

## NMR SPECTRA (page 1 of 32 pages)

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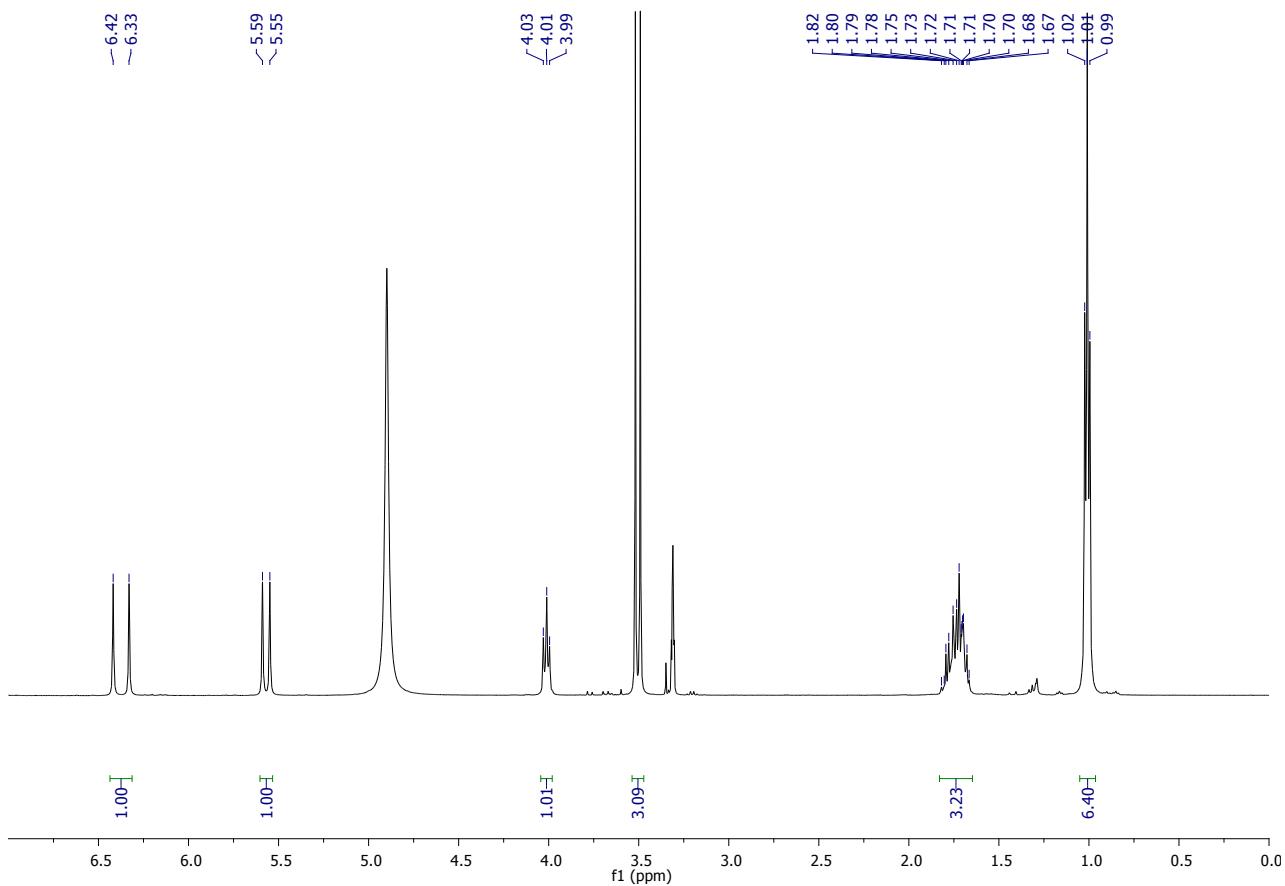
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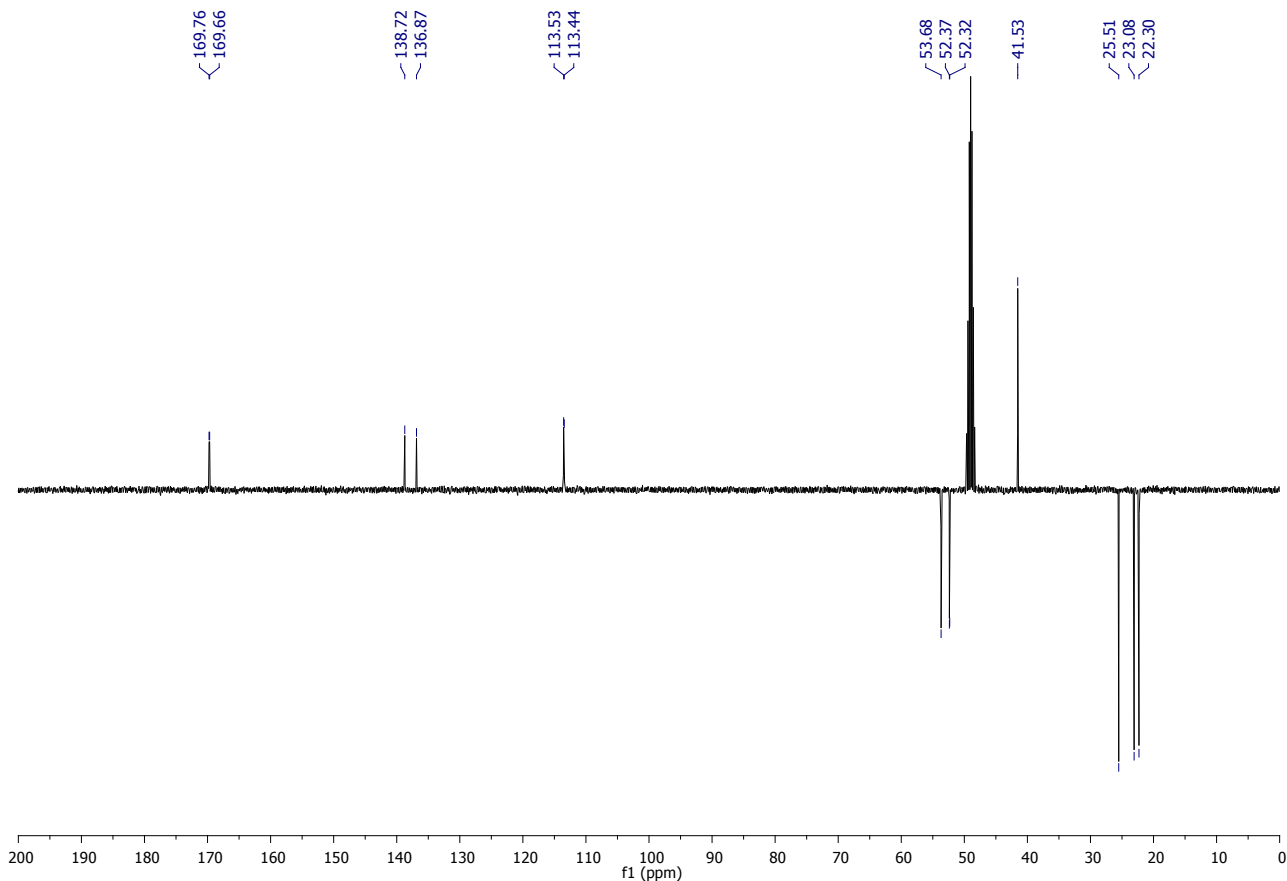
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# [1-(L-leucylamido)ethen-1-yl]phosphonic acid monomethyl ester, (1)

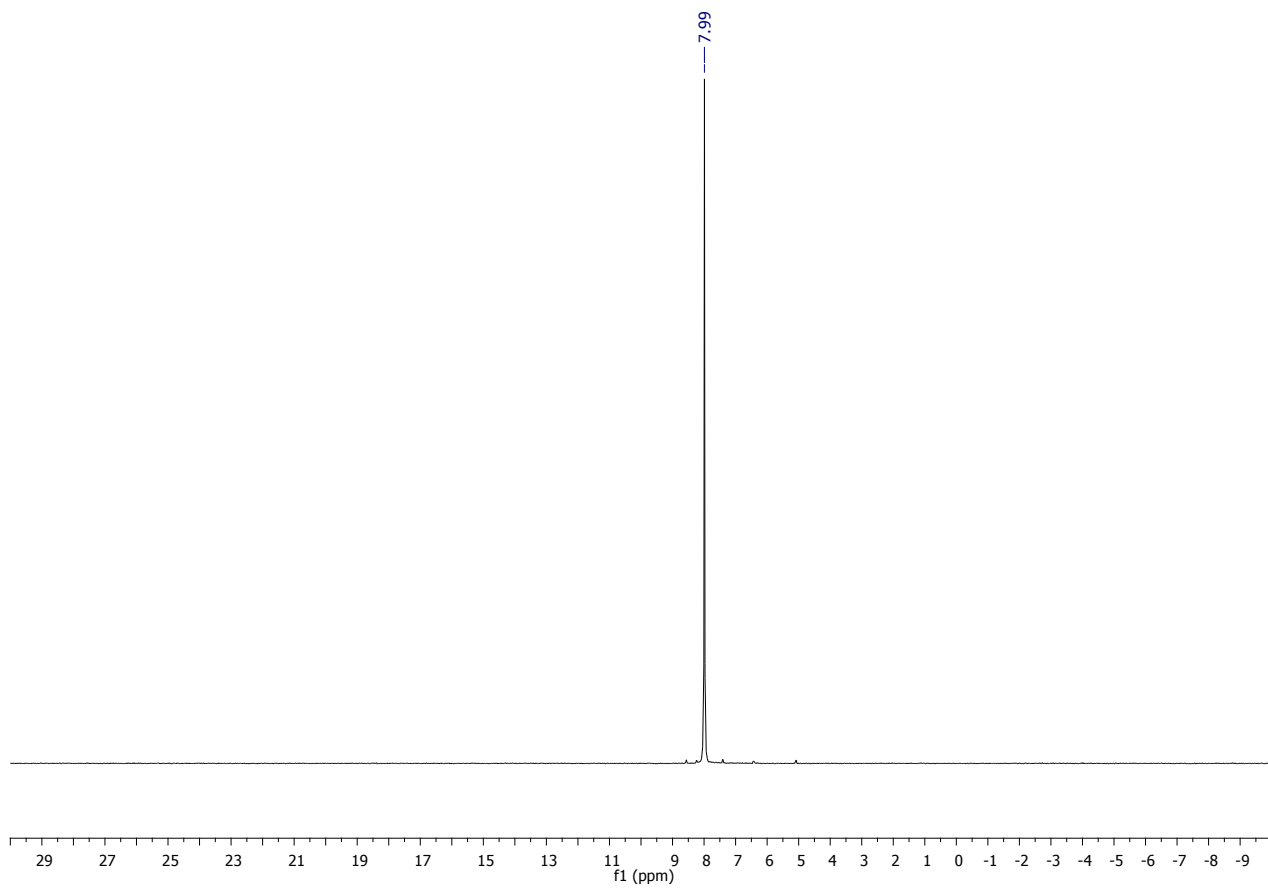
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

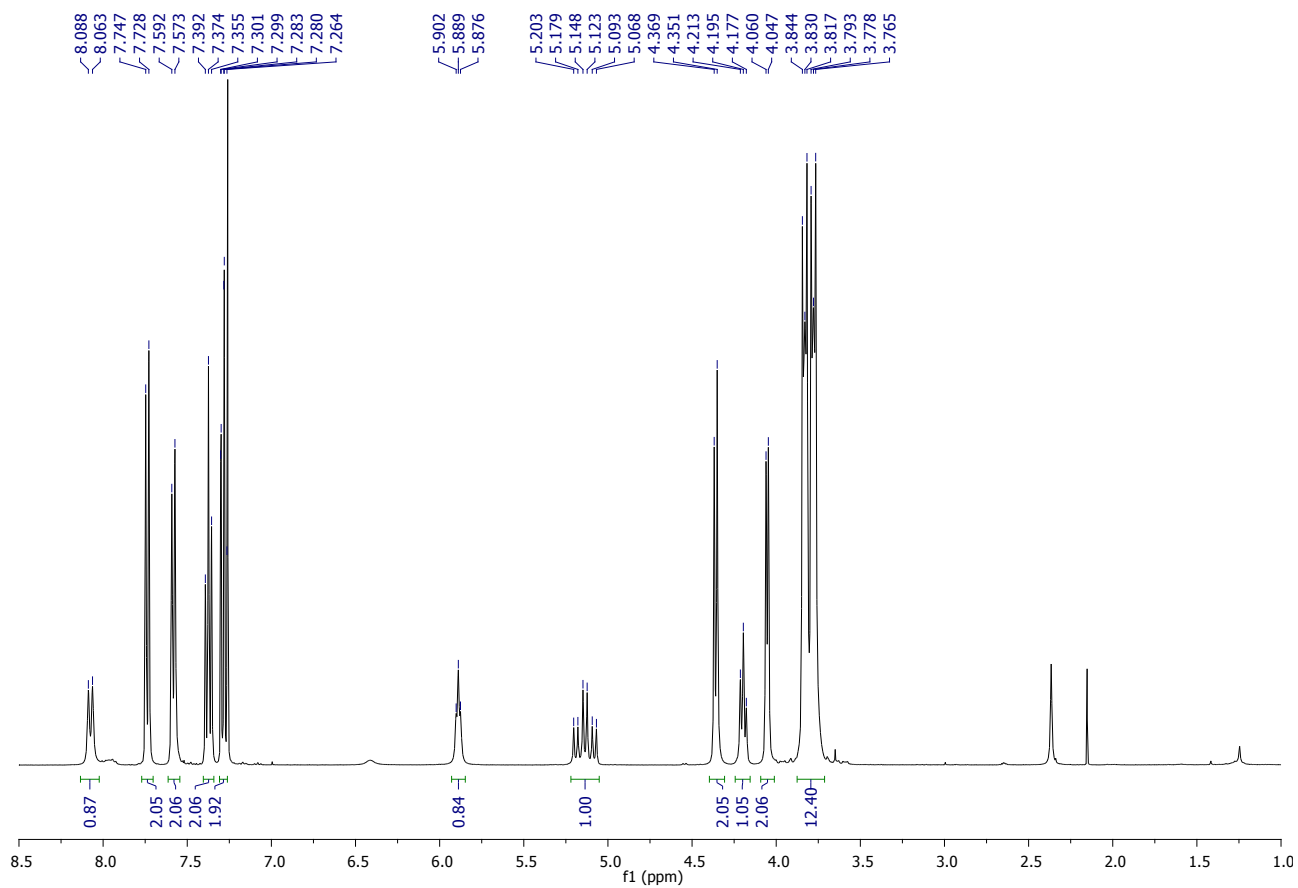


<sup>31</sup>P NMR spectrum

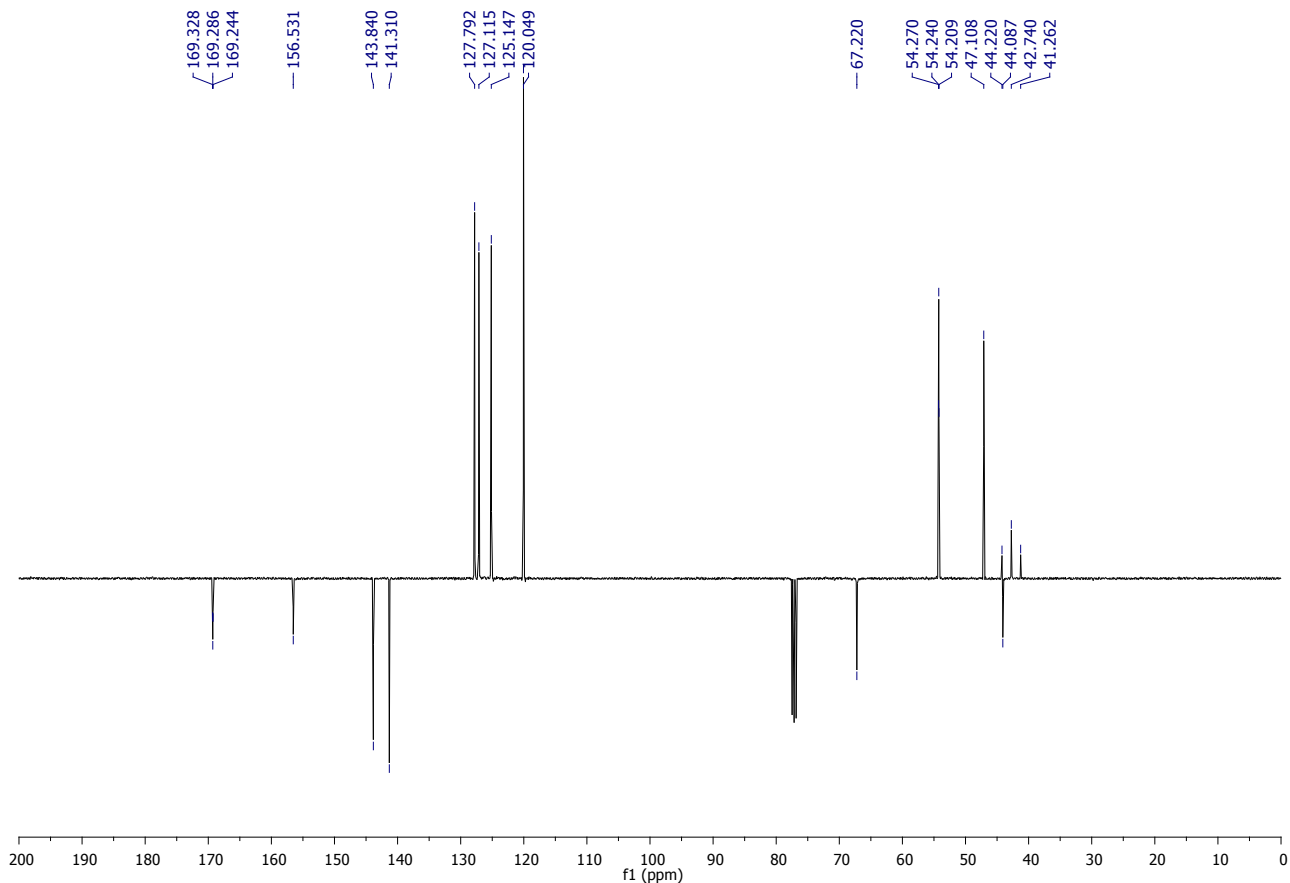


# Tetramethyl [N-(9-fluorenylmethoxycarbonyl)glycylamidomethyl]bisphosphonate, (5)

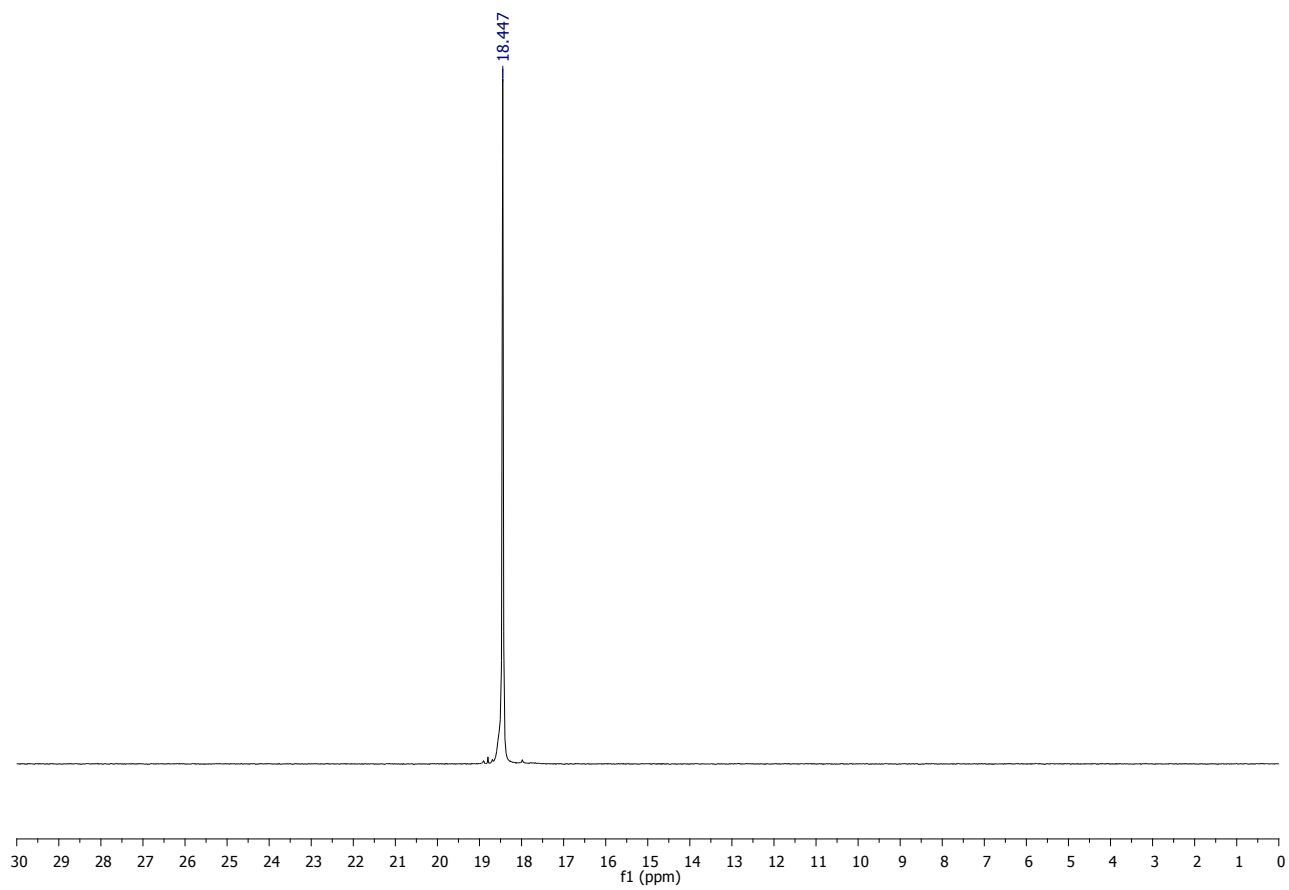
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

