Copper(I) Diselenocarbamate Clusters: Synthesis, Structures and Single-Source Precursors for Cu and Se Composite Materials

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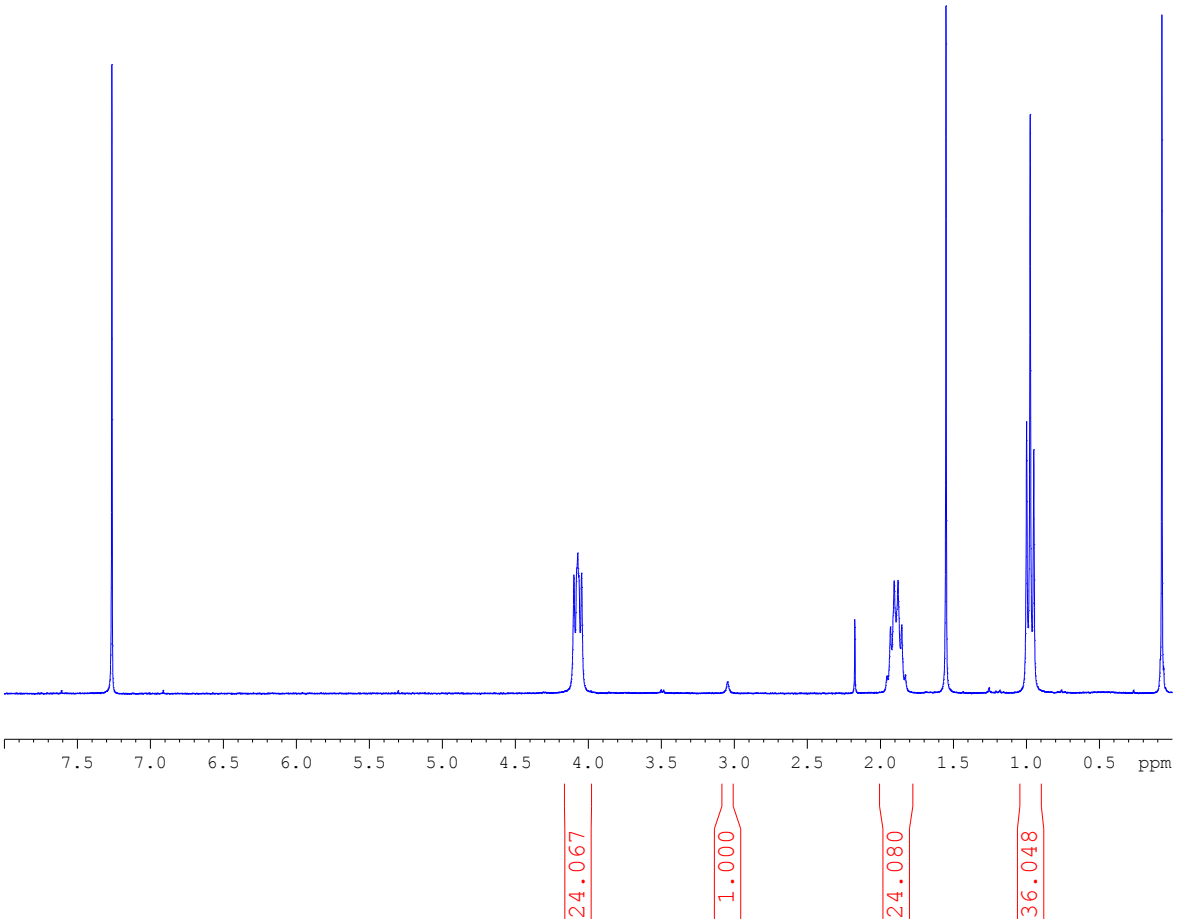

Figure S1. ^{1}H NMR spectra of $[Cu_8(H)\{Se_2CN^nPr_2\}_6](PF_6)$, $\mathbf{2_H}$ in $CDCl_3$

