

Table of Contents

- Preface
- Acknowledgments for the first edition
- Acknowledgments for the second edition
- 1 Overview Of Membrane Science And Technology
 - Introduction
 - Historical Development of Membranes
 - Types of Membranes
 - Membrane Processes
 - References
- 2 Membrane Transport Theory
 - Introduction
 - Solution-diffusion Model
 - Structure-Permeability Relationships in Solution-diffusion Membranes
 - Pore-flow Membranes
 - Conclusions and Future Directions
 - References
- 3 Membranes and Modules
 - Introduction
 - Isotropic Membranes
 - Anisotropic Membranes
 - Metal Membranes and Ceramic Membranes
 - Liquid Membranes
 - Hollow Fiber Membranes
 - Membrane Modules
 - Conclusions and Future Directions
 - References
- 4 Concentration Polarization
 - Introduction
 - Boundary Layer Film Model
 - Determination of the Peclet Number
 - Concentration Polarization in Liquid Separation Processes
 - Concentration Polarization in Gas Separation Processes
 - Cross-flow, Co-flow and Counter-flow
 - Conclusions and Future Directions
 - References
- 5 Reverse Osmosis
 - Introduction and History
 - Theoretical Background
 - Membranes and Materials
 - Reverse Osmosis Membrane Categories
 - Membrane Selectivity
 - Membrane Modules
 - Membrane Fouling Control
 - Membrane Cleaning

- Applications
- Conclusions and Future Directions
- References
- 6 Ultrafiltration
 - Introduction and History
 - Characterization of Ultrafiltration Membranes
 - Concentration Polarization and Membrane Fouling
 - Membrane Cleaning
 - Membranes and Modules
 - System Design
 - Applications
 - Conclusions and Future Directions
 - References
- 7 Microfiltration
 - Introduction and History
 - Background
 - Applications
 - Conclusions and Future Directions
 - References
- 8 Gas Separation
 - Introduction and History
 - Theoretical Background
 - Membrane Materials and Structure
 - Membrane Modules
 - Process Design
 - Applications
 - Conclusions and Future Directions
 - References
- 9 Pervaporation
 - Membrane Materials and Modules
 - Introduction and History
 - Theoretical Background
 - Process Design
 - Applications
 - Conclusions and Future Directions
 - References
- 10 Ion Exchange Membrane Processes-Electrodialysis
 - Introduction and History
 - Theoretical Background
 - Chemistry of Ion Exchange Membranes
 - Transport in Electrodialysis Membranes
 - System Design
 - Applications
 - Conclusions and Future Directions
 - References
- 11 Carrier Facilitated Transport

- Introduction and History
- Coupled Transport
- Facilitated Transport
- Conclusions and Future Directions
- References
- 12 Medical Applications Of Membranes
- Introduction
- Hemodialysis
- Blood Oxygenators
- Controlled Drug Delivery
- References
- 13 Other Membrane Processes
- Introduction
- Dialysis
- Membrane Reactors
- Donnan Dialysis and Diffusion Dialysis
- Charge Mosaic Membranes and Piezodialysis
- Membrane Contactors and Membrane Distillation
- Conclusions and Future Directions
- References
- Appendix
- Index