Supplementary Information For: Ru-Arene Azole Complexes as Anti-Amyloid-β Agents

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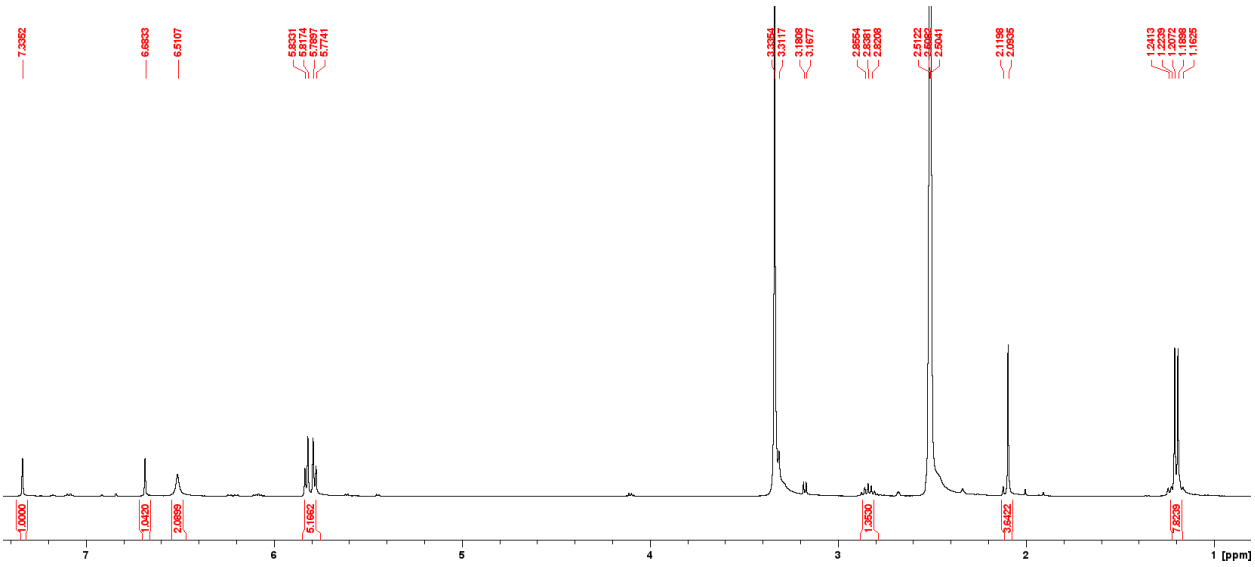

Figure S1. ^{1}H NMR spectrum of complex **RuO** in DMSO-D_6.

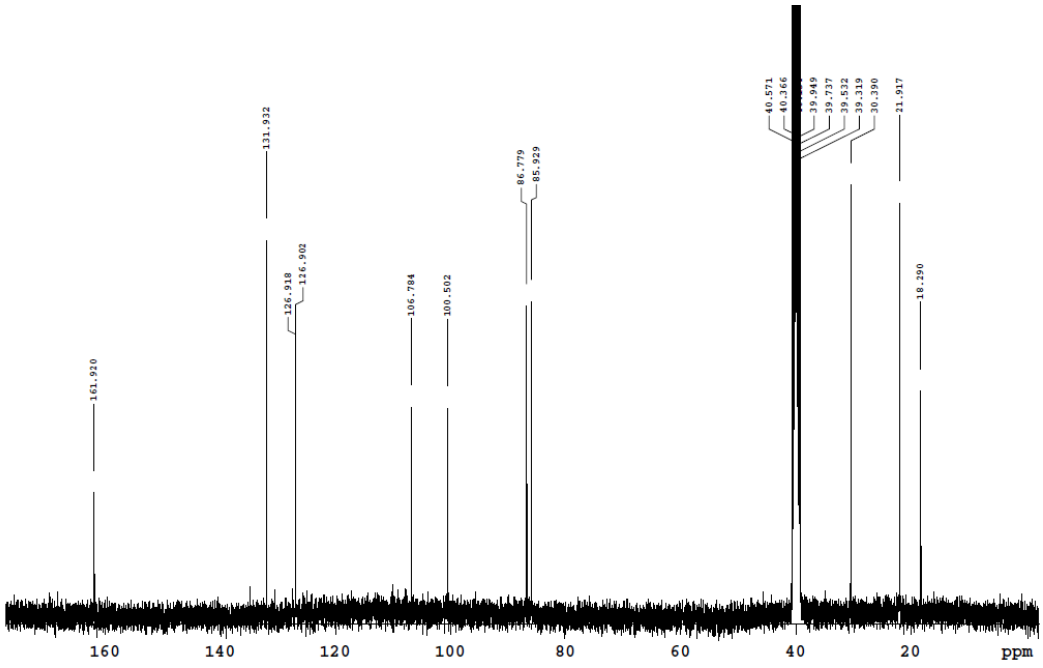

Figure S2. ^{13}C NMR spectrum of complex **RuO** in DMSO-D_6.

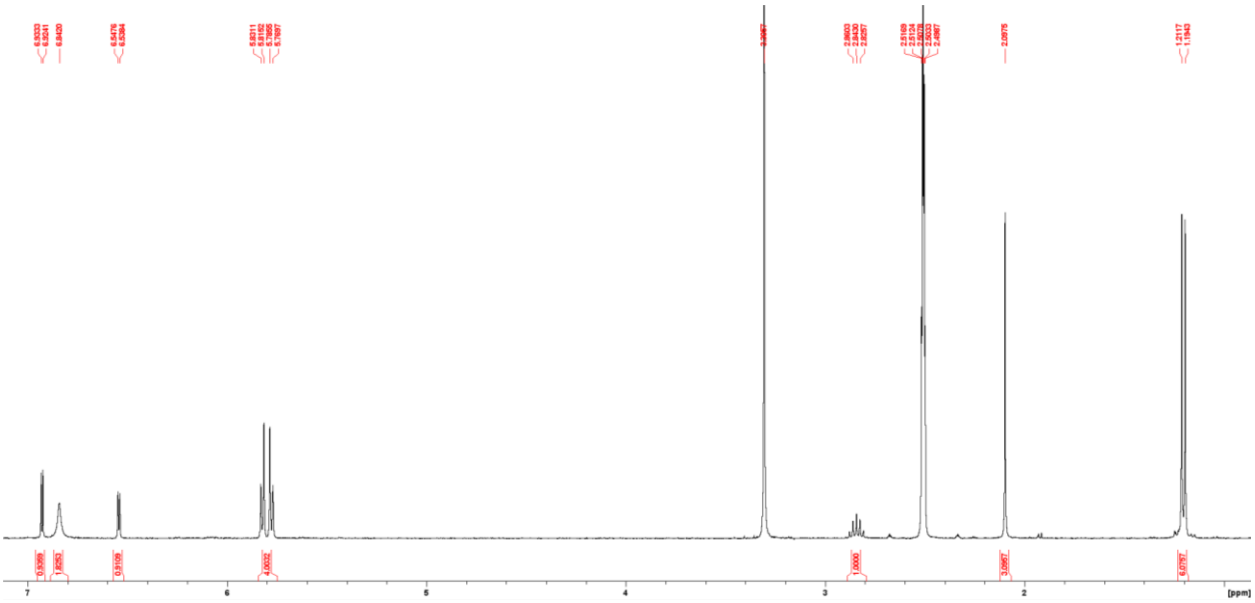

Figure S3. ^{1}H NMR spectrum of complex **RuS** in DMSO-D_6.

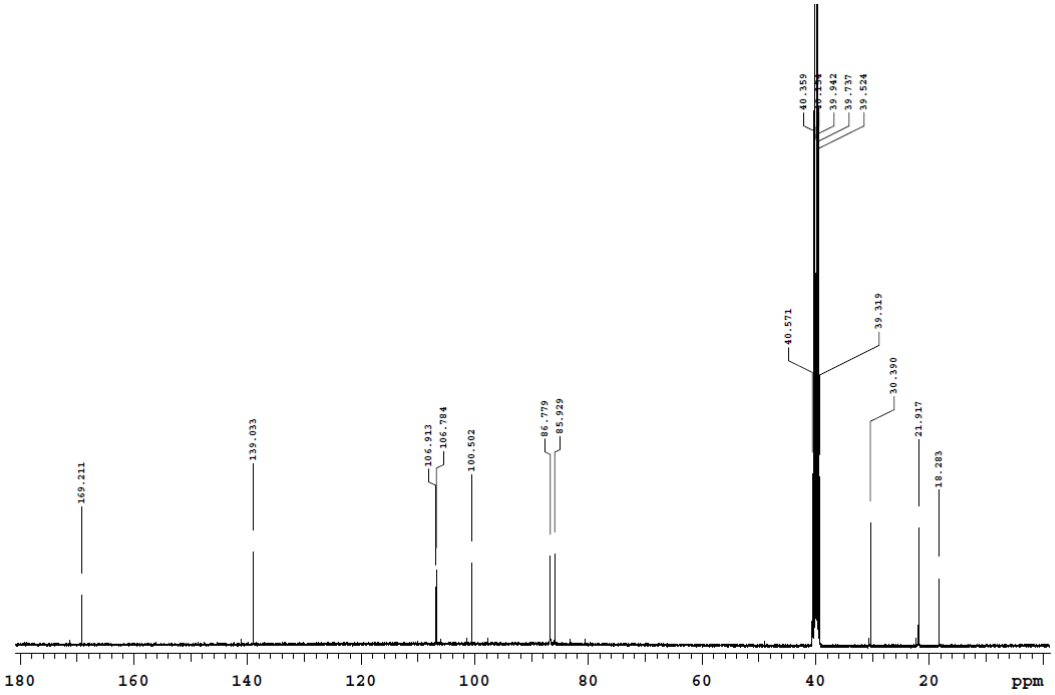

Figure S4. ^{13}C NMR spectrum of complex **RuS** in DMSO-D_6.

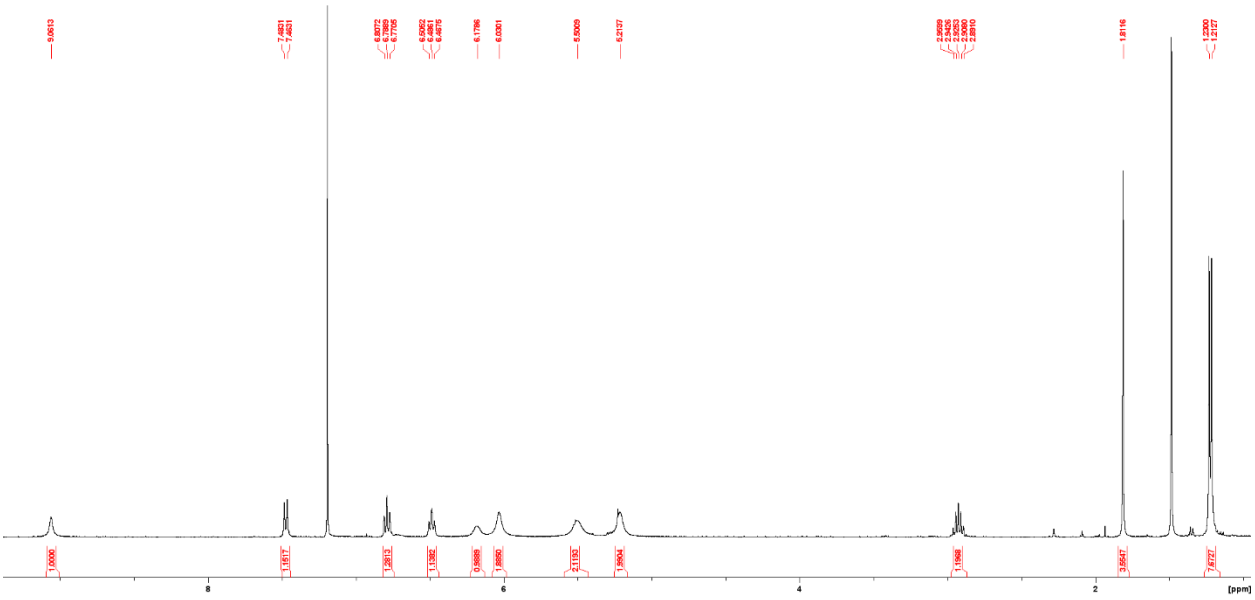

Figure S5. ^{1}H NMR spectrum of complex **RuBN** in $CDCl_3$.

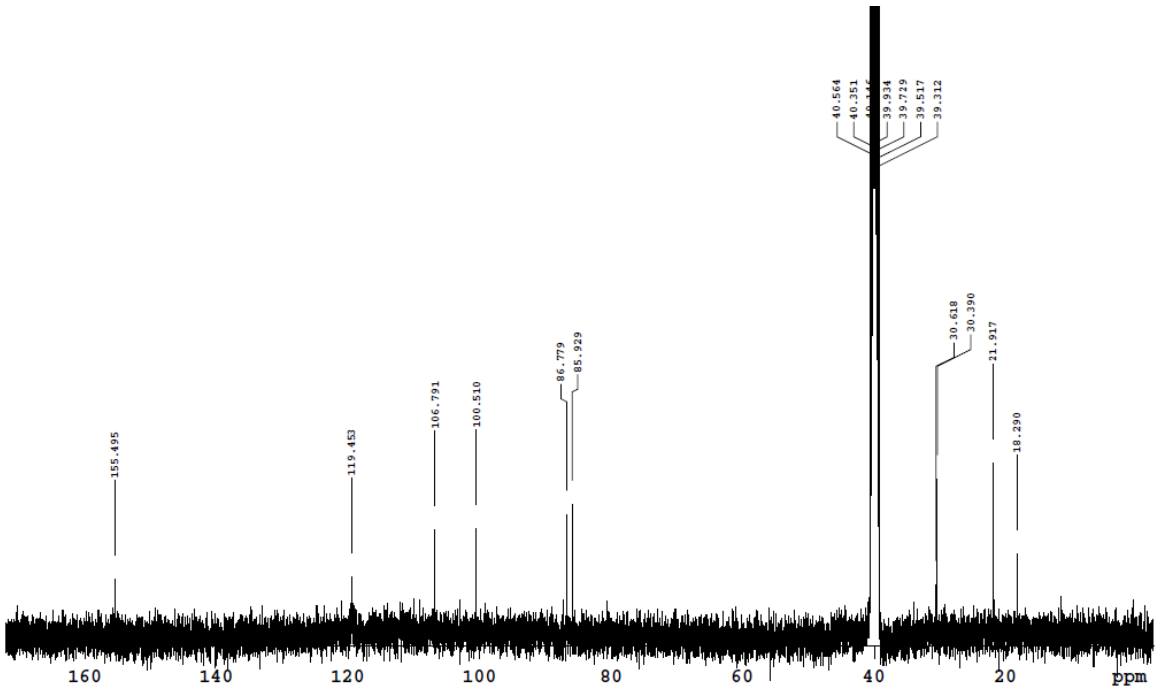

Figure S6. ^{13}C NMR spectrum of complex **RuBN** in DMSO-D_6.