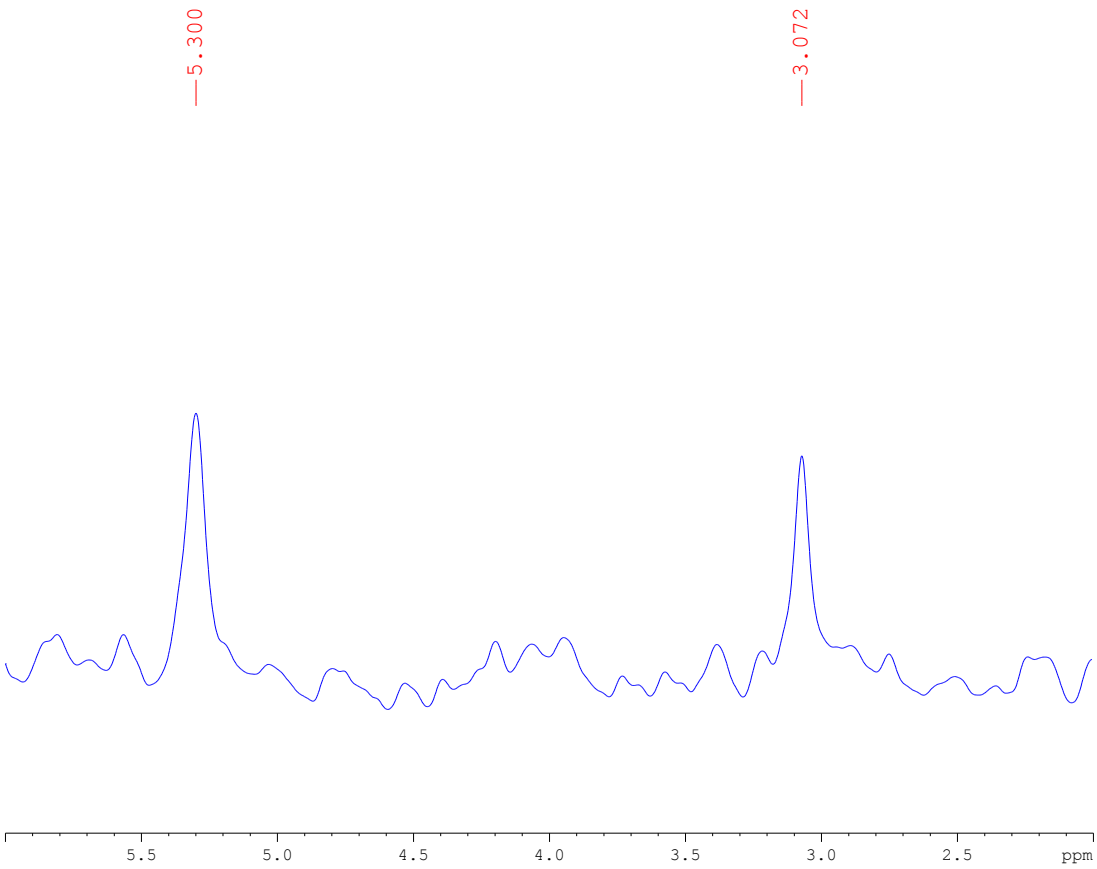

Figure S2. ^{2}H NMR spectra of $[Cu_8(D)\{Se_2CN^{n}Pr_2\}_6](PF_6)$, $\mathbf{2_D}$ in CH_2Cl_2

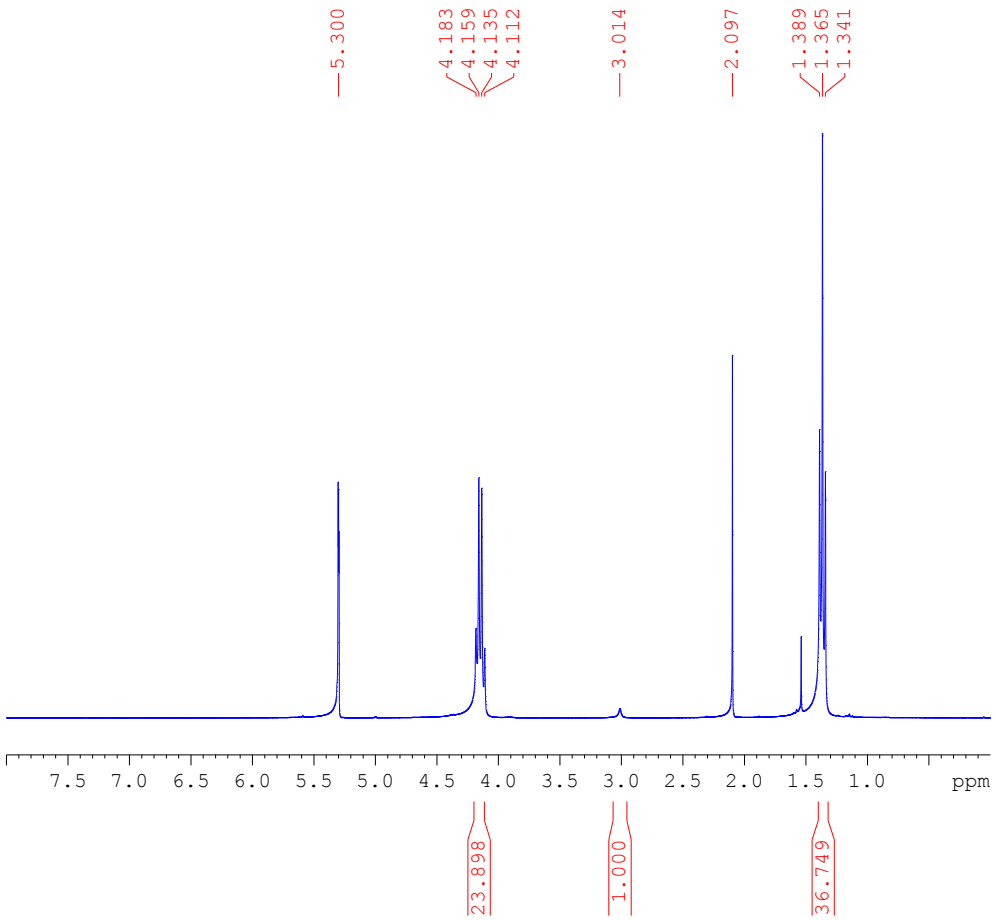

Figure S3. ^{1}H NMR spectra $[Cu_8(H)\{Se_2CNEt_2\}_6]$, $\mathbf{3_H}$ in CD_2Cl_2

