

Supporting Information

Ferrocenephosphonates: copper-promoted synthesis and further functionalization

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Crystallography

Crystallography. For compounds **(±)-8a** and **(±)-19a'**, the X-ray diffraction data were collected using D8 VENTURE Bruker AXS diffractometer equipped with a (CMOS) PHOTON 100 detector. For compound **12a**, the X-ray diffraction data were collected using D8 VENTURE Bruker AXS diffractometer equipped with a CMOS-PHOTON70 detector. The structure was solved by dual-space algorithm using the *SHELXT* program,¹ and then refined with full-matrix least-square methods based on F^2 (*SHELXL*).² All non-hydrogen atoms were refined with anisotropic atomic displacement parameters. H atoms were finally included in their calculated positions and treated as riding on their parent atom with constrained thermal parameters. The molecular diagrams were generated by MERCURY (version 2020.3.0).

Crystal data for compound **(±)-8a.** $C_{19}H_{30}FeIO_3PSi$, $M = 548.24$, $T = 150(2)$ K; orthorhombic $P\bar{2}_1\bar{2}_1\bar{2}_1$ (I.T.#19), $a = 7.9128(7)$, $b = 16.2355(14)$, $c = 17.6325(14)$ Å, $V = 2265.2(3)$ Å³. $Z = 4$, $d = 1.608$ g.cm⁻³, $\mu = 2.168$ mm⁻¹. A final refinement on F^2 with 5216 unique intensities and 242 parameters converged at $\omega R(F^2) = 0.0577$ ($R_F = 0.0247$) for 5020 observed reflections with $I > 2\sigma$. CCDC 2141661.

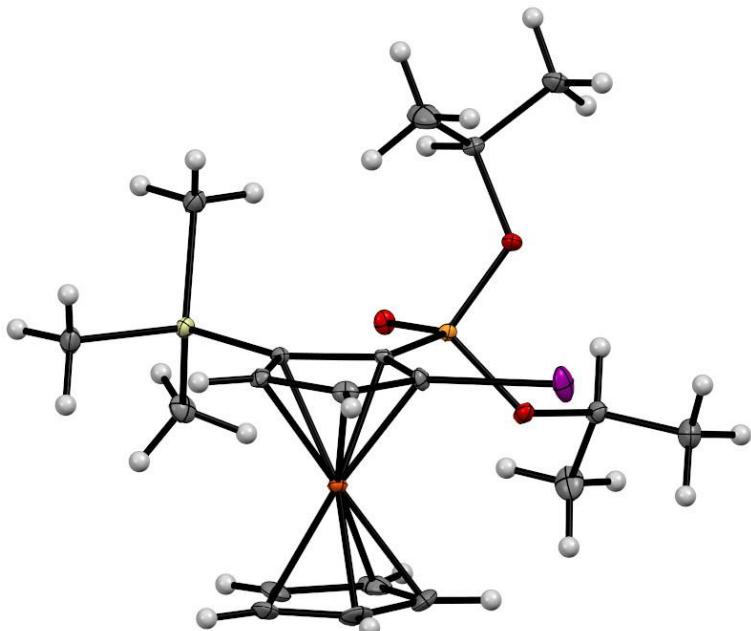


Figure 1. Molecular structure of compound **(±)-8a** (thermal ellipsoids shown at the 30% probability level).

Crystal data for compound **12a.** $C_{26}H_{25}F_2FeO_3P$, $M = 510.28$, $T = 150(2)$ K; monoclinic $P\bar{2}_1/n$ (I.T.#14), $a = 10.7141(15)$, $b = 9.6084(17)$, $c = 22.423(4)$ Å, $\beta = 100.062(6)$ °, $V = 2272.8(7)$ Å³. $Z = 4$, $d = 1.491$ g.cm⁻³, $\mu = 0.777$ mm⁻¹. A final refinement on F^2 with 5180 unique intensities and 300 parameters converged at $\omega R(F^2) = 0.0773$ ($R_F = 0.0312$) for 4716 observed reflections with $I > 2\sigma$. CCDC 2141662.

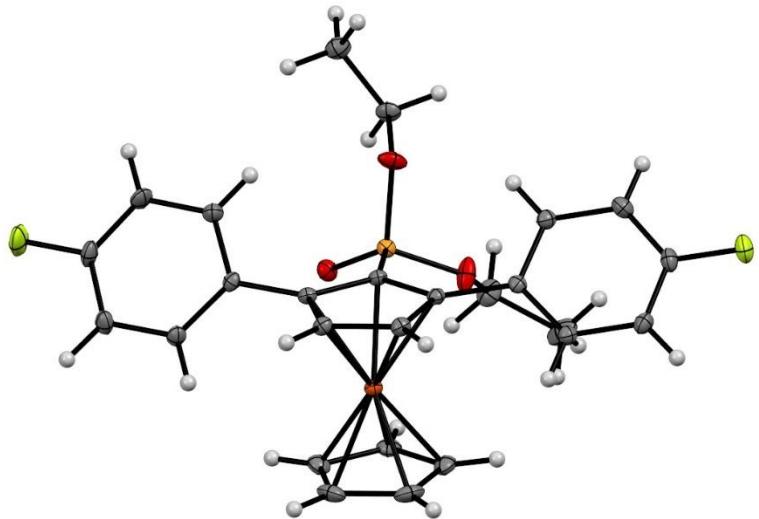


Figure 2. Molecular structure of compound **12a** (thermal ellipsoids shown at the 30% probability level).

Crystal data for compound (\pm)-19b**.** $C_{27}H_{48}FeNO_4PSi_2$, $M = 593.66$, $T = 150(2)$ K, triclinic $P\bar{1}$ (I.T.#2), $a = 7.5018(7)$, $b = 8.6698(9)$, $c = 24.883(3)$ Å, $\alpha = 86.639(4)$, $\beta = 86.775(3)$, $\gamma = 73.698(4)$ °, $V = 1549.3(3)$ Å³. $Z = 2$, $d = 1.273$ g.cm⁻³, $\mu = 0.647$ mm⁻¹. A final refinement on F^2 with 7125 unique intensities and 337 parameters converged at $\omega R(F^2) = 0.0927$ ($R_F = 0.0384$) for 6015 observed reflections with $I > 2\sigma$. CCDC 2141663.

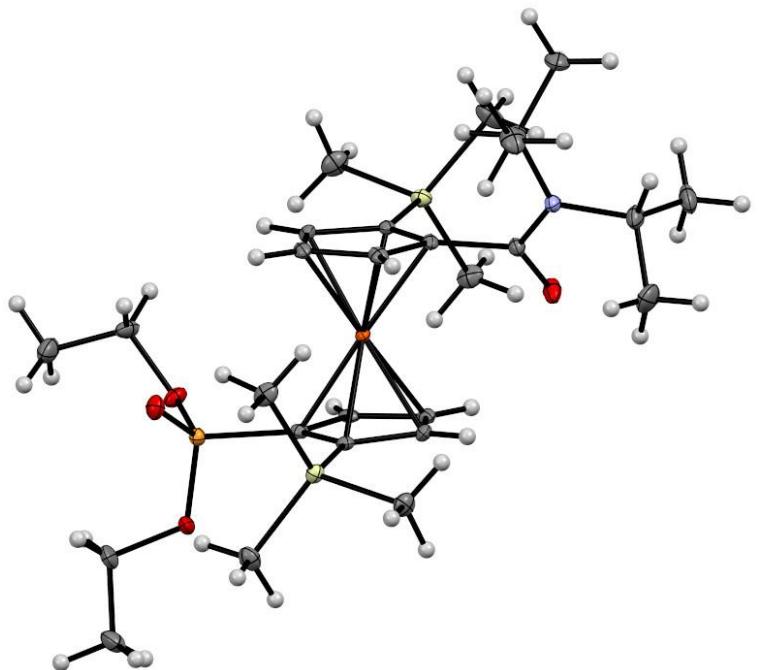
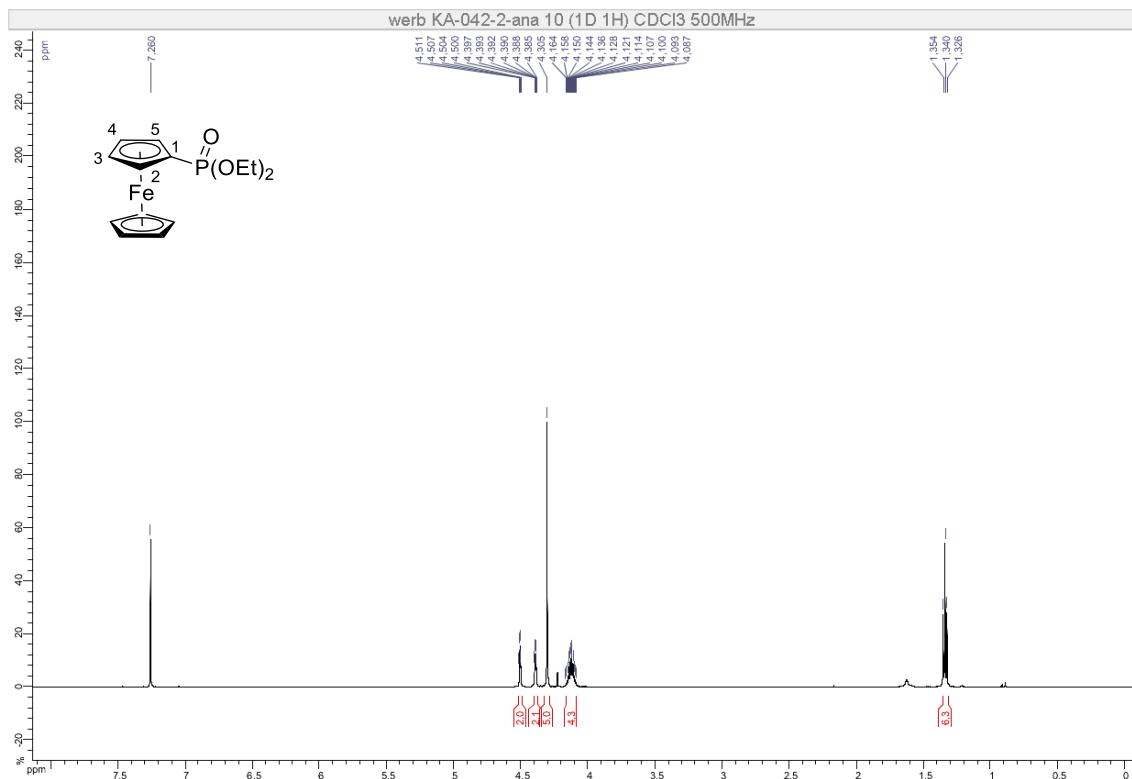


Figure 3. Molecular structure of compound (\pm)-**19b** (thermal ellipsoids shown at the 30% probability level).

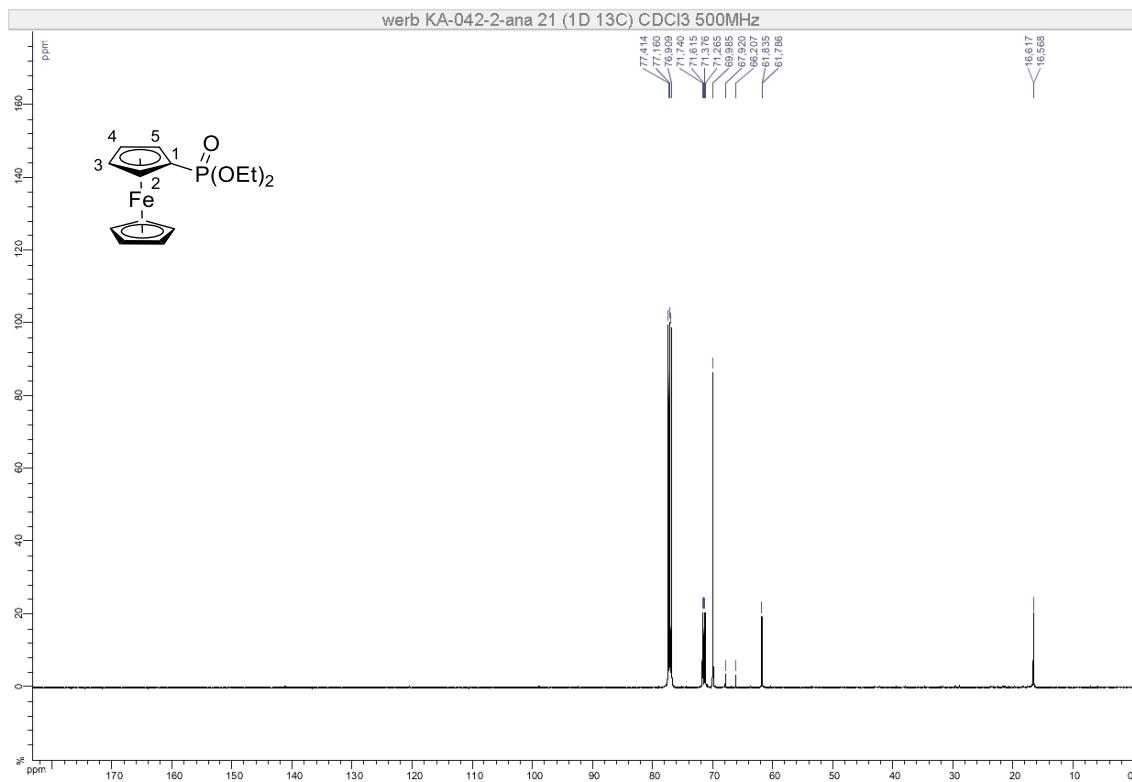
NMR Spectra

O,O-Diethylferrocenephosphonate (1a)

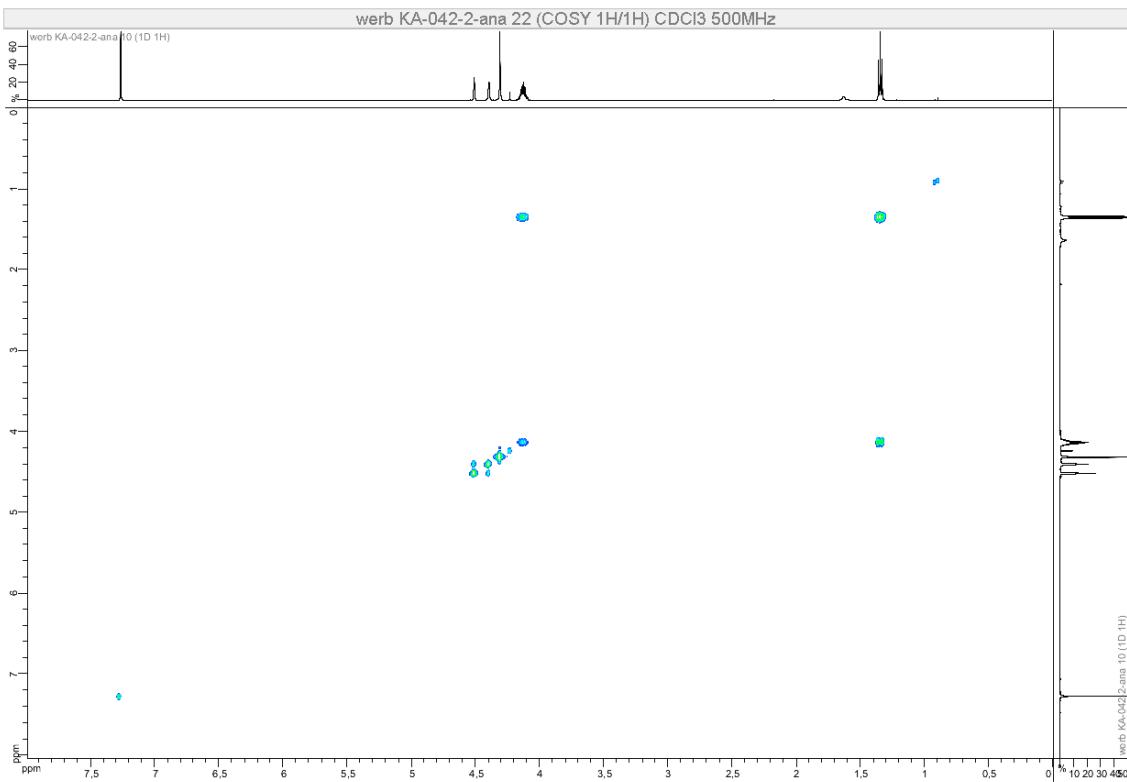
¹H NMR



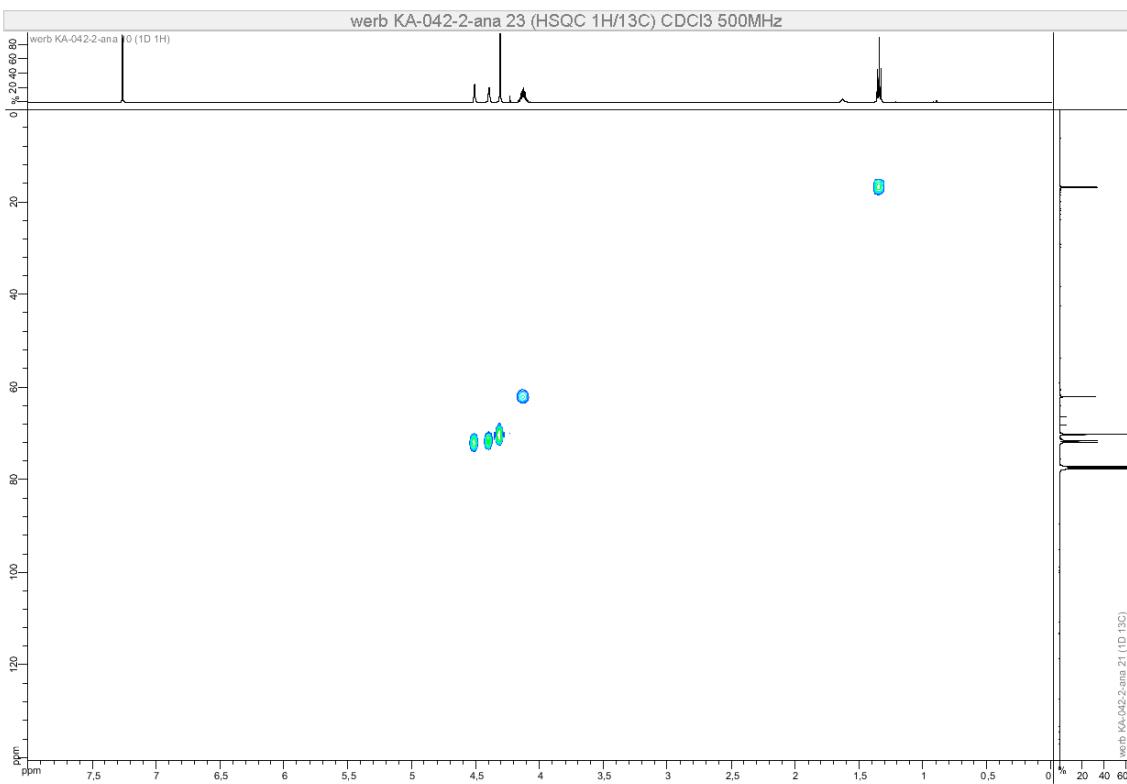
¹³C{¹H} NMR



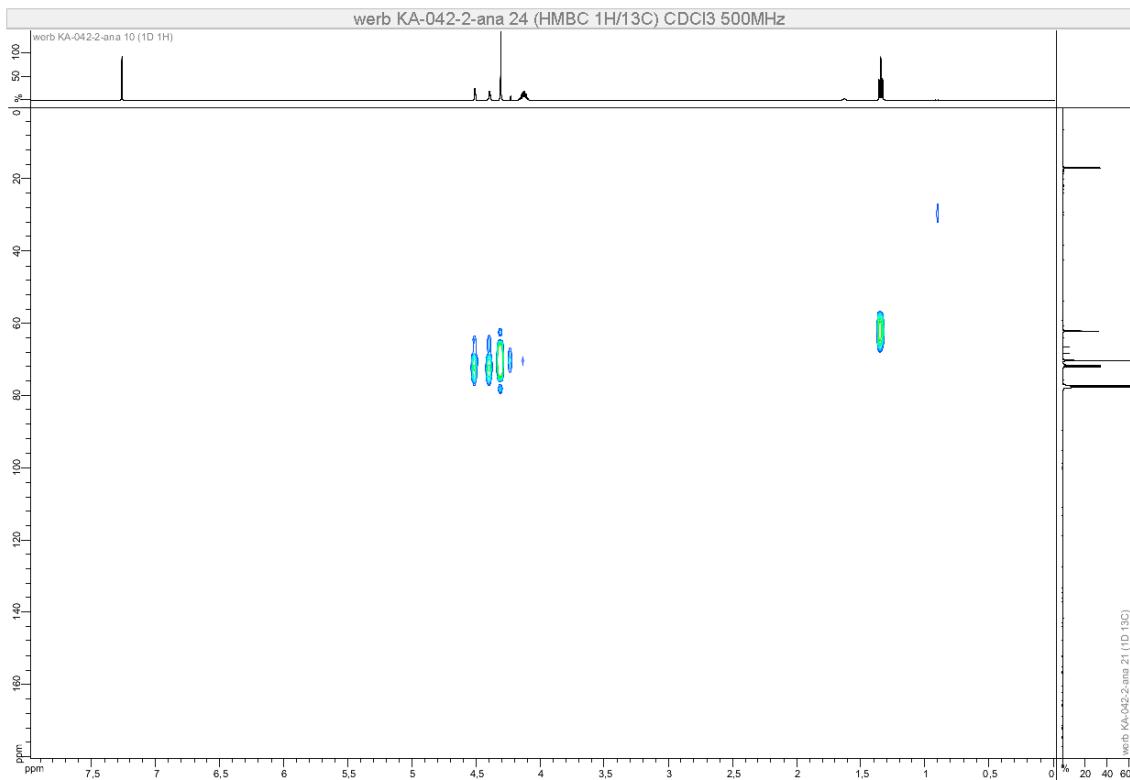
COSY NMR



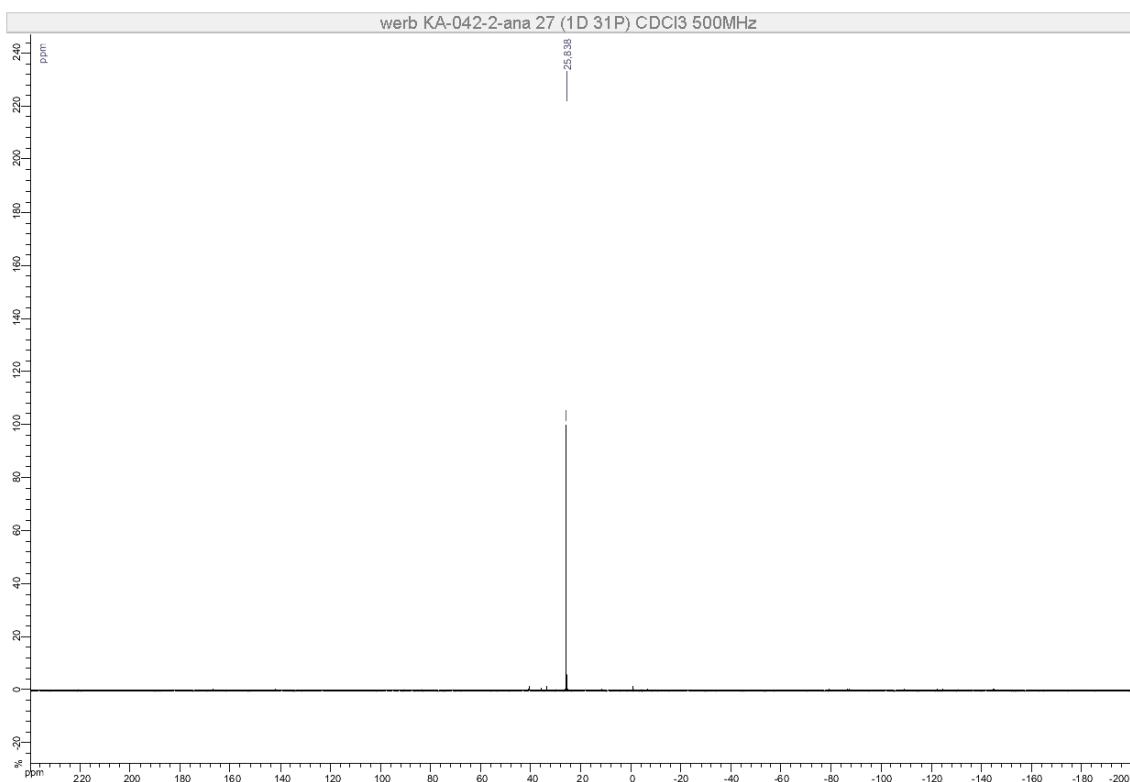
HSQC NMR



HMBC NMR

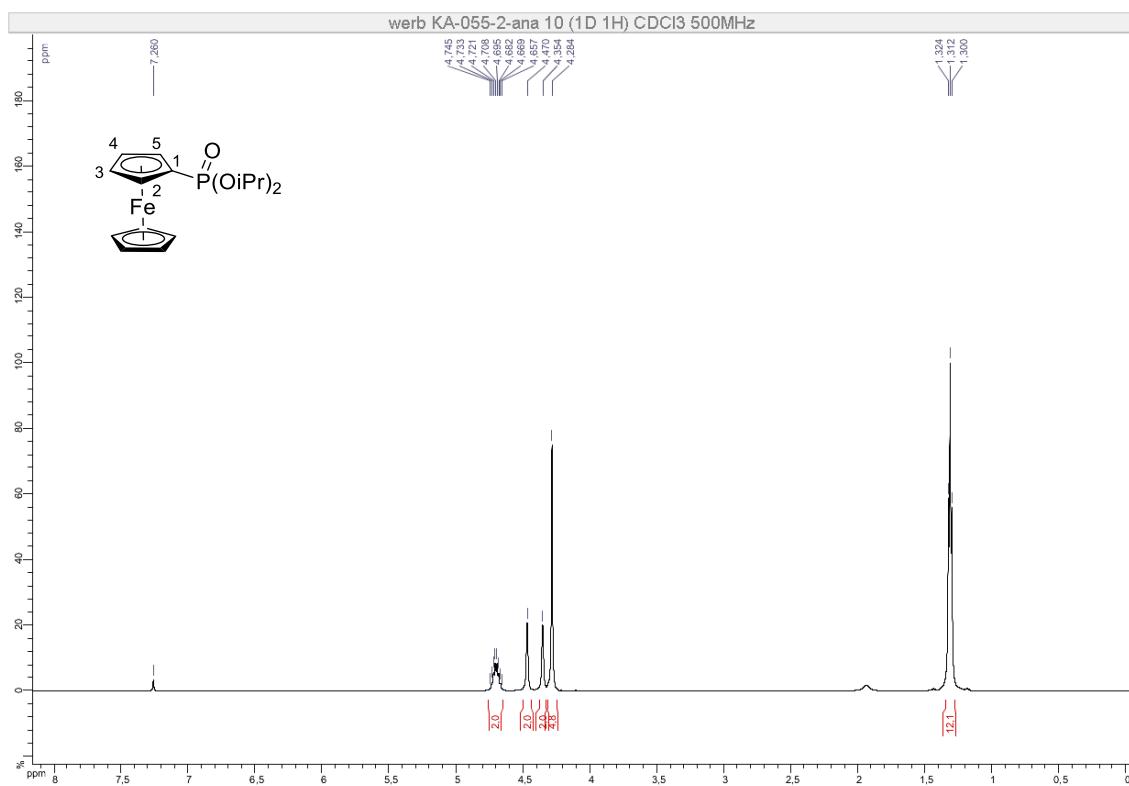


³¹P{¹H} NMR

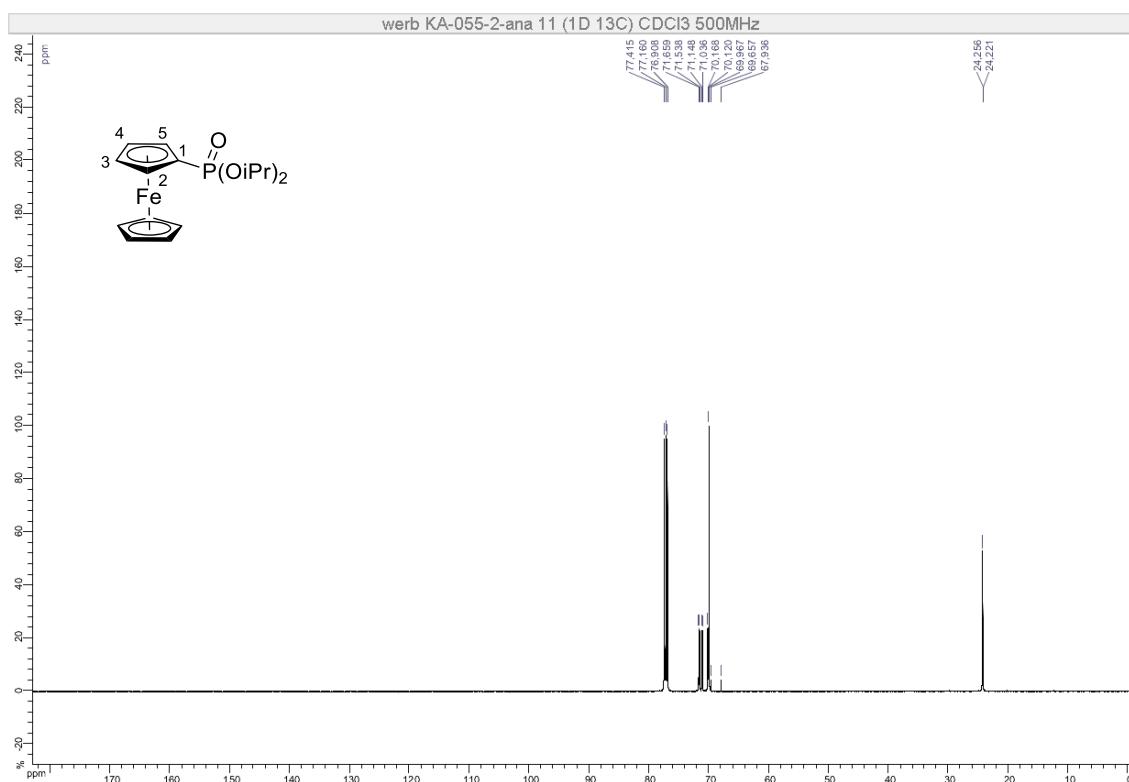


O,O-Diisopropylferrocenephosphonate (1b)

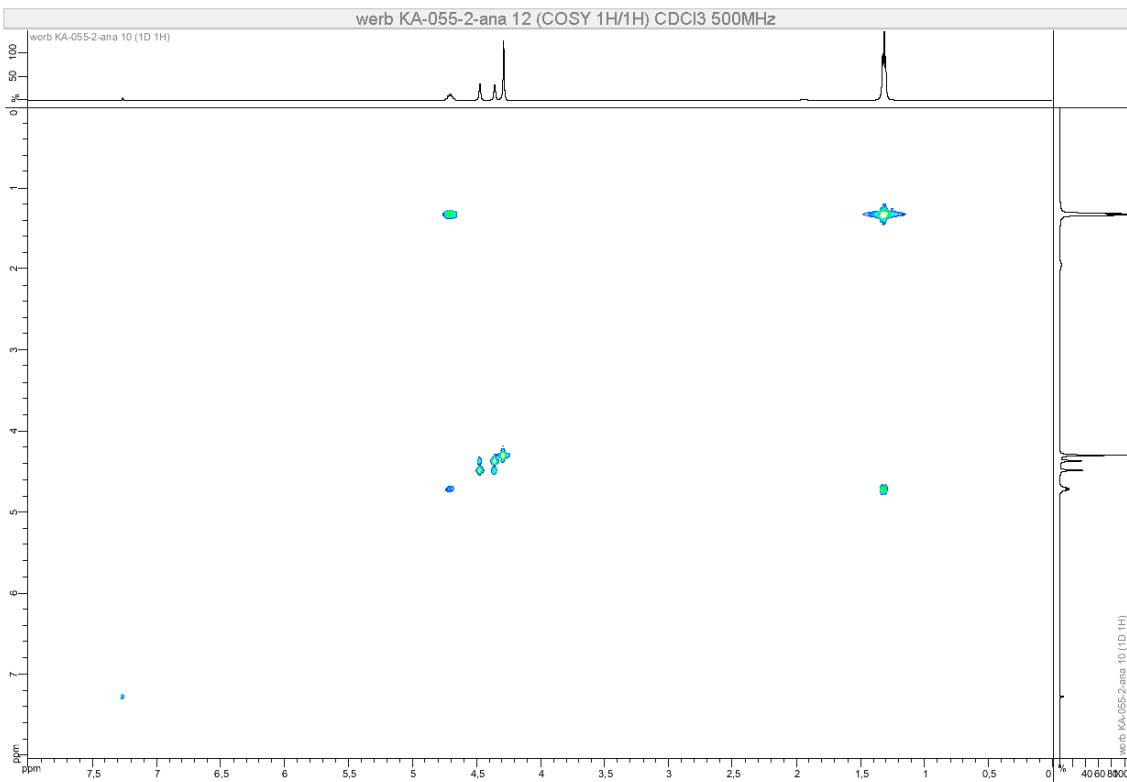
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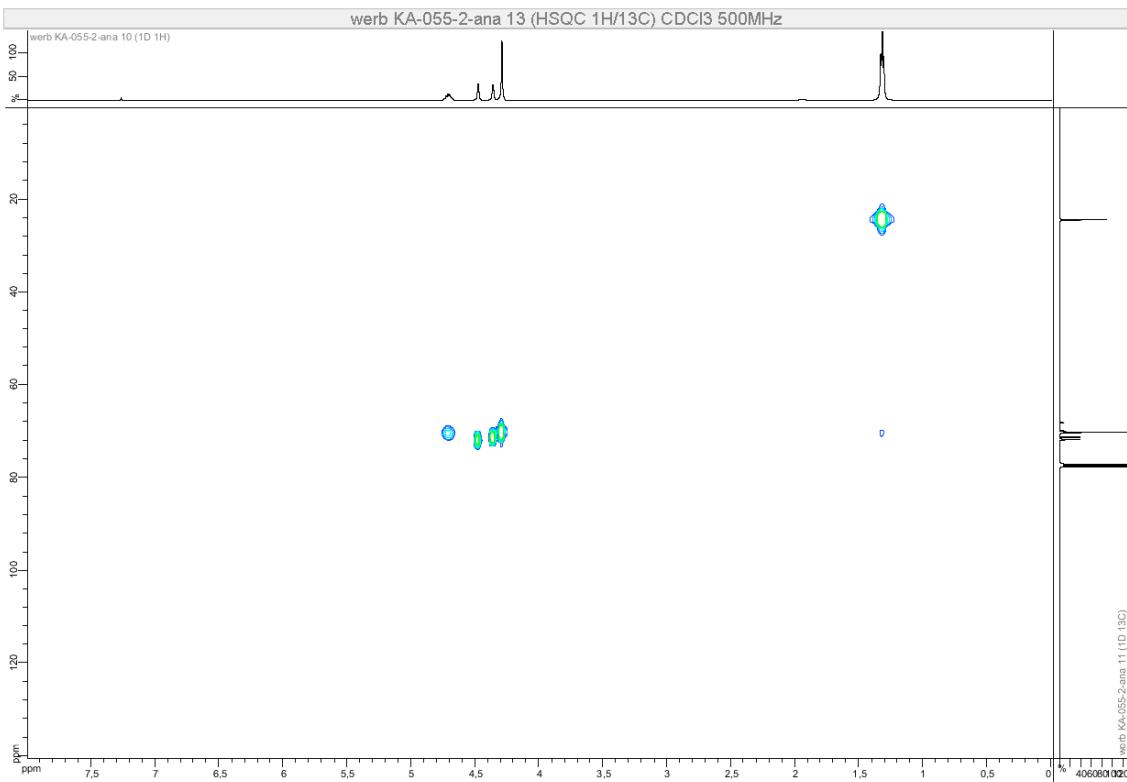
¹³C{¹H} NMR



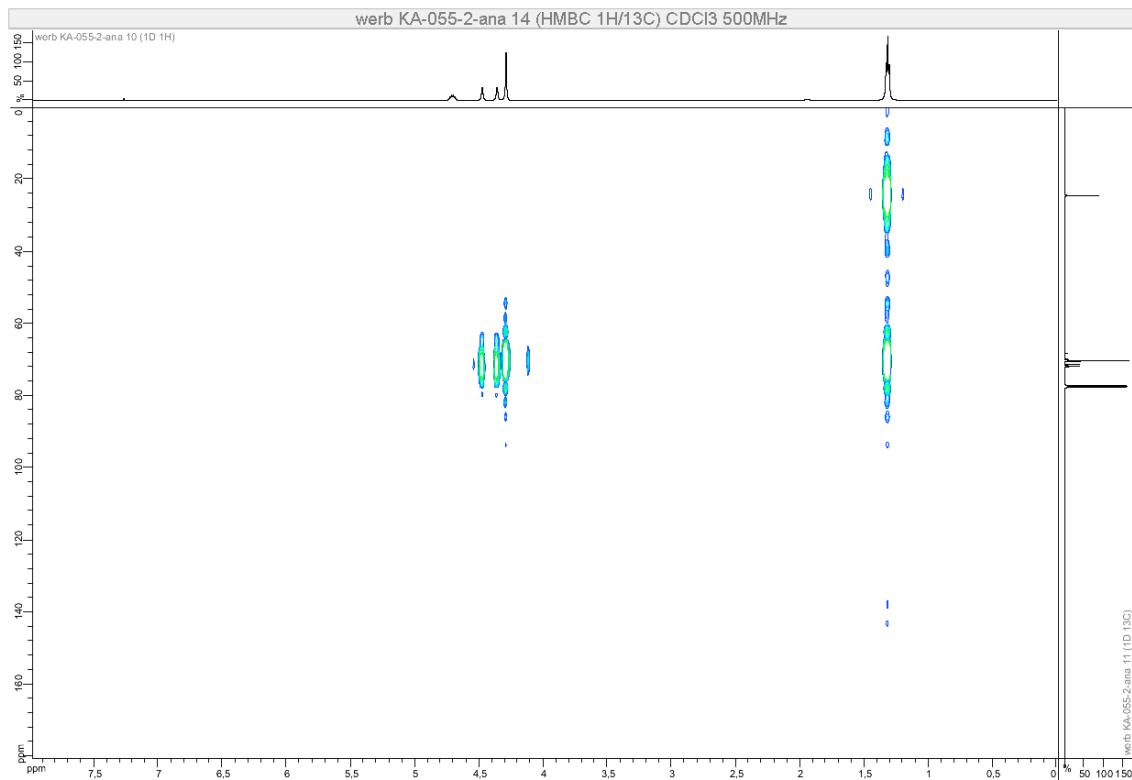
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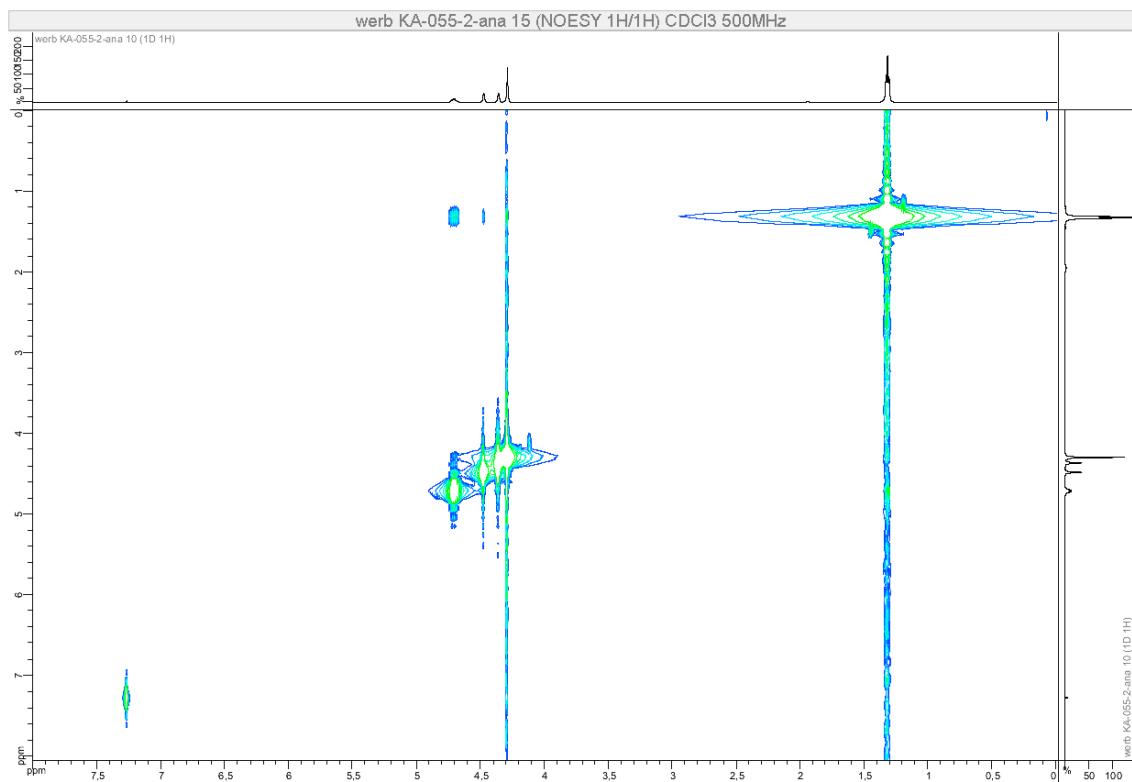
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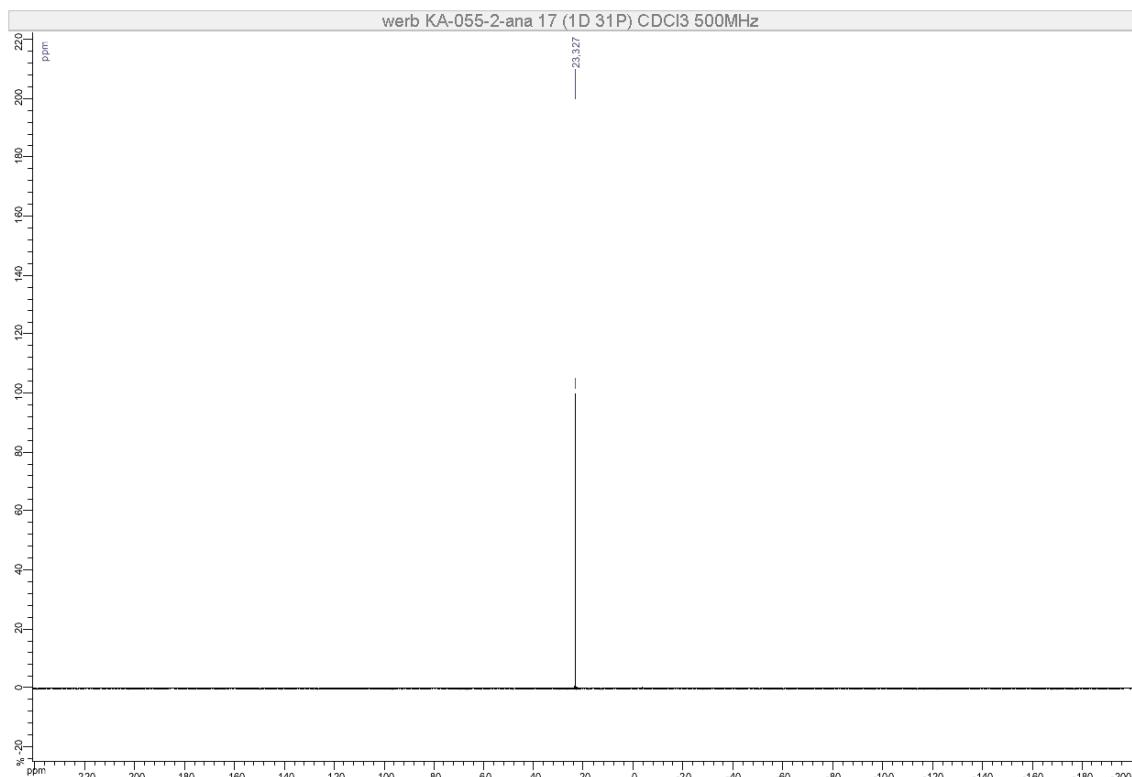
HMBC NMR



NOESY NMR

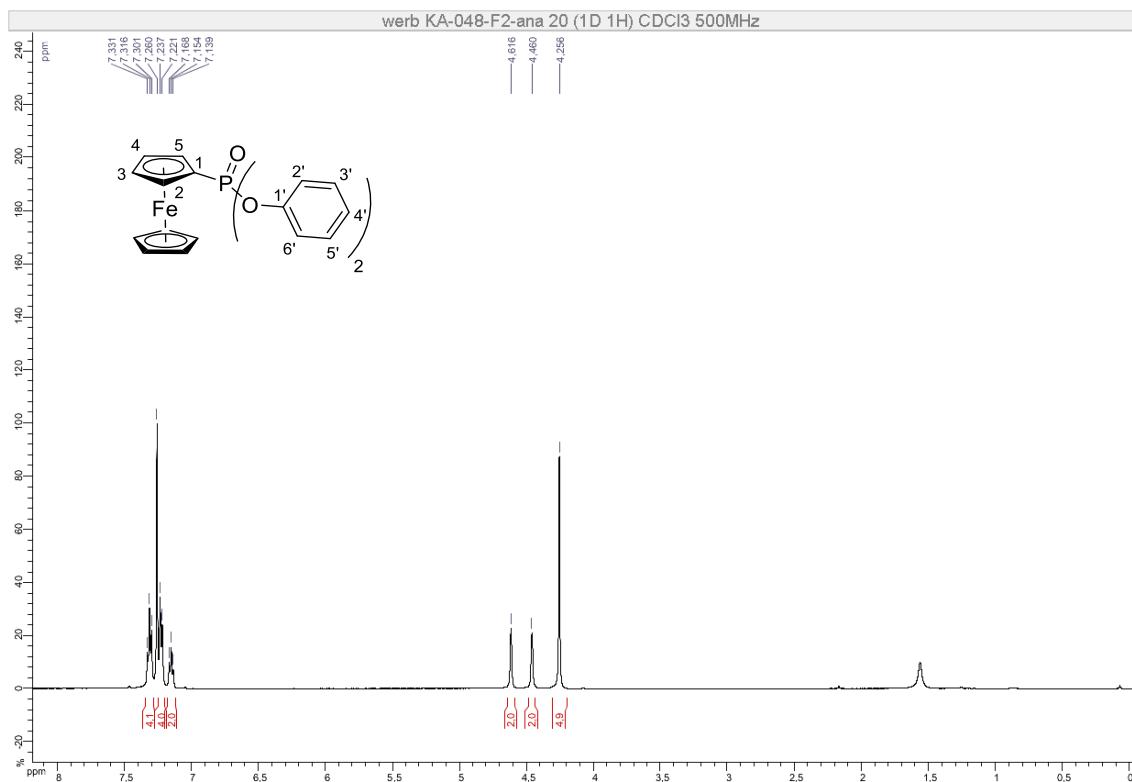


$^{31}\text{P}\{\text{H}\}$ NMR

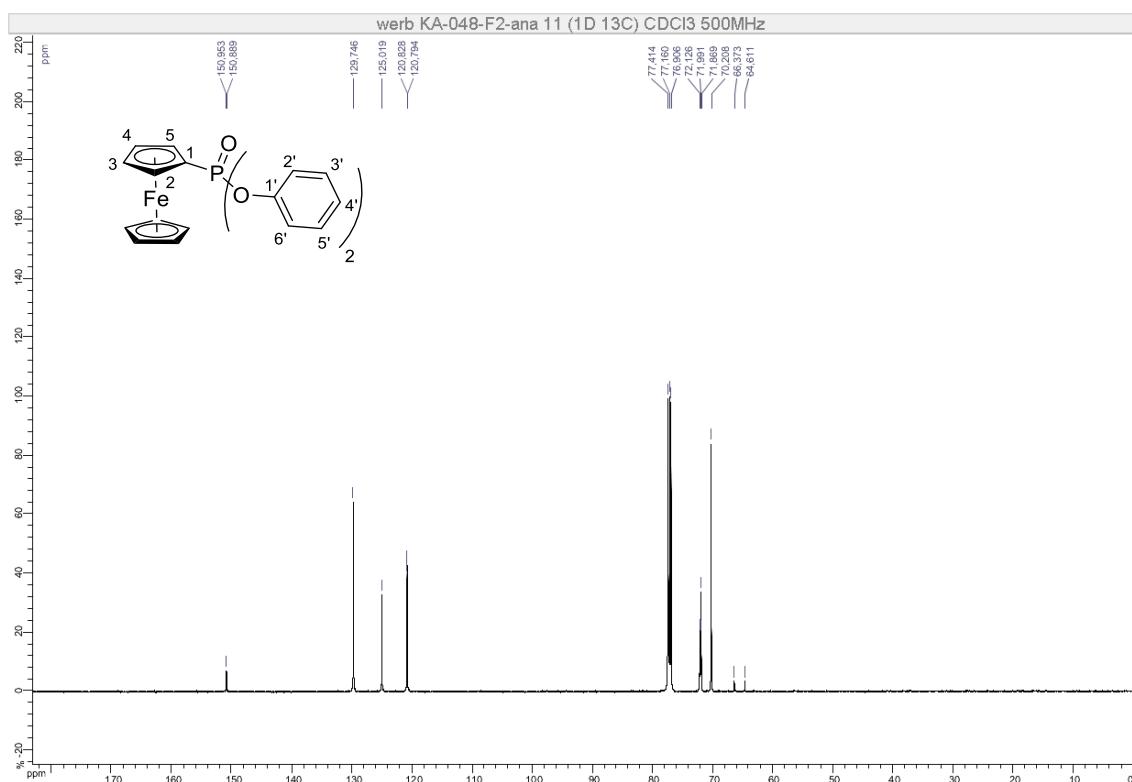


O,O-Diphenylferrocenephosphonate (1c)

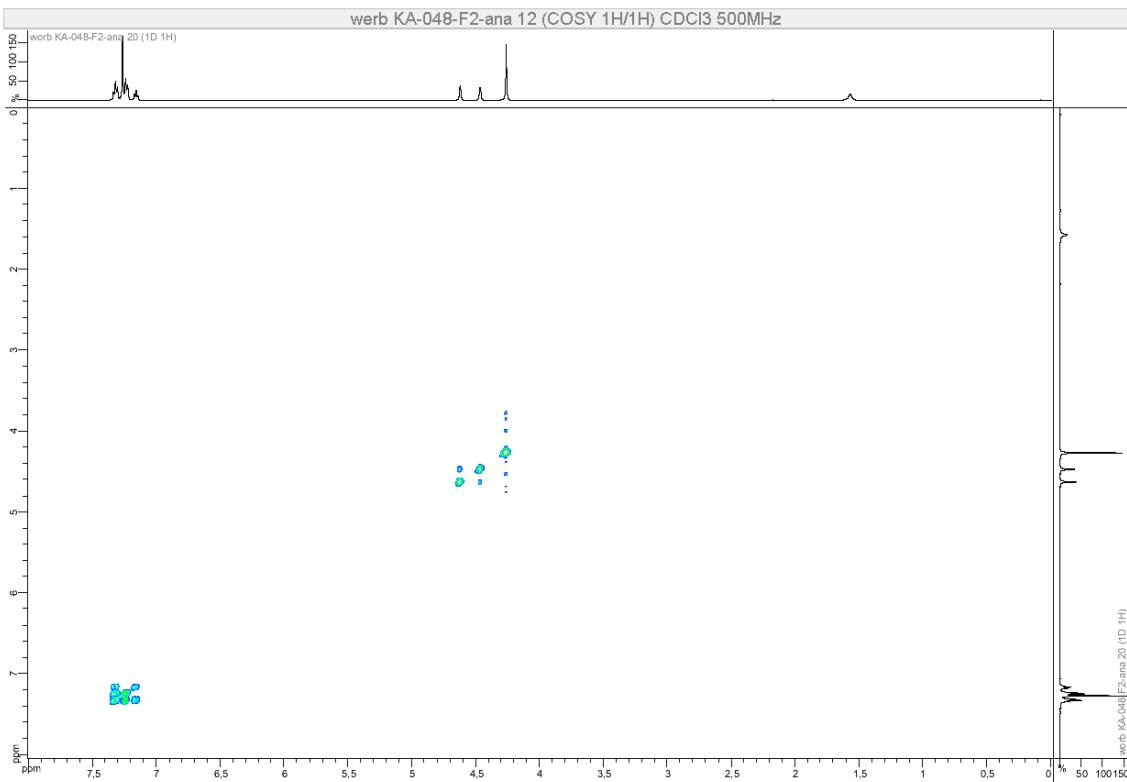
¹H NMR



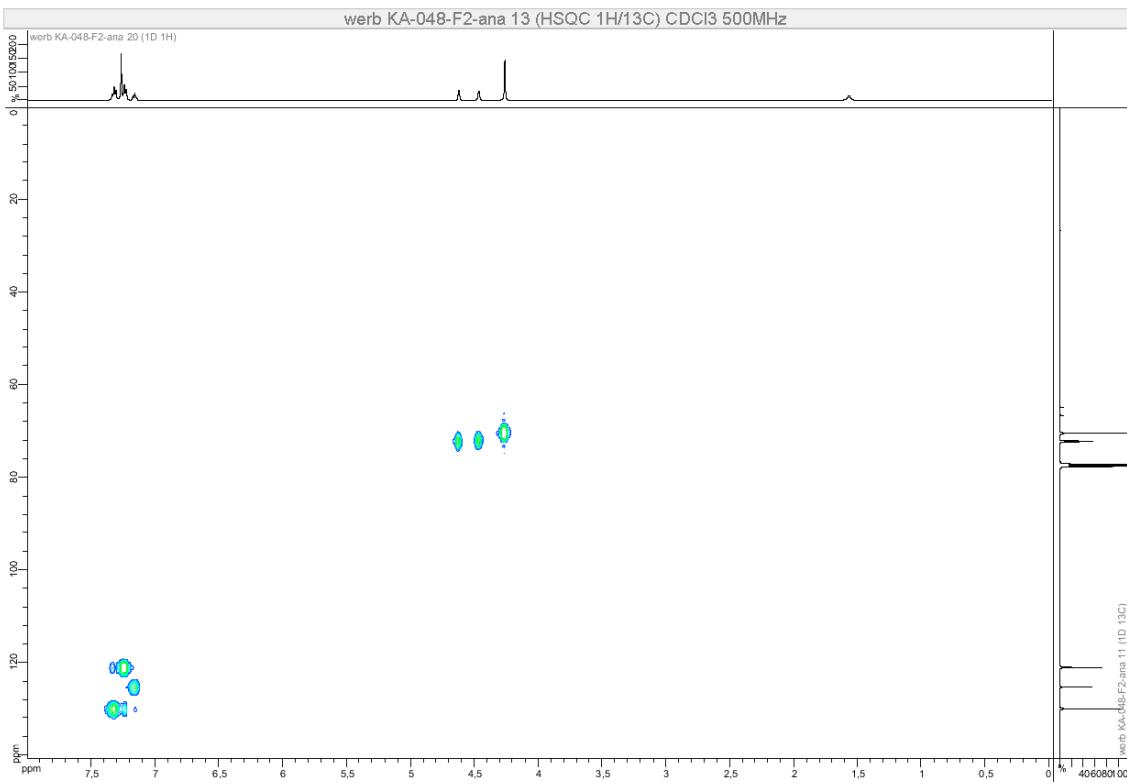
¹³C{¹H} NMR



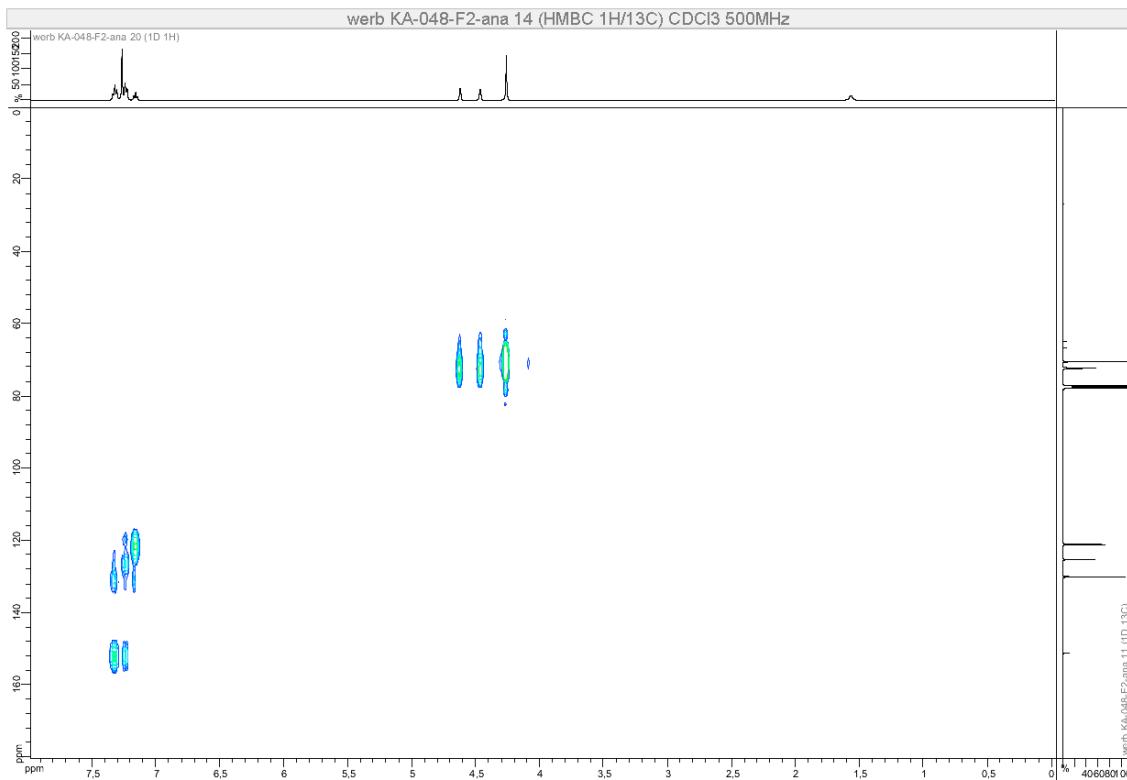
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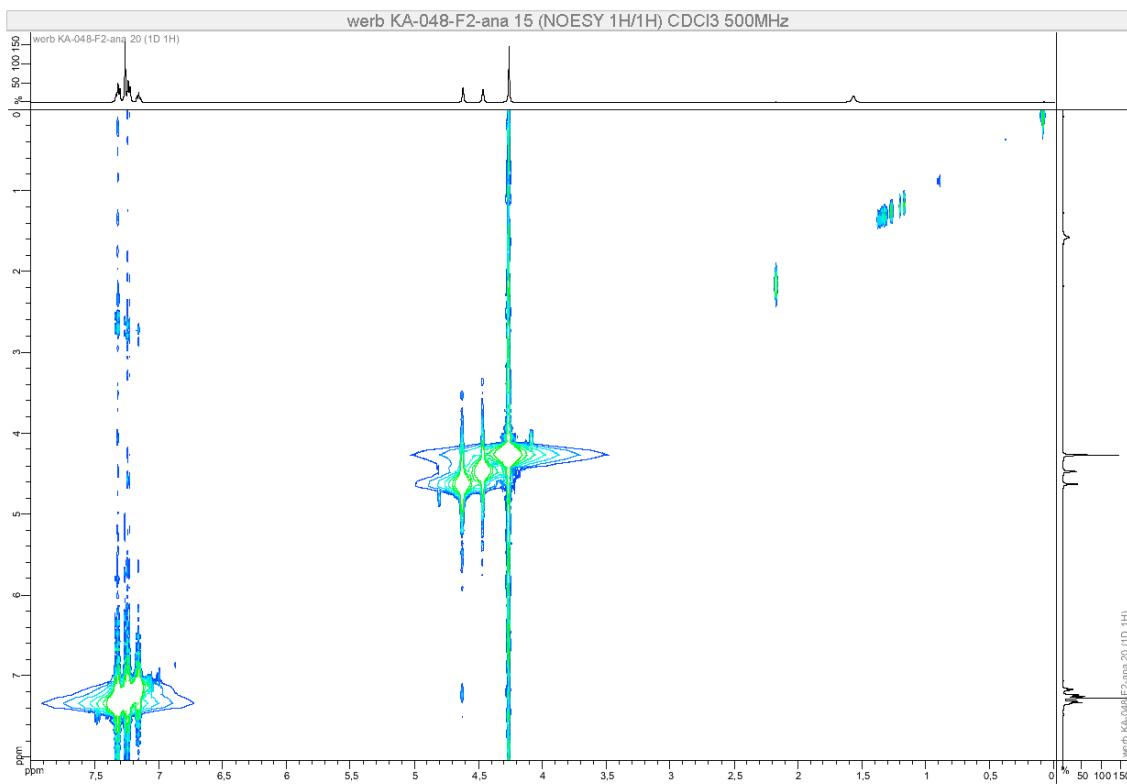
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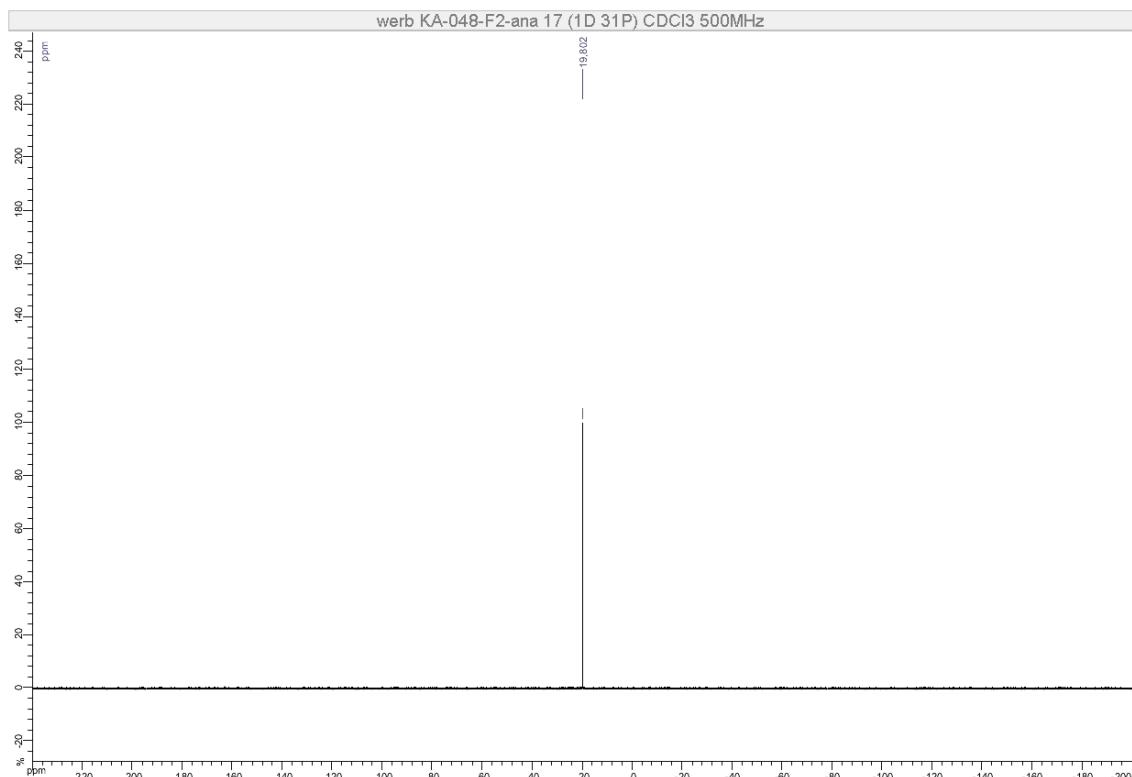
HMBC NMR



NOESY NMR

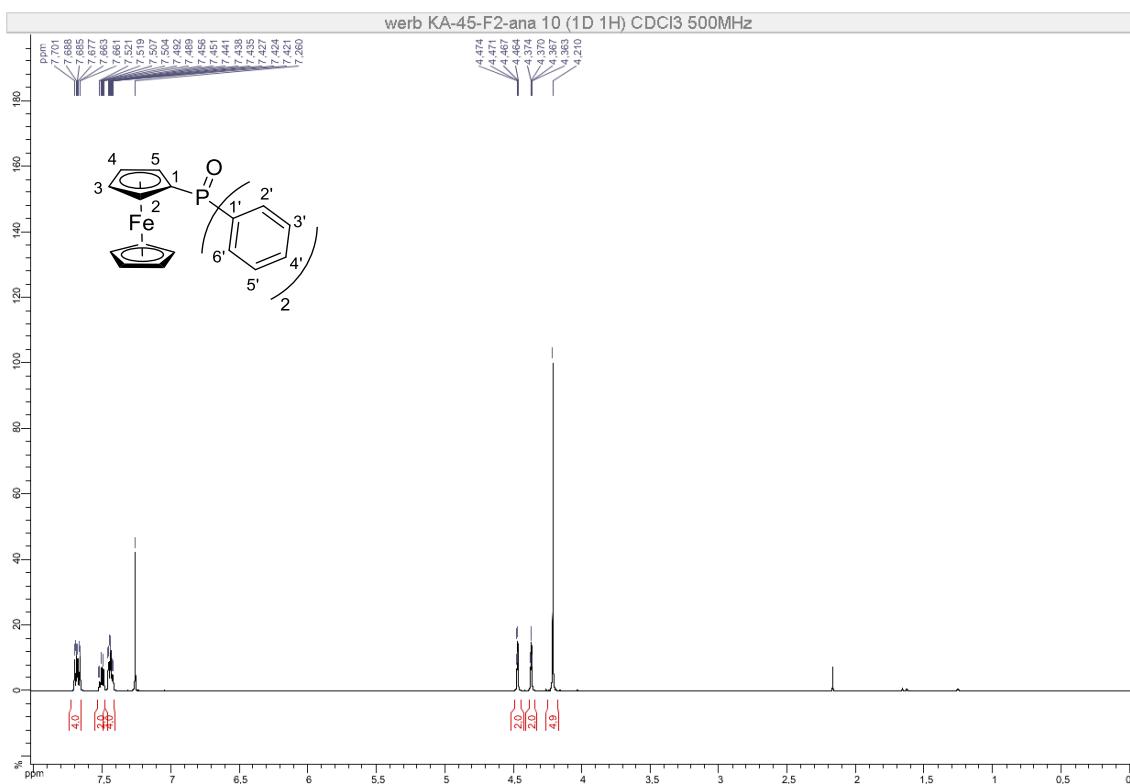


$^{31}\text{P}\{\text{H}\}$ NMR

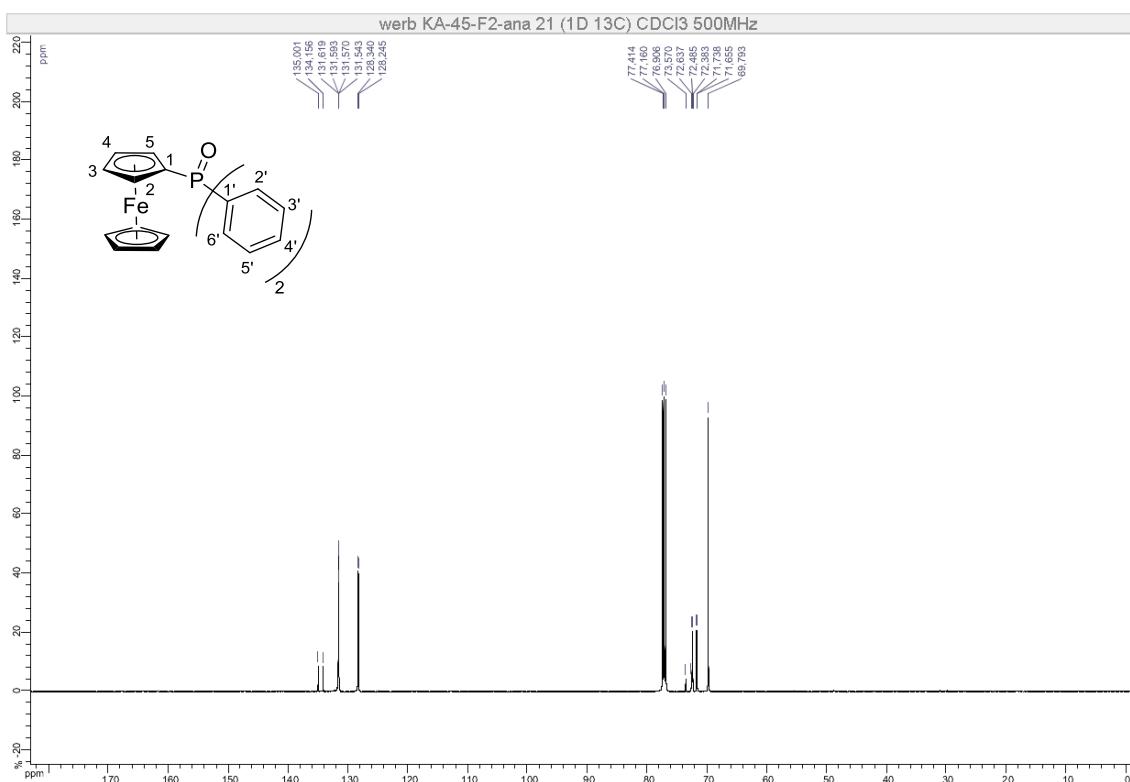


P,P-Diphenylferrocenephosphoxide (1d)