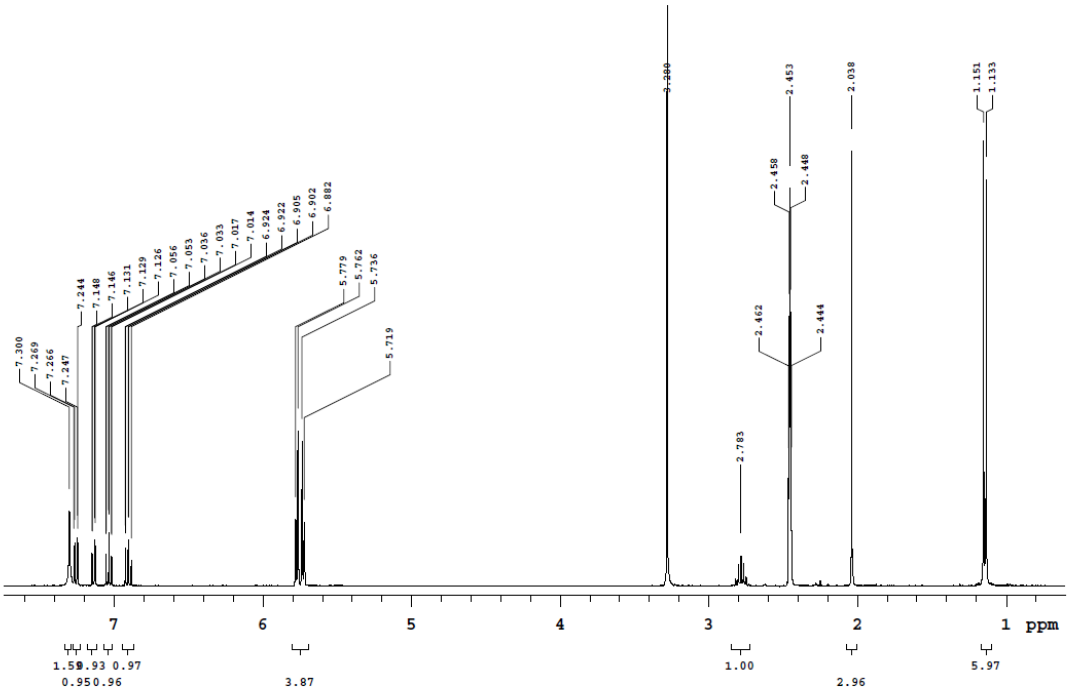

Figure S7. ^{1}H NMR spectrum of complex **RuBO** in DMSO-D_6.

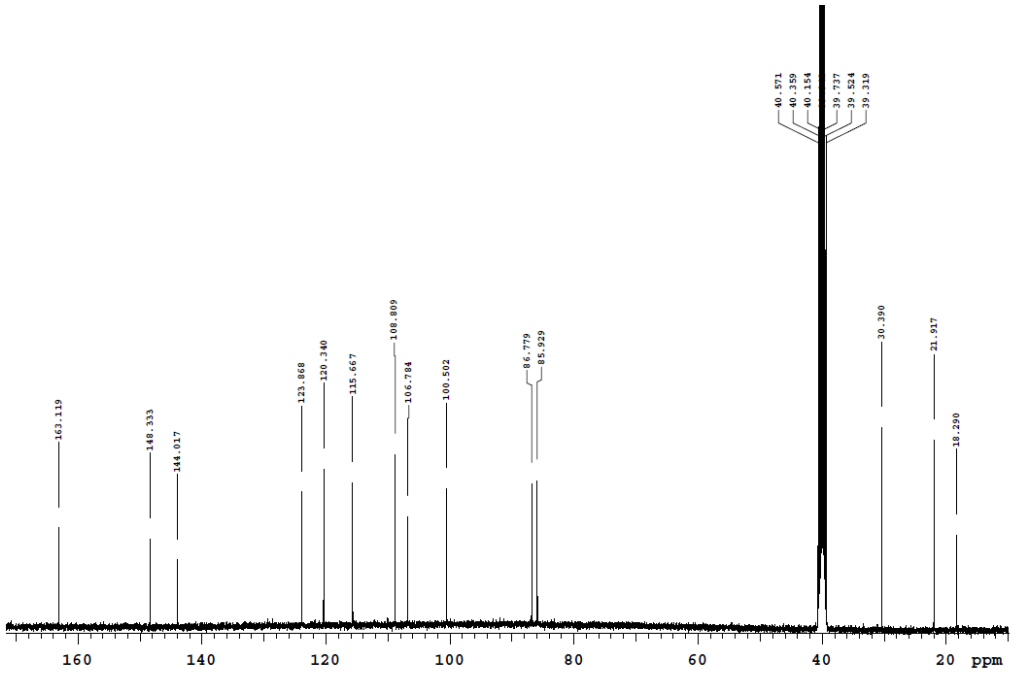

Figure S8. ^{13}C NMR spectrum of complex **RuBO** in DMSO-D_6.

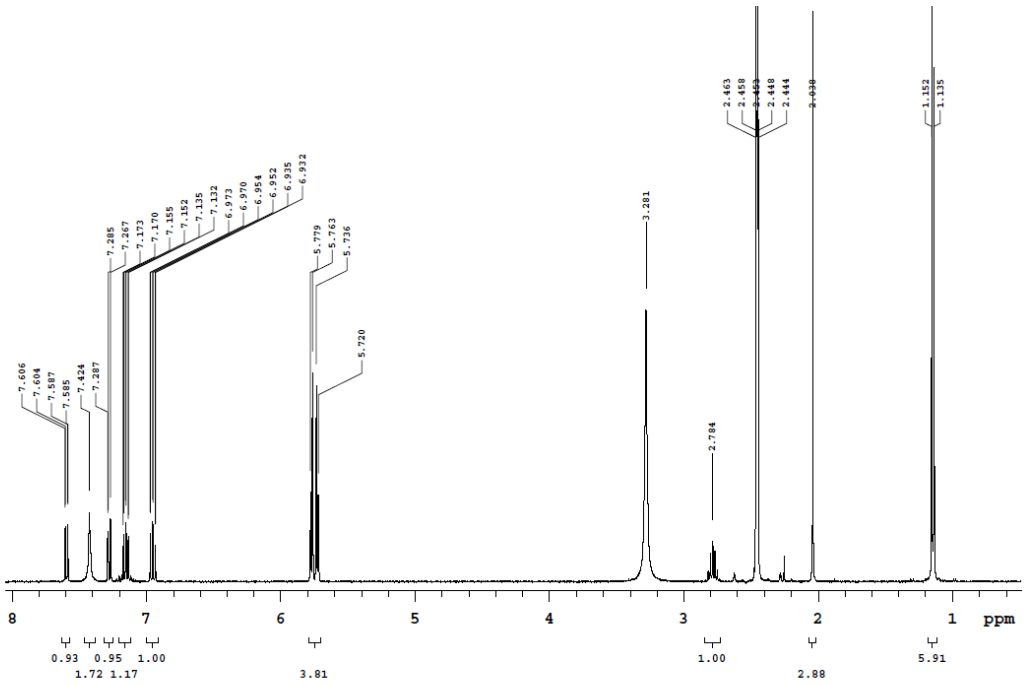

Figure S9. ^{1}H NMR spectrum of complex **RuBS** in DMSO-D_6.

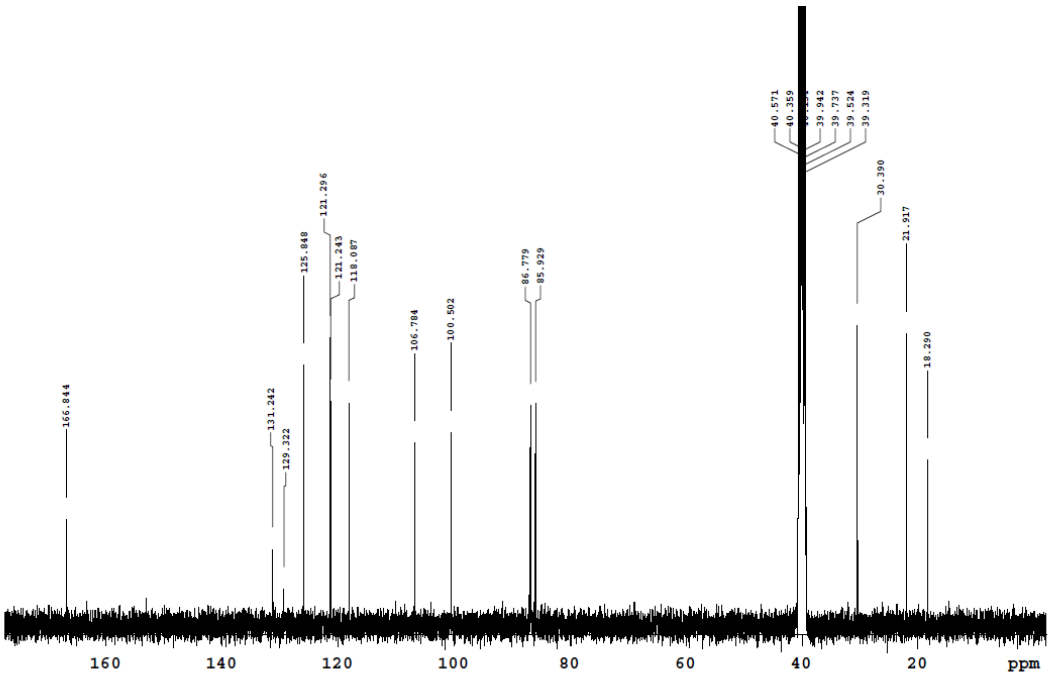

Figure S10. ^{13}C NMR spectrum of complex **RuBS** in DMSO-D_6.

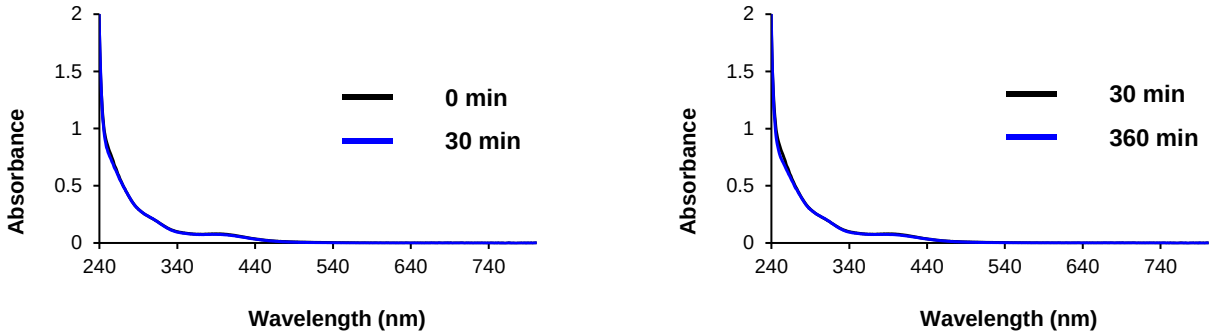

Figure S11. UV-Vis spectra of complex **RuO** (100 µM) incubated in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

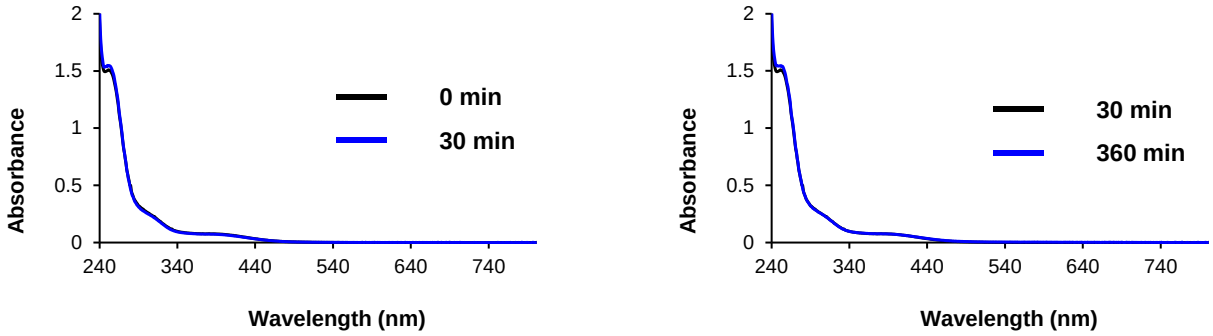

Figure S12. UV-Vis spectra of complex **RuS** (100 µM) incubated in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

