Nanoengineering: Fabrication, Properties, Optics, and Devices IV

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Editors

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Contents

ix Conference Committee
xi Introduction

SESSION 1 PHOTONIC CRYSTALS

6645 03 SiN photonic crystal cavities: promising tools for the manipulation of light in the visible range [6645-02]
M. Barth, Humboldt-Univ. Berlin (Germany); J. Kouba, BESSY GmbH (Germany); J. Stingl, Humboldt-Univ. Berlin (Germany); B. Löchel, BESSY GmbH (Germany); O. Benson, Humboldt-Univ. Berlin (Germany)

6645 05 Fabrication and optical characterization of Si$_3$N$_4$ 2D-photonic crystals for applications in visible range [6645-04]
J. Kouba, S. Kiss, BESSY GmbH (Germany); M. Barth, Humboldt Univ. of Berlin (Germany); W. Eberhardt, B. Loechel, BESSY GmbH (Germany)

SESSION 2 NANO-BIOTECHNOLOGY

6645 06 Parallel optical tweezers with combining a diffractive optical element and a spatial light modulator for photonic DNA memory (Invited Paper) [6645-05]
M. Zheng, N. Tate, Y. Ogura, J. Tanida, Osaka Univ. (Japan)

6645 09 Nano-scale patterning of phospholipid thin films by interferometric UV lithography [6645-08]
A. Kassu, J.-M. Taguenang, A. Sharma, Alabama A&M Univ. (USA)

6645 0A Biological fabrication of nanostructured silicon-germanium photonic crystals possessing unique photoluminescent and electroluminescent properties [6645-09]

6645 0B Development of ultra-low magnetic field sensors with magnetic tunneling junctions [6645-10]
P. W. T. Pong, J. E. Bonevich, W. F. Egelhoff, Jr., National Institute of Standards and Technology (USA)

SESSION 3 OPTICAL INTERCONNECTS

6645 0D Flexible optical wire-bonding for planar lightwave circuits packaging [6645-12]
R. R. Panepucci, A. J. Zakariya, T. Liu, Florida International Univ. (USA)

6645 0E Nanotaper coupler for the horizontal slot-waveguide [6645-13]
A. M. P. Fièvre, T. Liu, R. R. Panepucci, Florida International Univ. (USA)
Enhancement of light extraction efficiency of light-emitting diode with hexagonal photonic crystal layer [6645-15]

SESSION 4 NANOFABRICATED OPTICAL DEVICES

Short polymer waveguide resonator with Bragg reflectors [6645-17]
T. Liu, M. Nawrocka, R. Panepucci, Florida International Univ. (USA)

Wavelength reconfigurable photonic switching using thermally tuned micro-ring resonators fabricated on silicon substrate [6645-18]
M. R. Wang, H.-Y. Ng, Univ. of Miami (USA); D. Li, New Span Opto-Technology, Inc. (USA); X. Wang, J. Martinez, R. R. Panepucci, Florida International Univ. (USA); K. Pathak, U.S. Army Space and Missile Defense Command (USA)

Variable diffraction gratings using nanoporous electrodes and electrophoresis of dye ions [6645-20]
P. C. P. Hrudey, M. A. Martinuk, M. A. Mossman, Univ. of British Columbia (Canada); A. C. van Poppe, M. J. Brett, Univ. of Alberta (Canada); J. S. Huizinga, 3M Co. (USA); L. A. Whitehead, Univ. of British Columbia (Canada)

SESSION 5 QUANTUM DOTS AND WIRES

Design, fabrication, and testing of enhanced EO materials for mmW modulators [6645-25]
B. Redding, N. Faleev, X. Long, T. Creazzo, S. Shi, D. Prather, Univ. of Delaware (USA)

SESSION 6 NANOSTRUCTURE ENGINEERING

Ultrafast pulsed laser ablation for synthesis of nanocrystals (Invited Paper) [6645-26]
B. Liu, Z. Hu, IMRA America, Inc. (USA); Y. Chen, K. Sun, X. Pan, Univ. of Michigan (USA); Y. Che, IMRA America, Inc. (USA)

