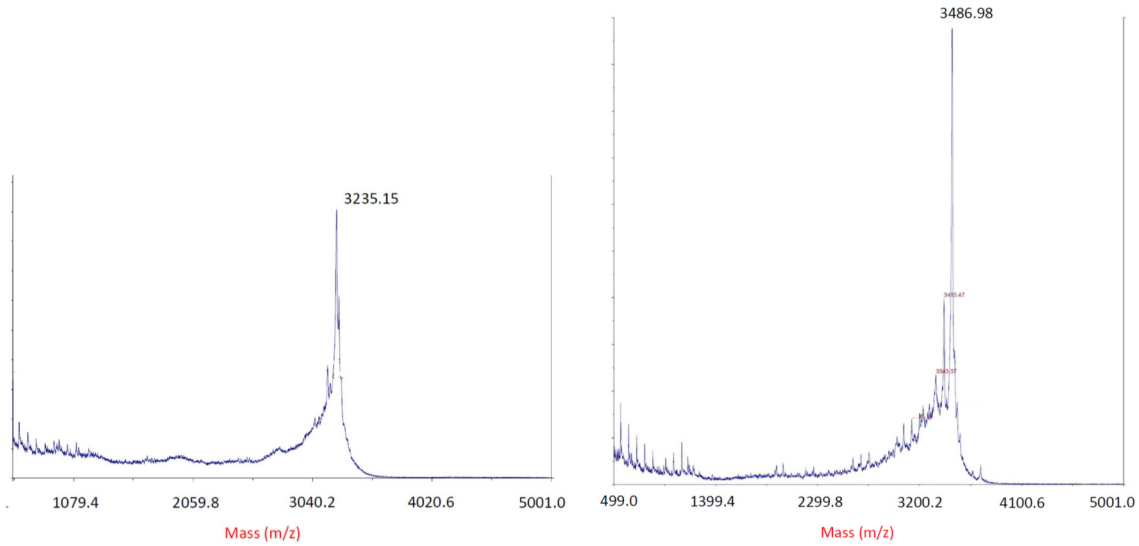
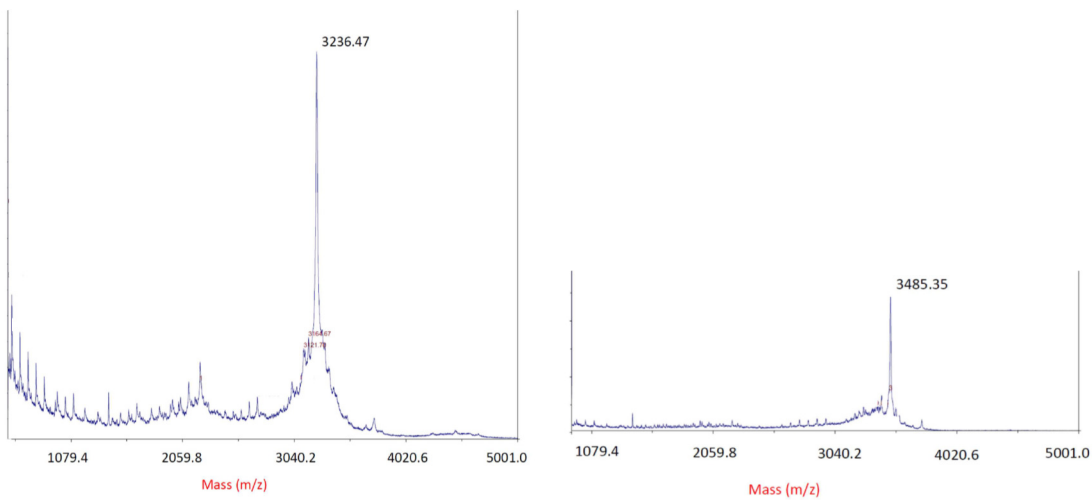


## Supporting Materials

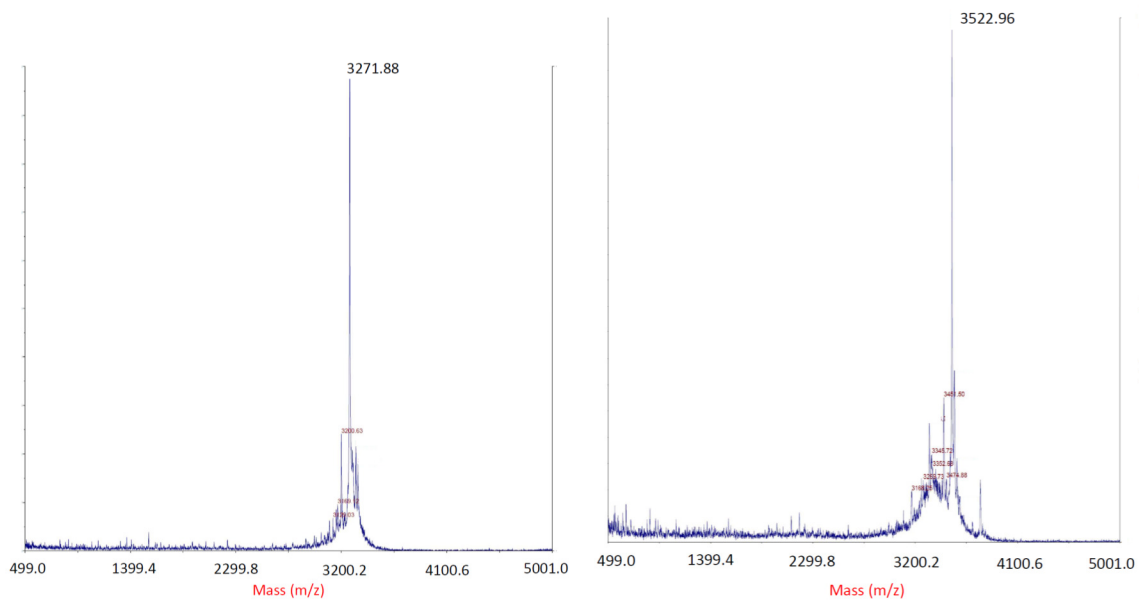
Figures 1-5 show the MALDI TOF spectra of the cysteine substituted HPLC6 mutants and their MSL spin labeled ones. The MALDI TOF spectra show the spin labeled products of these mutants.



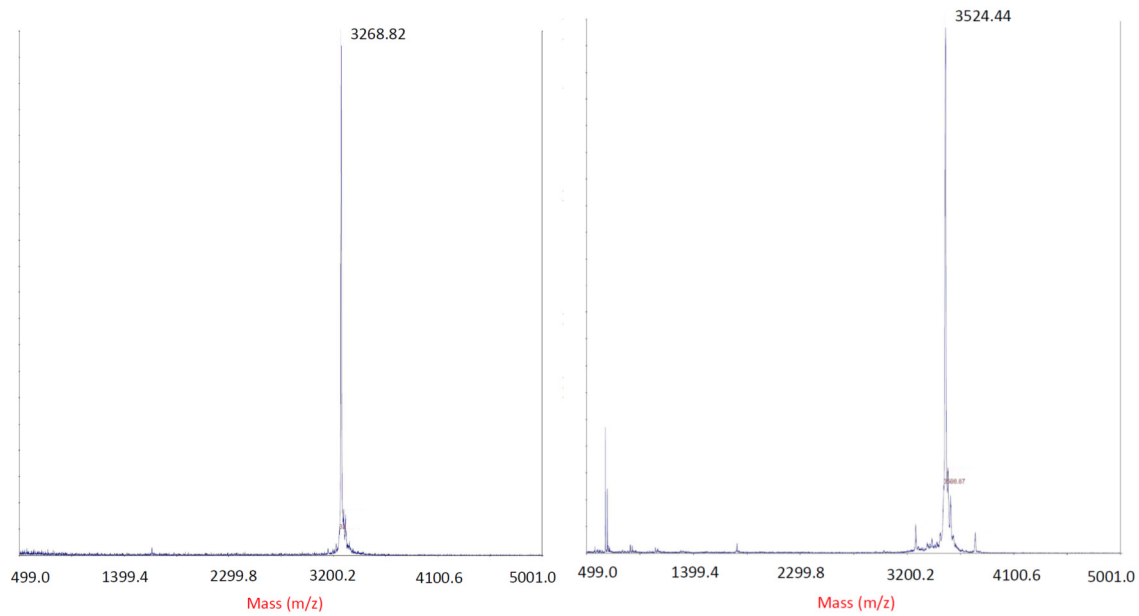
**Figure 1.** (Left) MALDI TOF spectrum of HPLC6 L23C peptides showing molar mass of 3235.15 Da; (Right) MALDI TOF spectrum of MSL spin labeled HPLC6 L23C peptides showing molar mass of 3486.98 Da.



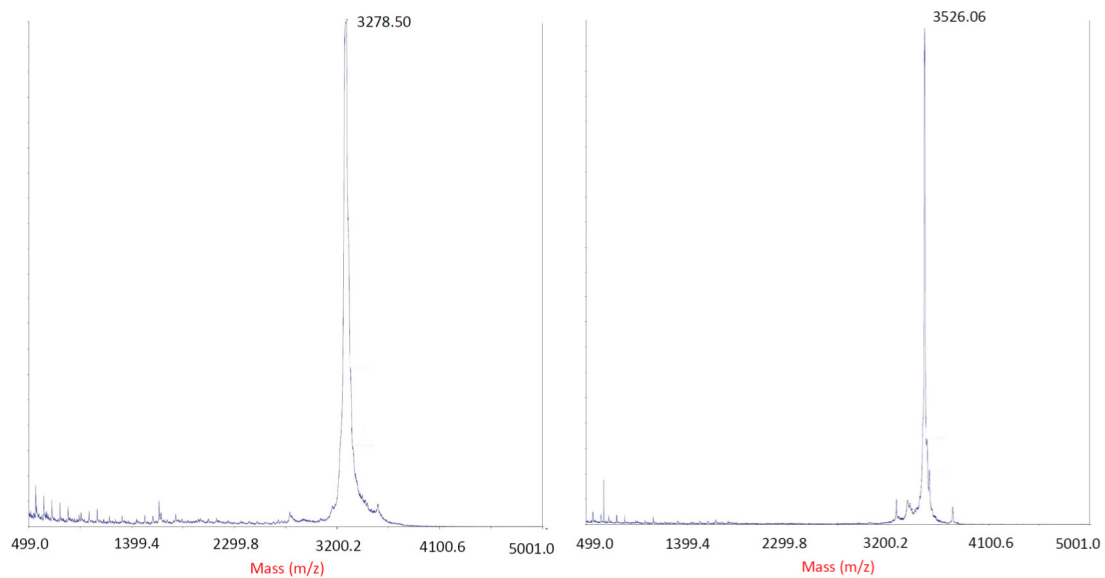
**Figure 2.** (Left) MALDI TOF spectrum of HPLC6-L12C peptides showing molar mass of 3236.47 Da; (Right) MALDI TOF spectrum of MSL spin labeled HPLC6-L12C peptides showing molar mass of 3485.35 Da.



**Figure 3.** (Left) MALDI TOF spectrum of HPLC6 A20C peptides showing molar mass of 3271.88 Da; (Right) MALDI TOF spectrum of MSL spin labeled HPLC6 A20C peptides showing molar mass of 3522.96 Da.

