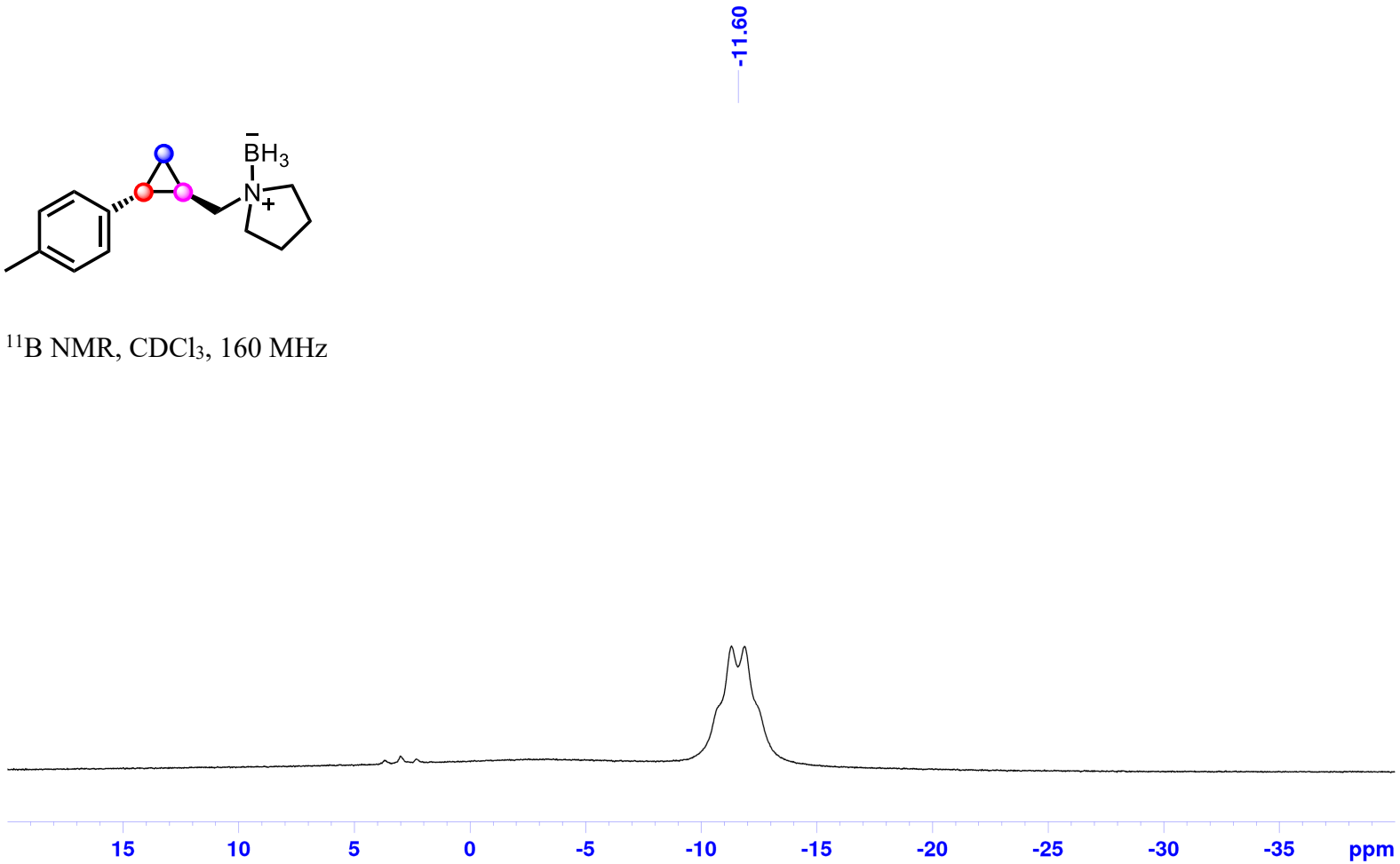
1-((2-(*p*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1q):



^{13}C NMR, $CDCl_3$, 126 MHz

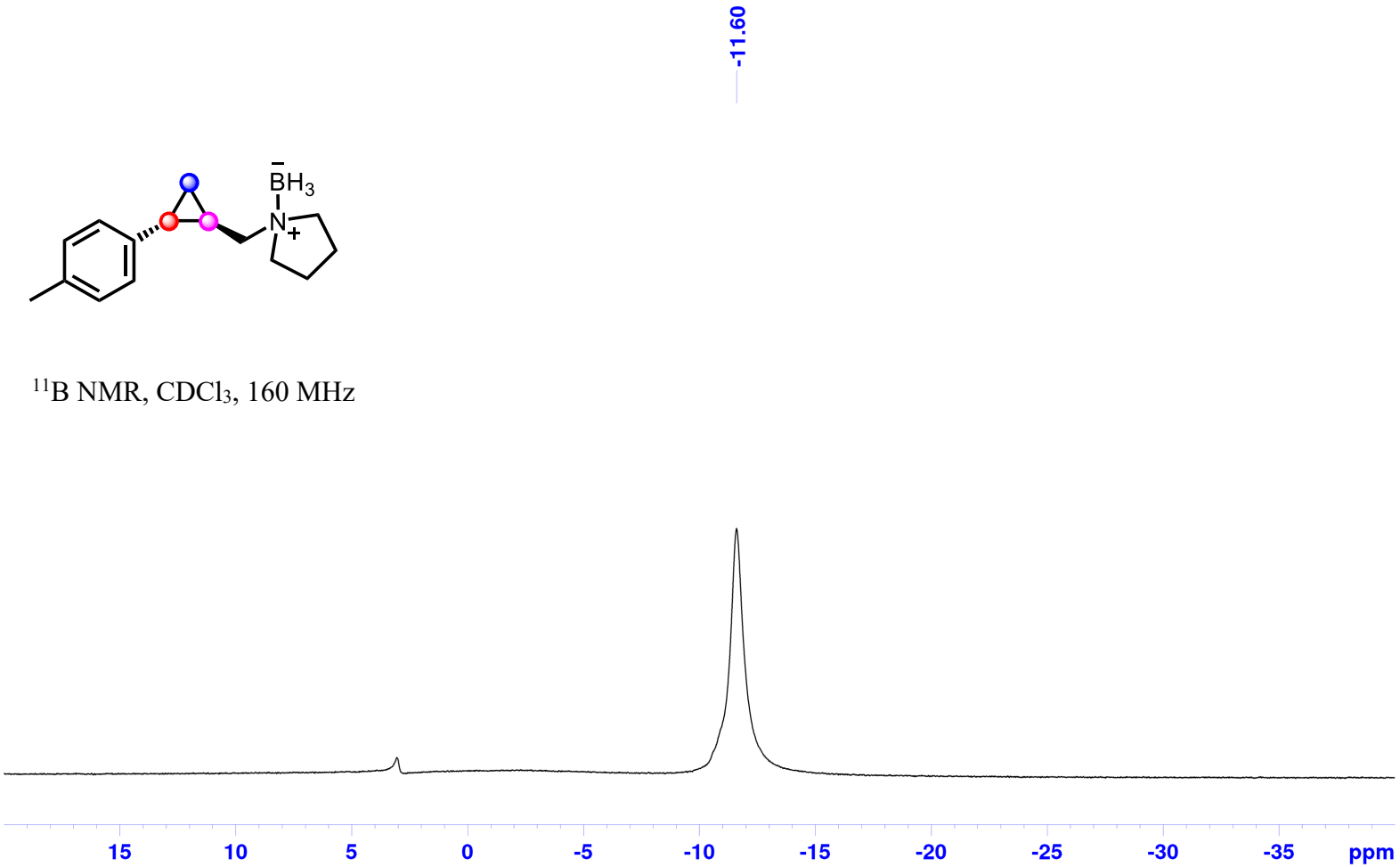
1-((2-(*p*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1q):

^{11}B NMR, $CDCl_3$, 160 MHz

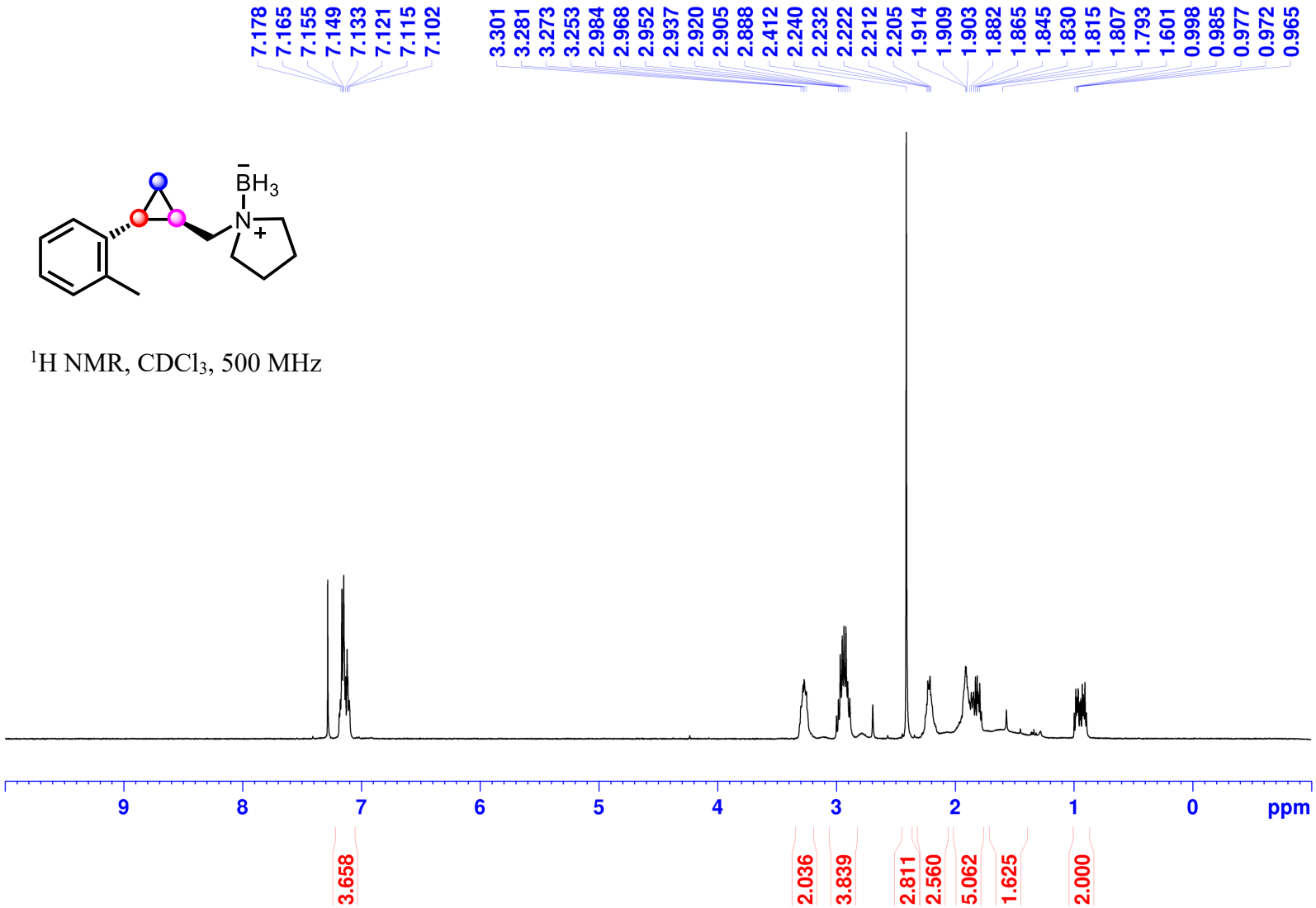


1-((2-(*p*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1q):

^{11}B NMR, $CDCl_3$, 160 MHz

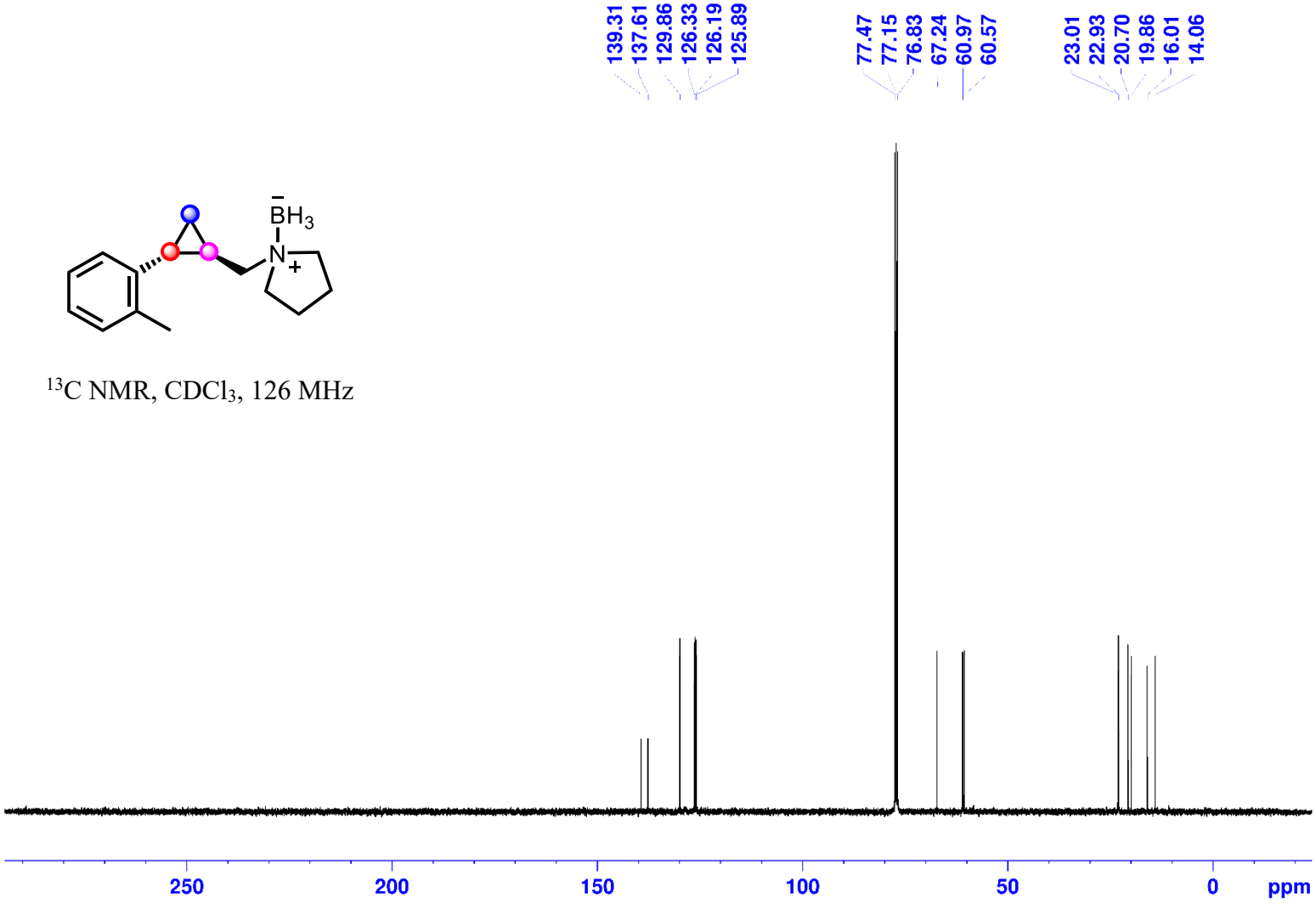


1-((2-(*o*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1r):



^{1}H NMR, $CDCl_3$, 500 MHz

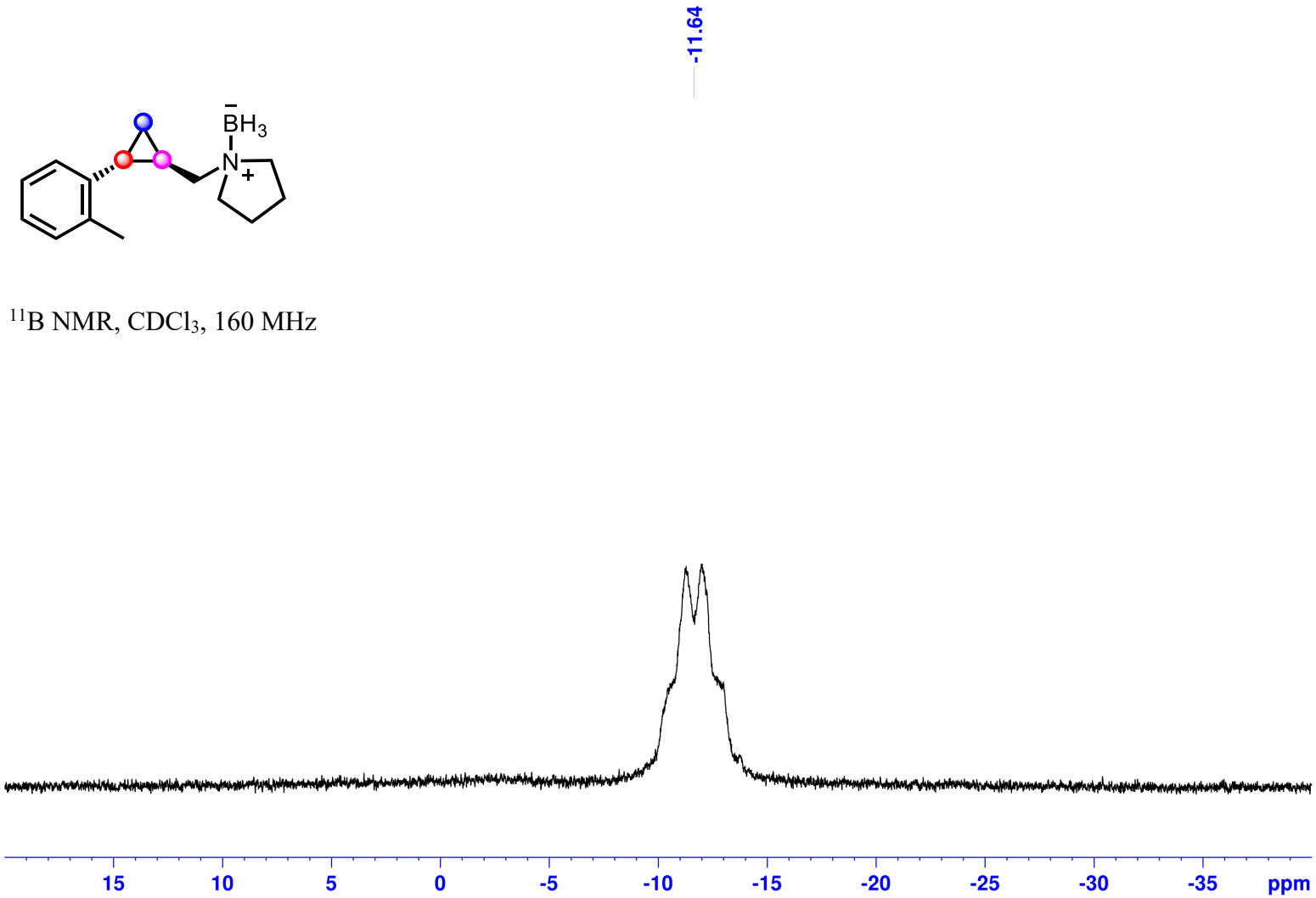
1-((2-(*o*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1r):



^{13}C NMR, $CDCl_3$, 126 MHz

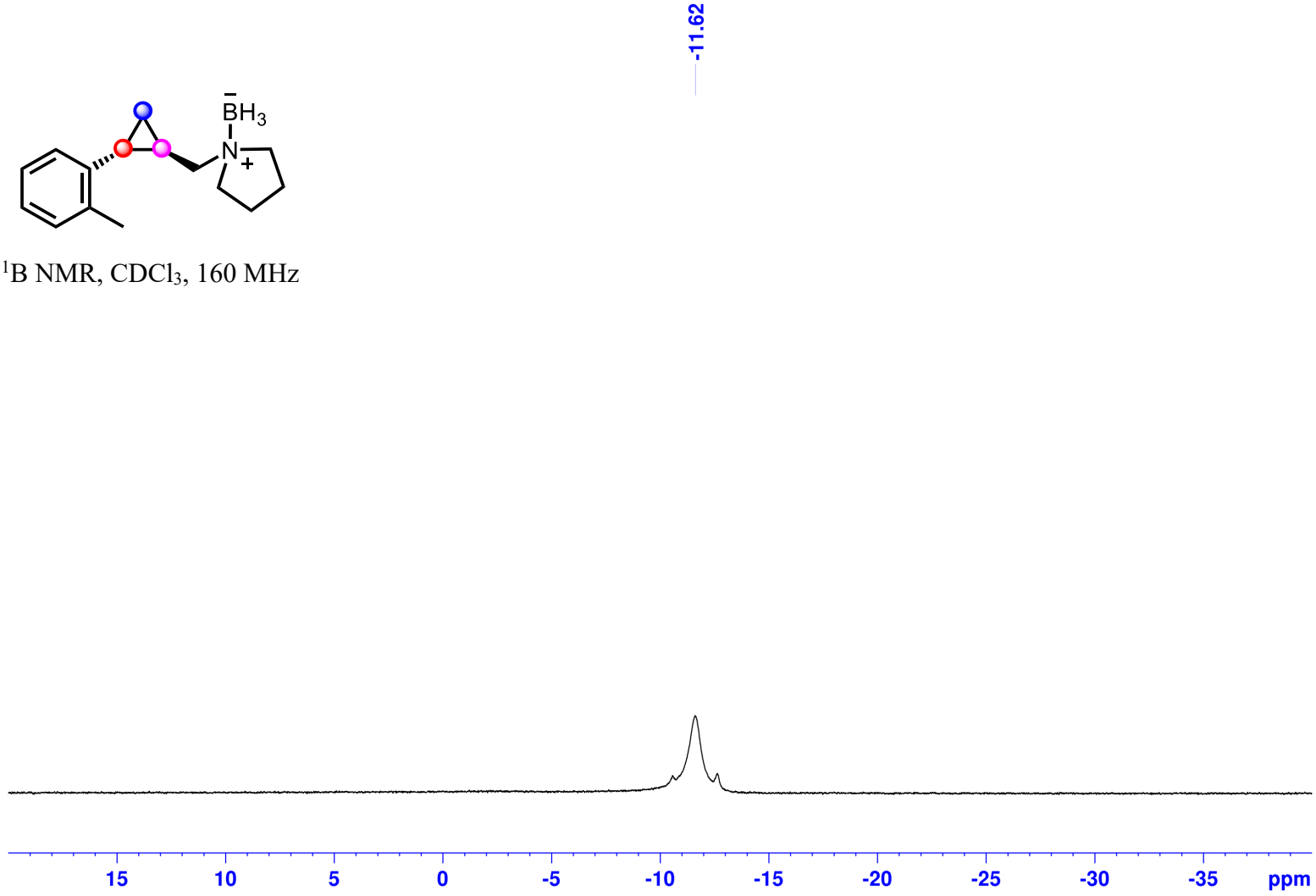
1-((2-(*o*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1r):

^{11}B NMR, $CDCl_3$, 160 MHz

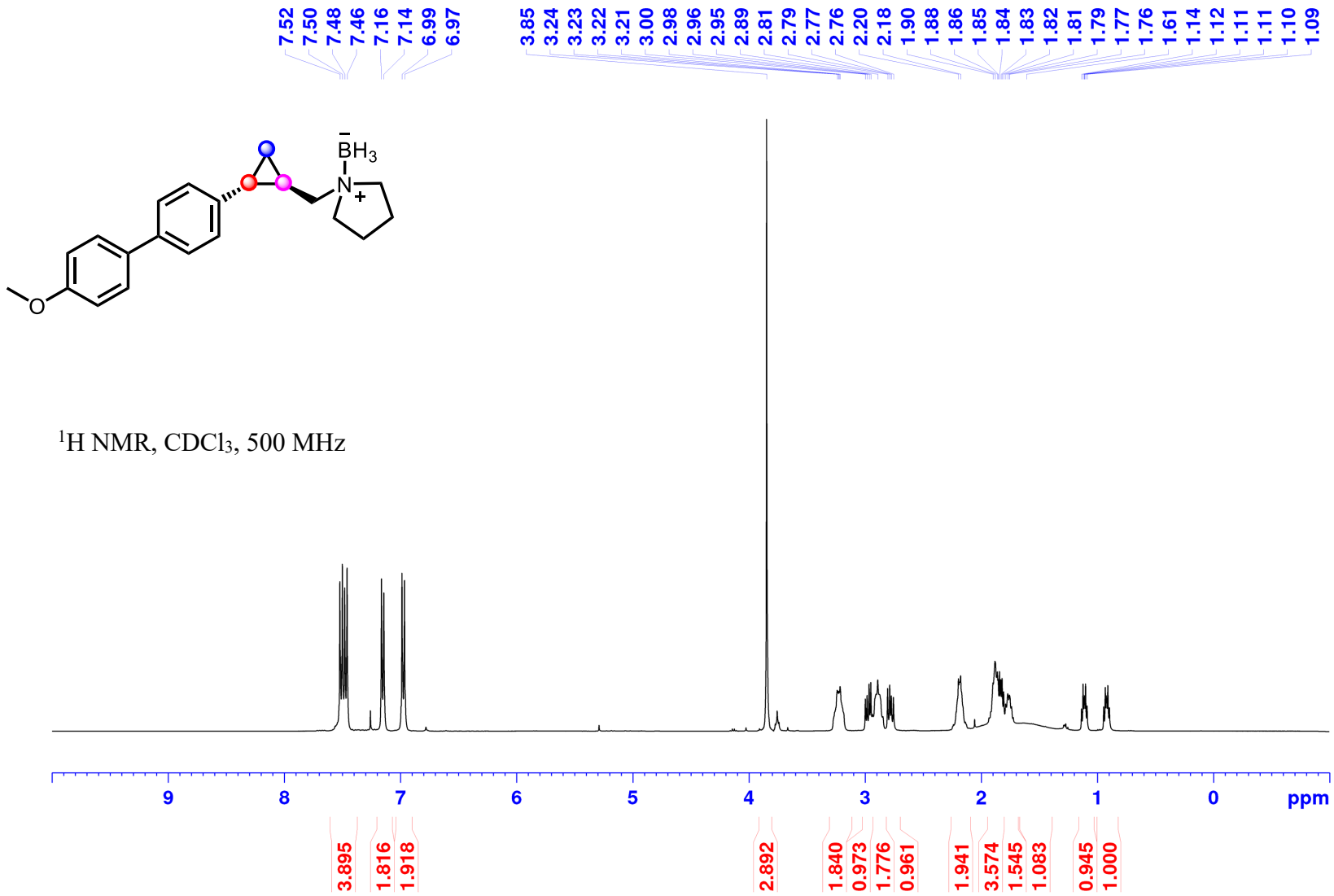


1-((2-(*o*-Tolyl)cyclopropyl)methyl)pyrrolidine Borane (1r):

