Journal of Nanoengineering & Nanomanufacturing

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A Special issue on

"ZnO Nanostructures: Growth and Applications"

Call for Papers

Since the discovery of first Ge transistors at Bell laboratory in 1947, semiconductor electronic devices has fabricated at an incredible pace, faster fabrication speed, smaller sizes, more power, and of the lower cost. Silicon emerged as semiconductor of the choice due to its higher melting point and formation of surface passivating layer. Due to the higher carrier mobility, superior electron transport, direct band-gap and special optical properties over Si, GaAs became semiconductor of the choice for the fabrication of optoelectronic devices such as laser diodes. Physical properties of Si and GaAs limit their applications in the fabrication of high power, high temperature electronics and UV/blue light emitters. Therefore, investigation of growth and processing techniques for an alternative semiconductor material is essential. Since wide bandgap semiconductors have inherent properties such as larger band-gap, higher electron mobility and higher breakdown field strength, therefore have applicability in the fabrication of high power, high temperature electronic devices and shorter wavelength optoelectronics.

Zinc oxide is a direct, wide band gap semiconductor with promising applications in the fabrication of shorter wavelength optoelectronics, transparent electronics, spintronics, photonics, and sensors. Higher exciton binding energy, ~60 meV, of ZnO as compared to GaN, ~25 meV, fascinates it with higher light emission efficiency for brighter UV/ blue lasers and LEDs. Single crystal ZnO has slightly lower (~200 cm^2/V) room temperature electron Hall mobility than that of the GaN, but it exhibits higher saturation velocity. It is higher radiation resistive than that of the GaN, therefore might have possible applications in space and nuclear. Since ZnO can be easily grown on cheap substrates such as glass and plastics, therefore cheaper devices can be fabricated. ZnO also serves as excellent host material for the doping of transition metals, noble metals, and rare earth elements, which fascinates it with fabulous magnetic, plasmonic, and luminescence properties. Point defects such as cationic/neutral zinc and/or anionic/neutral oxygen vacancies or their interstitials mesmerizes zinc oxide with intrinsic magnetic, plasmonic and luminescent properties. Now a day's zinc oxide is being used for the fabrication of electronic, photonics, plasmonics, energy harvesting and storage, sensors devices. Look and coworkers played significant role in the stimulation of research on zinc oxide and organized first workshop on zinc oxide in 1999 and subsequent workshops in 2002 and 2004, which brought together ZnO researchers from all around the world to present their finding and share their ideas.

Recently, Wang and coworkers from Georgia Institute of Technology have fabricated ZnO nanorod based nano-generator that converts mechanical signal of the muscular motion into electrical signal to power heart pacemakers. Zinc oxide nanostructures exhibit innumerable biological and medical applications. Their excellent luminescent properties made them suitable for cell staining for fluorescence imaging, while surface functionalized ZnO can be used for drug delivery. Magnetic ZnO nanoparticles are applicable for MRI applications and selective destruction of tumor cells. It is antimicrobial, antifungal, and sunscreen material.

Significant efforts in the last two decades have been focused on controlling optical, photonic, and electronic properties and improving crystal quality of zinc oxide nanostructures. However, in order to fully realize ZnO devices, additional material and process development issues must be overcome. This special issue is devoted to the various physical and chemical growth processes for the synthesis of 1D, 2D and 3D zinc oxide nanostructures and their device fabrication and biological applications. Contributions, such as **original research articles, communications, comprehensive or brief review articles**, are especially solicited but not limited to the following fields:

A. **ZnO nanostructures; processed by physical techniques such as laser ablation, ion or electron beam irradiation, molecular beam epitaxy, thermal evaporation, and physical vapor deposition etc.**
B. **ZnO nanostructures; processed by chemical techniques, such as sol-gel, hydro/solvothermal, microemulsion, chemical reduction etc.**
C. **ZnO nanostructures for energy harvesting and storage applications**
D. **ZnO nanostructures for piezoelectric applications**
E. **ZnO nanostructures for electronics, photonics, and spintronics applications**
F. **ZnO nanostructures for optoelectronic and electro-optical applications**
G. **ZnO nanostructures for sensing and detectors**
H. **ZnO nanostructures for medical and biological applications**
I. **ZnO nanostructures for environmental monitoring and waste water treatment**

Guest Editors:

Guest Editor
Dr. Subhash Chandra Singh
National Centre for Plasma Science and Technology, School of Physical Sciences,
Dublin City University, Glasnevin, Dublin-9, Ireland
E-mail: Subhash_laserlab@yahoo.co.in

Co- Guest Editors
Prof. Haibo Zeng
Key Laboratory for Intelligent Nano Materials and Devices of the Ministry of Education, State Key Laboratory of Mechanics and Control of Mechanical Structures, College of Material Science and Technology, Nanjing University of Aeronautics and Astronautics, Nanjing 210016, China, P. R. China
E-mail: zeng.haibo.nano@gmail.com

Dr. Hiroyuki Usui
Applied Chemistry Course, Department of Chemistry and Biotechnology

Tottori University, Minami 4-101, Koyama-cho, Tottori 680-0945, Japan
E-mail: usui@chem.tottori-u.ac.jp

Manuscript Submission:

Manuscripts must be prepared according to Journal's guidelines, available at http://www.aspbs.com/jnan/. Submit your manuscripts in MS word or PDF format directly to the Guest Editor or one of the Co-Guest Editors. ***All papers submitted to this issue will be subject to a strict peer review process to ensure excellent quality articles.*** Please make sure in the cover letter that the submitted paper has not been published previously and is not currently submitted for review to any other journal and will not be submitted elsewhere before a decision is made by this journal. Please notify well in advance for your intension to submit a research paper.

KEY TIMETABLE DATES

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