¹H NMR



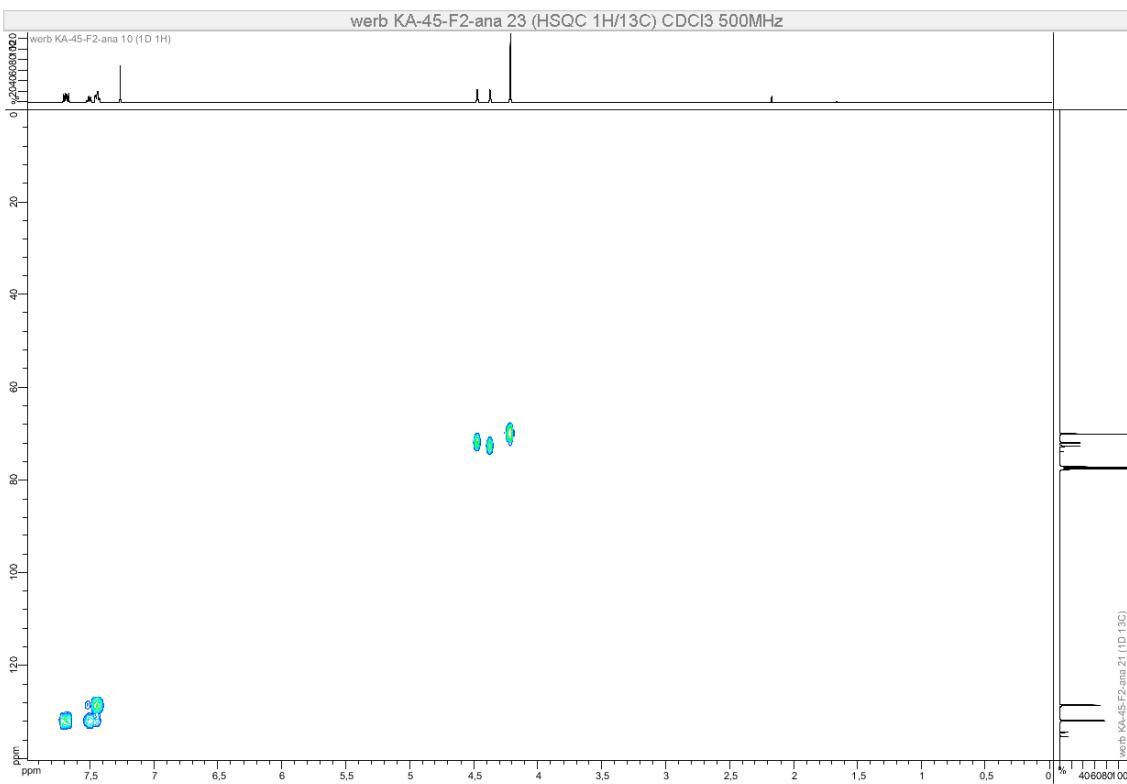
¹³C{¹H} NMR



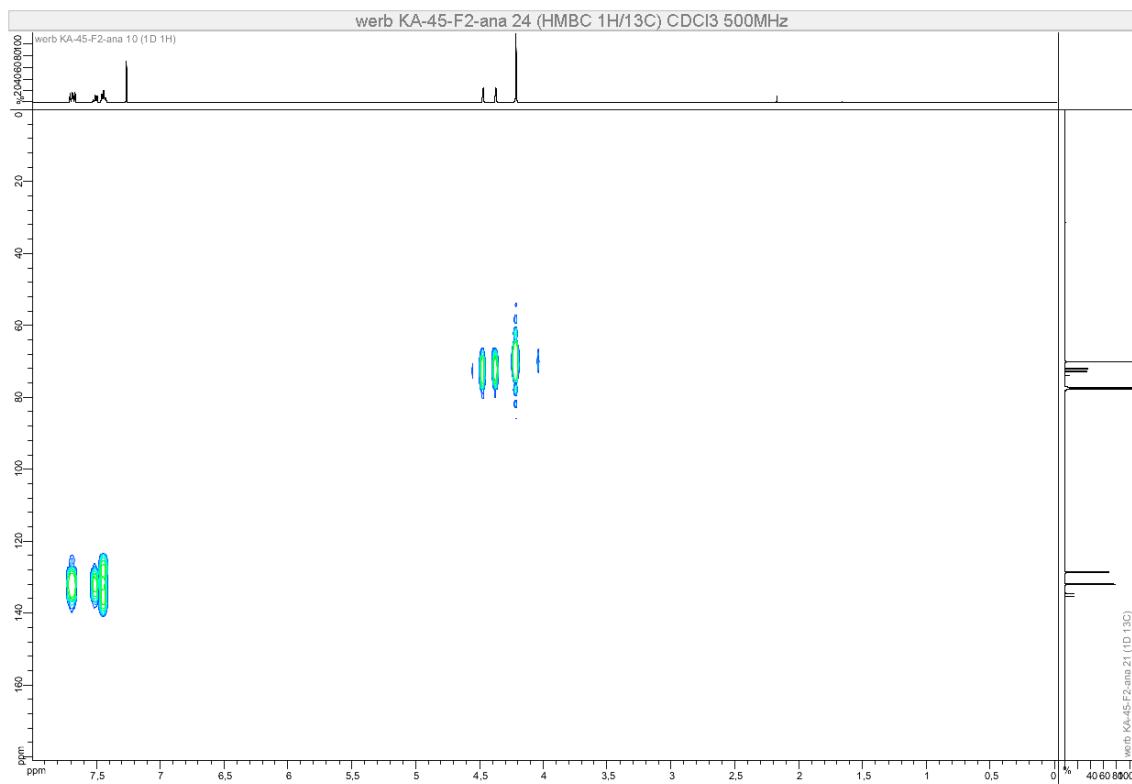
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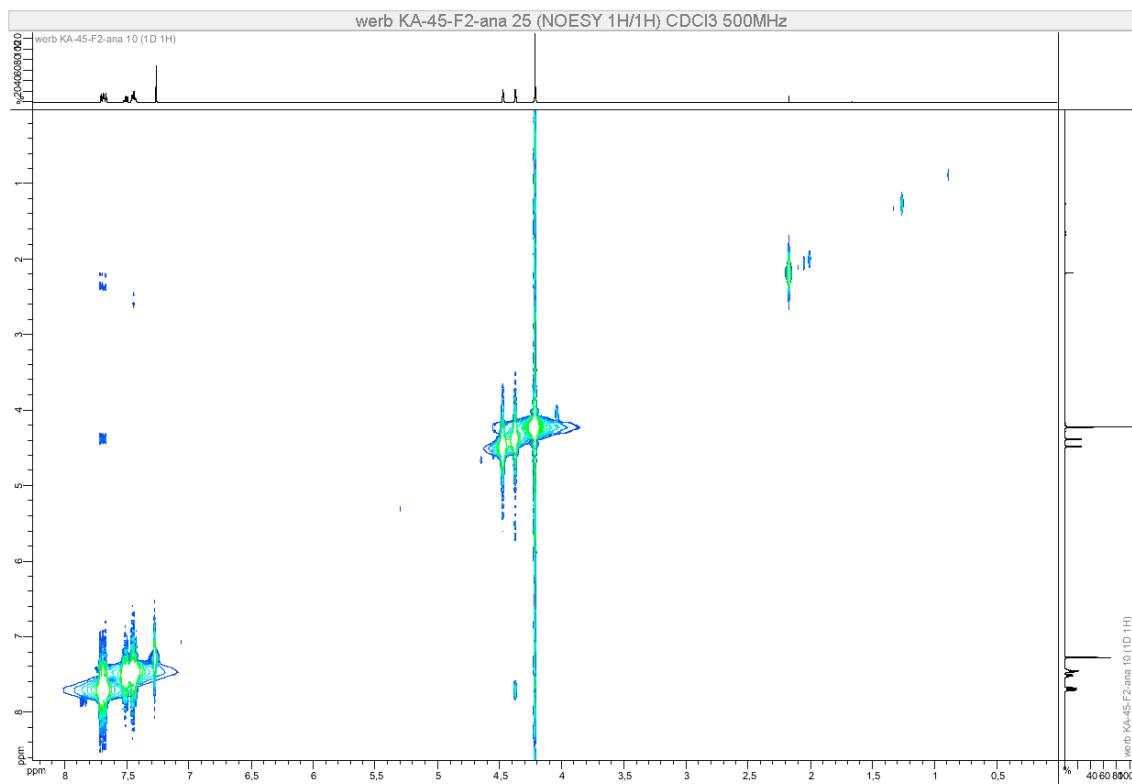
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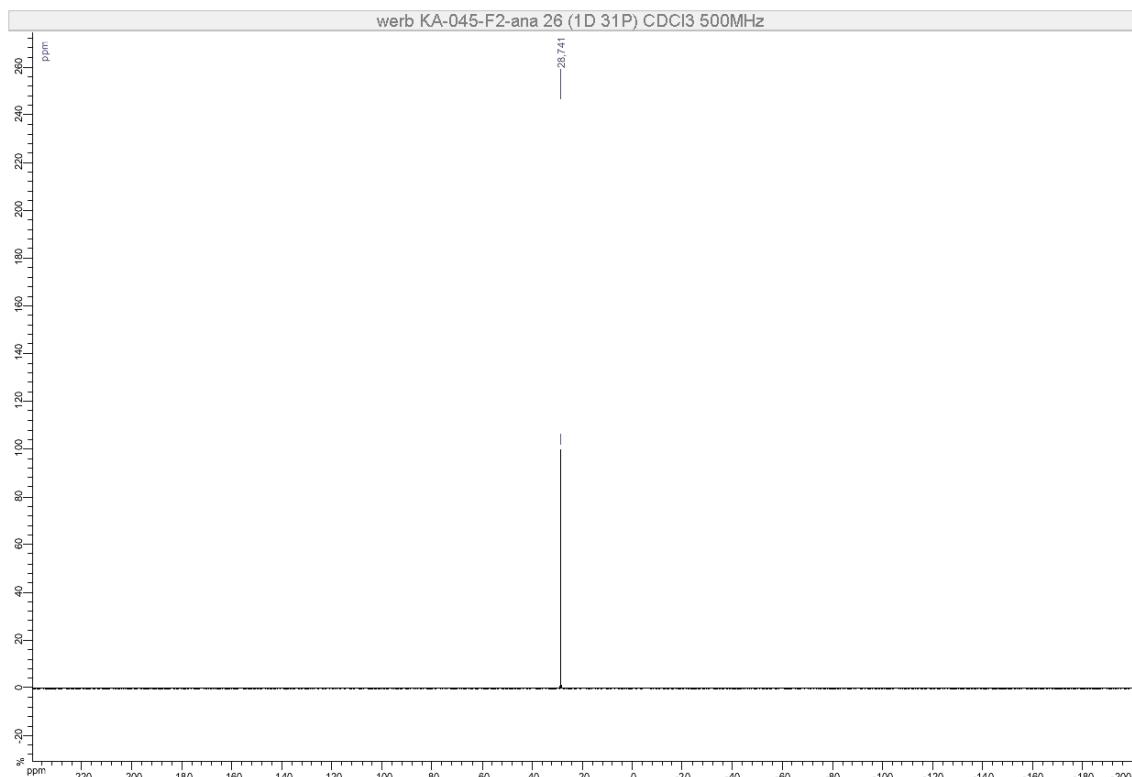
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NOESY NMR

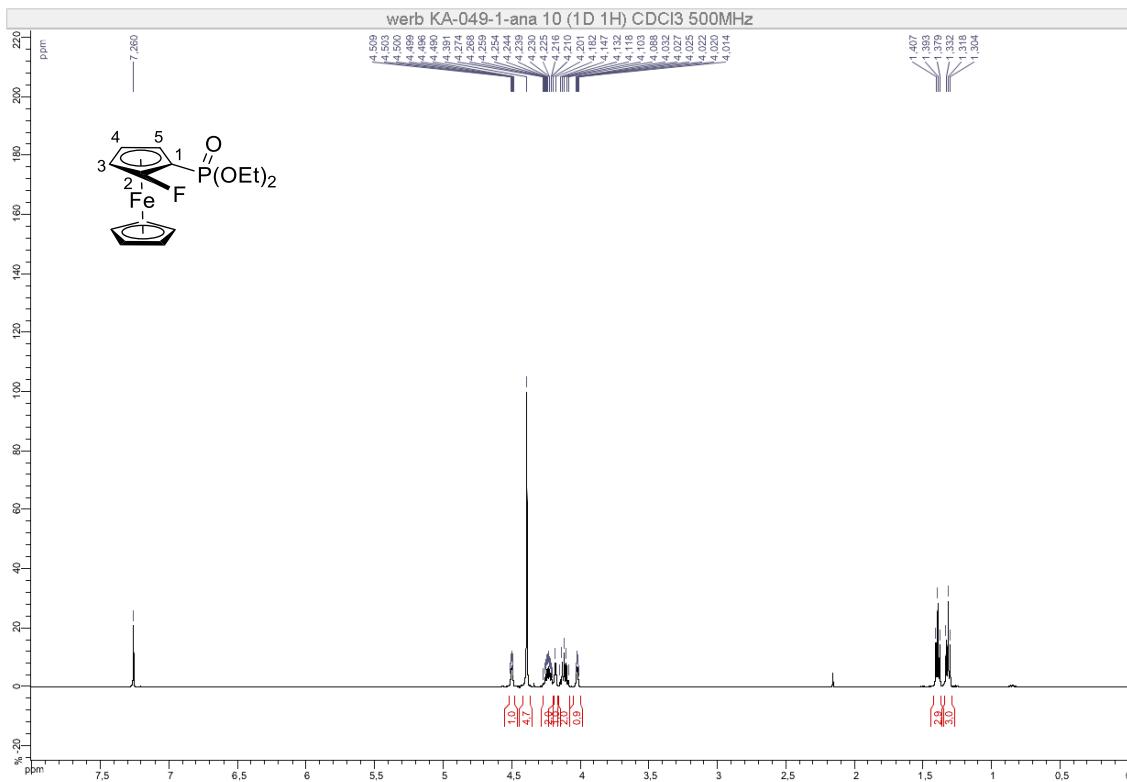


$^{31}\text{P}\{\text{H}\}$ NMR

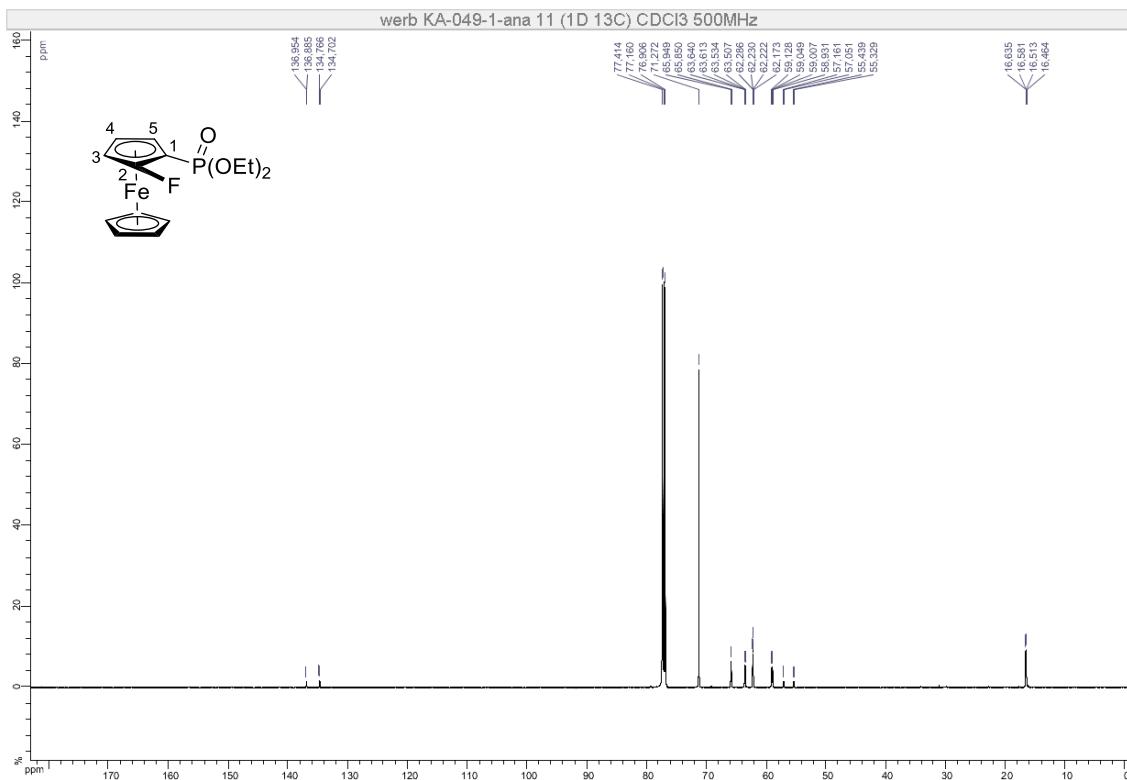


(\pm)-*O,O*-Diethyl-2-fluoroferrocenephosphonate ((\pm)-2a)

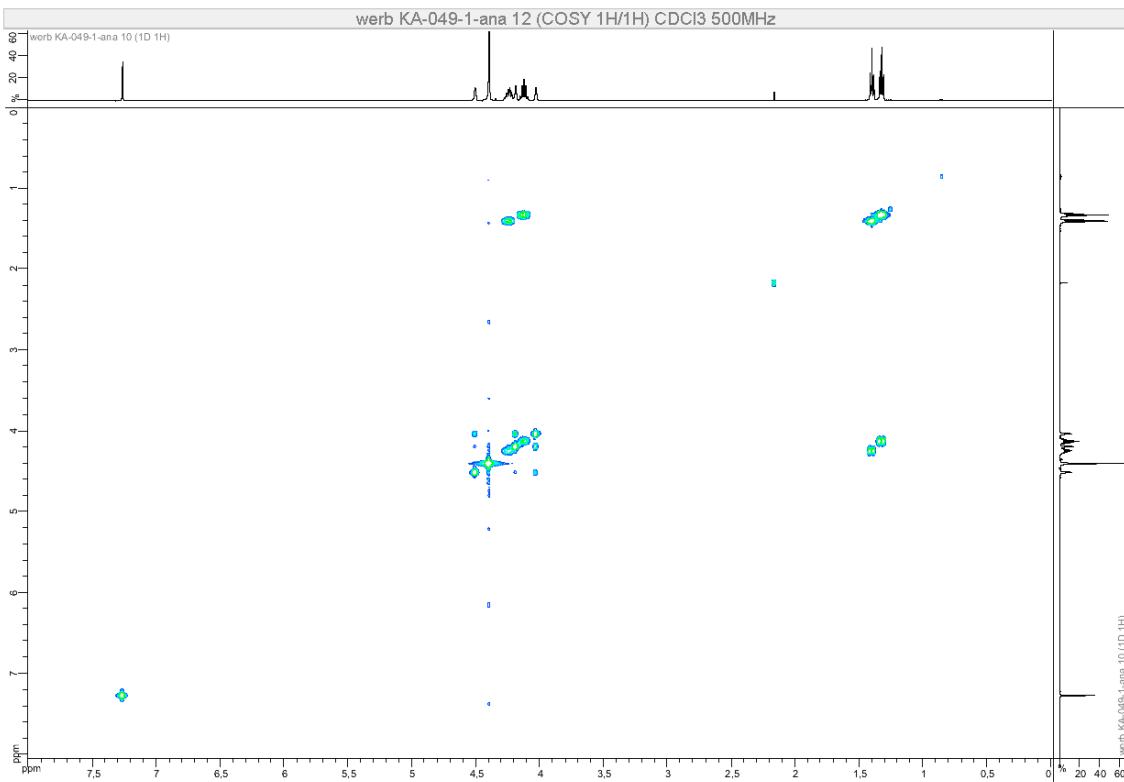
¹H NMR



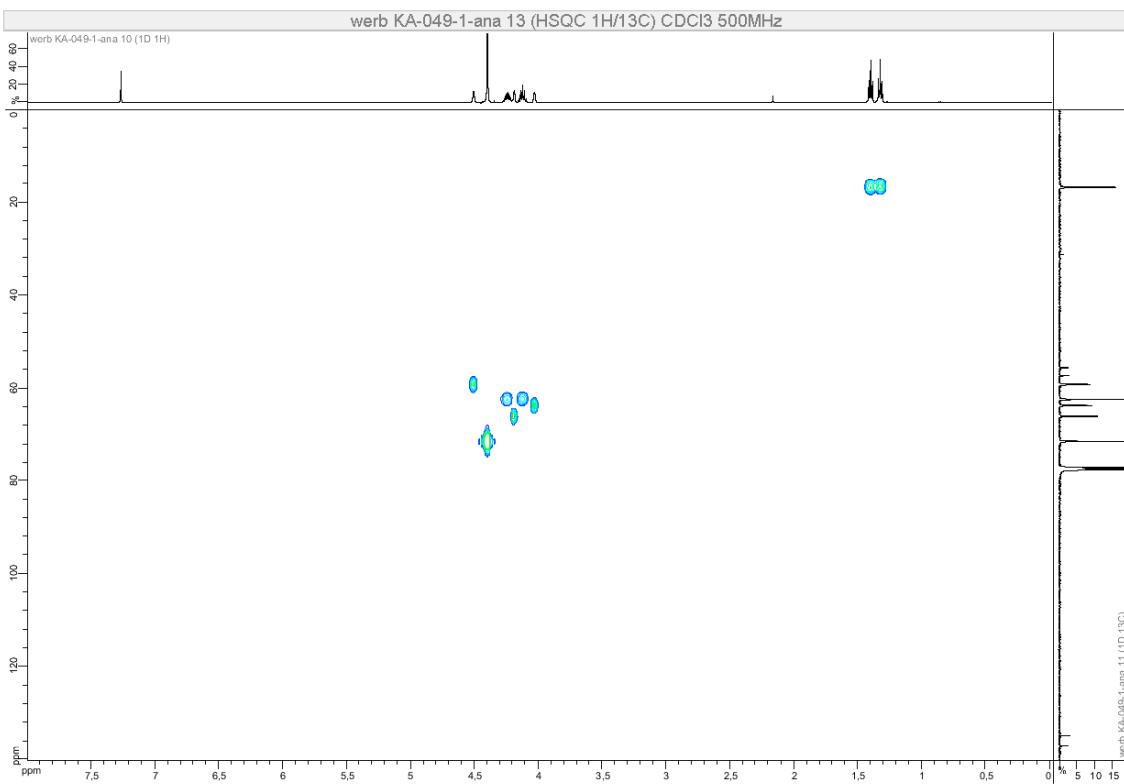
¹³C{¹H} NMR



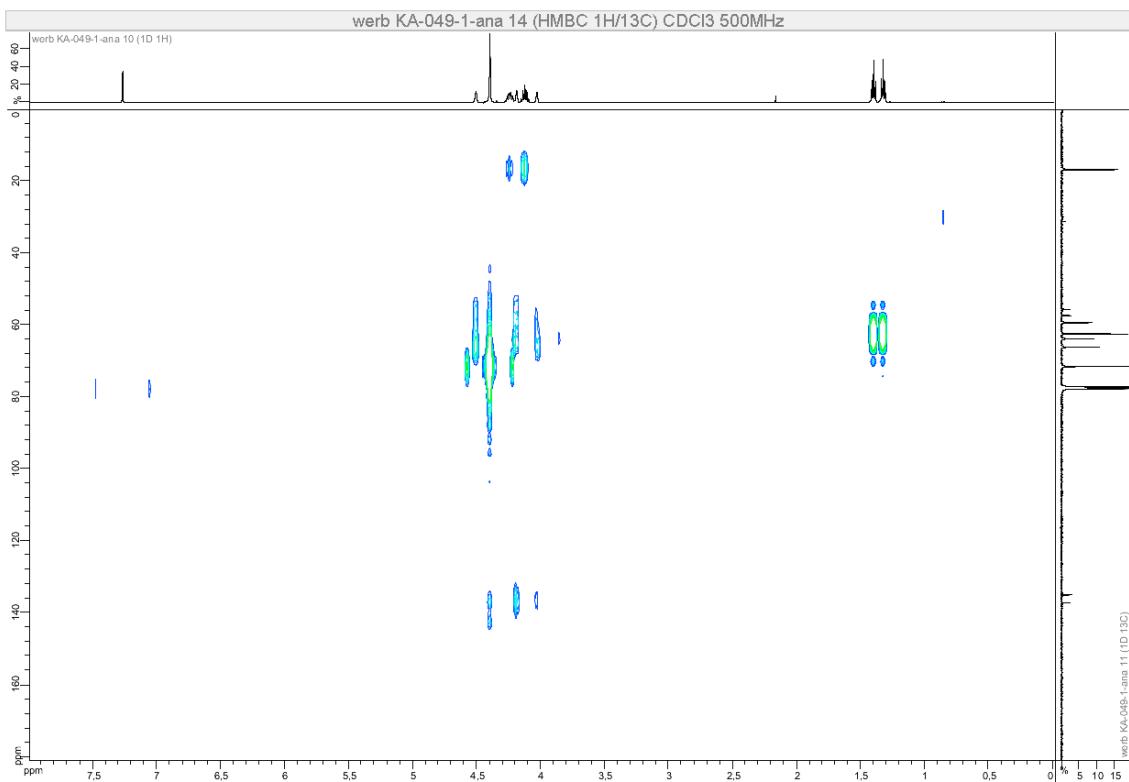
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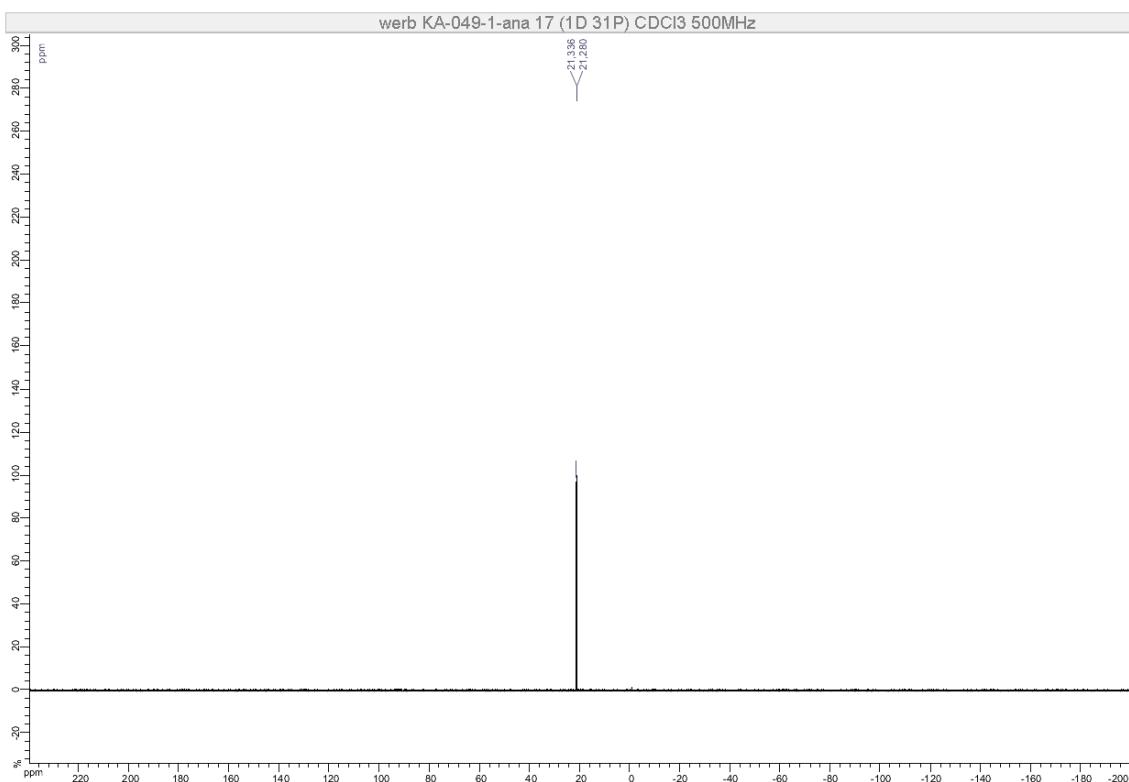
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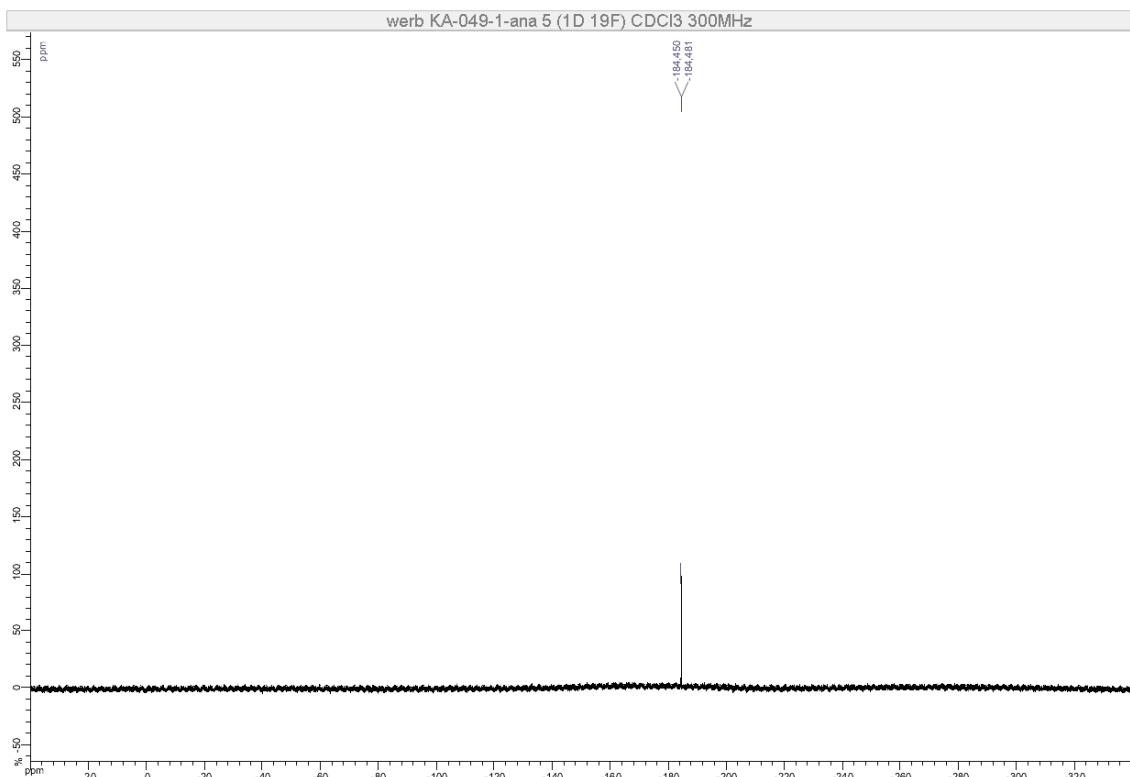
HMBC NMR



³¹P{¹H} NMR

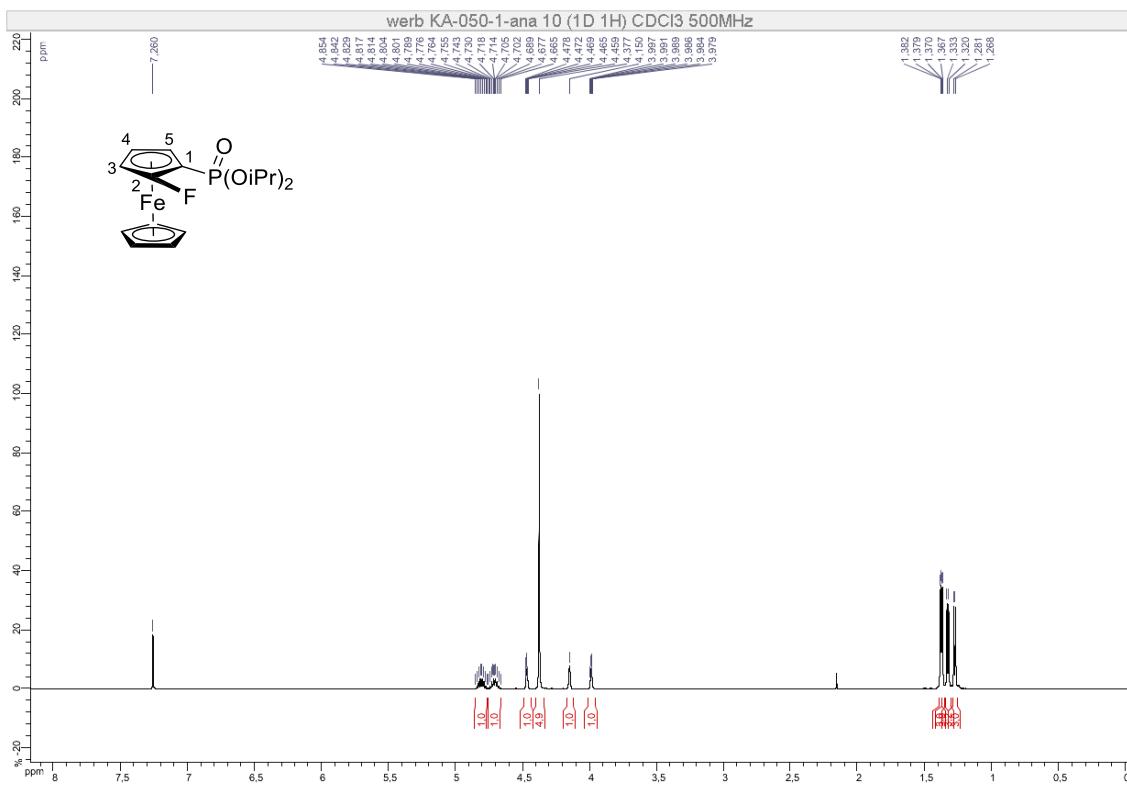


$^{19}\text{F}\{\text{H}\}$ NMR

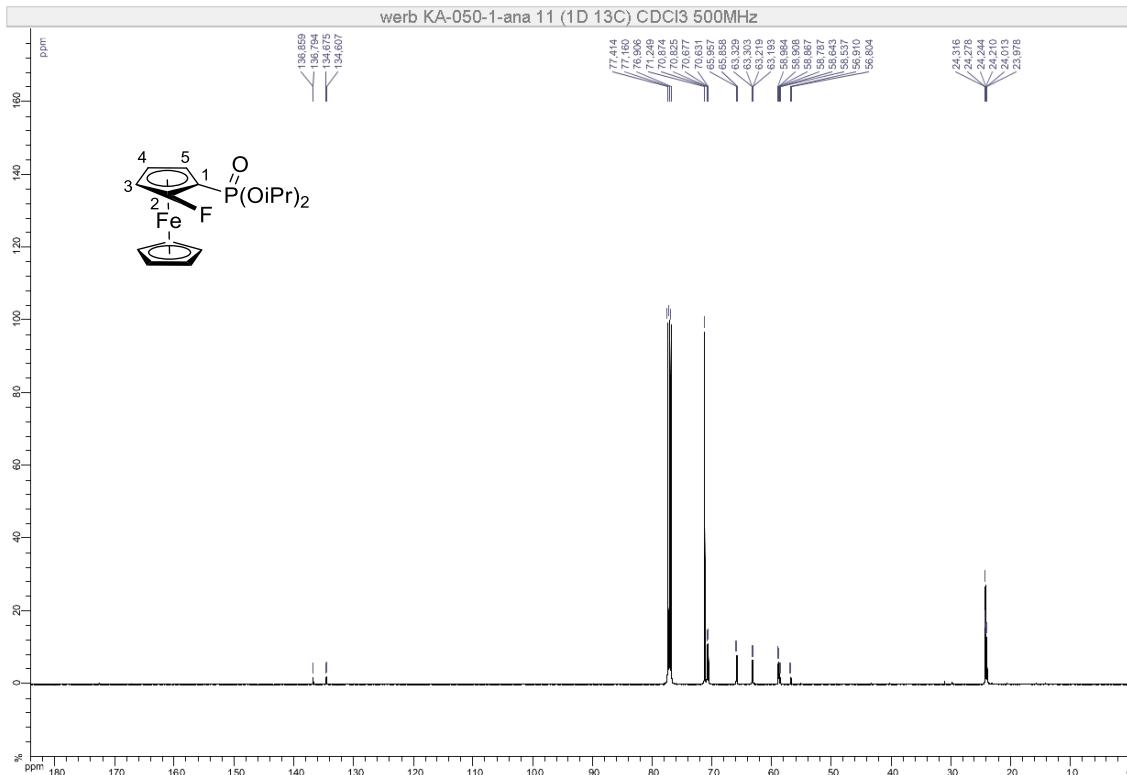


(\pm)-2-Fluoro-*O,O*-diisopropylferrocenephosphonate ((\pm)-2b)

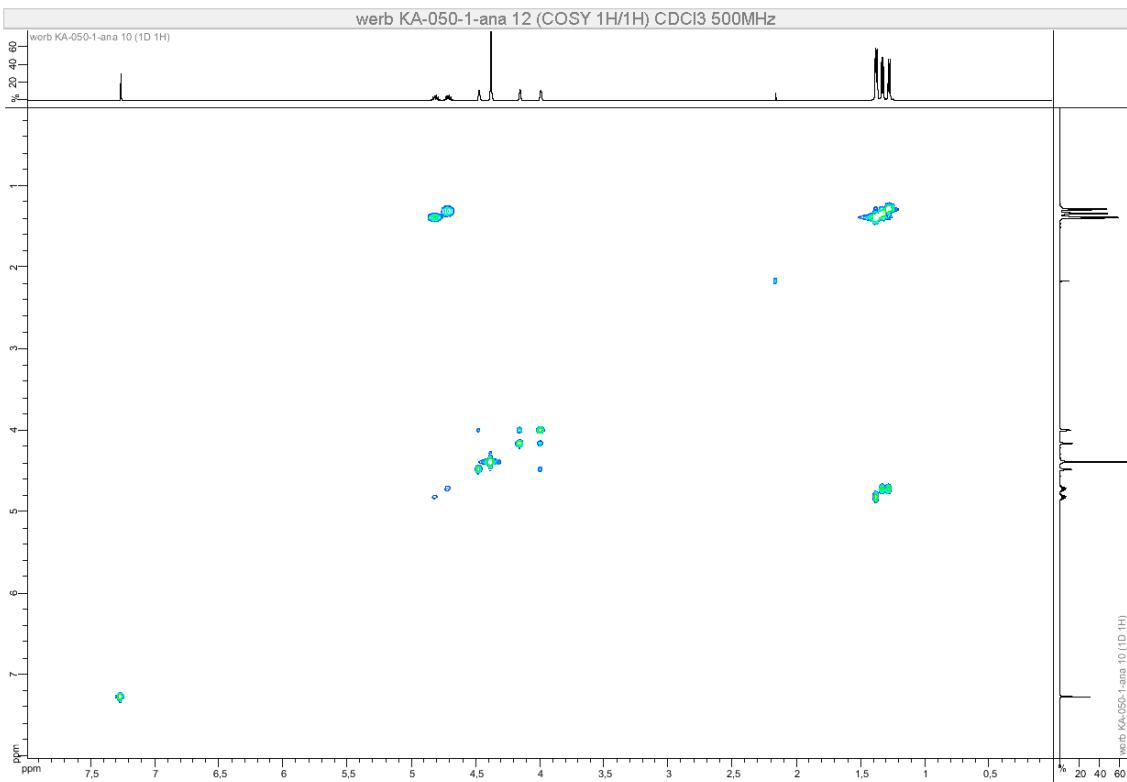
¹H NMR



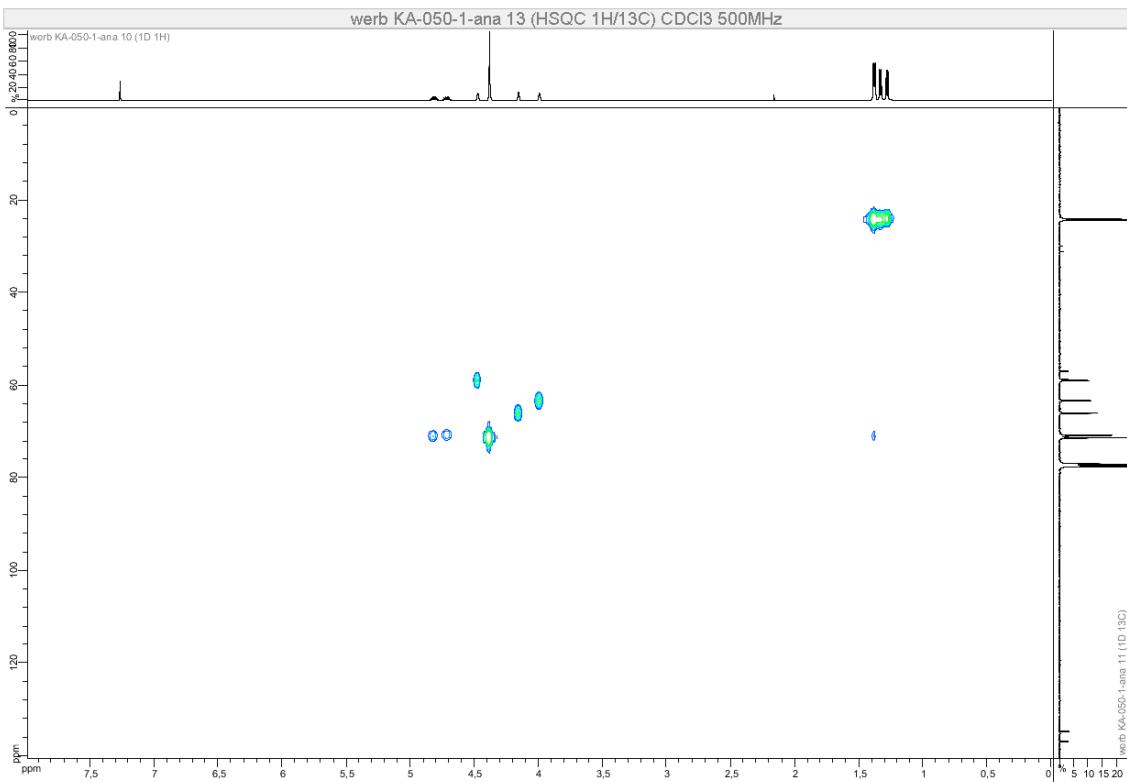
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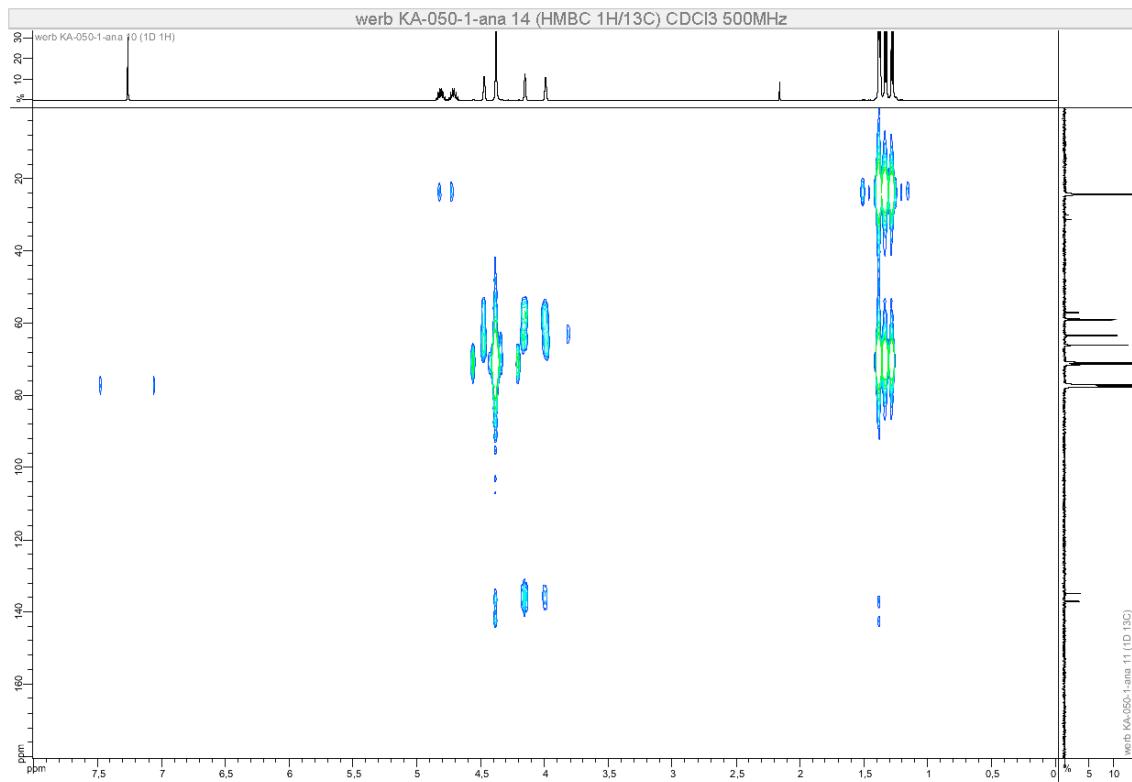
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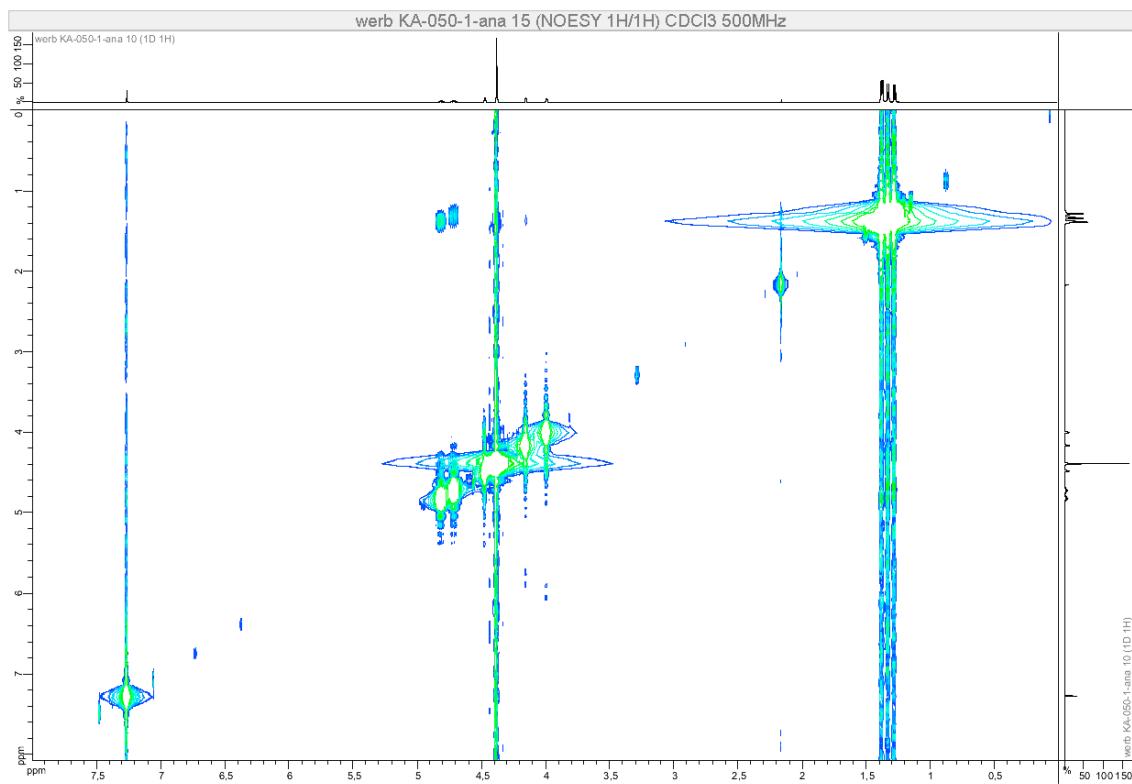
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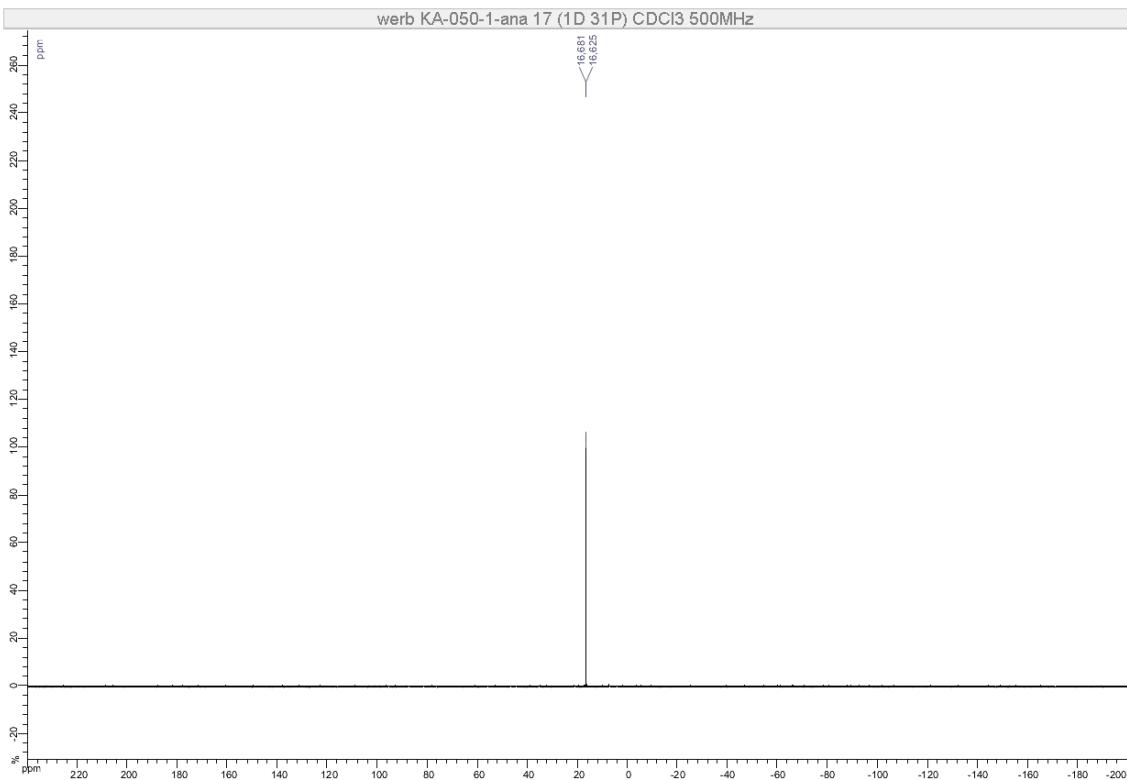
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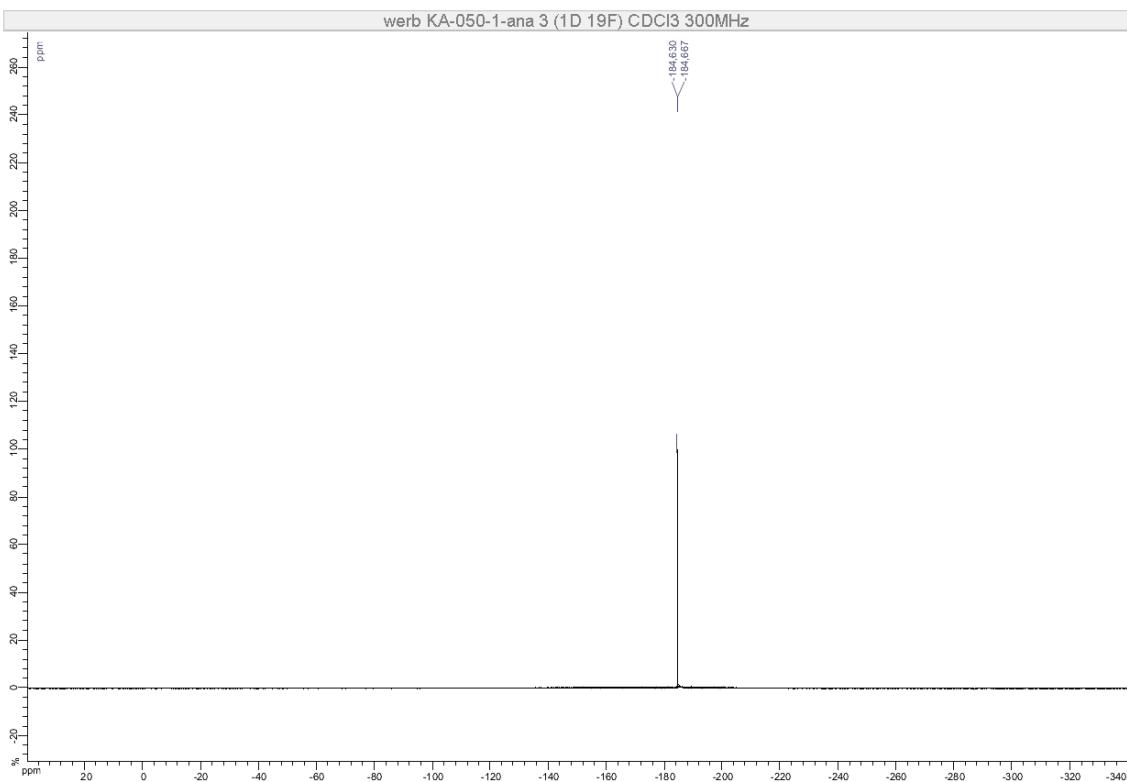
NOESY NMR



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

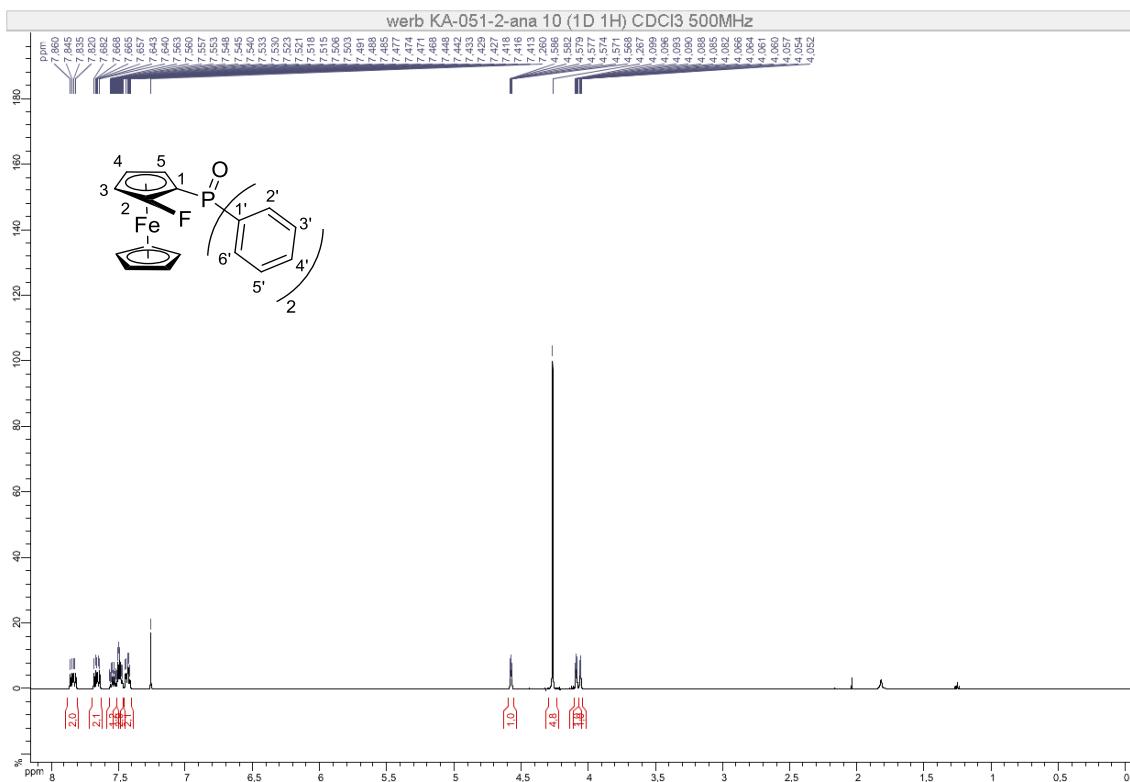


$^{19}\text{F}\{\text{H}\}$ NMR

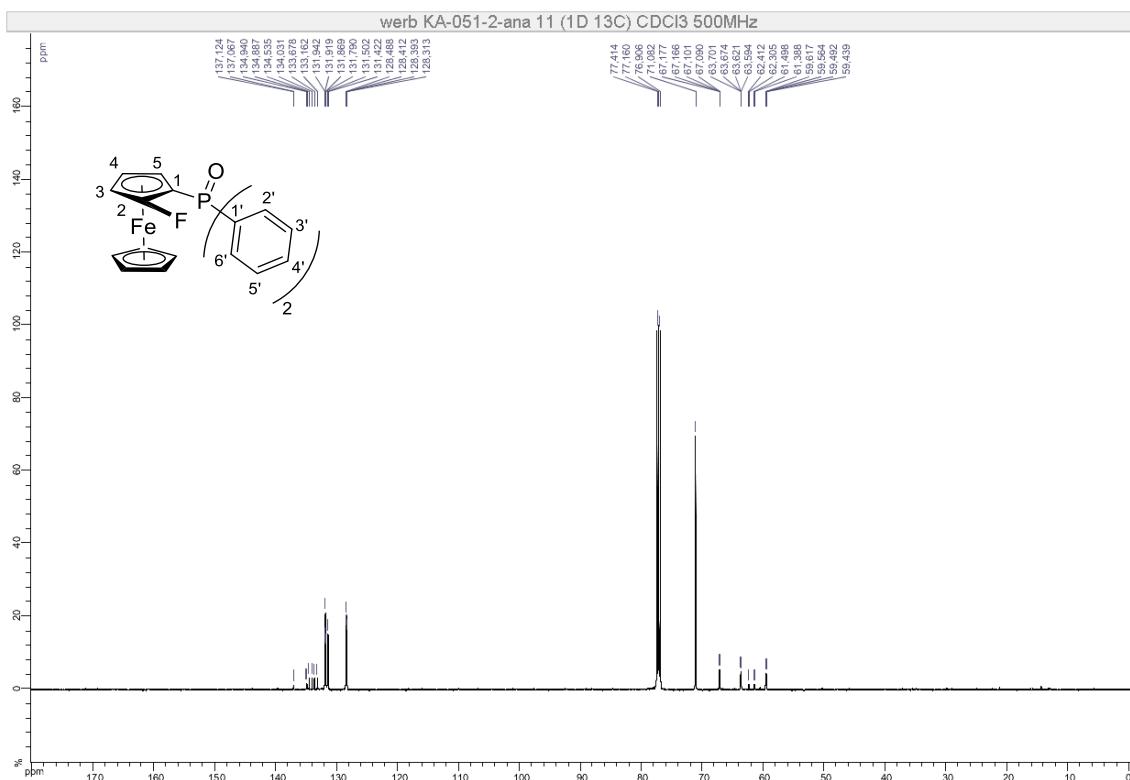


(\pm)-2-Fluoro-*P,P*-diphenylferrocenephosphoxide ((\pm)-2d)

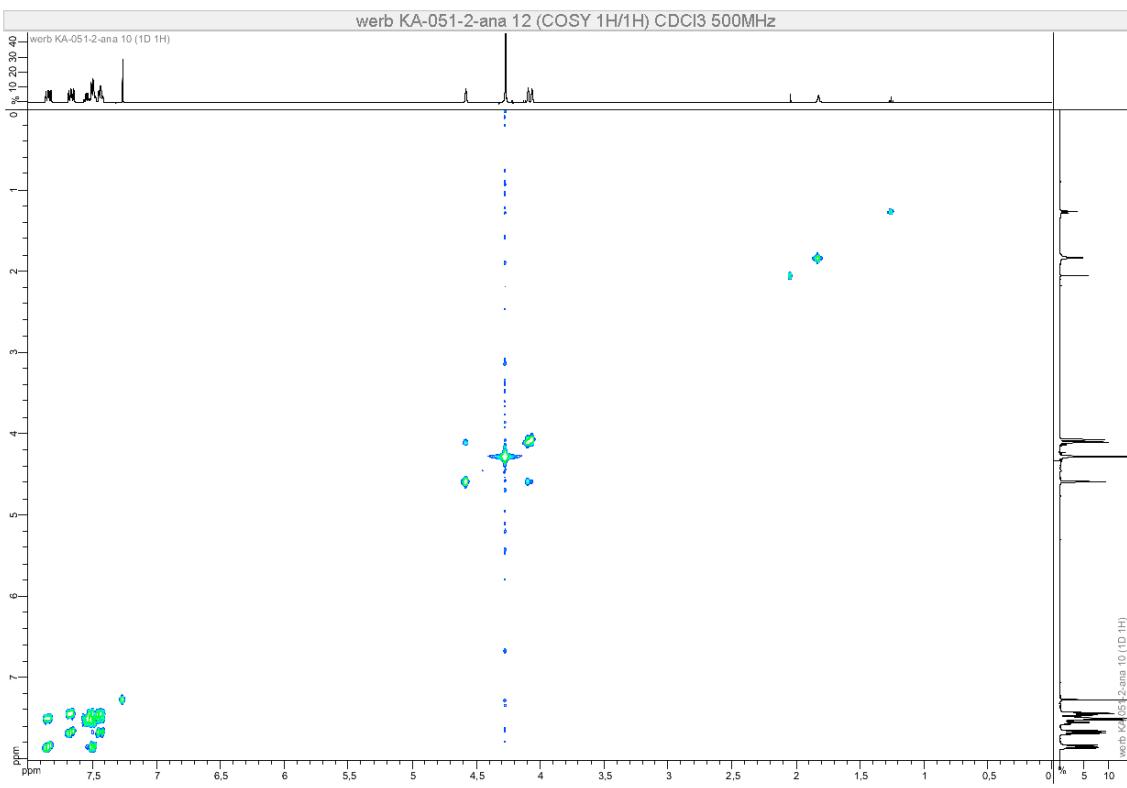
^1H NMR



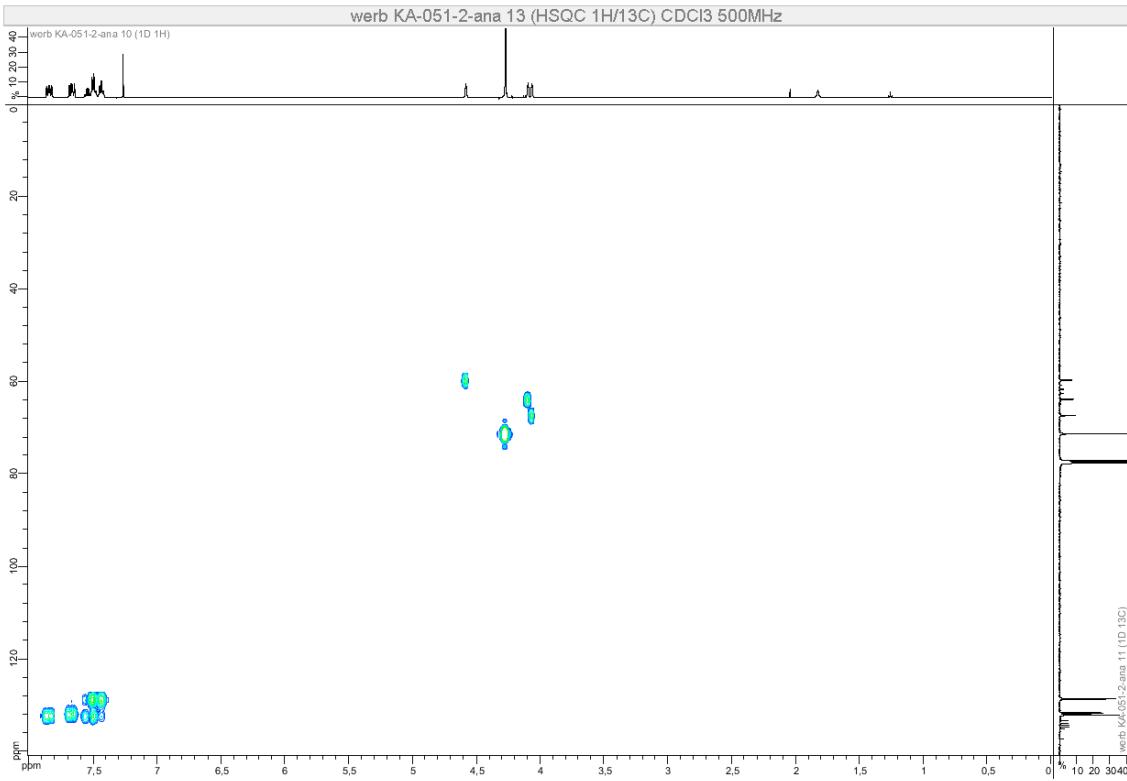
$^{13}\text{C}\{^1\text{H}\}$ NMR



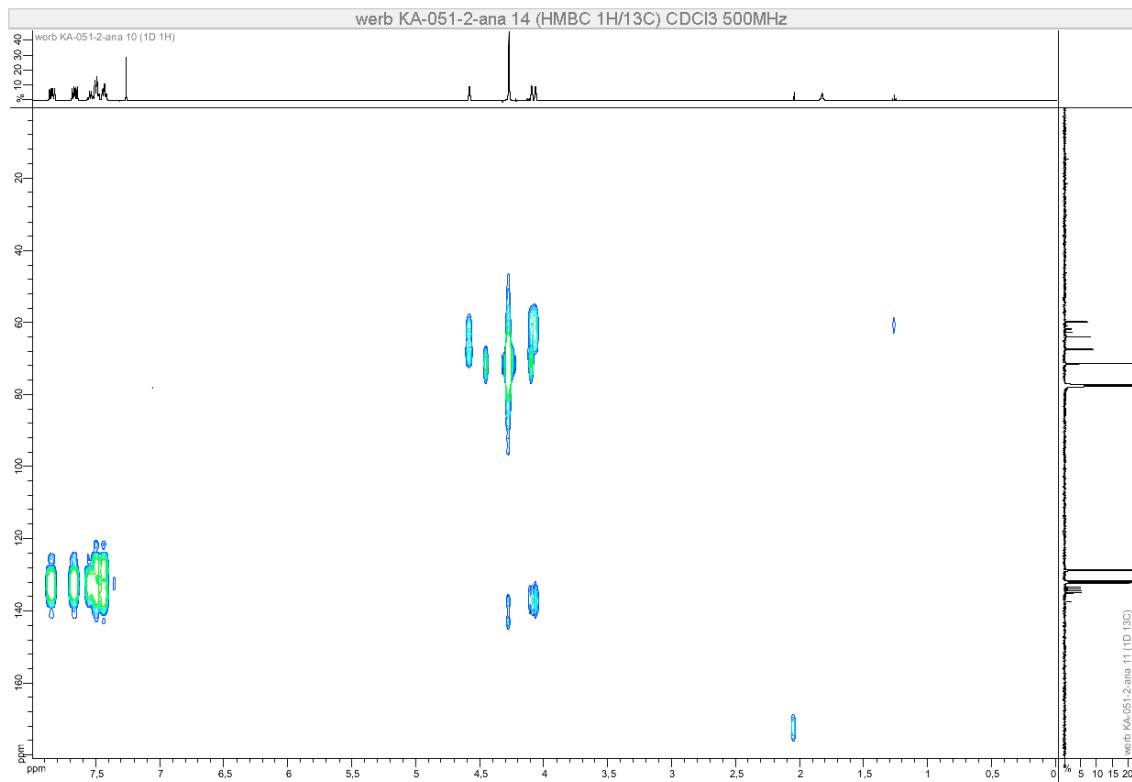
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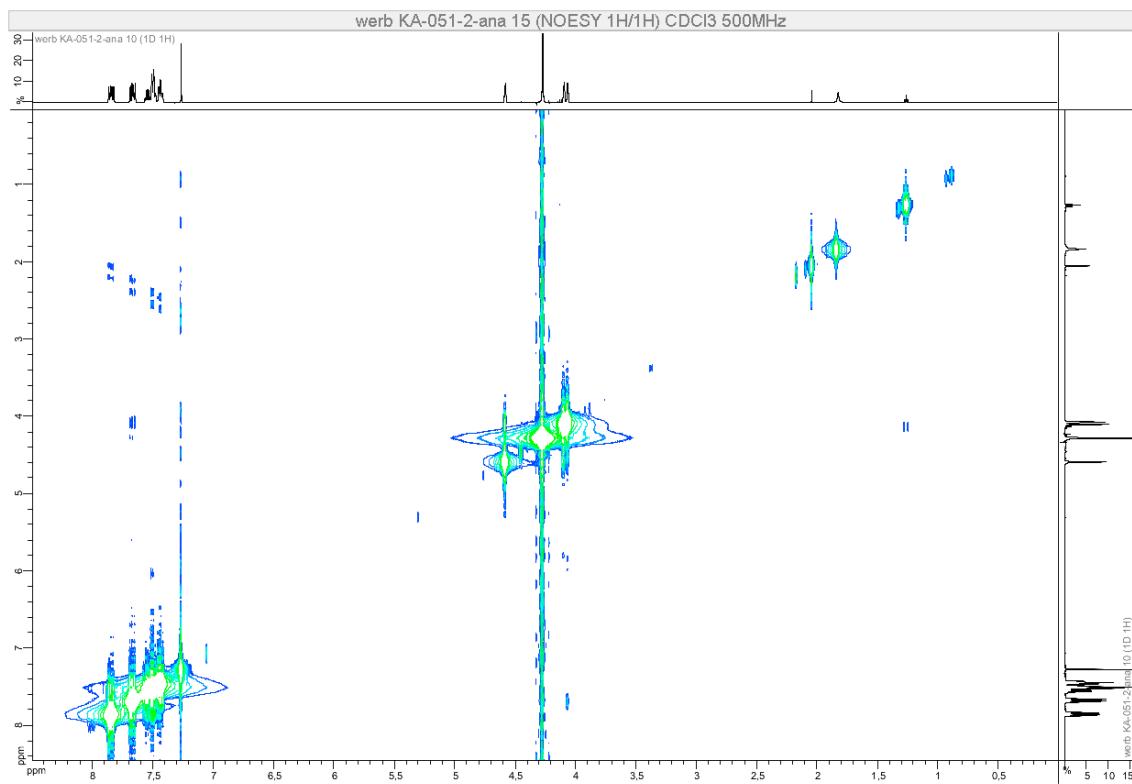
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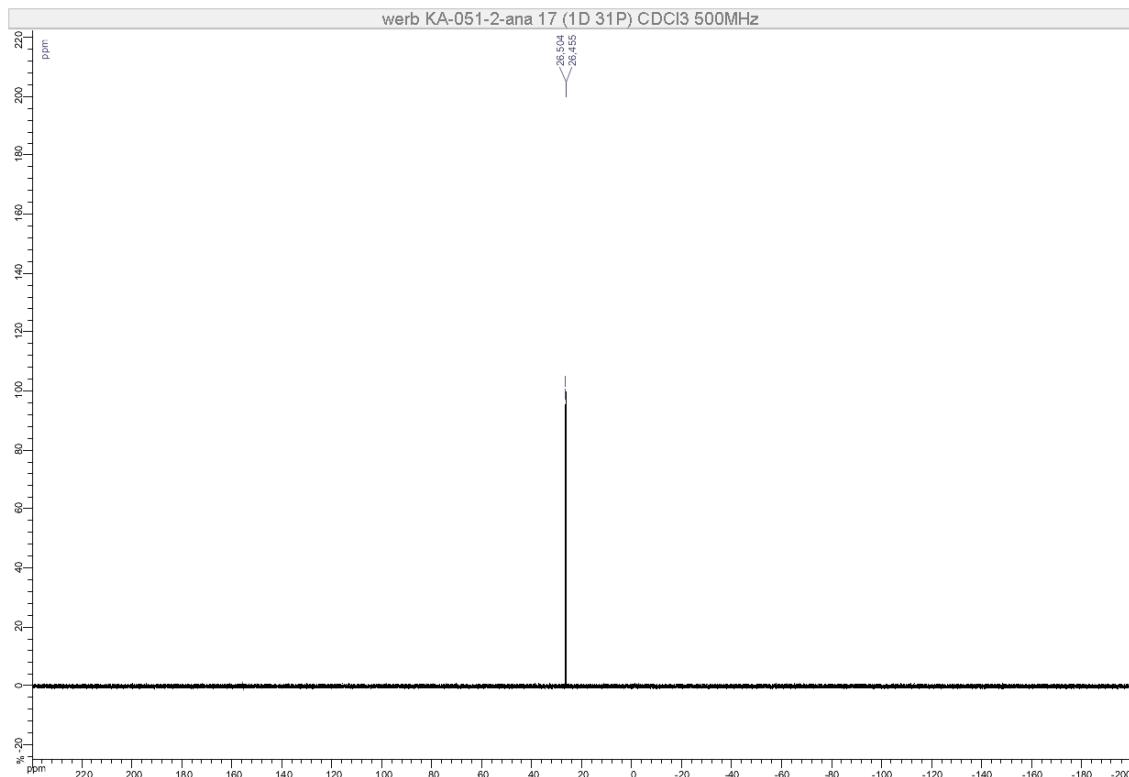
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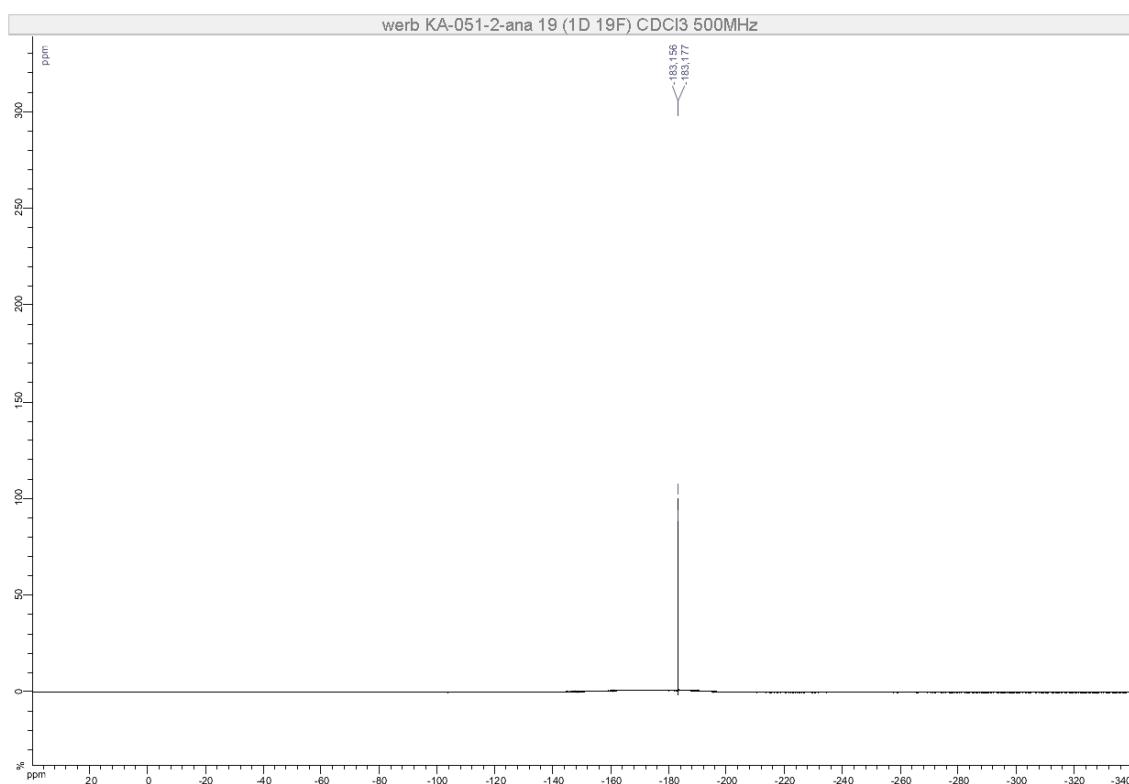
NOESY NMR