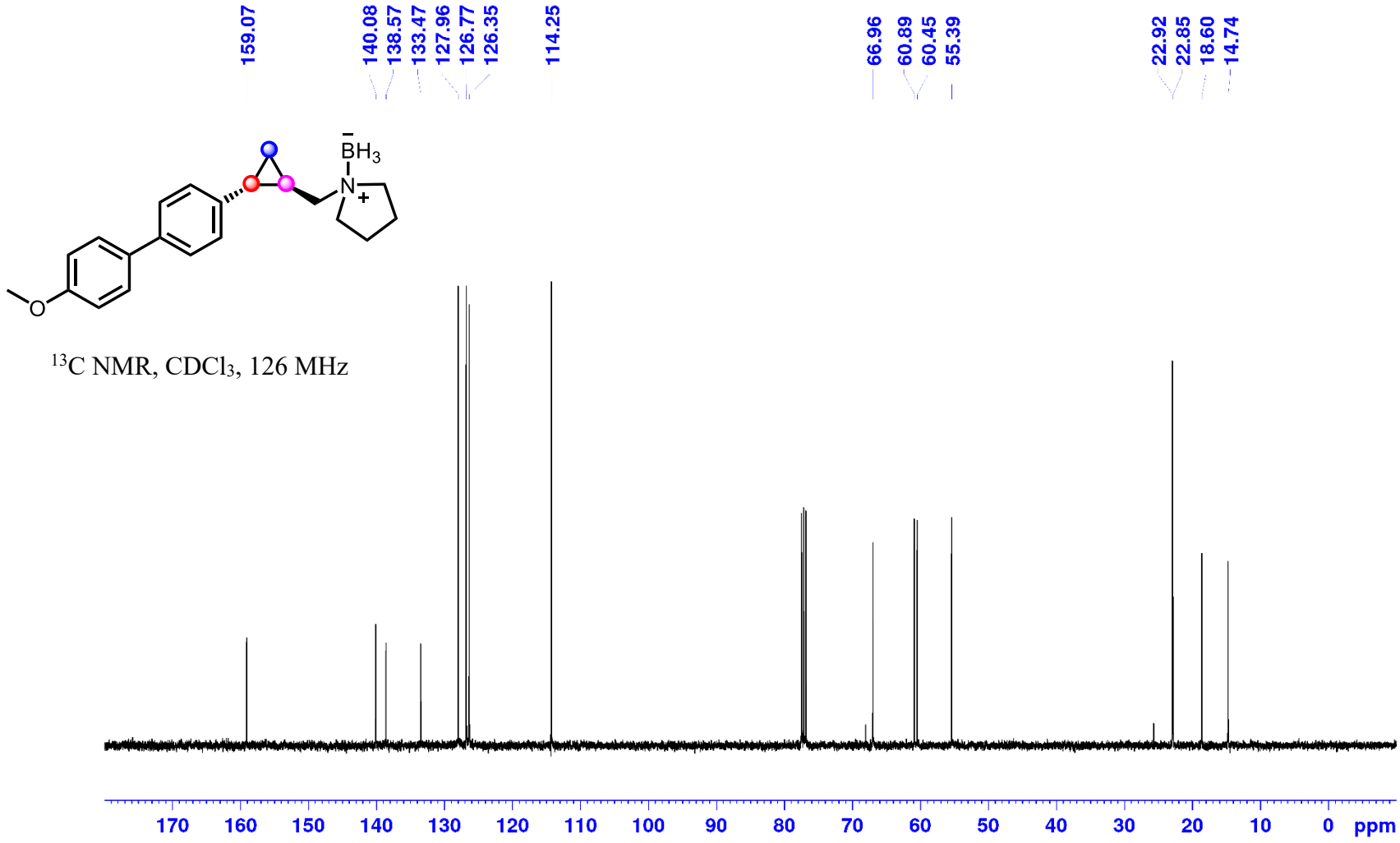
^{11}B NMR, $CDCl_3$, 160 MHz



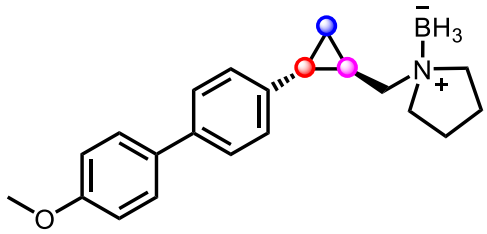
1-((2-(4'-Methoxy-[1,1'-biphenyl]-4-yl)cyclopropyl)methyl)pyrrolidine Borane (1s):



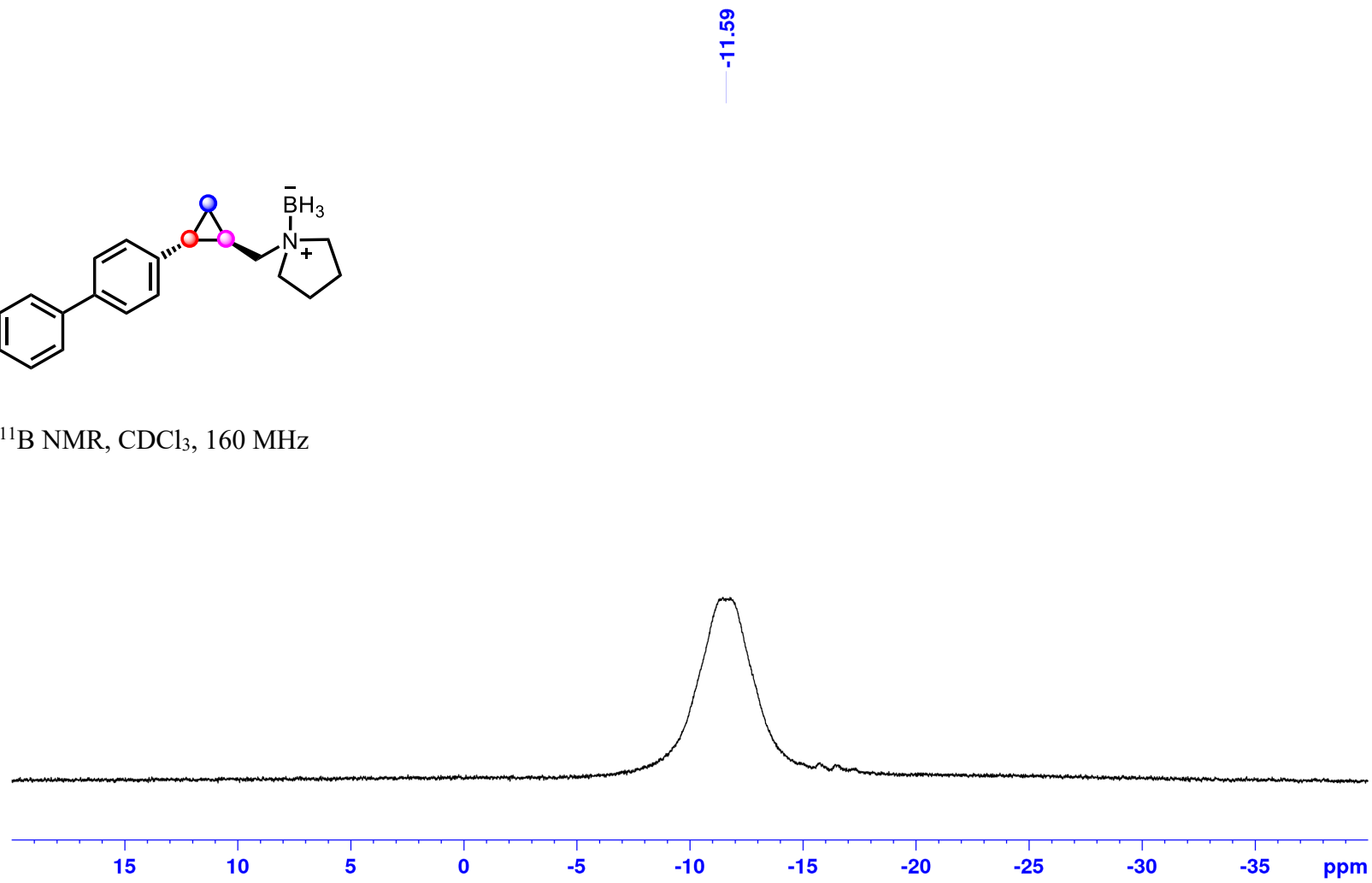
1-((2-(4'-Methoxy-[1,1'-biphenyl]-4-yl)cyclopropyl)methyl)pyrrolidine Borane (1s):



1-((2-(4'-Methoxy-[1,1'-biphenyl]-4-yl)cyclopropyl)methyl)pyrrolidine Borane (1s):

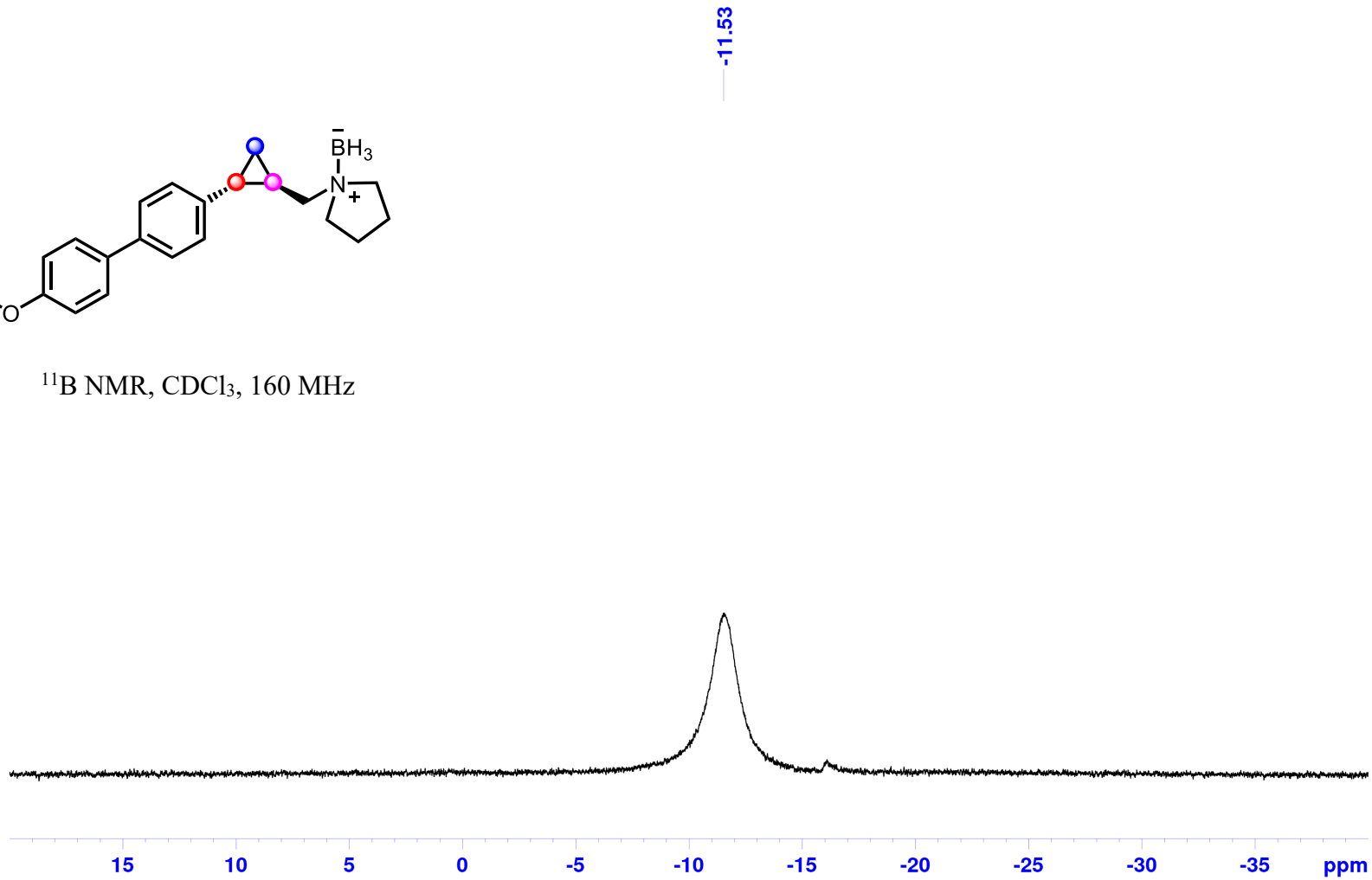


^{11}B NMR, $CDCl_3$, 160 MHz

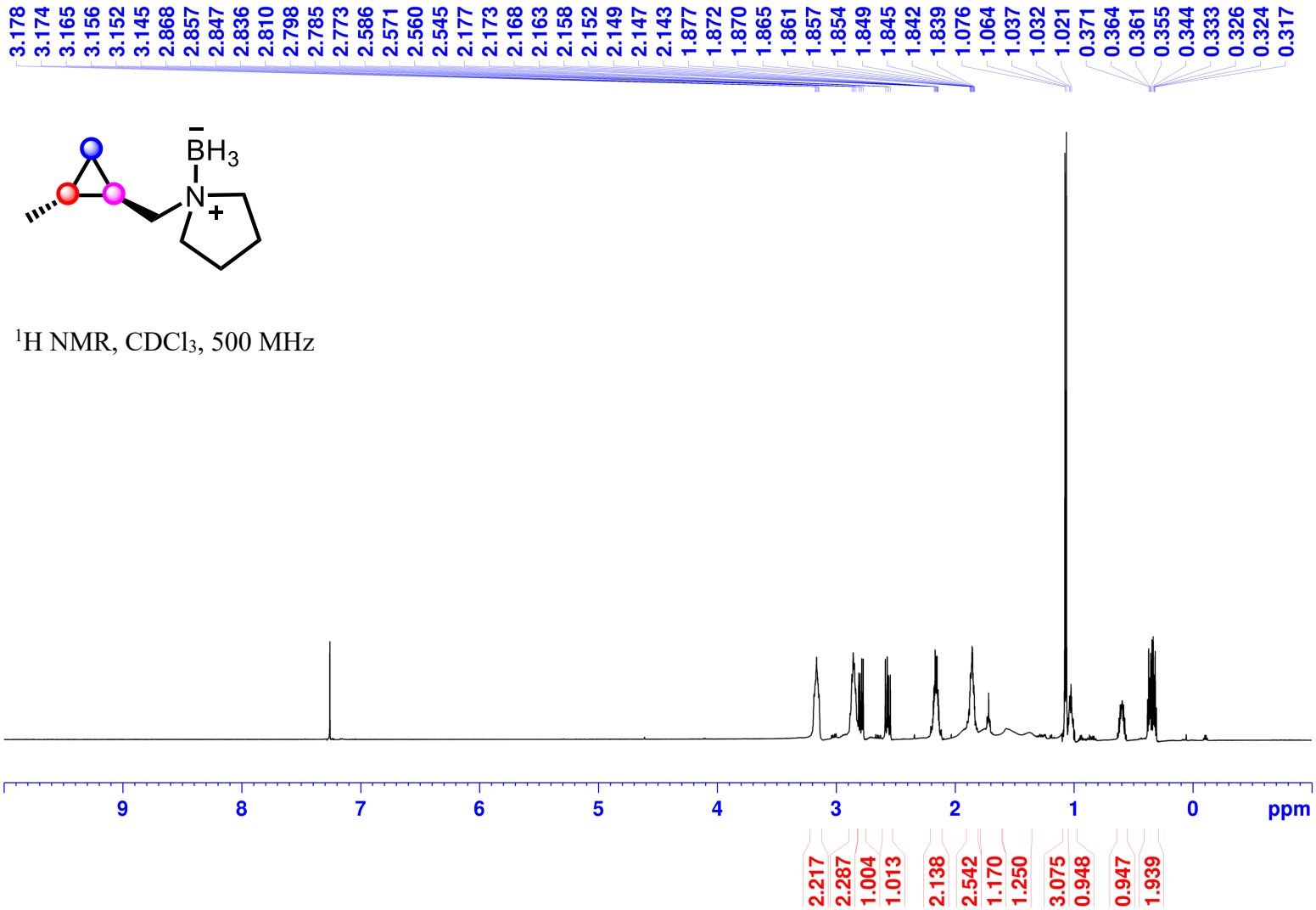


1-((2-(4'-Methoxy-[1,1'-biphenyl]-4-yl)cyclopropyl)methyl)pyrrolidine Borane (1s):

^{11}B NMR, $CDCl_3$, 160 MHz



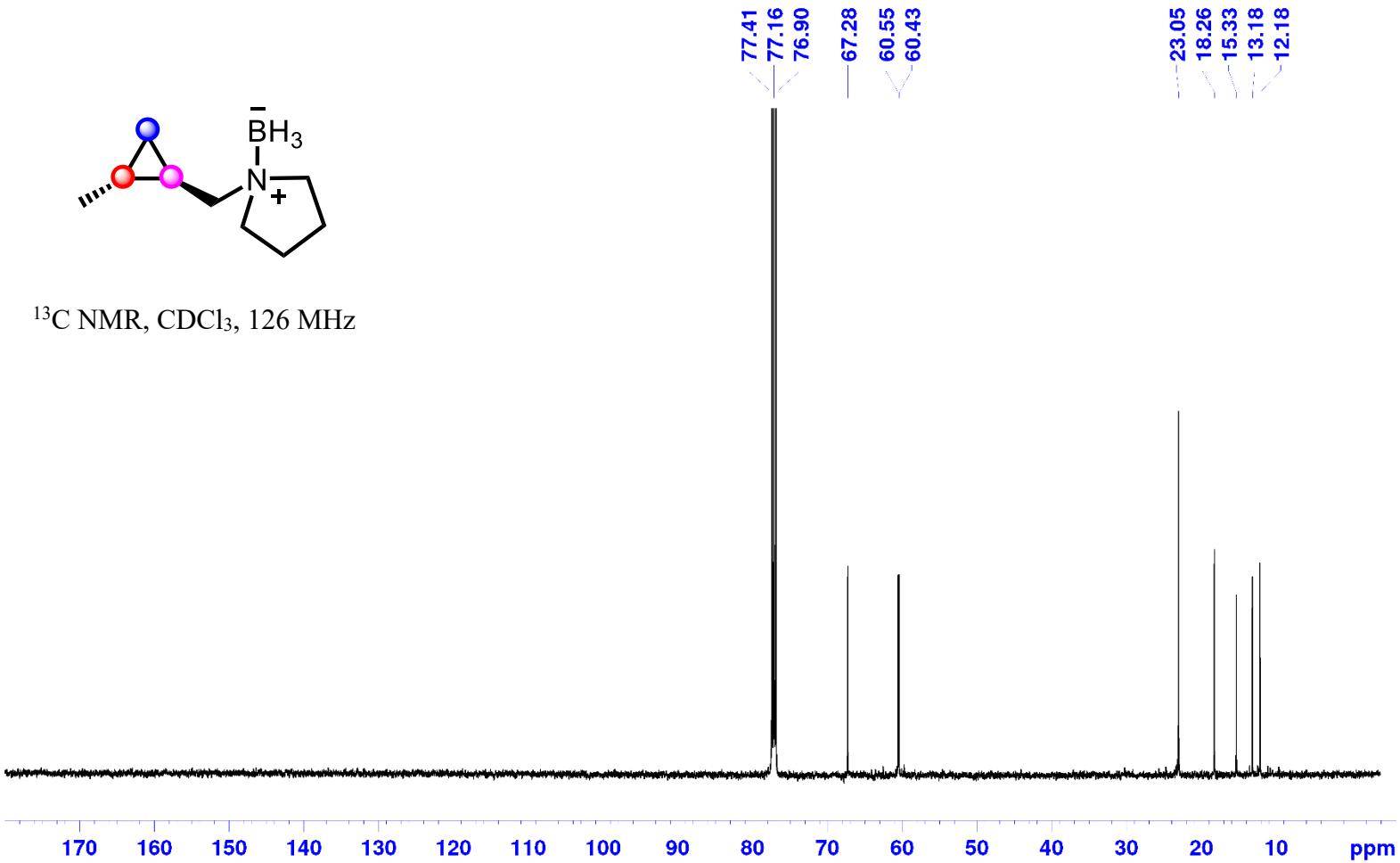
1-((2-Methylcyclopropyl)methyl)pyrrolidine Borane (1t):



^{1}H NMR, $CDCl_3$, 500 MHz

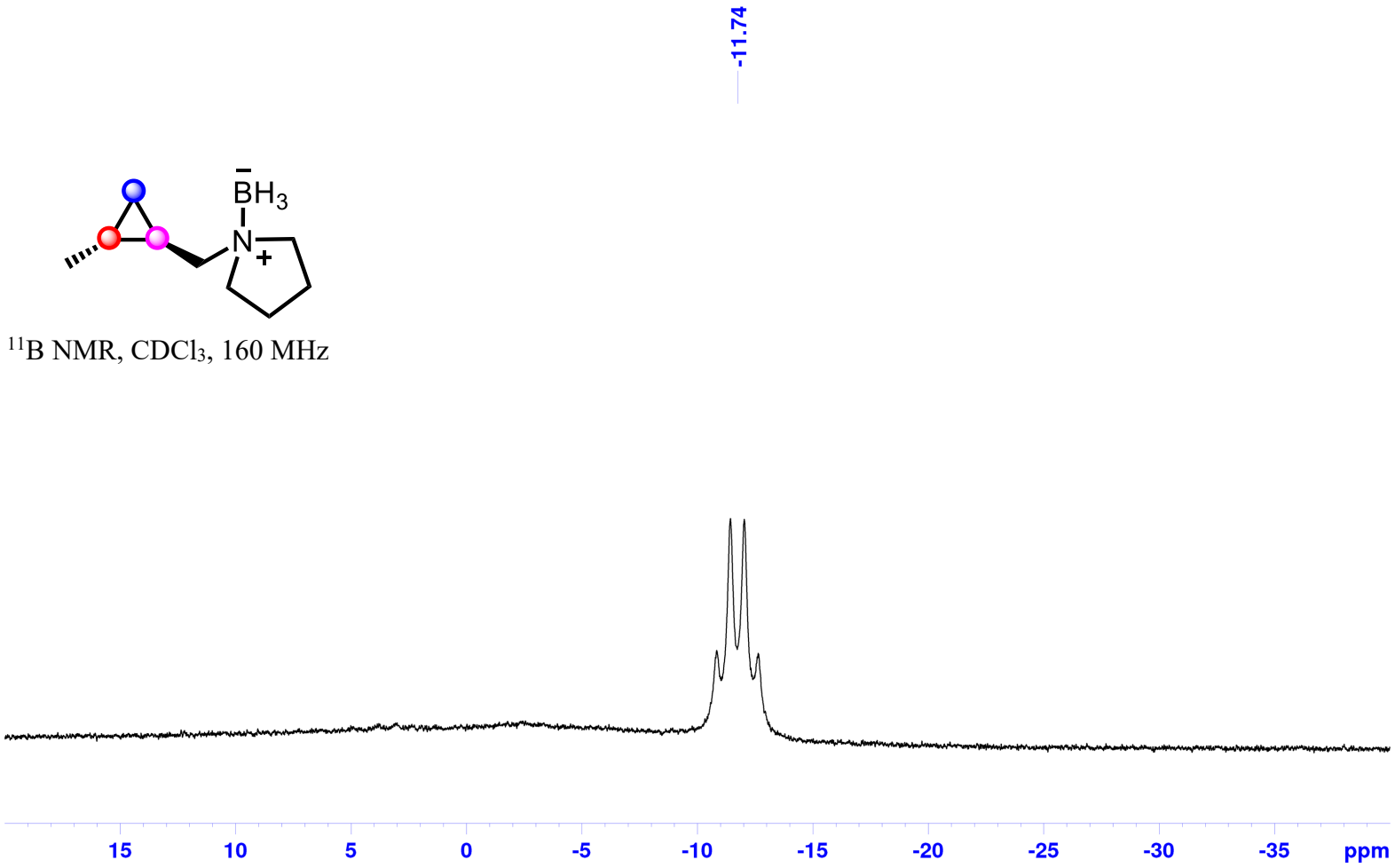
1-((2-Methylcyclopropyl)methyl)pyrrolidine Borane (1t):

