

# Contents

---

Preface	vii
Contributing Authors	ix
Contents of Volumes 1–10	xvii

## **42 / UV-Visible Absorption Spectroscopic Properties of Phthalocyanines and Related Macrocycles 1**

***Takamitsu Fukuda and Nagao Kobayashi***

List of Abbreviations	2
I. Introduction	3
II. Basic Theoretical Description of the Absorption Properties of Phthalocyanines	6
III. Absorption Spectra of Pcs	12
A. H <sub>2</sub> Pc and HPc	12
B. Group 1: Li <sub>2</sub> Pc, LiHPc, LiPc, Na <sub>2</sub> Pc and K <sub>2</sub> Pc	17
C. Group 2: BePc, MgPc, CaPc and BaPc	21
D. Group 3: ScPc, ScPc <sub>2</sub> , YPc <sub>2</sub> and Y <sub>2</sub> Pc <sub>3</sub>	24
E. Complexes of the Lanthanide Elements	28
F. Complexes of the Actinide Elements	37
G. Group 4: TiPc, ZrPc, ZrPc <sub>2</sub> and HfPc	39
H. Group 5: VPc, NbPc and TaPc	42
I. Group 6: CrPc, MoPc and WPc	45
J. Group 7: MnPc, TcPc, RePc and RePc <sub>2</sub>	49
K. Group 8: FePc, RuPc and OsPc	54
L. Group 9: CoPc, RhPc and IrPc	65
M. Group 10: NiPc, PdPc and PtPc	68
N. Group 11: CuPc, AgPc and AuPc	72
O. Group 12: ZnPc, CdPc, Cd <sub>2</sub> Pc <sub>3</sub> and HgPc	74
P. Group 13: B-subPc, AlPc, GaPc, InPc and TlPc	78
Q. Group 14: SiPc, GePc, SnPc, SnPc <sub>2</sub> and PbPc	86
R. Group 15: PPc, AsPc, SbPc, BiPc, BiPc <sub>2</sub> and Bi <sub>2</sub> Pc <sub>3</sub>	95

IV. Collective Absorption Data Tables. . . . .	99
V. Acknowledgment. . . . .	602
VI. References. . . . .	602
Index. . . . .	645