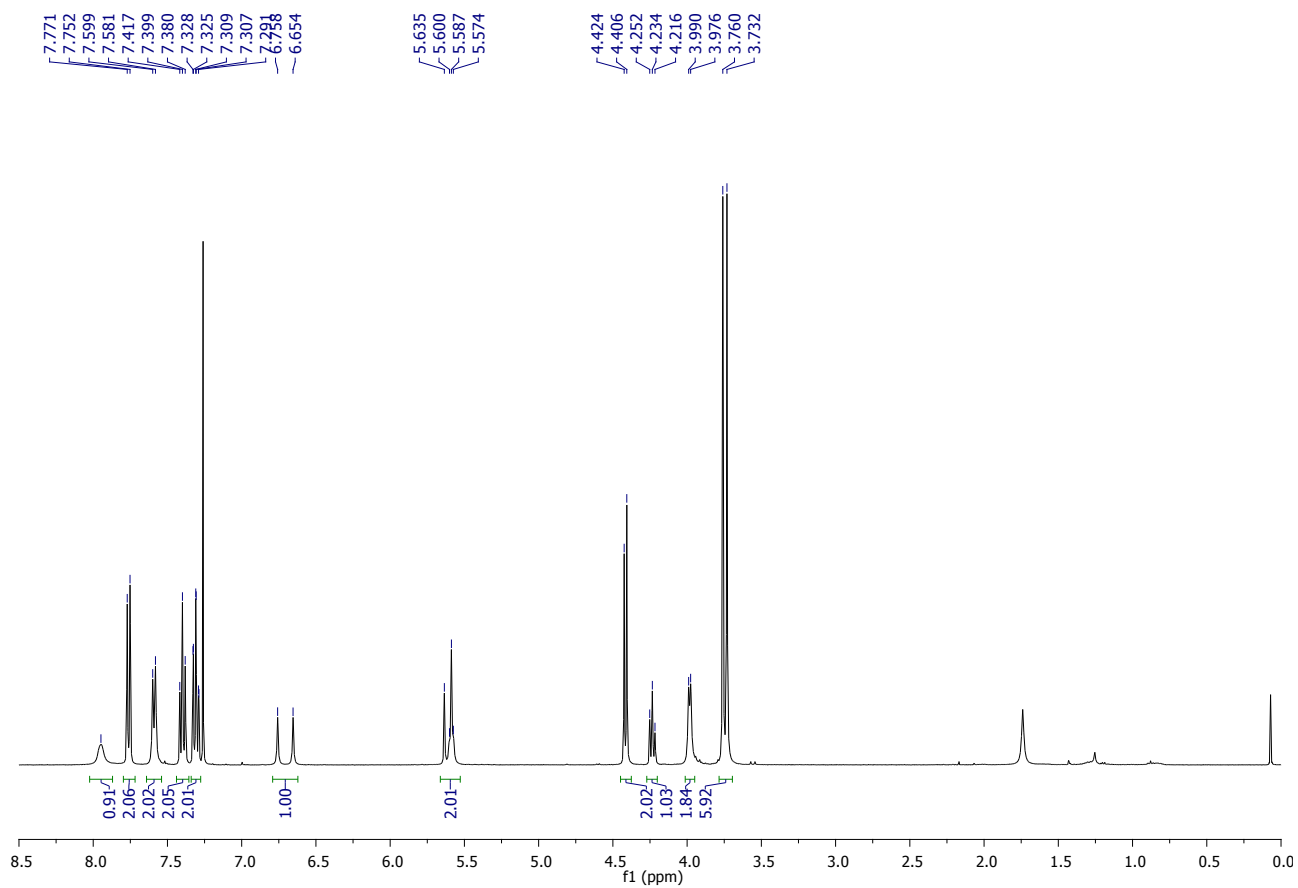


<sup>31</sup>P NMR spectrum

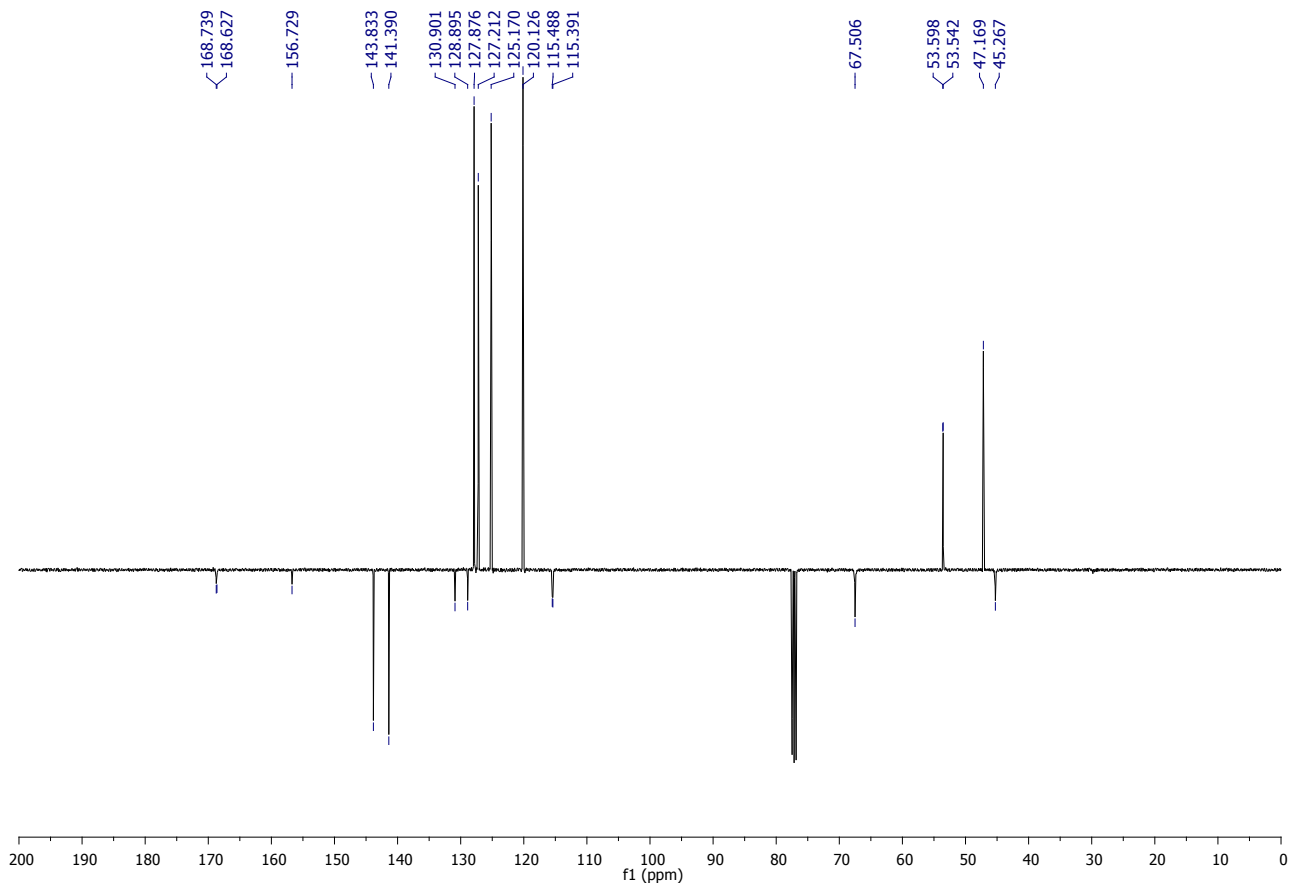


# Dimethyl {1-[N-(9-fluorenylmethoxycarbonyl)glycylamido]ethen-1-yl}phosphonate (7)

## <sup>1</sup>H NMR spectrum

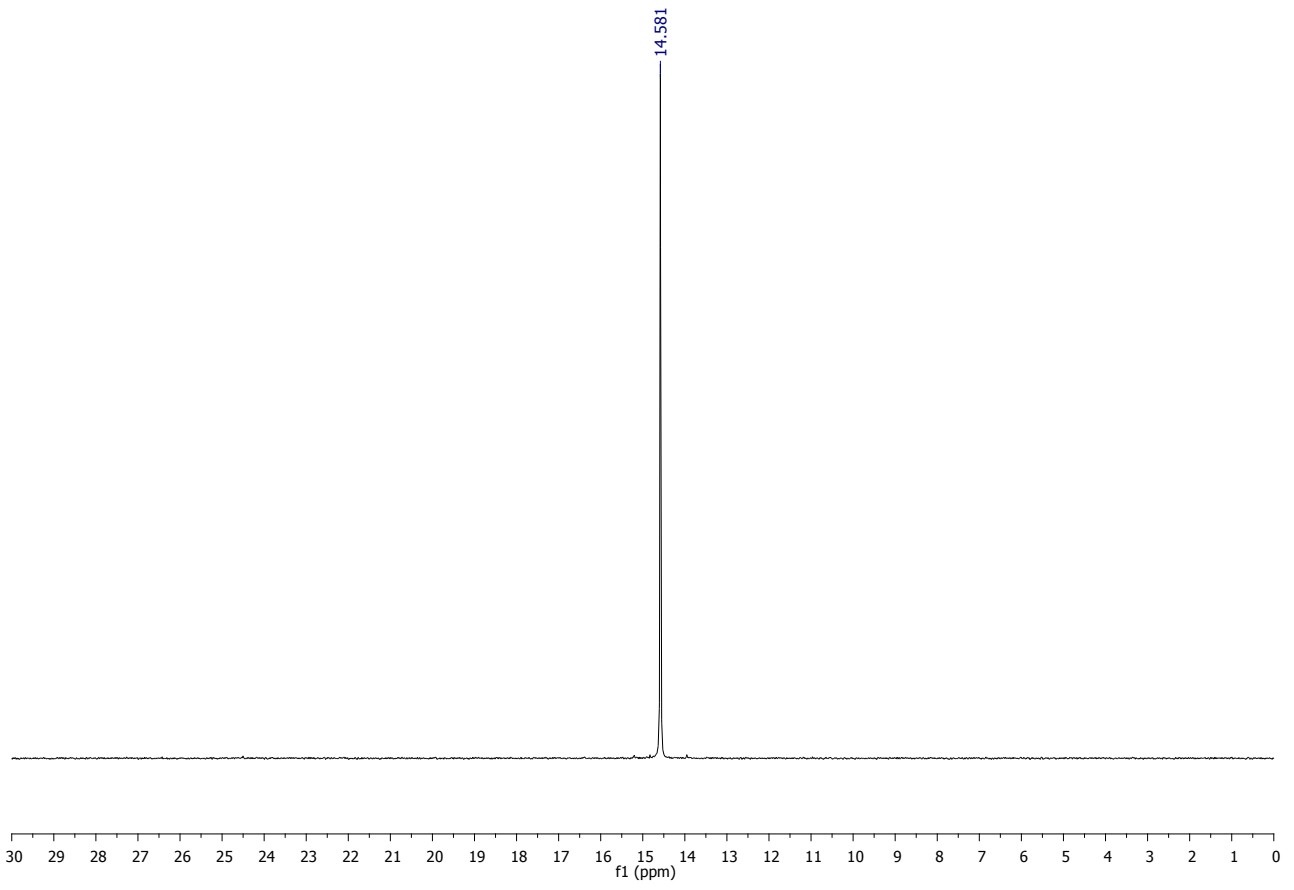


## APTC NMR spectrum



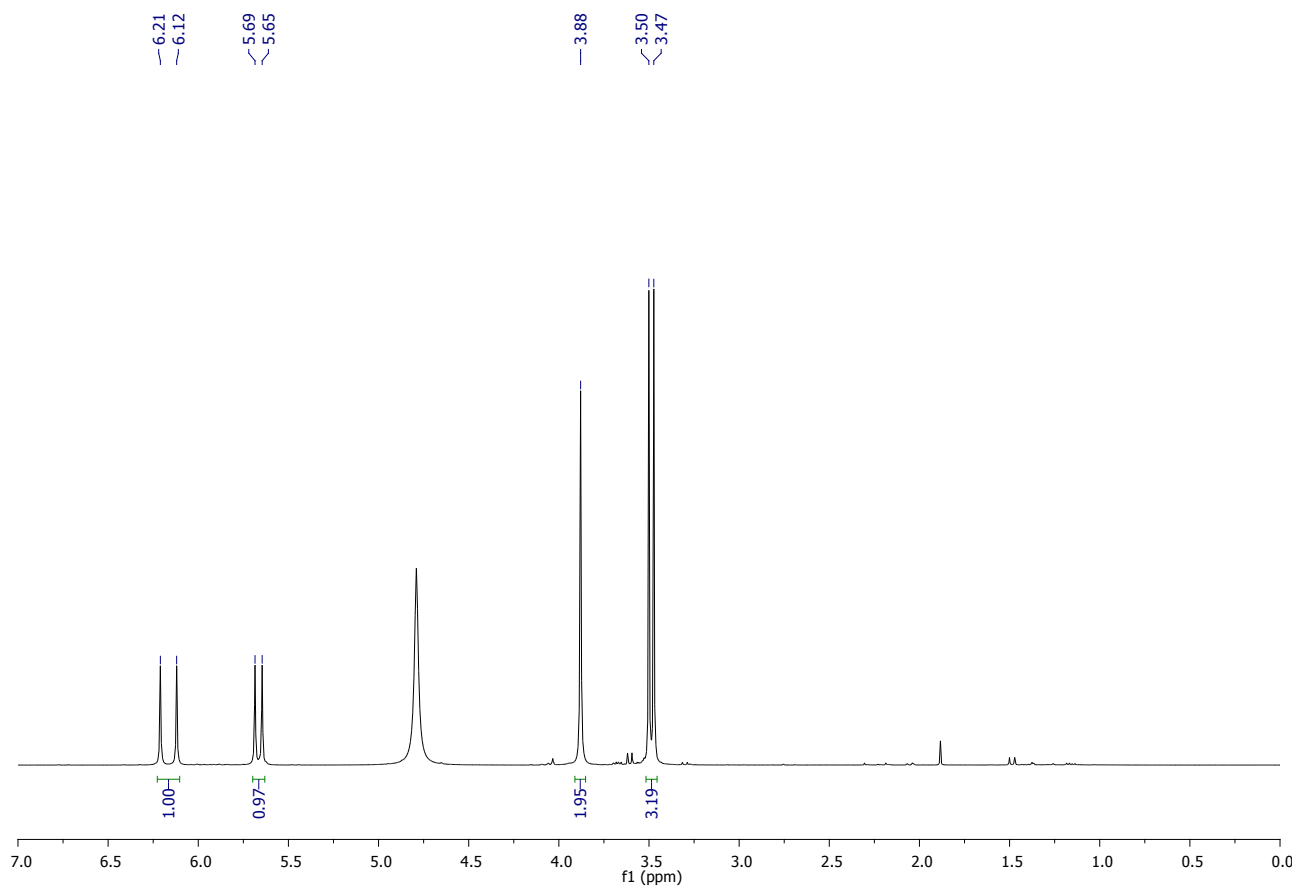


$^{31}\text{P}$  NMR spectrum

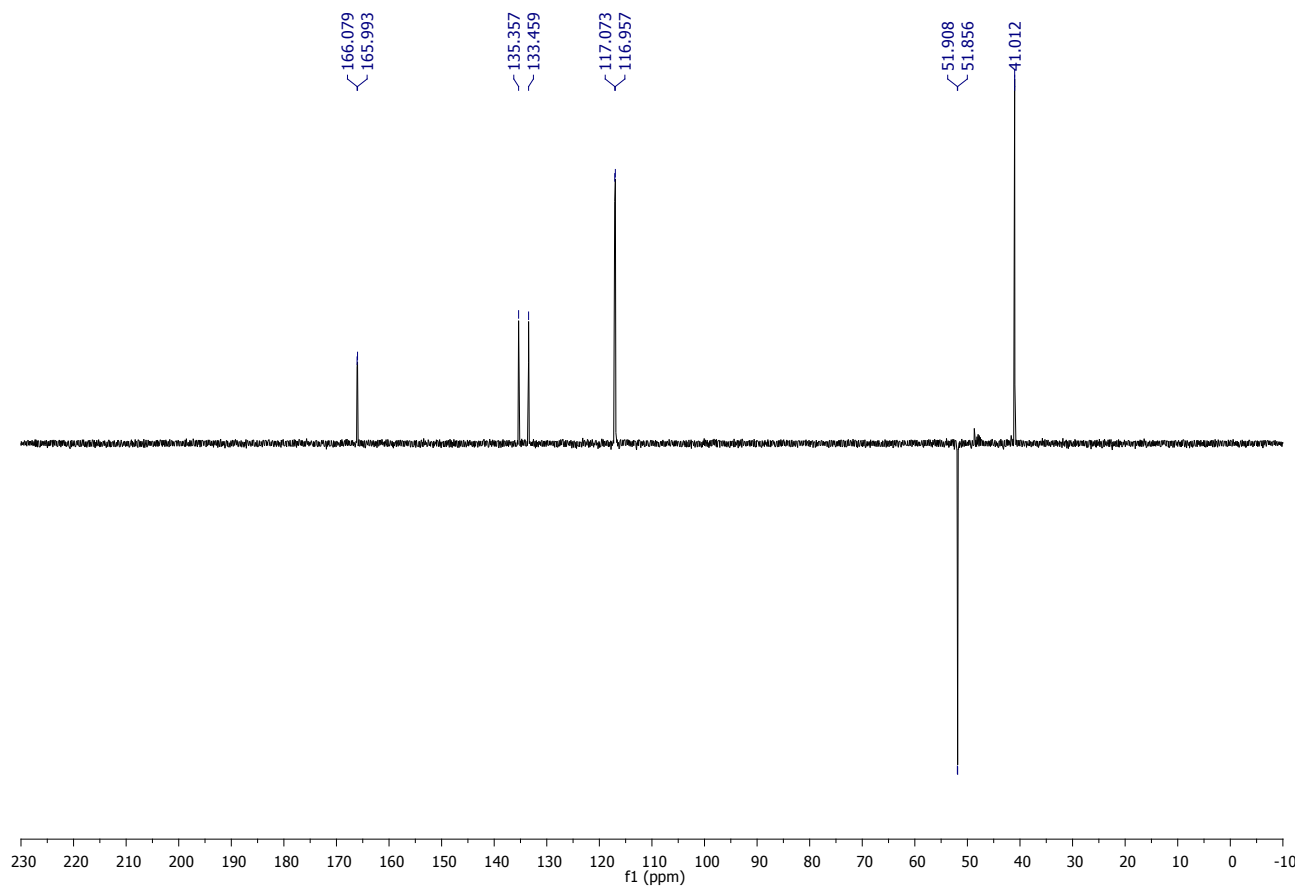


# [1-(glycidamido)ethen-1-yl]phosphonic acid monomethyl ester (2)

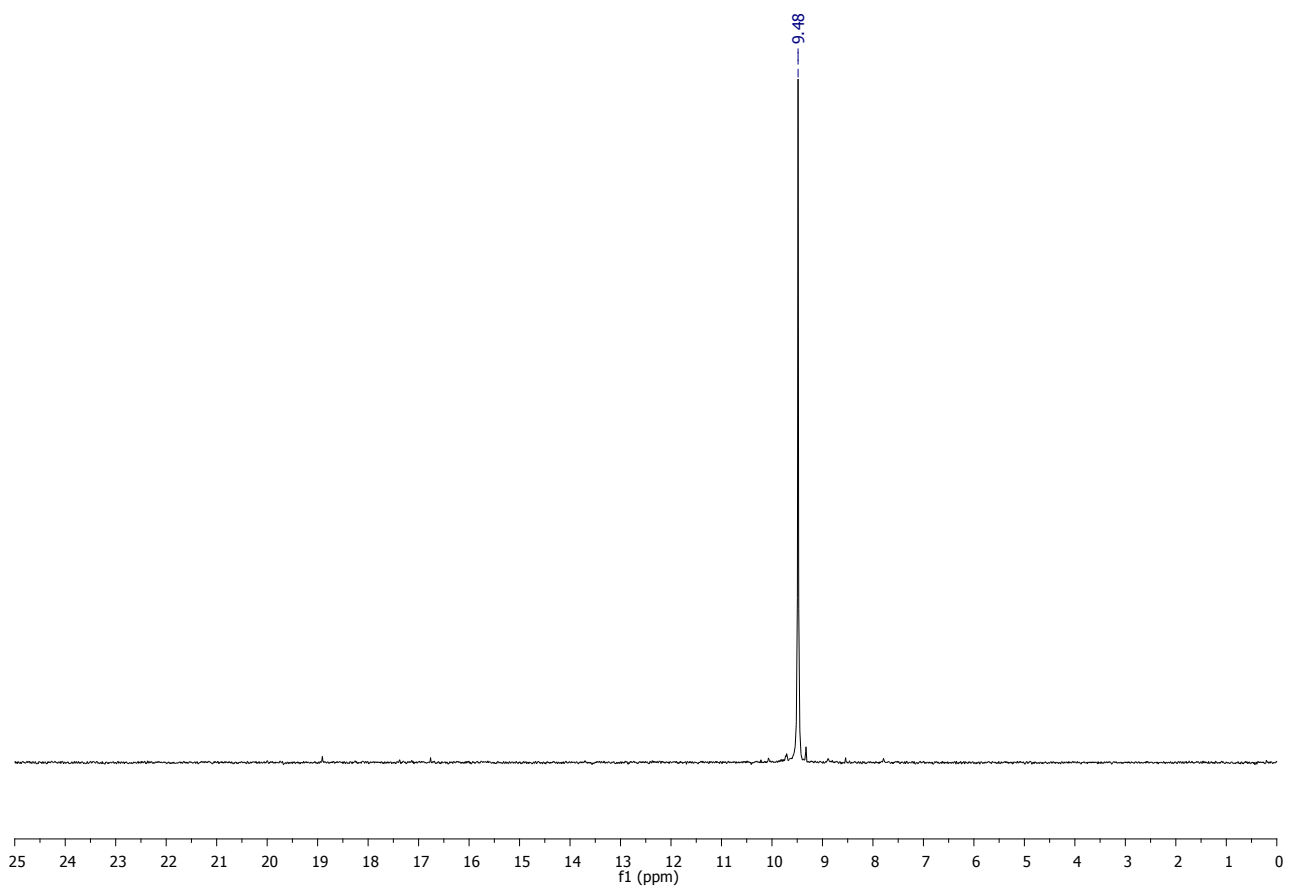
$^1\text{H}$  NMR spectrum



APTC NMR spectrum

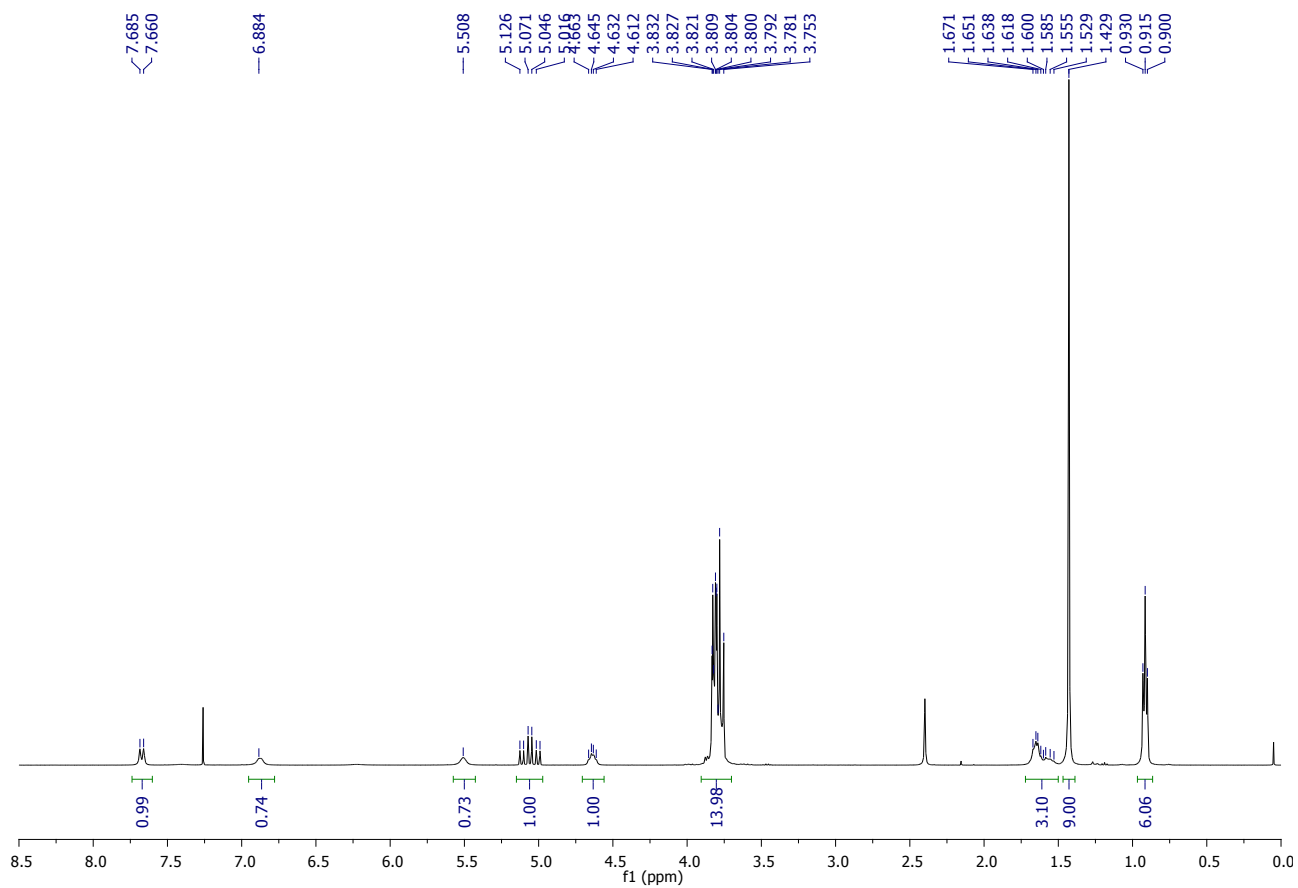


<sup>31</sup>P NMR spectrum

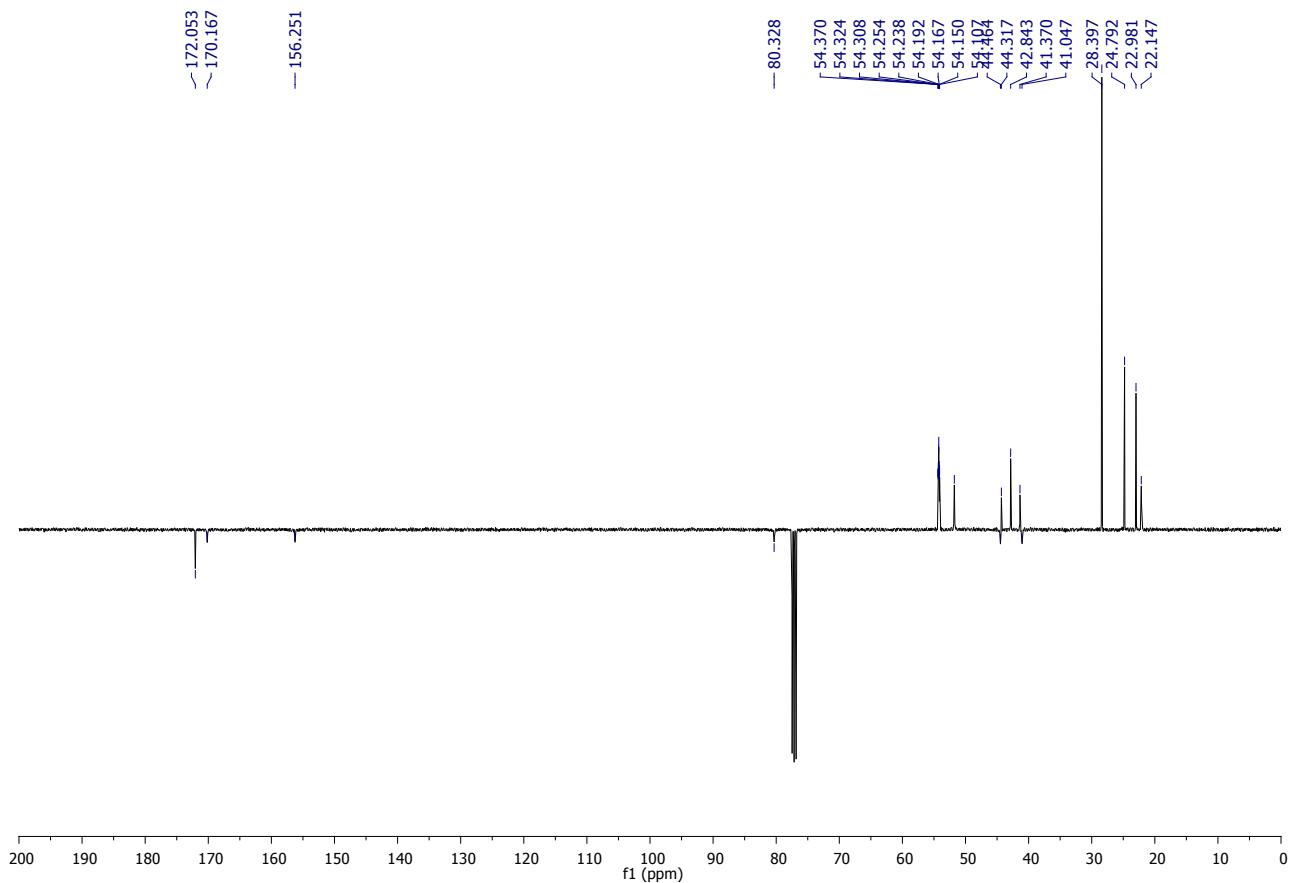


# Tetramethyl [N-(tert-butoxycarbonyl)glycyl-L-leucylamidomethyl]bisphosphonate (10)

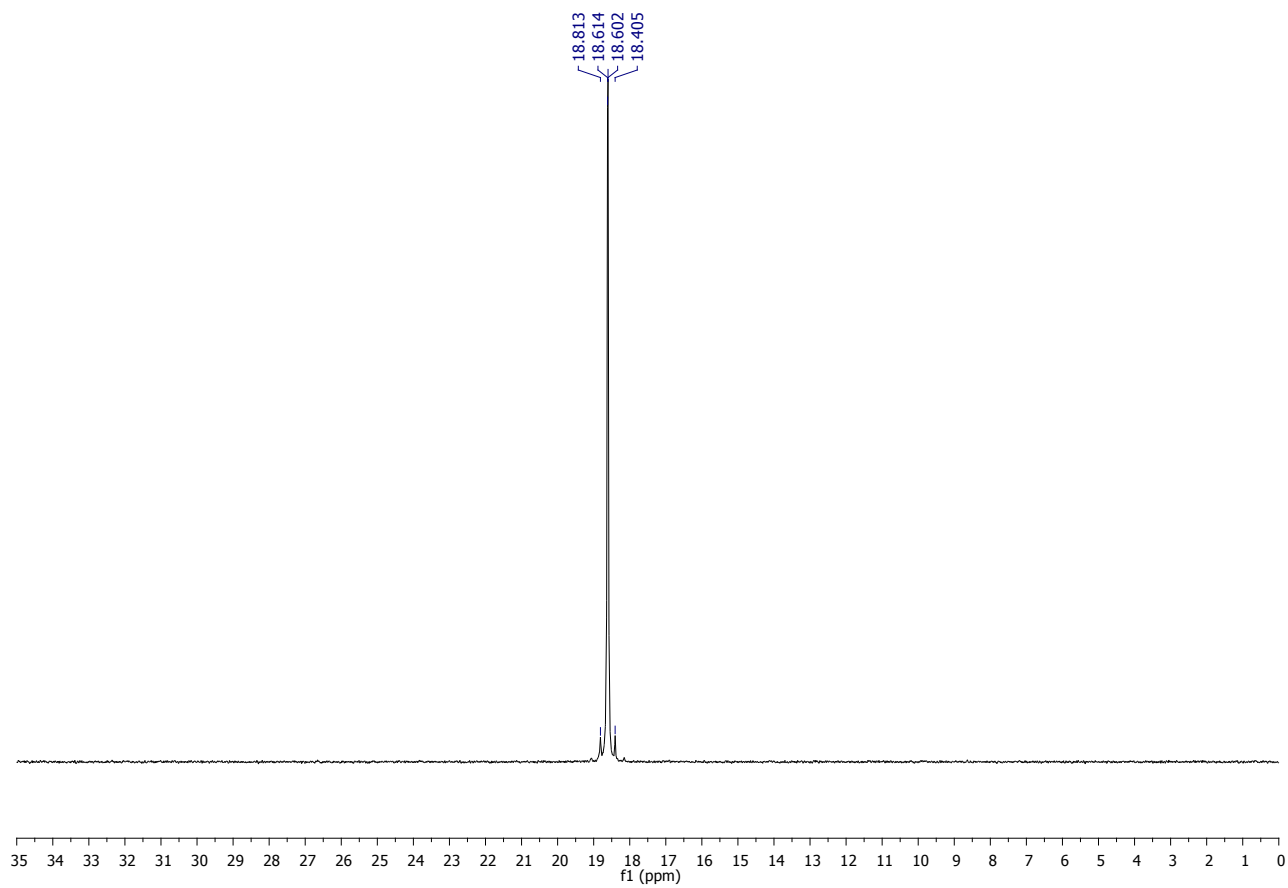
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

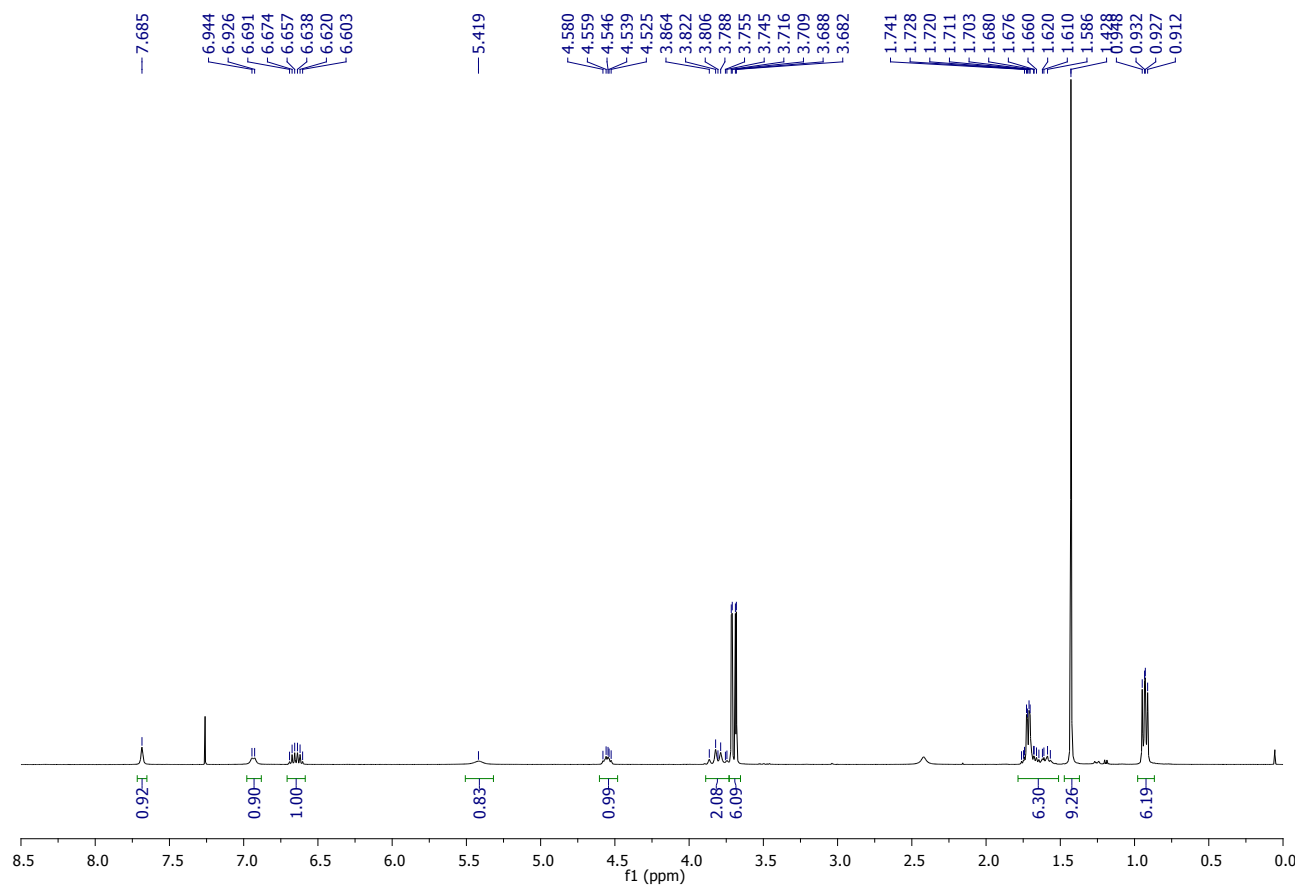


<sup>31</sup>P NMR spectrum

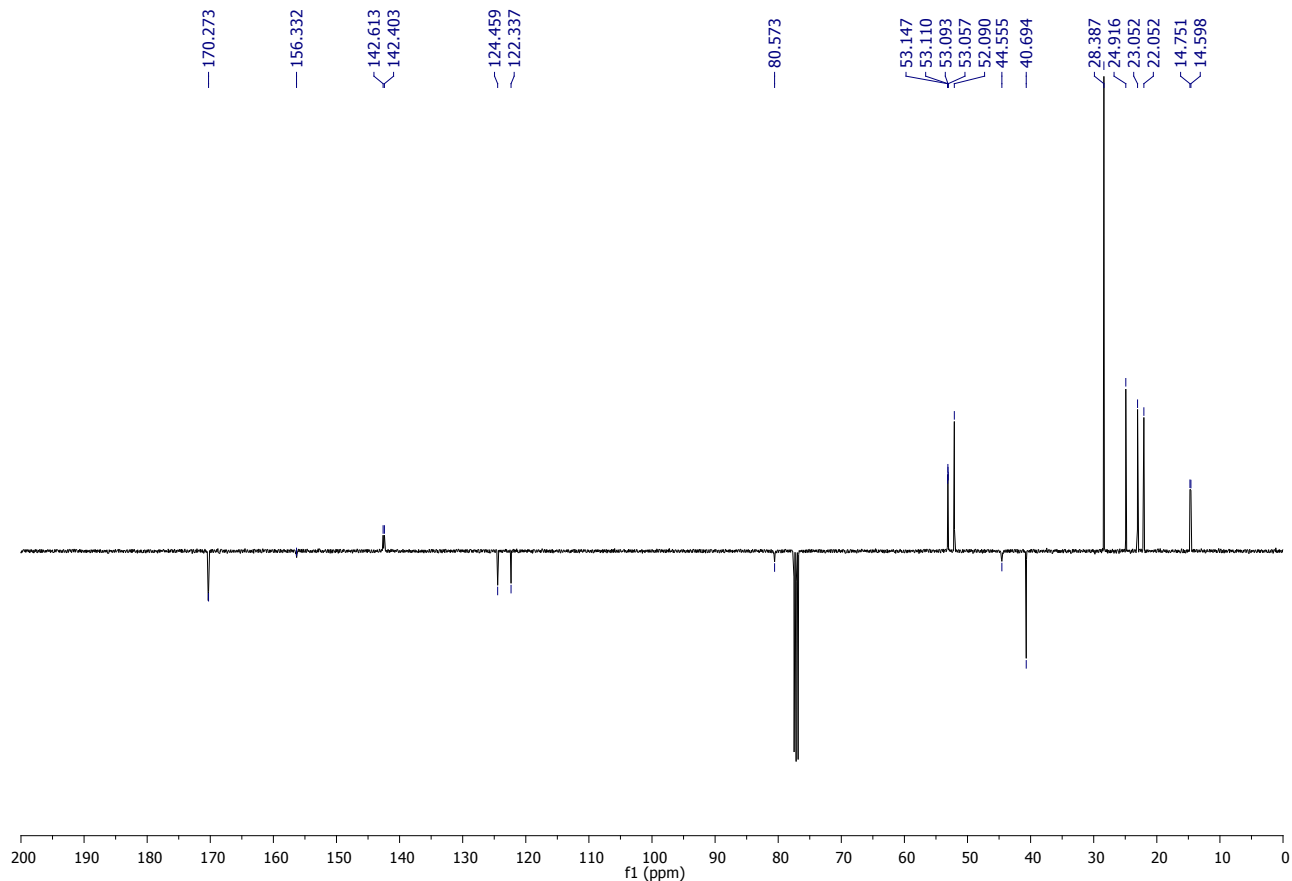


# Dimethyl (E)-{1-[N-(tert-butoxycarbonyl)glycyl-L-leucylamido]prop-1-en-1-yl}phosphonate (E-11)

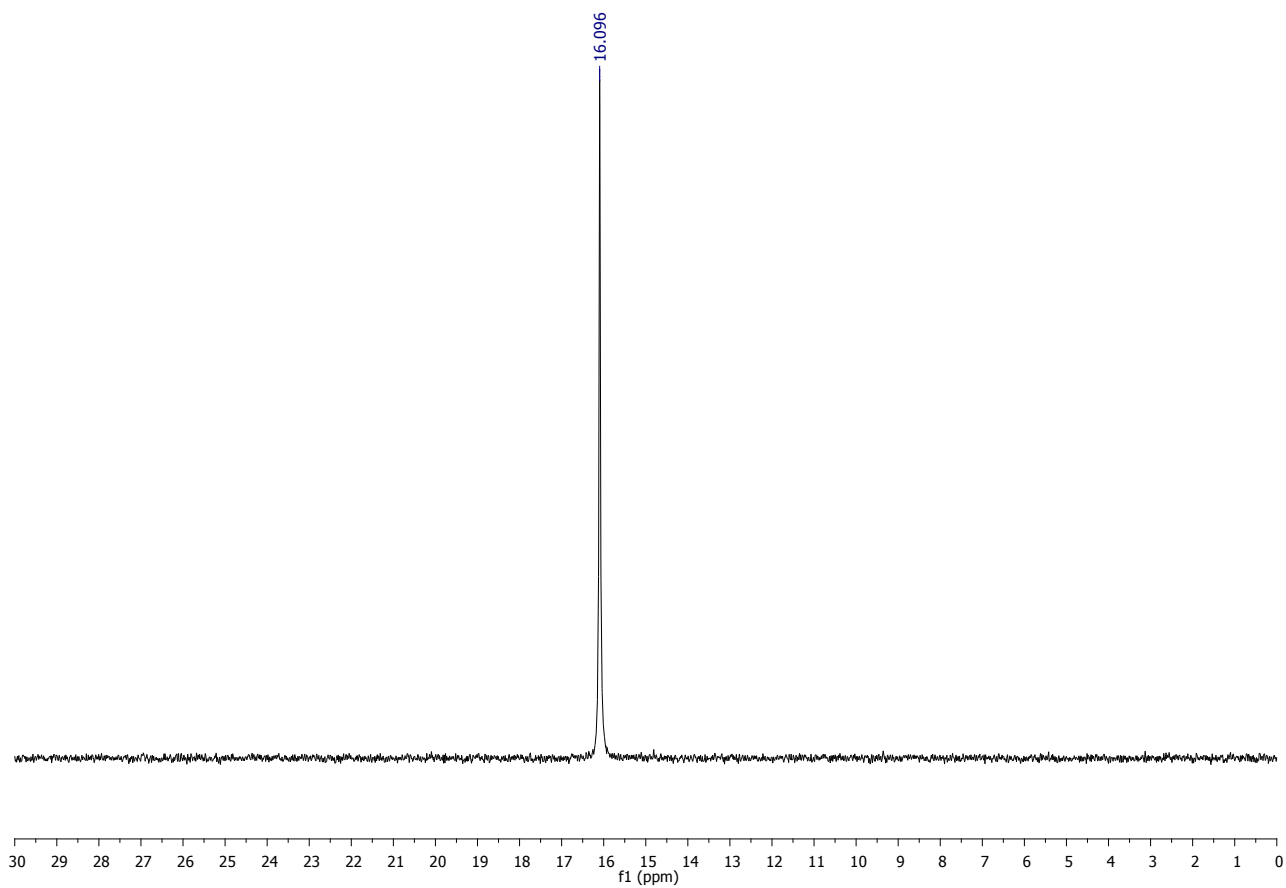
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