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

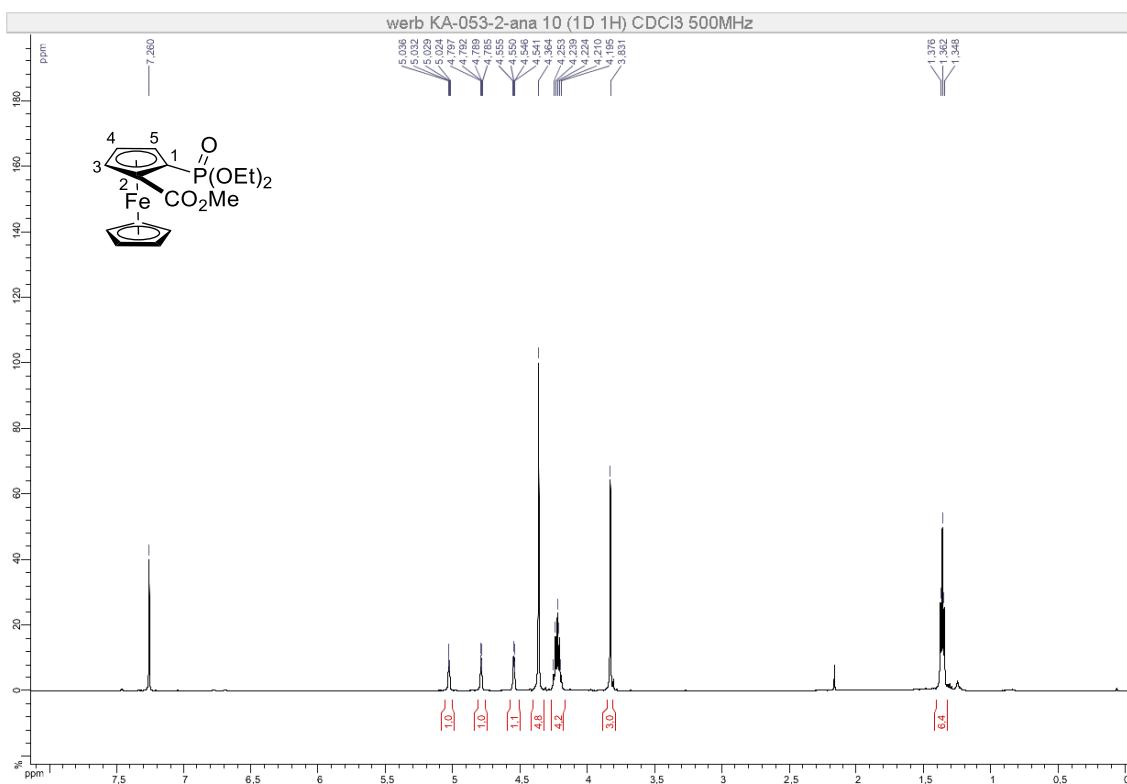


$^{19}\text{F}\{\text{H}\}$ NMR

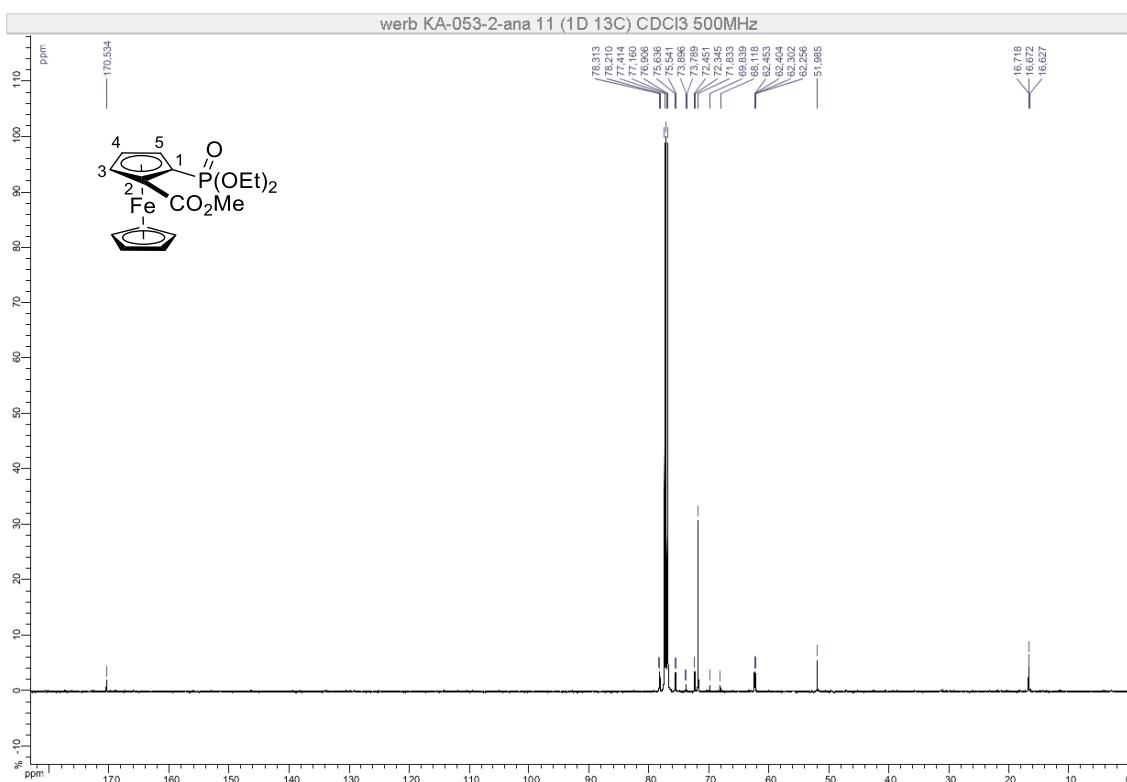


(\pm)-*O,O*-Diethyl-2-(methoxycarbonyl)ferrocenephosphonate ((\pm)-3a)

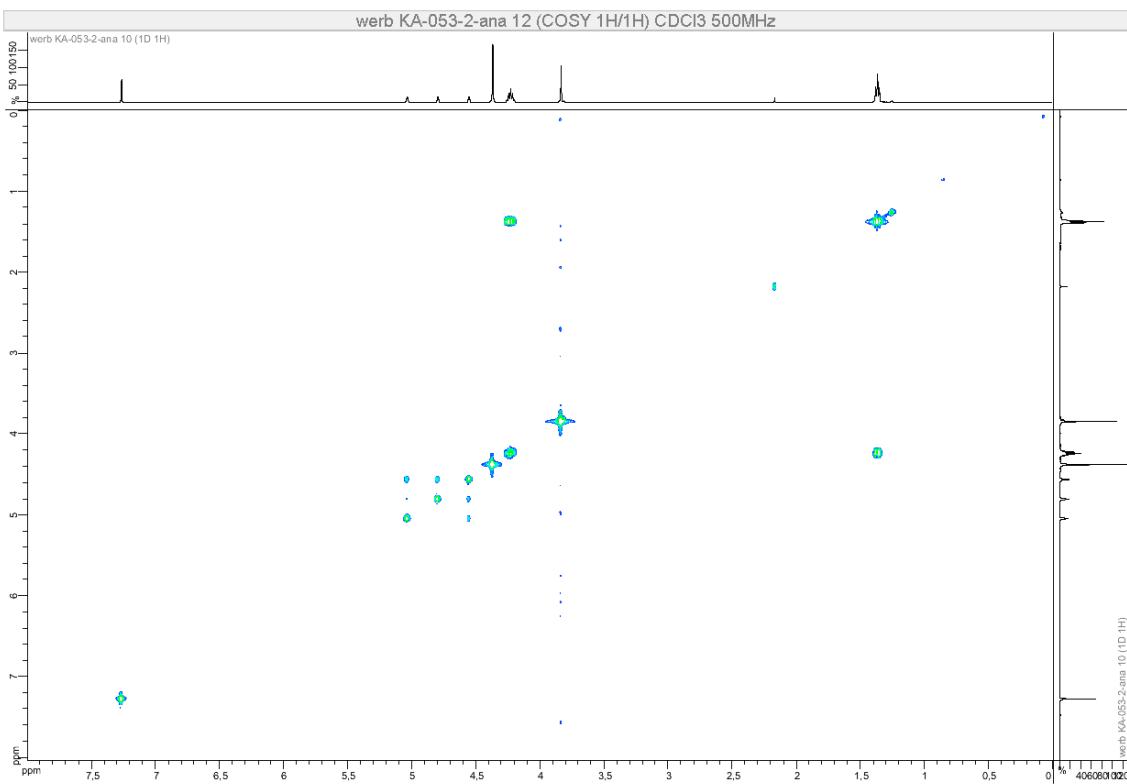
¹H NMR



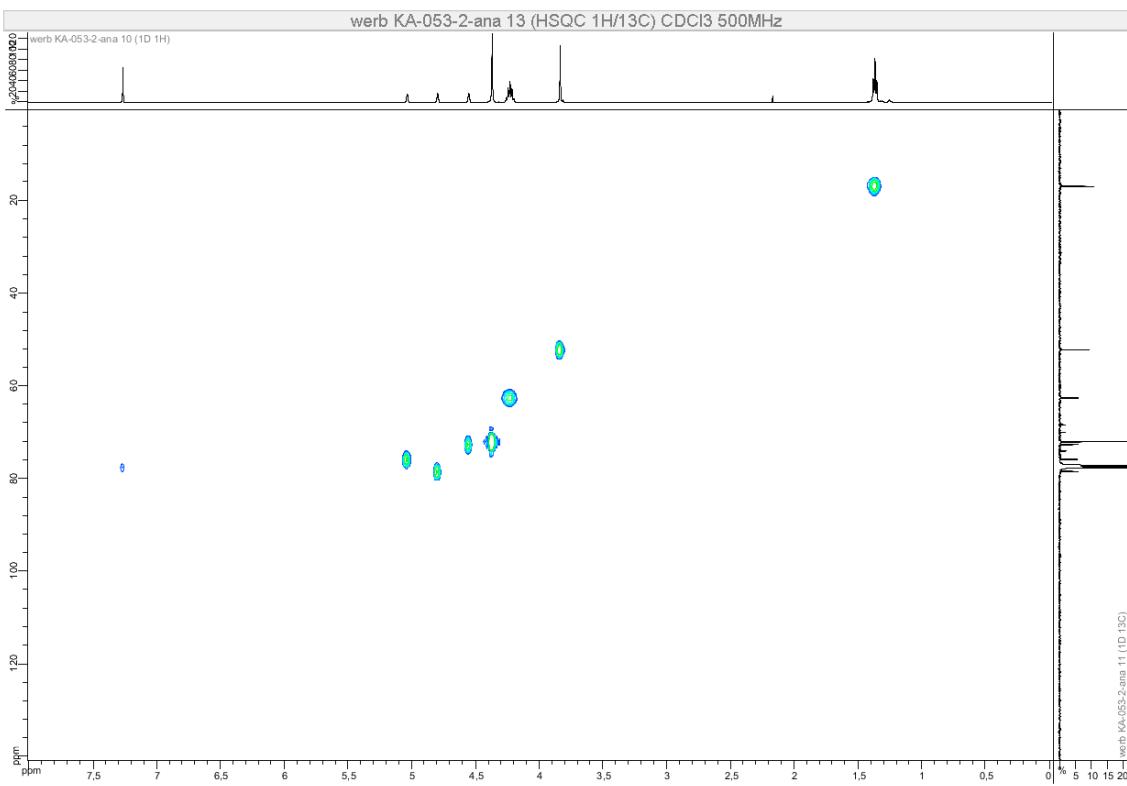
¹³C{¹H} NMR



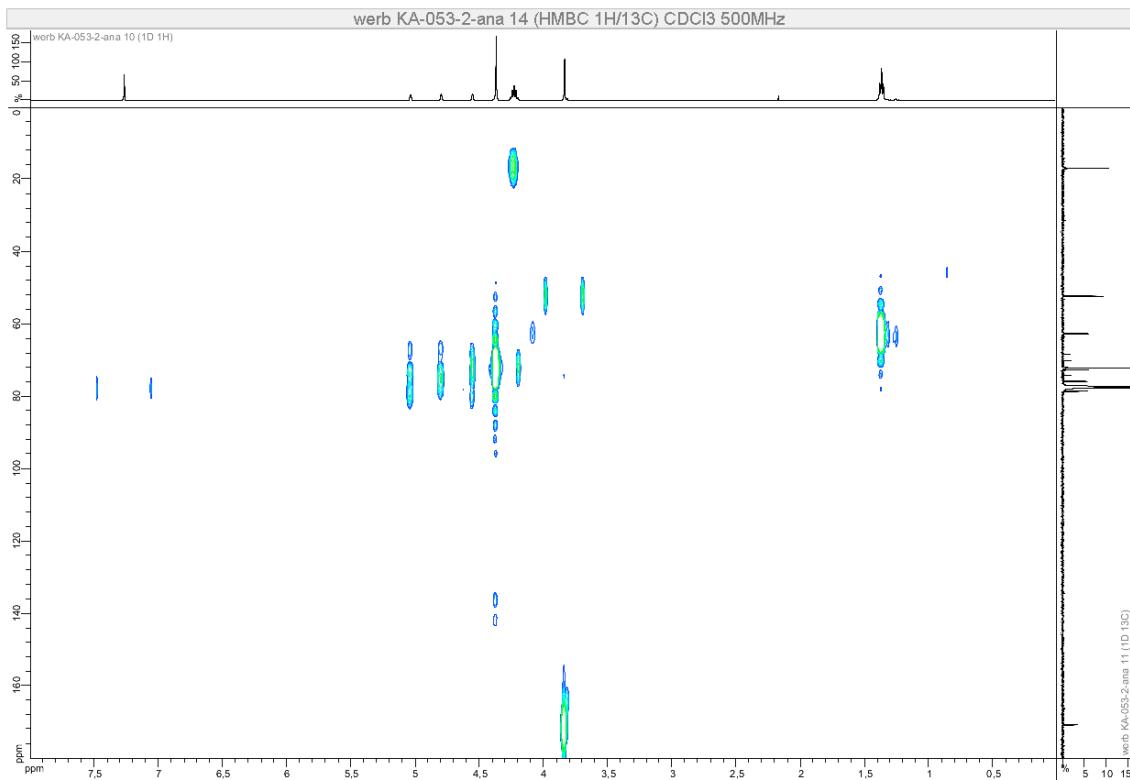
COSY NMR



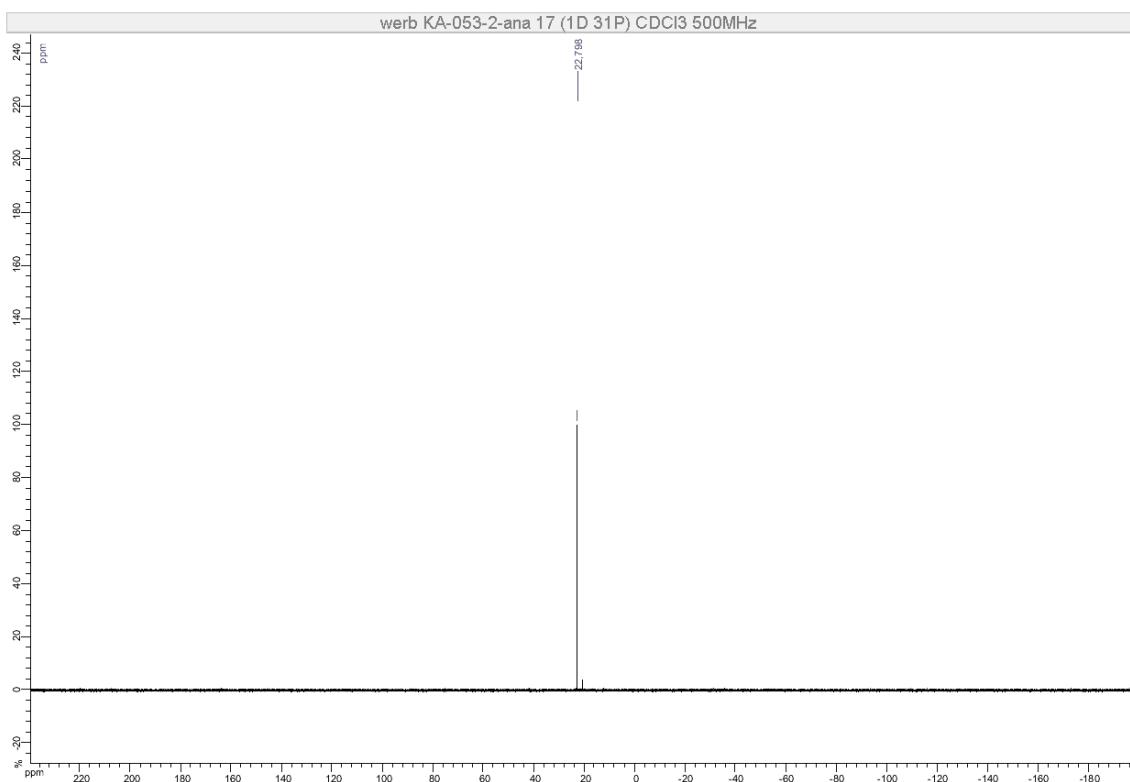
HSQC NMR



HMBC NMR

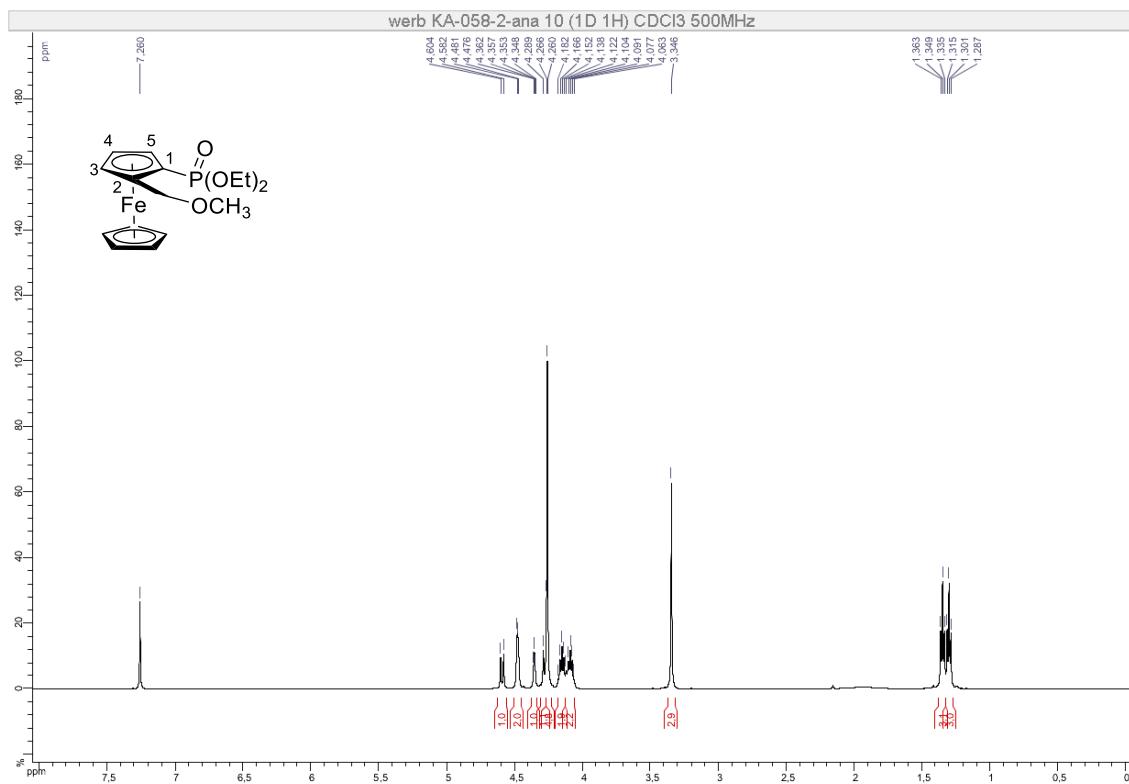


$^{31}\text{P}\{\text{H}\}$ NMR

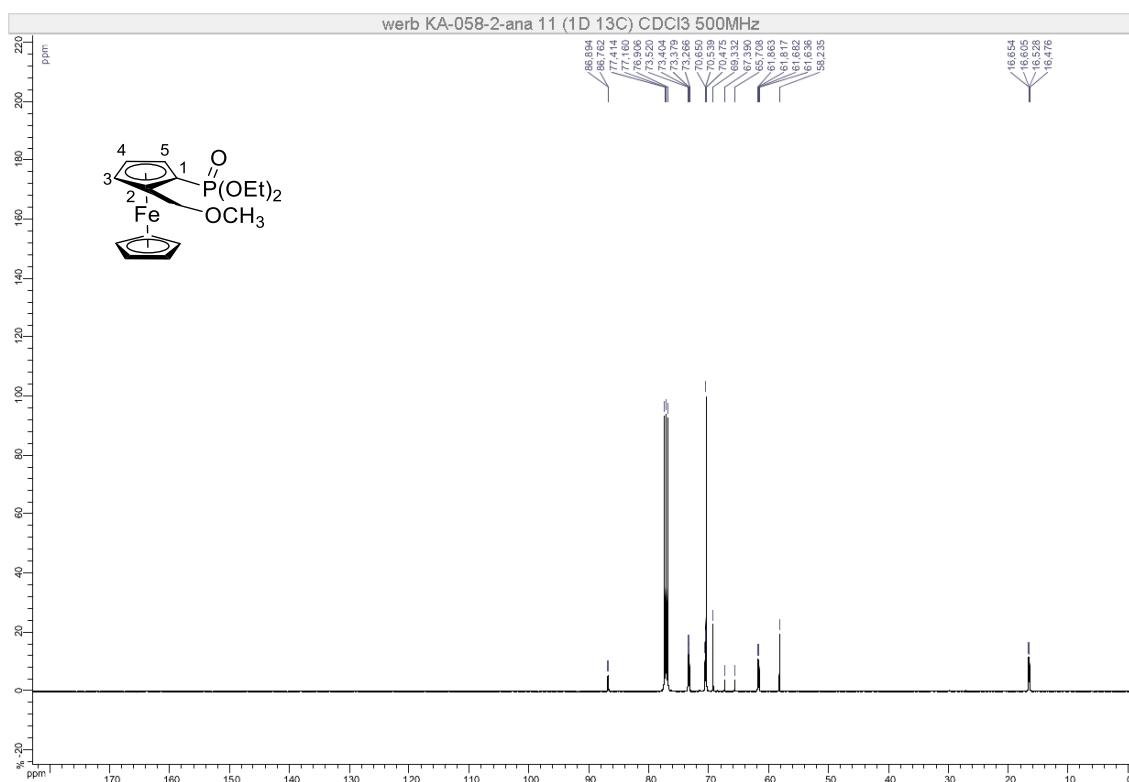


(\pm)-*O,O*-Diethyl-2-(methoxymethyl)ferrocenephosphonate ((\pm)-5a)

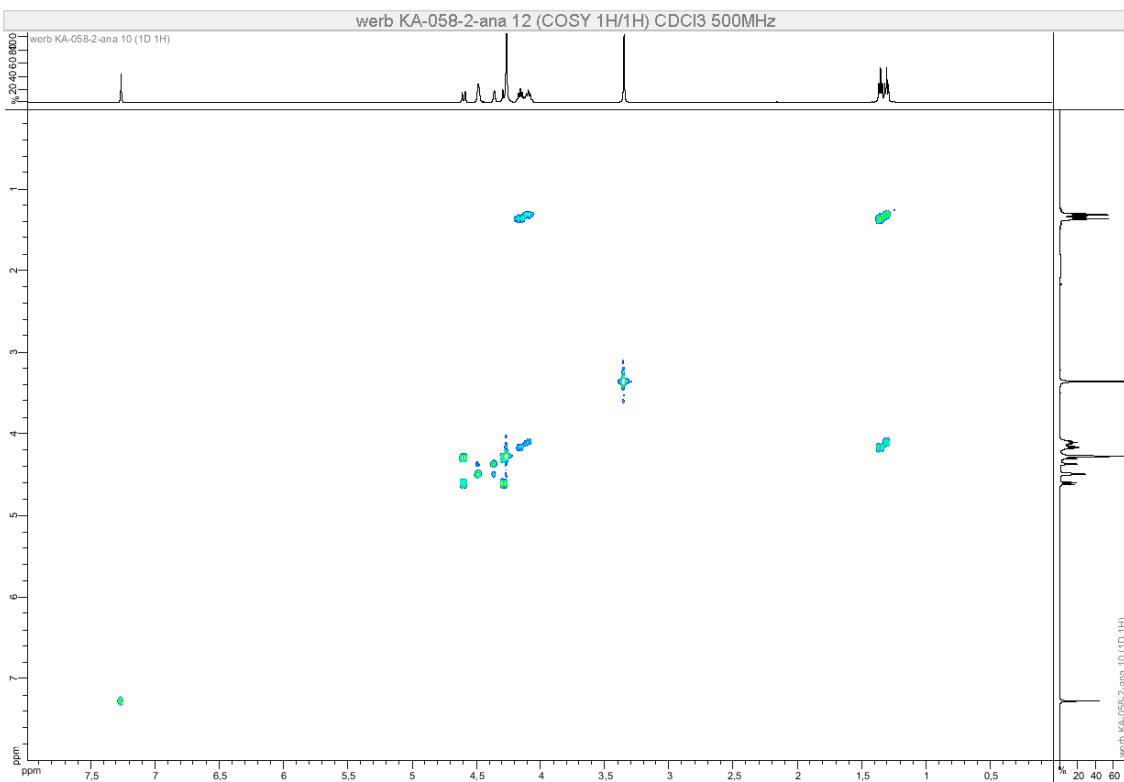
^1H NMR



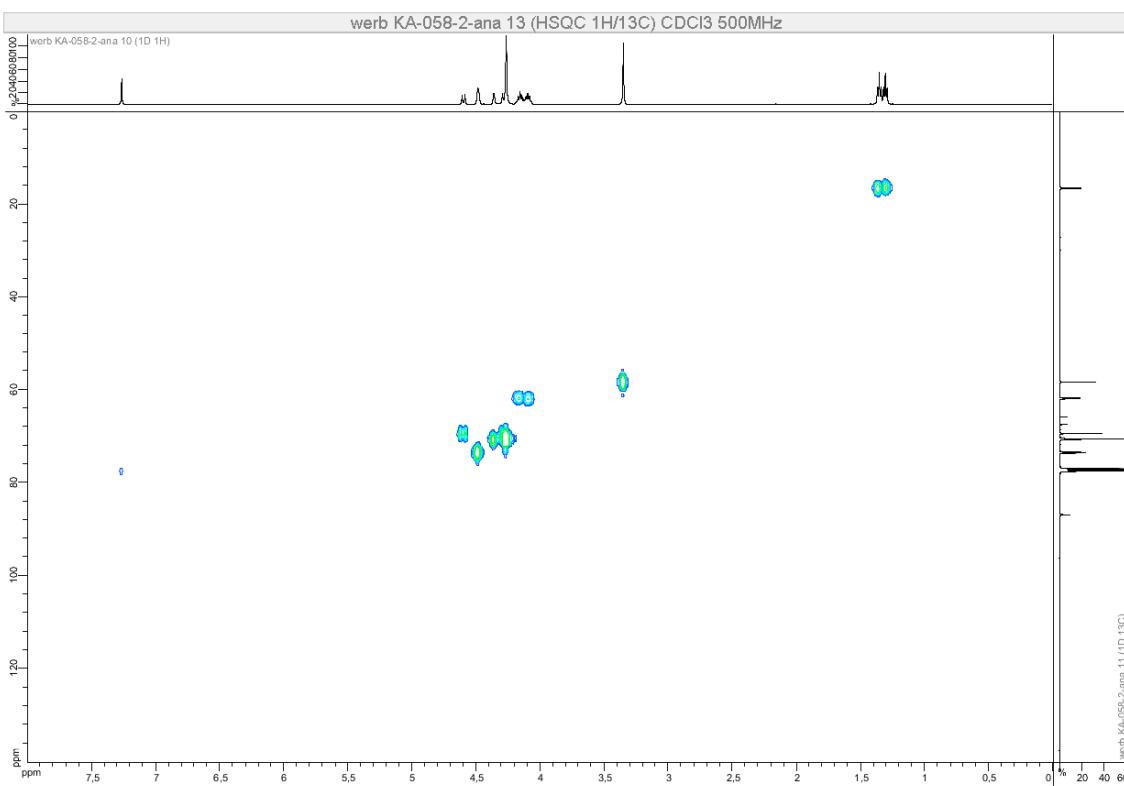
$^{13}\text{C}\{^1\text{H}\}$ NMR



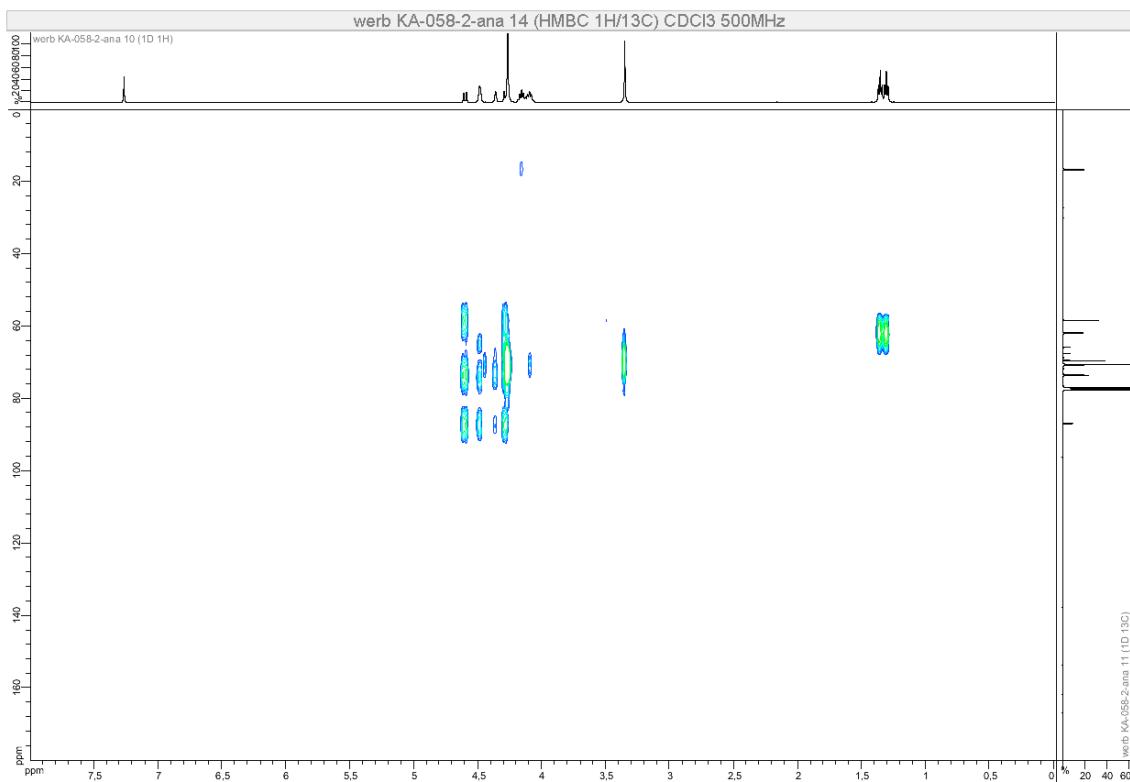
COSY NMR



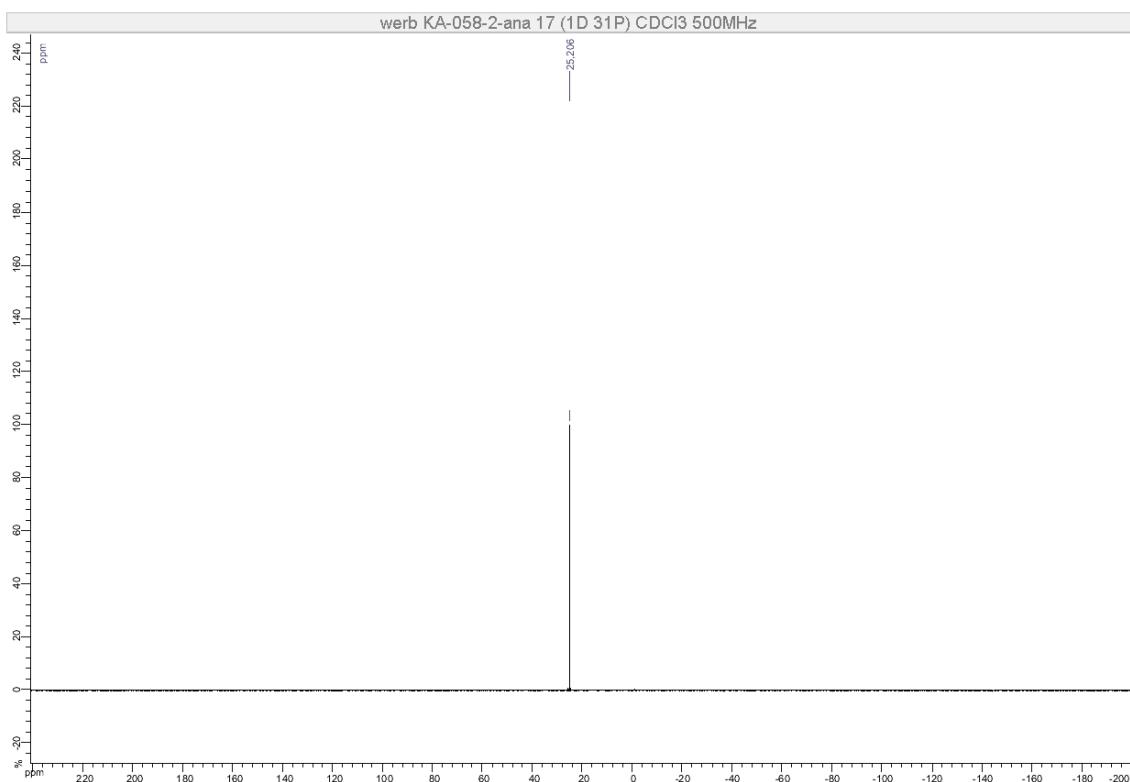
HSQC NMR



HMBC NMR

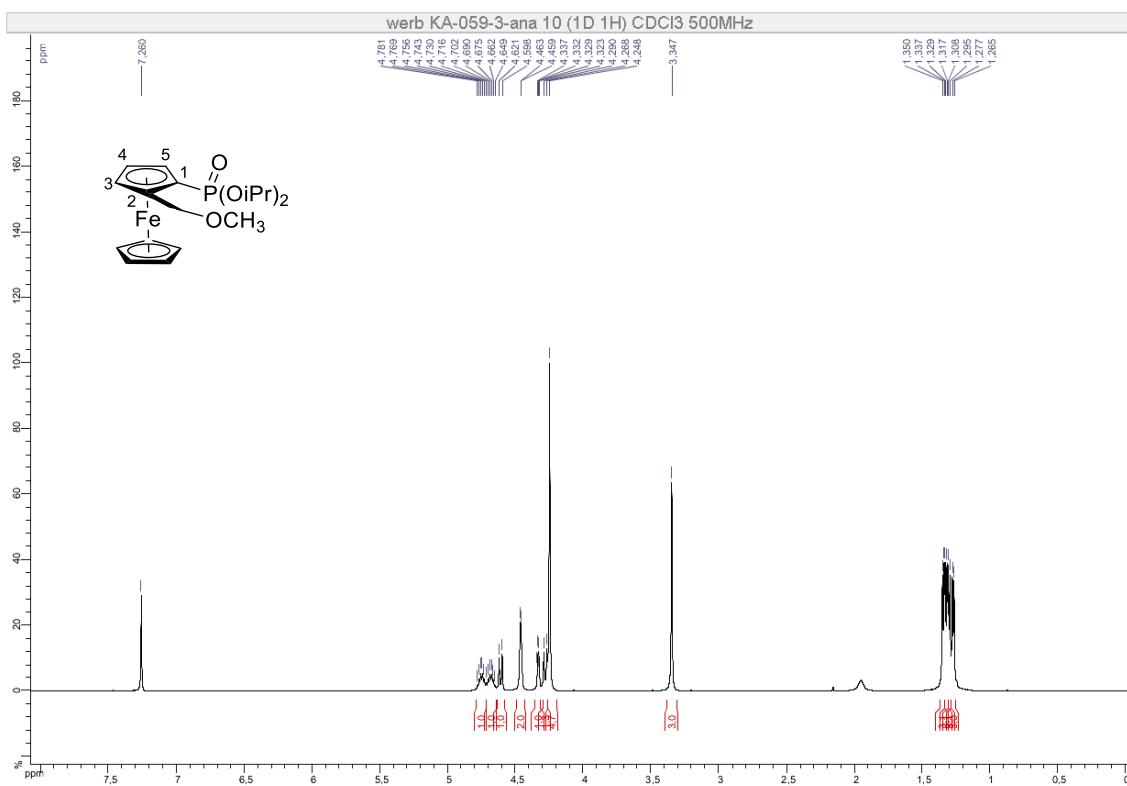


³¹P{¹H} NMR

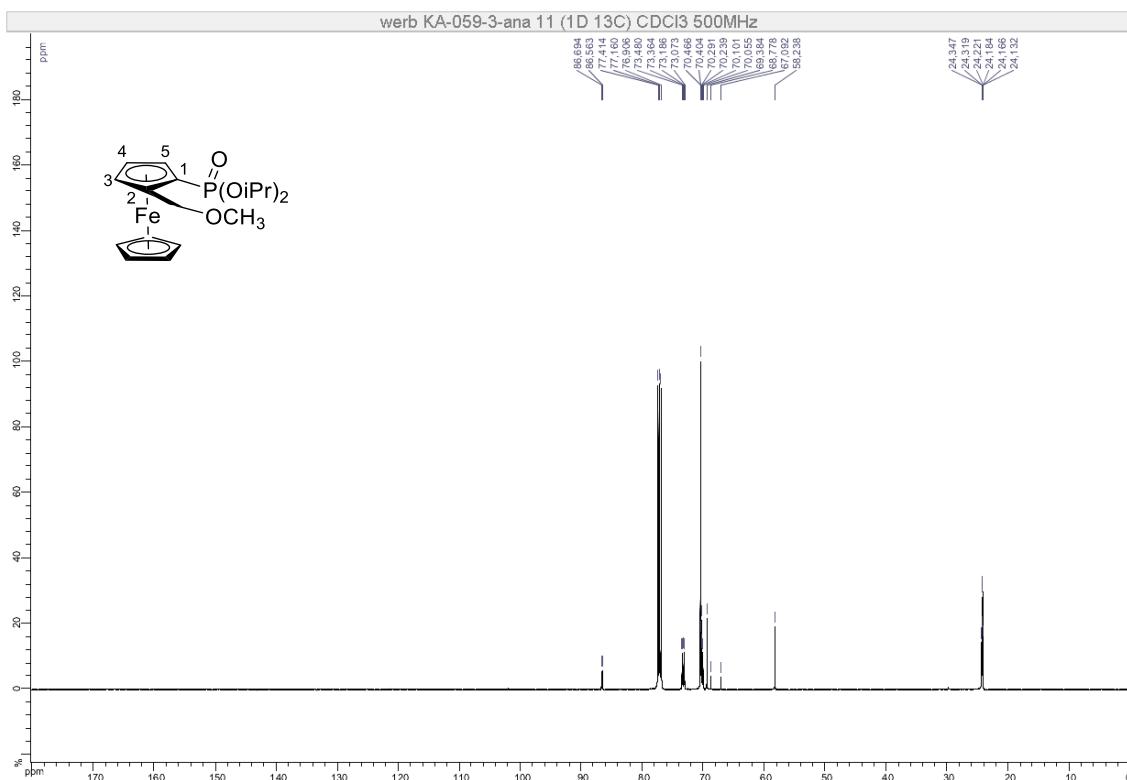


(\pm)-*O,O*-Diisopropyl-2-(methoxymethyl)ferrocenephosphonate ((\pm)-5b)

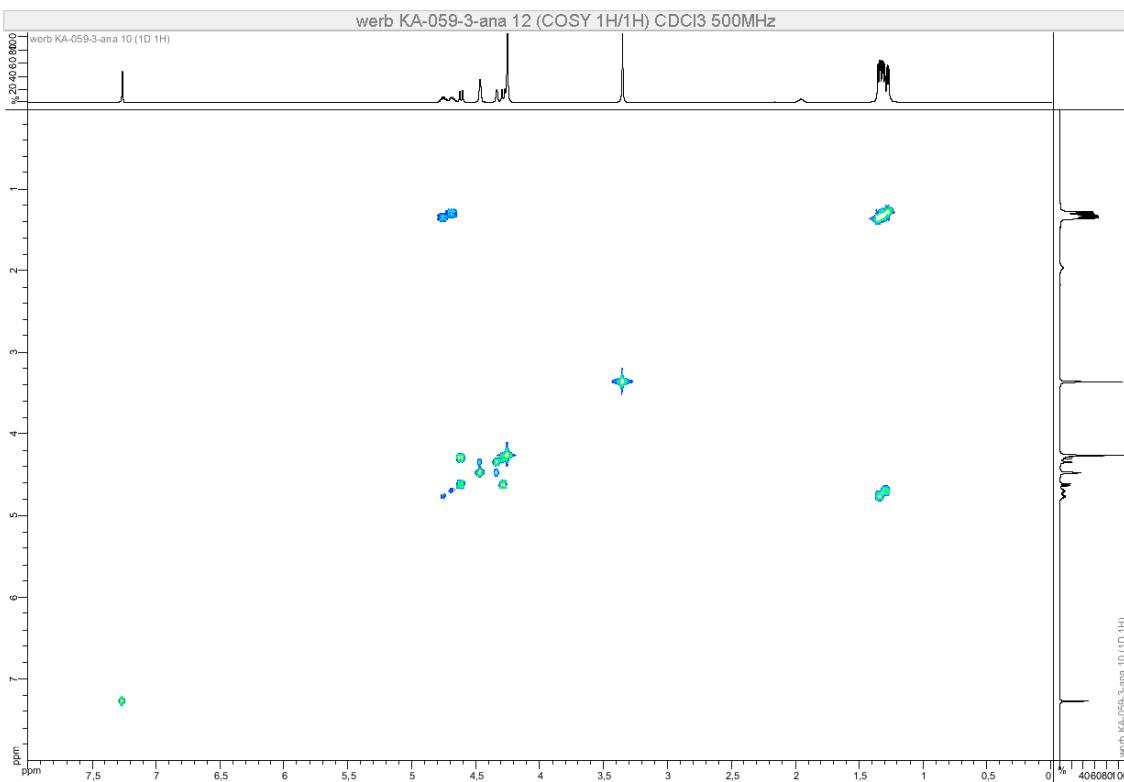
^1H NMR



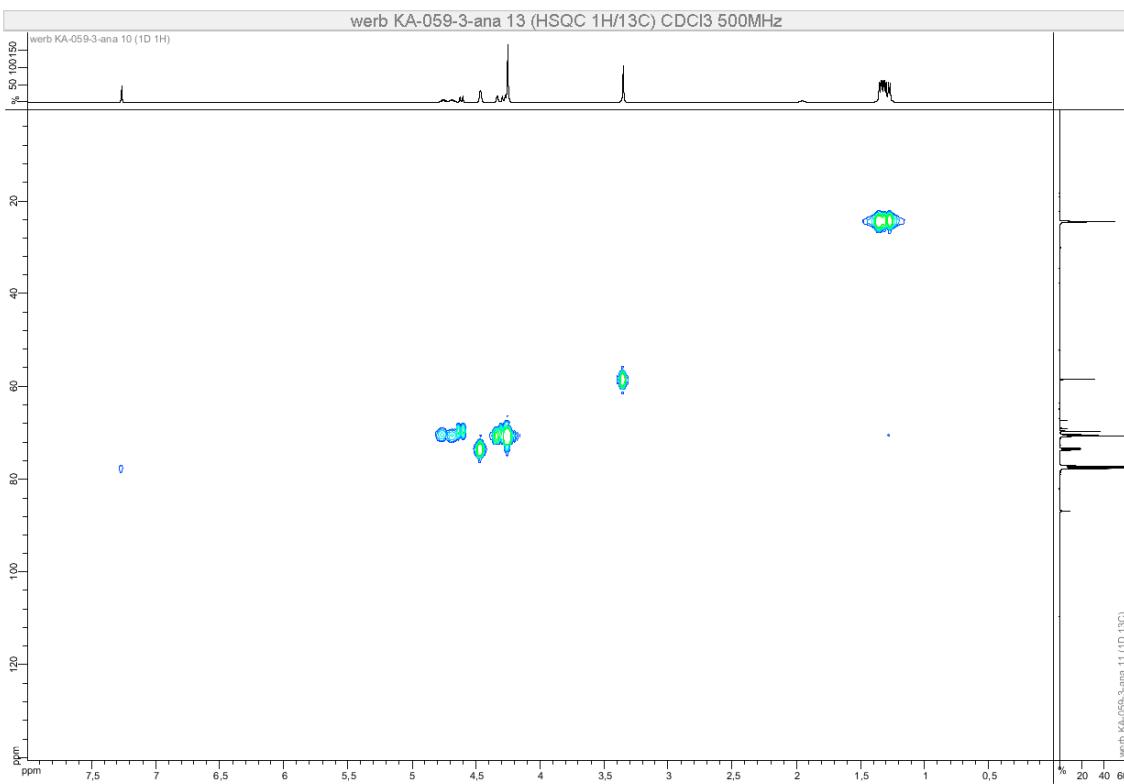
$^{13}\text{C}\{^1\text{H}\}$ NMR



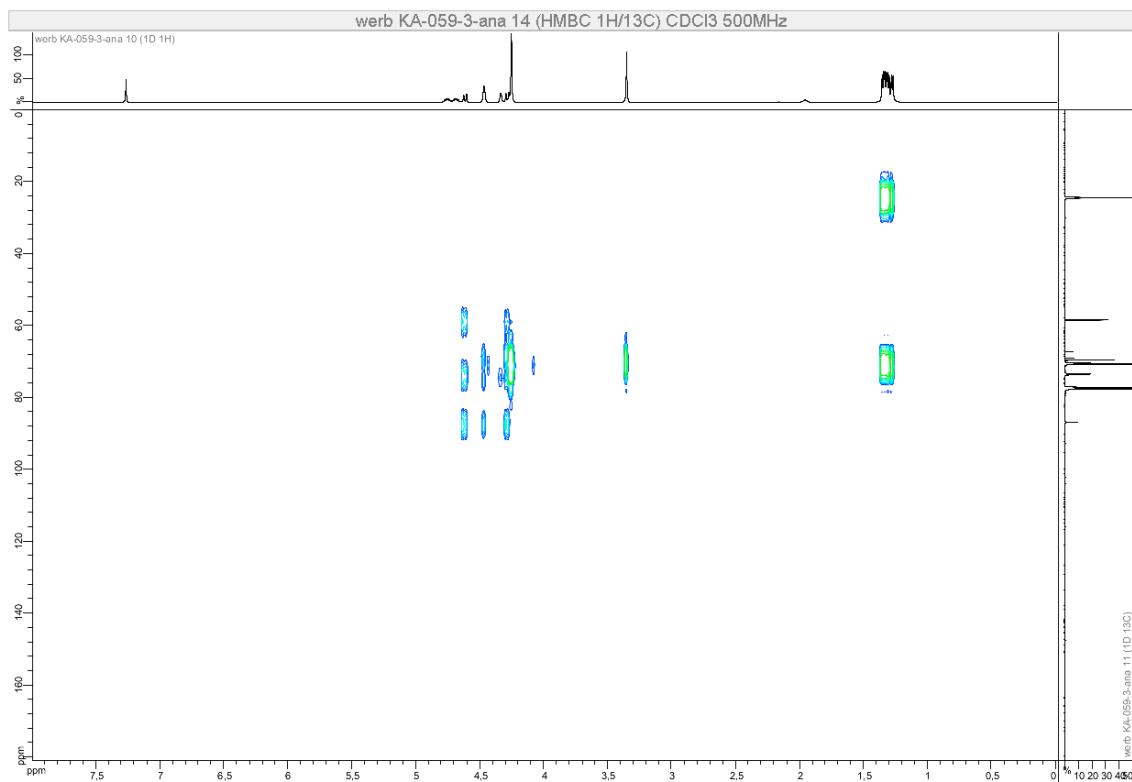
COSY NMR



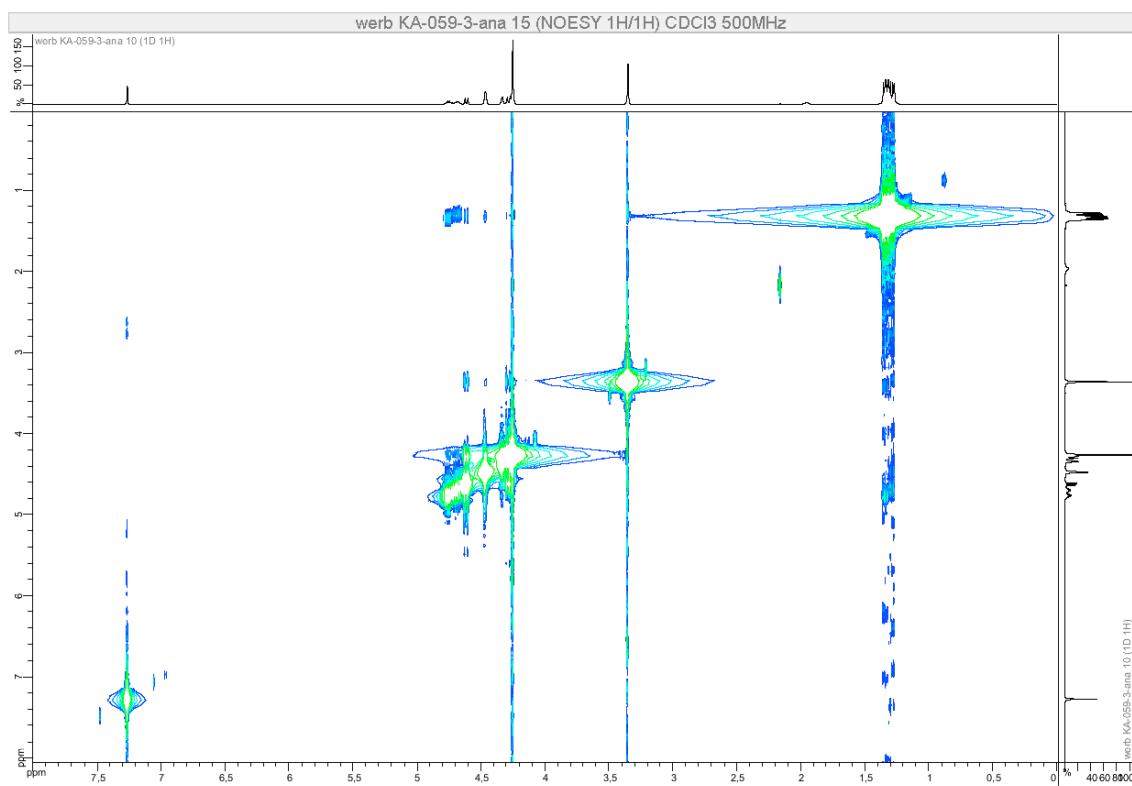
HSQC NMR



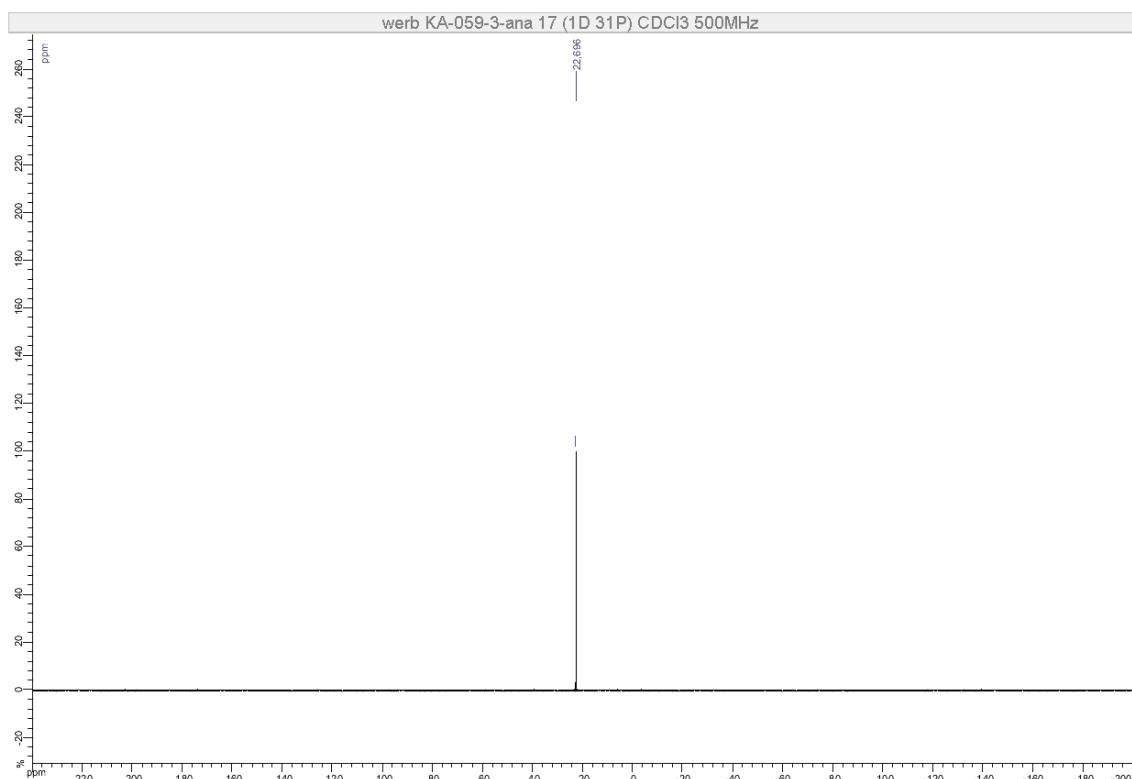
HMBC NMR



NOESY NMR

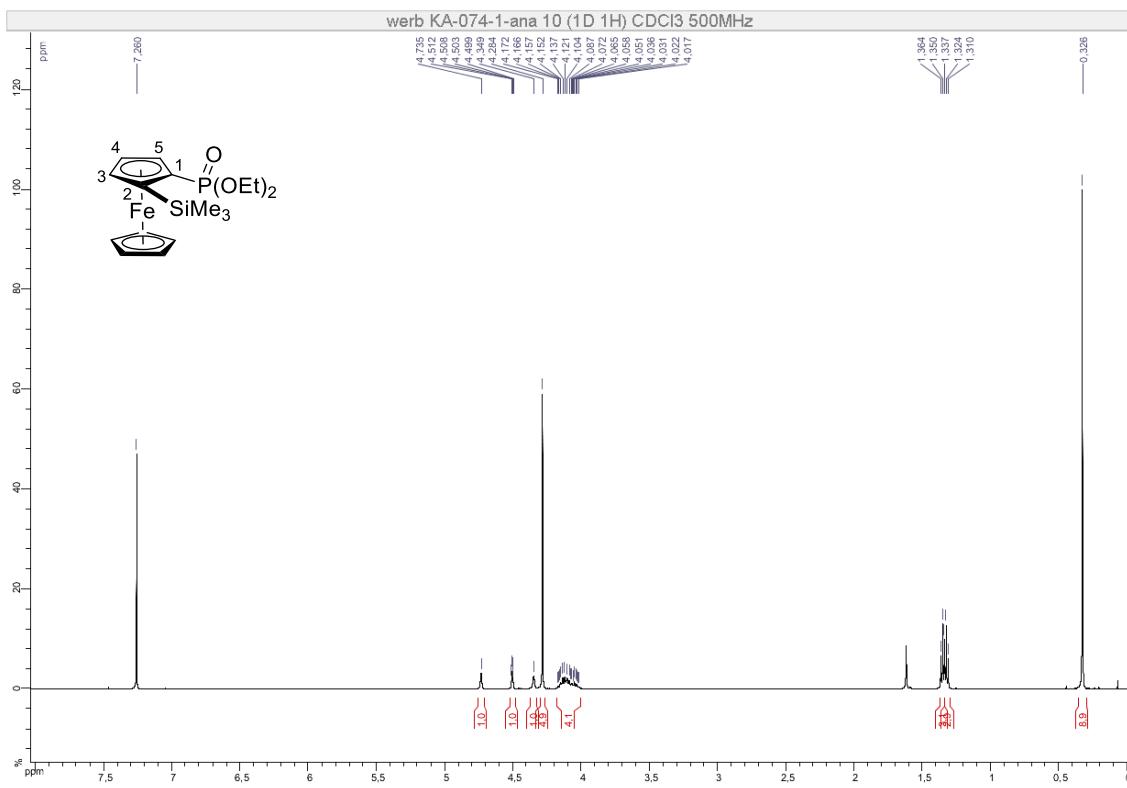


$^{31}\text{P}\{\text{H}\}$ NMR

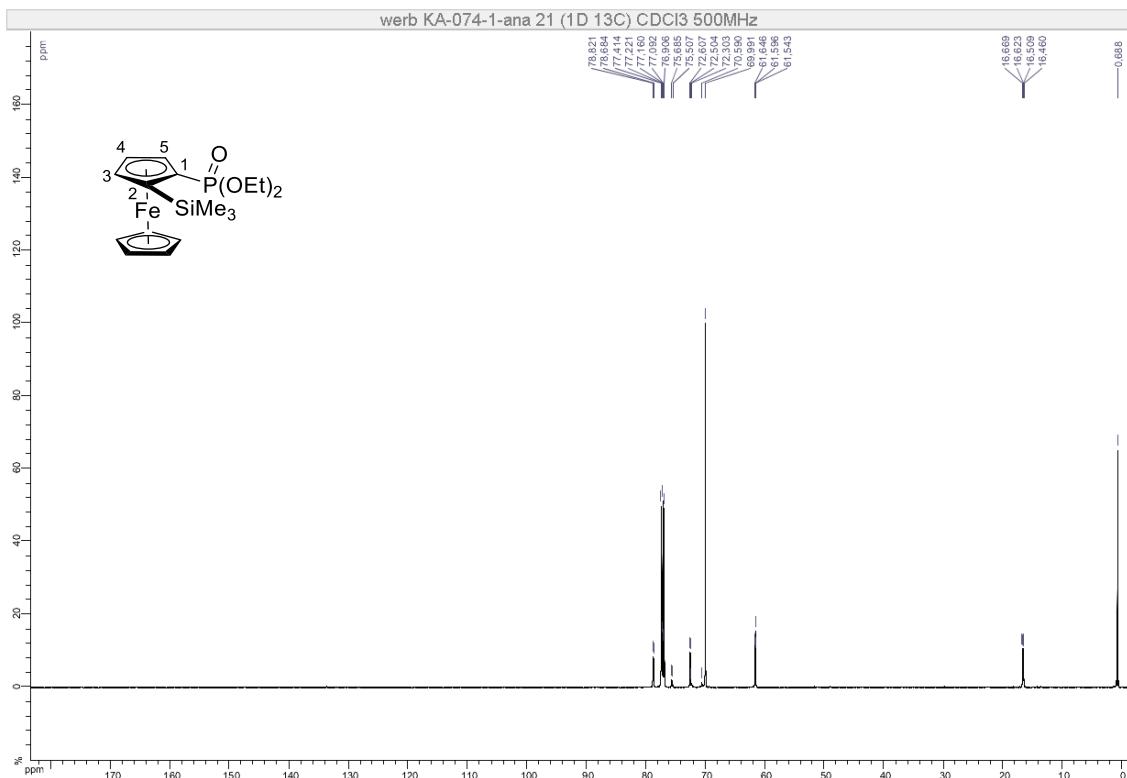


(\pm)-*O,O*-Diethyl-2-(trimethylsilyl)ferrocenephosphonate ((\pm)-6a)

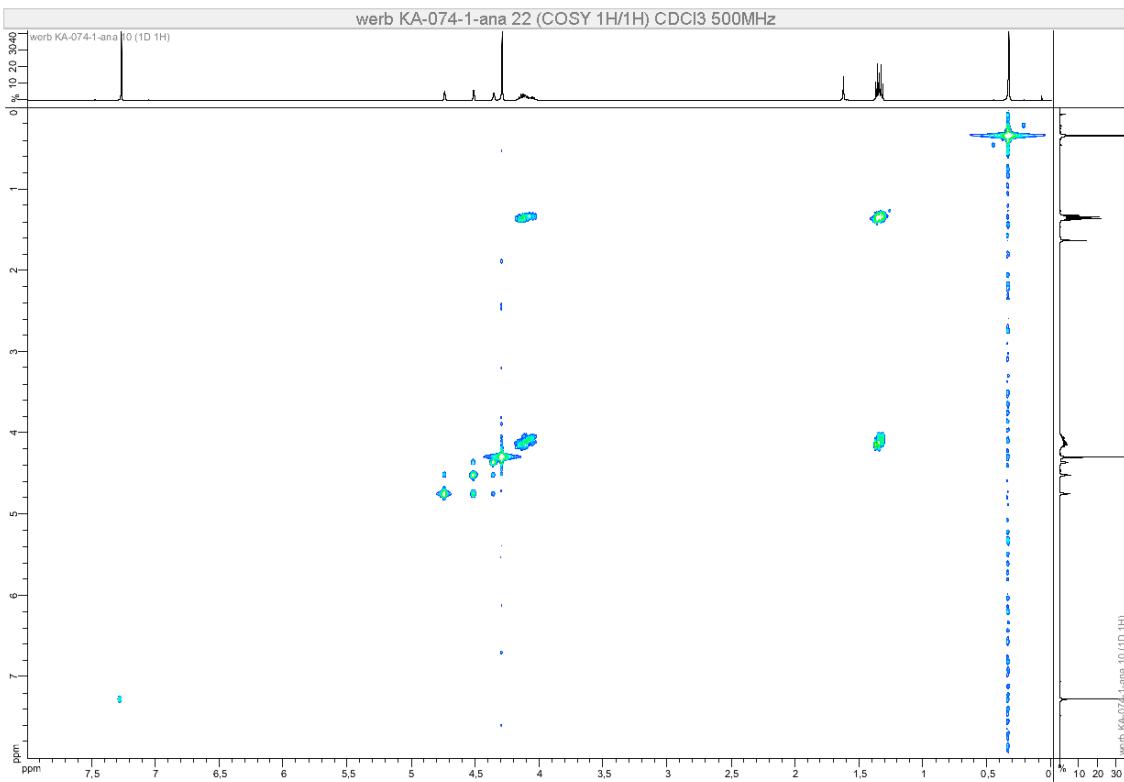
¹H NMR



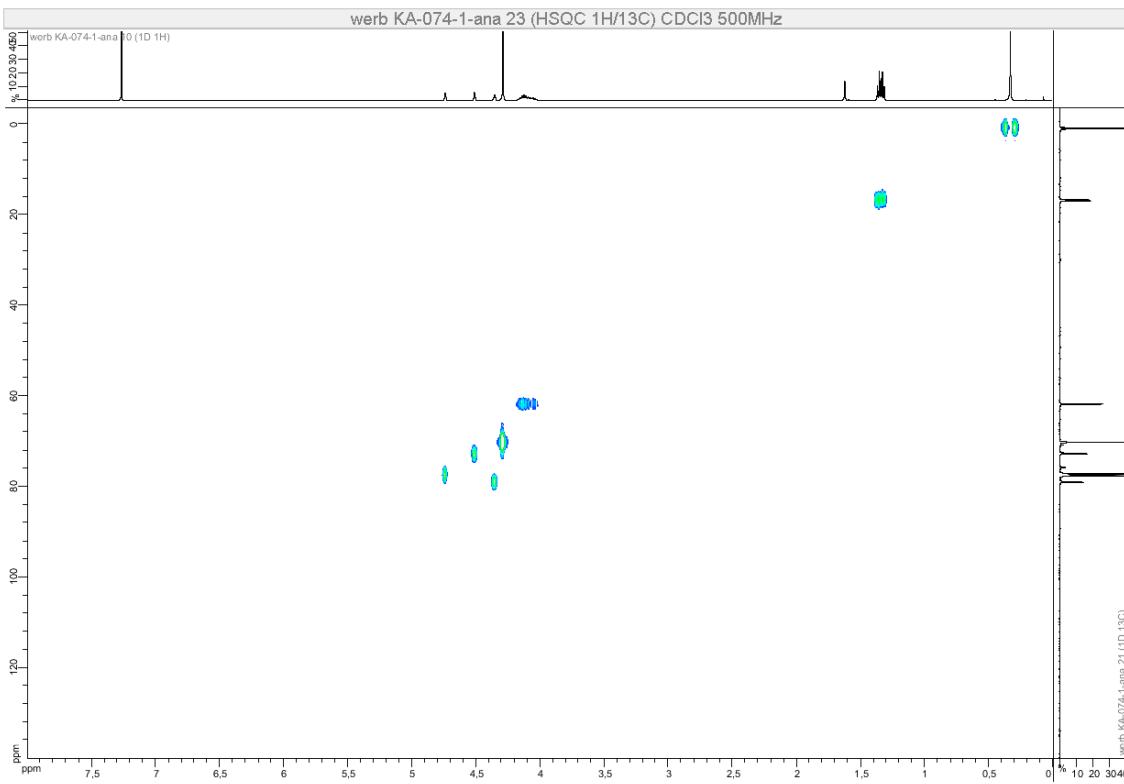
¹³C{¹H} NMR



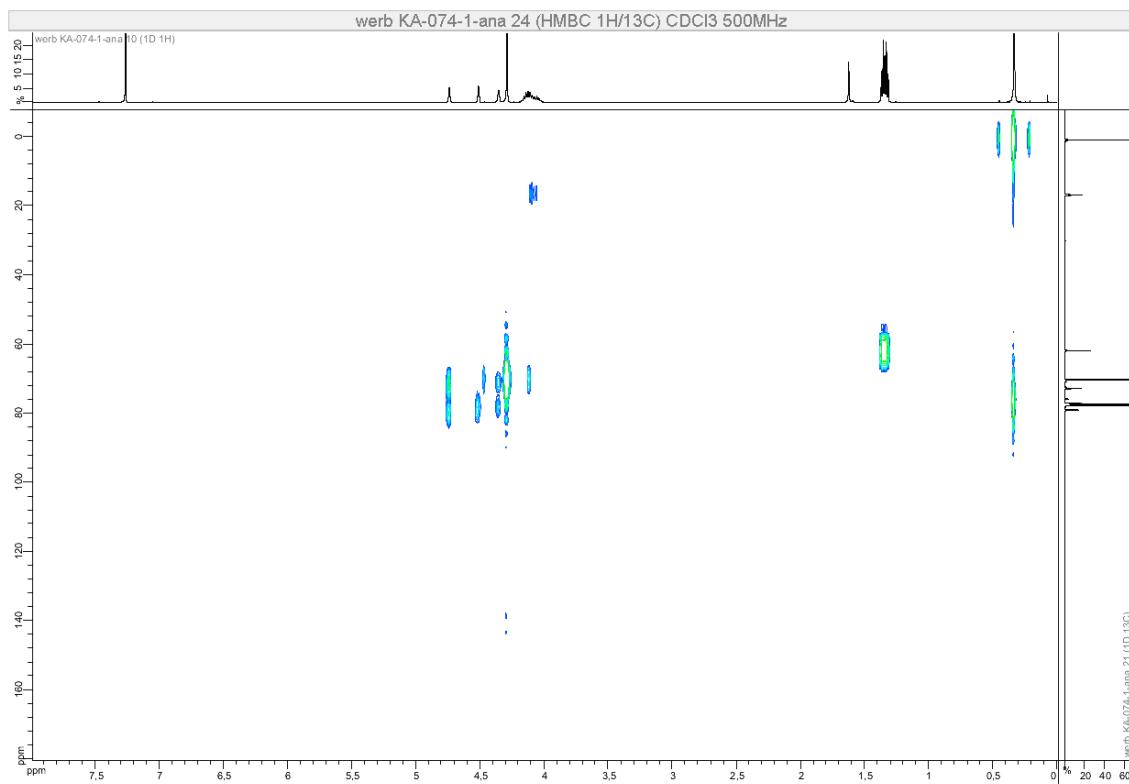
COSY NMR



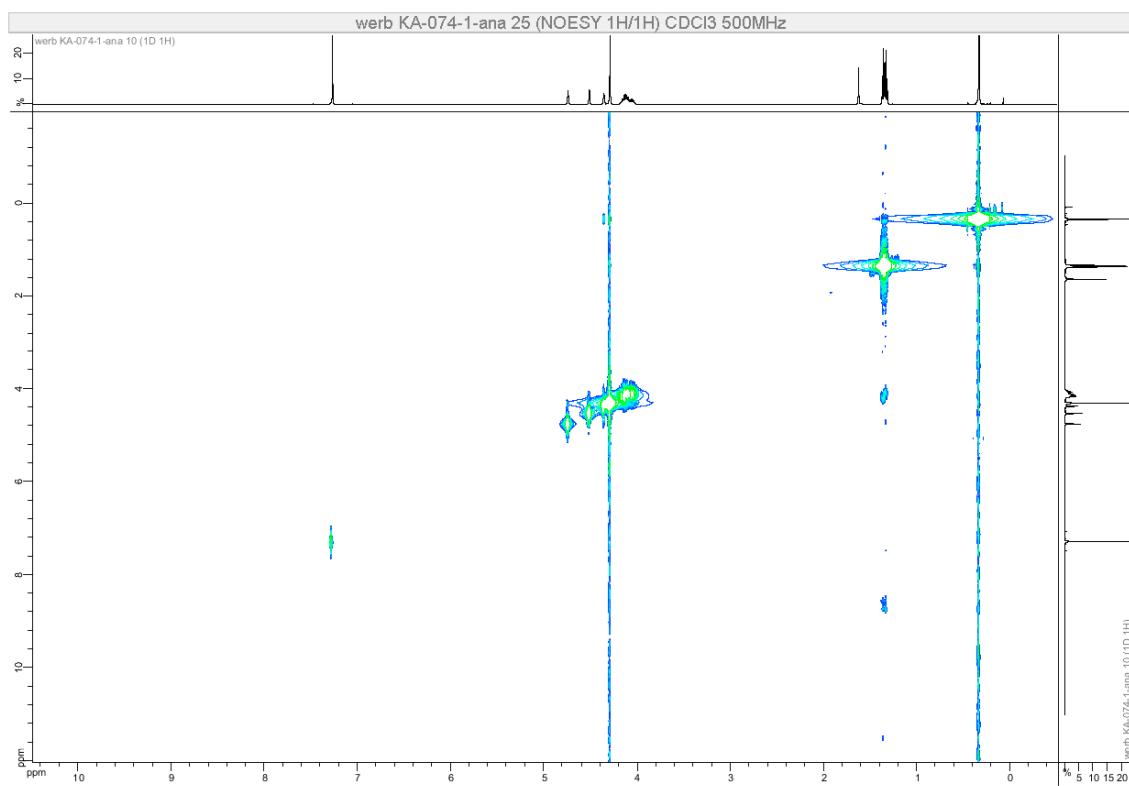
HSQC NMR



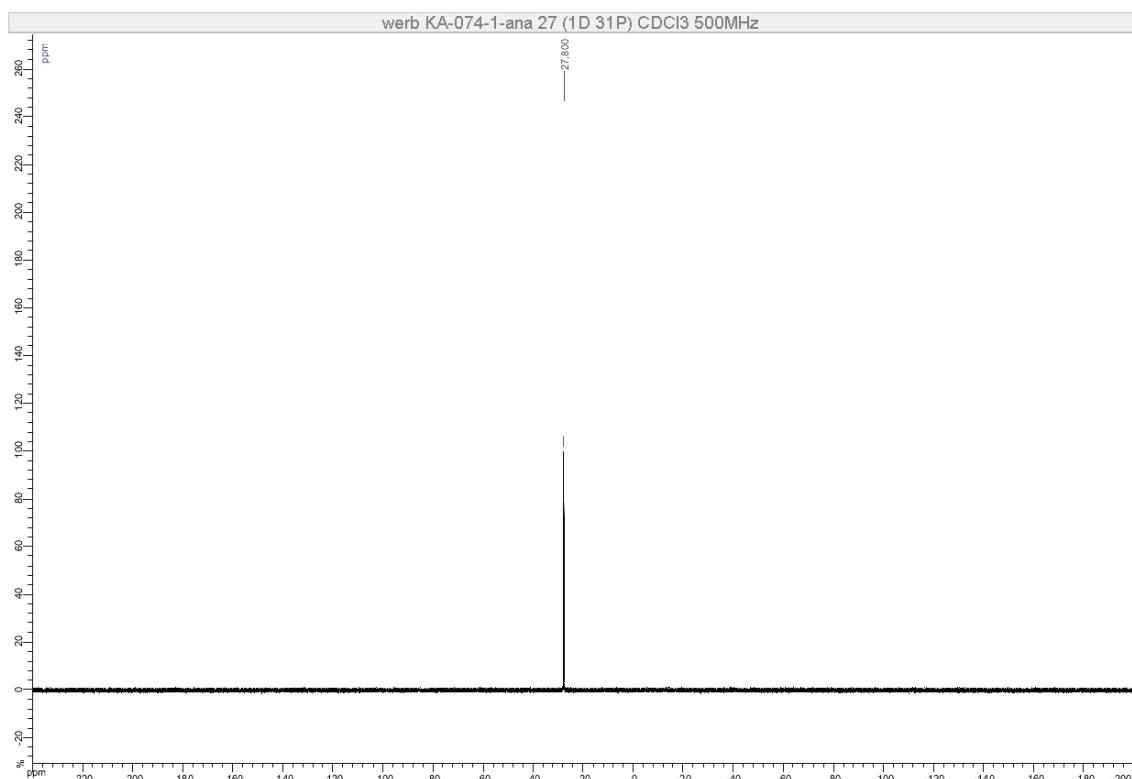
HMBC NMR



NOESY NMR

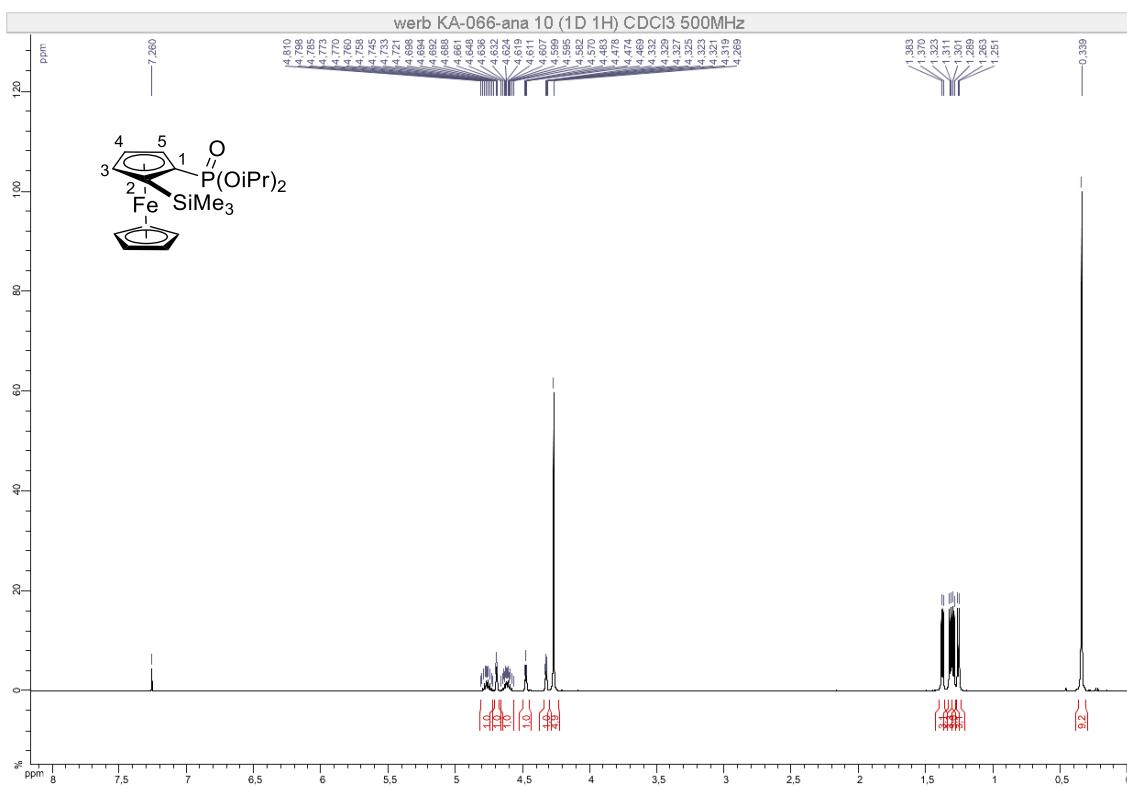


$^{31}\text{P}\{\text{H}\}$ NMR

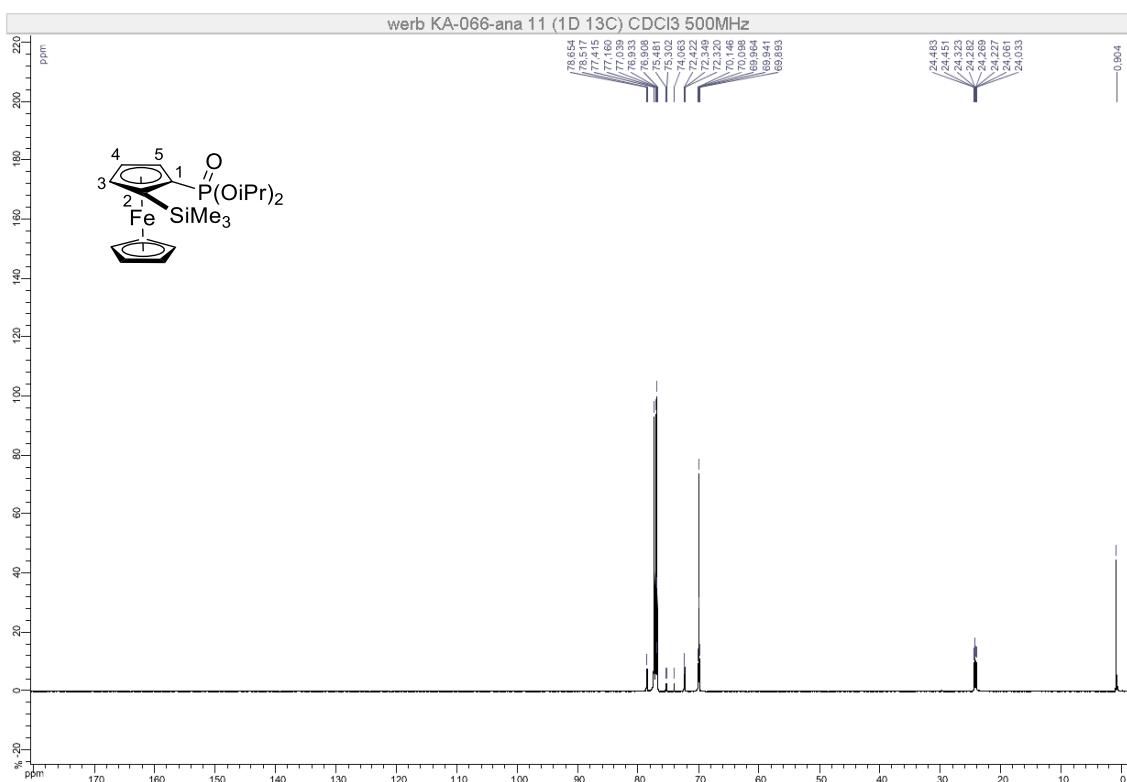


(\pm)-*O,O*-Diisopropyl-2-(trimethylsilyl)ferrocenephosphonate ((\pm)-6b)

