## Contents

**Foreword**  James W. Jorgenson  iii  
**Preface**  v  
**Contributors**  xi  

### PART I  OVERVIEW

1  Capillary Electrophoresis: Introduction and Assessment  3  
   *Barry L. Karger and Frantisek Foret*  
2  Micellar Electrokinetic Chromatography  65  
   *Shigeru Terabe*  
3  Conventional Isoelectric Focusing and Immobilized pH Gradients: An Overview  89  
   *Pier Giorgio Righetti and Marcella Chiari*

### PART II  BUFFER SYSTEM

4  The Buffer in Capillary Zone Electrophoresis  119  
   *George M. Janini and Haleem J. Issaq*  
5  Organic Solvents in Capillary Electrophoresis  161  
   *Ernst Kenndler*
6 Controlling Migration Behavior in Capillary Electrophoresis: Optimization Strategies for Method Development 187
Morteza G. Khaledi, Rachhpal S. Sahota, Joost K. Strasters, Changyu Quang, and Scott C. Smith

7 Dynamic Changes of Electrolyte Systems in Zone Electrophoresis 261
Petr Boček and Petr Gebauer

PART III  CAPILLARY COLUMN

8 Chemical Derivatization of Fused Silica Capillaries 287
Fred E. Regnier and Dan Wu

9 Technology of Separation Capillaries for Capillary Zone Electrophoresis and Capillary Gel Electrophoresis: The Chemistry of Surface Modification and Formation of Gels 311
Gerhard Schomburg

10 Capillary Electrophoresis with Coated Capillaries 357
Jörg Kohr and Heinz Engelhardt

11 Capillary Zone Electrophoresis of Biopolymers with Hydrophilic Fused-Silica Capillaries 383
Ziad El Rassi and Wassim Nashabeh

12 Covalent Surface Modification for Capillary Electrophoresis: Characterization and Effect of Nonionic Bondings on Separations in Capillary Electrophoresis 435
Ann M. Dougherty and Mark R. Schure

PART IV  INSTRUMENTATION

13 Direct Control of Electroosmotic Flow in Capillary Electrophoresis by Using an External Electric Field 475
Pei Tsai and Cheng S. Lee

14 Semipreparative Capillary Electrophoresis and Its Advantages 489
Takao Tsuda

15 Micropreparative Capillary Electrophoresis 509
Chuzo Fujimoto and Kiyokatsu Jinno

16 Mass Spectrometric Detection for Capillary Electrophoresis 525
Richard D. Smith and Harold R. Udseth

17 Capillary Zone Electrophoresis–Mass Spectrometry: Continuous Flow Fast-Atom Bombardment and Electrospray Ionization 569
Kenneth B. Tomer

18 Optical Detection Schemes for Capillary Electrophoresis 587
Edward S. Yeung
## CONTENTS

### 19 Laser-Induced Fluorescence Detection for Capillary Electrophoresis: A Powerful Analytical Tool for the Separation and Detection of Trace Amounts of Analytes

*Luis Hernandez, Narahari Joshi, Phillipe Verdeguer, and Norberto A. Guzman*

605

### PART V APPLICATIONS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Chiral Separation by Capillary Electrophoresis and Electrokinetic Chromatography</td>
<td><em>Koji Otsuka and Shigeru Terabe</em></td>
<td>617</td>
</tr>
<tr>
<td>21</td>
<td>The Sheath-Flow Cuvette in DNA Sequencing by Capillary Gel Electrophoresis and Two-Spectral-Channel, Laser-Induced Fluorescence Detection</td>
<td><em>Jianzhong Zhang, Da Yong Chen, Heather R. Harke, and Norman Dovichi</em></td>
<td>631</td>
</tr>
<tr>
<td>22</td>
<td>The Use of Capillary Electrophoresis in Clinical Diagnosis</td>
<td><em>Norberto A. Guzman, Carmen L. Gonzalez, Luis Hernandez, Clifford M. Berck, Maria A. Trebilcock, and Juan P. Advis</em></td>
<td>643</td>
</tr>
<tr>
<td>23</td>
<td>The Utility of Capillary Electrophoresis in Forensic Science</td>
<td><em>David M. Northrop</em></td>
<td>673</td>
</tr>
<tr>
<td>24</td>
<td>Capillary Electrophoresis and Electrokinetic Capillary Chromatography of Drugs in Body Fluids</td>
<td><em>Wolfgang Thormann</em></td>
<td>693</td>
</tr>
<tr>
<td>25</td>
<td>Quantitative Analysis with Capillary Zone Electrophoresis</td>
<td><em>Arthur M. Hoyt, Jr.</em></td>
<td>705</td>
</tr>
<tr>
<td>26</td>
<td>Capillary Polyacrylamide Gel Electrophoresis</td>
<td><em>András Guttman</em></td>
<td>715</td>
</tr>
<tr>
<td>27</td>
<td>Use of Cyclodextrins in Capillary Electrophoresis</td>
<td><em>Salvatore Fanali</em></td>
<td>731</td>
</tr>
<tr>
<td>28</td>
<td>Prospects for the Use of Capillary Electrophoresis in Neuroscience</td>
<td><em>Mark A. Hayes, S. Douglass Gilman, and Andrew G. Ewing</em></td>
<td>753</td>
</tr>
<tr>
<td>29</td>
<td>Capillary Isoelectric Focusing of Peptides, Proteins, and Antibodies</td>
<td><em>J. R. Mazzeo and Ira S. Krull</em></td>
<td>795</td>
</tr>
<tr>
<td>30</td>
<td>Behavior of Ricin on Untreated and Treated Capillary Electrophoresis Columns</td>
<td><em>Harry B. Hines and Ernst E. Brueggemann</em></td>
<td>819</td>
</tr>
</tbody>
</table>

*Index* 843