# Supplementary Material

## Ligand Effects on Structural, Protophilic and Reductive Features of Stannylated Dinuclear Iron Dithiolato Complexes

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**Figure S1.** Overlay of the x-ray structures of compounds **1**, **2** and **3**.

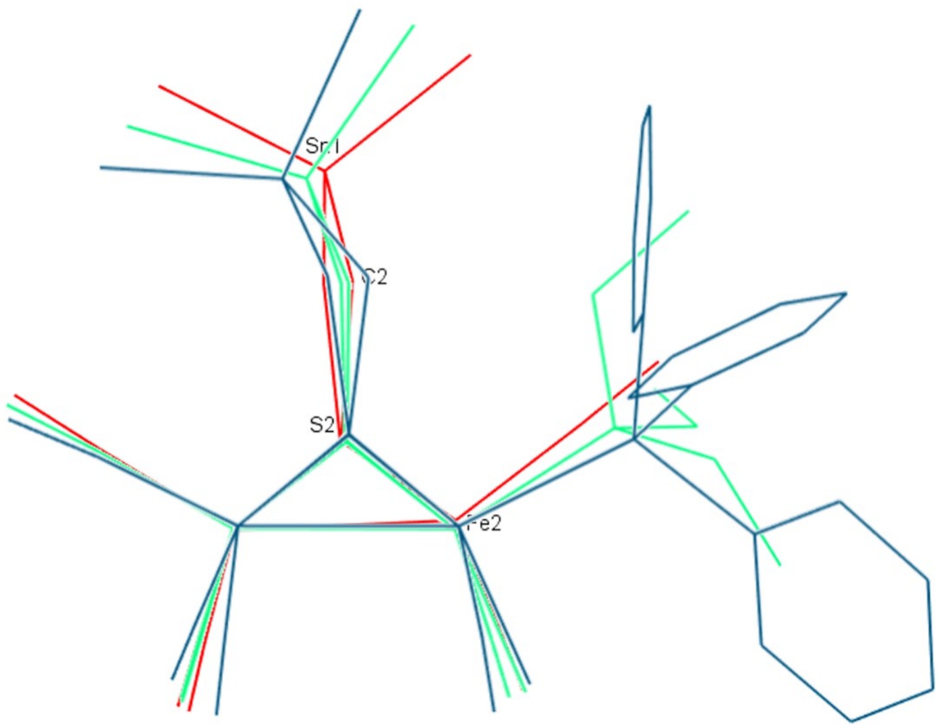

**Figure S2.** IR spectra of **2** and **3** do not suggest S-protonation in the presence of $HBF_4$. Panels (A) and (C) depict the IR spectrum from 2800 – 1800 $cm^{-1}$ including the CN stretches of acetonitrile (solvent, very strong bands at 2295 $cm^{-1}$ and 2255 $cm^{-1}$) and the CO stretches of **2** and **3** between 2150 – 1850 $cm^{-1}$. The IR regime of the SH stretches (2500 ±50 $cm^{-1}$) is highlighted. Panels (B) and (D) depict the IR regime of the SH stretches in greater details. Neither **2** (B) nor **3** (C) show a significant increase of signals around 2500 $cm^{-1}$ upon acidification in the presence of $HBF_4$ (red and blue traces, respectively). The SH stretching frequency is typically observed around 2500 cm-[1].

