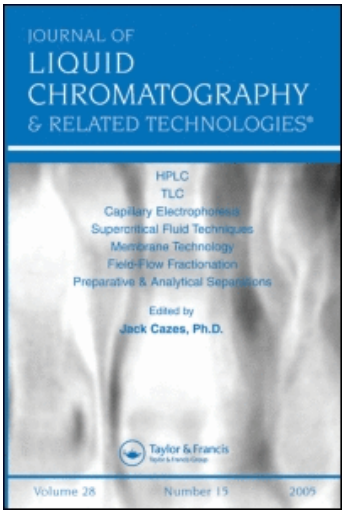

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Chemical Separations with Liquid Membranes

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THE BOOK CORNER

CHEMICAL SEPARATIONS WITH LIQUID MEMBRANES, R. A. Bartsch, J. D. Way, eds., ACS Symposium Series Volume 642, American Chemical Society, Washington, DC, 1996, 422 pp., $119.95.

"The ACS Symposium Series was first published in 1974 to provide a mechanism for publishing symposia quickly in book form. The purpose of this series is to publish comprehensive books, developed from symposia, which are usually snapshots in time of the current research being done on a topic, plus some review material on the topic. As a rule, only original research papers and original review papers are included in the volumes. Verbatim reproductions of previously published papers are not accepted."

So, according to the above ACS statement, the book is original work which was presented in two symposia sponsored by the Division of Industrial and Engineering Chemistry in 1995. Membranes that isolate distinct solutions and permit selective passage of chemical species are fundamental features of life processes. Considerable success has been achieved in the development of artificial membranes for the separation of a wide variety of ionic and molecular species.

The liquid membrane system involves an immiscible liquid that serves as a semipermeable barrier between two liquid or gas phases. The efficiency and selectivity of transport across the immiscible liquid may be markedly enhanced by the presence of a carrier in the membrane phase that reacts rapidly and reversibly with the desired chemical species. Liquid membrane systems have been, and are being, studied extensively by researchers in such fields as analytical, inorganic, and organic chemistry, chemical engineering, biotechnology, and biomedical engineering.

The 27 chapters of this book describe separations of metal ions, anionic species, organic molecules, and gas mixtures that involve liquid membrane processes. An overview chapter provides an introduction to the various liquid membrane configurations, transport mechanisms, and experimental techniques.

A tribute chapter follows, summarizing the many contributions of Norman N. Li in the field of membrane science. The remainder of the book is divided into sections on theory and mechanism (6 chapters), carrier design, synthesis, and evaluation (6 chapters), and applications in chemical separations (13 chapters).

The applications section covers a very broad range of separation processes, including separation of carbon dioxide from nitrogen; unsaturated from saturated hydrocarbons in both the gaseous and liquid states; individual transition and heavy metal cations, such as mercury and lead, including the field testing of a system for copper recovery from mine solutions; selenium from contaminated waters; radiotoxic species such as cesium, uranium, and plutonium from nuclear wastes; and sugars from aqueous solutions.

Drs. Bartsch and Way (the editors) should be commended for a job well done. The book should be used as a reference for everyone interested in separation.

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Reviewed by
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Book Corner Editor

CHIRAL SEPARATIONS, APPLICATIONS AND TECHNOLOGY, S. Ahuja, ed., American Chemical Society, Washington, DC, 1997, 349 pp., $99.95.

The separation of a racemic mixture into its enantiomers has gained a tremendous momentum in the last two decades. Enantiomers are compounds that have the same physical properties and chemical structures which are not

superimposable. As such, they are very difficult to separate and require, for their separation, specially fabricated chiral or discriminating materials or derivatization of the enantiomers to give stereoisomers which can be resolved easily. The present book presents the reader with state-of-the-art approaches to the resolution of a racemic mixture.

Chiral separation methods are extensively discussed in this book, and numerous examples from fields such as pharmaceuticals, agriculture, and food have been included (Chapters 5-9).

Chapter 1 is an overview. Chemical synthesis is a favorite route of preparation of enantiomers, especially when a large amount of a given enantiomer is required. E. J. Corey discusses catalytic enantioselective Diels-Alder reactions and enantioselective additions of carbon to carbonyl groups in Chapter 3. Other examples are discussed in Chapter 2. Enzyme-catalyzed reactions are ideally suited to production of single enantiomers because the interaction of proteins with small chiral molecules, in general, is highly stereospecific and shows clear preference for single enantiomers (Chapter 4).

Chapter 5 deals with stereoselective analysis in crop protection and discusses weed, disease, and insect control. Chapter 6, Chiral Separation Methods, is a chapter which should have been placed at the beginning of the book, and not in between crop protection and development of chiral methods (Chapter 7). Chapter 8 discusses renal elimination of drugs while Chapter 9 deals with analyses of food components and Chapter 10 with chromatography as a separation tool.

I feel that the editor selected good topics and good authors, but the organization of the book, i.e., order of chapters, flow of topics, is not the best. The book ends with Chapter 11, which is a discussion of enantioseparation using liquid membranes, an interesting topic. Overall the book is well written with a wealth of information and should be of help to analytical chemists in different fields.

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Reviewed by
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Book Corner Editor

HANDBOOK OF DRUG ANALYSIS, Applications in Forensic and Clinical Laboratories, R. H. Liu, D. E. Gadzala, American Chemical Society, Washington, DC, 1997, 367 pp., $129.95.

This book deals with a timely topic which is drawing great attention these days. The analysis of drugs of abuse has progressed in the last two decades. As stated in the Forword of the book written by Benjamin A. Perillo, Associate Deputy Assistant Administrator, Office of Science and Technology, Drug Enforcement Administration, U.S. Department of Justice, "From the early days of the analyst identifying controlled substances by using color tests, a microscope, and thin-layer chromatography, the profession has progressed to meet the requirements of timeliness and absolute specificity. Ultraviolet (UV) spectrophotometry and then infrared spectrophotometry (IR) became the norms in the middle to late 1970's. In the 1980's, gas chromatography-mass