

Supporting Information

One-pot synthesis of ferrocenyl dithiocarbamates and its application for the detection of Cu²⁺

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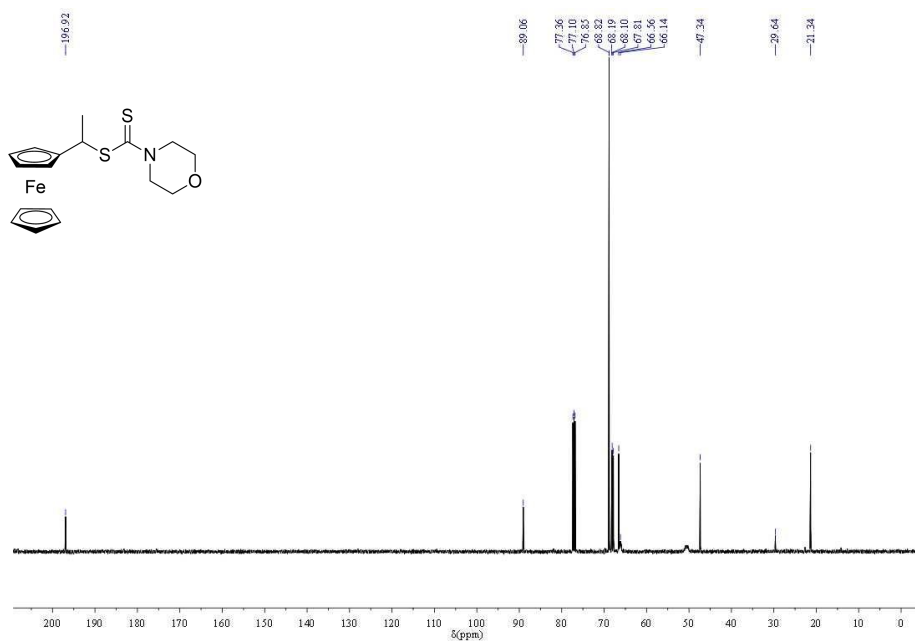
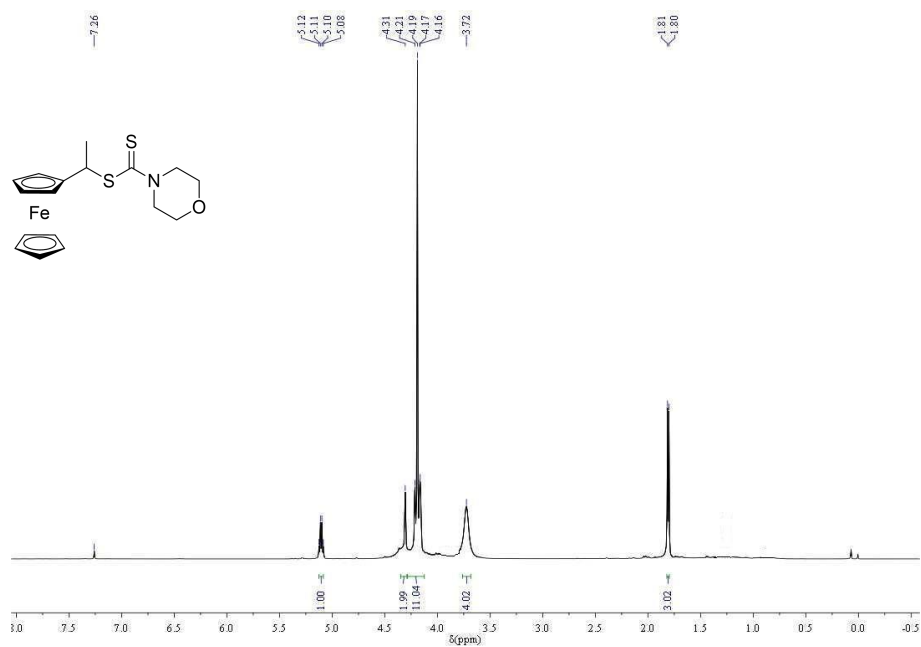
Contents

1. General information.....	2
2. ¹H, ¹³C NMR spectra for all compounds.....	3
3. Figure S1.....	17
4. Figure S2.....	17
5. Figure S3.....	18
6. Figure S4.....	18

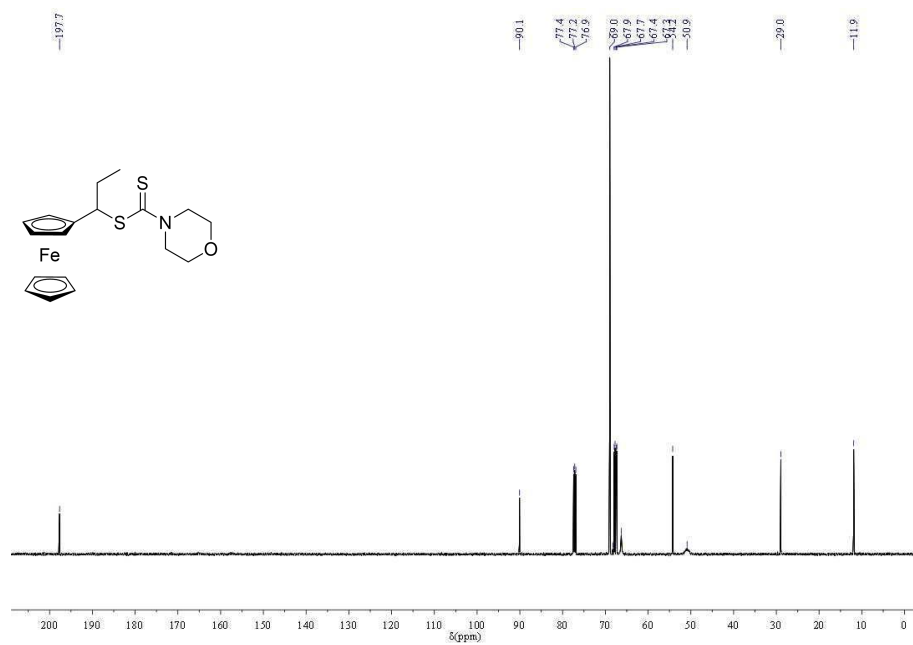
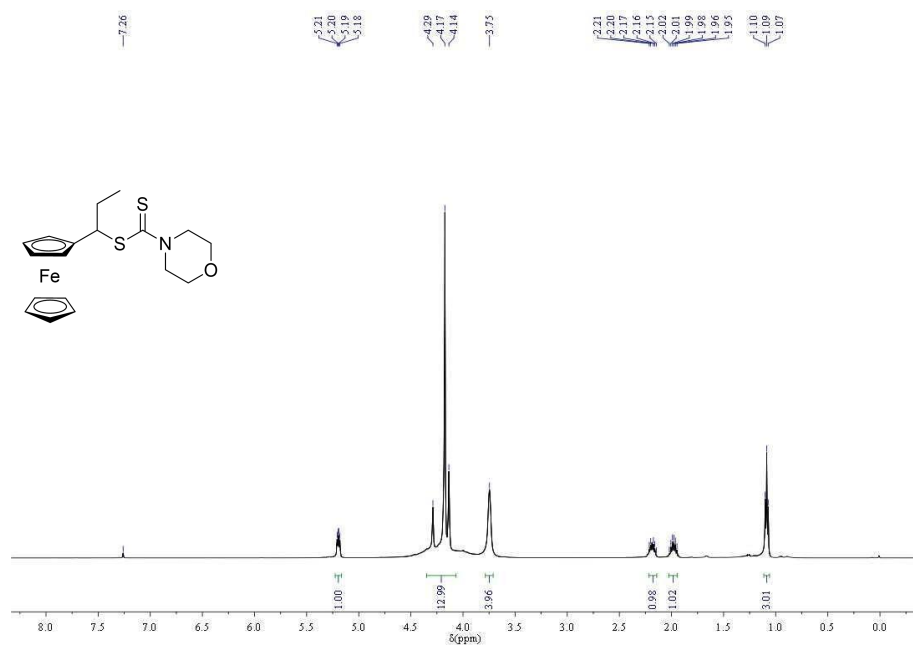
1. General information.