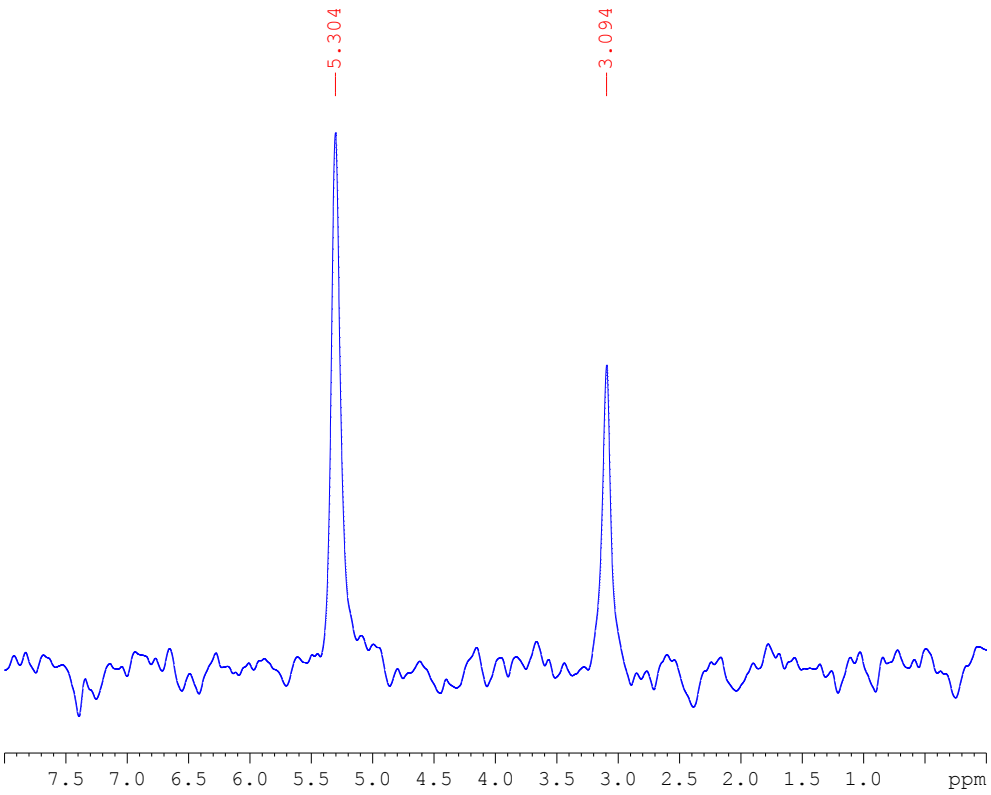

Figure S4. ^{2}H NMR spectra $[Cu_8(D)\{Se_2CNEt_2\}_6]$, $\mathbf{3_D}$ in CH_2Cl_2

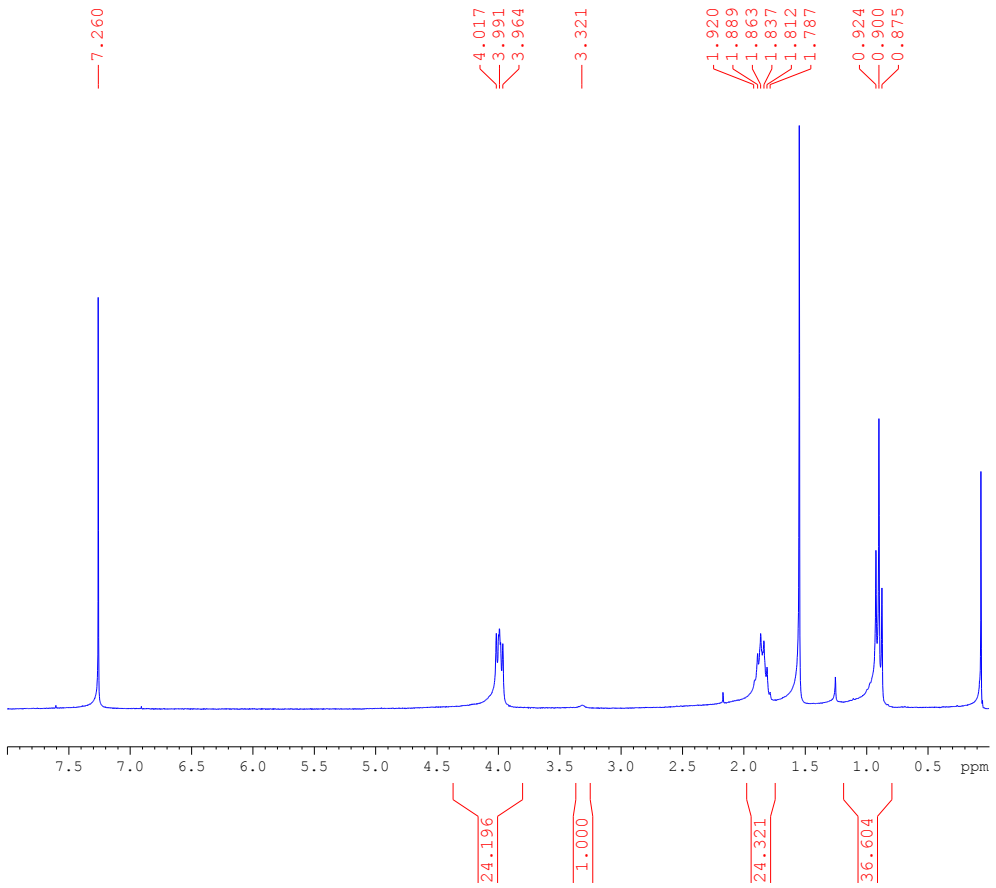

Figure S5. ^{1}H NMR spectra of $[Cu_7(H)\{Se_2CN^nPr_2\}_6]$, $\mathbf{4_H}$ in $CDCl_3$