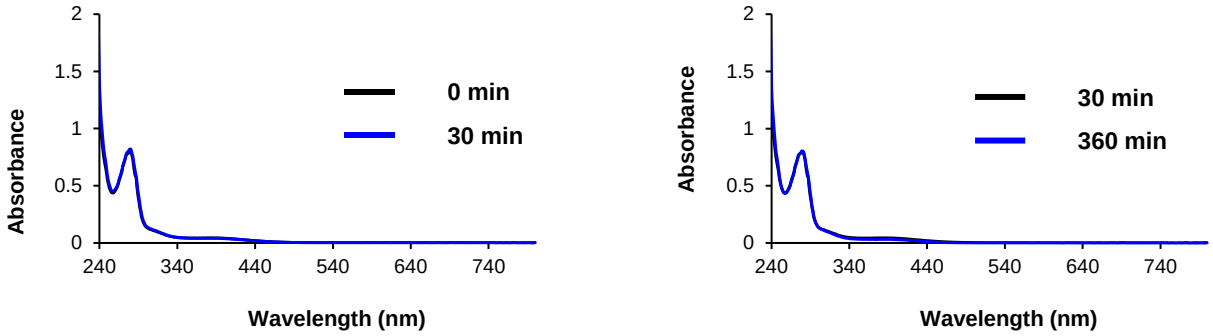

Figure S13. UV-Vis spectra of complex **RuBN** (100 µM) incubated in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

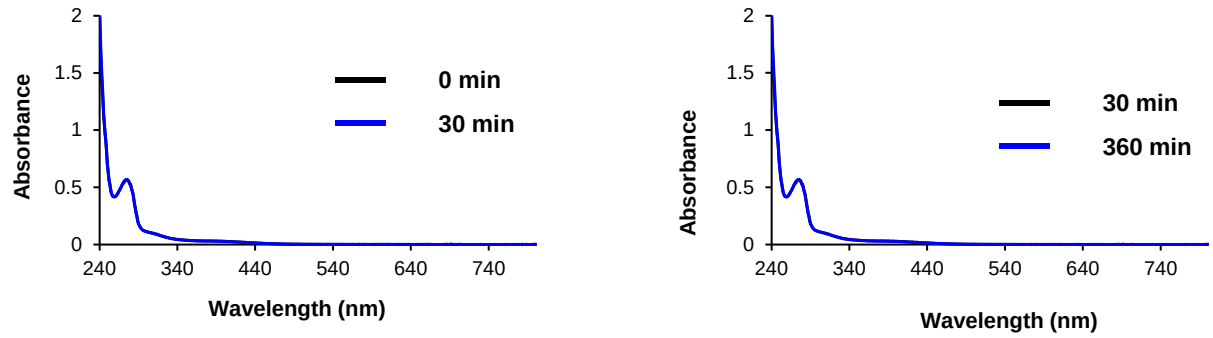

Figure S14. UV-Vis spectra of complex **RuBO** (100 µM) incubated in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

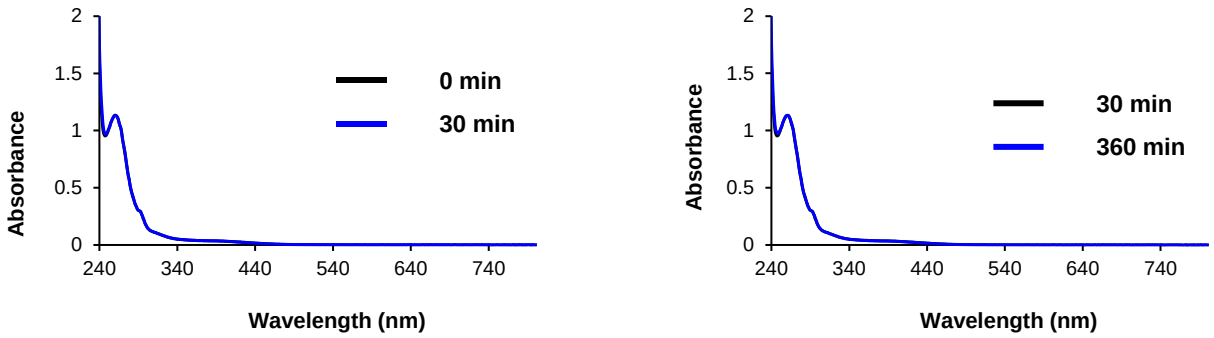

Figure S15. UV-Vis spectra of complex **RuBS** (100 µM) incubated in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

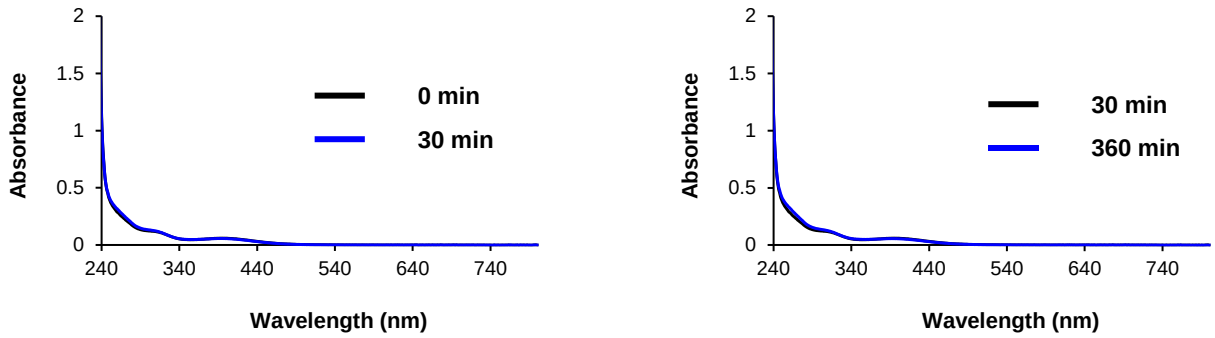

Figure S16. UV-Vis spectra of complex **RuO** (100 µM) incubated in H_2O at room temperature for 30 minutes (left) then for 6 hours (right).

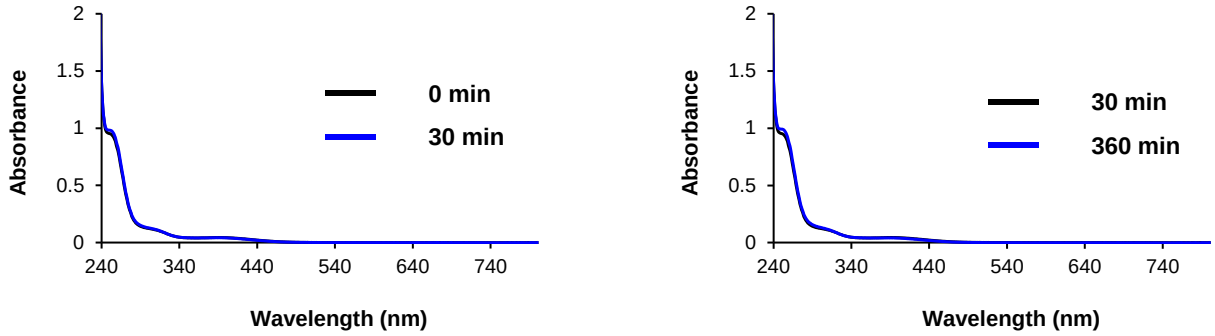

Figure S17. UV-Vis spectra of complex **RuS** (100 µM) incubated in H_2O at room temperature for 30 minutes (left) then for 6 hours (right).

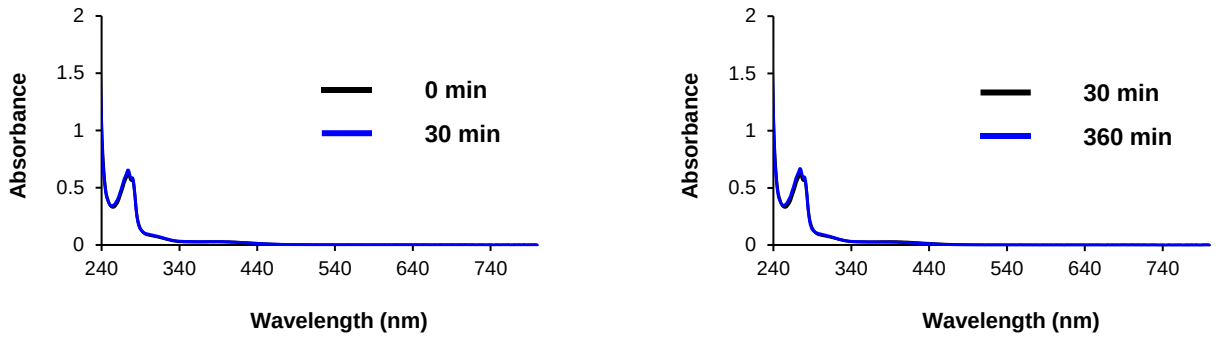

Figure S18. UV-Vis spectra of complex **RuBN** (100 µM) incubated in H_2O at room temperature for 30 minutes (left) then for 6 hours (right).

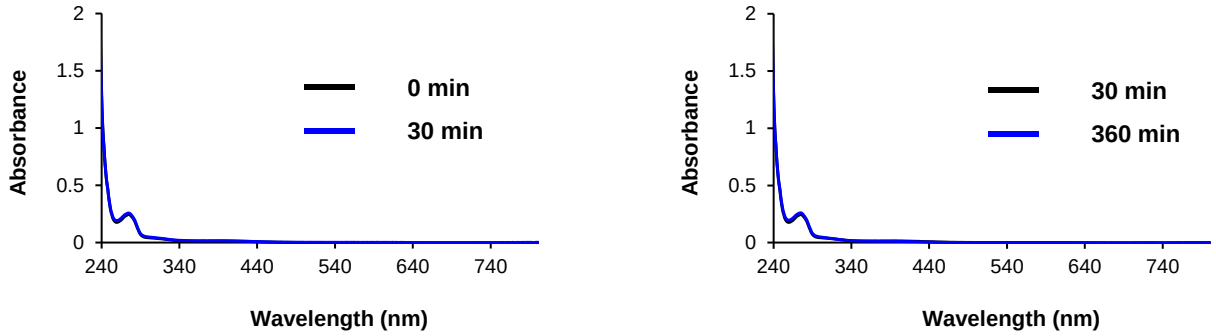

Figure S19. UV-Vis spectra of complex **RuBO** (100 µM) incubated in H_2O at room temperature for 30 minutes (left) then for 6 hours (right).

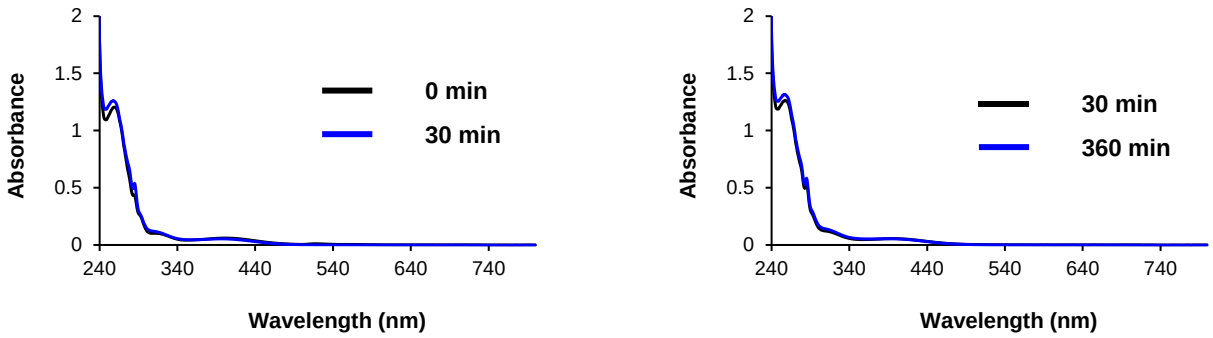

Figure S20. UV-Vis spectra of complex **RuBS** (100 µM) incubated in H_2O at room temperature for 30 minutes (left) then for 6 hours (right).

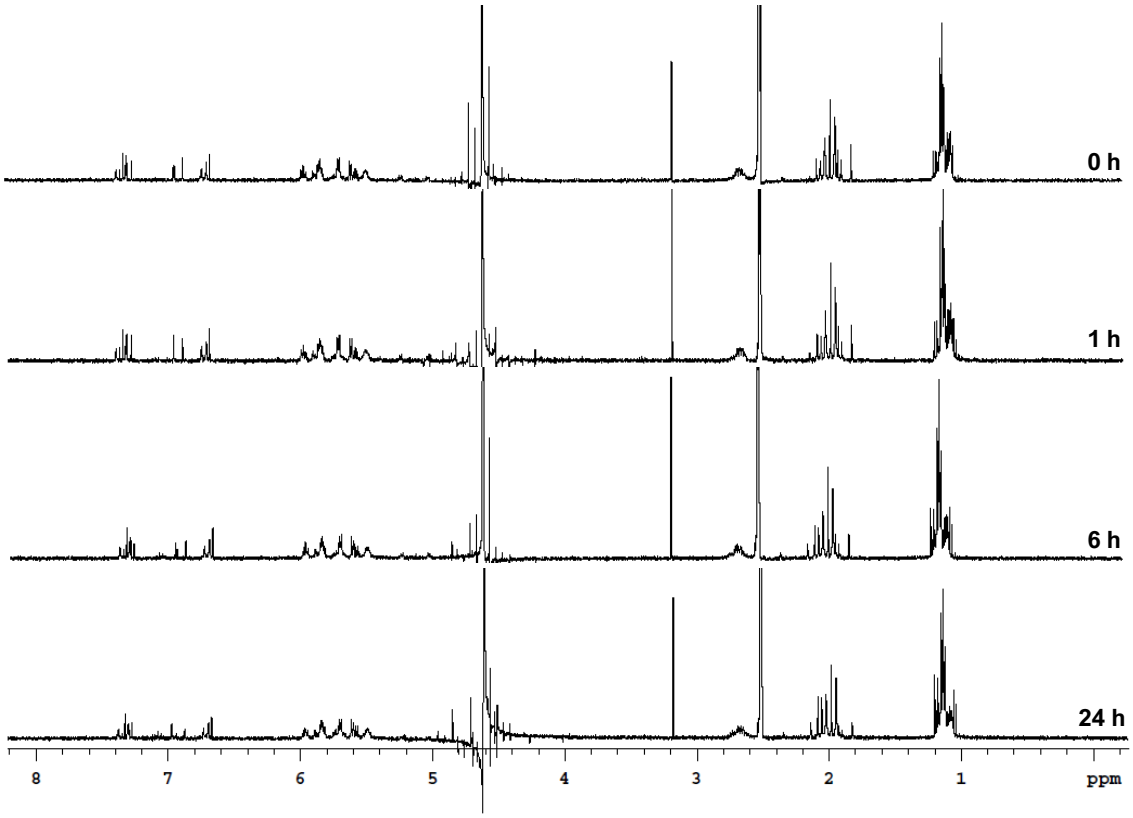

Figure S21. ^{1}H NMR spectrum of complex **RuO** in 10% DMSO-D_6 and D_2O over 24 hours.

