

Table of Contents

Executive Summary	4
Introduction	6
1. Concepts	
1.1 Microcavities	
<i>Thin-film 1D photonic crystals and Fabry-Perot microcavities</i>	10
<i>2D and 3D optical microcavities</i>	16
1.2 Plasmonics	
<i>Subwavelength surface plasmon optics</i>	19
1.3 Non-linear nano-optics	
<i>Non-linear nano-optics I</i>	22
<i>Non-linear nano-optics II</i>	24
<i>Non-linear nano-optics for ultra-sensitive detection</i>	27
1.4 Optical trapping and sorting	
<i>Optical tweezers</i>	29
1.5 Metamaterials in the visible	
<i>Metamaterials in the visible range</i>	32
1.6 Random Lasers	
<i>Physics and applications of random lasers</i>	34
2. Technologies	
2.1 Infiltration techniques	
<i>Opal templating</i>	38
2.2 Functionalisation	
<i>Functionalization for photonic biosensing</i>	41
2.3 Self Assembly	
<i>Opals</i>	44
<i>Field-assisted self assembly of opals</i>	47
<i>Assemblies of colloidal quantum dots</i>	49
<i>Near-infrared colloidal quantum dots for nanophotonics</i>	52
<i>Modelling and optimization in opal-based photonic crystals</i>	55
<i>One-dimensional (1D) nanostructures: optical properties</i>	57
<i>Colloidal crystals for light manipulation</i>	61
2.4 Nanofabrication	
<i>Nanoimprinting</i>	64
2.5 Hybrid Technologies	
<i>Functional 1-D confined hybrid organic-inorganic nanotechnologies</i>	69
<i>Heterogeneous integration of III-Vs on silicon</i>	72
<i>Integration of colloidal photonic crystals</i>	74
<i>Magnetophotonic crystals</i>	77
3. Emerging Devices	
2.1 Infiltration techniques	
<i>Hybrid organic-nanoparticle solar cells</i>	82
<i>Automotive lighting systems</i>	85
<i>Nanoparticle-doped organics waveguide optical amplifiers</i>	87
<i>Magneto-plasmonics for sensing applications</i>	90
Technical Acronyms	92
Contributors	93
Subject Index	94