Advances in Liquid Chromatography

35 Years of Column Liquid Chromatography in Japan

METHODS IN CHROMATOGRAPHY

Editor-in-Charge

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Advances in Liquid Chromatography

35 Years of Column Liquid Chromatography in Japan

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T. Hanai & H. Hatano

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FOREWORD

Professor Hiroyuki Hatano has, with the assistance of Dr. Toshihiko Hanai, made himself a nice present for his 70th birthday by editing a book on “Advances in Liquid Chromatography.”

Although High-performance Liquid Chromatography is already about 30 years old, a number of interesting new developments in methodology, and especially in applications, are still going on. The book itself concentrates on technical developments rather than progress in application, although examples of applications are used to illustrate the progress of the techniques. The choice of topics and the extent of the treatment is well balanced. Of special interest is a survey on less commonly used detection methods (5 chapters), on liquid chromatographic techniques applied in technological analysis (1 chapter) and on total analysis (2 chapters). Special attention is given to microcolumn high performance (1 chapter) and to recent developments in the field of stationary phases from chiral to silica packings (5 chapters). Aspects of the experimental practice are discussed in a paper about on-line degassing of the eluent. It was not the aim of this book to give a full treatment of modern liquid chromatography, but rather to discuss a number of less popular but nevertheless important features of liquid chromatography, all of which should receive more attention in the chromatographic community.

The chapters are written by recognized experts in the different fields and give excellent information useful for scientists who want to

consider the application of the newest developments in their work, and for teachers who would like to keep their courses up-to-date. The choice of the topics discussed and the extent of the treatment is well balanced. I fully recommend the study of *Advances in Liquid Chromatography* to everybody who wants to work with liquid chromatography on a solid scientific basis.

Josef F. K. Huber, Prof. Dr. Dr. h. c. mult
University of Vienna

PREFACE

This is a contemporary review of selected subjects in liquid chromatography, especially the technical developments. This book is for troubleshooting to solve complicated analytical problems.

As the preparation of the book coincided with the thirty-fifth anniversary of The Research Group on Liquid Chromatography in Japan, the opening chapter pays tribute to the history of modern liquid chromatography in Japan. Furthermore, the future demand in analytical chemistry is described. The following chapters are written by well-known authorities in each specialized area of chromatographic methods. The second chapter deals with the use of the amino acid analyzer. The third chapter pursues a liquid chromatograph suitable for the analysis of glycated albumin.

The detector sensitivity, the details of coulometric (Chapter 4), chemiluminescence (Chapter 6), and laser-based detection (Chapter 7) methods are described. The degassing system (Chapter 8) is pursued to achieve a higher detection sensitivity. To solve the difficult problem of analyzing radicals, electron spin resonance is used as the detector (Chapter 5). The infrared spectroscopic detection system combined with a micro scale separation (Chapter 10) is described for a qualitative analysis method. The miniaturization of the liquid chromatograph is pursued to answer environmental demands (Chapter 9).

Selective separation can be achieved using a suitable column packing material. The three types of chiral selective phases are

described. Chapter 11 deals with the synthesized monomer-based chiral phase, Chapter 12 pursues the synthesized polymer-based chiral phase, and Chapter 13 the naturally occurring chiral phase. A reproducible separation can be performed using stable packing materials. Chapter 14 describes organic polymer based packing materials, and Chapter 15 stable bonded silica gel packing materials.

The contents of this book were written by experienced practitioners to give introductory and comprehensive information to people who are interested in improving their capability to handle liquid chromatographic separation.

The editors would like to thank the authors for their contributions. Many thanks to Dr. Grace Tan of World Scientific Publishing Co.

Yokohama T. Hanai
Kyoto H. Hatano

CONTENTS

Foreword	v
Preface	vii
1. Advances in Chromatography for Technological Analysis; Chemical Speciation and Chemical Characterization	1
<i>Hiroyuki Hatano</i>	
1.1. Development of Instrumental Methods of Chromatography for Chemical Speciation and Chemical Characterization	
1.2. Chemical Speciation of Free Radicals with High-performance Liquid Chromatography and Electron Resonance Spectroscopy	
1.3. Chemical Characterization of Enzymic Precursor Protein, Activated Enzymes and Inactive Enzyme Protein with High-performance Liquid Chromatography	
References	

2. Development of the Amino Acid Analyzer in Japan 11

Fumiko Yamamoto and Sigetake Ganno

- 2.1. Introduction
- 2.2. The Precursory Work
- 2.3. The Birth of the Amino Acid Analyzer
- 2.4. Amino Acid Analyzer in 1960s
 - 2.4.1. The progress of resin technology for accelerated analysis
 - 2.4.2. Mechanical advances for accelerated analysis
- 2.5. Automated Amino Acid Analyzer in 1970s
 - 2.5.1. Completion of automated system by introduction of a computer
 - 2.5.2. Improvement in resin technology and analytical system
- 2.6. Latest Amino Acid Analyzer
- References
- Patents

