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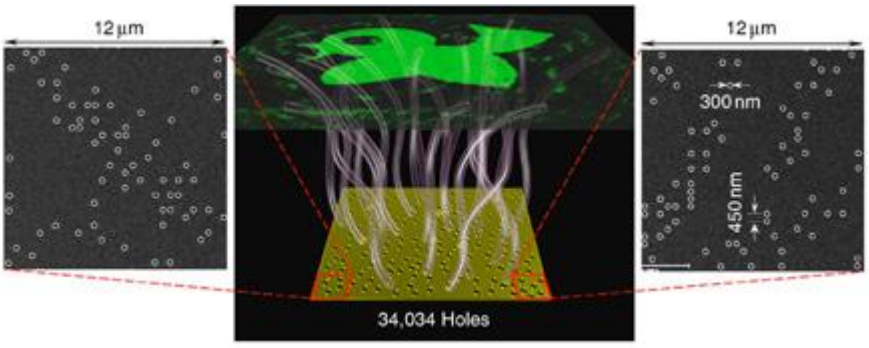


NEWS

✧ Partnership/Collaboration

Taiwan (Source: The Innovation and Application of Nanoscience Thematic Program (IANTP))

(1) Taiwan participates in the M-ERA.NET

Dr. Ting-Kuo Lee, as one of the board members representing MOST, attended the working group meeting and steering board meeting of M-ERA.NET consortium on September 14 in Warsaw, Poland. The main issue discussed in the meeting is to finalize the list of pre-proposals of Joint Call 2015. There are 2 proposals involving Taiwan partners recommended for proceeding to full proposals. On Sept. 15, M-ERA.NET conference has six talks presented by on-going projects funded under the M-ERA.NET scheme. The first talk was given by Professor Wei-Fang Su from National Taiwan University. She leads the project to use her materials for sensing special molecules, which is making progress. After the talks, there was a panel discussion and the six speakers were asked about their experience with international cooperation in general and the M-ERA.NET scheme in particular. One important function for this kind of program is to have students/postdocs from Taiwan team to visit collaborators to learn from them.

(2) 2015 Joint US-Korea-Taiwan Nanoscience Program Review and Technical Exchange

Each year the Asian Office of Aerospace Research and Development / US Air Force Office of Scientific Research (AOARD/AFOSR) holds annual program review for US-Korea Nano Bio Info Technology and USAF-Taiwan Nanoscience Programs. To Further international collaboration, Korea, Taiwan, and the US have decided to hold joint programs reviews in 2015 and 2016. The Korean National Research Foundation (NRF) has graciously hosted this year's review in Seoul, South Korea on 26-30 October 2015. More than 50 scholars and experts participated this event, and most of them gave a presentation. Next year this tri-nation program review and technical exchange will be held in Taiwan.

(3) Taiwan participates in the M-ERA.NET

Dr. Wen-Chang Hsu, representative of National/Regional funding organization of Taiwan, the Ministry of Science and Technology (MOST) has attended the M-ERA.NET Call 2015 Selection Meeting and the Kickoff Meeting which were held on 26-27 January 2016 in Vienna, Austria. The main issue discussed in the first part of the event is to finalize the list of full proposals of Joint Call 2015. There are only 20 recommended for funding within 54 passed full-proposals (39 failed). A full - proposal from National Chung Hsing University of Taiwan has been recommended for funding. The second part of the event refers to the M-ERA.NET 2 (2016 – 2021) which is a continuation of M-ERA.NET beyond FP7 and kicks off with 41 public national and regional funding organizations in 25 countries. It kicks off with 41 public national and regional funding organizations in 25 countries. There are 6 themes for M-ERA.NET2 Call 2016, including "Integrated computational materials engineering", "Innovative surfaces, coatings and interfaces", "High performance synthetic and biobased composites", "Functional materials", "Interfaces between materials and biological hosts for health applications" and "Materials for additive manufacturing". Deadline for submission of pre-proposals is 14 June 2016. Afterward there will be a Consensus Meeting for Pre-proposals 2016 in September.

(4) Taiwan held the 12th Cross-Strait Workshop on Nano Science and Technology

The 12th Cross-Strait Workshop on Nano Science and Technology (CSWNST-12) was held at Academia Sinica, Taiwan on 22-25 March 2016. The program consisted of 3 invited presentations, 80 oral presentations, and 18 poster presentations. More than 100 scholars and experts from Taiwan, China, and Hong Kong participated this event to share their work as presentations or posters. The seven conference topics this year include "Applications of Nanoscience and Nanotechnology: Biological and Biomedical", "Applications of Nanoscience and Nanotechnology: Energy, Environment & Catalyst", "Applications of Nanoscience and Nanotechnology: Optoelectronics and Electronics", "Characterization, Manipulation, and Standardization of Nanomaterials and Nanostructures", "Fabrication and Mass Production of Nanomaterials and Nanostructures", "Functionalization, Assembling, and Integration of Nanomaterials", and "Theoretical Modeling, Computation and Simulation in the Above Areas".

(5) Young scientists from Taiwan participated in the 9th Asia Nanotech Camp 2016 (ANC2016)

The 9th Asia Nanotech Camp 2016 (ANC2016) hosted by the Austrian Ministry for Transport, Innovation and Technology in cooperation with the Austrian Academy of Science and the IMC University of Applied Sciences Krems, was held on 3-8 April 2016 in Krems, Austria. This program aimed for young nanotechnology PhD students and early career researchers (within 3 years of their PhD graduation) to learn about the cutting-edge nanotech advancements, risk, responsibilities and sustainability. A workshop began with an introduction to the topic of "Safe and Sustainable Development of Nanotechnologies and Responsible Innovation Towards Sustainability". Well-known speakers from Asia and Europe presented concepts and perspectives in the field of nanosafety and nano risk governance with special emphasis on differences between Asia and Europe. Then there was an international conference of BioNanoMed following the workshop. Among the outstanding keynote speakers, Prof. Arben Merkoci from ICREA, Spain gave an inspiring presentation on development of biosensors such as DNA sensors and Immunosensors. There is a total of 24 participants from 11 countries, including Japan, Taiwan, Thailand, Malaysia, China, South Korea, Singapore, Iran, Hong Kong, Vietnam and Austria this year.