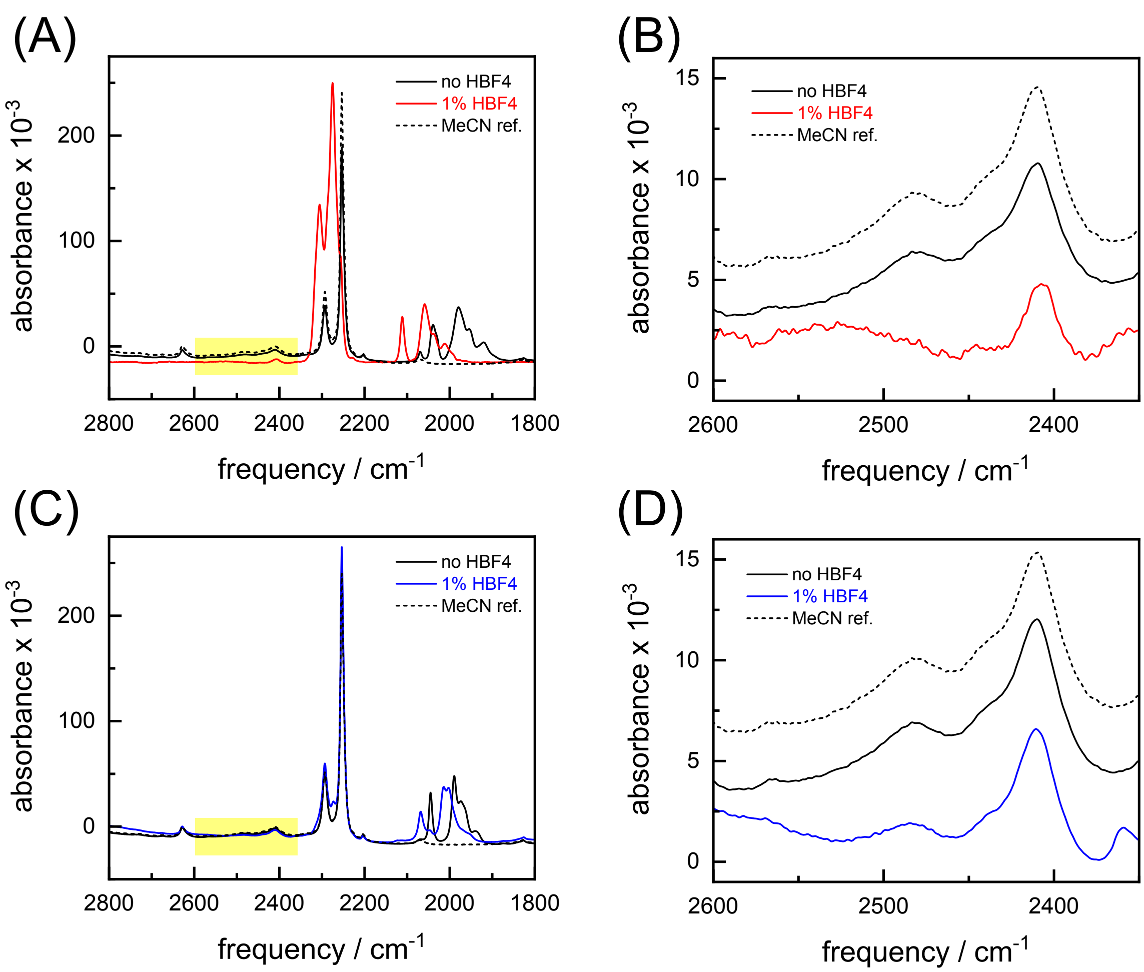

**Figure S3.** $^1$H NMR spectrum ($CD_2Cl_2$) of **2** at 298 K.

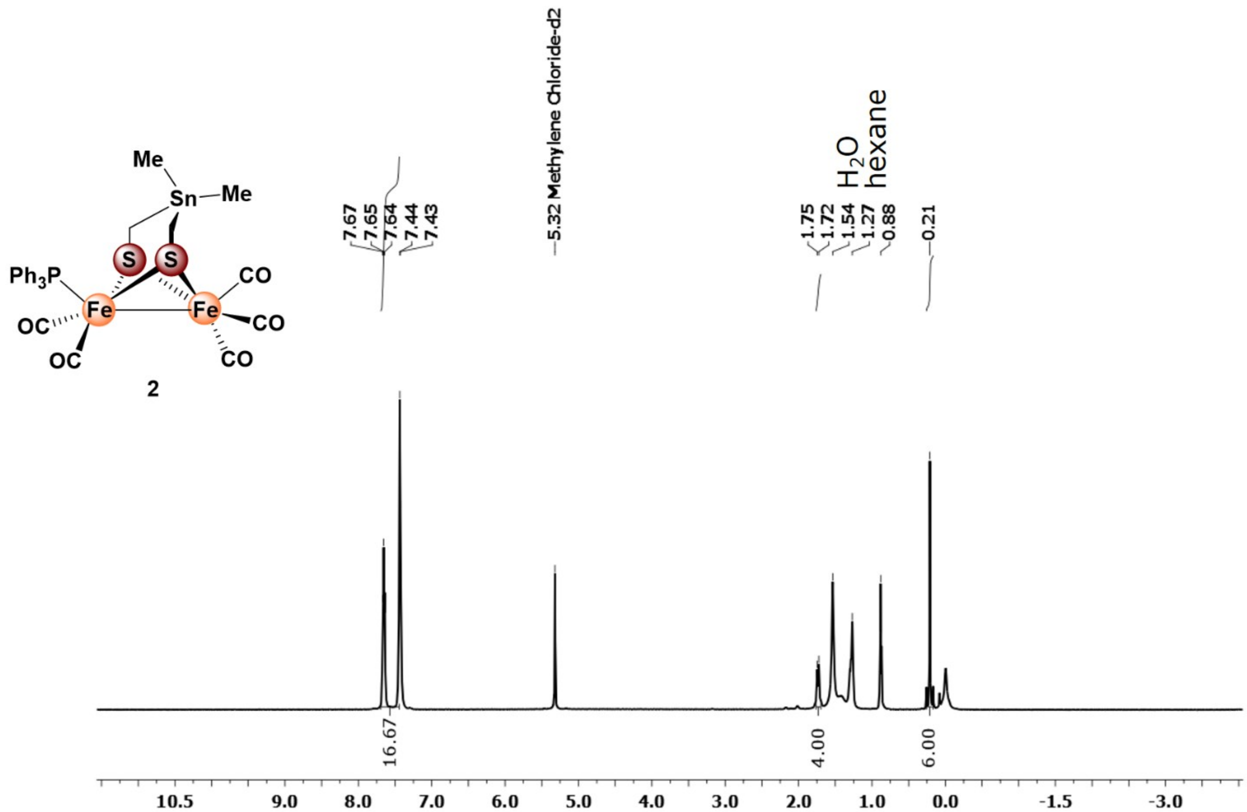

**Figure S4.** $^{31}P\{^{1}H\}$ NMR spectrum ($CD_2Cl_2$) of **2** at 298 K.

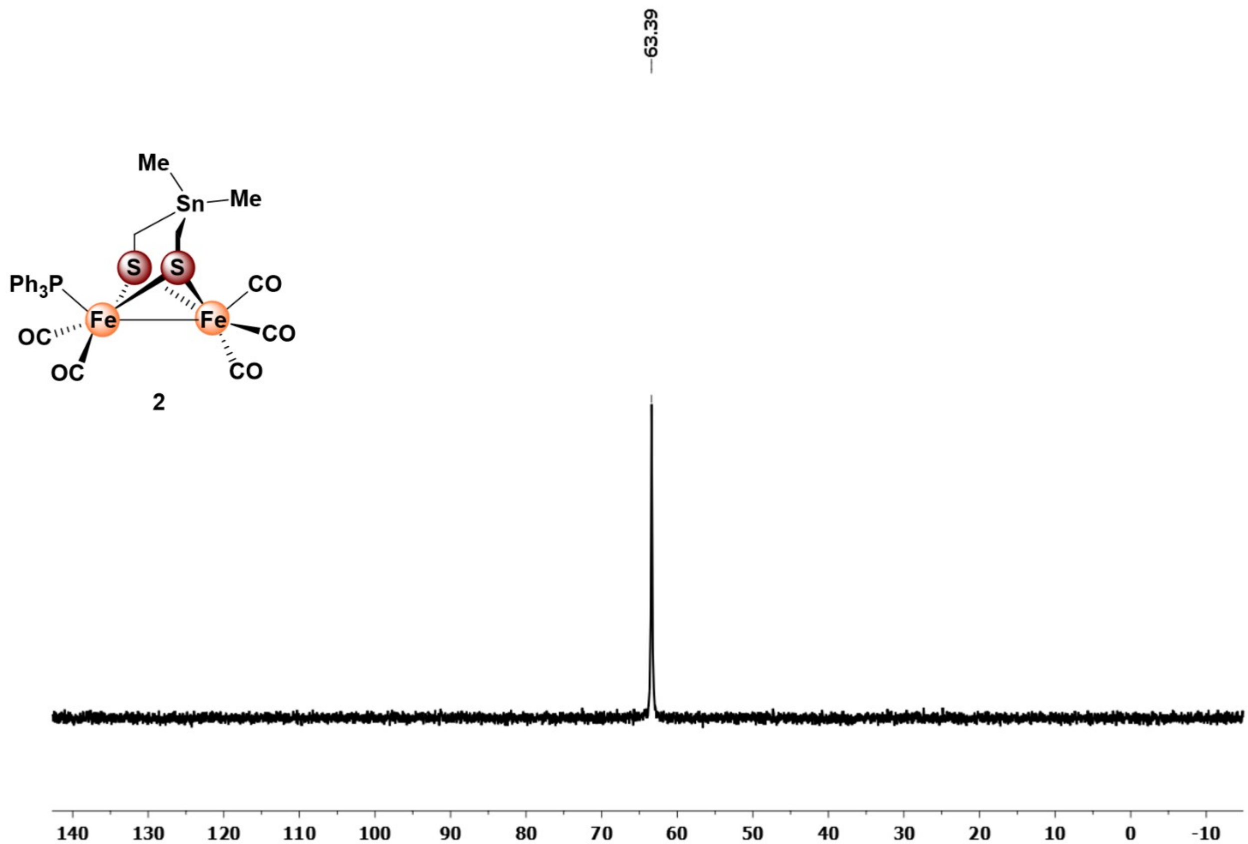