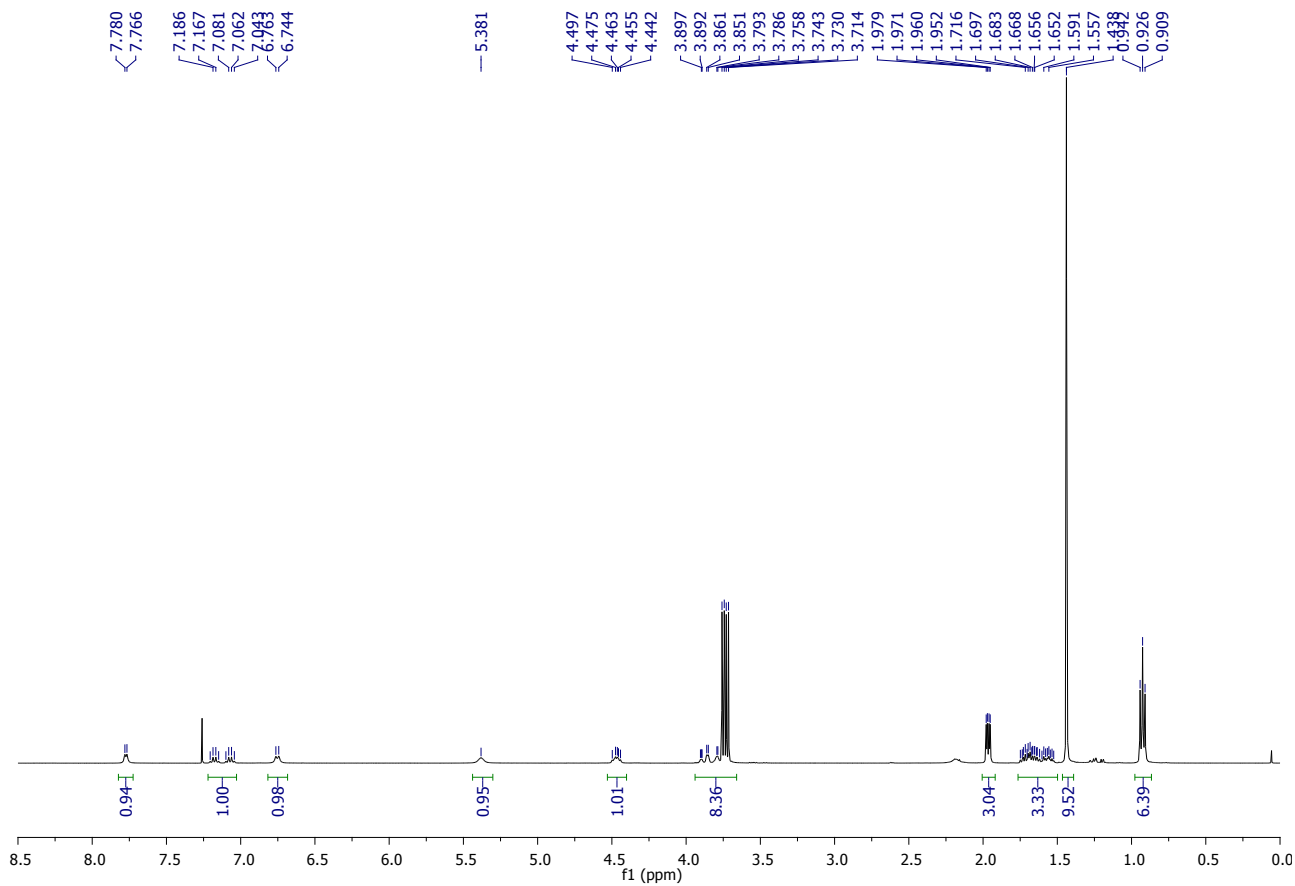


$^{31}\text{P}$  NMR spectrum

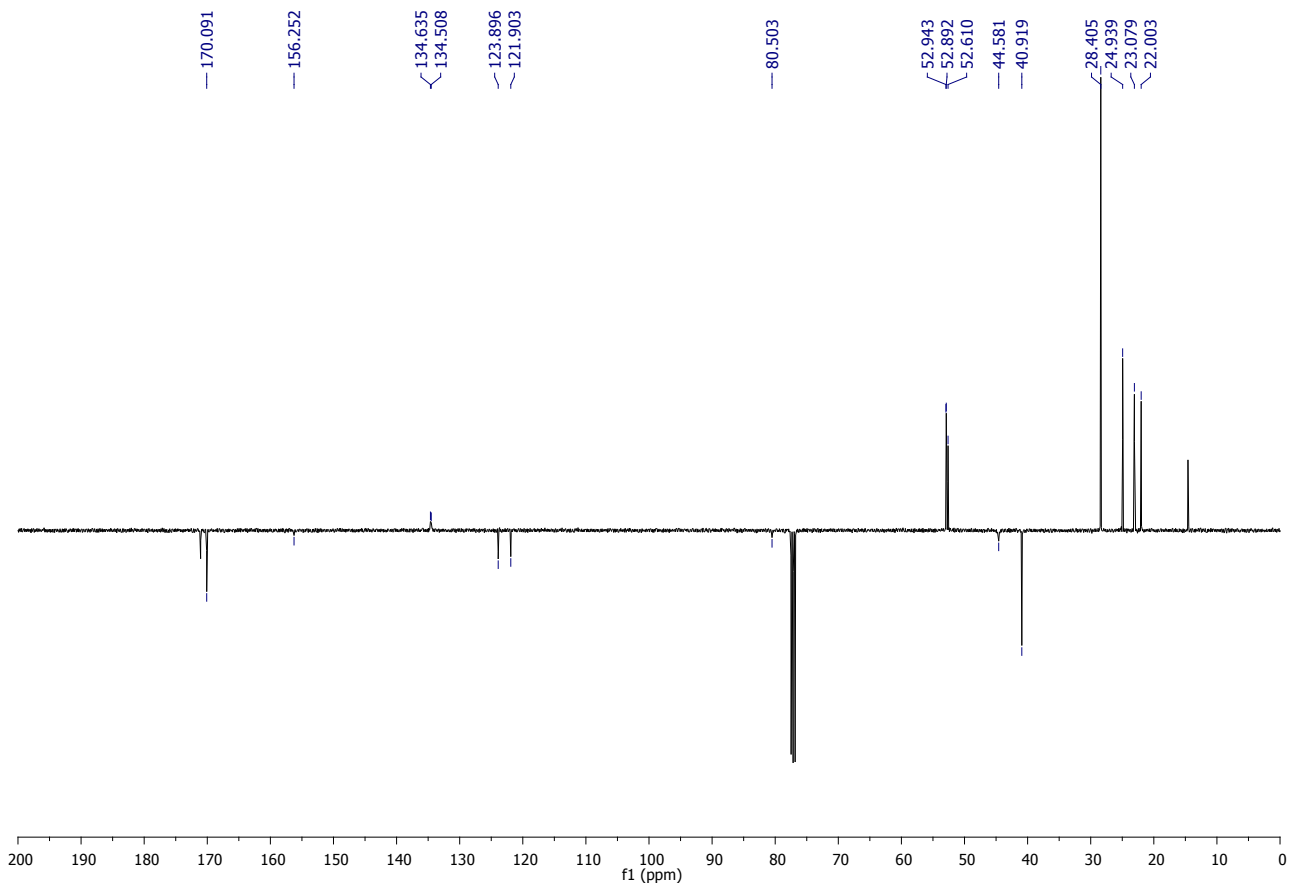


# Dimethyl (Z)-{1-[N-(tert-butoxycarbonyl)glycyl-L-leucylamido]prop-1-en-1-yl}phosphonate (Z-11)

## <sup>1</sup>H NMR spectrum

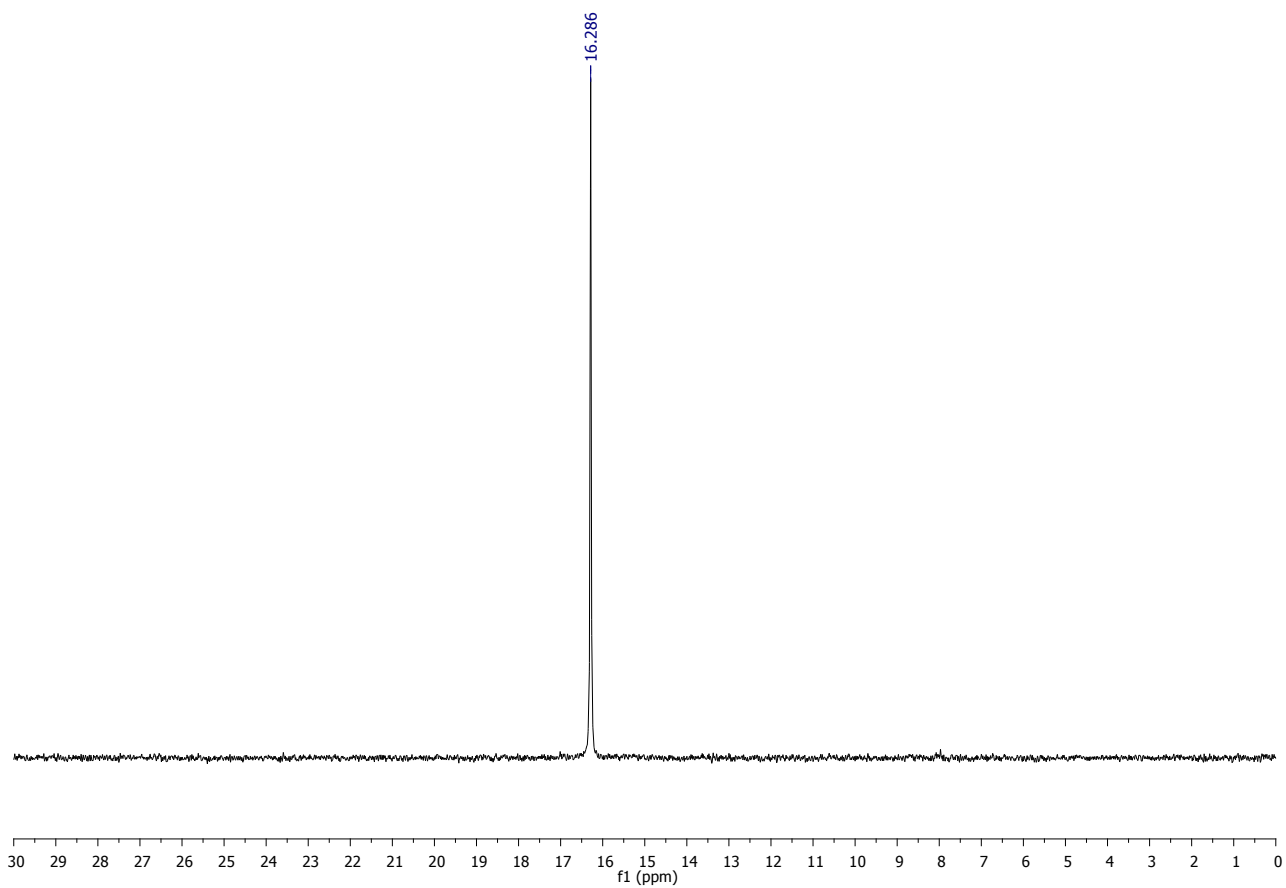


## APTC NMR spectrum



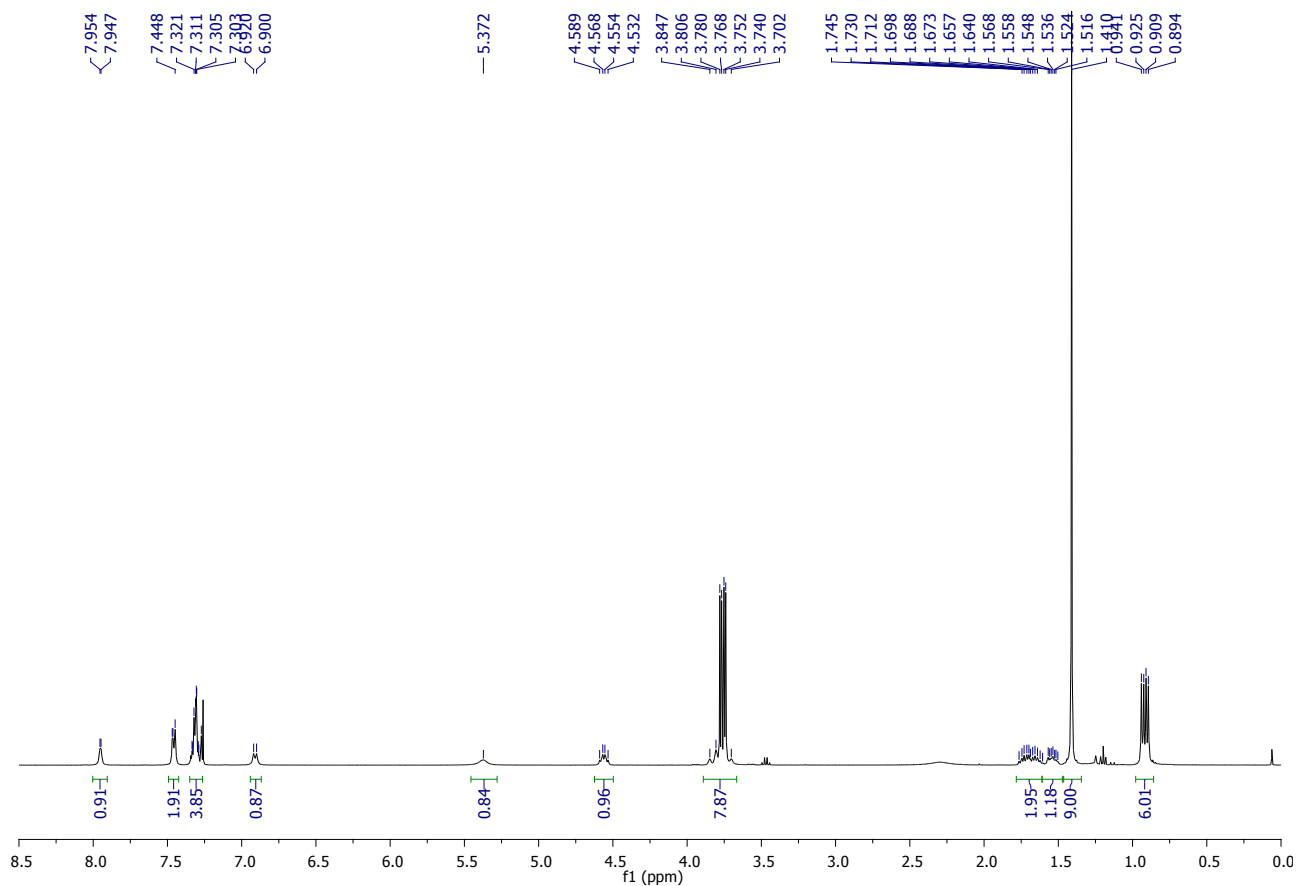


<sup>31</sup>P NMR spectrum

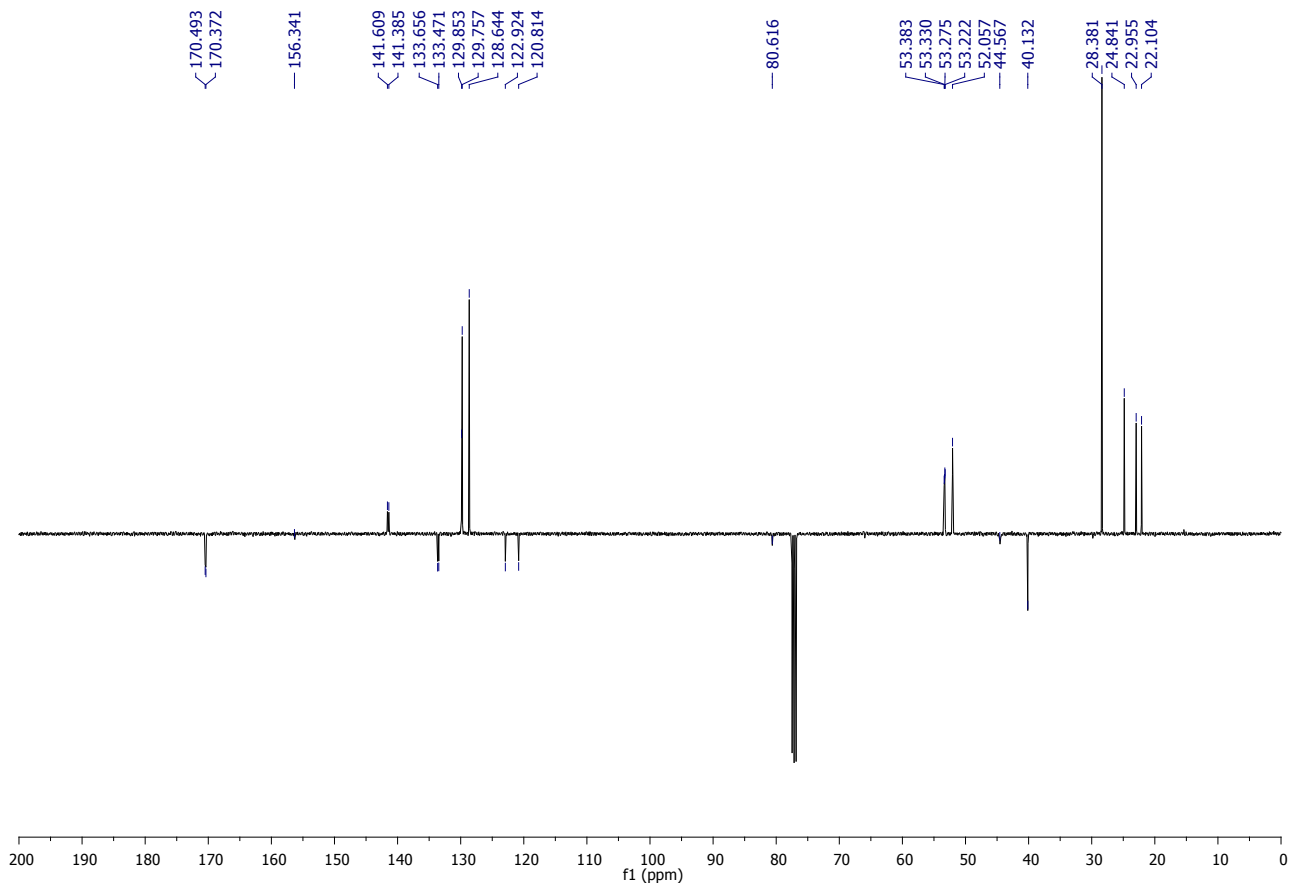


# Dimethyl (E)-{1-[N-(tert-butoxycarbonyl)glycyl-L-leucylamido]-2-phenylethen-1-yl}phosphonate (E-12)

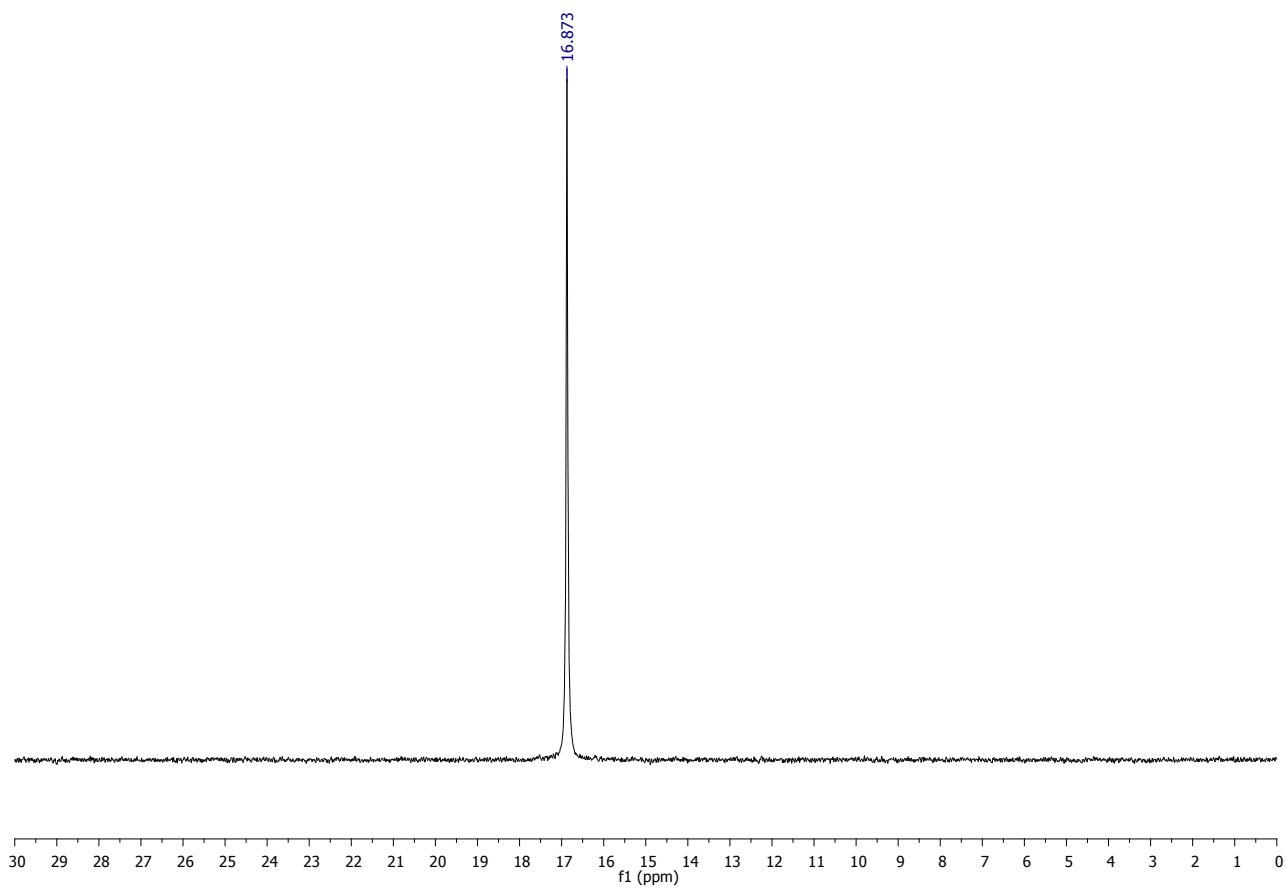
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

