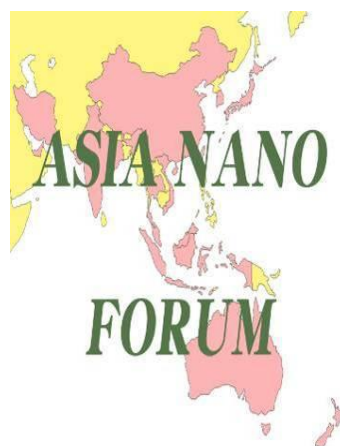


ASIA NANO FORUM NEWSLETTER

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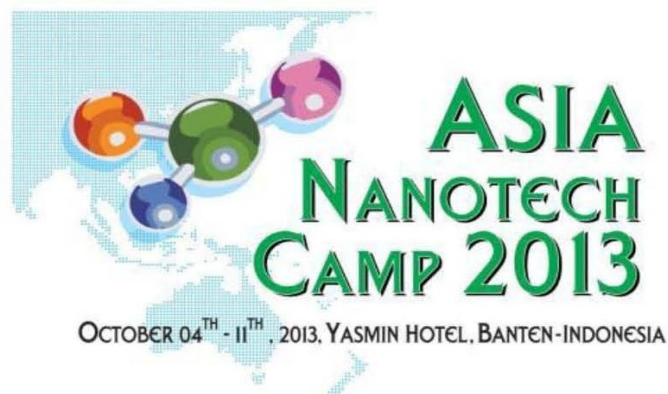
Asia Nanotech Camp 2013

- Responsible Development of Nanotechnology Products
Enabling Sustainability -

Group Project Executive Summary

ANF Secretariat, Singapore
December 2013

Editors:
Hongfang JIN
Lerwen LIU



Organized by,
ANF 
ASIA NANO FORUM SURYA
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Introduction



The Asia Nano Forum (ANF) is a network organization, founded in May 2004, to promote excellence in research, development and the economic uptake of nanotechnology within the Asian region. This collaborative network seeks to benefit its member economies educationally, socially, environmentally and economically by fostering collaboration and acting as a focus for regional and global nanotechnology issues. Asia Nano Forum (ANF)

Network is supported by 15 economies in the Asia Pacific Region including Australia, China, Hong Kong, India, Indonesia, Iran, Korea, Japan, Malaysia, New Zealand, Singapore, Taiwan, Thailand, UAE and Vietnam.



The newly founded Surya University has set itself to become a prominent global research-based university, continually in pursuit of cutting-edge research and technology advancement, and innovation in creating a place where science, technology and entrepreneurship intersect. It strives to play a critical role in close partnership with the government and prominent industry players, together to develop Indonesia into the center of excellence for science and technology advancement.

Studying at Indonesia's first research-based university, Surya University students are empowered to successfully compete in the vibrant knowledge-based economy of today and tomorrow, currently through programs designed with the ever-changing future in mind, supported by over 70 research centers committed to pursue the latest science and technology advancements in their respective areas

Asia Nanotech Camp (ANC)

Asia Nanotech Camp (ANC) is a program initiated by Asia Nano Forum (ANF) as a platform for young nanotechnology researchers to study the state of the art nanotechnology advancement and share learning on their research activities.

It provides unique educational opportunities for these young researchers to communicate, network, and collaborate with one another. The 6th Asia Nanotech Camp 2013 (ANC2013) was held during 1st -10th October, 2013 in Serpong, Indonesia, following the success of the previous ANC2008, ANC2009, ANC2010, ANC2011 and 2012 hosted in Japan, Taiwan, Singapore & Malaysia, Korea and China, respectively.

ANC2013

ANC2013 aims to promote responsible development of nanotechnology through highlighting how nanotechnology is adopted in the manufacturing of products used in everyday life including energy, water, health, space, transportation, ICT, etc. It not only address how nanotech enabling advantages such as high performance, low carbon footprint and lower cost, but also address the product life cycle to educate the participants how products are made and where they end up after being used and how they may be recycled. It provides challenges to researchers and engineers to invent technologies and design products contributing to a sustainable planet through nano innovation. There are 44 participants from 12 different economies joined the camp. The program includes 14 lectures focused on 4 topics (1. Design for Nano; 2. Manufacturing for Nano; 3. Product Characterization, Metrology and Quality Control and Waste Processing Technology; 4. Technopreneurship) plus group project competition and social activities.

Welcome address

I am pleased to welcome you to this Asian Nanotech Camp 2013, held in Indonesia for the first time.

Gathered here today are representatives from many foreign countries, connected to the domain of nanotechnology, science and engineering. Our distinguished speakers come from a variety of backgrounds, bringing with them a wealth of knowledge in the fields of science and entrepreneurship. We are also particularly happy to welcome our young local participants.

The field of nanotechnology is considered to be very important knowledge for the future. We also recognize that its integration and interactions with other fields can greatly improve the products of our research: this is reflected by the center of mobile, micro and nanotechnology, currently run by Prof. David Mendels.

As a very young institution, Surya University strives hard to become a major player in the design, creation and promotion of cutting edge technology. Thus sharing of knowledge and collaboration in research amongst various parties nationwide, region-wide and world-wide become increasingly pivotal in advancing our own capabilities to catch up with the latest knowledge that will help us to continue to develop Indonesia.

After this conference, we hope that each of you will come to realize the interconnectivity amongst us, and the benefits all of us can find in working together in Asia as a whole - particularly as ASEAN comes together. It is our duty to

increase and facilitate connections between science and industry, nationally and internationally. The task we will be asking you to perform will address this point in particular. We think it is going to be fun and enlightening.

Prof. Yohanes Surya, PhD., Founder and President of Surya University

Gallery



Poster Presentation



Opening Ceremony



Closing Ceremony



Lecture



Lecture



Networking



Networking



Networking



Networking



Culture Tour



Culture Tour



Culture Tour

Program

Yasmin Hotel, Karawaci

Day 1 - Friday, October 4th 2013

Time	Activities
06.00 - 08.00	Breakfast
08.00 - 09.00	Free time
09.00 - 10.00	Coffee Break
10.00 - 11.00	Free time
10.00 - 12.00	Free time
12.00 - 13.30	Lunch
13.30 - 14.00	Free time - Registration for Indonesia Participants
14.00 - 15.00	Free time - Registration for Indonesia Participants
15.00 - 16.00	Coffee Break
16.00 - 17.00	Free time
17.00 - 18.00	Free time
18.00 - 20.00	Welcoming Dinner

Day 2 - Saturday, October 5th 2013

Topic I: Design for Nano

Time	Activities
06.00 - 08.30	Breakfast
08.45 - 09.45	Opening Ceremony
09.45 - 10.00	Coffee Break
10.00 - 12.00	Lecture 1 - Biocompatible iron oxide magnetic nanoparticles: in vivo pharmacokinetics and magnetic induction hyperthermia properties Prof. Chao-Ming Fu -National Taiwan University, Taiwan
12.00 - 13.30	Lunch
13.30 - 15.00	Lecture 2 - Nano Physics Prof. David Mendels - CMMN, Surya University, Indonesia
15.00 - 15.30	Coffee Break
15.30 - 17.00	Lecture 3 - Bio-inspired Design Prof. Ille Gebeshuber - UKM, Malaysia
18.00 - 20.00	Dinner

Day 3 - Sunday, October 6th 2013

Topic II: Manufacturing for Nano

Time	Activities
06.00 - 08.00	Breakfast
08.00 - 10.00	Lecture 4 - Technopreneurship and the role of media in fueling Asian technopreneurs and innovators Sourav Roy - WWF, Singapore
10.00 - 10.15	Coffee Break

10.00 - 12.00	Lecture 5 - Synthesis of Hybrid Nanocomposites and Photocatalytic Degradation of Organic Dyes Prof. Weon Bae Ko - Sahmyook University Seoul, Korea
12.00 - 13.30	Lunch
13.30 - 15.00	Lecture 6 - Biomaterial Surfaces: Properties, Engineering, and Characterizations Prof. Bidhari Pidhatika - CMMN, Surya University, Indonesia
15.00 - 15.30	Coffee Break
15.30 - 17.00	Break out session: team research on manufacturing technologies
18.00 - 20.00	Dinner