All reagents were used as received from commercial sources, unless specified otherwise, or prepared as described in the references. N-tosylhydrazone and ammonium dithiocarbamate were prepared according to the literature method. Solvent dioxane was distilled over sodium. All Solvents were purified according to standard references procedures. For chromatography, 200-300 mesh silica gel (Qingdao, China) was employed. ^1H and ^{13}C NMR spectra were recorded at 500 MHz and 125 MHz FT-NMR spectrometer. Chemical shifts are reported in ppm using tetramethylsilane as internal standard when CDCl_3 was used as solvent. The HRMS analysis was obtained on a QTOF mass spectrometer. Melting points were determined with melting points apparatus and are uncorrected. The data of **3a** and **3e** were collected on a Bruker APEX II CCD Mo- $\text{K}\alpha$ radiation ($\lambda = 0.71073 \text{ \AA}$) and measured at room temperature.

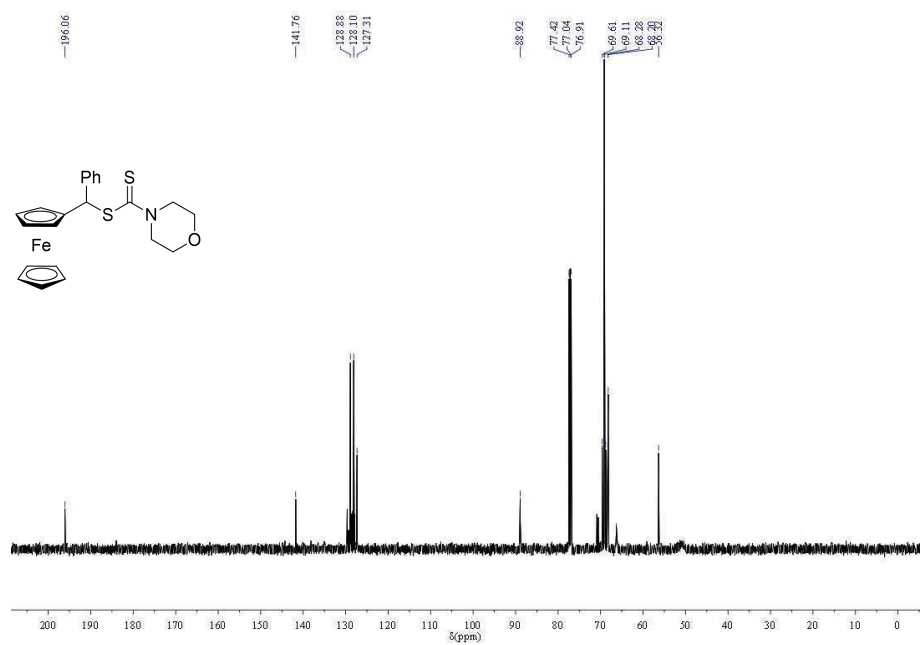
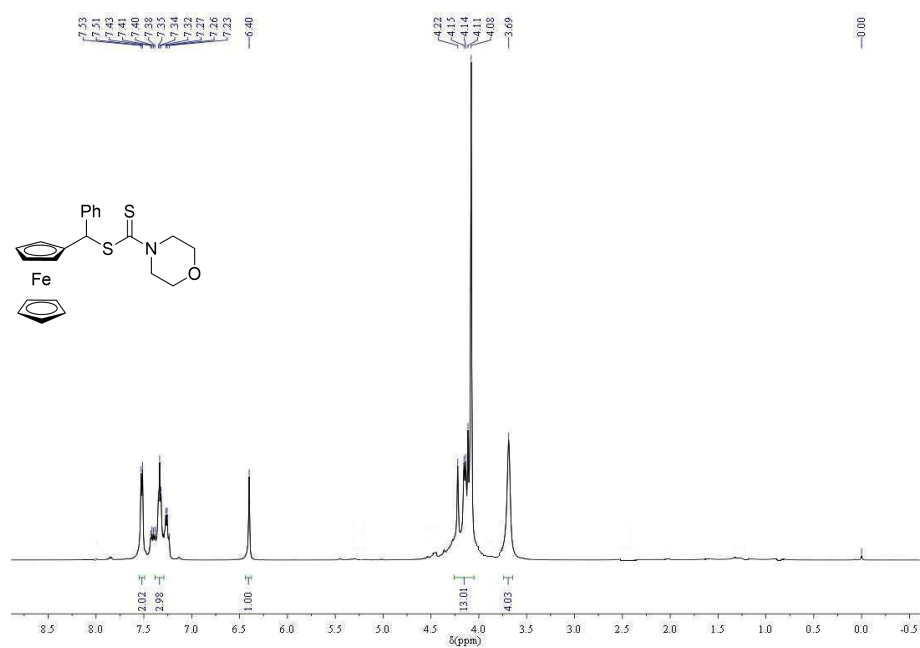
2.¹H, ¹³C NMR spectra for all compounds



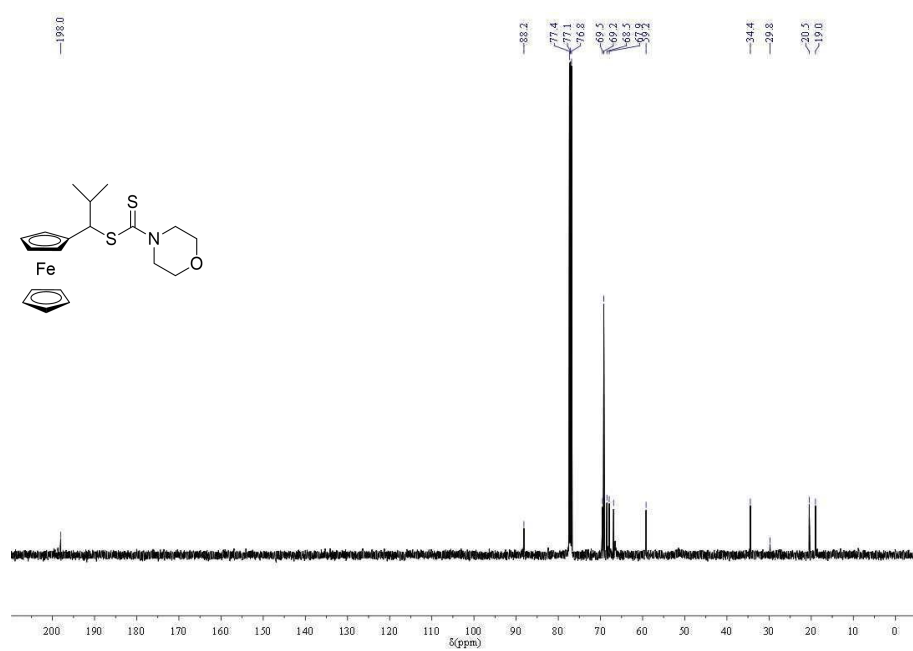
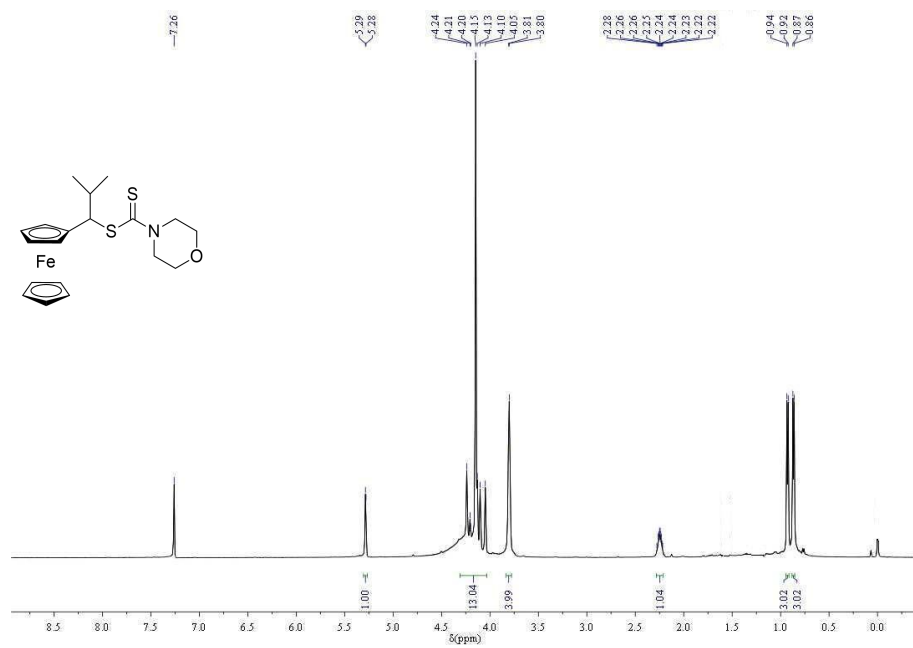
¹H NMR spectra and ¹³C NMR spectra for **3a**.