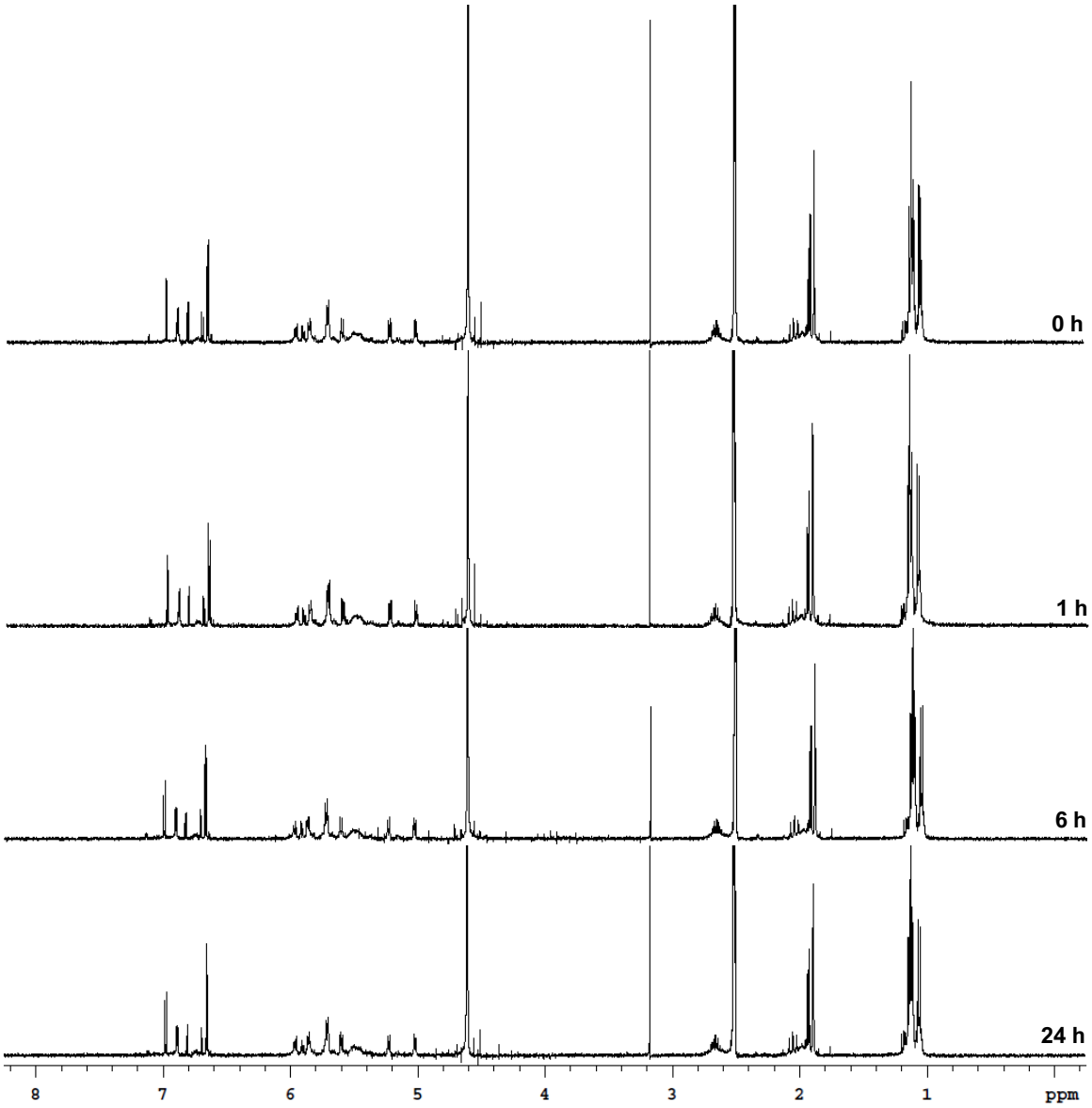

Figure S22. ^{1}H NMR spectrum of complex **RuS** in 10% DMSO-D_6 and D_2O over 24 hours.

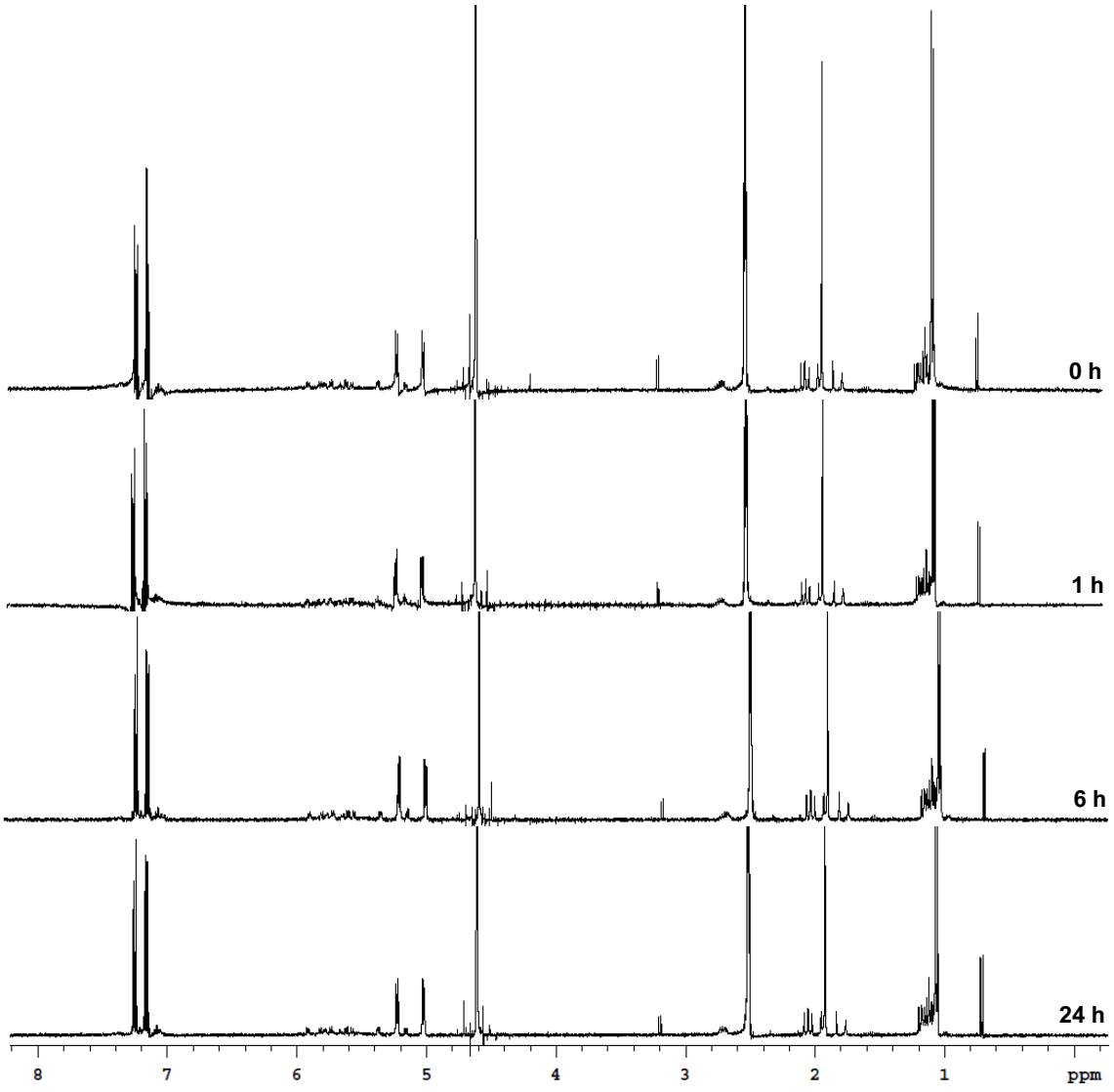

Figure S23. ^{1}H NMR spectrum of complex **RuBN** in 10% DMSO-D_6 and D_2O over 24 hours.

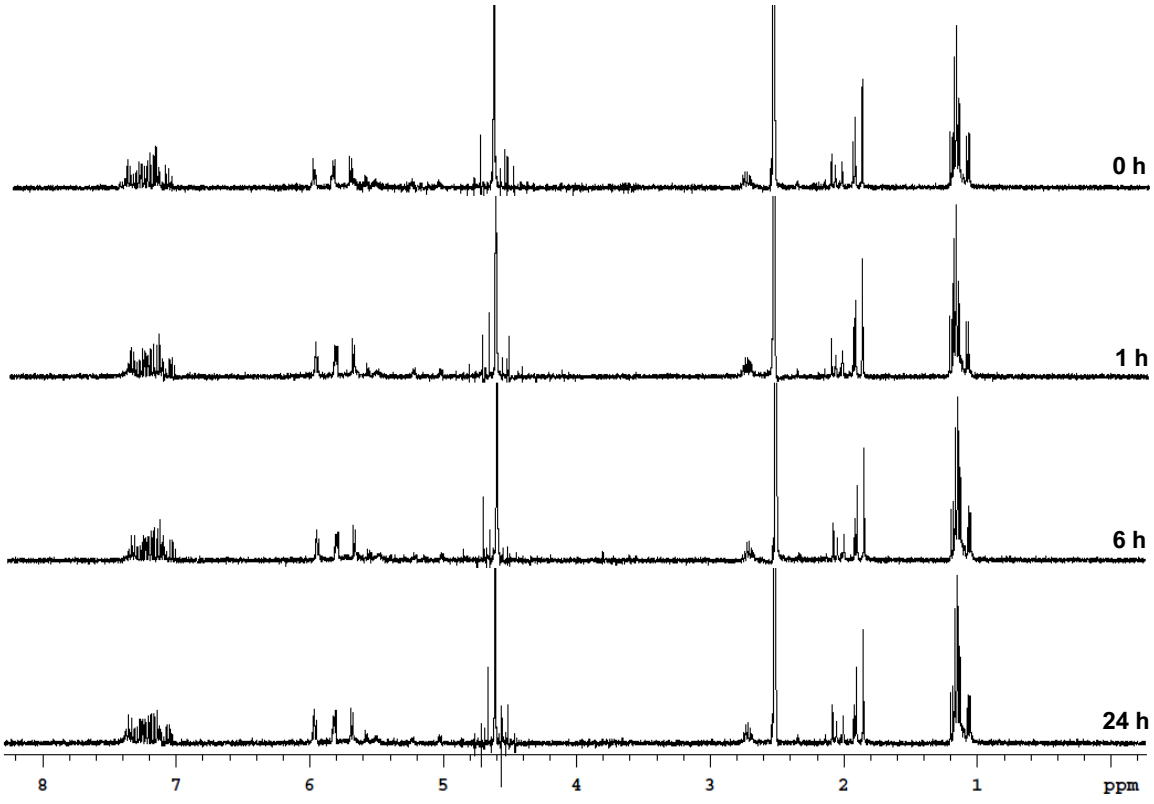

Figure S24. ^{1}H NMR spectrum of complex **RuBO** in 10% DMSO-D_6 and D_2O over 24 hours.

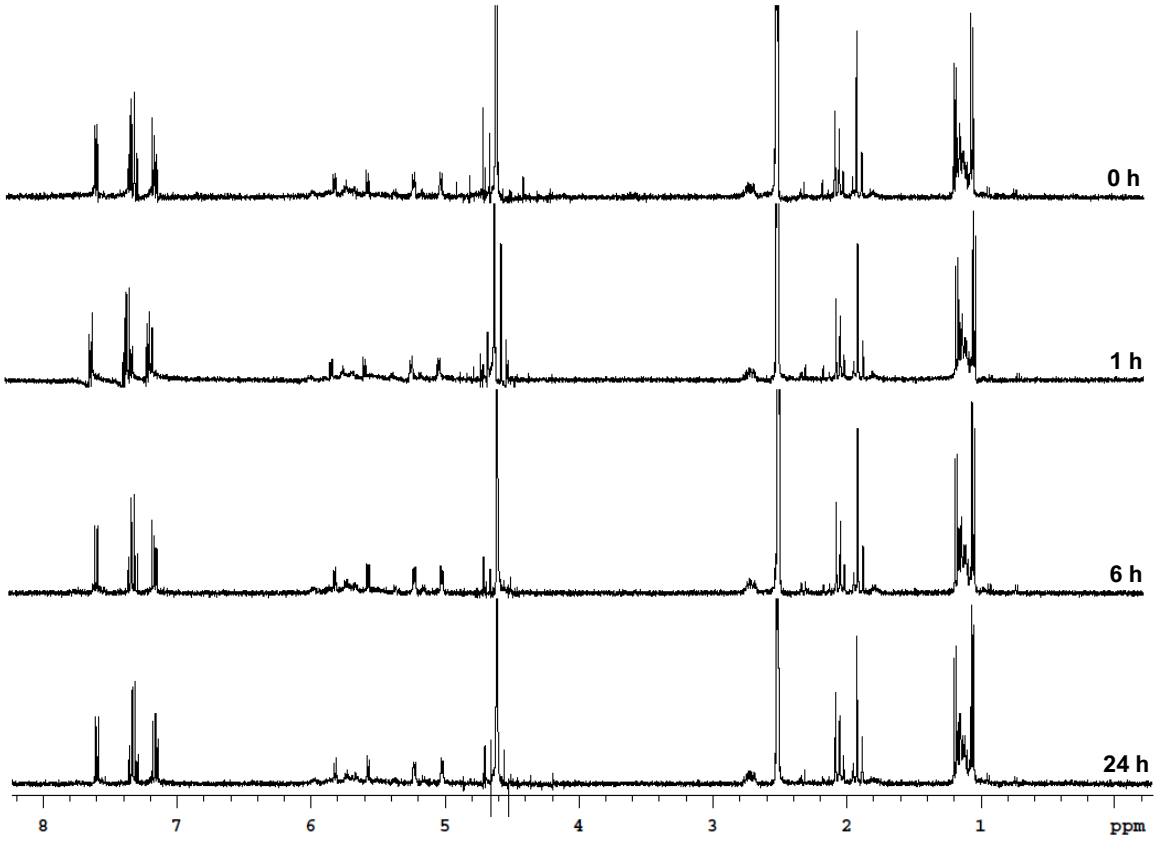

Figure S25. ^{1}H NMR spectrum of complex **RuBS** in 10% DMSO-D_6 and D_2O over 24 hours.