**Figure S5.** $^{13}C\{^{1}H\}$ NMR spectrum ($CDCl_3$) of **2** at 298 K.

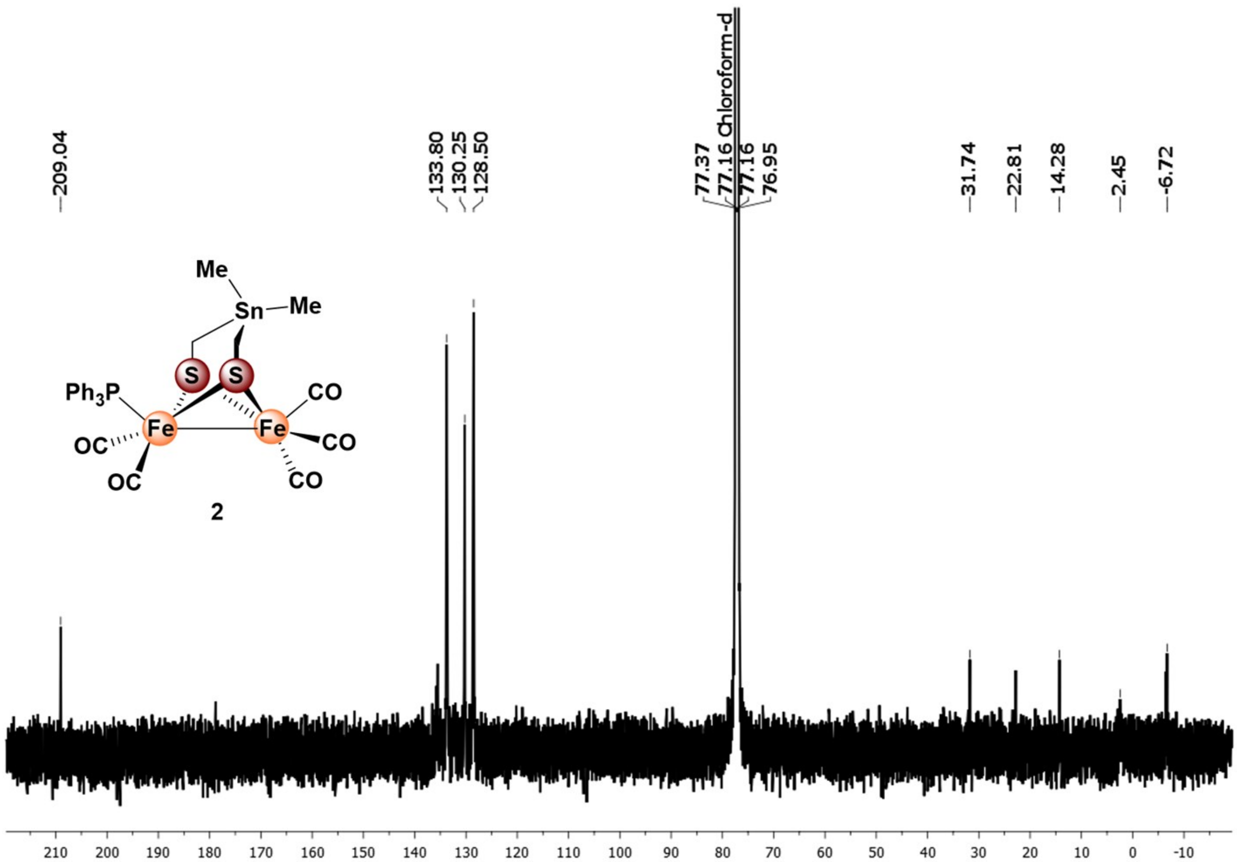

**Figure S6.** $^{1}$H NMR spectrum ($CDCl_3$) of **3** at 298 K.

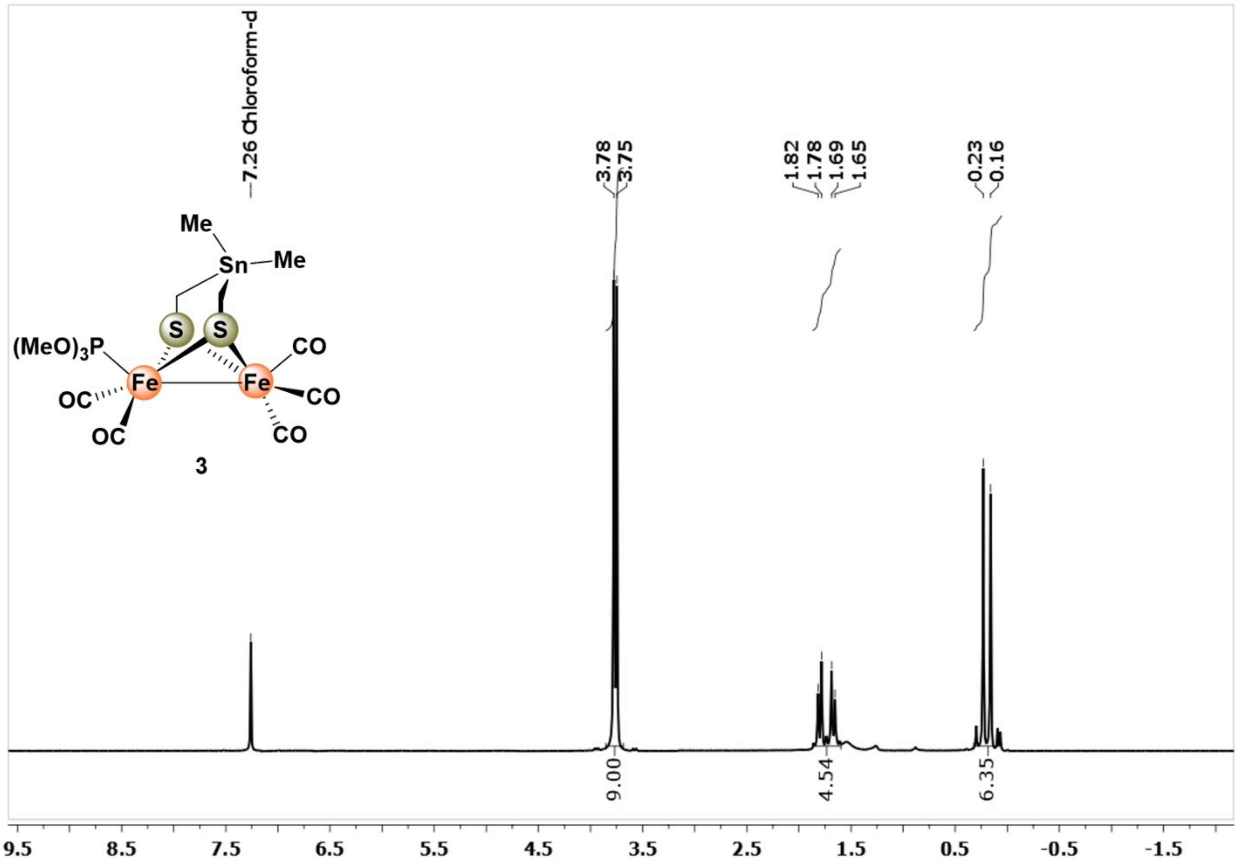

**Figure S7.** $^{31}P\{^1H\}$ NMR spectrum ($CDCl_3$) of **3** at 298 K.

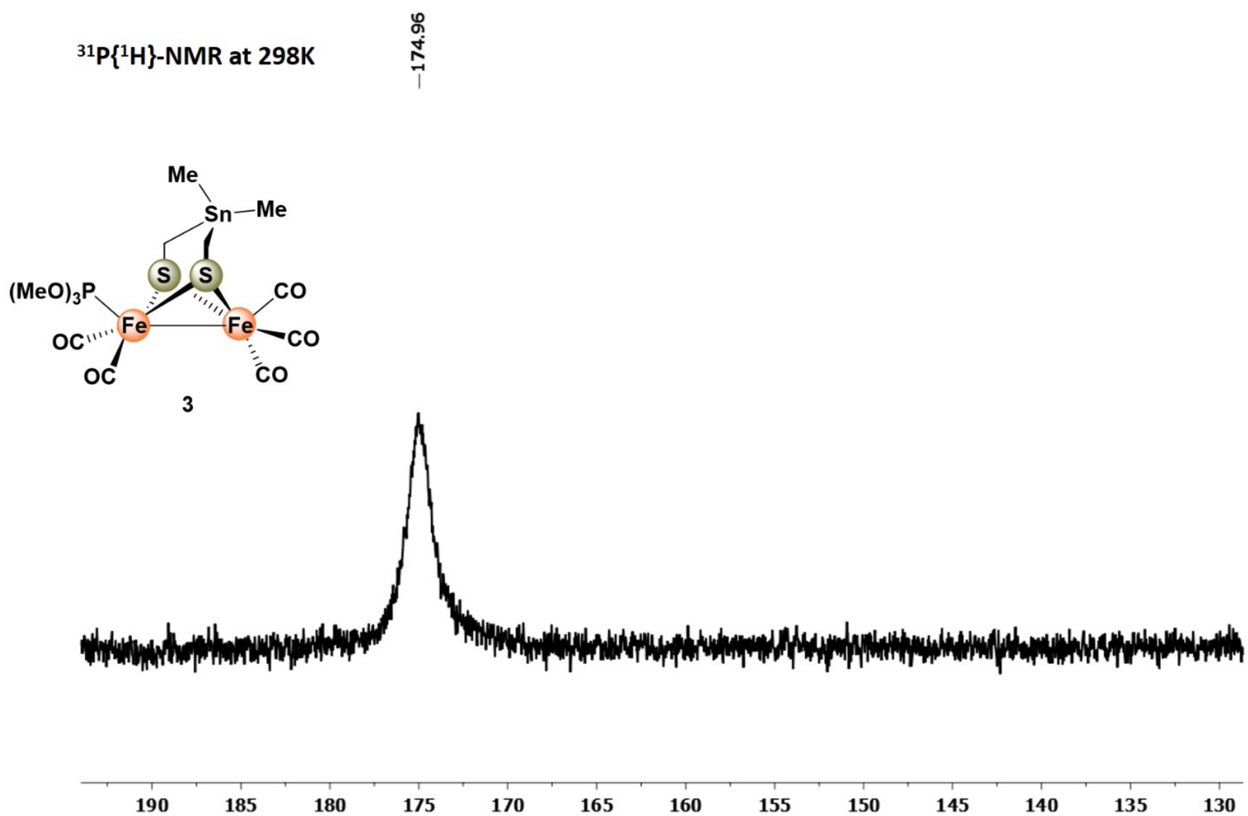