Day 4 - Monday, October 7th 2013

Topic III: Product Characterization, Metrology and Quality Control and Waste Processing Technologies

Time	Activities
06.00 - 08.00	Breakfast
08.00 - 10.00	Lecture 7 - Nanoimprint Lithography: High Throughput Nanopatterned Surface Manufacturing - A Process Chain Prof. Yudi Rahmawan & Prof. David Mendels CMMN, Surya University, Indonesia
10.00 - 10.15	Coffee Break
10.15 - 12.00	Lecture 8 - Nano engineered Ultra-High Performance Concrete Peter Weber - CeEntek, Singapore
12.00 - 13.30	Lunch
13.30 - 15.00	Lecture 9 - Nanofabrication and Materials characterization platform Ramam Akkipeddi - IMRE, Singapore
15.00 - 15.30	Coffee Break
15.30 - 17.00	Lecture 10 - E-FENTON Technology for TOC/COD Removal from Phenol Polluted Municipal Dr. Cheng Jiuhua - Joyce River Hi-Tech Pte Ltd, Singapore
18.00 - 20.00	Dinner

Day 5 - Tuesday, October 8th 2013

Topic IV: Technopreneurship

Time	Activities
06.00 - 08.00	Breakfast
08.00 - 10.00	Lecture 11 - Nanotechnology- from Smart Phone and Beyond Dr. Lerwen LIU-NanoGlobe
10.00 - 10.15	Coffee Break
10.15 - 12.00	Lecture 12 - Business Plan for New Venture Jonathan Gultom - CTI, Surya University, Indonesia

12.00 - 13.30	Lunch
13.30 - 15.00	Lecture 13 - Nanopowder synthesis and applications development Dr. Kurnia Wira - NanoScience Innovation Pte Ltd, Singapore
15.00 - 15.30	Coffee Break
15.30 - 17.00	Lecture 14 - Future Manufacturing and nanotechnology products Prof. David Mendels - CMMN, Surya University, Indonesia
18.00 - 20.00	Dinner

Day 6 - Wednesday, October 9th 2013

Time	Activities
06.00 - 08.00	Breakfast
08.00 - 10.00	Group Presentations 1
10.00 - 10.15	Coffee Break
10.15 - 12.00	Group Presentations 2
12.00 - 13.30	Lunch
13.30 - 15.00	Group Presentations 3
15.00 - 15.15	Coffee Break
15.15 - 18.00	Jury's Meeting
18.00 - 21.00	Award and Closing Ceremony - Conference dinner













Day 7 - Thursday, October 10th 2013

Time	Activities
06.00 - 07.30	Breakfast
07.30 - 08.00	Prepare to Depart
08.00 - 09.00	Depart to Museum Tekstil
09.00 - 12.00	Museum Tekstil
12.00 - 13.00	Lunch at
13.00 - 14.00	Depart to Monas
14.00 - 15.00	Monas
15.00 - 15.30	Depart to Kota tua
15.30 - 16.30	Kota tua Jakarta
16.30 - 17.30	Depart to Ancol
17.30 - 18.30	Ancol
18.30 - 20.00	Dinner at Bandar Jakarta, Ancol
20.00 - 21.00	Depart to Hotel

Day 8 - Friday, October 11th 2013

Time	Activities
06.00 - 08.00	Breakfast
08.00 - 12.00	Check out / DEPARTURE day

Invited Speakers

	Dr. Chao-Ming FU , Professor, Physics Department, National Taiwan University, Taiwan		Dr. David Mendels , Professor, Physics and Information Technologies at Surya University		Dr. Ille C. GEBESHUBER , Professor, Institute of Applied Physics, Vienna University of Technology, Austria
	Dr. Yudi RAHMAWAN Professor, Center for Mobile, Micro- and Nanotechnology, Surya University Indonesia		Prof. Weon Bae KO Professor, Department of Chemistry, Sahmyook University Korea		Mr. Jonathan GULTOM Lecturer, Department of Technopreneurship, Indonesia
	Mr. Peter WEBER , Founder, CEO of ceEntek (nano- engineered concrete) Singapore		Dr. Ramam AKKIPEDDI , Senior Scientist / Advisor, SNFC Group, IMRE Vice President of ANF Singapore		Mr. Sourav ROY , Director of Communication for WWF Singapore
	Dr. Jiuhua CHEN Founder and CEO, Joyce River Hi-Tech Pte Ltd. Singapore		Dr. Lerwen LIU Managing Director of NanoGlobe Secretary of ANF Singapore		Dr. Kurnia WIRA CEO of Nano Science Innovation, Singapore

ANC Sustainable Nanotech Project Competition

Introduction

All participants are divided into 10 groups each with 4-5 participants from different economies. Each group is required to design a product related with “sustainability” and present a business proposal which should include product concept, application and marketing.

Award Criteria and Evaluation Panel

Presentations are evaluated by a panel of experts for the ANC 2013 reward. The First, Second, and Third Prize is 400USD, 300USD and 200USD per group respectively.

Evaluation Panel:

Dr. Yong ZHANG, Professor and Deputy Head (Research & Enterprises) of Department of Bioengineering, National University of Singapore (NUS)

Dr. David Mendels, Professor of Physics and Information Technologies at Surya University.

Dr. Lerwen LIU, Managing Director of NanoGlobe and Secretary of Asia Nano Forum.

Award Criteria

The panel members score group presentations according to the following indexes: a) technology/product innovation, b) technology feasibility, c) product manufacturability, d) product market potential, e) team work, f) societal impact and g) presentation.

Projects Executive Summary

First Prize - Group3: A2A: Air to "Air" Nanotechnology—Flexible Water Collecting System

Team: Nur Elida (Malaysia), ZHU Fuyun (China), Anon Chindaduang (Thailand), Faisal (Indonesia), CHAN Dra-qu (Indonesia)

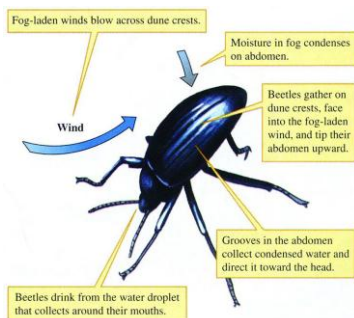


Introduction

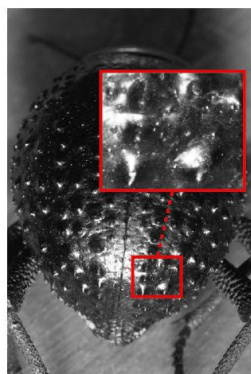
The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) now estimate that, although progress has been made, 605 million people worldwide will still be without access to safe drinking water in 2015. Every life form present on this blue planet needs water for survival. That's the reason we see environmentalists over the world encouraging individuals to save every drop, as those precious drops might be what someone is desperately in need for.

Source of Inspiration

Increasing biomimetic research shows that solutions to this global problem could be found in nature. In arid regions, where rain events are rare, the main sources of water are fog and dew. Certain plants as well as some species of beetles have adapted to collect dew and fog from air in order to survive in these conditions. In particular, fog harvesting in nature has been seen with some beetle species in the desert of Namibia, namely two beetles of the genus *Onymacris* which have been observed to use their body surfaces as fog collectors in a process termed as fogbasking. These beetles adopt a head standing position



facing the wind in order to collect fog droplets on their forewings, which have been described as smooth with regular grooves. Droplets accumulate until they are large enough to coalesce and roll into the beetle's mouth. The structures observed in the beetle species are hypothesized to play an important role in the water collection ability of the species and thus, research to create artificial fog harvesting materials concentrates on mimicking these structures.

