

Subject Index

A

- AC Techniques
 - Bode Plot 285
 - Conductivity 14f.
 - Electron transfer Processes 284
 - ,- Influence of mass transport 287
 - Equivalent Circuit for an electrode
 - ,- Diffusion Limited Reaction 282
 - ,- Electron transfer Limited 284
 - ,- Mixed Control 286
 - Impedance in the presence of adsorption 289ff
 - Measurement of film coverage 291
 - Nyquist Plot 284f.
 - Randles Circuit 284
 - Warburg Impedance 282f.
- Activity Coefficient 46ff.
 - Dependence on concentration 48ff.
 - In concentrated solutions 51
 - Measurement 139f.
 - Of neutral molecules 60
- Adiponitrile or Monsanto Process 424
- Adsorption
 - Dependence of current on 212
 - Enthalpies 211
 - Influence on current-voltage curves 293
 - Isotherms 208
 - ,- Langmuir 208f.
 - ,- Temkin 209
 - Of dipoles 210
 - Of ions 208
 - Of intermediates in electrochemical reactions 212
- Air batteries 484
 - Aluminium-air batteries 484
 - Zinc-air batteries 484
 - ,- Secondary types 485
- Alkaline Fuel Cells (AFC) 473ff.
 - Apollo Cell 472

B

- Bands
 - Metal Electronic 134
 - Conduction 134
 - Valence 135
- Batteries
 - Air batteries 484
 - ,- Aluminium-air batteries 484
 - ,- Zinc-air batteries 484
 - ,- Secondary types 485
 - Costs of energy storage in 449
 - ,- Table of Values 459
 - Current-voltage characteristics of 446
 - Discharge Characteristics in 447
 - Efficiency of batteries 486

- Energy Density in 446
- ,- Tables of values 459
- Open-circuit voltage of 444
- For electric vehicles 472
- Primary
 - ,- Alkaline Manganese 464
 - ,- Characteristics 466
 - ,- Leclanché Cell 442ff.
 - ,- Characteristics 441
 - ,- Discharge characteristic of 447
 - ,- Self-discharge in 444
 - ,- Lithium Primary Batteries 444
 - ,- Lithium-melt batteries
(Sohio Battery) 466
 - ,- Li/SOCl₂ 466
 - ,- Characteristics 466
 - ,- Zinc-Mercury Oxide 465
 - ,- Characteristics 467
 - Power density of 446
 - ,- Tables of Values 459
 - Secondary
 - ,- Current Yield in 449
 - ,- Cycle Number 453
 - ,- Energy Yield in 452
 - ,- Lead-acid 441ff.
 - ,- Discharge characteristic of 447
 - ,- Gassing in 449
 - ,- Lifetime 452
 - ,- Maintenance 451
 - ,- Self-discharge in 444
 - ,- Sulphation 449
 - ,- Lithium Secondary Batteries 457ff.
 - ,- Characteristics 451
 - ,- Charge-discharge cycle in 459
 - ,- Energy and Power density in 458
 - ,- Non-aqueous Solvents in 457
 - ,- Sulphur-based systems 458
 - ,- Nickel-Cadmium 450
 - ,- Characteristics 451
 - ,- Gassing in 453
 - ,- Nickel Iron 450
 - ,- Nickel-Metal Hydride 453
 - ,- Characteristics 462
 - ,- Nickel-Zinc 453
 - ,- Characteristics 463
 - ,- Dendrite formation in 455
 - ,- Silver-Zinc 452
 - ,- Characteristics 463
 - ,- Sodium-Sulphur 458
 - ,- Sodium β -alumina in 456
 - ,- Sodium-Nickel Chloride (ZEBRA
Battery) 456
 - ,- Zinc-Bromine 455
 - ,- Zinc-Chlorine 455
- ,- Self discharge 444
- ,- Specific Capacity of 444
- Bias
 - In semiconductor electrochemistry 138
- Bioelectrochemistry 241ff
 - Long-range electron transfer and biological systems
 - Biochemistry of glucose oxidase as a typical enzyme
 - Coupling of electron-transfer enzymes to electrodes
 - Use of mediators
 - Use of electrode surface modifiers
 - Use of bio-mimetic molecules
- Bipolar Cell Designs 399
- Bode Plot 285
- Bohr Magneton 305
- Buffer solutions 64ff.
- Butler-Volmer Equation 166ff., 184, 186
- C**
- Capacitance measurements 294
- Cations 6
- Cathode 6f., 158
- Cathodic Stripping Voltammetry 501
- Catholyte 6
- Cell 3ff.
 - Concentration 86, 105ff.
 - ,- With transference 108
 - ,- Without transference 108
 - Conventions 86, 95
 - Conventional Design
 - ,- Bipolar 399
 - ,- Diaphragm 405ff.
 - ,- Electrolysis 417, 420
 - ,- Membrane 399
 - ,- Monopolar 399
 - Modern Designs
 - ,- Fixed-bed reactors 425
 - ,- Fluidised-bed reactors 427
 - ,- Porous Layer electrodes 425
 - ,- Zero-gap principle 400f., 425
 - Reactions 4
 - ,- Voltage 5, 157ff.
 - ,- Calculation 88
 - ,- Measurement 84
 - ,- Pressure Dependence 91
 - ,- Temperature Dependence 90
 - Weston 101
- Chlor-alkali process 404ff.
 - Amalgam Cell for 406
 - Comparison of cells for 410
 - Diaphragm Cell for 405

