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BOOK REVIEWS

Fundamentals of Interface & Colloid Science
J. Lyklema
Volume I: Fundamentals
Volume II: Solid–Liquid Interfaces
Academic Press, London, Vol. I: 1991, Vol II: 1995, ISBN Vol. I: 0-12-460525-7, Vol. II: 0-12-460524-9, hardcover, Vol. I: £ 54.50, Vol. II: £ 65.00.

"Fundamentals of Interface and Colloid Science" is a textbook and a reference book as well. Volume I starts with a general introduction, serving the dual purpose of emphasizing the importance of interface and colloid science and acquainting the reader with basic phenomena, laws and issues. Chapter 2–7 cover a large part of classical physics and physical chemistry, with special reference to interface and colloid science. The book starts at a relatively elementary level, however, gradually the treatment becomes more advanced, to eventually attain expert level. Examples of elementary introductory parts include classical thermodynamics and the description of interactions between molecules. Among the more advanced topics are partition functions, Lifshits theory for interaction between macrobodies, stochastic processes and dynamic light scattering. Mathematical functions required to formulate these problems are explained in extended Appendices.

Volume II deals with solid–liquid interfaces and covers topics like adsorption at the solid–gas interface, adsorption from solution, electric double layers, electrokinetics and adsorption of polymers and polyelectrolytes. It has more the level of modern journals dealing with the subject. As support for readers without the required background extensive back-referencing has been applied. Some necessary mathematics and tables are presented in the Appendices.

Both volumes emphasize the principles of interface and colloid science and hence it follows the philosophy that experimental observations are presented for illustration rather than given for their own sake. Both books are highly recommended for both, newcomers in the field and specialists.

F. Kremer (Leipzig)

Photodegradation of Polymers
J.F. Rabek
Physical Characteristics and Applications
Springer-Verlag, Berlin, Heidelberg, New York 1996, ISBN 3-540-60716-1, 212 pages, hardback, DM 148,00.

This book is written for scientists, engineers and advanced students as an introduction to the physical characteristics and practical aspects of polymer photodegradation. The changes in the structure-property relationship under UV-and visible light irradiation are presented. Rather than providing a theoretical treatment of a subject only, experimentally collected and practical information on experimental work is offered, covering topics as "Electronically Excited States in Polymers", "Electronic Energy Transfer Processes in Polymers", "Photo-Oxidative Degradation", "Kinetic Treatments of Degradation" or "Photodecomposition of Polymers by Laser Radiation". The book does not want to be a compendium on photodegradation but instead to describe the experimental aspects in this technologically very import field of polymer research.

F. Kremer (Leipzig)

Rheo-Physics of Multiphase Polymer Systems: Characterization by Rheo-Optical Techniques
by K. Søndergaard, J. Lyngaae-Jørgensen (eds), XXVIII + 568 pages. Technomic Publishing Company, Inc., Lancaster, Basel (1995). Paperback ISBN 1-56676-156-5.

The 12 chapters of this comprehensive book on the rheo-physics of polymers, a relatively new, rapidly growing field of polymer science, are grouped into four parts that deal with the general principles of rheo-optics and with structure formation, phase transitions and morphology development in polymer systems during flow. The first part consists of an introduction to rheo-optics by K. Søndergaard, a chapter on the fundamentals of optical rheometry, reaching from the Maxwell equations over the Jones and Mueller calculus to the design of optical and scattering instruments, by G.G. Fuller, and two more chapters by Søndergaard, one on the theory of scattering techniques and the other one on experimental techniques and instrumentation. This thorough introduction into the methods of rheo-optics will be appreciated both by readers who are not yet familiar with the background of rheo-optical methods and applications and by those who are looking for guidelines for setting up their own experiments. Reading the introductory part, however, is not a prerequisite for understanding any of the subsequent chapters 5–12, since each chapter has the character of a review and is self-consistent with an introduction and a summary.

The three chapters of the second part on flow-induced structure formation are contributions by A.J. McHugh and B.J. Edwards on polymer solutions, by McHugh on flow-induced crystallization of polymers and by P. Navard on liquid crystalline polymers. The third part on phase transitions during flow deals with dissolution and demixing in polymer systems (by B.A. Wolf and R. Horst), with phase changes in polymer blends (by H.W. Kammer) and with phase transitions of two-phase systems (by Lyngaae-Jørgensen and Søndergaard). The last two chapters, making up the part on flow-induced structure formation, are by Søndergaard and Lyngaae-Jørgensen on polymer blends and alloys and by C. Bélanger, P. Cielo, B.D. Favis, and W.I. Patterson on polymer blend characterization by light scattering. Each of these chapters gives an excellent overview on its respective topic and contains a large number of references to the original work. A list on nomenclature, a glossary and an index are further useful features of the book.

This book can be recommended to both scientists and engineers with an interest in rheo-physics in general – not only that of polymers. The volume will be useful both for the researcher who wants to do rheo-optical experiments himself and for anybody who wants to get a quick but detailed overview on the recent experimental and theoretical advances in the field.

C. Schmidt (Freiburg i. Br.)