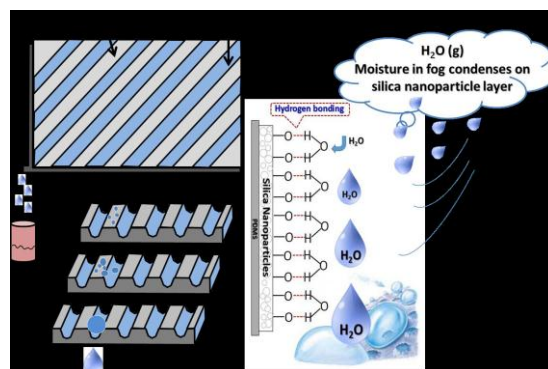


Concept and Design

The A2A water collecting concept comes into being by imitating the dorsal surface of Namib Desert Beetles. Clearly, the double layer of A2A water collecting surface creates turbulence in the fog stream. Furthermore, it can also be seen as a hydrophilic surface attracting water droplets with a hydrophobic surface transporting them to the container, a principle based on the hydrophilic/hydrophobic surface combination described for the beetles. Actually, hydrophilic/hydrophobic surfaces can be realized by many ways. Here we select PDMS (Polydimethylsiloxane) as hydrophobic layer taking advantage of its intrinsic hydrophobicity and excellent flexibility while silica nanoparticles as hydrophilic layer because of the outstanding water harvesting capacity. The combination of these two materials is very easy to achieve, and it's low-cost, highly efficient and practical.

In general terms, underlying all fog harvesting surfaces is the interplay of water supply and removal mechanisms, which in nature are influenced by external factors, mainly the wind of the environment. Water is supplied by the impact of air born fog droplets onto surfaces as well as drop nucleation and growth by condensation from dew. Subsequently, drops grow by direct impact of drops on drops, by continuous condensation, by the accretion of water molecules diffusing along the surface and/or by coalescence of adjacent drops. Once these drops have grown to a critical volume, drop removal by drop motion becomes relevant. A simple force balance opposing the pinning force to the gravitational pull experienced by the drop can be used to describe this system.

Application and Marketing



➤ The promising applications could be extended from daily use to industrial production.

- A2A roof System

Putting flexible A2A product onto large-area roof, and providing water for daily life.

- A2A portable water collector

Applying A2A product in portable camp or carrying simple A2A water collector with outside workers, travellers and even soldiers.

- A2A nanoplanting system

Planting the artificial A2A leaf in the same pot as the plant, water harvested on the leaf will be fed to the plants. Large amounts of huge A2A leaves can be applied even in massive crop planting.

➤ The advantages for marketing would be:

- Simple technology, easy to achieve;
- Flexible and folding, thus portable;
- Convenient, practical, and effective;
- Applicable in extensive conditions, such as residential, outdoor, forest, desert.

"Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand." --Albert Einstein

Biography



Nur Elida joined Electrochemical Material Group at Advanced Material Research Center (AMREC), Malaysia as a researcher since 2010. She is working on NanoMaterials majoring in Carbon nanotubes, nanorod and hybrid nanomaterial.



Fuyun ZHU is a Ph.D. candidate in Institute of Microelectronics, Peking University, majoring in Microelectronics. Her current research interests are Micro/nano fabrication, DRIE, modeling and simulation, 3D Reconstruction, MEMS.



Anon Chindaduang joined National Nanotechnology Center (NANOTEC), National Science and Technology Development Agency (NSTDA) as a research assistant since 2006. His research interests are : Molecular Sensors (Chemical and biological sensors) Organic & Inorganic Synthesis (Solution & Solid Phase) , e-Sensitized Solar Cells , Spectroscopy , Organic Structure Elucidation , Natural Product Purification (Chromatography) Microbial Transformation.



Faisal
Indonesia



CHAN Dra-qu
Indonesia

Second Prize - Group8: Green Pack

Team : Luong Truc Quynh Ngan(Vietnam), Tristan Tan(Singapore), Hoerudin(Indonesia), Wun-Cheng Luo(Taiwan)



Introduction

Nowadays, global plastic packaging sales approx US\$ 200 billion/year (average demand growth 6.5%/year). Around 45% of plastic packaging is used for food packaging and petroleum-based plastic packaging (e.g. polystyrene) is used extensively due to its high strength & low density. But the problems of these products are:

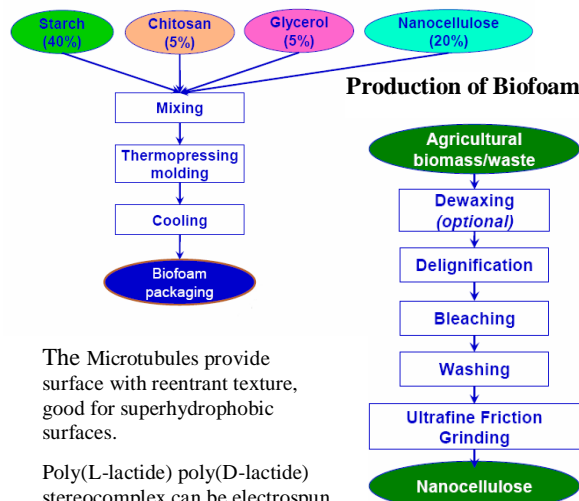
- Continual usage of non-renewable fossil fuels;
- Several decades to degrade and
- Toxic byproducts from incineration.

Packaging industries and consumers are currently interested in environmentally friendly packaging and the development of eco-friendly packaging is warranted. Biodegradable foam packaging made from natural, renewable, abundant, and cheap polymers appears as an excellent alternative but the major problems with bio-based foam packaging are high gas permeability, poor mechanical and thermal properties and hydrophilic (high water absorption).

How does nanotech solve these problems? – **Green pack**

Ingredients of our product and production of biofoam

Production of Nanocellulose



The Microtubules provide surface with reentrant texture, good for superhydrophobic surfaces.

Poly(L-lactide) poly(D-lactide) stereocomplex can be electrospun onto containers, making a hydrophobic surface.

Ingredients of our product include: Tuber starch; Nanocellulose fibers; Chitosan, Glycerol (from triglycerides); Poly (L-lactide) and poly (D-lactide) stereocomplex (PLLA and PDLA)

The advantages of our products:

- 100% food grade foam packaging (negligible health risk)
- Suitable for dry/solid foods and liquids (cold or hot)
- Antimicrobial properties
- Renewable raw materials (minimize agricultural waste)
- Degradable within 3 - 6 months (compared to several decades for petrochemical-based foam)
- Comparable properties and price to that of petrochemical-based foam

- Low environmental footprint

Upscaling

- Feedstock of starting materials is extremely abundant (from agricultural waste/biomass).
- Production of nanocellulose is similar to paper making
- Moulding process can use same machinery as current polystyrene manufacturing, equipment already exist.
- Electrospinning simple to industrialize.

Marketing

Our Target market includes: Packaging industries; Fast food giants and Green restaurants or stores.

The partners who will help us are the Government, United Nations and Environmental NGOs.

The key messages for marketing would be:

- Good for environment
- Negligible health risk
- Comparable properties and price

Biography



Luong Truc Quynh NGAN is a researcher in Department of Developing Analytical Equipment and Method, Institute of Materials Science, Vietnam Academy of Science and Technology. She got Ph.D in the same

Institute. Her major research interests are Porous silicon and silicon carbide, Silicon nanowires, Surface-enhanced Raman scattering.



Wun-Cheng LUO is a Ph.D. candidate in Taiwan National Chiao-Tung University, Department of Electronics Engineering. His main research interest is in the emerging nanoscale resistive random-access memory (RRAM), process development of nanoscale devices and reliability.



Tristan TAN joined Institute of Materials Research and Engineering as a research assistant since 2011. His major is Chemistry. His research interests are : Synthesis (Organic synthesis, polymers, metal organic frameworks) and Characterization (NMR, GCMS, FTIR, SEM, Single crystal X-ray crystallography).