Fabrication of spintronic devices: etching endpoint detection by resistance measurement for magnetic tunnel junctions [6645-27]
P. W. T. Pong, M. Schmoueli, W. F. Egelhoff, Jr., National Institute of Standards and Technology (USA)

Preliminary design and noise considerations for an ultrasensitive magnetic field sensor [6645-29]
P. W. T. Pong, R. McMichael, National Institute of Standards and Technology (USA); A. S. Edelstein, Army Research Lab. (USA); E. R. Nowak, Univ. of Delaware (USA); W. F. Egelhoff, Jr., National Institute of Standards and Technology (USA)

In situ Raman scattering in nanomaterial flame synthesis: a case on TiO2 nanoparticles [6645-31]
X. Liu, Rutgers, The State Univ. of New Jersey (USA)
SESSION 7 THIN FILM NANOSTRUCTURE OPTICS

6645 0W  Optics of thin-film silicon solar cells with efficient periodic light trapping textures [6645-32]
C. Haase, Forschungszentrum Jülich (Germany); D. Knipp, Jacobs Univ. Bremen (Germany);
H. Stiebig, Forschungszentrum Jülich (Germany)

6645 0X  Tailored circular Bragg phenomena in TiO2 sculptured thin films through post-deposition
processing [6645-33]
S. M. Pursel, M. W. Horn, A. Lakhtakia, Pennsylvania State Univ. (USA)

6645 0Z  Fabrication and characterization of silicon/silicon dioxide super lattices for silicon based
light emitting devices [6645-35]
T. Creazzo, E. Marchena, B. Redding, T. Hodson, D. Prather, Univ. of Delaware (USA)

6645 10  Function of bubble pit in super-RENS storage [6645-36]
Q. Liu, C. Guo, S. Cao, Z. Zhang, National Ctr. for Nanoscience and Technology (China);
T. Fukaya, National Institute of Advanced Industrial Science and Technology (Japan)

6645 11  Narrowband linear-polarization rejection filter based on columnar thin film superlattice
[6645-37]
F. Chiadini, Univ. of Salerno (Italy); V. Fiumara, Univ. of Basilicata (Italy); A. Scaglione, Univ.
of Salerno (Italy); A. Lakhtakia, Pennsylvania State Univ. (USA)

SESSION 8 ORGANIC NANOSTRUCTURES

6645 13  Fabrication of sub-diffraction-limit molecular structures by scanning near-field
photolithography [6645-39]
R. E. Ducker, M. T. Montague, S. Sun, G. J. Leggett, Univ. of Sheffield (United Kingdom)

6645 14  Elasticity of two-photon-fabricated nano-wires [6645-40]
S. Nakanishi, Osaka Univ. (Japan); H.-B. Sun, Jinlin Univ. (China); S. Kawata, Osaka Univ.
(Japan)

SESSION 9 NANOTUBES

6645 16  Optical polarizer made of mechanically aligned carbon nanotubes [6645-42]
S. Shoji, Osaka Univ. (Japan) and CREST, Japan Corp. of Science and Technology (Japan);
H. Suzuki, Osaka Univ. (Japan); R. P. Zaccaria, Osaka Univ. (Japan) and CREST, Japan Corp.
of Science and Technology (Japan); Z. Sekkat, Osaka Univ. (Japan), Al Akhawayn Univ. in
Ifrane (Morocco), and Academy Hassan II of Science and Technology (Morocco); S. Kawata, Osaka Univ. (Japan), RIKEN (Japan), and CREST, Japan Corp. of Science and Technology (Japan)

6645 1A  Nano materials for efficiently lowering the freezing point of heat transfer nanofluids
[6645-46]
H. Hong, South Dakota School of Mines and Technology (USA); W. Roy, Army Research Lab.
(USA)
6645 1B  Light source with carbon nanotubes field emission cathode and rare-earth doped nanocrystalline phosphors [6645-47]
P. Psuja, W. Strek, Institute of Low Temperature and Structure Research (Poland)

