



Second Edition

edited by **Di Wei**

Electrochemical Nanofabrication

Principles and Applications



Preface

With the development of nanotechnology and nanomaterials, the arena of electrochemical nanofabrication has expanded significantly. The first version of the book was drafted in 2009. In 2010, the Nobel Prize in Physics was awarded to Prof. Konstantin Novoselov and Prof. Andre Geim from the University of Manchester for groundbreaking experiments regarding the two-dimensional material graphene. Three years later, the European Commission launched the European Union's biggest-ever research initiative, the Graphene Flagship, with a budget of 1 billion euro. This has boosted the research on graphene globally.

As Nokia's representative involved in the Graphene Flagship from the very beginning, I believe the two-dimensional wonder materials are defining a new scope of research in electrochemistry. This is also the motivation for us to collect new advances on applying graphene in different electrochemical devices such as electrochemical sensors and energy solutions. In this second edition, the book is enriched with the synthesis of graphene-based materials through electrochemical methods, the applications of graphene in lithium ion and sodium ion batteries, and using graphene composites for different sensing platforms. This will be of great interest to a broad audience in nanotechnology and electrochemistry.

Di Wei

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Contents

<i>Preface</i>	xiii
1. Electrochemical Nanofabrications: A General Review	1
<i>Di Wei</i>	
1.1 Electrochemical Atomic Layer Epitaxy	2
1.2 Electrochemical Synthesis of Quantum Dots and Semiconducting Nanocompounds	4
1.3 Electrochemical Deposition Methods for Metallic Nanostructures	7
1.4 Electrochemical Nanolithography	9
1.5 3D Electrochemical Nanoconstruction	15
1.6 Electrochemical Etching and LIGA Technique	15
1.7 Micro- and Nano-Machining by Ultrashort Voltage Pulsing Technique	17
1.8 Template-Free Methods for Conducting Polymer Nano-Architecture	21
1.9 Template Methods	24
1.9.1 Anodized Aluminum Oxide Membranes	24
1.9.2 Zinc Oxide	27
1.9.3 Titanium Dioxide	30
1.9.4 Electrochemical Fabrication of Soft Matters in Nanoscale Using Templates	32
1.10 Carbon Nanotube Templates	35
1.11 Colloidal Polystyrene Latex Templates	36
1.12 Electrochemistry and Self-Assembled Monolayers	39
1.13 Other Template Methods	41
1.14 Nanoscale Electrochemistry	43
1.15 Sonoelectrochemistry and Others	44
1.16 Conclusions	45

2. Electrochemical Replication of Self-Assembled Block Copolymer Nanostructures	59
<i>Edward Crossland, Henry Snaith, and Ullrich Steiner</i>	
2.1 Introduction	60
2.2 Principles of Block Copolymer Self-Assembly	62
2.3 Block Copolymer Thin Films	67
2.3.1 Alignment of the Microphase	70
2.3.1.1 Electric field alignment	71
2.4 Porous Block Copolymer Film Templates	75
2.4.1 Nondegradative Routes to Porous Templates	77
2.4.2 Accessible Pore Sizes	78
2.4.3 Template Stability	79
2.4.4 Nanowire Replication: Cylinder-Forming BCP Templates	80
2.4.4.1 In-plane nanowires	80
2.4.4.2 Standing nanowires arrays	81
2.4.4.3 Polymeric nanowire replication	84
2.4.5 Combination with Top-Down Lithography	85
2.4.6 Bicontinuous Gyroid Copolymer Templates	86
2.4.6.1 Viewing the porous gyroid morphology	88
2.4.6.2 Replication of gyroid network arrays	89
2.5 Applications: The Bulk Heterojunction Solar Cell	96
2.5.1 Block Copolymers in the Dye-Sensitized Solar Cell	97
2.6 Concluding Remarks	103
3. Synthesis of Organic Electroactive Materials in Ionic Liquids	113
<i>Michal Wagner, Carita Kvarnström, and Ari Ivaska</i>	
3.1 Introduction	113
3.2 Structure and Properties of Ionic Liquids	114
3.3 Electropolymerization of Conducting Polymers in Ionic Liquids	117