Hoerudin
Indonesia

Third Prize - Group6: iFresh – Air Purification Nanotech Towards a Greener Globe

Team: Jiangbo ZHAO(Australia), Bo MENG(China), Jinting CHEN(Singapore), Chaweevan SAPCHAROENKUN (Thailand), Redo PARIANSAH(Indonesia)



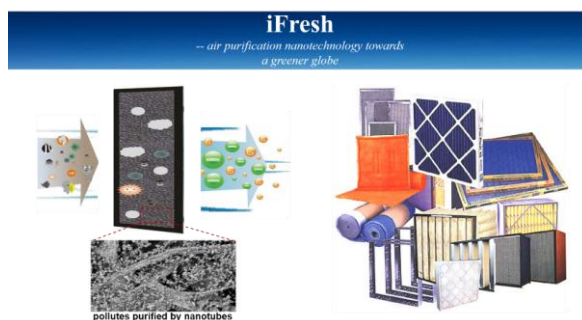
Introduction

Nowadays, air pollution has been a serious global problem. As the increased consumption of fuels associated with cars, planes, power plants, industrial production, and other human activities, the smog or smoky haze emerges to shroud over cities in many countries around the world. For example, the smoky haze hit 1.43 million square kilometres in China this year, which has affected millions of people and posed a significant threat to public health. In Singapore, the famous garden country was even attacked by haze in June, 2013. The main pollutant index surged to all-time high level, leading the government officials to warn residents to stay indoors and reduce outdoor activities.

Amid air pollution, especially long-term exposure to suspended particulates can aggravate respiratory ailments of human body and make great harm to health. It estimated that the air pollution causes around 1.2 percent of total annual global deaths, corresponding to at least 800,000 people. This situation can be worse when people are exposed to a higher level of pollutants. The new study has suggested that every additional

100 micrograms of particulate matter per cubic meter in the atmosphere induce a reduction of life expectancy at birth by three years.

The more frightening fact is that no one can escape from the air pollution. It persists everywhere. The indoor air can suffer from more highly concentrated harmful pollutants than outdoors due to the limited ventilation in comparison to the open space. In other words, shutting down window can result in poorer air quality. If we do not take any action, nowhere provides the air we can breathe to be desired. Considered that people may spend approximately 90 percent or more of their time indoors, it is therefore necessary to have an indoor-air-purification system to clean and fresh the air, particularly in newly renovated buildings, offices, houses, and the space where people can freely smoke.



High-quality i-Fresh air purifier. Left panel: the scheme of novel all-in-one air purification filter, eliminating pollutants and making the air clean and fresh. The filter is composed of textile carbon nanotubes coated with porous Au/Ag nanoparticles. Right panel: flexible filter designs can be adapted to various applications.

With this highly-demanding market and considerable social welfare, our group have now developed a novel nanotechnology air purifier (*i-Fresh*) that very effectively blocks, absorbs, and/or breaks down the airborne criteria pollutants that pass through it. Our goal is to establish a nanotechnology-based revolutionary air-purifying techniques delivering greener and more sustainable solutions to globe. Our *i-Fresh* series are not intended to replace any systems, but they greatly improvise the existing ones.

To enhance the effectiveness and improve the maintainability, *i-Fresh* series are designed with a textile of multi-walled carbon nanotubes and densely porous Au/Ag nanoparticles deposited onto them, as shown in Figure. Multi-walled carbon nanotubes are used for airborne particulates removing/blocking and gas absorption. The synthetic porous Au/Ag nanoparticles are functional as catalyst for anti-bacteria and/or degrading the harmful chemicals. The secret of high efficiency of this new product is highly related with the large surface area of the multi-walled carbon nanotubes and noble nanoparticles with porosity, which provide a larger number of active sites. Furthermore, the excellent chemical and mechanical stability of multi-walled carbon nanotubes offer the air purifiers easy cleaning, with lifetime usage. So maintenance is sustainable and inexpensive.

Apart from the multifunctional capability (removal of different pollutants), *i-Fresh* series are highlighted with weaving multi-walled carbon nanotubes to filter. This cored technology makes our design towards all-in-one air purification filter. This is extremely different from the traditional air purifiers, incorporating multiple separately-fabricated functional films and then assembling these various layers together. *i-Fresh* filters do not need additional assembly of different layers. Its fabrication streamline is compatible with modern textile techniques, easy manufacturing, scalable, and low cost. Such manufacture process also enables them to be adaptable for a large dynamic range of applications, e.g., the vehicles, air conditioner and industry exhausting systems.

For all these innovative elements, *i-Fresh* is the right choice. *i-Fresh* can help to create a better, cleaner and pleasant indoor climate.

Biography



Jiangbo Zhao joined the Institute for Photonics and Advanced Sensing (IPAS) at the University of Adelaide as a postdoctoral fellow. He is working on incorporating nanoparticles into glass, motivated by harnessing the unique nanoscale properties into practical photonic devices. He completed the PhD degree in Oct. 2013 at the Advanced Cytometry Laboratories, Macquarie University, Sydney. His PhD research looks at the creation of bright upconversion nanocrystals, which are materials that can convert infrared radiation into visible luminescence, and he has explored promising applications in areas such as bioimaging, biosensing and display technologies.



Bo MENG is a Ph.D. candidate in Peking University, majoring in Microelectronics. His current research interests are energy harvester and self-powered systems. He is also switching on the study on mass production of high-efficiency triboelectric nanogenerator.



Jingting CHEN is a scientist of Institute of Materials Research and Engineering (IMRE). She got Ph.D. in Bioengineering, National University of Singapore. Her current research focus is on the development of membrane mimics for the study of membrane proteins.



Chaweevan SAPCHAROENKUN Researcher at Nano Characterization Laboratory (NCL), National Nanotechnology Center, Thailand. She got Ph.D. in The University of Edinburgh. Her interests include AFM nanolithography, fabrication and characterization of nanoparticles, nanolithography approach to controlled carbon nanotubes growth, metal deposition, nano-standardization, nano-metrology.



Redo PARIANSAH
Indonesia

Best Presentation Prize - Group2: Twinkle Trees- Let Nature Light Up Your Life

Team: Viola SIM(Hong Kong), Eun Byurl CHO(Korea), Insan Rivan NASUTION(Indonesia), Mario RICHIR(Indonesia), Bo SUN(China)

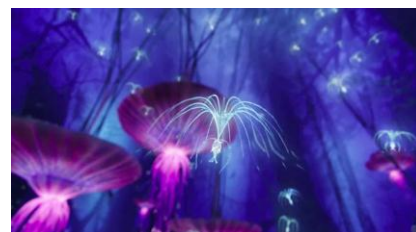


Introduction

Street lighting takes up 1% of California's electricity consumption. While it seems like a small amount, they could actually constitute up to 60% of the city's government electricity costs and also contributes thousands of metric

tonnes of carbon dioxide. For lovers of Science fiction or Game/Movie enthusiasts, scenes like the glowing trees in Avatar (2009) seems like they are far off dreams.

However there are research papers floating around with mechanisms on how to make plants glow and thus replacing street lamps with "natural" tree lamps becomes closer to reality.



Technology

Borrowing the idea of the oxidation of luciferin in nanotubes from a paper in NanoLetters² and phosphorescence we plan to use both of these concepts in order to ensure that our glowing plants have a longer lighting life. Phosphorescence is used as they have delayed emission which could potentially utilize the sun's energy to light up the plants in the early evening.

Luciferin that is generally found in fireflies emits the light when oxidized and this reaction is promoted by an enzyme called luciferase. We also play on the notion that plants take in oxygen at night, which theoretically should make it more feasible to oxidize the luciferin at night. The release of the luciferin in nanotubes is controlled by encapsulating it in a "water in oil in water" emulsion.

These two technologies combined should provide enough emission to last throughout the night and emission intensity could be enhanced by suitable nanostructures that would ideally resonate with the frequency emitted.³ Subwavelength nano hole arrays can enhance the intensity of transmitted light because of the surface plasmon resonance. This occurs when light efficiently converts the incident light into surface plasmon mode by scattering. Therefore combining this type of nanostructure with luciferin can help to increase the light intensity.

