SUPPORTING INFORMATION

for

Substitution of the native Zn(II) with Cd(II), Co(II) and Ni(II) changes the downhill unfolding mechanism of Ros87 to a completely different scenario

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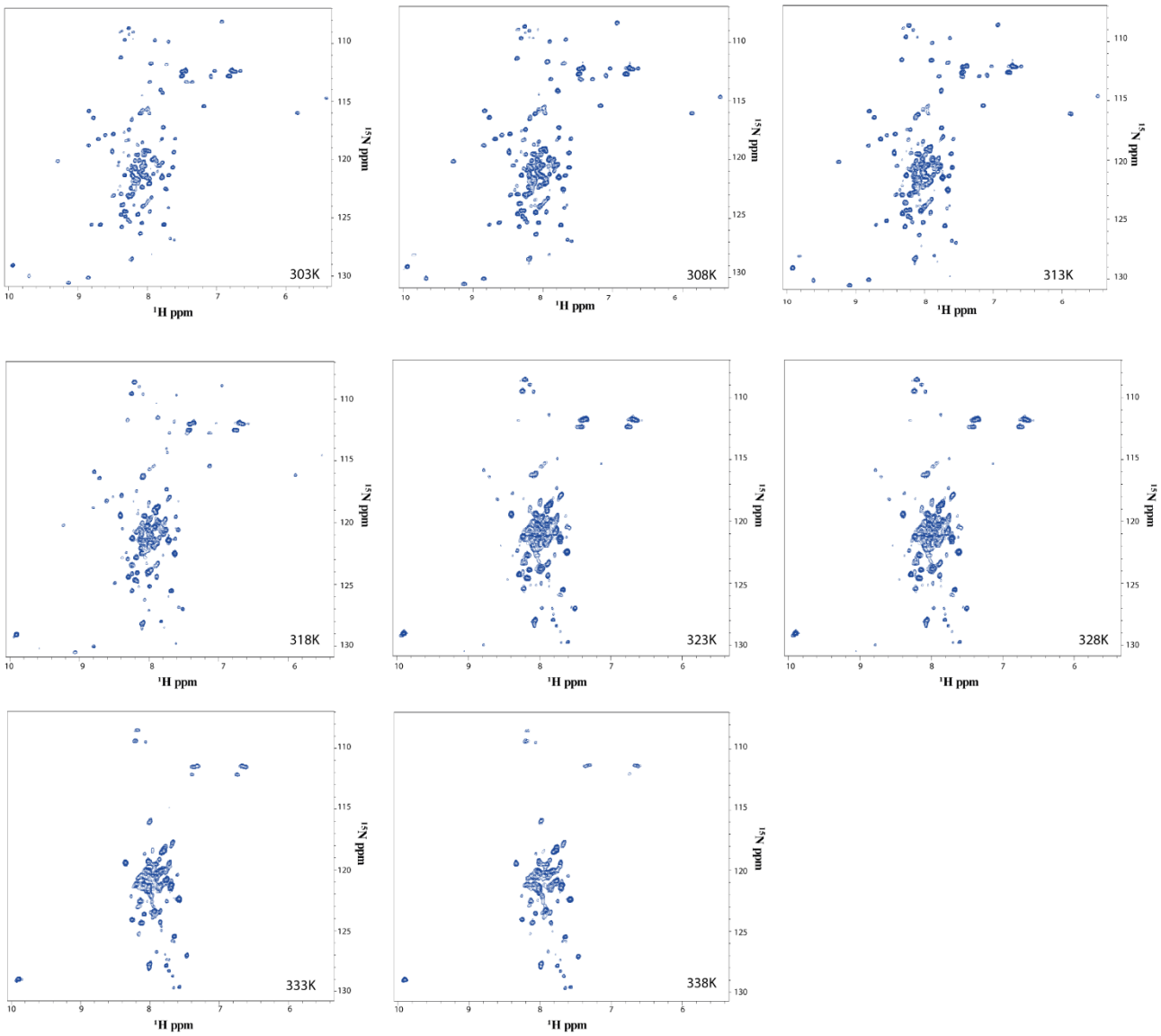

Figure S1. Thermal unfolding of Co(II)-Ros87 via NMR: ^{1}H-^{15}N HSQC spectra acquired at different temperatures using a 600 MHz spectrometer.

