

**INTERNATIONAL WORKSHOP ON NANOTECHNOLOGY (IWON) 2013:
TRANSFERRING NANOTECHNOLOGY CONCEPT
TOWARDS BUSINESS PERSPECTIVES
SERPONG, INDONESIA, 02 – 05 OCTOBER 2013**

BRIEF REPORT

Nanotechnology is the art, science and technology of manoeuvring the matter on an atomic and molecular scale. In the nanometer scale (10^{-9} m), materials tend to exhibit unique properties as compared to those in bulk scale. Within last decade, this aspect is increasingly being extensively exploited in almost all diverse fields and has led to a scientific and industrial revolution of the 21st Century. There is a Nano Movement all over the globe and Nano is fast becoming a household word and a culture. The scope of Nanotechnology is ever expanding and has already covered the industries like electronics, medical, pharmaceutical, cosmetics, food, textiles, ceramics etc. For example, nanotechnology development in computers has not only led to much more compact size, but has also enabled improvement of its capability and capacity to solve giant programmes in much shorter period. World-wide, nanotechnology was incorporated into manufacturing goods worth over \$30 billion in 2005 and the projections for 2015 indicate business worth over \$2.6 trillion.

No country would like to be left behind in accruing the benefits of this emerging field. For developing countries, nanotechnology can open up new opportunities for rapid progress in priority areas. A nation's capacity to benefit from such revolutionary technology development will however depend on the prevailing institutional and human capacities and the embedded social culture of innovation and entrepreneurship. Successful research and technology transfer activities will be possible only through cooperative endeavours between developed and developing countries and between public and private institutions. Developing countries must determine which specific technologies and advancements will address their unique economic, social and environmental needs so that they could benefit from working with other countries and institutions to develop, adapt and transfer innovative improvements across many application areas.

Although nanotechnology is in its infancy, it is the right time to explore its exploitation by the developing countries according to a well planned long term perspective. In order to explore the wider prospects and share the best practices on transferring Nanotechnology for industrial applications in the developing countries, the Centre for Science and Technology of the Non-aligned and Other Developing Countries (NAM S&T Centre) jointly with the Ministry of Research and Technology (RISTEK), Government of Indonesia and the Indonesian Institute of Sciences (LIPI), and in collaboration with Indonesian Society for Nanotechnology, organized an **'International Workshop on Nanotechnology (IWON) 2013: Transferring Nanotechnology Concept towards Business Perspectives'** in Serpong, Indonesia during 2-5 October 2013.

The Inaugural Session started with opening by the master of ceremony and a traditional performance from Kalimantan. This was followed by the Report Speech of Dr. Nurul Taufiku Rochman, Chairperson of the Workshop Organising Committee. After the welcome address by Prof. Dr. Lukman Hakim, Chairman of LIPI, Prof. Dr. Arun P. Kulshreshtha, Director & Executive Head, NAM S&T Centre presented the genesis of the event and also briefly described the activities of the Centre. Since H.E. Prof. Dr. Ir. Gusti M. Hatta, Honourable Minister for Research and Technology (RISTEK), Republic of Indonesia could not personally inaugurate the Workshop due to unforeseen commitments, his Key Note address was read by Dr. Mulyanto, Honourable Deputy Minister for Science & Technology Institutions in RISTEK. This was followed

by Conferment Token of Appreciation from the Honourable Deputy Minister to the Director of NAM S&T Center, and Conferment Book of "300 Doktor Nano" from the Chairperson of the Organising Committee to the Honourable Deputy Minister, Chairman of LIPI and Director of the NAM S&T Center. The session was concluded with the photo sessions and a press conference with the Honourable Deputy Minister, Chairman LIPI, Director NAM S&T Center and Dr. Nurul Taufiku Rochman / Prof. Dr. Silvester Tursiloadi of the Organising Committee.

104 experts, professionals, researchers and administrators from 33 countries including Australia, Cambodia, China, Egypt, The Gambia, Hong Kong, India, Indonesia, Iran, Iraq, Japan, Kenya, Republic of Korea, Madagascar, Malawi, Malaysia, Mauritius, Myanmar, Nepal, Nigeria, Pakistan, South Africa, Sri Lanka, Sudan, Taiwan, Tanzania, Thailand, Togo, Uganda, Venezuela, Vietnam, Zambia and Zimbabwe, of which 24 (underlined) were the member countries of the NAM S&T Centre, attended this international workshop. Of these, 30 participants were sponsored by the NAM S&T Centre; a resource person was invited from Japan; 31 researchers from 11 countries were from the Asia Nano Forum Society (ANF), Singapore sponsored under Asia Nanotech Camp (ANC); and 35 participants were from Indonesian R&D and academic institutions.