6645 1D  Self-sensing of CNF and Ni nanowire/PVDF and cellulose composites using electro-micromechanical test [6645-50]
J.-M. Park, Gyeongsang National Univ. (South Korea) and The Univ. of Utah (USA); P.-G. Kim, J.-H. Jang, S.-J. Kim, Gyeongsang National Univ. (South Korea); D.-J. Yoon, Korea Research Institute of Standards and Science (South Korea); G. Hansen, Metal Matrix Composites, Inc. (USA); K. L. DeVries, The Univ. of Utah (USA)

6645 1E  Diffusive and convective dye replenishment in optofluidic light sources [6645-51]
M. Gersborg-Hansen, N. A. Mortensen, A. Kristensen, Technical Univ. of Denmark (Denmark)

6645 1G  Holographic fabrication of photonic nanostructures for optofluidic integration [6645-53]
S.-K. Lee, S.-G. Park, J.-H. Kang, Korea Advanced Institute of Science and Technology (South Korea); J. H. Moon, Samsung Advanced Institute of Technology (South Korea); S.-M. Yang, Korea Advanced Institute of Science and Technology (South Korea)

6645 1H  Photonic crystal biosensor microplates with integrated fluid networks for high throughput applications in drug discovery [6645-54]
C. J. Choi, L. L. Chan, M. F. Pineda, B. T. Cunningham, Univ. of Illinois at Urbana-Champaign (USA)

6645 1I  Capillary driven tunable optofluidic DFB dye lasers [6645-55]
M. Gersborg-Hansen, A. Kristensen, Technical Univ. of Denmark (Denmark)

6645 1J  Nanoscale optofluidic sensor arrays for Dengue virus detection [6645-56]
S. Mandal, R. Akhmechet, L. Chen, S. Nugen, A. Baeumner, D. Erickson, Cornell Univ. (USA)

6645 1K  Microfluidic channel with built-in photonic crystal nanolaser [6645-57]
S.-H. Kim, S.-K. Lee, Y.-H. Lee, S.-M. Yang, Korea Advanced Institute of Science and Technology (South Korea)

6645 1L  Liquid-infiltrated photonic crystals for lab-on-a-chip applications [6645-58]
S. Xiao, J. Pedersen, N. A. Mortensen, Technical Univ. of Denmark (Denmark)

6645 1M  Electroactive nanowells for spectrographic fluidic memory [6645-59]
B. Cordovez, Cornell Univ. (USA); D. Psaltis, Ecole Polytechnique Fédérale de Lausanne (Switzerland); D. Erickson, Cornell Univ. (USA)
SESSION 12  NANOPROCESSING TECHNOLOGIES AND NANOSYSTEMS FOR MEDICAL APPLICATIONS

6645 1P  Electron microscopy characterization of iron oxide nanopowders (prepared by laser pyrolysis) for magnetic fluid applications [6645-63]
V. Ciupina, G. Prodan, Ovidius Univ. of Constanta (Romania); I. Morjan, F. Dumitrache, R. Alexandrescu, National Institute for Laser, Plasma and Radiation Physics (Romania); E. Vasile, Metav-CD SRL (Romania); L. Vegas, D. Bica, National Institute for Research and Development in Microtechnology (Romania)

6645 1Q  Cytotoxicity of the photoluminescent silicon nanocrystals [6645-64]
J. Choi, Univ. of Maryland, College Park (USA), National Institute of Standards and Technology (USA), and U.S. Food and Drug Administration (USA); Q. Zhang, V. M. Hitchins, U.S. Food and Drug Administration (USA); N. S. Wang, Univ. of Maryland, College Park (USA); V. Reipa, National Institute of Standards and Technology (USA)