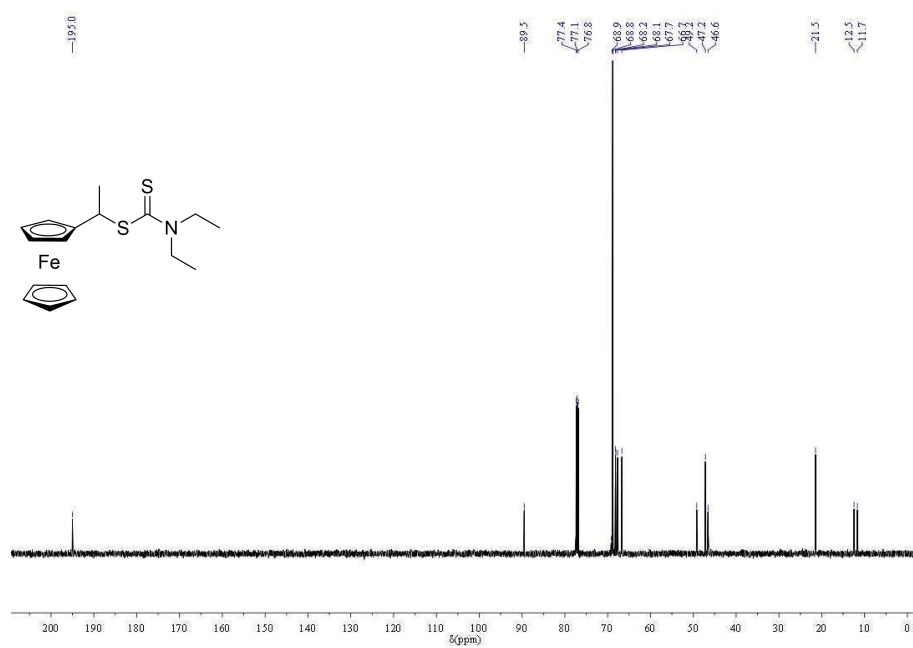
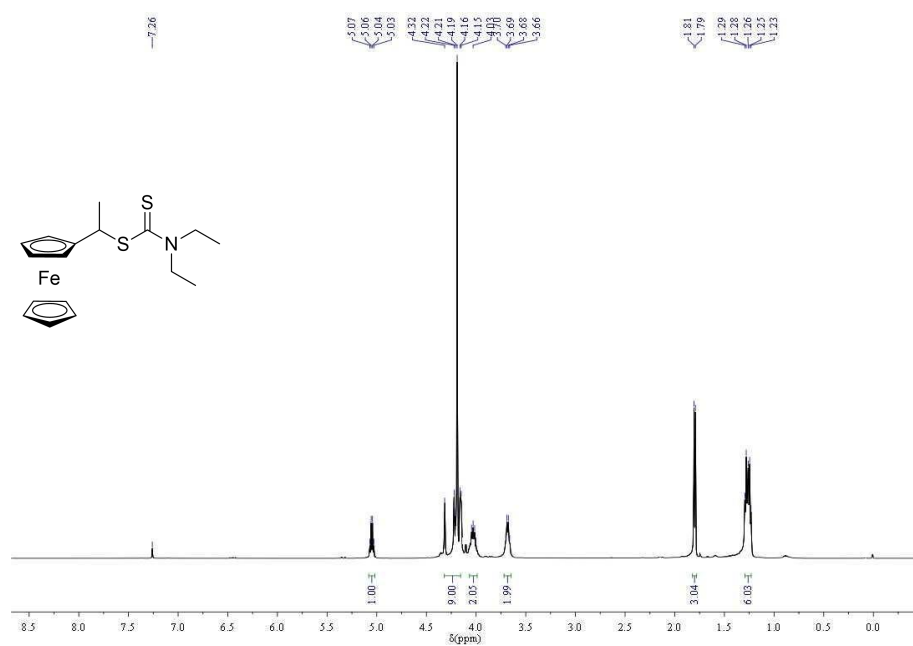
¹H NMR spectra and ¹³C NMR spectra for **3b**.



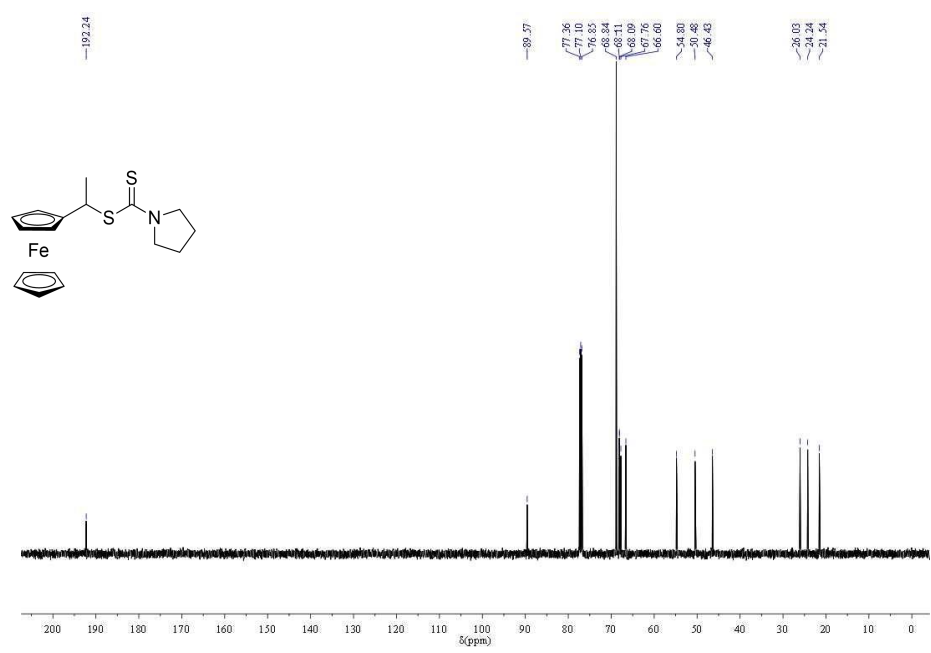
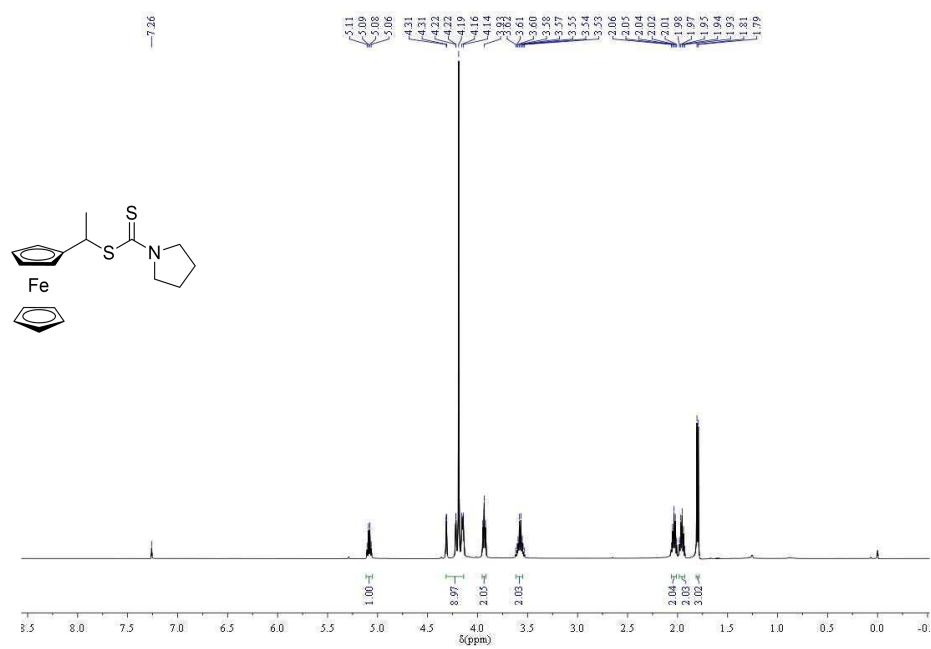
¹H NMR spectra and ¹³C NMR spectra for 3c.



