
Contents

1 Organic Crystalline Nanofibers	
1.1 Introduction	1
1.2 Growth of Ultrathin Films: Molecular Orientation Control	2
1.3 Needle Films on Dedicated Templates: Mutual Orientation and Morphology Control of Nanoaggregates	6
1.3.1 Plain Mica	6
1.3.2 Au-Modified Mica	8
1.3.3 Water-Treated Mica	9
1.4 Selected Applications in Nano- and Microoptics	9
1.5 Summary and Outlook: Future Devices From Organic Nanofibers	14
References	15
2 Titanium-Based Molecular Architectures Formed by Self-Assembled Reactions	
2.1 Introduction	17
2.1.1 Results and Discussion	19
2.2 Formation of Molecular Architectures	19
2.3 Molecular Architectures Accompanied by Radical Induced C–C Coupling Reactions	33
2.4 Molecular Architectures Based on C–C Coupling Reactions Initiated by C–H Bond Activation Reactions	38
2.5 Conclusion and Future Directions	42
References	43
3 Self-Assemblies of Organic and Inorganic Materials	
3.1 Introduction	47
3.2 Structure of Colloidal Self-Assemblies Made of Surfactants and Used as Templates	49
3.3 Production of Nanocrystals by Using Colloidal Solutions as Templates and Their Limitations	51
3.4 Self-Organization of Nanocrystals	55

3.5 Colloidal Nanolithography by Using Nanocrystals Organized in a Given Structure as Masks [83].....	61
3.6 Conclusion	64
References	64
4 Self-Assembled Nanoparticle Rings	
4.1 Introduction	67
4.2 Experimental Formation of Nanoparticle Rings	68
4.2.1 Spreading of Polymer Solution on Water Surface	68
4.2.2 HDA Pancake Structures	69
4.2.3 CoPt ₃ Nanoparticle Rings	72
4.3 Model for the Formation of HDA Pancakes	74
4.3.1 Phase Separation of Binary Solution	74
4.3.2 Rupture of Thin HDA Film into Micrometer-Size Pancakes ...	78
4.4 Formation of a Nanoparticle Ring at the Edge of an HDA Pancake.....	81
4.4.1 Pinning of an HDA Micrometer-Size Pancake.....	81
4.4.2 Forces Acting on the Nanoparticle Located in the Interior of Pancake	82
4.4.3 Forces Acting on the Nanoparticle Located at the Edge of Pancake	84
4.5 Summary and Conclusions.....	85
References	86
5 Patterns of Nanodroplets: The Belousov–Zhabotinsky- Aerosol OT-Microemulsion System	
5.1 Introduction	89
5.2 The BZ-AOT System	90
5.2.1 The BZ Reaction	90
5.2.2 AOT Microemulsions	91
5.2.3 The BZ-AOT System	93
5.3 Experimental Results	94
5.3.1 Experimental Configuration	94
5.3.2 Turing Patterns	95
5.3.3 Patterns Associated with a Fast-Diffusing Activator	97
5.3.4 Complex Patterns – Dashes and Segments	100
5.3.5 Localized Patterns	101
5.4 Theoretical Considerations	103
5.5 Constructing a Model.....	104
5.5.1 Linear Stability Analysis and Types of Bifurcations	106
5.5.2 Results of Numerical Simulations	108
5.6 Conclusion and Future Directions	109
References	112

6 Honeycomb Carbon Networks: Preparation, Structure, and Transport	
6.1 Introduction	115
6.2 Experimental Formation of Polymer Honeycomb Structures	118
6.2.1 Spreading of One Liquid on Another	118
6.2.2 Production of Polymer Networks	119
6.2.3 Structural Forms of Nitrocellulose Networks	120
6.2.4 Structural Forms of Poly(<i>p</i> -phenylenevinylene) and Poly (3-octylthiophene) Networks	123
6.3 Model for the Formation of Honeycomb Structures in Polymer Films	125
6.3.1 Water Droplet on the Fluid Polymer Layer	125
6.4 Nitrocellulose Networks as Precursor for Carbon Networks	132
6.4.1 Temperature Dependence of Hopping Transport in Carbon Networks	133
6.4.2 Electrical Field Dependence of Hopping Transport in Carbon Networks	142
6.5 Summary and Conclusions	150
References	151
7 Chemical Waves in Living Cells	
7.1 Introduction	155
7.2 Waves of Metabolic Activity	156
7.3 Calcium Signaling Waves	160
7.4 Conclusions	164
References	166
Index	169

Self-Organized Morphology in Nanostructured Materials

Al-Shamery, K.; Parisi, J. (Eds.)

2008, XIII, 176 p., Hardcover

ISBN: 978-3-540-72674-6