^{13}C NMR, $CDCl_3$, 126 MHz



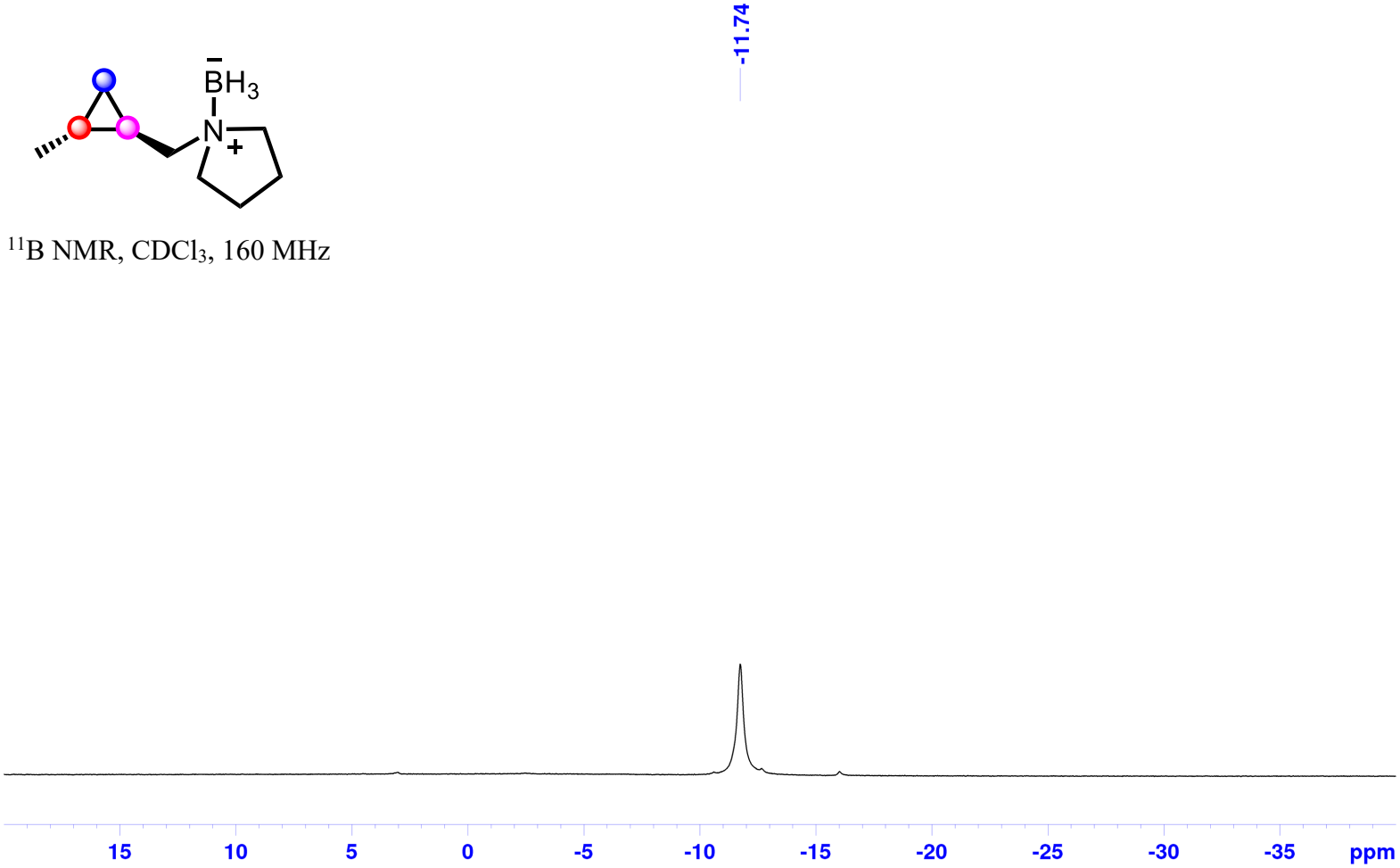
1-((2-Methylcyclopropyl)methyl)pyrrolidine Borane (1t):

^{11}B NMR, $CDCl_3$, 160 MHz

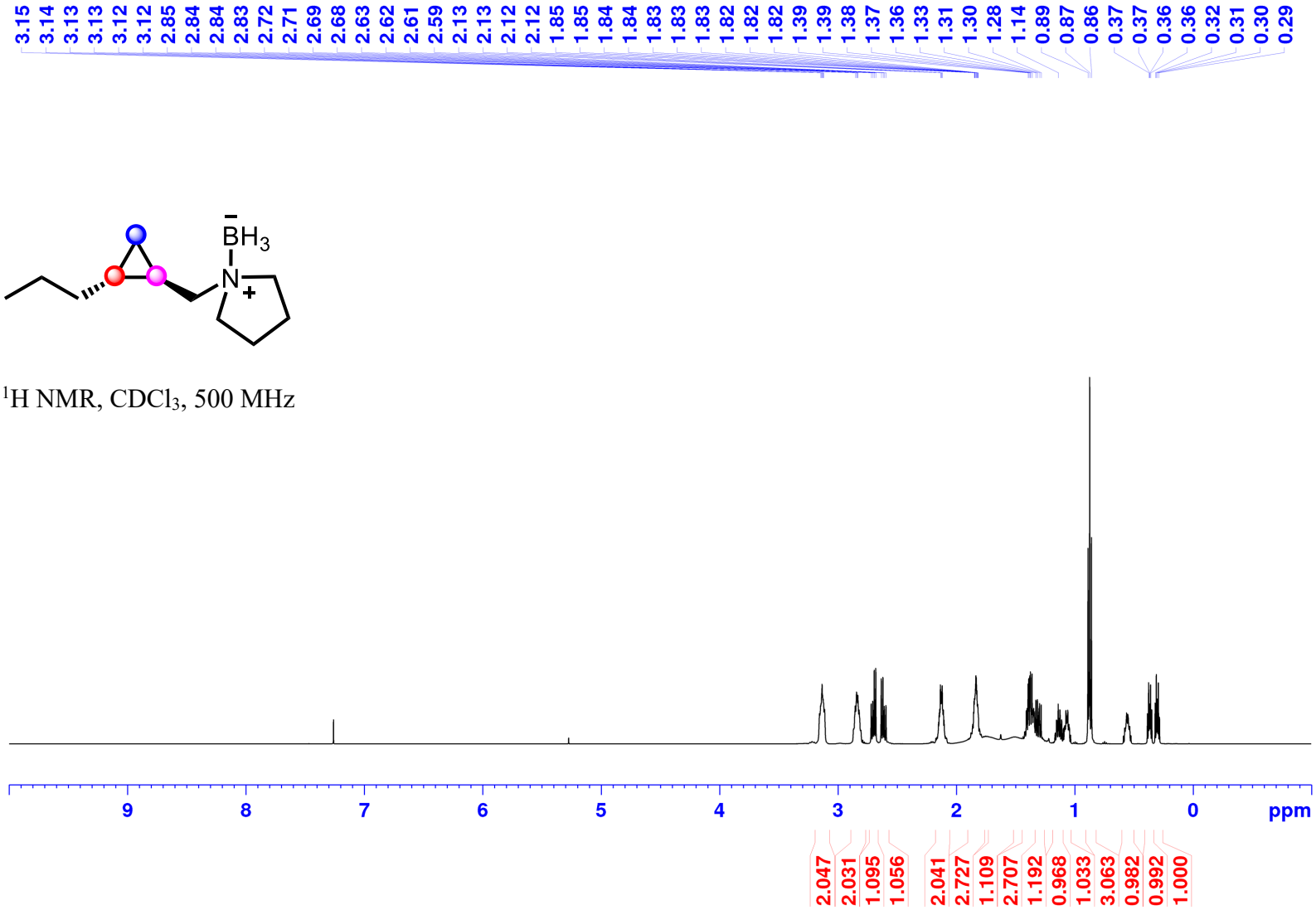


1-((2-Methylcyclopropyl)methyl)pyrrolidine Borane (1t):

^{11}B NMR, $CDCl_3$, 160 MHz



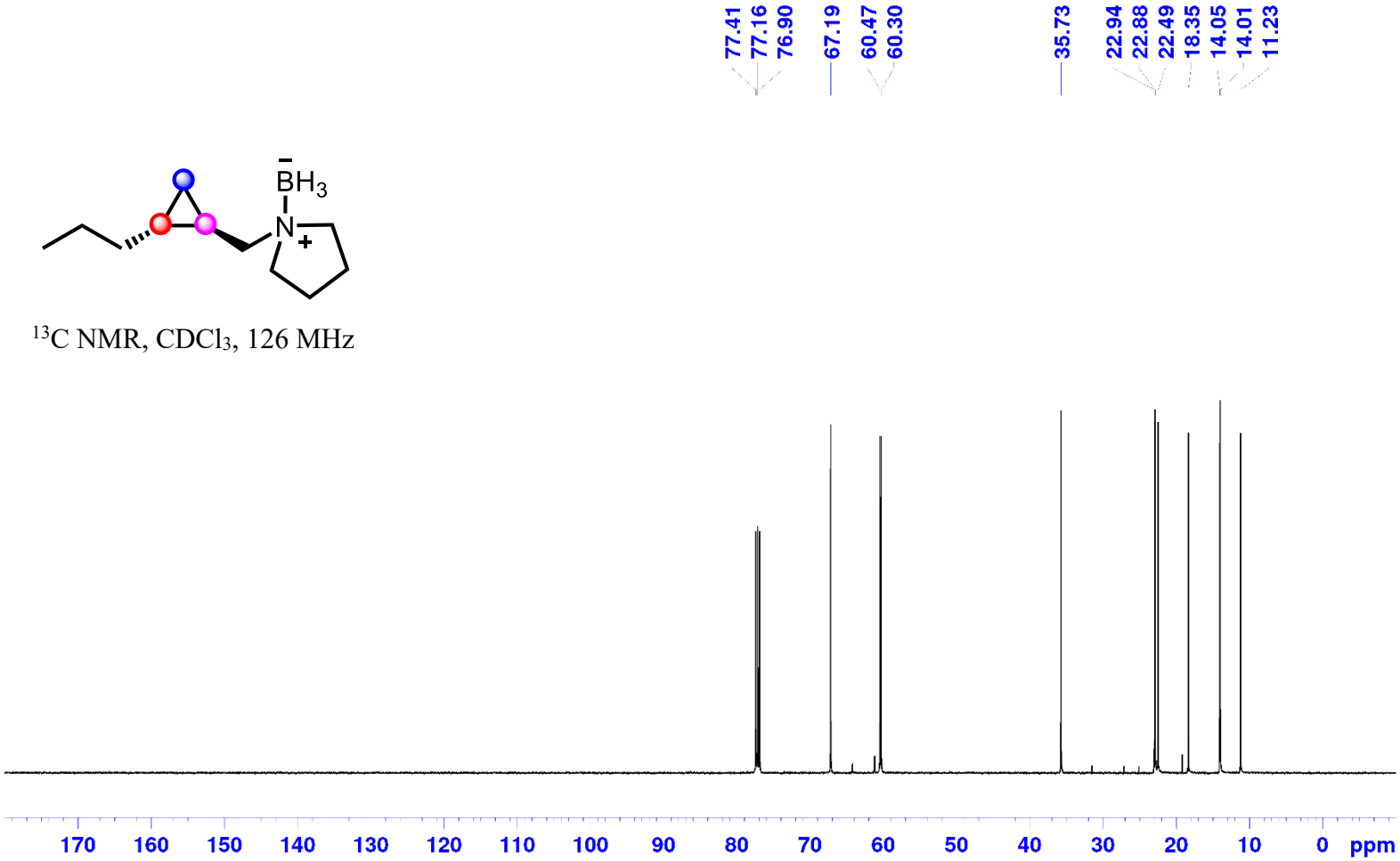
1-((2-Propylcyclopropyl)methyl)pyrrolidine Borane (1u):



^{1}H NMR, $CDCl_3$, 500 MHz

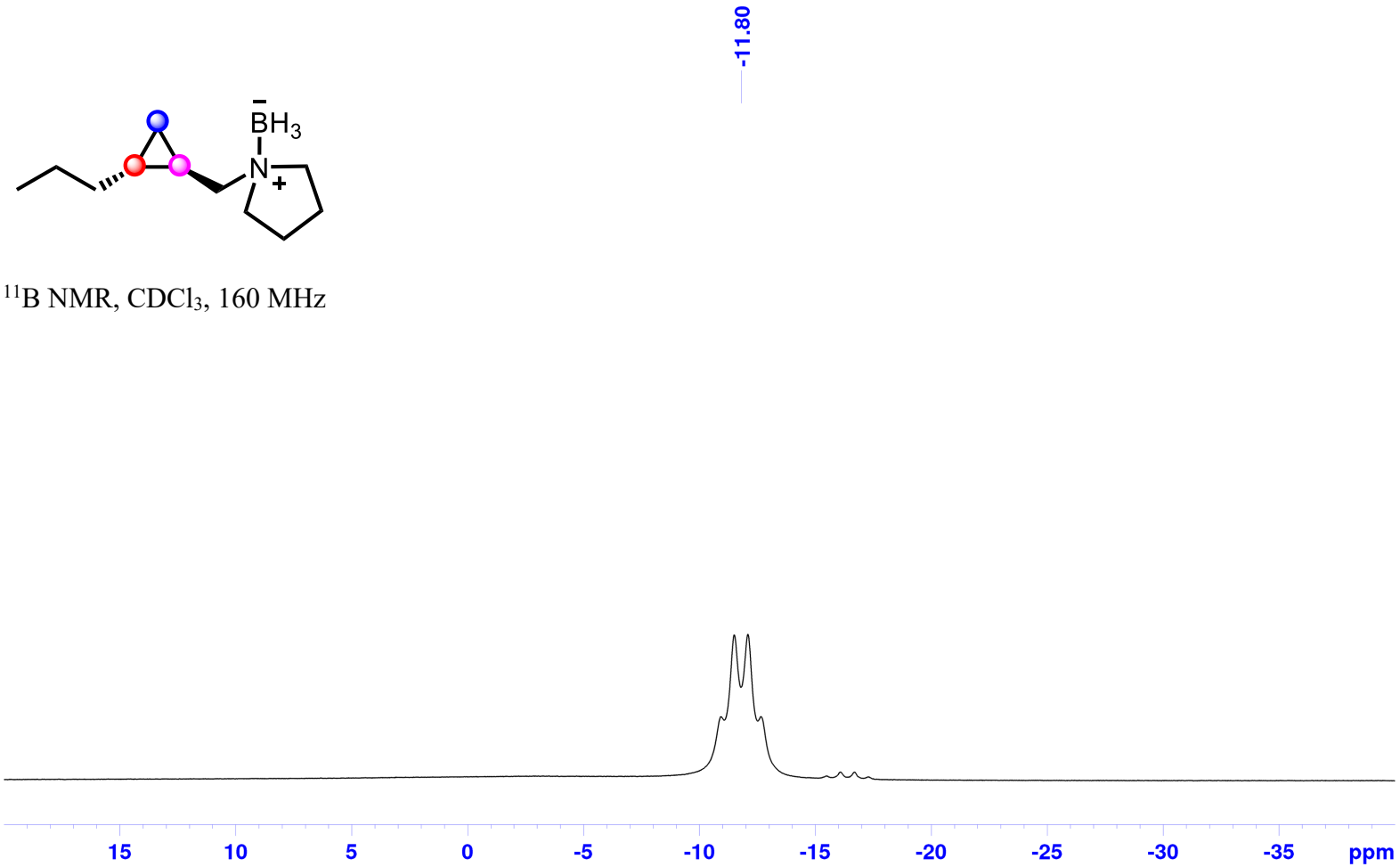
1-((2-Propylcyclopropyl)methyl)pyrrolidine Borane (1u):

^{13}C NMR, $CDCl_3$, 126 MHz



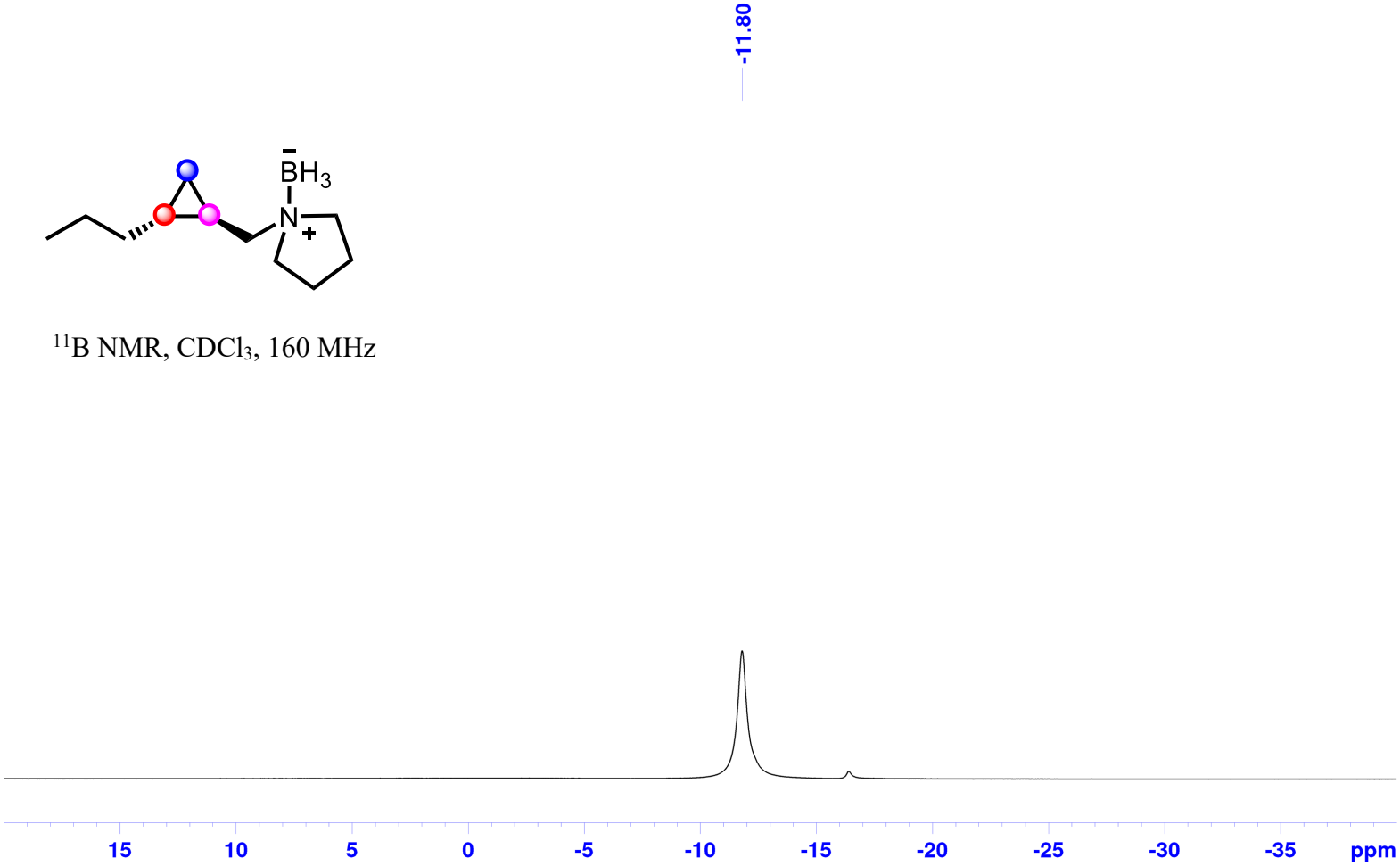
1-((2-Propylcyclopropyl)methyl)pyrrolidine Borane (1u):

^{11}B NMR, $CDCl_3$, 160 MHz

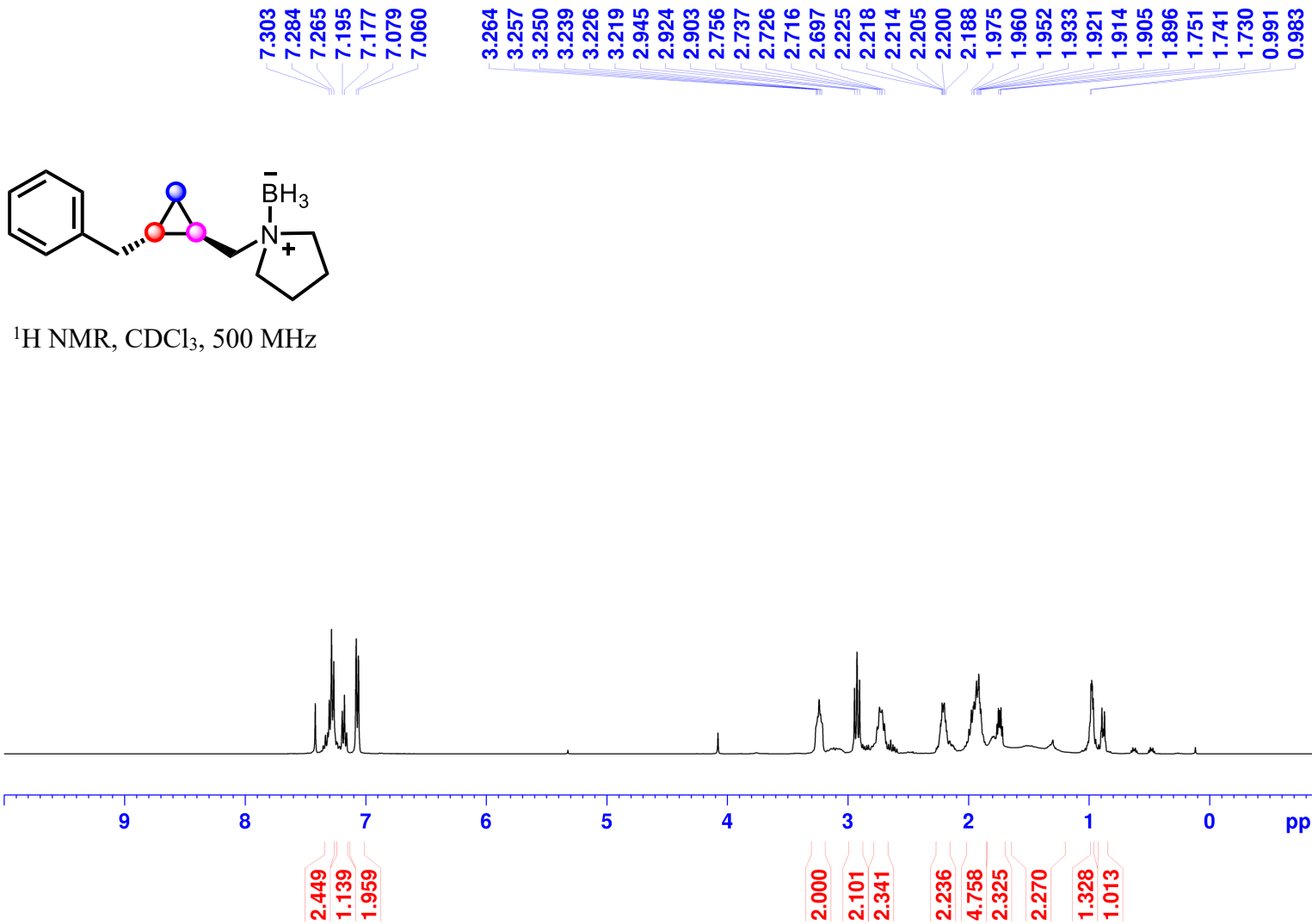


1-((2-Propylcyclopropyl)methyl)pyrrolidine Borane (1u):