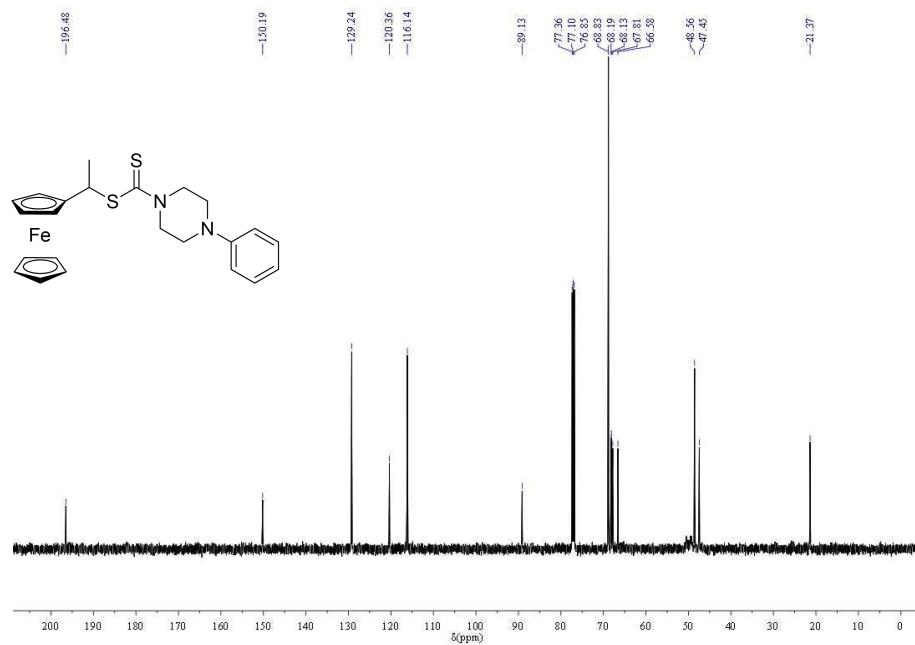
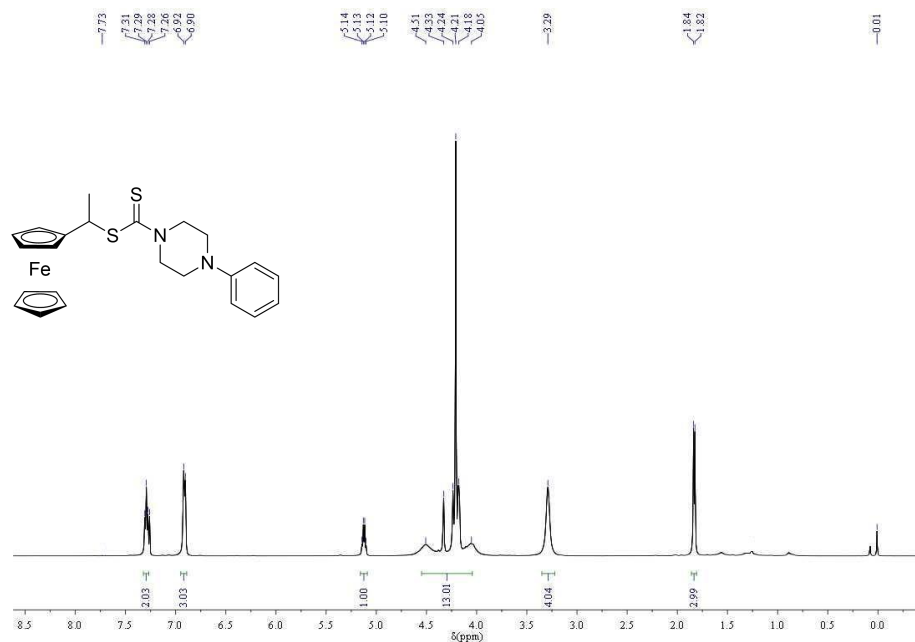
¹H NMR spectra and ¹³C NMR spectra for **3d**.



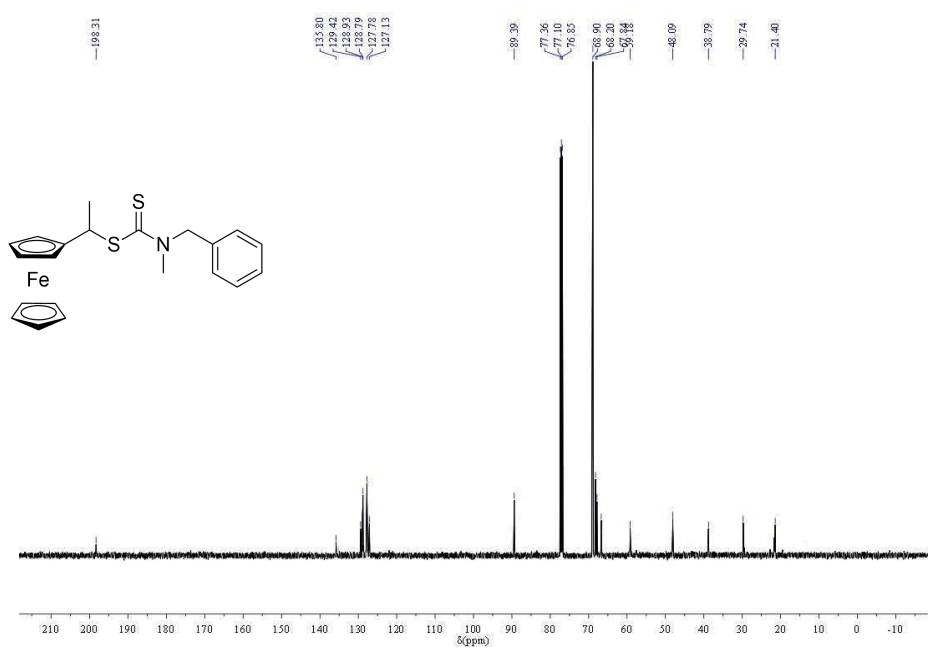
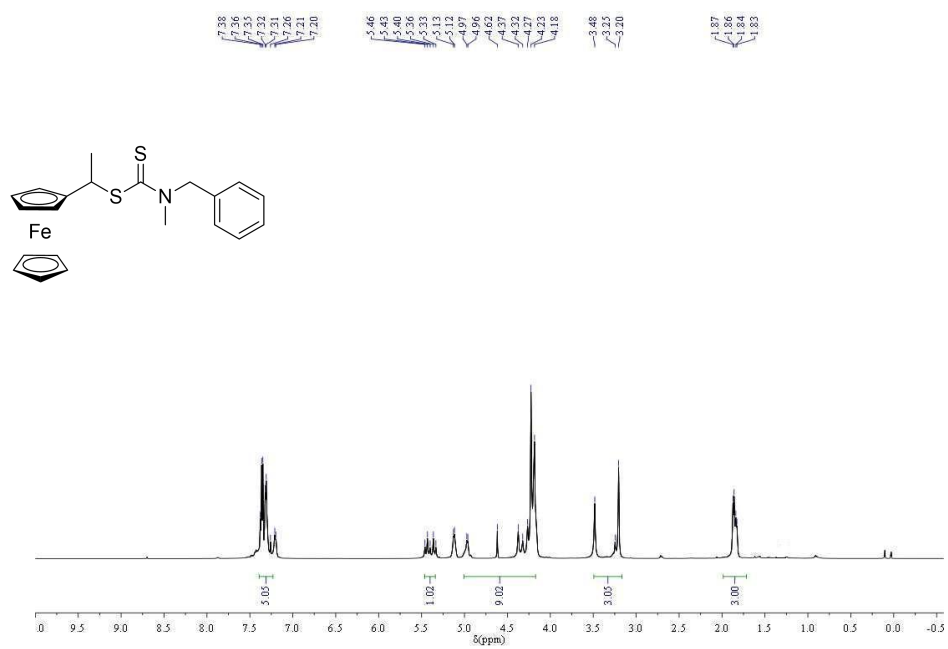
^1H NMR spectra and ^{13}C NMR spectra for **3e**.