3.4	Synthesis of Polymer Composites and Carbon-Based Nanomaterials in Ionic Liquids	123
3.5	Conclusions	128
4.	Imidazolium-Based Ionic Liquid Functional Materials and Their Application to Electroanalytical Chemistry	139
	<i>Yuanjian Zhang, Yanfei Shen, and Li Niu</i>	
4.1	Introduction	139
4.2	Electrosynthesis	140
4.3	Functionalization of Ionic Liquids for Ease Immobilization	142
4.4	Electrolyte-Free Electrochemistry	150
4.5	ILs-Based Multifunctional Compounds for Electrocatalysis and Biosensors	152
4.6	ILs-Protected Nanostructures as Electrocatalysts for Some Key Reactions	156
4.7	Others	160
4.8	Conclusions	163
5.	Nanostructured TiO₂ Materials for New-Generation Li-Ion Batteries	171
	<i>Gregorio F. Ortiz, Pedro Lavela, José L. Tirado, Ilie Hanzu, Thierry Djenizian, and Philippe Knauth</i>	
5.1	Introduction	171
5.2	Economic and Scientific Context of Battery Technology over the World	173
5.2.1	Li-Ion Battery Technology: Past and Present	177
5.3	Fabrication of Self-Assembled TiO ₂ Nanotubes	182
5.3.1	Anodization of Titanium: Experimental Aspects	182
5.3.2	The Principle of Fabrication	185
5.4	Characterization of Titania Nanotubes Layers	188
5.4.1	Scanning Electron Micrograph and X-Ray Diffraction	188
5.4.2	TiO ₂ Polymorph: The Interest of Anatase and Amorphous Titania	192

5.5	Battery Applications	199
5.5.1	Electrochemical Behavior of Samples in Lithium Cells	199
5.5.2	SEM Study of Cycled Electrodes	211
5.6	Conclusions	212
6.	Hierarchically Nanostructured Electrode Materials for Lithium-Ion Batteries	223
	<i>Yu-Guo Guo, Sen Xin, and Li-Jun Wan</i>	
6.1	Brief Introduction to Lithium-Ion Batteries	224
6.2	Anode Materials	227
6.2.1	Graphite	227
6.2.2	Nongraphitized Carbon Materials	228
6.2.3	Alloys	229
6.2.4	Transition Metal Oxides	230
6.3	Cathode Materials	230
6.3.1	Layered Structured Hexagonal Oxide	231
6.3.2	Spinel Structured Oxide	231
6.3.3	Olivine Structured Oxide	232
6.4	Nanostructured Electrode Materials	232
6.4.1	Advantages of Nanomaterials	233
6.4.2	Disadvantages of Nanomaterials	235
6.5	Hierarchically Nanostructured Electrode Materials	236
6.5.1	Sphere-Like Nano/Micro Hierarchical Structures for Electrode Materials	237
6.5.2	Flower-Like Nano/Micro Hierarchical Structures for Electrode Materials	240
6.5.3	Hierarchical 3D Mixed Conducting Networks	242
6.6	Conclusions	244
7.	Ionic Liquid-Assisted Fabrication of Graphene-Based Electroactive Composite Materials	251
	<i>Pia Damlin, Bhushan Gadgil, and Carita Kvarnström</i>	
7.1	Introduction	251
7.2	Conducting Polymers	252

7.3	Ionic Liquids	254
7.3.1	Ionic Liquids in Electrochemistry	255
7.4	Graphene	257
7.4.1	Preparation of Graphene	258
7.4.2	Production of Graphene Oxide	259
7.4.2.1	Post treatment of GO	259
7.4.3	Electrochemical Exfoliation of Graphite	261
7.5	Graphene/CP Composites	263
7.6	Applications of Composite Materials	269
7.6.1	Supercapacitors	269
7.6.2	Electrochromic Composite Materials	274
8.	Chemically Converted Graphene: Functionalization, Nanocomposites, and Applications	291
	<i>Li Niu, Yuanyuan Jiang, Yizhong Lu, Shiyu Gan, Fenghua Li, and Dongxue Han</i>	
8.1	Introduction	292
8.2	Graphene-Based Nanocomposite	293
8.2.1	Graphene–Polymer Composites	293
8.2.2	Graphene-Filled Polymer Composites	294
8.2.3	Polymer-Functionalized Graphene	296
8.2.4	Graphene–Nanoparticle Composites	297
8.2.5	Composites with Metal Nanoparticles	298
8.2.6	Composites with Metal Oxide Nanoparticles	305
8.2.7	Graphene Quantum Dots Hybrids	307
8.2.8	Composite with Other Nanoparticles	308
8.2.9	Graphene Composite with Organic Molecules	309
8.3	Conclusions and Future Outlook	314
9.	Development of Graphene-Based Nanostructures	327
	<i>Huaqiang Cao</i>	
9.1	Introduction	328
9.2	Fluorescence Quenching of Hybrid Graphene Material Covalently Functional with Indolizine	329