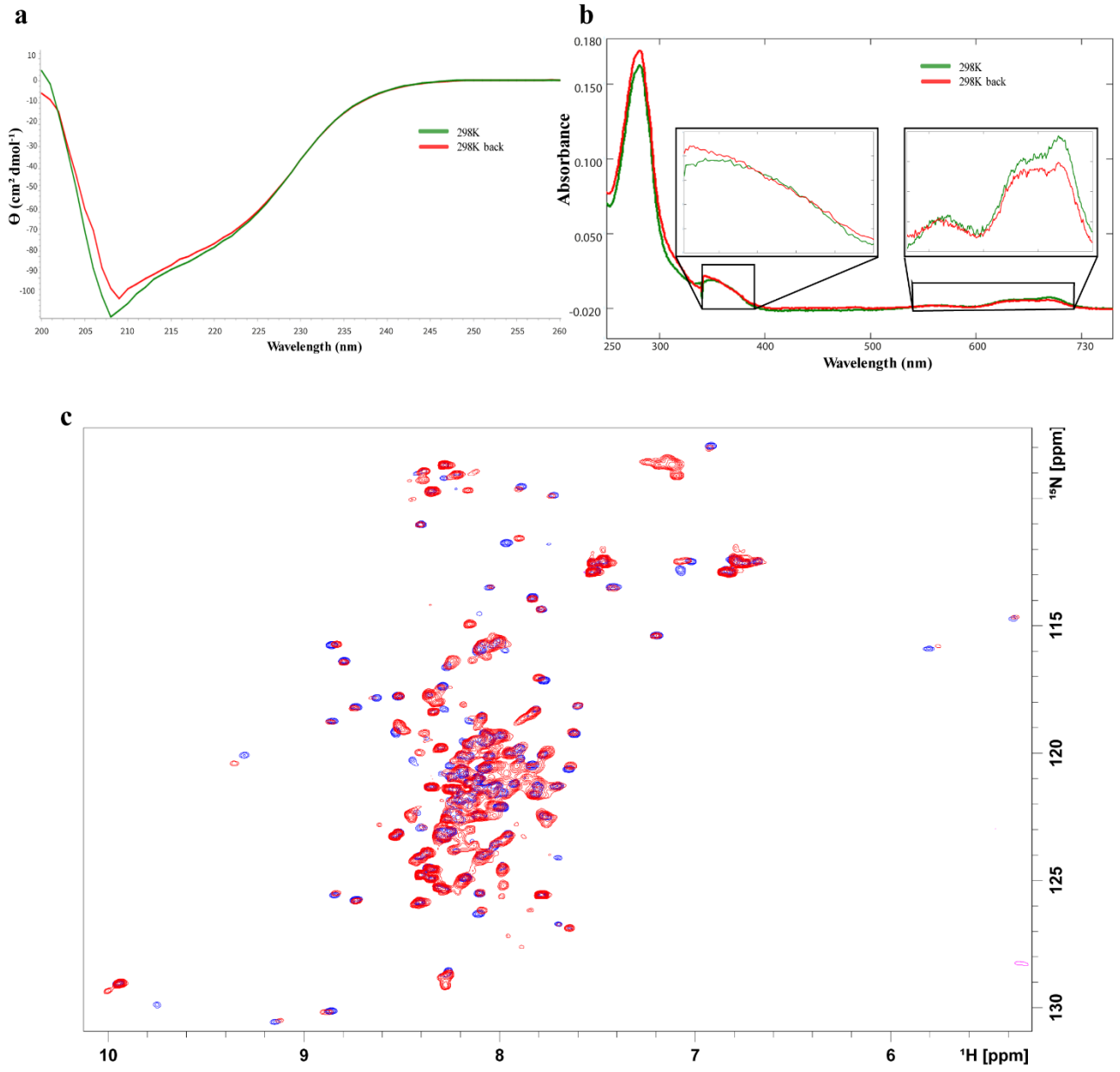

Figure S2. Reversibility of the thermal unfolding of Co(II)-Ros87. **a)** CD spectra acquired at 298 K before (green) and after heating the sample at 368 K (red). **b)** UV-Vis spectra at 298 K before (green) and after heating the sample at 368 K (red); the most significant regions of the spectrum are magnified (350-400nm and 550-690nm). **c)** superposition of the ^{1}H-^{15}N HSQC spectra of Co(II)-Ros87 acquired at 298 K before (blue) and after heating the sample at 343 K (red), respectively.