^{11}B NMR, $CDCl_3$, 160 MHz

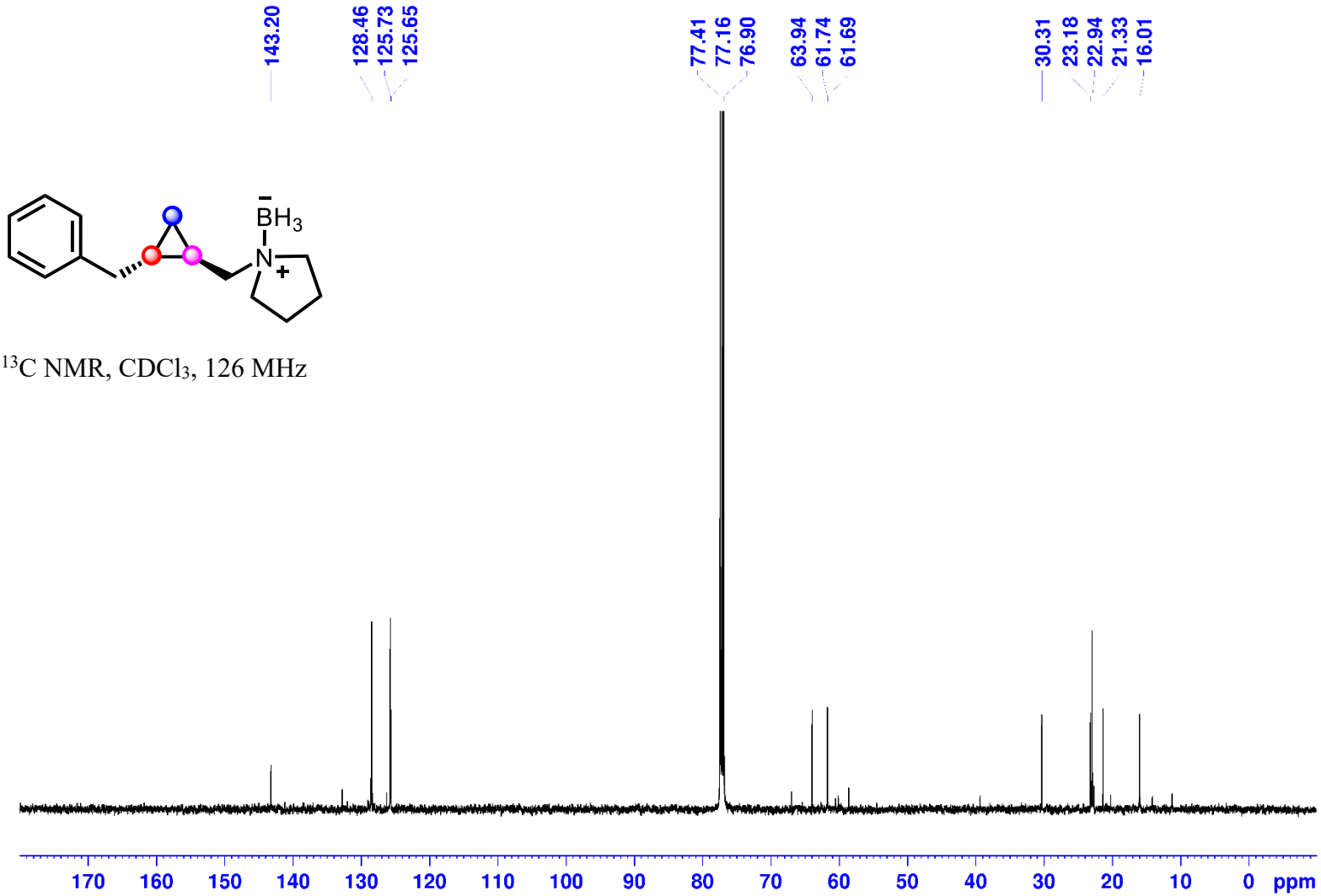


1-((2-Benzylcyclopropyl)methyl)pyrrolidine Borane (1v):



^{1}H NMR, $CDCl_3$, 500 MHz

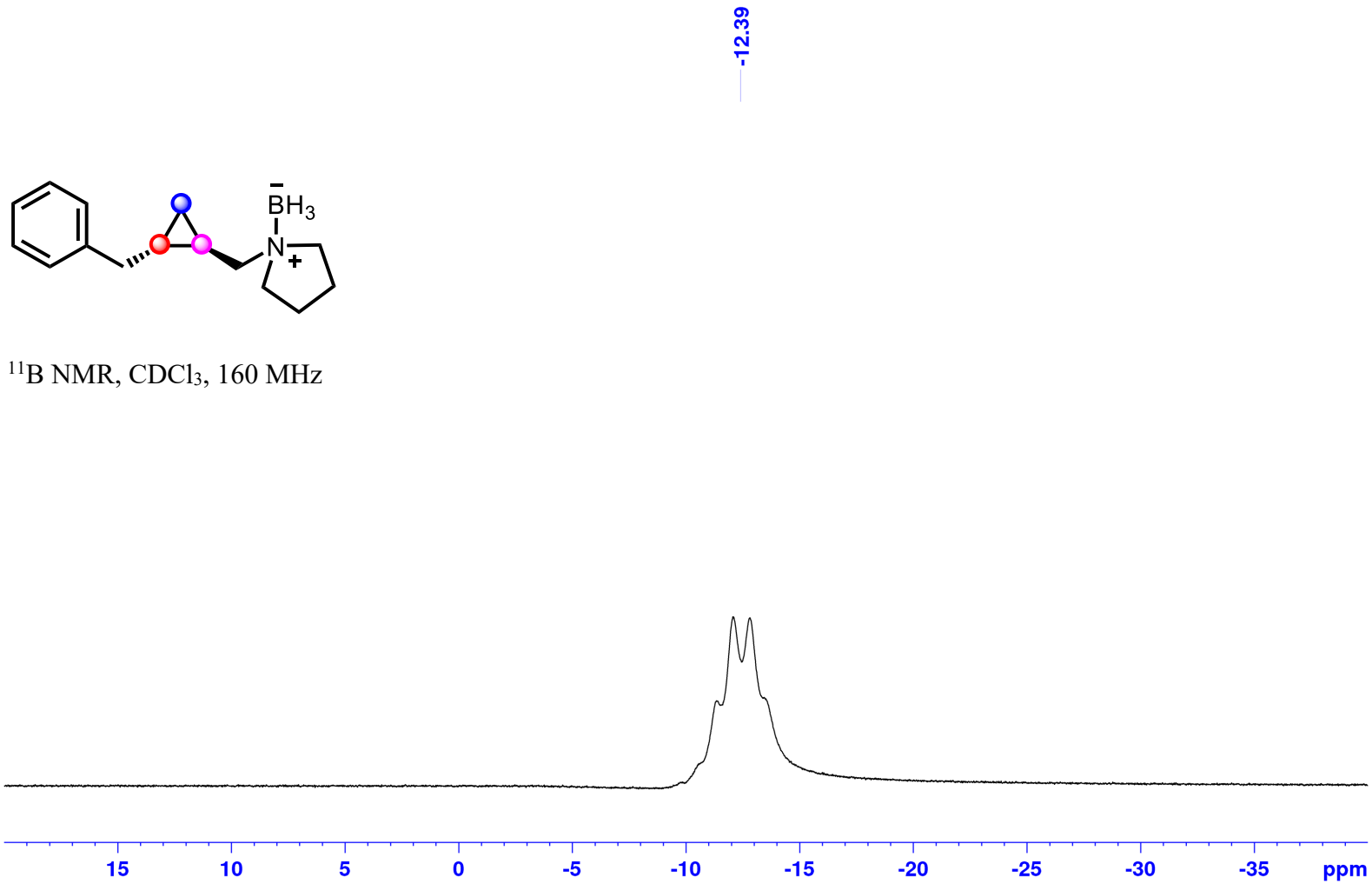
1-((2-Benzylcyclopropyl)methyl)pyrrolidine Borane (1v):



^{13}C NMR, $CDCl_3$, 126 MHz

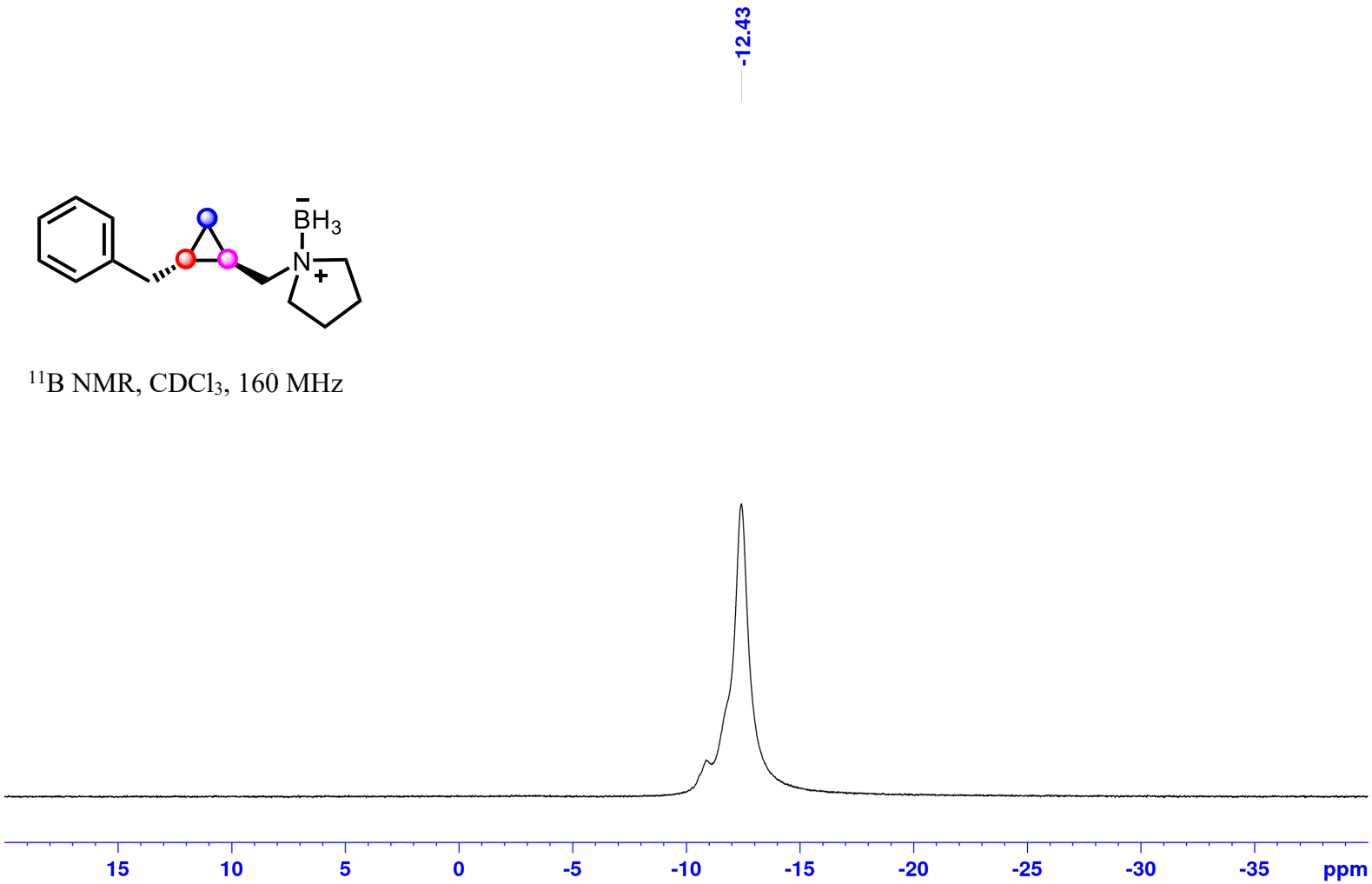
1-((2-Benzylcyclopropyl)methyl)pyrrolidine Borane (1v):

^{11}B NMR, $CDCl_3$, 160 MHz



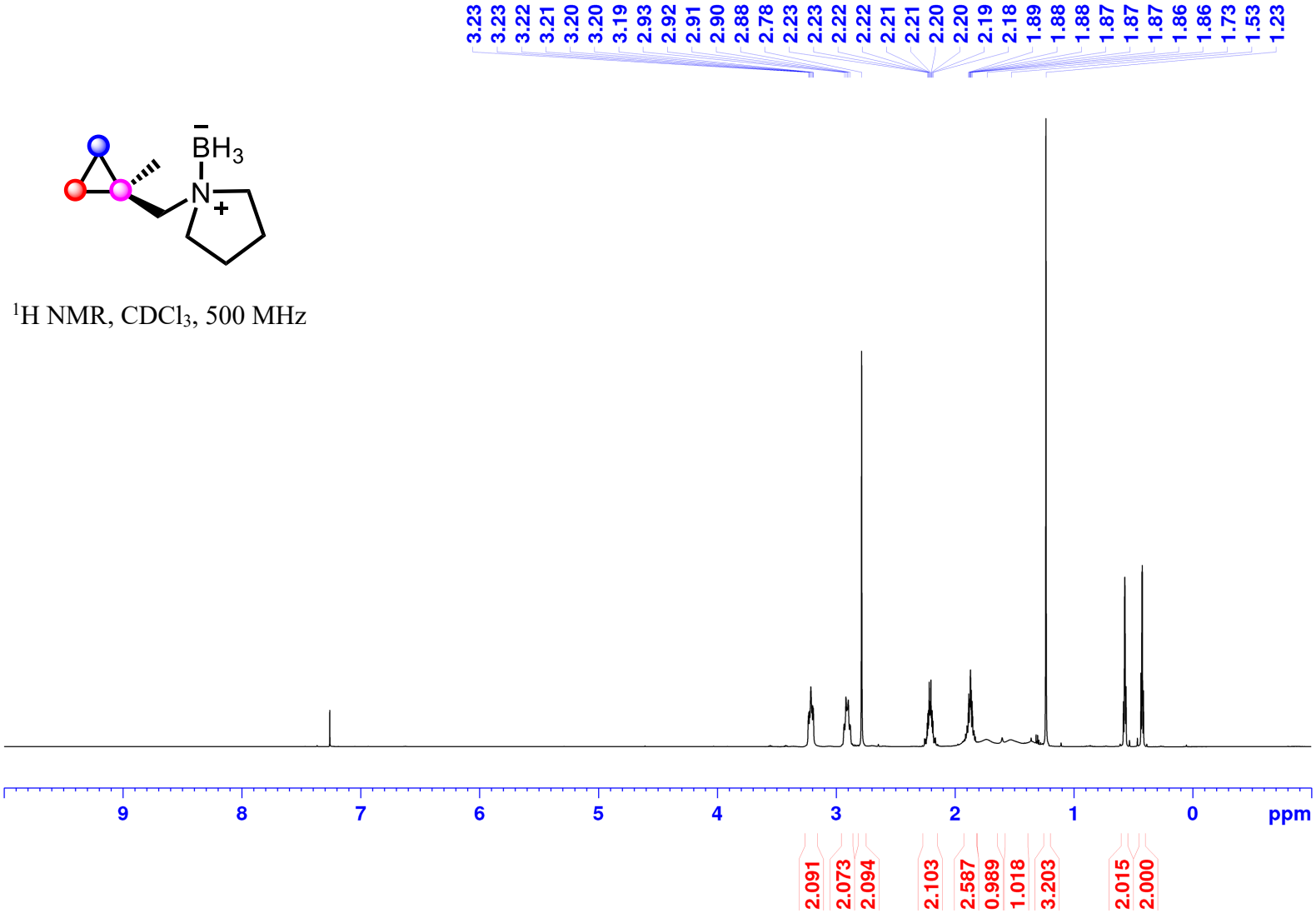
1-((2-Benzylcyclopropyl)methyl)pyrrolidine Borane (1v):

^{11}B NMR, $CDCl_3$, 160 MHz

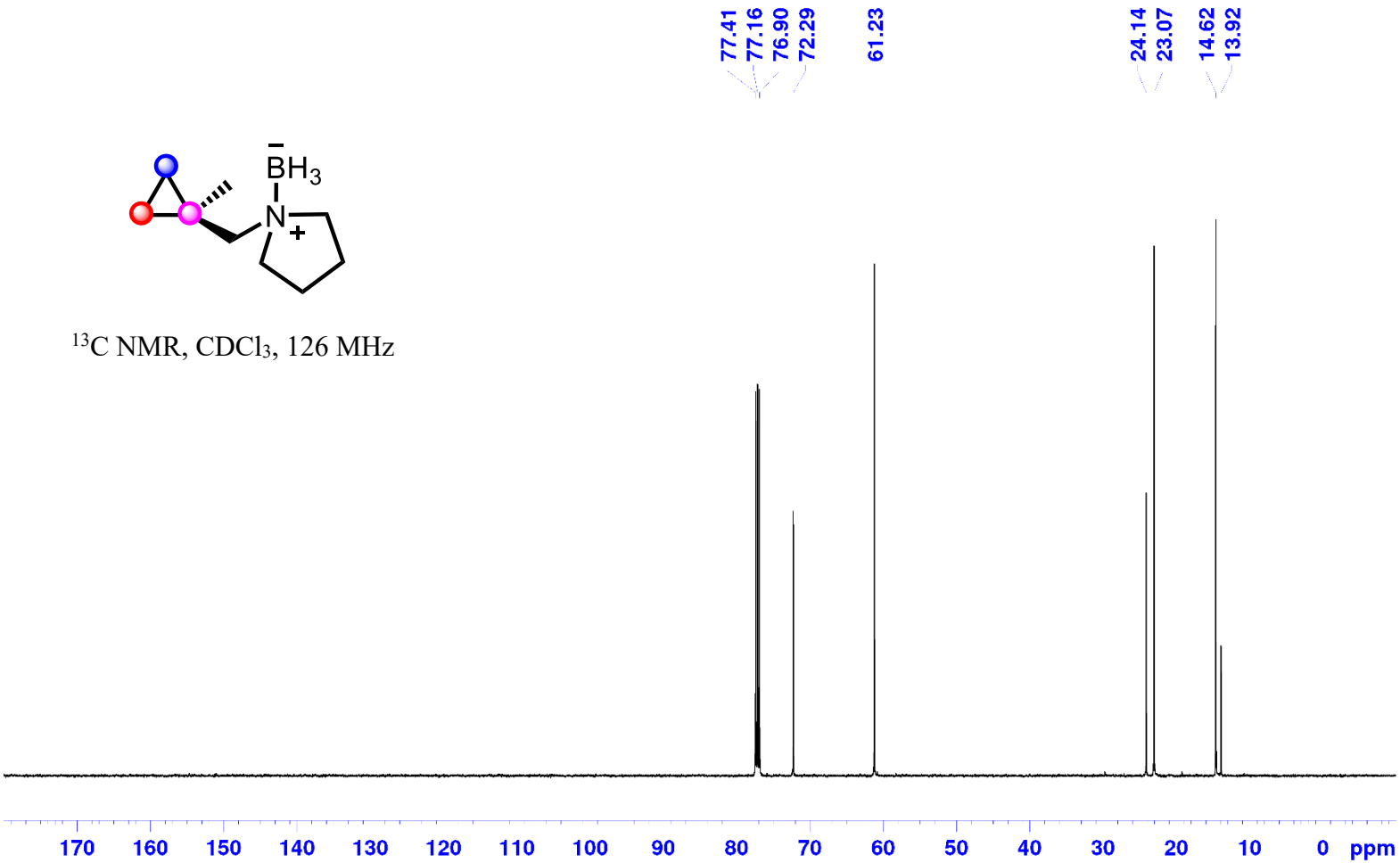


1-((1-Methylcyclopropyl)methyl)pyrrolidine Borane (1w):

^{1}H NMR, $CDCl_3$, 500 MHz



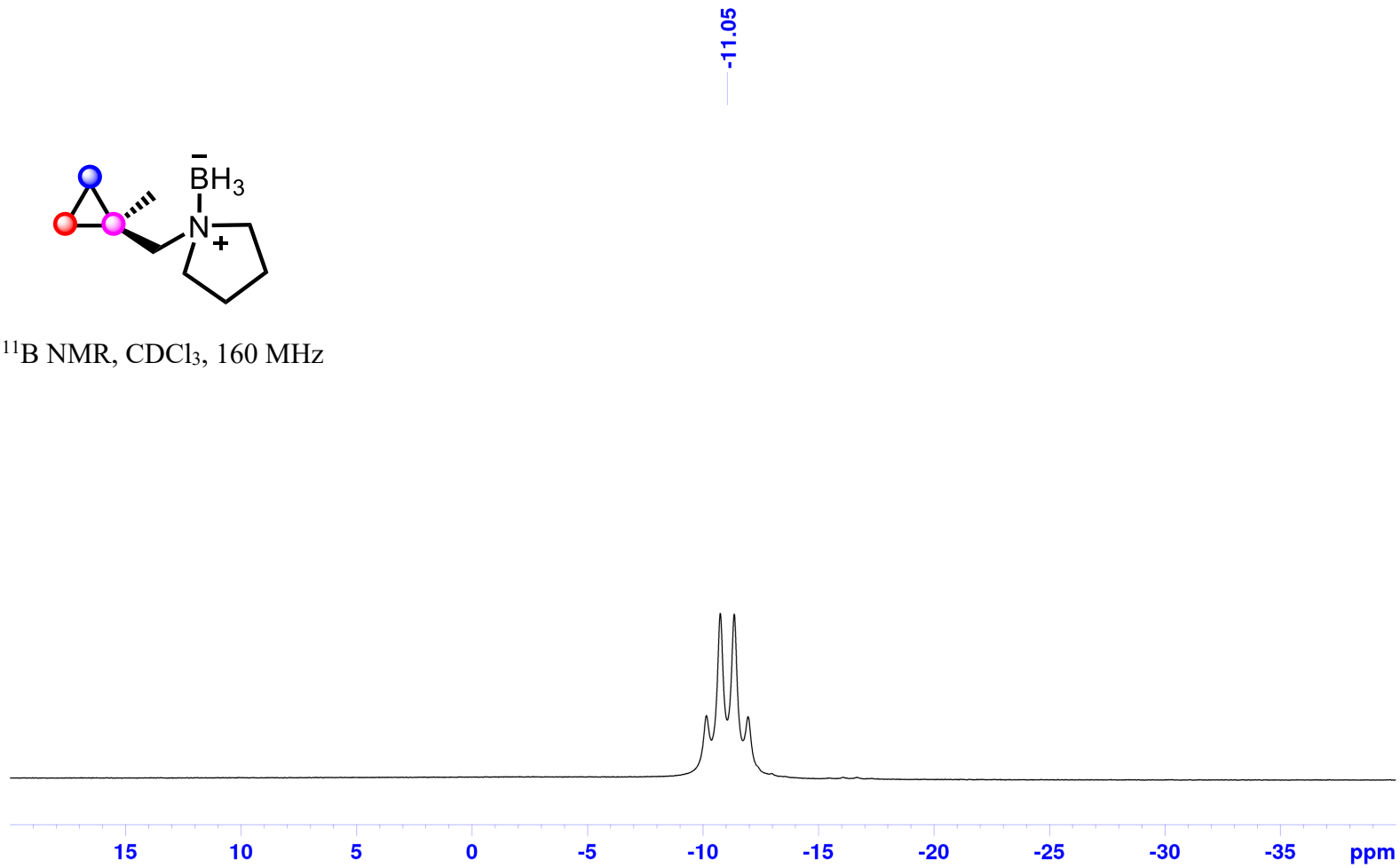
1-((1-Methylcyclopropyl)methyl)pyrrolidine Borane (1w):



^{13}C NMR, $CDCl_3$, 126 MHz

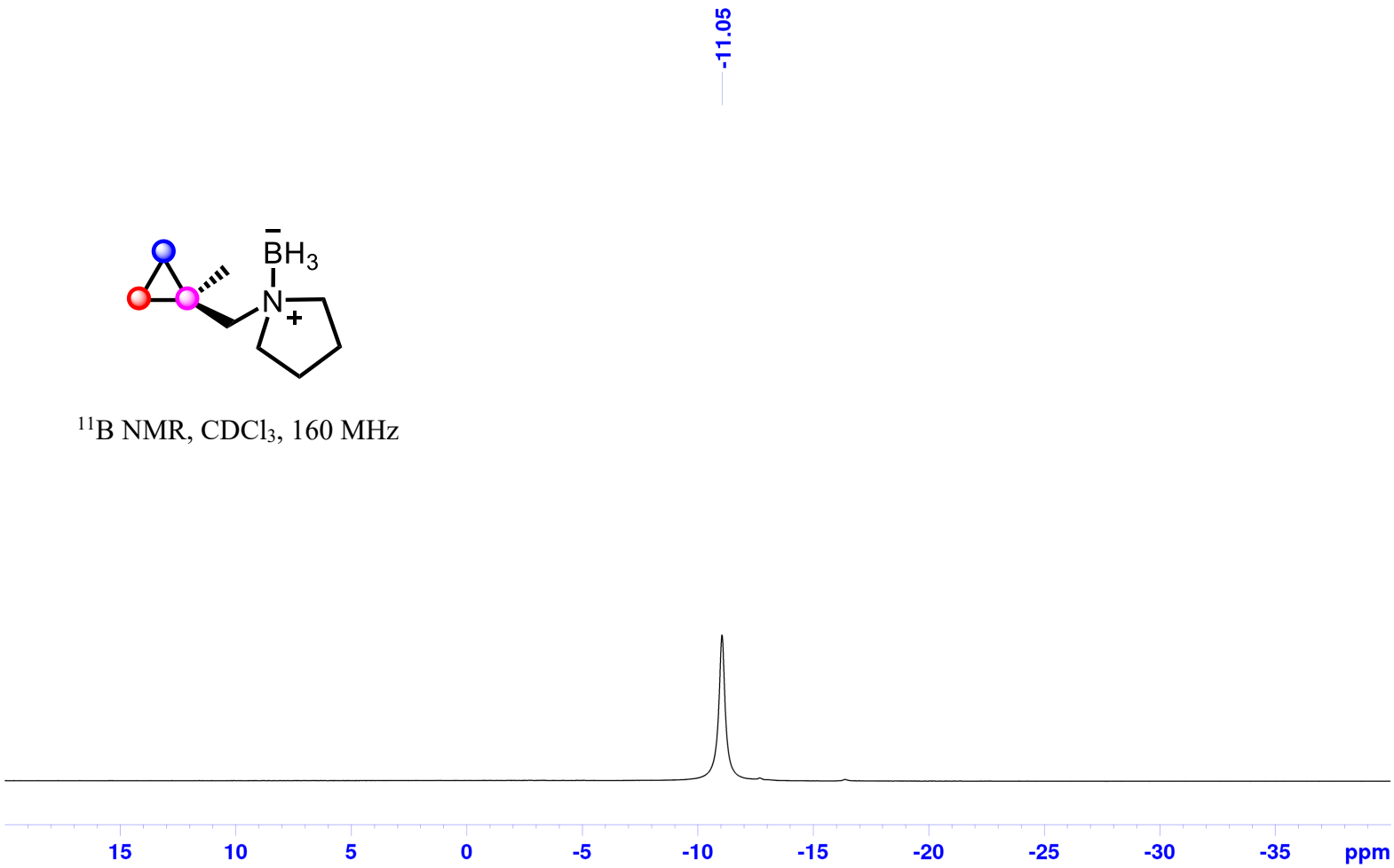
1-((1-Methylcyclopropyl)methyl)pyrrolidine Borane (1w):