Application of the product

Our product will come in the form of a liquid with dispersed nanoparticles inside it. As demonstrated in simple secondary school scientific experiments involving dyes and white flowers⁴, the plants are able to transport small particles via the xylem to various parts of the plants. In order to do this we inject our solution into the stems of the plants/trunks of

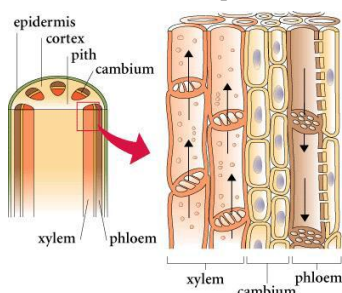


Figure 1 : A Diagram of explaining the location and structure of the Xylem⁵

the trees, ensuring that the needle/drill can penetrate through the phloem to reach the transport system. They are then transported to various parts of the trees/plants, mainly aimed at the leaves/flowers, where they can glow and light up.

Marketing

Our main gimmick would be an environmentally friendly method to light up the streets. We believe that our early endorsers could utilize the glowing trees as a method to attract more tourists to the area, which could in turn boost the economy. We will also focus on reducing the electricity consumption of cities as we are focusing on the governments as our large bodies of users. However we will also appeal to the artistic or fun loving segment of the normal residents by creating a cheaper and shorter-lived product for casual use.

Other Uses

The nanoparticle solution can be used for a myriad of purposes apart from street lighting.

With the number of cases of hikers getting lost in the mountains, mountain guides can use our product to produce marking trees back to safety that will not interfere with the nature's beauty. By injecting this product into trees along the ways of mountain climbing, this can be a guide light for climber at night. Ordinary citizens can also buy smaller quantities for decoration purposes or to enhance gifts for a loved one. Event planners will also find service in the product: For example, these glowing flowers can replace the candles in the wedding ceremony or the decoration bulbs on the Christmas trees or used as an interior design items.

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Biography



Viola SIM is a Ph.D candidate in Chemical Engineering, The Hong Kong University of Science and Technology. Her current research topic is Exploring various zeolite types and properties to improve a novel self-humidifying membrane to adapt it to higher temperature and improve its water.



Eun Byurl CHO is a Ph.D. candidate in is a Ph.D candidate in School of Integrated Technology (SIT), College of Engineering, Yonsei University. Her research interests are Roll-to-Roll process, Nano imprinting, Optically active nanostructures, Focused Ion Beam (FIB), Reflective display.



Bo SUN is a Ph.D. candidate Ph. D candidate in State Key Laboratory of Digital Manufacturing Equipment and Technology, Huazhong University of Science and Technology. His research interests include Silicon nanowires, nanosphere lithograph, metal assisted chemical etching, TiO₂ nanorods, CdS/CdSe quantum dot, photoelectrochemical solar cell.



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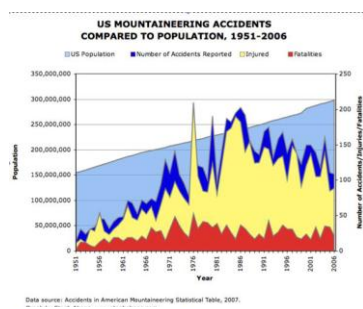


Figure 2: Mountaineering Accidents in the US 1951-2006⁶

Best Marketing Prize: Group7: A Sensor for Toxic Gases: 7Gsensing™

Team: Mahmoud MIRZAE(Iran), Fuad Indra Zakia (Indonesia), CHONG Yuen Tung (Singapore), Hung-Cheng LIN(Taiwan), Waraporn NUALPAENG (Thailand)

Introduction

Human activities cause an increase in atmospheric pollutions. Effective and inexpensive systems for detection and quantification of environmentally hazardous gases are important. However, the ways to detect the contents of atmosphere are not quite easy.

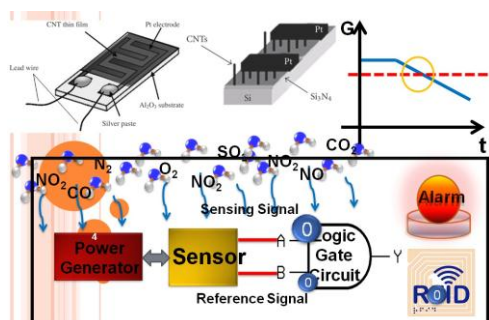
7Gsensing™

As a new product, we produce and develop market leading gas sensors, which integrate unique and innovative sensor technology for a wide range of applications. The sensors, which have the properties of high sensitivity to NO, NO₂, NH₃, CO, CO₂, CH₄, H₂ gases, extremely low power consumption, fast response, and room temperature operation.



Sensing Systems

The details of sensing systems refer to chemical materials and electronic circuits to make possible the sensing operation.



Applications

As the technologies are increased, so many pollutants are all around the world. For protecting the local environments, 7Gsensing™ could sufficiently help.

Marketing

Producing wide ranges of product types could make 7Gsensing™ as a proper choice for customers of different applications. Human self-protection or controlling the rooms atmosphere are just two examples of the widely used our gas sensor under trade mark of 7Gsensing™.

Biography



Mahmoud MIRZAE is currently an assistant professor and Department Chair at Department of Nanotechnology, Pharmaceutical Sciences Branch, Islamic Azad University, Tehran, Iran since September 2011. His research interests include: Physical Chemistry Studies of Nano / Bio Structures , Computer Aided Drug Design (CADD)



Hung-Cheng LIN is a Ph.D candidate in Department of Photonics, Institute of Electro-Optical Engineering, National Chiao Tung University. His research interests include Nano electronics, Bio-medical electronics, Bio-chemistry sensors, Organic transistors and Vertical transistors.



Fuad Indra Alzakia received his MSc degree in the University of Tokyo. He is working in the Center of Mobile, Micro, and Nanotechnology, Surya University, Indonesia



CHONG Yuen Tung received his Ph.D in Microsystems Engineering, University of Freiburg, Germany. She is a scientist in IMRE, Singapore. Her research involve in cross-regime research projects, while focusing on continuous development of core competencies – thin film deposition and material characterization techniques



Waraporn NUALPAENG is a research assistant at National Nanotechnology Center (NANOTEC), Thailand. Her research area are Renewable energy, especially new route of biodiesel production via heterogeneous catalysis over nanostructure .

Group1 : Develop Nn Innovative and Sustainable Product Using Nanotechnologies "UMBRELEC"

Team: Tiphaine Corbet (HK), Dawei SU(AU)



Technology and idea

TiO₂ nanocrystal is an efficient and cheap photocatalyst, which can be applied in both sustainable energy and water treatment fields.

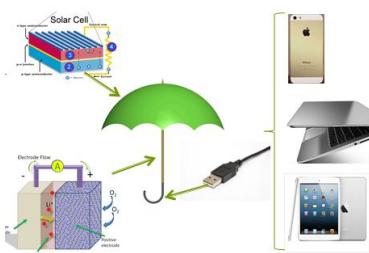
The first idea was to develop a "survival kit", based on this material, which would provide sustainable energy and clean water for travellers or for soldiers. However, given the short time, it was finally decided to focus only on the energy part.

Opportunity

Various lectures during this camp encouraged the participants to observe the society where they are living to identify needs and opportunities. As Tiphaine was new in Asia, she shared with the team her observations and surprises. Two remarks caught their attention: the "addiction" to smart phones and the need of extra-battery for city-dwellers (calls, games, video in the transportations...), and the huge use of umbrellas even when it is sunny ("white skin fashion"). That is how it was decided to create... the "Umbrellec"!

Concept

The "Umbrellec" would be a mobile source of sustainable energy to charge small electric devices. It will take the shape of an umbrella: the head would be a solar panel transforming solar energy in electricity, the electricity would accumulate and be stored in a battery hidden in the handle, and devices could be plugged at the bottom.