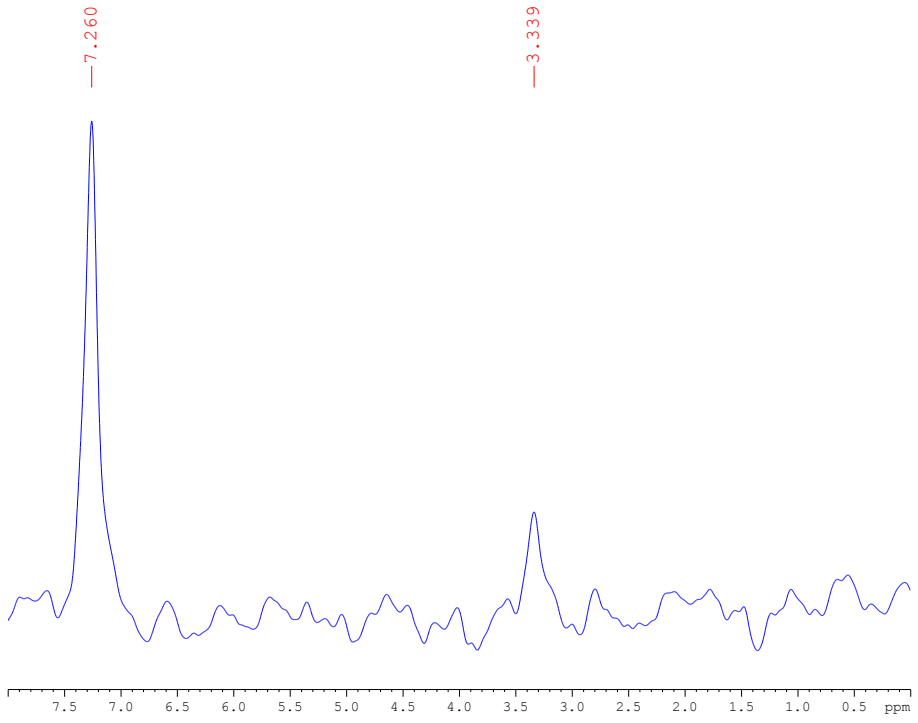

Figure S6. ^{2}H NMR spectra of $[Cu_7(D)\{Se_2CN^nPr_2\}_6]$, $\mathbf{4_D}$ in $CHCl_3$.

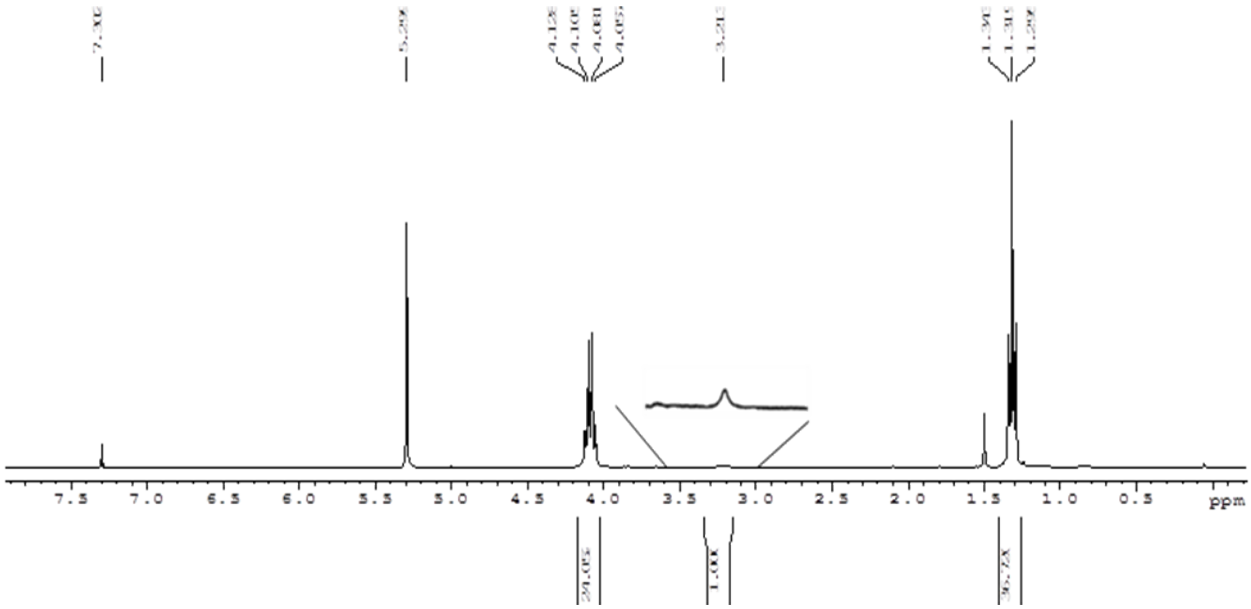

Figure S7. ^{1}H NMR spectra of $[Cu_7(H)\{Se_2CNEt_2\}_6]$, $\mathbf{5_H}$ in CD_2Cl_2

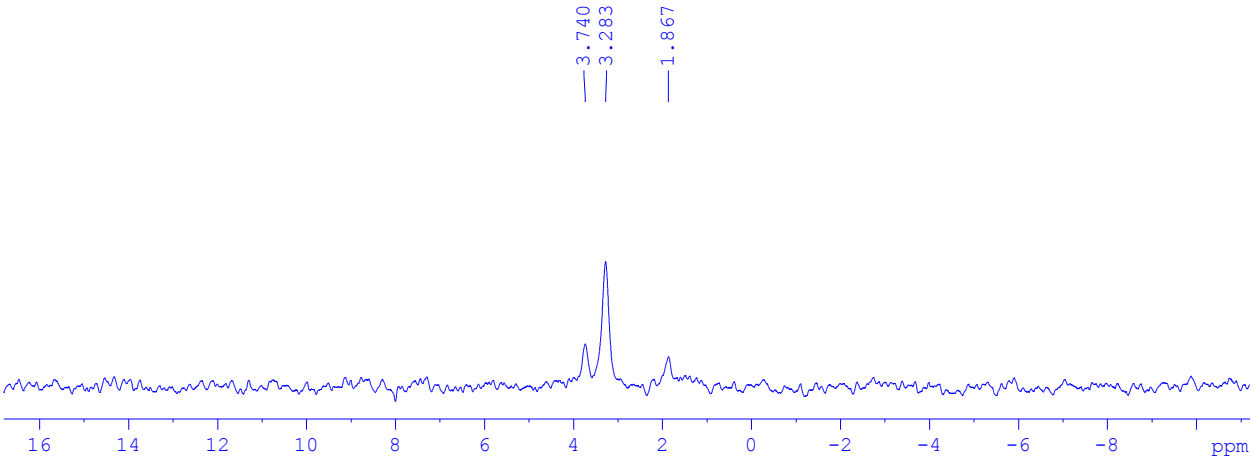

Figure S8. ^{2}H NMR spectra of $[Cu_7(D)\{Se_2CNEt_2\}_6]$, $\mathbf{5_D}$ in THF