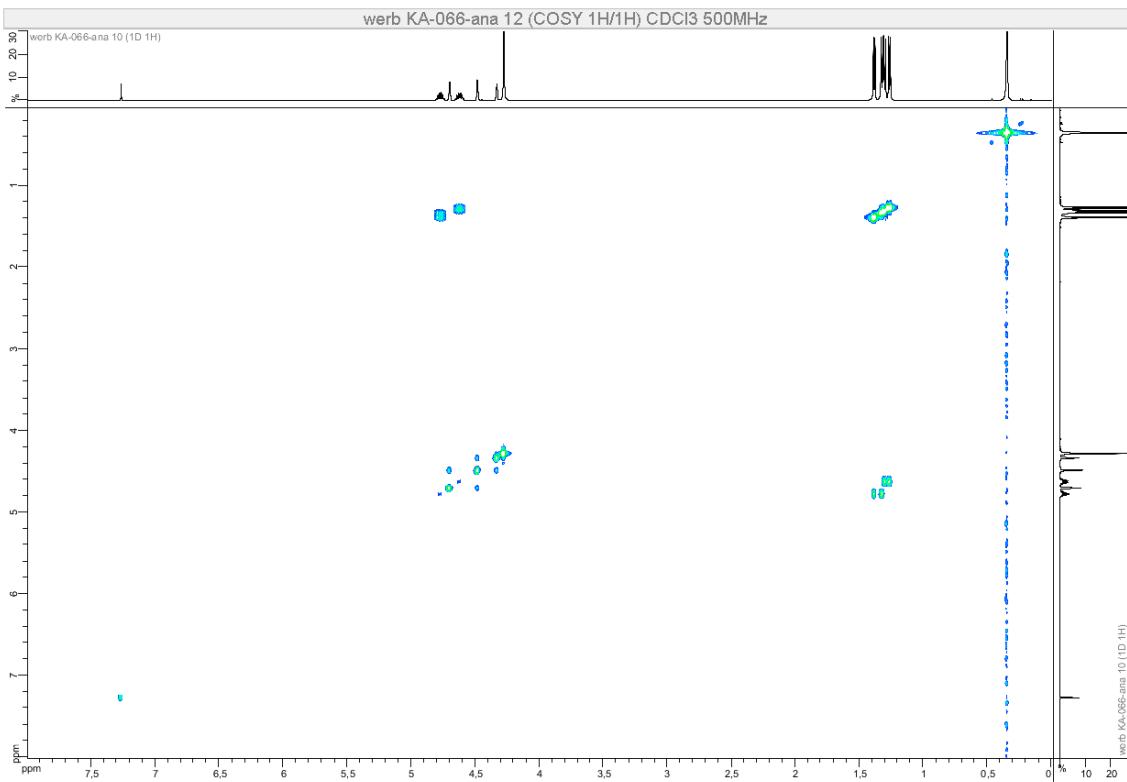
¹H NMR



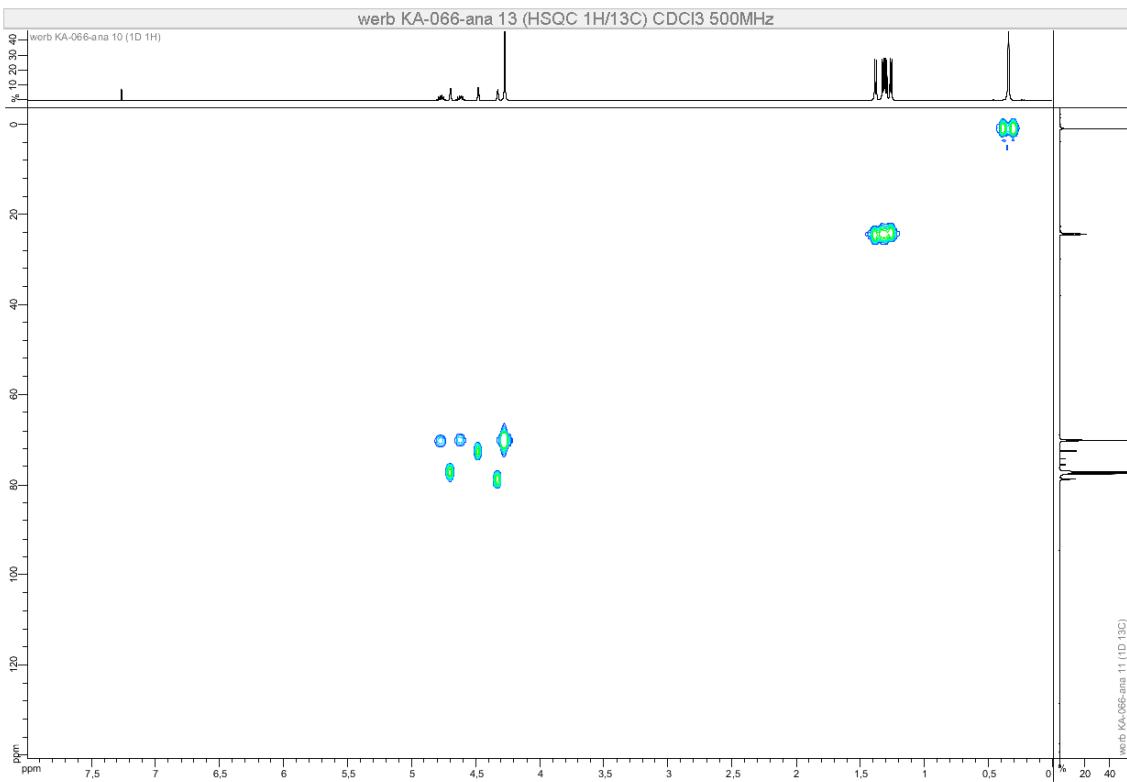
¹³C{¹H} NMR



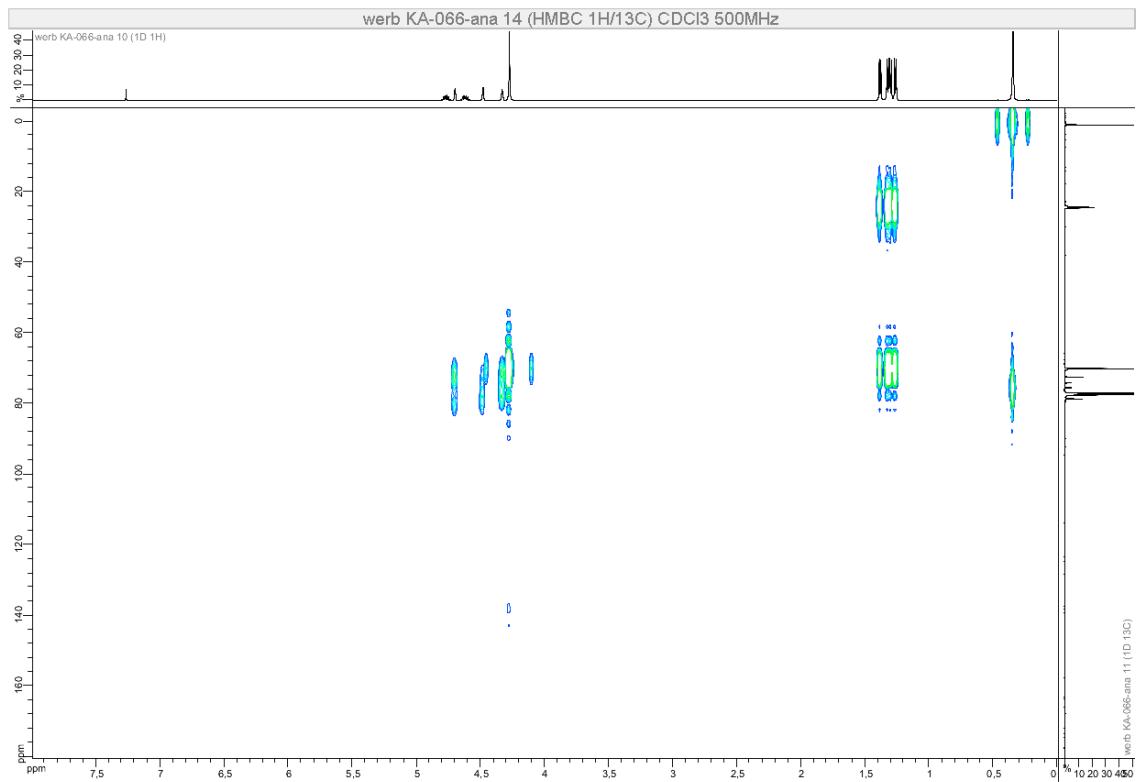
COSY NMR



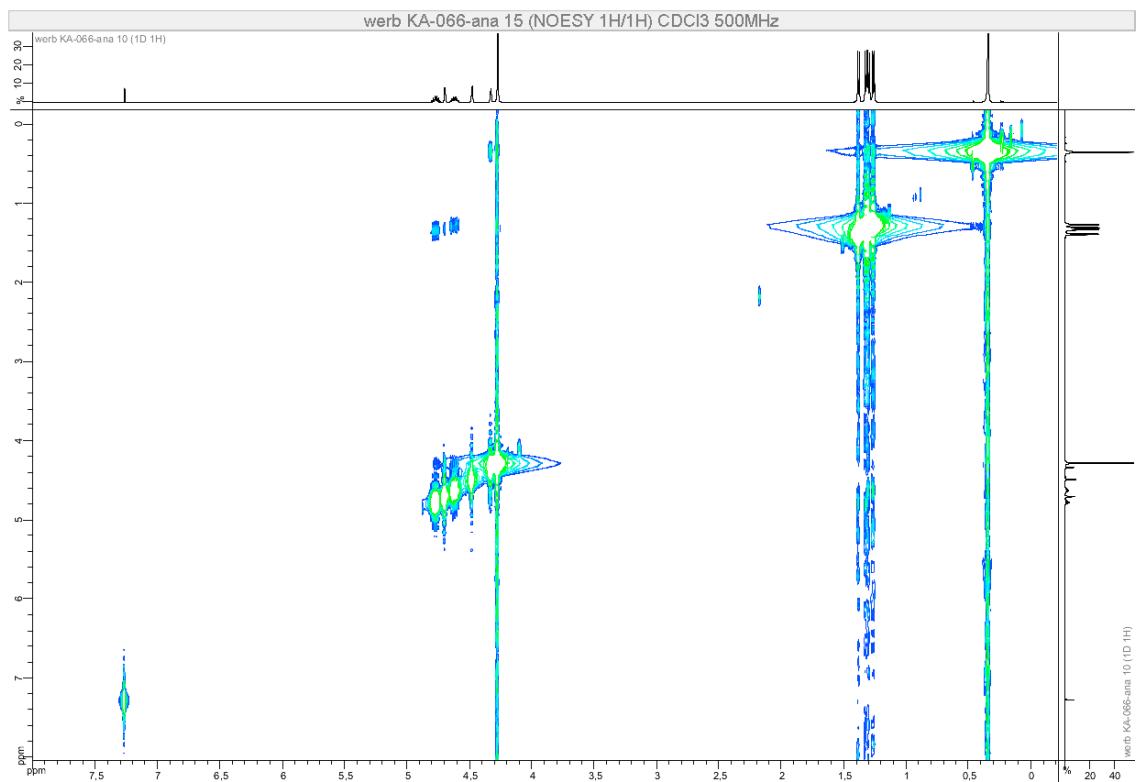
HSQC NMR



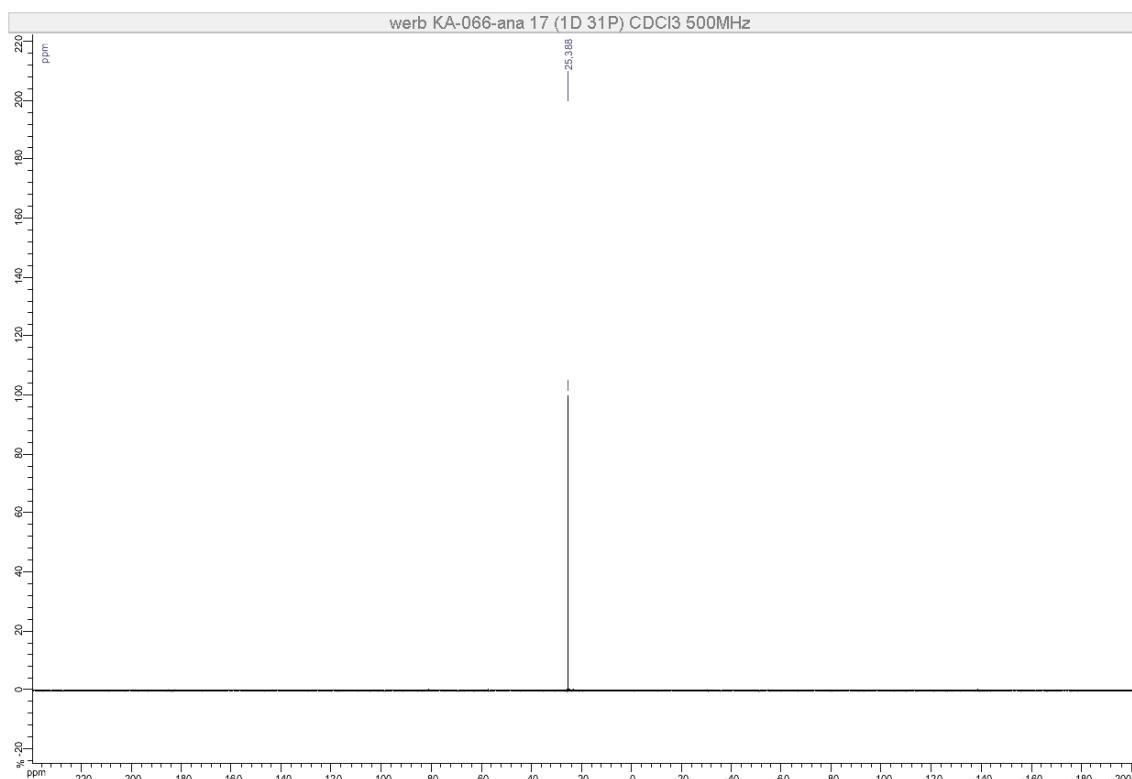
HMBC NMR



NOESY NMR

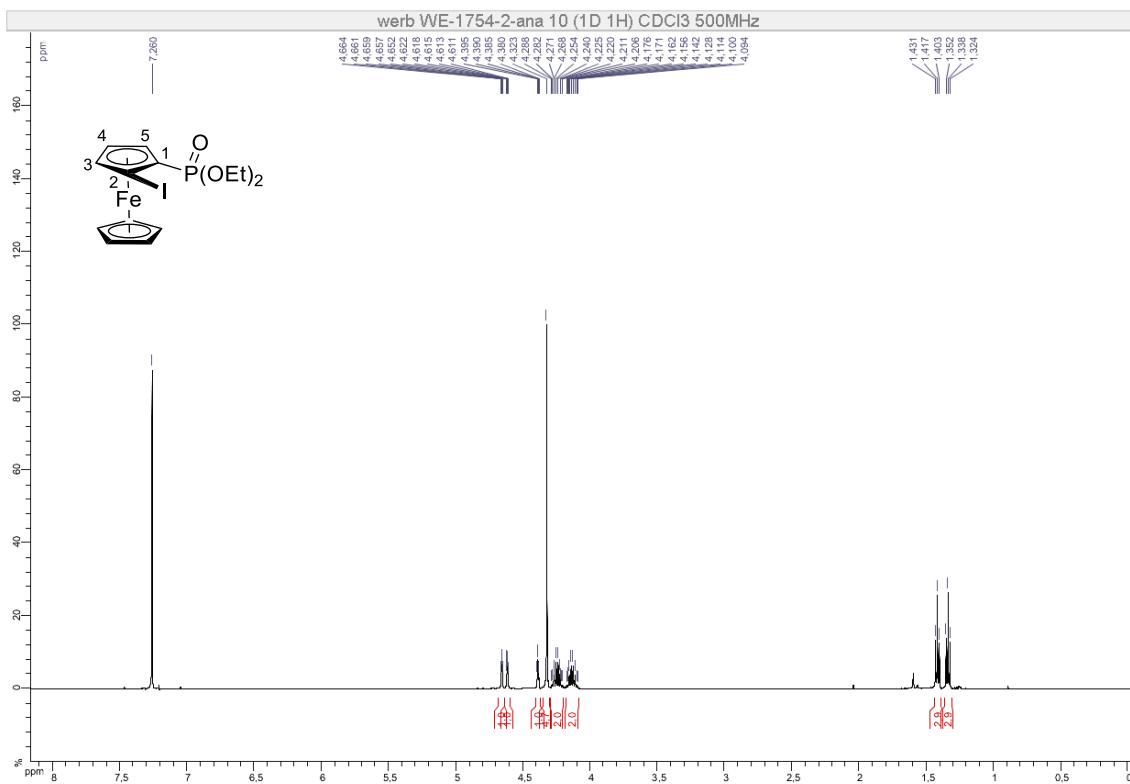


$^{31}\text{P}\{\text{H}\}$ NMR

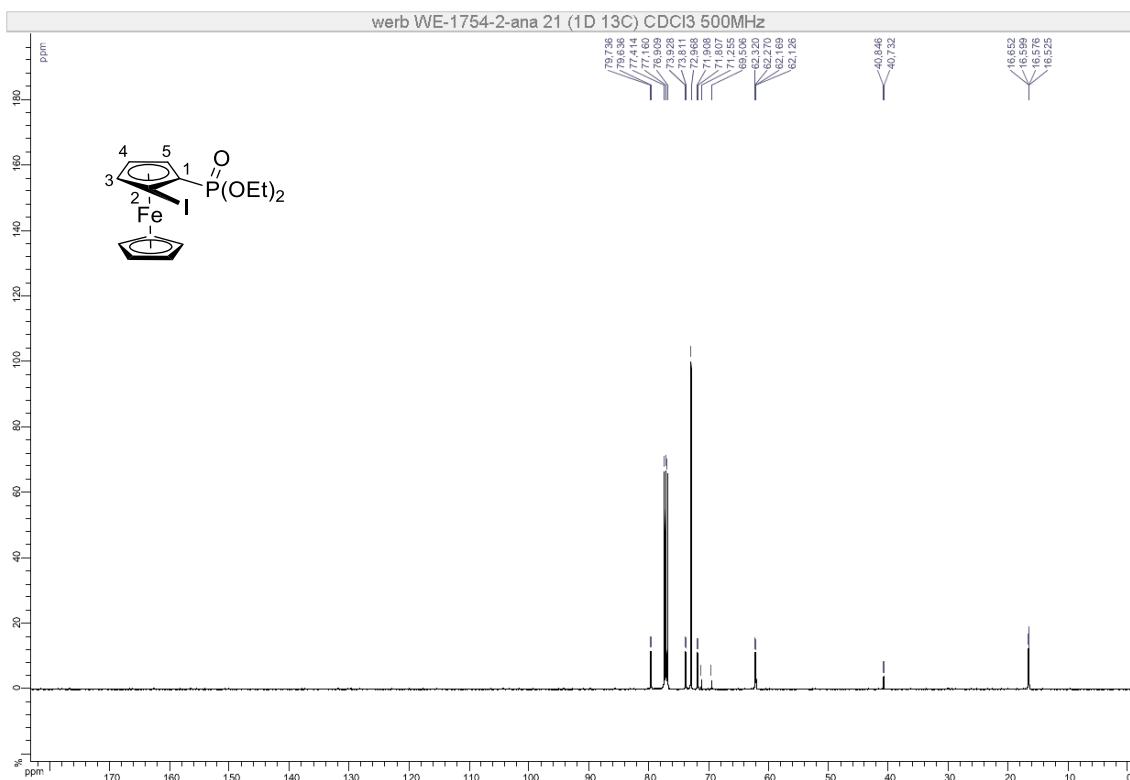


(\pm)-*O,O*-Diethyl-2-iodoferrocenephosphonate ((\pm)-7a)

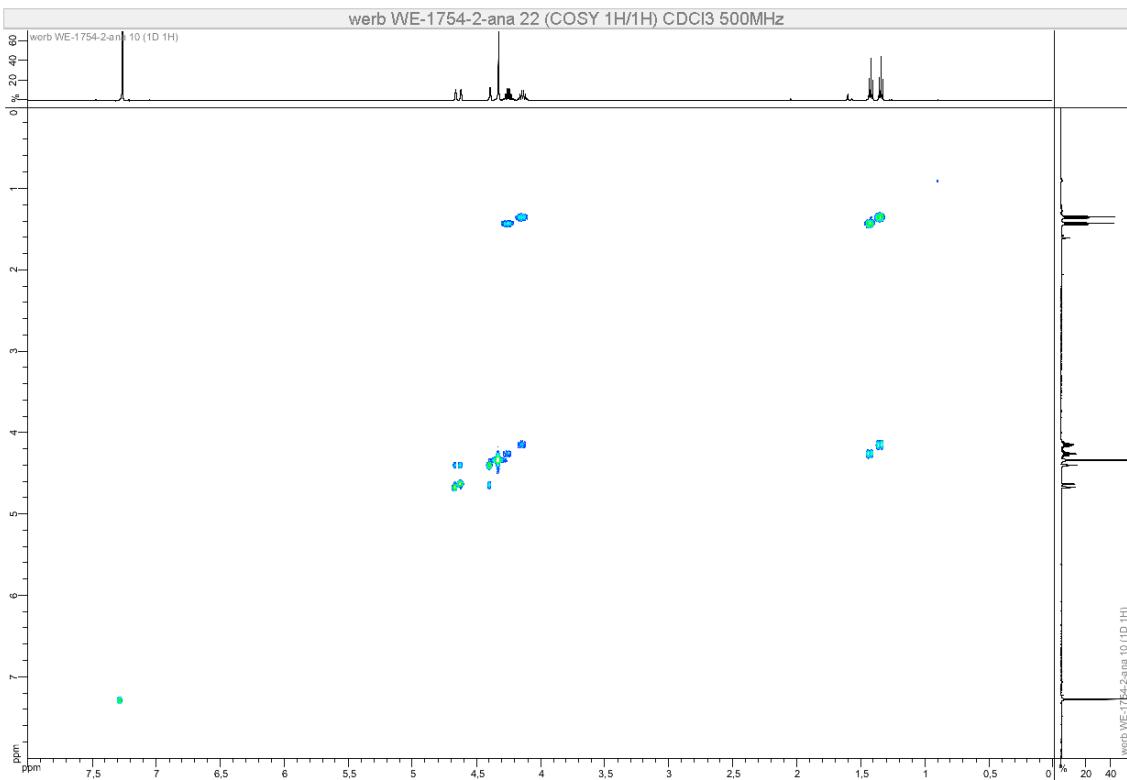
¹H NMR



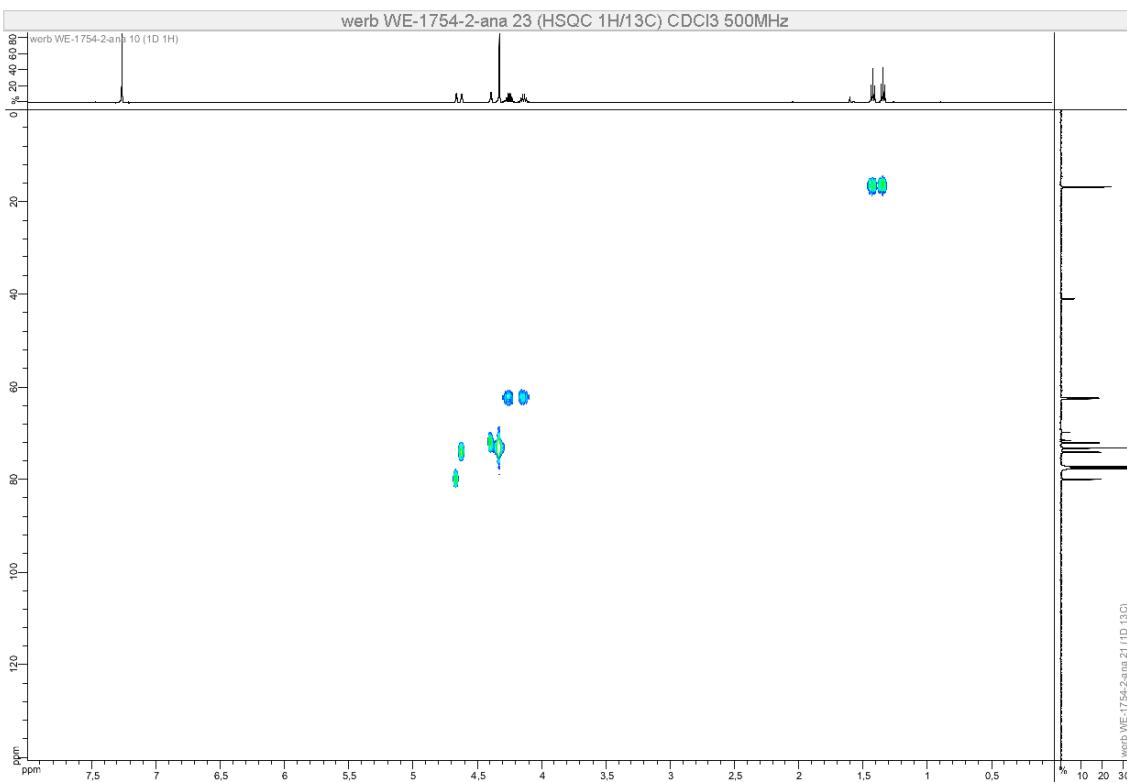
¹³C{¹H} NMR



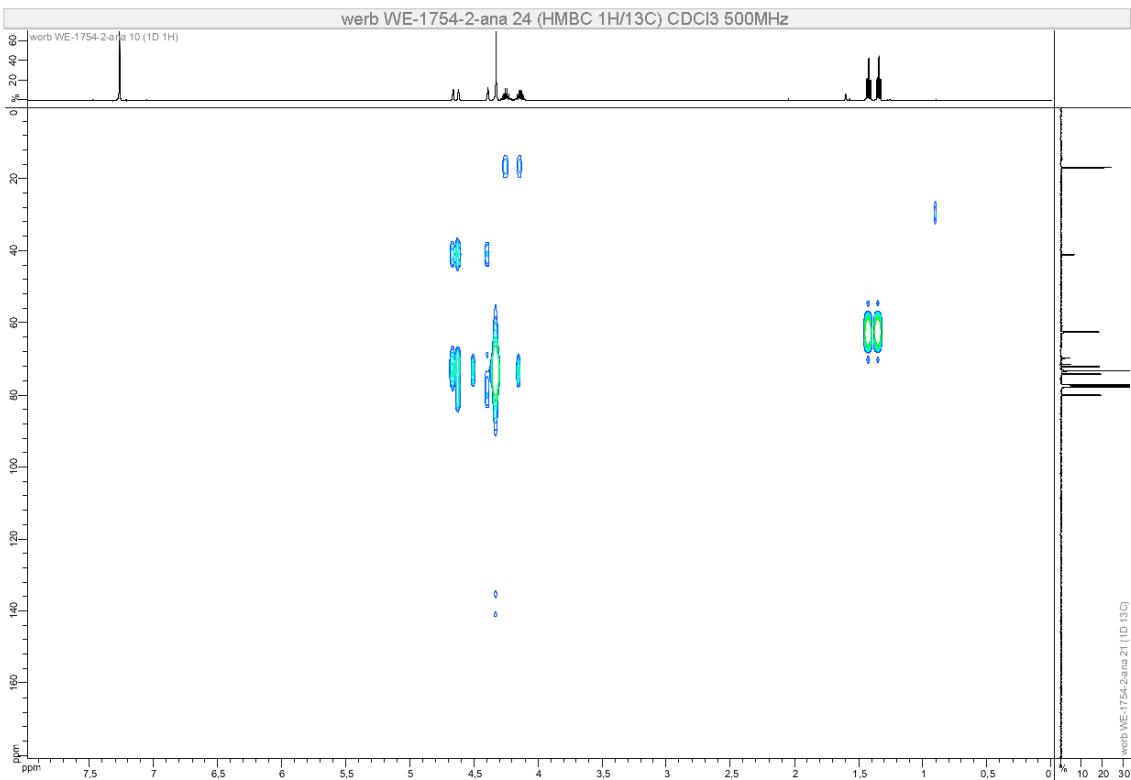
COSY NMR



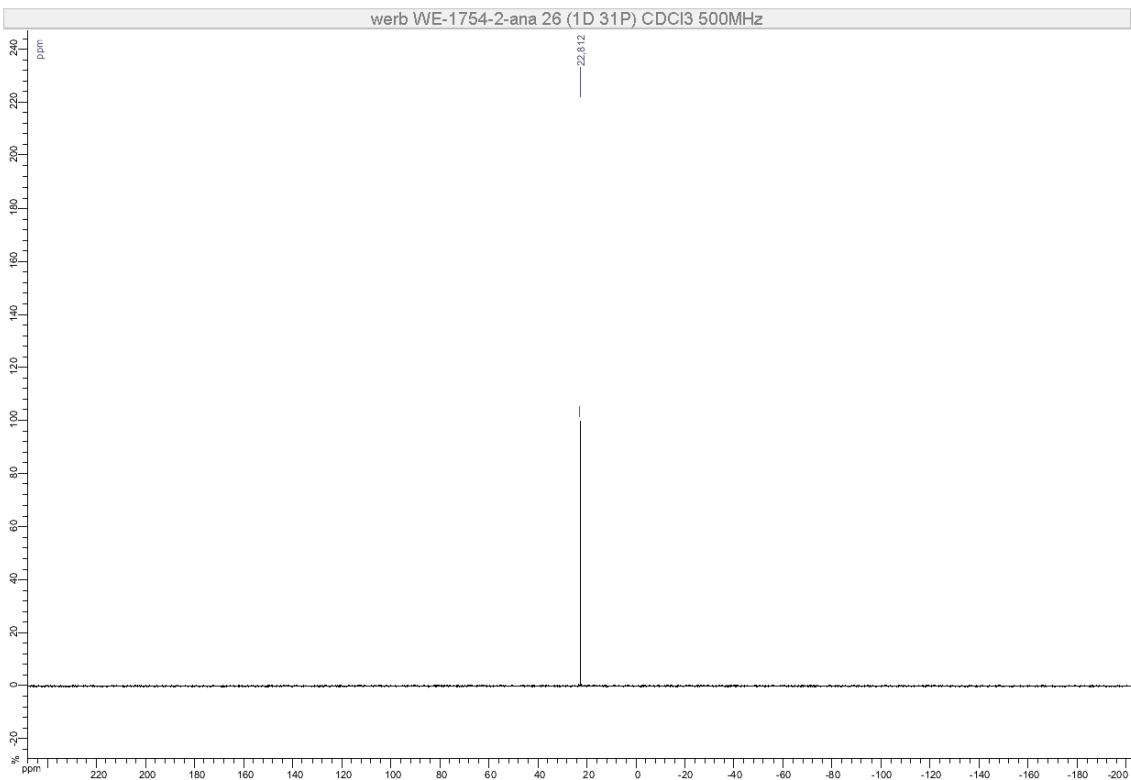
HSQC NMR



HMBC NMR

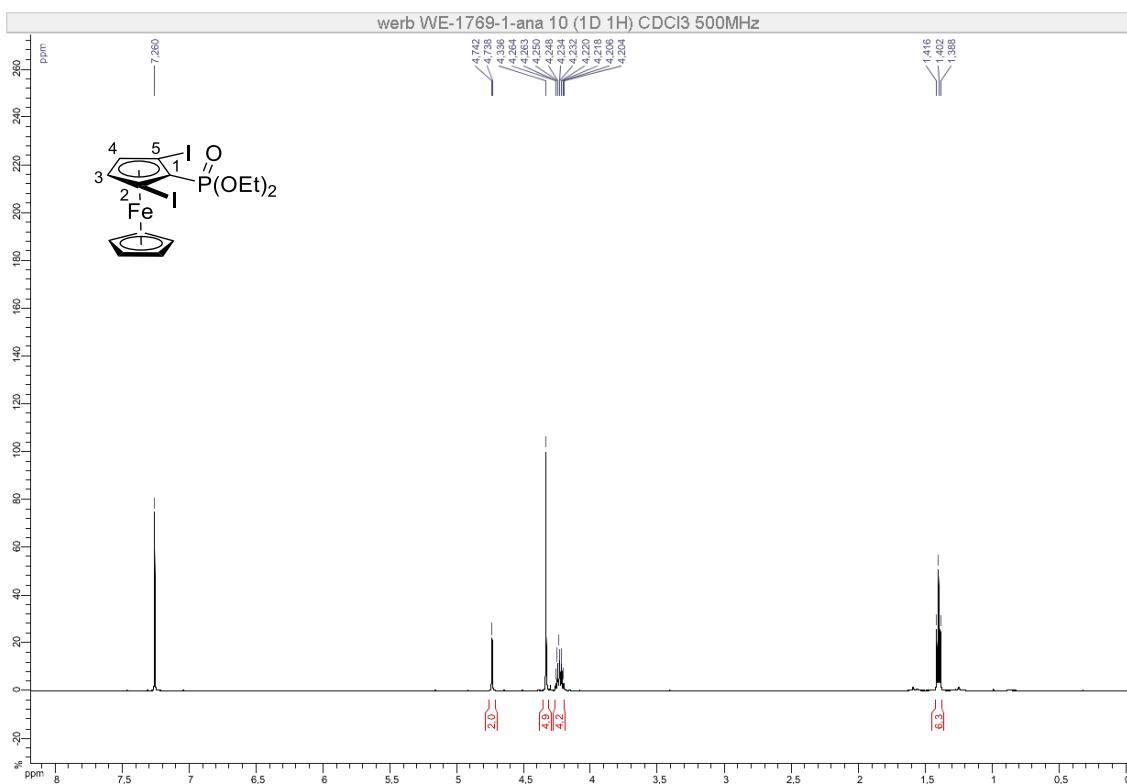


$^{31}\text{P}\{\text{H}\}$ NMR

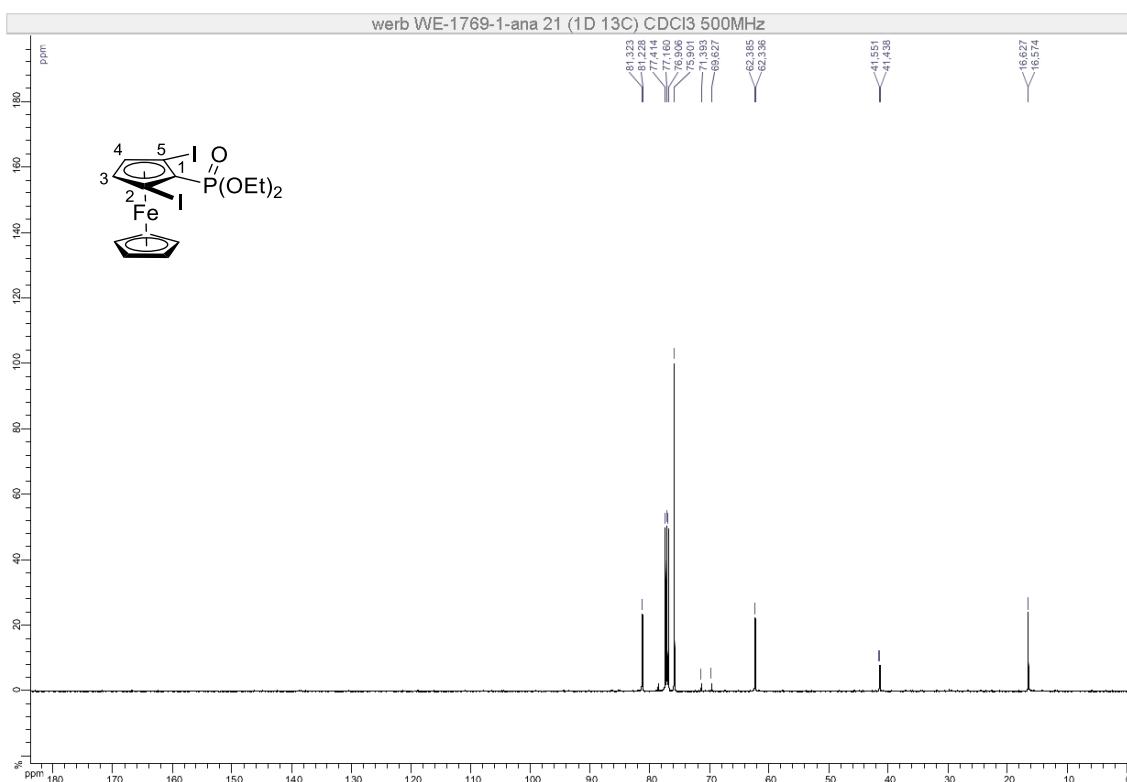


O,O-Diethyl-2,5-diiodoferrocenephosphonate (7a')

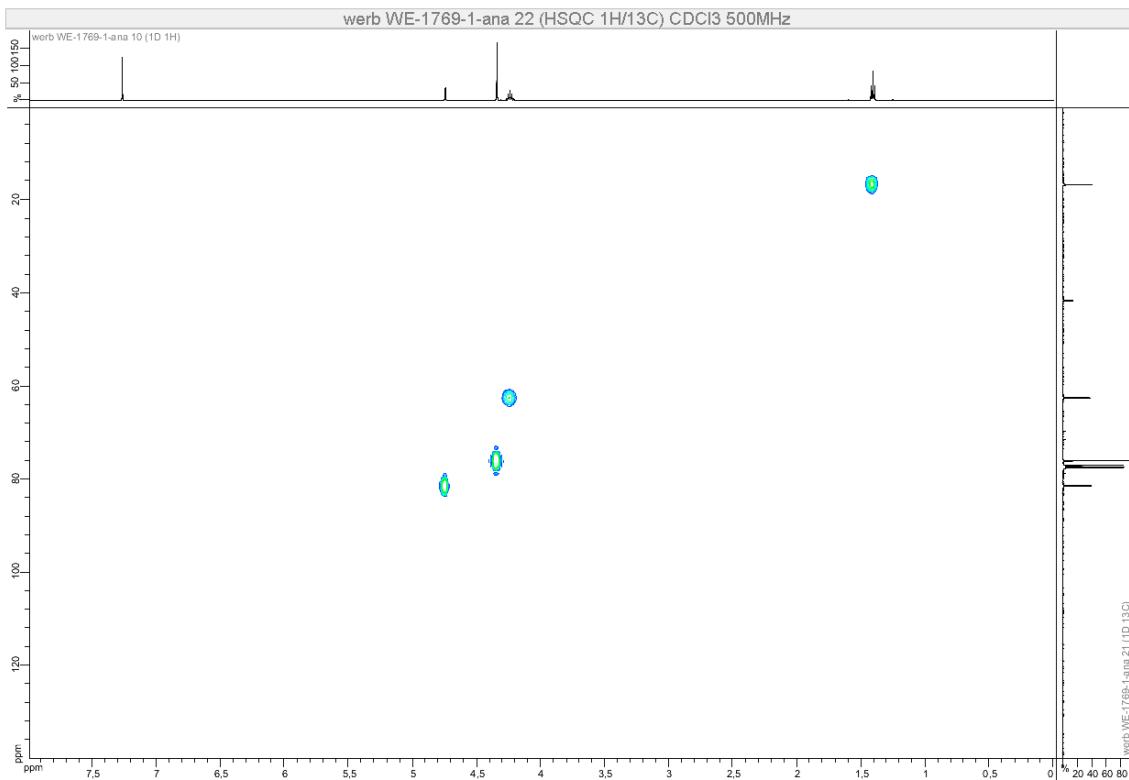
¹H NMR



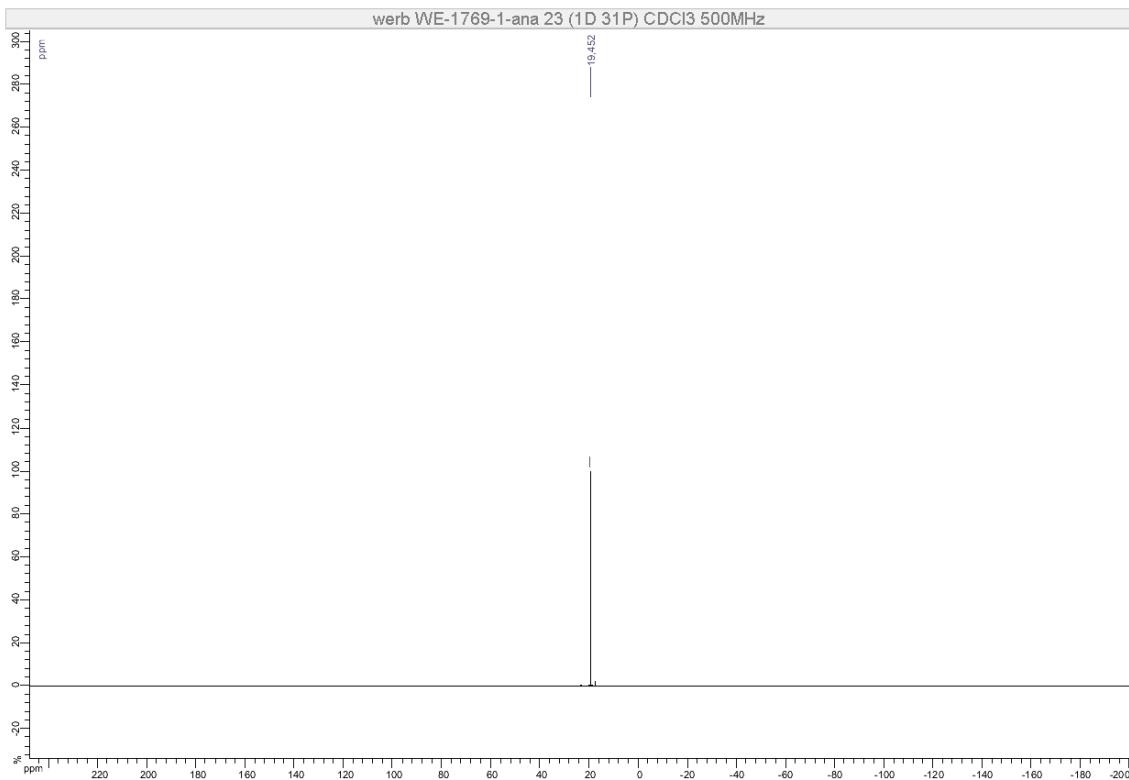
¹³C{¹H} NMR



HSQC NMR

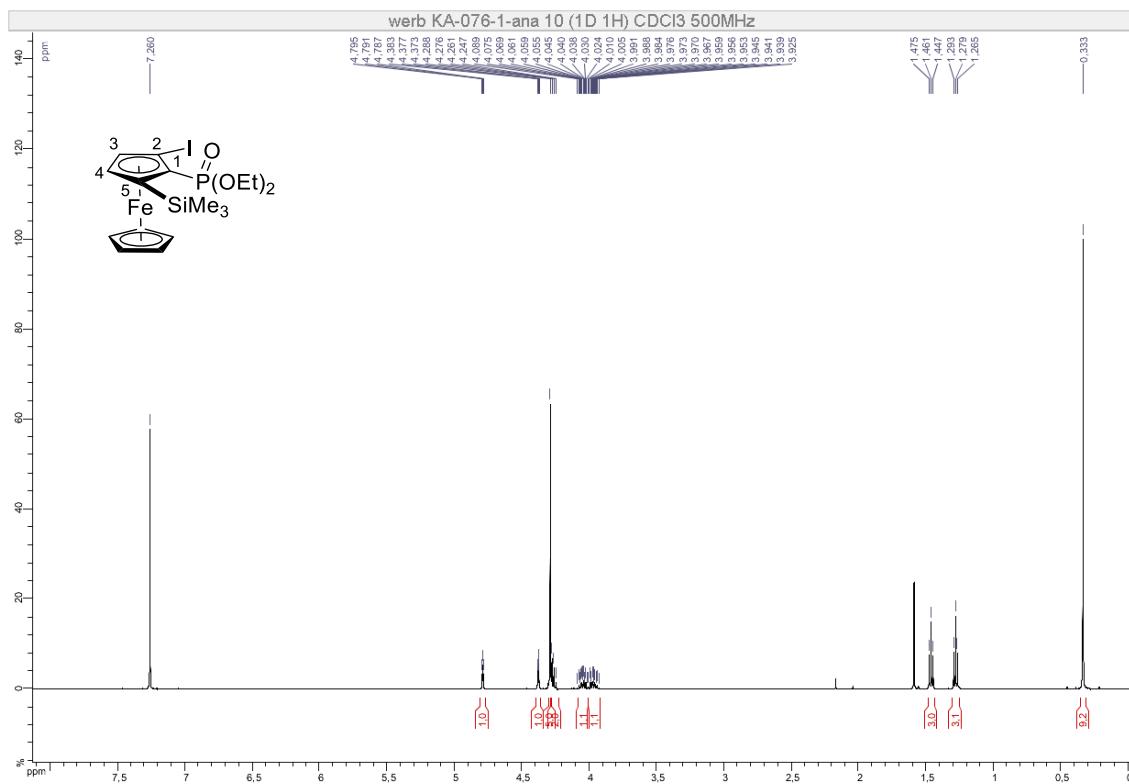


³¹P{¹H} NMR

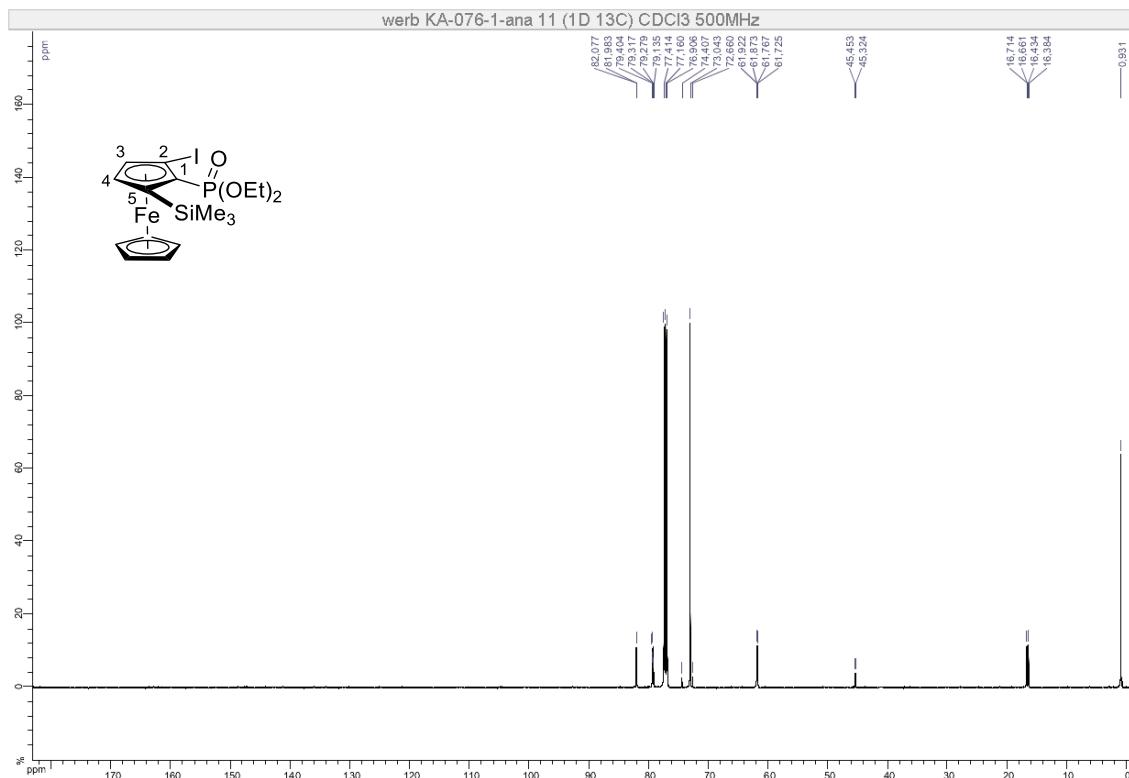


(\pm)-*O,O*-Diethyl-2-iodo-5-(trimethylsilyl)ferrocenephosphonate ((\pm)-8a)

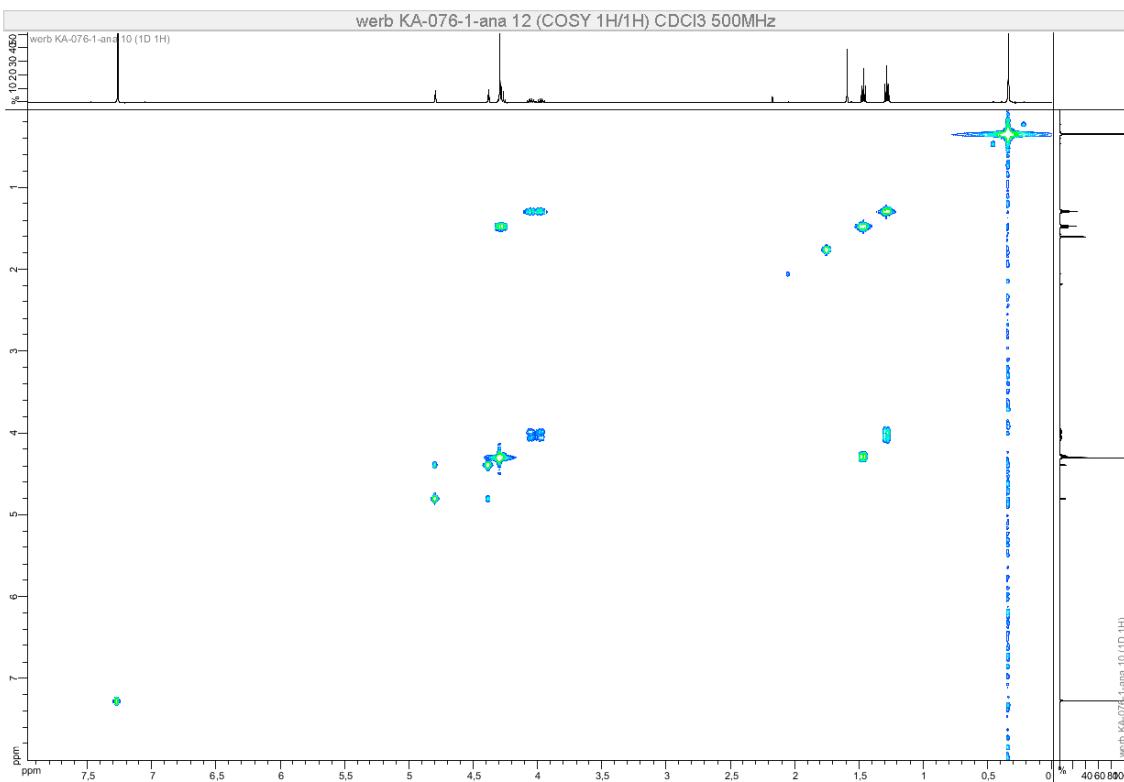
¹H NMR



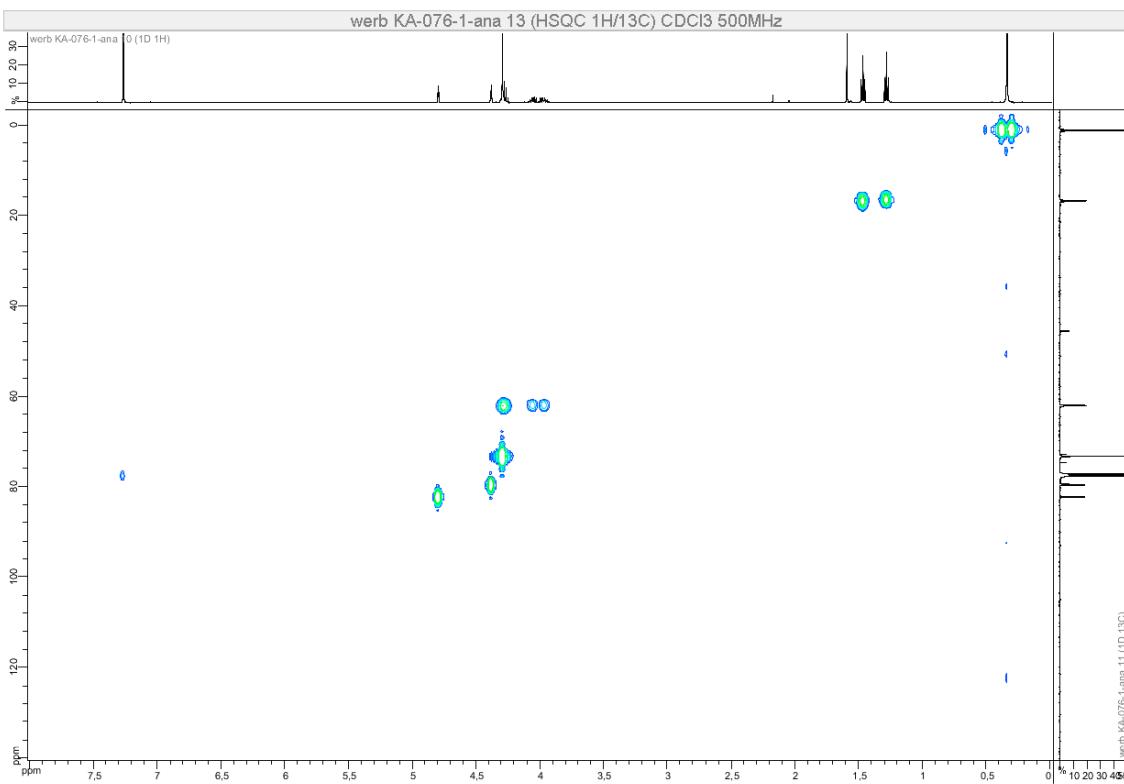
¹³C{¹H} NMR



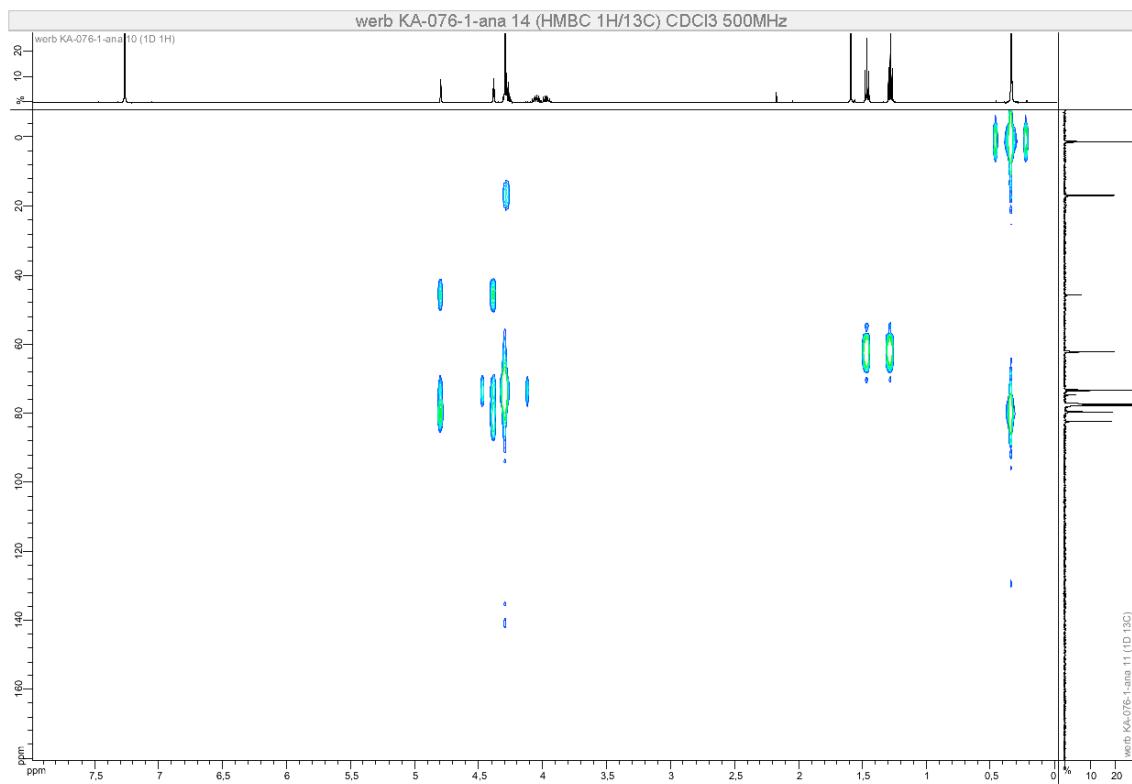
COSY NMR



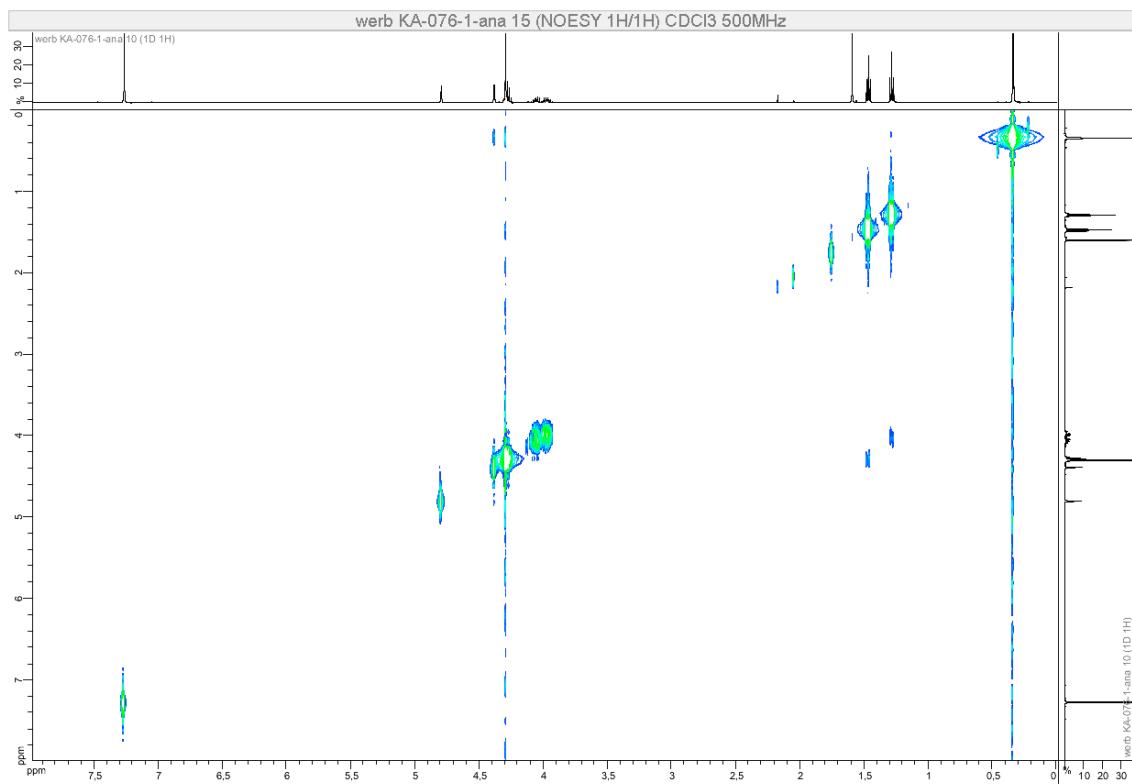
HSQC NMR



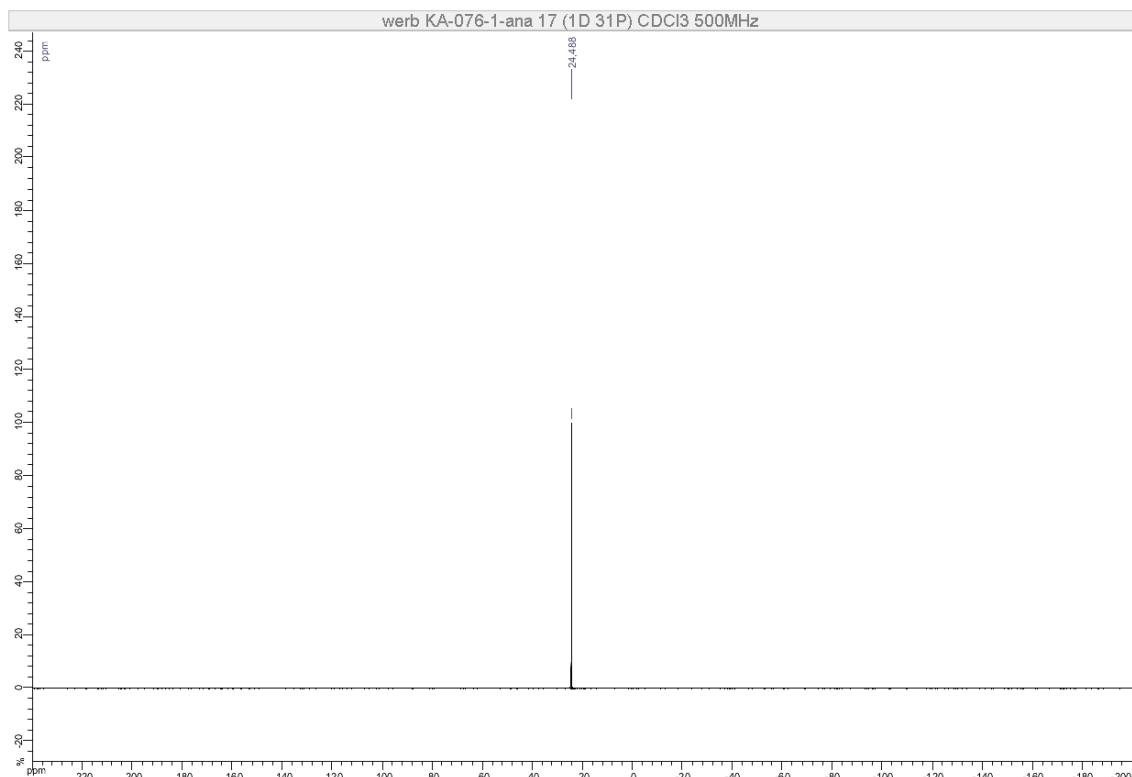
HMBC NMR



NOESY NMR

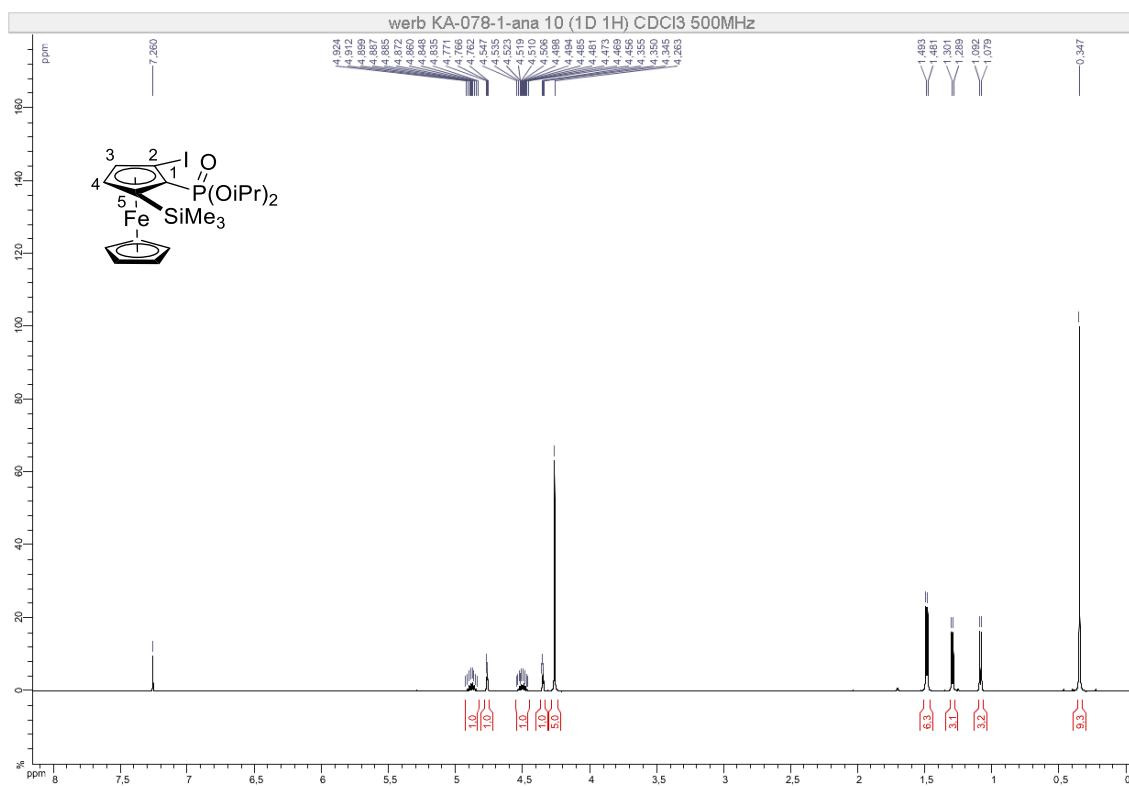


$^{31}\text{P}\{\text{H}\}$ NMR

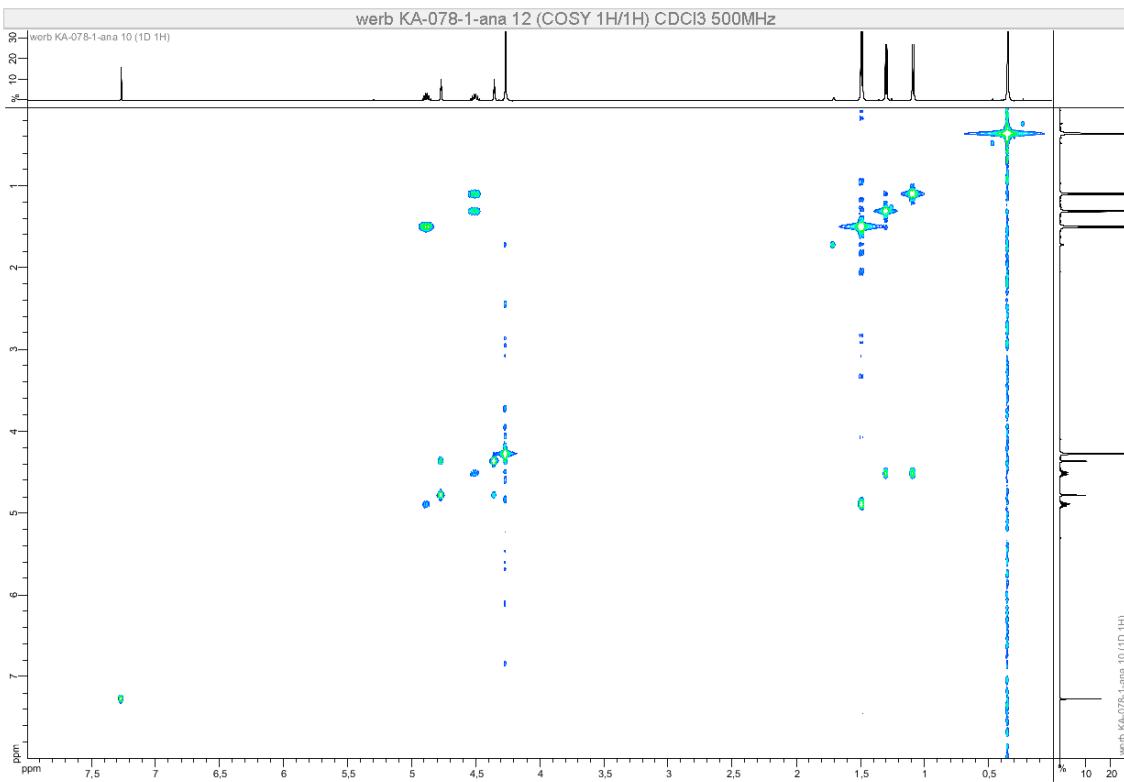


(\pm)-2-Iodo-*O,O*-diisopropyl-5-(trimethylsilyl)ferrocenephosphonate ((\pm)-8b)