6645 1U  Near-infrared laser photothermal therapy and photodynamic inactivation of cells by using gold nanoparticles and dyes [6645-68]
G. G. Akchurin, G. G. Akchurin, Saratov State Univ. (Russia); V. A. Bogatyrev, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russia); I. L. Maksimova, Saratov State Univ. (Russia); G. A. Seliverstov, Saratov State Medical Univ. (Russia); G. S. Terentyuk, First Veterinary Clinic (Russia); B. N. Khlebtsov, N. G. Khlebtsov, Institute of Biochemistry and Physiology of Plants and Microorganisms (Russia); V. V. Tuchin, Saratov State Univ. (Russia)

POSTER SESSION

6645 1V  Fabrication strategies for magnetic tunnel junctions with magnetoelectronic applications [6645-69]
P. W. T. Pong, W. F. Egelhoff, Jr., National Institute of Standards and Technology (USA)

6645 1W  Flexible Bragg reflection waveguide devices fabricated on a plastic substrate [6645-72]
K.-J. Kim, J.-A. Yi, M.-C. Oh, Pusan National Univ. (South Korea); Y.-O. Noh, H.-J. Lee, ChemOptics (South Korea)

6645 1X  Characterization of AlF3 thin films in the ultraviolet by magnetron sputtering of aluminum target [6645-73]
B.-H. Liao, M.-C. Liu, C.-C. Lee, National Central Univ. (Taiwan)

6645 1Y  The research of oblique deposition of lanthanum fluoride thin films at 193nm [6645-74]
M.-C. Liu, B.-H. Liao, W.-H. Cho, C.-C. Lee, National Central Univ. (Taiwan); C.-C. Jaing, Minghsin Univ. of Science and Technology (Taiwan)

6645 1Z  Dynamic force microscopy and x-ray photoemission spectroscopy studies of conducting polymer thin film on nanoscale structured Al surface [6645-75]
H. Kato, S. Takemura, A. Ishii, Y. Takarai, Y. Watanabe, T. Sugiyama, T. Hiramatsu, N. Nanba, Kanto Gakuin Univ. (Japan); O. Nishikawa, M. Taniguchi, Kanazawa Institute of Technology (Japan)
Pho toxopolymerization of hybrid organic/inorganic materials based on nanostructured units for photonic applications [6645-77]
I. Fortunati, T. Dainese, R. Signorini, R. Bozio, Univ. of Padova (Italy); V. Tagliazucca, S. Dirè, Univ. of Trento (Italy); G. Lemercier, J.-C. Mulatier, C. Andraud, Lab. de Chimie, CNRS, ENS-Lyon (France); P. Schiavuta, CIVEN, Nanofabrication Facility (Italy); Y. Bottazzo, G. Della Giustina, G. Brusatin, M. Guglielmi, Univ. of Padova (Italy)

Theory and numerical design of coupled-resonator optical waveguide sections with bends [6645-78]
S. V. Pishko, S. V. Boriskina, V. Karazin Kharkov National Univ. (Ukraine)

Covalent attachment of photoluminescent silicon nanoparticles to streptavidin [6645-80]
J. Choi, Univ. of Maryland, College Park (USA) and National Institute of Standards and Technology (USA); P. Niarhos, N. S. Wang, Univ. of Maryland, College Park (USA); V. Reipa, National Institute of Standards and Technology (USA)

Micro-opto-electro-mechanical system (MOEMS) for microstructure manipulation and optical characterization [6645-82]
J. A. Martinez, T. Liu, R. R. Panepucci, Florida International Univ. (USA)

The role of electro-osmosis and dielectrophoresis in collection of micro/nano size particles in low frequency AC electric field [6645-85]
C. Wei, C.-W. Hsu, C.-C. Wang, Tatung Univ. (Taiwan)

A sub-wavelength level polarizer with high contrast and high tolerance of incident ray’s angle in the range of visible wavelength [6645-86]
Y.-C. Lo, K.-Y. Cheng, T.-C. Teng, C.-C. Sun, National Central Univ. (Taiwan)

