Unconventional Approaches to Nanostructures with Applications in Electronics, Photonics, Information Storage and Sensing
Unconventional Approaches to Nanostructures with Applications in Electronics, Photonics, Information Storage and Sensing

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CONTENTS

Preface ........................................................................................................... xi

Materials Research Society Symposium Proceedings ........................................ xii

QUANTUM DOTS AND NANO PARTICLES

Red Shifted-Photoluminescence of Ensembles of GaN Nano-Crystallites .......... 3
Leah Bergman, Xiang-Bai Chen, Joel Feldmeier, Andrew P. Purdy,
Fran Adar, and Emmanuel Lero y

* Optical Properties and Local Structure of Cu(II) Dopant in ZnSe
Nanoparticles .................................................................................................. 9
Thaddeus J. Norman Jr., Donny Magana, Frank Bridges, and
Jin Z. Zhang

Quantum Dot-Organic Oligomer Nanostructures: Electronic
Excitation Migration and Optical Memory Design ............................................. 17
Artjay Javier, C. Steven Yun, and Geoffrey F. Strouse

* Growth and Optical Properties of GaP, GaP@GaN and
GaN@GaP Core-Shell Nanowires ....................................................................... 23
Hung-Min Lin, Jian Yang, Yong-Lin Chen, Yau-Chung Lia,
Kai-Min Yin, Ji-Jung Kai, Fu-Rong Chen, Li-Chyong Chen,
Yang-Fang Chen, and Chia-Chun Chen

Synthesis of Gold Nanoshells and Their Use in Sensing Applications ............... 31
Yugang Sun and Younan Xia

Self-Assembling Around Templates—Creating Nano Dots and
Pits for Chemical Sensing .............................................................................. 37
Franz L. Dickert, Peter A. Lieberzeit, Oliver Hayden,
Roland Bindeus, Karl-Jürgen Mann, and Claudia Haderspeck

Atomic Ordering in Self-Assembled Epitaxial and Endotaxial
Compound and Element Semiconductor Quantum Dot
Structures: The First Review ............................................................................ 43
Peter Möck

Unconventional Nanoparticle Technology of Superconductor
Ceramic Articles .................................................................................................. 49
Anatoly E. Rokhvarge r and Lubov A. Chigirinsky

*Invited Paper
Synthesis of Carbon-Encapsulated Magnetic Nanoparticles by a Grain-Boundary-Reaction
Qixiang Wang, Guoqing Ning, Fei Wei, and Guohua Luo

Preparation of Inks With Monodisperse Colloidal Silica and Their Self-Assembly in an Ink-Jet Printed Droplet
Hwa-Young Ko, Hyunjung Shin, and Jooho Moon

Fabrication of Nanoimprint Stamps by Nanosphere Lithography
Chun-Wen Kuo, Jau-Ye Shin, Yi-Hong Cho, and Peilin Chen

ONE-DIMENSIONAL NANOSTRUCTURES

Chalcogen Nanowires: Synthesis and Properties
Brian T. Maysers and Younan Xia

Dielectrophoretic Assembly of Switchable Two-Dimensional Photonic Crystals With Specific Orientation
Simon O. Lumsden, Eric W. Kaler, and Orlin D. Velev

Synthesis of CdO Nanoneedles for Photonic and Sensing Applications
Xiaolei Liu, Chao Li, Song Han, and Chongwu Zhou

From Helical Nanowires, Nanocrosses to Aligned Micro-Carbon Fibers
Hai-Feng Zhang, Chong-Min Wang, James S. Young, James E. Coleman, and Lai-Sheng Wang

Growth and Characterization of ZnO Nanowires
Jason B. Baxter, Ron E.M.W. Bessens, and Enay S. Aydiil

Catalytic Growth of Semiconducting ZnO Nanowires by Reactive Evaporation Process
Joodong Park, Han-Ho Choi, and Rajiv K. Singh

Effects of Doping on the Growth of ZnO Nanostructures
Yanfa Yan, P. Liu, M.J. Romero, and M.M. Al-Jassim

Fabrication and Characterization of Iron-Cobalt Alloy Magnetic Nanocluster Wires by Thermal Decomposition Method in Magnetic Fields
Heesung Moon, Changhun Nam, Changwook Kim, Bongsoo Kim, and Gangho Lee
Surface Patterns of Tetragonal Phase FePt Thin Films From Pt@Fe₂O₃ Core-Shell Nanoparticles Using Combined Langmuir-Blodgett and Soft Lithographic Techniques .................................................. 187
Qijie Guo, Xiaowei Teng, and Hong Yang

Control of Morphology of Nanoparticles—Liquid Crystal Colloids ........................................... 193
John L. West, Ke Zhang, and Anatoliy Glushchenko