**Figure S8.** $^{31}P\{^{1}H\}$ NMR spectrum ($CDCl_3$) of **3** at 223 K.

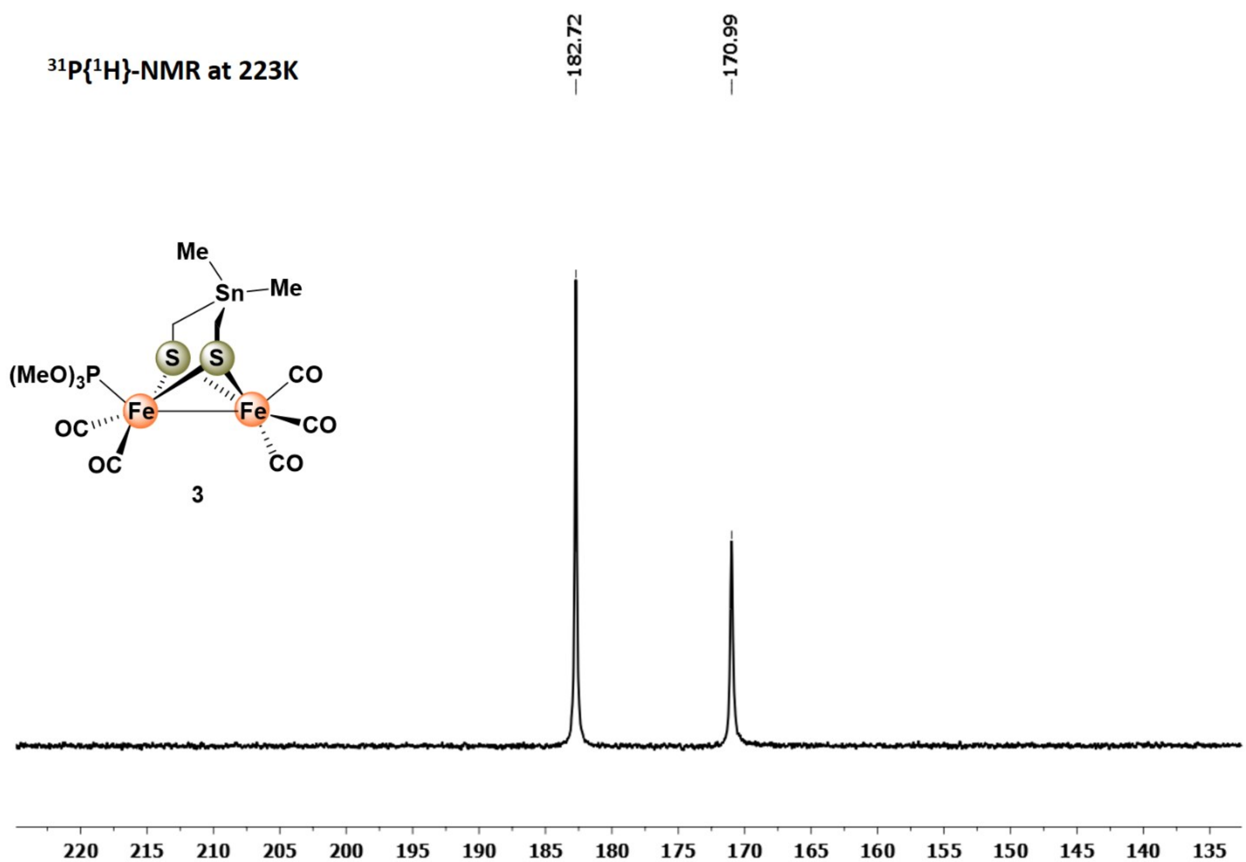

**Figure S9.** $^{13}C\{^{1}H\}$ NMR spectrum ($CDCl_3$) of **3** at 298 K.

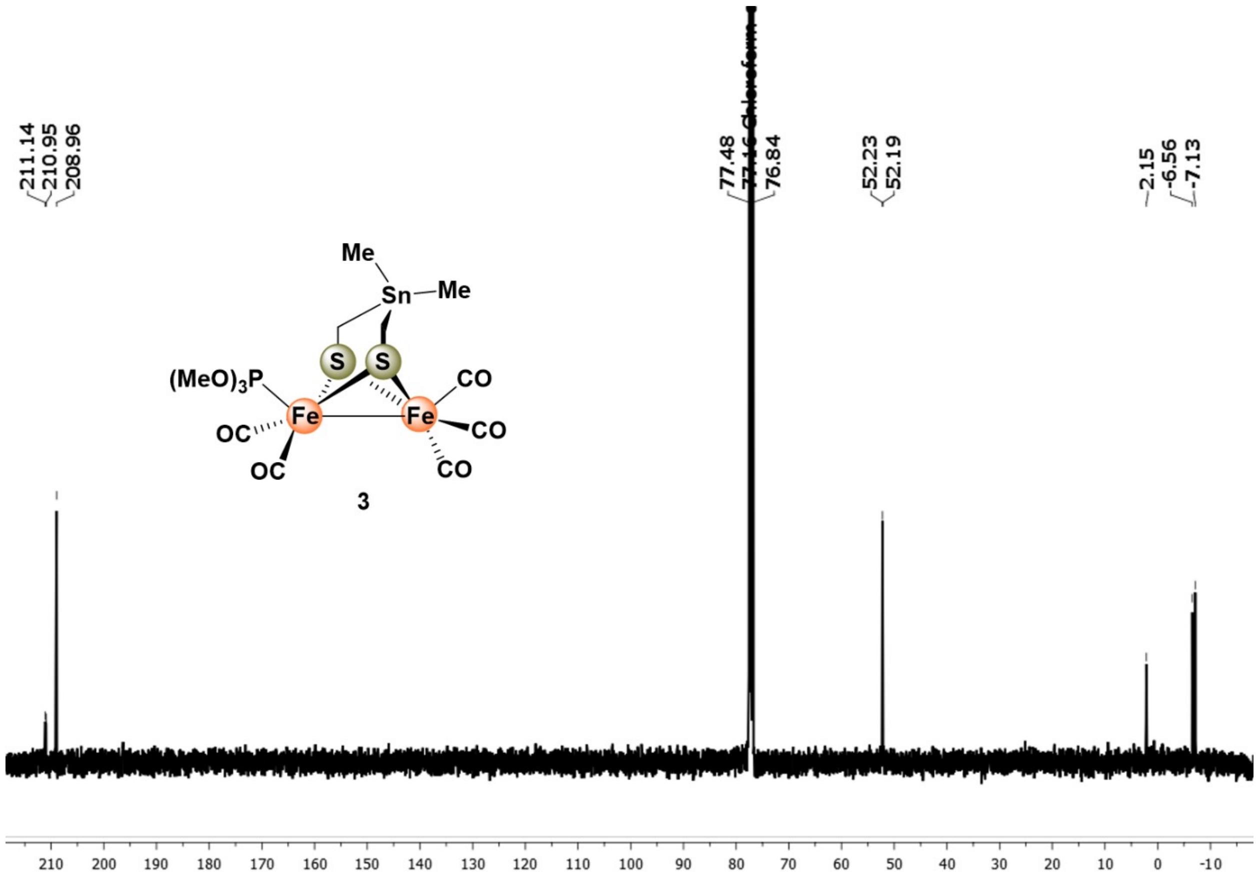

**Figure S10.