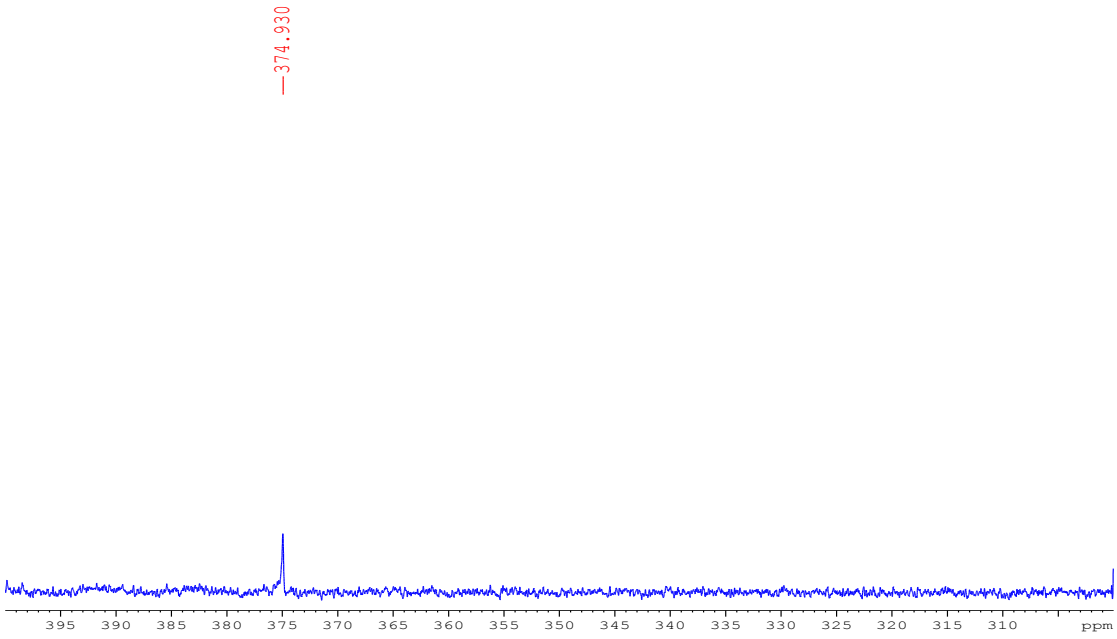

Figure S9. ^{77}Se NMR spectra of $[Cu_8(H)\{Se_2CN^nPr_2\}_6](PF_6)$, $\mathbf{2_H}$ in $CHCl_3$

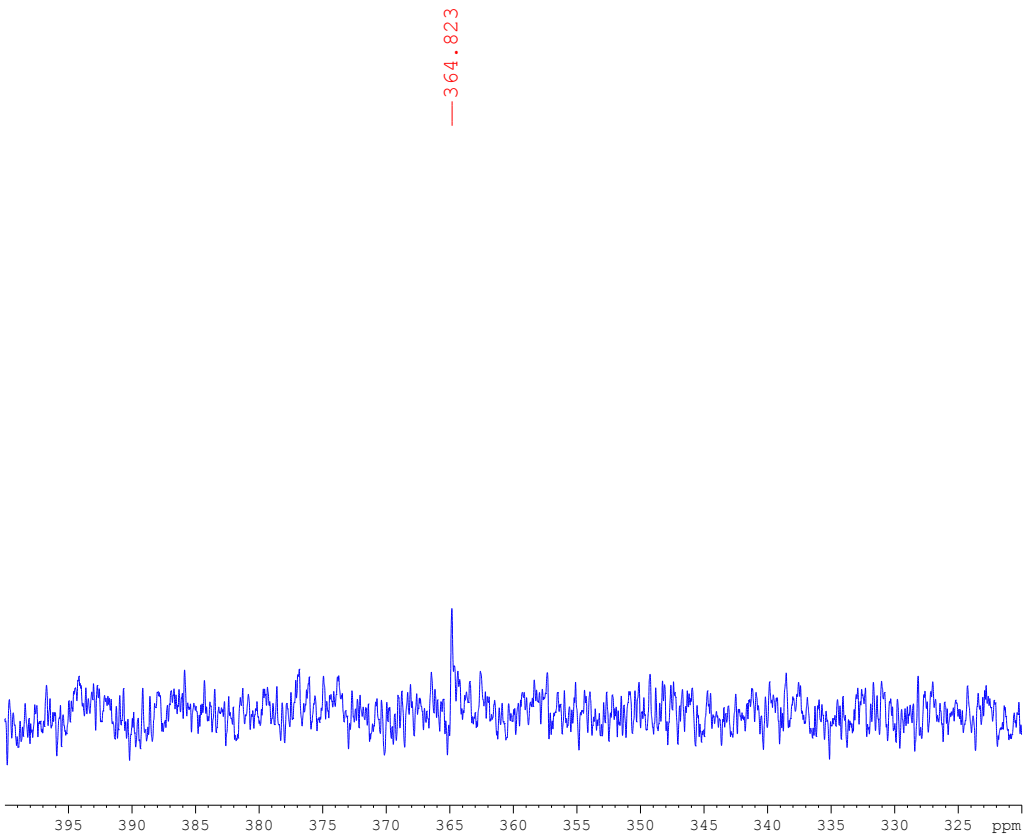

Figure S10. ^{77}Se NMR spectra of $[Cu_8(H)\{Se_2CNEt_2\}_6]PF_6$, **3$_H$** in CH_2Cl_2