Complex	SMILES
RuO	Nc1occn1[Ru]12345(Cl)(Cl)C6=C3[C]5(=C2C1=[C]46C)C(C)C
RuS	Nc1sccn1[Ru]12345(Cl)(Cl)C6=C3[C]5(=C2C1=[C]46C)C(C)C
RuBN	Nc1[nH]c2c(n1[Ru]13456(Cl)(Cl)C7=C4[C]6(=C3C1=[C]57C)C(C)C)cccc2
RuBO	Nc1oc2c(n1[Ru]13456(Cl)(Cl)C7=C4[C]6(=C3C1=[C]57C)C(C)C)cccc2
RuBS	Nc1sc2c(n1[Ru]13456(Cl)(Cl)C7=C4[C]6(=C3C1=[C]57C)C(C)C)cccc2

Table S1. Simplified molecular-input line-entry system (SMILES) for each Ru complex used to calculate the log P values.

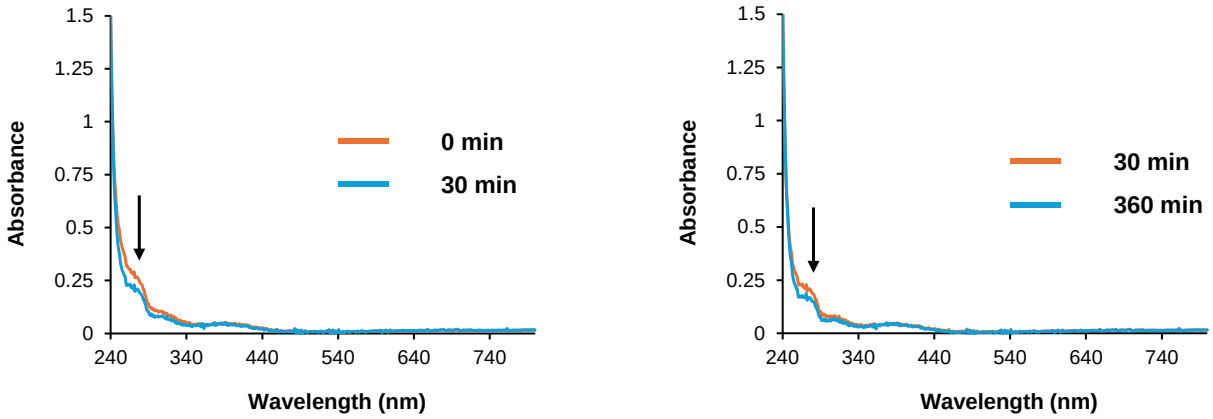

Figure S26. UV-Vis Spectra of **RuO** following mixing with an equimolar amount of $A\beta_{16}$ (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

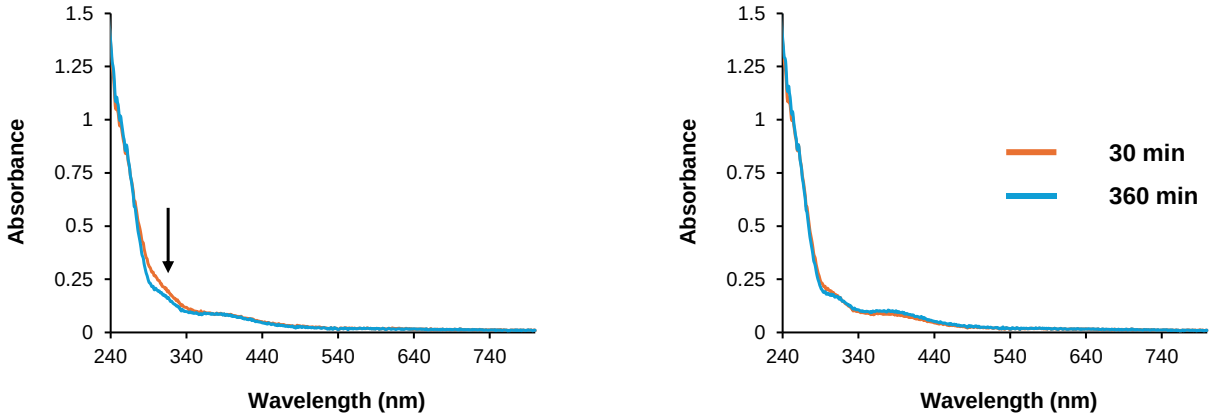

Figure S27. UV-Vis Spectra of **RuS** following mixing with an equimolar amount of $A\beta_{16}$ (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

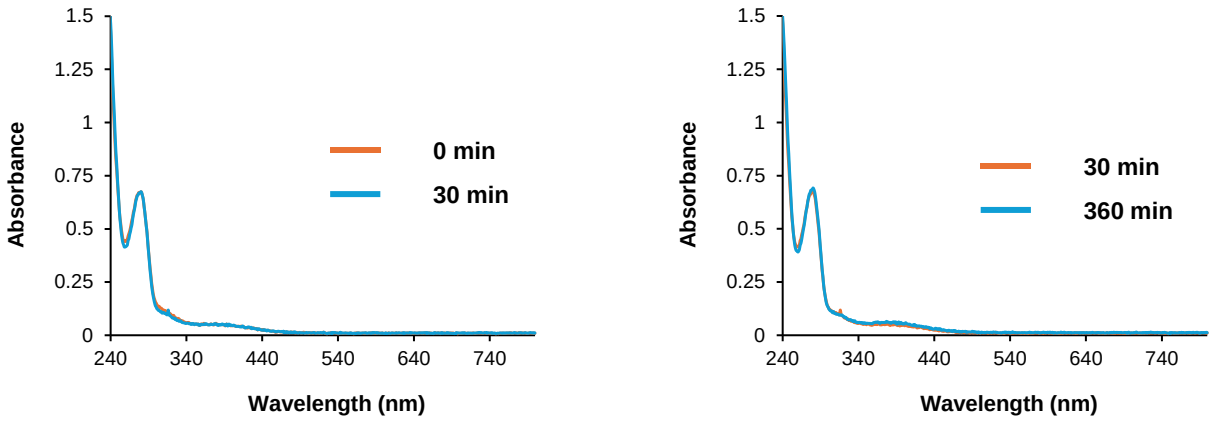

Figure S28. UV-Vis Spectra of **RuBN** following mixing with an equimolar amount of $A\beta_{16}$ (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

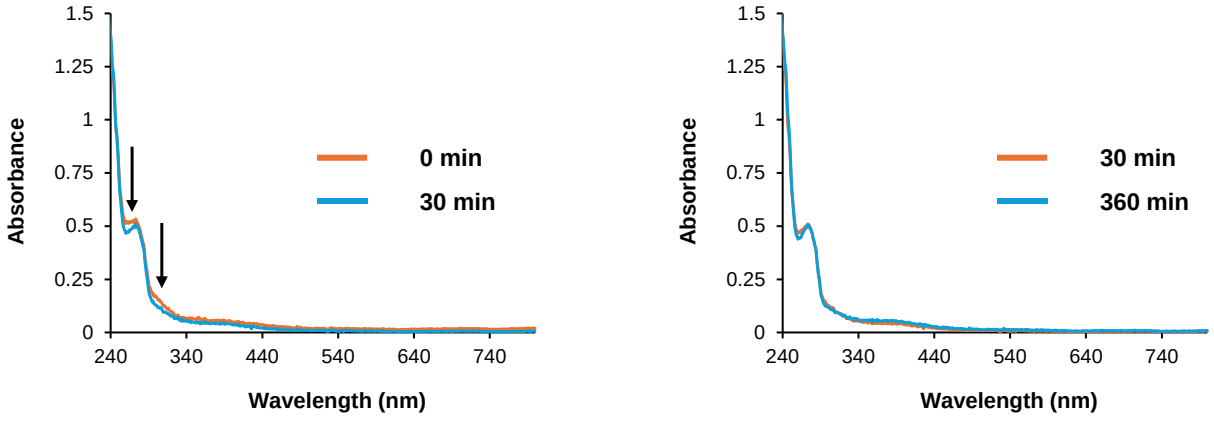

Figure S29. UV-Vis Spectra of **RuBO** following mixing with an equimolar amount of $A\beta_{16}$ (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

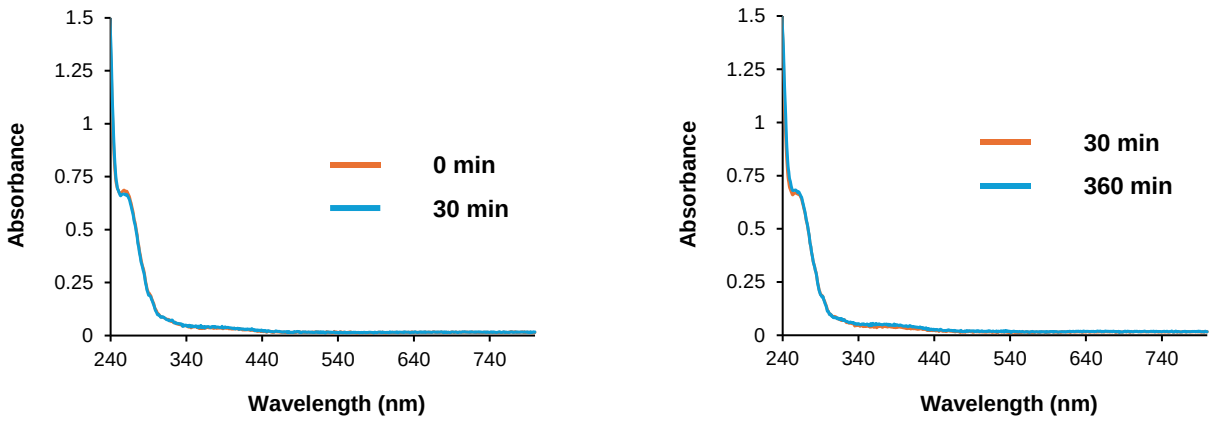

Figure S30. UV-Vis Spectra of **RuBS** following mixing with an equimolar amount of $A\beta_{16}$ (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

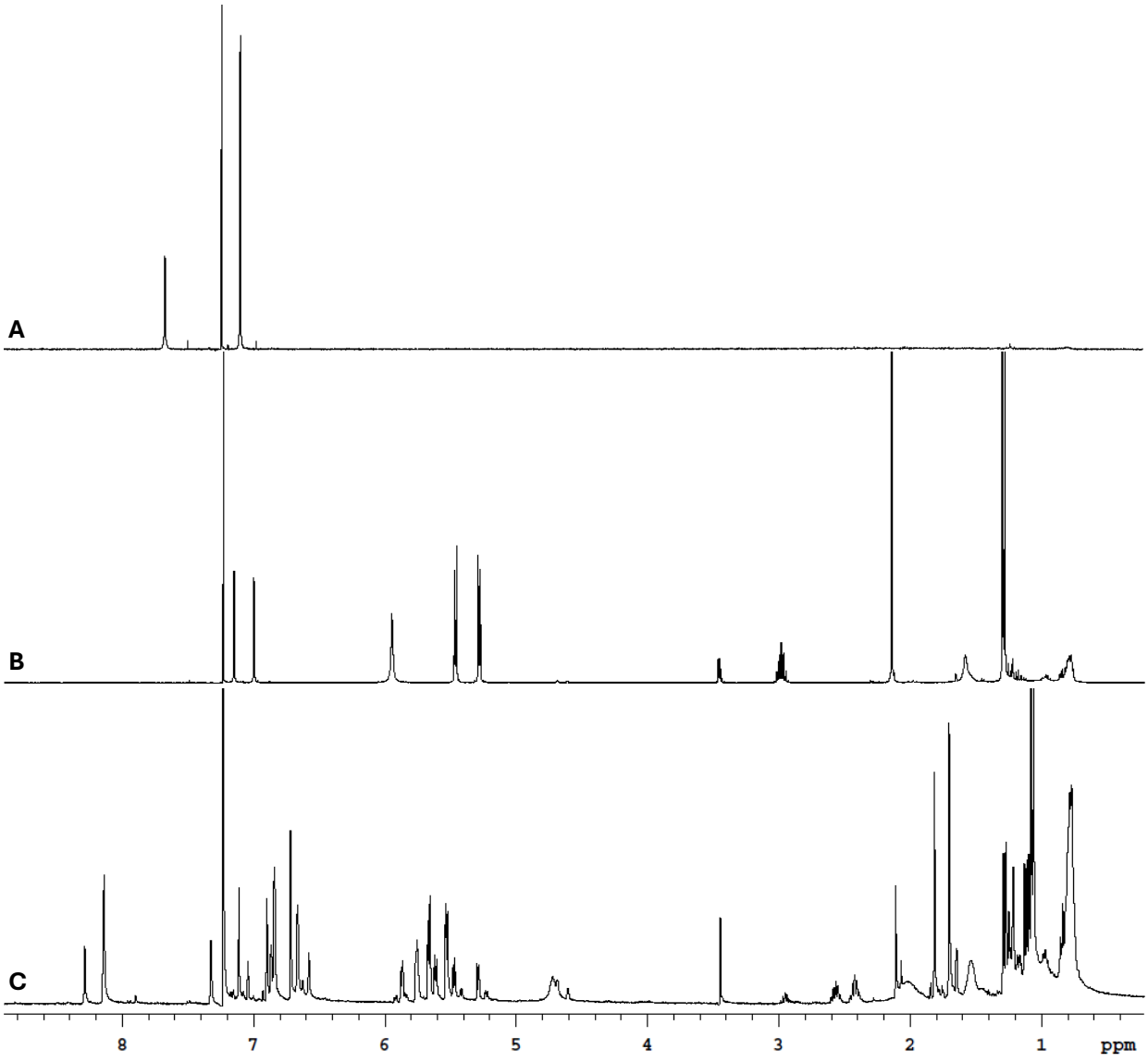

Figure S31. ^{1}H NMR spectra in $CDCl_3$ of complex **RuO** (18 µM) with imidazole (18 µM). A: Imidazole alone, B: **RuO** alone, C: Imidazole and **RuO** immediately after mixing.