Technical description

a. Solar cell

Instead of classical solar cells in silicon, TiO₂ nanocrystals would be used to obtain cheaper, environment friendly and flexible solar cells.

b. Battery

A new kind of battery would also be used: Lithium-air battery, which presents a very high energy-density, use a natural and free reactant (air) and is stable and non-toxic.

Marketing

The target population could be extended from Asian city-dwellers to outside workers, travellers and even soldiers (adapting the shape to helmet or backpack).

The key messages for marketing would be:

- Sustainable energy
- Compact, mobile, autonomous
- Low cost high technology
- Innovation

Future development

The initial idea of a "survival kit" could be then developed, adding a water treatment device, a bio-inspired GPS, and even gas and water sensors for military application.

Biography



Tiphaine Corbet is a French chemical engineer. She studied in France, in Spain and in the UK and after a few years working in east of France, she finally settled down in Hong Kong. She is specialized in water treatment and worked 3 years for the technical department of Veolia Water. She is now a research assistant in the Hong Kong University of Science and Technology, focusing on the treatment of new micropollutants in water: endocrine disrupting compounds. She is also working as a scientific officer for the French consulate in Hong Kong.



Dawei Su is research fellow in University of Wollongong, Australia. Prior to the current position, he got the PhD in University of Technology, Sydney. His research activities include theoretical calculations, synthesis and characterization of new nanostructured electrode materials for advanced energy storage and conversion, including Li-ion, Na-ion, and Li-Air (O₂) batteries. He has published about 31 SCI papers in the prestige journals with high impact factor, such as the Chemical Communications, Journal of Materials Chemistry A, Chemistry-A European Journal, and Advanced Energy Materials. In particular, two papers (first author) were published by the Nature Publishing Group: NPG Asia Materials, and Scientific Reports.

Group4: Piezo PBAC- "The Brighter Future for the Next Generation"

Team : Khomson Suttisintong(Thailand), Nurhidayatullaili Muhd Julkapli(Malaysia) and Wen LIU(China)



Introduction

Energy crisis are becoming a worldwide problem and researchers are making every effort to search for the green and renewable energy source. Since the early 2000s the demand for energy and limits on the rate of fuel production has created such a bottleneck leading to the current energy crisis. The human race has reached a crisis point in the way it produces and uses its energy. Non-renewable resources are quickly disappearing, and increasingly society is turning to renewable energy sources to produce the energy needed.

The use of distributed energy resources is increasingly being pursued to large conventional energy supplier (Suga et al. 2007). In this project, new trends in power electronics for the integration of solar and piezo/tribo-electrical power generators are presented with accomplished long term energy storage of paper battery, which nominated as Piezo PBAC. Piezo PBAC is the short form of Piezo Portable Battery Charger, a harvesting and storage energy device with nano technology features. It is a combination technology of nano-organic solar cell technologies, piezo and triboelectrical technology as the energy harvesting while nano paper batteries for the energy storage. The combination technology is an answer to the increasing energy demand of mobile battery-powered electronic devices with autonomous power source.

Nano-Organic Solar Cell Technologies

An organic solar cell (OSC) is a photovoltaic device whose active layer comprises π -conjugated polymers and small molecules. OSC components can be deposited from solution in a roll-to-roll manner. The materials are also mostly earth-abundant and devices can be semitransparentor aesthetically pleasing that the devices are ultra-flexible and even stretchable, and that the materials and whole devices can be extraordinarily lightweight. Organic photovoltaic devices are thus unique not only in that they could have low costs in production, but that their thinness and extremely small mass could also reduce the costs associated with transportation and installation of modules.

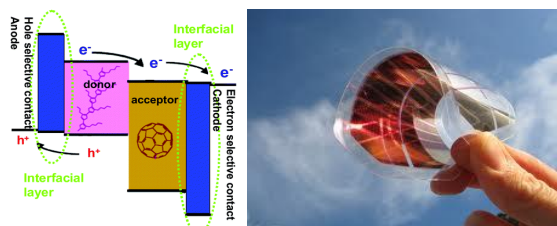


Figure 1: Layout of nano organic solar cells

Organic photovoltaic cells are often cited for their potential to fulfil roles in unique applications such as wearable electronics, portable energy sources, artificial retinas, etc. Many of these applications are specifically targeted to the consumer market rather than to utility-scale generation of power.

Nano-Piezo and Tribo-Electrical Technologies

Among various kinds of energy in the environment, the mechanical energy is relatively stable and widely distributed. Vibration energy harvesters based on different working principles (*i.e.* electromagnetic, electrostatic, piezoelectric) have been developed and studied. With the advantage of high output voltage, piezoelectric harvesters have drawn a lot of attention. Piezoelectric nanogenerators (NGs) using PVDF, PZT, BaTiO₃ etc. have been measured and show good output performance.

For one kind of piezoelectric NGs, the piezoelectric layer is bent and recovered to generate voltage, in which case the electrode will inevitably friction with the substrate material. The friction can be utilized to generate energy based on the combination of triboelectric and electrostatic effect. Triboelectric NGs can be applied to biomedical and environmental systems as a power supply or a self-powered active sensor.

In this work, we present an r-shape hybrid NG to generate

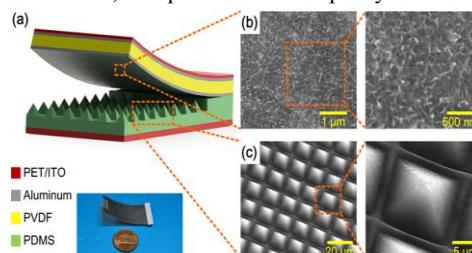


Figure 2 : Structure of the hybrid nanogenerator.

electricity through mechanical input. The piezoelectric NG and the triboelectric NG are combined together to enhance the output performance. Given an external force, both piezoelectric and triboelectric output can be generated. Nanostructures have been fabricated on the surface to enlarge the contact area, thus further improving the output. After a few cycles of movement, negative charges are accumulated on the PDMS surface, while positive charges exists on the bottom Al electrode. Given an external force, PVDF is bent to generate piezoelectric output. Meanwhile, gap distance between PDMS and bottom Al electrode decreases, which will produce a triboelectric output (Figure 2).

Nano-Paper Battery

Nano paper battery is an ultra-thin, flexible and environment-friendly engineered battery with a spacer formed largely of paper that functionalized as conventional ones without corrosive and a bulky housing (Osawa et al. 1992). Its nanoscale structures act as high surface electrodes, smooth topology, much more efficient electrical movement and perfect surface specificity with a good electrical conduction (Liu & Crooks 2012). Coating a sheet of paper with ink made of carbon nanotubes and silver nanowires produced a highly conductive storage device that could be used in a multitude of applications (Figure 3). Therefore, this supercapacitor may last through 40,000 charge-discharge cycles – at least an order of

magnitude more than lithium batteries (Ng *et al.* 2005). The product has the advantage of high surface-to-volume ratio and may be especially useful on the quick transfer and large-scale storage of electricity (Ng *et al.* 2005).

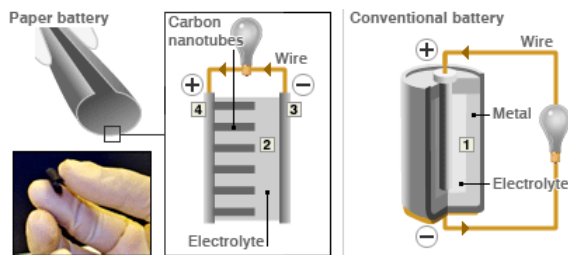


Figure 3: The lay out of paper batteries

Market plan and Potential Customer

The Piezo-PBAC technology has potential to be commercialized within a short time. Such a product, compatible with roll-to-roll production processes, might open a new way for harvesting and storing energy for small consumption electronic devices. The market for products like mobile phones, CD and MP3 players, digital cameras, laptops, pocket games and medical health care assistants have grown steadily all over the world. Wireless connected computer keyboards, headsets for mobile phones, PDAs, electronic tags or smart cards are now part of our daily life. In order to reduce energy consumption and improve their mobility, these electronic devices have to constantly reduce their size. The integration of the Piezo-PBAC into small planar and mobile objects (cellular phones, smart cards, remote controls, tags and others) could revolutionize their use.

