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Editors

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## Contents

vii  Conference Committee
ix  Introduction

### SESSION 1 NANOPHOTONICS

7764 03  Cladding index engineering of the photonic properties of single-mode photonic crystal devices [7764-02]
M. D. Weed, H. P. Seigneur, W. V. Schoenfeld, CREOL, The College of Optics and Photonics, Univ. of Central Florida (United States)

7764 05  Flexible Cu plasmonic waveguide for board-level optical interconnection [7764-04]
J. T. Kim, S. Park, M. Kim, S. K. Park, J. J. Ju, Electronics and Telecommunications Research Institute (Korea, Republic of)

7764 07  A compact polarization-independent racetrack resonator with polarization-independent directional coupler and compensation sections formed by slot waveguides [7764-06]
Y.-F. Ma, D.-W. Huang, National Taiwan Univ. (Taiwan)

### SESSION 2 ENERGY CONVERSION AND ALTERNATIVE ENERGY SOLUTIONS THROUGH NANOENGINEERING

7764 08  Nanotechnologies for efficient solar and wind energy harvesting and storage (Invited Paper) [7764-07]
L. A. Eldada, HelioVolt Corp. (United States)

7764 09  New technology for microfabrication and testing of a thermoelectric device for generating mobile electrical power [7764-08]
N. S. Prasad, NASA Langley Research Ctr. (United States); P. J. Taylor, U.S. Army Research Lab. (United States); S. B. Trivedi, S. W. Kutcher, Brimrose Technology Corp. (United States)

7764 0A  Band structures of cylindrical AlN/GaN quantum dots with fully coupled piezoelectric models [7764-09]
S. Prabhakar, Wilfrid Laurier Univ. (Canada); R. Melnik, Wilfrid Laurier Univ. (Canada) and BCAM (Spain)

7764 0B  Investigation of the light energy extraction efficiency using surface modes in electrically pumped semiconductor microcavity [7764-10]
E. H. Khoo, I. Ahmed, E. P. Li, A*STAR Institute of High Performance Computing (Singapore)

### SESSION 3 THE NEXT FRONTIER IN NANOENGINEERING

7764 0E  Femtosecond laser direct writing of nanoscale silicon lines [7764-13]
J. I. Mitchell, S. J. Park, C. A. Watson, P. Srisungsitthisunti, C. Tansarawiput, M. Qi, E. A. Stach, C. Yang, X. Xu, Purdue Univ. (United States)
Fabrication of thin, free-standing BPSG films for metrological methods utilizing neutron-induced nuclear reactions [7764-15]
C. L. Trivelpiece, J. S. Brenizer, Jr., C. G. Pantano, The Pennsylvania State Univ. (United States)

SESSION 4 NANOFABRICATION: NEW TECHNIQUES, PROPERTIES, AND EMERGING APPLICATIONS

Nanoscale logic operation in optically manipulated micro-droplets (Invited Paper) [7764-16]
Y. Ogura, T. Nishimura, J. Tanida, Osaka Univ. (Japan)

Nanoimprinted polymer chips for light induced local heating of liquids in micro- and nanochannels [7764-17]
L. H. Thamdrup, J. N. Pedersen, H. Flyvbjerg, N. B. Larsen, A. Kristensen, Technical Univ. of Denmark (Denmark)

Di-block co-polymer derived nanoporous polymer liquid core waveguides [7764-18]
M. B. Christiansen, N. Gopalakrishnan, K. S. Sagar, S. Ndoni, A. Kristensen, Technical Univ. of Denmark (Denmark)

Non-contact stiffness measurement of a suspended single walled carbon nanotube devices [7764-19]
Y. Zheng, NASA Goddard Space Flight Ctr. (United States); C. Su, Veeco Instruments Inc. (United States); S. Getty, NASA Goddard Space Flight Ctr. (United States)

Electrical properties of in-situ grown and transferred organic nanofibers [7764-20]
R. M. d. O. Hansen, M. Madsen, J. Kjelstrup-Hansen, Univ. of Southern Denmark (Denmark); R. H. Pedersen, N. Gadegaard, Univ. of Glasgow (United Kingdom); H.-G. Rubahn, Univ. of Southern Denmark (Denmark)

Gold/silver coated nanoporous ceramic membranes: a new substrate for SERS studies [7764-21]
A. Kassu, P. Robinson, A. Sharma, Alabama A&M Univ. (United States); P. B. Ruffin, C. Brantley, E. Edwards, U.S. Army Aviation and Missile Research, Development and Engineering Ctr. (United States)