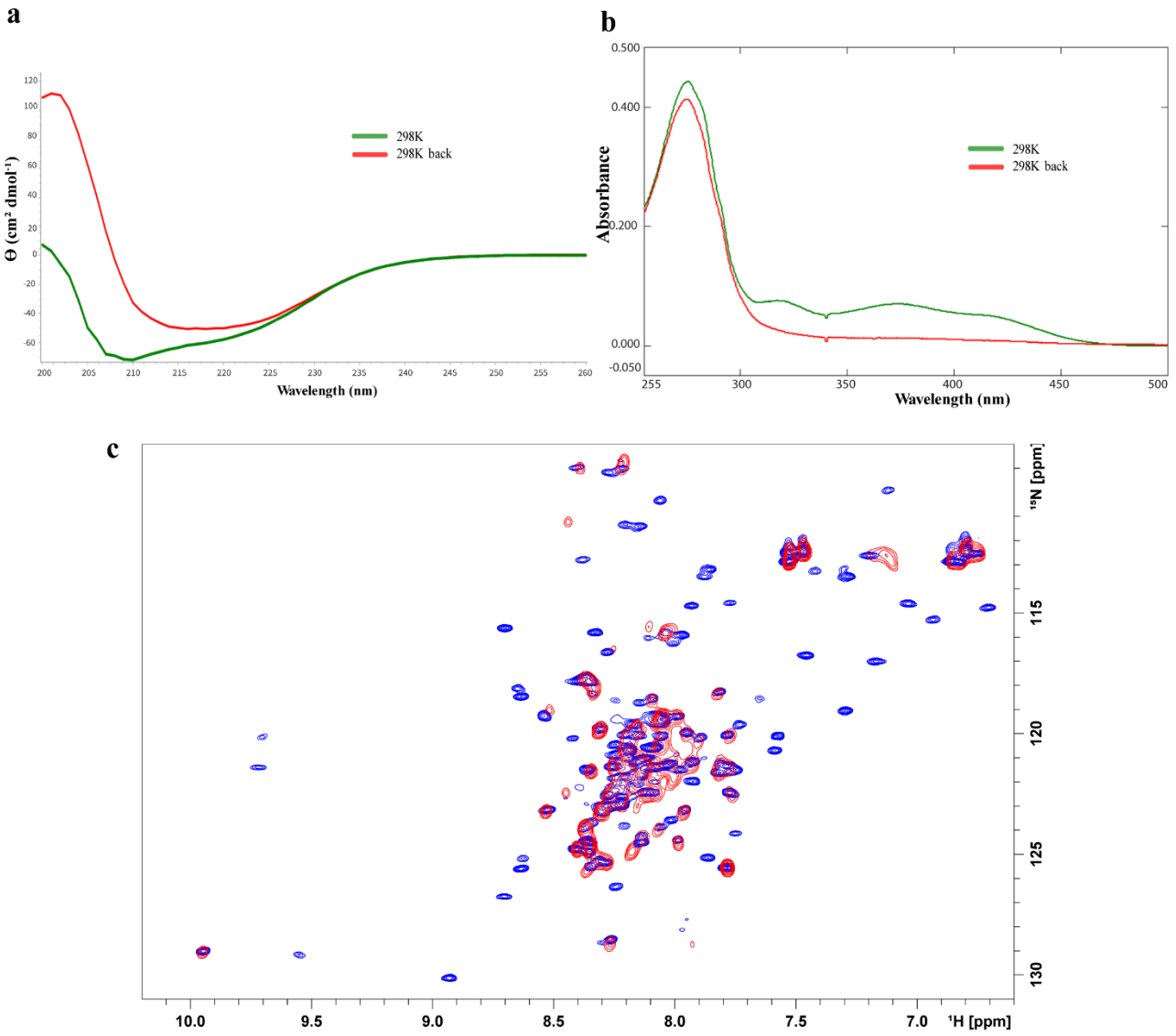

Figure S3. Reversibility of the thermal unfolding of Ni(II)-Ros87. **a)** CD spectra acquired at 298 K before (green) and after heating the sample to 368 K (red), respectively. **b)** UV-Vis spectra at 298 K before (green) and after heating the sample at 368 K (red). **c)** superposition of the ^{1}H-^{15}N HSQC spectra of Ni(II)-Ros87 recorded at 298K before (blue) and after heating the sample at 343K (red).

