

## Advances in Polymer Science Vol. 64: Polymer Membranes

*M. Gordon (Ed.)*

Springer Verlag (Heidelberg),

155 pages, DM82,

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This volume of the series comprises three review articles on selected areas of membrane science.

The first and longest article, 'Polymeric monolayers and liposomes as models for biomembranes' (H. Bader, K. Dorn, B. Hupfer and H. Ringsdorf), is an absorbing account of the progress made in providing realistic models for biomembranes. Monolayers, bimolecular lipid films and especially liposomes prepared by polymerization of the monomeric lipid structures are discussed at some length. The remainder of the article is devoted largely to ways of modelling typical biological behaviour such as surface recognition and enzymatic activity through the introduction of natural lipids and proteins into a synthetic system or of synthetic components into a natural cell membrane.

There follows a review, 'Polyamides as barrier materials' (H. Sumitomo and K. Hashimoto), of the various polyamide materials that have been considered for membrane applications, largely in the field of reverse osmosis. There is a short account of desired membrane properties and the importance of factors such as hydrophilic-hydrophobic content of the membrane and uniformity in the distribution of the sorbed water in determining the flux and solute rejection. The numerous polyamide related materials that have been tested are then discussed with indications of their water flux and salt rejection performance.

The final article, 'Membranes with non-homogeneous sorption and transport properties' (J. H. Petropoulos), deals largely with theoretical aspects of the transport of gases in glassy polymers and in composite structures. A concise account of dual mode transport theory and its more recent applications is followed by reviews of gas transport in heterogeneous polymeric media such as polymer blends and graft copolymers that exhibit distinct domain structures and laminated or graded structures in which the transport properties vary across the membrane. Developments in permeation time-lag and transient diffusion analysis

when the solubility and diffusion coefficients are functions of the space coordinate are illustrated with respect to microporous membranes formed by compression of fine powders. Although the emphasis is on gas transport, the application of dual mode theory to ionic transport in membranes is also considered as well as the effect on ionic transport of non-uniform distribution of electric charge in charged membranes.

The articles are authoritative accounts of the selected subject areas and will be of interest to membrane scientists.

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## Plastics Additives Handbook – Stabilizers, Processing Aids, Fillers, Reinforcements, Colorants for Thermoplastics

*R. Gächter and H. Müller (Eds)*

Carl Hanser Verlag (München)

1985, xxiv + 754 pages,

DM148 (approx. US \$58, £44)

ISBN 3-446-13662-2

It is more than a decade since Mascia's monograph appeared on this subject. The area has developed extensively in the intervening period, and has prompted some specialist reviews and compilations such as Henman's 'World Index of Polyolefin Stabilizers'. However, no major, comprehensive English-language contribution to the literature has been forthcoming. The 'Taschenbuch der Kunststoff-Additiv' (in German), meanwhile, has appeared in two editions. The publishers have taken advantage of the resultant opportunity, by now producing this translation and revision of the second edition. The editors state that the English text corresponds very closely with the latest German edition, except for minor changes and linguistic adaptations.

The resultant Handbook is an admirable review of the state-of-the-art achieved in additives for plastics. It would seem a useful starting point and reference

work for all those in industry, or in applied science research groups, concerned with the technology of plastics, particularly those involved in thermoplastics compounding and compound development. Lecturers in, and students of, polymer science and technology would do well to read it at an appropriate depth to get a current overview of this developing field.

Its scope is limited to thermoplastic polymers, but the term additives has been interpreted in its broadest sense. Thus, fillers and reinforcements are covered. This is in accord with the current connotation of 'additives'.

By virtue of the comprehensive nature of the task, the result is a lengthy book. It is, however, presented in a convenient practical format, by virtue of its physical dimensions, and the flexible vinyl-laminated cover. This makes a compact volume, justifying adequately the title Handbook. Its appearance is by no means formidable, and might even be described as deceptive, when the breadth of coverage is considered.

The editors have approached this subject, difficult because of its diversity and continuing rapid development, by engaging over twenty authors from Continental European industry. The first seventeen chapters are each devoted to an individual additive class. These are:

- Antioxidants
- Metal deactivators
- Light stabilizers
- PVC stabilizers
- Plasticizers
- Lubricants and related auxiliaries
- High-polymeric processing aids for PVC
- High-polymeric additives as impact modifiers
- Fillers and reinforcements
- Colorants
- Flame retardants
- Antistatic agents
- Fluorescent whitening agents
- Biostabilizers
- Chemical blowing agents
- Organic peroxides as cross-linking agents
- Nucleating agents

Each of these chapters is structured essentially along the same lines, commencing with an introductory technical-commercial outline, followed by a synopsis of the appropriate fundamental science. The subsequent main part deals with the additives and their use in individual thermoplastics. In many chapters the commercial products