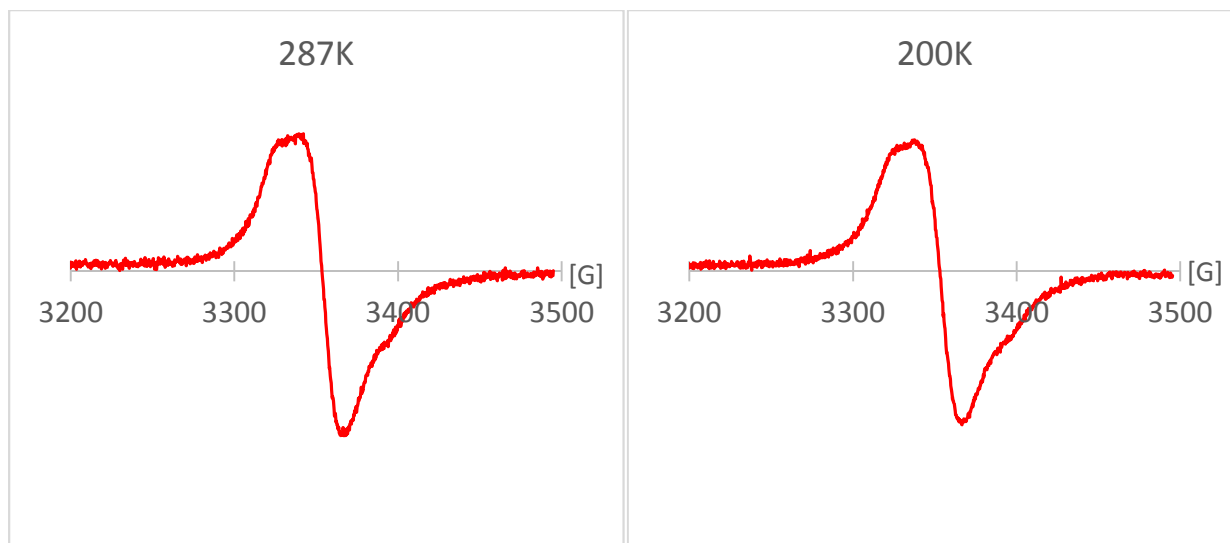


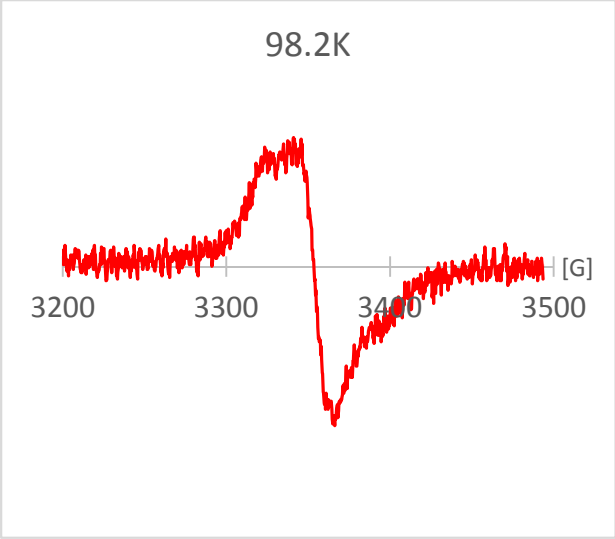
**Figure 4.** (Left) MALDI TOF spectrum of HPLC6 A11C peptides showing molar mass of 3268.82 Da; (Right) MALDI TOF spectrum of MSL spin labeled HPLC6 A11C peptides showing molar mass of 3524.44 Da.



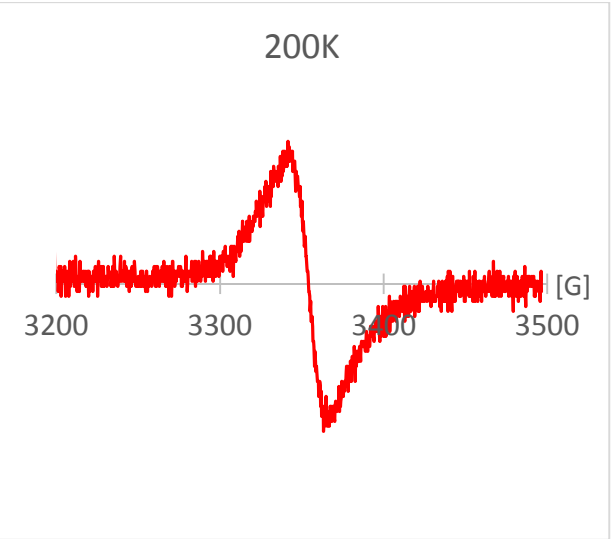
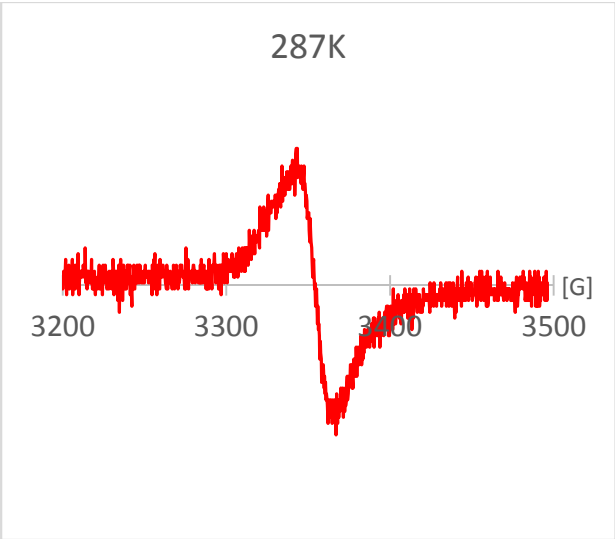
**Figure 5.** (Left) MALDI TOF spectrum of HPLC6 A17C peptides showing molar mass of 3278.50 Da; (Right) MALDI TOF spectrum of MSL spin labeled HPLC6 A17C peptides showing molar mass of 3526.06 Da.

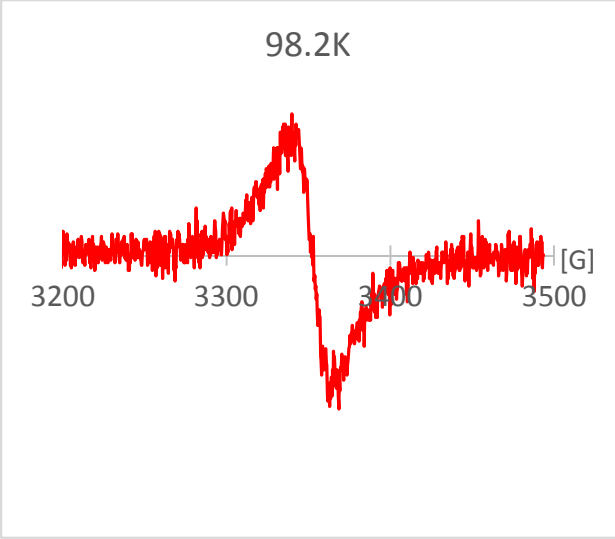
Figures 6- 11 show the experimental VT EPR spectra of MSL spin labelled HPLC6 mutants.



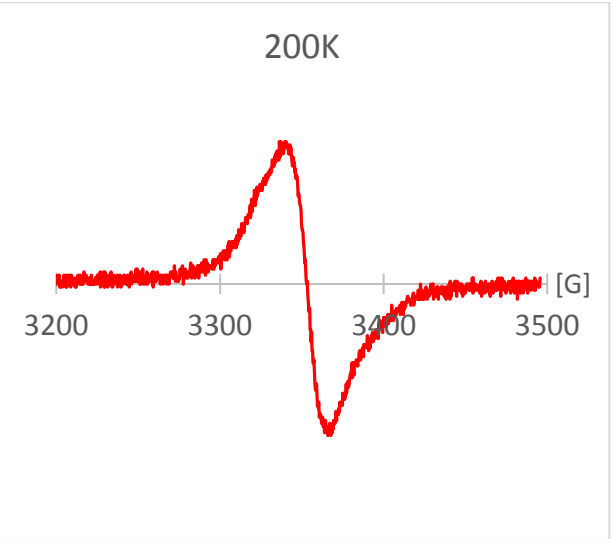
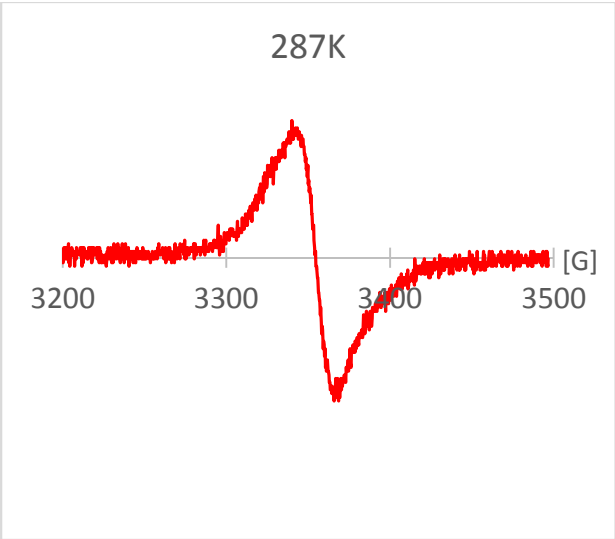


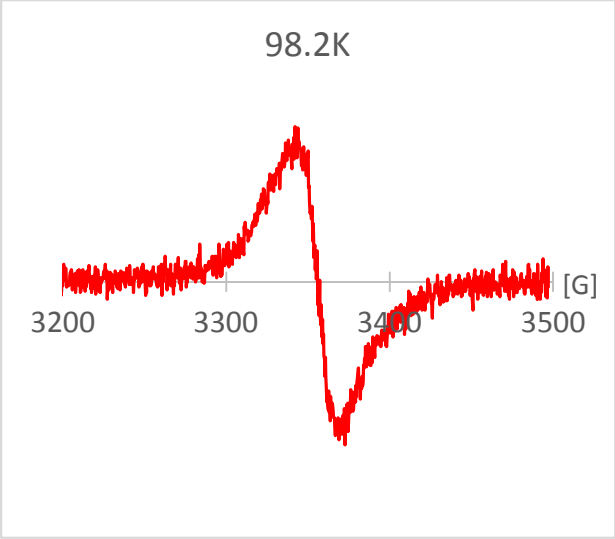
(a) Spin labeled HPLC6 L23C peptides



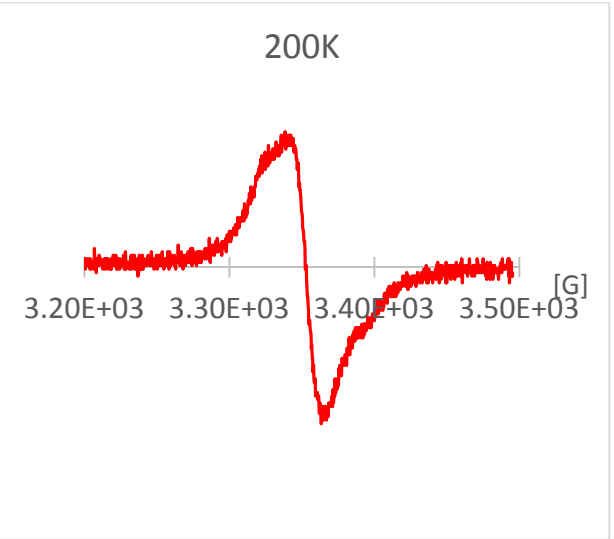
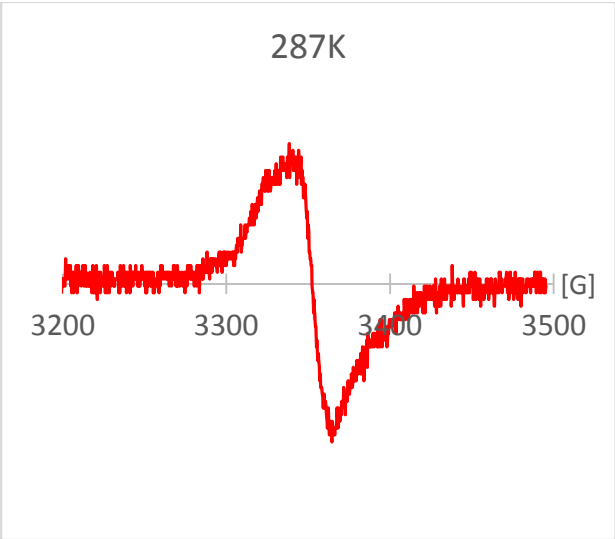


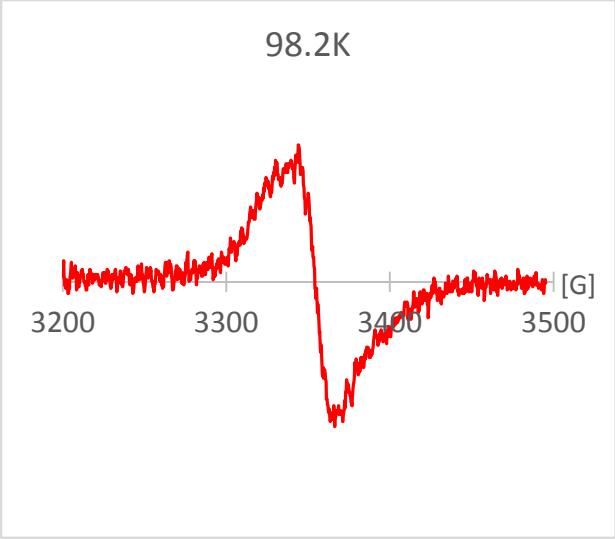
(b) Spin labeled HPLC6 L12C peptides



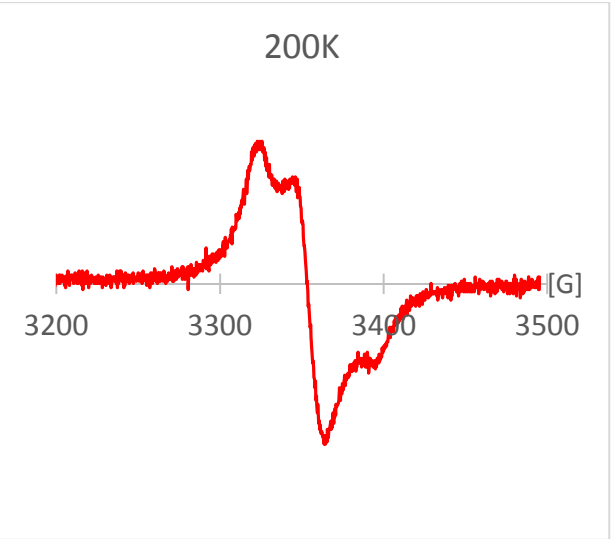
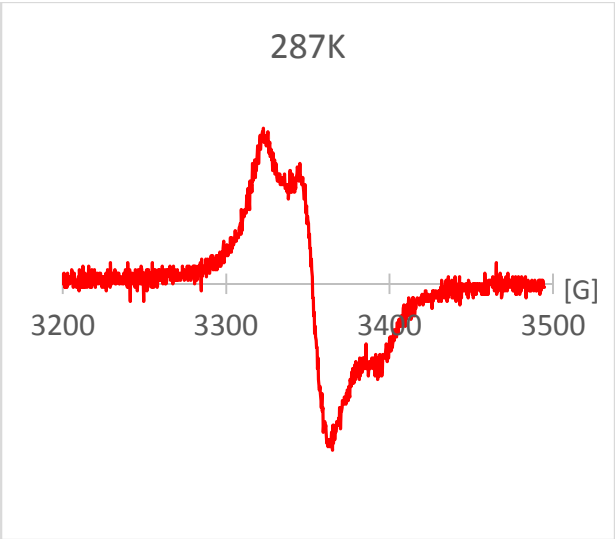