Furthermore, it is not only limited to just a portable energy harvest and storage devices but this technology is potentially a very nice, low cost, flexible to be apply for the “green building” applications.

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Biography



Nurhidayatullaili Muhd Julkapli is currently a senior lecturer at Nanotechnology and Catalysis Research Centre (NANOCAT), Universiti Malaya, Malaysia. She received Ph.D degree from Universiti Sains Malaysia, Malaysia. She devoted in research in nanotechnology synthesis and functionalization for the catalysis applications and has published more than 20 papers in prominent journals, conferences and book chapters.



Khomson Suttisintong is a researcher at National Nanotechnology Center (NANOTEC), Thailand. After he finished his Ph.D. degree in Organic Chemistry, he joined Functional Nanomaterials and Interfaces Laboratory (FNI) to pursue his career path as a Nano-Chemist. His interests are involved the synthesis methodologies and total synthesis of complex molecules.



Wen Liu received B.S. degree in Electronic Science & Technology from Southeast University, China in 2011. She is a master candidate in National Key Lab of Nano/Micro Fabrication Technology at Peking University, China. She majors in MEMS and her research interest is energy harvester.

Group5: ARSENIC SNIKERS

Team : Nur Aainaa Syafini MOHD RADZI(Malaysia), Liang ZHOU(Australia), Angga PRAWIRA(Indonesia), Xin HUANG(China), Haposan Yoga Pradika Napitupulu (Indonesia)



Summary :



Figure 1: Skin lesions and cancer caused by Arsenic pollution

Arsenic occurs naturally in rocks and soil, water, air, and plants and animals. It can be further released into the environment through natural activities such as volcanic action, erosion of rocks and forest fires, or through human actions. On January 22, 2001 EPA adopted a new standard for arsenic in drinking water at 10 parts per billion (ppb), replacing the old standard of 50 ppb. The rule became effective on February 22, 2002. The Arsenic and Clarifications to Compliance and New Source Contaminants Monitoring Final Rule was published in the Federal Register (66 FR 6976) on January 22, 2001 (EPA, 2012).

Long-term human exposure, through drinking of contaminated water, is an important public health problem in some regions and countries, and is associated with cancer of the skin, lungs, bladder and kidney. Figure 1 shows

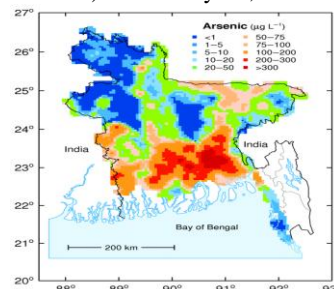


Figure 2: Distribution of Arsenic (BGS and DPHE, 2001)

among the effects of Arsenic pollution. Acute arsenic poisoning produces vomiting, oesophageal and abdominal pain, and bloody “rice water” diarrhea (WHO, 2013).

Around 137 million people are poisoned daily by arsenic in their drinking water and food. Arsenic has contaminates groundwater in more than 70 countries, including Bangladesh, India, the USA, South America, China, Thailand and Taiwan (SciNews, 2013). The worst arsenic contamination case has been recorded in Bangladesh and shown in Figure 2. 57 million rural Bangladeshis are exposed to Arsenic contaminated water and Arsenic-related deaths in the country has account for up to 15% of all deaths due to unsafe levels of arsenic (BGS and DPHE, 2001).

Building local arsenic testing capacity costs a few hundred million US dollars. Understanding on the urge to solve Arsenic pollution issues and how current cost for testing are burdening, Group 5 has come out with an idea to produce an innovative product functioning as an Arsenic testing kit with cheap price and suitable for everyone. The product which was named as “Arsenic Snikers” use *metal-oxide-semiconductor field-effect transistor (MOSFET)* as the main component (Figure 3). MOSFET in an Arsenic Snikers is a onetime used component.

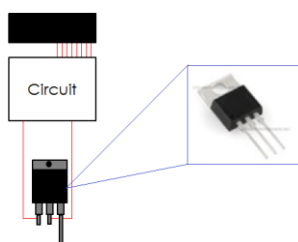


Figure 3: Schematic diagram of the Arsenic Snikers with its MOSFET

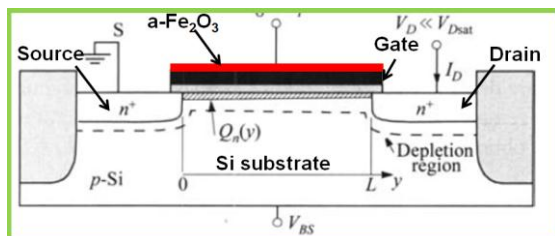


Figure 4: Mechanism of Arsenic detector in the MOSFET

In general, MOSFET is the most important component in a field-effect transistor. Based on the basic working principle of this device (shown in Figure 4), current from the source to the drain is decided by the gate voltage. For the Arsenic Snikers, a layer of silicon wafer with iron oxide thin film will be placed at the gate which is possible because of the absorbing properties of iron oxide. A silicon wafer with iron oxide thin film will be prepared by spin coating the silicon wafer with a nanoparticles iron oxide solutions. When arsenate ion touch the surface of the iron oxide, the electrical field will form and send a signal. The signal will be read based on a propositional relationship between Current and standard concentration of an Arsenic.

The first target market for the Arsenic Snikers is China. According to Rodríguez-Lado *et al.* (2013), 19.6 million people in China are at risk of arsenic-contaminated groundwater. China will be the most suitable country for the use of Arsenic Snikers kit because of their Arsenic contamination situation as well as the easy access to component supplies.

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Biography



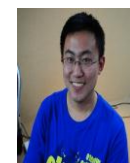
Dr. Nur Aainaa Syafini MOHD RADZI, 27 years old, Malaysia. Representing NanoMalaysia Berhad, a Malaysian government agency mandated to promote the deployment and development of Nanotechnology in Malaysia. A PhD holder in Atmospheric Environment.



Dr. Liang ZHOU, 29 years old, Australia. Representing The University of Queensland Brisbane Australia. A PhD holder from Fudan University.



Angga PRAWIRA, 22 years old, Indonesia. Representing Satuan 81 Kopassus ABRI. Letnan Satu Infantri.



Xin HUANG, 24 years old, Beijing, China Representing Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences. A Master holder in simulation and numerical analysis on MEMS/NEMS devices.



Haposan Yoga Pradika Napitupulu, 22 years old, Indonesia. Representing Gajah Tunggal Politechnic. A diploma candidate in Electronic Engineering.

Email: haposan.napitupulu@gmail.com

Group10: NANO-Antibacterial Cleaning Agent

Team: Budihardjo Felicia Febriana (Hong Kong), He SHEN (China), Hyunje WOO (Korea), and Le Viet Cuong (Vietnam)



Summary

Detergent is a surfactant or a mixture of surfactants with cleaning properties which may contain enzymes to degrade protein-based stains, bleach to de-colorize stains and as cleaning agent, and blue dyes to counter yellowing. There are some problems of detergent sold in market, such as requirement of a mechanical force, hydrocarbon chain of detergent does not break bacteria causing bacteria to remain in the solution, and produces foam which causes slippery floor. Therefore, we would like to address this problem by inventing a Nano-antibacterial cleaning agent. By incorporating nanomaterial into the cleaning agent we hope that it can further enhance the antimicrobial properties of detergent.

The broad-spectrum antimicrobial properties of nanomaterials, in particular silver nano-products, encourage their usage in biomedical applications, water and air purification, food production, cosmetics, clothing, and numerous household products [J Nanopart Res (2010) 12:1531–1551]. With the rapid development of nanotechnology, amount of anti-bacterial nanomaterials have been extended further. Nanomaterials appear to exert bacteriocidal activity predominantly through release of ions followed (individually or in combination) by increased permeability, directly damage bacteria membranes, DNA and proteins and oxidative stress [ACS Nano (2010) 4:5731–5736; J Nanopart Res (2010) 12:1531–1551].