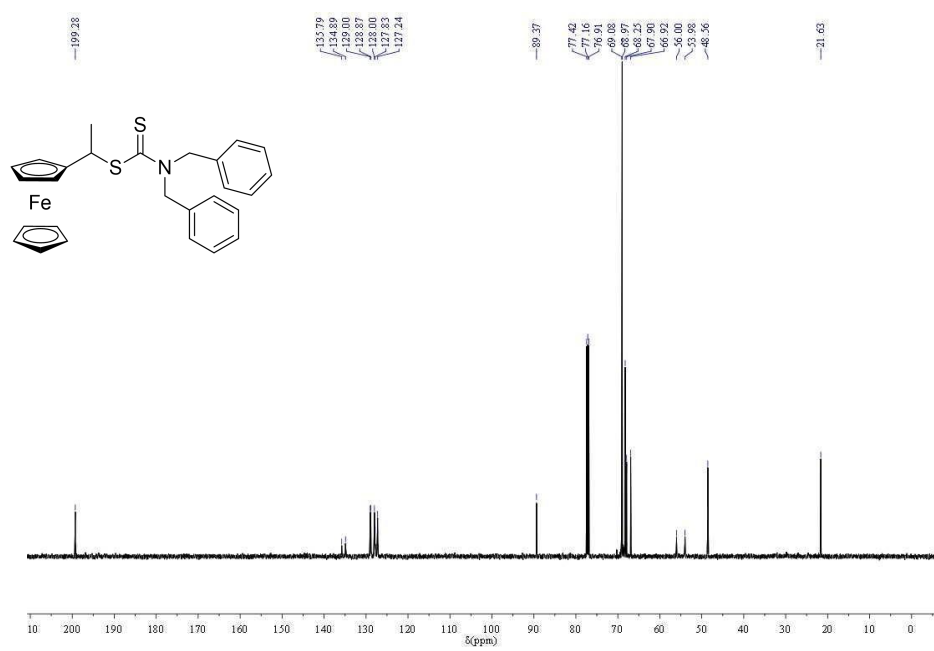
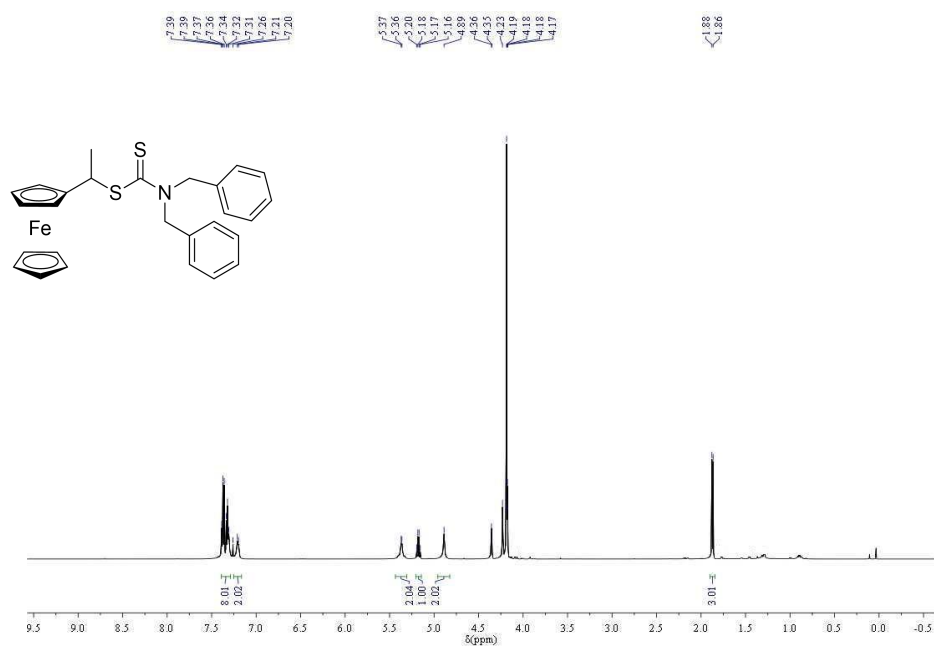
^1H NMR spectra and ^{13}C NMR spectra for **3f**.



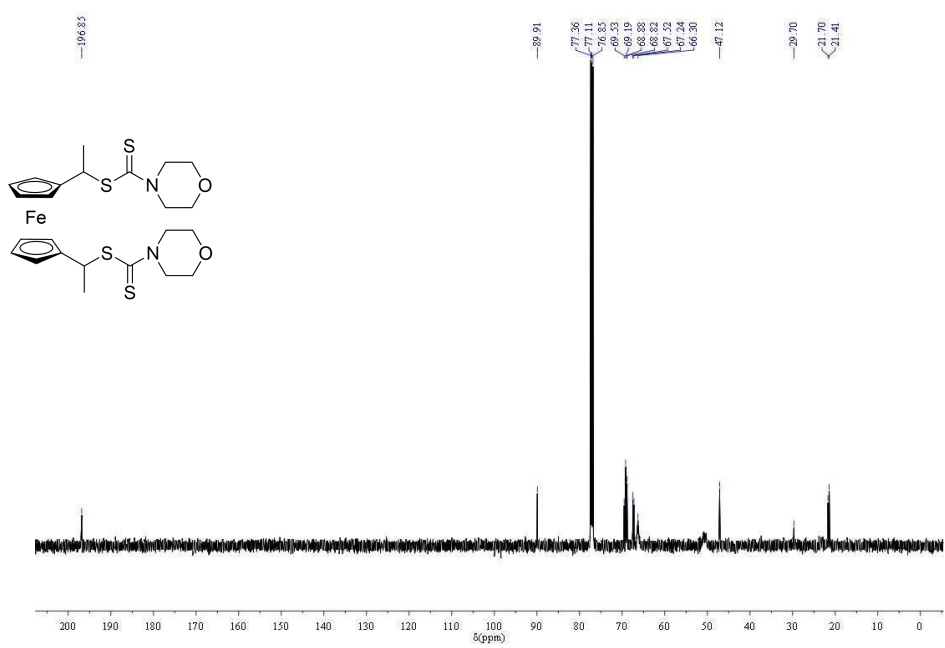
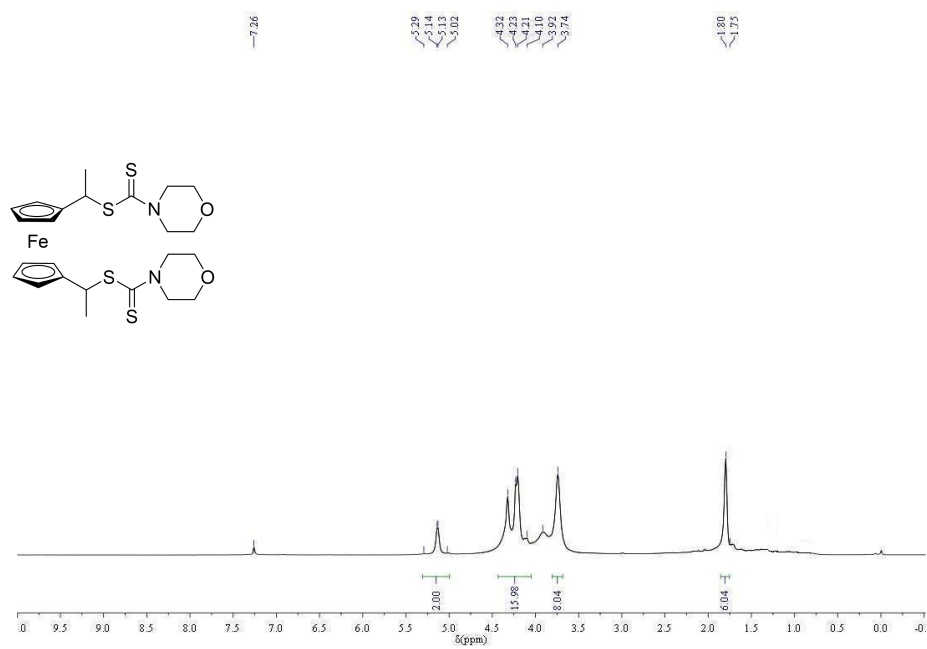
¹H NMR spectra and ¹³C NMR spectra for **3g**.