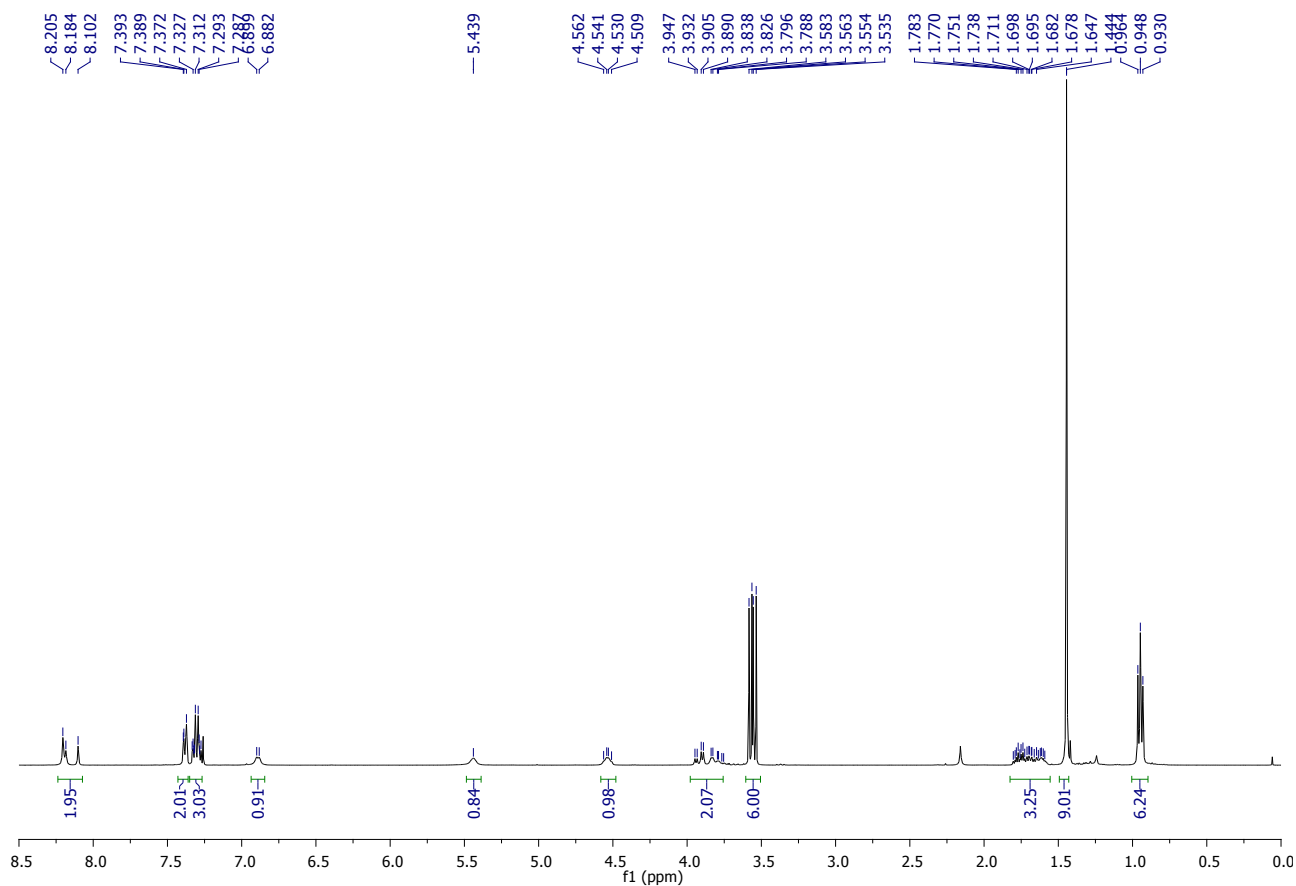


$^{31}\text{P}$  NMR spectrum

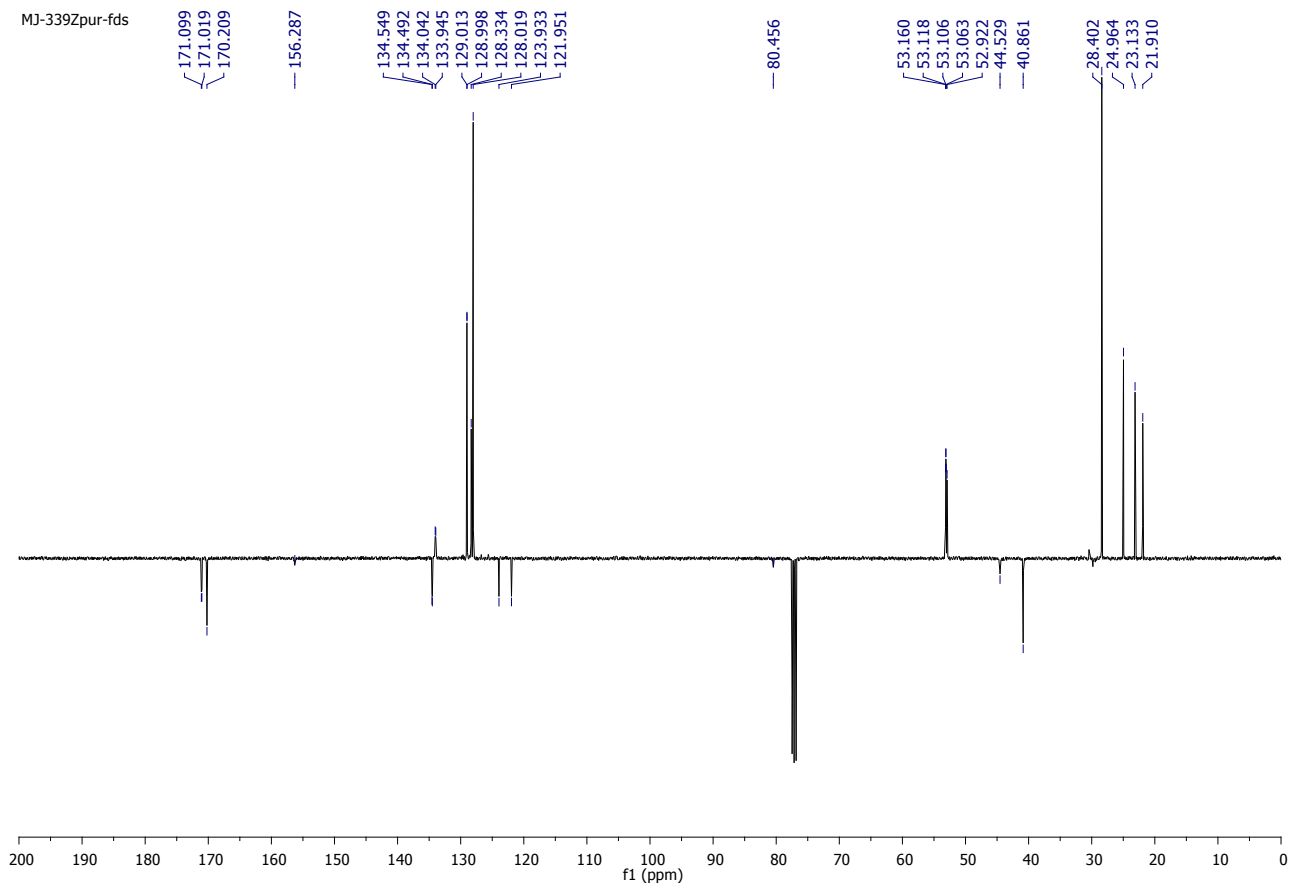


**Dimethyl (Z)-{1-[N-(tert-butoxycarbonyl)glycyl-L-leucylamido]-2-phenylethen-1-yl}phosphonate (Z-12)**

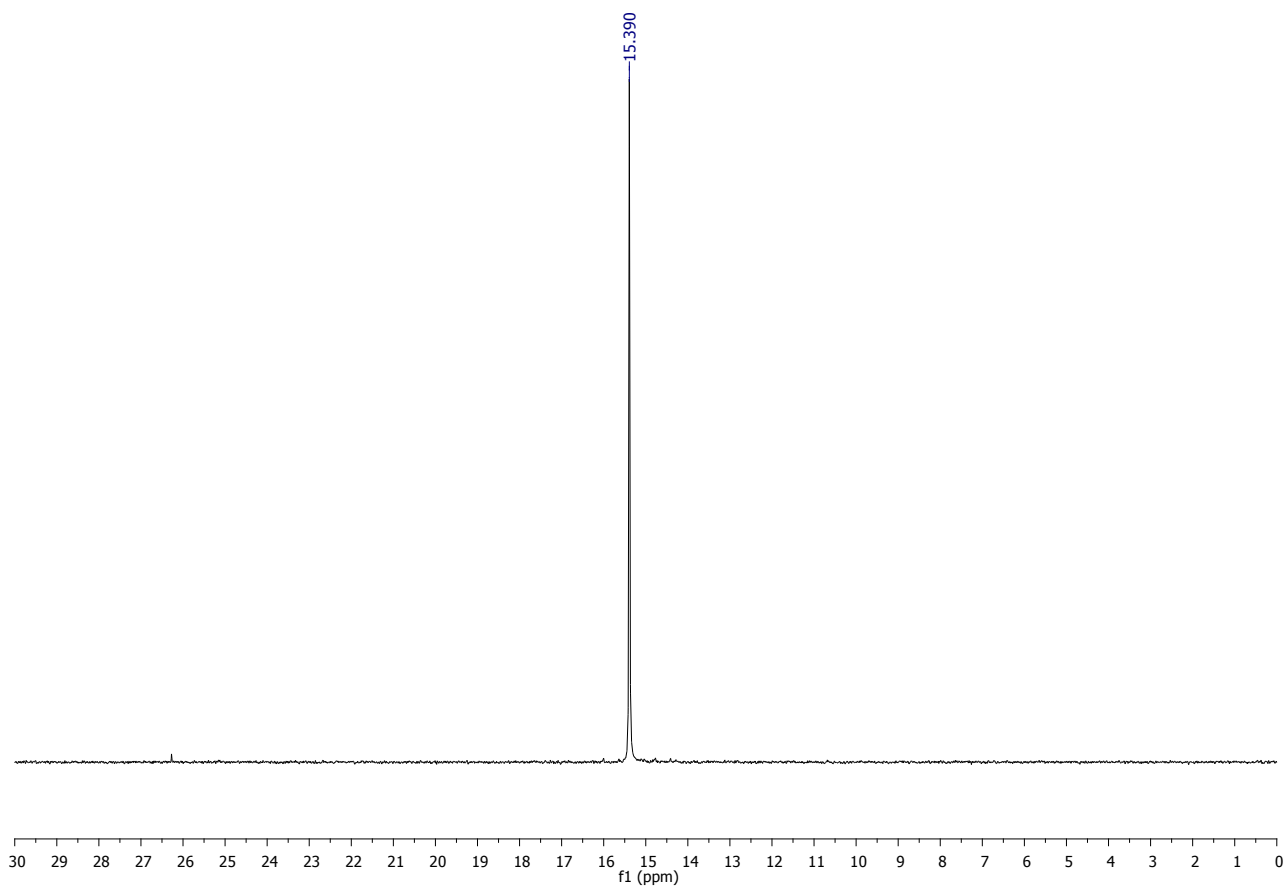
<sup>1</sup>H NMR spectrum



APTC NMR spectrum

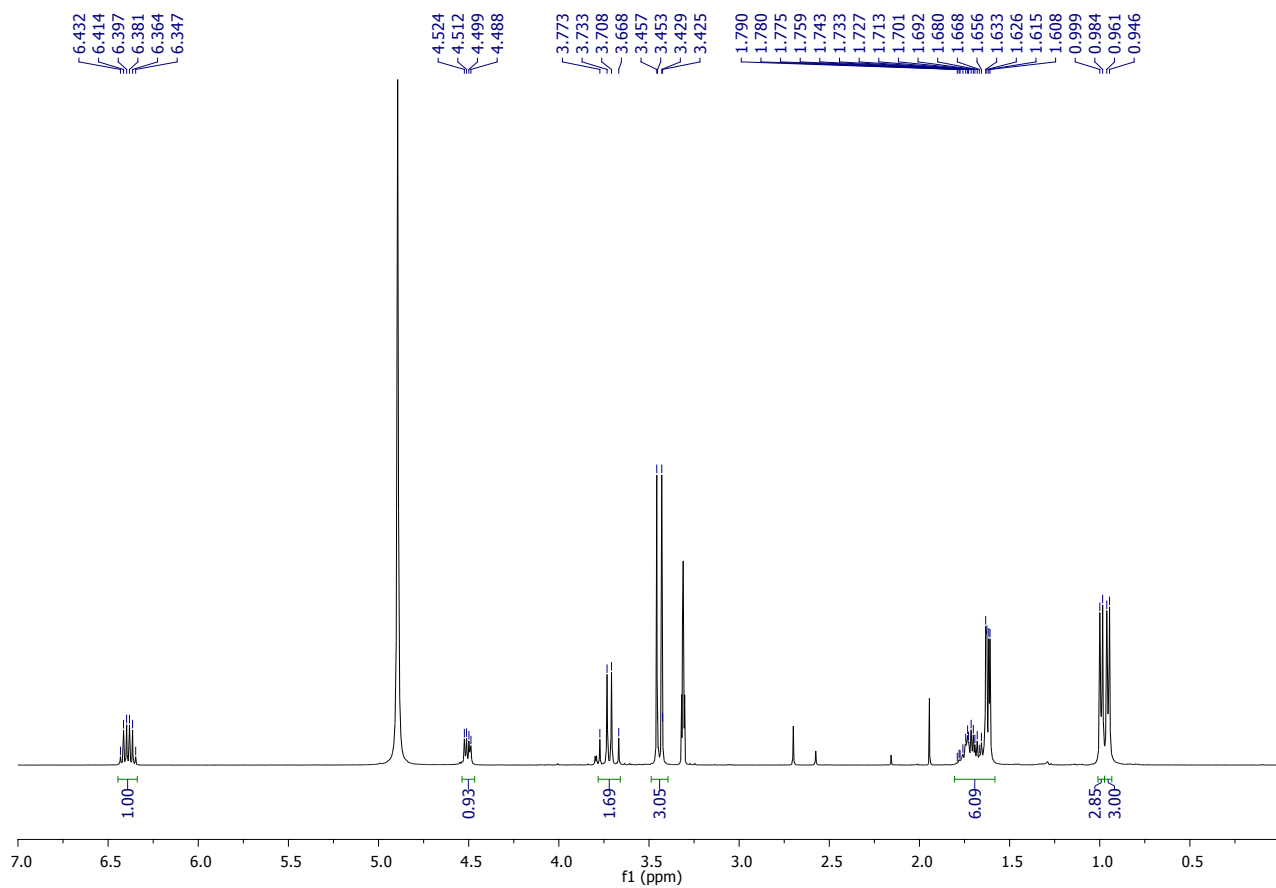


<sup>31</sup>P NMR spectrum

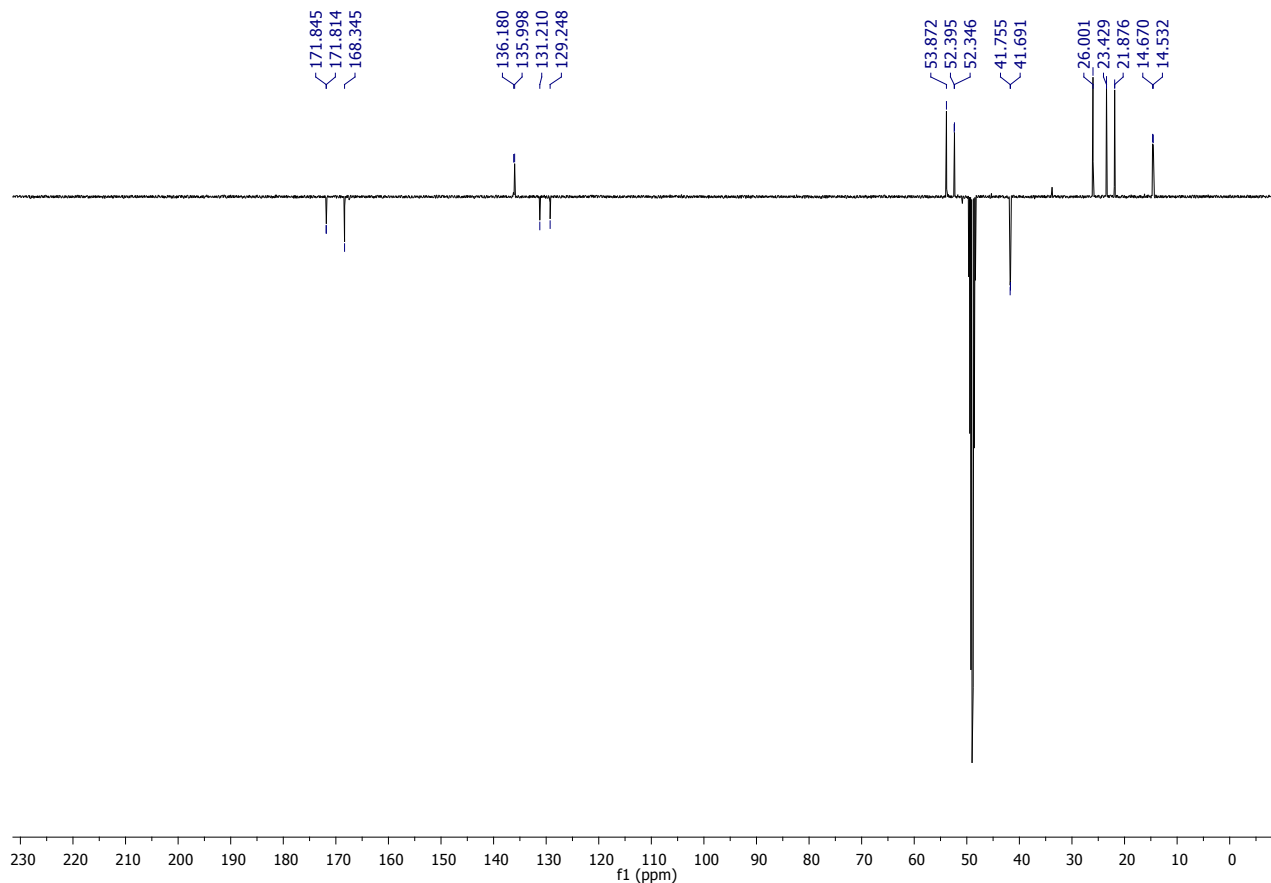


**(E)-[1-(glycyl-L-leucylamido)prop-1-en-1-yl]phosphonic acid monomethyl ester (13)**

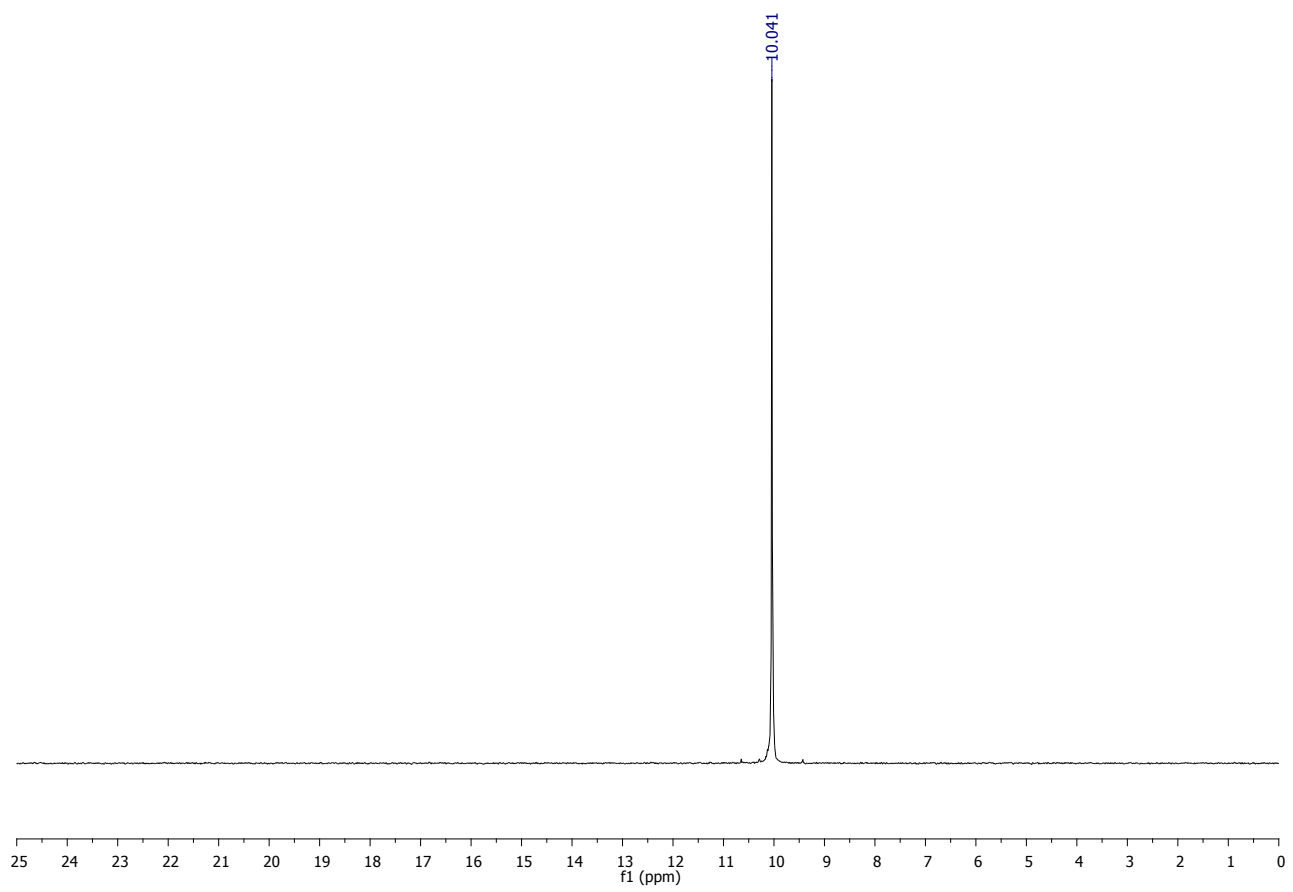
<sup>1</sup>H NMR spectrum



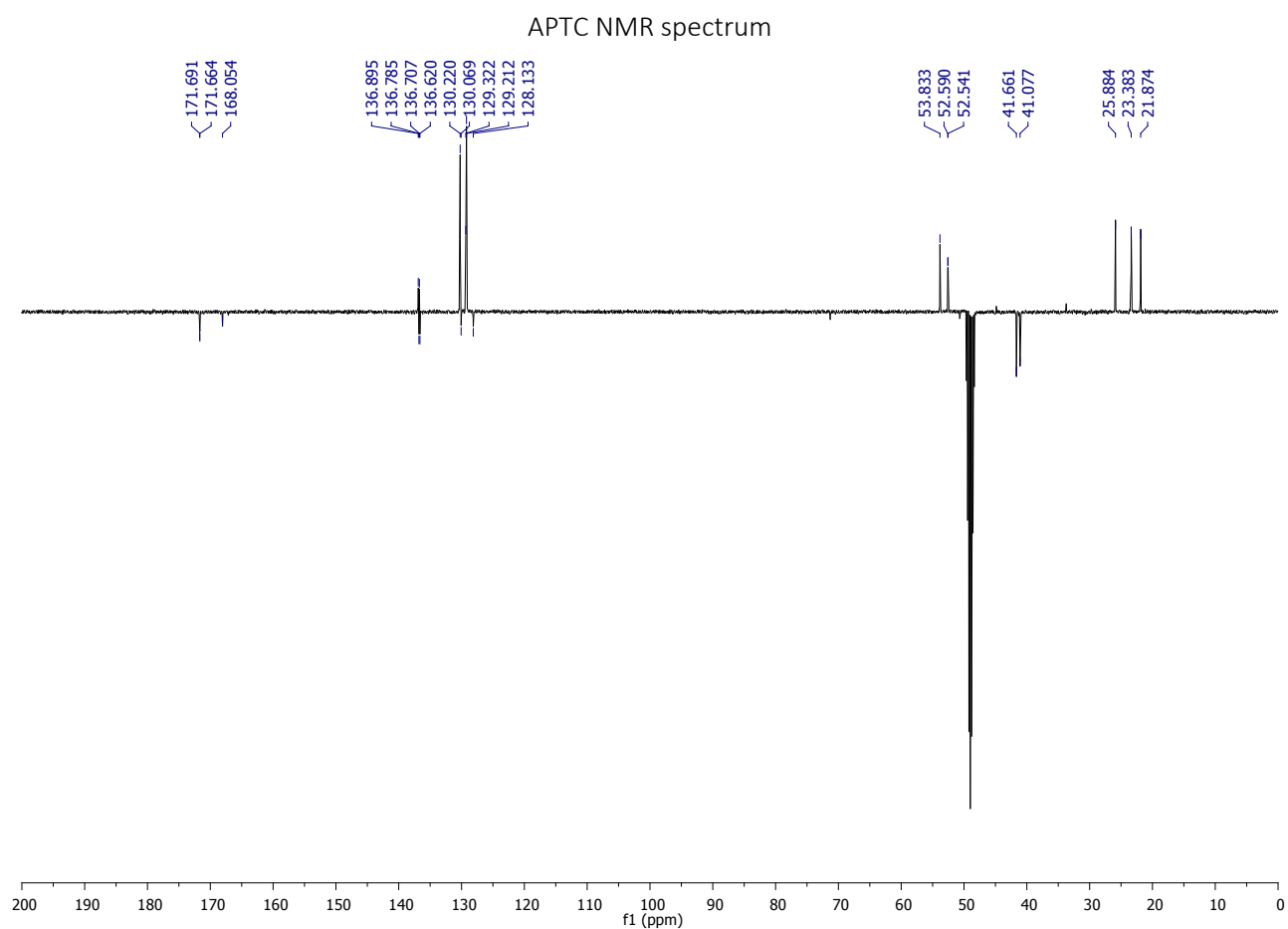
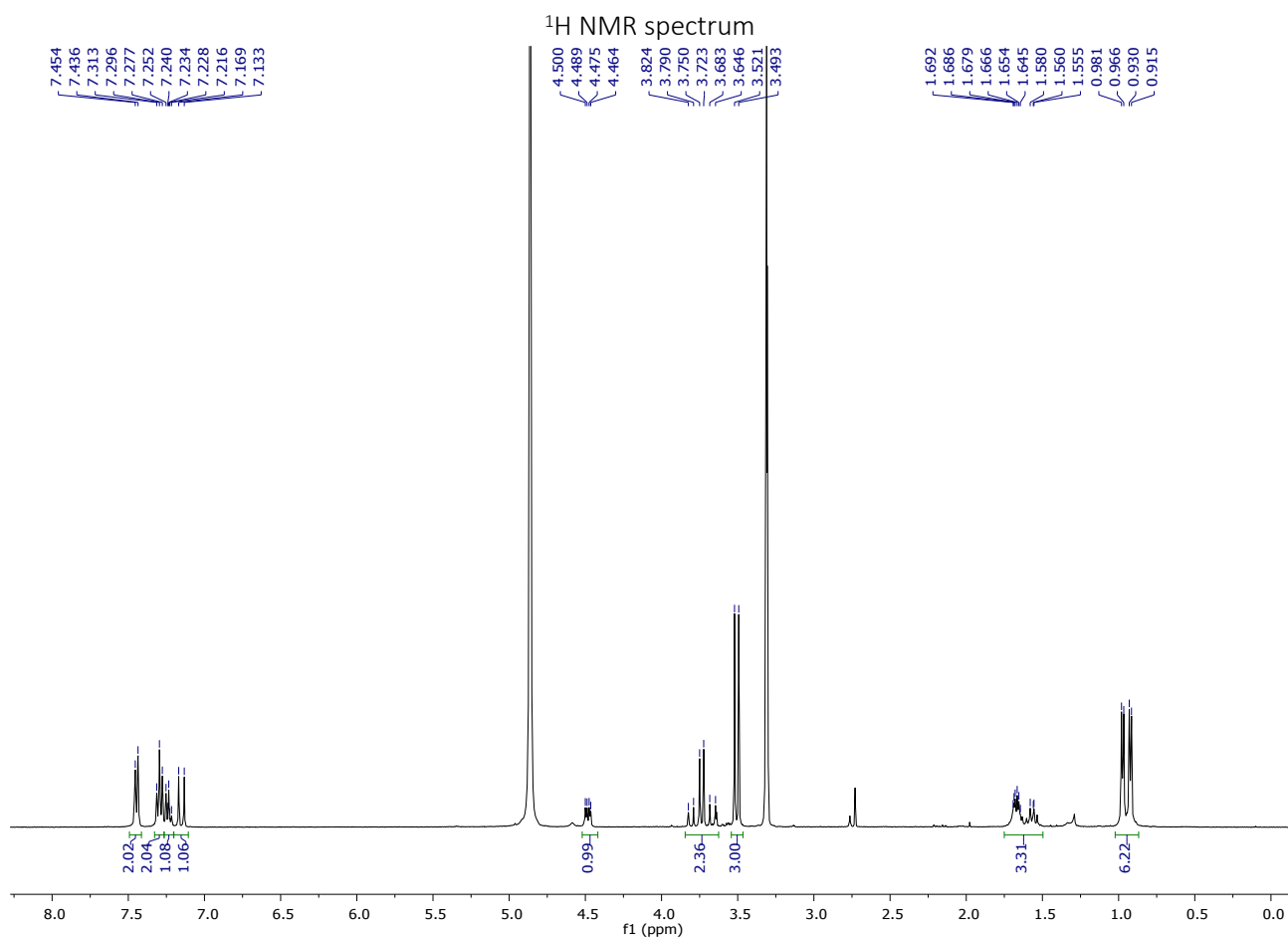
APTC NMR spectrum



<sup>31</sup>P NMR spectrum

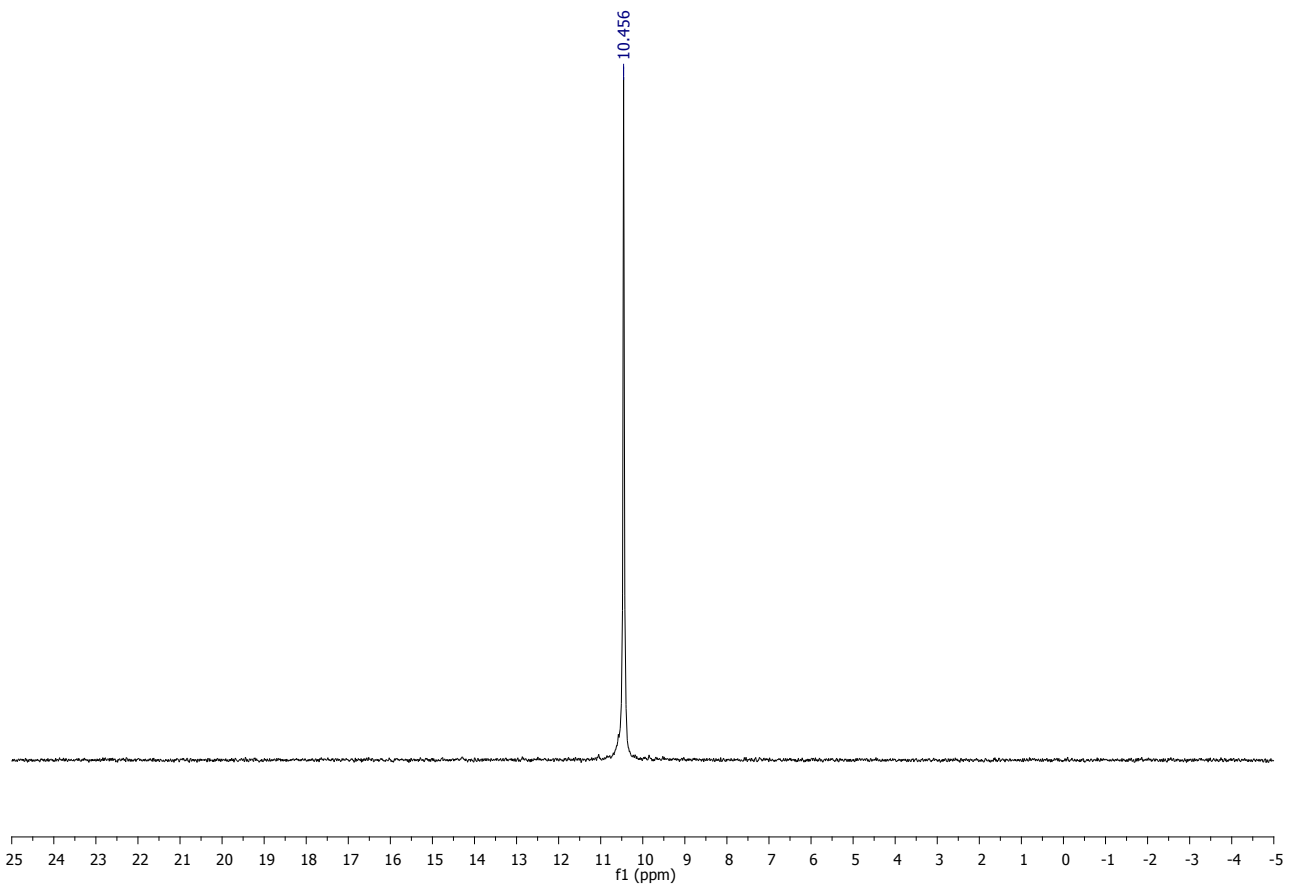


**(E)-[1-(glycyl-L-leucylamido)-2-phenylethen-1-yl]phosphonic acid monomethyl ester (14)**



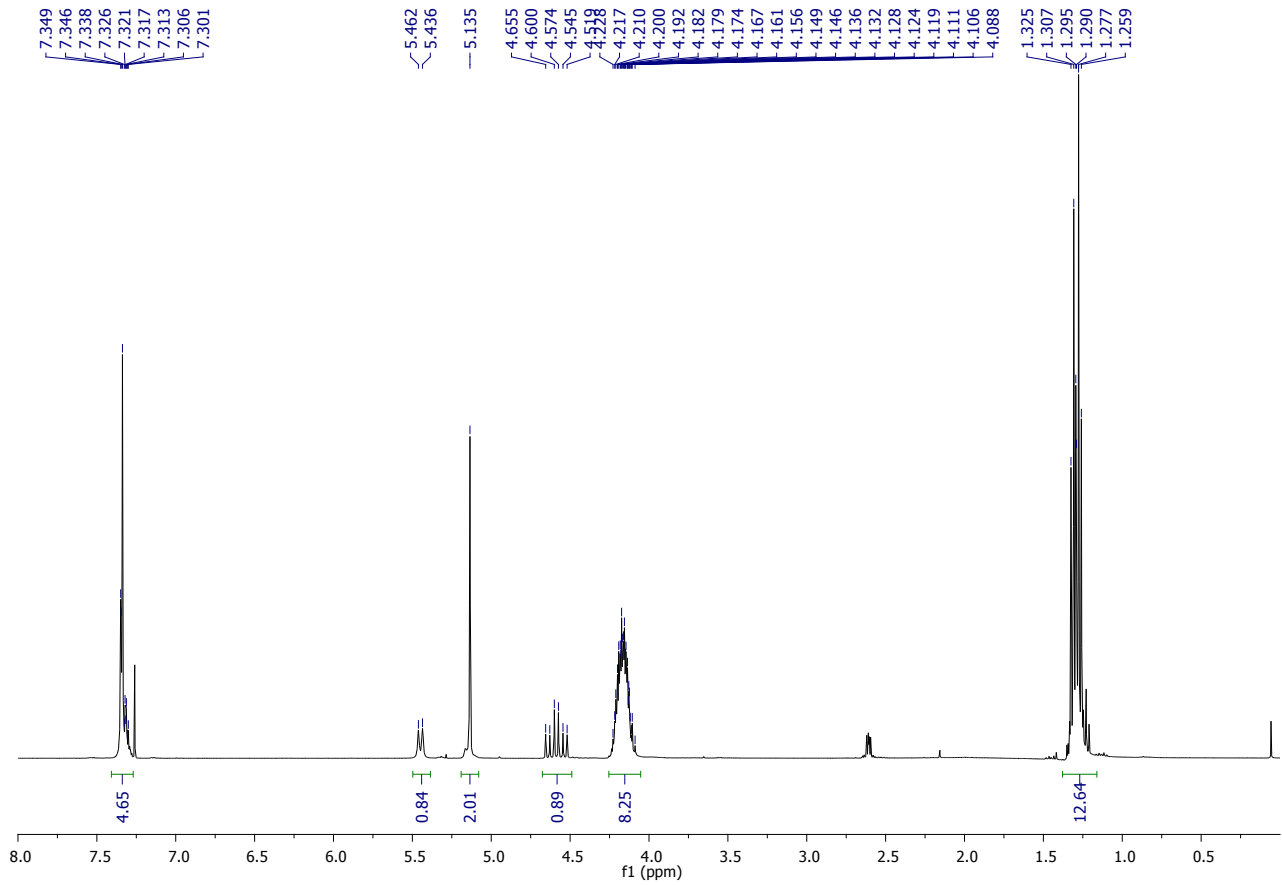


<sup>31</sup>P NMR spectrum

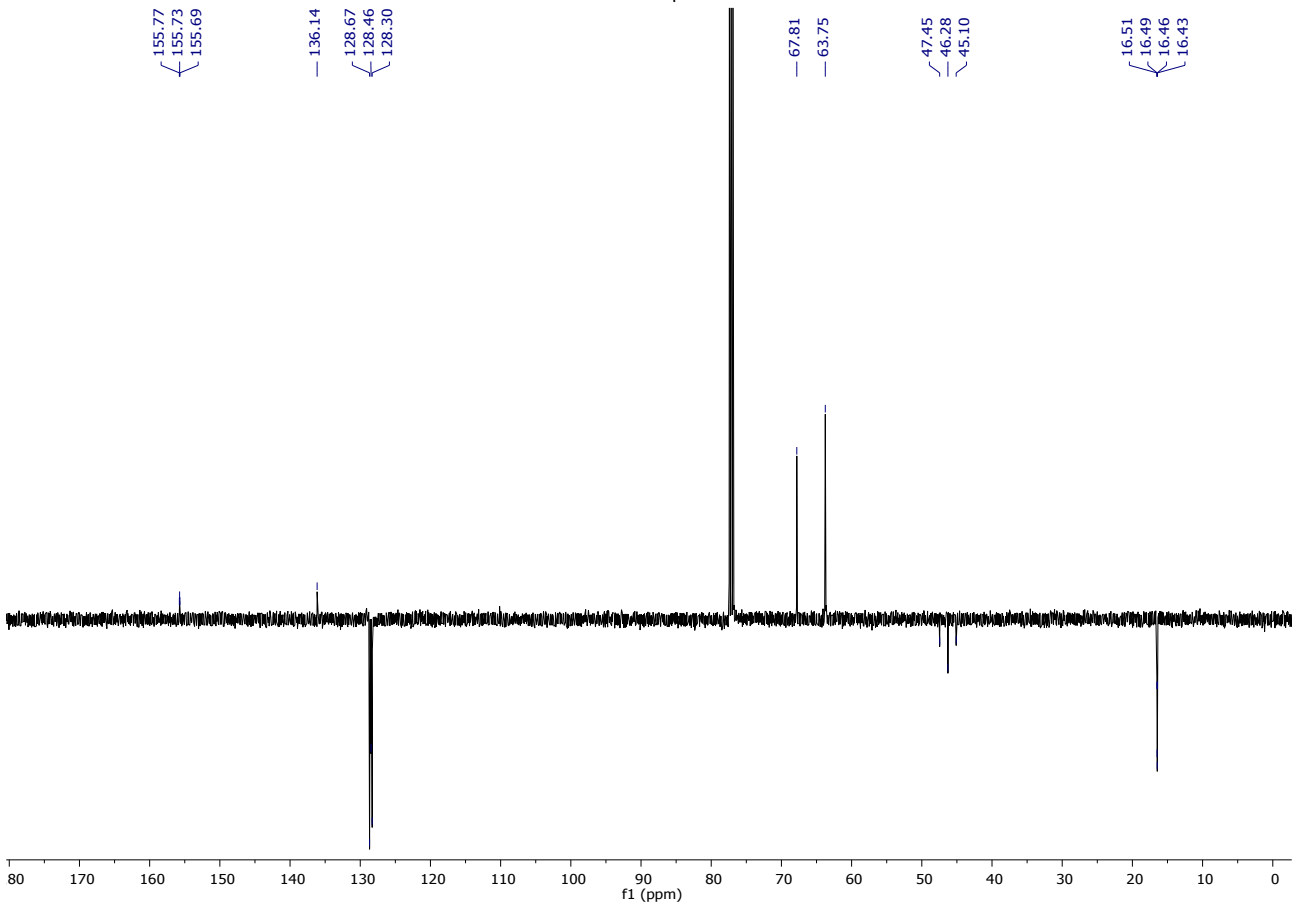


# Tetraethyl (benzyloxycarbonylaminoethyl)bisphosphonate (17)

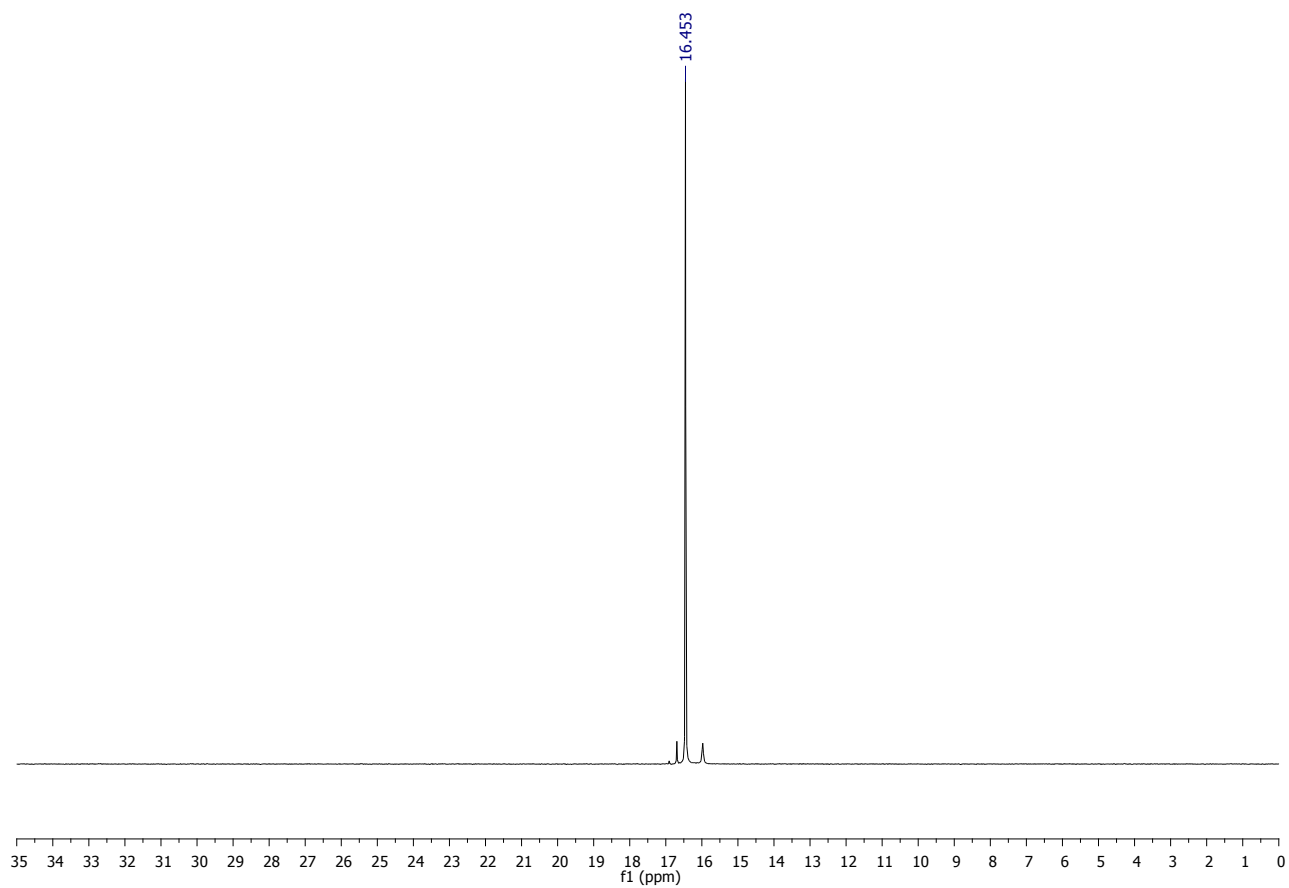
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