PROPERTIES AND APPLICATIONS

Design and Characterization of Nanoarchitectures From Multifunctional Polyparaphenylenees ................................................................. 201
Renu Ravindranath, Suresh Valiyaveettil, Chinnapan Basak, Ananda Putra, Fitri Fitrilawati, and Wolfgang Knoll

Synthesis and Characterization of Pd Nano-Pillar Arrays in the Metal Hydride Switchable Mirror ................................................................. 207
M. Di Vecce and J.J. Kelly

Chemical Sensors Based on Individual In₂O₃ Nanowires ................................................................. 213
Daibua Zhang, Chao Li, Xiaolei Liu, Song Han, Tao Yang, and Chengwu Zhou

Electric Field Induced Carbon Nanostructures for Electronics and High Surface Area Applications ................................................................. 219
Chao Hsuin Lin, Shu Hsing Lee, Chih Ming Hsu, Ming Her Tsai, and Cheng Tzu Kuo

Electro-Optical and Morphological Properties of Bragg Transmission Gratings Written in Holographic Polymer Dispersed Liquid Crystals by Thioc-en-e Photopolymerization ................................................................. 225
L.V. Natarajan, V.P. Tondiglia, R.L. Sutherland, D. Tomlin, and T.J. Bunning

Magnetic Properties of La₀.₁SrₓMnO₃ Nanocrystals Embedded in a Mesoporous Silicate ................................................................. 231
Shigemi Kohiki, Yoshihisa Ishida, Sinichiro Nogami, Hirokazu Shimooka, Takayuki Tajiri, Hiroyuki Deguchi, Masanori Mitome, and Masssoki Oku

Theoretical Study on Tunnel Magnetoresistance Oscillation Due to Coulomb Blockade in Nanoscale Magnetic Tunnel Junction ................................................................. 237
Yasushi Takemura and Jun-ichi Shirakashi
Novel Glucose Biosensor Based on the Microcantilever......................................................243
Jianhong Pei, Fang Tian, and Thomas Thundat

Normal Incidence Intersubband Transitions in InGaAs/GaAs
Quantum Dots With Non-Monotonic Shift .................................................................249
M.L. Hussein, W.Q. Ma, and G.J. Salamo

Oxidation of Si/nc-Ge/Si Heterostructures for Non Volatile
Memory Applications .........................................................................................................253
M. Kanoun, A. Souifi, S. Decossas, C. Dubois, G. Bremond,
F. Bassani, Y. Lim, A. Ronda, I. Berbecier, O. Kermarrec,
and D. Benmahel

Field Emission of Zinc Oxide Nanostructures .................................................................259
Sang Hyun Lee, SeGi Yu, Taewon Jeong, Jungna Heo,
Wonseok Kim, Chang Soo Lee, Jeonghee Lee, J.M. Kim,
TaEun Kim, and Kee Suk Nahm

Synthesis and Electronic Properties of Single-Crystalline
Indium Nitride Nanowires ...............................................................................................265
Tao Tang, Song Han, Wu Jin, Xiaolei Liu, Chao Li,
Daihua Zhang, and Chongwu Zhou

* Large Scale Production of Carbon Nanotube Transistors:
A Generic Platform for Chemical Sensors ....................................................................271
Jean-Christophe P. Gabriel

Author Index .......................................................................................................................279

Subject Index .....................................................................................................................283

*Invited Paper
Nanostructures (or structures with at least one dimension between 1 and 100 nm) have attracted steadily growing interest due to their peculiar, fascinating properties and unique applications relative to the bulk materials. Many interesting new phenomena are associated with nanometer-sized dimensions; well-established examples include quantized excitation or emission, Coulomb blockade, single electron tunneling, metal-insulator transition, and superparamagnetism. By using these nanostructures as functional components, various prototypes of devices have been successfully fabricated recently, with notable examples including quantum dot lasers and single electron transistors.

The ability to generate these small structures is central to the advance of many areas in modern science and technology (e.g., electronics, photonics, and information storage). Although some nanostructures can be generated using advanced nanolithographic techniques (e.g., e-beam writing), the development of these methods into practical routes to large numbers of nanostructures rapidly and at low cost still requires great ingenuity. Chemical methods and self-assembly seem to provide a more promising strategy for the formation of nanostructures in terms of cost, throughput, and potential for large-scale production. The papers presented at Symposium Q, "Unconventional Approaches to Nanostructures with Applications in Electronics, Photonics, Information Storage and Sensing," held April 21-25 at the 2002 MRS Spring Meeting in San Francisco, California, and included in this proceedings volume, cover research ranging from the fundamental chemistry and physics of nanostructures, to their interactions with light and electricity, and to application in novel devices and technologies.

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