

# BOOKS

**The Mathematical Theory of Diffusion and Reaction in Permeable Catalysts**, Vol. 2, Questions of Uniqueness, Stability and Transient Behavior, Rutherford Aris, Oxford University Press, New York, 1975. \$25.75.

This is the second part of the new and significant contribution of Professor Aris on the mathematical theory of diffusion and reaction in permeable catalysts. While the 444 pages of the first volume contain a comprehensive survey of the vast literature concerning the steady state behavior, the 214 pages of the second volume contain a well organized presentation of the existing theory concerning problems of uniqueness, stability and transient behavior of catalytic systems.

The scope of the problems covered in this volume is somewhat narrower than those covered in the first one. A major cause for this is the present lack of adequate mathematical tools for handling the general equations describing systems in which several reactions occur simultaneously. Thus, most of the results are for rather specific systems, such as a pellet in which a single reaction occurs.

The author presents in this book an admirable, systematic account of all the available mathematical tools of analysis and of the major results concerning the subject. The presentation is very clear and logical and enables the reader to obtain a clear perspective of the existing theory and of the areas which await further theoretical developments. The author covered thoroughly the chemical engineering literature and in addition introduces the reader to important related works of several applied mathematicians, and presents a concise introduction to the fascinating subject of diffusion waves and chemical structures. Similar to the first volume this book contains new unpublished results of the author and his students.

This book is a most important contribution to the profession. It is highly recommended to any individual interested in the theoretical analysis of these systems, and to every experimentalist who wishes to receive some theoretical guidance. Hopefully, the book

will receive the attention it deserves also from applied mathematicians and motivate them to obtain answers to some of the many existing unsolved problems.

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**Polymer Conversion**, W. A. Holmes-Walker, Halstead Press-John Wiley, N.Y., 1975. \$32.50.

This book is focused on the basics of polymer processing and polymer technology. Since it is somewhat lacking in the fundamentals of polymer science and engineering, it does not serve as a basic textbook in this area. However, it contains much useful quantitative data on material comparison and processing behavior. It therefore should be a useful supplementary text for those teaching in the processing area. Unfortunately, at the relatively high cost of this book, only the wealthy students could afford it!

The topics covered include a chapter on the comparison of the characteristics of polymer materials with those of other materials as metals and ceramics. The generalities of the flow behavior of polymers is then considered followed by four chapters concerned with polymer processing. Much of the material in these chapters is of a technological nature. The final two chapters focus on polymers used in combination with other materials and design criteria of plastics.

In summary, the book should have its greatest appeal to industrial engineers who wish to gain some insight into polymer processing and technology. The text is easy to read and quite well organized with useful reference tables, photographs and graphical data.

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**Chemical Process Economics, Second Edition**, John Happel and Donald G. Jordan, Marcel Dekker, Inc., New York. 511 pages. \$19.75.

This is a useful book. It contains many well thought out and well constructed examples. It is well organized and has obviously been written by people who understand their subject matter. It should be extremely useful at the senior level in most chemical engineering programs since it effectively provides students with the tools they need to incorporate economic consideration into process design. As the authors point out in their Preface, there are five major parts to this text:

1. Chapter One gives an overview of the chemical process industry and its characteristics. It is an excellent way to begin such a text and fills needs which are not met in other books of this type.

2. Chapters Two and Three are devoted to the principles of economic evaluation. Both contain many well described examples, which markedly enhances its usefulness as a text. Chapter Four is a review of various mathematical techniques.

3. Chapters Five and Six provide the numbers and the specific procedures needed to apply the principles described in Chapters Two, Three and Four.

4. Applications are treated by means of example in Chapters Seven and Eight. The importance of approximation procedures and their rational use is very well handled. The approximation procedures themselves have been collected in Appendix C, but they deserve a position of more importance in the book.

5. There are two other Appendices in addition to Appendix C. Appendix A is devoted to interest formulas and Appendix B is a well written discussion on inflation, a timely topic of immense importance.

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