

Contents

Preface — V

List of contributing authors — IX

List of symbols and abbreviations — XI

Luboš Novák, Milan Šípek

1 Principles and historical survey of electromembrane processes — 1

Part I: Theory and materials

Milan Šípek

2 Basic thermodynamic principles — 13

Tomáš Bystroň, Dalimil Šnita

3 Basic concepts and laws of electrochemistry — 25

Luboš Novák, Miroslav Bleha, Aleš Černín, Robert Válek

4 Ion-selective materials and membranes — 61

Miroslav Bleha, Milan Šípek, Dalimil Šnita

5 Transport processes — 79

Dalimil Šnita, Roman Kodym

6 Mathematical modelling of electromembrane processes — 107

Part II: Electromembrane separation and synthesis processes

David Tvrzník, Aleš Černín, Luboš Novák

7 Electrodialysis — 161

David Tvrzník, Aleš Černín, Luboš Novák

8 Electrodeionization — 229

David Tvrzník, Aleš Černín, Luboš Novák

9 Capacitive deionization — 259

Zdeněk Palatý

10 Diffusion dialysis — 263

Luboš Novák, Aleš Černín

11 Electrophoresis — 275

David Tvrzník, Aleš Černín, Luboš Novák

**12 Main industrial applications of electromembrane separation
and synthesis processes — 283**

Part III: Electromembrane conversion processes

Martin Paidar, Karel Bouzek

13 Membrane electrolysis — 315

Martin Paidar, Karel Bouzek, Petr Mazúr, Aleš Černín

14 Electromembrane processes for energy conversion — 335

Index — 373