- Dimensionally Stable Anodes (DSA) 404
 - Electrode Reactions in 404
 - Membrane Process for 409
 - using oxygen cathode 410ff
 - Chlorate Preparation
 - Conditions 418
 - Chronopotentiometry 502
 - Chemical stripping chronocoulometry 502
 - stripping chronocoulometry 504
 - Conductivity 18ff.
 - Extrinsic (in semiconductors) 135
 - Intrinsic (in semiconductors) 136
 - Conductivity Cell 14, 19
 - Extrapolation to high frequency 16
 - Cell constant 19
 - Conductivity Titrations 73f.
 - Convection
 - Forced 255
 - Laminar 192
 - Transport by 192
 - Turbulent 248ff.
 - ,- In the measurement of fast electron transfer 247
 - Correction for iR-drop 277
 - Corrosion 225ff.
 - Acid 226
 - Inhibition through film formation 230
 - ,- Electrophoretic Protection 230
 - Oxygen 227
 - Protection 228
 - ,- Cathodic 229
 - Coulomb's Law 1
 - Coulometer
 - Silver 8
 - Combustion-Gas 8
 - Coulometry in electroanalytical chemistry 503
 - potentiostatic coulometry 503
 - galvanostatic coulometry 504
 - Cryolite 417
 - Current-Potential Characteristic 161
 - In melts 393
 - In solid electrolytes 385
 - In solid-polymer electrolytes 388
 - Of batteries 446
 - Current-time behaviour 189
 - At a micro-electrode 202
 - Cyclic Voltammetry 260ff.
 - Correction for resistive (iR) effects 277ff.
 - Cyclic voltammograms 261
 - ,- Gold 264
 - ,- Platinum 262ff.
 - Diagnostic Criteria 275
 - Fast scan voltammetry 276
 - Measurement of Film Coverage 292
 - Of solution redox couples 261ff.
 - , 9,10-diphenylanthracene 273
 - ,- Formaldehyde 267
 - ,- Formic Acid 267
 - ,- Methanol 267
 - Theory of 267ff.
 - ,- Fast electron transfer 227
 - ,- Slow electron transfer 269
 - ,- Matsuda Number 271
 - ,- Multiple Potential Sweeps 273
- D**
- Daniell Cell 105
 - Debye-Hückel
 - Limiting Law 50, 73, 139
 - Region 29
 - Theory of Dilute electrolytes 38ff.
 - Debye-Onsager Equation 44
 - Debye Screening Length 43
 - Decomposition
 - Potential Difference 5
 - Dendrite formation 219
 - Desalination see Electrodialysis
 - Detoxification of water 235, 240
 - Direct oxidation methods 432
 - Indirect Oxidation methods 432
 - Diffuse Double Layer 116f.
 - Diffusion
 - Fick's First Law 106, 188
 - Fick's Second Law 190
 - Nernst diffusion layer 192
 - Potentials 106ff.
 - ,- Elimination 111
 - Overpotential 187ff.
 - Spherical 200f.
 - Surface 214f.
 - Dipole
 - water 2, 33
 - Direct Methanol Fuel Cells 481
 - Dissociation constant of weak electrolytes 63, 142
 - Effect on overpotential 204
 - Measurement of rate of 207
 - Dissociation Field Effect 63, 124
 - Donnan Potential see Membrane Potential
 - Double Layer
 - Capacity 121ff.
 - Structure 121
 - ,- On semiconductor electrodes 136

