



Editor-In-Chief

Dr. Ejembi John Onah, D.Sc

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Ejembi John Onah, D.Sc

Founding President Focus Nanotechnology Africa Inc (FONAI), Ithaca NY USA, Chairman Steering Committee, USEACANI, CO-Chair-US-EU-Africa-Asia-Pacific and Caribbean Academy of Nanoscience and Nanotechnology (USEACANN) and Editor-In-Chief, Journal Nanotechnology Progress International (JONPI).  
P.O.Box 763, Ithaca NY 14851, USA

Email: [Eonah@Fonai.org](mailto:Eonah@Fonai.org)

## **Editorial Review: Nanoenergy; nanosolar cell**

### **Abstract**

Capturing solar light at UV-Visible by organic photovoltaic (polymer based solar cell) at efficiencies of 10-30% is an ideal that is crucial to alternative energy. This type of solar cell would be cheaper, lightweight, flexible, durable, etc as compared to commonly used silicon based solar cells that are expensive, fragile, heavy, etc. Further, such solar cells can be used indoors and outdoors because it captures energy at the entire light spectrum even as paints on buildings, cars, etc. The subject of this editorial review is to discuss architectures that can create such efficiencies thereby reducing the cost of energy to about 2 cent per watts instead of \$4-\$5 per watt by silicon solar cell compared to \$1 from fossil.

**Keyword:** Alternative energy, organic photovoltaics (OPV), solar cell, architectures

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## **Nano-composite Polymer Electrolyte Membranes containing Nano-tubular Titania for Fuel Cells**

Kerrilee Stewart, Boor Singh Lalia and Harinder Pal Singh Missan\*

Department of Physics, University of West Indies, St. Augustine, Trinidad, West Indies

(\* Corresponding author email: [harinder.missan@sta.uwi.edu](mailto:harinder.missan@sta.uwi.edu))

### **Abstract**

Nano-composite polymer electrolyte membranes containing in-lab synthesized nano-tubular and particulate titanium dioxide have been developed based on fluoride backbone copolymer (polyvinylidene fluoride-co-hexafluoropropylene) (PVdF-HFP) for fuel cell applications. Nano-tubular titanium dioxide has been synthesized from titanium dioxide particles of varying size using hydrothermal method. The effect of time on the growth of titania nanotubes have been studied and is found to be maximum for 5 days. Nano-tubular structure has been confirmed using XRD and SEM spectroscopy. The developed nano-tubes are further used to synthesize nano-composite polymer electrolyte membranes and various properties have been studied. High ionic conductivity, good mechanical stability, good thermal stability has been observed for these membranes. High conductivity of the order of  $10^{-3}$  S/cm has been observed for electrolyte membranes containing nano-tubular titania. The conductivity of nanocomposite membranes is almost one order higher than the membranes without any nano-tubular phase.

**Keyword:** Titanium dioxide, nanotubes, ionic conductivity, nanocomposite, XRD, SEM

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**Educating the next generation of scientists and engineers:  
Nanotechnology in the K-16 science curriculum**

Aldrin E. Sweeney  
University of Central Florida  
asweeney@pegasus.cc.ucf.edu

**Abstract**

Nanoscience and nanotechnology represent the most rapidly developing areas in contemporary scientific discovery and innovation. Nanoscience involves exploration and understanding of the fundamental behavior of structures having at least one dimension between 1 and 100 nm. Nanotechnology may be defined as the understanding and application of phenomena at the atomic level, leading to the design, construction and utilization of functional structures, again with at least one characteristic dimension measured in nanometers. Continuing advances in nanoscience and nanotechnology will impact all levels of science and engineering education.

**Keyword:** Nanoeducation, nanoscience, nanotechnology

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# Study of Electric Field Induced Second Harmonic (EFISH) Generation from Au and Ag implanted LiNbO<sub>3</sub> nano Composites

Chaudhary A.K. <sup>\*1,2</sup>, Maaza M. <sup>2</sup>, Fasasi A.Y. <sup>2</sup>, Nandwandwe M. <sup>2,3</sup>, Beye A.C. <sup>e2</sup> and Neethling P. <sup>4</sup>

1-Advanced Centre of Research in High Energy Materials, P-002, Science Complex, University of Hyderabad, Hyderabad-500046 (India)

2- Materials Research Group, iThemba Labs, Sommerset West, Cape –Town, South Africa

3- Department of Physics, Zululand University, South Africa

4- Department of Physics, Laser Research institute, University of Stellenbosch, Stellenbosch, Western Cape, South Africa

\*E-mail : anilphys@yahoo.com

## Abstract

Second Harmonic generation (SHG) using laser requires a non centro-symmetric materials or materials that lack inversion symmetry. However, symmetry breaking interface between metal –semiconductor can also permit third order process also known as EFISH .The paper reports the comparative study of EFISH generated from Au and Ag nano particles implanted on LiNbO<sub>3</sub> substrates using ion beam implantation technique . We have employed  $\lambda= 782$  nm of Ti: Sapphire laser having repetition rate of 80 MHz pulse width of  $85\pm 5$  femto seconds with maximum pulse energy of the order of 10.5 nJ. The generated second harmonic signal is separated out from the fundamental using UV filter and detected with the help of PMT coupled with Lock-in amplifier . We have also

tested the polarization effect and observed the presence of dipole mode in case of Au implanted nano composites and quarderpole mode in Ag implanted nano composites.

**Keyword:** SHG, Au and Ag nano particles, Lock-in-amplifier, plasmons

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## **Overview on Nanotechnology Research, Development and Commercialization in Asia Pacific Region**

Lerwen Liu

NanoGlobe, Singapore

[lerwen@nano-globe.biz](mailto:lerwen@nano-globe.biz)

### **Abstract**

This review covers progress of nanoscience and nanotechnology in Asia as an overview. It highlights policy and strategy and progress made on investment, infrastructures, research and development in this region. Further, it draws some helpful conclusions on this emerging revolutionary crucial field.

**Keyword:** Asia, nanotechnology, investment, infrastructures, research and development

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