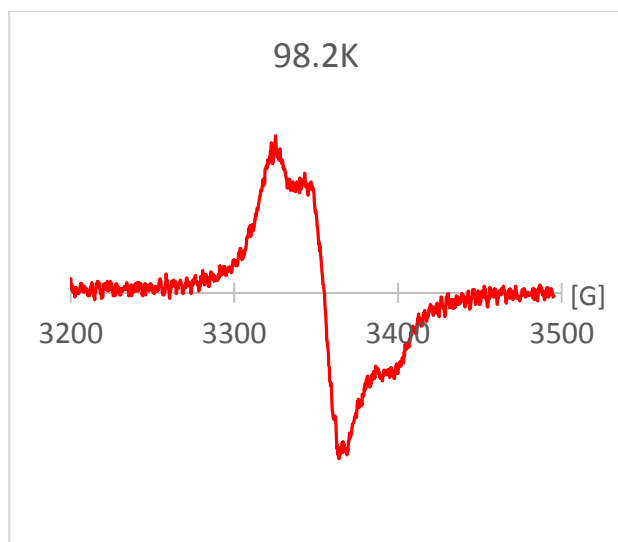
(c) Spin labeled HPLC6 A20C peptides





(d) Spin Labeled HPLC6 A11C peptides

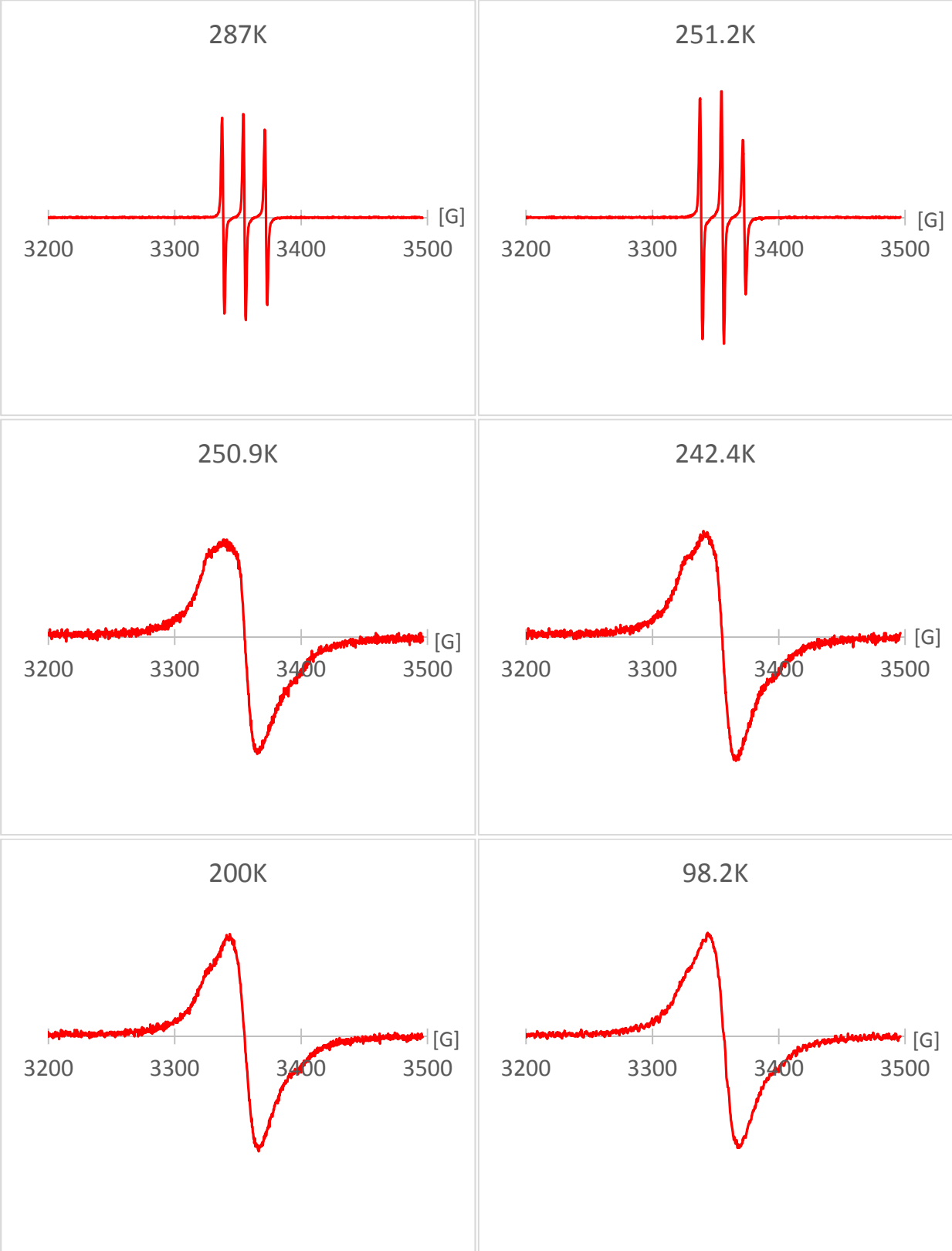




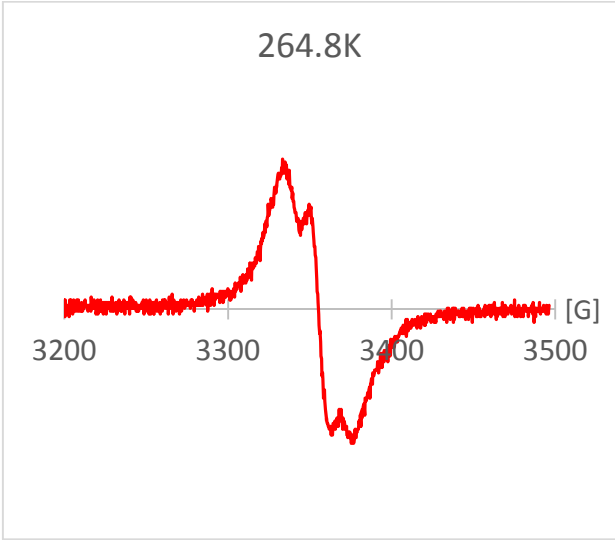
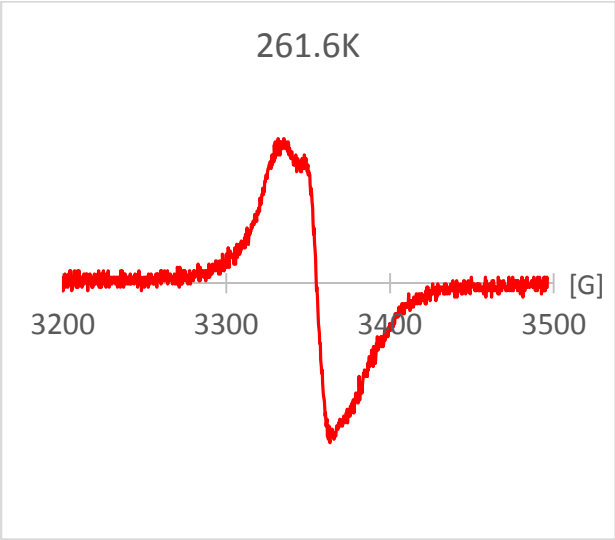
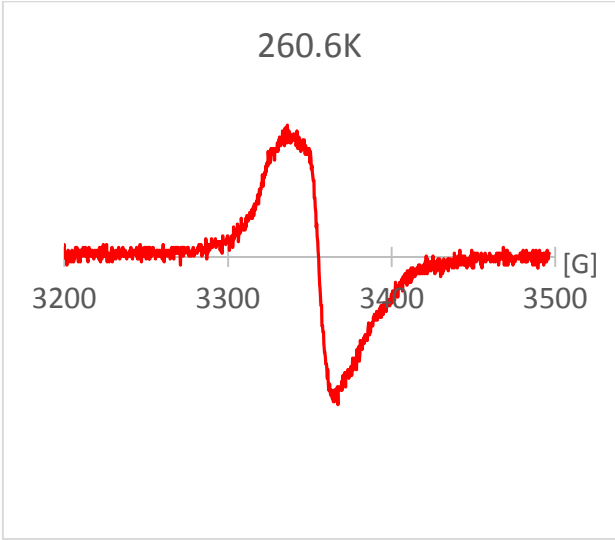
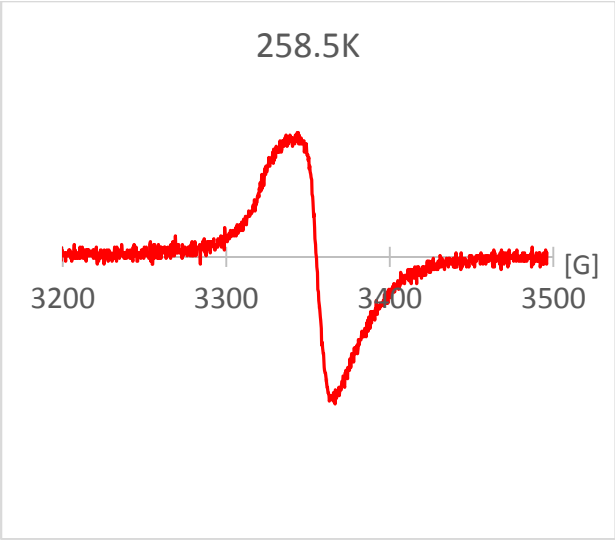
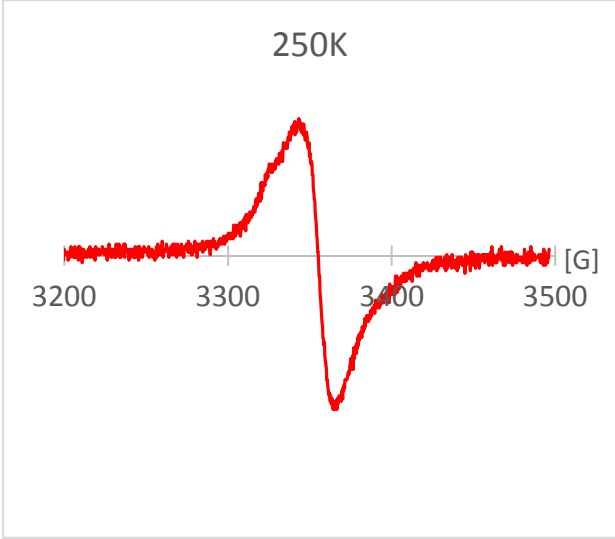
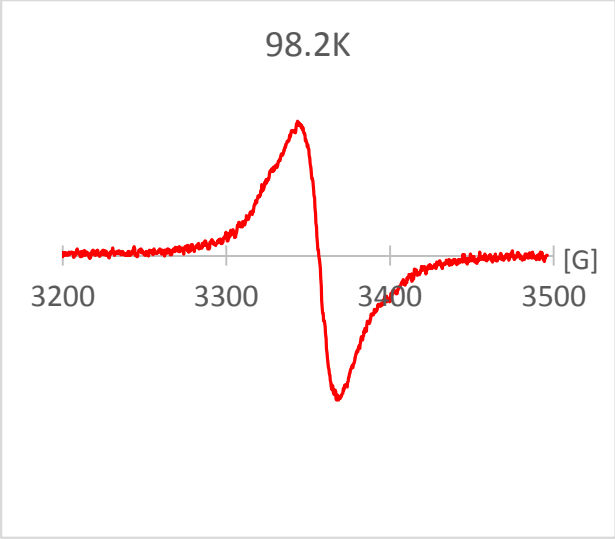
(e) Spin labeled HPLC6 A17C peptides

**Figure 6.** VT EPR spectra of MSL spin labeled HPLC6 peptide solid powders at different temperatures through the cooling process. Those through the heating process look the same.