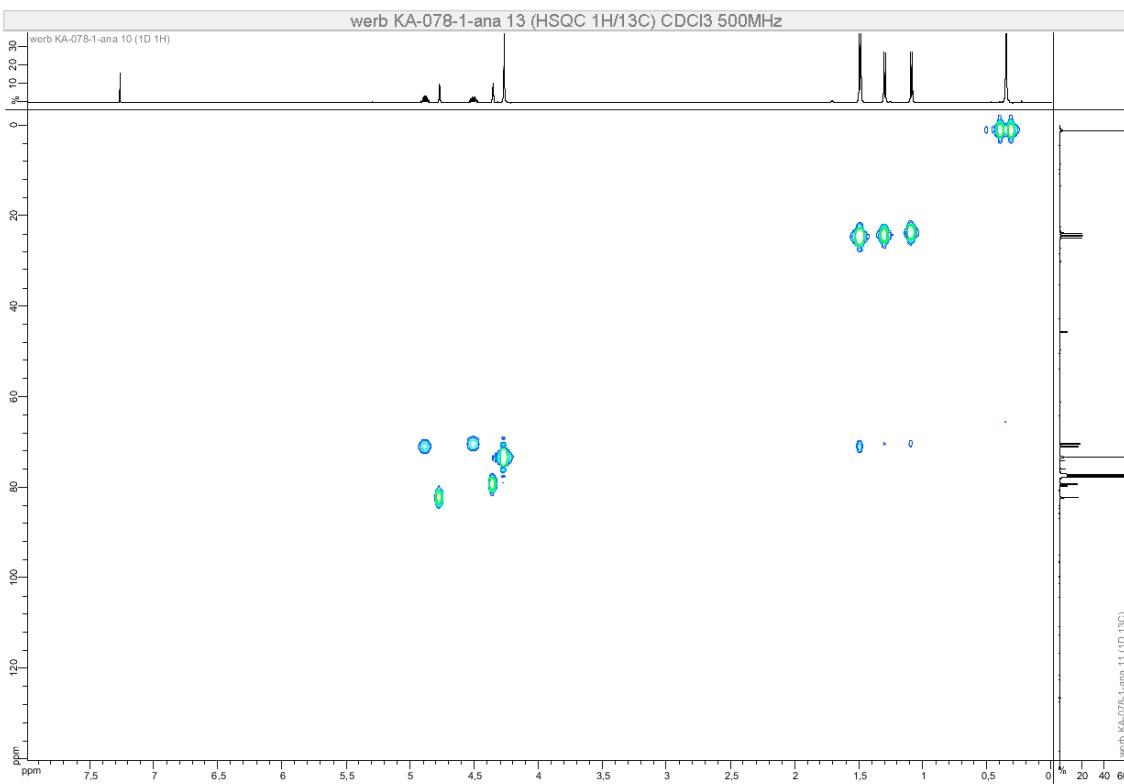
^1H NMR



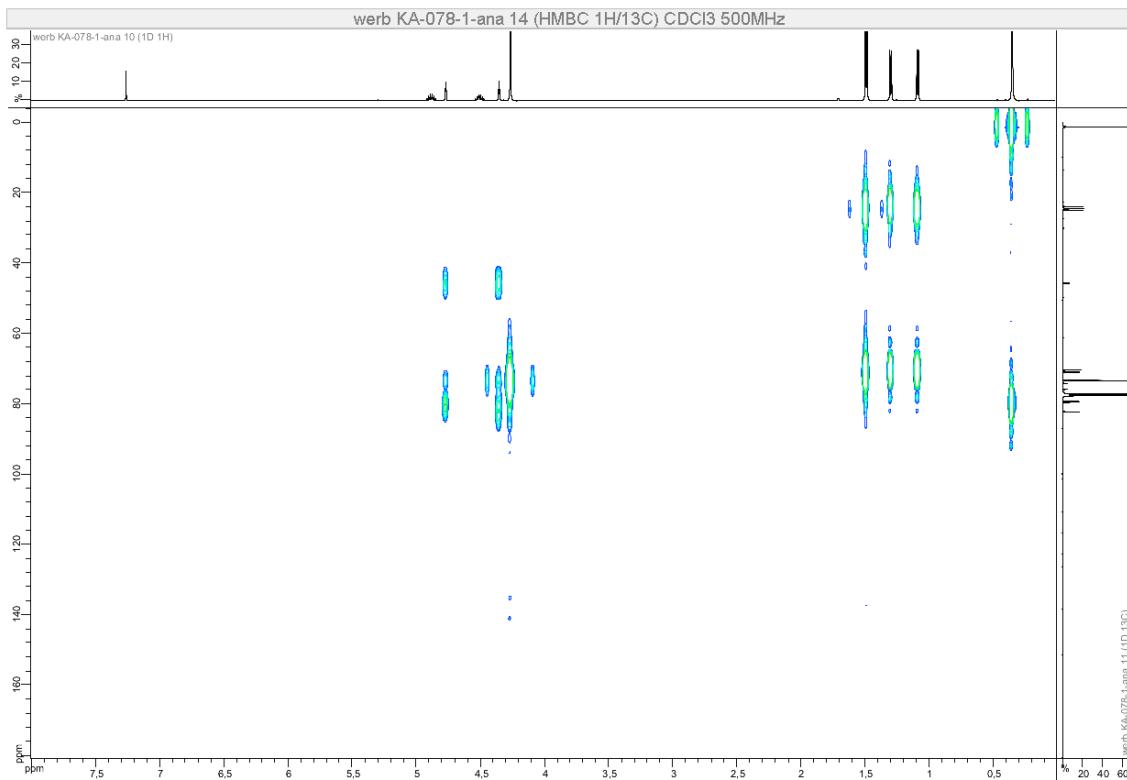
COSY NMR



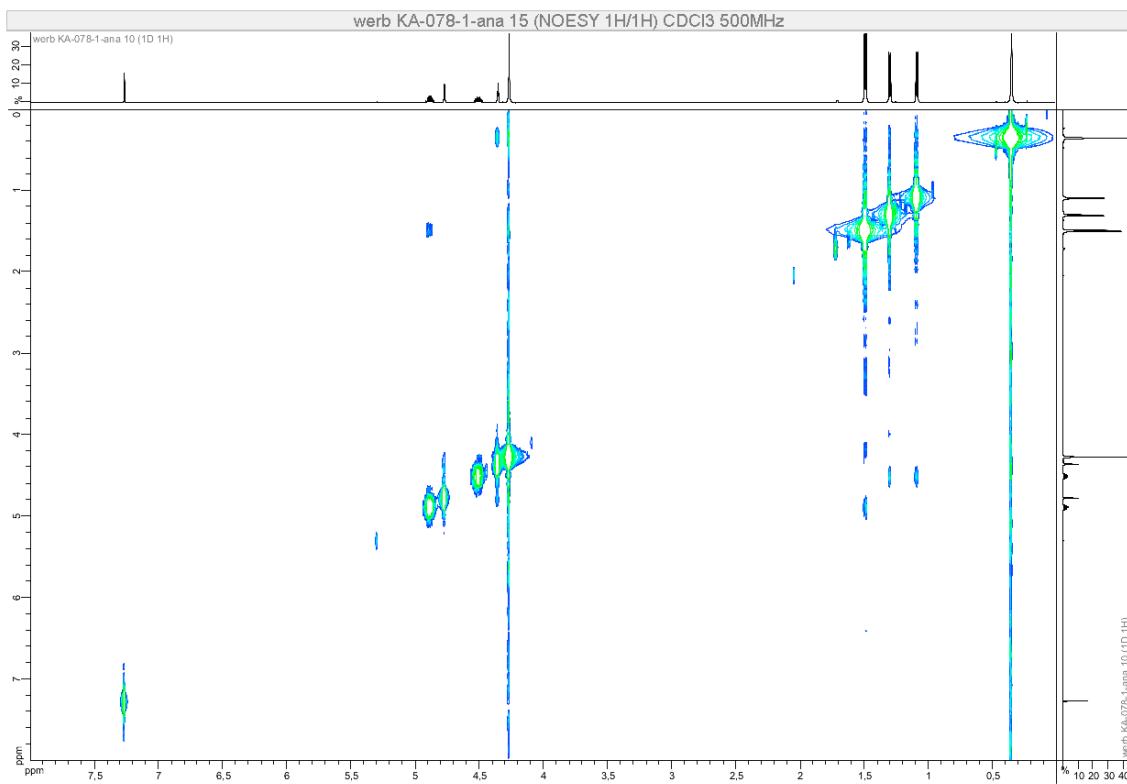
HSQC NMR



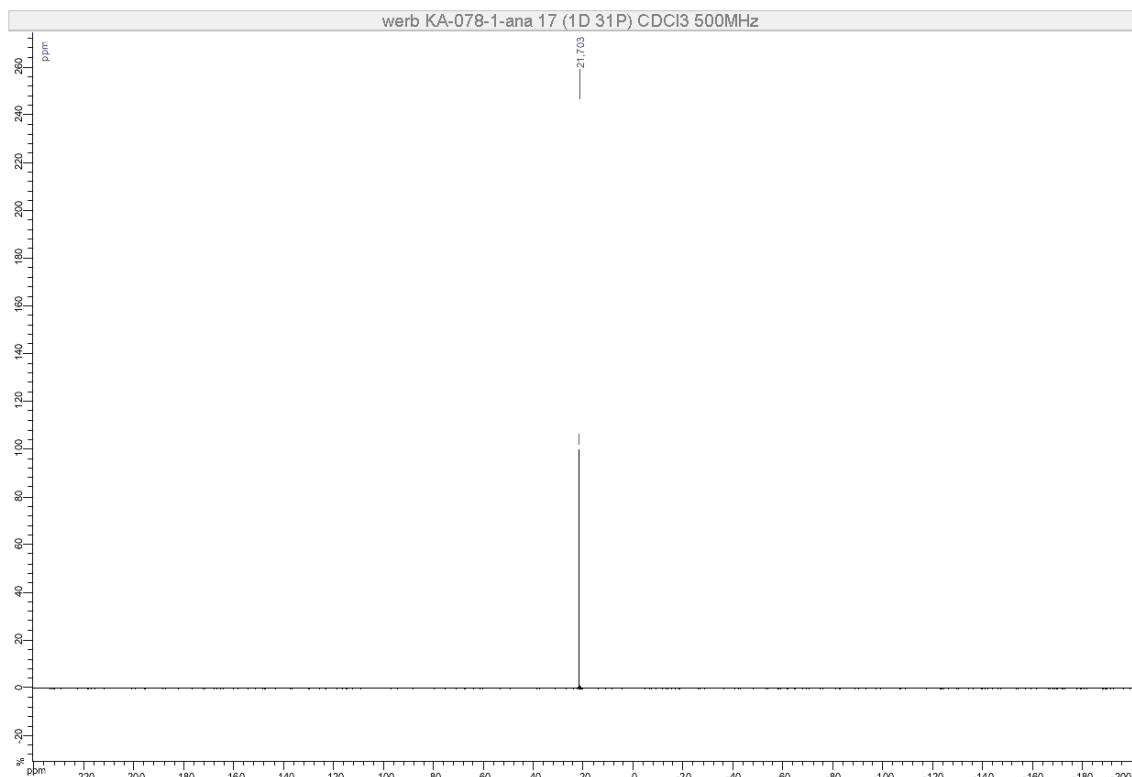
HMBC NMR



NOESY NMR

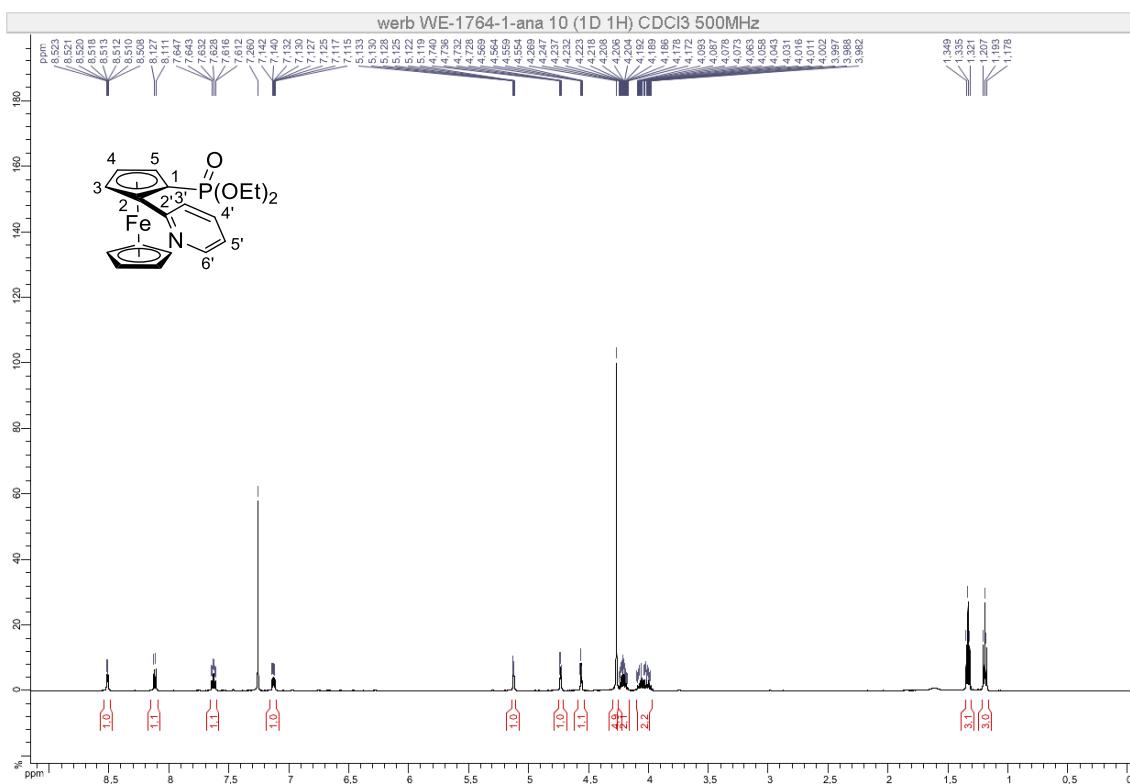


$^{31}\text{P}\{\text{H}\}$ NMR

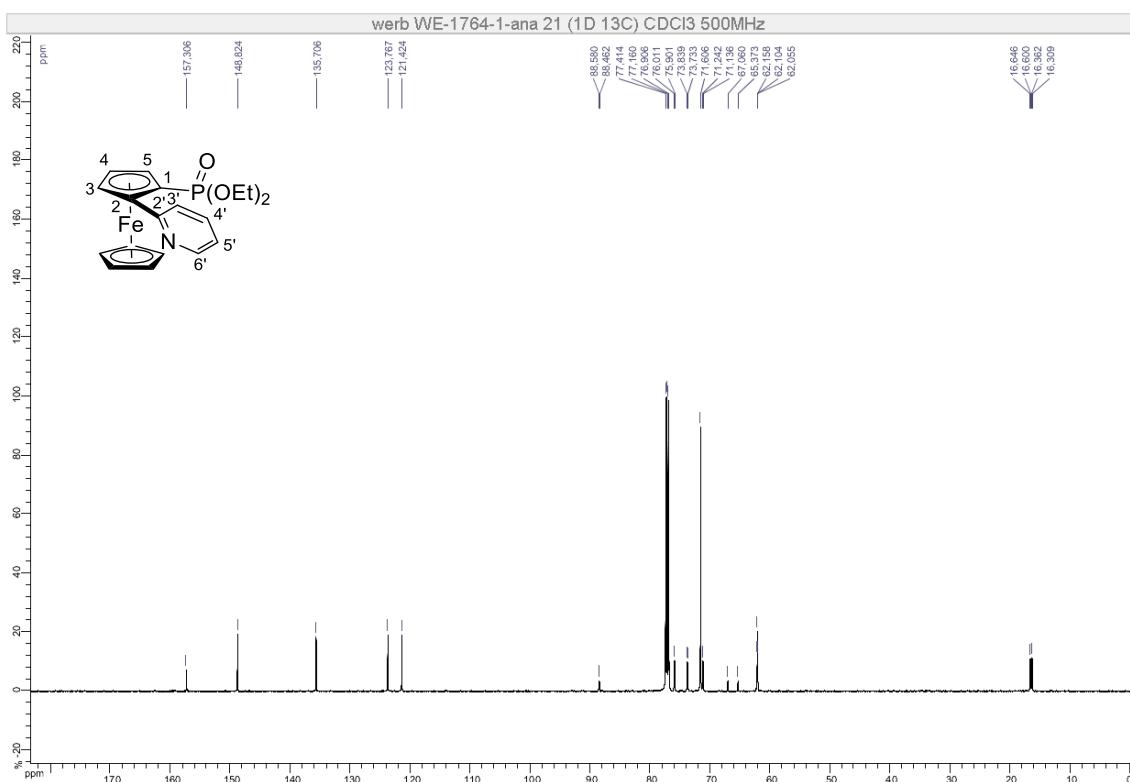


(\pm)-*O,O*-Diethyl-2-(2-pyridyl)ferrocenephosphonate ((\pm)-9a)

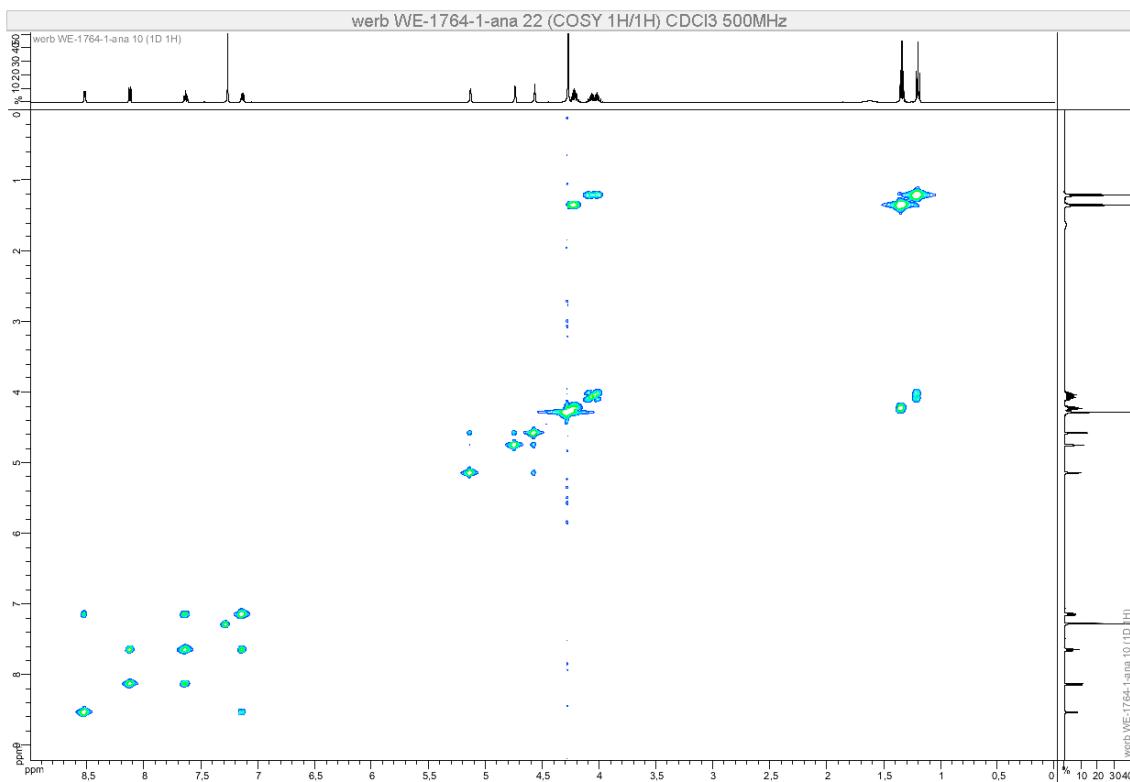
^1H NMR



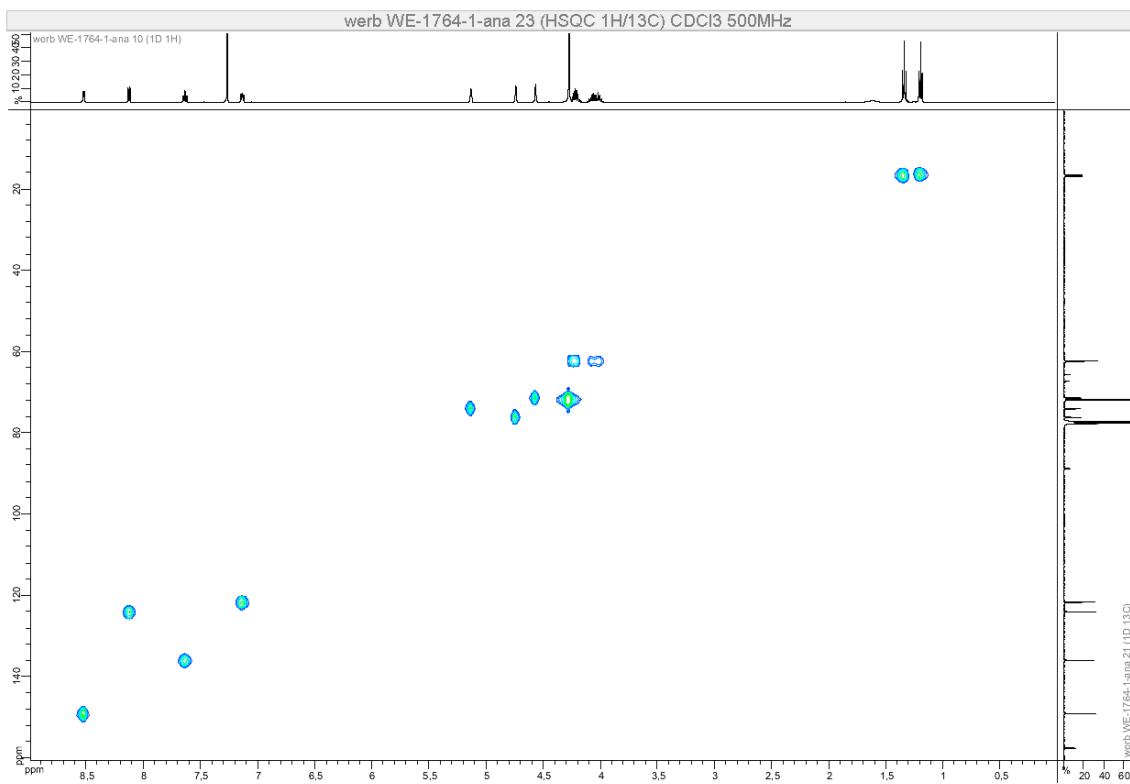
$^{13}\text{C}\{^1\text{H}\}$ NMR



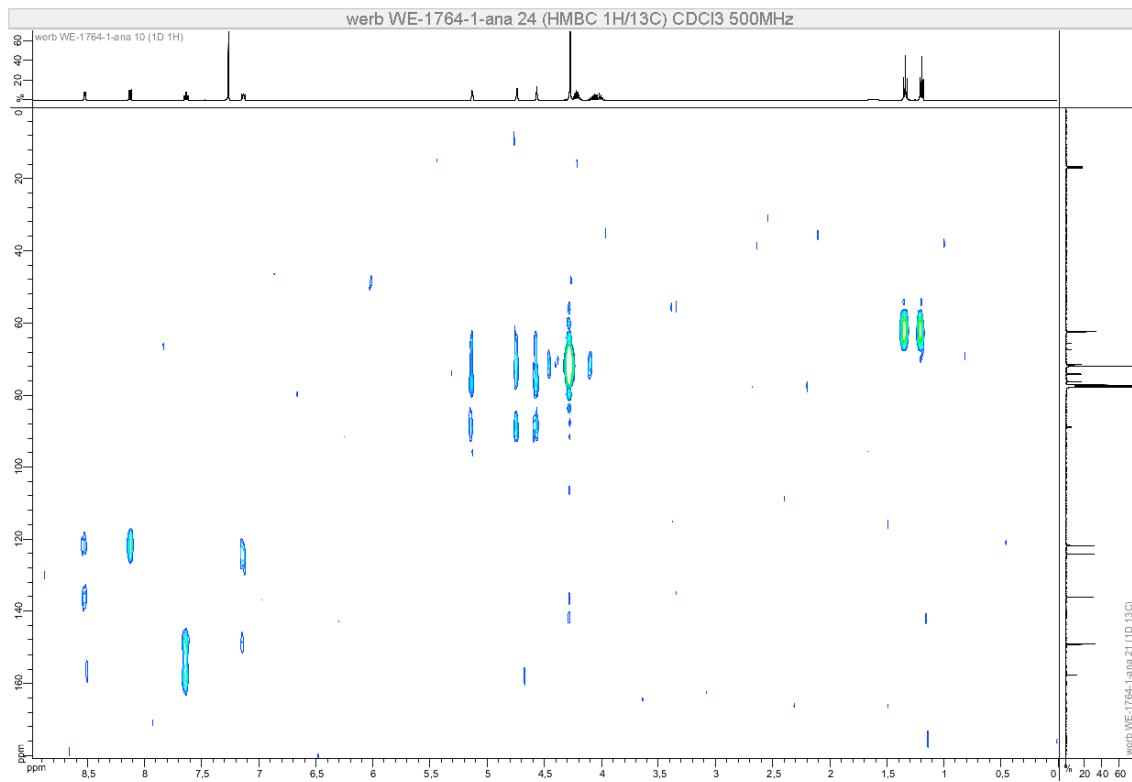
COSY NMR



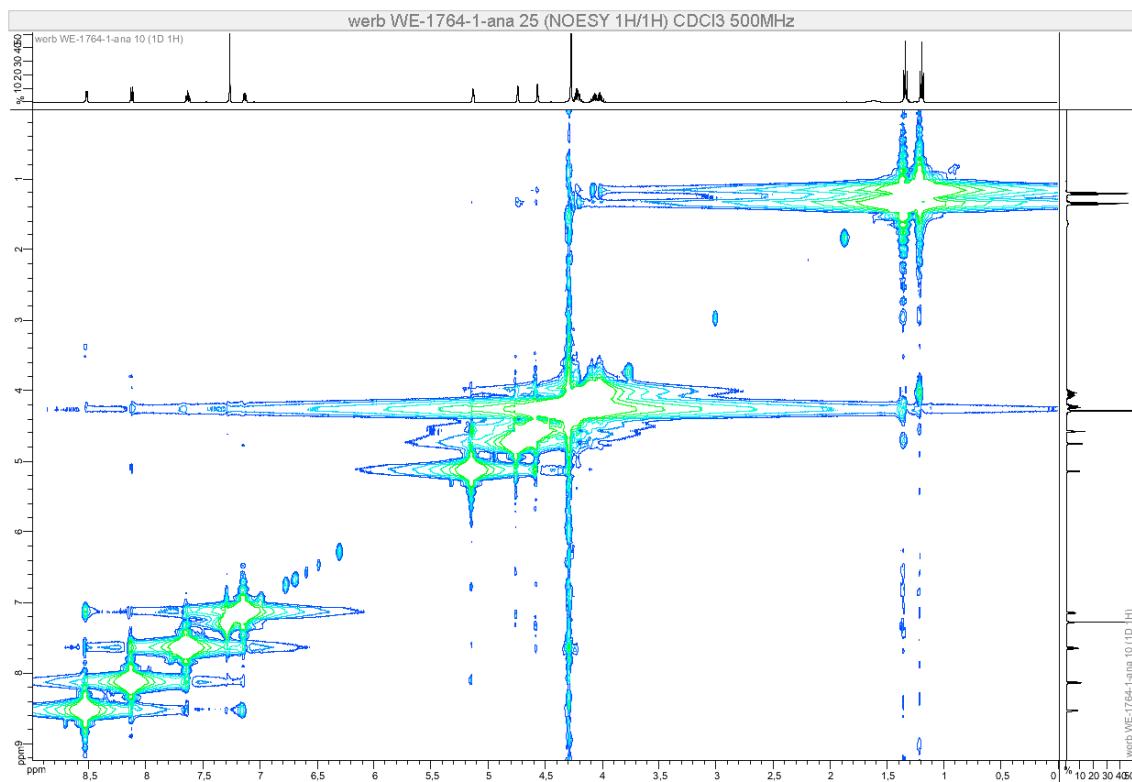
HSQC NMR



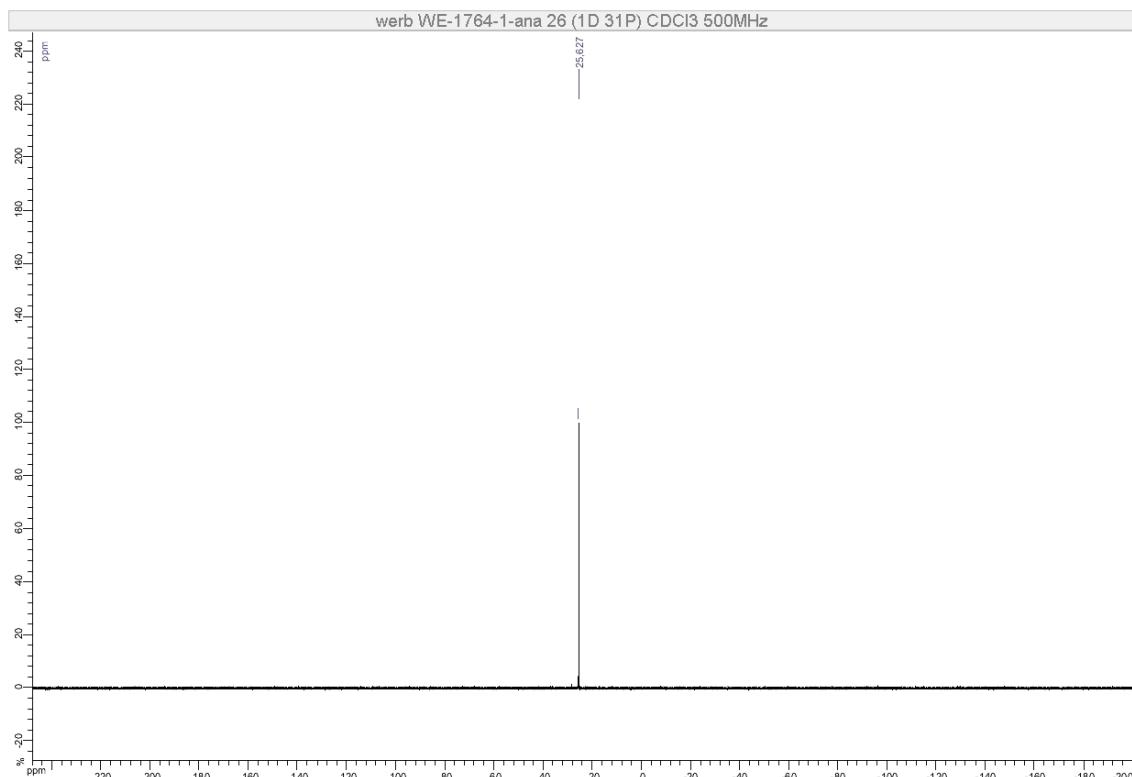
HMBC NMR



NOESY NMR

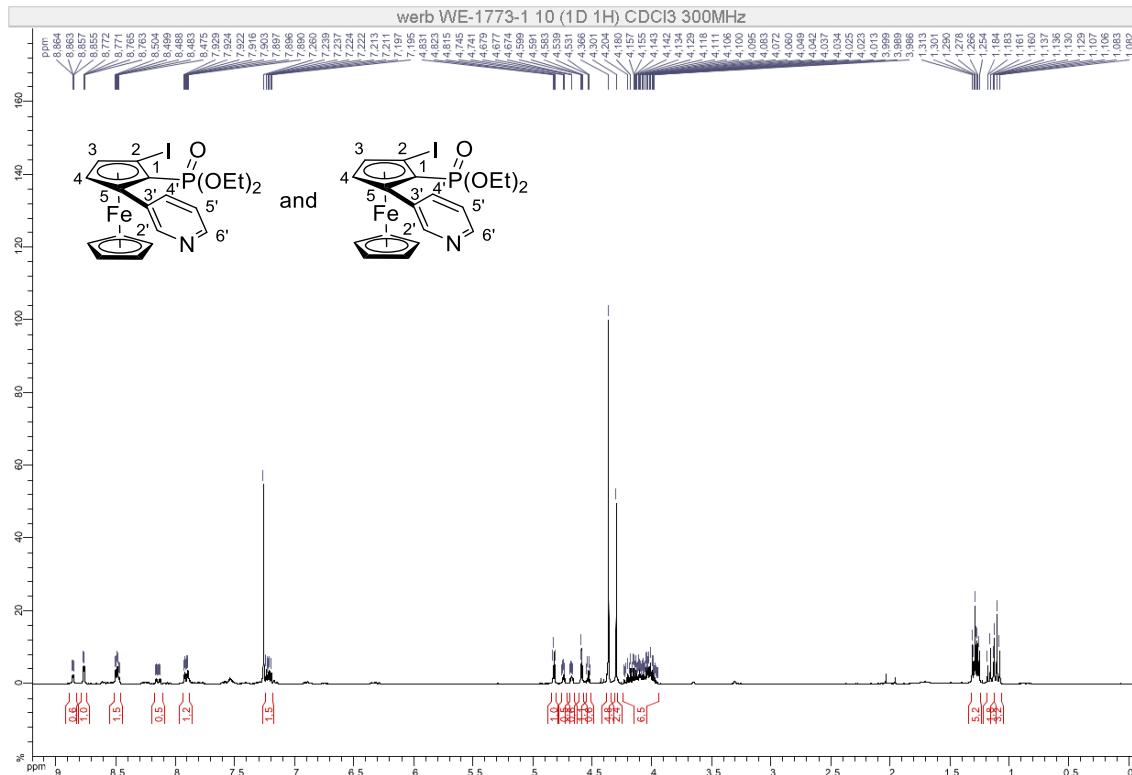


$^{31}\text{P}\{\text{H}\}$ NMR

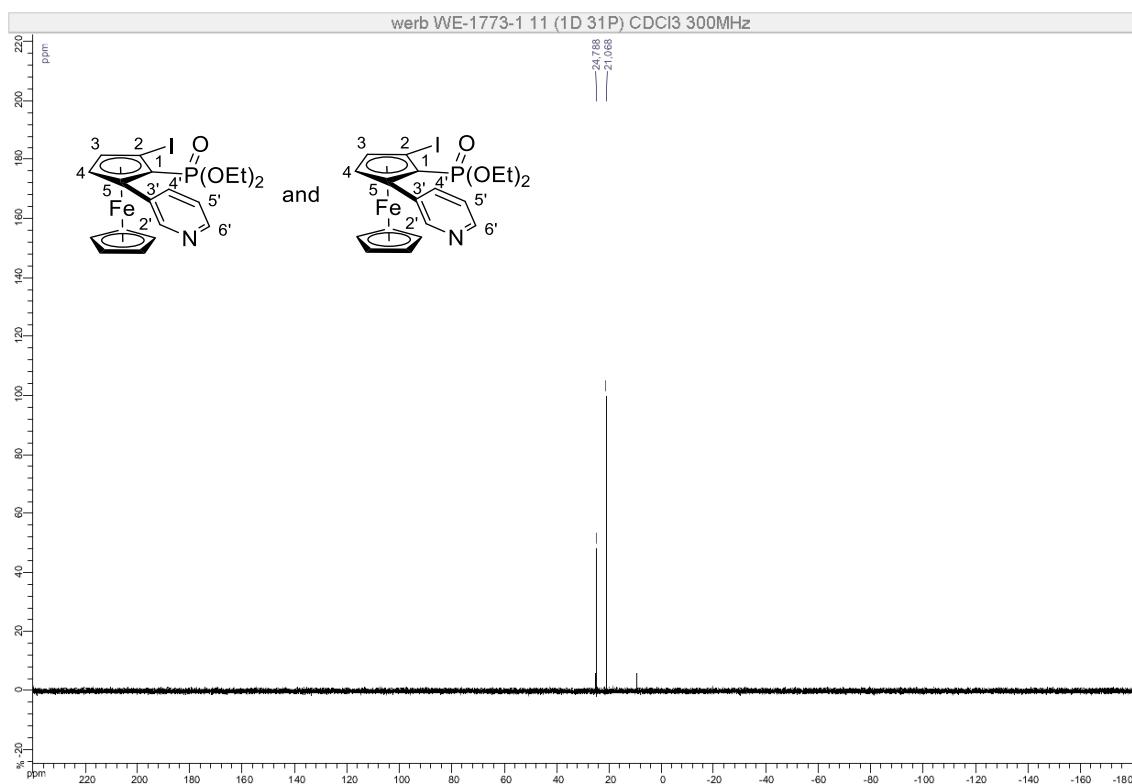


(\pm)-*O,O*-Diethyl-2-iodo-5-(2-pyridyl)ferrocenephosphonate ((\pm)-10aI), as a 67:33 mixture with the corresponding deiodinated product ((\pm)-10aH)

¹H NMR

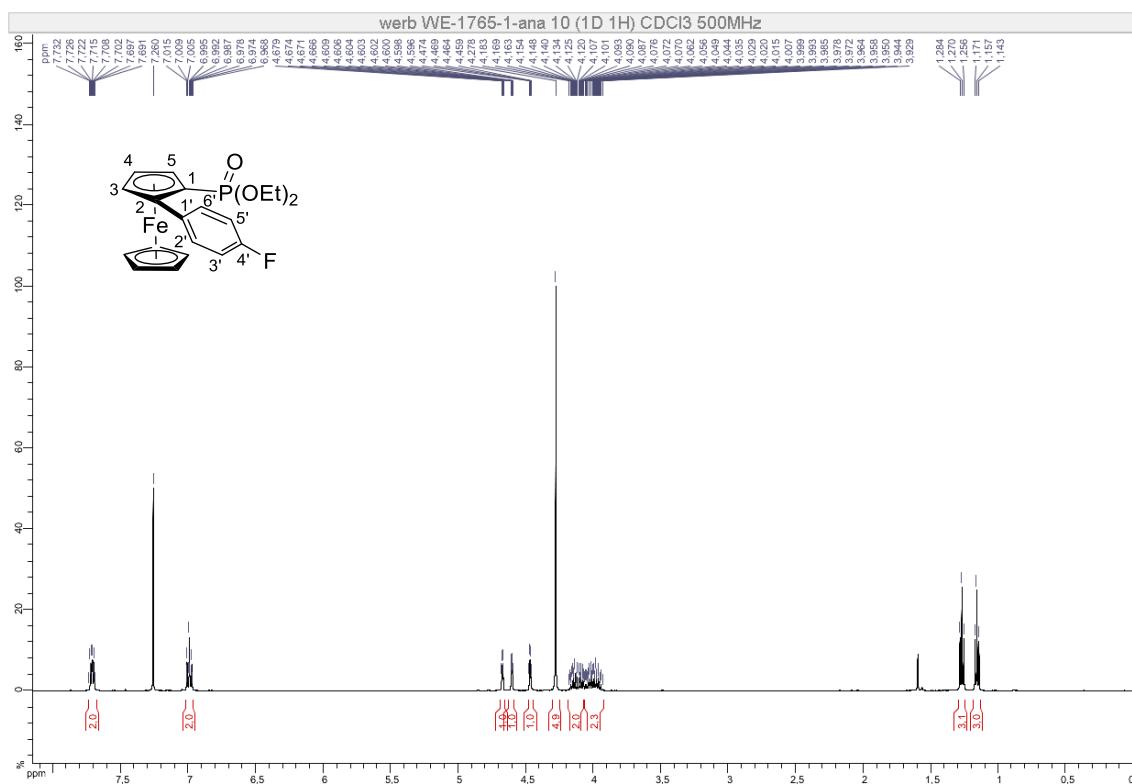


³¹P{¹H} NMR

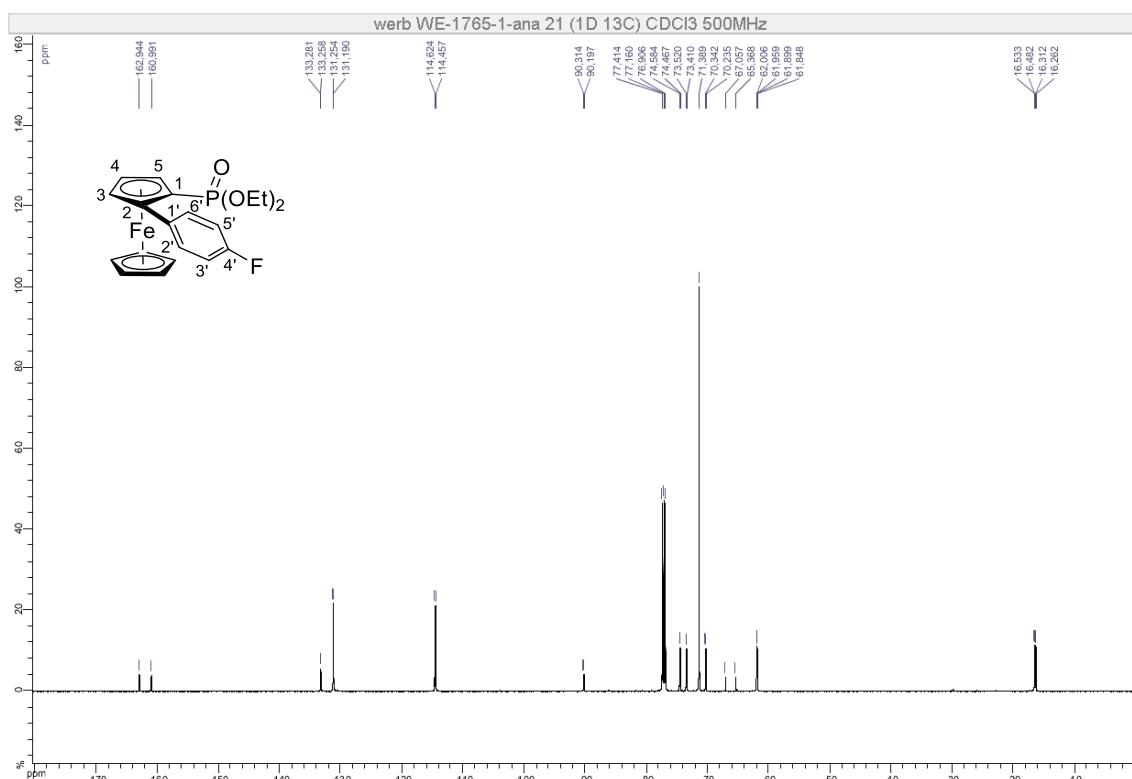


(\pm)-*O,O*-Diethyl-2-(4-fluorophenyl)ferrocenephosphonate ((\pm)-11a)

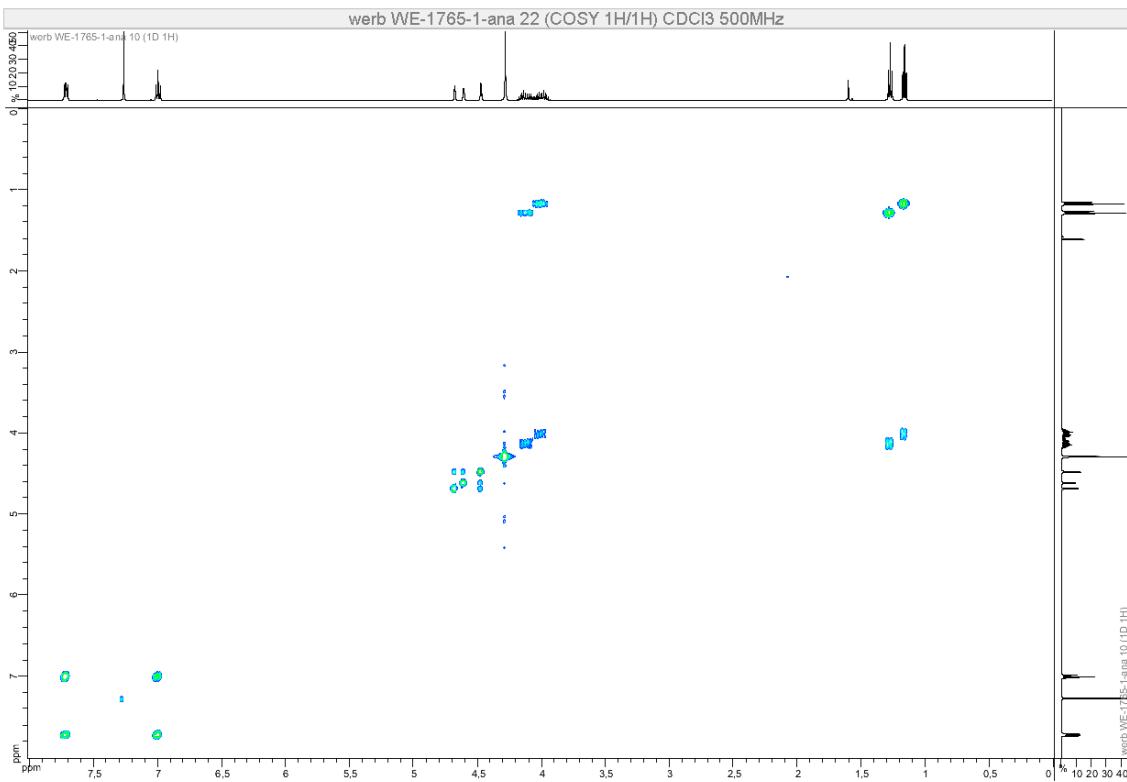
^1H NMR



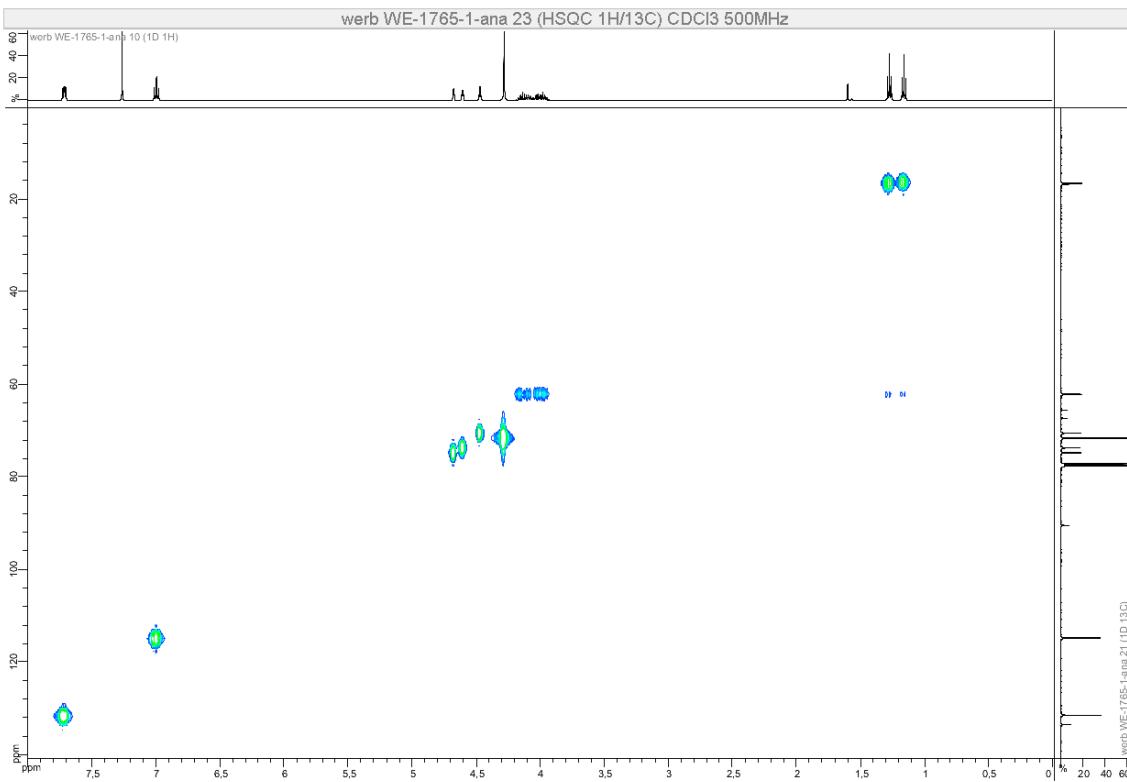
$^{13}\text{C}\{^1\text{H}\}$ NMR



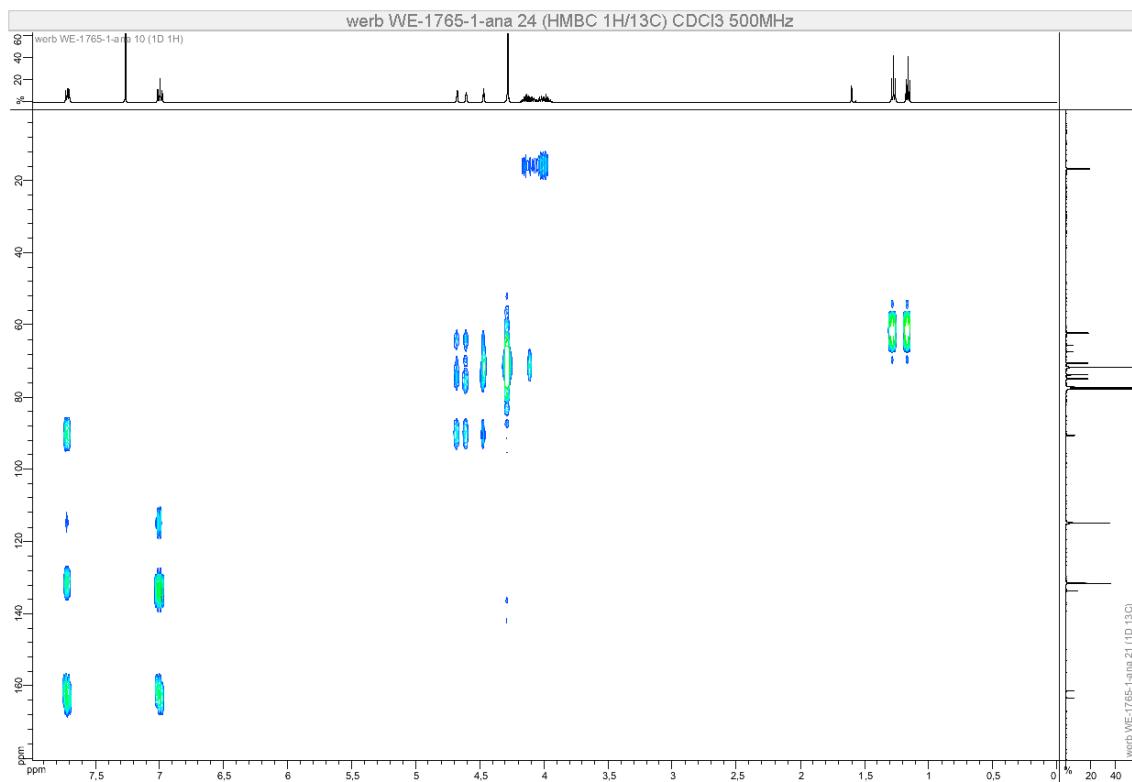
COSY NMR



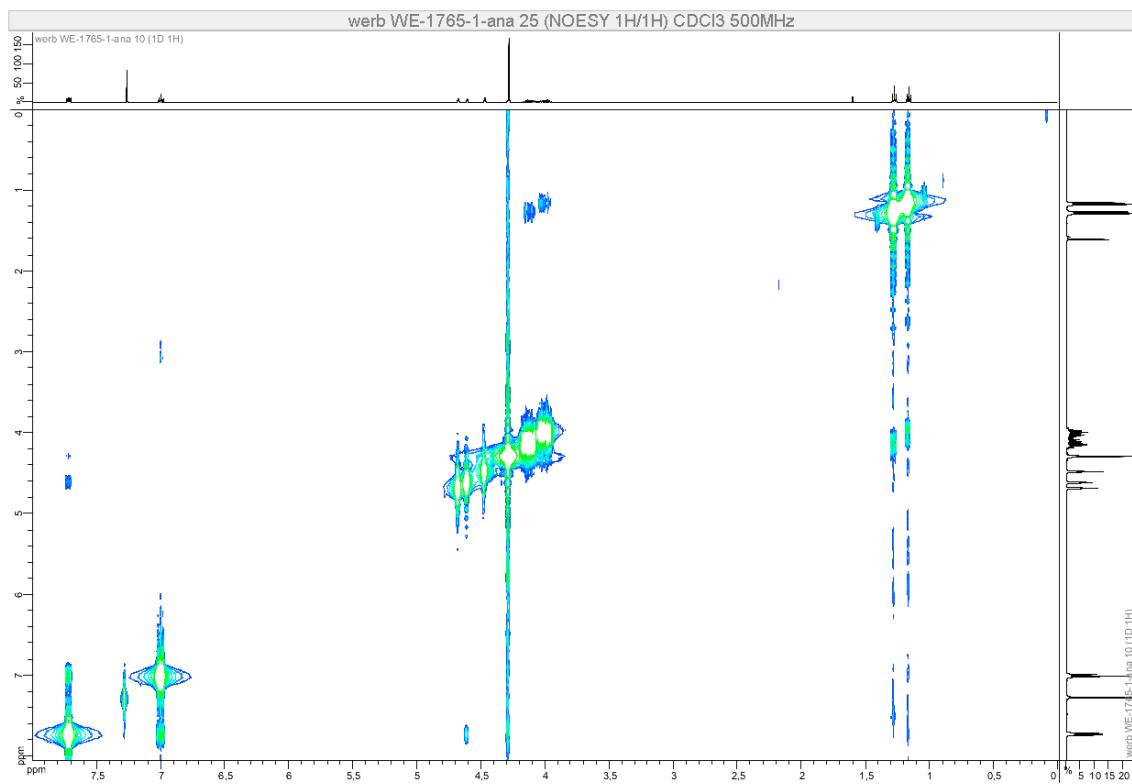
HSQC NMR



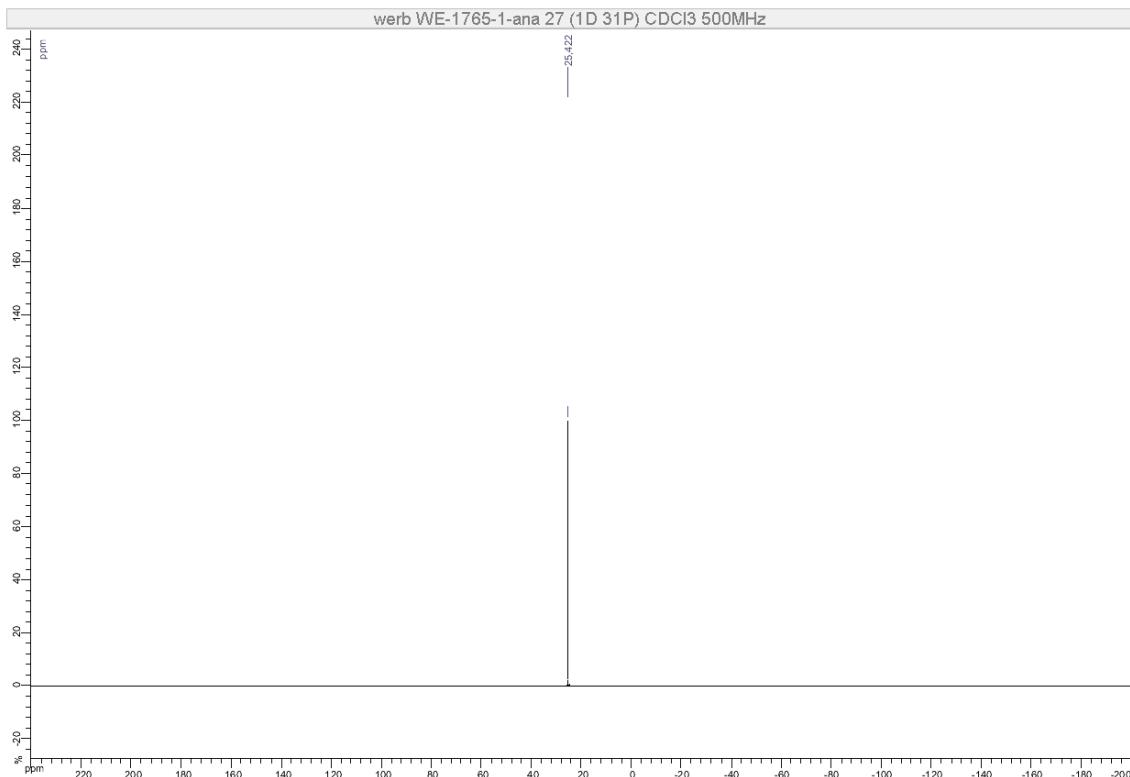
HMBC NMR



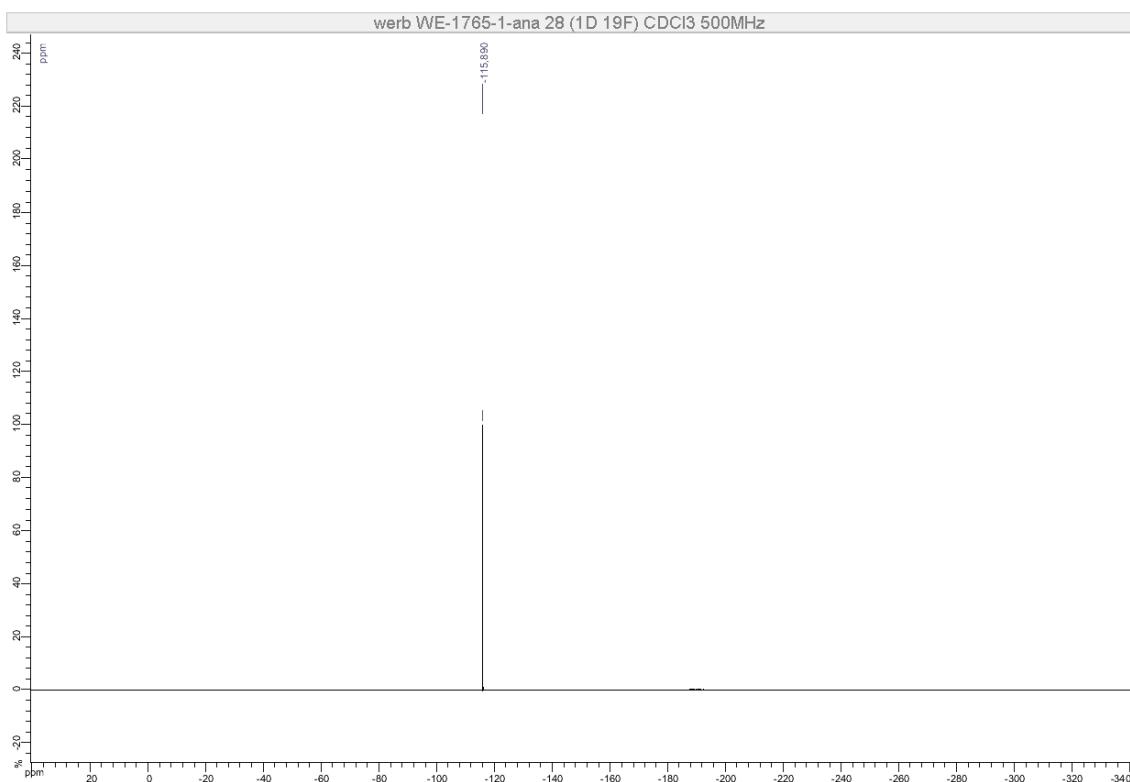
NOESY NMR



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

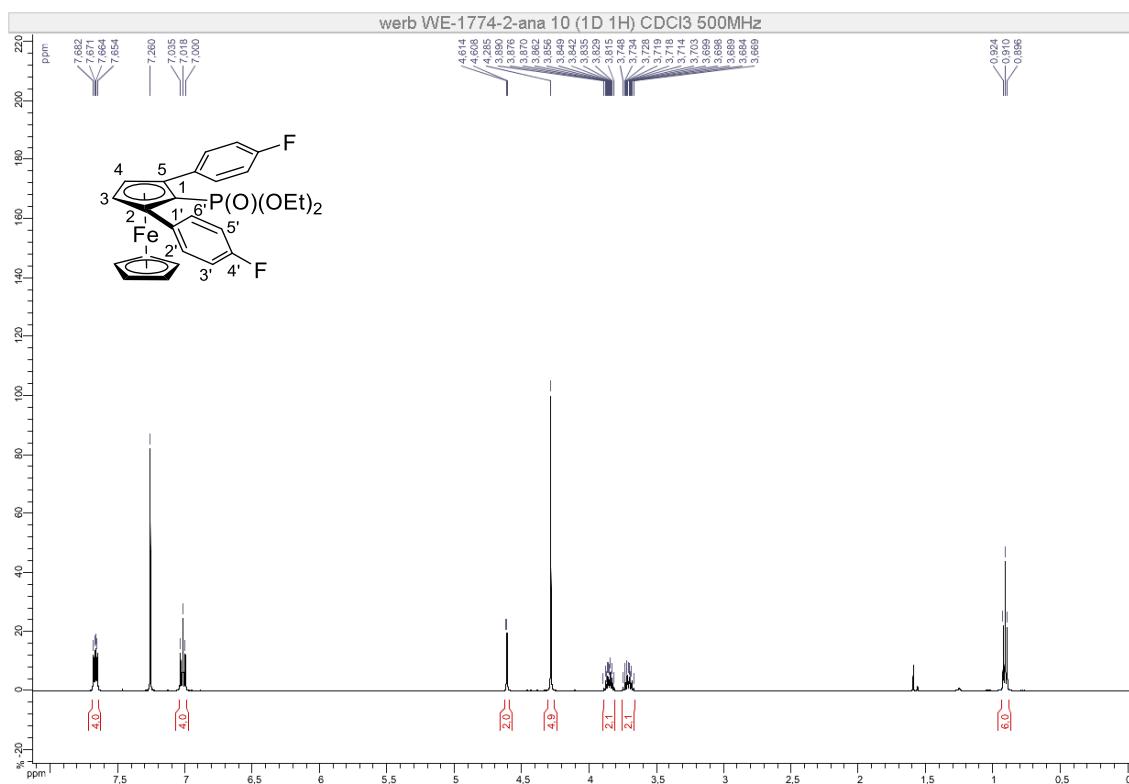


$^{19}\text{F}\{\text{H}\}$ NMR

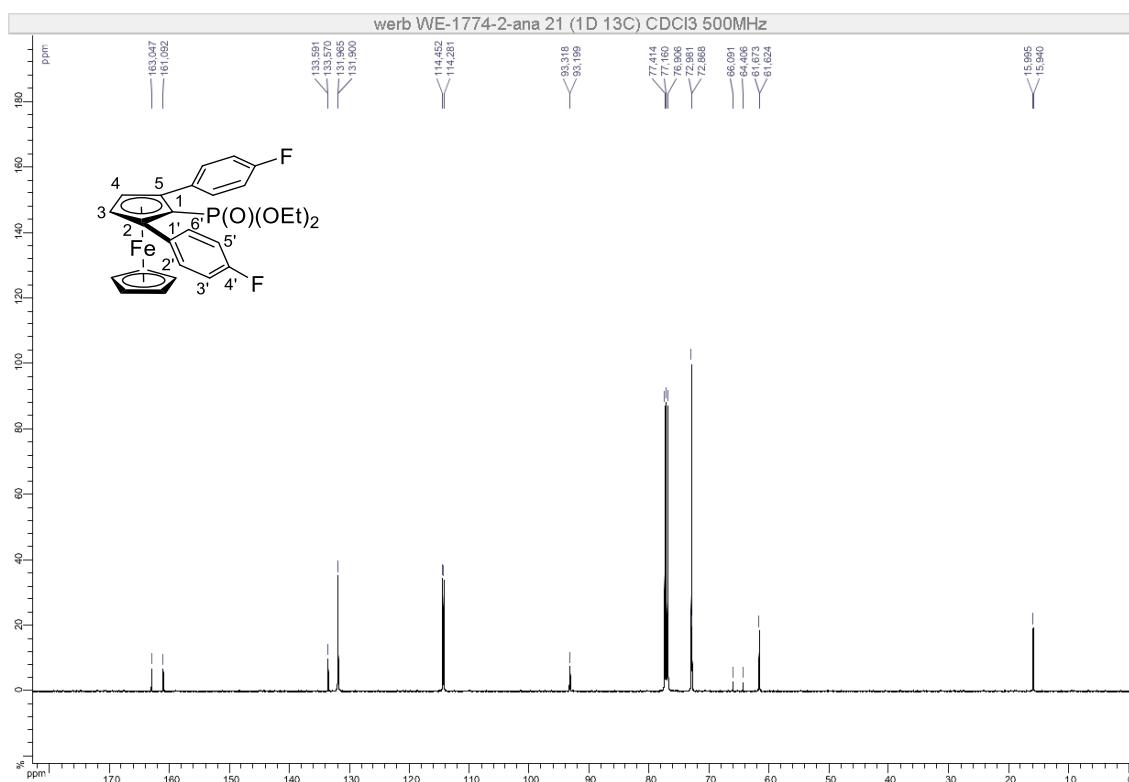


O,O-Diethyl-2,5-di(4-fluorophenyl)ferrocenephosphonate (12a)