E

- Electric Field 3, 13
 - At metal-electrode electrolyte interface 123f.
 - At semiconductor electrolyte interface 136f.
- Electrocapillarity 124
- Electrocatalysis
 - Bifunctional catalysts 401
 - Carbon monoxide oxidation 358ff
 - ,- Langmuir-Hinshelwood mechanism 361
 - Ethanol oxidation 364ff
 - Exchange current in 342ff.
 - ,- Activation overpotential 403
 - Future Trends in 428
 - ,- Polymeric Catalysts with pendant active groups 428
 - ,- Under-potential deposited layers 428
 - Hydrogen oxidation 341ff
 - ,- Heyrovsky reaction 342
 - ,- Volmer-Tafel reaction 342
 - Hydrophobic Layer in 402
 - Methanol oxidation 348ff
 - ,- parallel pathways 350
 - ,- reaction products 352
 - ,- effect of adsorbed anions 354
 - ,- catalyst promoters 356
 - Morphology of catalysts 401
 - NEMCA effect 429
 - Oxygen reduction 397
- Electrochemical Engineering 399
- Electrochemical Machining and polishing 223
- Electrochemical Mass Spectroscopy
 - Basis of technique 309
 - Differential Electrochemical Mass Spectroscopy (DEMS) 313ff
 - ,- Dual thin layer flow cell 319
 - ,- Rotating electrodes 317ff
 - Experimental Problems 310
 - Ex-situ Measurements 311
 - ,- Electrochemical Thermal Desorption MS (ECTDMS) 311
 - Fragmentation Pattern 310
 - Transfer Factor 310
- Electrochemical polymerisation of heterocyclic compounds 373
 - Electronic structure of polymer films
 - The polymerisation mechanism for poly-pyrrole
 - Polarons in poly-pyrrole and related polymers
- Electrochemical Potential 80

Electrochemical Quartz-crystal

- Microgravimetry (EQCM) 504
- Electrochemical Reaction Order 173f.
- Electrochemical Sensors 505ff.
 - Conductivity measurement 505
 - Gas Sensors 511
 - ,- Amperometric Sensors 513
 - ,- Clark Cell 513
 - ,- Indirect cells 515
 - ,- Table of types 516
 - ,- Conductimetric sensors 511
 - ,- Potentiometric sensors 511
 - ,- Lambda-Sonde Principle 512
 - Ion-sensitive electrodes 506
 - ,- Glass membrane electrodes 506
 - ,- Sodium Electrode 507
 - ,- Solid and liquid-membrane electrodes 508
 - ,- Potassium-sensitive electrodes 508
 - ,- Ion-selective Field Effect Transistors (ISFET) 510
 - ,- Interference effects in 507
 - ,- Nikolski equation 507
 - pH measurement 505
 - Redox electrodes 506
- Electrochemical Separation Processes
 - Electrodialysis 433
 - Electrophoresis 434
 - Procedures in the Nuclear Industry 435
 - ,- PUREX process 434
 - Treatment of waste water 435
- Electrochemical Series 93
 - In non-aqueous Solvents 102
- ElectrocrySTALLisation 213ff.
- Electrode 3
 - Counter 160f., 234ff.
 - Micro- and ultra-micro 201ff.
 - Potentials 77ff.
 - ,- Standard 96
 - ,- Measurement 141
 - ,- Mixed 225
 - Reactions 4f., 8
 - Reference 93ff., 160f.
 - Redox 82
 - Rotating-disc 195ff.
 - Working 160f.
- Electro-dialysis 433
 - Preparation of free acids from salts 433
- ElectrofloTATION 432
- Electrogravimetry 494
 - Electrochemical Quartz-crystal
 - Microgravimetry 504
- Electrolysis 3f., 353, 413ff.