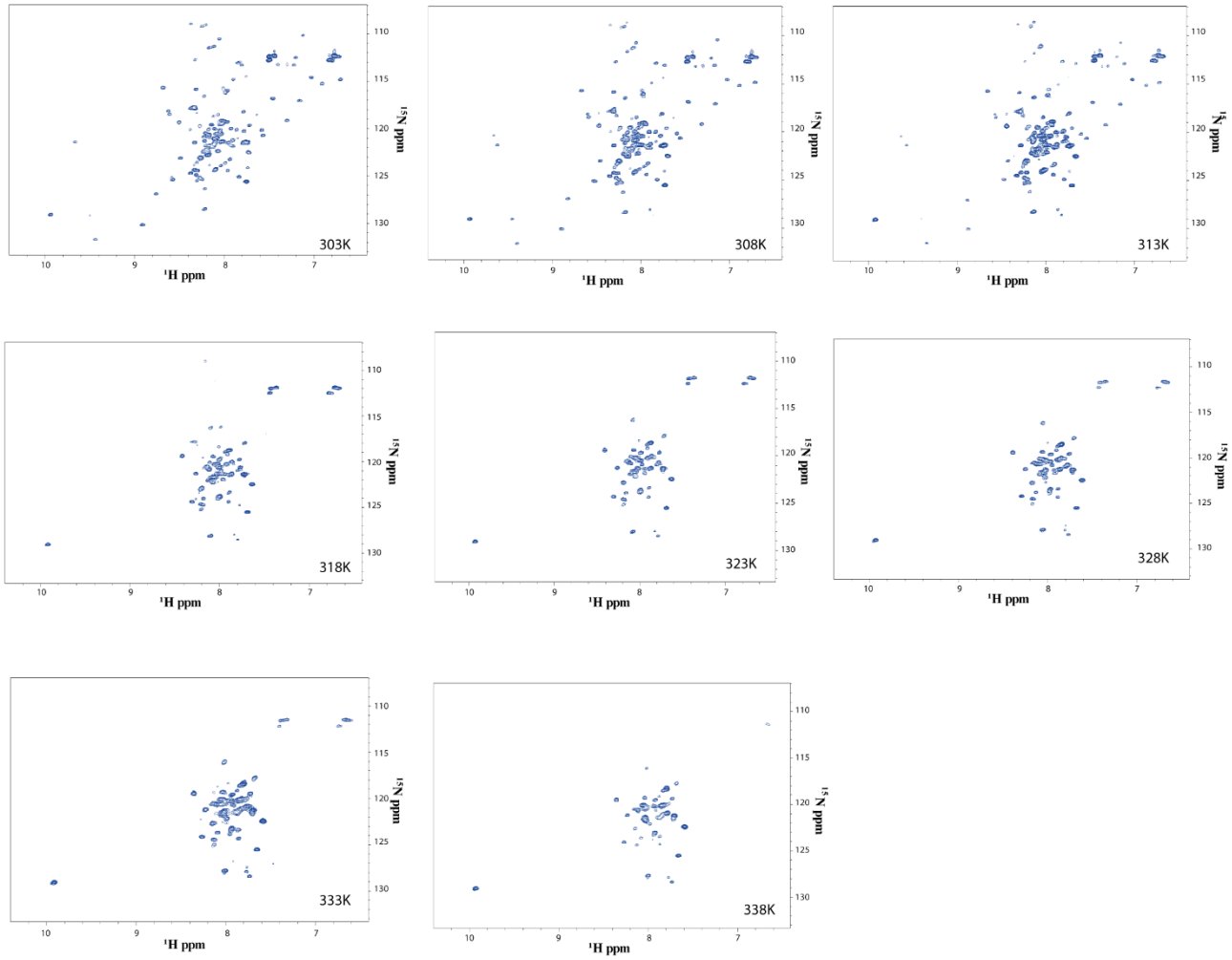

Figure S4. Thermal unfolding of Ni(II)-Ros87 monitored via NMR: ^{1}H-^{15}N HSQC spectra measured at different temperatures.

ΔδHN/ΔT **(ppb/K)**	**Residues with non linear coefficients**	**Residues with linear coefficients**
>-4.6	SER16 VAL 23 CYS24 GLY28 HIS37 SER43 MET44 GLU48 ARG50 TYR66	GLN18 CYS27 GLU51 TRP53
<-4.6	ASP20 LEU25 SER30 LEU34 LYS35 LEU38 HIS42 ALA69 GLY78 GLY80 ARG82 LYS84	GLU5 LYS6 GLN7 SER12 VAL13 ASP19 HIS21 GLY29 PHE31 ARG36 THR39 THR40 HIS41 THR45 ASP58 MET77 GLN87 ALA85 ARG87
>-4.6 from 298 K to 323 K and <-4.6 from 323K to 338K	VAL4 LYS8 ALA10 VAL17 GLU26 GLU47 LYS55 TYR59 ALA65 ALA68 SER71 ALA74 LYS75 LEU79	

Table S1. Amide-proton temperature coefficients (ppb/K) of Ni(II)-Ros87.