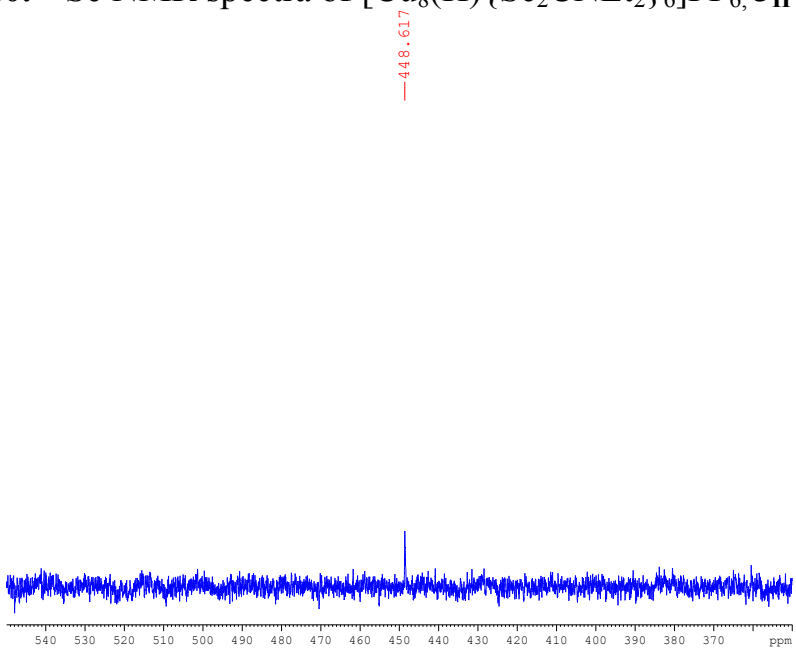

Figure S11. ^{77}Se NMR spectra $[Cu_7(H)\{Se_2CN^nPr_2\}_6]$, **4$_H$** in $CHCl_3$

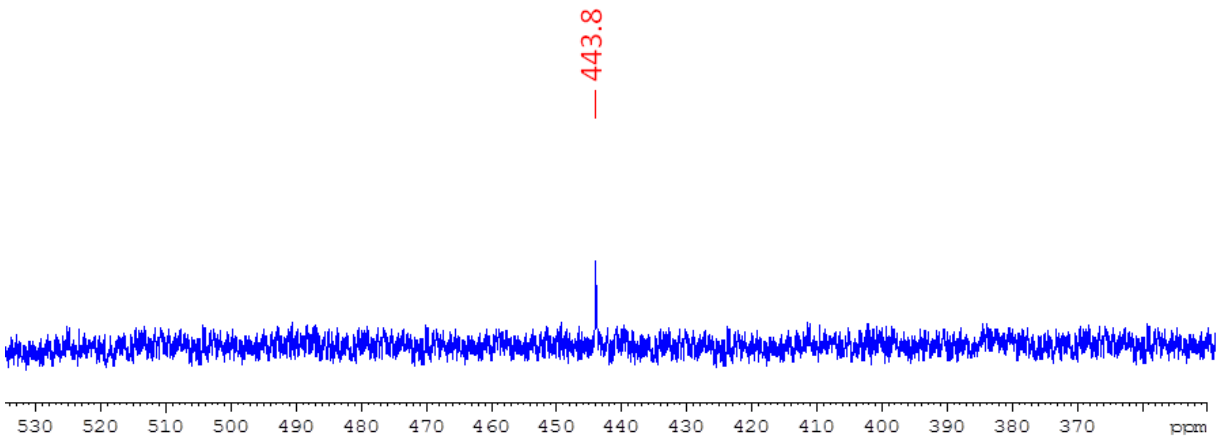

Figure S12. ^{77}Se NMR spectra of $[Cu_7(H)\{Se_2CNEt_2\}_6]$, $\mathbf{5_H}$ in CH_2Cl_2