- Chlor-alkali process 404ff.
- Water decomposition 408
- Electrolyte 1ff.
 - Double Layer 103ff.
 - Strong 21, 23ff.
 - Weak 26
 - ,- Dissociation Field Effect 63
 - ,- Dissociation constant 73
- Electrokinetic effects
 - Dorn Effect 128
 - Electro-osmotic Effect 128
 - Electrophoresis 128f.
 - Streaming Potential 130
- Electrolytic Conductivity, see Ionic Conductivity
- Electromotive Force
 - (emf) 4, 6
 - Calculation 88
 - Concentrations Cell 86f.
 - Galvanic Cells 77f.
 - Measurement 86
 - Pressure Dependence 91
 - Temperature dependence 91
- Electron-Spin Resonance
 - Concentration limit 307
 - Electrochemical Cells for 306
 - Hyperfine Structure 306
 - Spin Traps in 308
- Electron Transfer
 - Elementary Theory 162ff.
 - Quantum mechanical Treatment 179ff.
 - Successive Electron Transfer Processes 170
 - Temperature dependence 184
 - With coupled chemical equilibria 173ff.
- Electronic
 - Charge 1f.
 - Conductivity 3
- Electro-organic chemistry
 - Chlorination 414
 - Direct Processes 346, 369
 - ,- Oxidation 369
 - ,- Reduction 371
 - ,- Adiponitrile Process 372
 - ,- Electrochemical Polymerisation 373
 - ,- Indirect Processes 346, 367
 - ,- Fenton's Reaction 368
- Electro-organic Synthesis
 - Adiponitrile or Monsanto Process 424
 - Halogenation
 - ,- Perfluorobutyric acid 423
 - ,- Perfluoroctanoic acid 423
 - Hydrogenation Processes
- ,- 1,2-dihydrophthalic acid 423
- ,- *m*-Aniline Sulphonic Acid 423
- ,- Piperidine 423
- Organometallic
- ,- Tetra-ethyl lead 423
- Overview of processes 422
- Oxidation processes
- ,- Gluconic Acid 423
- Electro-oxidation of alcohols on Ni(III)-oxide 373
- Electrophoretic Effect 38ff., 63
- Enthalpy
 - of activation in electron transfer reactions 166
 - of activation in solid-state ionic conduction 383
 - of formation 89
- Enthalpy of solvation of ions 56
- Entropy
 - of activation in electron transfer reactions 184
 - of activation in solid-state ionic conduction 383
 - of dissolution 2
 - of formation 89, 144
- Error Function 189ff.
- Exchange Current density 165, 166ff.
 - Concentration Dependence 169ff.
 - Dependence on re-organisation energy 182
 - Dependence on adsorption enthalpy 212
 - Numerical Values 170
- Extensions to the Debye-Hückel theory of ionic interactions 58ff
 - Ion-pair effects
 - Monte Carlo calculations
 - Molecular dynamic calculations
 - Effects of changes in the solvent activity - Hitchcock equation
 - Robinson-Stokes equation
- F**
- Faraday 7f.
- Faraday constant 7
- Faraday's Laws 7
- Fermi-Dirac Distribution 134
- Fermi Level 134
- Fick's Laws of Diffusion 106
- Field-effect transistor 510
- Films on surfaces
 - Measurement by charge passed 292ff.
 - Measurement by capacitance 294
 - Microbalance methods for 320

