

Table of Contents

Shining light on metal-complexes	1
1 Spectroscopy and Inter-/Intra-Molecular processes: an introduction	5
1.1 Ultrafast Transient Absorption	5
1.2 Ultrafast phenomena	8
1.2.1 Intramolecular processes	8
1.2.2 Intermolecular processes: Energy and electron transfer	12
1.2.3 Wave-packet dynamics	18
2 Experimental Set-up and data treatment	21
2.1 Experimental Set-ups	21
2.1.1 Two-Dimensional Transient Absorption	21
2.1.2 ULTRA beam-line at Rutherford Appleton Laboratory (RAL)	33
2.2 Data Treatment	34
3 Solvent and ligand effects on Pt(pop) intramolecular relaxation	39
3.1 $d^8 - d^8$ complexes and Pt(pop): an introduction	39
3.2 Steady state spectra	44
3.3 Solvent dependence	46
3.3.1 Sample preparation	46
3.3.2 Experimental results	46
3.4 Ligand dependence	52
3.4.1 Sample preparation	52
3.4.2 Experimental results	52
3.5 Summary of the GF results	57
3.6 Discussion	58
3.7 Conclusions	61

4	Electron and Energy Transfer in Myoglobins	63
4.1	Myoglobin and tryptophan	64
4.2	Deoxy-Myoglobin.....	70
4.2.1	UV pump-visible probe	70
4.2.2	UV pump-IR probe.....	79
4.2.3	Deoxy-Mb conclusions.....	83
4.3	Carboxy-myoglobin (MbCO)	84
4.3.1	UV pump-IR probe.....	85
4.3.2	MbCO conclusions.....	89
4.4	Nitrosyl-myoglobin (MbNO).....	90
4.4.1	UV pump-visible probe	91
4.4.2	UV pump-IR probe.....	96
4.4.3	MbNO conclusions.....	100
4.5	Cyano-myoglobin (MbCN).....	102
4.5.1	UV pump-IR probe.....	102
4.5.2	Application of Marcus' theory of electron transfer on MbCN.....	106
4.5.3	MbCN conclusions.....	108
4.6	General conclusions.....	108
5	Prion proteins and their biological role	111
5.1	Sample preparation	115
5.2	Static spectra of PrPs	117
5.3	Transient absorption experiments on HGGGW (OPS)	118
5.3.1	Investigation of OPS dynamics	118
5.3.2	Investigation of OPS-Cu dynamics	121
5.4	Transient absorption experiments on (PHGGGWGQ) ₄ (OP4).....	124
5.4.1	Investigation of OP4 dynamics	124
5.4.2	Investigation of OP4-Cu dynamics.....	126
5.5	Discussion.....	128

5.6	Conclusions	131
6	Conclusions and Perspectives	133
	List of abbreviations.....	139
	Acknowledgements.....	143
	Bibliography.....	145
	Appendix A (Pt(pop)).....	161
	Curriculum Vitae.....	165