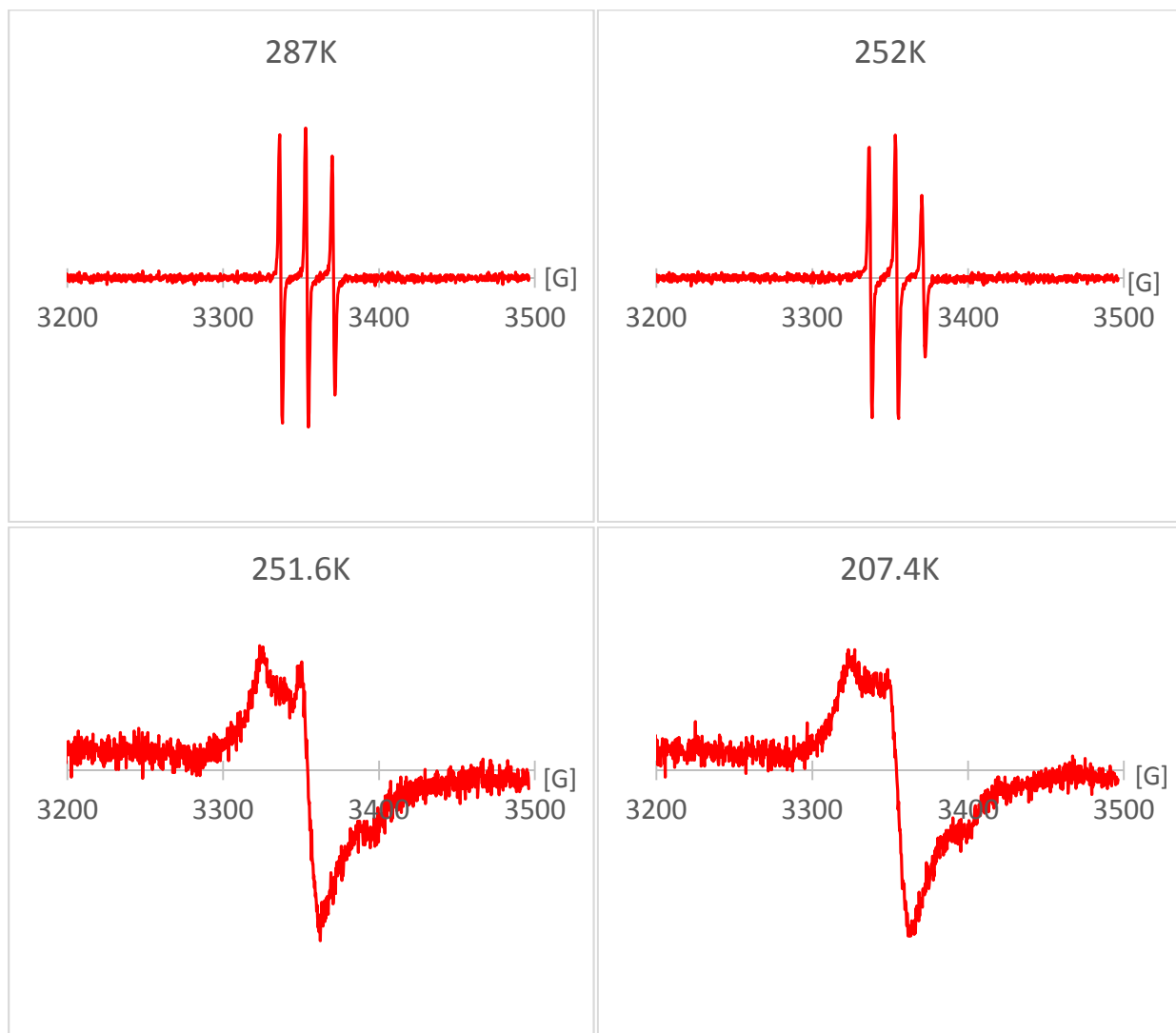
(a) Through cooling process

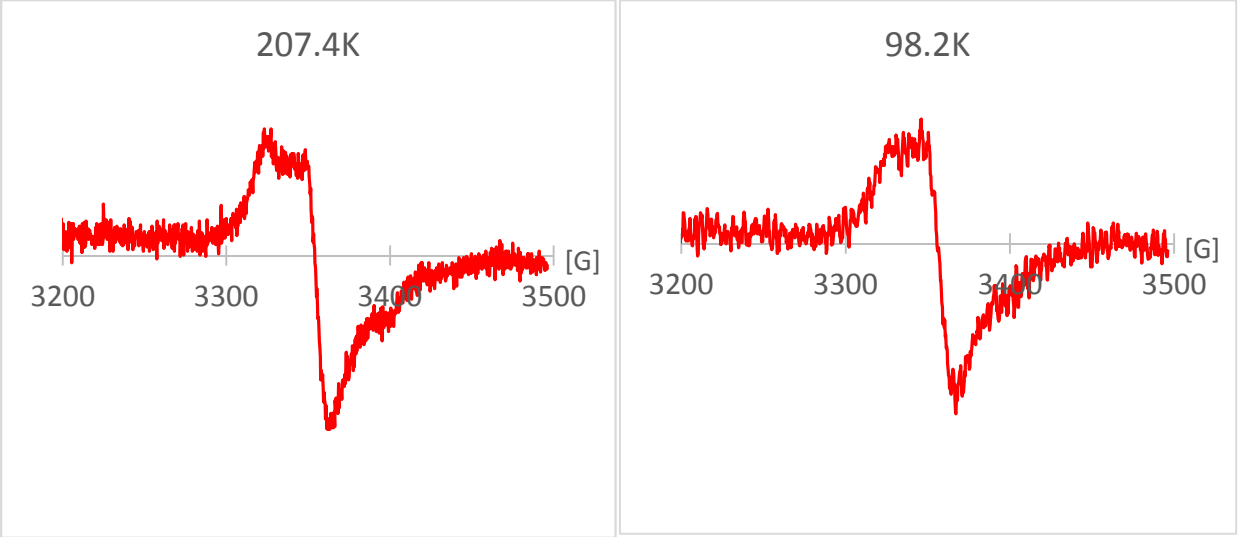




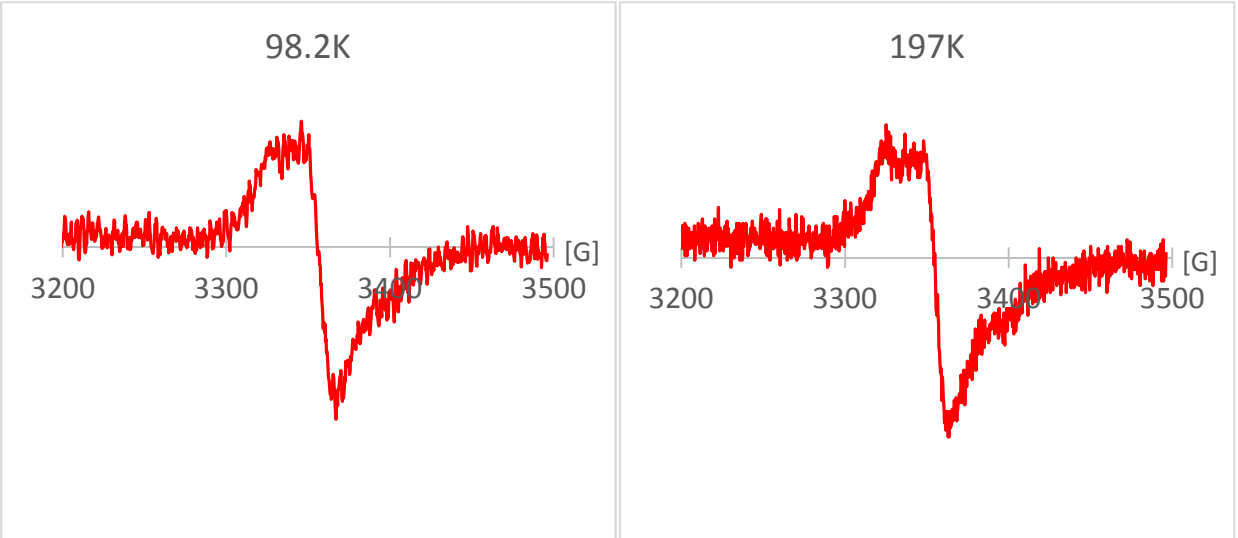
(b) Through heating process

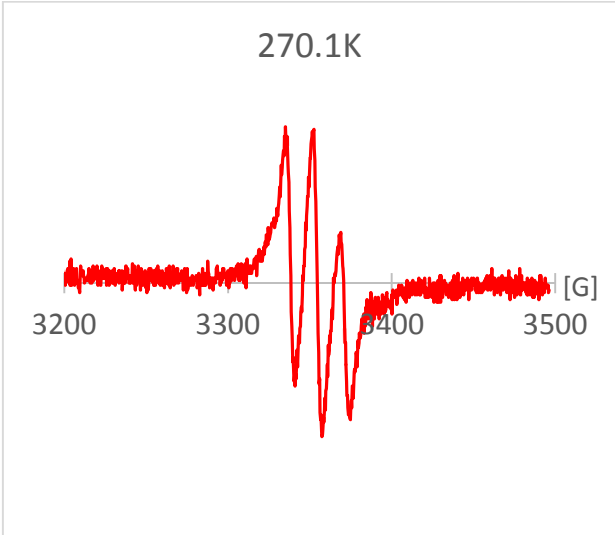
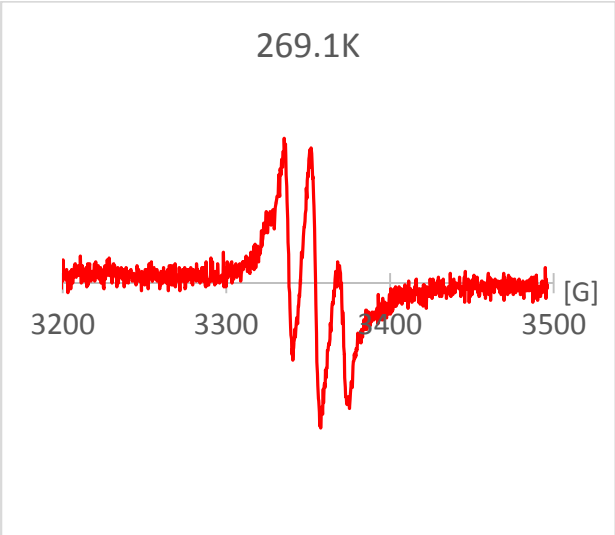
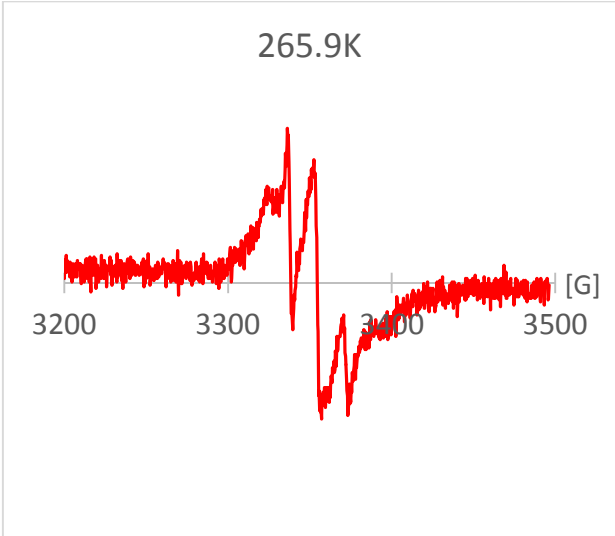
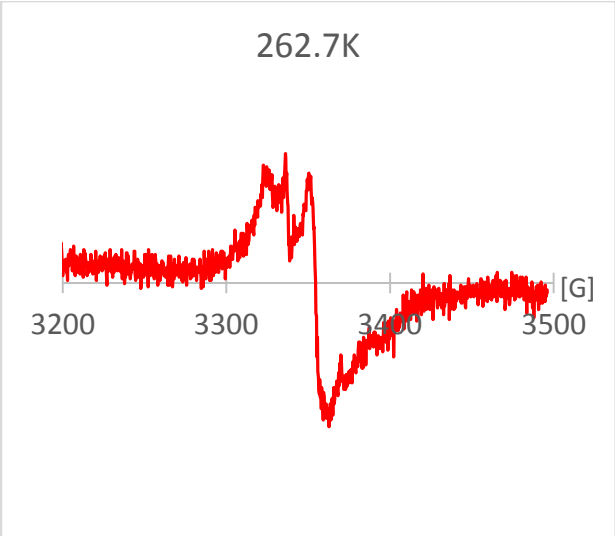
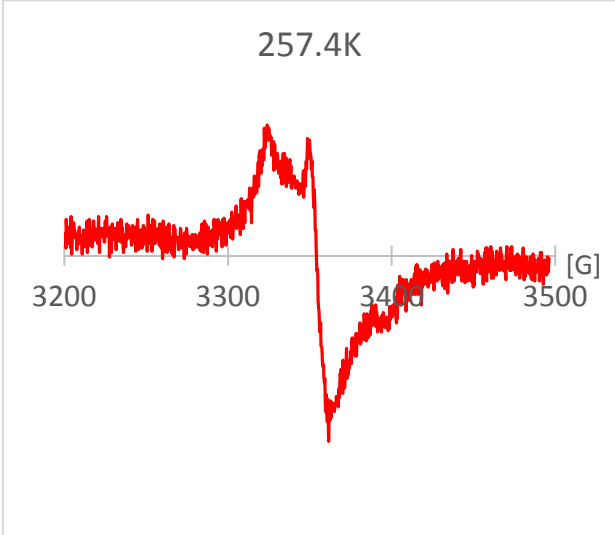
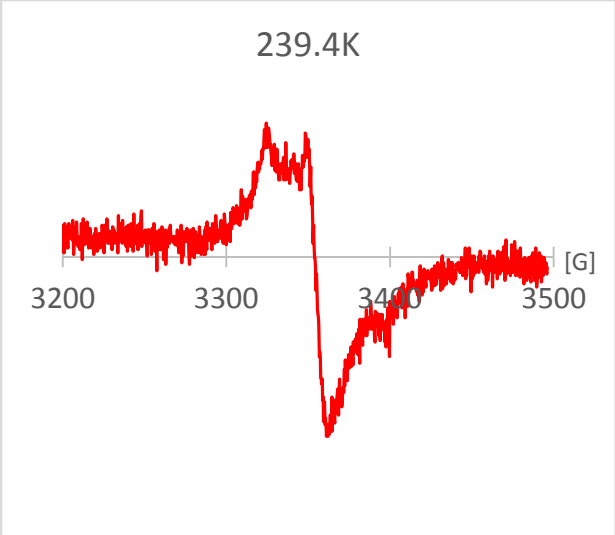
**Figure 7.** VT EPR spectra of MSL spin labeled HPLC6 L12C water solution through the cooling process (a) and through the heating process (b).