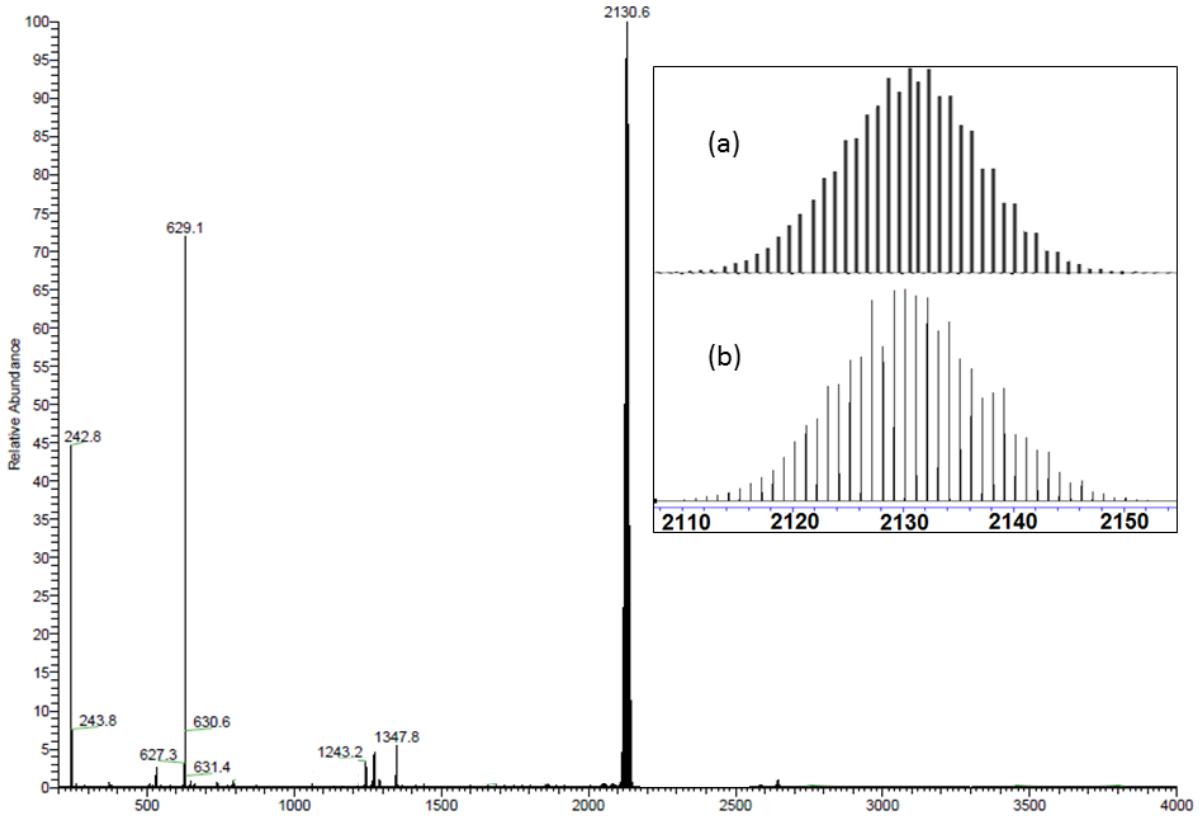

Figure S13. ESI-MS spectrum of $[Cu_8(H)\{Se_2CN^nPr_2\}_6]^+$, $\mathbf{2_H}$. The inset shows experimental (a) and theoretical one (b).

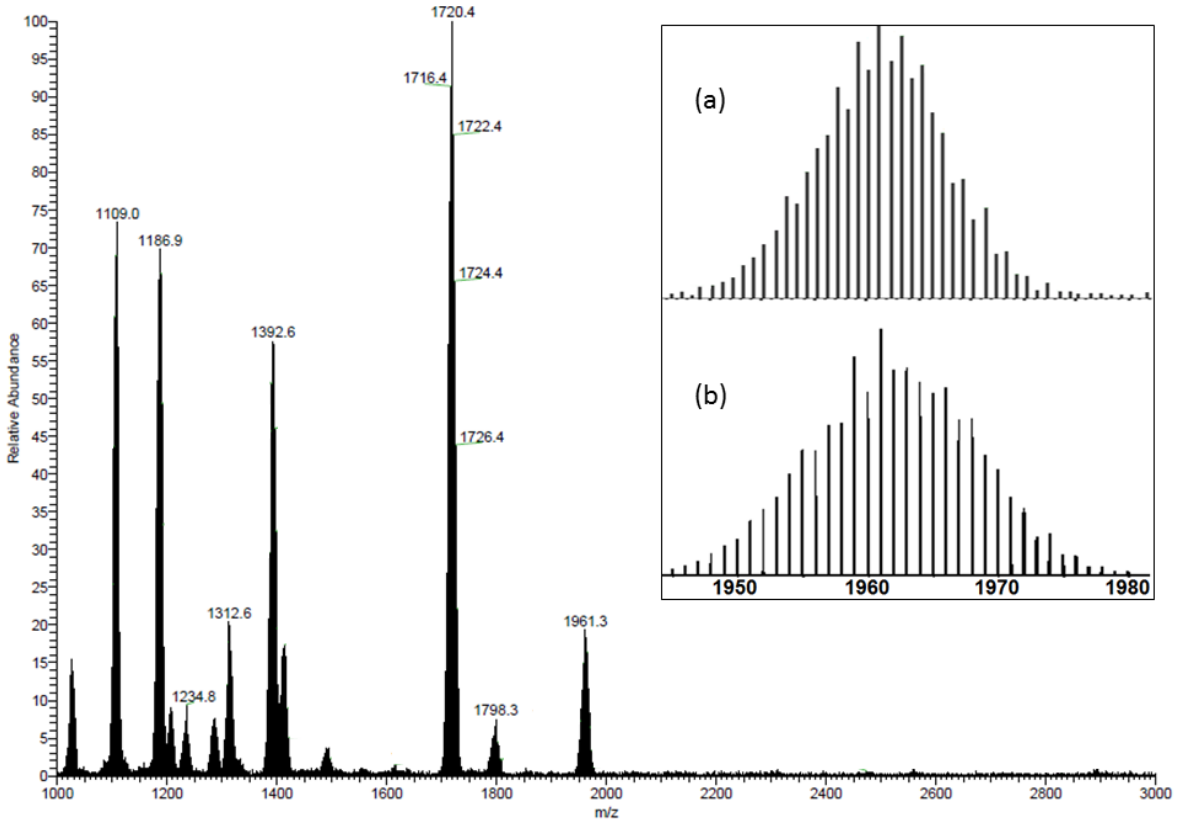

Figure S14. ESI-MS spectrum of $[Cu_8(H)\{Se_2CNEt_2\}_6]^+$, $\mathbf{3_H}$. The inset shows experimental (a) and theoretical one (b).