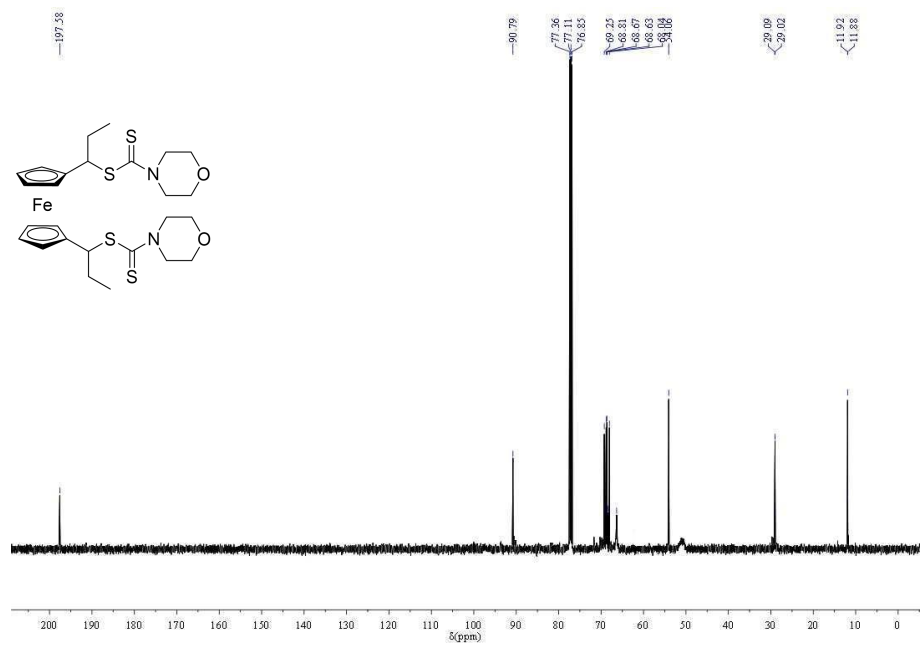
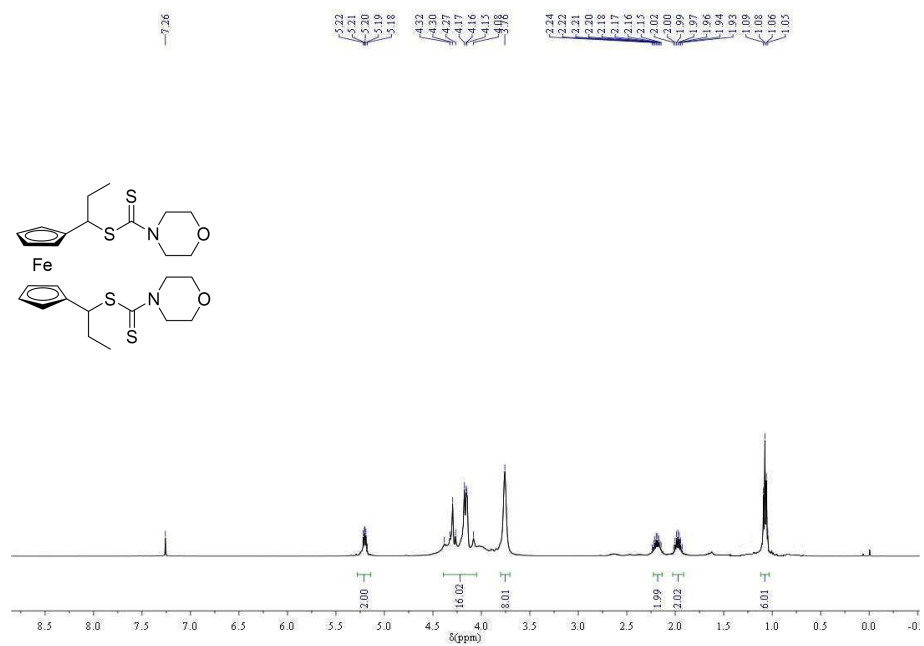
¹H NMR spectra and ¹³C NMR spectra for **3h**.



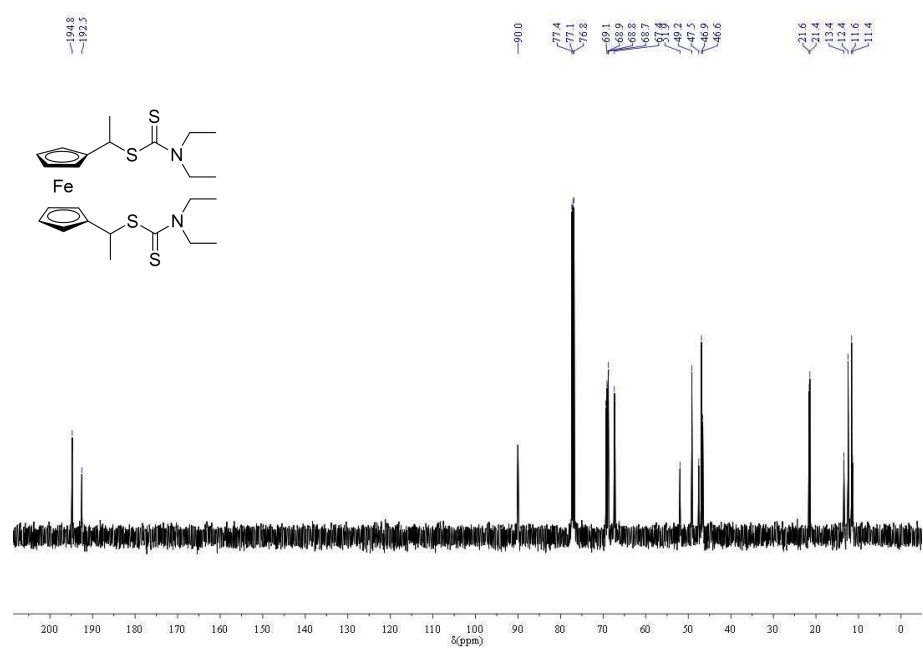
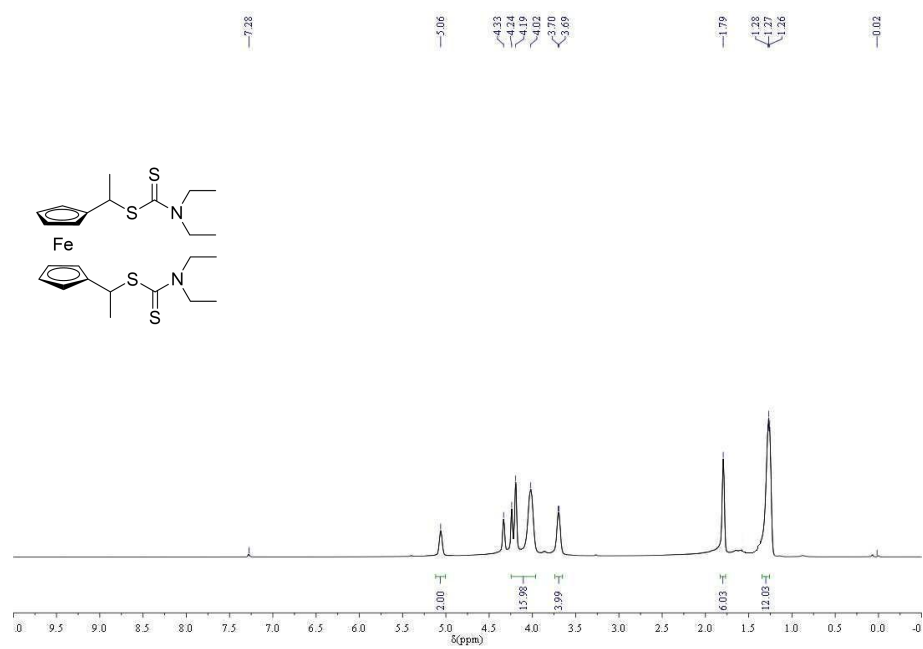
^1H NMR spectra and ^{13}C NMR spectra for **3i**.