3. Glycated Albumin Analyzer 33

Takateru Uchida, Takuji Kozuma, Keiko Yasukawana and Kenji Shima

- 3.1. Introduction
- 3.2. Chromatographic System
- 3.3. Analytical Evaluation
- 3.4. Clinical Evaluation
- 3.5. Conclusion
- Acknowledgment
- References

4. Liquid Chromatography with Coulometric Detector 43

Yoshinori Takata

- 4.1. Introduction
- 4.2. Principle of Detection
- 4.3. Detector Cell
- 4.4. Apparatus for HPLC-Coulometry
- 4.5. Detection Techniques
 - 4.5.1. Primary constant potential coulometric detection
 - 4.5.2. Secondary constant potential coulometric detection
 - 4.5.3. Indirect coulometric detection
 - 4.5.4. Trace analysis with mini-column preconcentration
 - 4.5.5. Elimination of interfering dissolved oxygen by using sulfite
 - 4.5.6. The pH control column
- 4.6. Applications
 - 4.6.1. Determination of trace heavy metal ions in the boiling water reactor coolant
 - 4.6.2. Cation-exchange chromatography of rare earths
- 4.7. Conclusion
- References

5. HPLC-ESR Detection of Free Radicals 75

Fumio Moriya and Keisuke Makino

- 5.1. Introduction
- 5.2. Separation and Detection of Stable Radicals by Combination of Liquid Chromatography and ESR Spectroscopy (LC-ESR)

- 5.3. Chemical Derivatization of Short-lived Radicals for HPLC-ESR by the Spin Trapping Method
- 5.4. Separation of MNP Spin Adducts
- 5.5. Separation of Spin Adducts from Amino Acids and Imino Acids
- 5.6. Separation of Spin Adducts from Dipeptides and Tripeptides
- 5.7. Some of the Information on the Structures and Properties of Free Radicals Obtained in the Studies on γ -Radiolytic Aqueous Systems by the Spin Trap HPLC-ESR Method
 - 5.7.1. Separation and discrimination of diastereoisomeric radicals
 - 5.7.2. Other significant information for free radicals
- 5.8. Application of the HPLC-ESR Method
- 5.9. Concluding Remarks
- Acknowledgments
- References

6. LC-Chemiluminescence Detection

99

Kenichiro Nakashima and Kazuhiro Imai

- 6.1. Introduction
- 6.2. CL Reactions
- 6.3. CL Detection in LC
 - 6.3.1. Luminol CL reaction
 - 6.3.2. ABEI CL
 - 6.3.3. Luminol CL
 - 6.3.4. DPH CL
 - 6.3.5. Peroxyoxalate CL reaction
 - 6.3.6. TCPO-CL
 - 6.3.7. TDPO-CL

6.3.8. Lucigenin and lophine CL
References

7. Liquid Chromatography and Capillary Electrophoresis with Laser Fluorometric Detection **123**

Totaro Imasaka

- 7.1. Introduction
- 7.2. Fluorometry Using Nitrogen-Laser-Pumped Dye Laser
 - 7.2.1. Conventional column liquid chromatography
 - 7.2.2. Microcolumn liquid chromatography
- 7.3. Semiconductor Laser Fluorometry
 - 7.3.1. Conventional column liquid chromatography
 - 7.3.2. Capillary electrophoresis
 - 7.3.3. Micellar electrokinetic chromatography
- 7.4. Summary
- References

8. Advantages of On-line Degassing **151**

Akihiko Nagai

- 8.1. Introduction
- 8.2. Comparison of Degassing Methods
- 8.3. On-line Degassing Method
- 8.4. Effect of Degassing
 - 8.4.1. Improved stability of refractive index detector
 - 8.4.2. Improvement of sensitivity in fluorescence detection

- 8.4.3. Improvement in UV detection
- 8.4.4. Improvement of sensitivity in electrochemical detection
- 8.4.5. Degassing for optimizing pump performance
- 8.4.6. Improvement of vitamin C aqueous stability
- 8.5. Conclusion
- References