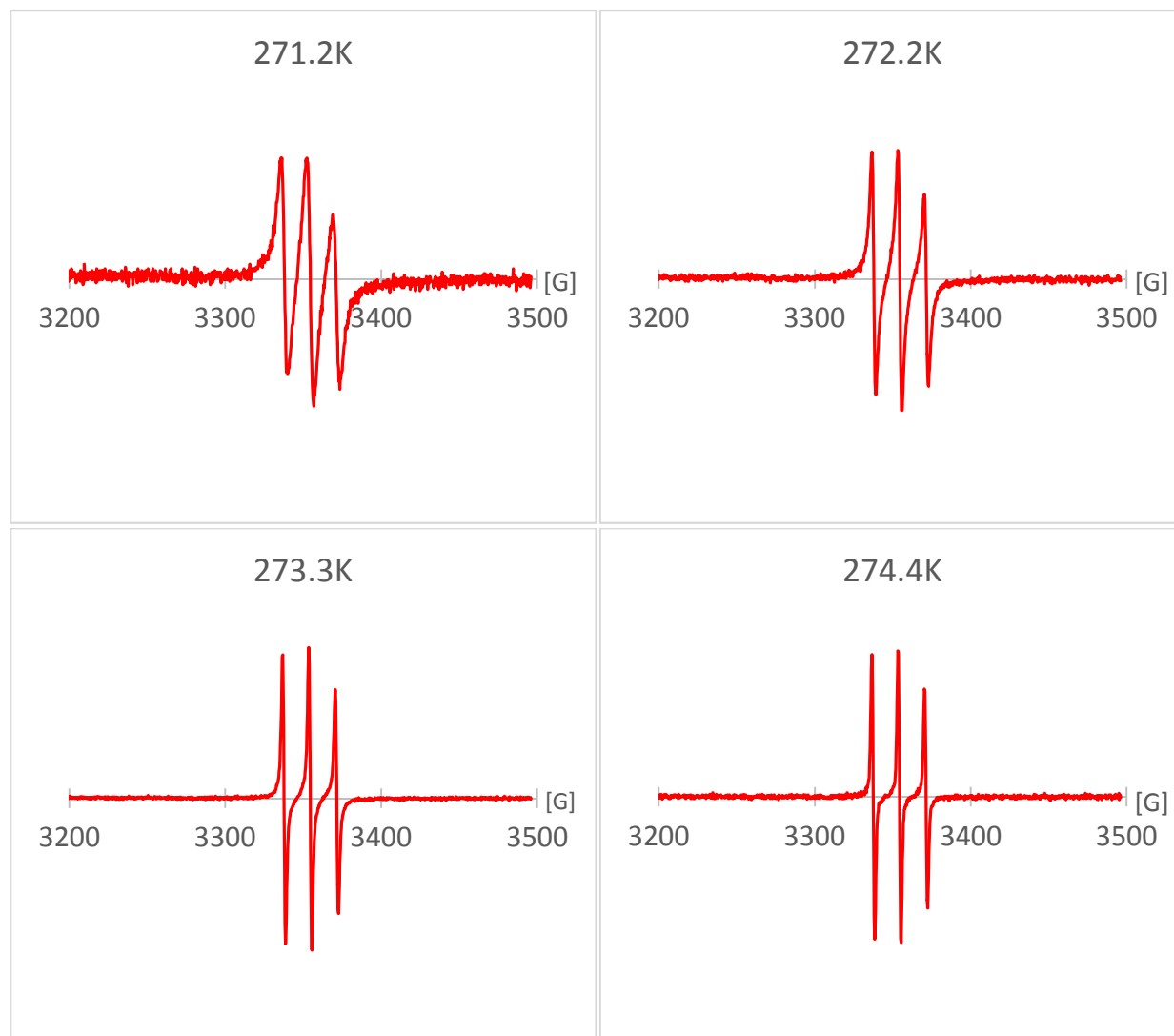




(a) Through cooling process

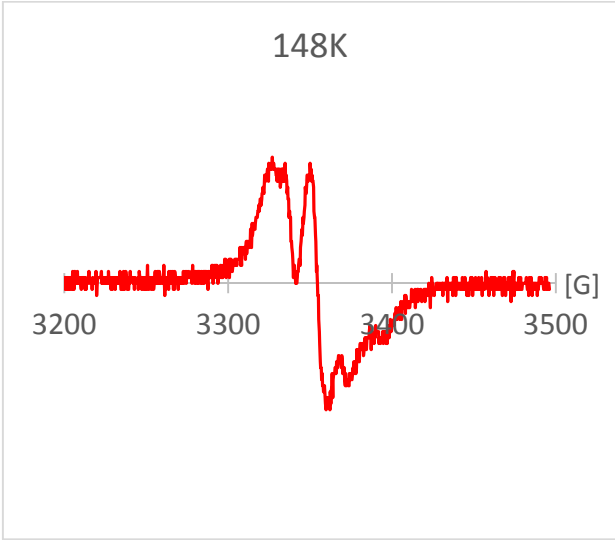
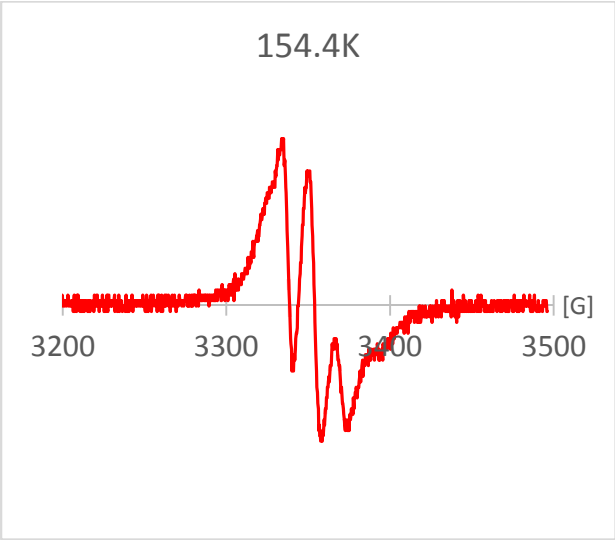
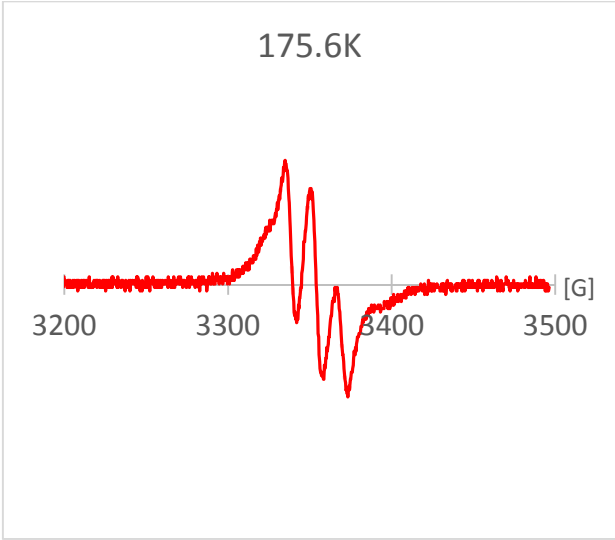
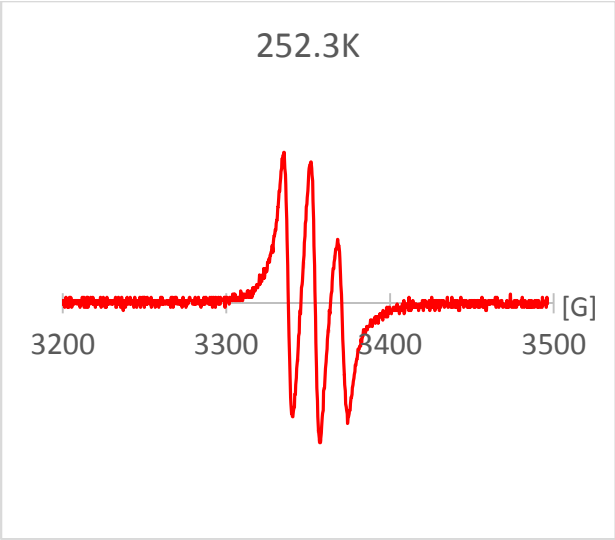
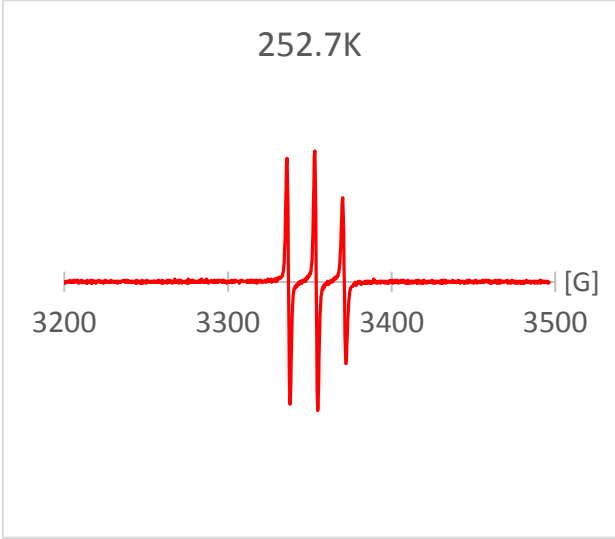
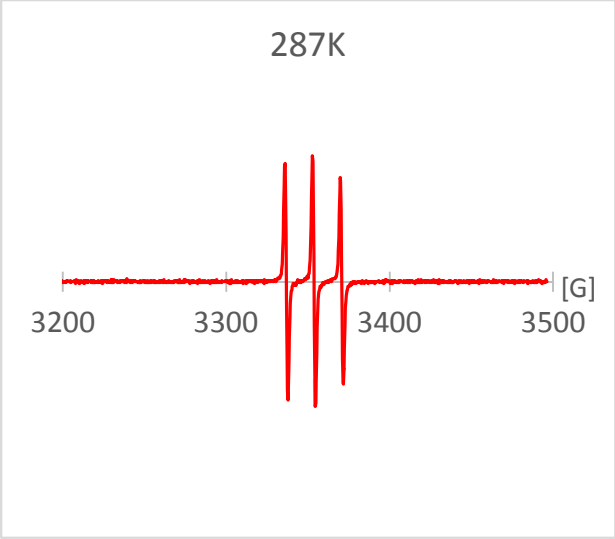