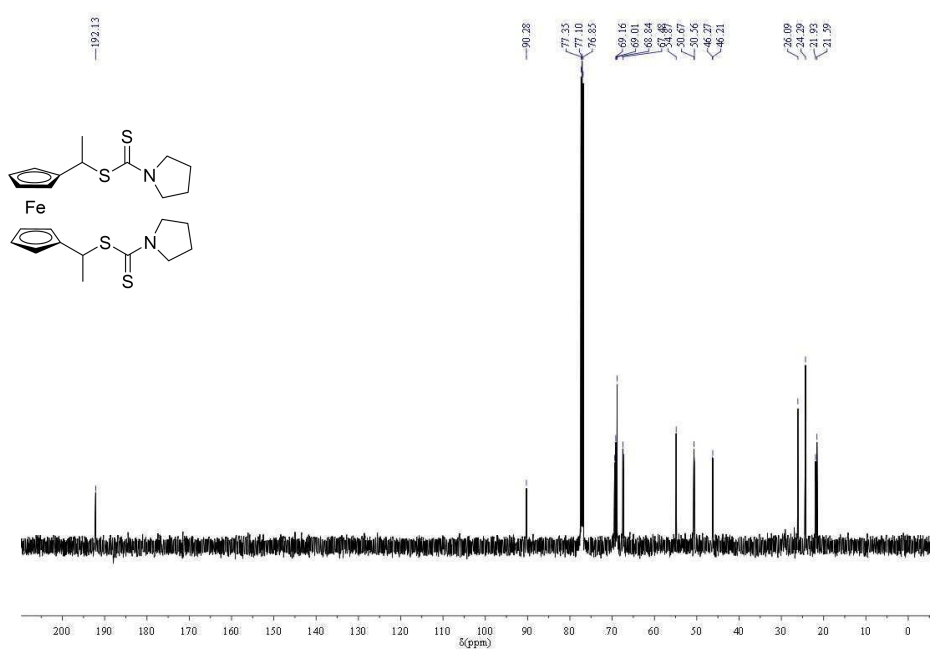
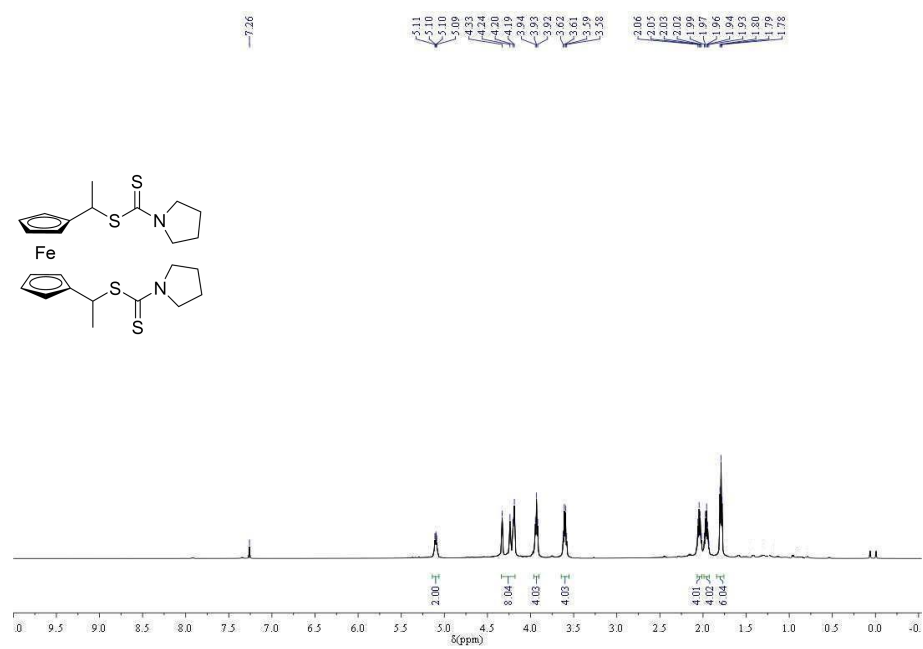
¹H NMR spectra and ¹³C NMR spectra for **5a**.



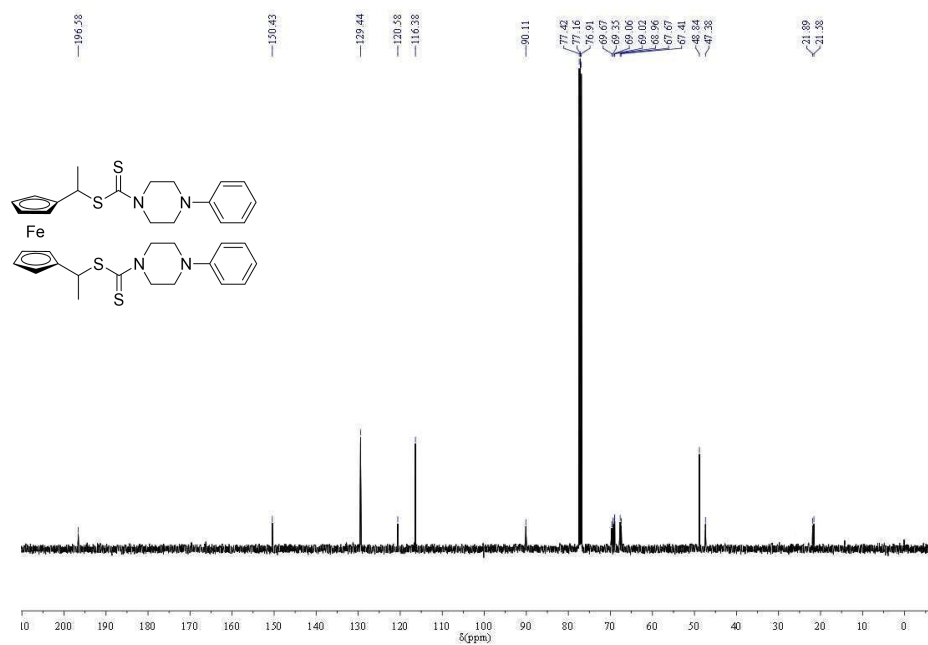
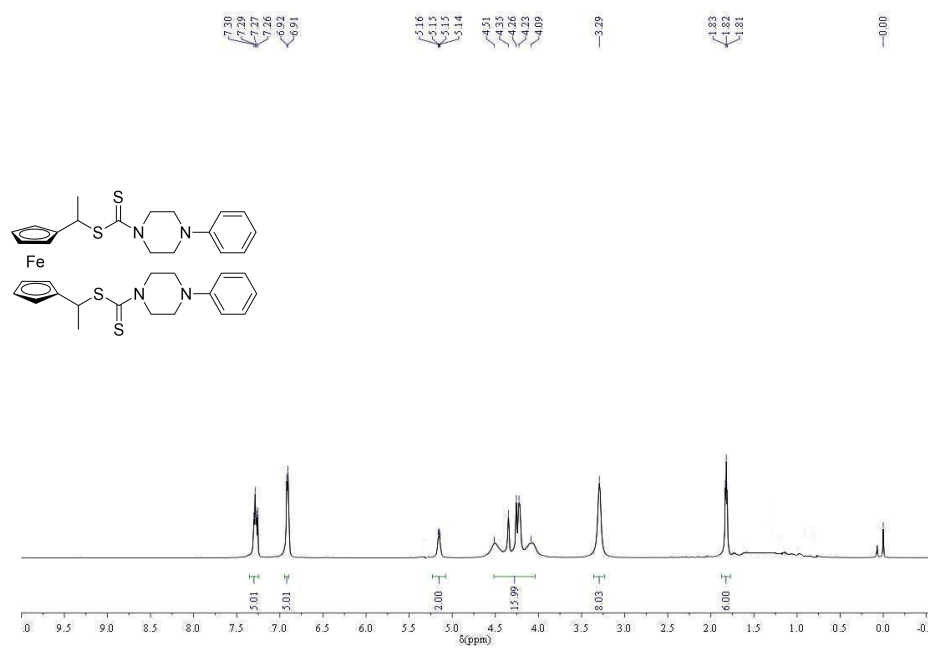
¹H NMR spectra and ¹³C NMR spectra for **5b**.