^{11}B NMR, $CDCl_3$, 160 MHz



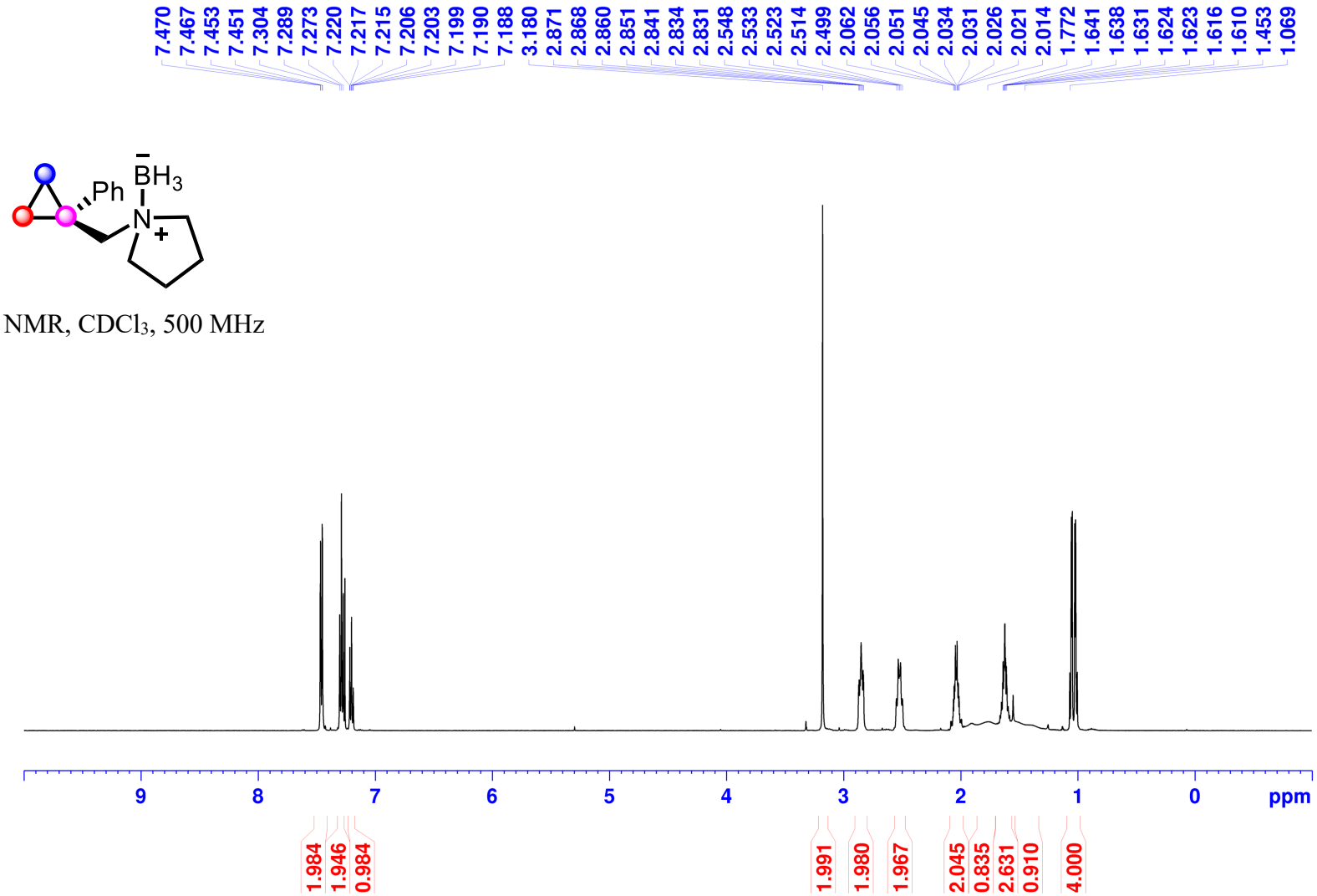
1-((1-Methylcyclopropyl)methyl)pyrrolidine Borane (1w):

^{11}B NMR, $CDCl_3$, 160 MHz

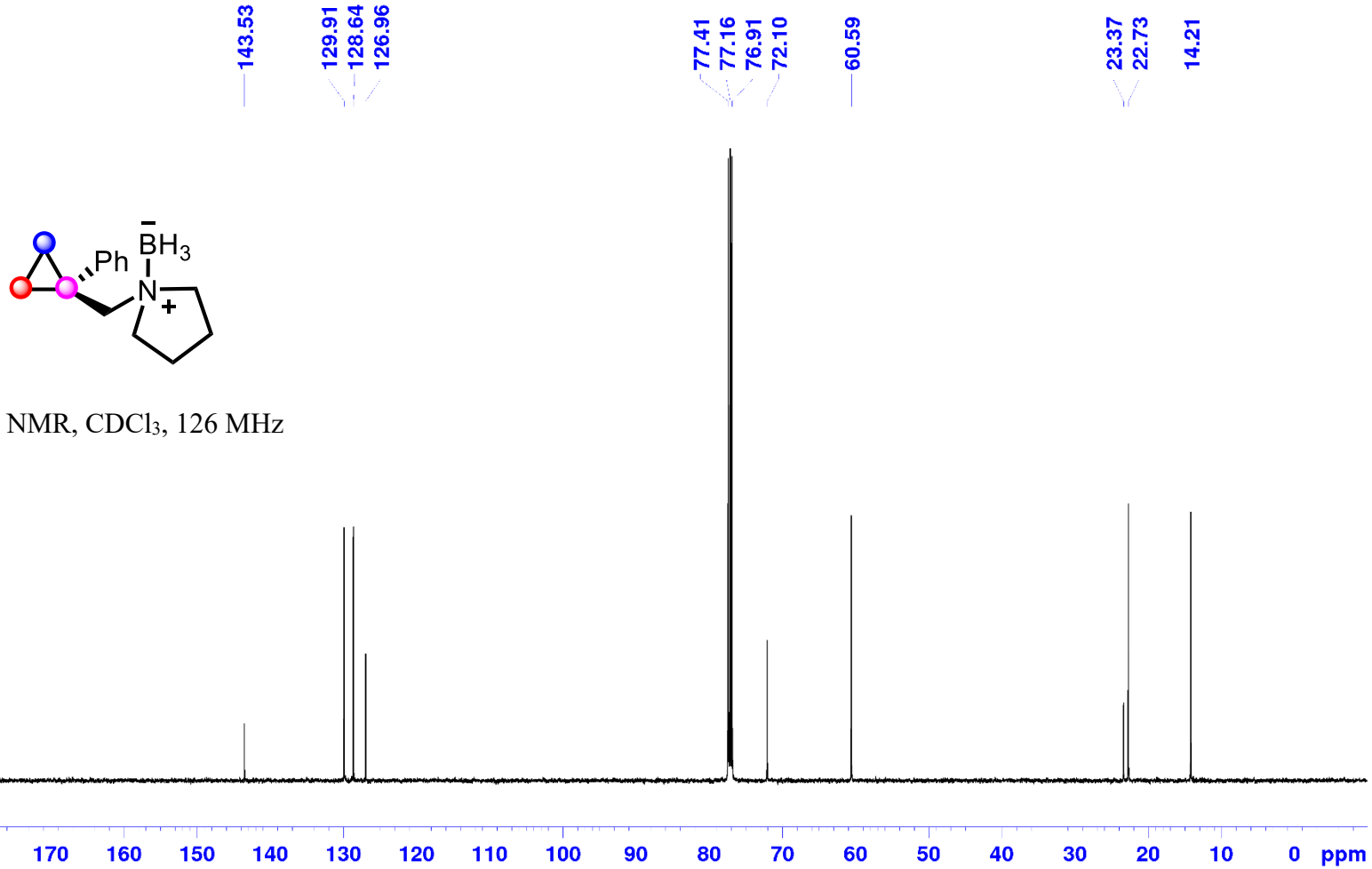


1-((1-Phenylcyclopropyl)methyl)pyrrolidine Borane (1x):

^{1}H NMR, $CDCl_3$, 500 MHz



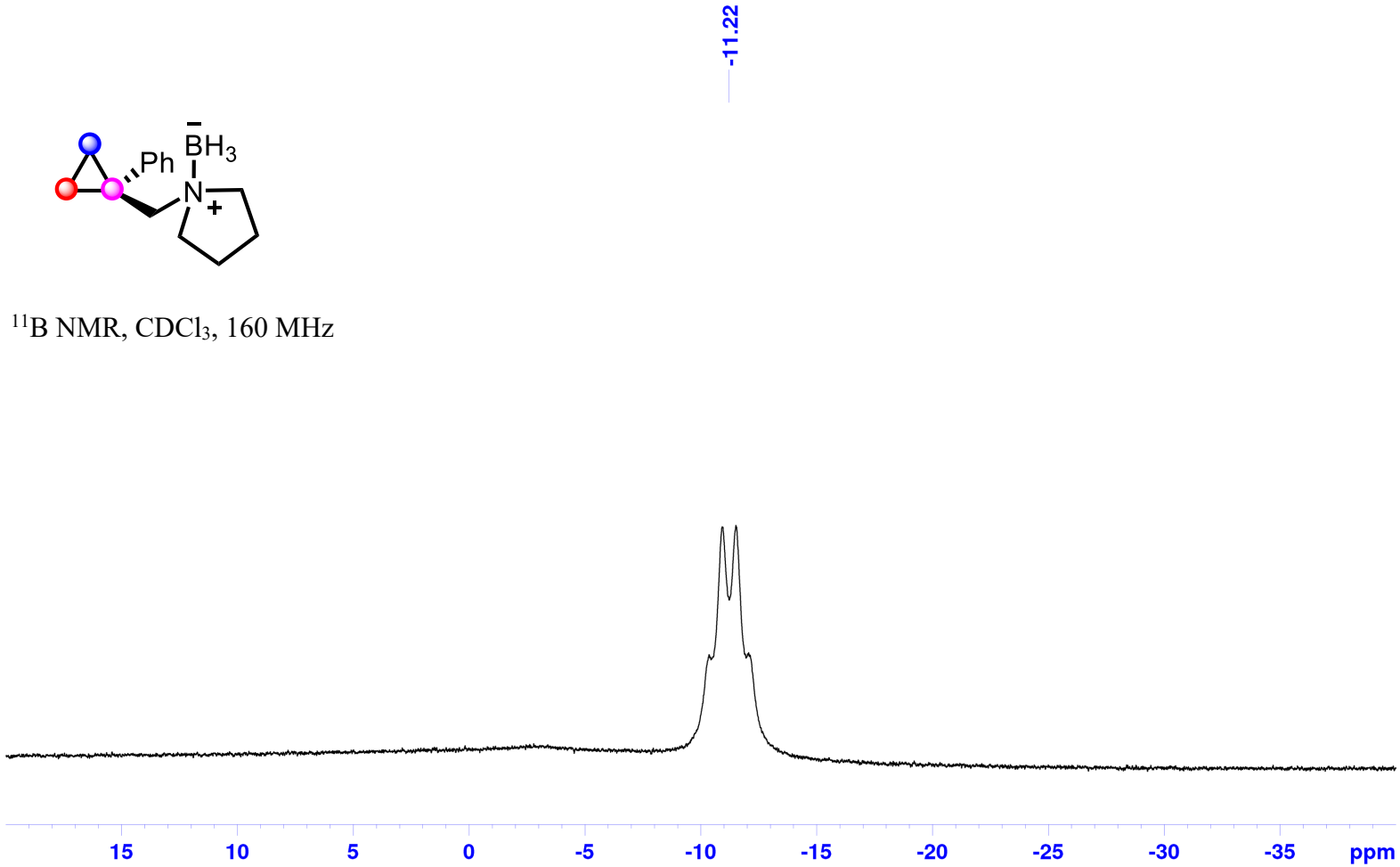
1-((1-Phenylcyclopropyl)methyl)pyrrolidine Borane (1x):



^{13}C NMR, $CDCl_3$, 126 MHz

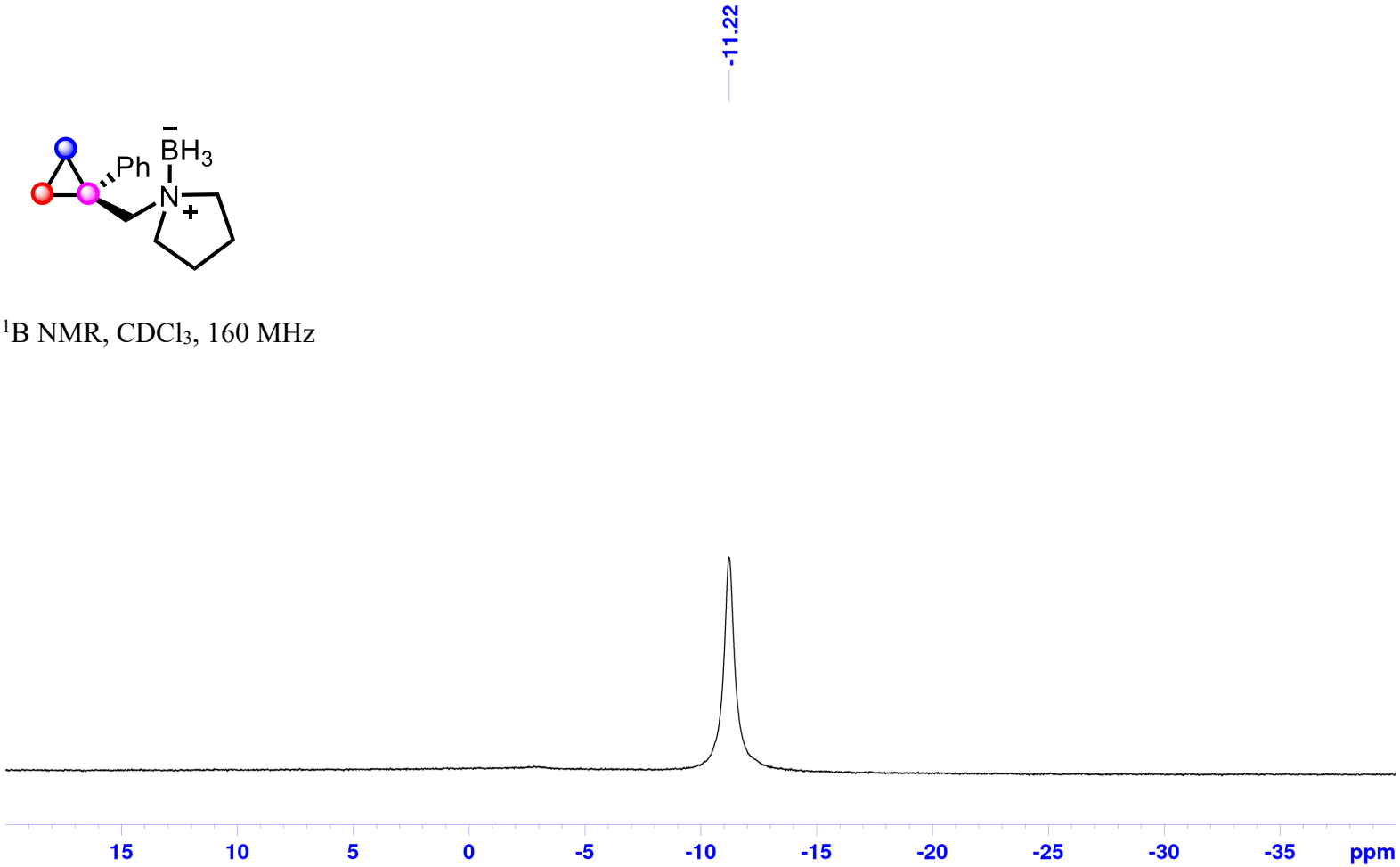
1-((1-Phenylcyclopropyl)methyl)pyrrolidine Borane (1x):

^{11}B NMR, $CDCl_3$, 160 MHz

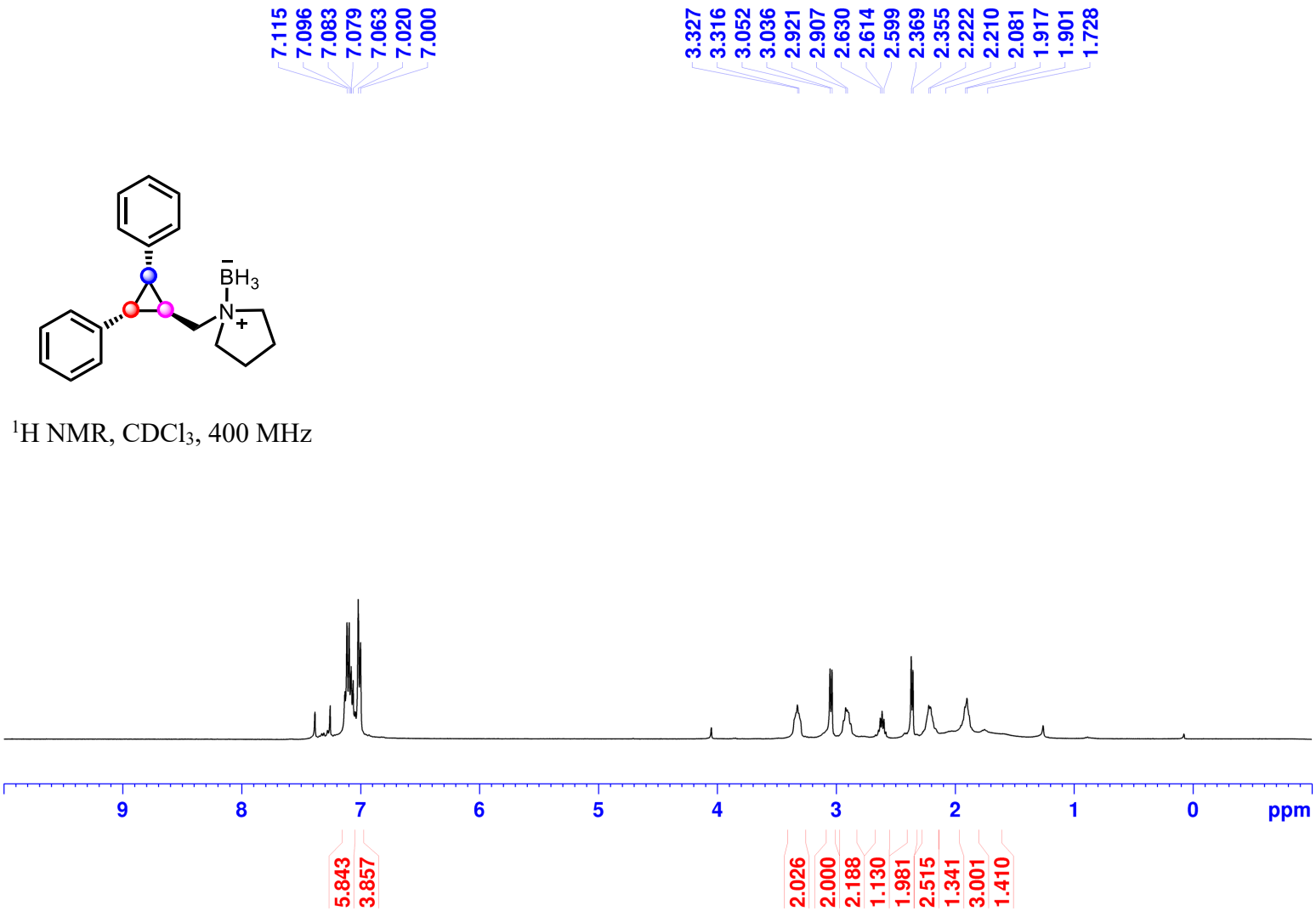


1-((1-Phenylcyclopropyl)methyl)pyrrolidine Borane (1x):

^{11}B NMR, $CDCl_3$, 160 MHz

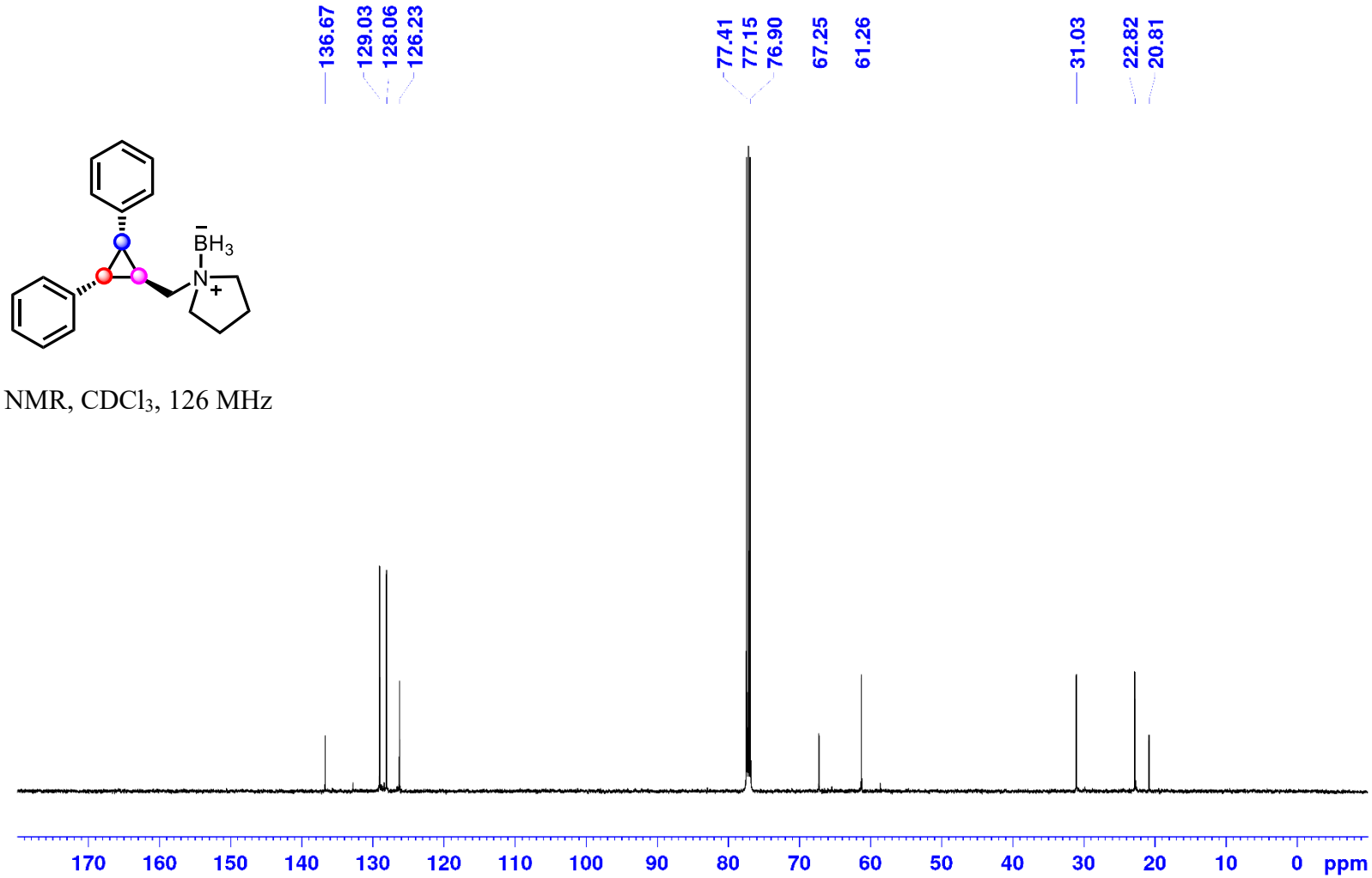


1-(((1*R*,2*R*,3*S*)-2,3-diphenylcyclopropyl)methyl)pyrrolidine Borane (1y):