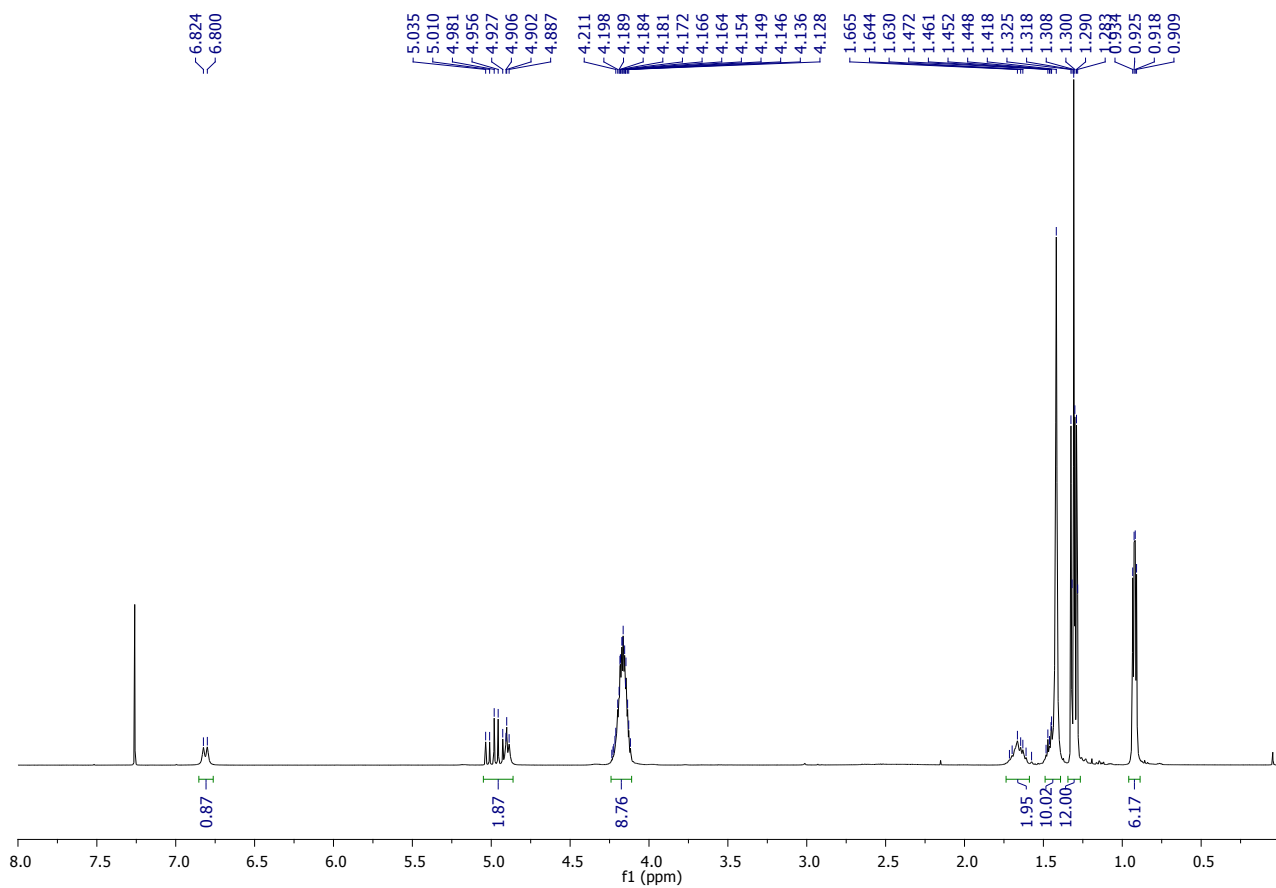


<sup>31</sup>P NMR spectrum

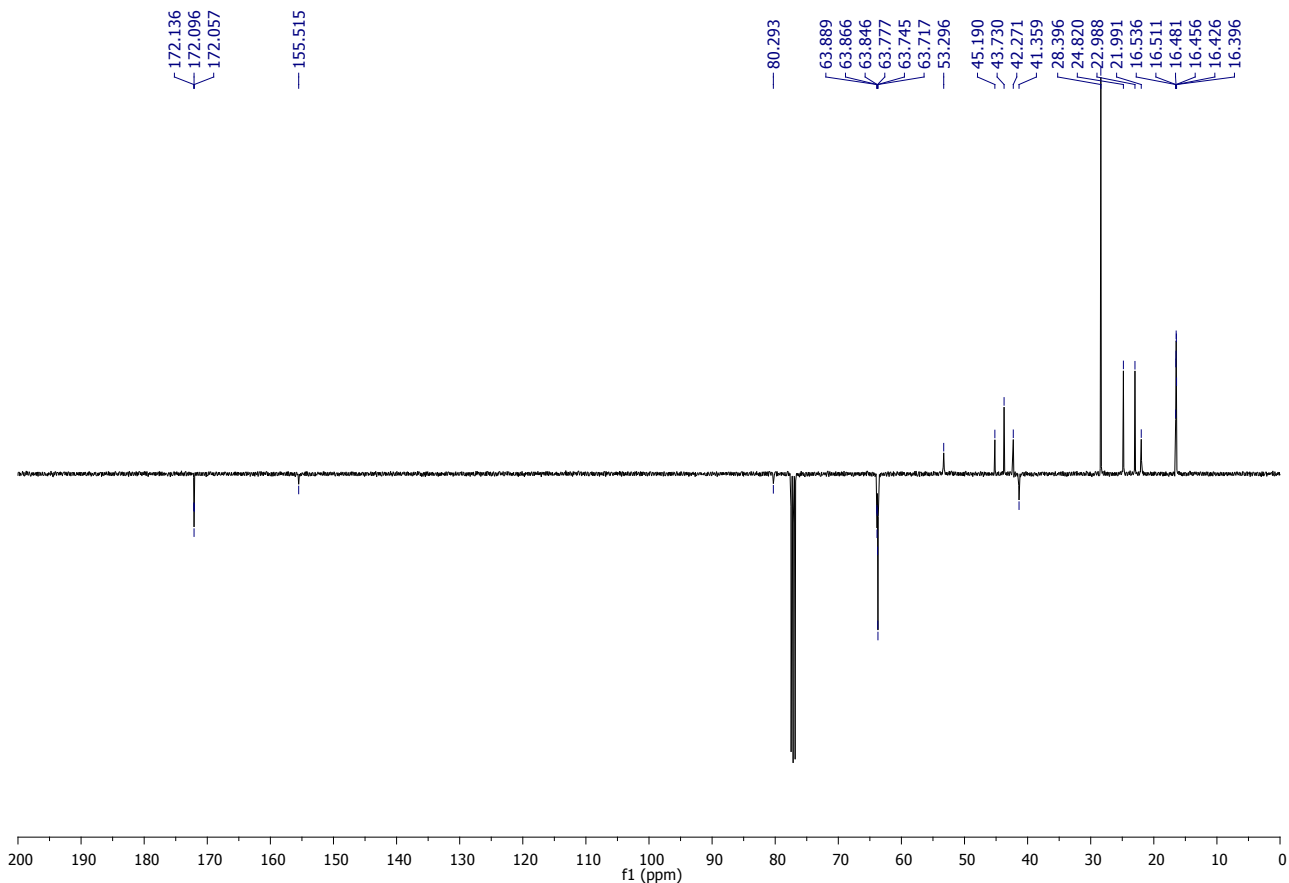


# Tetraethyl [N-(*tert*-butoxycarbonyl)-L-leucylamidomethyl]bisphosphonate (18)

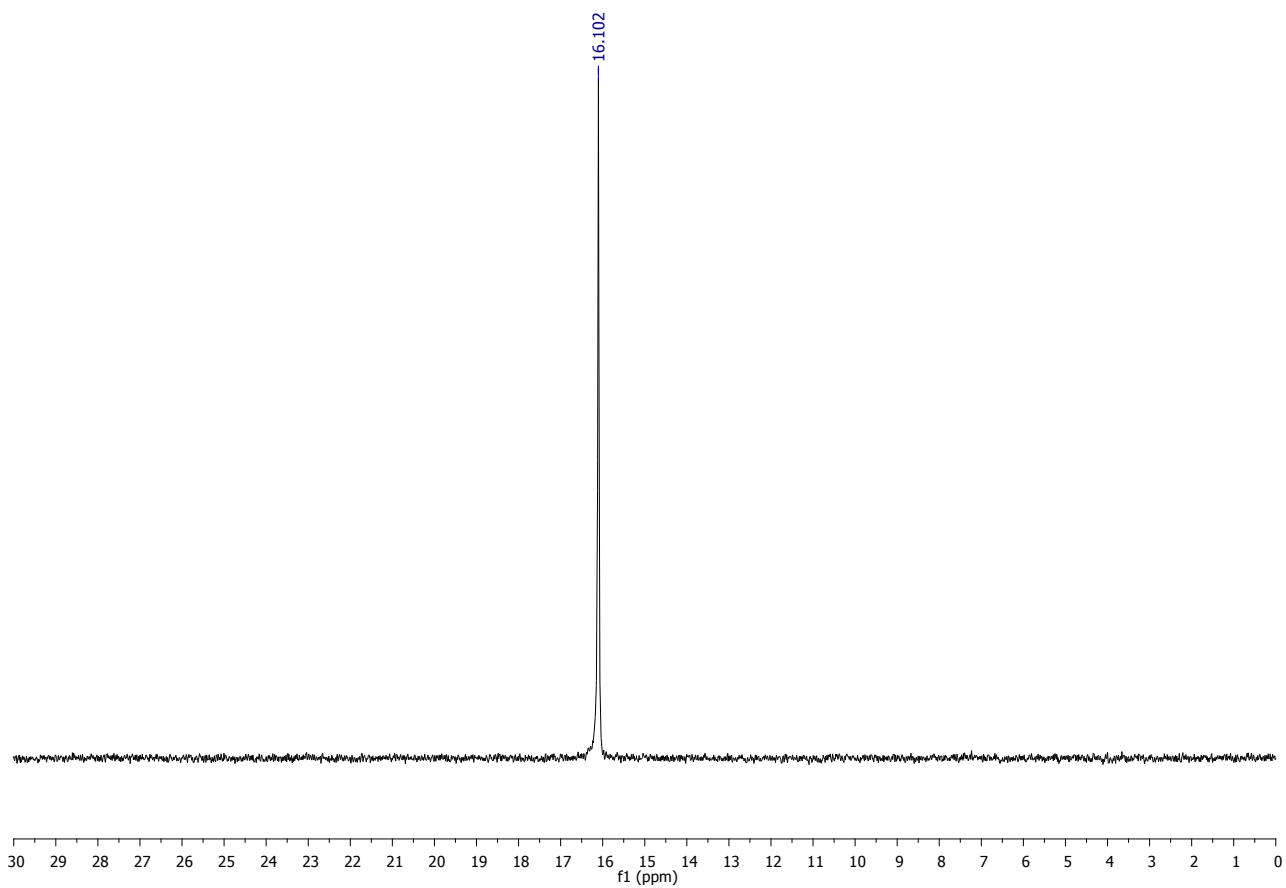
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

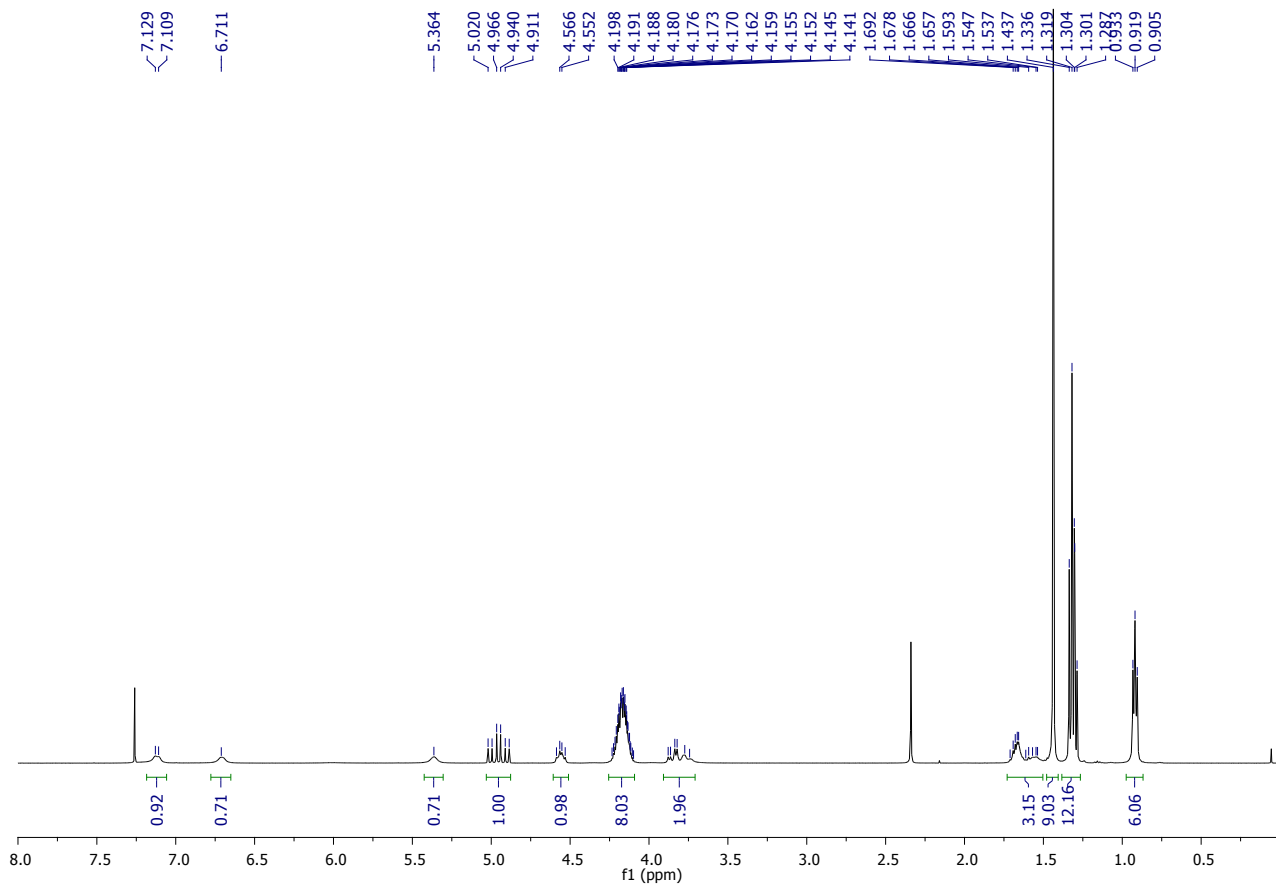


<sup>31</sup>P NMR spectrum

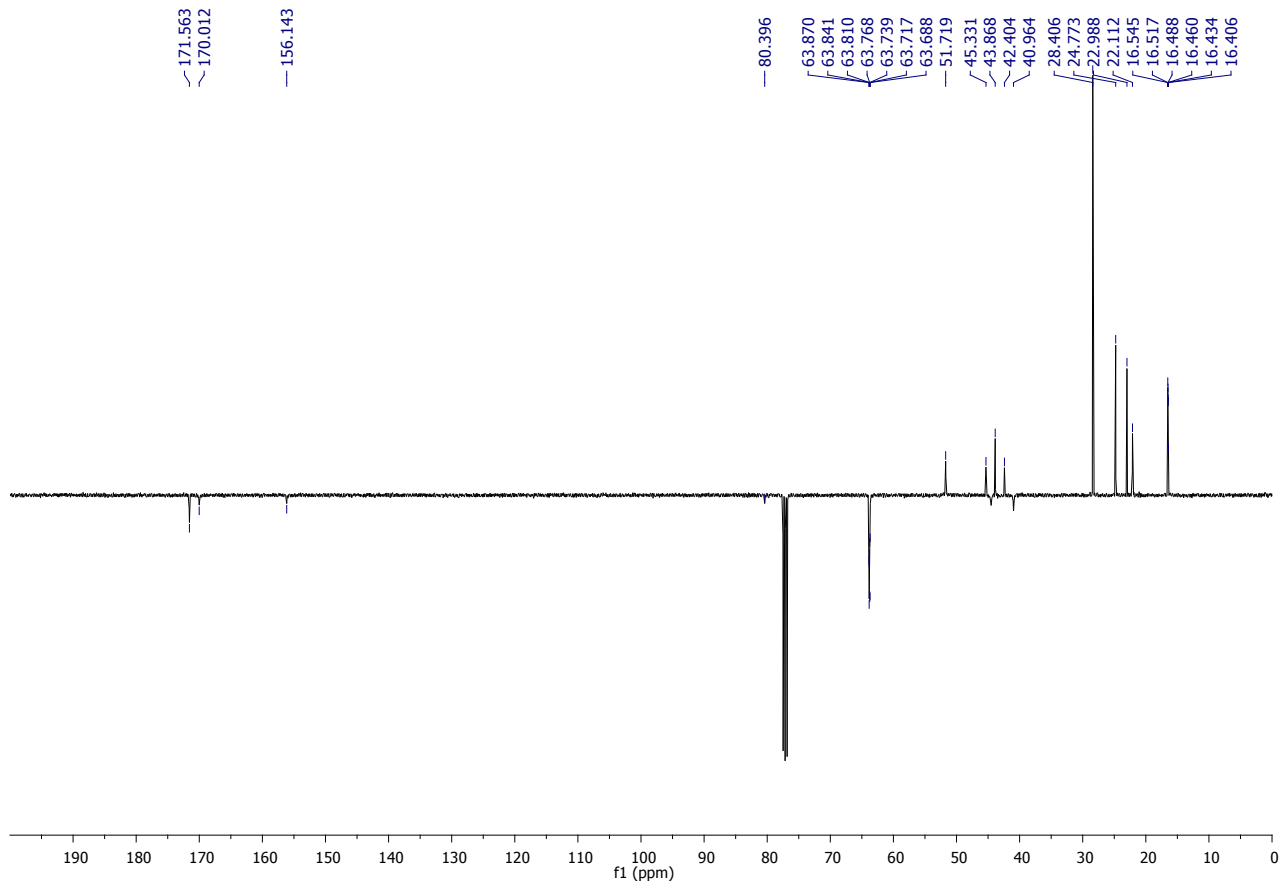


Tetraethyl [N-(tert-butoxycarbonyl)glycyl-L-leucylamidomethyl]bisphosphonate (19)

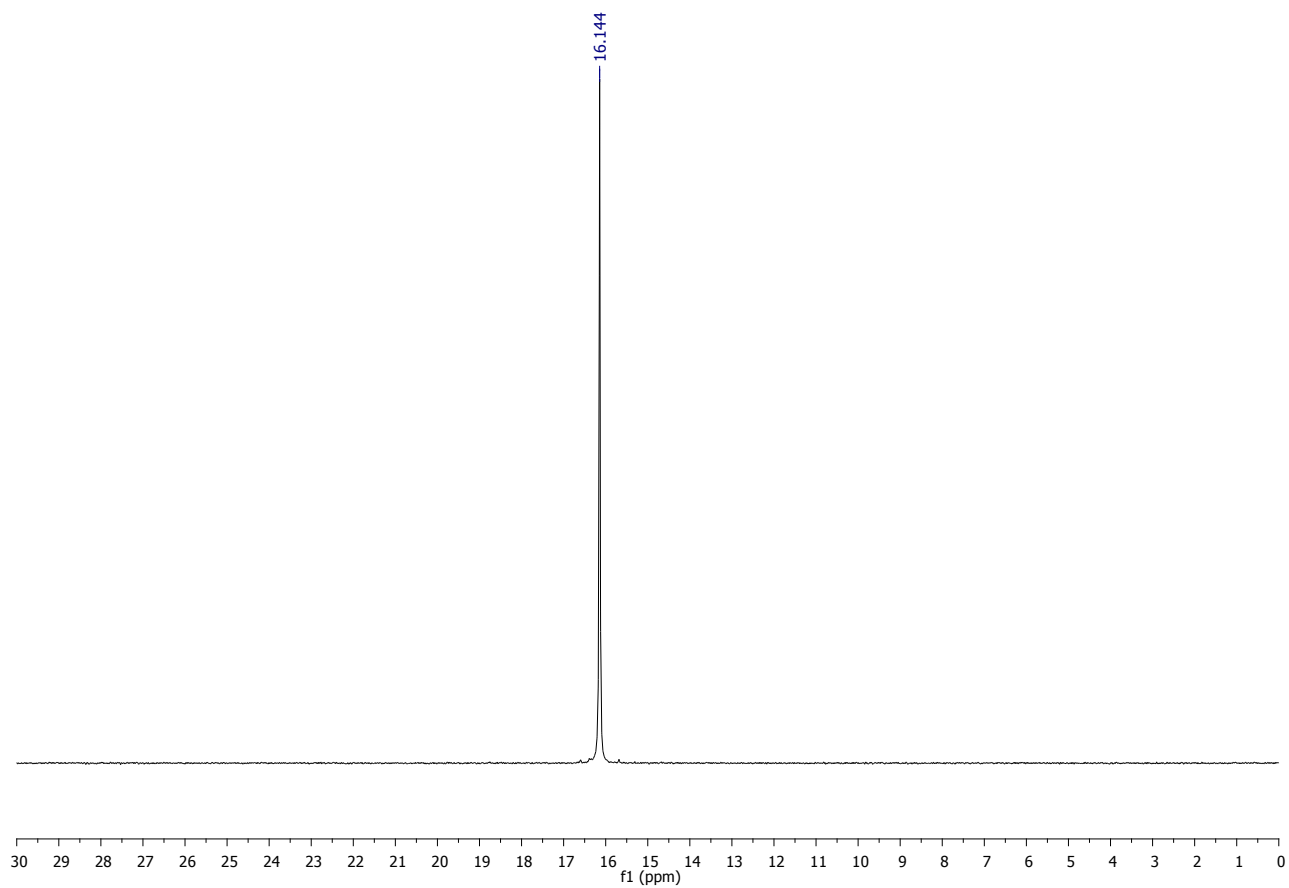
<sup>1</sup>H NMR spectrum



APTC NMR spectrum

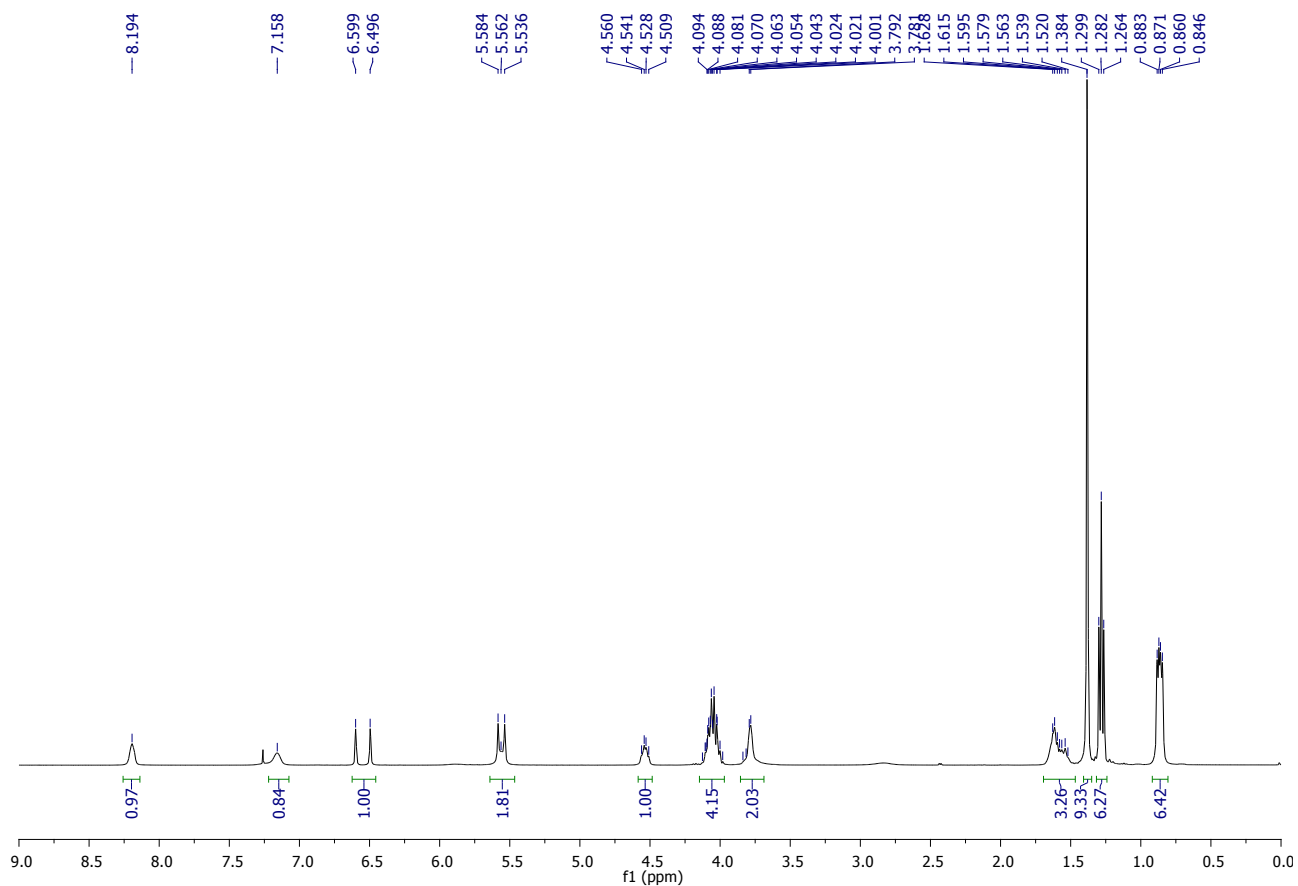


<sup>31</sup>P NMR spectrum

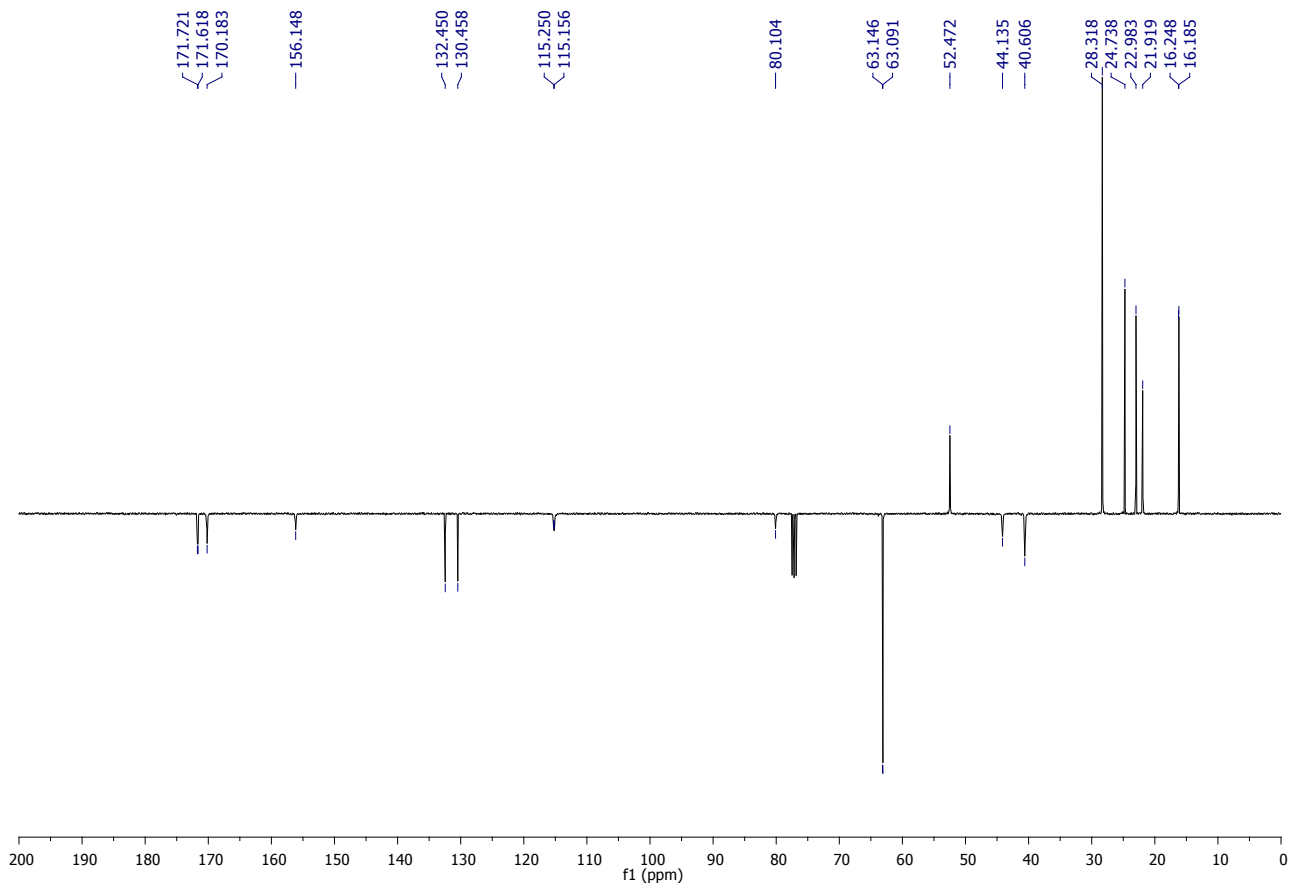


# Diethyl {1-[N-(*tert*-butoxycarbonyl)glycyl-L-leucylamido]ethen-1-yl}phosphonate (20)

## <sup>1</sup>H NMR spectrum

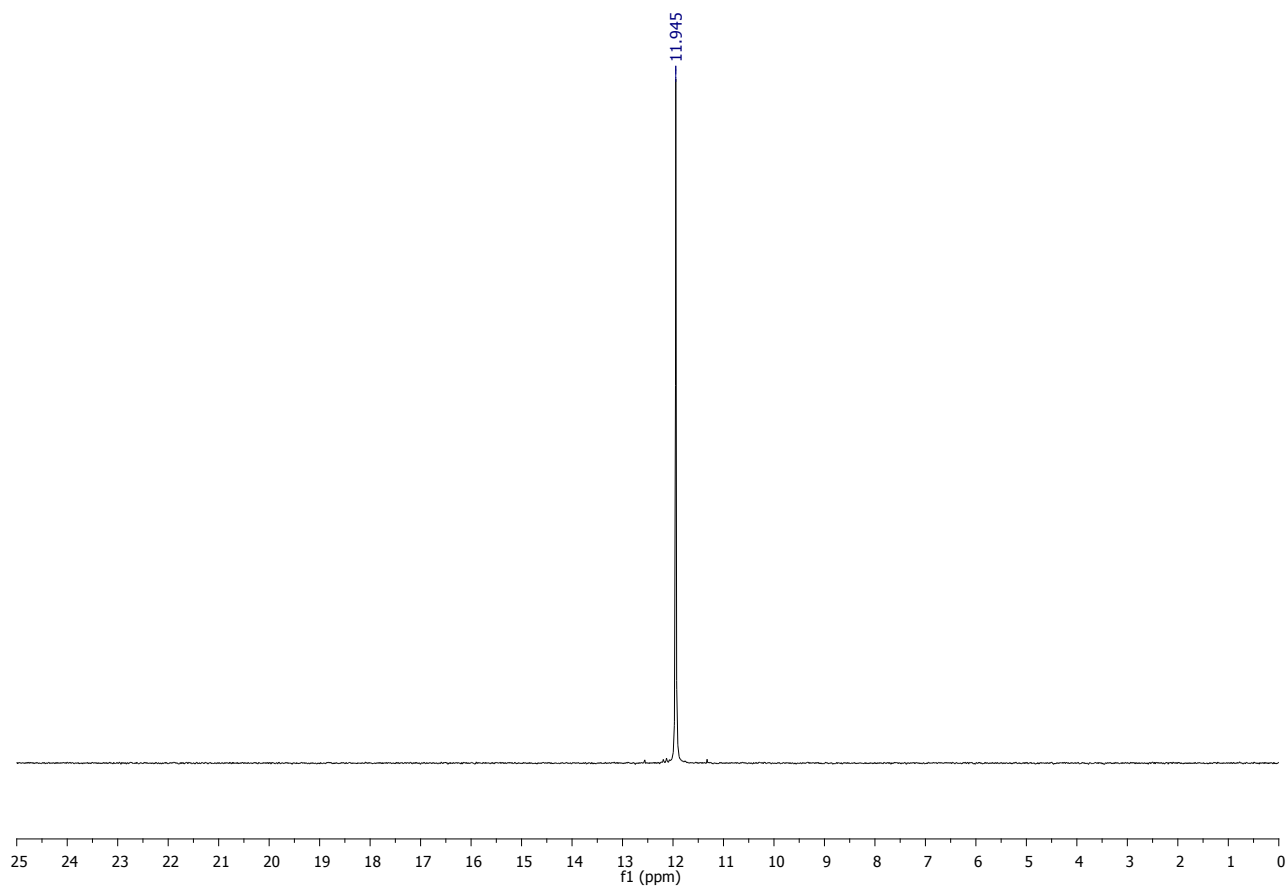


## APTC NMR spectrum

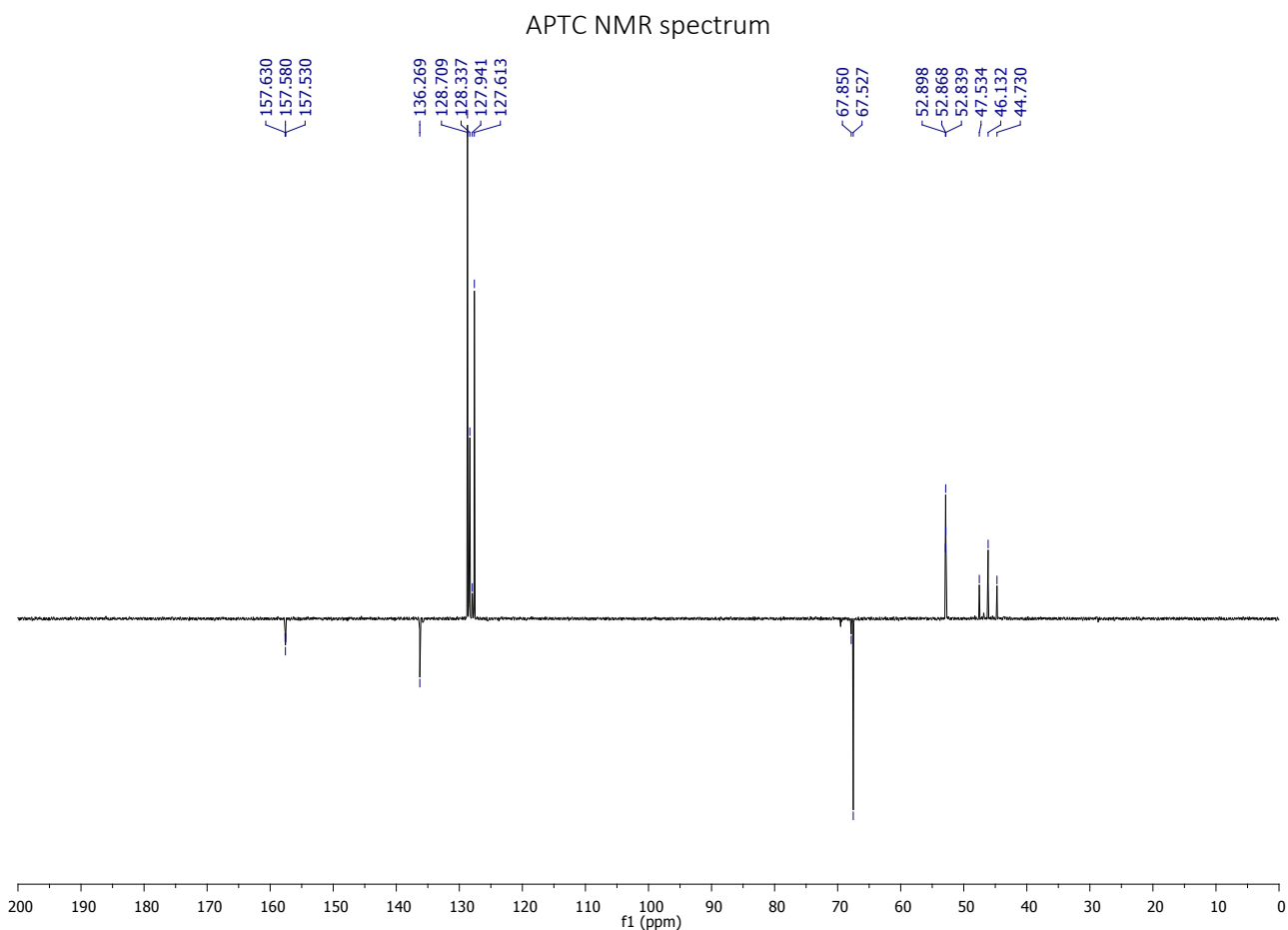
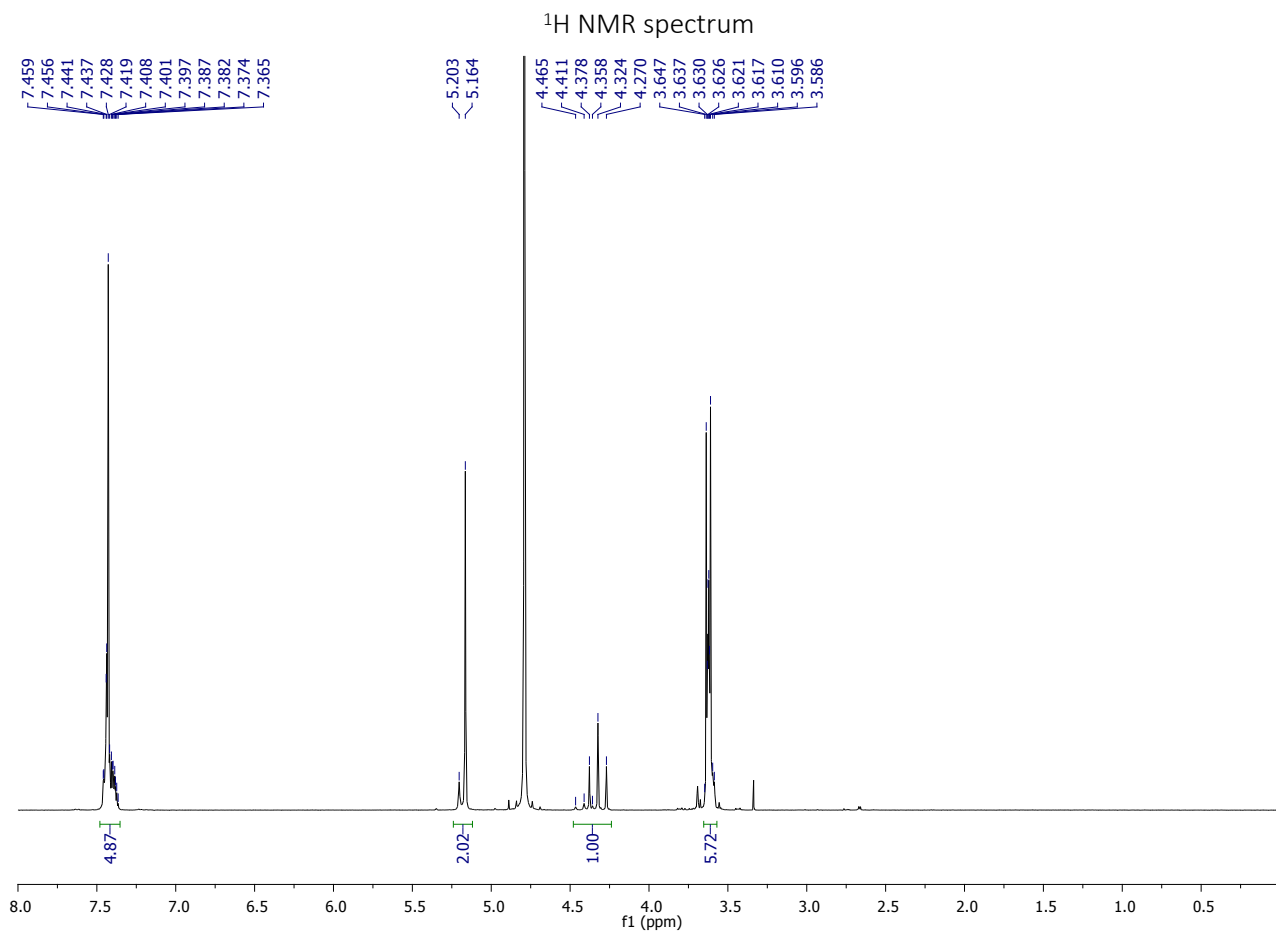




