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Book Review

Advances in Chromatography, Vol. 34, edited by P.R. Brown and E. Grushka; Marcel Dekker, New York, Basel, Hong Kong, 1994, XVIII+435 pp., price US\$ 165.00, ISBN 0-8247-9087-1.

The 34th member in the successful series of *Advances in Chromatography* includes 7 chapters dealing with the latest news of various topics of separation science.

Capillary electrophoresis (CE) – the youngest among the electrophoretic methods – has been used for several applications. Two important fields of such applications are discussed in detail in this book.

The analysis of proteins in capillaries by electrophoresis is one of the most problematic tasks. The authors of Chapter 1 (O.W. Reif, R. Lausch and R. Freitag) give a short review of the different modes of CE and discuss the difficulties in sample preparation, injection, detection and the effect of capillary coating on the separation. The other half of the chapter provides a complete summary of applications for serum and protein separation performed to date with zone electrophoresis, isoelectric focusing, isotachopheresis and gel electrophoresis (56 pages). Figures from recently published papers show the success and advantages of the CE techniques.

The investigation of carbohydrates with CE needs special electrolyte systems. CE of carbohydrates is discussed in Chapter 4 (74 pages). The author (Z. El Rassi) describes the major considerations that are important in the capillary electrophoresis of sugars and sugar complexes (e.g. borate- or metal cation complexes) followed by the discussion of the capillary conditions and the detection systems. The methodologies for the separation of monosaccharides, polysaccharides, glycoproteins, glycopeptides, glycosaminoglycans and glycolipids are the topics of the second part of this chapter.

Chapter 2 (52 pages) gives an overview of gas chromatography–matrix isolation–infrared spectrometry (GC–MI–IR), a hyphenated GC technique for the analysis of natural products and compounds occurring in natural products. After a detailed description of various hardware setups, the authors (W.M. Coleman III and B.M. Gordon) show the experimental realization of infrared spectrometric analysis of matrix isolated substances. Influences and changes on the IR spectra are discussed showing tables of IR data of selected compounds (alkenes, ketones, lactams, amides, etc.). Examples of identifications of minor components of complex natural essential oils are cited showing the low-nanogram-sensitivity capability of this technique.

Two chapters of the book deal with theoretical aspects of separation sciences.

The peak overlap in chromatography is discussed in Chapter 3 (author J.M. Davis, 68 pages) with statistical modeling. Testing of one-dimensional and two-dimensional overlap theories has been done by computer simulations and experimental data. The chapter provides a full series of the descriptive equations and the limitations are also discussed. A critical review of various methods (Fourier-type, Poisson-type theories from different authors) are given with sufficiently selected references.

Chapter 7 starts with the statement: “*Uncertainty is omnipresent in data derived from experimental measurements.... The aims of this chapter are to elucidate the uncertainty structure of quantitative analysis and to describe application of this concept to system optimization in separation science*” (77

pages). Describing the errors from measurement and signal processing steps in high performance liquid chromatography (HPLC) and CE, the authors (Y. Hayashi and R. Matsuda) discuss the stochastic properties of signals and the uncertainty structure of quantitative analysis giving the theoretical approaches to experimental results. The fundamentals of optimization and the review of applications of FUMI (function of mutual information) and MEI (measurement-elicited information) give the authors the opportunity to show their skill in this important statistical approximation. The last session of this chapter describes the factors that might affect precision and throughput of separation procedures.

The remaining two chapters of the book summarize important applications of supercritical fluid chromatography (SFC) and HPLC.

Chapter 5 is an excellent summary of environmental applications of SFC (58 pages). Analysis and detection with different methodologies of the four large groups of environmentally harmful compounds, polychlorinated biphenyls, pesticides and herbicides, phenols and polynuclear aromatic hydrocarbons are

treated by the authors (L.J. Mulcahey, C.L. Rankin and M.E.P. McNally) showing the rapid development of SFC in various examples.

The HPLC investigations of homologous series of simple organic ions are presented in Chapter 6 (38 pages). After a short introductory summary of the relevant parameters in chromatography, the author (N.E. Hoffman) deals with the reversed-phase, ion-exchange and ion-exclusion chromatography of the organic ions.

The collection of the chapters show the high demands of the editors (P.R. Brown and E. Gruscha) in providing a comprehensive literature on recent advances in chromatography. Both students and qualified researchers can use the book with benefit as a reference and/or handbook for the selected topics. The extensive reference lists are adequate and the figures give proper illustration of the results published recently.

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