^{1}H NMR, $CDCl_3$, 400 MHz

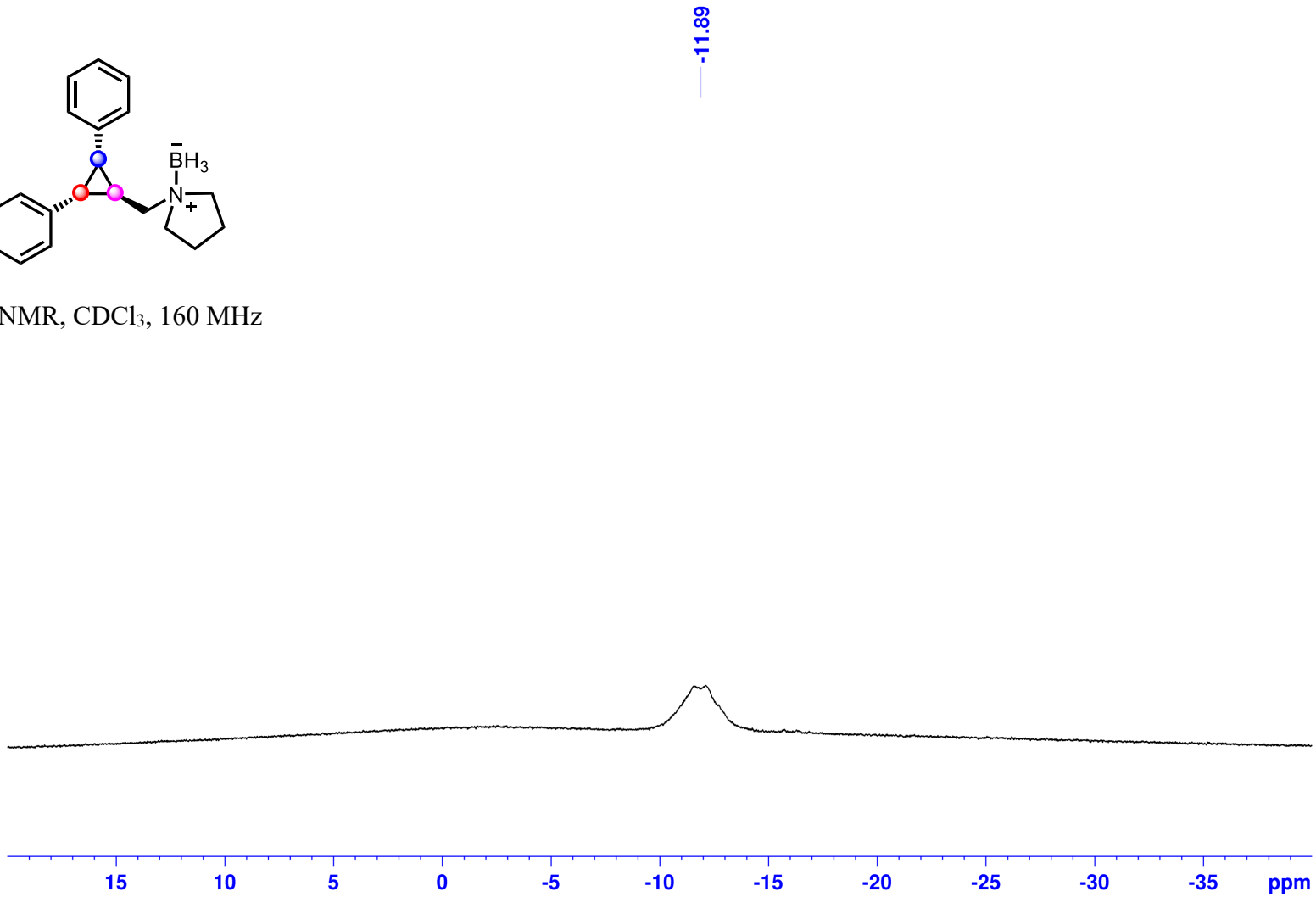
1-(((1*R*,2*R*,3*S*)-2,3-Diphenylcyclopropyl)methyl)pyrrolidine Borane (1y):



^{13}C NMR, $CDCl_3$, 126 MHz

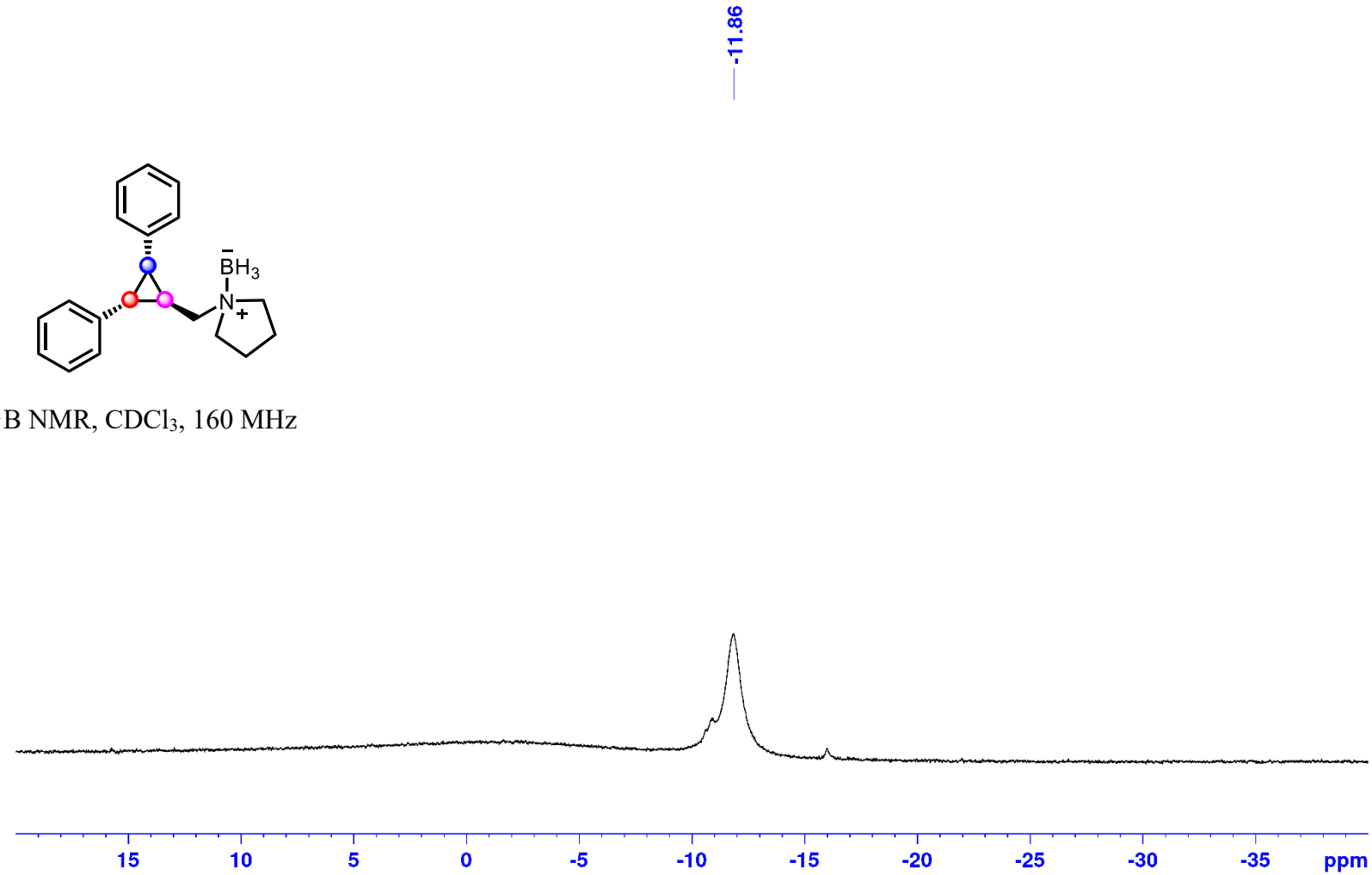
1-(((1*R*,2*R*,3*S*)-2,3-Diphenylcyclopropyl)methyl)pyrrolidine Borane (1y):

^{11}B NMR, $CDCl_3$, 160 MHz

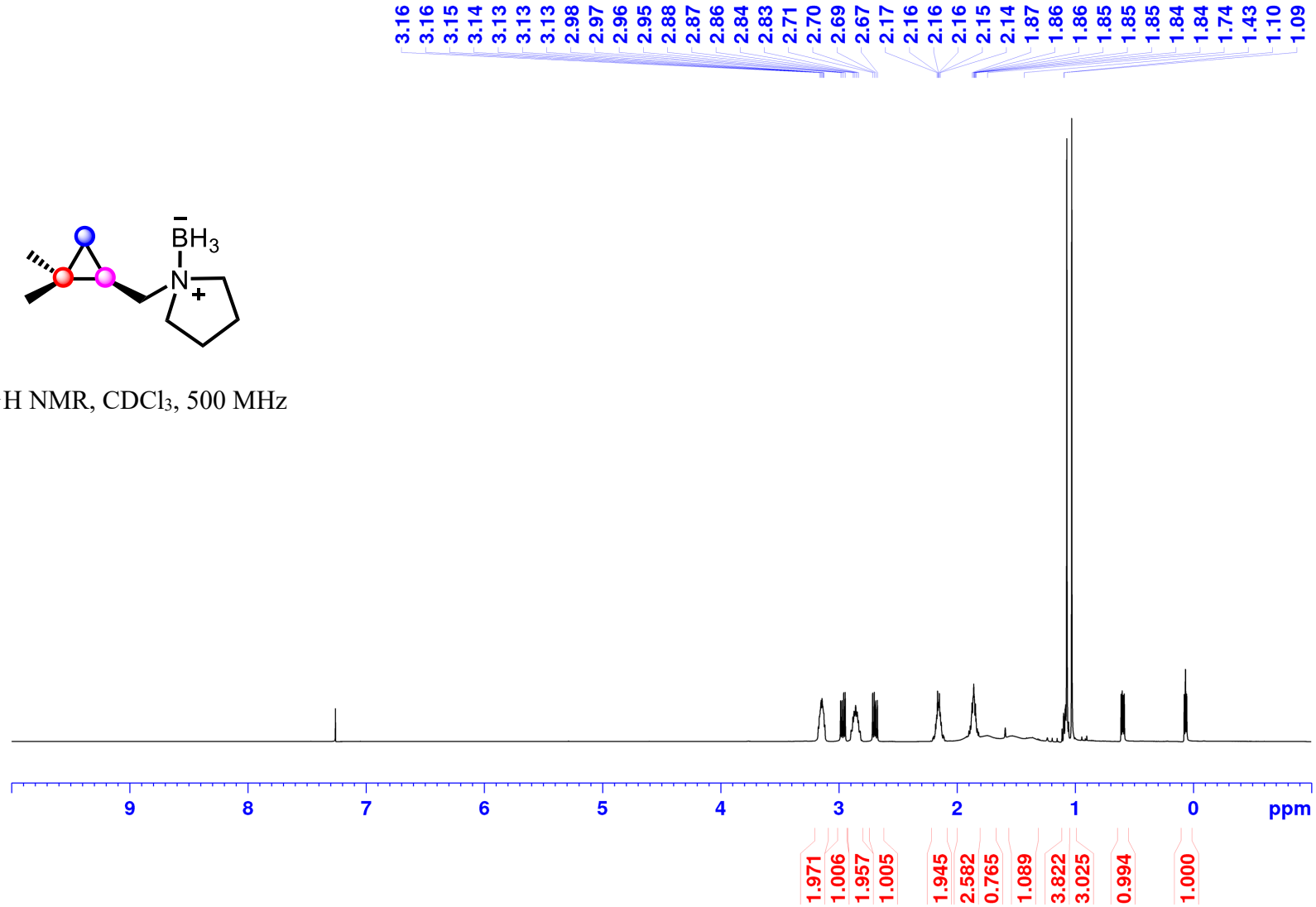


1-(((1*R*,2*R*,3*S*)-2,3-Diphenylcyclopropyl)methyl)pyrrolidine Borane (1y):

^{11}B NMR, $CDCl_3$, 160 MHz



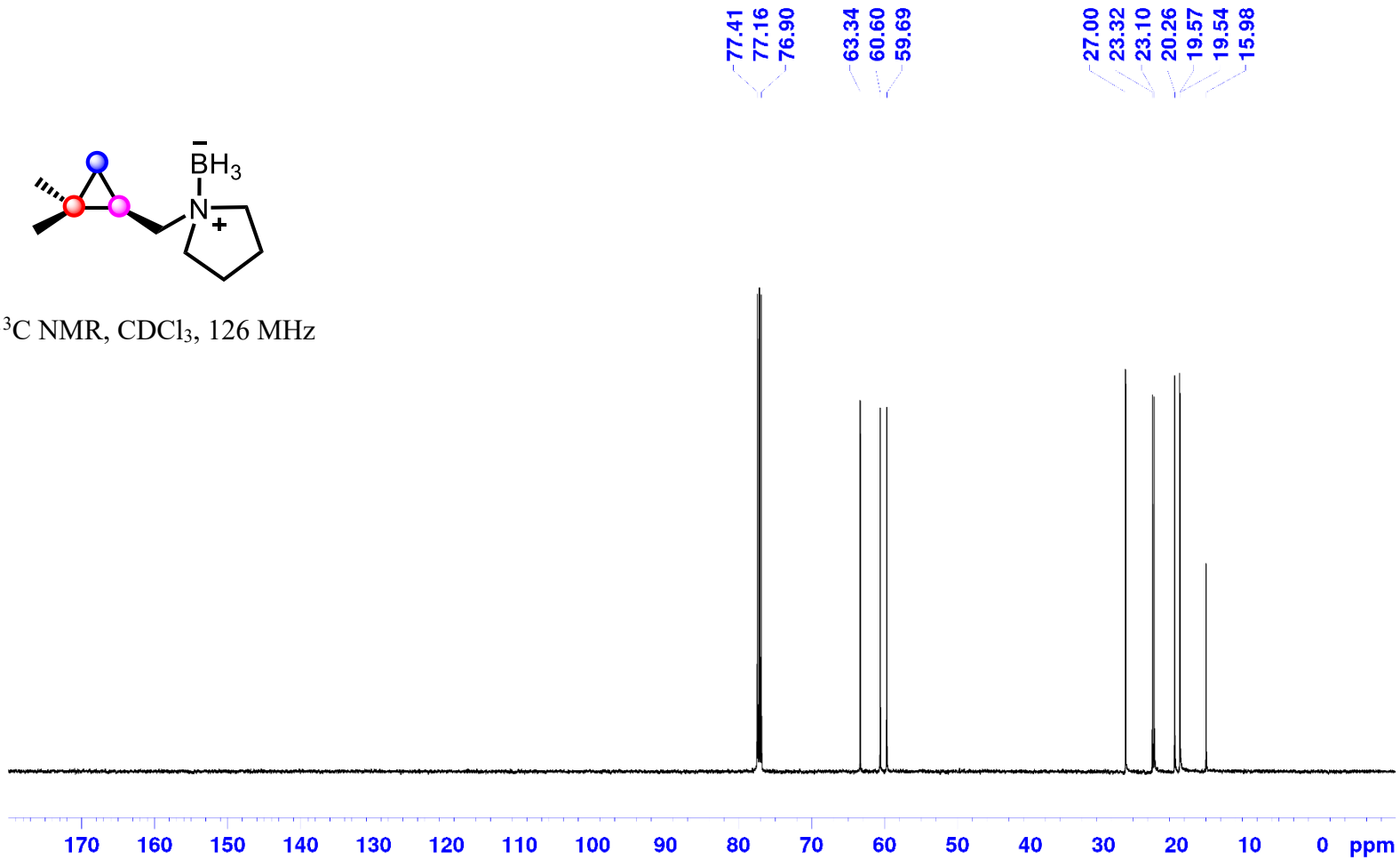
1-((2,2-Dimethylcyclopropyl)methyl)pyrrolidine Borane (1z):



^{1}H NMR, $CDCl_3$, 500 MHz

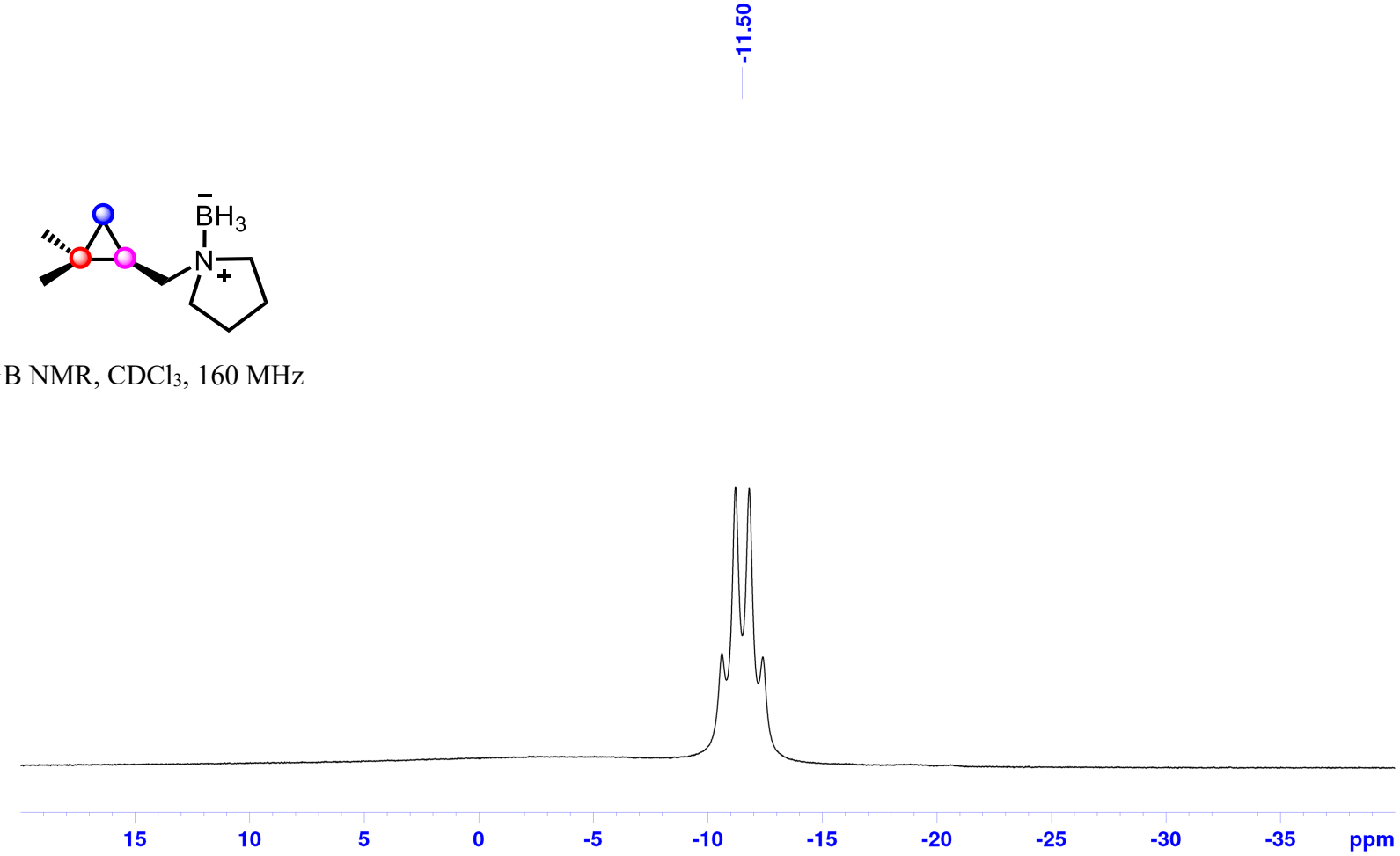
1-((2,2-Dimethylcyclopropyl)methyl)pyrrolidine Borane (1z):

^{13}C NMR, $CDCl_3$, 126 MHz



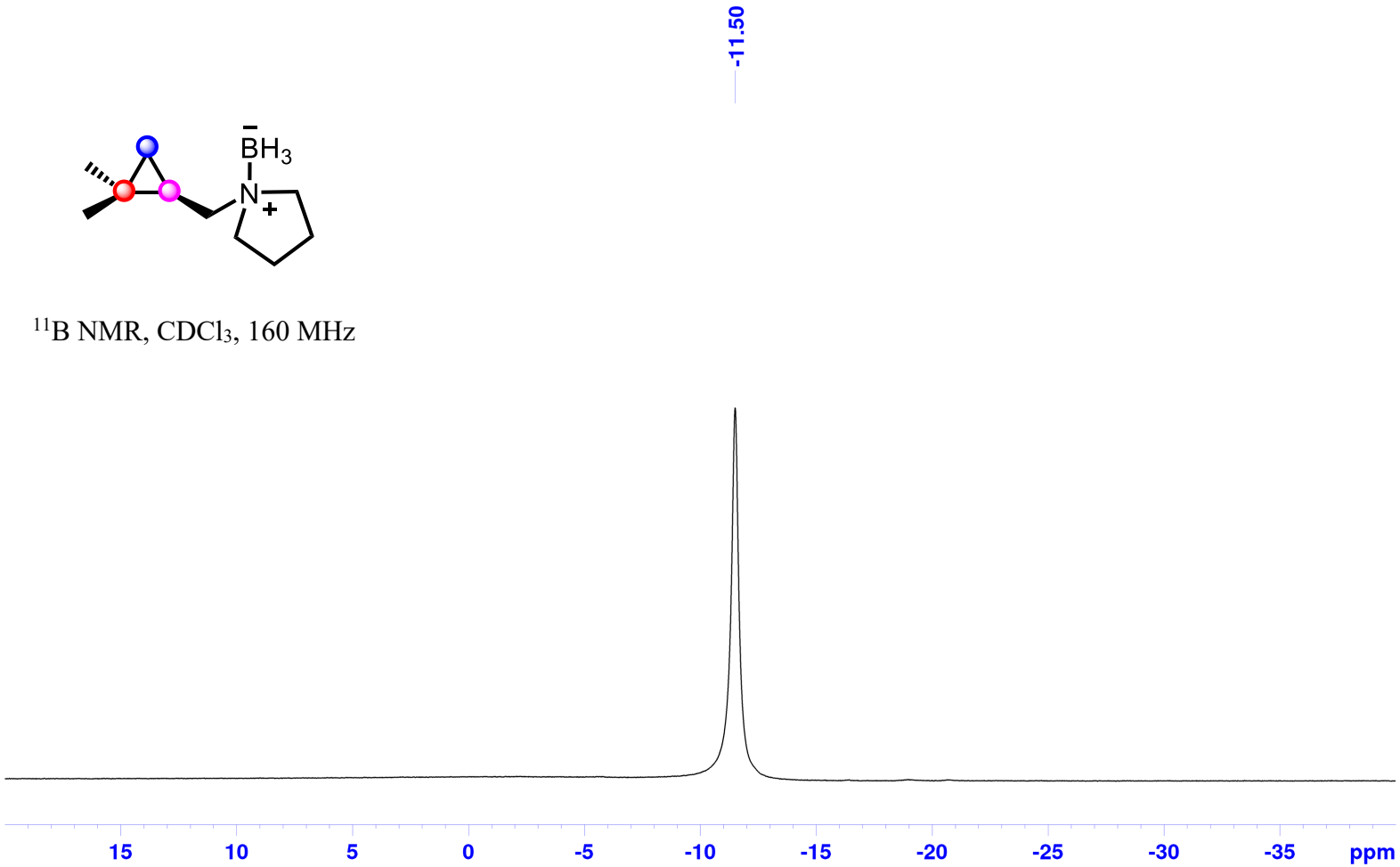
1-((2,2-Dimethylcyclopropyl)methyl)pyrrolidine Borane (1z):