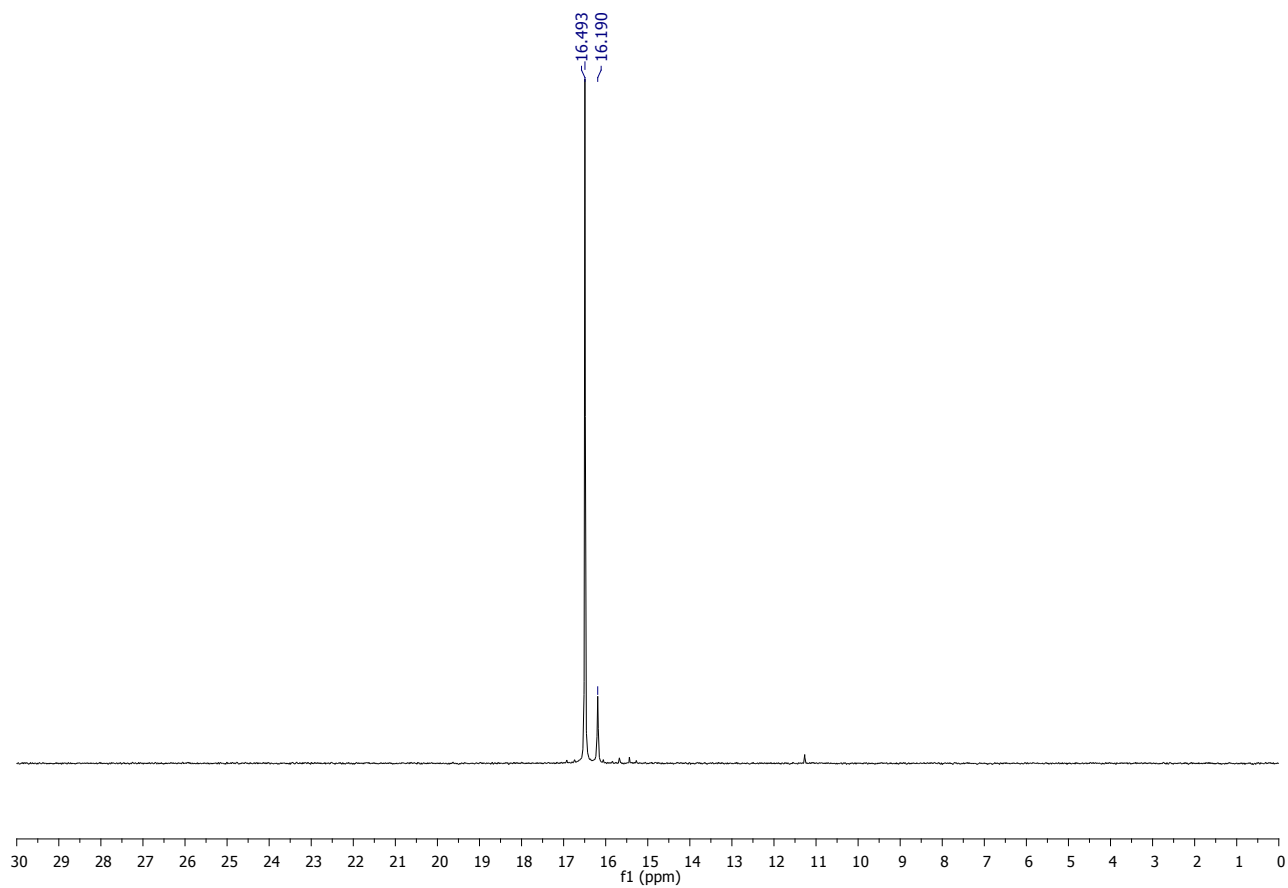
<sup>31</sup>P NMR spectrum



(Benzyloxycarbonylaminoethyl)bis(phosphonic acid monomethyl ester) (21)

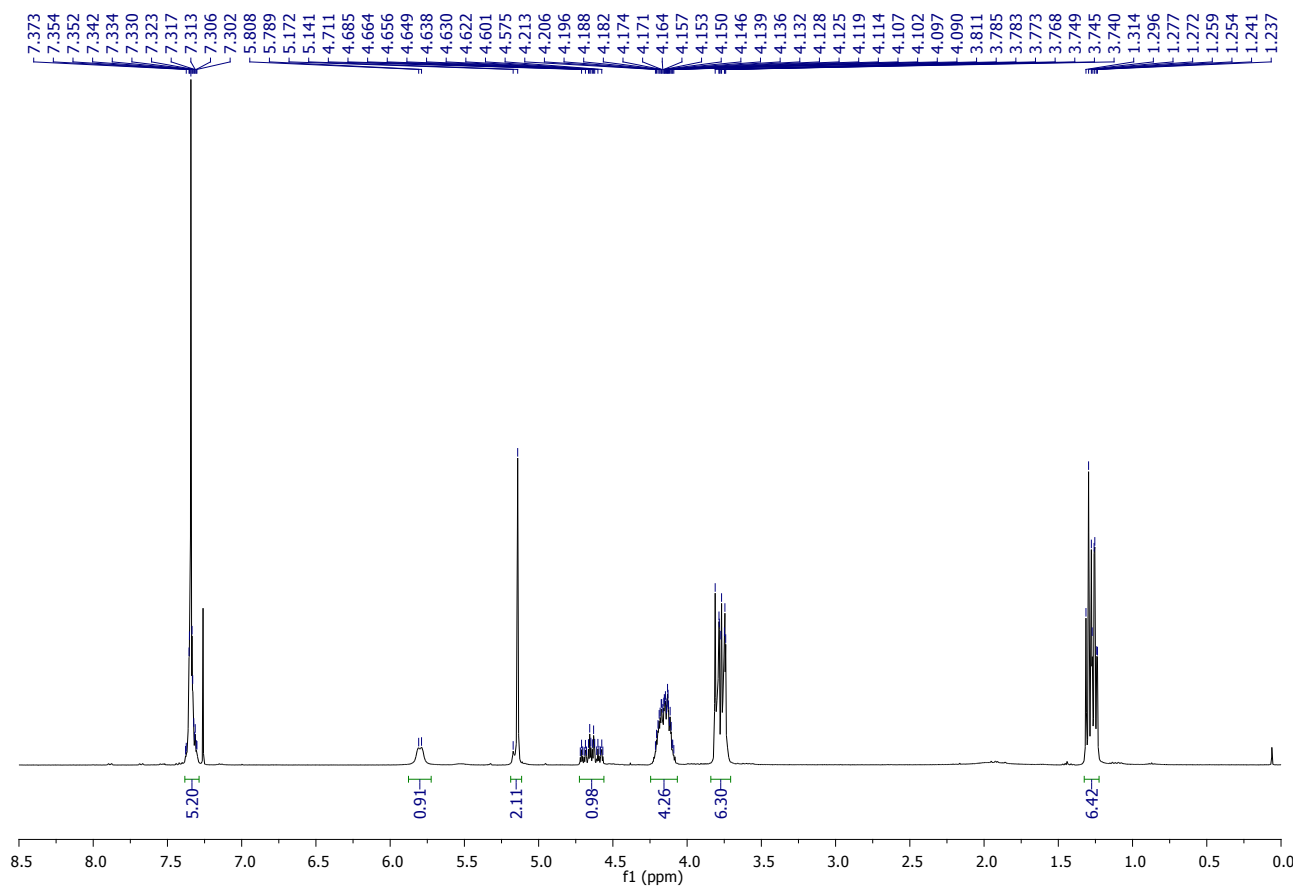


<sup>31</sup>P NMR spectrum

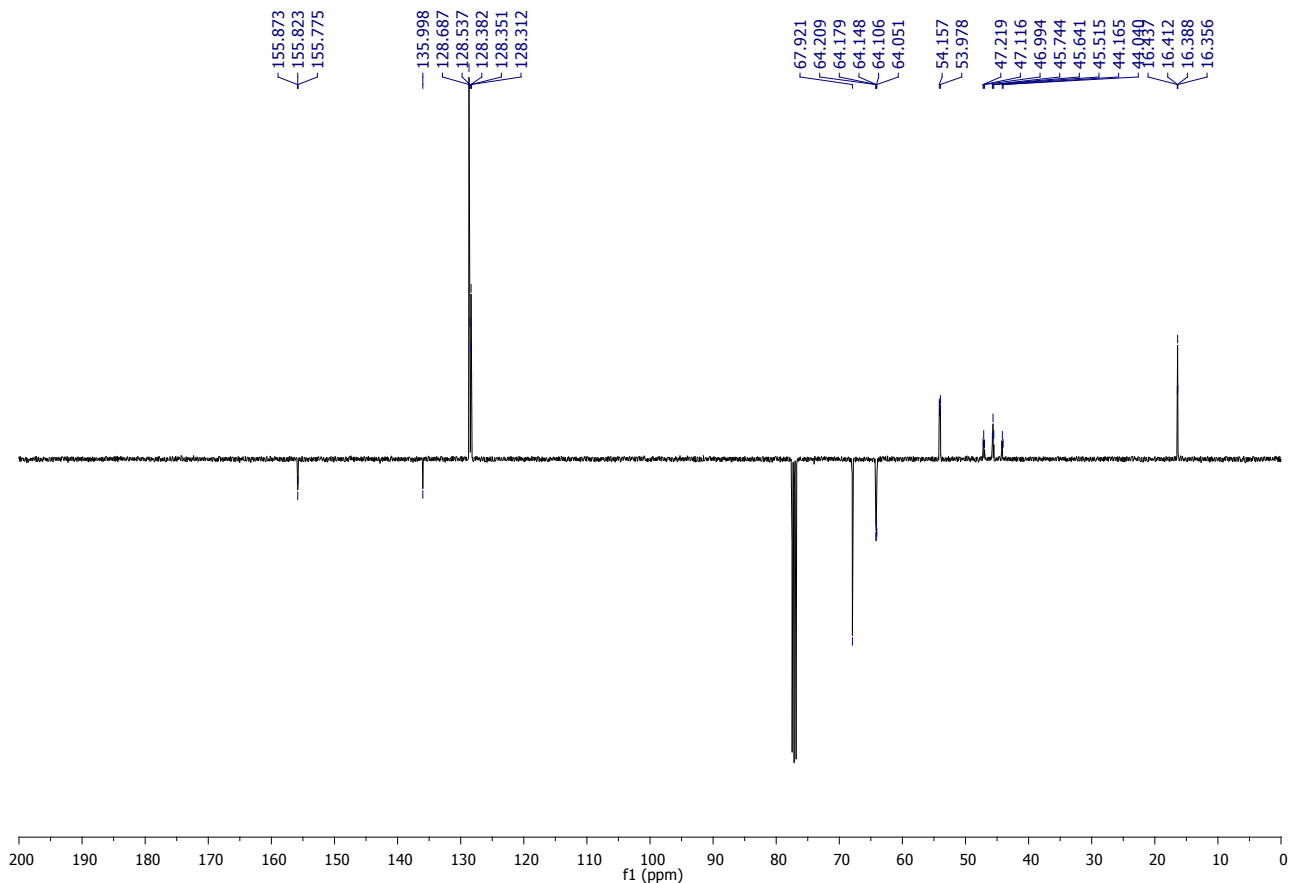


# Diethyl dimethyl (benzyloxycarbonylaminoethyl)bisphosphonate (22)

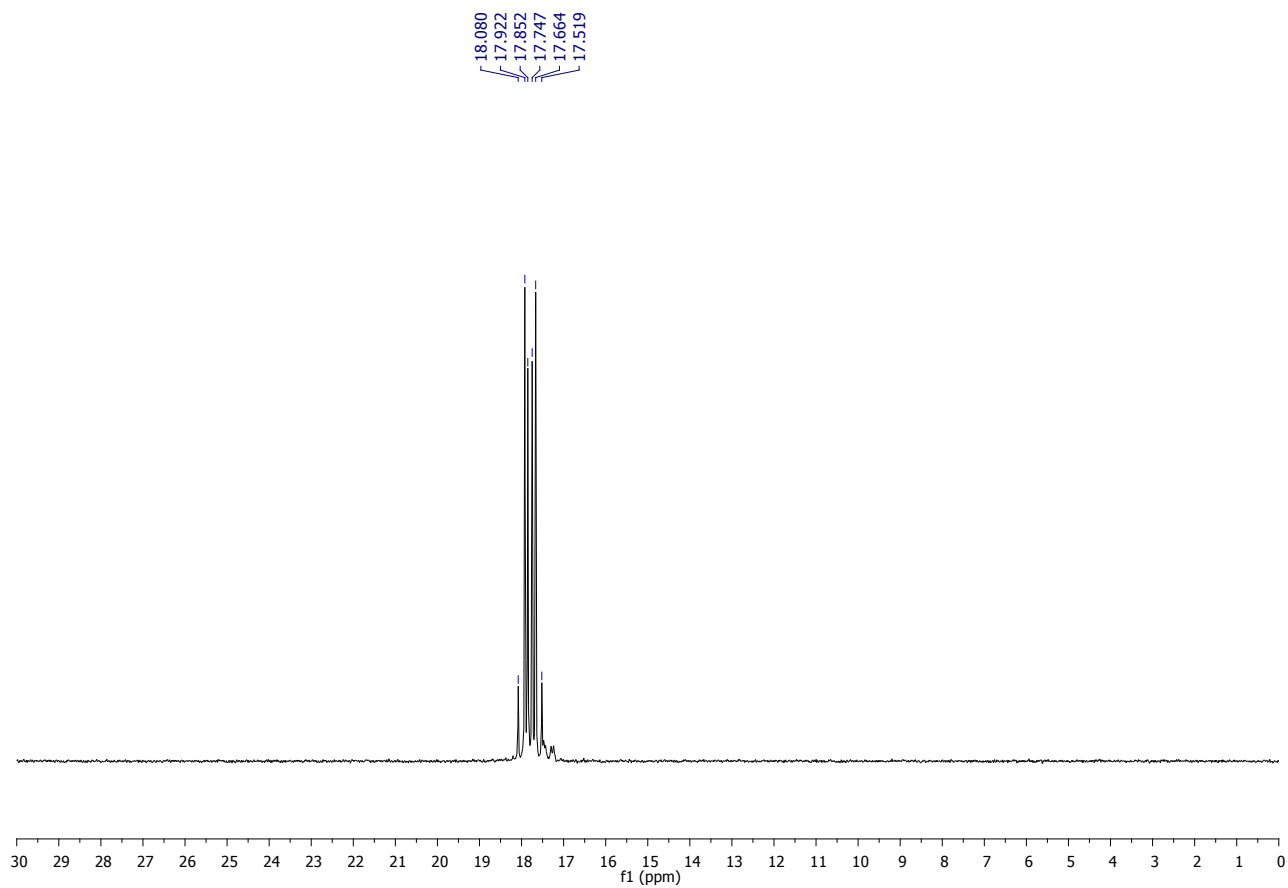
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

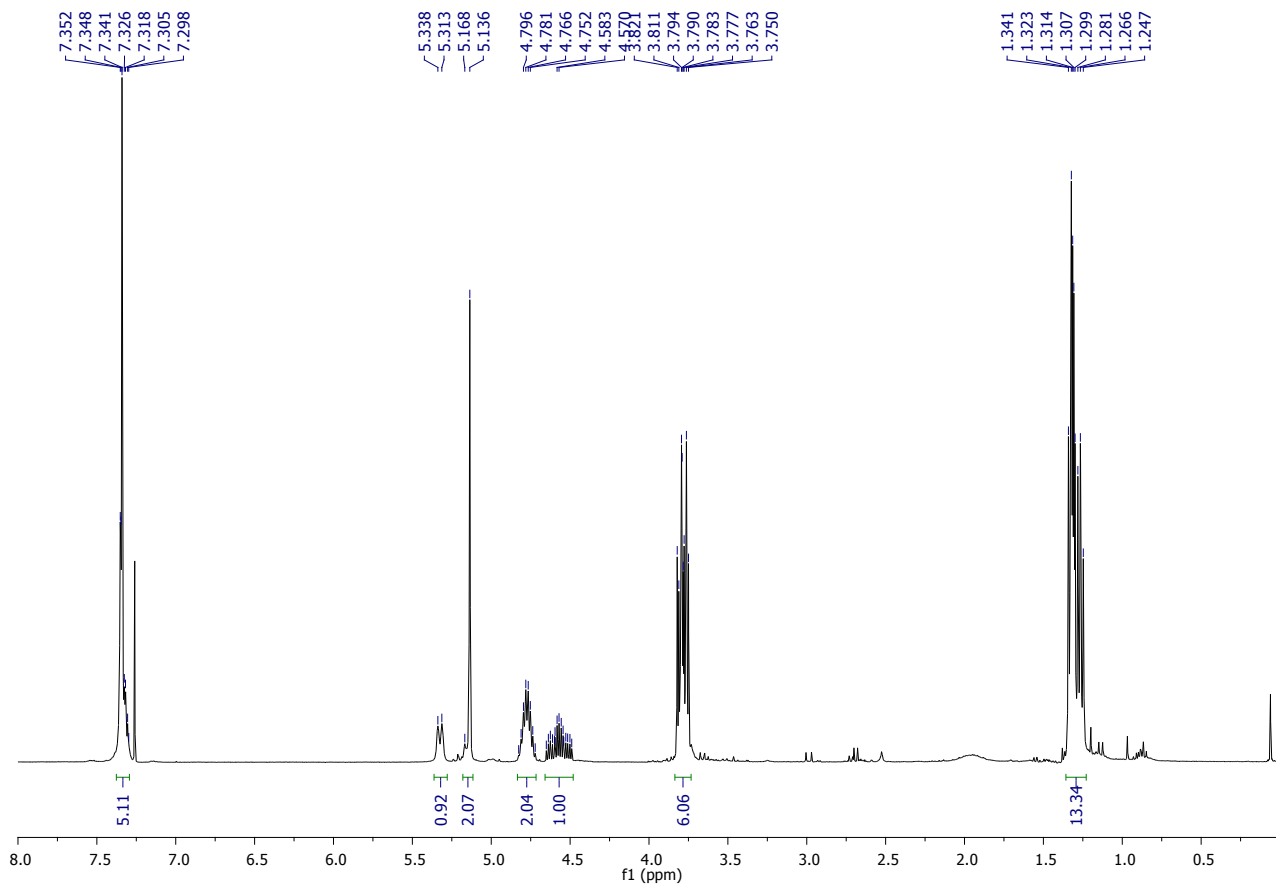


<sup>31</sup>P NMR spectrum

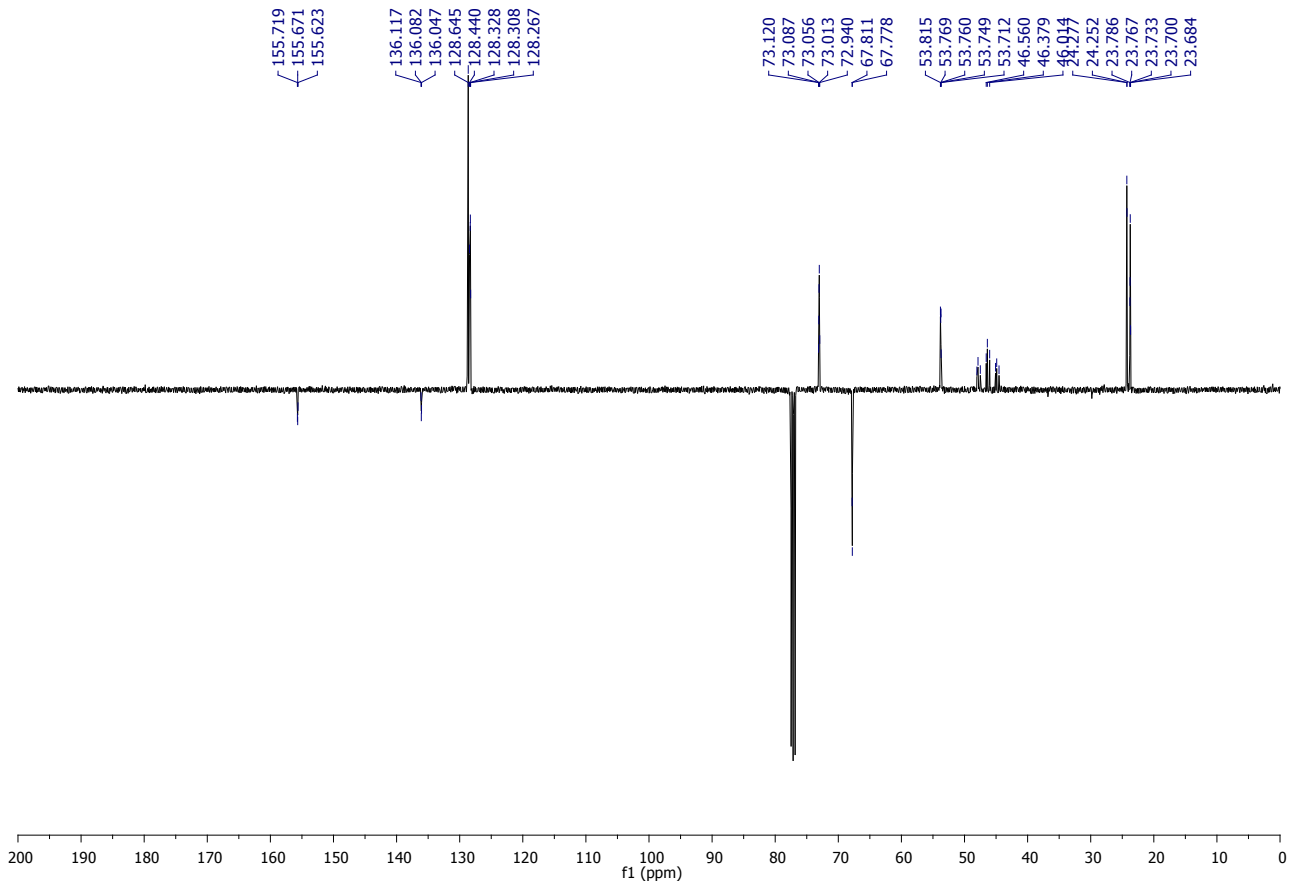


# Diisopropyl dimethyl (benzyloxycarbonylamino methyl)bisphosphonate (23)

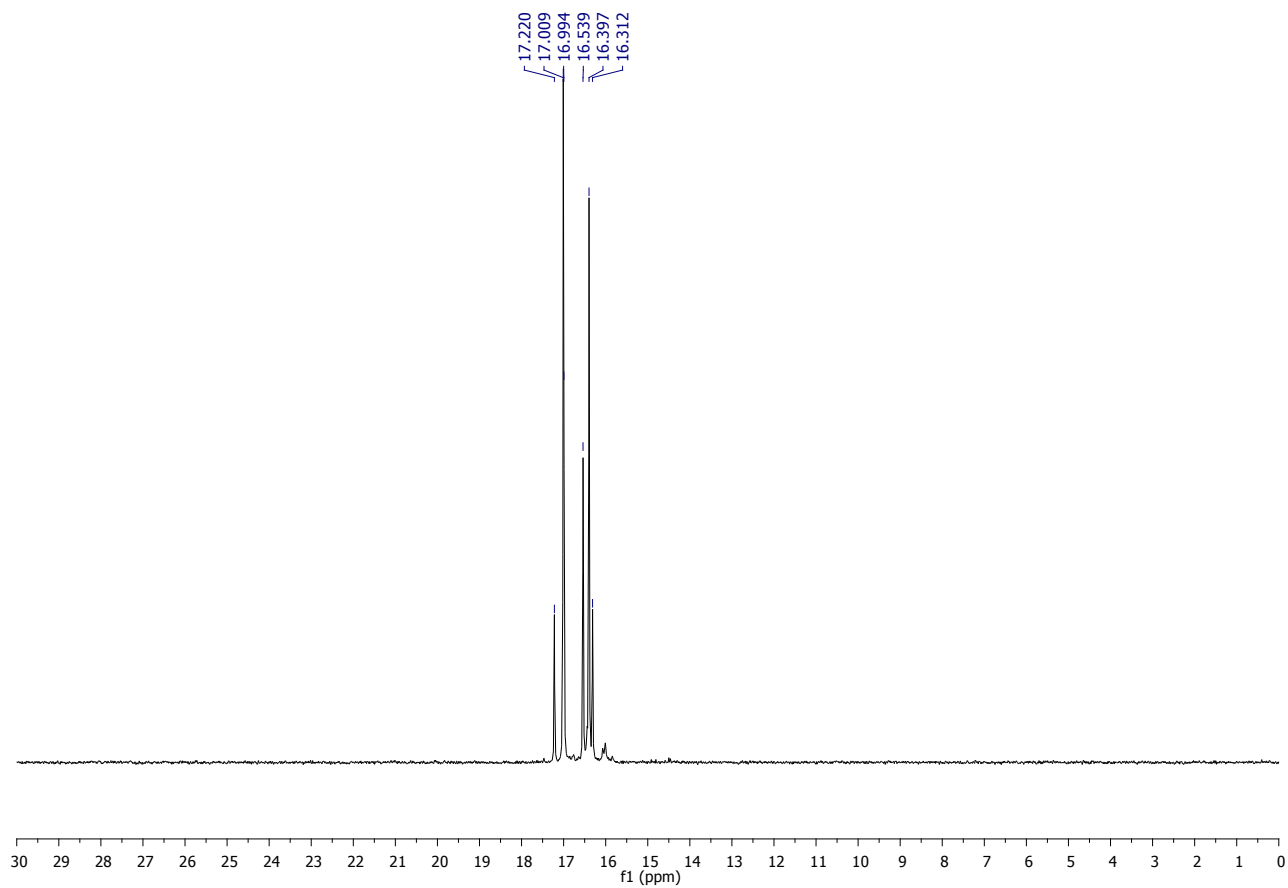
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