The overseas participants sponsored by the NAM S&T Centre were from Cambodia [Dr. Keo Lychek, In Charge of Master's Programme GEE, Electrical Engineering, Institute of Technology of Cambodia, Phnom Penh]; Egypt [Prof. Dr. Emad Abdel Salam Abdel Moaty Mostafa, Head, Biomaterials Department, National Research Centre, El Dokki, Cairo; and Prof. Khaled Ebnalwaled, Associate Professor, Crystalline and Nanomaterials Measurements (CNM) Lab, Department of Physics, Faculty of Science, South Valley University, Qena]; The Gambia [Mr. Lamin Ceesay, Senior Science & Technology Officer, Ministry of Higher Education, Research, Science and Technology, Kotu]; India [Prof. V. Murugan, Principal, Dayananda Sagar College of Pharmacy, Bangalore; and Ms. Parul Sehgal, Research Assistant, NAM S&T Centre, New Delhi]; Iran [Dr. Hojatolah- Hajihoseini Sefideh, Director, Research Institute for New Technologies, Iranian Research Organization for Science and Technology (IROST), Ministry of Science, Research and Technology (MSRT), Tehran]; Iraq [Mrs. Kifah A. Fayad AL-Imarah, Director, Renewable Energy Directorate / Hydrogen and Biofuel Department, Ministry of Science and Technology, Baghdad]; Kenya [Dr. Naumih Noah, Chemistry Lecturer, Kenyatta University, Nairobi]; Madagascar [Mr. Hery Andrianaiaina, Permanent Secretary of CORANANO, Department of Maintenance & Instrumentation, Institute National Des Sciences et Techniques Nucleaires (INSTN), Antananarivo]; Malawi [Dr. Timothy Tiwonge Biswick, Senior Lecturer, University of Malawi, Zomba]; Malaysia [Dr. Abdul Kadir Masrom, Under Secretary, Ministry of Science Technology and Innovation, Putrajaya]; Mauritius [Prof. Dhanjay Jhurry, National Research Chair, Mauritius Research Council, Center for Biomedical and Biomaterials Research, ANDI Centre of Excellence, Réduit]; Myanmar [Dr. Lwin Thuzar Shwe, Deputy Director, Foreign Scholar Section, Ministry of Science and Technology, Nay Pyi Taw]; Nepal [Dr. Suresh Kumar Dhungel, Senior Officer, Nepal Academy of Science and Technology (NAST), Khumaltar, Lalitpur]; Nigeria [Engr. Timothy Oladele Odedele, Assistant Director, New and Advanced Materials, Raw Materials Research & Development Council (RMRDC), Abuja; and Mr. Ojo Olusola Emmanuel, Research Officer, Federal Institute of Industrial Research (FIRO). Lagos]; Pakistan [Dr. Shahzad Alam, Director General, PCSIR Laboratories Complex, Lahore; and Prof. Qamar ul Wahab, IT Chair Professor, Electronic Design Centre, Faculty of Electronics and Computer Engineering, NED University of Engineering and Technology, Karachi]; South Africa [Dr Robert Tshikhudo, Head, Mintek Nanotechnology Innovation Centre (NIC), Randburg; and Prof. M. Maaza, UNESCO UNISA AFRICA Chair in Nanosciences / Nanotechnology, iThemba LABS - National Research Foundation of South Africa, Somerset West, Western Cape Province]; Sri Lanka [Dr. Iresha Renuka Menike Kottegoda, Head and Principal Research Scientist, Industrial Technology Institute, Colombo]; Sudan [Prof. Dr. Eltayeb Edris Eisa Ebrahim, President, Sudan Academy of Sciences (SAS), Ozone Park, Khartoum]; Tanzania [Dr.

