

Contents

PART I	PHYSICAL ASPECTS OF PHOTOCHEMISTRY	
	Photophysical Processes in Condensed Phases	3
	<i>By R.B. Cundall</i>	
1	General	3
2	Singlet State Processes	9
	2.1 Electron Transfer Reactions and Exciplexes	14
	2.2 Dyes and Related Systems	17
	2.3 Photoisomerization and Related Processes	19
	2.4 Electronic Excitation Energy Transfer	22
	2.5 Polymeric Systems	24
	2.6 Colloidal and Heterogeneous Systems	25
3	Triplet State Processes	29
4	Other Chemical Systems	34
5	Biological Systems	36
	References	40
PART II	PHOTOCHEMISTRY OF INORGANIC AND ORGANOMETALLIC COMPOUNDS	
Chapter 1	The Photochemistry of Transition-metal Complexes	65
	<i>By A. Cox</i>	
1	Introduction	65
2	Titanium	65
3	Vanadium, Niobium, and Tantalum	66
4	Chromium, Molybdenum, and Tungsten	67
5	Manganese and Rhenium	69
6	Iron	70
7	Ruthenium	71
8	Osmium	77
9	Cobalt	77

10 Rhodium and Iridium	79
11 Nickel	81
12 Platinum	82
13 Copper and Gold	83
14 Lanthanides	84
15 Uranium	86
16 Actinides	88
17 Miscellaneous	88
References	88
Chapter 2 The Photochemistry of Transition-metal Organometallic Compounds	103
By A. Cox	
1 Introduction	103
2 Titanium	103
3 Niobium	105
4 Chromium, Molybdenum, and Tungsten	105
5 Manganese and Rhenium	108
6 Iron	111
7 Ruthenium	116
8 Osmium	117
9 Cobalt	117
10 Cobalt and Iridium	118
11 Rhodium and Iridium	118
12 Nickel	122
13 Palladium and Platinum	123
14 Copper and Silver	124
15 Miscellaneous	124
References	124
Chapter 3 The Photochemistry of Compounds of the Main Group Elements	135
By A. Cox	
1 Introduction	135

2	Boron and Indium	135
3	Silicon, Germanium, and Tin	137
4	Nitrogen and Phosphorus	141
5	Oxygen, Sulphur, and Selenium	142
6	Halogens	142
7	Miscellaneous	143
	References	143
PART III	ORGANIC ASPECTS OF PHOTOCHEMISTRY	151
Chapter 1	Photolysis of Carbonyl Compounds <i>By W.M. Horspool</i>	151
1	Norrish Type I Reactions	151
2	Norrish Type II Reactions	156
3	Oxetane Formation	162
4	Miscellaneous Reactions	164
	References	170
Chapter 2	Enone Cycloadditions and Rearrangements: Photoreactions of Dienones and Quinones <i>By W.M. Horspool</i>	173
1	Cycloaddition Reactions	173
	Intramolecular	173
	Intermolecular	185
	Dimerization	195
2	Rearrangement Reactions	197
	α , β -Unsaturated Systems	197
	β , γ -Unsaturated Systems	208
3	Photoreactions of Thymines and Related Compounds	211
4	Photochemistry of Dienones	214
	Cross-Conjugated Dienones	214
	Linearly Conjugated Dienones	222
5	1,2-, 1,3-, and 1,4-Diketones	222
6	Quinones	232
	Reference	237

Chapter 3	Photochemistry of Alkenes, Alkynes, and Related Compounds	245
	<i>By W.M. Horspool</i>	
1	Reactions of Alkenes	245
	Addition Reactions	245
	<i>cis-trans</i> Isomerization	245
	Hydrogen Abstraction	249
	Miscellaneous Reactions	251
2	Reactions involving Cyclopropane Rings	253
3	Reactions of Dienes, Trienes, and Higher Polyenes	261
4	[2+2] Intramolecular Additions	267
5	Dimerization and Intermolecular Additions	273
6	Miscellaneous Reactions	273
	Reference	280
Chapter 4	Photochemistry of Aromatic Compounds	285
	<i>By A.C. Weedon</i>	
	Introduction	285
1	Isomerization Reactions	287
2	Addition Reactions	299
3	Substitution Reactions	309
4	Intramolecular Cyclization Reactions	317
5	Dimerization Reactions	327
6	Lateral Nuclear Rearrangements	328
7	Peripheral Photochemistry	333
	Reference	338
Chapter 5	Photoreduction and -oxidation	344
	<i>By A. Cox</i>	
1	Introduction	344
2	Reduction of the Carbonyl Group	344
3	Reduction of Nitrogen-containing Compounds	347
4	Miscellaneous Reductions	348
5	Singlet Oxygen	348
6	Oxidation of Aliphatic Compounds	350

7	Oxidation of Aromatic Compounds	352
8	Oxidation of Nitrogen-containing Compounds	355
9	Miscellaneous Oxidations	356
	References	357
Chapter 6	Photoreactions of Compounds containing Heteroatoms other than Oxygen <i>By S.T. Reid</i>	366
1	Nitrogen-containing Compounds	366
	Rearrangements	366
	Addition reactions	383
	Miscellaneous Reactions	392
2	Sulphur-containing Compounds	392
3	Compounds containing other Heteroatoms	401
	References	407
Chapter 7	Photoelimination <i>By S.T. Reid</i>	413
1	Elimination of Nitrogen from Azo-compounds	413
2	Elimination of Nitrogen from Diazo-compounds	423
3	Elimination of Nitrogen from Azides	429
4	Photoelimination of Carbon Dioxide	434
5	Fragmentation of Organosulphur Compounds	436
6	Miscellaneous Decomposition and Elimination Reactions	439
	References	447
PART IV	POLYMER PHOTOCHEMISTRY <i>By N.S. Allen</i>	455
1	Introduction	455
2	Photopolymerization	455
	2.1 Photoinitiated Addition Polymerisation	456
	2.2 Photocrosslinking	462
	2.3 Photografting	466
3	Optical and Luminescence Properties	466
4	Photodegradation and Photooxidation of Polymers	476

4.1	Polyolefins	476
4.2	Poly(vinylhalides)	477
4.3	Polystyrenes	478
4.4	Polyacrylics	478
4.5	Polyamides	479
4.6	Poly(Organosilanes)	479
4.7	Rubbers and Polywethanes	479
4.8	Natural Polymers	480
4.9	Miscellaneous Polymers	481
5	Photostabilisation Process	483
6	Dyes and Pigments	487
	References	490