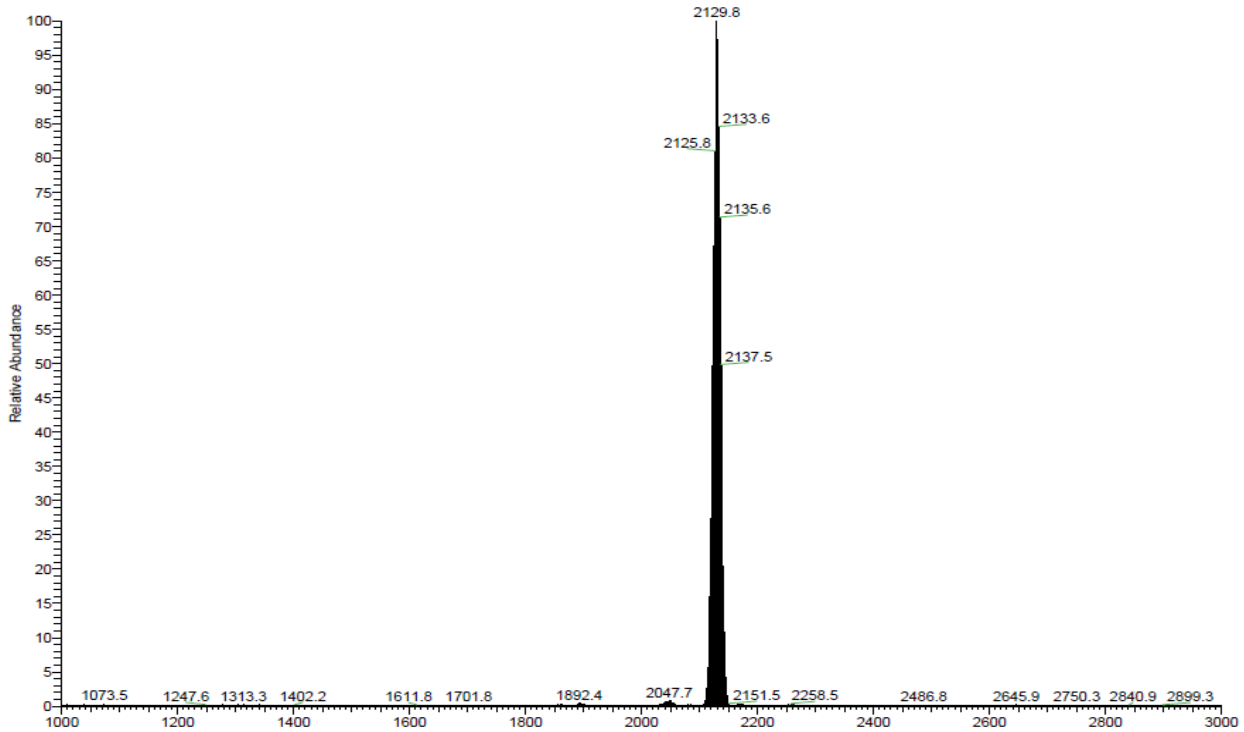

Figure S15. ESI-MS spectrum of $[Cu_7(H)\{Se_2CN^nPr_2\}_6]^+$, $\mathbf{4_H}$, observed an adduct species $[Cu_7(H)\{Se_2CN^nPr_2\}_6(Cu)]^+$, $[\mathbf{4_H + Cu}]^+$.

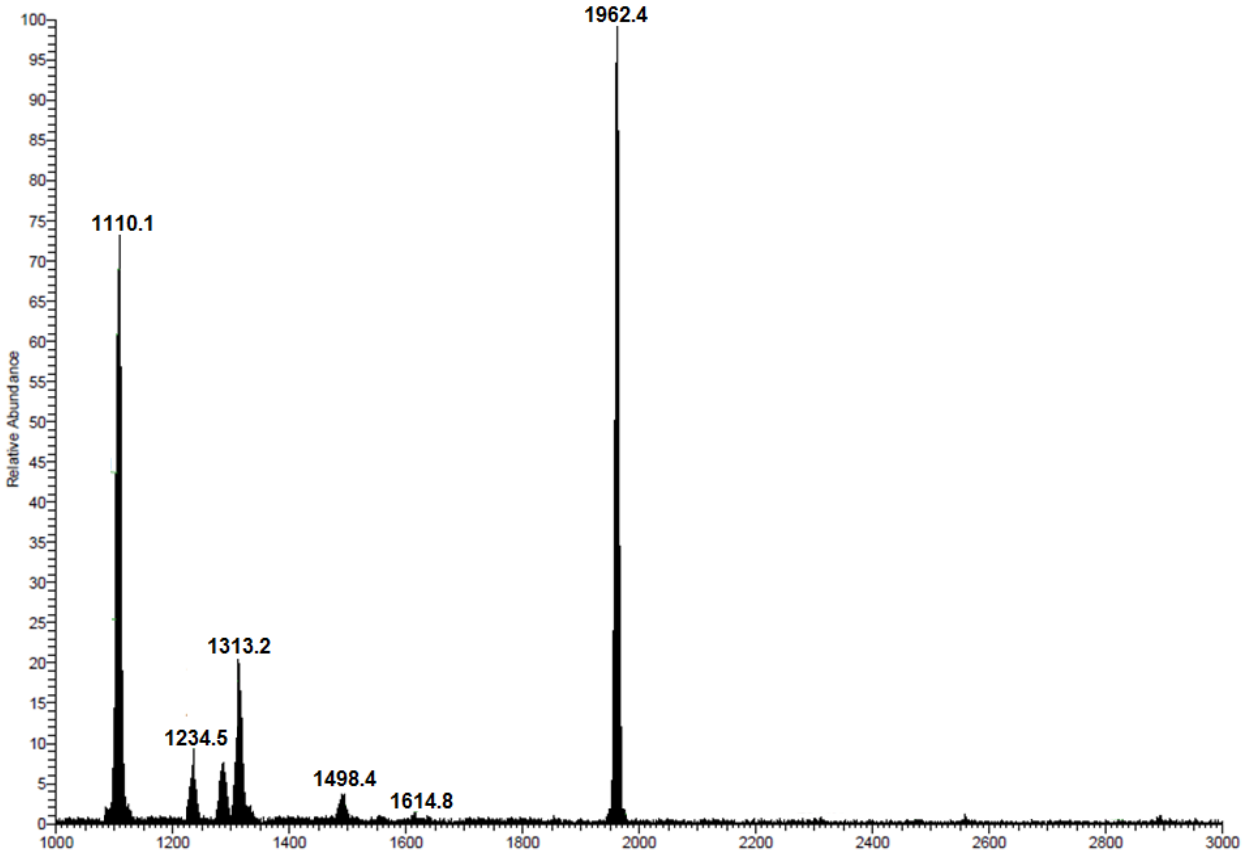

Figure S16. ESI-MS spectrum of $[Cu_7(H)\{Se_2CNEt_2\}_6]$, $\mathbf{5_H}$, observed an adduct species $[Cu_7(H)\{Se_2CNEt_2\}_6(Cu)]^+$, $[\mathbf{5_H + Cu}]^+$.