¹H NMR spectra and ¹³C NMR spectra for **5c**.



¹H NMR spectra and ¹³C NMR spectra for **5d**.



^1H NMR spectra and ^{13}C NMR spectra for **5e**.

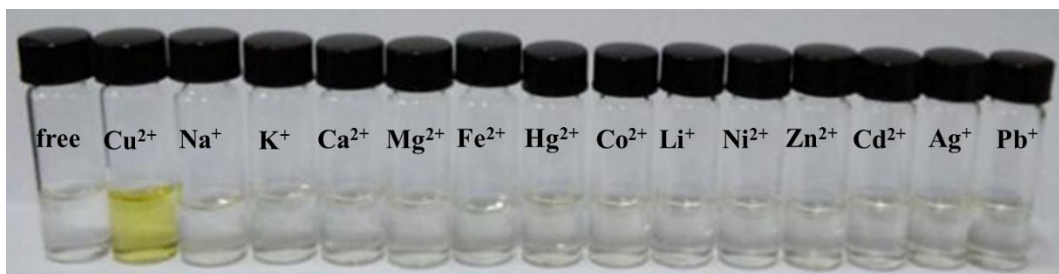


Figure S1. Visual color changes of probe **3e** upon addition of various metal ions (5 equiv) in CH₃CN/H₂O (7:3, v/v, 10 μM).

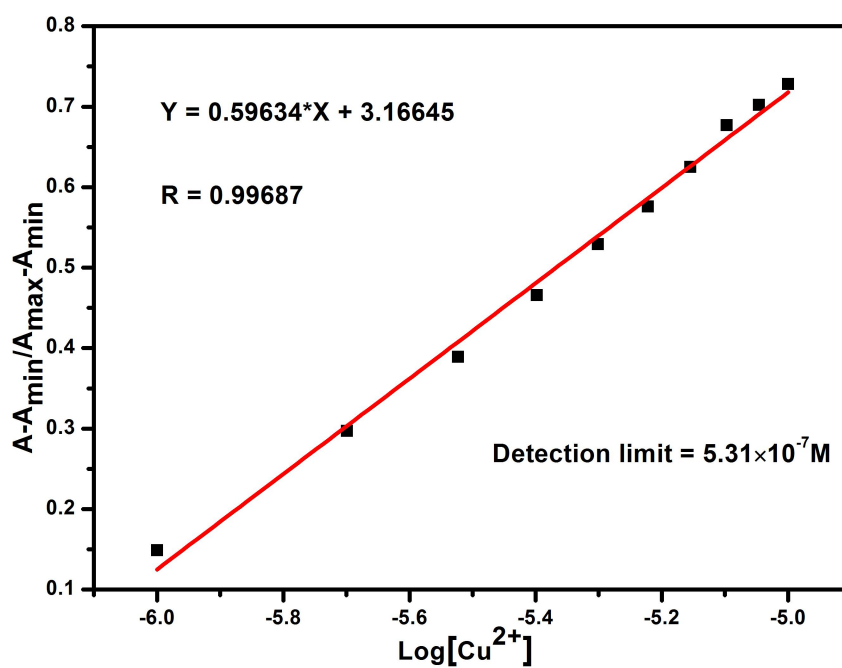


Figure S2. Benesi - Hildebrand plot obtained from the UV- vis absorption (absorption calculated from 423 nm) **3e**-Cu²⁺.

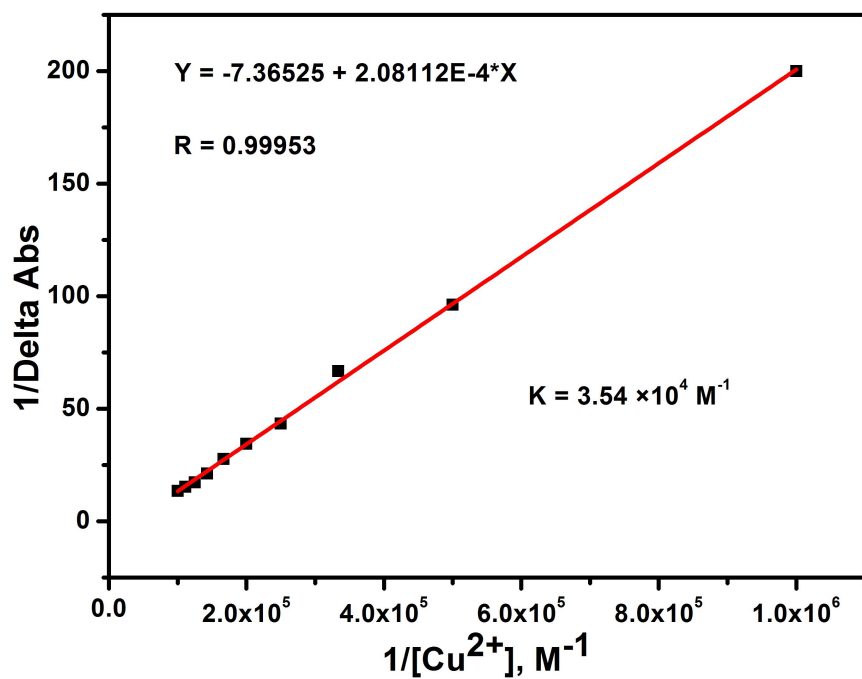


Figure S3. Benesi - Hildebrand plot obtained from the UV- vis absorption (absorption calculated from 423 nm) 3e-Cu^{2+} .

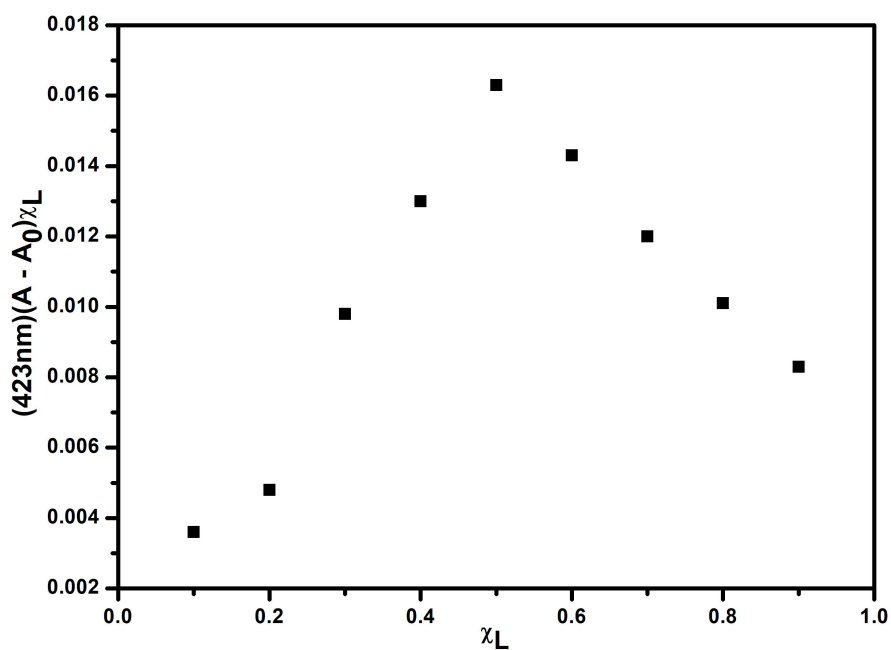


Figure S4. The Job's plot of receptor 3e-Cu^{2+} .