^{11}B NMR, $CDCl_3$, 160 MHz

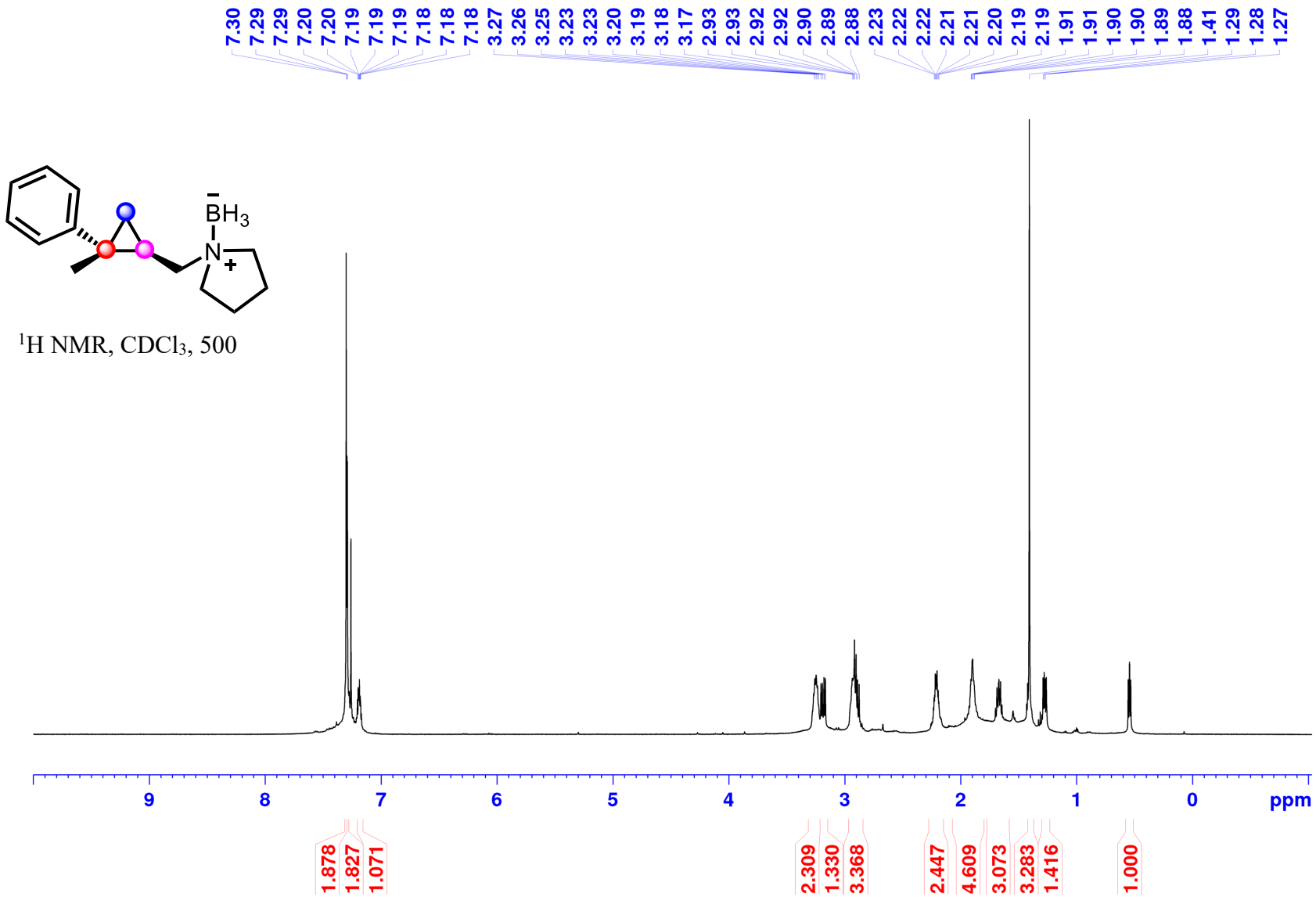


1-((2,2-Dimethylcyclopropyl)methyl)pyrrolidine Borane (1z):

^{11}B NMR, $CDCl_3$, 160 MHz

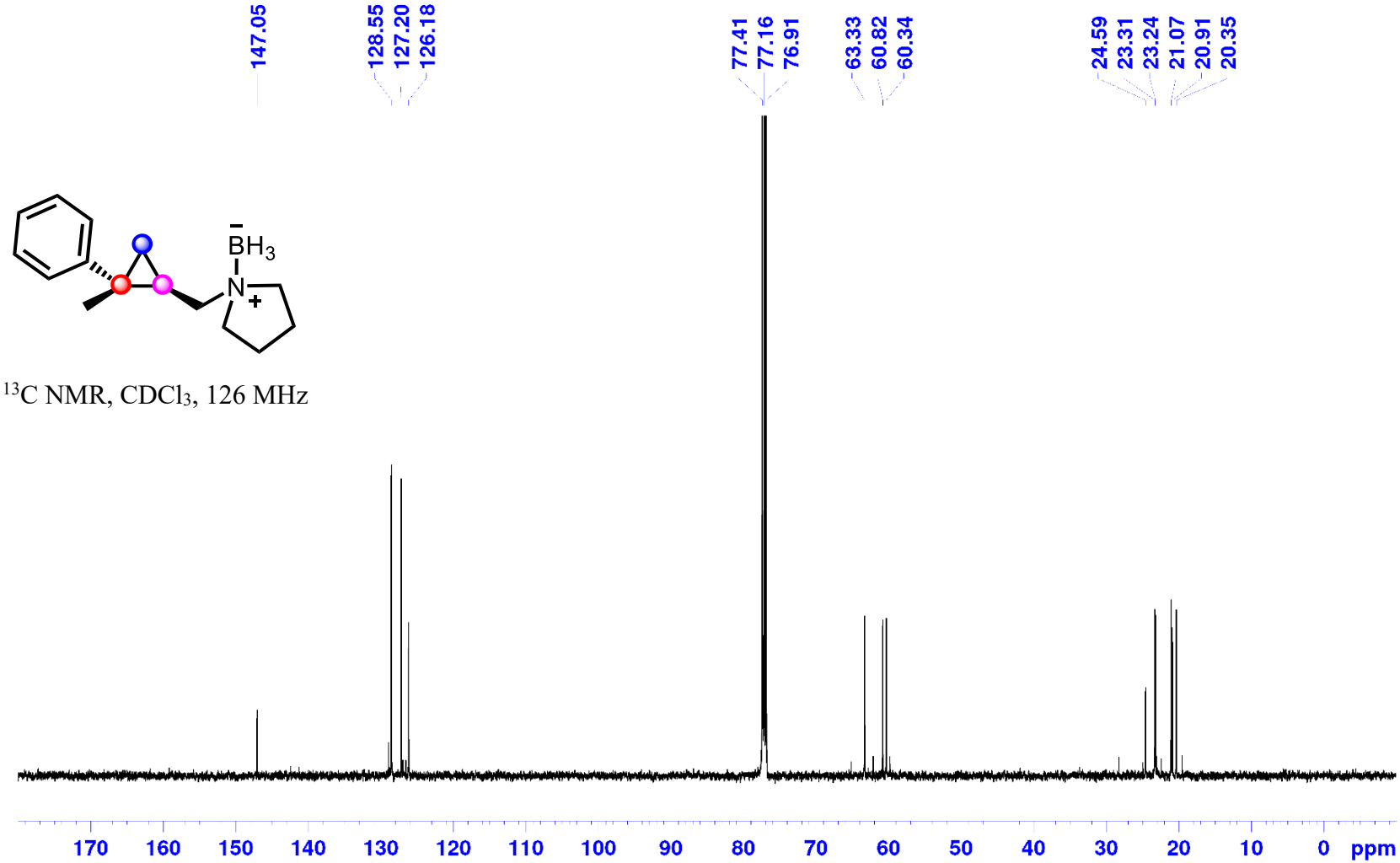


1-(((1*S*,2*S*)-2-Methyl-2-phenylcyclopropyl)methyl)pyrrolidine Borane (1aa):



^{1}H NMR, $CDCl_3$, 500

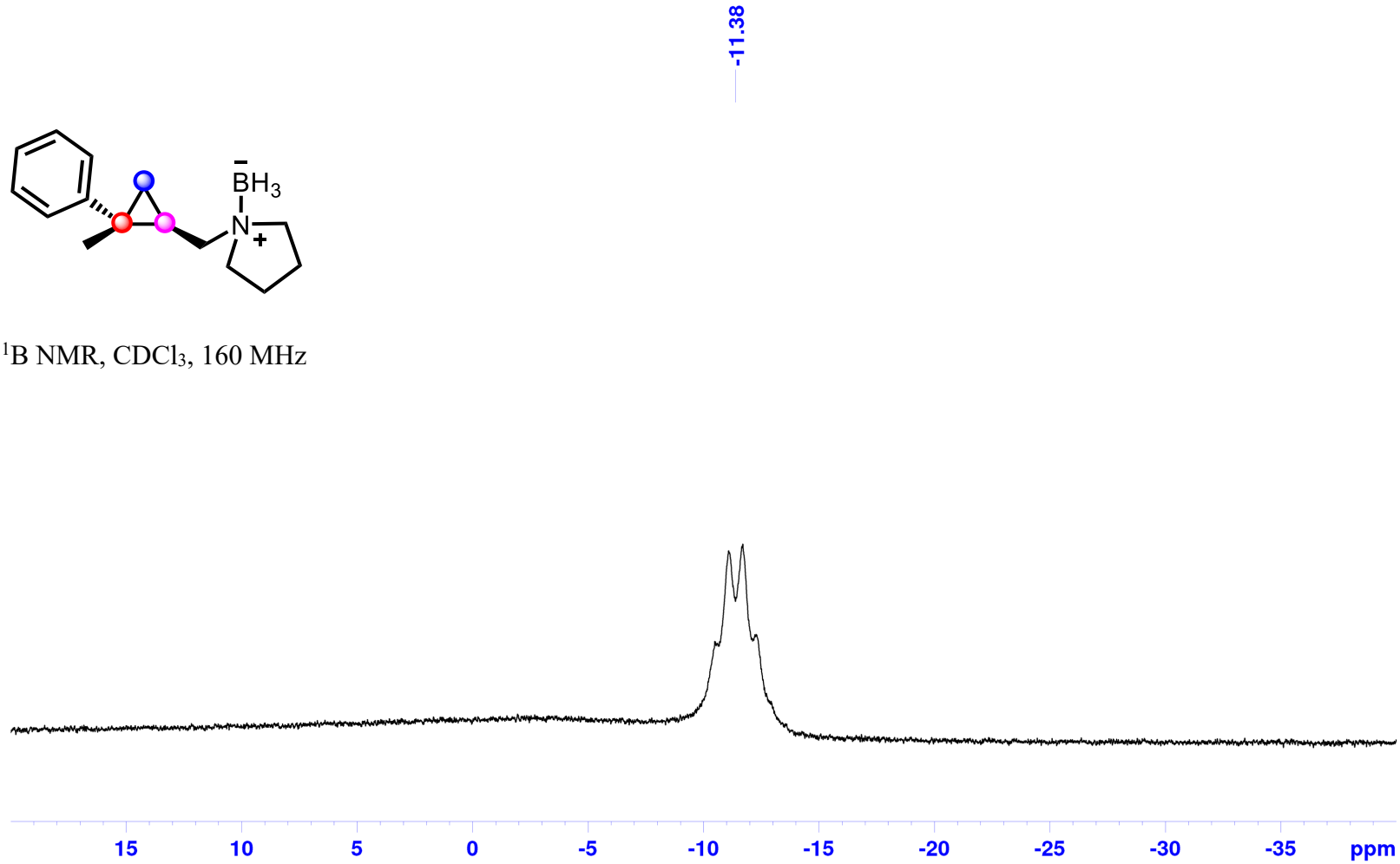
1-(((1*S*,2*S*)-2-Methyl-2-phenylcyclopropyl)methyl)pyrrolidine Borane (1aa)**:**



^{13}C NMR, $CDCl_3$, 126 MHz

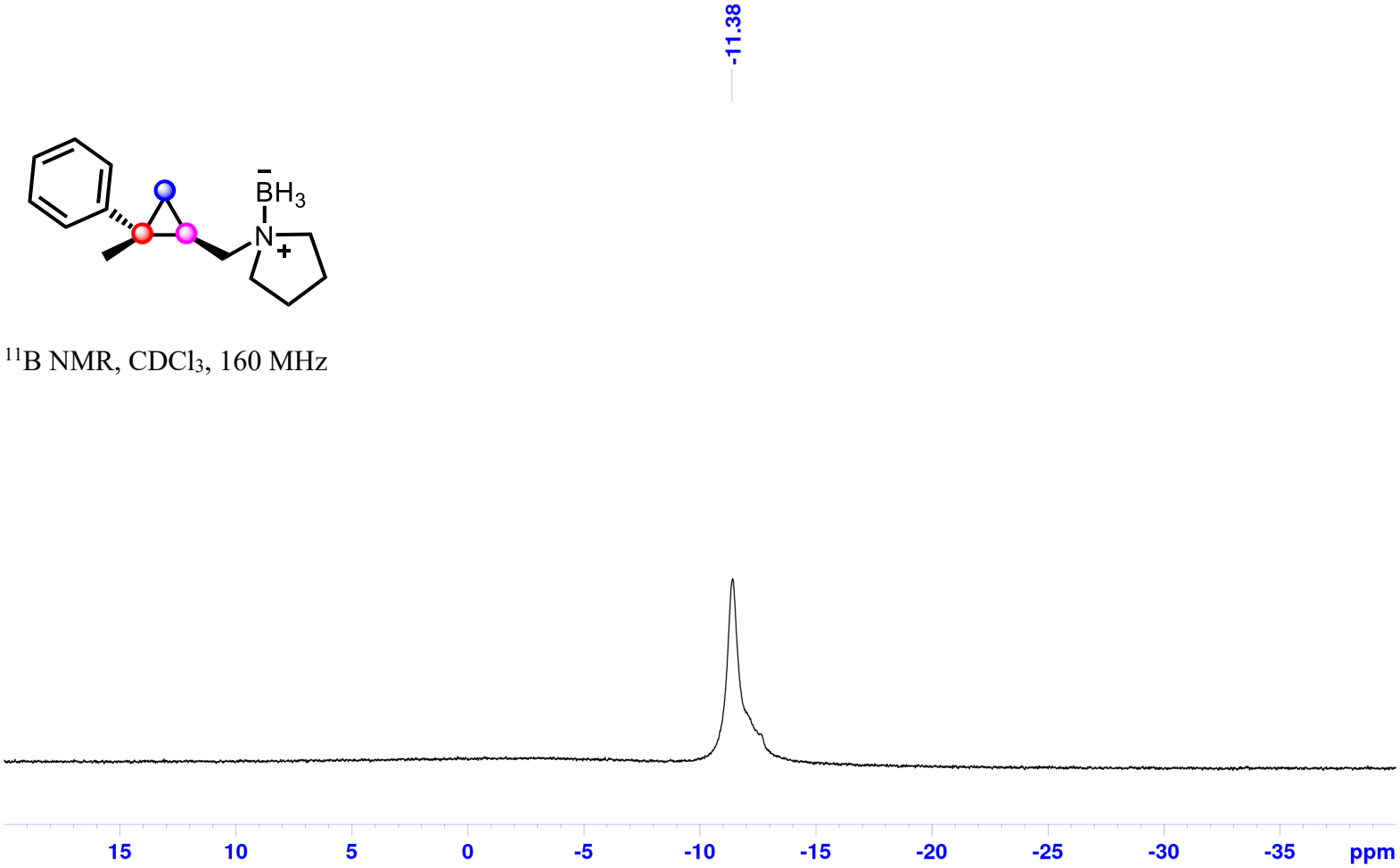
1-(((1*S*,2*S*)-2-Methyl-2-phenylcyclopropyl)methyl)pyrrolidine Borane (1aa):

^{11}B NMR, $CDCl_3$, 160 MHz

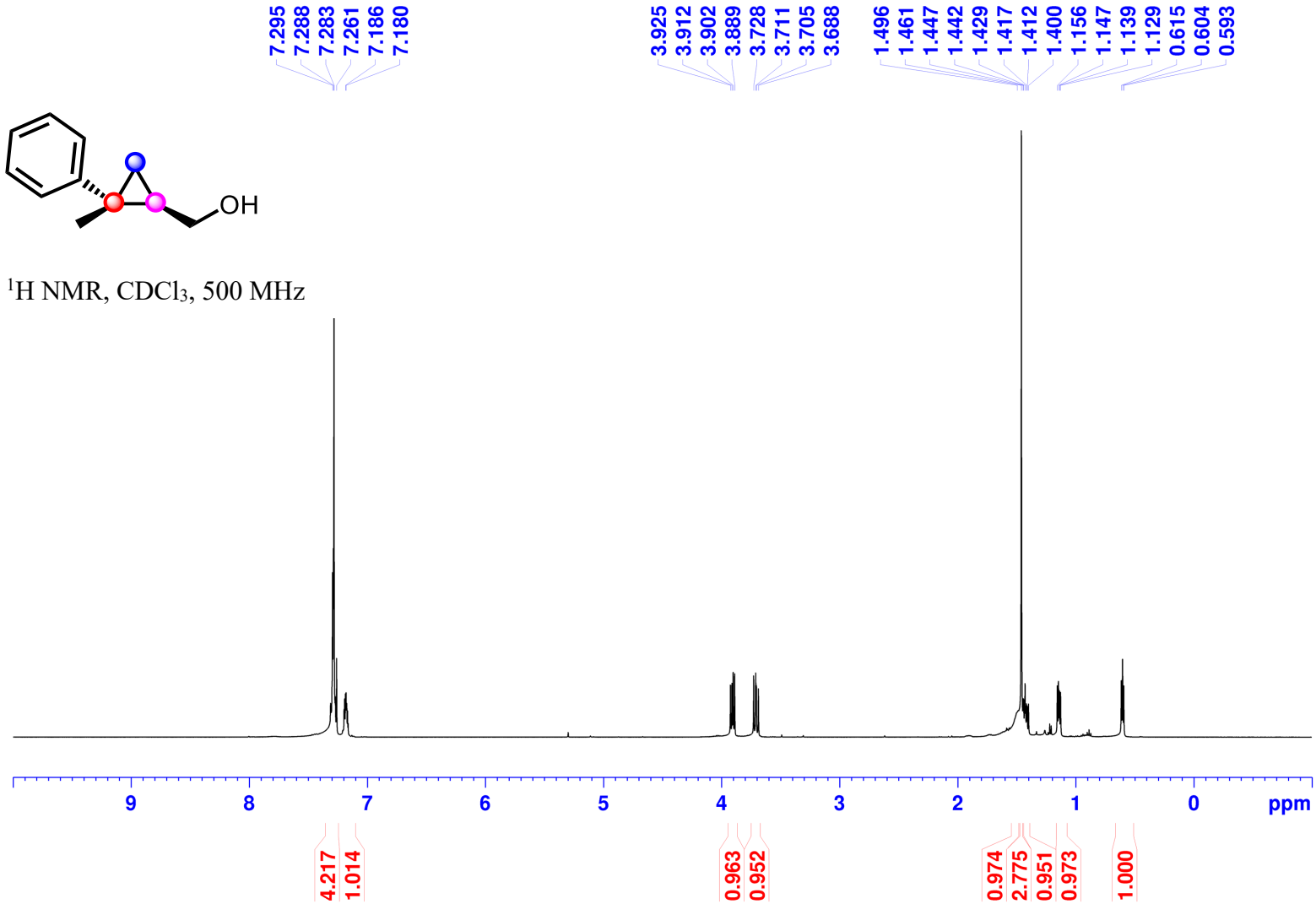


1-(((1*S*,2*S*)-2-Methyl-2-phenylcyclopropyl)methyl)pyrrolidine Borane (1aa):

^{11}B NMR, $CDCl_3$, 160 MHz

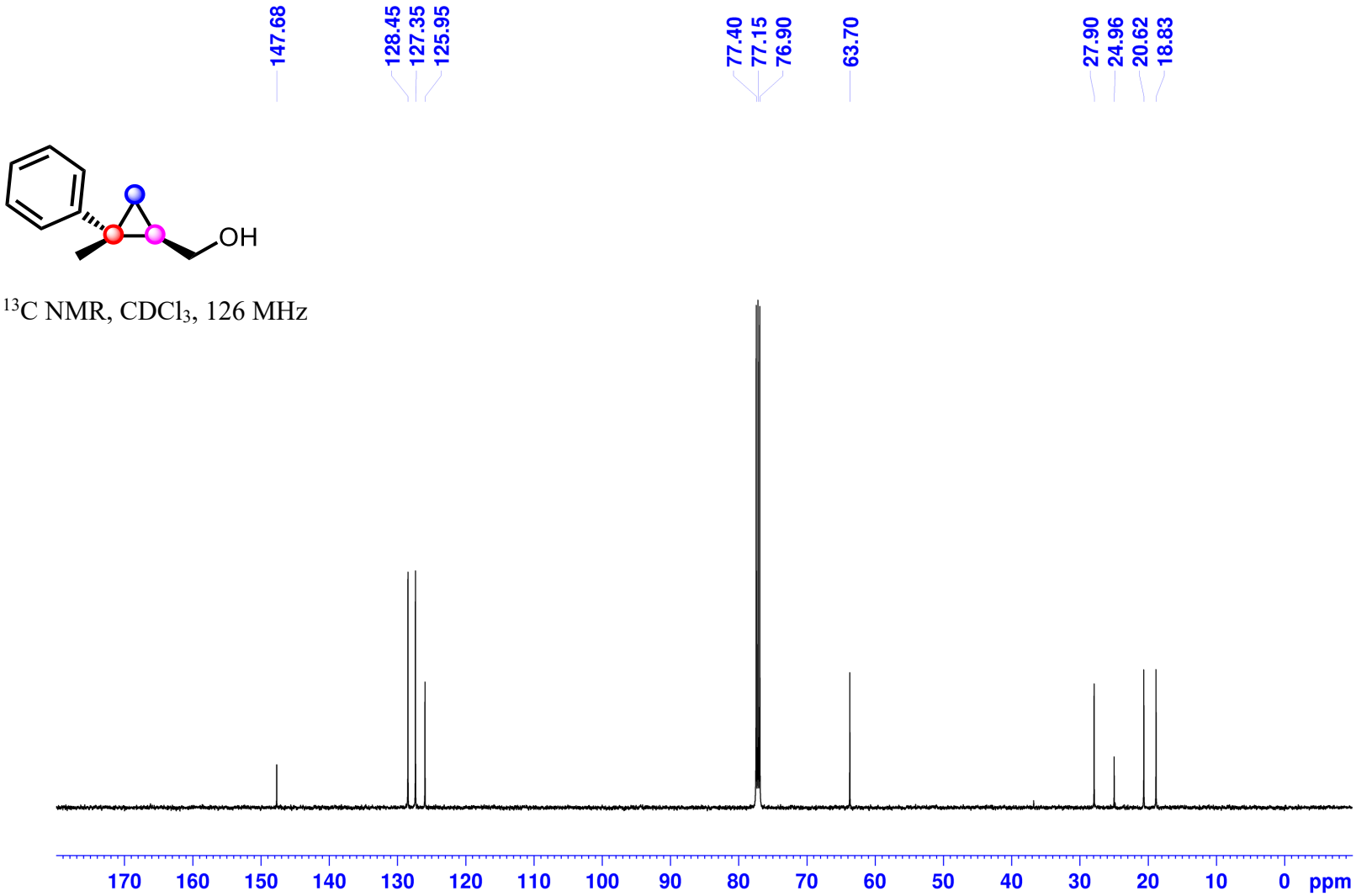


(1*S*,2*S*)-2-Methyl-2-phenylcyclopropyl)methanol (S1):



^{1}H NMR, $CDCl_3$, 500 MHz

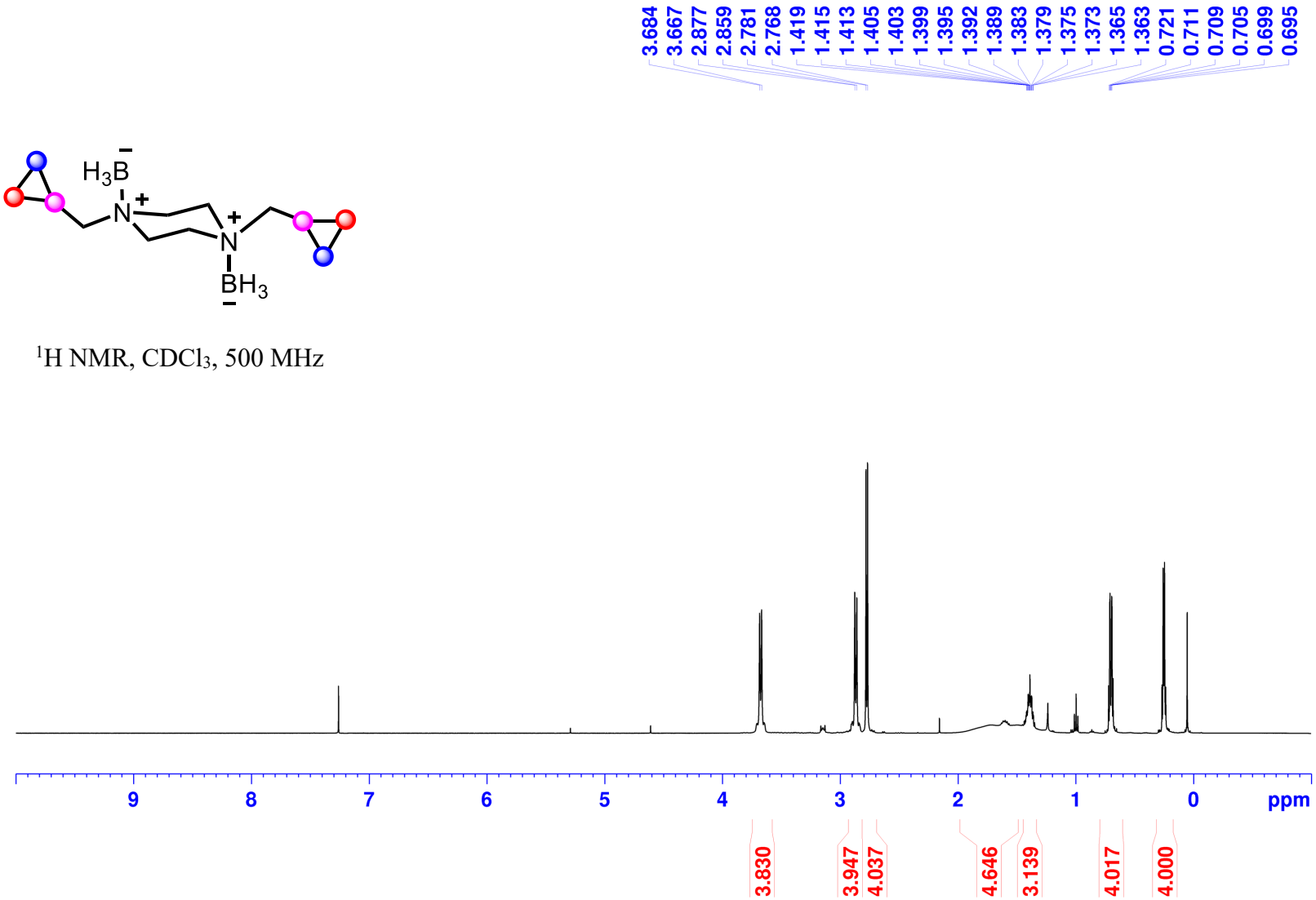
(1*S*,2*S*)-2-Methyl-2-phenylcyclopropyl)methanol (S1):