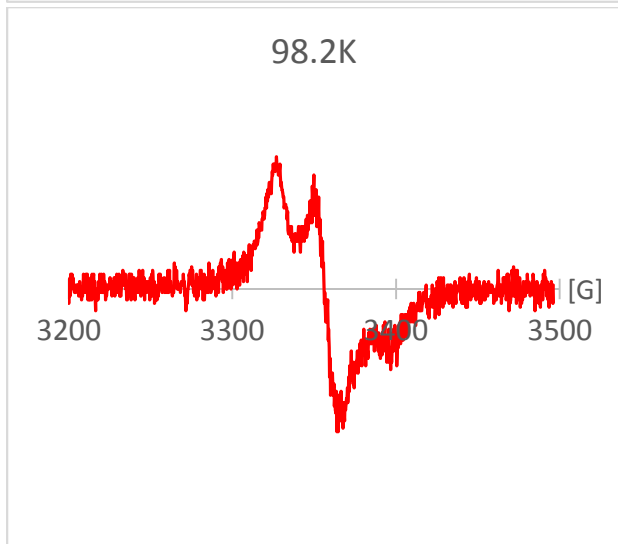
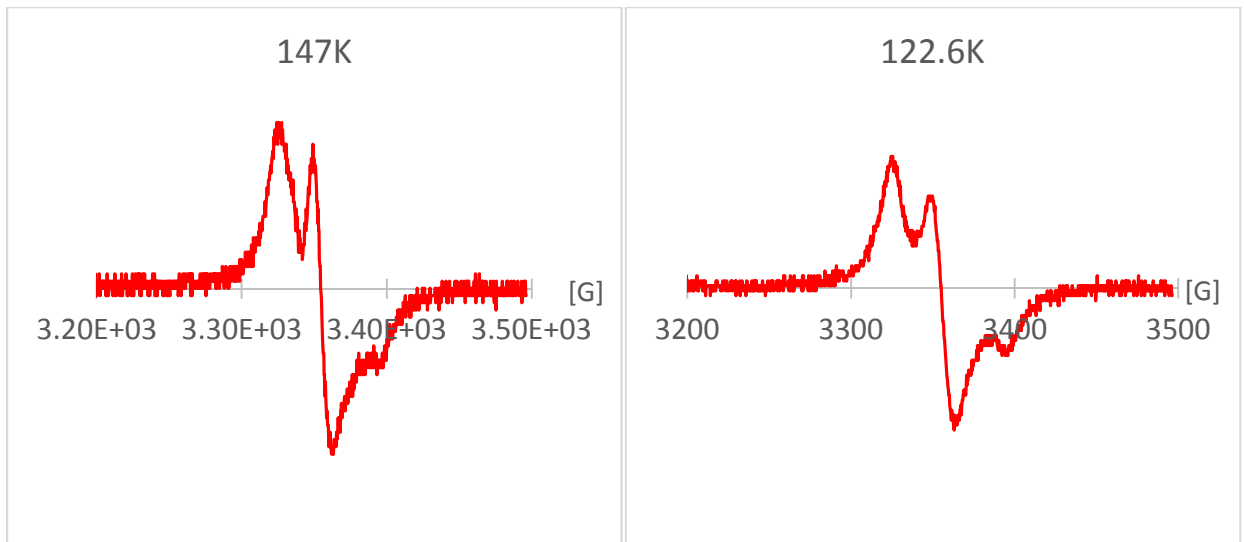


(b) Through heating process

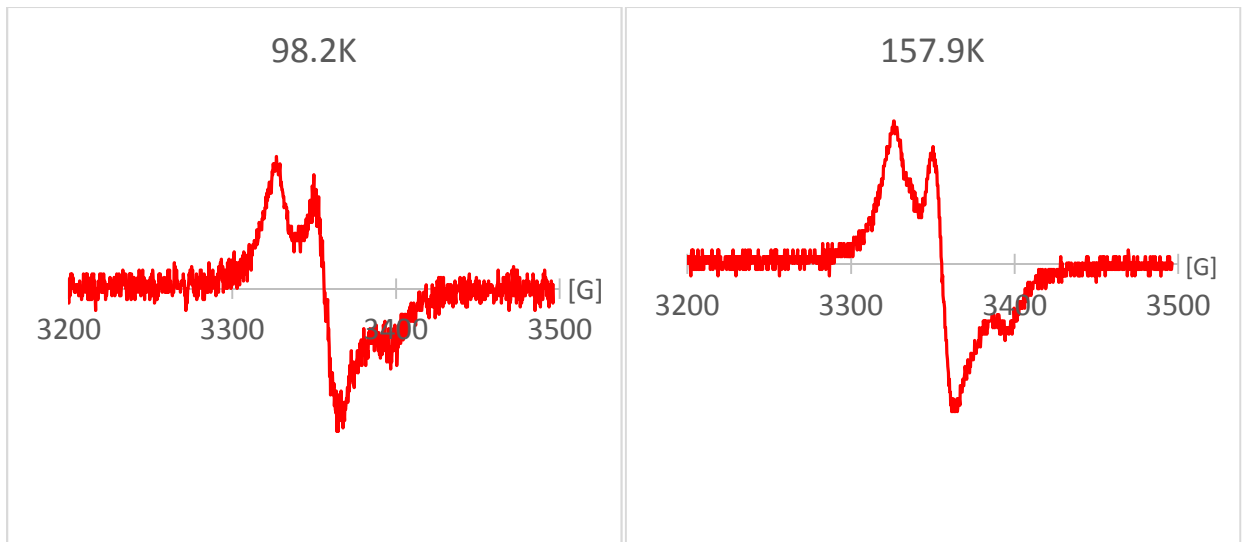
**Figure 8.** VT EPR spectra of MSL spin labeled HPLC6 L23C water solution through the cooling process (a) and through the heating process (b).

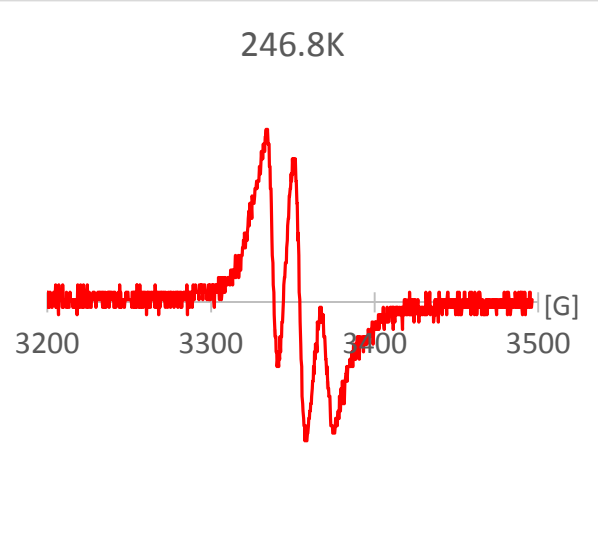
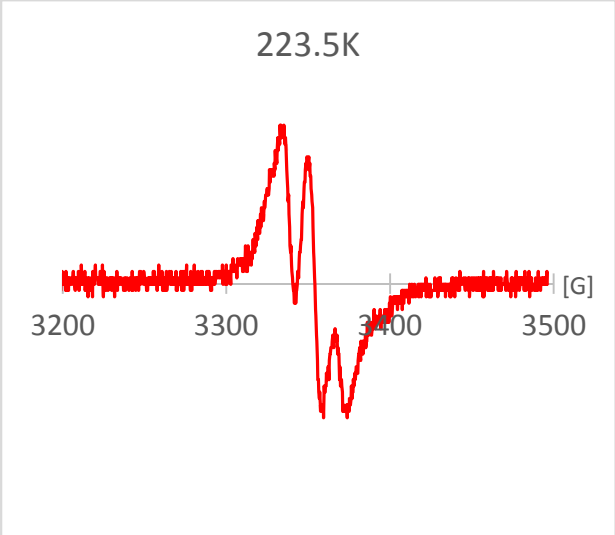
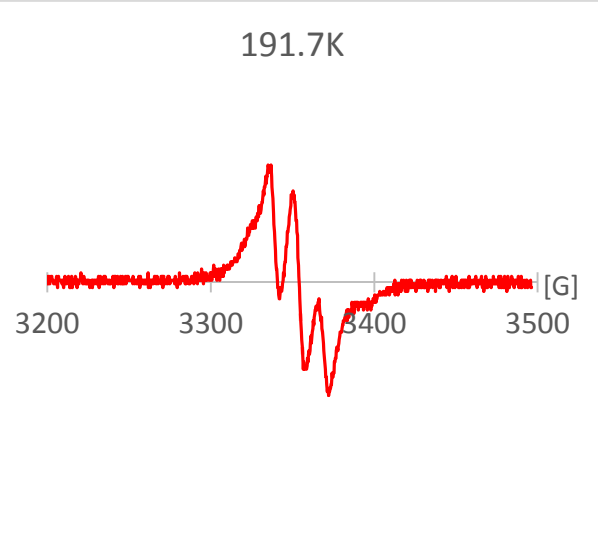
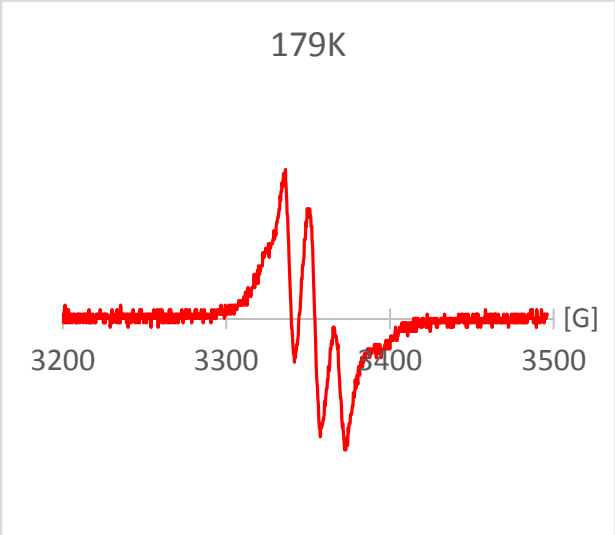
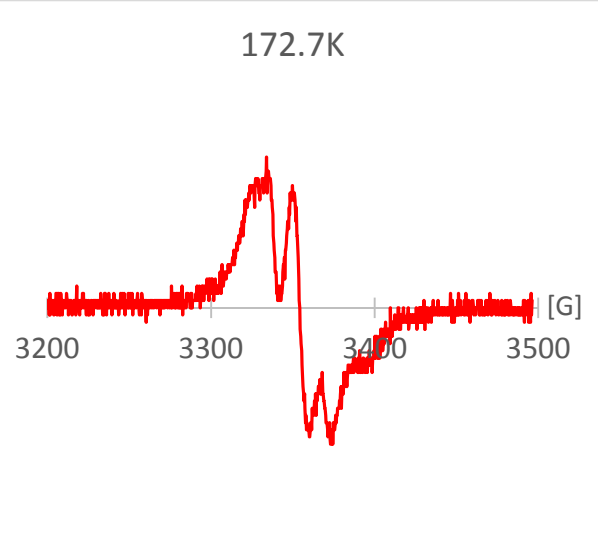
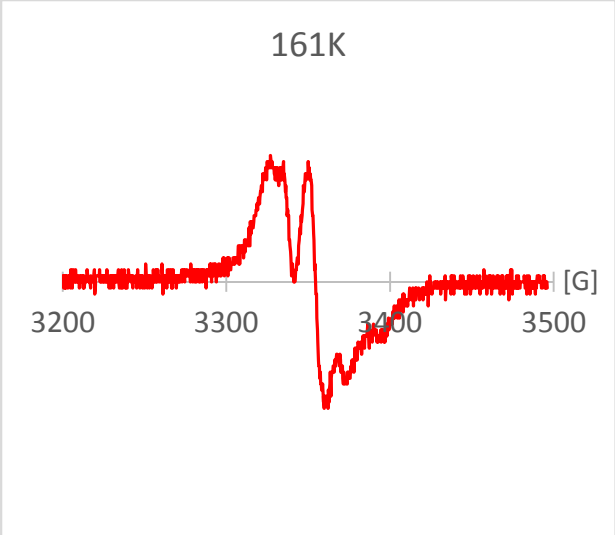