** In situ $^{1}H$ NMR spectrum ($CD_2Cl_2$) of complex **3** with $HBF_4{\cdot}Et_2O$ at 298 K

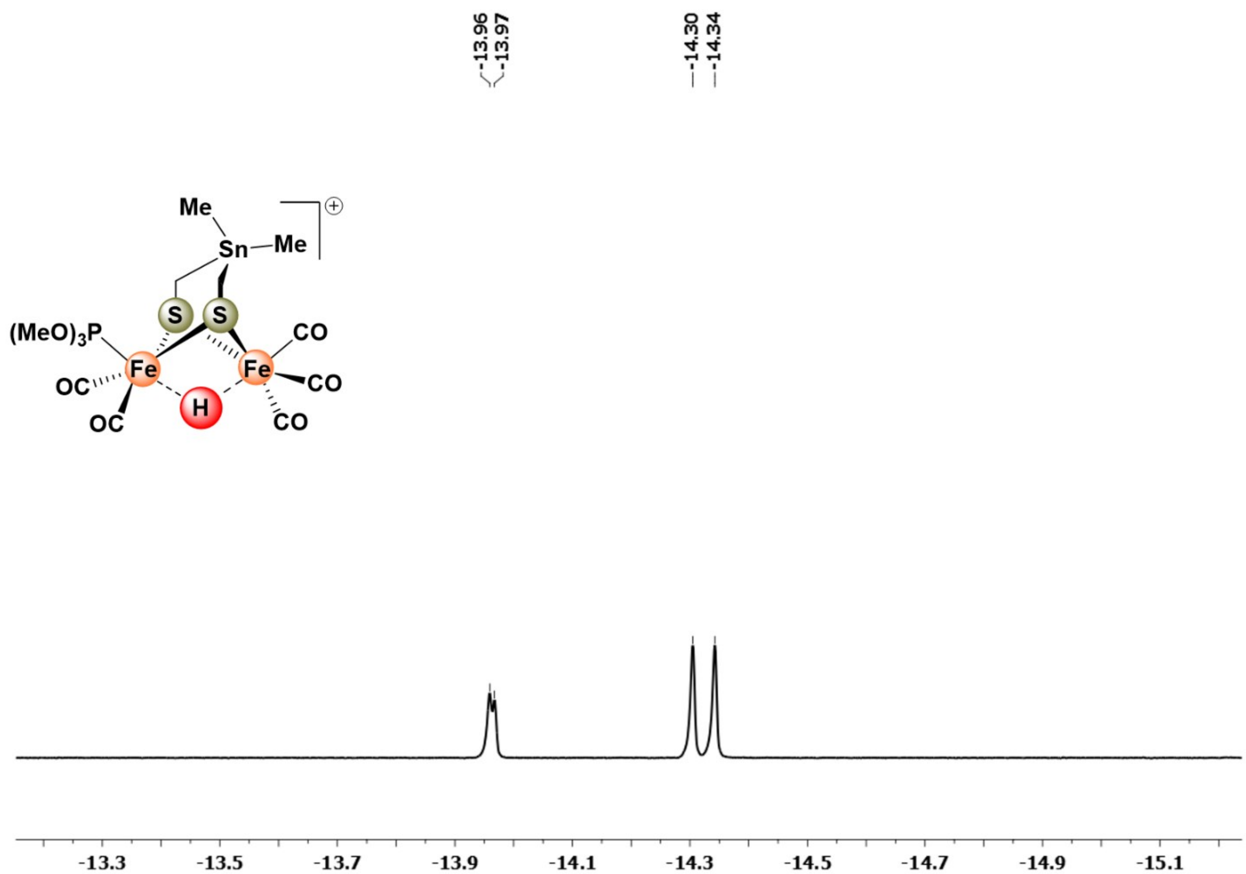

**Figure S11.** In situ $^{31}P$ NMR spectrum ($CD_2Cl_2$) of complex **3** with $HBF_4{\cdot}Et_2O$ at 298 K

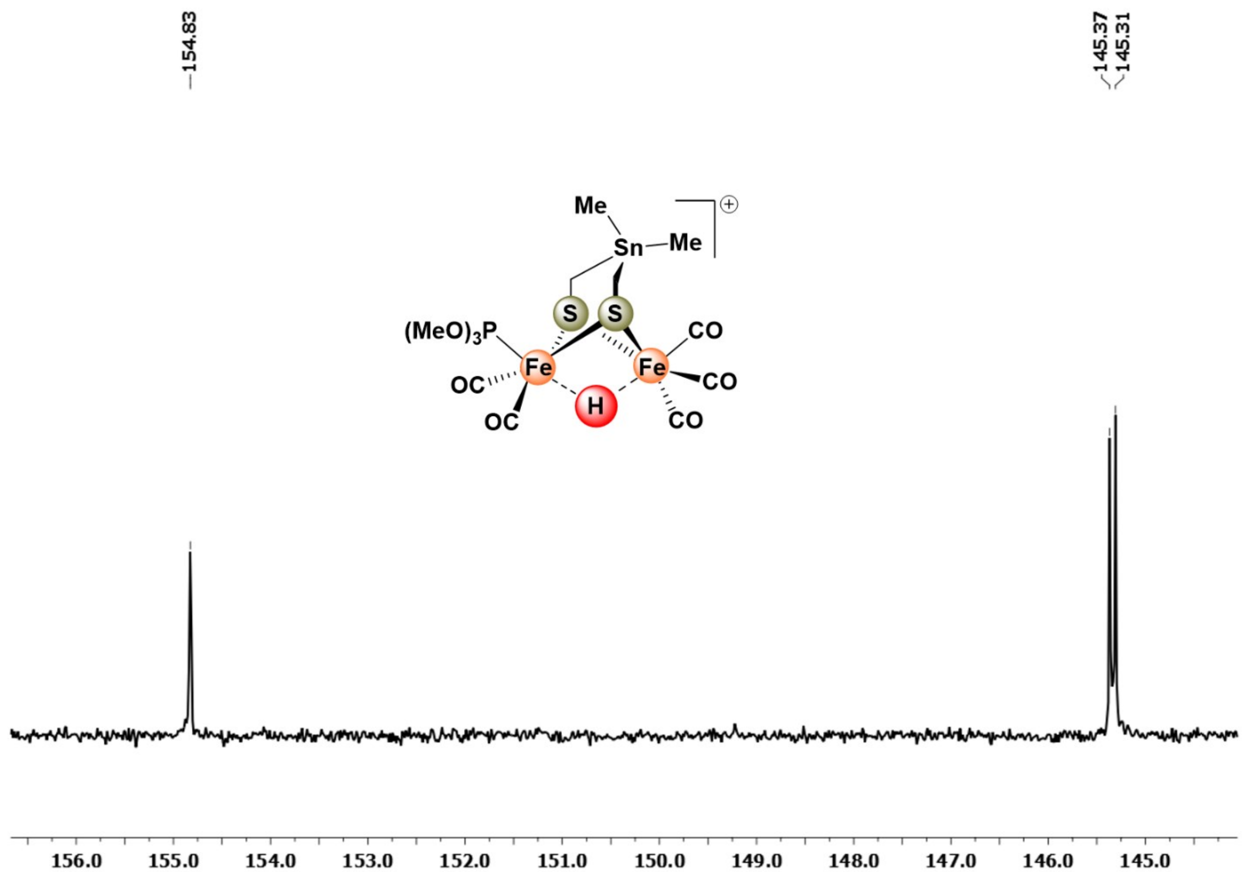

**Figure S12.