- Radiotracer Methods for 319
- Scanning Probe methods for 321
- Studies with *in situ* Infra-Red Spectroscopy 300
- Studies with Thermal Desorption MS 311
- Fixed-bed reactors 426
- Flade potential 221
- Fluidised-bed reactors 426
- Free Energy
 - Of Activation in electron transfer 168
 - Of formation 144
- Frumkin effect 377
- Fuel Cells 468ff.
 - Alkaline Fuel Cells (AFC) 473
 - ,- Apollo Cell 472
 - ,- Characteristics 478
 - Direct Methanol Fuel Cell (DMFC) 481ff
 - Efficiencies 482
 - For electric vehicles 379
 - Hydrazine fuel Cells 481
 - Gas-diffusion Electrodes in 469
 - Grove Cell 469
 - Molten Carbonate Fuel Cells (MCFC) 476, 480
 - ,- Characteristics 480
 - ,- Current-voltage Studies 393
 - ,- Internal Reforming in 477
 - Phosphoric Acid Fuel Cells (PAFC) 473, 475f., 479f.
 - ,- Characteristics 480
 - Reformation in 472
 - Solid-Oxide Fuel Cells (SOFC) 473, 477, 485
 - ,- Characteristics 480
 - Solid Polymer Fuel Cells (SPFC) or Polymer Electrolyte Membrane FC (PEMFC) 473, 474
 - ,- Characteristics 479
- G**
 - Galvani Potential difference 78ff.
 - Galvanic Cell 4ff., 439ff.
 - Active components 440
 - Fuel Cells 439, 468ff.
 - Gas-diffusion Electrodes in 469
 - Primary Batteries 449, 464ff.
 - Secondary Batteries 450ff.
 - Galvanoplastic modelling 224
 - Galvanostat 252
 - Galvanostatic Electrolysis 191
 - Gas-diffusion electrodes 469ff.
 - PTFE binders in 470
- Three-phase boundary in 469
- Gas Sensors 510
 - Amperometric Sensors 513
 - ,- Clark Cell 513
 - ,- Indirect cells 515
 - ,- Table of types 516
 - Conductimetric sensors 511
 - Potentiometric sensors 511
 - ,- Lambda-Sonde Principle 512
- Gouy-Chapman Theory 117ff.
- Grove Cell 469
- Guggenheim's Equation 60
- H**
 - Harmonic Oscillator 297
 - Harned Cell 143, 147f.
 - Haugaard Layer 149f.
 - HCl-electrolysis with oxygen cathode 413, 414
 - Helmholtz Double Layer 116ff.
 - Henderson Equation 109f.
 - Hitchcock's Equation 60
 - Hydration 2
 - Ionic 32f., 55f.
 - Proton 34
 - Hydrazine fuel Cells 481
 - Hydrogen Economy 420ff.
 - Hydrogen Electrode
 - Reaction mechanisms for 342
 - ,- Effect of pH 344
 - ,- Heyrovsky Reaction 342
 - ,- Influence of adsorbates on i-V curves 342
 - On solid-polymer electrolytes 388
 - ,- Tafel Reaction 341
 - ,- Volmer Reaction 342
 - ,- Volmer-Tafel Mechanism 342
 - Hydrogen Peroxide Preparation
 - Conditions 419
 - Hypochlorite Preparation
 - Conditions 419
- I**
 - Ilkovic Equation 497
 - Industrial Electrochemical Processes 397ff.
 - Cell Designs
 - ,- Classical 399
 - ,- Chlor-alkali Process 404ff.
 - ,- Energy Yield 397
 - Inorganic Chemical Preparation 418
 - ,- Chlorate 418
 - ,- Hydrogen Peroxide 419
 - ,- Hypochlorite 418
 - ,- Perchlorate 418

- ,- Peroxodisulphate 419
 - Metal Extraction and Purification 414ff.
 - Specific Energy Usage 398
 - Water Electrolysis 420ff.
 - Infra-Red Spectroscopy
 - Electrochemically Modulated IR Spectroscopy (EMIRS) 299
 - External Reflection Cell 298
 - Force Constant 297
 - Fourier Transform IR Spectroscopy 300
 - Harmonic Oscillator 297
 - Internal Reflection Cell 298
 - Normal Modes 297
 - Selection Rules 297
 - Subtractively Normalised Fourier Transform IR Spectroscopy (SNIFTIRS) 300
 - Surface-Enhanced Infrared Adsorption Spectroscopy (SEIRAS) 304
 - Thin-Layer Cell 298
 - Transparent Windows 298
 - Inorganic Preparative Electrochemistry 418
 - Chlorate 418
 - Hydrogen Peroxide 419
 - Hypochlorite 418
 - Perchlorate 418
 - Peroxodisulphate 419
 - Interface
 - Metal/Electrolyte 15, 116
 - Semiconductor/electrolyte 137
 - Ions 1ff.
 - Ion-Selective Field Effect Transistor (ISFET) 510
 - Ion-sensitive electrodes 506
 - Glass membrane electrodes 506
 - ,- Sodium Electrode 507
 - ,- Solid and liquid-membrane electrodes 508
 - ,- Potassium-sensitive electrodes 508
 - Ion-selective Field Effect Transistors (ISFET) 510
 - Interference effects in 507
 - Nikolski equation 507
 - Ionic Atmosphere 39
 - Radius 42
 - Ionic Charges 1f.
 - Ionic Conductivity 3, 18
 - Effect of AC frequency
 - ,- Debye-Falkenhagen Effect 46
 - Effect of strong electric field
 - ,- Wien effect 46
 - Equivalent Conductivity 22f., 25ff.
 - Hydroxide Conductivity 34
 - In non-aqueous solutions 66
 - In melts 392
 - ,- Current-voltage studies in 393
 - ,- Numerical Values 393
 - In solids 381
 - ,- Numerical data 383
 - ,- Measurement 382
 - ,- Solid-polymer Electrolytes (SPE) 387
 - ,- Superionic conductors 383
 - Law of Independent Migration of Ions 26f.
 - Limiting Ionic conductivities 28, 31
 - Molar Conductivity 22, 26f.
 - Numerical Values 19f.
 - Proton Conductivity 31, 34
 - Ionic Migration 125
 - Ionic Mobility 27,38
 - Ionic Product of Water 64, 71
 - Ionic Strength 39, 41, 47, 50
 - Isoelectric Point 129
- K**
- Kohlrausch's Law 23
 - Kolbe reaction 372
- L**
- Lead-acid Battery 441ff.
 - Characteristics 462
 - Discharge characteristic of 444
 - Gassing in 449
 - Lifetime 442
 - Maintenance 442
 - Self-discharge in 444
 - Sulphation 449
 - Leclanché Cell 442
 - Characteristics 466
 - Discharge characteristic of 447
 - Self-discharge in 444
 - Limiting Current Region 188
 - Liquid Junction 105
 - Potentials 105
 - ,- Henderson Equation 109
 - ,- Elimination 111
 - Lippmann Equation 125
 - Lithium Primary Batteries
 - Lithium-melt batteries (Sohio Battery) 466
 - Li/SOCl₂ 466
 - ,- Characteristics 451
 - Lithium Secondary Batteries 457ff
 - Characteristics 451
 - Characteristics of Li-Ion batteries 459, 464
 - Charge-discharge cycle in 459, 460
 - Energy and Power density in 458
 - Non-aqueous Solvents in 457