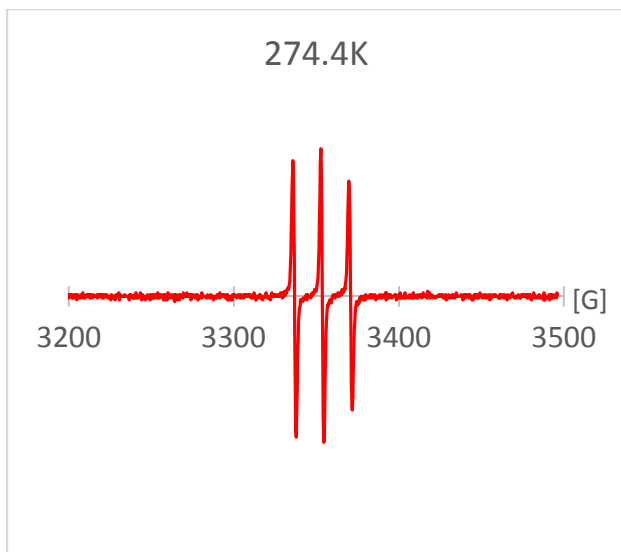


(a) Through cooling process



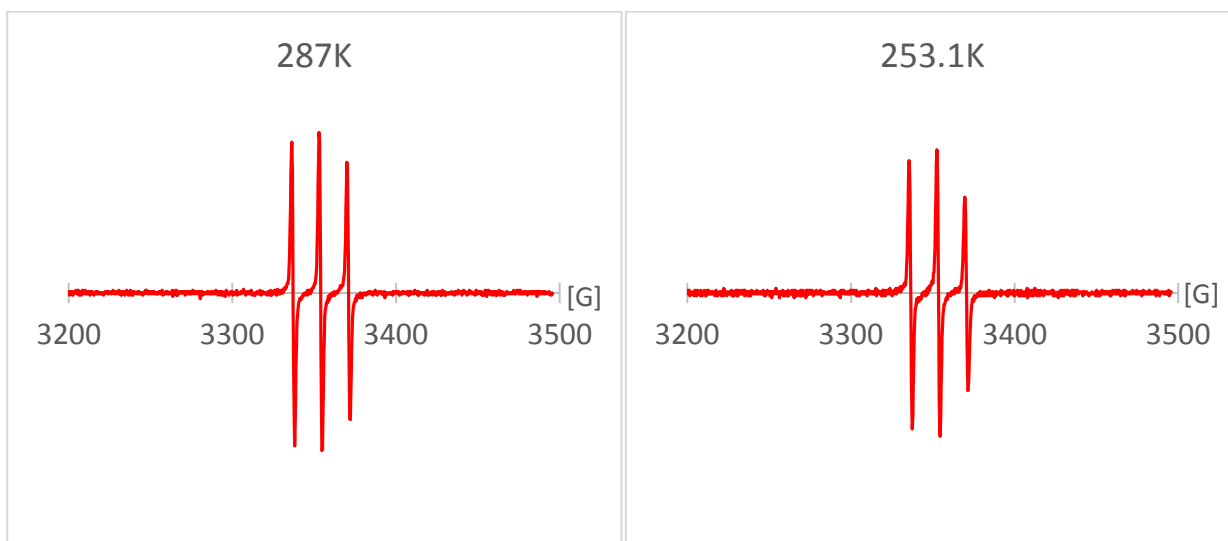


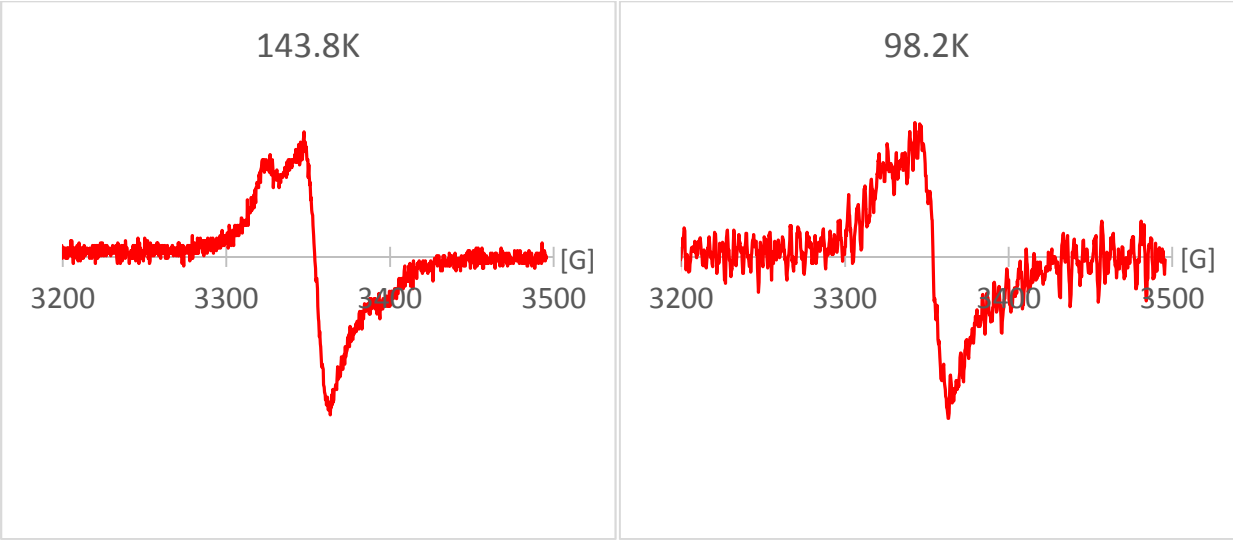
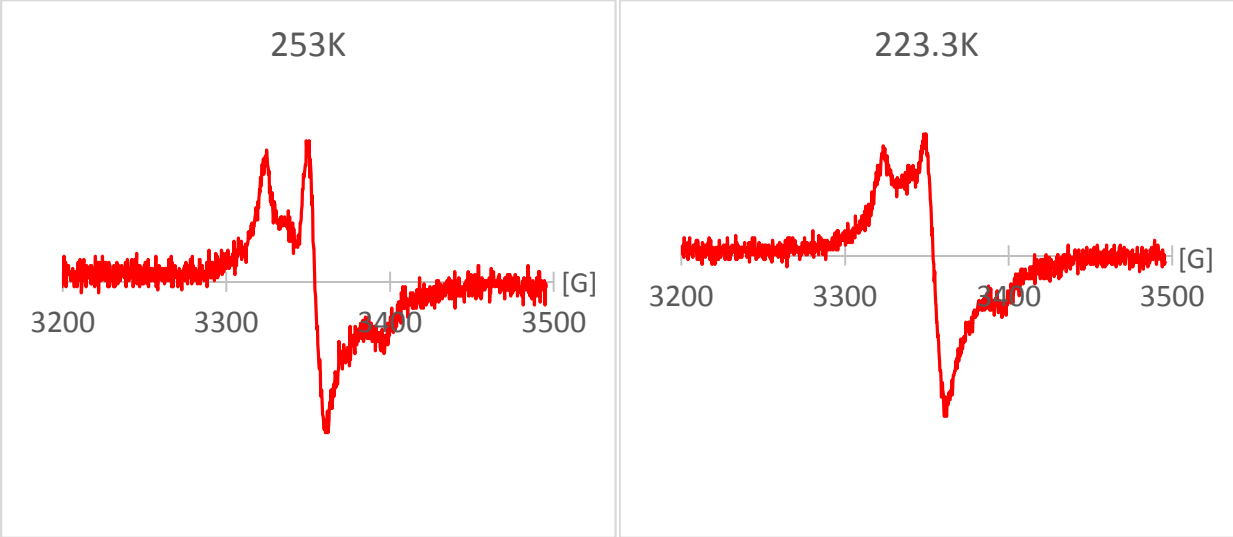




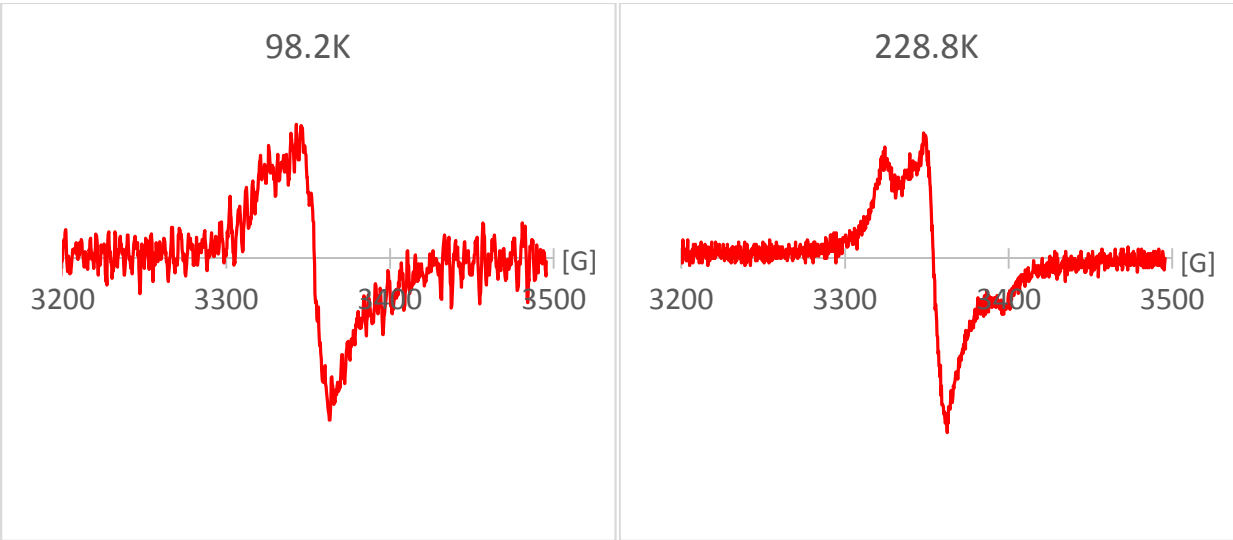
(b) Heating Process

**Figure 9.** VT EPR spectra of MSL spin labeled HPLC6 A20C solution at concentration of 2.0 mg/ml through the cooling process (a) and through the heating process (b).