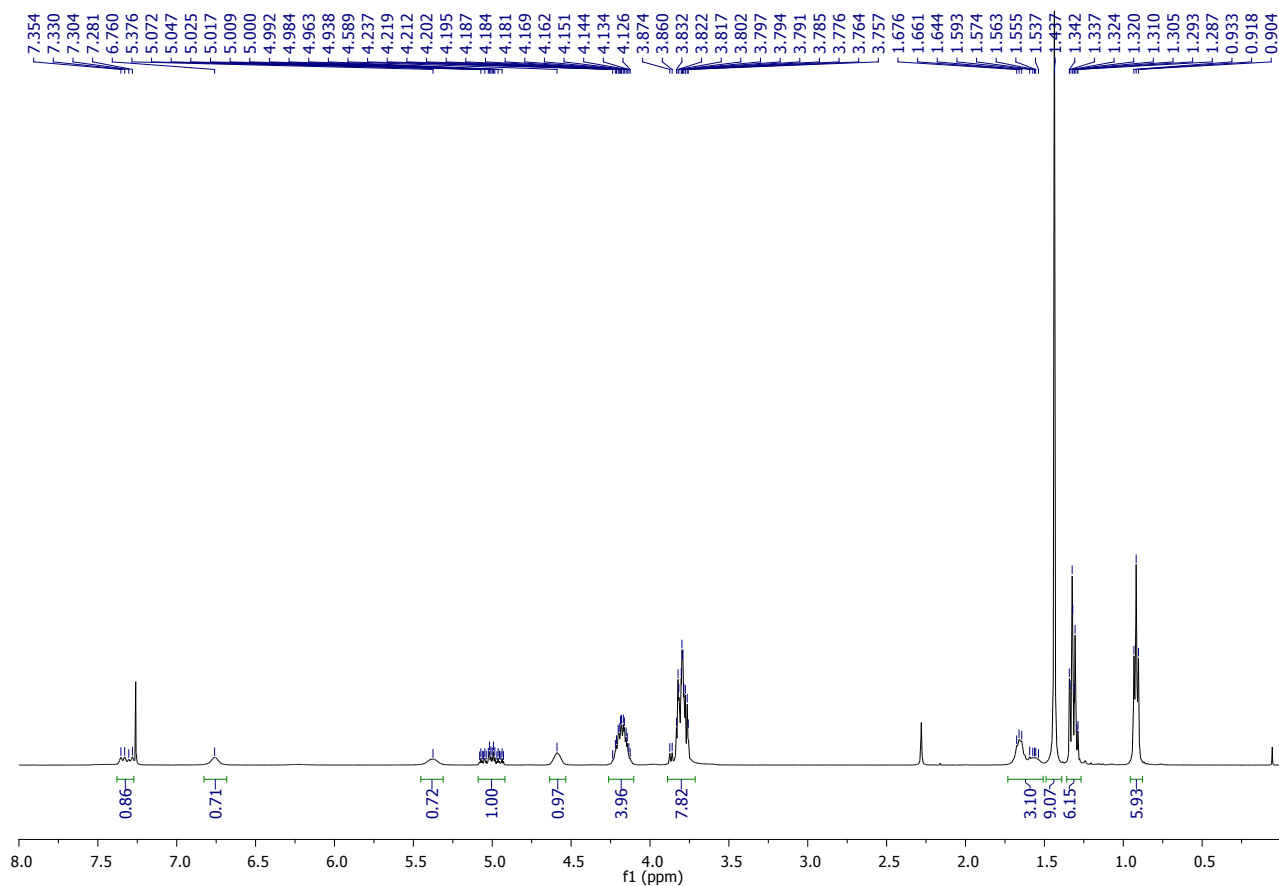


<sup>31</sup>P NMR spectrum

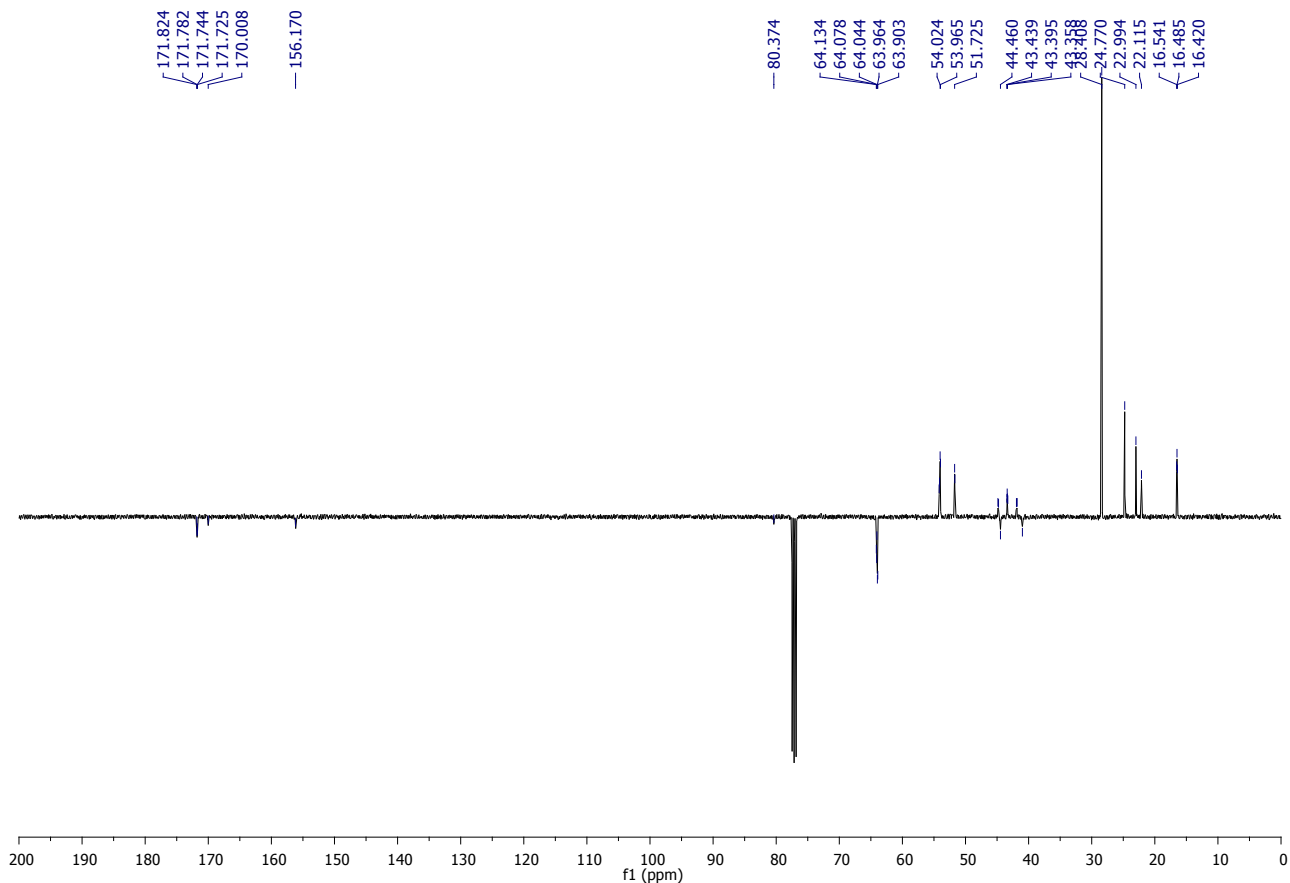


# Diethyl dimethyl [N-(tert-butoxycarbonyl)glycyl-L-leucylamidomethyl]bisphosphonate (24)

## <sup>1</sup>H NMR spectrum

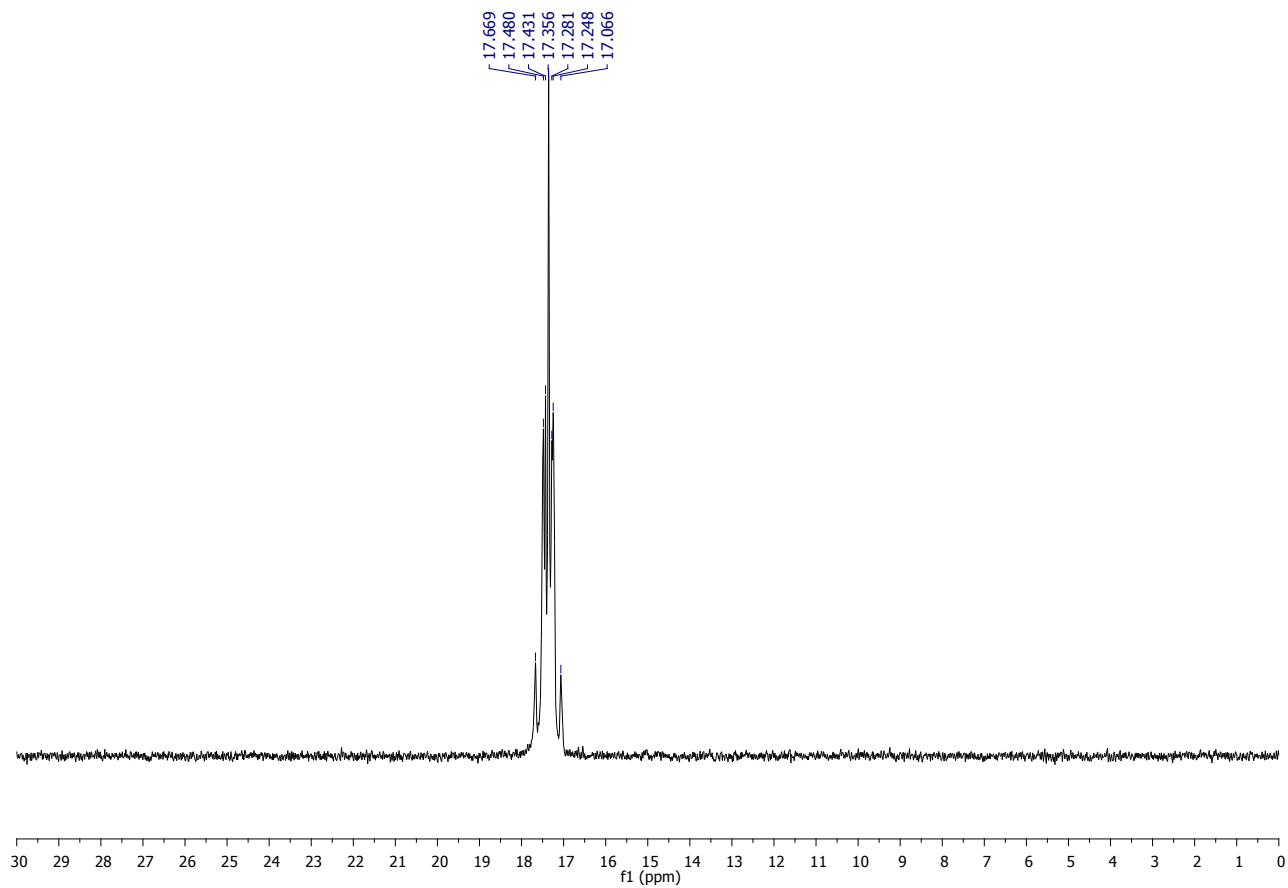


## APTC NMR spectrum



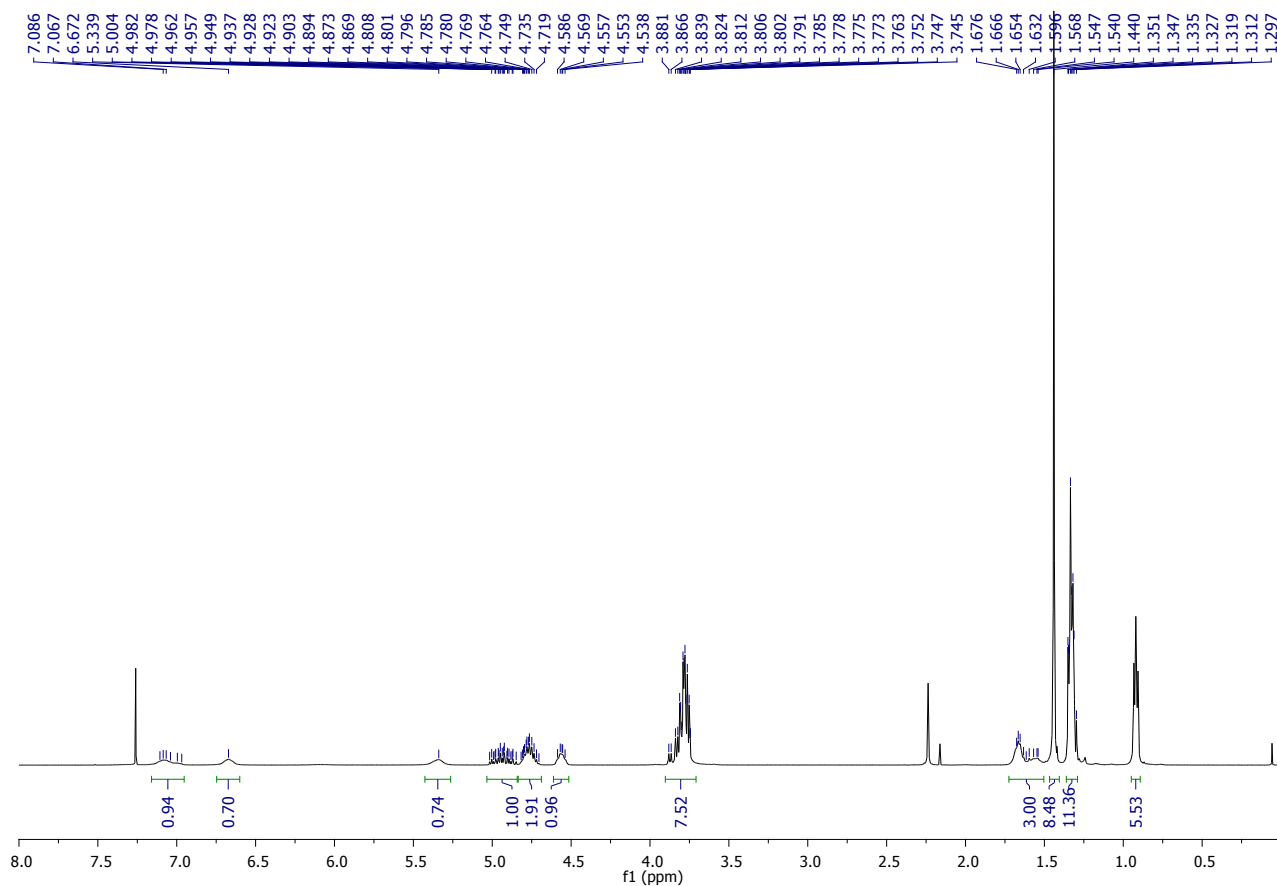


<sup>31</sup>P NMR spectrum

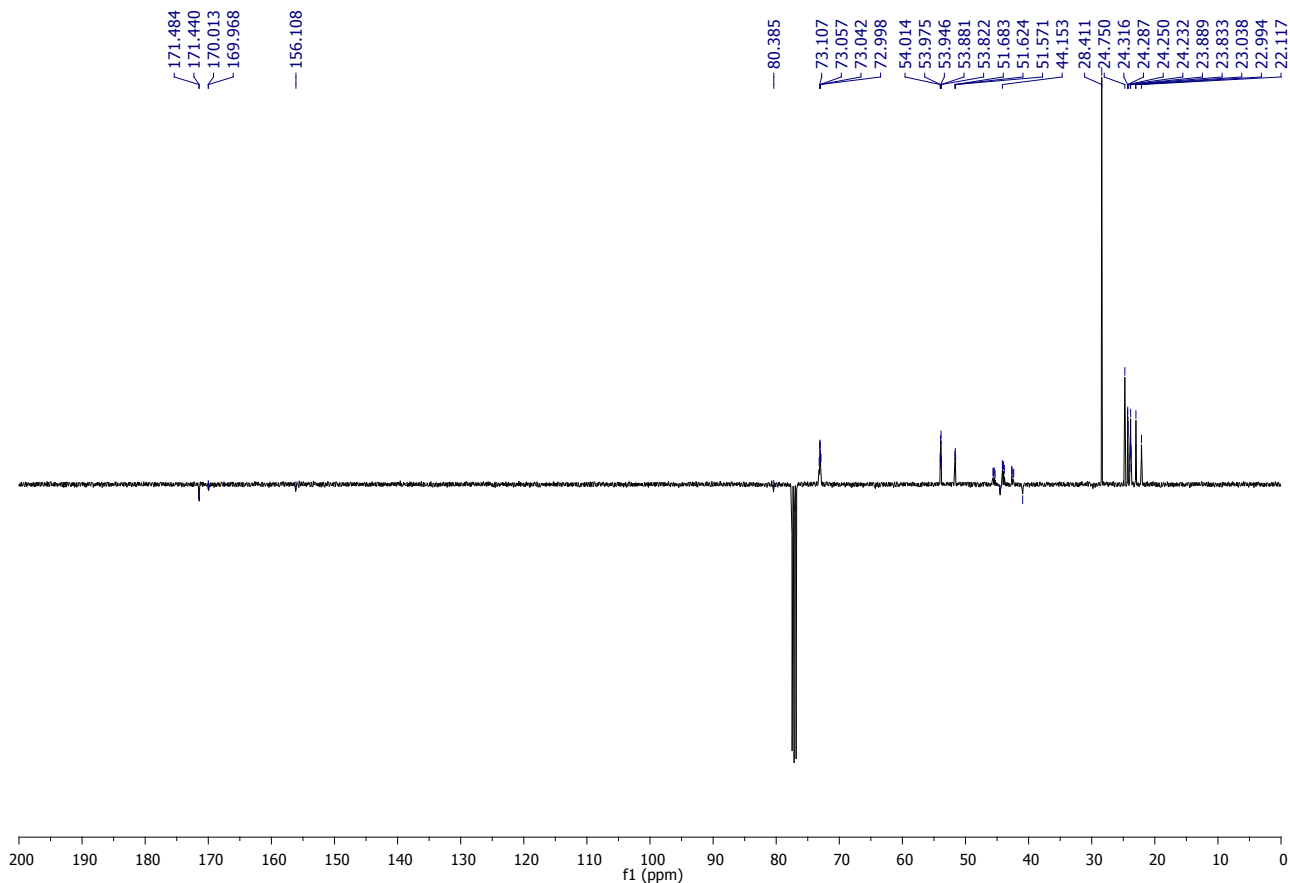


# Diisopropyl dimethyl [N-(*tert*-butoxycarbonyl)glycyl-L-leucylamidomethyl]bisphosphonate (25)

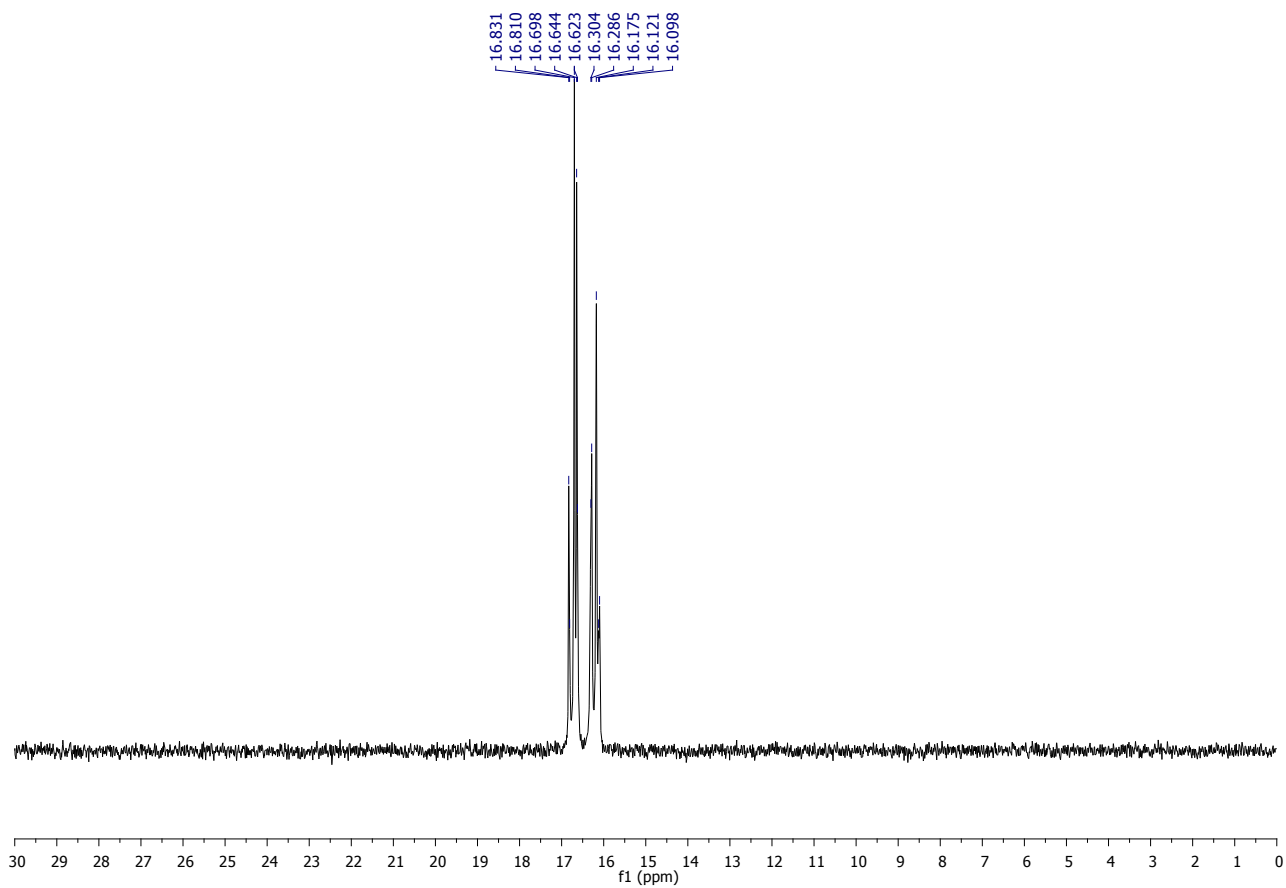
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

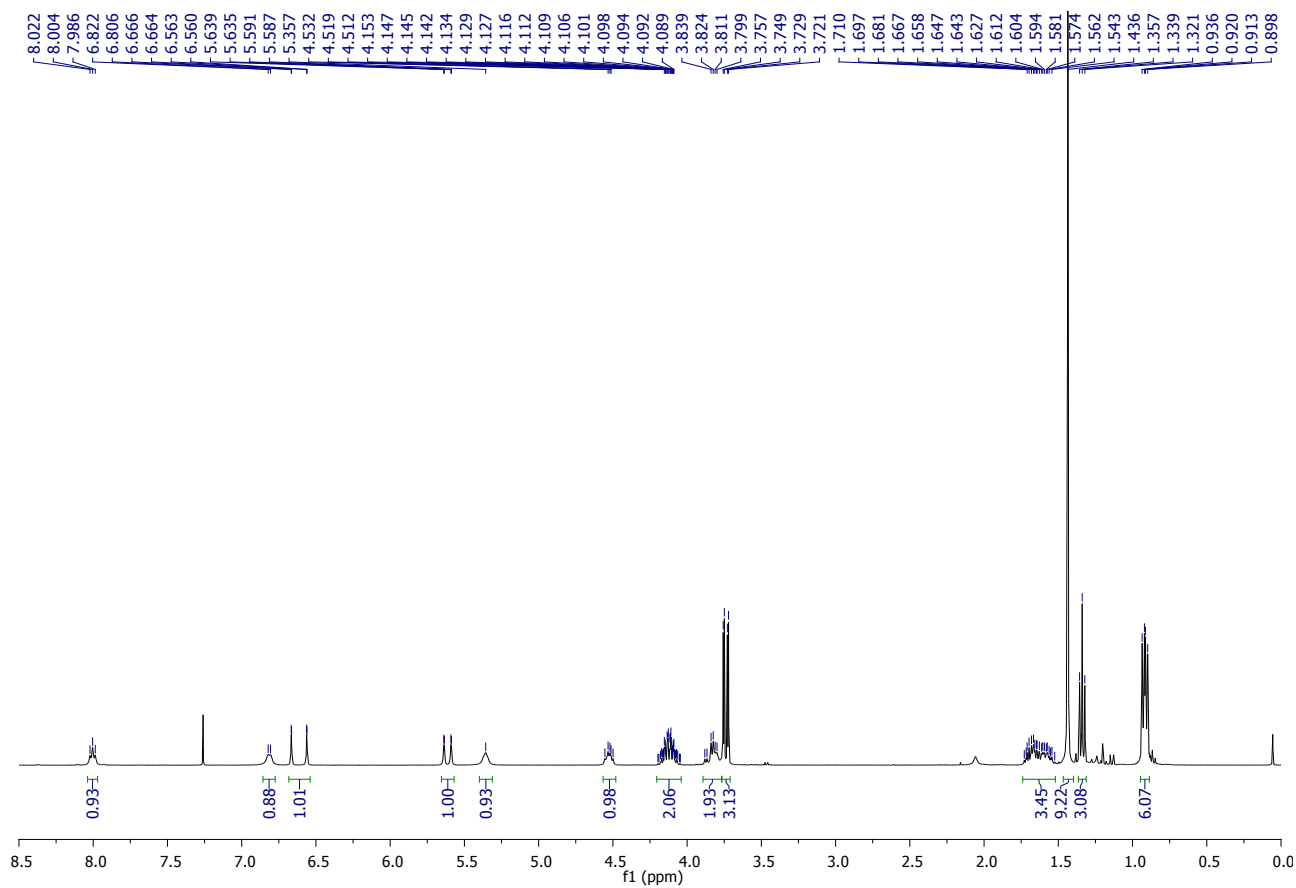


$^{31}\text{P}$  NMR spectrum

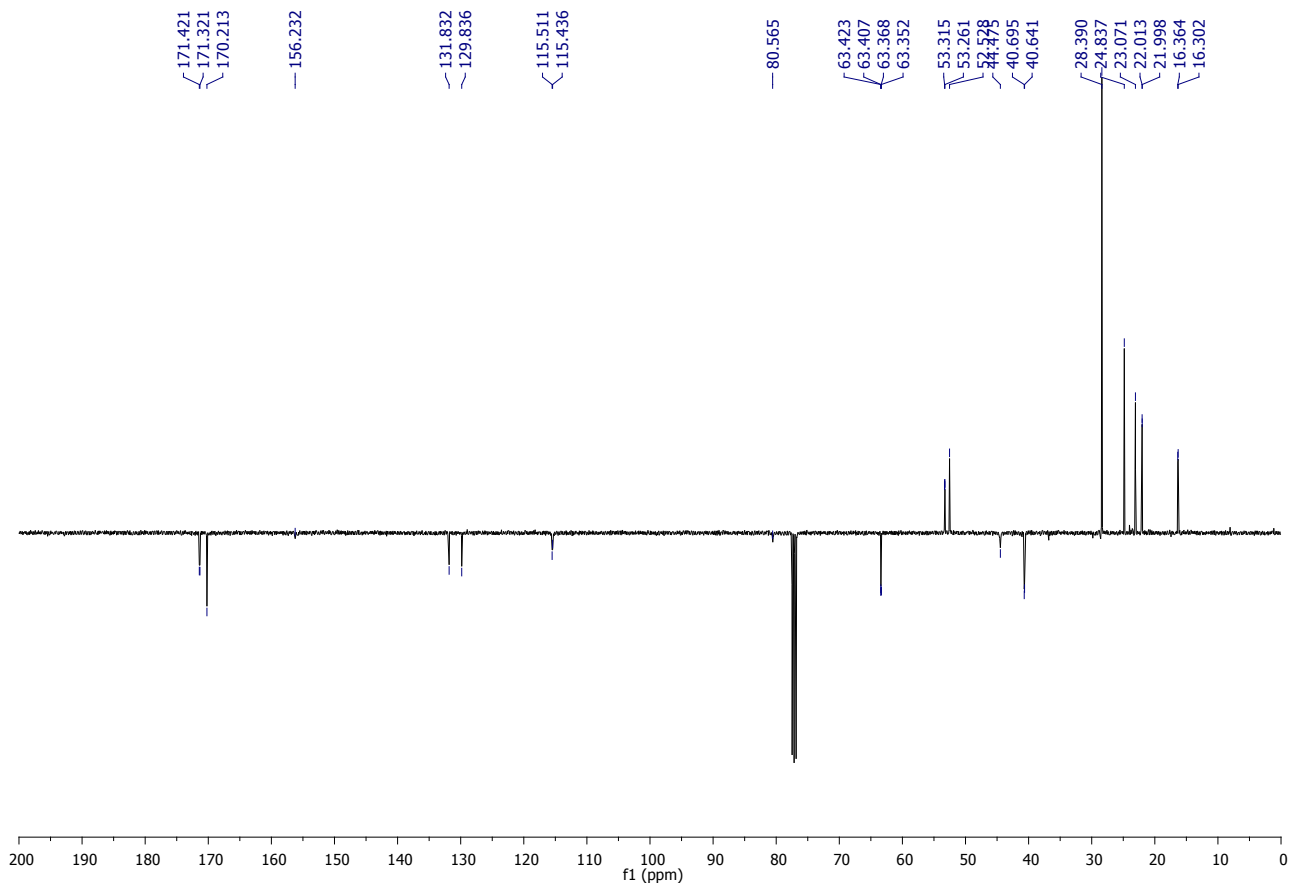


# Ethyl methyl {1-[*N*-(*tert*-butoxycarbonyl)glycyl-L-leucylamido]ethen-1-yl}phosphonate (26)

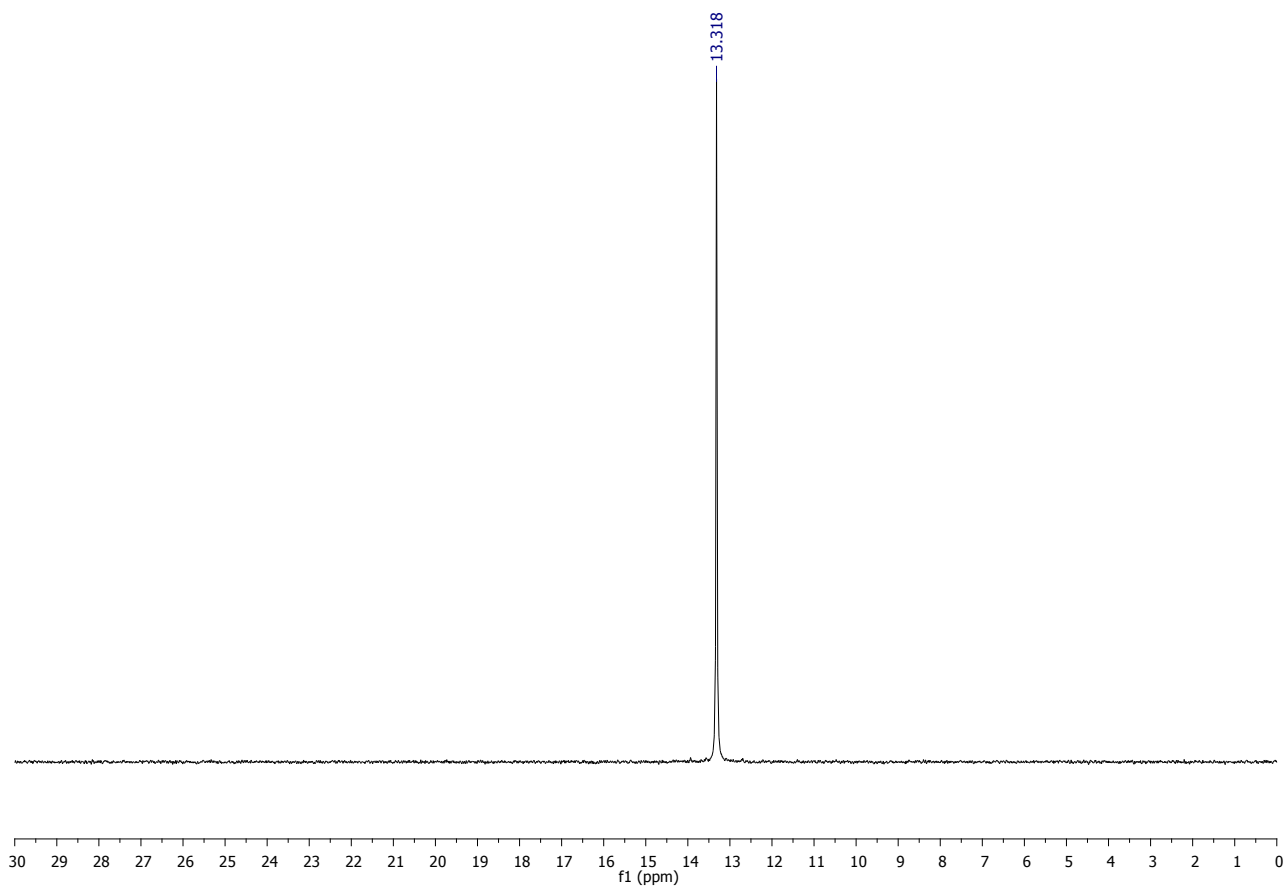
## <sup>1</sup>H NMR spectrum



## APTC NMR spectrum

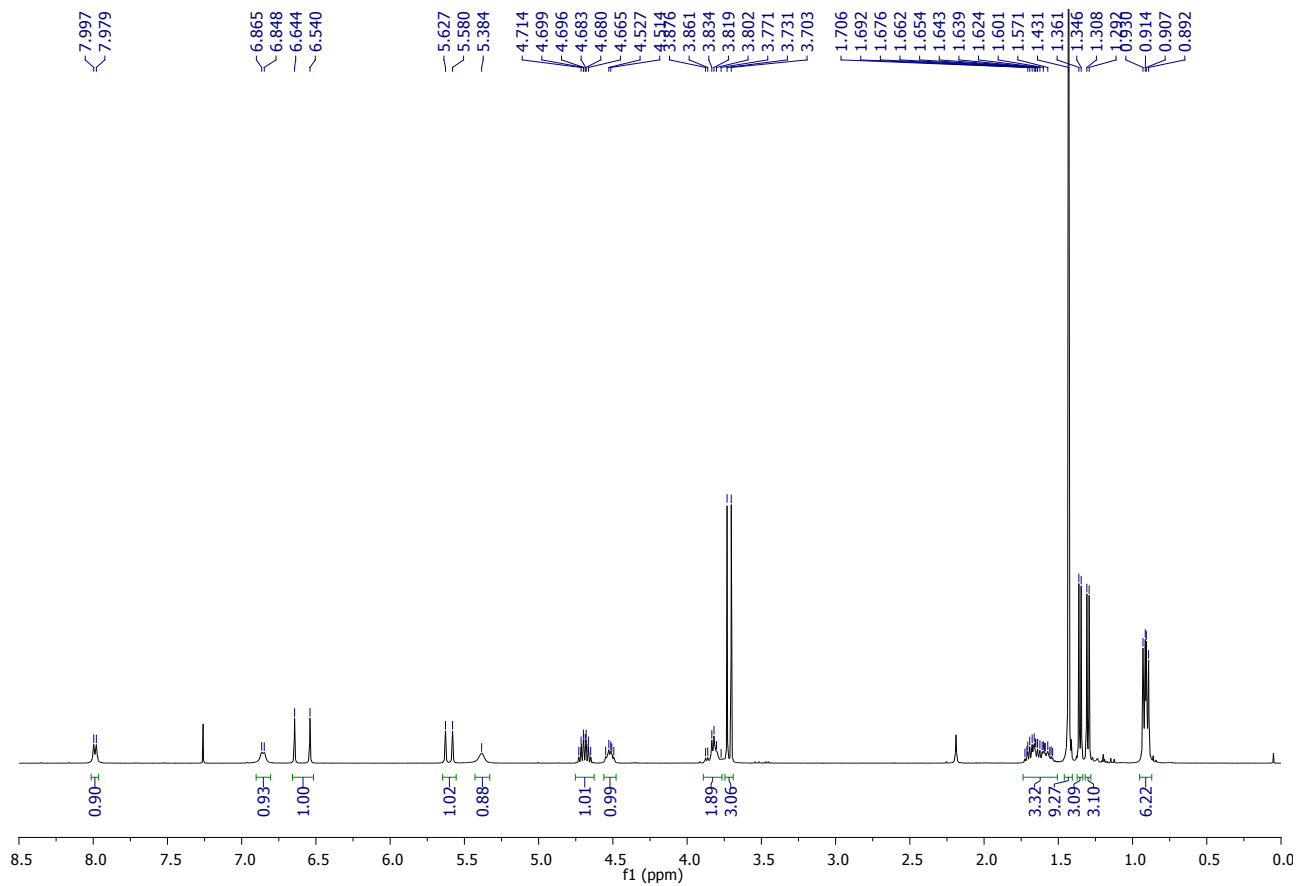


<sup>31</sup>P NMR spectrum

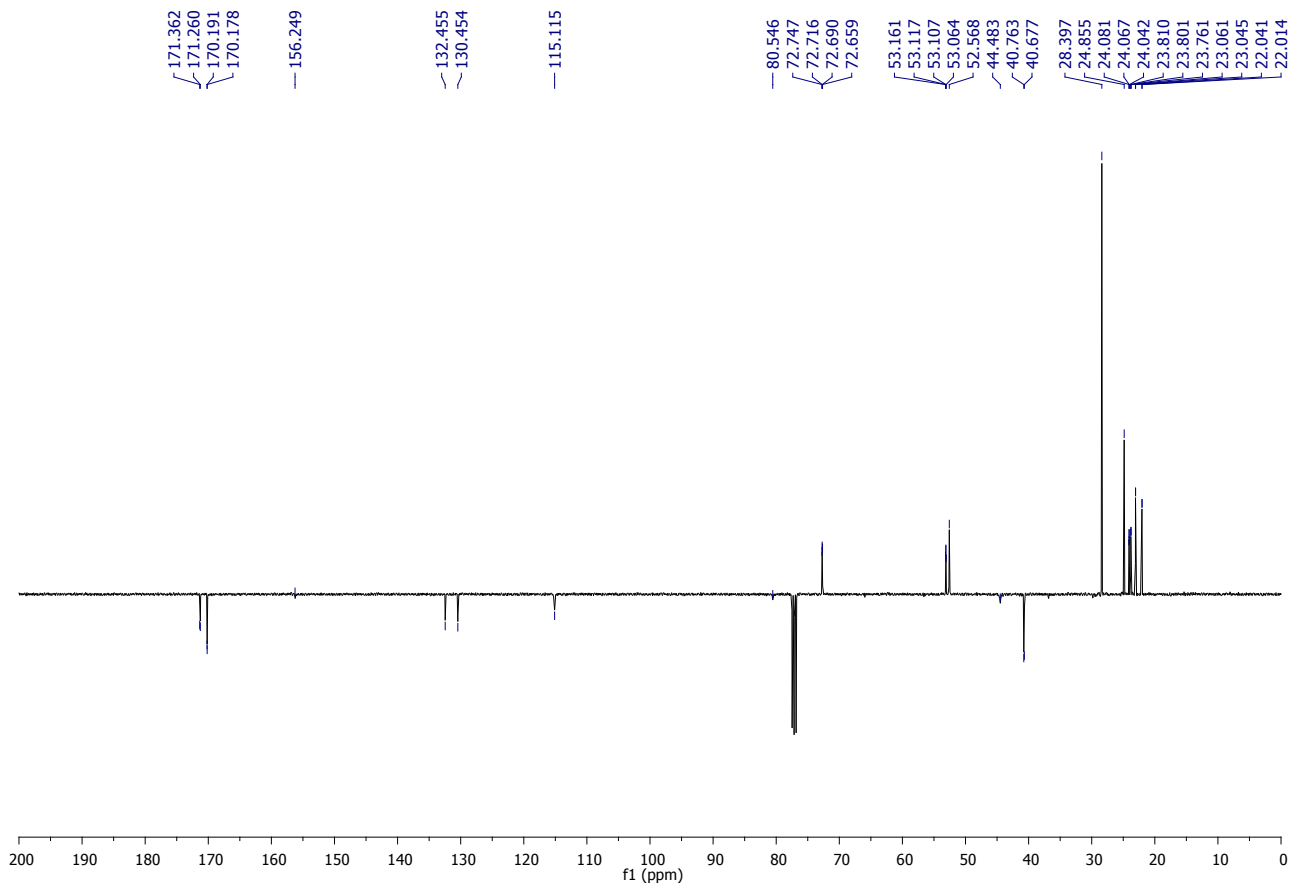


Isopropyl methyl {1-[N-(*tert*-butoxycarbonyl)glycyl-L-leucylamido]ethen-1-yl}phosphonate (27)

