

Contents

Preface iii

I INTRODUCTION

1. **Sensor Issues for the 1990s: An Introduction to the North Carolina Section American Chemical Society Symposium on Biosensors**
Richard P. Buck*

II MICROELECTRODES AND MICROELECTRONIC DEVICES

2. **Solid State Potentiometric Sensors** 17
Jiri Janata
3. **Voltammetric Detection of Neurotransmitter Release** 39
R. Mark Wightman
4. **Application of Field Effect Electro-Osmosis to Separation-Based Sensors** 55
Kiumars Ghowsi and Robert J. Gale
5. **Serotonin-Sensing Properties of Identified Invertebrate Neurons** 63
Rodney S. Skeen, William S. Kisaalita, Bernard J. Van Wie, Simon J. Fung, and Charles D. Barnes

III MODIFIED ELECTRODES, AMPEROMETRIC, AND POTENTIOMETRIC SENSORS

6. **Novel Sensing Membranes for Organic Guests Based on the Host Functionalities of Macrocyclic Polyamines and Related Compounds** 71
Kazunori Odashima and Yoshio Umezawa

*Invited speakers are indicated by bold letters.

7. Applications of Enzymes in Amperometric Sensors: Problems and Possibilities 95
Philip N. Bartlett
8. Electrochemical Reactions, Enzyme Electrocatalysis, and Immunoassay Reactions in Hydrogels
B. N. Oliver, Louis A. Coury, J. O. Egekeze, C. S. Sosnoff, Yining Zhang, Royce W. Murray, C. Keller, and Mirtha X. Umaña
9. Amplification Possibilities with Neuroreceptor-Based Biosensors
Lemuel B. Wingard Jr.
10. Enzyme-Analyte Conjugates as Signal Generators for Amperometric Immunosensors: Immunochemical Phenomena Related to the Detection of Hapten Molecules 153
Willfried Schramm, SeHwan Paek, and Tony Yang
11. Development of a Polypyrrole Glucose Biosensor 171
Guy Fortier, Eric Brassard, and Daniel Bélanger
12. Electrochemistry of Polypyrrole-Glucose Oxidase Electrode 179
Daniel Bélanger, Jocelyn Nadreau, and Guy Fortier
13. Amperometric Glucose Sensor Fabricated from Glucose Oxidase and a Mediator Co-immobilized on a Colloidal Gold Hydrogel Electrode 187
A. L. Crumbliss, R. W. Henkens, S. C. Perine, K. R. Tubergen, B. S. Kitchell, and J. Stonehuerner
14. Amperometric Biosensors for Glucose, Lactate, and Glycolate Based on Oxidases and Redox-Modified Siloxane Polymers
Paul D. Hale, Toru Inagaki, Hung Sui Lee, Terje A. Skotheim, Hiroko I. Karan, and Yoshi Okamoto

15. Transition Metal Encapsulation by
"Metallocrown" Ethers
Myoung Soo Lah, Vincent L. Pecoraro,
Martin L. Kirk, and William E. Hatfield
- IV OPTICAL AND ACOUSTIC WAVE-BASED SENSORS
16. Optical Fiber Electrodes for Electrochemical
Luminescence-Based Homogeneous Immunoassay 209
Masuo Aizawa
17. Immunosensors: Remaining Problems in the
Development of Remote, Continuous, Multi-
Channel Devices 219
J. D. Andrade, J.-N. Lin, V. Hlady, J.
Herron, D. Christensen, and J. Kopecek
18. Direct Observation of Immunoglobulin Adsorption
Dynamics Using the Atomic Force Microscope 241
J.-N. Lin, B. Drake, A. S. Lea, P. K. Hansma,
and J. D. Andrade
19. A Comparison of Three Thermal Sensors Based on
Fiber Optics and Polymer Films for
Biosensor Applications 251
Raymond Dessy, Larry Arney, Lloyd Burgess,
and Eric Richmond
20. Fiber Optic-Based Biosensors Utilizing
Immobilized Enzyme Systems 285
M. S. Abdel-Latif and G. G. Guilbault
21. Fiber Optic Chemical Sensors (FOCS): An
Answer to the Need for Small, Specific
Monitors
Kisholoy Goswami, Stanley M. Klainer,
Dileep K. Dandge, and Johnny R. Thomas
22. Polymeric Indicator Substrates for Fiber
Optic Chemical Sensors 311
W. Rudolf Seitz, Yunke Zhang, Zhang Zhujun,
Amy Sommers, Chen Jian, Richard Russell, and
Donald C. Sundberg
23. The Use of Metal Island Films to Support
Radiative Surface Plasmons as a Method
of Transducing Interfacial Events
Reno F. DeBono, M. Thompson, A. L. Mallon,
and M. J. Scaini

24. Chemical Sensors Based on Photopyroelectric Transduction M. S. Heimlich, U. J. Krull, R. F. DeBono, and R. S. Brown	
25 Antibody-Based Biosensor for Continuous Monitoring Anne W. Kusterbeck, Gregory A. Wemhoff, and Frances S. Ligler	
26 Rapid, Filtration-Based Immunoassays Performed with a Silicon Biosensor Mariann E. Lucas, Marilyn F. Huntington, Francis J. Regina, Jeffrey M. Bolts, Stephen C. Alter, Mark E. Ballman, and Gregory L. Kirk	351
. The Silicon Microphysiometer: Detection of Biological Effects of Chemical and Biochemical Agents by Alterations of Cellular Metabolic Rate J. Wallace Parce, George B. Sigal, Karen M. Kercso, and John C. Owicki	367
28 Substrate-Supported Planar Membranes Containing Murine Antibody Fc Receptors: A Total Internal Reflection Fluorescence Microscopy Study Claudia L. Poqlitsch and Nancy L. Thompson	375
29. A Nicotinic Receptor Optical Biosensor Kim R. Rogers, Mohyee E. Eldefrawi, and David P. Richman	383
Index	391