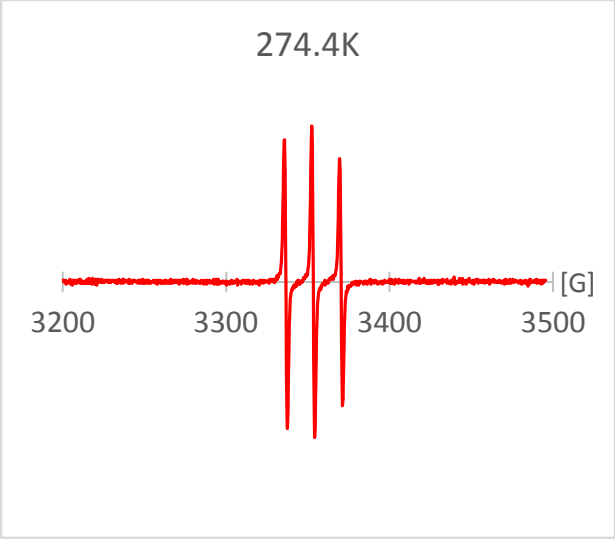




(a) Cooling Process

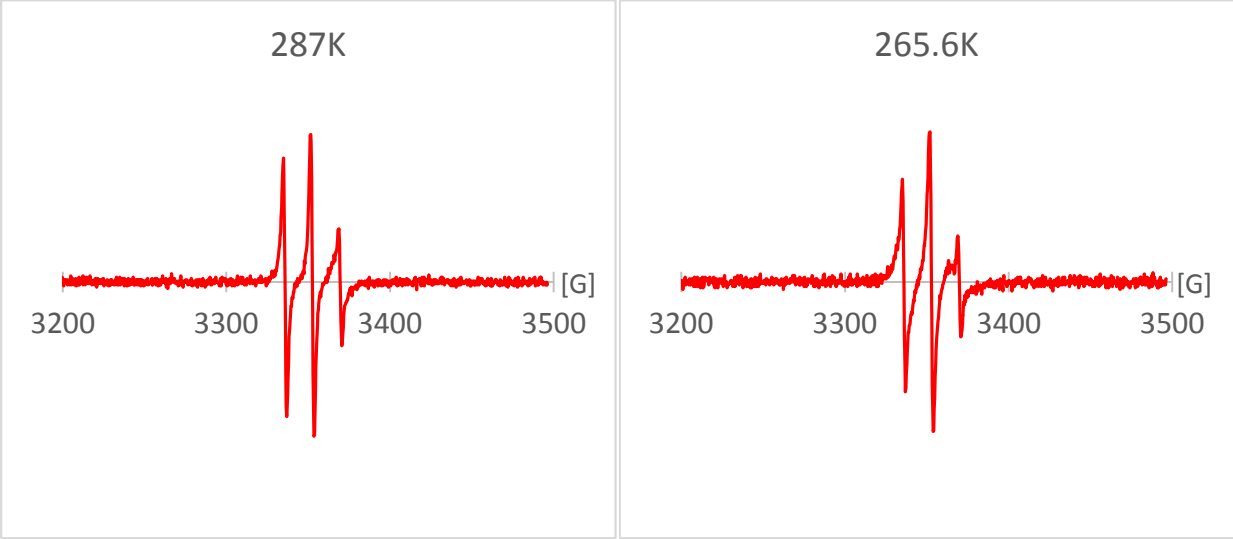


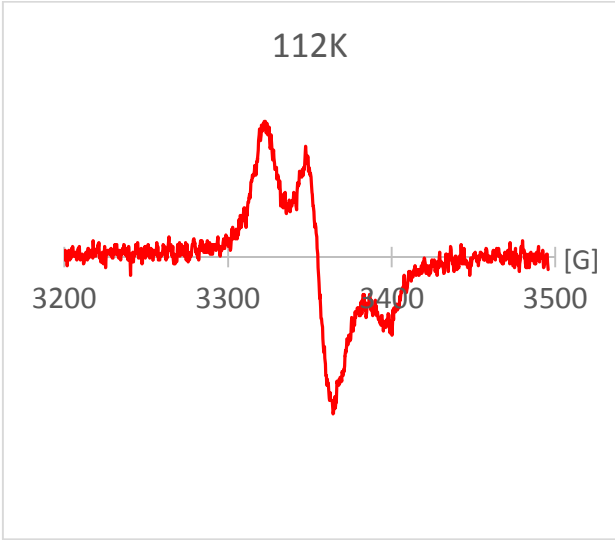
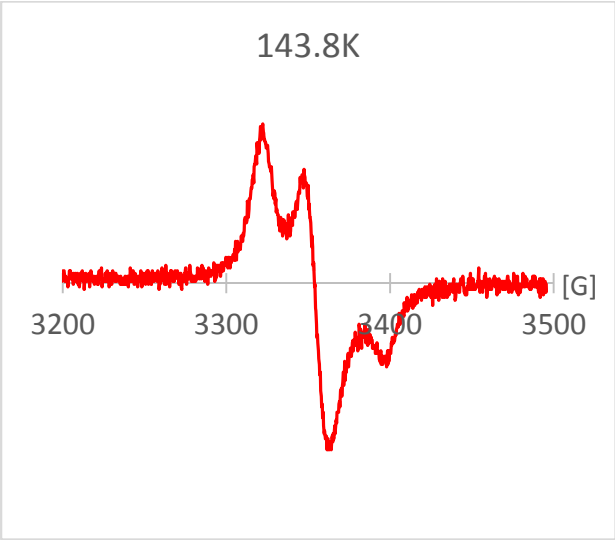
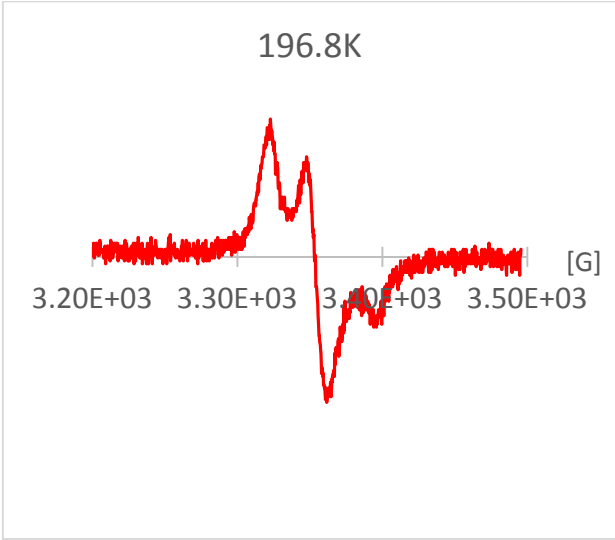
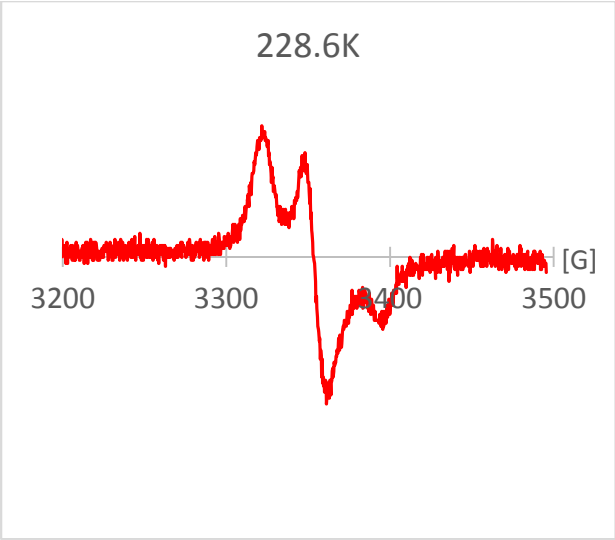
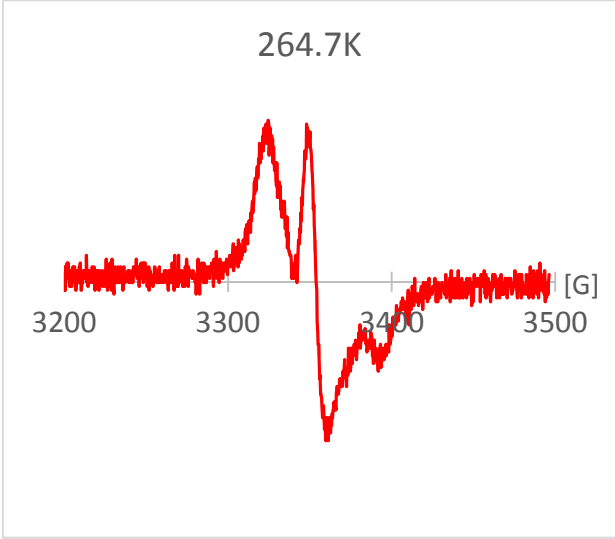
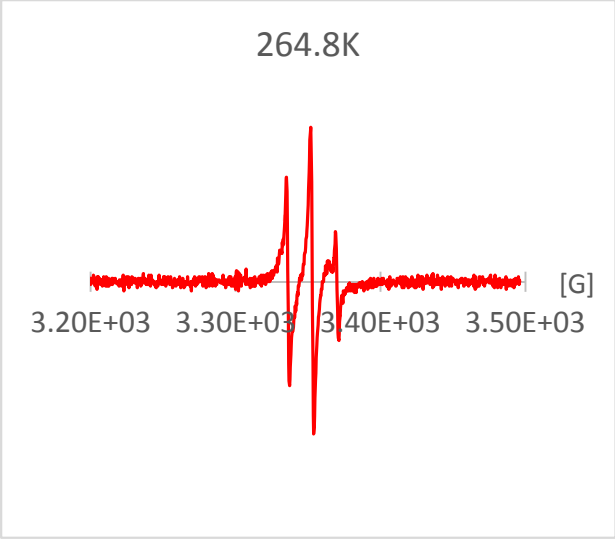




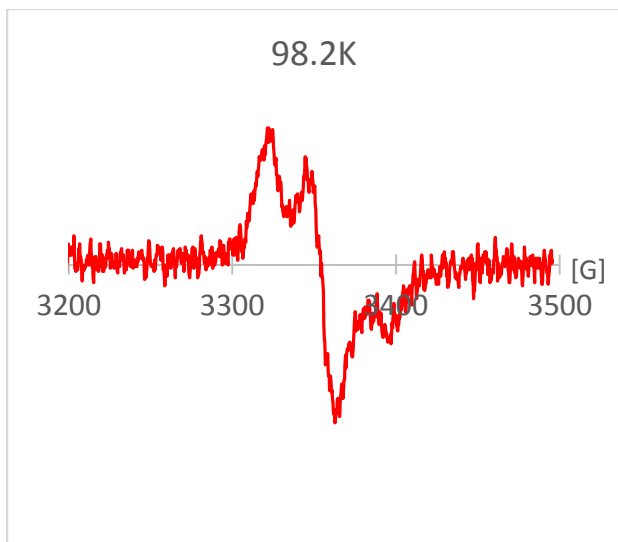
(b) Heating Process

**Figure 10.** VT EPR spectra of MSL spin labeled HPLC6 A11C solution at concentration of 2.0 mg/ml through the cooling process (a) and through the heating process (b).

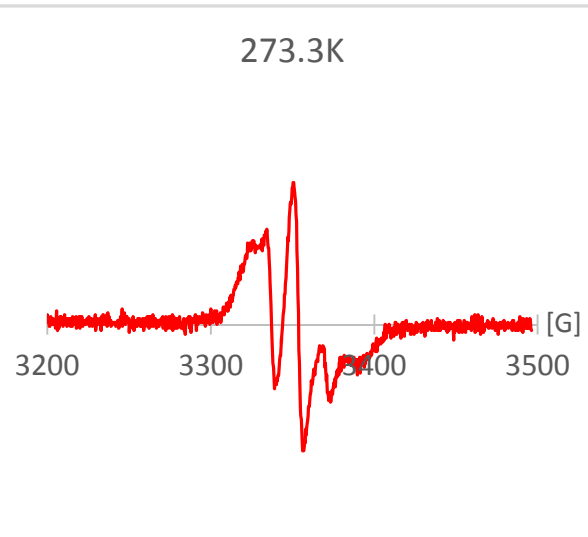
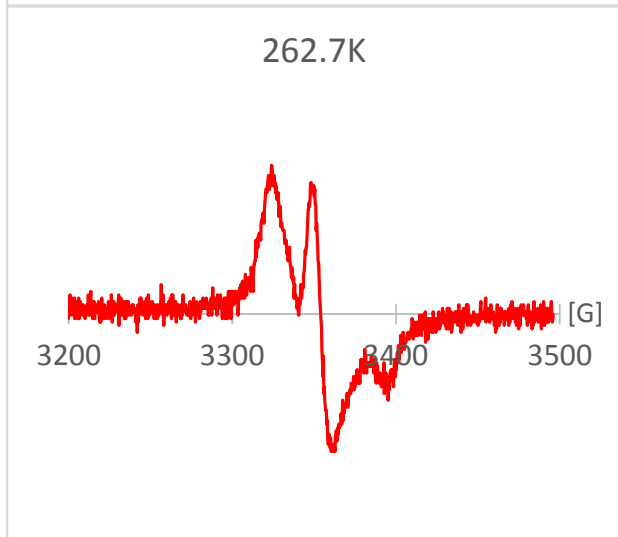
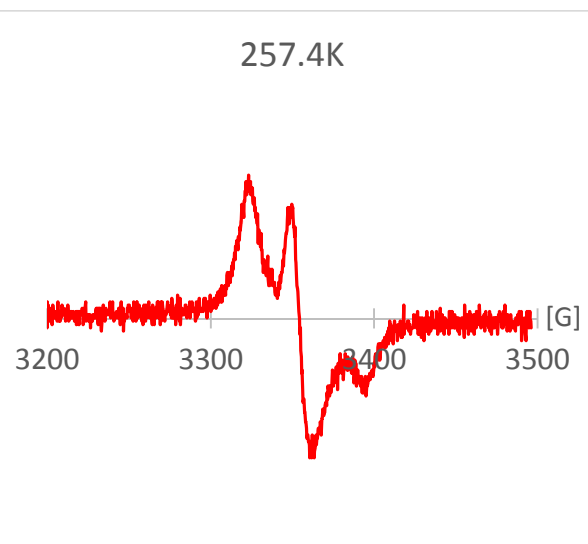
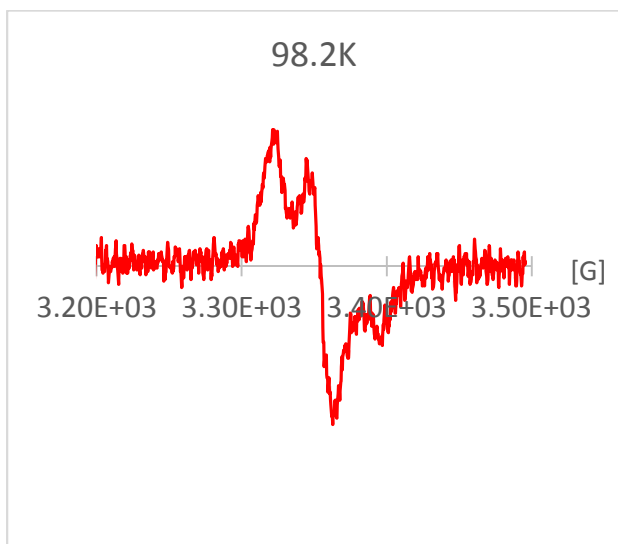








(a) Cooling Process





(b) Heating Process

**Figure 11.** VT EPR spectra of MSL spin labeled HPLC6 A17C peptide water solution at 2.0 mg/ml through the cooling process (a) and through the heating process (b).