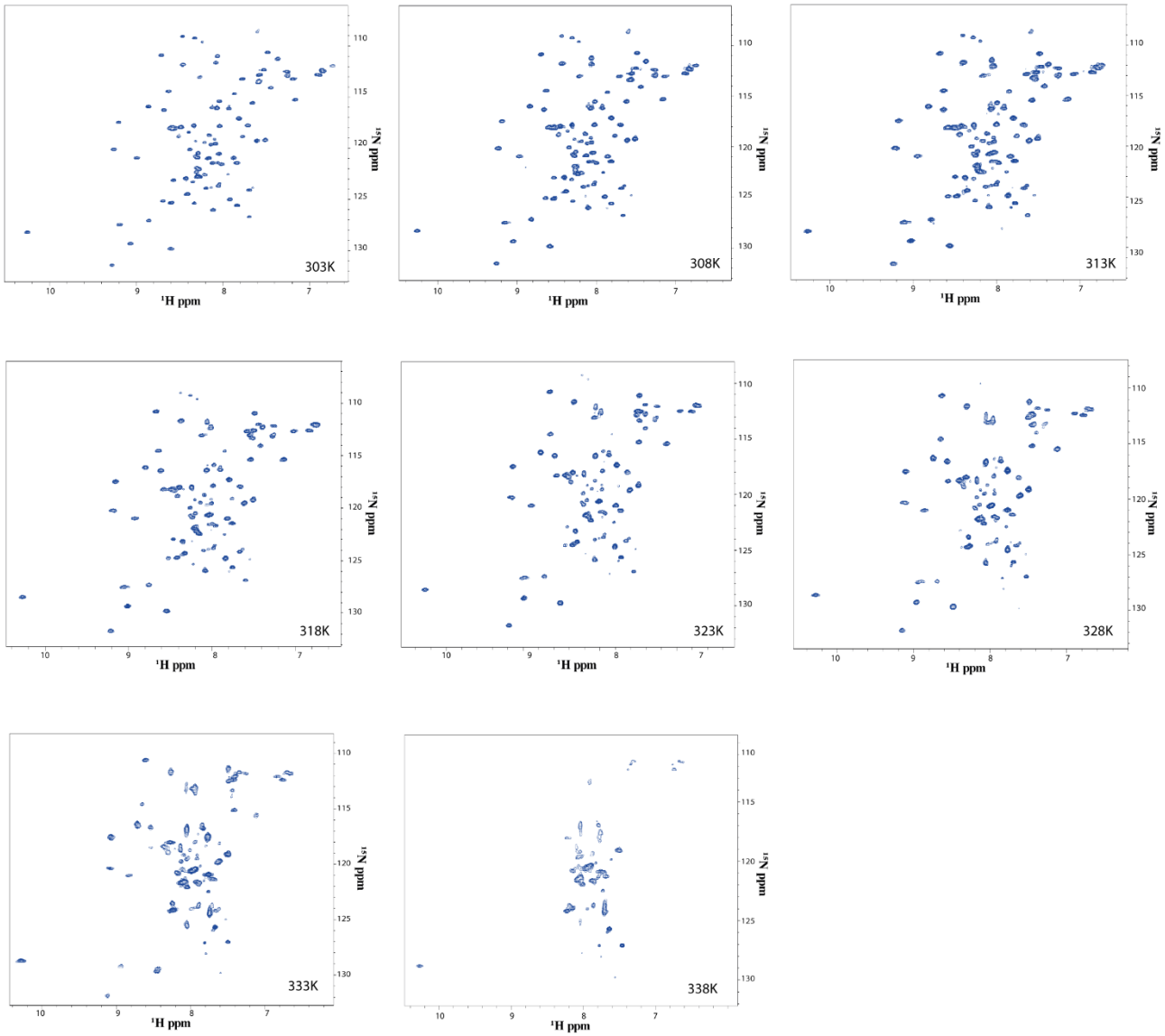

Figure S5. Thermal unfolding of Cd(II)-Ros87 investigated by NMR: ^{1}H-^{15}N HSQC spectra collected at different temperatures.

ΔδHN/ΔT **(ppb/K)**	**Residues with non linear coefficients**	**Residues with linear coefficients**
>-4.6	SER16 CYS24 GLY29 SER33 HIS 37 ARG50 GLU51	GLN18 LYS35 SER43 GLU48 TYR49 TRP53 TYR66
<-4.6	ALA10 VAL13 ASP19 ILE22 VAL23 CYS27 LEU38 THR45 LEU55 VAL57 TYR59 GLU68 GLN81 ARG87	VAL4 GLU5 GLN7 VAL17 HIS21 SER30 PHE31 LEU34 ARG36 THR39 THR40 HIS41 ALA65 ALA74 LYS75 MET77 GLY80 ARG82 ALA85
>-4.6 from 298 K to 323 K and <-4.6 from 323K to 338K	LYS6 SER12 LEU25 GLU26 MET44 GLU47 LYS52 ASP58 ALA63 ALA69 ARG70 GLU76 GLY78 LEU79	MET61 LEU73

Table S2. Amide-proton temperature coefficients (ppb/K) of Cd(II)-Ros87.