Egid B. Mubofu, Senior Lecturer and Head, Department of Chemistry, University of Dar-es-Salaam]; Togo [Mr. N'konou David Kokou Kekeli Mawunyegan, Ph.D. Student in Materials Science, Department of Physics, University of Lomé]; Uganda [Prof. Obwoya Kinyera Sam, Associate Professor, Kyambogo University]; Venezuela [Dr. Anwar Salem Hasmy Aguilar, Director, Venezuelan Nanotechnology Network, Universidad Simón Bolívar, Caracas]; Vietnam [Prof. Pham Duc Thang, Dean, Faculty of Engineering Physics and Nanotechnology, Laboratory for Micro and Nanotechnology, University of Engineering and Technology, Vietnam National University, Hanoi]; Zambia [Mr. Benson Banda, Principal Education Officer, National Science Centre, Ministry of Education, Science, Vocation Training and Early Education, Lusaka]; Netherlands]. The NAM S&T Centre was represented during the Workshop by Prof. Arun P. Kulshreshtha, Director & Executive Head for planning and organising the event.

The overall programme of the Workshop was conducted in seven sessions including one plenary, five technical and one concluding and valedictory session, respectively co-chaired by: Prof. Dr. Silvester Tursiloadi (Indonesia) and Prof. Dr. Eltayeb Edris Eisa Ebrahim (Sudan); Prof. M. Maaza (South Africa) and Mrs. Kifah Al Imarah (Iraq); Dr. V. Murugan (India) and Prof. Pham Duc Thang (Vietnam); Prof. Dr. Emad AbdelSalam AbdelMoaty Mostafa (Egypt) and Prof. Qamar ul Wahab (Pakistan); Prof. Khaled Ebnalwaled (Egypt) and Prof. Dhanjay Jhurry (Mauritius); Prof. Obwoya Kinyera Sam (Uganda) and Dr. Anwar Salem Hasmy Aguilar (Venezuela); and Dr. Nurul Taufiqu Rahman (Indonesia) and Dr. Hojatolah Hajihoseini Sefideh (Iran).

Plenary talks were given by Dr. Yuya Oaki, Assistant Professor, Department of Applied Chemistry, School of Integrated Design Engineering, Faculty of Science and Technology, Keio University, Yokohama, Japan and Mr. Ragil Yoga Edi, Head, Sub Division of IP Registration and Protection, Center of Innovation, Indonesian Institute of Sciences (LIPI).

The scientific papers presented by the foreign participants during the Workshop were on 'Nanotechnology: The Future Development Plan for Institute of Technology of Cambodia' by Dr. Keo Lychek of Cambodia; 'Functional and Potential Aspects of Ceramic Nanoparticles' by Prof. Dr. Emad AbdelSalam AbdelMoaty Mostafa of Egypt; 'Pressure Dependence of Conduction Mechanism and Microstructure Properties of Nanocrystalline CdS' by Prof. Khaled Ebnalwaled of Egypt; 'Potentials of Nanotechnology Application in the Gambia' by Mr. Lamin Ceesay of The Gambia; 'Formulation and In Vitro Evaluation of Albumin Nanoparticles containing Temozolomide' by Dr. V. Murugan of India; 'Transferring Nanotechnology Concept for Industrial Use: Applications of Nanotechnology for Agriculture, Food and Medicine' by Ms. Parul Sehgal of India; 'Iran Nanotechnology Initiative' by Dr. Hojatolah- Hajihoseini Sefideh of Iran; 'Nanotechnology in the Production, Storage and Utilization of Renewable Hydrogen Energy' by Mrs. Kifah A. Fayad Al-Imarah of Iraq; 'Nano-Remediation of Carcinogenic Hexavalent Chromium using Palladium Nanoparticles' by Dr. Naumih Noah of Kenya; 'Madagascar Nanotechnology Initiative Program' by Mr. Hery Andrianaina of Madagascar; 'Multi-Metallic Sulphide Catalysts for Ultra-deep Hydrodesulphurisation of Diesel Fuels' by Dr. Timothy Tiwonge Biswick of Malawi; 'Nanotechnology Contribution as Economic Driver in Malaysian Economic Transformation Program' by Dr. Abdul Kadir Masrom of Malaysia; 'Nanomedicine Research at the Centre for Biomedical and Biomaterials Research' by Prof. Dhanjay Jhurry of Mauritius; 'Preparation of CuO Nanoparticles by Precipitation Method' by Dr. Lwin Thuzar Shwe of Myanmar; 'Institutionalizing Nanotechnology in Nepal' by Dr. Suresh Kumar Dhungel of Nepal; 'Barriers to Nanotechnology Transfer Towards Business Perspectives' by Engr. Timothy Oladele Odedele of Nigeria; 'Characterisation of Some Nigeria Limestone for Production of Nano Precipitated Calcium Carbonate' by Mr. Ojo Olusola Emmanuel of Nigeria; 'Status of Nano-technology in Pakistan: Threats and Opportunities' by Dr. Shahzad Alam of Pakistan; 'Wide Bandgap Semiconductor based Nano-structured Electronics and Photonics' by Prof. Qamar ul Wahab of Pakistan; 'Development and Industrialisation of Advanced Nanoparticle