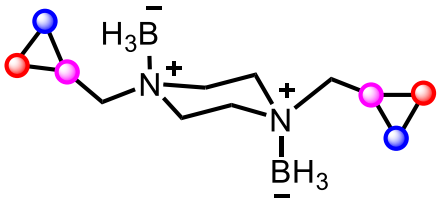
^{13}C NMR, $CDCl_3$, 126 MHz

1,4-Bis(cyclopropylmethyl)piperazine borane (1ab):

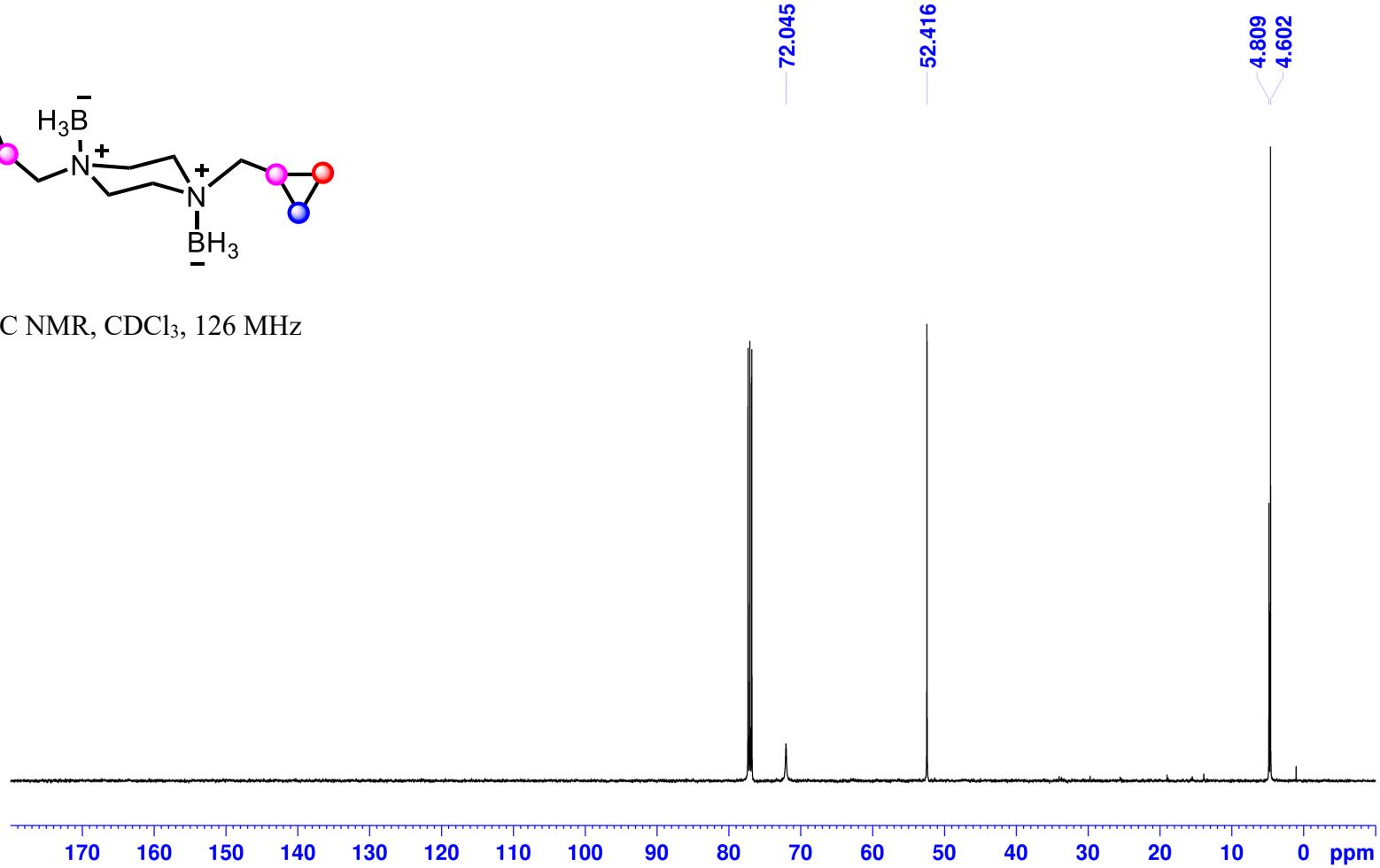
^{1}H NMR, $CDCl_3$, 500 MHz



1,4-Bis(cyclopropylmethyl)piperazine borane (1ab):

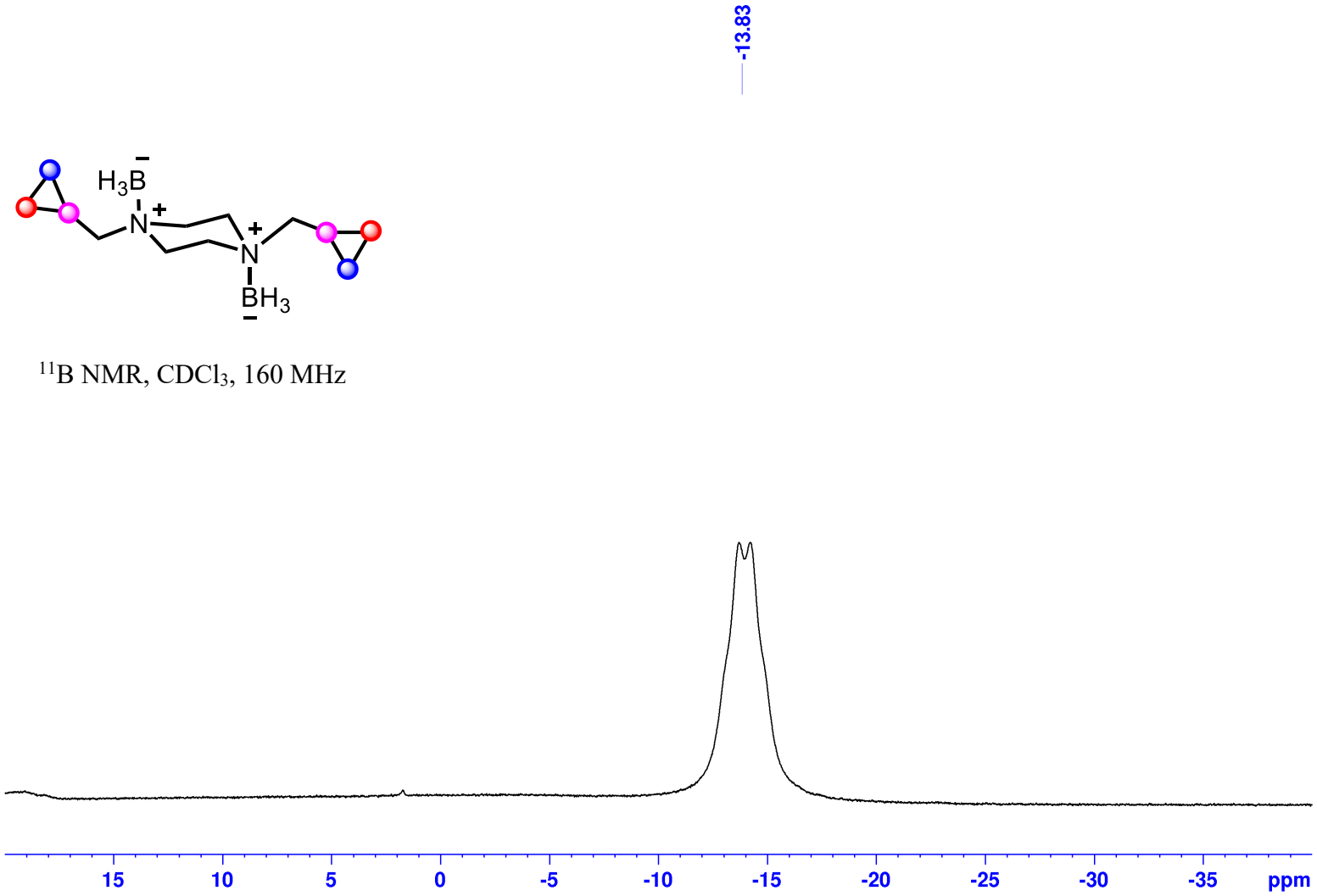


^{13}C NMR, $CDCl_3$, 126 MHz



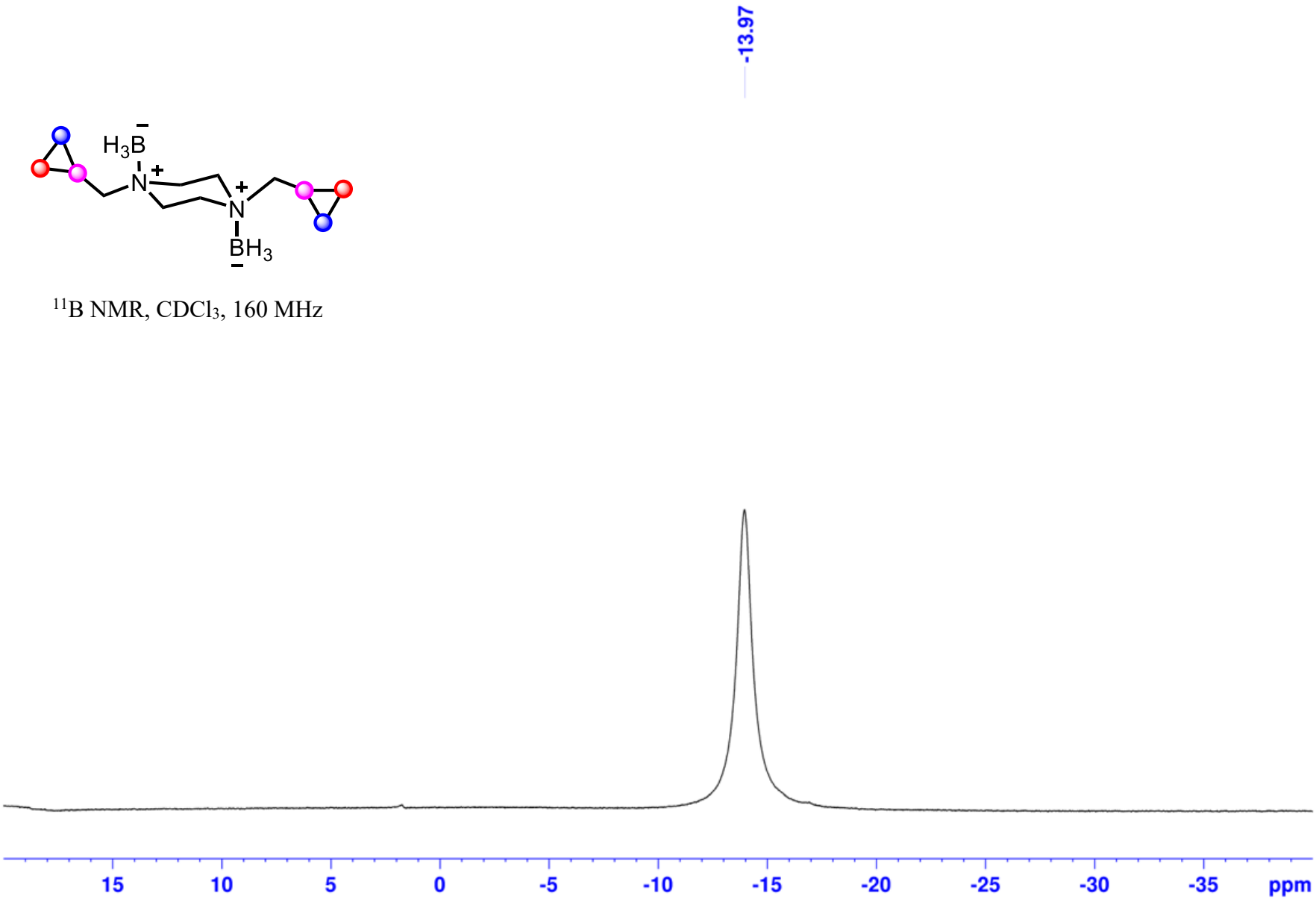
1,4-Bis(cyclopropylmethyl)piperazine borane (1ab):

^{11}B NMR, $CDCl_3$, 160 MHz

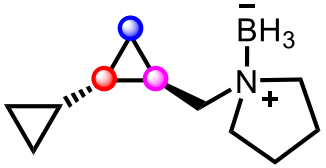


1,4-Bis(cyclopropylmethyl)piperazine borane (1ab):

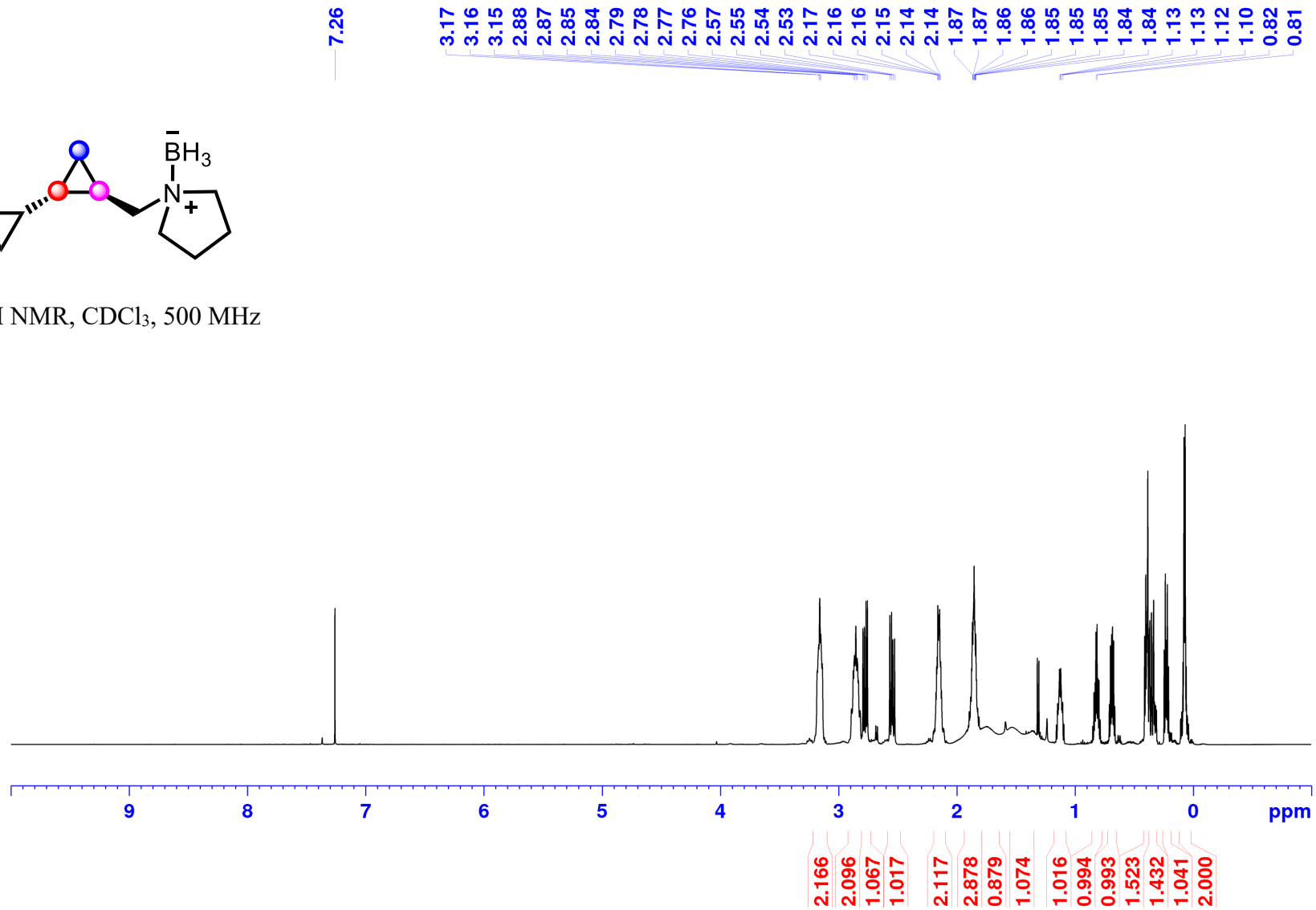
^{11}B NMR, $CDCl_3$, 160 MHz



1-([1,1'-bi(Cyclopropan)]-2-ylmethyl)pyrrolidine Borane (1ac)

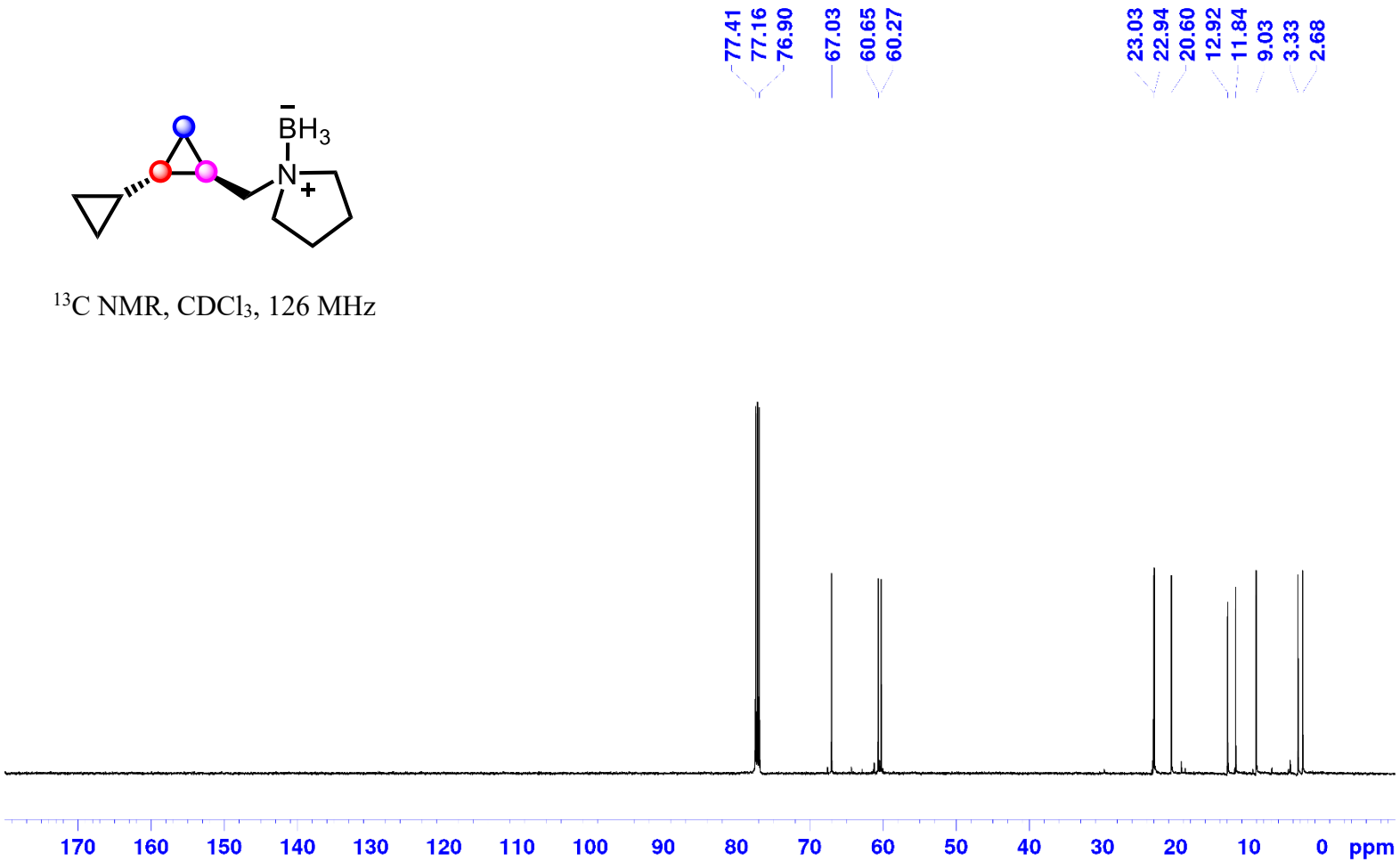


^{1}H NMR, $CDCl_3$, 500 MHz



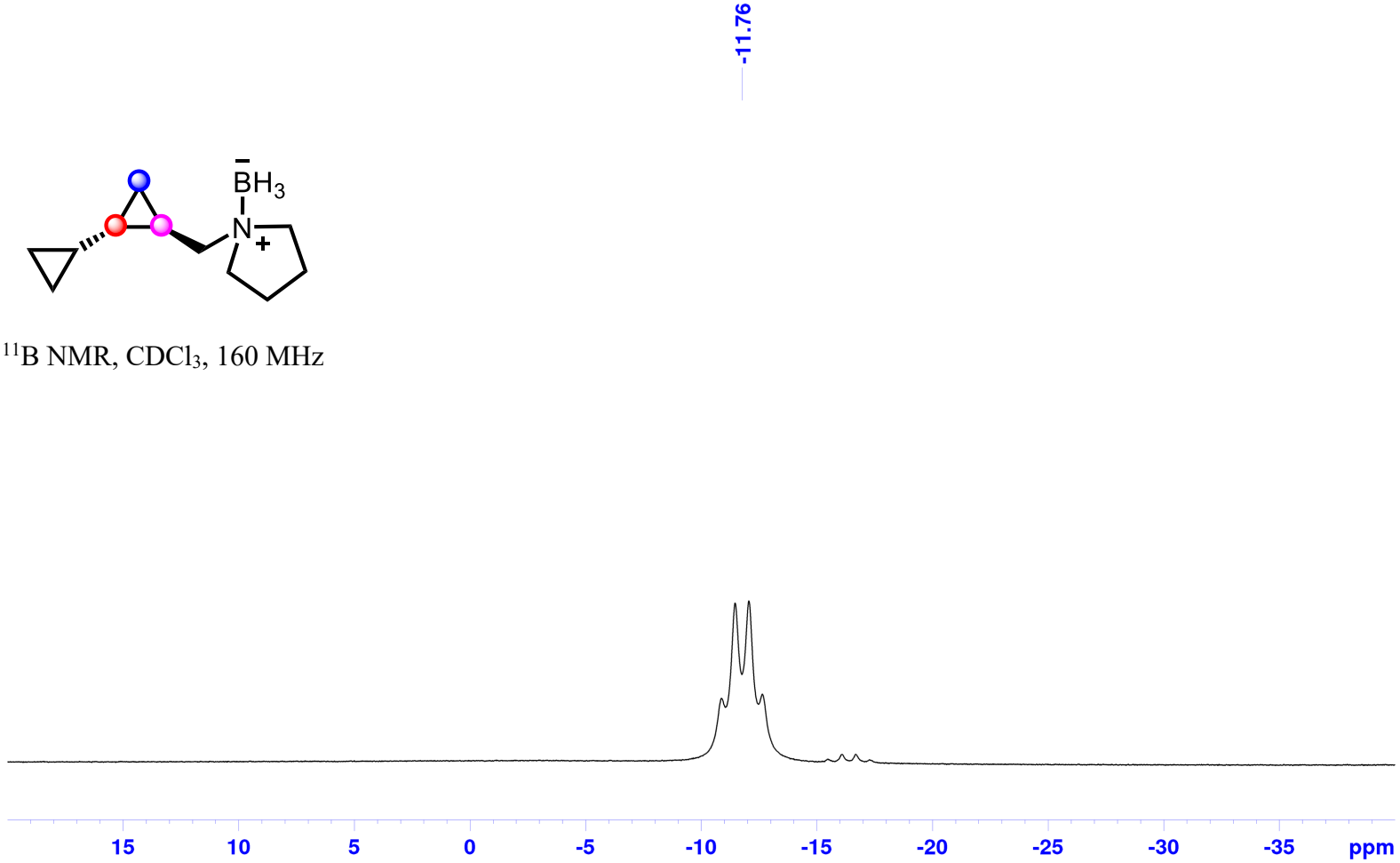
1-([1,1'-bi(Cyclopropan)]-2-ylmethyl)pyrrolidine Borane (1ac) :

^{13}C NMR, $CDCl_3$, 126 MHz



1-([1,1'-bi(Cyclopropan)]-2-ylmethyl)pyrrolidine Borane (1ac) :

^{11}B NMR, $CDCl_3$, 160 MHz



1-([1,1'-bi(Cyclopropan)]-2-ylmethyl)pyrrolidine Borane (1ac) :

^{11}B NMR, $CDCl_3$, 160 MHz