Total losses analysis and calculations for PbSe/PbSrSe multiple quantum well structures [7764-22]
M. Khodr, Hariri Canadian Univ. (Lebanon)

POSTER SESSION

Synthesis and characterization of some carbon based nanostructures [7764-23]
V. Ciupina, Univ. Ovidius Constanta (Romania); I. G. Morjan, R. Alexandrescu, F. V. Dumitrache, National Institute for Lasers, Plasma and Radiation Physics (Romania); G. Prodan, Univ. Ovidius Constanta (Romania); C. Lungu, National Institute for Lasers, Plasma and Radiation Physics (Romania); R. Viadoiu, Univ. Ovidius Constanta (Romania); I. Mustata, V. Zarovschi, National Institute for Lasers, Plasma and Radiation Physics (Romania); J. Sullivan, S. Saied, Aston Univ. (United Kingdom); E. Vasile, S.C. Metav-Cercetare Dezvoltare S.A. (Romania); I. Oancea-Stanescu, M. Prodan, D. Manole, A. Mandes, V. Dinca, M. Contulov, Univ. Ovidius Constanta (Romania)
Lithography-free surface modification by self-masking during glass dry-etching [7764-24]
E. Hein, D. Fox, H. Fouckhardt, Technische Univ. Kaiserslautern (Germany)

Reusing commercial SERS substrate by gold/silver coating [7764-25]
A. Kassu, P. Robinson, A. Sharma, Alabama A&M Univ. (United States); P. B. Ruffin, C. Brantley, E. Edwards, U.S. Army Aviation and Missile Research, Development and Engineering Ctr. (United States)

New method of fabrication Fresnel zone plate for hard x-ray radiation [7764-26]
A. V. Kuyumchyan, Institute of Microelectronics Technology (Russian Federation) and American Nanoscience and Advanced Medical Equipment Inc. (United States); D. A. Kuyumchyan, Riverside Community College (United States); V. V. Aristov, E. V. Shulakov, Institute of Microelectronics Technology (Russian Federation)

Applying the dynamical model of drying process of a polymer solution coated on a flat substrate to effects of bumpy substrate [7764-28]
H. Kagami, Nagoya College (Japan); H. Kubota, Kumamoto Univ. (Japan)

Nanocrystalline titanium dioxide coated optical fiber sensor for ammonia vapour detection [7764-29]
B. Renganathan, D. Sastikumar, G. Gobi, R. Srinivasan, N. Rajeshwari Yogamalar, A. Chandra Bose, National Institute of Technology, Tiruchirappalli (India)

Fabrication and characterization of ZnO nanowire structure on flexible substrate with different solution molarities [7764-33]

Bending efficiency investigation of horizontal slot waveguide microrings [7764-38]
A. Kargar, D. Wang, Univ. of California, San Diego (United States)

Author Index
Conference Committee

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1 Nanophotonics
Louay A. Eldada, HelioVolt Corporation (United States)

2 Energy Conversion and Alternative Energy Solutions Through Nanoengineering
Elizabeth A. Dobisz, Hitachi Global Storage Technologies, Inc. (United States)

3 The Next Frontier in Nanoengineering
Louay A. Eldada, HelioVolt Corporation (United States)
Nanofabrication: New Techniques, Properties, and Emerging Applications
Elizabeth A. Dobisz, Hitachi Global Storage Technologies, Inc.
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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-100 nm regime. Existing processes of record have been extended well beyond the ranges previously deemed feasible or reliable. New technologies such as advanced solar and wind energy harvesting systems, energy storage systems, biotechnology and medical nanosystems, 3D sensors, 3D displays, systems on a chip, optofluidics, nanophotonics, and molecular electronics and optics are emerging. The upcoming synthesized nanomaterials, nanocomposites, nanocoatings, nanoparticles, nanotubes and nanowires, offer extremely attractive novel physical properties with many opportunities. Continuing improvements in the design and fabrication of micro/nano/quantum-scale optical elements have driven the development of both passive and active miniature optical components with ever more diverse applications. New applications 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. Commercial drivers are increased functionality, reduced size, performance, reliability, and cost.

The proceedings of the Nanoengineering Conference include discussions of novel material fabrication and processing, properties of nanostructures, innovative patterning and processing techniques, micro/nano/quantum optics, and fabrication and packaging of miniature devices. The innovations reflected in the papers range from driving existing schemes and processes to new limits to totally novel concepts and designs. Papers from academic and research institutions push the state of the art in miniaturization, level of integration, and performance figures of merit; papers from the industry require yield and tolerances as new design criteria, and nanofabrication manufacturing methods are exploited to make commercially deployed products.

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.

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