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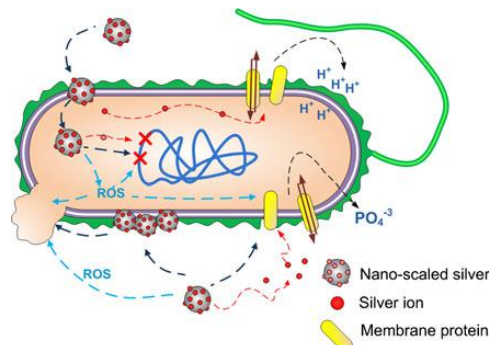


Figure 1. Diagram summarizing nano-silver interaction with bacterial. Nano-silver may (1) release ions and generate ROS; (2) interact with membrane proteins affecting their correct function; (3) accumulate in membrane affecting permeability; and (4) affect DNA. Ref. [J Nanopart Res (2010) 12:1531–1551]

Different forms of anti-bacteria metal-based nanomaterials are already reported by scientists including: silver, gold, titanium dioxide, and et al. Another type of anti-bacteria materials is carbon based, such as graphene, carbon nanotubes (CNT) and fullerene. In order to improve the killing efficiency, researchers combined multi- components to form a composition. Among these, silver combination with graphene or carbon nanotubes nanomaterials are the most efficient ones [Sci Transl Med (2013) 5: 190ra81; J. Phys. Chem. C (2010) 11: 12728–12735; Nano Res (2010) 3: 339–349].

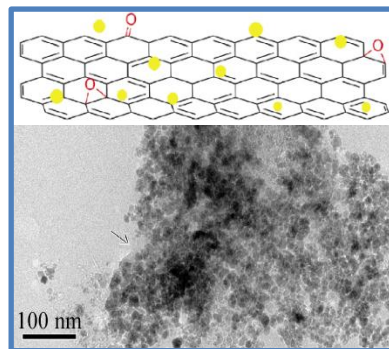


Figure 2. Diagram and TEM image of graphene-Ag composition. Ref. [Nano Res (2010) 3: 339–349]

By considering the different forms of reported anti-bacteria metal-based nanomaterials, we decided to use a hybrid antibacterial nanostructure. Fe₃O₄ microspheres (100nm) is first synthesized and coated by graphene. Cu NPs will then be immobilized onto the graphene. Cu NPs and graphene are selected based on their ability to kill bacteria. Ag NPs antibacterial is well-known. However, Cu NPs can replace Ag NPs due to cheaper price of Cu salt compare to Ag.

This hybrid antibacterial nanostructure is highly stable under 200 °C of temperature, more than 20 times recyclable nanomaterial, and high selectivity for killing specific bacteria



Figure 3: Design of Hybrid Antibacterial Nanostructure

The next step is to incorporate the anti-bacteria nanomaterial (Fe_3O_4 - Graphene-Cu) into liquid detergent via encapsulation. It can also be used to make a nano cloth with anti-bacterial property. Inspired by the “magic cloth”, the nano cloth created will also be easy to clean and to use.

The polypropylene chips (PP chips) and the nanomaterial (Fe_3O_4 - Graphene-Cu) were first dried and cooled down. PP chips were then mixed with the nanomaterial. The pp chips with the nanomaterial were then heated up until the sample is melted. [JOURNAL OF MATERIALS SCIENCE 40 (2005) 5407–5411] Extrusion method was then used to array the fiber into hollow pillars which have capillary effect. The form is capable of trapping solid dust in between the pillars while absorbing water through the capillary effect which in between these pillars can trap solid dust particle while the tip of the pillar can absorb water.



Figure 4: Hollow Fiber Structure

Sustainability, low cost, and re-usable are some of the properties of this product. This product also able to kill bacteria and clean the dust on the floor.

Biography



Budihardjo Felicia Febriana received bachelor degree from School of Engineering, the Hong Kong University of Science and Technology and is a master candidate in the same university. Her current research is to investigate the potential use of the Time-of-Flight Secondary Ion Mass Spectrum (F-SIMS), a surface-sensitive and non-destructive method, to detect zeolite structures



He SHEN received her bachelor degree from University of Science and Technology of China and now is a Ph.D candidate of Suzhou Institute of Nano-tech and Nano-bionics (SINANO), CAS. Her current research are involved in

Graphene oxide based drug delivery system and

Three dimension scaffold for stem cells culture



Le Viet Cuong received his B.S. BSc degree in Engineering physics from VNU, Vietnam and

MSc degree in Micro and nanotechnology from University of Paris-sud 11, France. His is now a Ph.D candidate Nano materials and devices (major) at UET, VNU. His current research topic is Fabrication and characterization of micro-nanostructured

hard magnetic materials for applications in biology



Hyunje WOO is Ph.D. Candidate in Inorganic Chemistry, Pusan National University. His research interests include : synthesis of new nanocatalysts & applications for organic reactions, fabrications & applications of Nanomaterials, synthesis of sustainable, recyclable, and selective hybrid catalysts, development of atom economic tandem catalytic reaction.

Group9: Lotus Structure effect tile

Team: Nishiyama Yuta(Japan), Niken H Sumarno(Indonesia), Ho Thanh Ha (Vietnam), Chinglin Wu(Taiwan)



Introduction

Bathroom is the wettest part of the house and usually become the most susceptible to damage. The damage occurs because of wall paint flaking, fungal and mold growth, also fouling and scaling formation on the floor.

Why molds grow?

- ① Water drops on the tile.
- ② Water can't move easily and stay there.

- ③ Molds grow

Solution: Lotus effect

- ① Water drops on the tile with lotus structure.
- ② Water can move easily because of hydrophobicity.
- ③ Molds do not grow.

- Lotus (*Nelumbo nucifera*) had long been recognized for its water repellency. It is due to nanosized wax papillae on the upper side of each epidermal cell.
- Raindrops make a high contact angle with the papillae and roll off carrying dust and dirt particles
- This property termed as the lotus effect

How to get the lotus structure

Nanoimprint lithography(NIL) is a method of fabricating nanometer scale patterns

- High resolution
- Control performance

- Productivity
- Low cost

Marketing



What they think that they have achieved

I would like to say thank you to ANC organization for supporting me at the airplane, the accommodation and all. Yasmin hotel was a very nice and warm place to stay. I got to know new friends, their researches, exchange ideas.... Team working was a really efficient activity that I loved the most. I was always not very good at team working and this occasion helped me a lot. -- Ho Thanh Ha (Vietnam)

I am grateful to ANF and Surya University for supporting and holding this camp. The Asia Nanotech Camp 2013 is one of the best conferences I ever attended. It has encouraged me further studying and also reminded me to take notice of product marketing. The innovative idea shared in the camp is also impressed. All lovely new friends I met there give me unforgettable memories. Hope that we will see each other again soon in the future. -- Ching-Lin Wu (Taiwan)

Biography



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Ho Thanh Ha is currently working in Nano medicine group at Laboratory for Nano Technology in Ho Chi Minh City. I'm interested in new drug carrier formulations. Besides work, She loves playing go, making handmade



solar heat gain. In addition to studying, he enjoys travelling and taking beautiful pictures in Taiwan.

Ching-Lin Wu is a Ph.D. student of Material Science at National Cheng Kung University, Taiwan. His group work on the study of green building. He is now trying to improve the performance of energy-saving window by the use of nanostructure, which can control the indoor



Yuta Nishiyama, 22 years old, is pursuing B.A. (expected by Mar. 2014) in Mechanical Engineering, Keio Univ. (Tokyo)



Niken Harimurti is a research staff of Indonesian Center for Agricultural Post Harvest Research and Development. Her research topics include the application of nanotechnology for development of functional foods and the development of national biofertilizer.