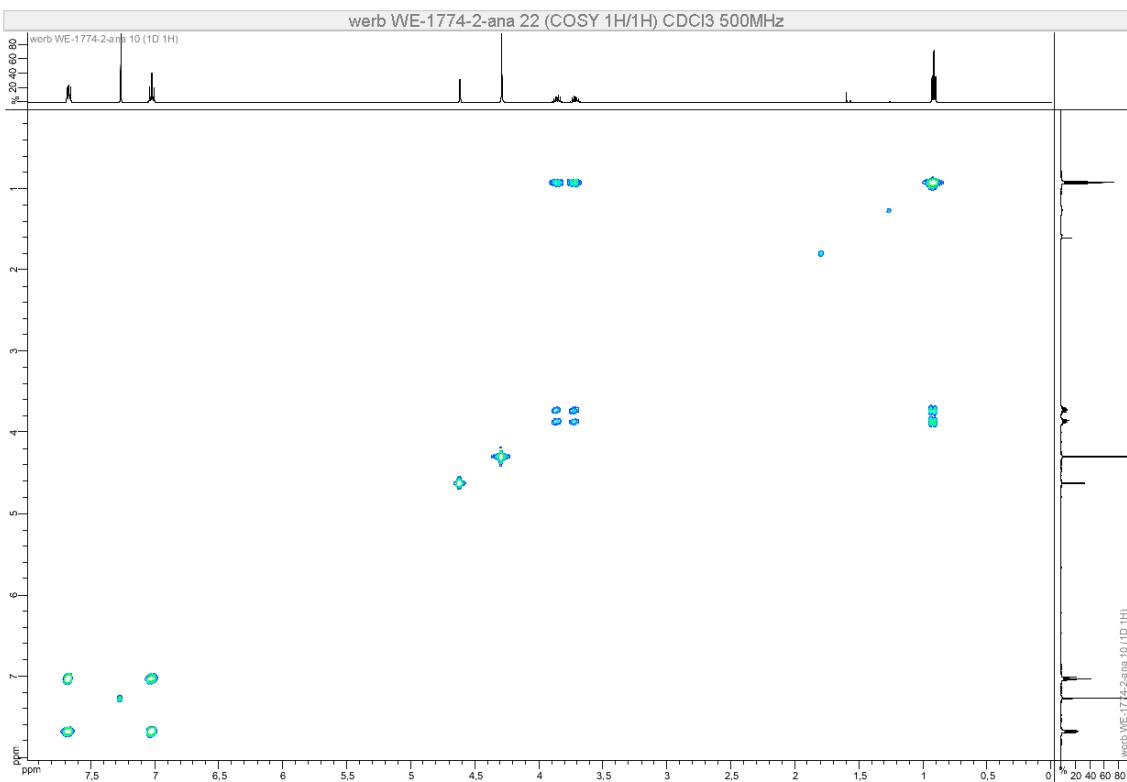
¹H NMR



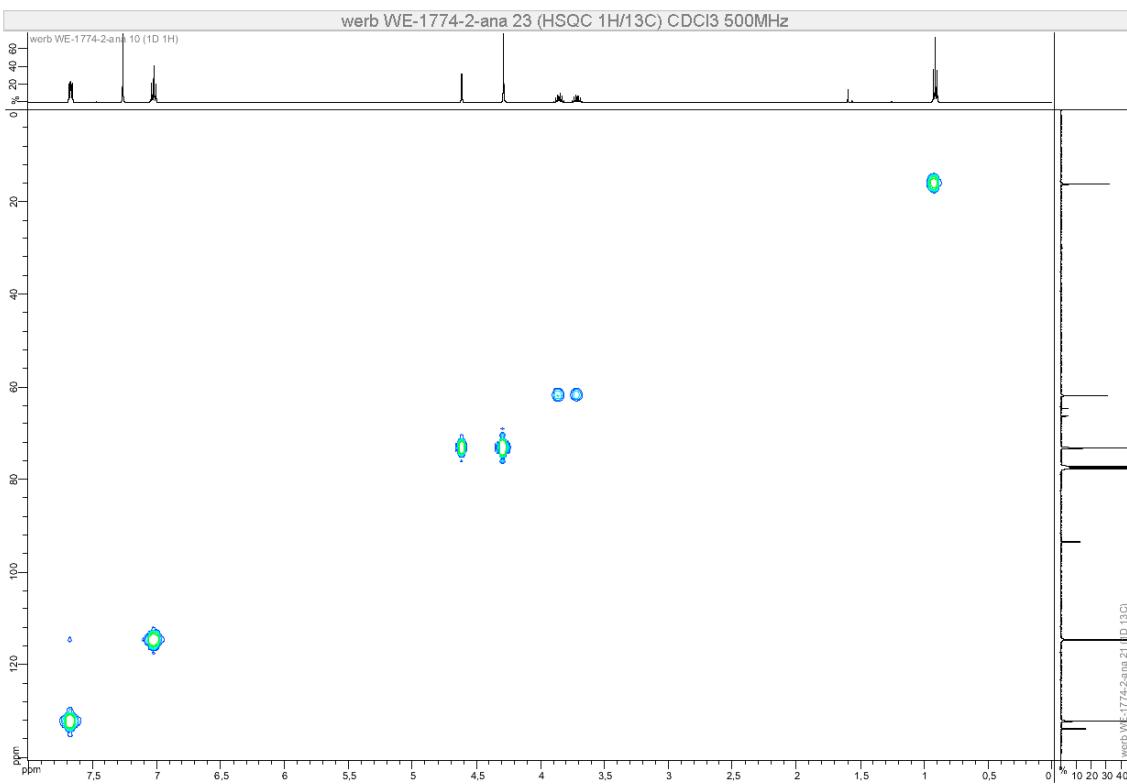
¹³C{¹H} NMR



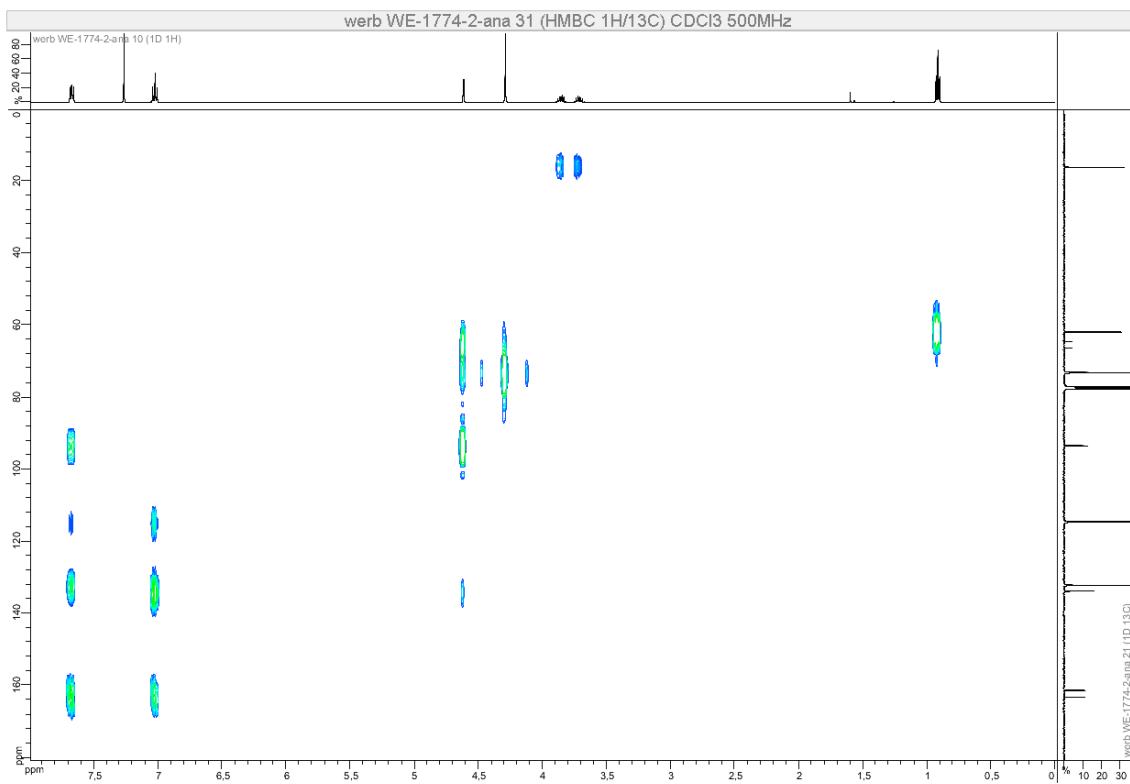
COSY NMR



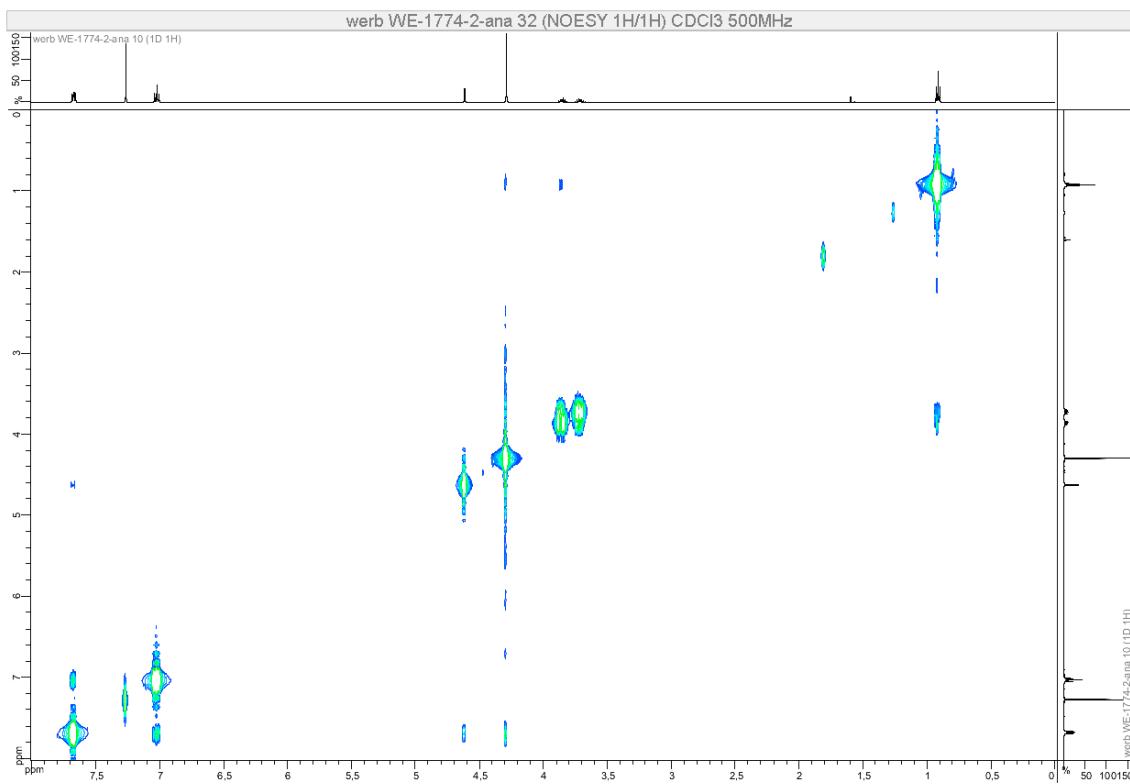
HSQC NMR



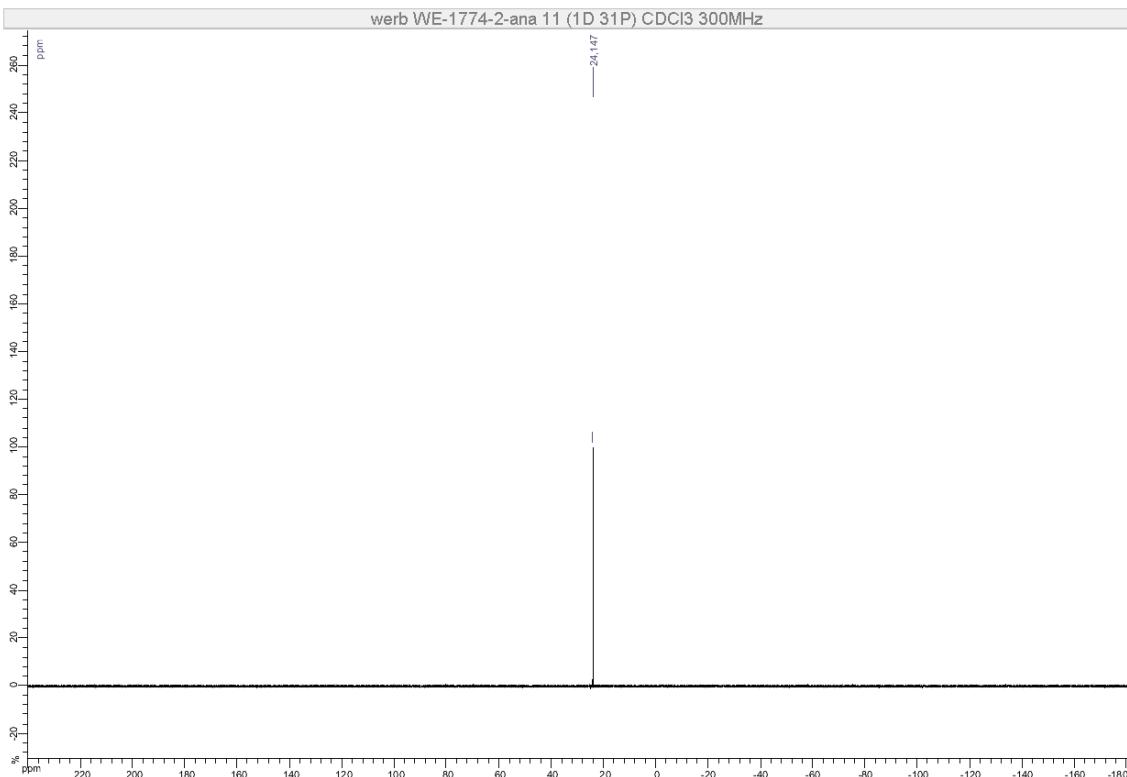
HMBC NMR



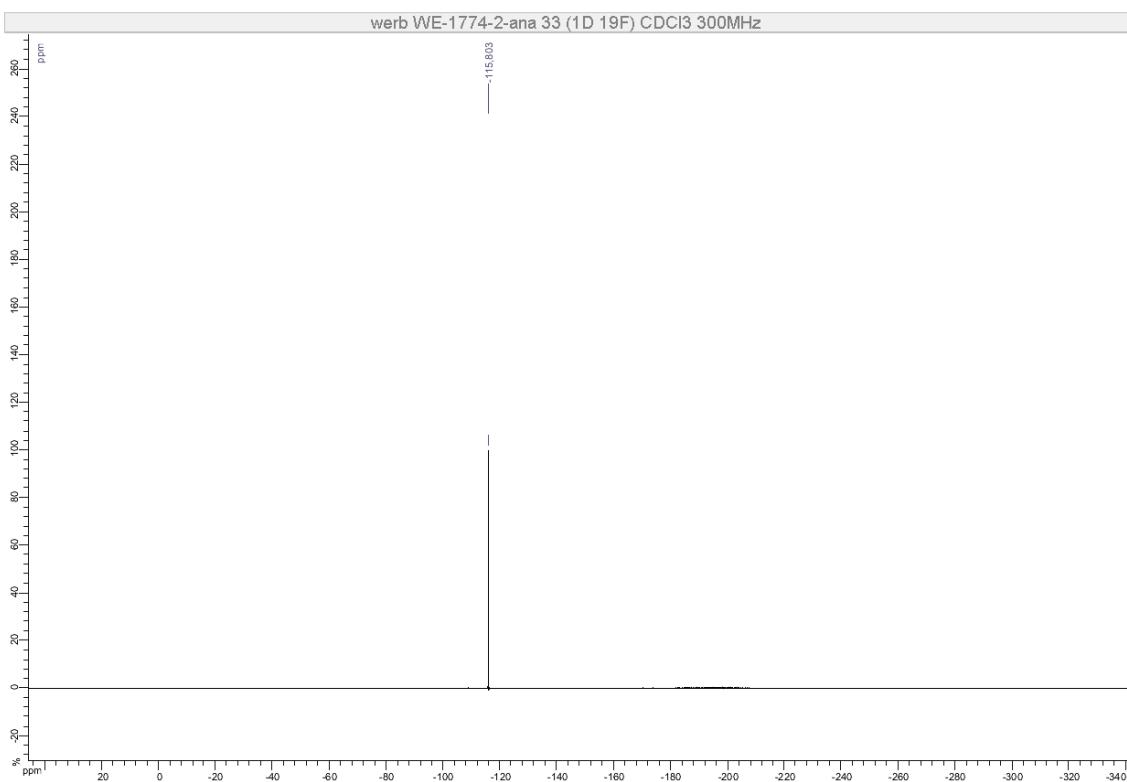
NOESY NMR



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

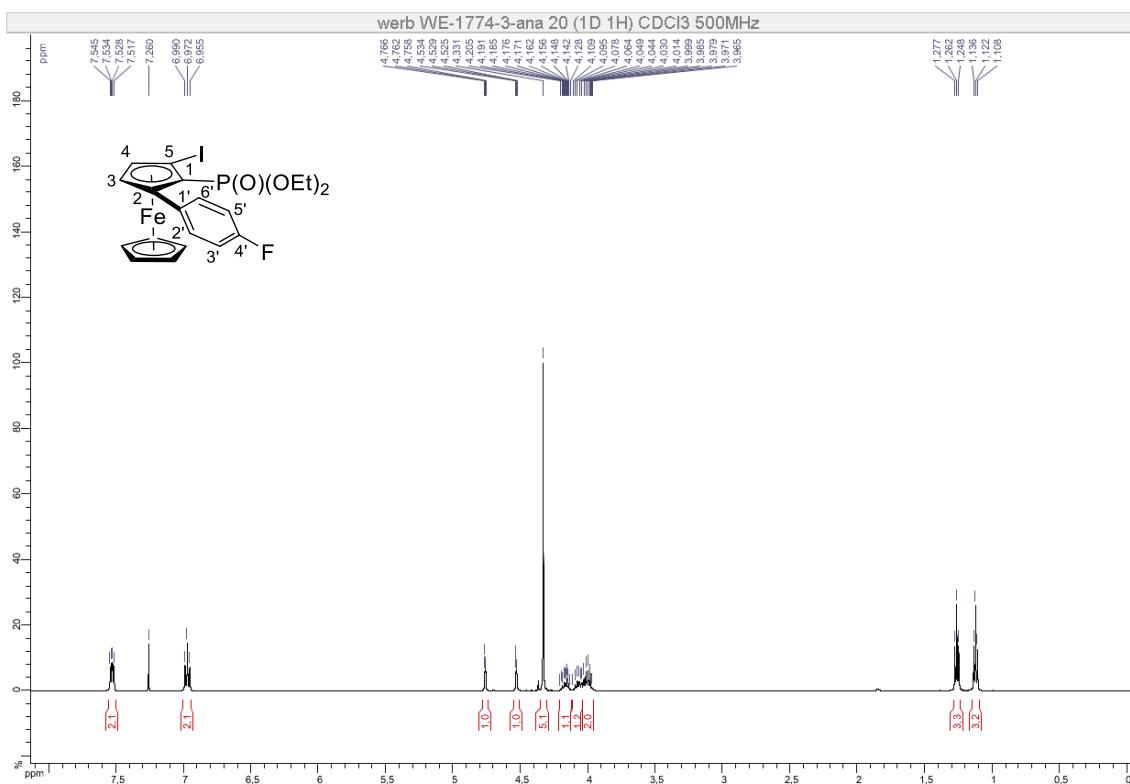


$^{19}\text{F}\{\text{H}\}$ NMR

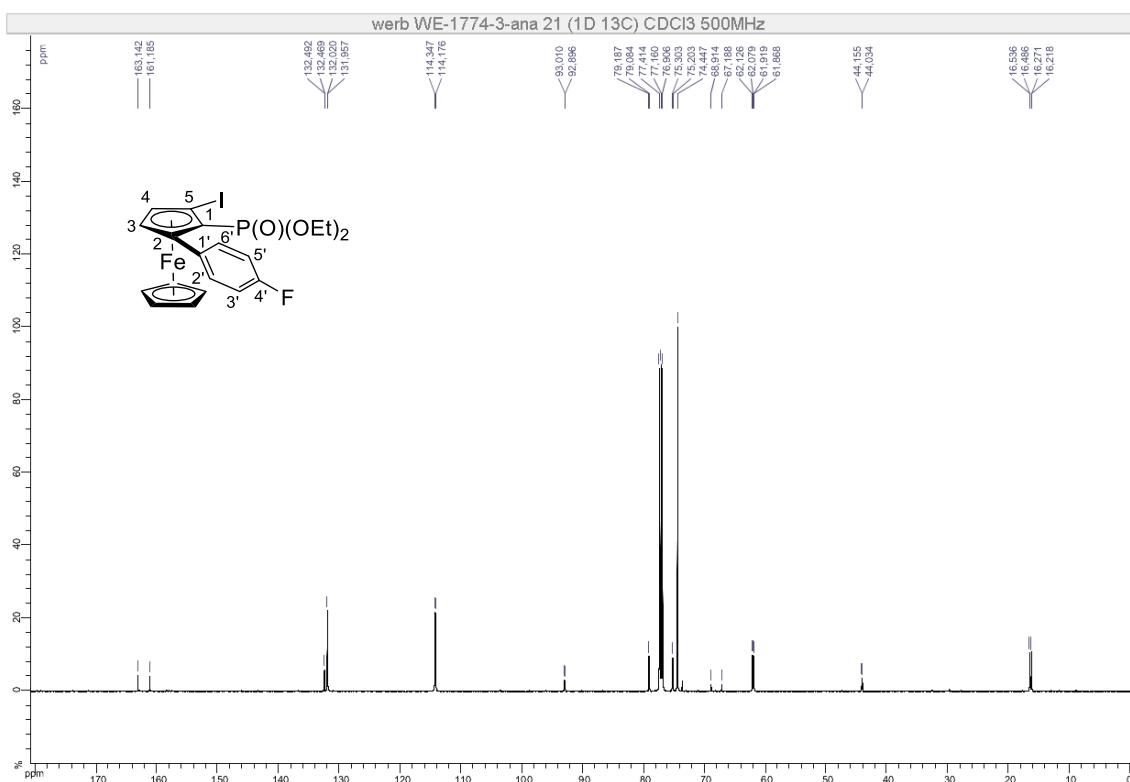


(\pm)-*O,O*-Diethyl-2-(4-fluorophenyl)-5-iodoferrocenephosphonate ((\pm)-13a)

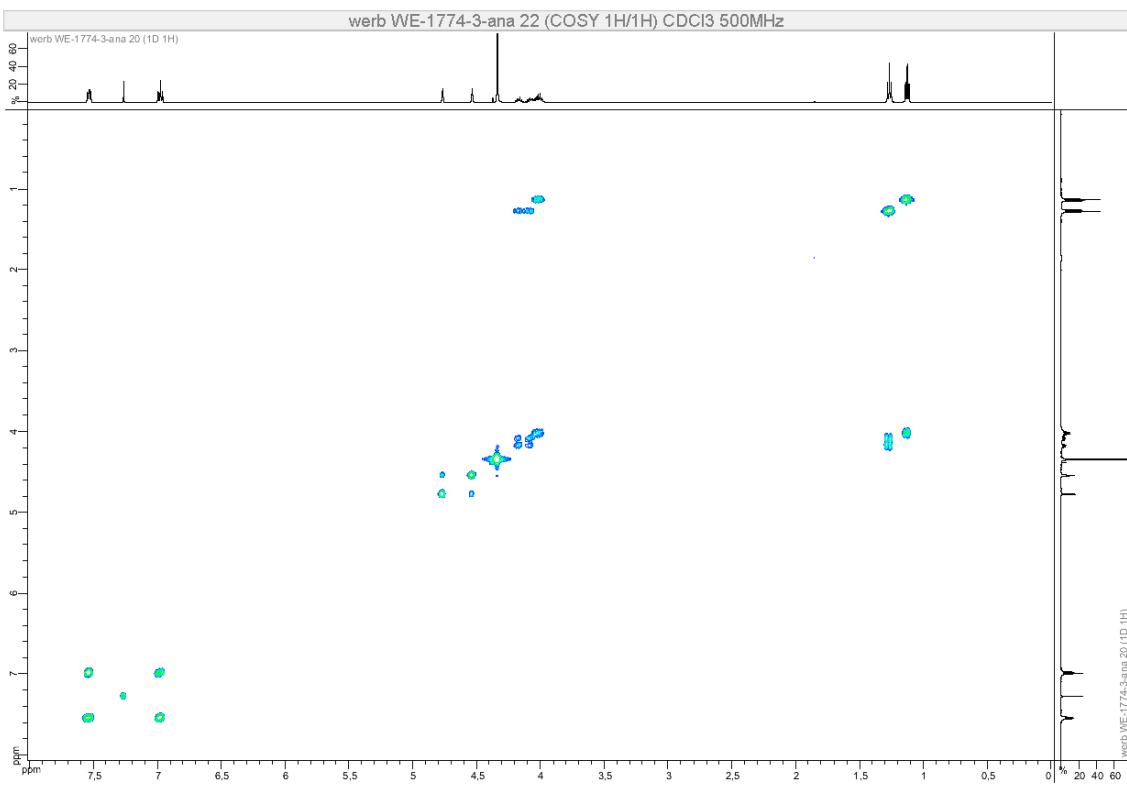
^1H NMR



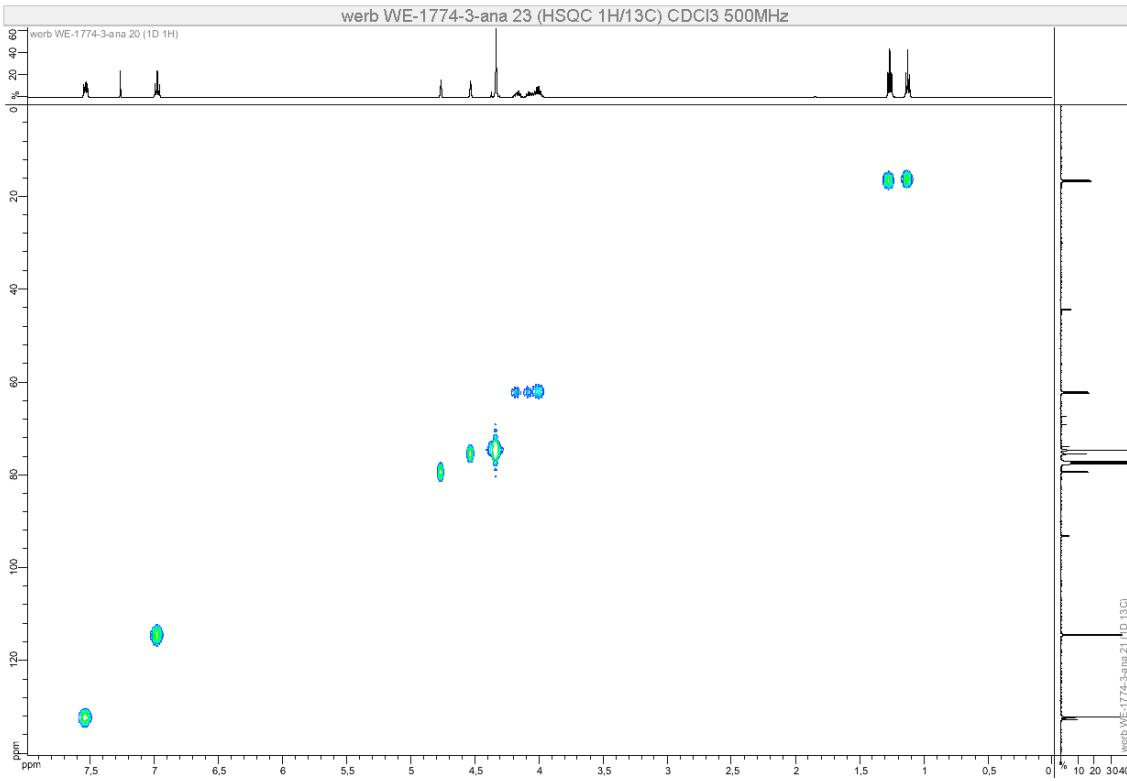
$^{13}\text{C}\{^1\text{H}\}$ NMR



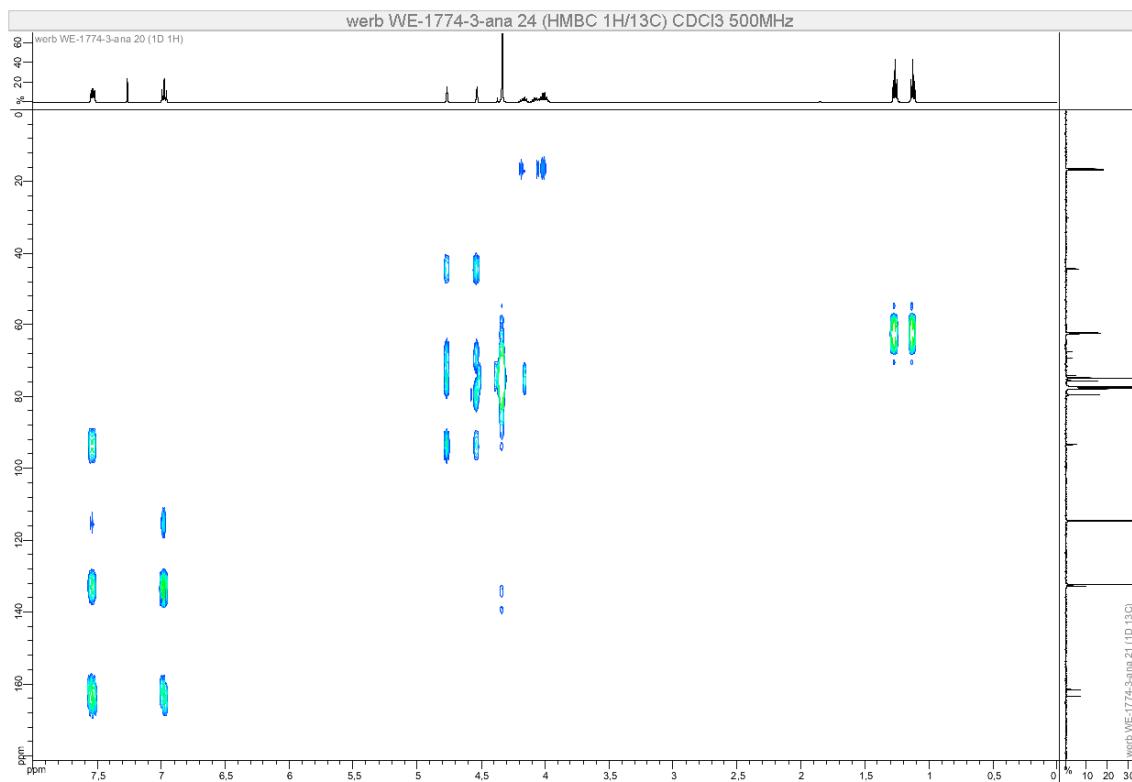
COSY NMR



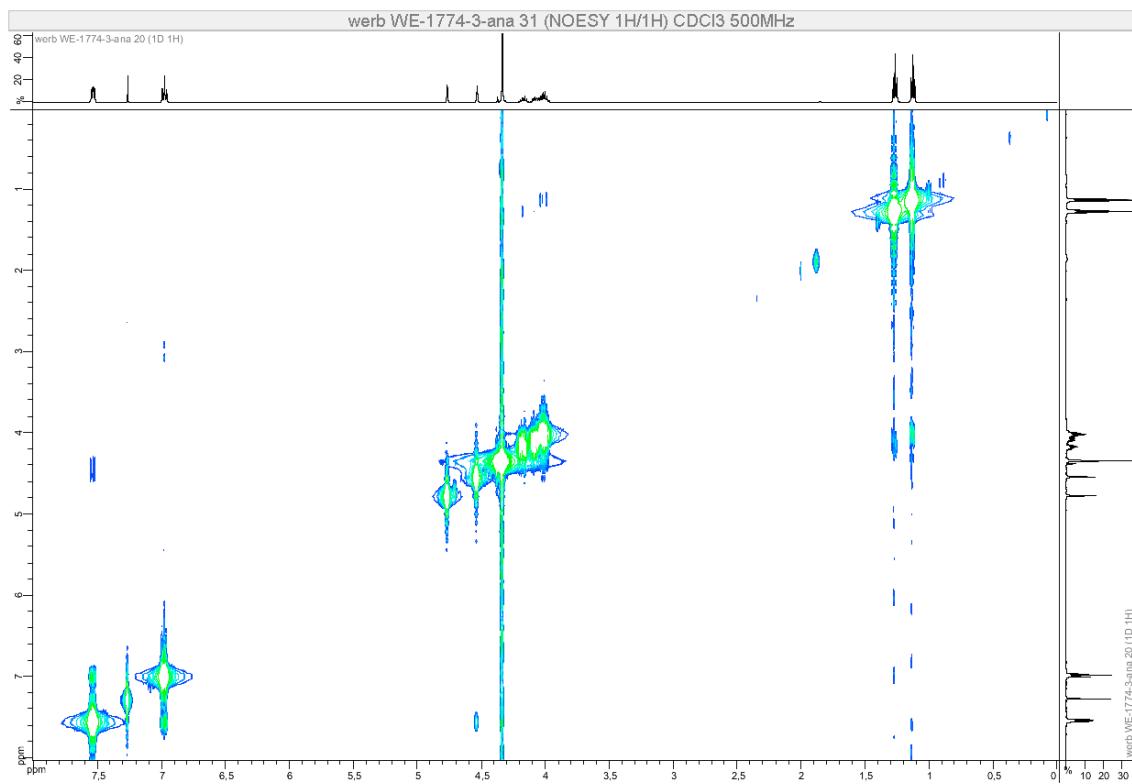
HSQC NMR



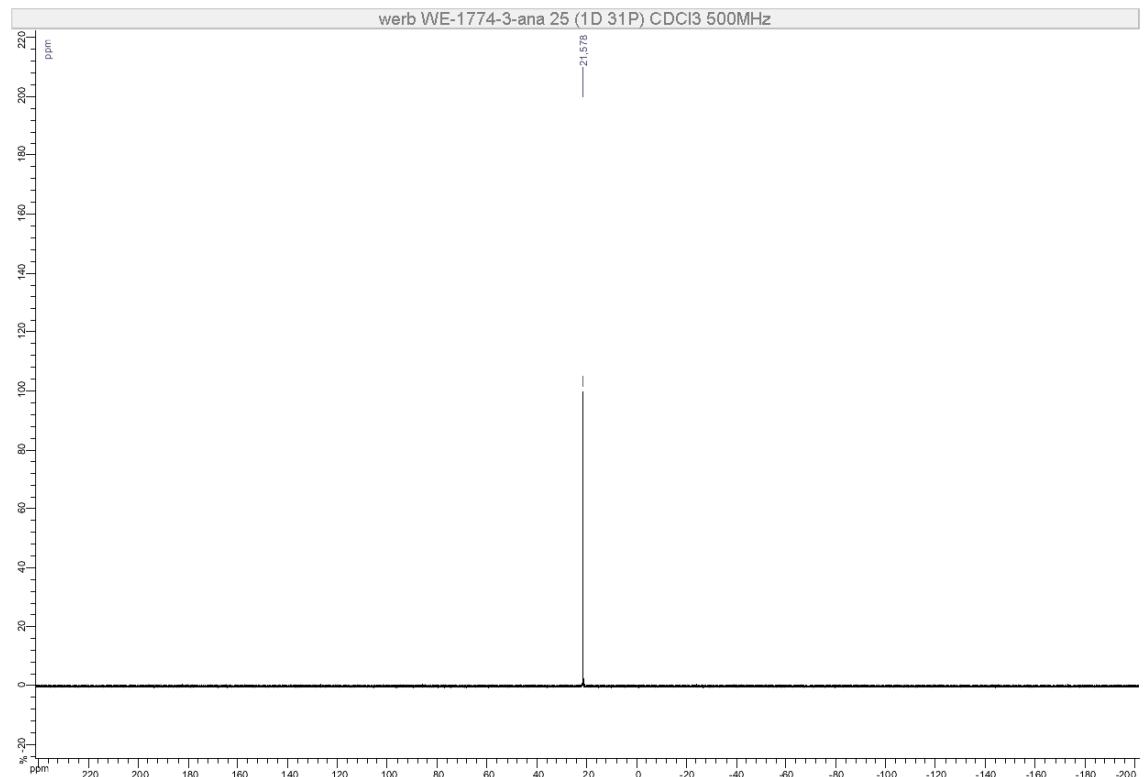
HMBC NMR



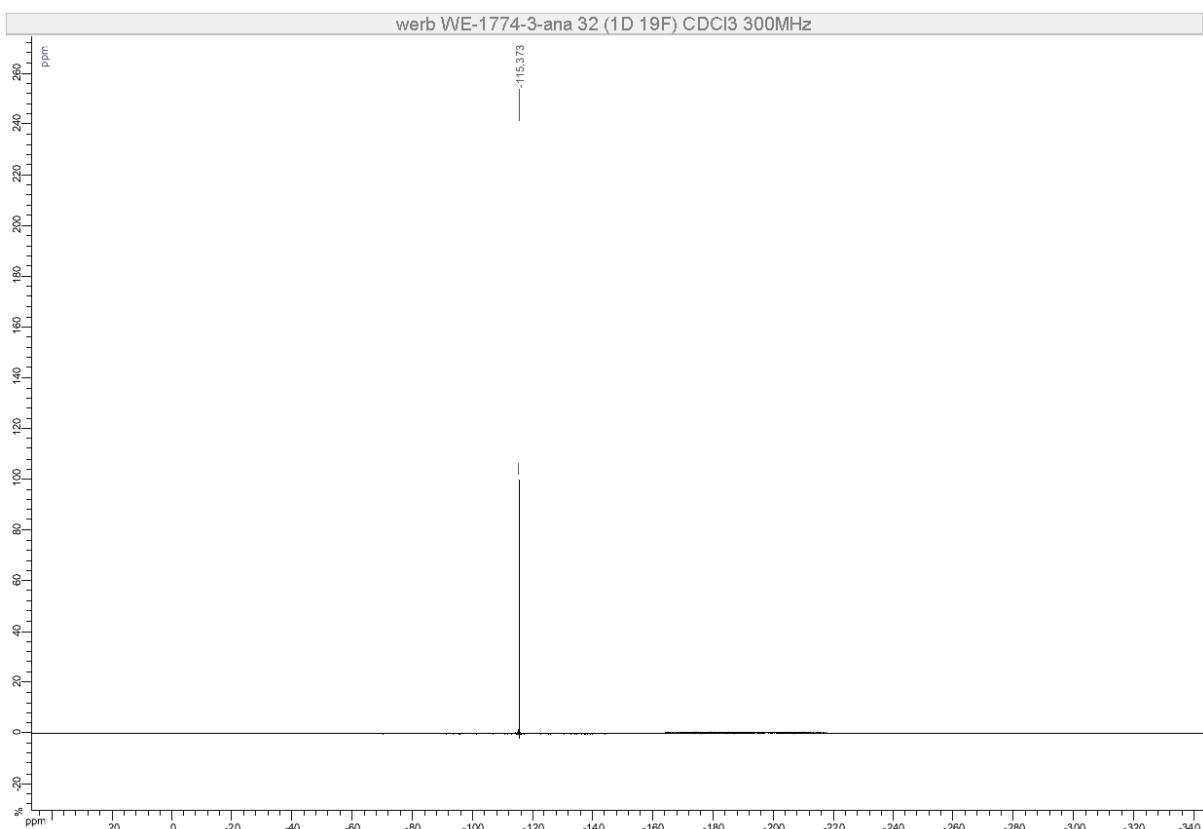
NOESY NMR



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

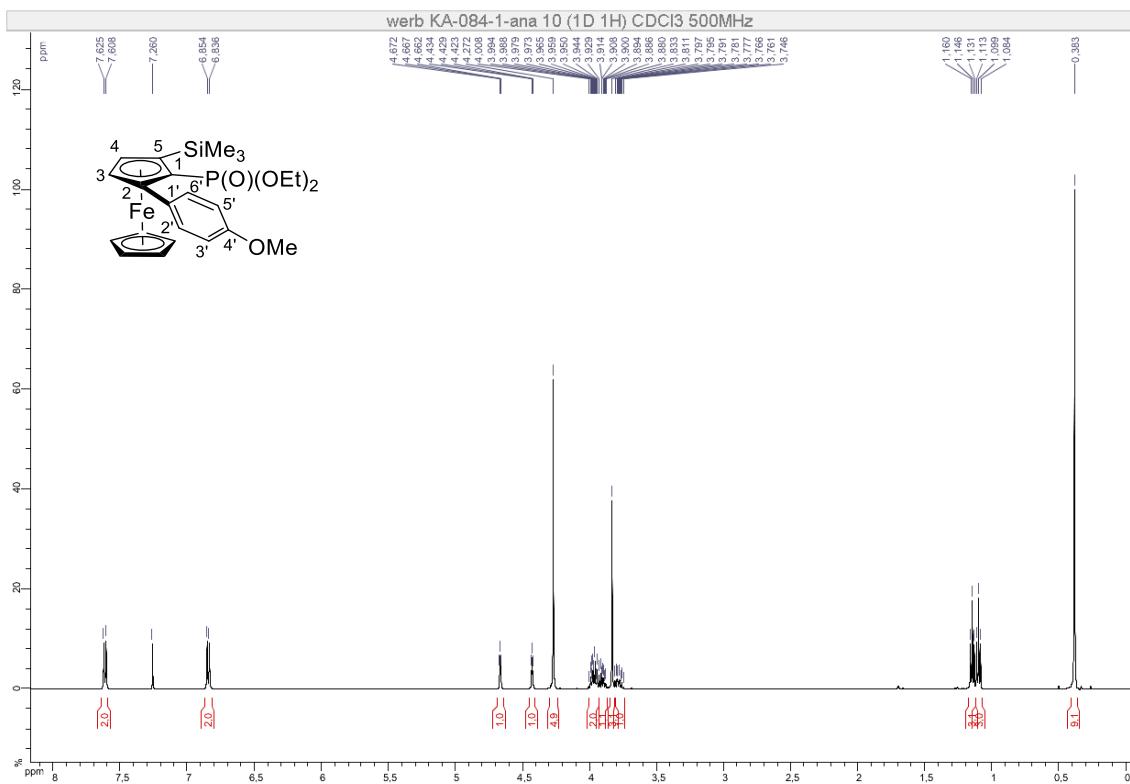


$^{19}\text{F}\{\text{H}\}$ NMR

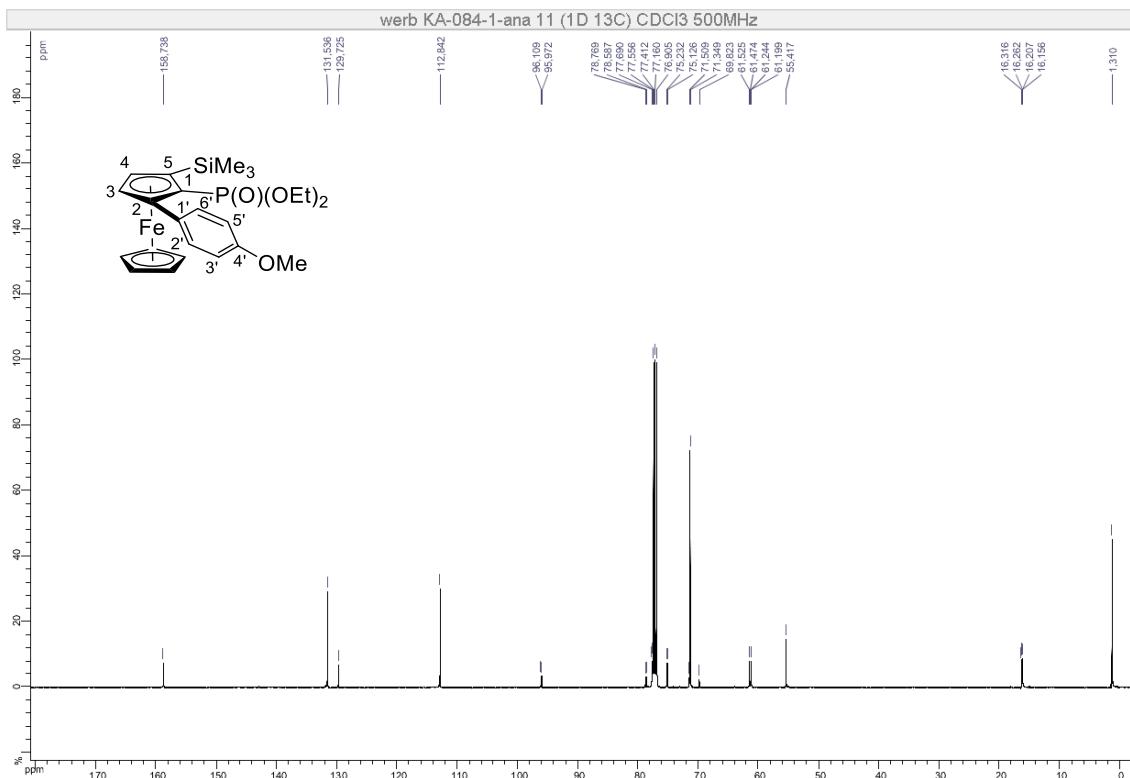


(\pm)-*O,O*-Diethyl-2-(4-methoxyphenyl)-5-(trimethylsilyl)ferrocenephosphonate ((\pm)-14a)

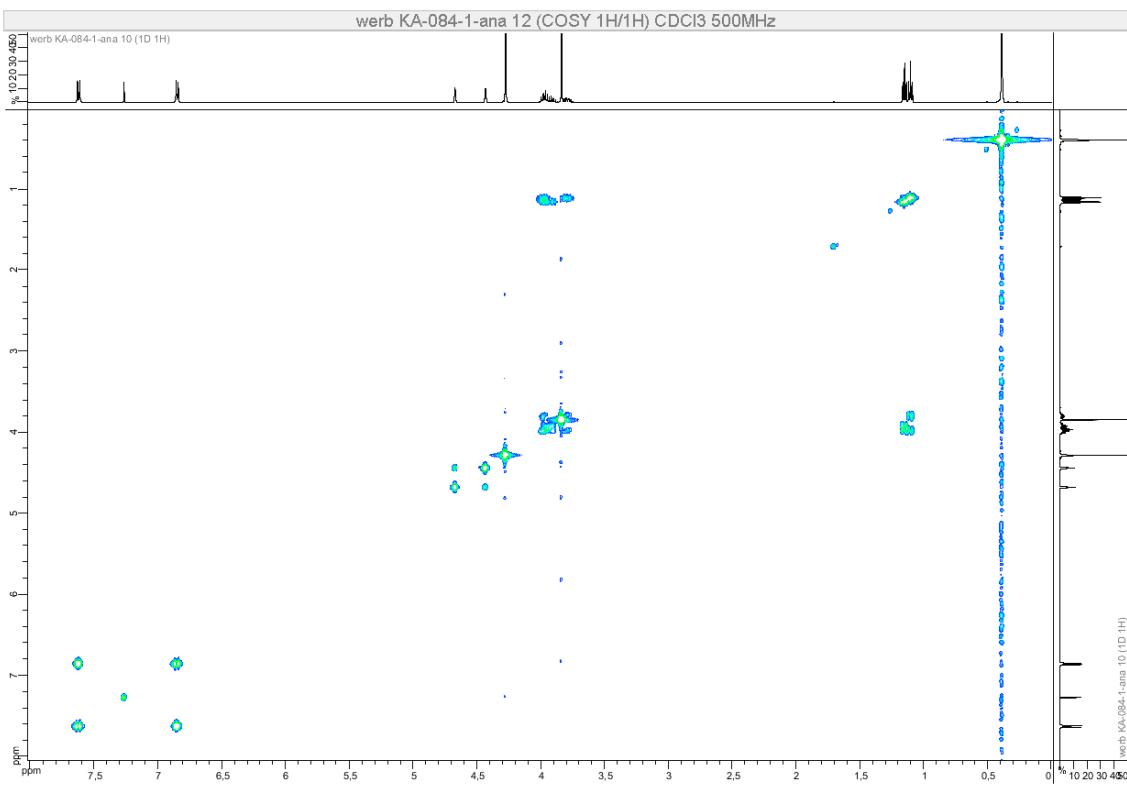
¹H NMR



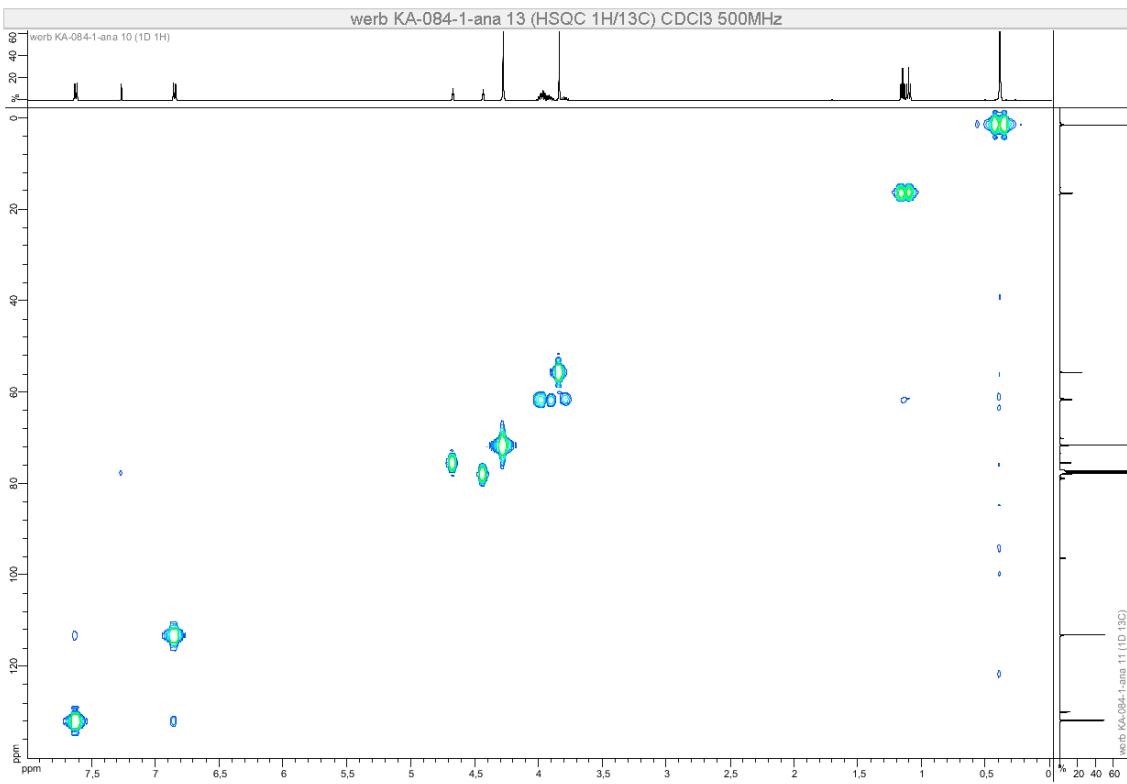
¹³C{¹H} NMR



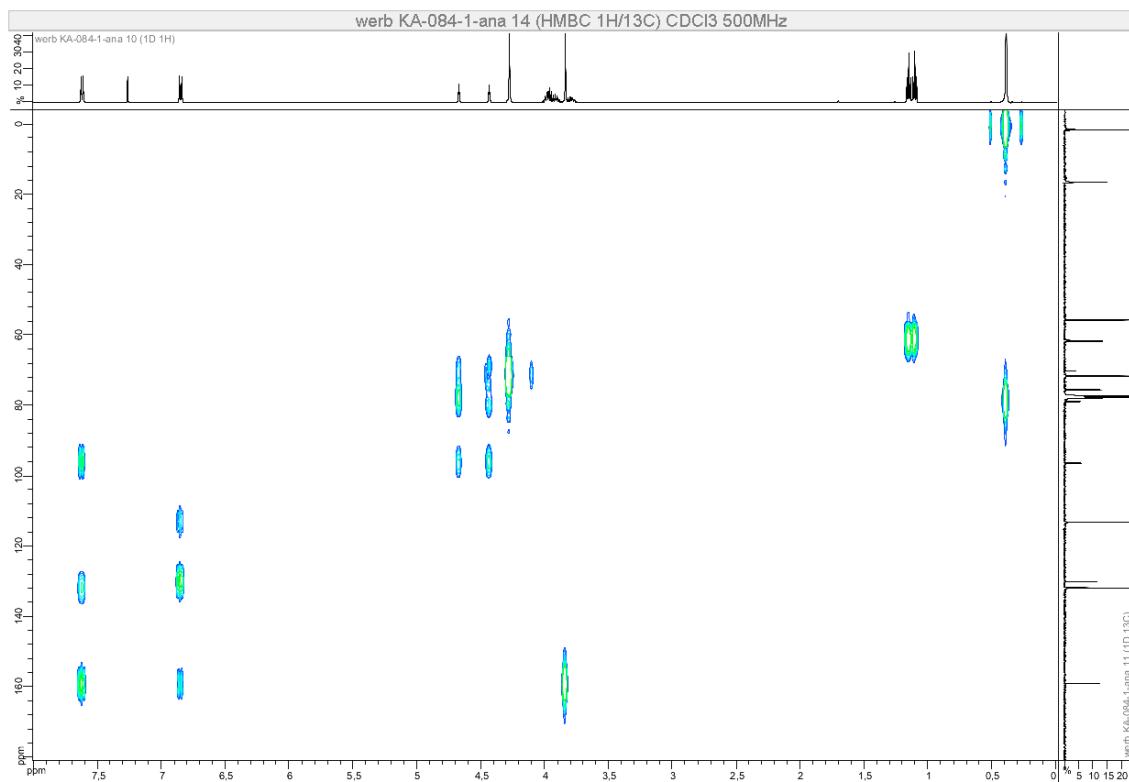
COSY NMR



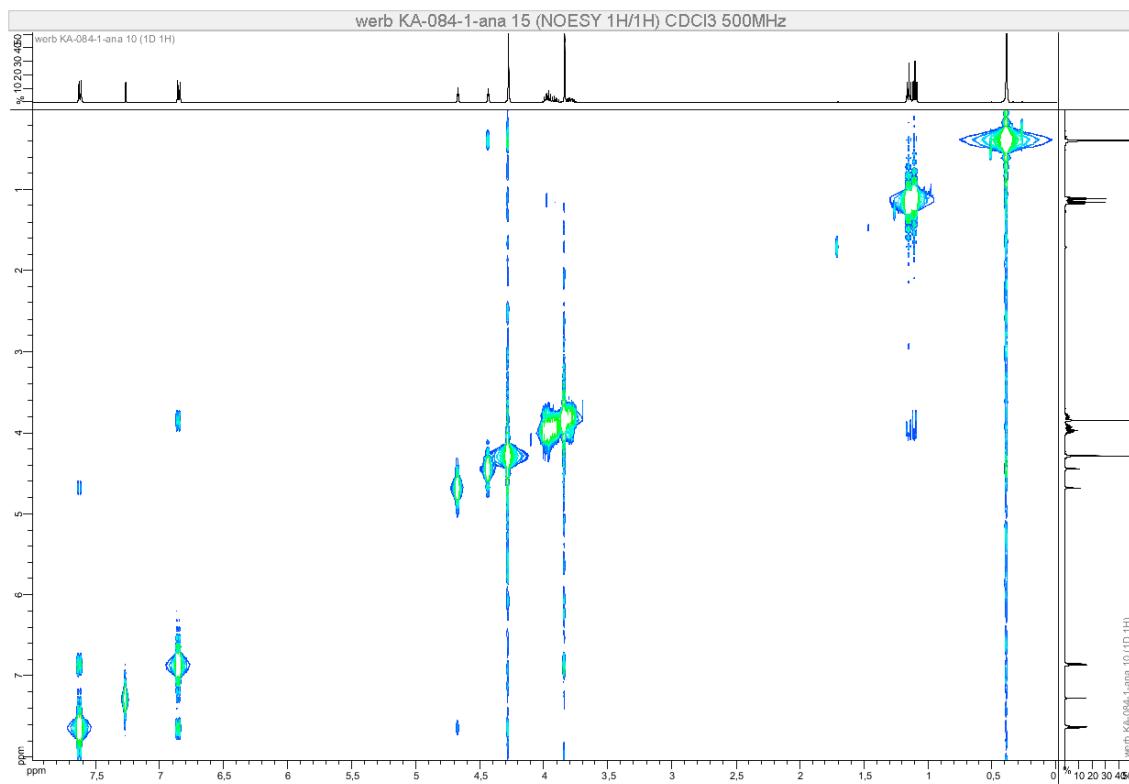
HSQC NMR



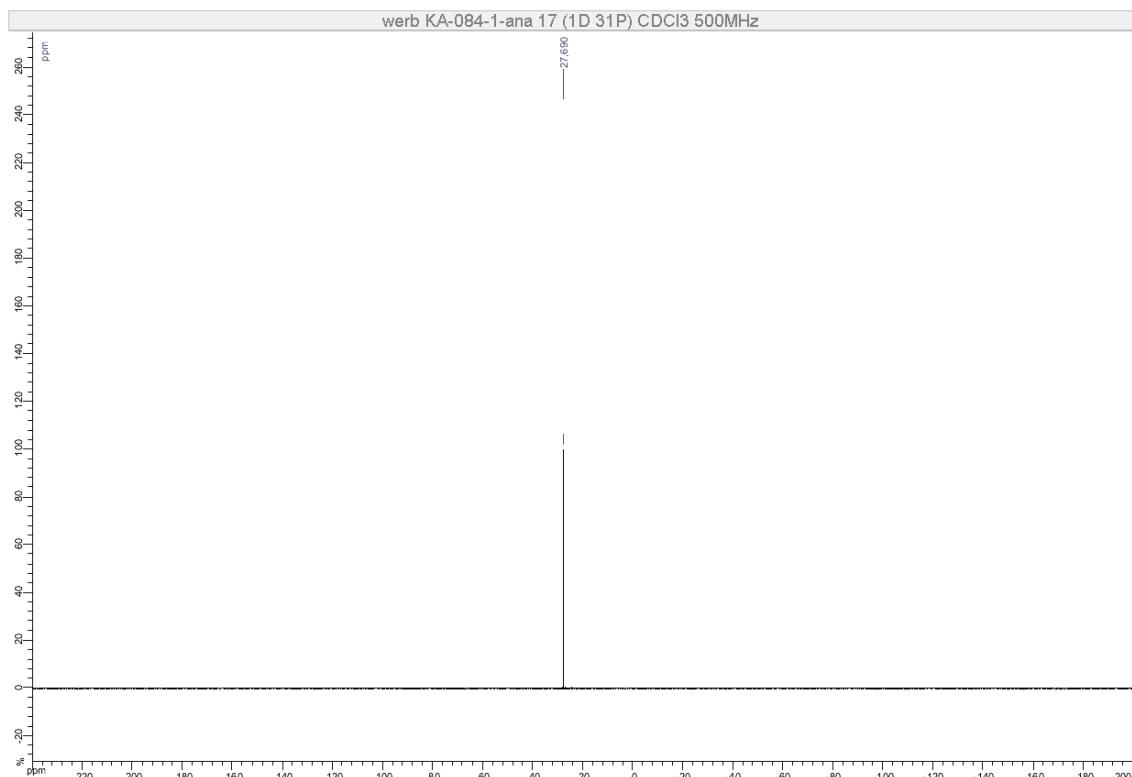
HMBC NMR



NOESY NMR

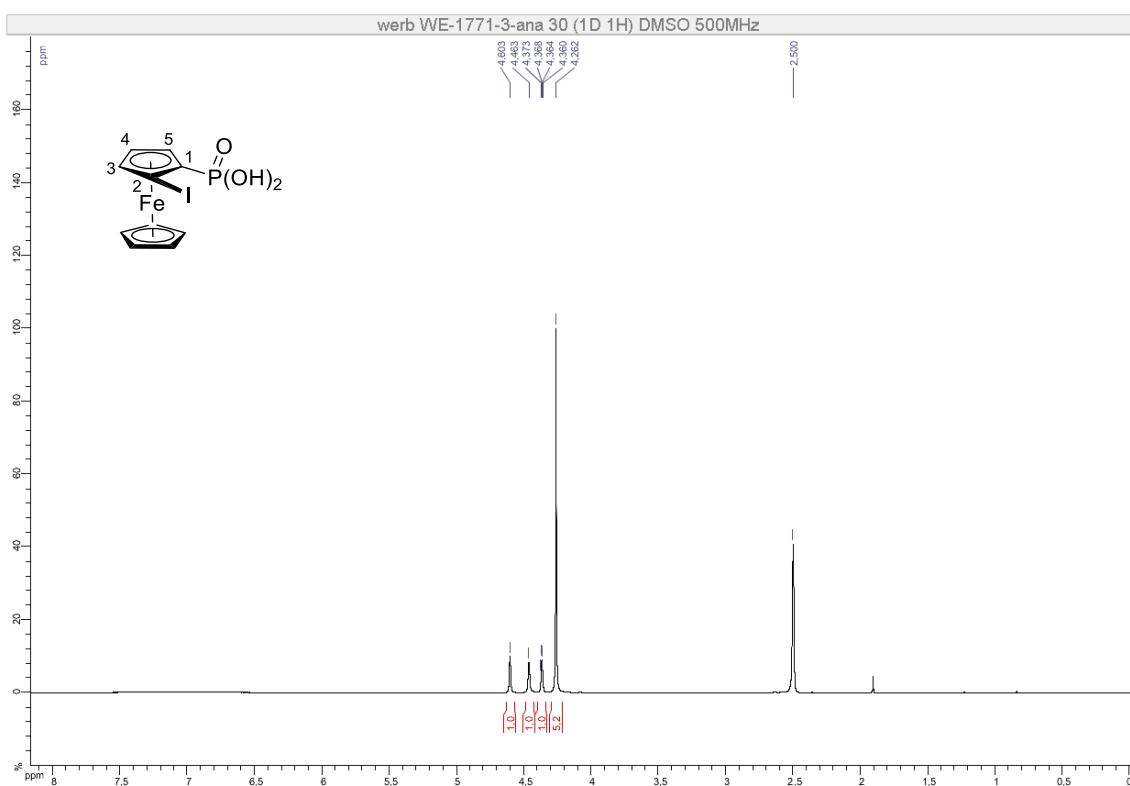


$^{31}\text{P}\{\text{H}\}$ NMR

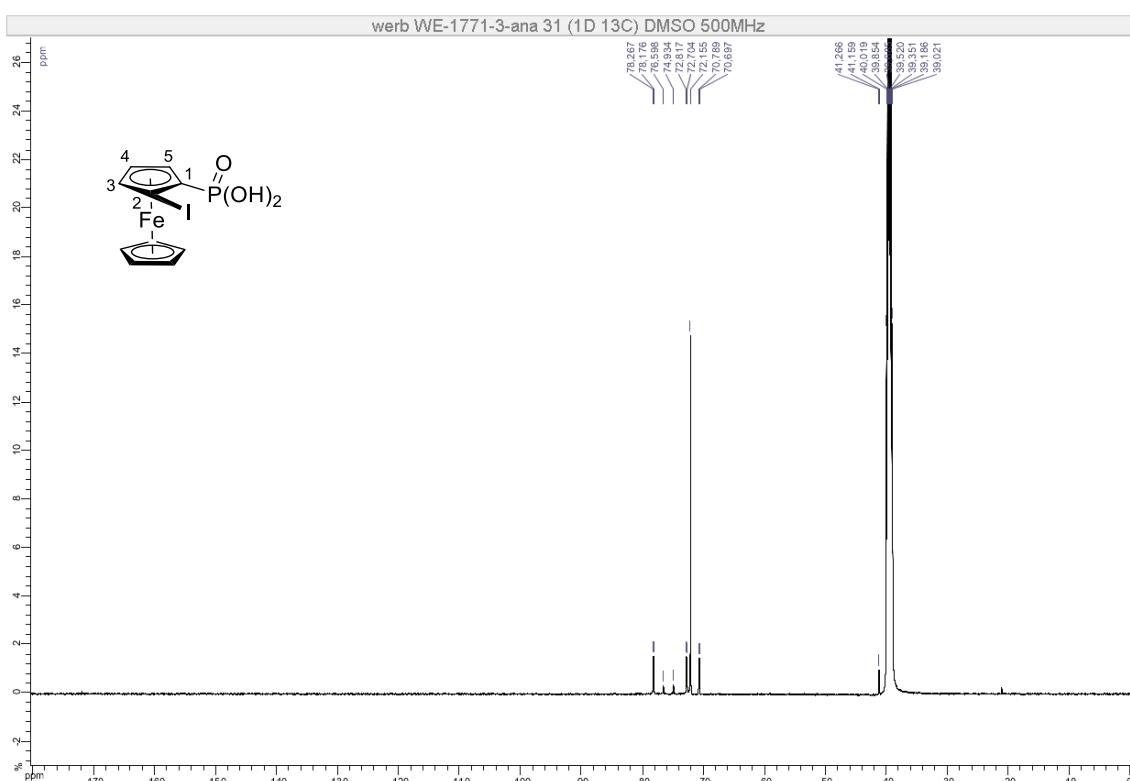


(\pm)-2-Iodoferrocenephosphonic acid ((\pm)-15)

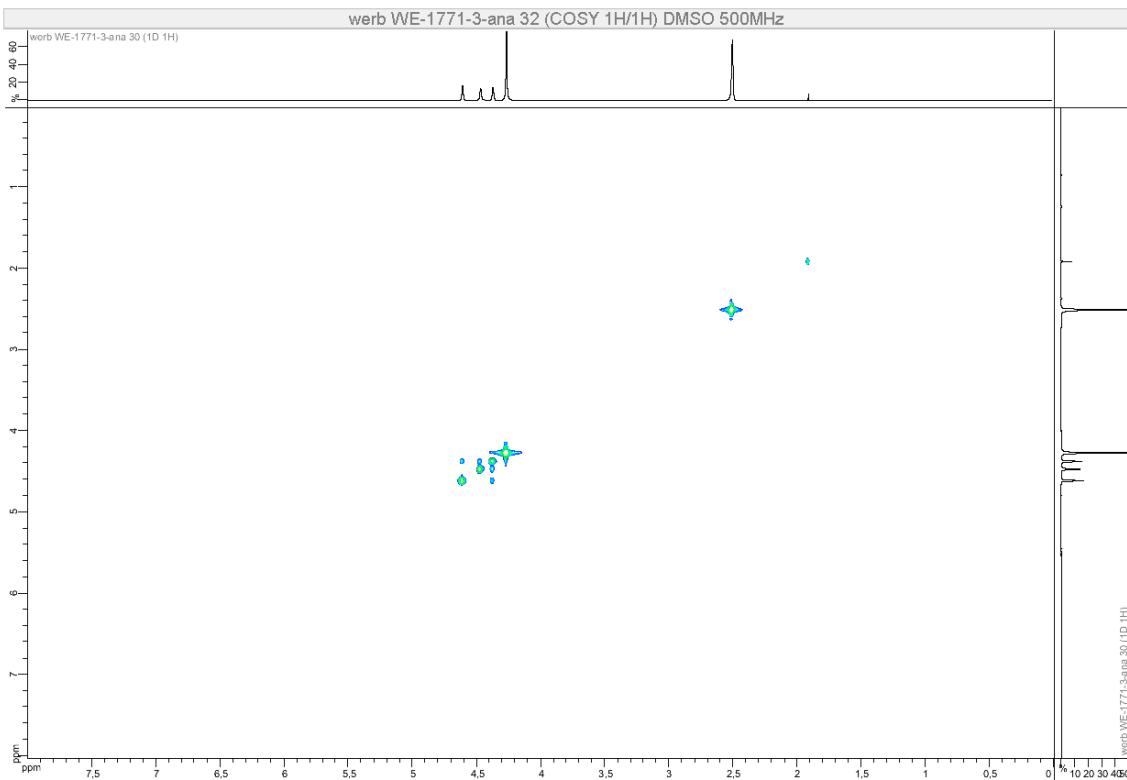
^1H NMR



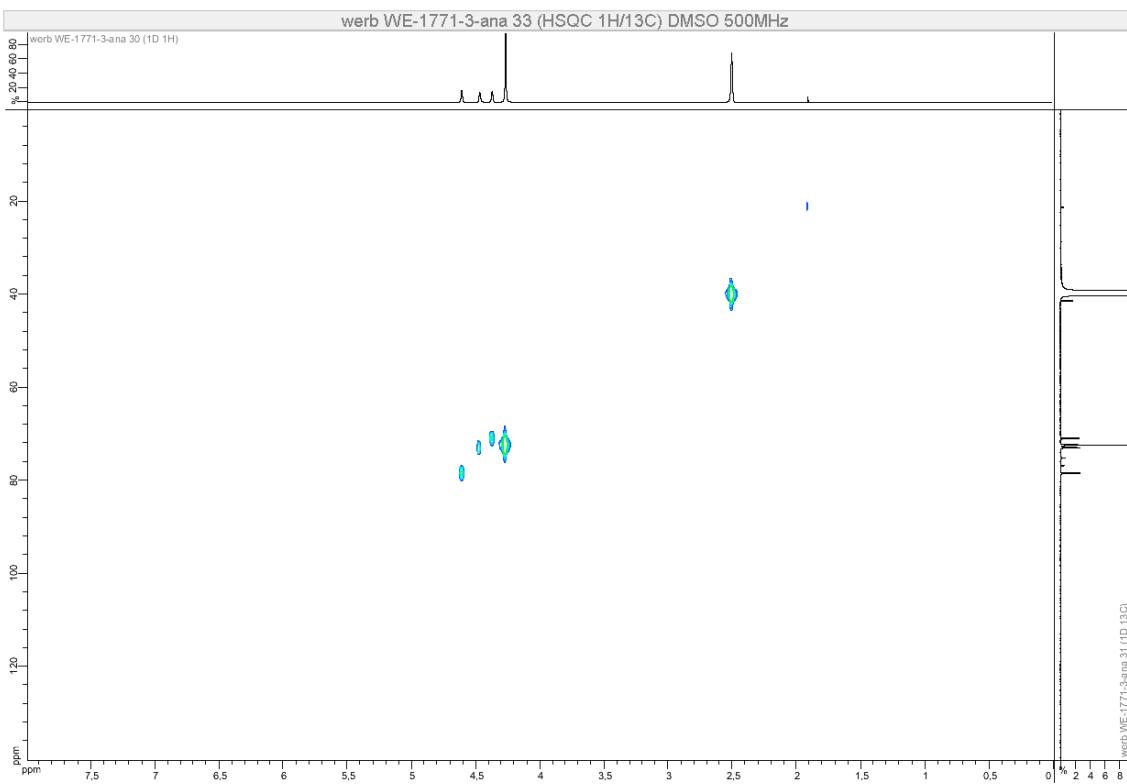
$^{13}\text{C}\{^1\text{H}\}$ NMR



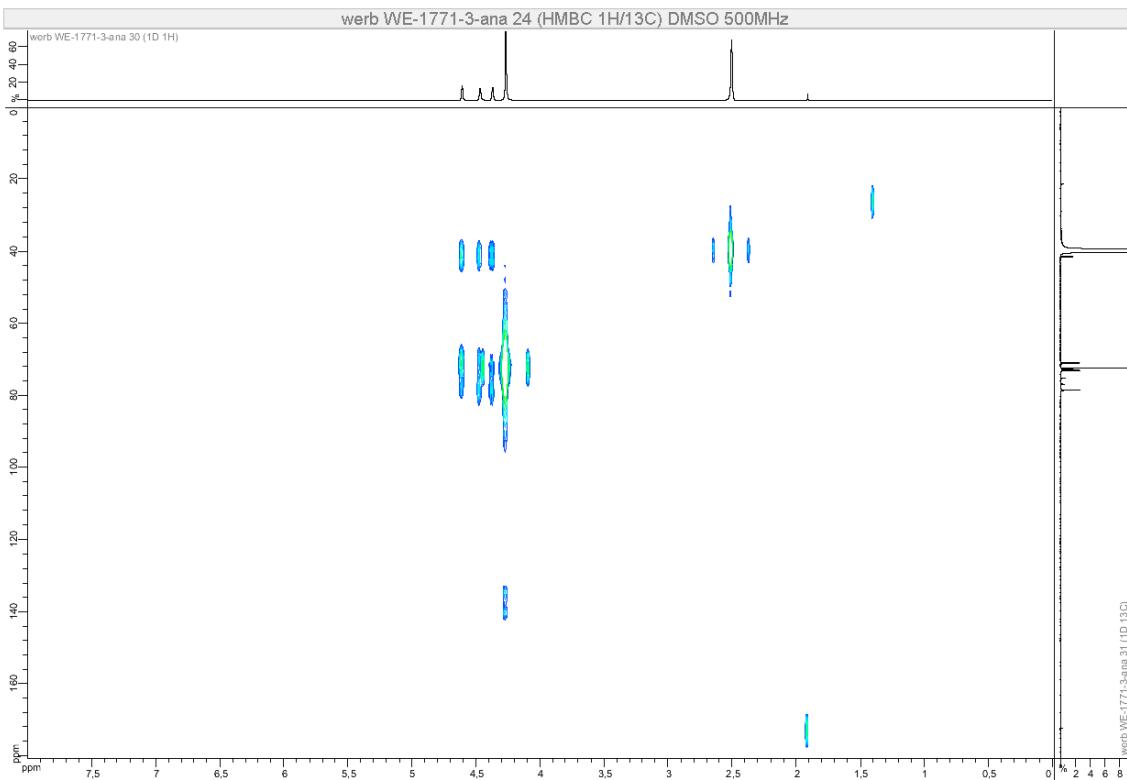
COSY NMR



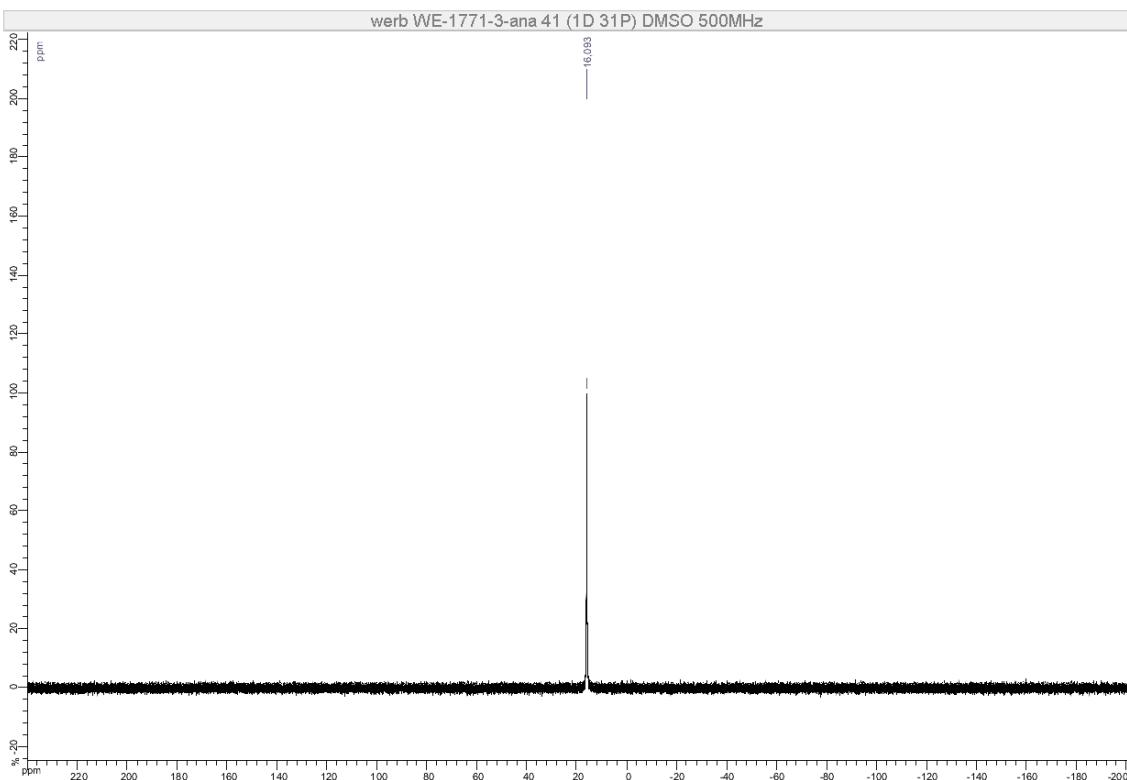
HSQC NMR



HMBC NMR

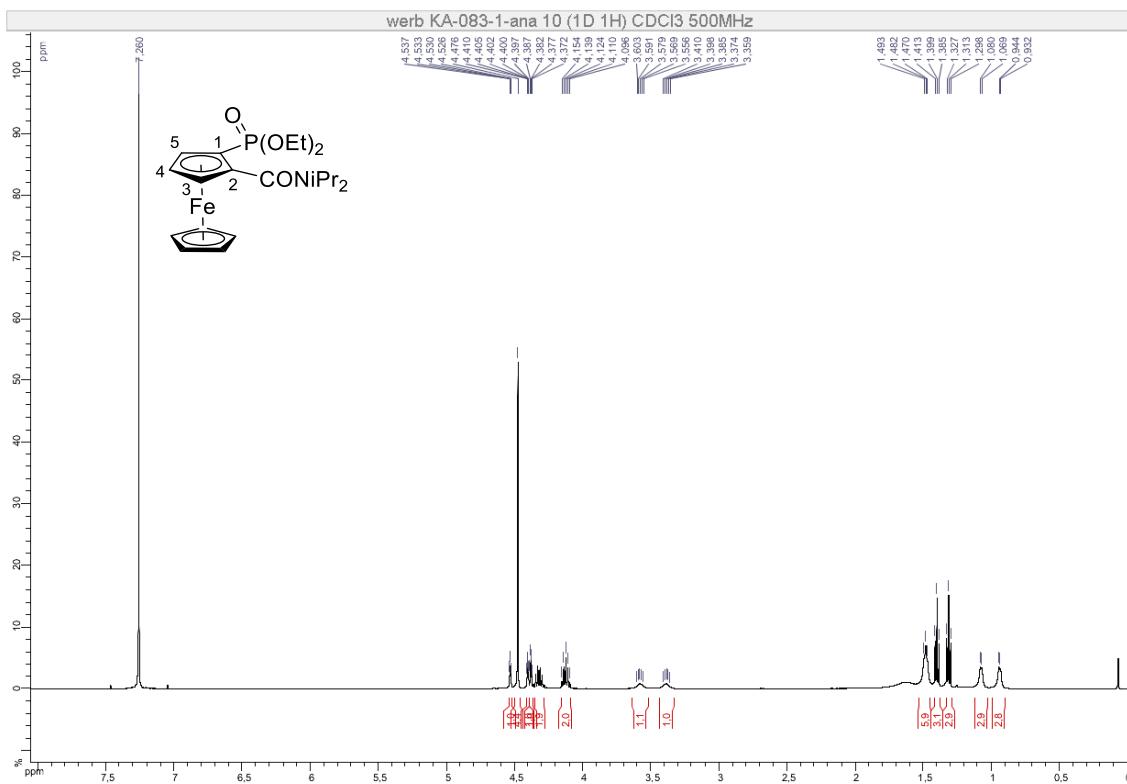


$^{31}\text{P}\{\text{H}\}$ NMR

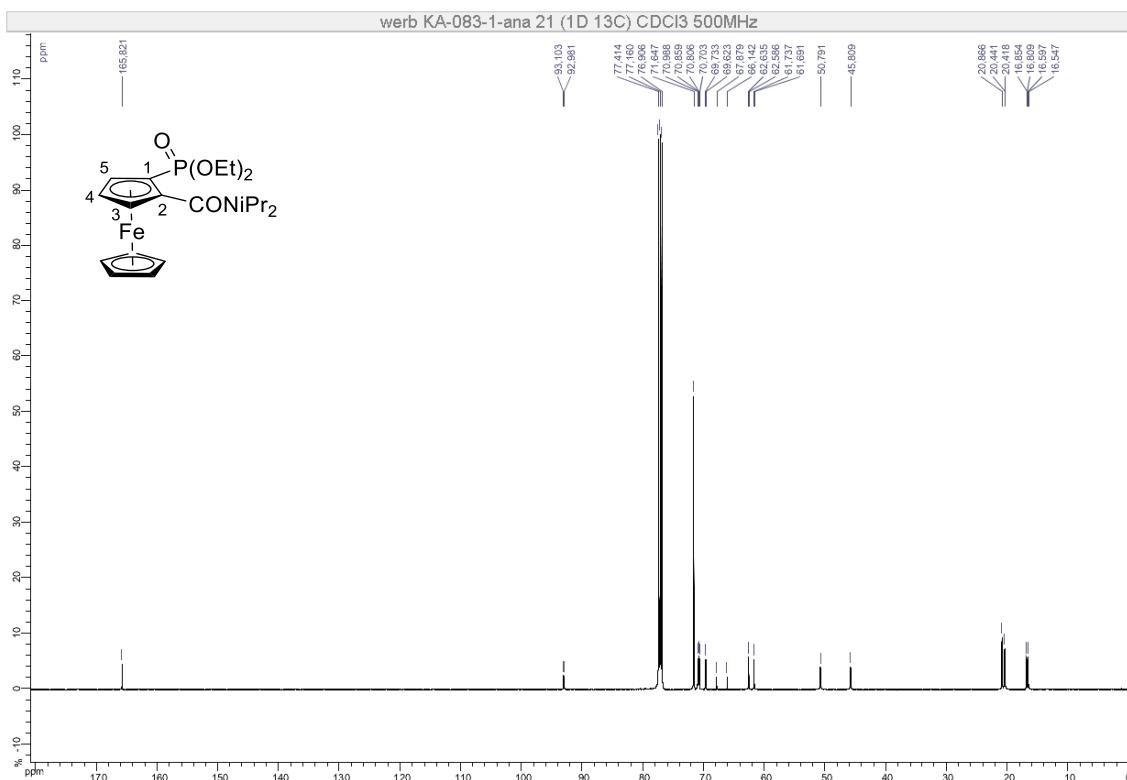


(\pm)-2-(Diisopropylaminocarbonyl)-*O,O*-diethylferrocenephosphonate ((\pm)-16a)