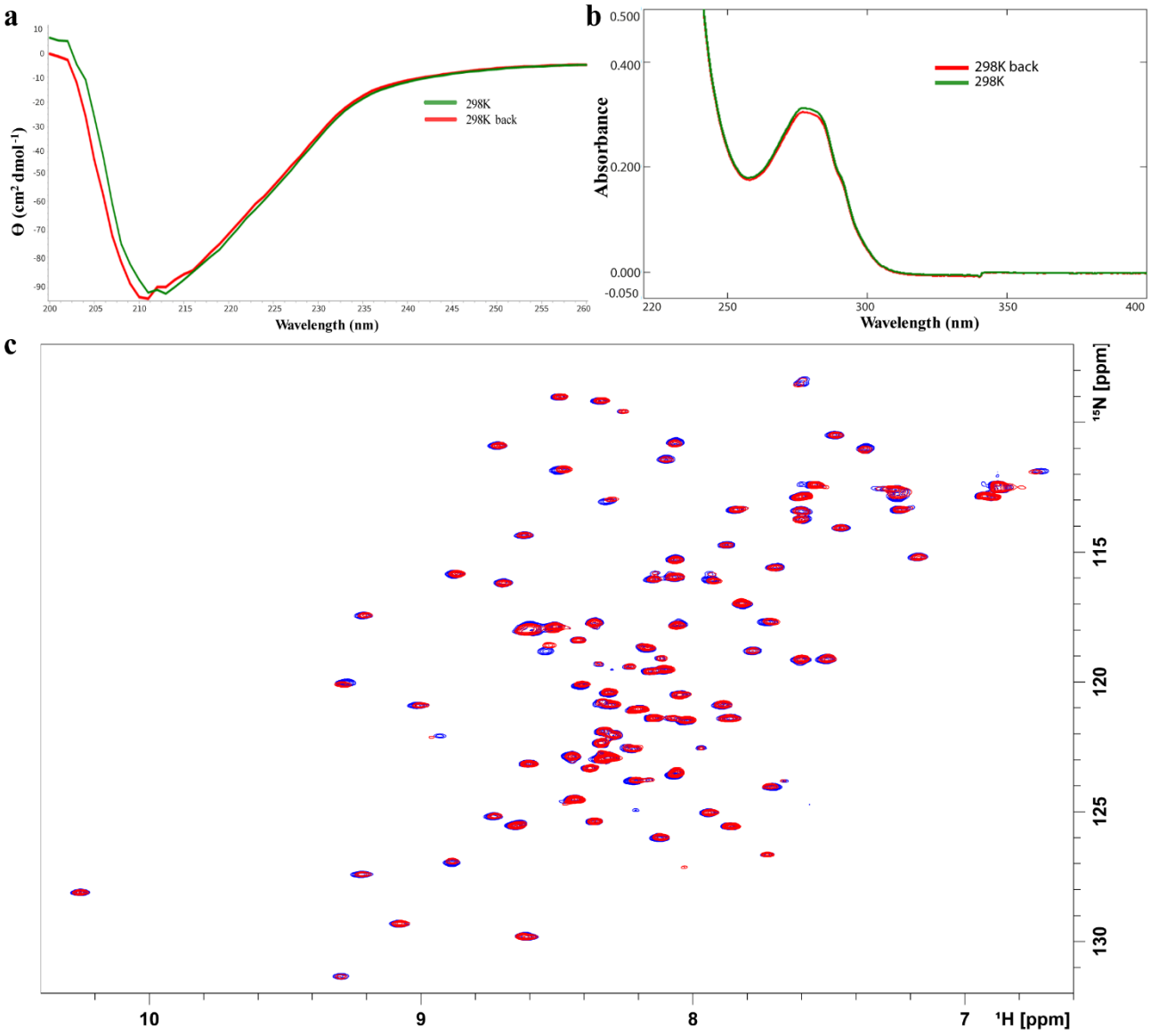

Figure S6. Reversibility of the thermal unfolding of Cd(II)-Ros87. **a)** CD spectra acquired at 298 K before (green) and after heating the sample at 368 K (red). **b)** UV-Vis spectra at 298 K before (green) and after heating the sample at 368K (red). **c)** superposition of the ^{1}H-^{15}N HSQC spectra of Cd(II)-Ros87 at 298K before (blue) and after heating the sample at 343K (red).