Dielectric constant trends in silicate spin-on glasses [6645-87]
N. Iwamoto, T. Li, Honeywell Specialty Materials (USA); J. Sepa, A. Krishnamoorthy, Honeywell Electronic Materials (USA)

Author Index
Conference Committee

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1 Photonic Crystals
Louay A. Eldada, DuPont Photonics Technologies (USA)

2 Nano-Biotechnology
Elizabeth A. Dobisz, Hitachi Global Storage Technologies (USA)

3 Optical Interconnects
El-Hang Lee, Inha University (South Korea)

4 Nanofabricated Optical Devices
Louay A. Eldada, DuPont Photonics Technologies (USA)

5 Quantum Dots and Wires
Elizabeth A. Dobisz, Hitachi Global Storage Technologies (USA)
<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Authors and Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Nanostructure Engineering</td>
<td>Yusuke Ogura, Osaka University (Japan)</td>
</tr>
<tr>
<td>7</td>
<td>Thin Film Nanostructure Optics</td>
<td>Gregory J. Exarhos, Pacific Northwest National Laboratory (USA)</td>
</tr>
<tr>
<td>8</td>
<td>Organic Nanostructures</td>
<td>Louay A. Eldada, DuPont Photonics Technologies (USA)</td>
</tr>
<tr>
<td>9</td>
<td>Nanotubes</td>
<td>Elizabeth A. Dobisz, Hitachi Global Storage Technologies (USA)</td>
</tr>
<tr>
<td>10</td>
<td>Nanowires, Nanofibers, and Nanorods</td>
<td>André-Jean Attias, Université Pierre et Marie Curie (France)</td>
</tr>
<tr>
<td>11</td>
<td>Optofluidics</td>
<td>Demetri Psaltis, École Polytechnique Fédérale de Lausanne (Switzerland)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yeshaiahu Fainman, University of California, San Diego (USA)</td>
</tr>
<tr>
<td>12</td>
<td>Nanoprocessing Technologies and Nanosystems for Medical Applications</td>
<td>Frederic Zenhausern, Arizona State University (USA)</td>
</tr>
</tbody>
</table>
Introduction

This volume features contributions from scientists and engineers in the general area of nanoengineering. Over the past couple of years, mature technologies such as logic, memory, and data storage have been rapidly thrust into the sub-100nm regime. Existing processes of record have been extended well beyond the ranges deemed feasible or reliable. New technologies such as biotechnology, medical nanosystems, 3D sensors, 3D displays, systems on a chip, optofluidics, nanophotonics, and molecular electronics and optics are emerging. The upcoming synthesized nanomaterials, nanotubes, and nanowires, offer extremely attractive physical features and great opportunities. Continuing improvements in the design and fabrication of micro/nano/quantum-scale optical elements have driven the development of passive and active miniature optical components with applications in ever more diverse areas of photonics. These areas include optical communication, neural systems, optical information processing, optical computing, optical storage, optical scanning, smart pixel arrays, information display, imaging, printing, medical diagnosis, and chemical and biological sensing. Emerging nanotechnologies present new opportunities and challenges in materials processing, device design, and integration. Drivers for commercial deployment include function, performance, reliability, space, and cost.

Papers in these proceedings include discussions of materials nanoengineering, properties of nanostructures, innovative patterning and processing techniques, micro/nano/quantum optics, and fabrication and packaging of miniature devices. Some papers describe the refinement of existing schemes and processes, while others introduce novel concepts and new designs. Papers from academic and research institutions push the state of the art in miniaturization, level of integration, and performance figures of merit, and papers from the industry emphasize design criteria and manufacturing methods that result in practical components and systems that can be deployed commercially.

Although this volume cannot include all the recent important work in the vast field of nanoengineering, it does cover a significant cross-section of the advances happening globally in areas where nanoengineering is making an impact. We hope these papers by world-renown experts serve the purpose of bringing the readers up to date on the state of the art in this fast-growing and exciting field.

Elizabeth A. Dobisz
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