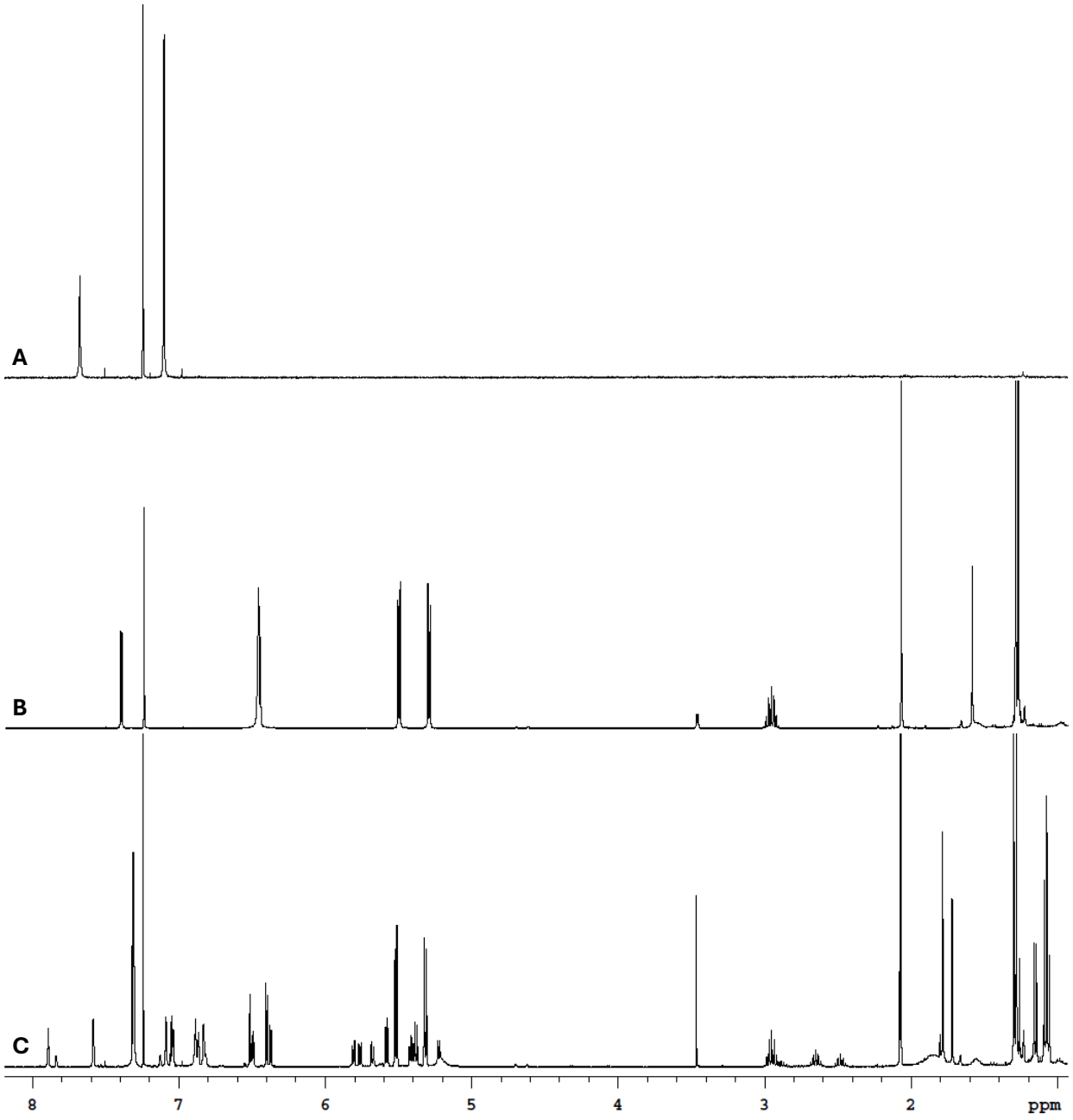

Figure S32. ^{1}H NMR spectra in $CDCl_3$ of complex **RuS** (18 µM) with imidazole (18 µM). A: Imidazole alone, B: **RuS** alone, C: Imidazole and **RuS** immediately after mixing.

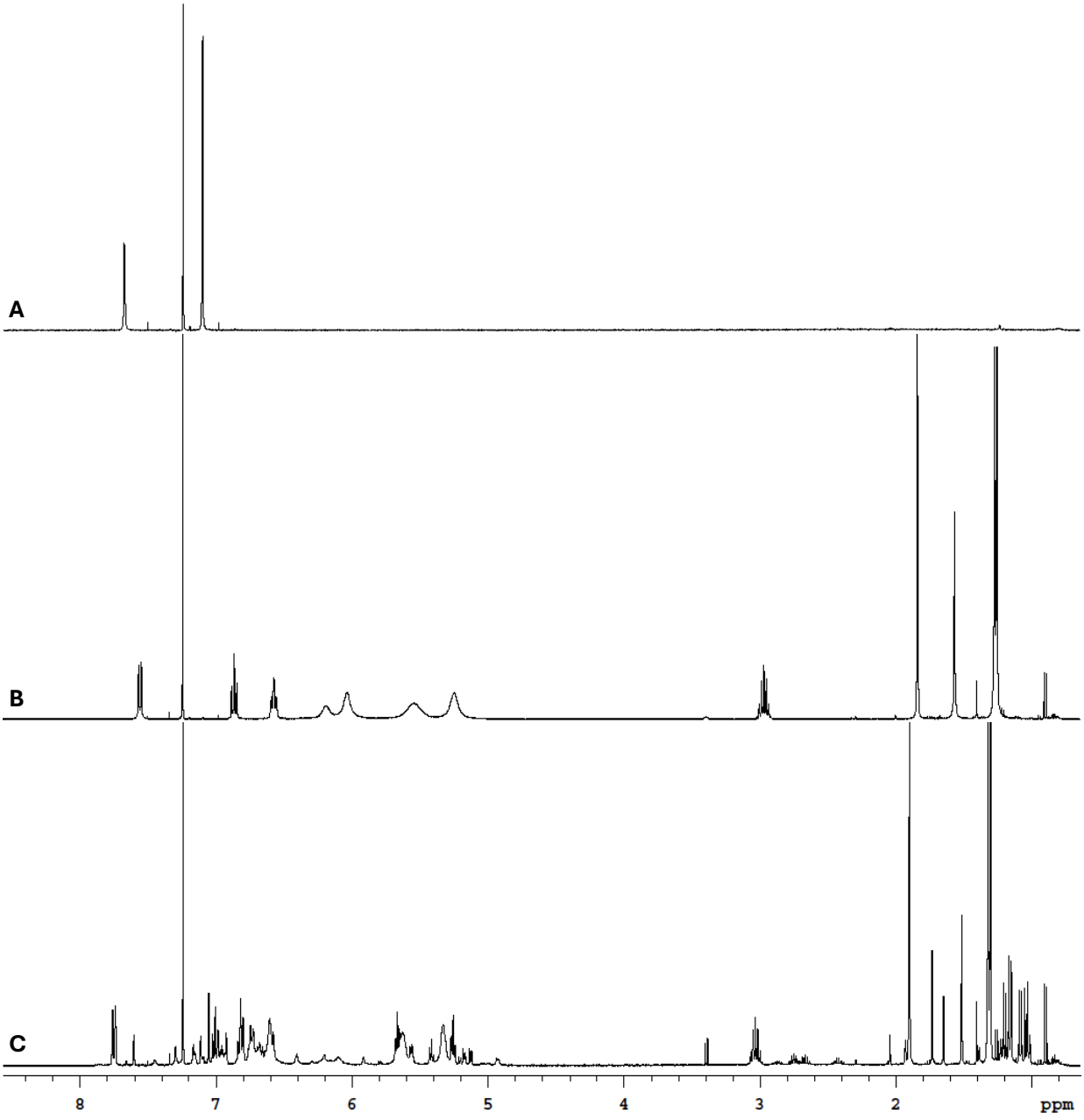

Figure S33. ^{1}H NMR spectra in $CDCl_3$ of complex **RuBN** (16 µM) with imidazole (16 µM). A: Imidazole alone, B: **RuBN** alone, C: Imidazole and **RuBN** immediately after mixing.

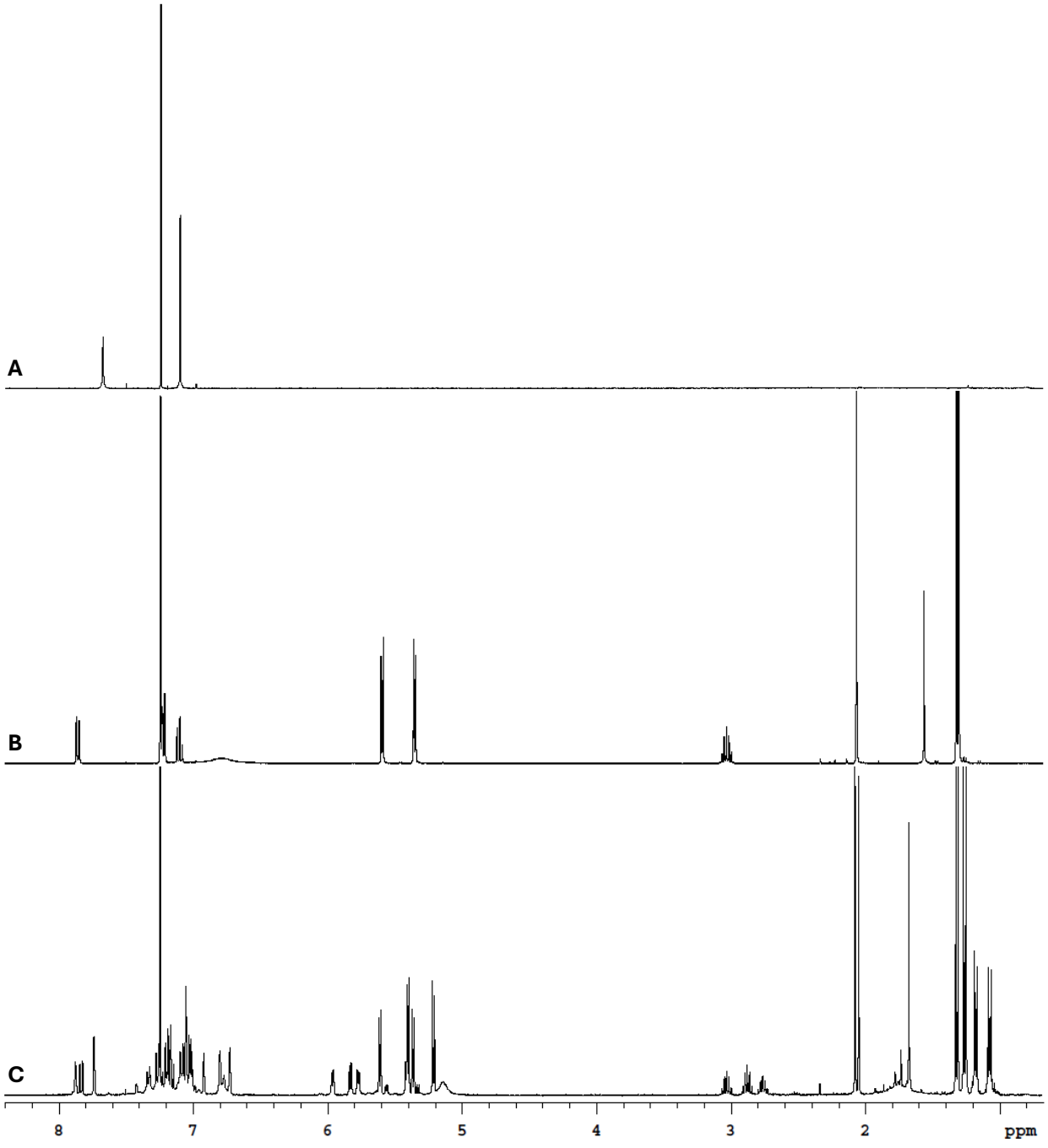

Figure S34. ^{1}H NMR spectra in $CDCl_3$ of complex **RuBO** (16 µM) with imidazole (16 µM). A: Imidazole alone, B: **RuBO** alone, C: Imidazole and **RuBO** immediately after mixing.