- Sulphur-based systems 458
- Luggin Capillary 161

- M**
- Madelung Constant 2
- Mass Spectroscopy *see* Electrochemical Mass Spectroscopy
- Masstransport through migration 199
- Matsuda Number 271f.
- Mechanisms of electrochemical reactions through Tafel slope analysis 175ff
 - Oldham-Ryland approach
 - Effect of adsorption isotherm -
 - Temkin isotherm analysis
- Membrane Electrode Assembly (MEA) 425, 474, 482, 488
- Membrane Potentials 112ff.
- Metal Deposition 213ff.
- Metal Dissolution 220ff.
- Metal Extraction and purification
 - Copper purification 415
 - Electrolysis of molten salts 417
 - ,- Aluminium Extraction and purification 414
 - Extraction from aqueous solution 415
 - Zinc extraction 415
- Metal Powders
 - Electrochemical Preparation 222
- Microbalance methods 320
- Micro-electrodes 201ff
- Molality 41ff., 55, 61
- Molecular Orbitals
 - Highest Occupied (HOMO) 367
 - Lowest Unoccupied (LUMO) 367
- Mole fraction 48
- Molecular dynamics approach to the calculation of liquids 54
- Molten Carbonate Fuel Cells (MCFC) 476ff.
 - Characteristics 480
 - Current-voltage Studies 393
 - Internal Reforming in 476
- Monopolar Cell designs 399
- Monsanto Process 424
- Monte Carlo calculations of liquids 54
- Multi-electron transfer Processes 170
 - With coupled chemical equilibria 173

- N**
- Nano Structures 325ff
 - Preparation 326
- NEMCA effect 429
 - Decomposition of formaldehyde at silver 429
 - Decomposition of formaldehyde on gold 431
 - Oxidation of CO on Pt/ZrO₂ 429f.
- Nernst Diffusion Layer 187ff., 192f.
- Nernst Equation 81ff.
 - For Redox Electrodes 82
 - For Gas Electrodes 83
- Nernst-Einstein Equation 106
- Nernst Glower 384
- Nernst-Planck Equation 199
- Nickel-Cadmium Batteries 450
 - Characteristics 451
- Nickel Iron Batteries 450
 - Characteristics 451
- Nickel-Metal Hydride Batteries 453
 - Characteristics 462
- Nickel-Zinc Batteries 453
 - Characteristics 463
 - Dendrite formation in 455
- Non-aqueous Solutions 66ff.
- Nuclear Reprocessing 434
- Nyquist Plot 284