** Cyclic voltammetry of 1.0 mM $Fe_2(CO)_5(PPh_3)\{\mu\text{-}(SCH_2)_2\}SnMe_2$ (**2**) in $CH_2Cl_2$-[*n*-$Bu_4N$][$BF_4$] (0.1 M) at various scan rates. Glassy carbon electrode. Potential *E* is given in volts (V) and referenced to $Fc^+$/Fc couple. The arrows indicate the scan direction.

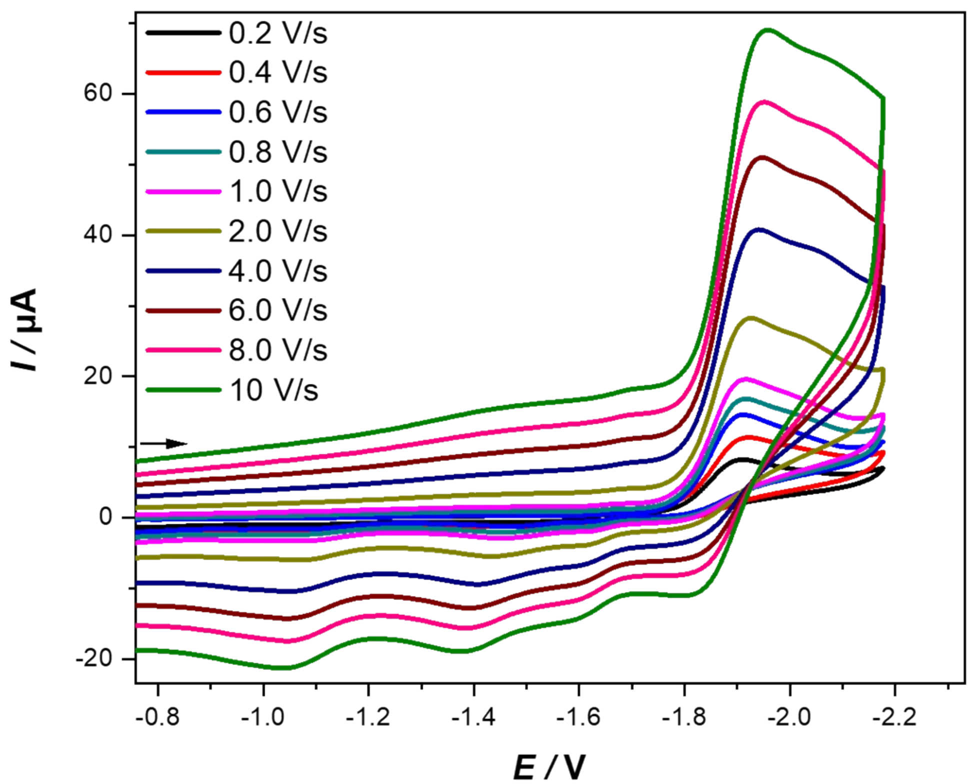

**Figure S13.** Cyclic voltammetry of 1.0 mM $Fe_2(CO)_5(P(OMe)_3)\{\mu\text{-}(SCH_2)_2\}SnMe_2$ (**3**) in $CH_2Cl_2$-[$n$-$Bu_4N$][$BF_4$] (0.1 M) at ν = 0.2-1 V/s. Glassy carbon electrode. Potential $E$ is given in volts (V) and referenced to $Fc^+$/Fc couple. The arrows indicate the scan direction.