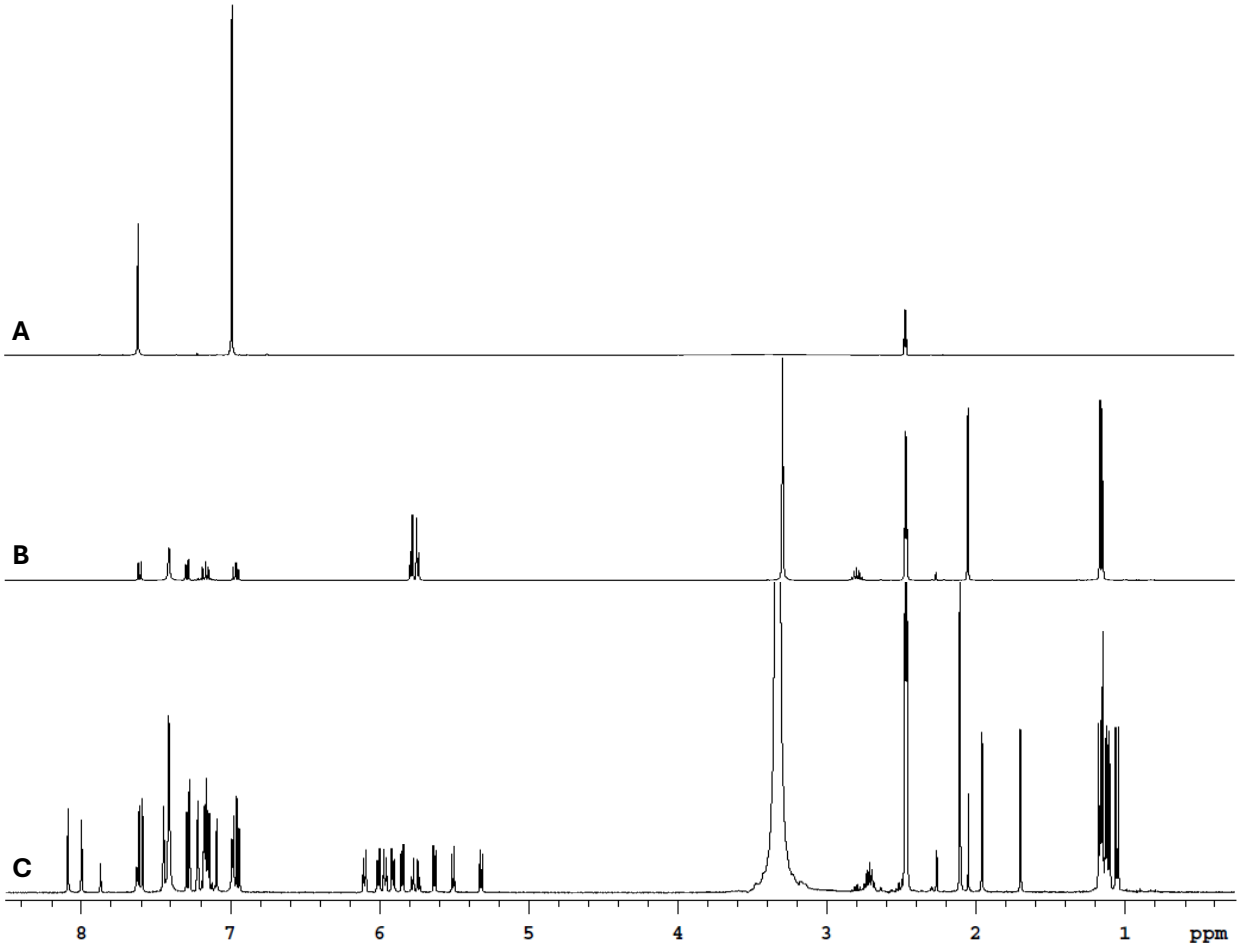

Figure S35. ^{1}H NMR spectra in DMSO-D_6 of complex **RuBS** (16 µM) with imidazole (16 µM). A: Imidazole alone, B: **RuBS** alone, C: Imidazole and **RuBS** immediately after mixing.

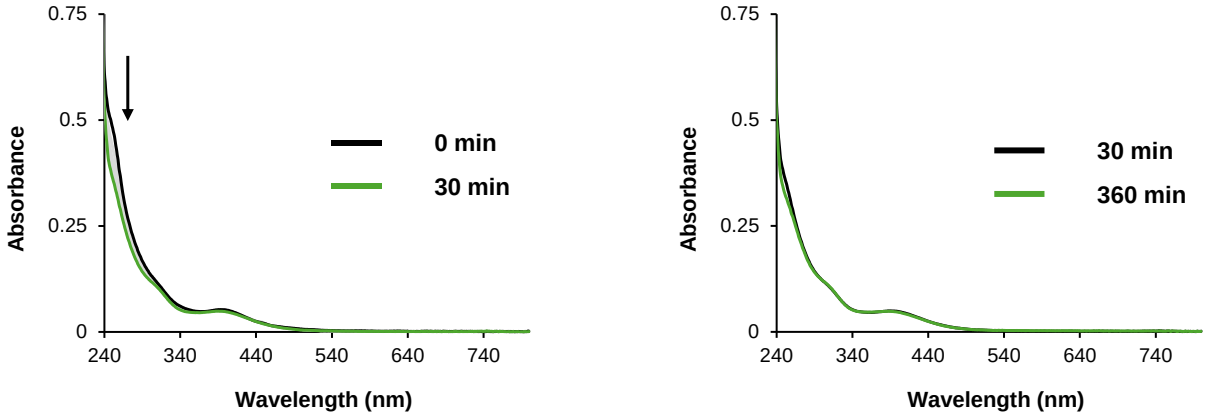

Figure S36. UV-Vis Spectra of **RuO** following mixing with an equimolar amount of imidazole (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

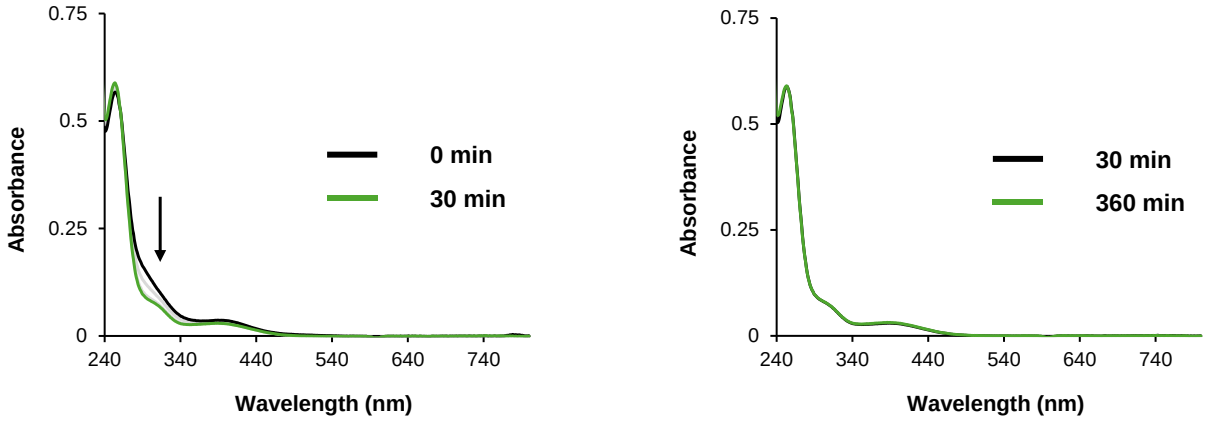

Figure S37. UV-Vis Spectra of **RuS** following mixing with an equimolar amount of imidazole (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

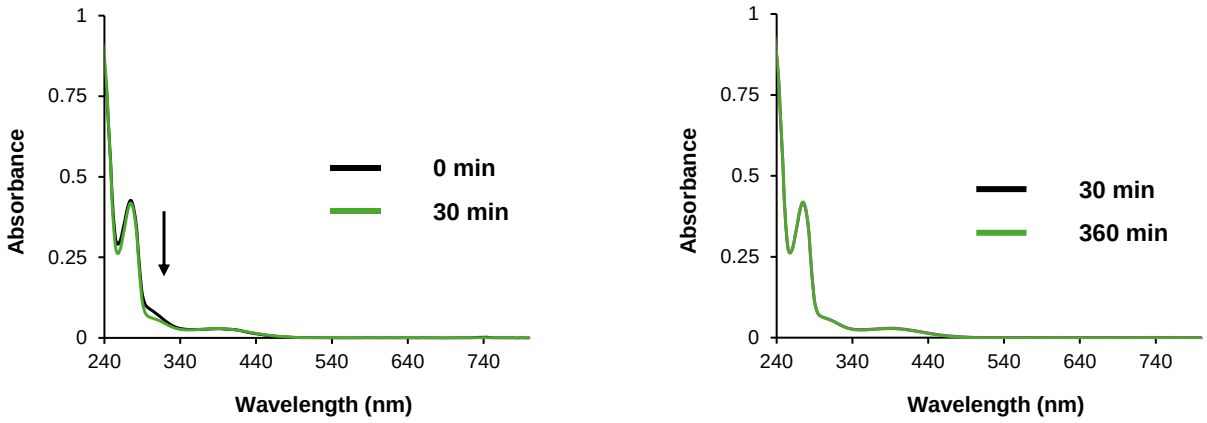

Figure S38. UV-Vis Spectra of **RuBO** following mixing with an equimolar amount of imidazole (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

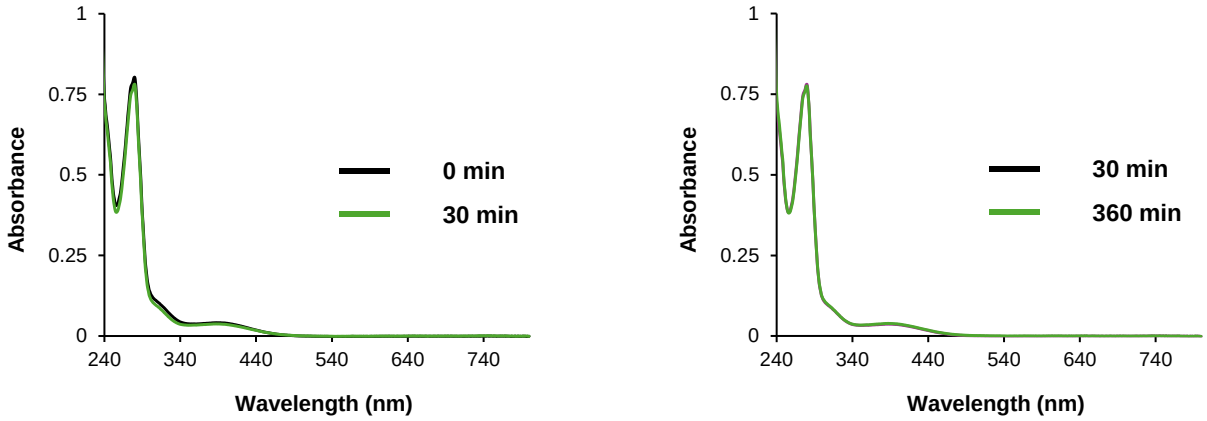

Figure S39. UV-Vis Spectra of **RuBN** following mixing with an equimolar amount of imidazole (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

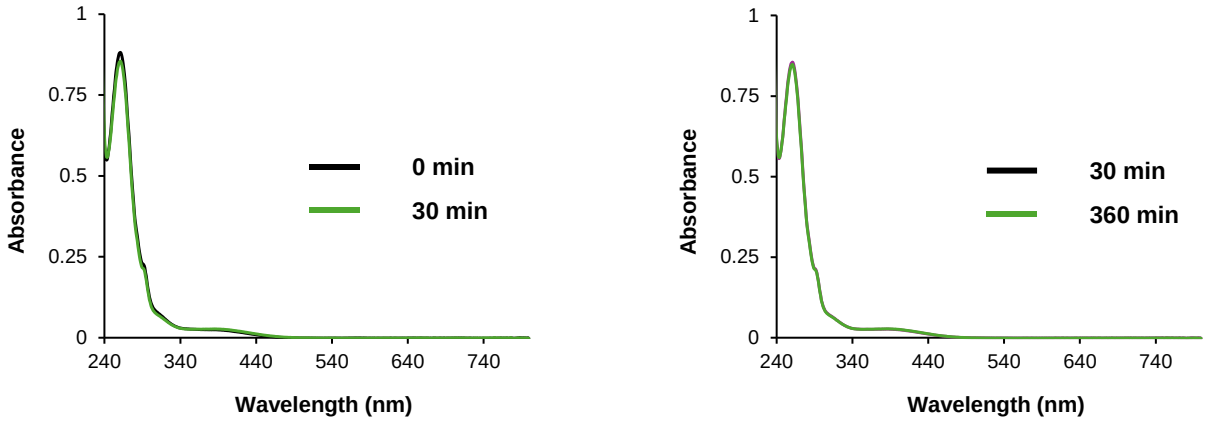

Figure S40. UV-Vis Spectra of **RuBS** following mixing with an equimolar amount of imidazole (100 μM) and incubation in PBS (pH 7.4) at 37 °C for 30 minutes (left) then for 6 hours (right).

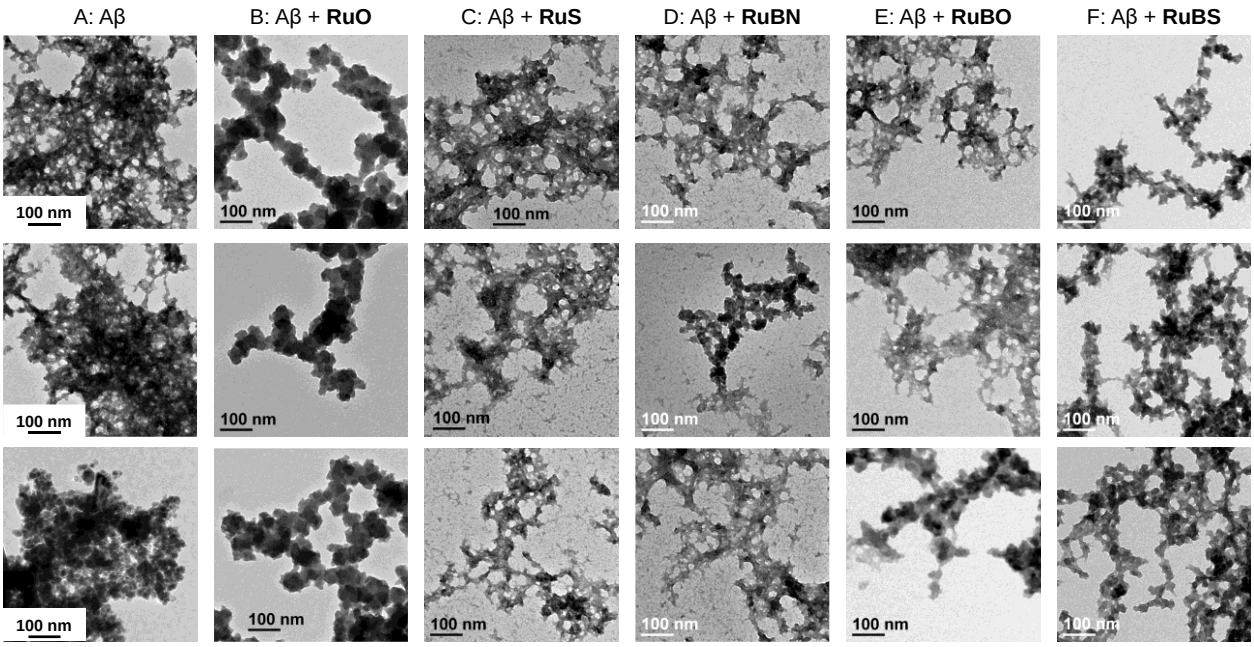

Figure S41. TEM images collected for all of the Ru complexes with $A\beta_{42}$ from the DLS filtrates. Column A: Aβ alone, Column B: Aβ + **RuO**, Column C: Aβ + **RuS**, Column D: Aβ + **RuBN**, Column E: Aβ + **RuBO**, Column F: Aβ + **RuBS**. Scale bars are provided within each image.