- O**
- Optical Techniques for Electrode Study
 - Ellipsometry 329
 - Infra-Red *see* Infra-Red Spectroscopy
 - Optical Absorption Spectroscopy 328
 - Optical Reflectance Spectroscopy 329
- Oscillations in Electrochemical Systems 375ff
 - Bifurcation 377
 - Current oscillations 377
 - Negative Differential Resistance (NDR) 377
- Ostwald Dilution Law 61f.
- Overpotential 159
 - Adsorption 212
 - Activation 403
 - Concentration 185
 - Diffusion 159, 187ff.
 - Electron-transfer 159
 - Measurement 160
 - Reaction 159, 204ff.
- Oxygen Electrode
 - Reaction mechanisms for 346
 - ,- In molten carbonate electrolytes 393
 - ,- In solid-polymer electrolytes 388
 - ,- On stabilised zirconia 384
 - ,- Parallel pathways 346
 - ,- Use of Rotating Ring-disc Electrode for 347

P

- Pairwise distribution function 52
 - For liquid argon
 - For water
- Passivation 220
- Perchlorate Preparation
 - Conditions 419
- Permittivity see Relative Permittivity
 - of free space 1
- Peroxodisulphate Preparation
 - Conditions 419
- pH
 - Bates-Guggenheim Convention 147
 - Buffer solutions 64
 - Conventional Scale 64
 - Definition 64
 - In non-aqueous solutions 70
 - Influence on kinetics of the Hydrogen Electrode 344
 - Measurement 145
 - ,- Glass Electrode 148ff.
 - Potential-pH diagrams 227
 - Of zero-zeta potential 129
- Phosphoric Acid Fuel Cells (PAFC) 473, 475, 479f.
 - Characteristics 475
- Photoelectrochemical cells for solar-energy conversion 236ff.
 - Dye-sensitisation and photoelectrochemical cells
 - Multiple p-n junction photoelectrochemical devices
- Photoelectrochemistry 234f.
- Photogalvanic Cells 235f.
- Platinisation 17f.
- Prandtl Layer 193
- Point of zero charge 122, 125
 - Measurement
 - ,- Ac techniques 294
 - ,- Electrocapillarity 124
 - ,- in situ FTIR 124
 - ,- Piezo-effect 127
- Poisson Equation 137
 - Poisson-Boltzmann Equation 41
- Polarisable electrodes 115
- Polarography 494ff.
 - AC Polarography 499
 - Anodic Stripping Voltammetry (ASV) 501
 - ,- Differential pulse ASV 500
 - Cathodic Stripping Voltammetry 501
 - DC Polarography 494ff.
 - Differential Polarography 499

P

- Half-wave potential 501
 - Ilkovic Equation 497
 - Pulse polarography 498ff.
 - Sensitivity in 498
- Potential-pH diagrams 227
- Potential step method 253ff
- Potential-time behaviour 191
- Potentiometric Titrations 155
- Potentiostat 230
- Pourbaix diagrams 228
- PUREX process 436
- Purification of water 431ff.
 - Electrodialysis 433
 - Electroflotation 432
 - Metal deposition 432
 - Oxidation of organic impurities 432

Q

- Quantum Mechanical Tunnelling Effect 162, 179

R

- Radiotracer Measurements 319
- Randles Circuit 284
- Reaction Co-ordinate 163
- Reaction Mechanisms in Electrochemistry 339ff.
 - Electro-organic Chemistry 366ff.
 - The Hydrogen Electrode 341ff.
 - The Oxygen Electrode 346ff.
- Reactivation 222
- Relative permittivity 1
 - of water 2
 - of non-aqueous solvents 67f.
- Relaxation Effect 38
- Reference Electrodes 93
 - In non-aqueous solvents 102
 - Normal Hydrogen Electrode 94
 - Of the second kind 98
 - ,- Calomel 100
 - ,- Lead Sulphate 101
 - ,- Mercury Sulphate 101
 - ,- Mercury Oxide 101
 - ,- Silver-silver chloride 99
 - ,- Thalamid 151
- Reformation in Fuel Cells feeds 472
 - Internal Reforming 475
- Reorganisation Energy 179, 182ff.
- Reprocessing 435
- Residual Current 91
- Resistivity 10
- Reynolds Number 257
- Room-temperature melts based on the imidazolium cation 395