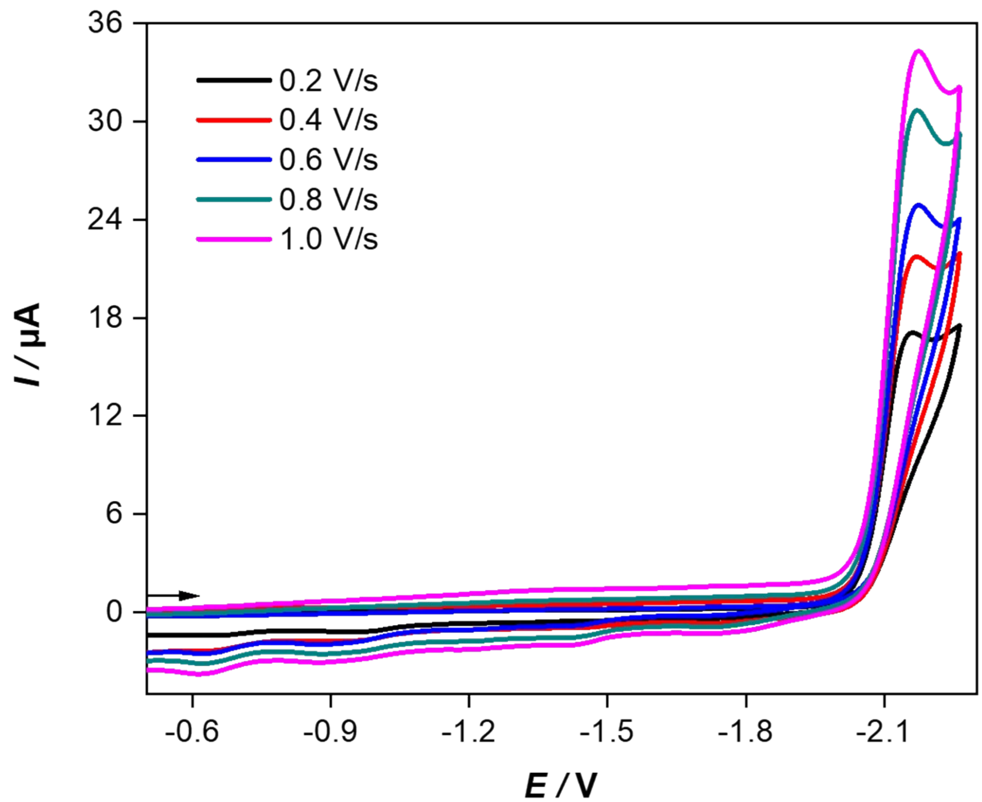

**Figure S14.** Cyclic voltammetry of 1.0 mM $Fe_2(CO)_5(P(OMe)_3)\{\mu\text{-}(SCH_2)_2\}SnMe_2$ (**3**) in $CH_2Cl_2$-[$n$-$Bu_4N$][$BF_4$] (0.1 M) at ν = 2-10 V/s. Glassy carbon electrode. Potential $E$ is given in volts (V) and referenced to $Fc^+/Fc$ couple. The arrows indicate the scan direction.

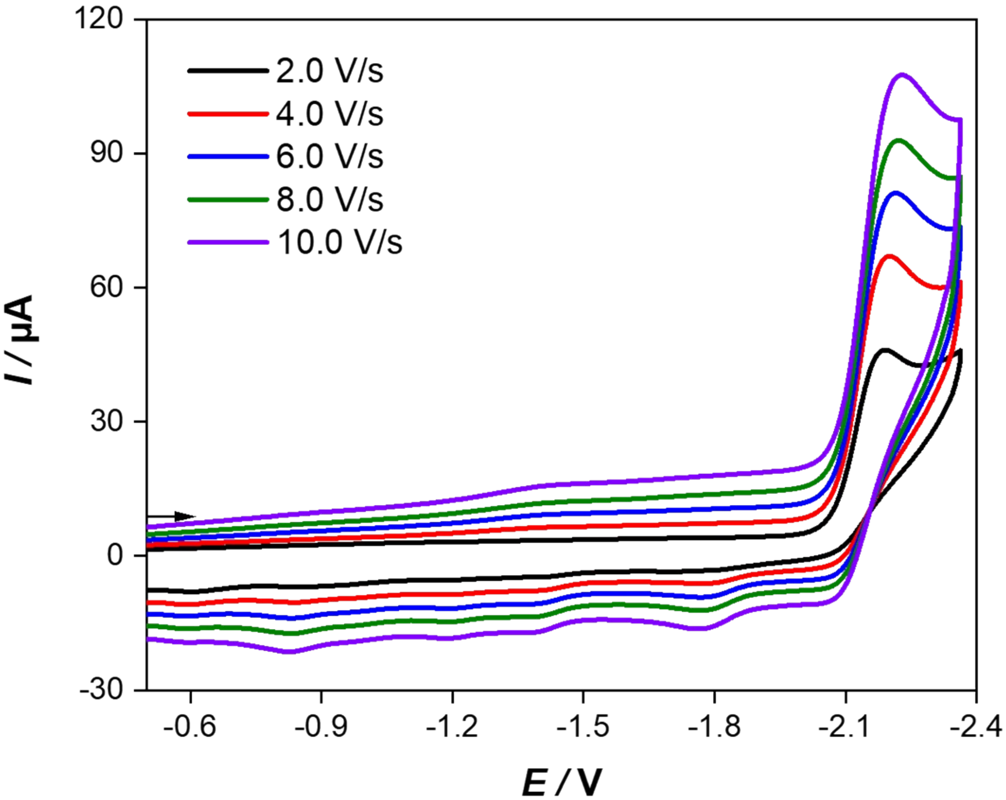

**Figure S15.** Cyclic voltammetry (0.2 V·s$^{-1}$) of 1.0 mM $Fe_2(CO)_5(PPh_3)\{\mu\text{-}(SCH_2)_2\}SnMe_2$ (**2**) in $CH_2Cl_2$-[$n$-$Bu_4N$][$BF_4$] (0.1 M) at [$HBF_4{\cdot}Et_2O$]/[**2**] = 0-4. Glassy carbon electrode (diameter = 1.6 mm). Potential $E$ is given in volts (V) and referenced to $Fc^+$/Fc couple.