



ELSEVIER

Journal of Chromatography A, 825 (1998) 205–206

---

---

JOURNAL OF  
CHROMATOGRAPHY A

---

---

---

## Book review

---

*Handbook of Capillary Electrophoresis, 2nd Edition*, edited by James P. Landers, CRC Press, Boca Raton, FL, ISBN 0-8493-2498-X; 894 pp.; price US\$ 139.

This second edition of the “Handbook of Capillary Electrophoresis” provides an updated reference which covers many aspects of capillary electrophoresis (CE) in around 900 pages. The production of a second edition of the “Handbook” was definitely a good idea, given the fast pace at which CE is now developing. The sheer bulk of this volume amazes me, since it was not so many years ago when you could scan the pages of a few journals each month to find the one or two papers describing the latest in CE developments.

The book is divided into five sections: Modes, occupying the first 153 pages, includes chapters on an Introduction to CE (R.P. Oda and J.P. Landers), Micellar Electrokinetic Chromatography (J.R. Mazzeo), CE Separation of Enantiomers by Cyclodextrin Array Chiral Analysis (A. Guttman), Capillary Isoelectric Focusing (R. Rodriguez-Diaz, T. Wehr, M. Zhu and V. Levi), Theory and Practice of Electrochromatography (M.M. Dittman and G.P. Rozing). The section on Analytes (190 pages) covers Capillary Ion Electrophoresis (W.R. Jones), Analysis of Small Organic Molecules (K.D. Altria), CE of Peptides (T. van de Goor, A. Apffel, J. Chakel and W. Hancock), CE of Proteins (T. Pritchett and F.A. Robey), Carbohydrate Analysis by CE (J.D. Olechno and J.A. Nolan) and Separation of DNA by CE (K.J. Ulfelder and B.R. McCord). Essential Aspects of CE (114 pages) includes chapters on Optical Detection Techniques for CE (S.L. Pentoney, Jr. and S.V. Sweedler), Electrochemical Detection in CE (C. Haber), Data Analysis in CE (B.J. Wanders), Effects

of Sample Matrix on CE Analysis (Z.K. Shihabi) and On-Line Sample Preconcentration for CE (D.S. Burgi and R.L. Chien). The Applications section (178 pages) covers CE for the Analysis of Single Cells: Electrochemical, Mass Spectrometric and Radiochemical Detection (F.D. Swanek, S.S. Ferris and A.G. Ewing), CE for the Analysis of Single Cells: Laser-Induced Fluorescence Detection (E.S. Yeung), Capillary Gel Electrophoresis for Large-Scale DNA Sequencing: Separation and Detection (N.J. Dovichi), CE for the Analysis of Drugs in Biological Fluids (R.P. Oda, M.E. Roche, J.P. Landers and Z.K. Shihabi), Use of CE for Binding Studies (F.A. Robey), Immunoassays and Enzyme Assays Using CE (N.M. Schultz, L. Tao, D.J. Rose Jr., R.T. Kennedy) and Clinical Applications of CE (R.P. Oda, V.J. Bush and J.P. Landers). The final section, Specialized Aspects of CE (189 pages) includes chapters on Capillary Surface Modification in CE (A.M. Dougherty, N. Cooke and P. Shieh), Improved CE Separations Associated with Controlling Osmotic Flow (C.S. Lee), Continuous Separations by Electrophoresis in Rectangular Channels (P.F. Gavin and A.G. Ewing), Two-Dimensional Liquid Chromatography-CE (D.J. Jeffrey, T.F. Hooker and J.W. Jorgenson), CE-Mass Spectrometry (J.C. Severs and R.D. Smith), Microfabricated Devices for Performing CE (S.C. Jacobsen and J.M. Ramsey) and Fraction Collection with Micro-Preparative CE (M.A. Strausbauch and P.J. Wettstein). There are also appendices showing practical calculations and troubleshooting. As can be seen from this list, there is good coverage of a wide variety of CE topics, and so perhaps one should be lenient when judging the claim on the book cover that “This fully updated Second Edition covers all areas of interest . . .”. Despite this rather

extravagant assertion, there is surprisingly little on quantitative aspects of CE, method validation or method transfer; some of these topics do get brief mention, but a more complete coverage in these areas is definitely warranted.

As with almost any multi-author volume there are some significant differences in style, and the chapters vary in style from tutorial, to critical review with lots of discussion, to more comprehensive reviews with less discussion. Still, in every chapter there are adequate references to point the reader towards the appropriate primary literature such that they can pursue a topic further. Perhaps this volume could have been improved by a more vigorous effort at standardization between chapters. As an example, in some chapters all the experimental details are given in the figure legends which makes for easy and informative reading, however, in other chapters the figure legends are very brief and peak assignments may be missing, so that the utility of the figures is reduced. It should be noted that this book is generously illustrated, and most of the figures have reproduced well. Improved proofreading would have been useful, for example  $\mu$  turned into “m” on many occasions, changing “micro” into “milli” (e.g. in Table I of the introductory chapter, or in the figure legends in the small organics chapter), while millimeters (mm) were sometimes transformed into millimolar concentrations (mM). Such mix-ups in units could be quite confusing to a reader who was new to CE.

The strength of this book is that in this one volume you can find useful information on a wide variety of common and not-so common CE topics. I found some of the “Specialized Aspects” chapters such as those on 2-dimensional separations, CE–MS or microfabricated devices most enjoyable and informative. These are topics at the forefront of CE research, and in each case the future potential is clearly presented. The references are commendably up to date with a few 1996 citations in most chapters, important for contributions on the fast-moving fields described in this section. In the “Analyte” section, I thought the DNA and carbohydrates chapters stood out amongst a generally high-quality group of contributions. There were also interesting contributions on subjects which are less frequently discussed, such as data analysis or electro-

osmotic flow control to improve resolution. Most of the contributors took a fairly broad view of their assigned field, although there were some exceptions such as the chapter on chiral separations, where 12 of the figures were reproduced from just two of the author’s own papers.

Of all the sections of this book, the only one which I was disappointed by was the “Modes” section. Some of the contributions such as those on micellar electrokinetic chromatography or isoelectric focusing are nicely written, but in general the reader gains only a superficial understanding of how the individual modes of capillary electrophoresis function. This wouldn’t be so bad if there weren’t claims on the rear cover about this volume “. . . providing easy access to all aspects of CE theory and basic principles . . .” and that it “facilitates the understanding of the theory of electrophoresis” – this seems to me to be rather exaggerated. I was particularly disappointed by the first chapter which is an introduction to CE and which presumably would mainly be of interest to beginners; there are really too many minor errors such as units being mixed up or symbols being used for different things at different points in the chapter (changes in symbol usage also occur between chapters, but in a multi-author volume that is hard to avoid). Still, there are other papers and books available which can fill in the theoretical gaps left by this volume, and so these weaknesses do not unduly detract from a generally useful book.

Despite the few reservations described above, I am certainly glad to be in possession of a copy of this handbook. My colleagues seem happy too, since I am frequently loaning it out to the curious who want to know some more about this or that aspect of CE. One great feature of this book is the price, only \$139 (in the US); this works out at around 6 cents per page, and that has got to be a bargain for a hardcover text! I can only applaud the courage of the editor who took on the task of melding together the 30 chapters comprising this book to produce a timely, up to date volume. It is perhaps the most complete work on CE as it is currently practiced, and in spite of a few flaws I would recommend this volume to anyone who needs a wide-ranging overview of CE.

Wilmington, DE, USA

D.K. Lloyd