9.3	Graphene-Based Materials Used as Electrodes in Ni-MH and Li-Ion Batteries	335
9.4	Removal of Dye from Water by Cu ₂ O@Graphene	349
9.5	Summary	354
10.	Recent Advances in Multidimensional Electrode Nanoarchitecturing for Lithium-Ion and Sodium-Ion Batteries	365
	<i>Gregorio Ortiz, Pedro Lavela, Ricardo Alcántara, and José L. Tirado</i>	
10.1	Introduction	365
10.2	Newly Developed Procedures for nt-TiO ₂ Utilization	366
10.3	First-Row Transition Metal Oxide Nanocomposites with Unusual Performance	369
10.3.1	Conversion Electrodes	369
10.3.2	Composites with Carbon Materials	371
10.3.3	Composites with Other Metal Oxides	373
10.3.4	Composites with Metals	375
10.3.5	Composites with Polymers	375
10.4	Metal Foams for 2D and 3D Battery Architectures	376
10.5	Graphene-Transition Metal Oxide Heterostructures for Battery Applications	380
10.5.1	Synthetic Route	382
10.5.2	Metal Oxides Involved in Energy Storage System	387
10.6	Surface Modification of Nanostructures for Improved Battery Performance	392
11.	Electrochemical Fabrication of Carbon Nanomaterial and Conducting Polymer Composites for Chemical Sensing	417
	<i>Zhanna A. Boeva, Rose-Marie Latonen, Tom Lindfors, and Zekra Mousavi</i>	
11.1	Introduction	417
11.2	Composites of Carbon Nanotubes and Conducting Polymers	419

11.2.1 Poly(3,4-Ethylenedioxythiophene)	420
11.2.2 Polyaniline	427
11.2.3 Polypyrrole	433
11.3 Composites of Graphene Derivatives and Conducting Polymers	439
11.3.1 Poly(3,4-Ethylenedioxythiophene)	440
11.3.2 Polyaniline	451
11.3.3 Polypyrrole	452
11.3.4 Other ECPs	457
11.4 Conclusions	459

“This book provides an innovative and thought-provoking view of electrochemical processes in nanofabrication. A comprehensive overview of the field is complemented by focused coverage of niche specialist topics involving metallic, oxide and polymeric materials in diverse combinations and complex interfacial architectures. A pedagogical approach to the central fundamental concepts allows the non-specialist to appreciate the significance of some perceptive subsequent analytical critique. Excellent use of illustrative material assists appreciation of the synergy between the novel fundamental science and its application in practical devices. This is an excellent book for those working in the field and others considering entering it.”

Prof. A. Robert Hillman
University of Leicester, UK

Nanotechnology has attracted billions of dollars in venture capital from research institutes, governments, and industries in recent years. Traditional nanofabrication techniques such as CVD, sol-gel, and self-assembly have been intensively studied. However, the electrochemical nanofabrication technique, which offers huge benefits for manufacturing nanomaterials as well as broad applications in industries, has not been given much attention compared with the traditional nanofabrication methods. This book fits the niche of such technology because it summarizes various electrochemical nanofabrication methods and shows their various essential applications in areas such as batteries, sensors, and many future technologies.

With the development of nanotechnology and nanomaterials, the arena of electrochemical nanofabrication has expanded significantly. The first edition of this book was drafted in 2009. In 2010, the Nobel Prize in Physics was awarded to Prof. Konstantin Novoselov and Prof. Andre Geim from the University of Manchester for their groundbreaking experiments on the two-dimensional material graphene. Three years later, the European Commission launched the European Union’s biggest ever research initiative, the Graphene Flagship, with a budget of 1 billion euros. In light of these developments, this new edition of the book is enriched with the synthesis of graphene-based materials through electrochemical methods, the applications of graphene in lithium-ion and sodium-ion batteries, and the use of graphene composites in various sensing platforms. It will be of immense interest to a broad audience in nanotechnology and electrochemistry.



Di Wei is a senior member of Wolfson College at the University of Cambridge and senior researcher at Nokia Technologies. He was also nominated docent (adjunct professor) at Åbo Akademi University, Finland, in 2014. He has been Nokia’s principal investigator in energy work package within the European Union’s Graphene Flagship since 2013. His research covers organic electronics, sensors, and energy solutions (photovoltaics, supercapacitors, and batteries). In addition to contributing to over 50 peer-reviewed journal publications, 30 conference proceedings, 5 keynotes, and 50 international patents, Dr. Wei has written chapters for 4 books on the topics of nanotechnology and electrochemistry.

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