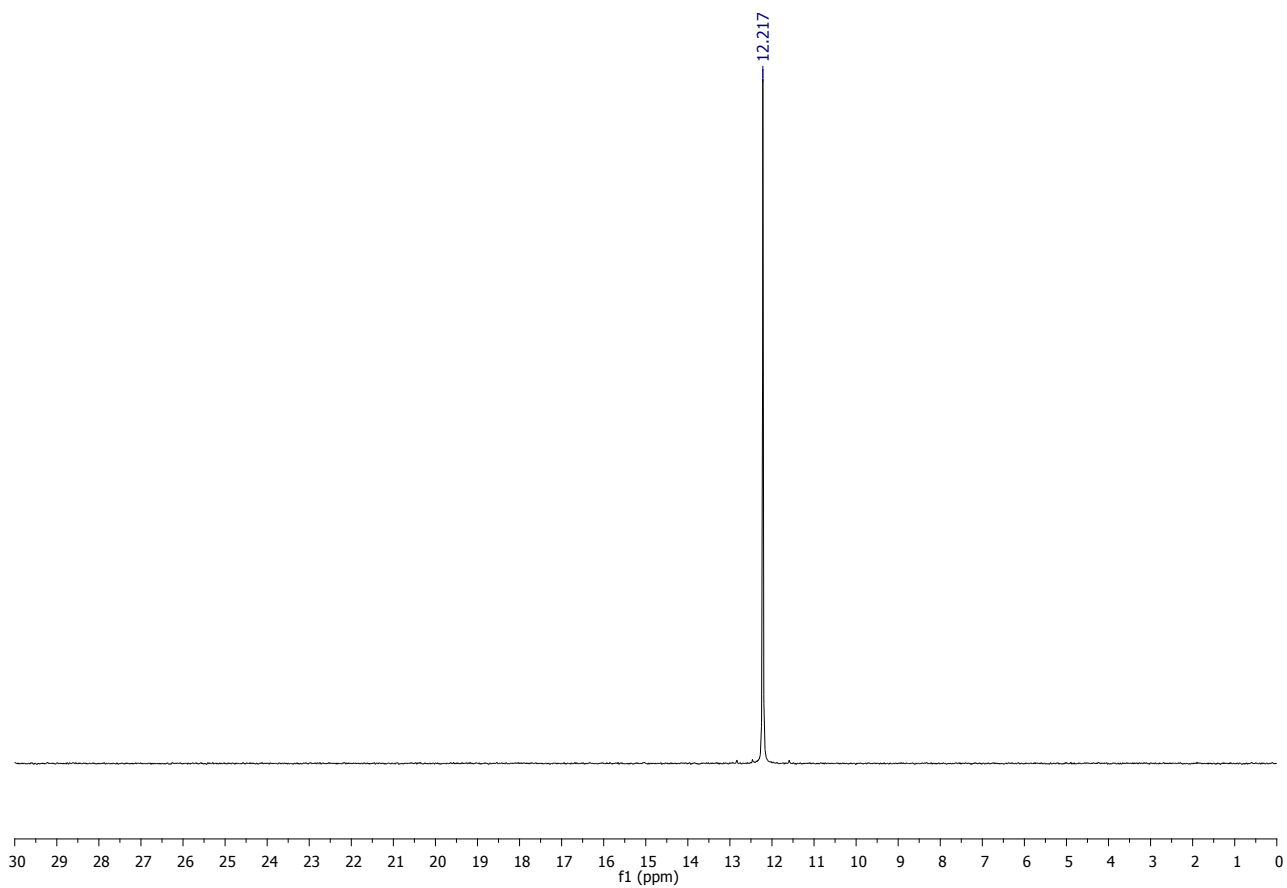
<sup>1</sup>H NMR spectrum



APTC NMR spectrum

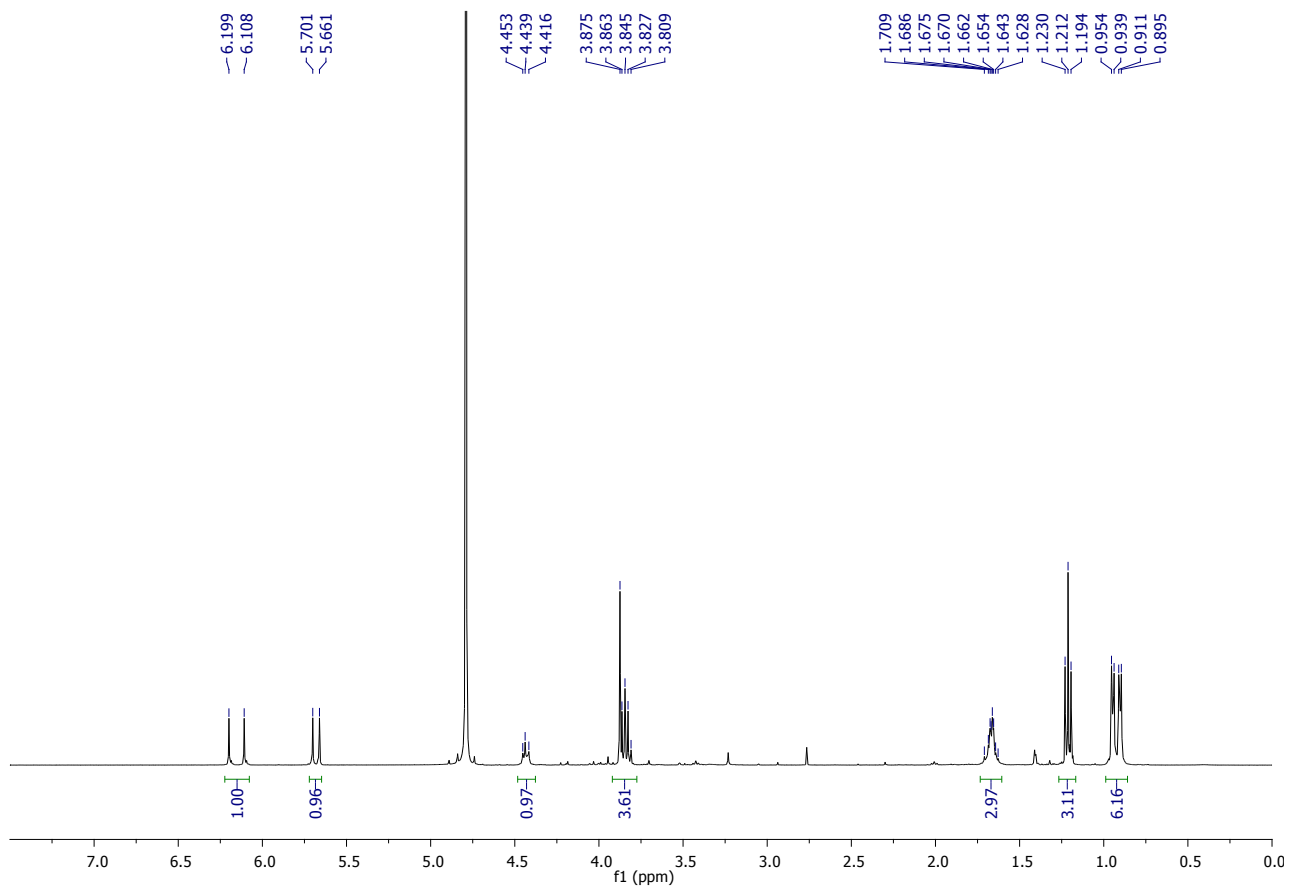


<sup>31</sup>P NMR spectrum

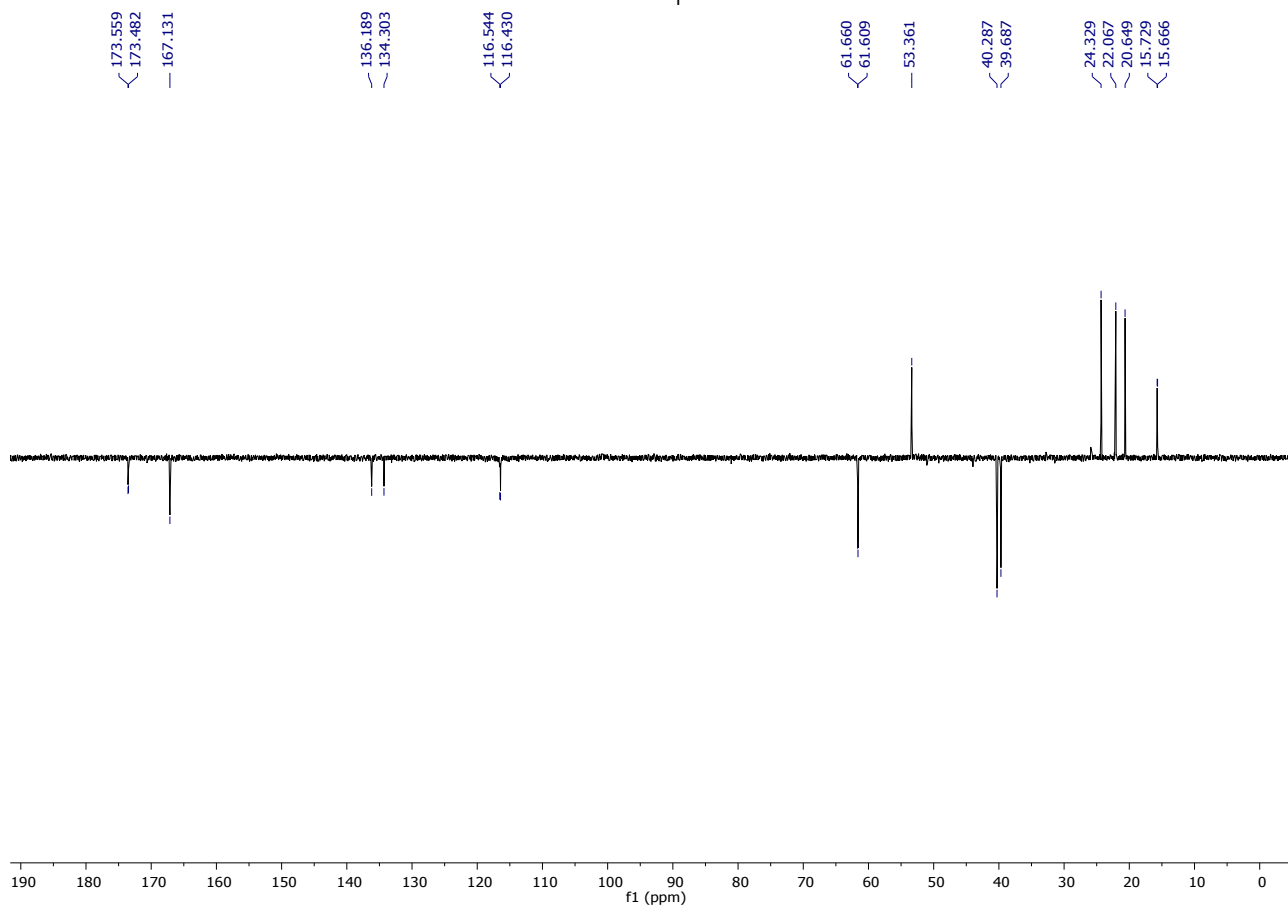


# [1-(Glycyl-L-leucylamido)ethen-1-yl]phosphonic acid monoethyl ester (15)

<sup>1</sup>H NMR spectrum

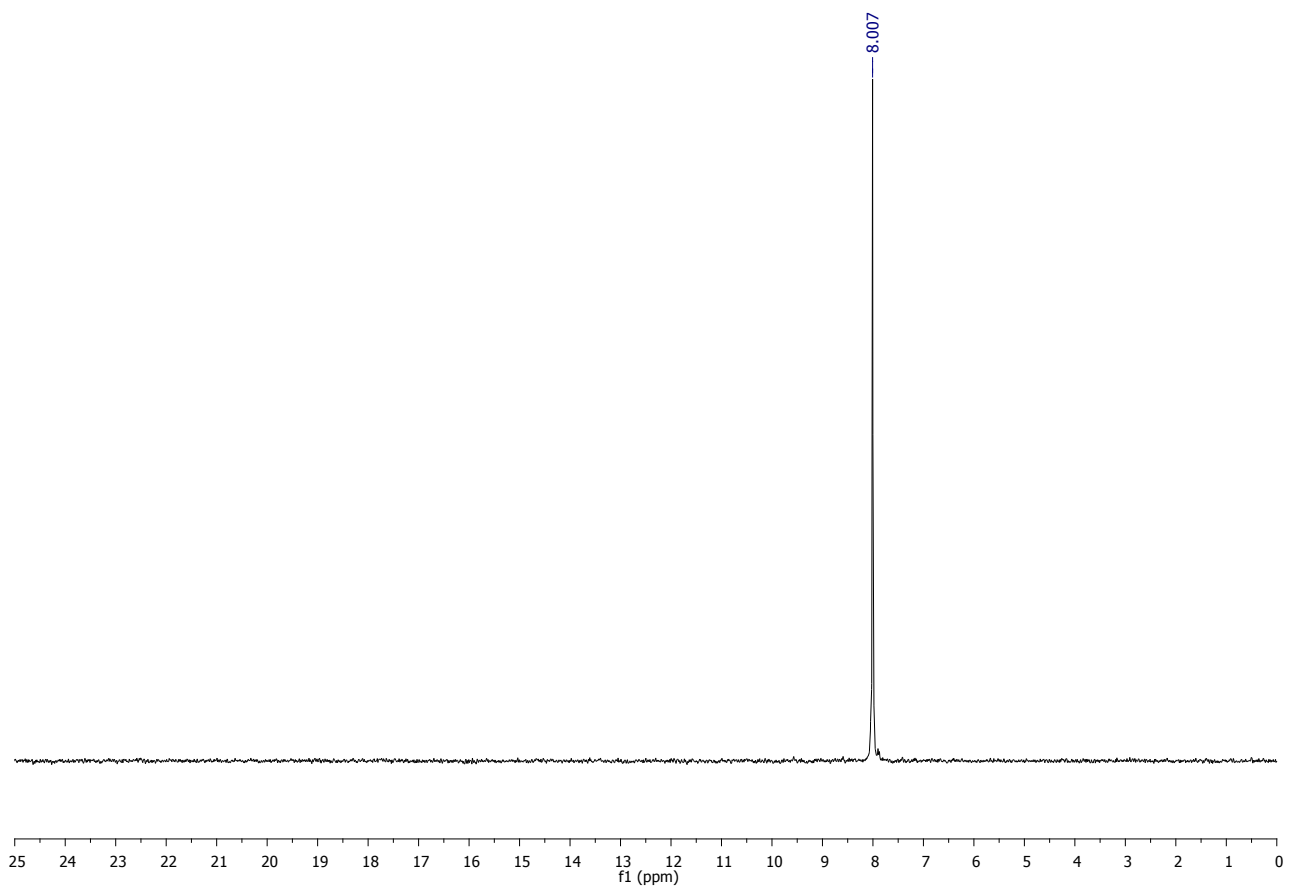


APTC NMR spectrum



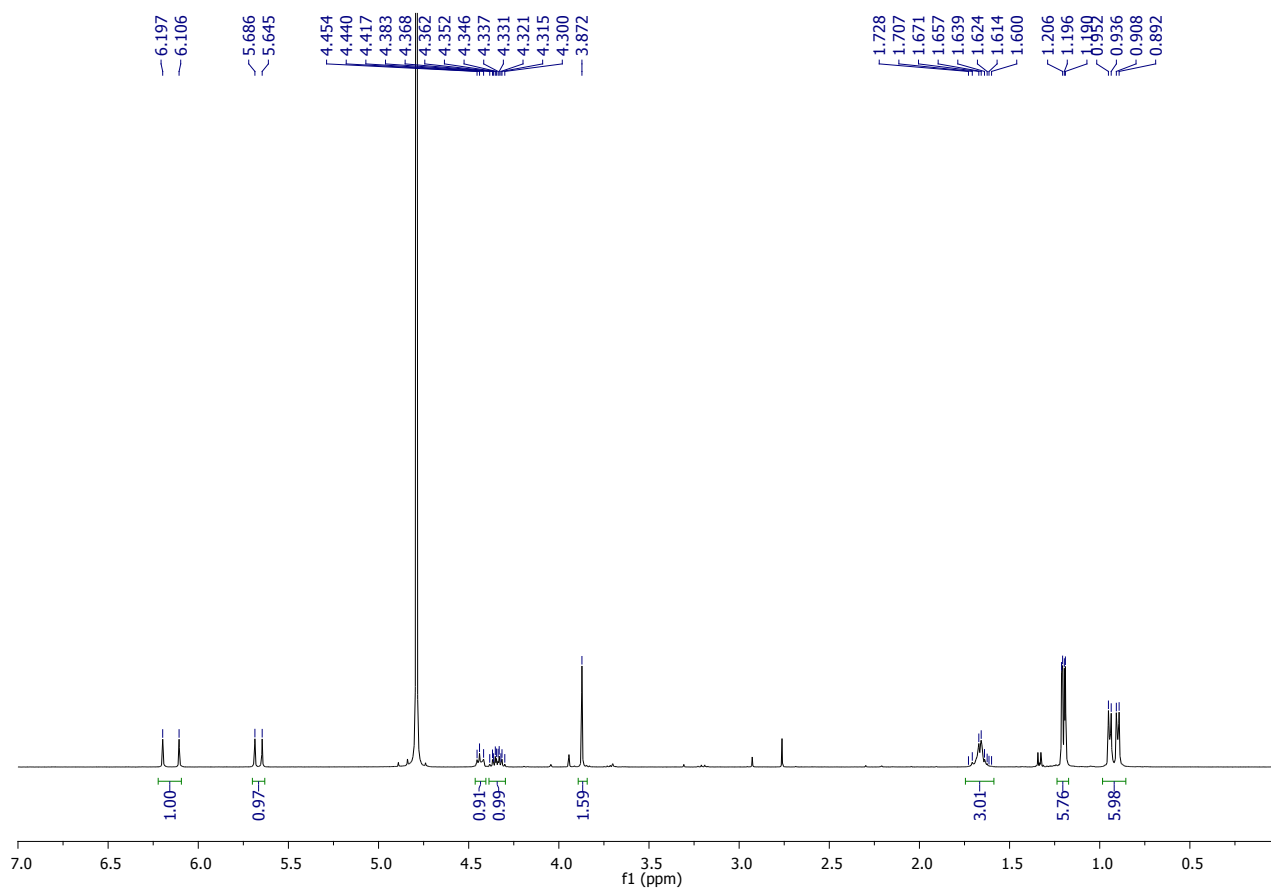


$^{31}\text{P}$  NMR spectrum

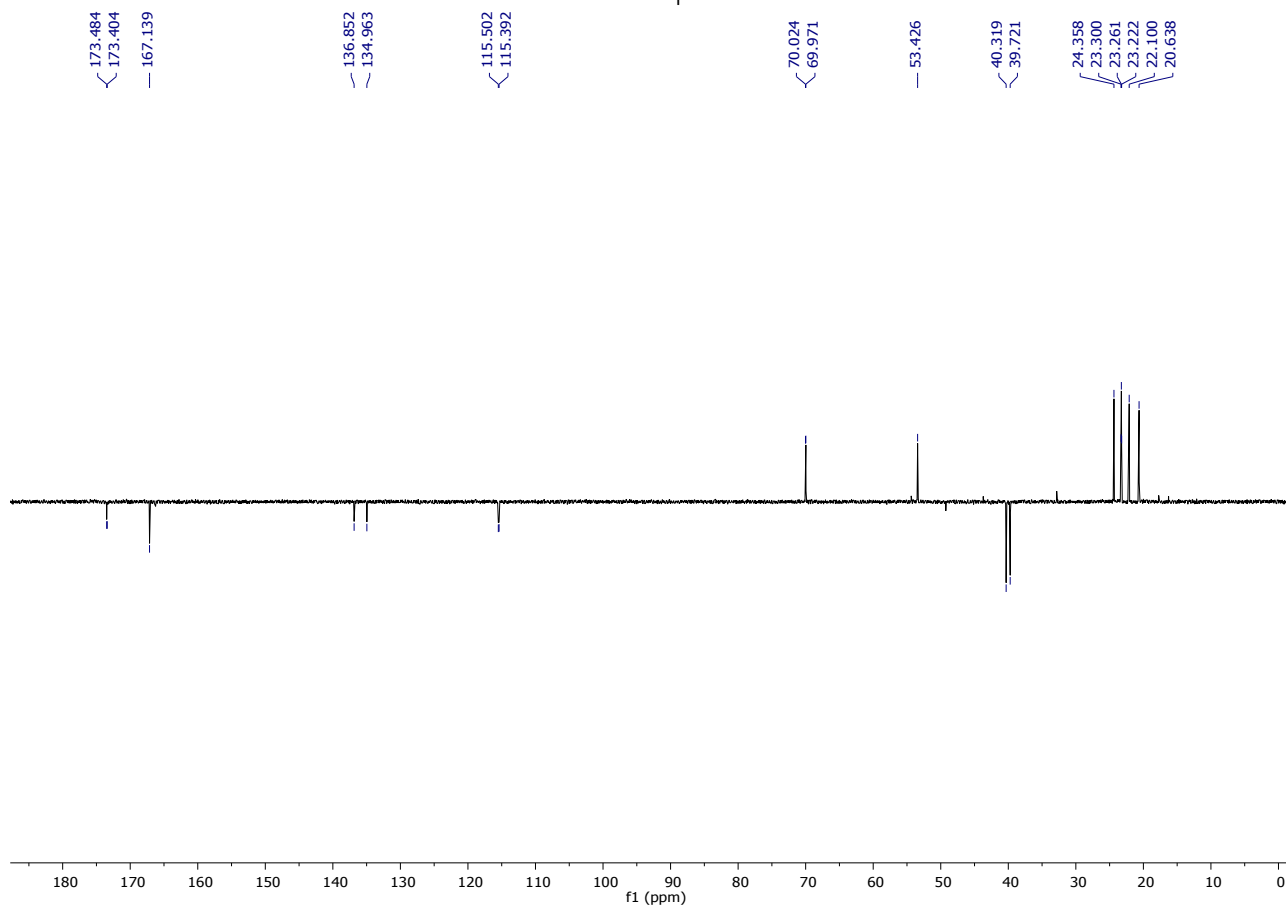


# [1-(Glycyl-L-leucylamido)ethen-1-yl]phosphonic acid monoisopropyl ester (16)

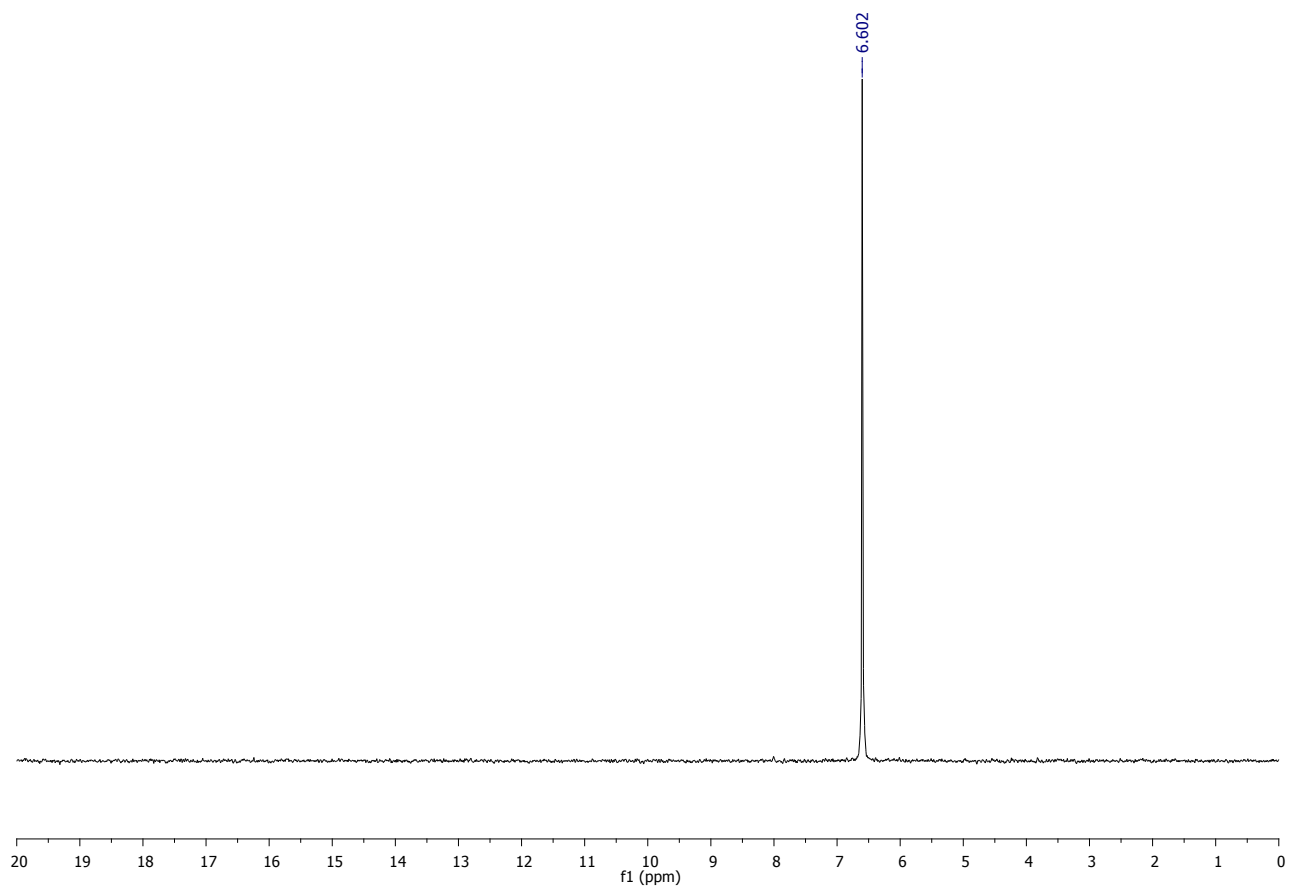
<sup>1</sup>H NMR spectrum



APTC NMR spectrum

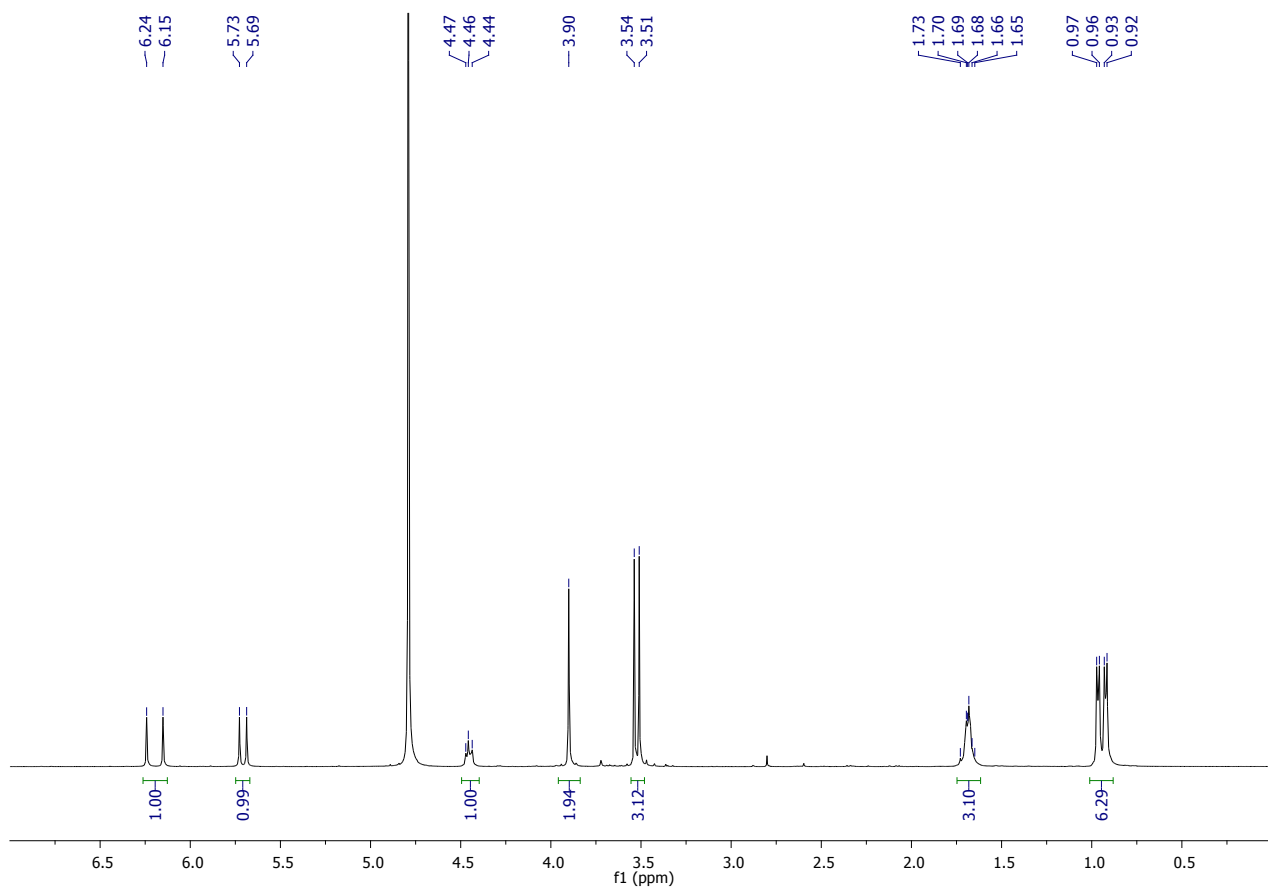


<sup>31</sup>P NMR spectrum

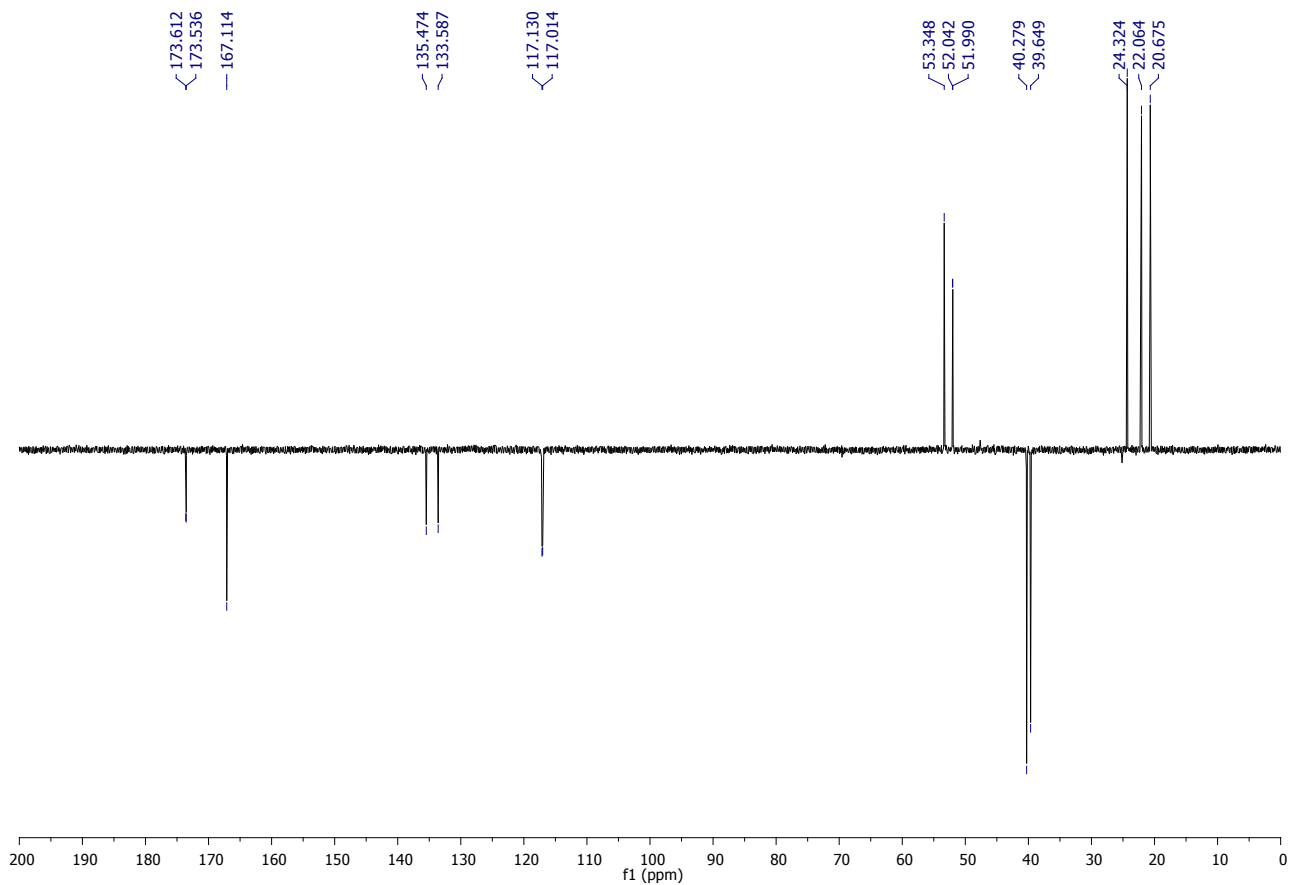


# Dehydrophos

## $^1\text{H}$ NMR spectrum



## APTC NMR spectrum



$^{31}\text{P}$  NMR spectrum