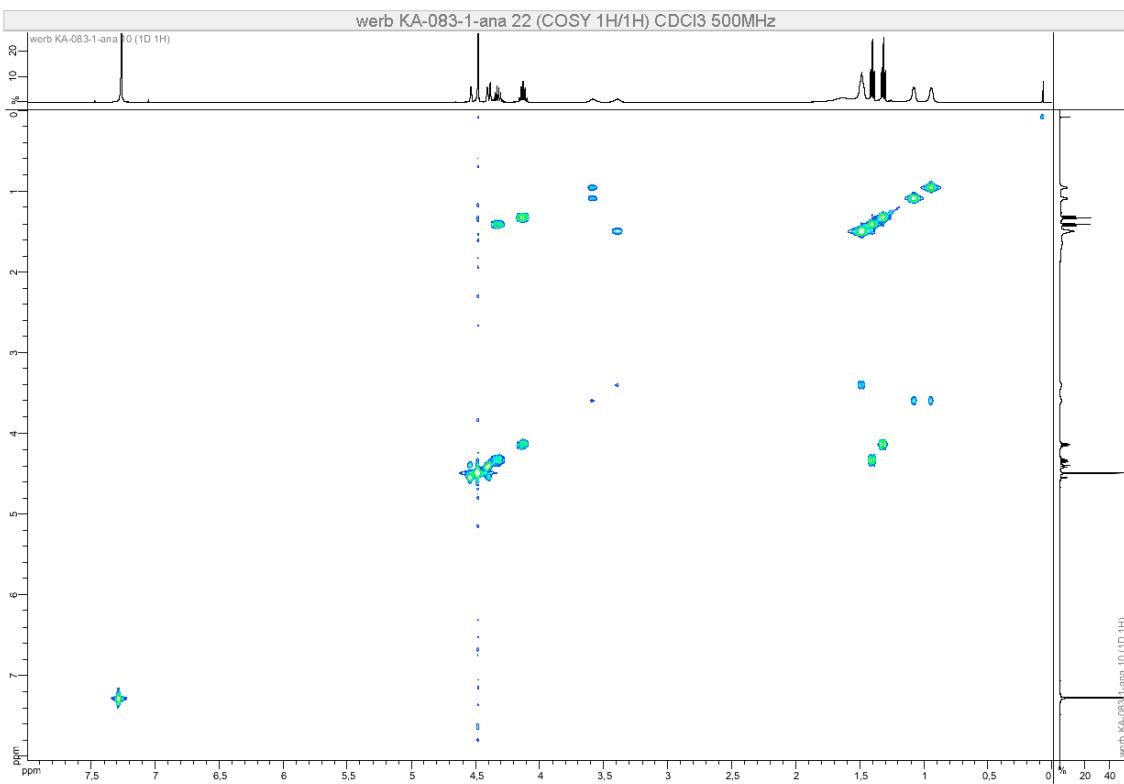
¹H NMR



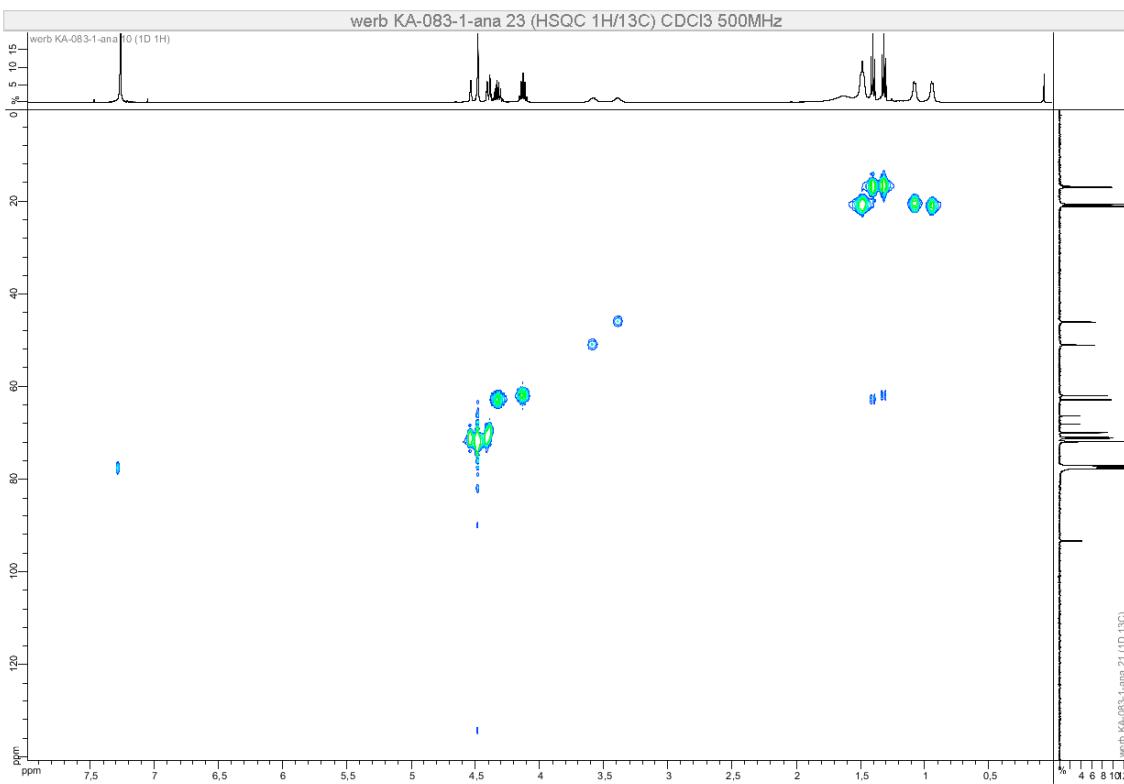
¹³C{¹H} NMR



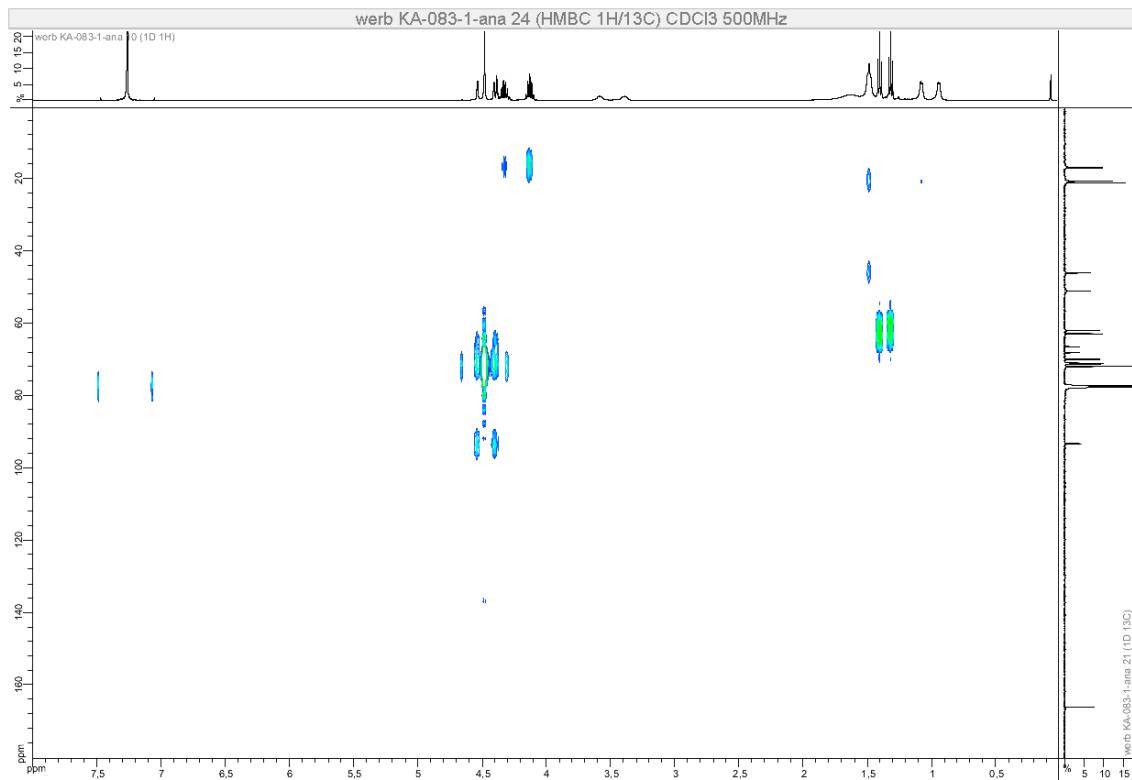
COSY NMR



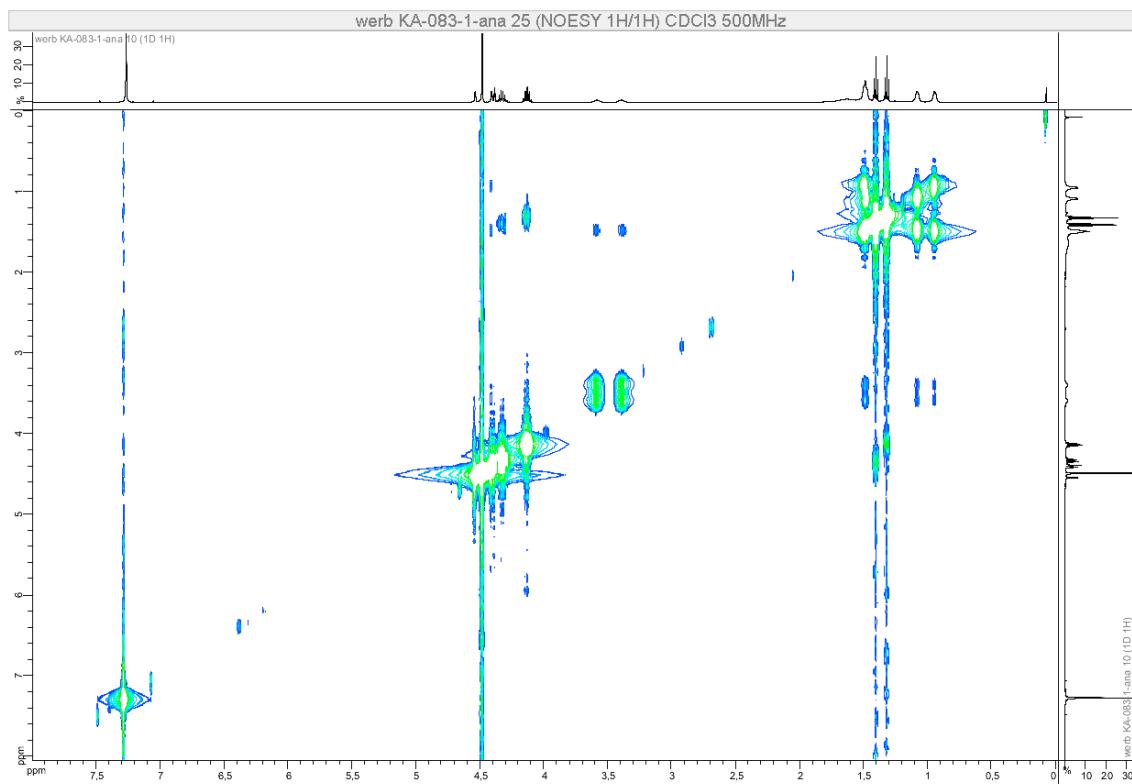
HSQC NMR



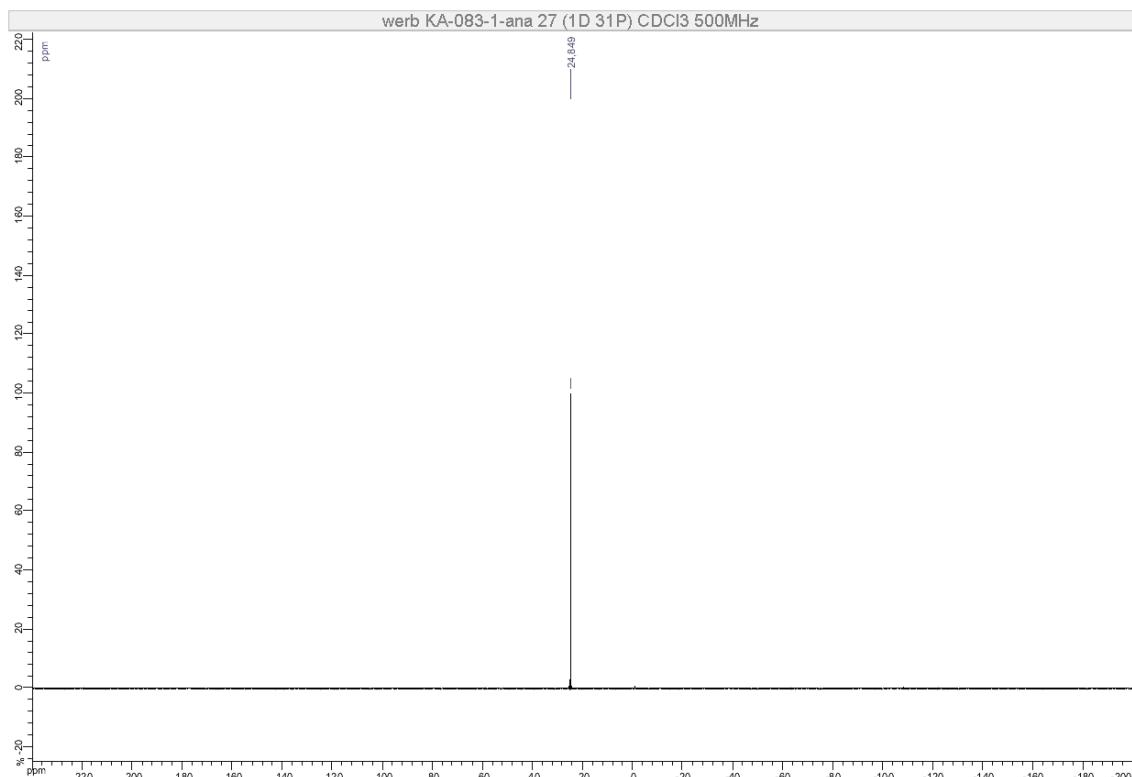
HMBC NMR



NOESY NMR

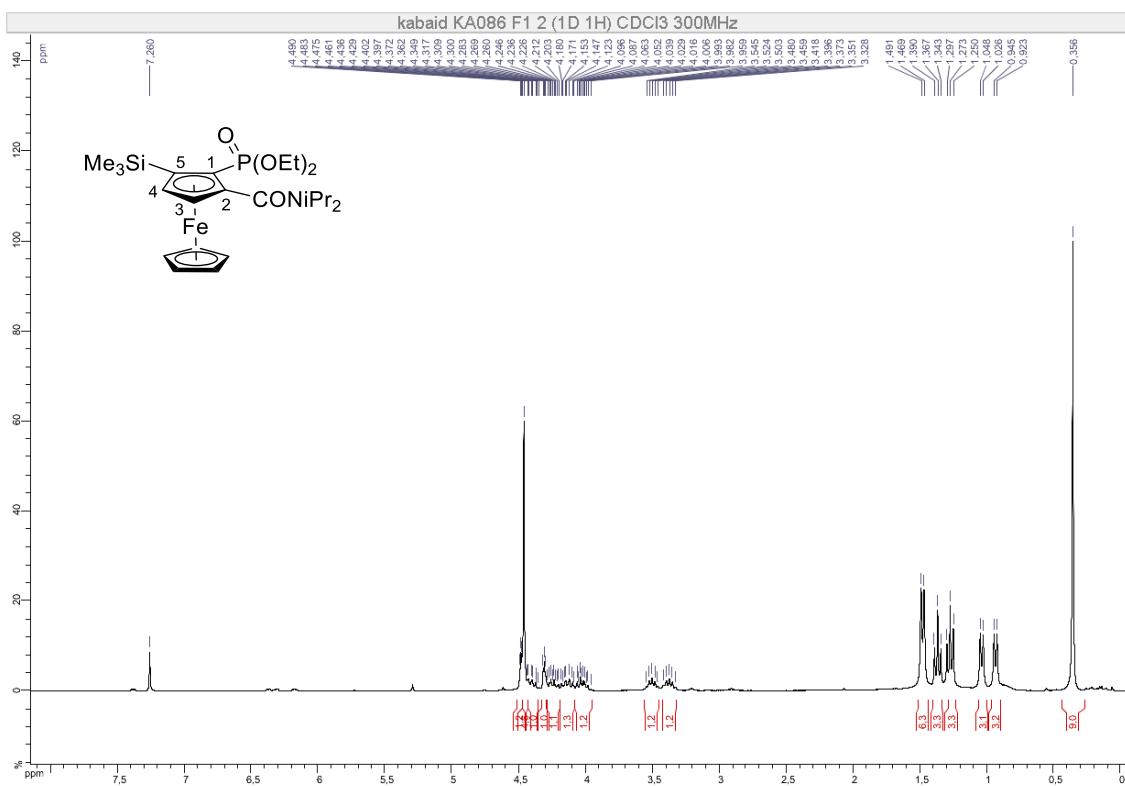


$^{31}\text{P}\{\text{H}\}$ NMR

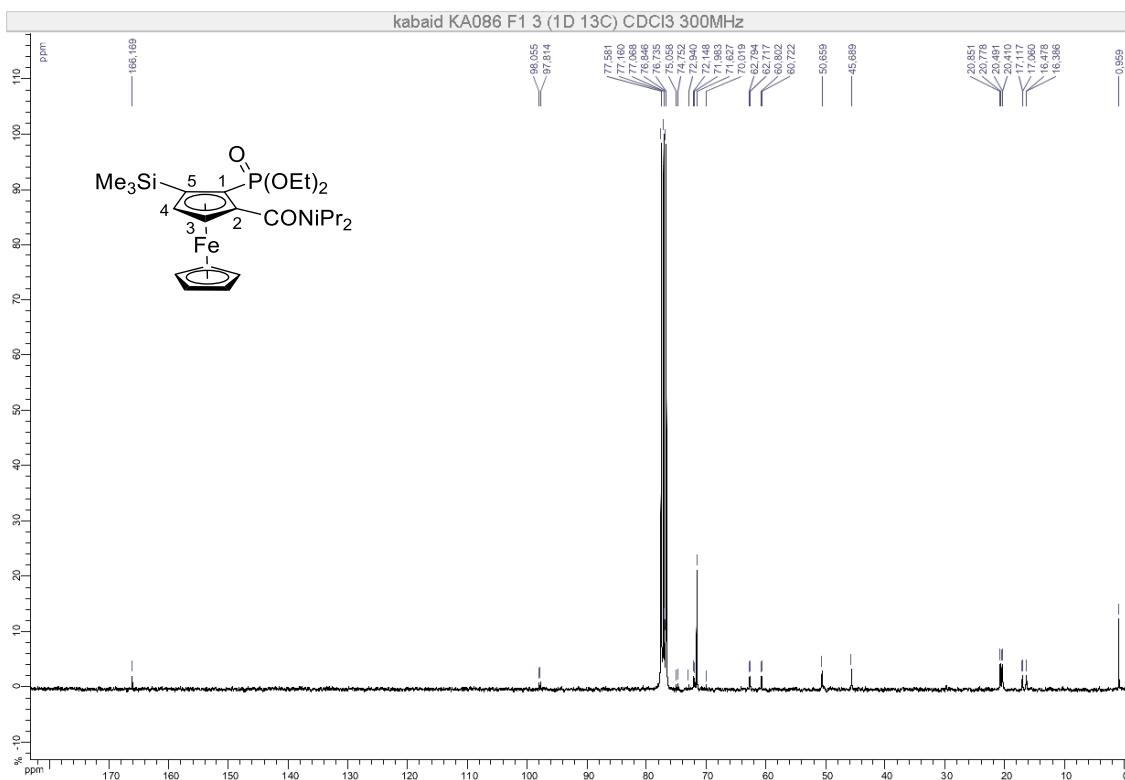


(\pm)-2-(Diisopropylaminocarbonyl)-*O,O*-diethyl-5-(trimethylsilyl)ferrocenephosphonate ((\pm)-17a)

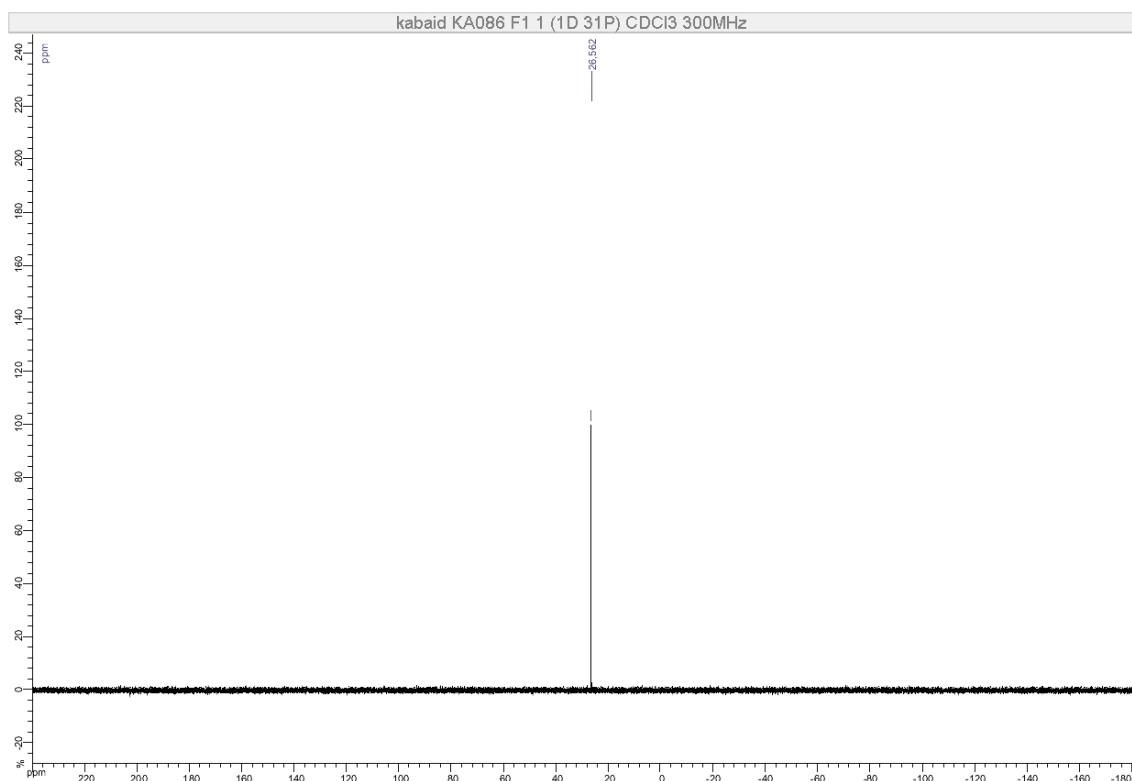
^1H NMR



$^{13}\text{C}\{^1\text{H}\}$ NMR (75 MHz)

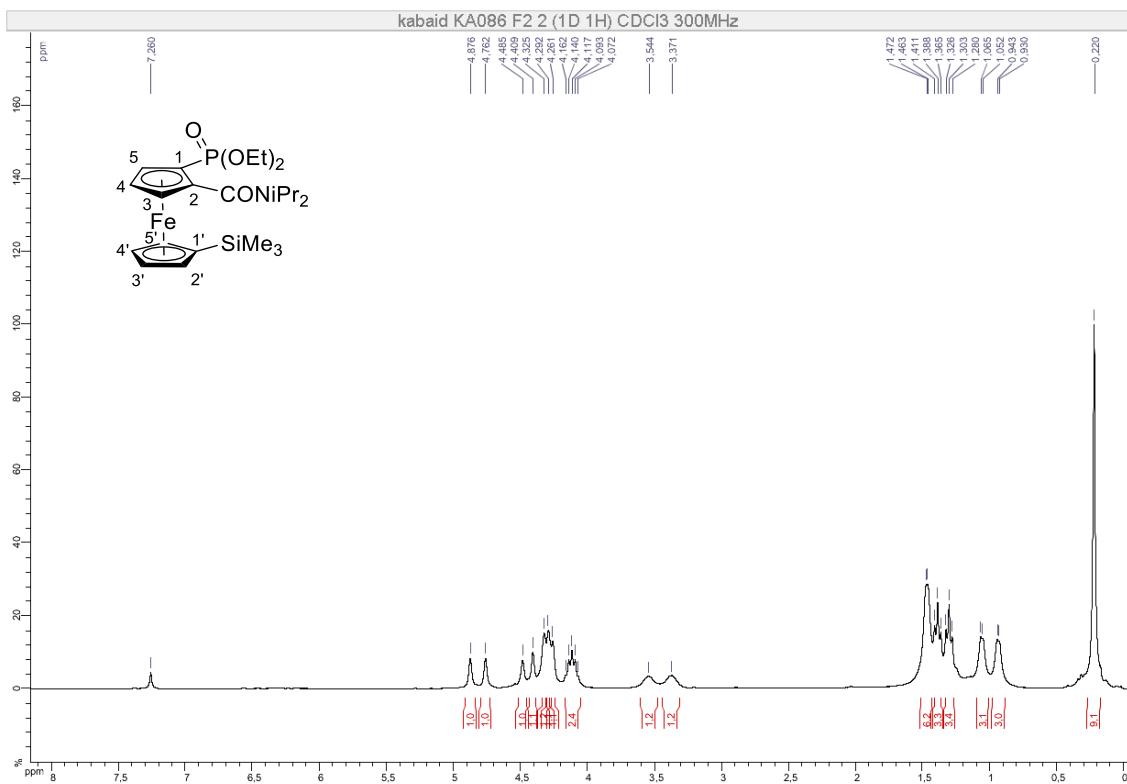


$^{31}\text{P}\{\text{H}\}$ NMR

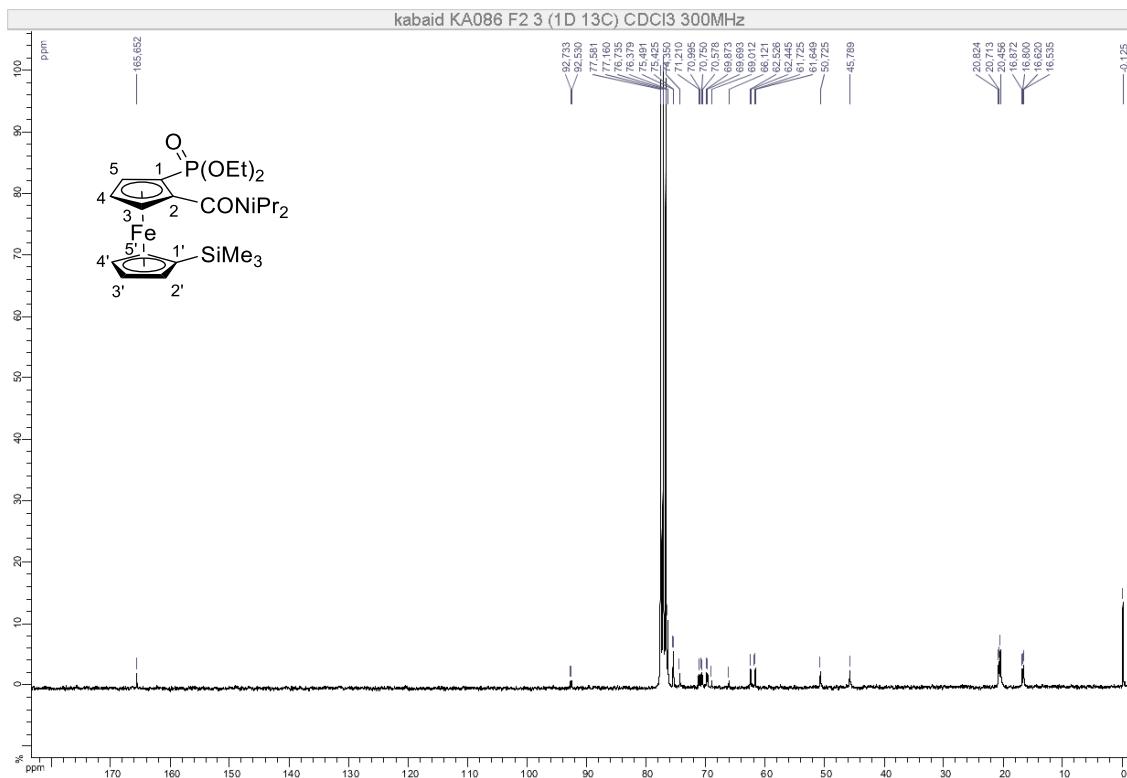


(\pm)-2-(Diisopropylaminocarbonyl)-*O,O*-diethyl-1'-(trimethylsilyl)ferrocenephosphonate ((\pm)-17a')

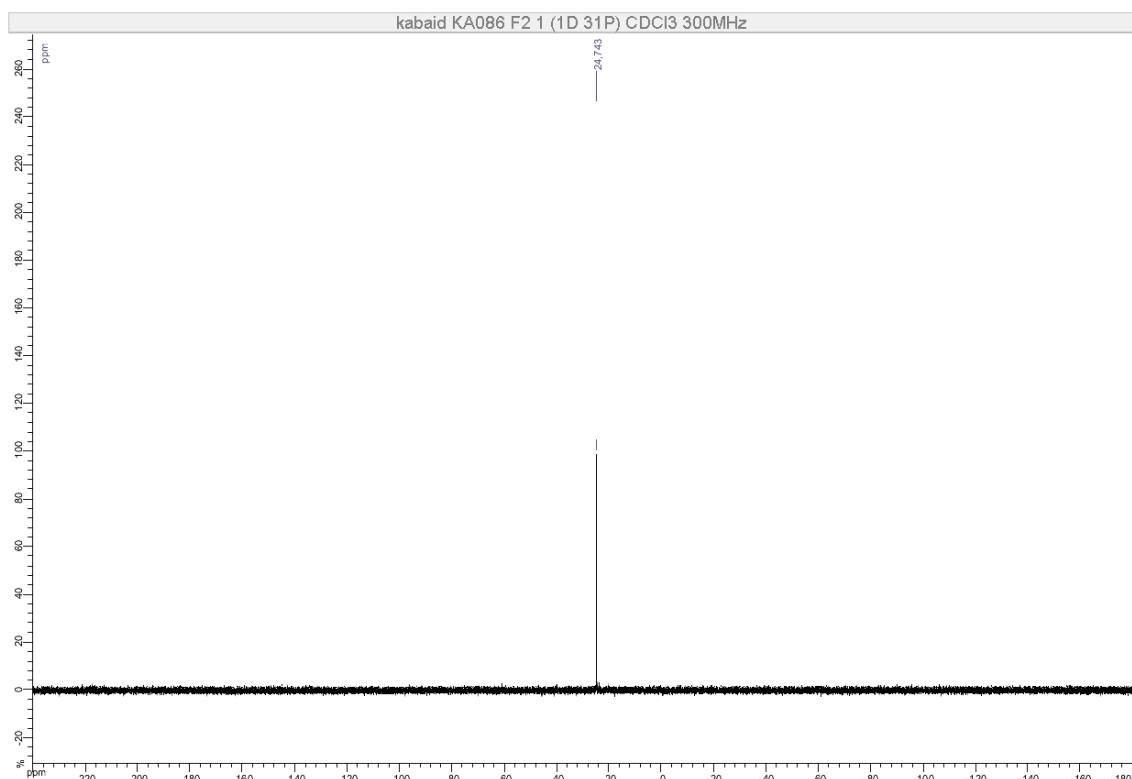
¹H NMR



¹³C{¹H} NMR (75 MHz)

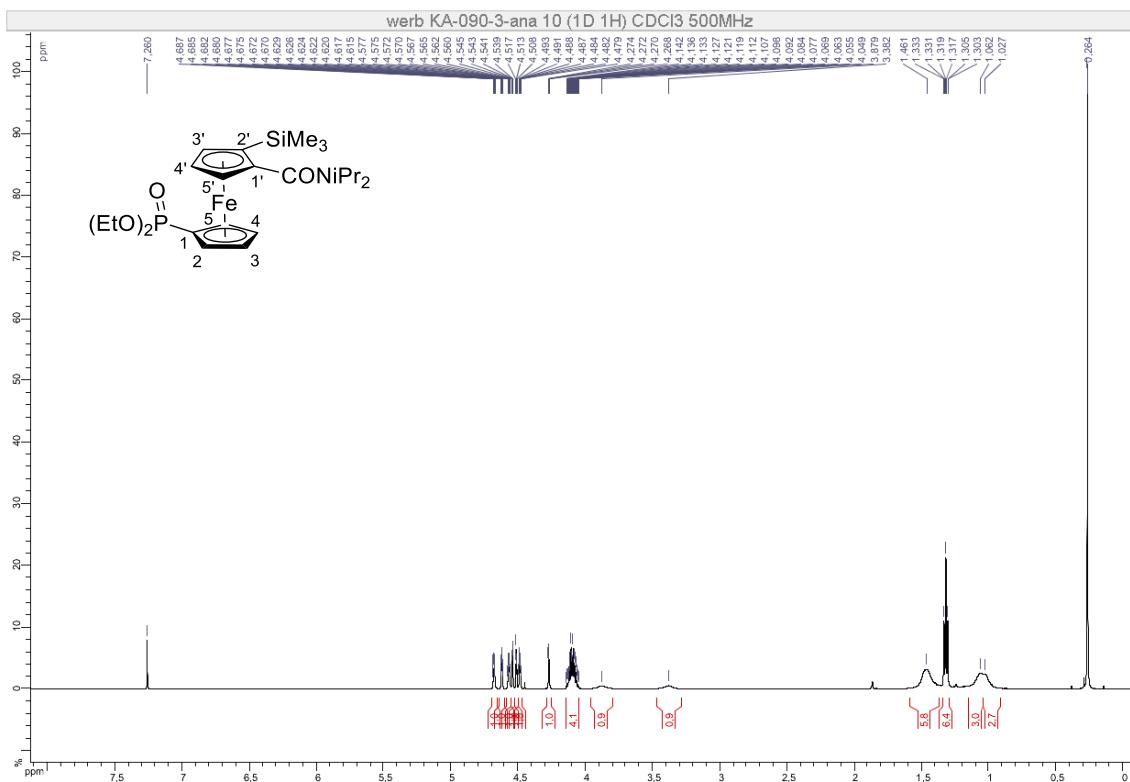


$^{31}\text{P}\{\text{H}\}$ NMR

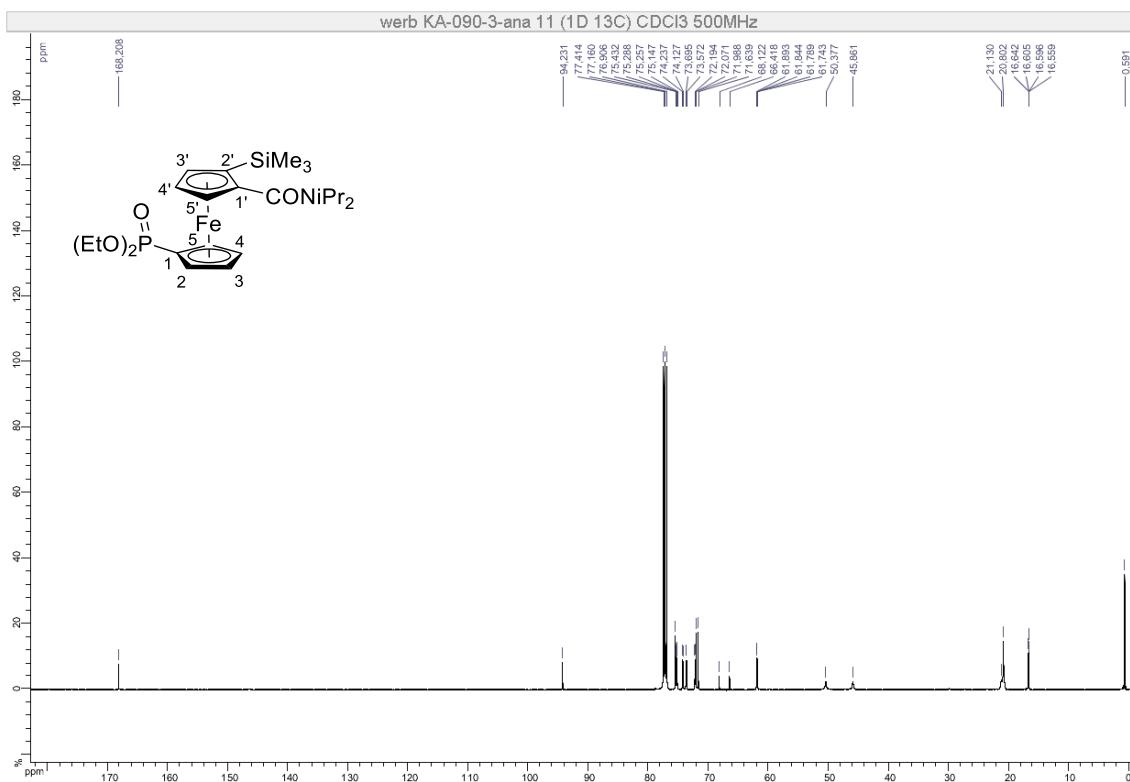


(\pm)-1'-(Diisopropylaminocarbonyl)-O,O-diethyl-2'-(trimethylsilyl)ferrocenephosphonate ((\pm)-18a)

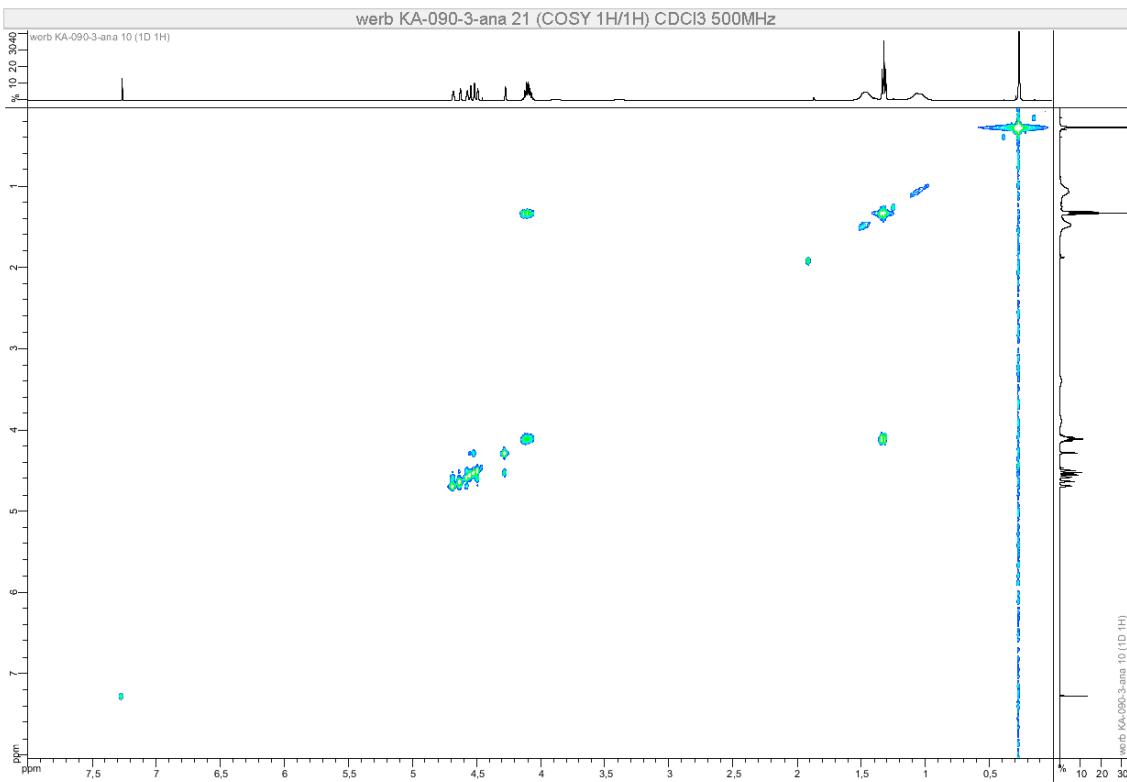
¹H NMR



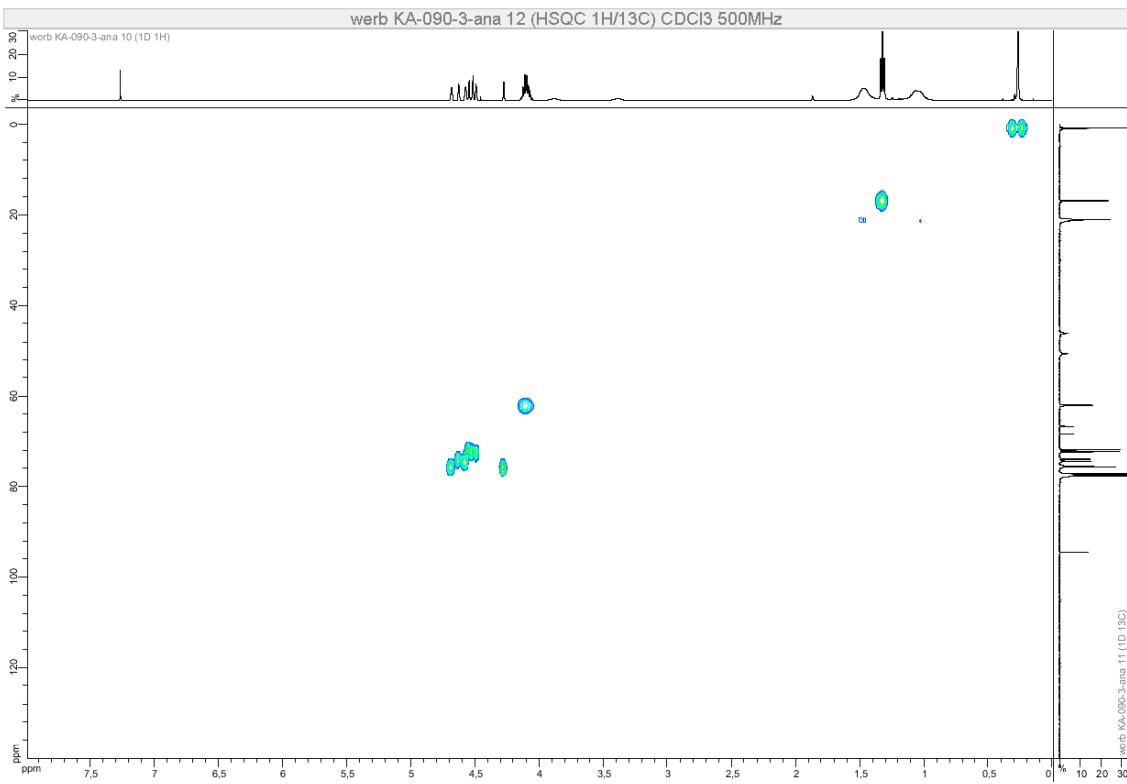
¹³C{¹H} NMR



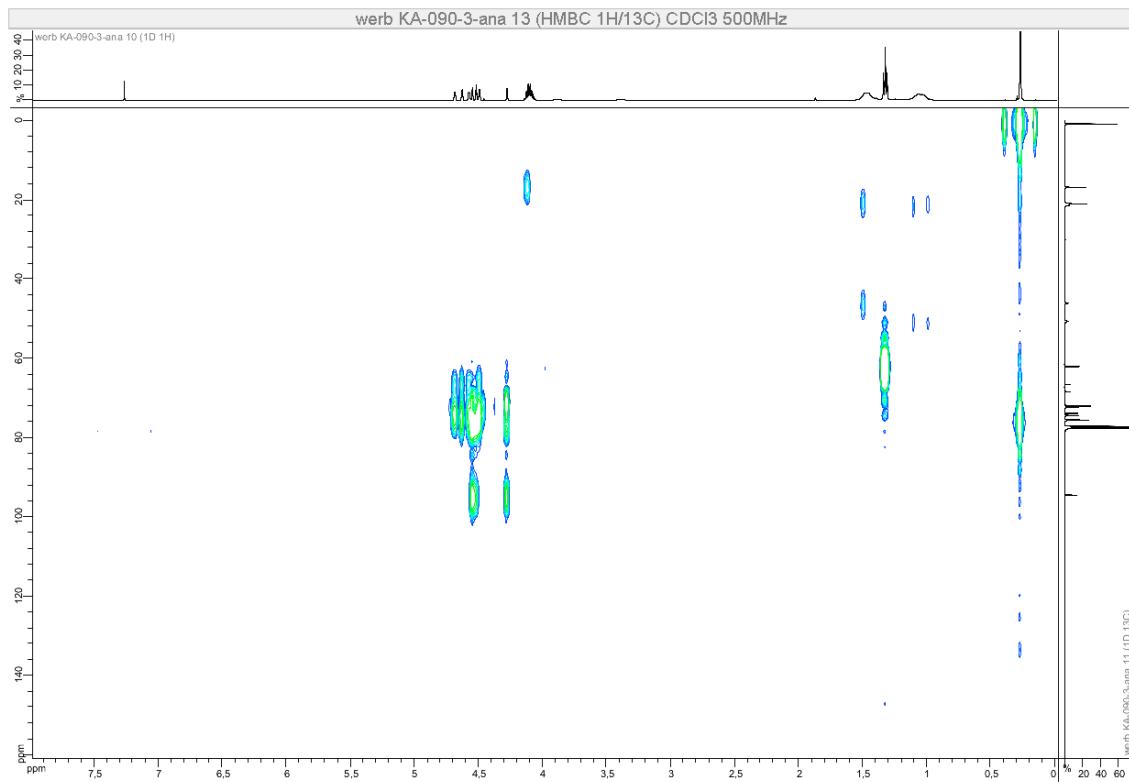
COSY NMR



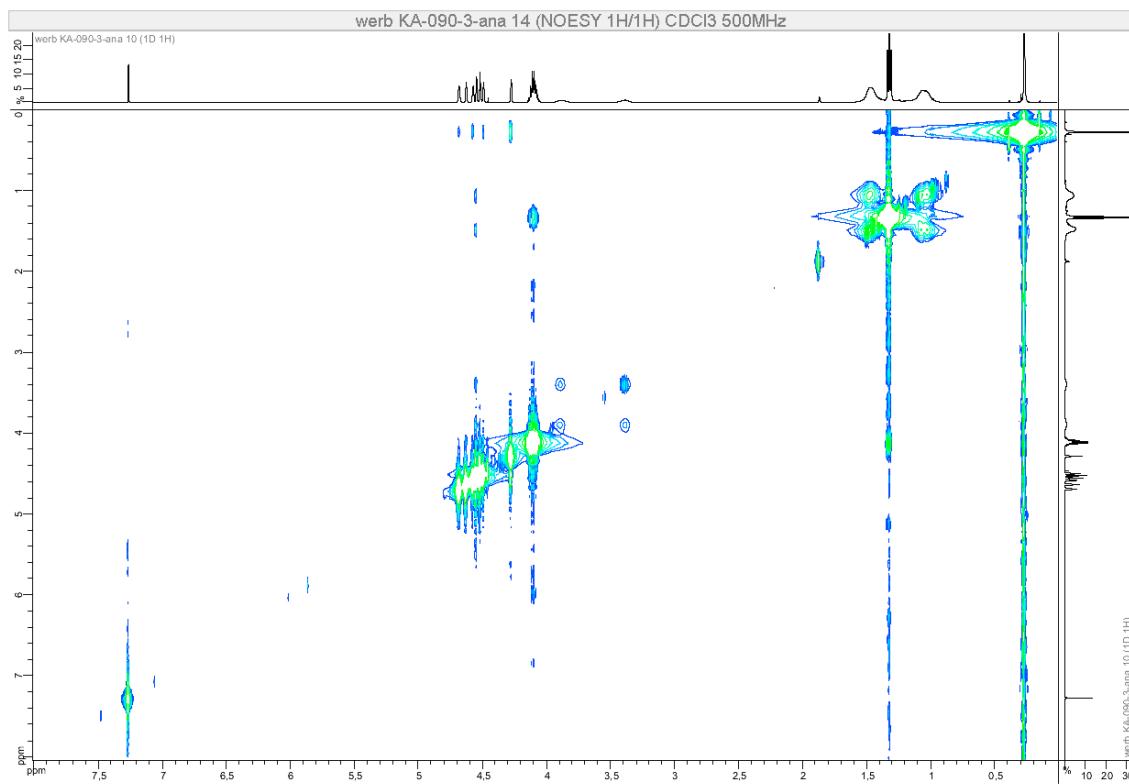
HSQC NMR



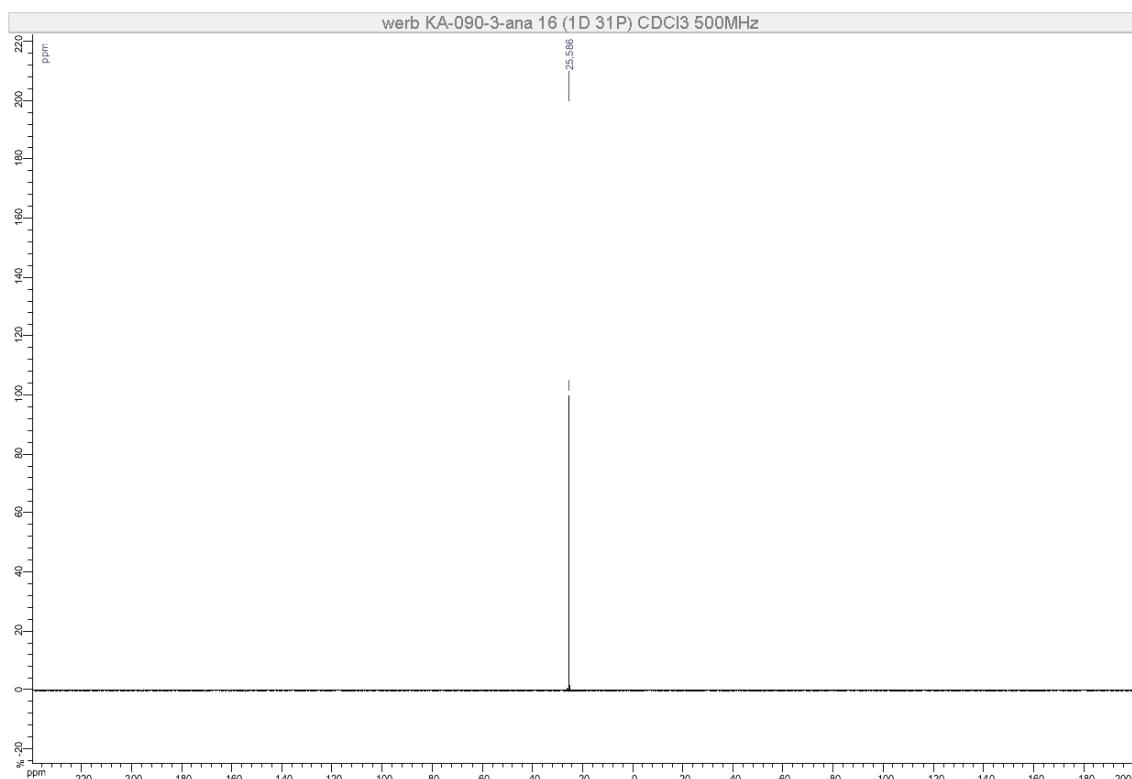
HMBC NMR



NOESY NMR

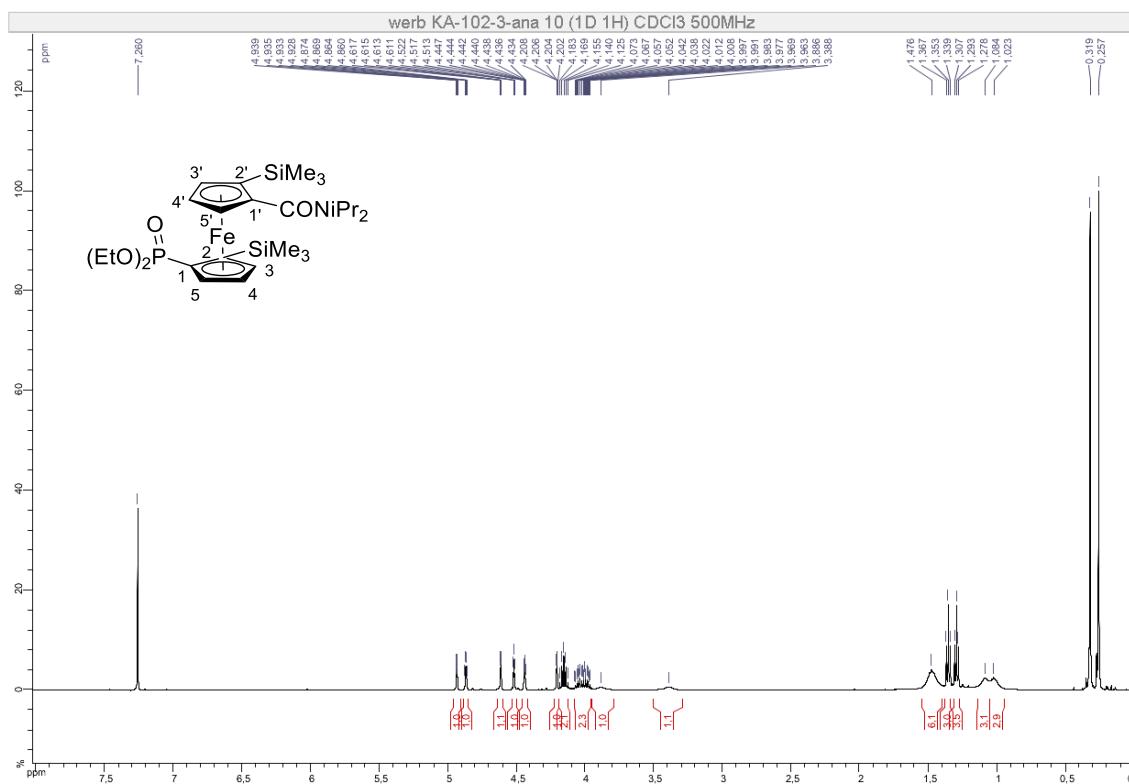


$^{31}\text{P}\{\text{H}\}$ NMR

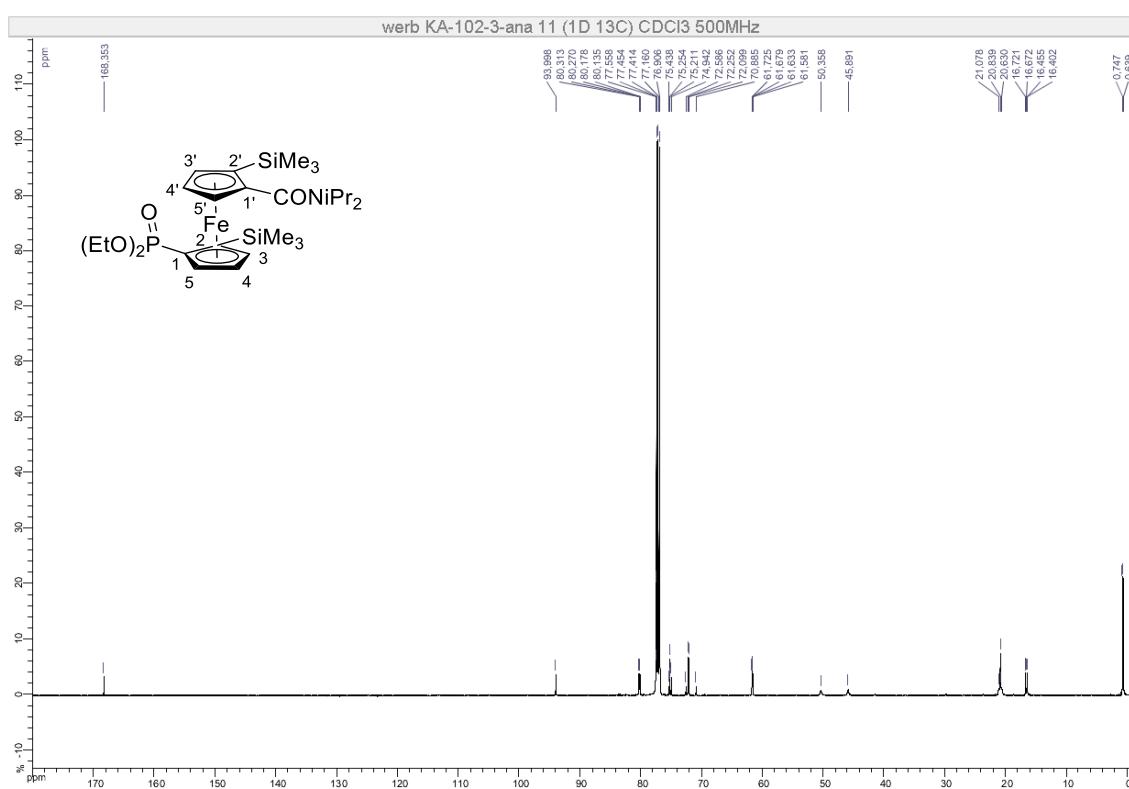


(R,R)- and (S,S)-1'-(Diisopropylaminocarbonyl)-O,O-diethyl-2,2'-bis(trimethylsilyl)ferrocenephosphonate ((±)-19a)

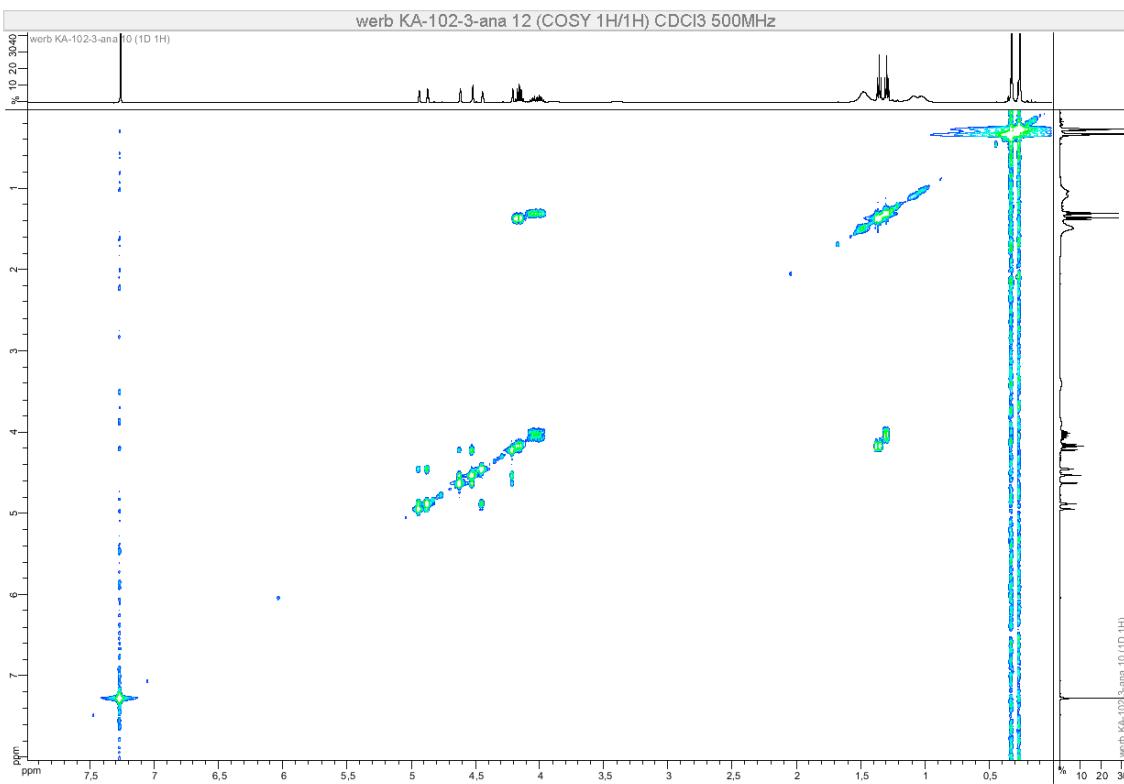
¹H NMR



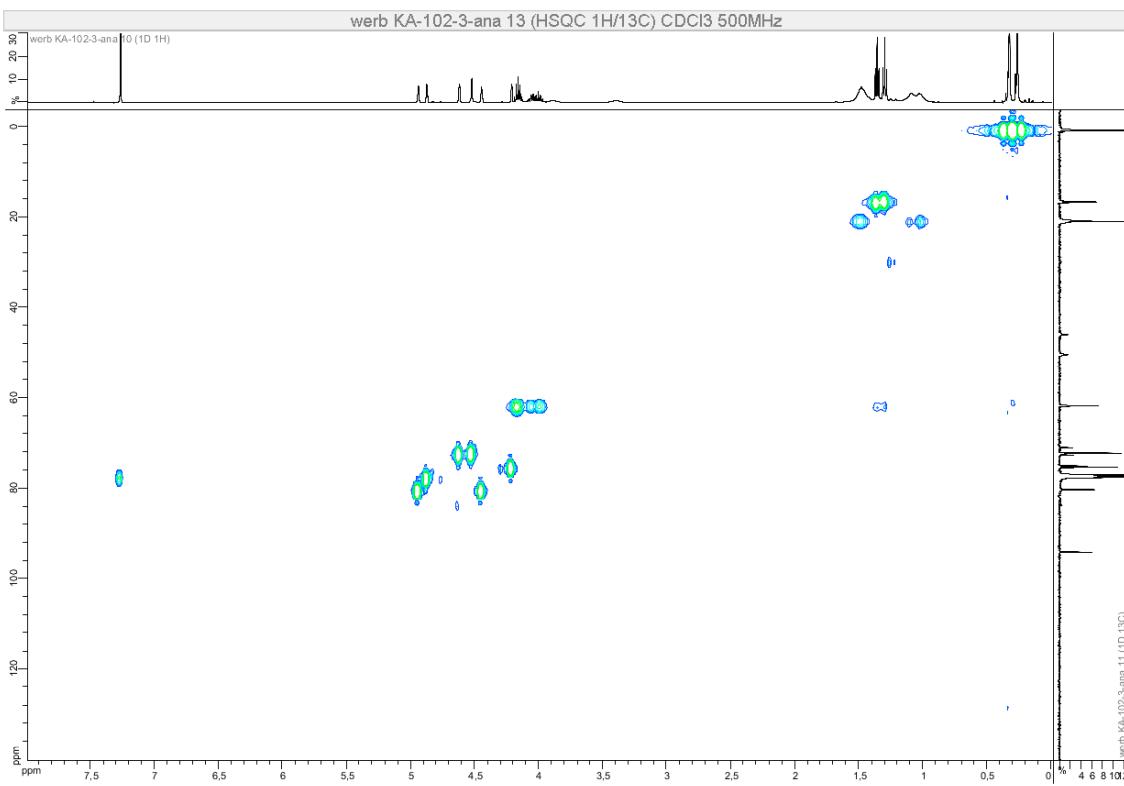
¹³C{¹H} NMR



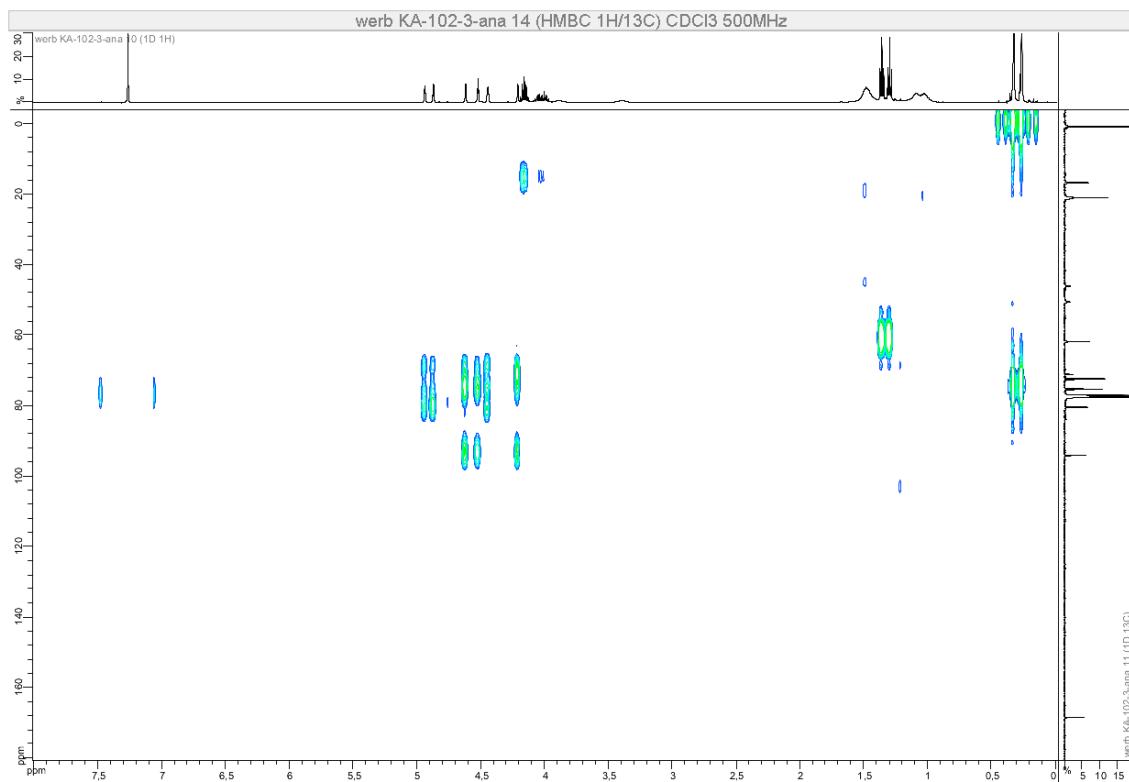
COSY NMR



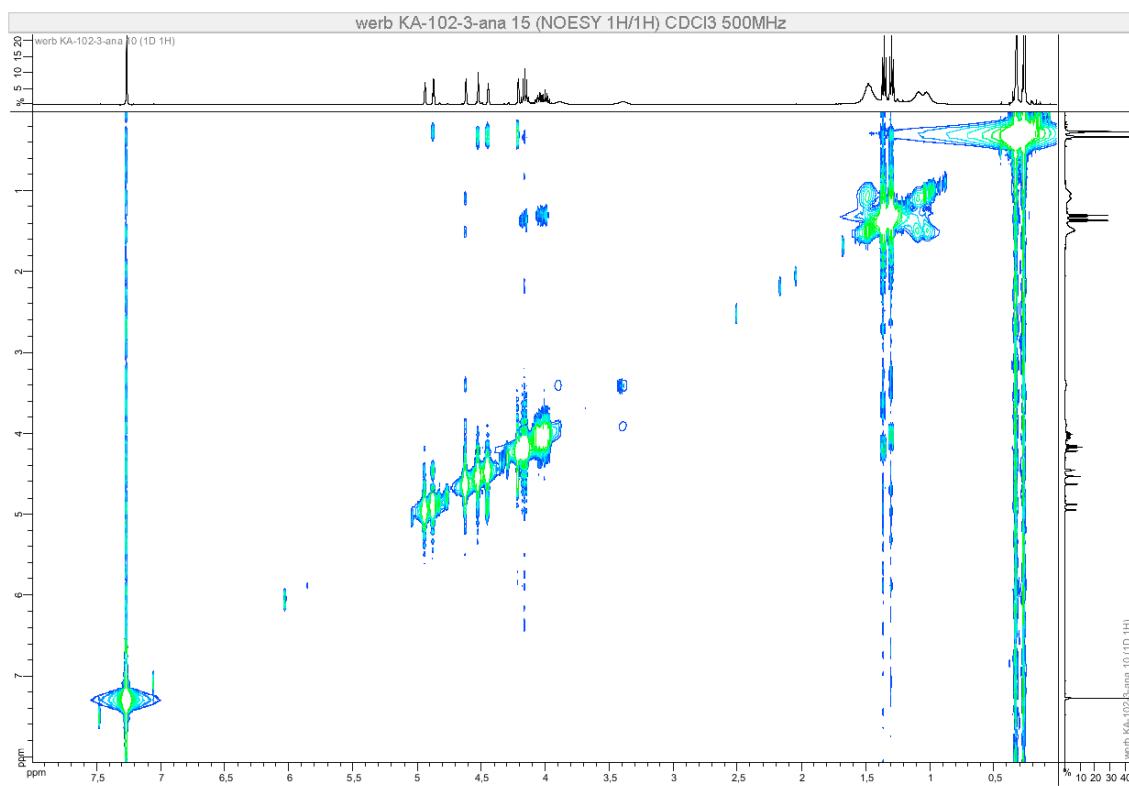
HSQC NMR



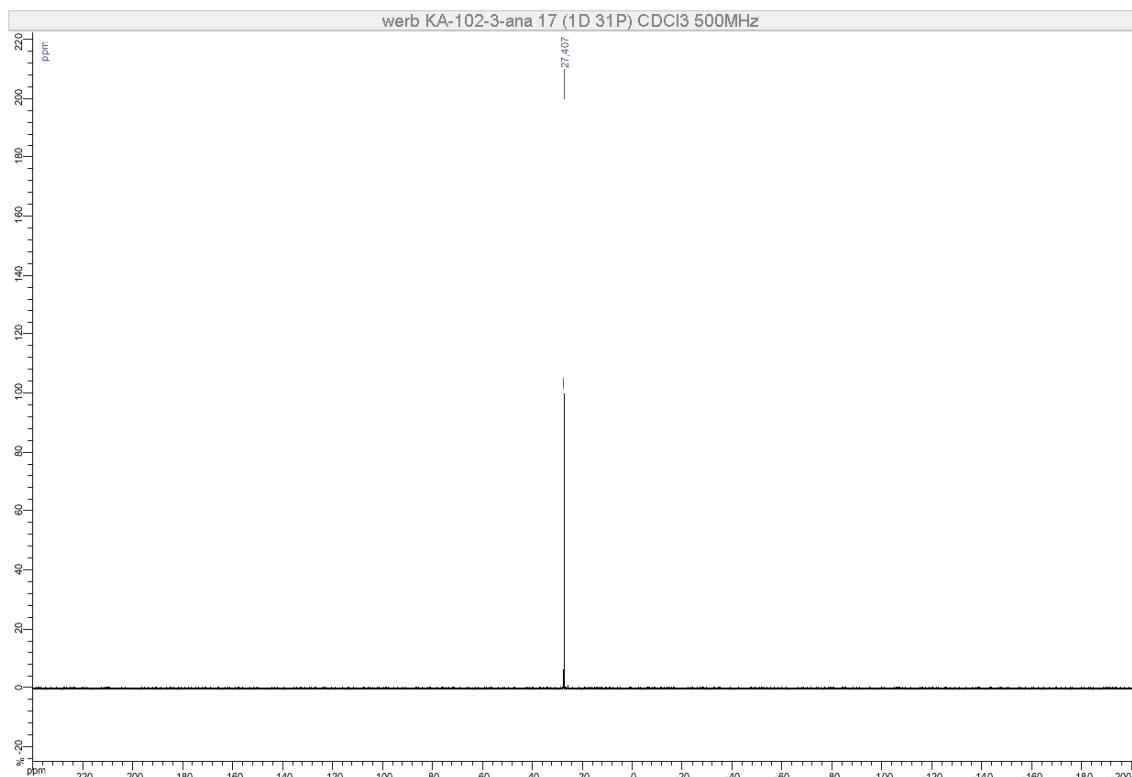
HMBC NMR



NOESY NMR

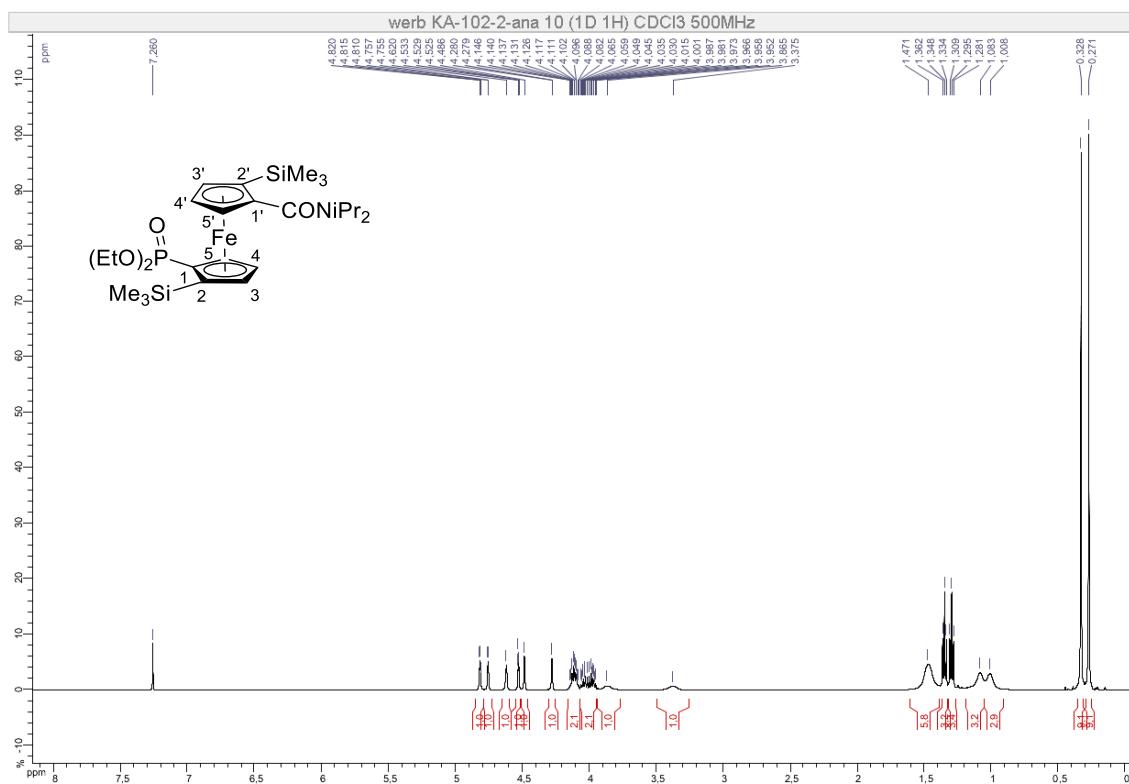


$^{31}\text{P}\{\text{H}\}$ NMR

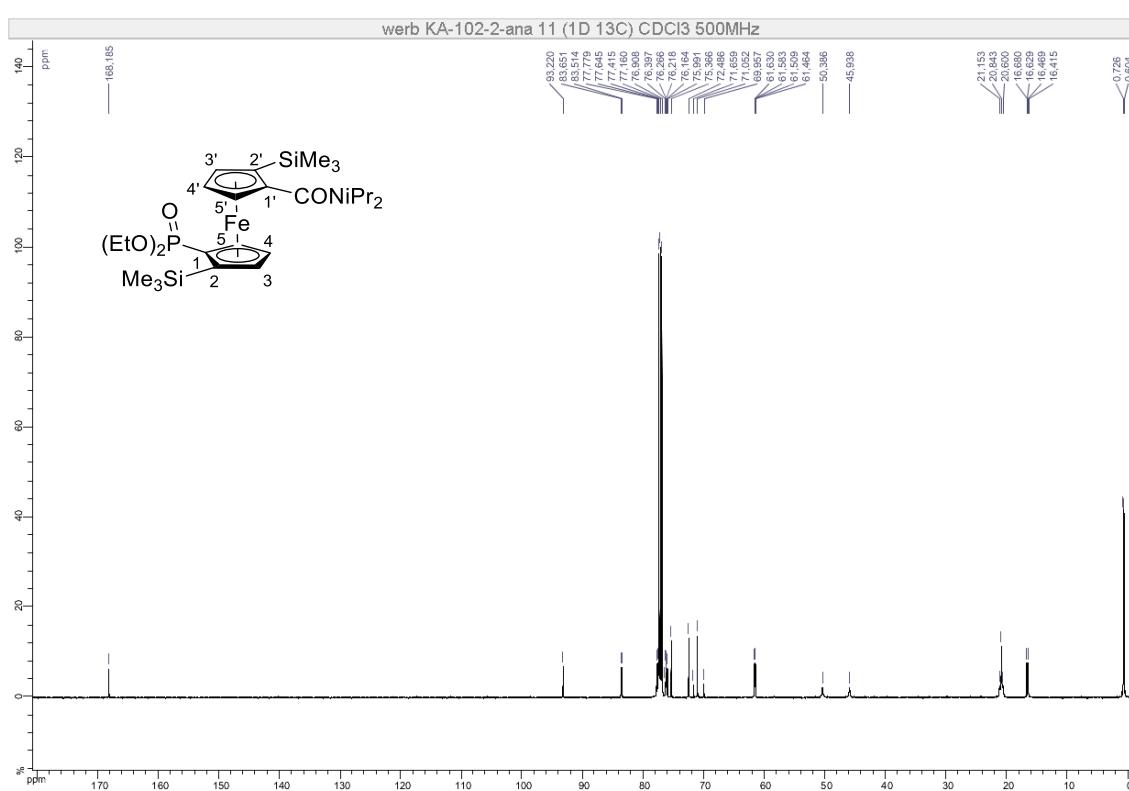


(R,S)- and (S,R)-1'-(Diisopropylaminocarbonyl)-O,O-diethyl-2,2'-bis(trimethylsilyl)ferrocenephosphonate ((±)-19a')