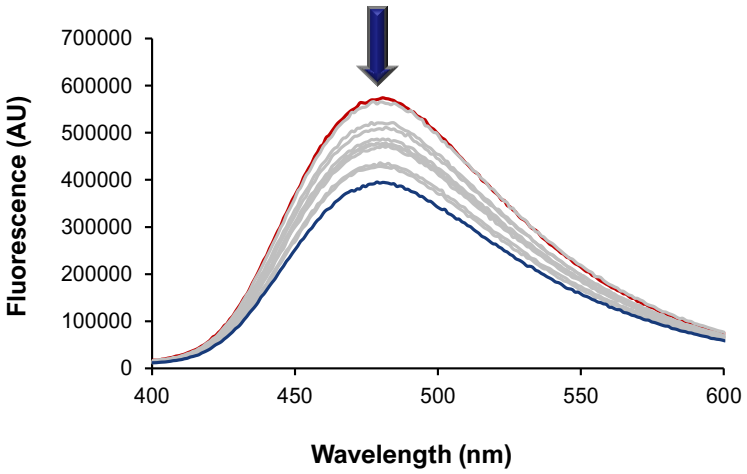

Figure S42. Fluorescence emission spectra at various Ru-HSA ratios by the titration of HSA-DG (1:1) with **RuO**. Experimental conditions: λ_{ex} = 330 nm, λ_{em} = 350-600 nm, [HSA] = [DG] = 2.5 µM, [Ru] = 0-25 µM, in PBS (pH 7.4).

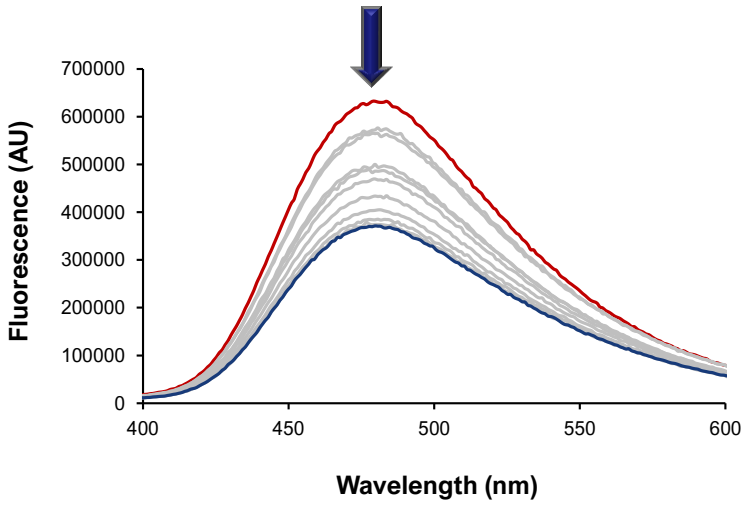

Figure S43. Fluorescence emission spectra at various Ru-HSA ratios by the titration of HSA-DG (1:1) with **RuS**. Experimental conditions: λ_{ex} = 330 nm, λ_{em} = 350-600 nm, [HSA] = [DG] = 2.5 µM, [Ru] = 0-25 µM, in PBS (pH 7.4).

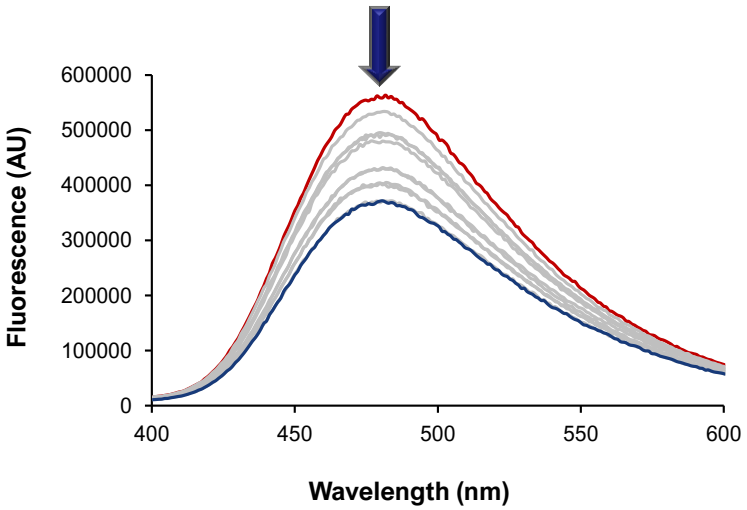

Figure S44. Fluorescence emission spectra at various Ru-HSA ratios by the titration of HSA-DG (1:1) with **RuBN**. Experimental conditions: λ_{ex} = 330 nm, λ_{em} = 350-600 nm, [HSA] = [DG] = 2.5 µM, [Ru] = 0-25 µM, in PBS (pH 7.4).

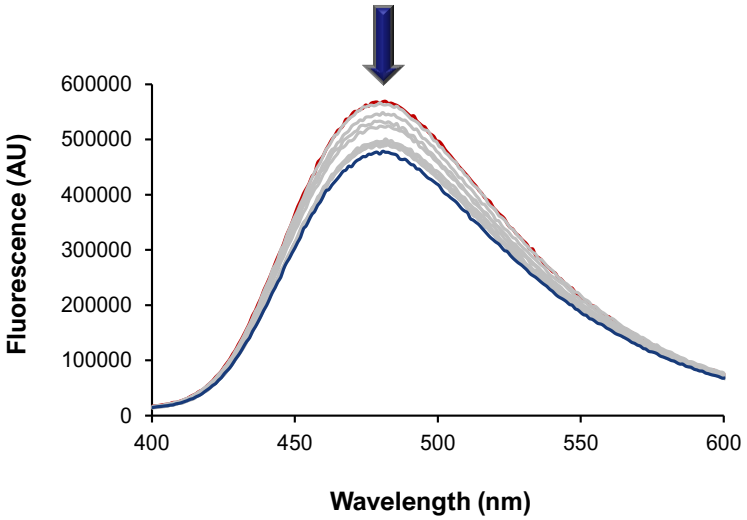

Figure S45. Fluorescence emission spectra at various Ru-HSA ratios by the titration of HSA-DG (1:1) with **RuBO**. Experimental conditions: λ_{ex} = 330 nm, λ_{em} = 350-600 nm, [HSA] = [DG] = 2.5 µM, [Ru] = 0-25 µM, in PBS (pH 7.4).

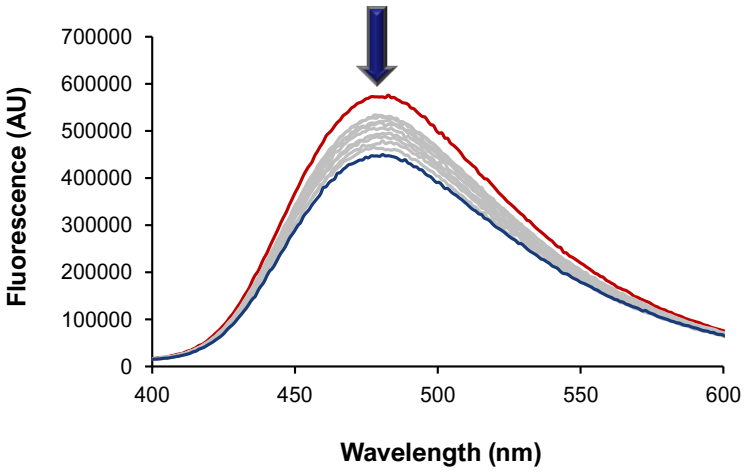

Figure S46. Fluorescence emission spectra at various Ru-HSA ratios by the titration of HSA-DG (1:1) with **RuBS**. Experimental conditions: λ_{ex} = 330 nm, λ_{em} = 350-600 nm, [HSA] = [DG] = 2.5 µM, [Ru] = 0-25 µM, in PBS (pH 7.4).

Table S2. Crystal data and structure refinement for **RuO**.

CCDC Number	2356322	
Empirical formula	C13 H18 Cl2 N2 O Ru	
Formula weight	390.26	
Temperature	100.00(10) K	
Wavelength	1.54184 Å	
Crystal system	monoclinic	
Space group	$P2_1/n$	
Unit cell dimensions	a = 9.84141(5) Å	a = 90°
	b = 8.20452(6) Å	b = 96.4651(5)°
	c = 18.14037(10) Å	g = 90°
Volume	1455.411(15) $Å^3$	
Z	4	
Density (calculated)	1.781 Mg/m^3	
Absorption coefficient	12.041 mm^{-1}	
F(000)	784	
Crystal color, morphology	orange, block	
Crystal size	0.185 x 0.078 x 0.048 mm^3	
Theta range for data collection	4.896 to 80.230°	
Index ranges	$-7 \le h \le 12$, $-10 \le k \le 10$, $-23 \le l \le 23$	
Reflections collected	18727	
Independent reflections	3119 [R(int) = 0.0379]	
Observed reflections	3042	
Completeness to theta = 74.504°	99.7%	
Absorption correction	Multi-scan	
Max. and min. transmission	1.00000 and 0.62780	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	3119 / 0 / 183	
Goodness-of-fit on F^2	1.086	
Final R indices [I>2sigma(I)]	$R1$ = 0.0232, $wR2$ = 0.0574	
R indices (all data)	$R1$ = 0.0238, $wR2$ = 0.0578	
Largest diff. peak and hole	0.453 and -0.800 e.$Å^{-3}$	

Table S3. Crystal data and structure refinement for **RuS**.

CCDC Number	2356323	
Empirical formula	C13 H18 Cl2 N2 Ru S	
Formula weight	406.32	
Temperature	100.00(10) K	
Wavelength	1.54184 Å	
Crystal system	orthorhombic	
Space group	$P2_12_12_1$	
Unit cell dimensions	a = 9.01050(10) Å	a = 90°
	b = 12.05820(10) Å	b = 90°
	c = 14.31010(10) Å	g = 90°
Volume	1554.80(2) $Å^3$	
Z	4	
Density (calculated)	1.736 Mg/m^3	
Absorption coefficient	12.471 mm^{-1}	
F(000)	816	
Crystal color, morphology	orange, block	
Crystal size	0.204 x 0.119 x 0.066 mm^3	
Theta range for data collection	4.796 to 80.227°	
Index ranges	$-10 \le h \le 11$, $-15 \le k \le 14$, $-18 \le l \le 18$	
Reflections collected	17298	
Independent reflections	3359 [R(int) = 0.0402]	
Observed reflections	3344	
Completeness to theta = 74.504°	100.0%	
Absorption correction	Multi-scan	
Max. and min. transmission	1.00000 and 0.48907	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	3359 / 6 / 183	
Goodness-of-fit on F^2	1.111	
Final R indices [I>2sigma(I)]	$R1$ = 0.0252, $wR2$ = 0.0624	
R indices (all data)	$R1$ = 0.0254, $wR2$ = 0.0624	
Absolute structure parameter	-0.004(6)	
Largest diff. peak and hole	0.431 and -0.648 e.$Å^{-3}$	

Table S4. Crystal data and structure refinement for **RuBO**.

CCDC Number	2356324	
Empirical formula	C17 H20 Cl2 N2 O Ru	
Formula weight	440.32	
Temperature	99.98(15) K	
Wavelength	1.54184 Å	
Crystal system	orthorhombic	
Space group	*Pbca*	
Unit cell dimensions	*a* = 7.65340(10) Å	a = 90°
	b = 18.62460(10) Å	b = 90°
	c = 24.3077(2) Å	g = 90°
Volume	3464.86(6) $Å^3$	
Z	8	
Density (calculated)	1.688 Mg/m^3	
Absorption coefficient	10.199 mm^{-1}	
F(000)	1776	
Crystal color, morphology	orange, needle	
Crystal size	0.099 x 0.068 x 0.051 mm^3	
Theta range for data collection	3.637 to 80.145°	
Index ranges	$-9 \le h \le 9$, $-23 \le k \le 19$, $-28 \le l \le 31$	
Reflections collected	30957	
Independent reflections	3724 [*R*(int) = 0.0363]	
Observed reflections	3545	
Completeness to theta = 74.504°	100.0%	
Absorption correction	Multi-scan	
Max. and min. transmission	1.00000 and 0.76953	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	3724 / 0 / 219	
Goodness-of-fit on F^2	1.072	
Final *R* indices [*I*>2sigma(*I*)]	*R*1 = 0.0225, *wR*2 = 0.0576	
R indices (all data)	*R*1 = 0.0236, *wR*2 = 0.0582	
Largest diff. peak and hole	0.338 and -0.734 $e.Å^{-3}$	