9. Microcolumn Liquid Chromatography 169

Toyohide Takeuchi and Daido Ishii

- 9.1. Introduction
- 9.2. Instrumentation
 - 9.2.1. Pump
 - 9.2.2. Injection
 - i. Valve injection
 - ii. Pre-column enrichment
 - 9.2.3. Separation column
 - 9.2.4. Detection
- 9.3. Efficient Use of Microcolumns in LC
 - 9.3.1. Direct combination with FABMS
 - 9.3.2. On-column fluorimetric detection
 - 9.3.3. Use of cyclodextrin as mobile phase additive for enantiomeric resolution
- 9.4. Open-tubular Capillary LC
 - 9.4.1. Background of open-tubular columns
 - 9.4.2. Theoretical aspects
- 9.5. Unified Chromatography
- 9.6. Perspective of Microcolumn LC
- References

10. Microcolumn Liquid Chromatography in Hyphenated Techniques (Microcolumn LC/FTIR) 199

Kiyokatu Jinno and Chuzo Fujimoto

- 10.1. Introduction
- 10.2. Flow-cell Approach
- 10.3. Solvent Elimination Approach
- 10.4. Other Approaches
- References

11. Recent Progress of Chiral Stationary Phases for HPLC 213

Naobumi Oi

- 11.1. Introduction
- 11.2. Phases Based on Hydrogen-bonding
- 11.3. π -Donor and π -Acceptor Phases
- 11.4. Ligand Exchange Phases
- 11.5. Host-guest Complexation Phases
- 11.6. Conclusion
- References

12. Chiral Synthetic Polymer Packings 231

Eiji Yashima and Yoshio Okamoto

- 12.1. Introduction
- 12.2. Polymethacrylates
 - 12.2.1. Poly(triphenylmethyl methacrylate)

- 12.2.2. Poly(diphenyl-2-pyridylmethyl methacrylate)
- 12.2.3. Other polymethacrylates
- 12.3. Poly(meth)acrylamides
- 12.4. Polyamides
- 12.5. Synthetic Polymers with Chiral Cavities
- 12.6. Other CSPs
- 12.7. Conclusion
- References

13. Protein-bonded Chiral Packings and Their Application **255**

Yoshiya Oda and Toshinobu Miwa

- 13.1. Introduction
 - 13.1.1. Development of egg white protein-bonded phases
 - 13.1.2. Application of egg white protein-bonded phases
- 13.2. Egg Proteins for Chiral Packings
 - 13.2.1. Ovomucoid
 - 13.2.2. Avidin
 - 13.2.3. Flavoprotein
 - 13.2.4. Conalbumin
 - 13.2.5. Others
- 13.3. Characteristics of Packings
 - 13.3.1. Bonding conditions
 - 13.3.2. Chromatographic conditions
 - Ovomucoid
 - Avidin
 - Conalbumin
 - 13.3.3. Modified protein-bonded chiral columns

- 13.4. Application of Protein-bonded Chiral Columns
 - 13.4.1. Application of ovomucoid-bonded columns
 - 13.4.2. Direct injection of plasma samples onto protein-bonded columns
- 13.5. Column-switching Method Combined with Protein-bonded Chiral Columns
 - 13.5.1. Background
 - 13.5.2. New column-switching system combined with an ovomucoid column
 - 13.5.3. Combination with mass spectrometry
- 13.6. Conclusion
- Acknowledgments
- References

14. Organic Polymer Packings

289

Toshihiko Hanai

- 14.1. Introduction
- 14.2. Classification of Organic Polymer Gels
- 14.3. Application
 - 14.3.1. Packings for hydrophobic interaction
 - 14.3.2. Packings for non-aqueous size exclusion liquid chromatography
 - 14.3.3. Packings for aqueous size exclusion liquid chromatography
 - 14.3.4. Packings for ion-exchange liquid chromatography
- 14.4. Conclusion
- Acknowledgment
- References

15. Synthesis and Properties of Stable Bonded Silica Gel Packings and the Performance 307

Toshihiko Hanai

- 15.1. Introduction
- 15.2. Method of Silica Gels Synthesis
- 15.3. Chemical Modification of Silica Gel Surface
 - 15.3.1. Mono- or poly-functional silanization
 - 15.3.2. Measurement of surface activity of silanized silica gels
- 15.4. Measurement of Stability of Modified Silica Gels
 - 15.4.1. Stability in acidic solution
 - 15.4.2. Stability in basic solution
 - 15.4.3. Performance of stable silica gel column
- 15.5. Computational Chemical Analysis of the Structure of Silica Gel
 - 15.5.1. Construction of silica gel by computational chemical method
 - 15.5.2. Estimation of chemically modified site of surface silanol groups
- 15.6. Computational Chemical Analysis of the Selectivity of Modified Silica Gel
- 15.7. A Quantitative Structure-retention Relation (QSRR) in Reversed-phase Liquid Chromatography
 - 15.7.1. QSRR based on the properties of polyaromatic hydro-carbons
 - 15.7.2. QSRR based on the properties of alkylbenzenes
- References