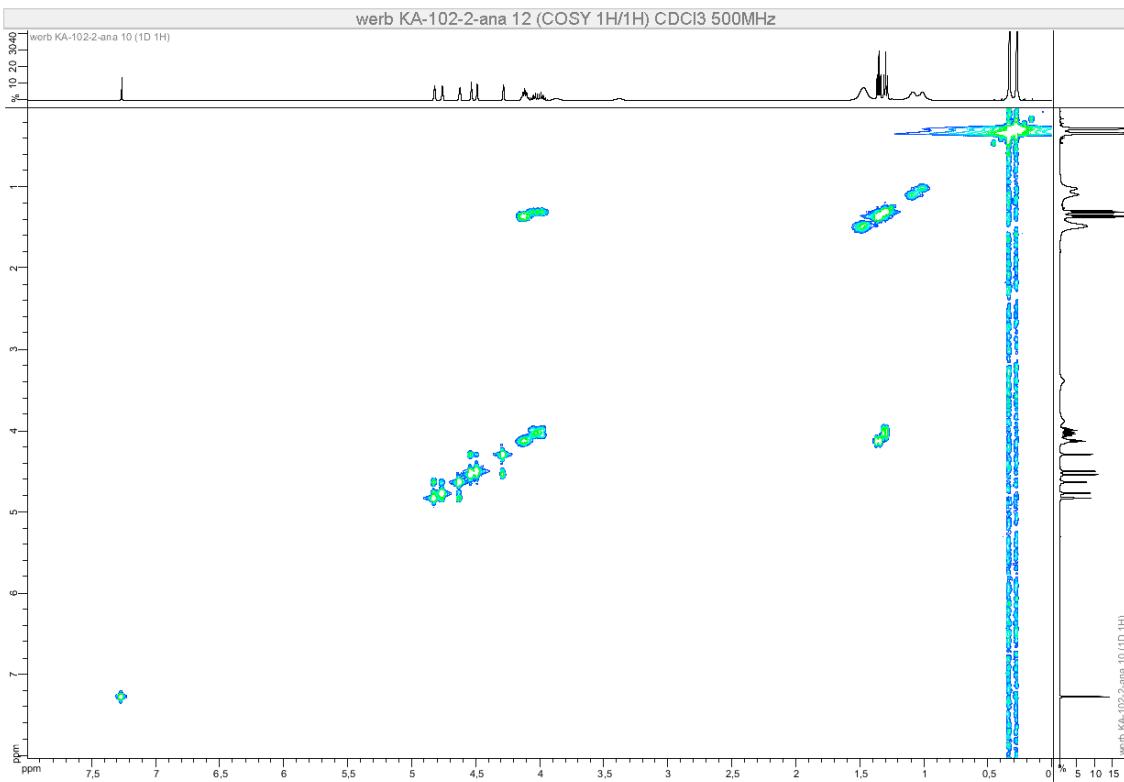
¹H NMR



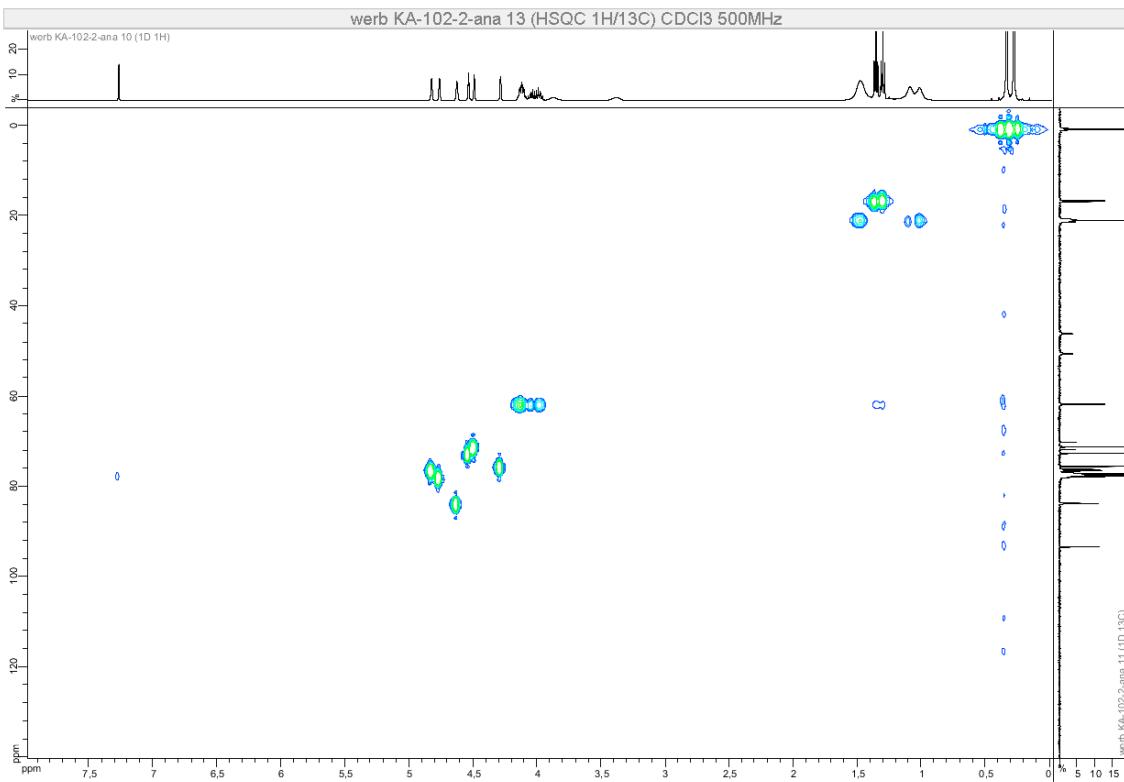
¹³C{¹H} NMR



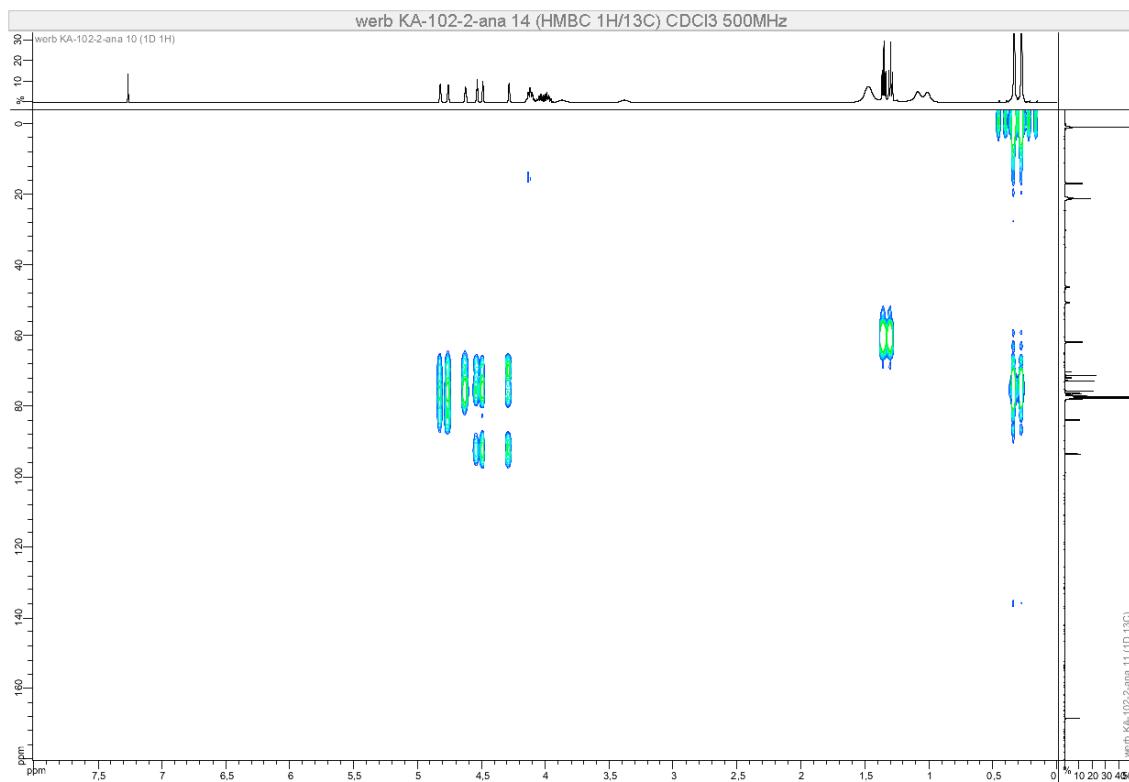
COSY NMR



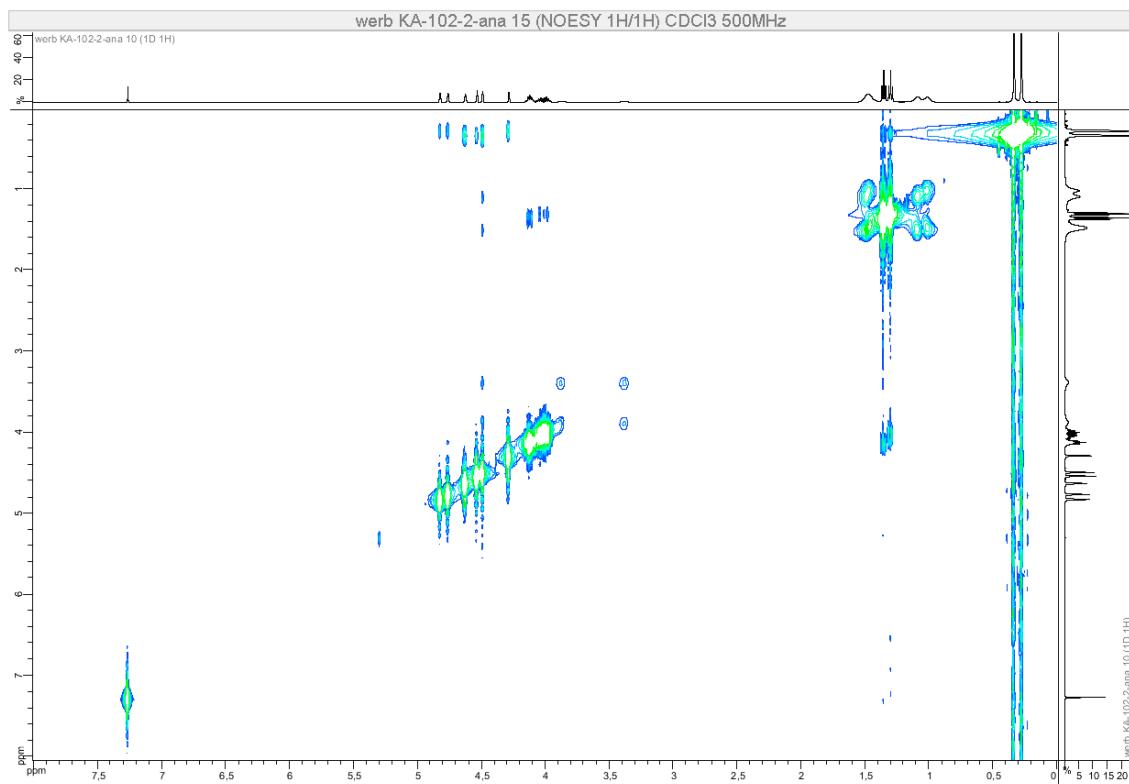
HSQC NMR



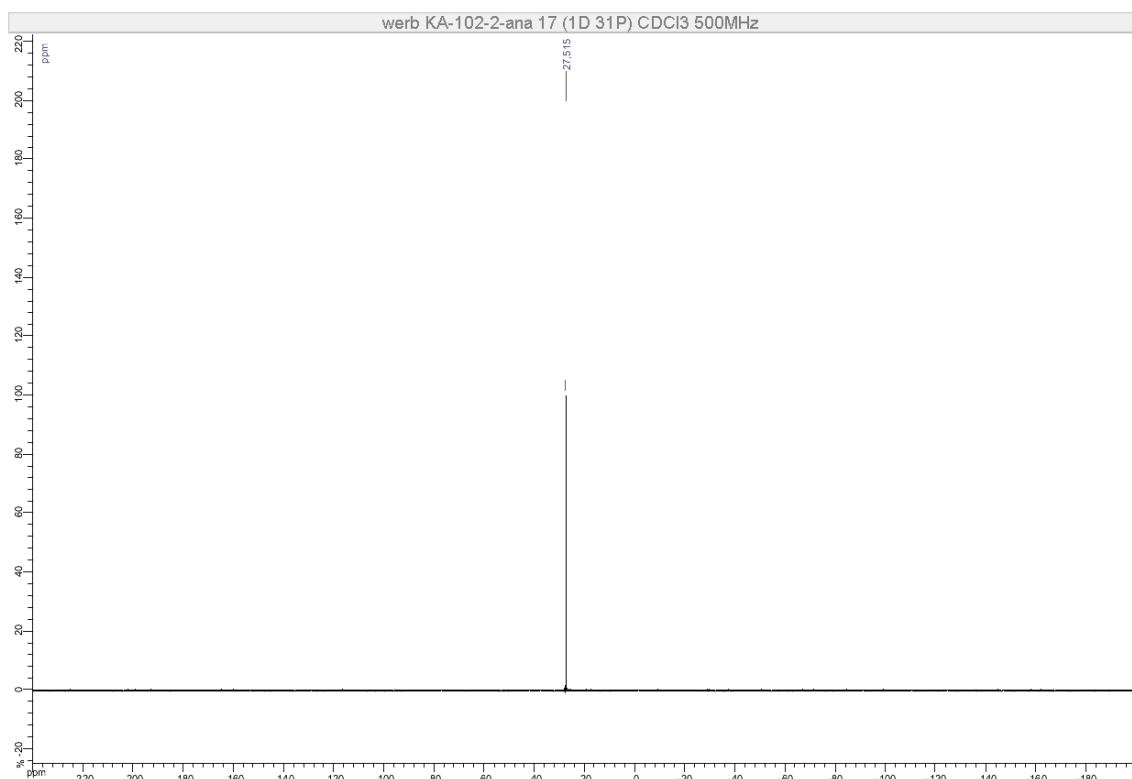
HMBC NMR



NOESY NMR

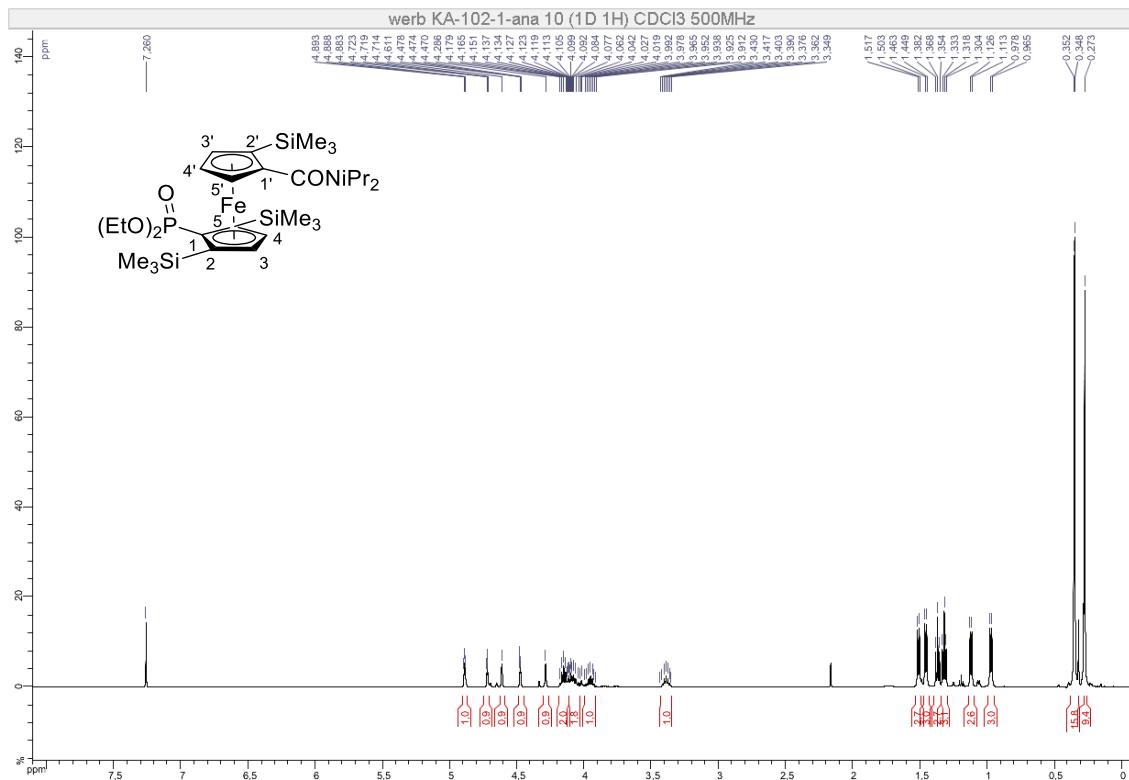


$^{31}\text{P}\{\text{H}\}$ NMR

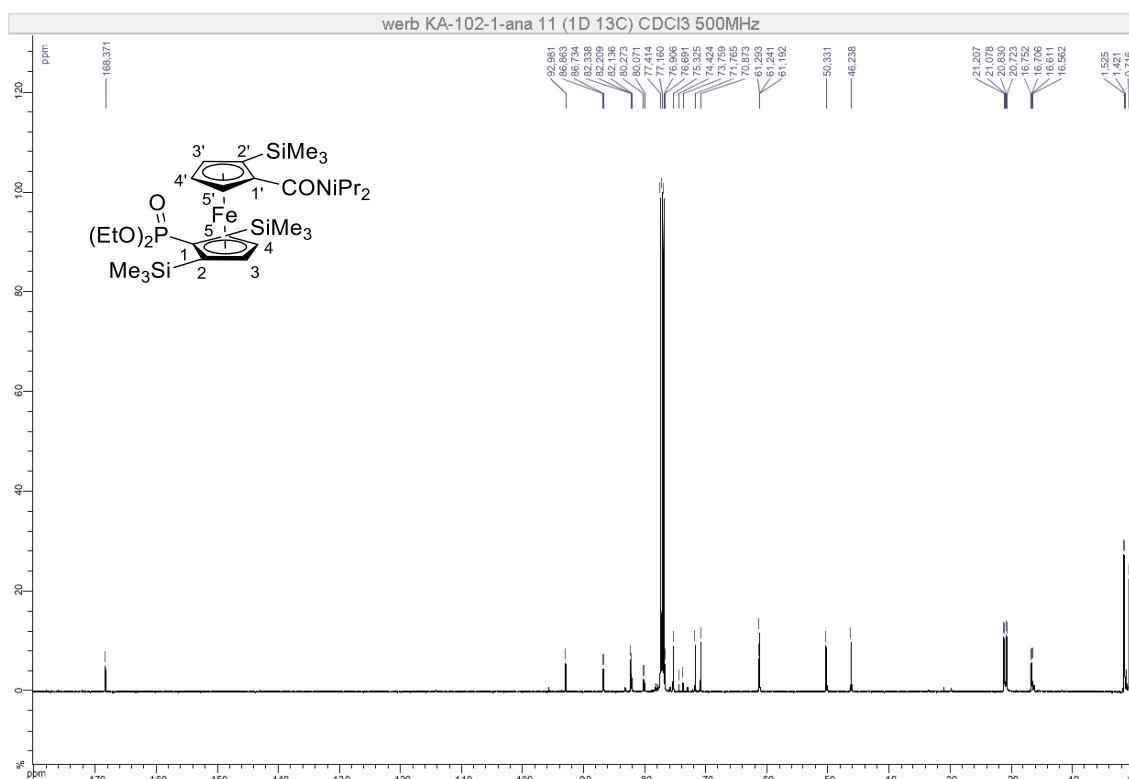


(\pm)-1'-(Diisopropylaminocarbonyl)-O,O-diethyl-2,5,2'-tris(trimethylsilyl)ferrocenephosphonate ((\pm)-19a")

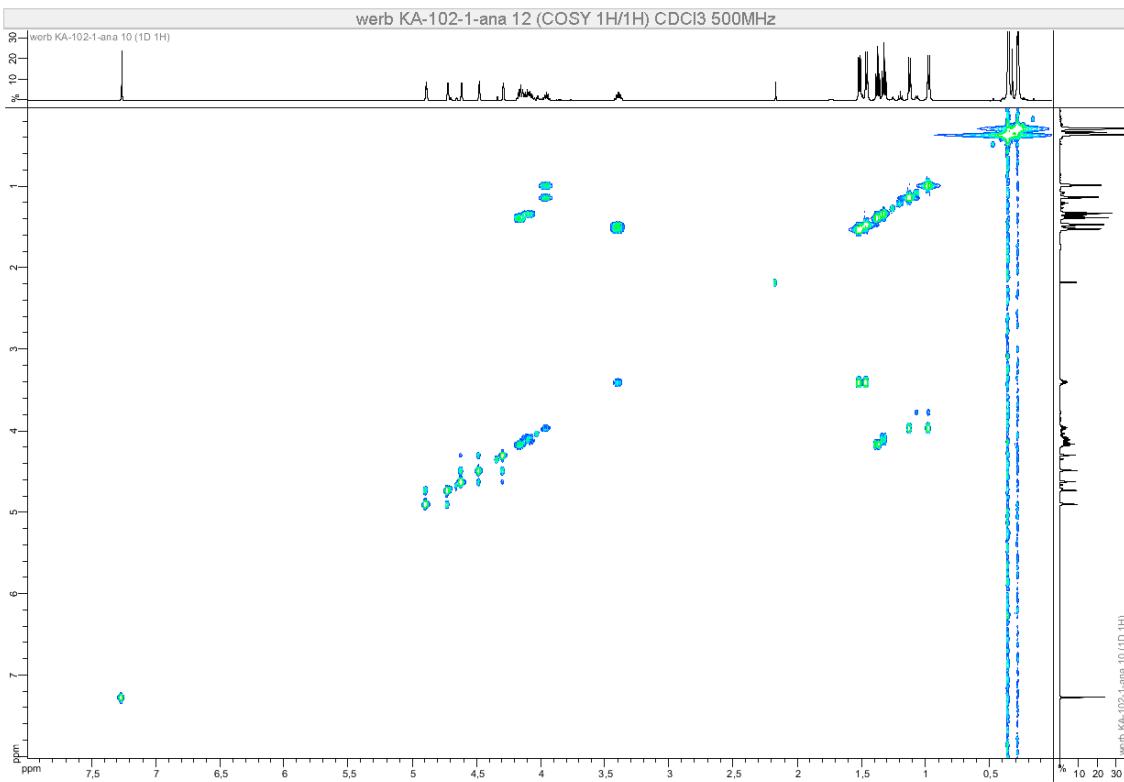
¹H NMR



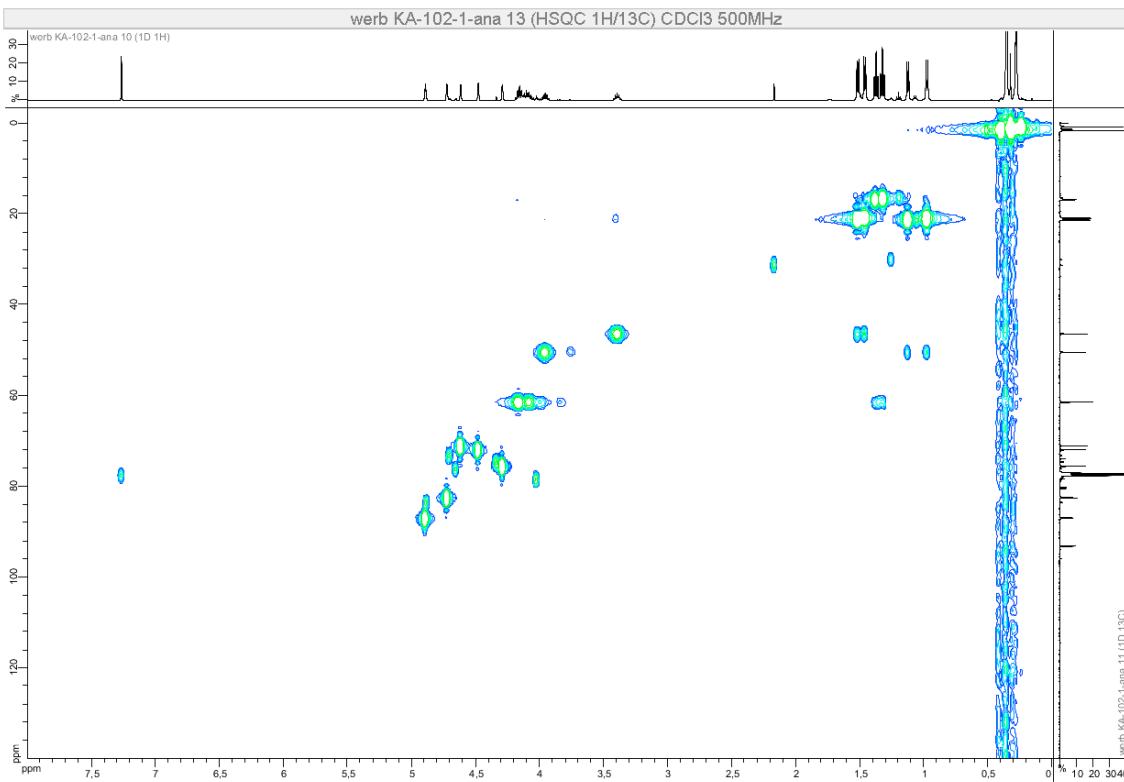
¹³C{¹H} NMR



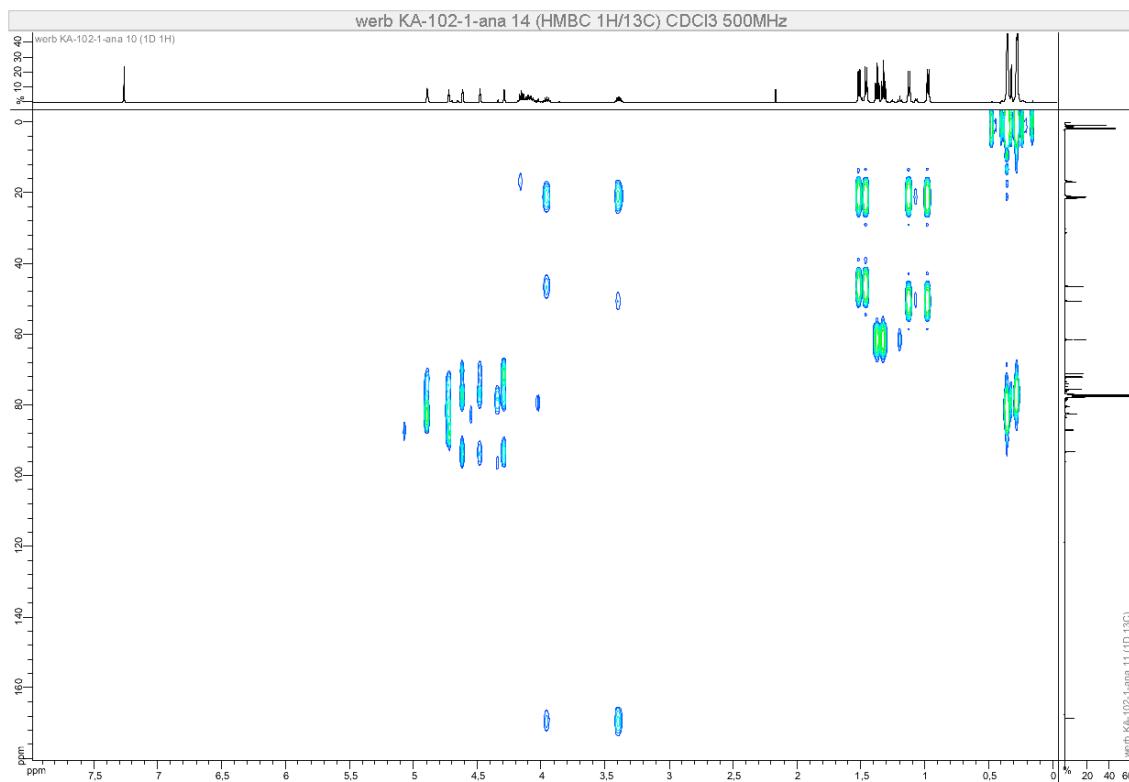
COSY NMR



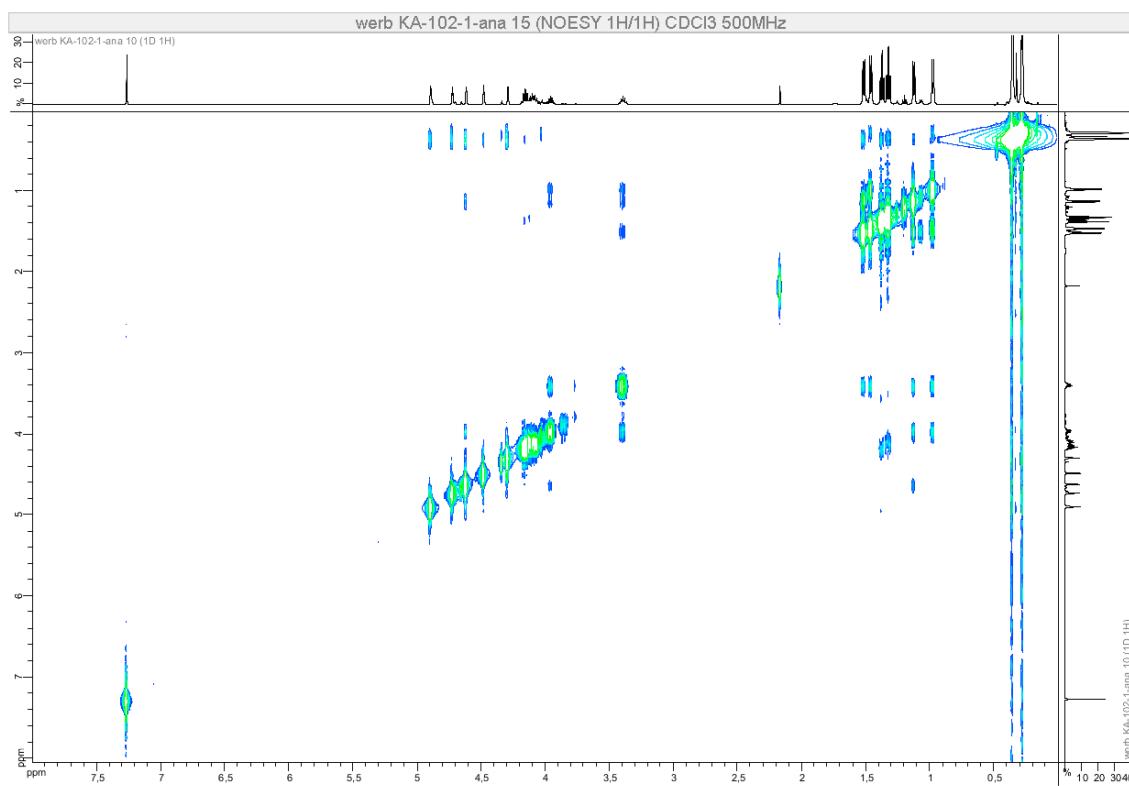
HSQC NMR



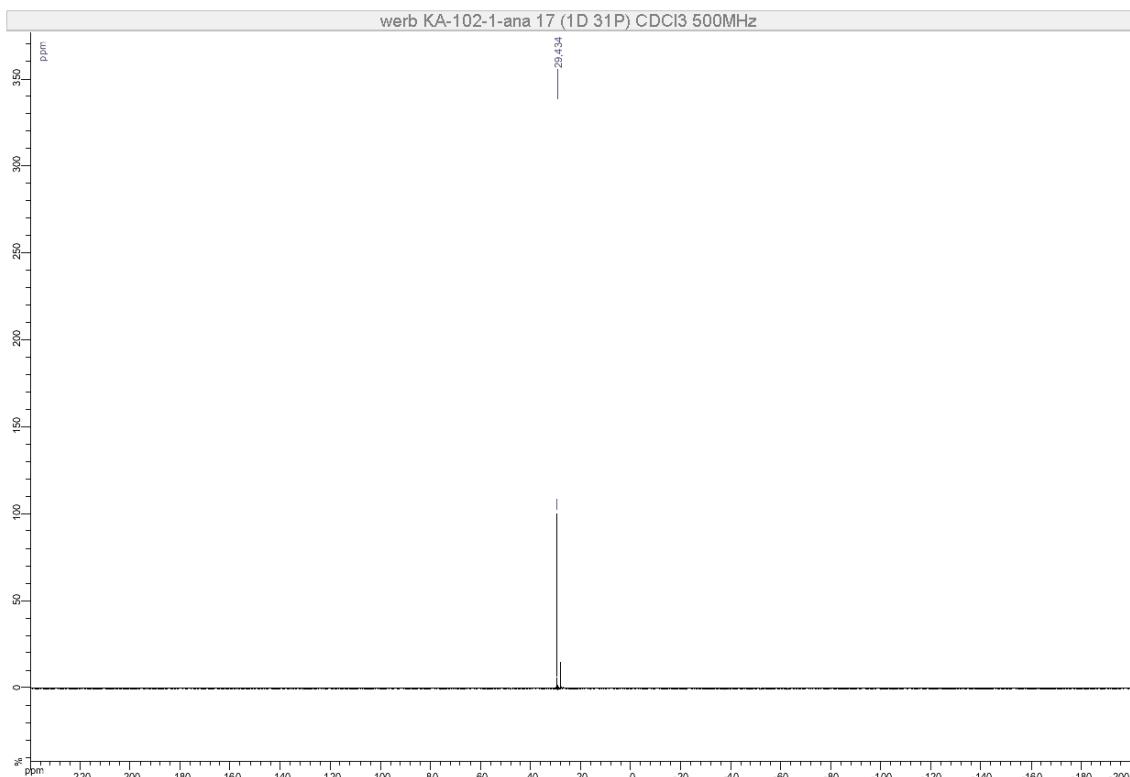
HMBC NMR



NOESY NMR

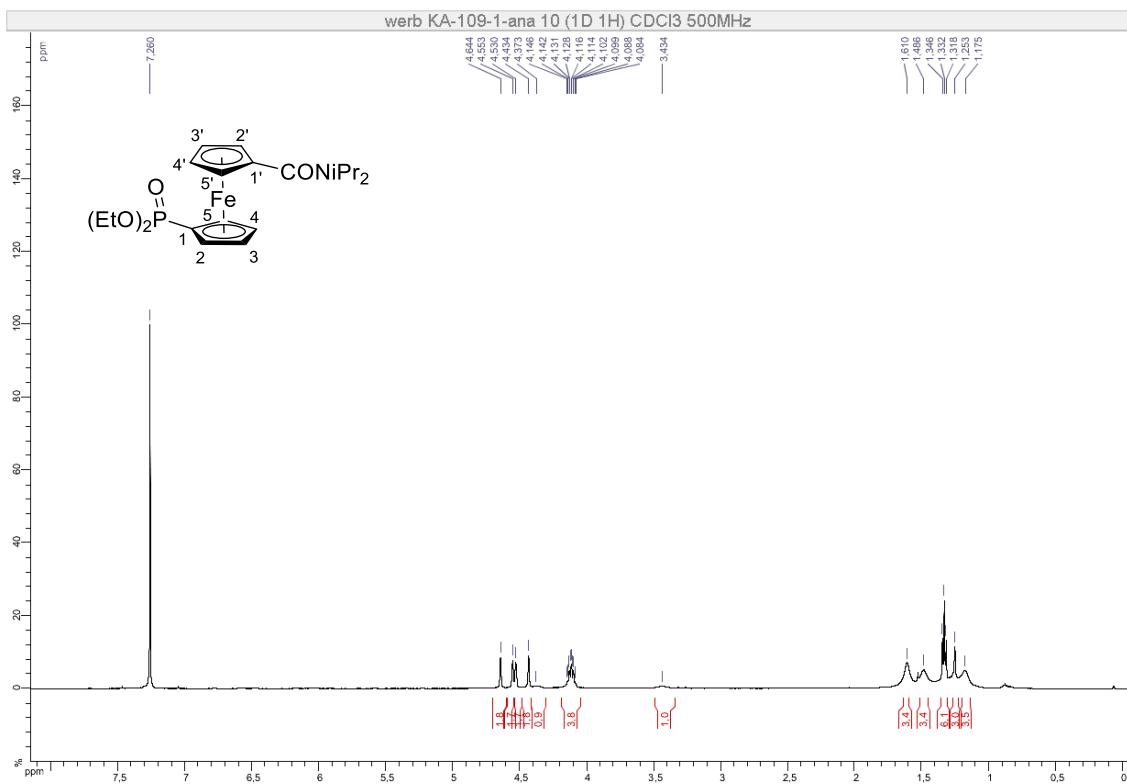


$^{31}\text{P}\{\text{H}\}$ NMR

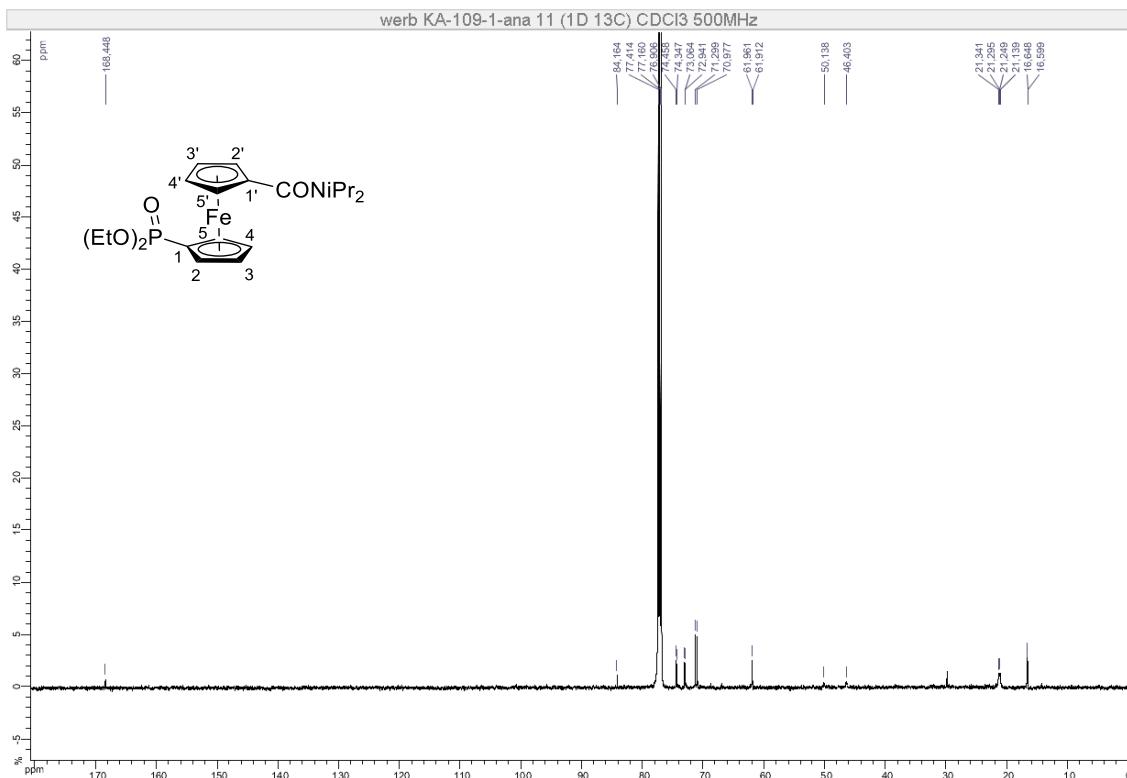


1'--(Diisopropylaminocarbonyl)-*O,O*-diethylferrocenephosphonate (20a)

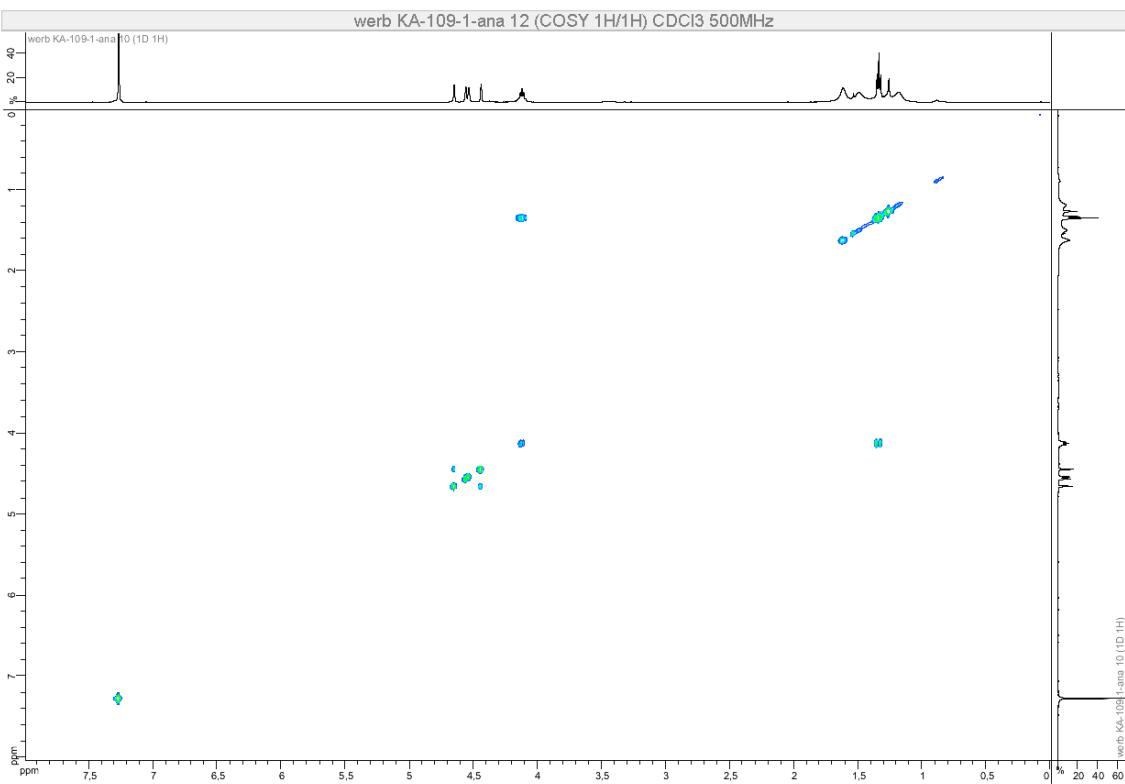
¹H NMR



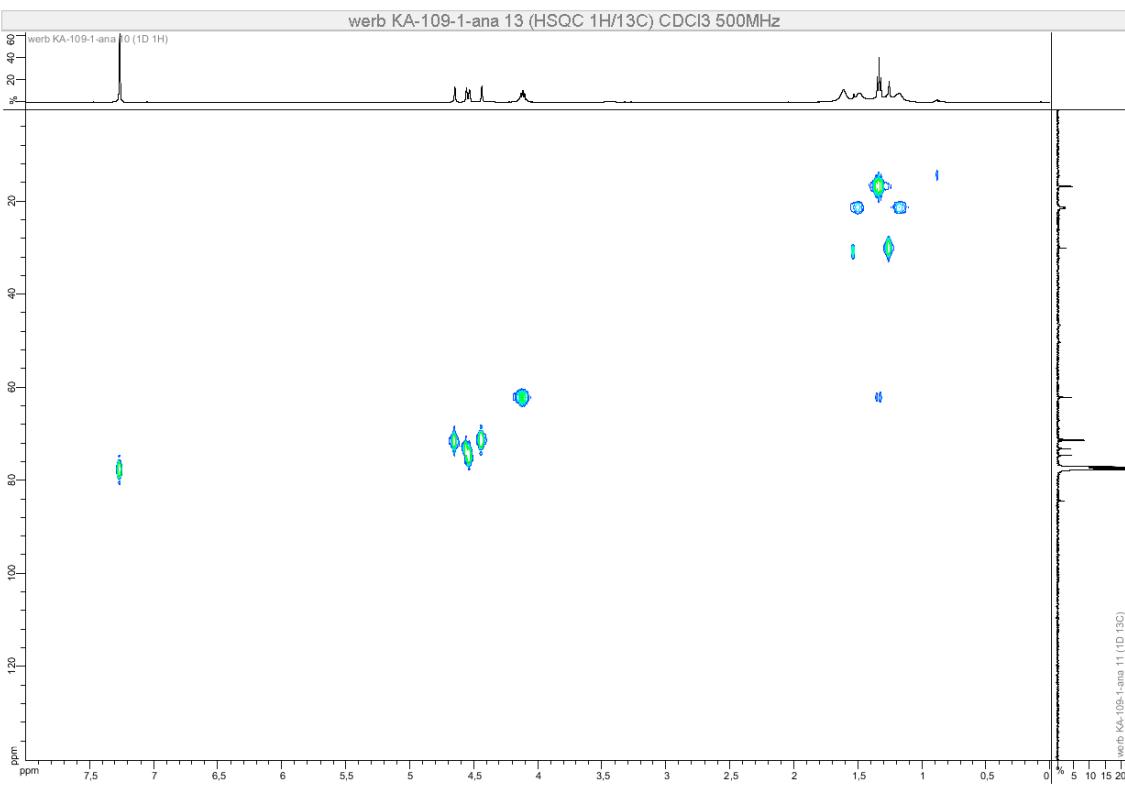
¹³C{¹H} NMR



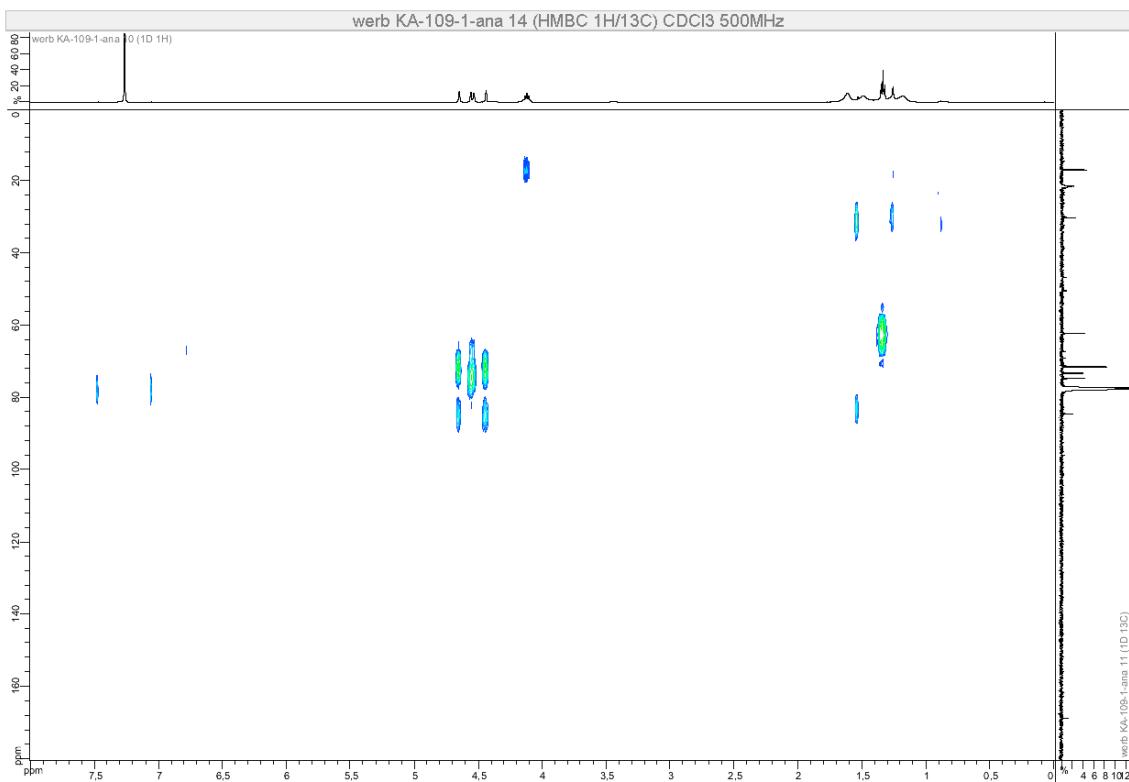
COSY NMR



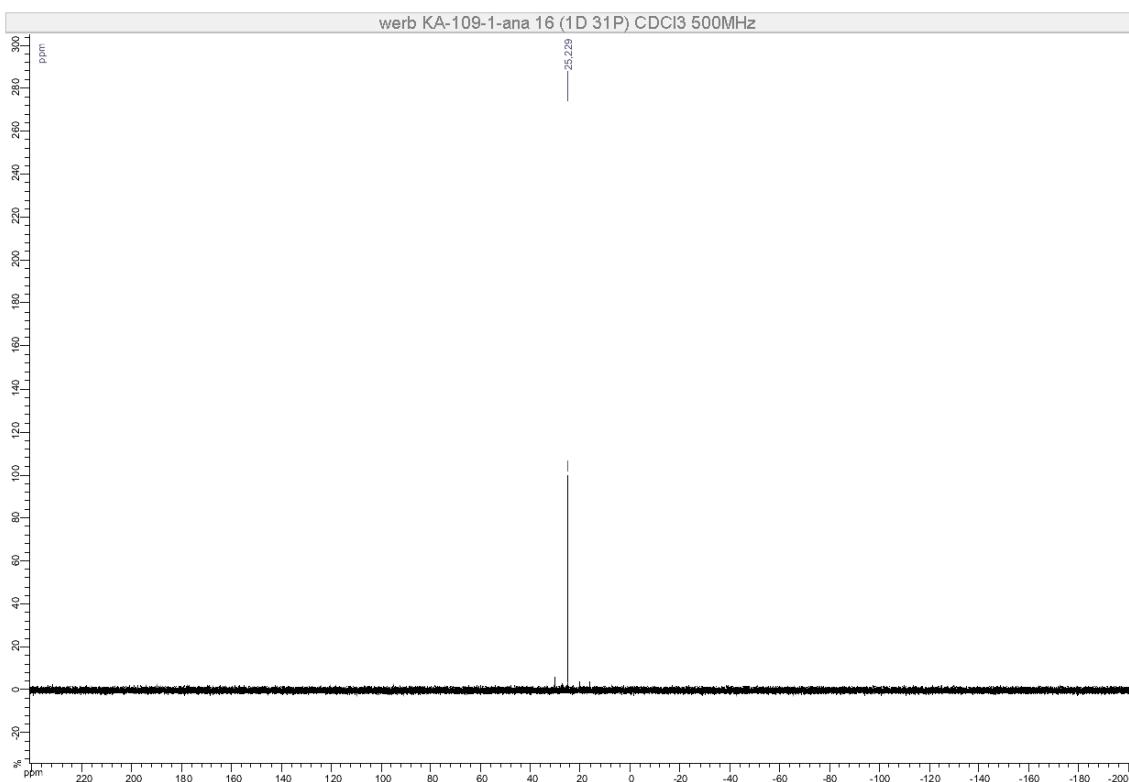
HSQC NMR



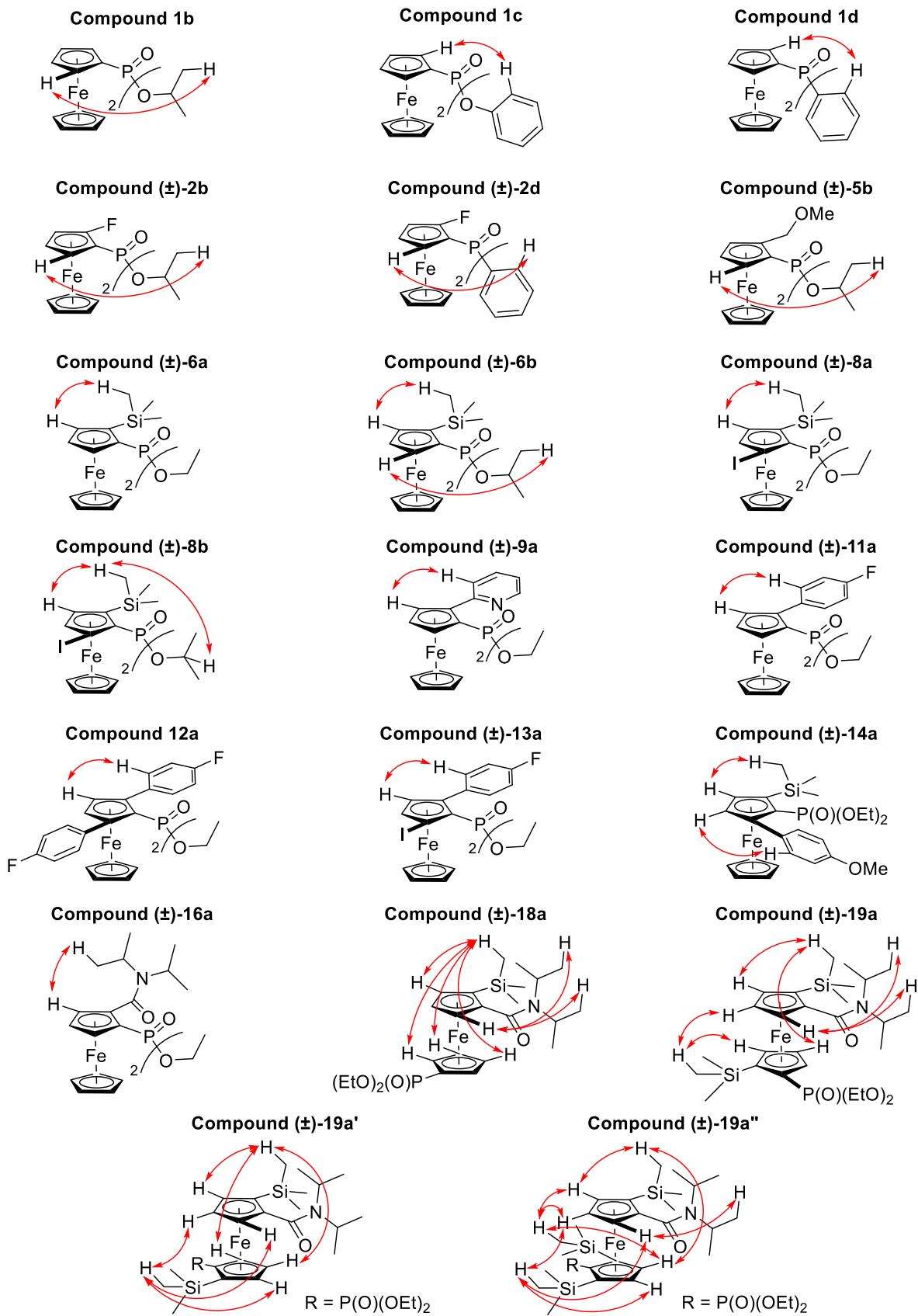
HMBC NMR



³¹P{¹H} NMR



Selected NOESY correlations



HPLC Chromatograms

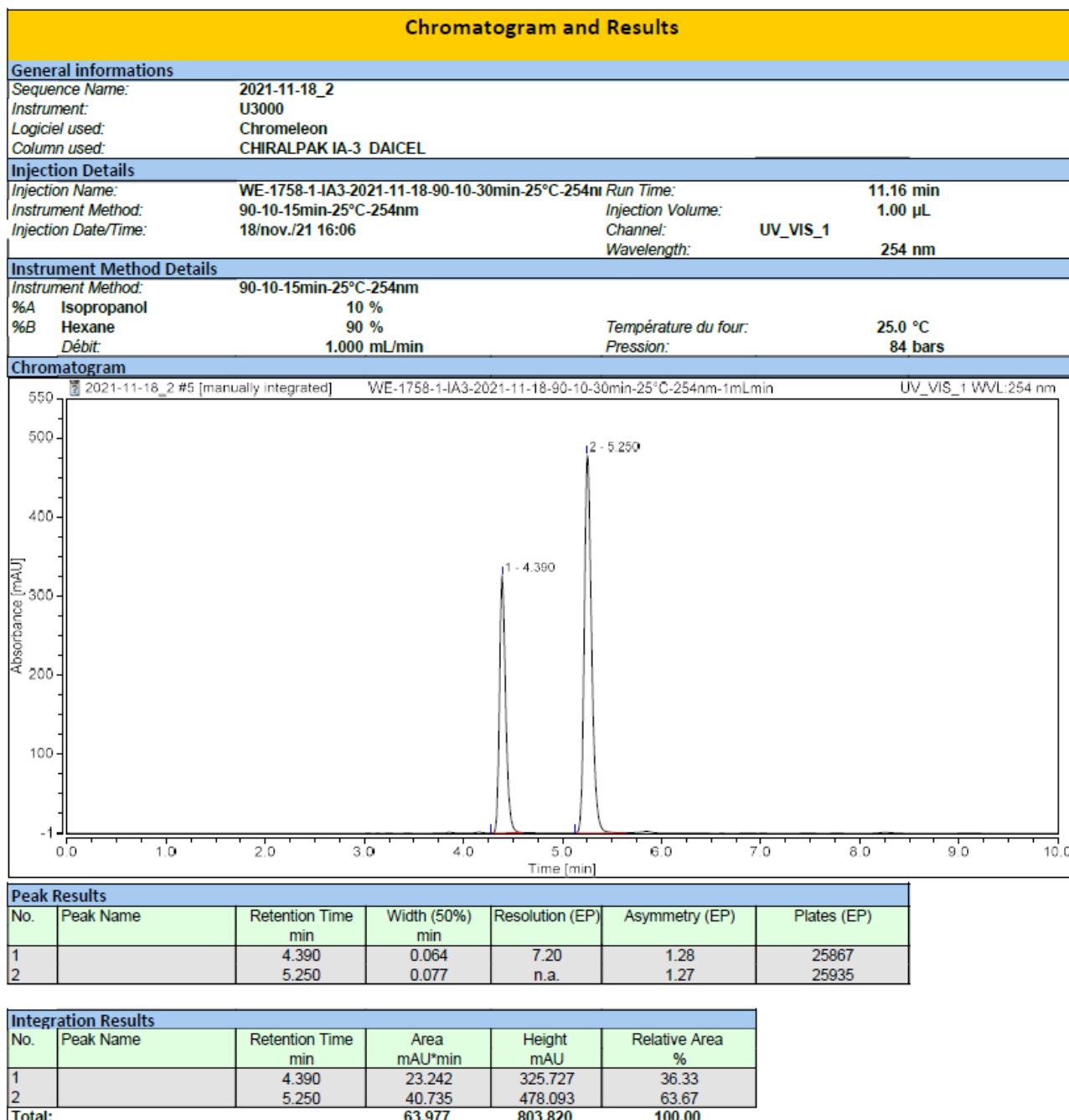
(\pm)-*O,O*-Diethyl-2-(trimethylsilyl)ferrocenephosphonate ((\pm)-6a)

Chromatogram and Results											
General informations											
Sequence Name:		2021-11-18_2									
Instrument:		U3000									
Logiciel used:		Chromeleon									
Column used:		CHIRALPAK IA-3 DAICEL									
Injection Details											
Injection Name:		WE-1767-1-IA3-2021-11-18-90-10-30min-25°C-254nm									
Instrument Method:		Run Time: 11.19 min 90-10-30min-25°C-254nm Injection Volume: 1.00 µL									
Injection Date/Time:		18/nov./21 15:22 Channel: UV_VIS_1 Wavelength: 254 nm									
Instrument Method Details											
Instrument Method:		90-10-30min-25°C-254nm									
%A Isopropanol	10 %	Température du four: 25.0 °C									
%B Hexane	90 %	Pression: 83 bars									
Débit:	1.000 mL/min										
Chromatogram											
2021-11-18_2 #2 [manually integrated]		WE-1767-1-IA3-2021-11-18-90-10-30min-25°C-254nm-1mL/min UV_VIS_1 WVL:254 nm									
Peak Results											
No.	Peak Name	Retention Time min	Width (50%) min	Resolution (EP)	Asymmetry (EP)	Plates (EP)					
1		4.392	0.063	7.31	1.29	26615					
2		5.255	0.076	n.a.	1.23	26532					
Integration Results											
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %						
1		4.392	64.265	910.535	49.98						
2		5.255	64.315	764.315	50.02						
Total:			128.580	1674.850	100.00						

Deprotonation of *O,O*-diethylferrocenephosphonate (1a**) with *n*-BuLi-(+)-sparteine surrogate using chlorotrimethylsilane as electrophile**

Chromatogram and Results						
General informations						
Sequence Name:	2021-11-18_2	Instrument:	U3000	Logiciel used:	Chromeleon	Column used:
					CHIRALPAK IA-3 DAICEL	
Injection Details						
Injection Name:	WE-1756-1-IA3-2021-11-18-90-10-30min-25°C-254nm	Run Time:	10.06 min	Instrument Method:	90-10-30min-25°C-254nm	Injection Volume:
Injection Date/Time:	18/nov./21 15:55	Channel:	UV_VIS_1			1.00 µL
		Wavelength:	254 nm			
Instrument Method Details						
Instrument Method:	90-10-30min-25°C-254nm	%A Isopropanol	10 %	%B Hexane	90 %	Température du four:
Débit:	1.000 mL/min					Pression:
						25.0 °C
						83 bars
Chromatogram						
Peak Results						
No.	Peak Name	Retention Time min	Width (50%) min	Resolution (EP)	Asymmetry (EP)	Plates (EP)
1		4.392	0.064	7.24	1.29	26158
2		5.253	0.076	n.a.	1.24	26143
Integration Results						
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	
1		4.392	49.622	694.731	63.44	
2		5.253	28.594	337.252	36.56	
Total:			78.216	1031.984	100.00	

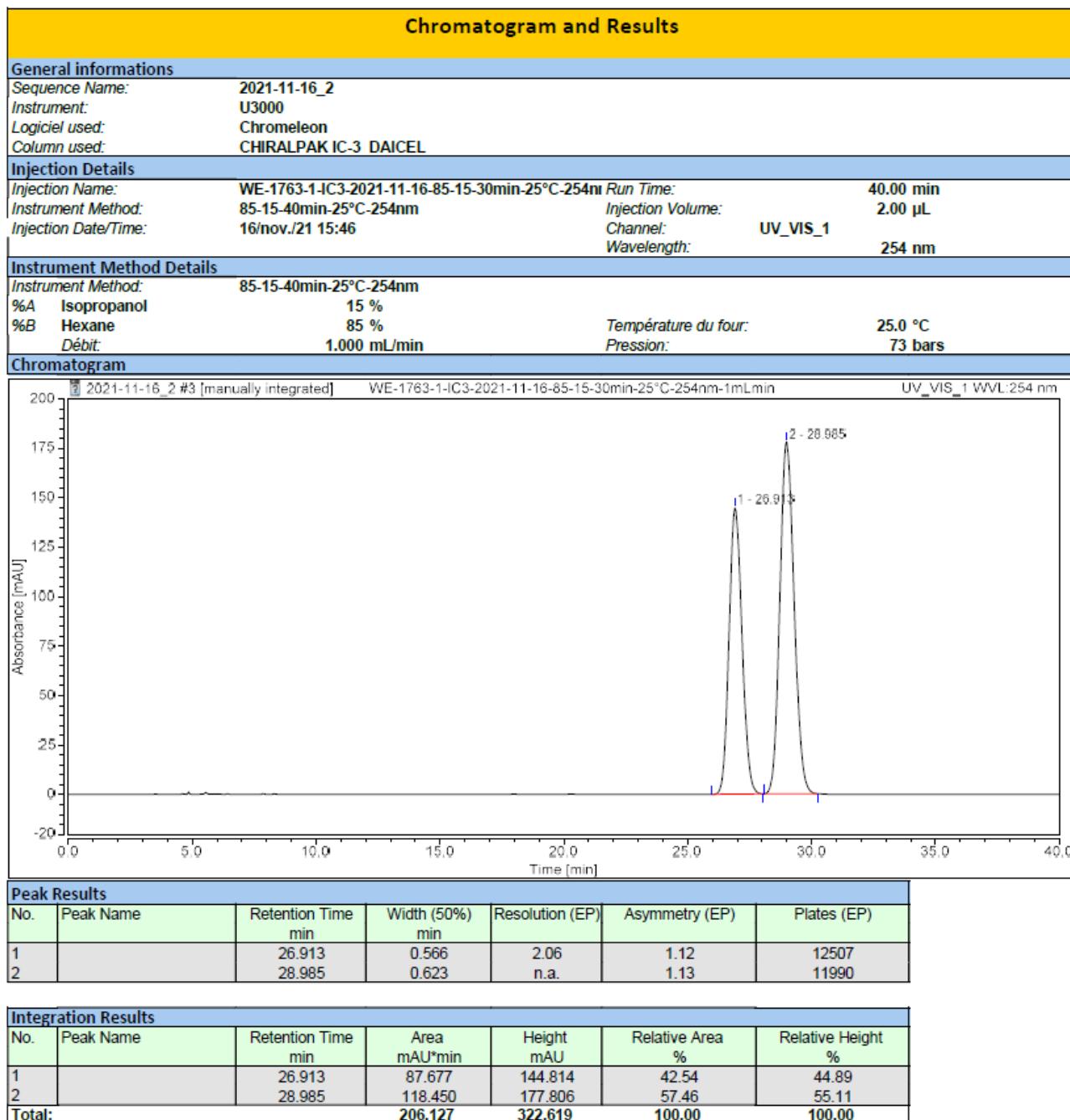
Deprotonation of *O,O*-diethylferrocenephosphonate (1a**) with *n*-BuLi-(*R,R*)-TMCDA using chlorotrimethylsilane as electrophile**



(±)-*O,O*-Diethyl-2-iodoferrocenephosphonate ((±)-7a)

Chromatogram and Results						
General informations						
Sequence Name:	2021-11-15					
Instrument:	U3000					
Logiciel used:	Chromeleon					
Column used:	CHIRALPAK IC-3 DAICEL					
Injection Details						
Injection Name:	WE-1754-2-IC3-2021-11-15-85-15-30min-25°C-254nm	Run Time:	40.00 min			
Instrument Method:	85-15-40min-25°C-254nm	Injection Volume:	1.00 µL			
Injection Date/Time:	15/nov./21 15:58	Channel:	UV_VIS_1			
		Wavelength:	254 nm			
Instrument Method Details						
Instrument Method:	85-15-40min-25°C-254nm					
%A Isopropanol	15 %					
%B Hexane	85 %			Température du four:	25.0 °C	
Débit:	1.000 mL/min			Pression:	74 bars	
Chromatogram						
<p>2021-11-15 #13 [manually integrated] WE-1754-2-IC3-2021-11-15-85-15-30min-25°C-254nm-1mLmin UV_VIS_1 WVL:254 nm</p> <p>Absorbance [mAU]</p> <p>Time [min]</p> <p>1 - 26.772</p> <p>2 - 28.848</p>						
Peak Results						
No.	Peak Name	Retention Time min	Width (50%) min	Resolution (EP)	Asymmetry (EP)	Plates (EP)
1		26.772	0.567	2.06	1.14	12349
2		28.848	0.624	n.a.	1.13	11841
Integration Results						
No.	Peak Name	Retention Time min	Area mAU*min	Height mAU	Relative Area %	Relative Height %
1		26.772	116.646	192.439	50.00	52.42
2		28.848	116.638	174.675	50.00	47.58
Total:			233.283	367.114	100.00	100.00

Deprotonation of *O,O*-diethylferrocenephosphonate (1a**) with (S)-PEALi using [(S)-PEA]₂Zn as *in situ* trap**



References

1. Sheldrick, G. *Acta Crystallogr. Sect. A* **2015**, *71*, 3.
2. Sheldrick, G. *Acta Crystallogr. C* **2015**, *71*, 3.