Systems and Devices for Health and Water Applications' by Dr Robert Tshikhudo of South Africa; 'Solar Energy R&D Landscape and Solar Energy Roadmap of South Africa: Nano Opportunities' by Prof. M. Maaza of South Africa; 'Status of Development of Nanotechnology based Value Added Products' by Dr. Iresha Renuka Menike Kottegoda of Sri Lanka; 'Nano Science & Nano Technology Program in Sudan' by Prof. Dr. Eltayeb Edris Eisa Ebrahim of Sudan; 'Synthesis and Characterization of Anacardic Acid-capped Chalcogenide Nanoparticles' by Dr. Egid B. Mubofu of Tanzania; 'Synthesis of Intrinsic and Aluminum-doped Zinc Oxide (ZnO) Nanoparticles as a Buffer Layer in Organic Solar Cells by Chemical Bath Deposition Method' by Mr. N'konou Kokou Kekeli Mawunyegan of Togo; 'Status of Nanotechnology in Uganda' by Prof. Obwoya Kinyera Sam of Uganda; 'Nanotechnology in Venezuela: Current Situation and Perspective' by Dr. Anwar Salem Hasmy Aguilar of Venezuela; 'Nanotechnology: Research and Development in Vietnam' by Prof. Pham Duc Thang of Vietnam; 'The Challenge of Nanotechnology among Teachers in Zambia: A Theoretical Perspective' by Mr. Benson Banda of Zambia; 'From Laboratory to Market: The Challenges of Transferring Nanotechnology Concept towards Business Perspectives' by Mr. Trust Saidi of Zimbabwe.

Three scientific papers presented by Indonesian scientists were on 'Development of Nano-Structured Intercalation Catalyst from Ion-Exchangable Inorganic Layered Compounds toward Green Oxidation Reactions' by Dr. Indri Badria Adilina of the Research Center for Chemistry, Indonesian Institute of Sciences (LIPI); 'The Structure and Adsorption Properties of Annealed-Reduced Graphene Oxide' by Dr. Fitri Khairunisa of the Chemistry Department, Indonesia University of Education, Bandung; and 'Cellulose Nano fibre Isolation from Sludge from Pulp and Paper Industry' by Dr. Dian Susanthi of the Department of Chemistry, Bogor Agricultural University, Dramaga.

During the Concluding and Valedictory Session chaired by Dr. Nurul Taufiqu Rahman of Indonesia and Dr. Hojatolah Hajihoseini Sefideh of Iran, Prof. Dr. Arun P. Kulshreshtha, Director, NAM S&T Centre made a presentation on 'The Role of the NAM S&T Centre for South – South Cooperation in Science & Technology'. Subsequently, there was considerable discussion and debate to generate a set of recommendations titled 'Serpong Recommendations on Transferring Nanotechnology Concept towards Business Perspectives', and this document was unanimously adopted during the Closing Session. The Workshop ended with the handing over of the Certificates to the participants and concluding remarks by Prof. Dr. Silvester Tursiloadi.

The last day of the event was dedicated to a day-long field visit by the foreign participants to the Research Center PUSPIPTEK, Serpong, Taman Mini Indonesia Indah (TMII), Museum Indonesia, NAM Monument and Keong Mas.

The participants thanked the organisers for the successful and fruitful organisation of the Workshop and for excellent hospitality and arrangements made for the delegates, and unanimously hoped that more similar events will be held in future with a focus on South-South cooperation.