- Electroplating of ultra-pure aluminium
- Use of room-temperature melts in batteries
- Rotating-disc Electrode 193ff.
 - Frumkin-Tedoradze equation (also known as Koutecky-Levich equation) 196ff
 - Levich (limiting current) equation 194ff
 - Ring-Disc electrode 193, 255f.
 - ring-ring electrode 256
- S**
- Salt Bridge 112
- Scanning Probe Methods
 - Atomic Force Microscopy (AFM) 324
 - Rastered Kelvin Microscopy 325
 - Scanning Electrochemical Microscopy (SECM) 325
 - Scanning Tunnelling Microscopy (STM) 324
- Schematic representation of cells and cell conventions 86
- Screw dislocation on surface 214
 - Crystal Growth in the presence of 218
 - Dendrite formation 219
- Semiconductor Electrodes 133ff.
 - Current flows on 231ff.
 - ,- Effect of potential 233
 - ,- Photoeffects in 233
- Silver Iodide 382ff.
- Silver-Zinc Battery 452
 - Characteristics 461
- Sodium -alumina 461
- Sodium-Sulphur Batteries 456
 - Sodium -alumina in 429
- Sodium-Nickel Chloride (ZEBRA Battery) 456
- Solar Energy Conversion 235
- Solid-Oxide Fuel Cells (SOFC) 473, 475, 479f.
 - Characteristics 475
- Solid polymer electrolyte membranes other than Nafion 388ff
 - Membranes with impregnated solid or liquid electrolytes
 - Sulphonated non-perfluoro-membranes
 - ORMISILS and related silane backbone membranes
 - Polyetheretherketones and related membranes
 - Polybenzimidazoles
 - Anionically conducting membranes
- Solid-Polymer Electrolytes 386ff.
 - Current-voltage curves with 388
 - Dow Membrane 387
 - In chlor-alkali process 412
 - Nafion 387ff.
- Solid-Polymer Fuel Cells (SPFC) 473
 - Characteristics 479
- Solid-State Chemistry
 - Defects 382
 - ,- Interstitials 382
 - ,- Vacancies 382
- Solubility Product 72, 141
- Solvation 32f., 55f., 59
 - Enthalpy of Solvation 72
- Space Charge Layer
 - In ionic membranes 114
 - In semiconductor electrodes 138
- Space-time Yield 399ff., 425
- Specific Energy Usage 399
- Spectro-electrochemical Methods 295ff.
 - Infra-Red Studies 297ff.
 - Electron-spin Resonance 305ff
- SPE-electrolysis 425
- Spherical diffusion 200
- Stabilised zirconia 384
- Step site on surface 214
- Stokes' Law 13, 18, 32
- Studies of ionic solvation 55ff
 - Inner and outer solvation sheaths
- Supercapacitor 487ff
 - double-layer capacitor 489
- Surface
 - Defects 213ff.
 - Diffusion 214
- T**
- Tafel Equation 167f.
- Temperature dependence of distribution function for water 53
- Theoretical studies of the structure of the double layer 130ff
 - Jellium model
 - Molecular dynamic approaches
 - Orientation of water molecules at the electrode surface
 - Long-range water structure models and charge density effects on the electrode
 - Car-Parinello calculations of dynamic electrolyte structure
 - Lateral ionic mobility at the electrode surface
- Theory of liquids 52

Transport Number 28ff.

- Hittorf Method 29
- Moving Boundary Method 37
- Numerical Values 31

Turbulent flow 257ff

- determination of exchange current 260

Two-dimensional nucleation and growth of films 216ff

- Role of active sites in film growth
- Avrami's theorem
- Progressive Nucleation
- Instantaneous Nucleation

U

Underpotential Deposition 219ff.

Units

- Concentration 11
- Current 9,10
- Length 10
- Mass 10
- Molality 11
- Resistance 9,10
- SI 10
- Temperature 10
- Voltage 9,10

V

Viscosity 13

- of water 17
- kinematic 193

Volcano effect 212

W

Walden's Rule 36

Warburg Impedance 282

Weston Cell 102

Wheatstone Bridge 17

X

X-ray Absorption Near-Edge Structure (XANES) 334

Z

Zero-gap principle 401

ZEBRA Battery 456

Zeta Potential 119

- Point of zero zeta potential 129

Zinc-Bromine Batteries 455

Zinc-Chlorine Batteries 455

Zinc-Mercury Oxide Batteries 465

- Characteristics 465

Further Titles of Interest

Holze, R.

Experimental Electrochemistry

A Student's Lab Course

2007

Softcover

ISBN 3-527-31098-3

Bard, A. J., Faulkner, L. R.

Electrochemical Methods

Fundamentals and Applications

2001

Hardcover

ISBN 0-471-04372-9

