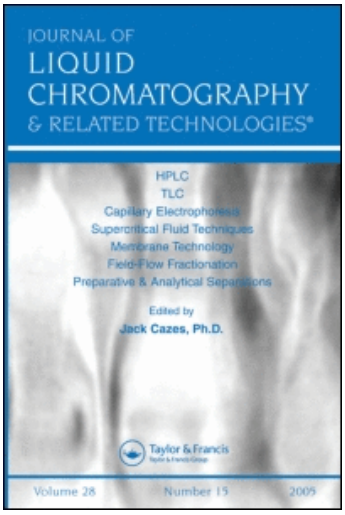

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A Review of: Molecular Basis of Chromatographic Separation

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THE BOOK CORNER

CAPILLARY ELECTROPHORESIS IN BIOTECHNOLOGY AND ENVIRONMENTAL ANALYSIS, H. Parvez, P. Caudy, S. Parvez, P. Roland-Gosselin, EDS., Volume 5 of Progress in HPLC-HPCE, VSP, Utrecht, The Netherlands, 1997, 484 pp., $143.00.

This volume of Progress in HPLC-HPCE is a collection of papers by different authors. According to the editors "The collection of papers presented in Volume 5 of Progress in HPLC-HPCE tries to evaluate the true impact of high performance capillary electrophoresis (HPCE) today on analytical biotechnology and environmental analysis." The book is divided into five main topics, technological innovations, protein and peptide analysis, HPCE in drug abuse and drug interactions, HPCE of carbohydrates, chiral and enantiomers, and HPCE of anions and cations.

The section on technological innovations deals mainly with CE/MS and CE/LIF, and neglects to mention other multidimensional techniques such as HPLC/HPCE and CE/NMR.

In the section about laser induced fluorescence detection (LIF) they neglect to mention the use of a KrF laser as a LIF detector in CE for native proteins and peptides that contain an aromatic amino acid.

The second section deals with protein and peptide analysis. The chapters are dedicated to the analysis of protein folding, determination of phosphorylated histone H1 variants, process monitoring in biotechnology, and peptide mapping of monoclonal antibodies and biologically active peptides.

Drug abuse and drug interactions are discussed in Section Three. The application of HPCE is investigated for the screening of drugs of abuse. This new use of HPCE may lead to considerable benefits in biomedical analysis. The determination of protein-drug binding by capillary zone electrophoresis, as well as assay of catecholamines and other transmitters, are further additions to the utility of this new analytical tool. The analysis of DNA analogs and antisense therapeutics are further proofs for the future adaptation of HPCE to clinical applications.

Section Four deals with separation of carbohydrates and chiral mixtures. The chapter on separation of enantiomers is very good and comprehensive. The last section is a chapter dealing with the separation of anions and cations.

Overall, the book is good. However, it is not up-to-date on some of the topics, as mentioned earlier. Also, some of the figures are of poor quality, for example, the figures on pages 77 and 78. On page 280 the figure caption does not give the pH value.

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Editor
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MOLECULAR BASIS OF CHROMATOGRAPHIC SEPARATION, E. Forgács, T. Cserháti, CRC Press, Boca Raton, Florida, 1997, 244 pp., $110.00.

The authors, in the Introduction of the book, state, "Chromatographic techniques have reached the point where the average chromatographer can achieve standard spectacular results using empirical rules and experiences. However, it is more and more obvious that successful separation of various solutes (selection of the best separation technique, stationary and mobile phase

composition, etc.) requires a profound knowledge of the effects of molecular parameters of solutes, supports, and mobile phases and their possible interactions on retention. The rational design of an optimal separation process involves the expert application of such knowledge."

This is an absolutely true statement with which I agree. In order to achieve optimum separation, i.e., baseline separation of a mixture, in a minimum amount of time, the analyst needs to know the interaction between the solute, the mobile phase, and the stationary phase. Trial and error experimentation is tedious, time consuming, expensive, and is not for the knowledgeable separation scientist. The authors tell us that, "The objectives of the present monograph are the compilation and concise evaluation of the newest results in this rapidly developing domain of chromatography, brief enumeration of the methods applied, critical discussion of the results, and elucidation of the impact of molecular structure on the optimization of a wide range of chromatographic separations. The book is meant to be sufficient in terms of the needs of the average professional who intends to work in this interesting field."

In general, the book covers practical and molecular aspects of modern separation techniques; presents current methods and applications; explains how to select the most efficient chromatographic method by understanding the molecular basis of separation; discusses current research such as structure-retention relations, separation and optimization techniques, and retention prediction; discusses applications and potential applications in industry, biotechnology, environmental science, forensic sciences, and other fields; and contains valuable data for researchers, practicing chromatographers, and students.

The book is contains three chapters. The first one discusses adsorption phenomena and molecular interactions in both gas and liquid chromatography. This chapter is highly theoretical and filled with 73, sometimes tortuous, equations. Although the authors explain and simplify the discussion, some might find it hard to follow.

Chapter 2 deals with gas chromatography, while the bulk of the book (about 150 pages) is devoted to liquid chromatography (thin layer and high performance). These two chapters (2-3) deal with fundamentals and supports. The HPLC discussion covers normal phase with a nice discussion of silica particles and their properties, reversed-phase, graphitized carbon, metal oxides, and new RPHPLC stationary phase materials.

Overall, this is a good book. It is, however, highly theoretical with over 485 equations. The section on cyclodextrins and enantiomer separation is relatively weak and inadequate. It is recommended for those who enjoy theory

and who would like to understand how separation in GC and HPLC can be optimized by understanding simple facts such as molecular structure and properties of the solute, stationary and mobile phases and the interaction between them.

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