(6) Taiwan-Malaysia NanoMark/NANO*Verify* Programs Workshop in Taiwan

Taiwan-Malaysia NanoMark/NANO*Verify* Programs Workshop was hosted by Taiwan Nanotechnology Industry Development Association (TANIDA) on 12 April 2016 in Taipei, Taiwan. As pioneer countries in promoting nano-certification in the world, Taiwan and Malaysia have already established the voluntary certification of nanoMark and NANO*Verify* respectively. Therefore, a certification network of nanoproducts is expected to be developed. Delegation from Malaysia was led by Dr. Rezal Khairi Ahmad, CEO of NanoMalaysia Berhad. There was a signing ceremony of the Memorandum of

Understanding (MOU) between TANIDA and NanoMalaysia Berhad prior to the workshop. Both parties agree to encourage and promote cooperation in the field of mutual recognition on nano products certification and nanotechnology commercialization. The discussed topics during the workshop include "NanoMark Program General Process and Sstatus", "NanoMark Standards Status and Case Study", "NanoMark Testing Laboratories", "NANO*Verify* Programme Overview and Status", "NANO*Verify* General Process", and "NANO*Verify* Testing Laboratories".

Malaysia (Source: Nano Malaysia**)**

(1) NANO- SCITECH 2016

SHAH ALAM, 27TH FEBRUARY 2016 – International Seminar on Nanoscience and Nanotechnology 2016 (Nano-SciTech 2016) was held at the Institute Of Leadership and Development (ILD), UiTM Shah Alam.

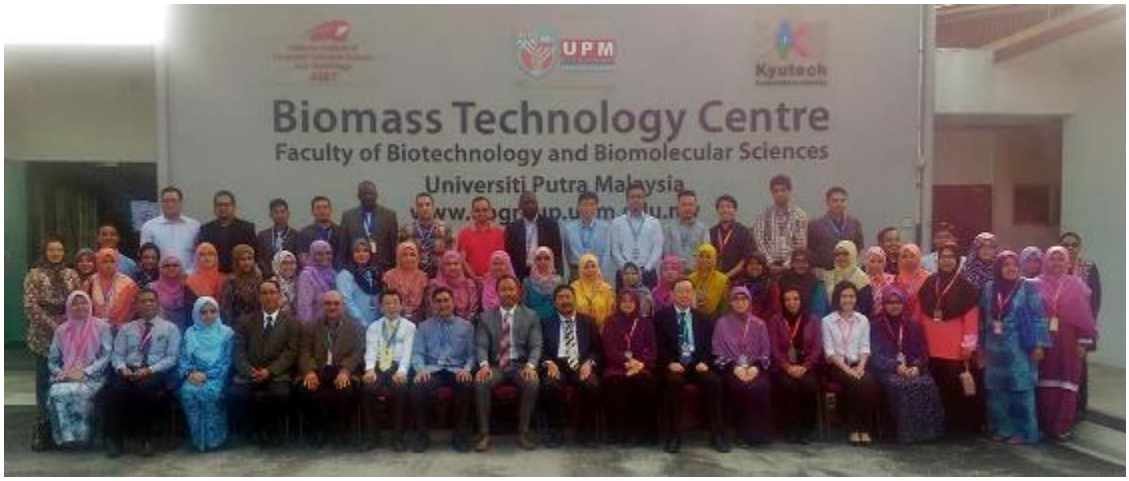
Chief Executive Officer of NanoMalaysia, Dr. Rezal Khairi Ahmad gave an in depth understanding on commercialisation of nanotechnology to the participants at the seminar.

NANO-SciTech 2016 was organised by NANO-SciTech Centre, Institute of Science, Universiti Teknologi MARA (UiTM) with UiTM-NITech Liaison Office, Nagoya Institute of Technology (NITech), Nagoya, Japan and National Institute of Technology, Kagawa College, Kagawa-Ken, Japan as co-organisers. The scientific objective of this conference was to stimulate the interest of academicians and researchers in the Nanoscience, Nanotechnology and Nano-engineering field by providing a platform for necessary linkages and interaction involving participants from different regions over the world.

(2) NANOCELLULOSE WORKSHOP 2016

SERDANG, 21ST MARCH 2016 – Workshop on Nanocellulose Material: From Fundamental to Applications was held at Biomass Technology Centre, Universiti Putra Malaysia (UPM), Serdang. This workshop was organised by Institute of Tropical Forestry and Forest Products (INTROP), Universiti Putra Malaysia.

The participants were given the insight on theoretical and technical aspects of nanocellulose fibres including on nanocellulose potential in Malaysia which was shared by Dr. Rezal Khairi Ahmad, Chief Executive Officer of NanoMalaysia.



Australia (Source: Australian Nanotechnology Network)

Another successful International Conference on Nanoscience and Nanotechnology (ICONN 2016) hosted by the Australian Nanotechnology Network was held in Canberra in February 2016.

ICONN2016 attracted six hundred delegates from nineteen countries and was chaired by Prof Chennupati Jagadish and Prof Hoe Tan from the Australian National University.

A short course on the Introduction to Nanofabrication Technologies was held on the first day, was organised by, and featured speakers from the Australian National Fabrication facility.

8 Plenary speakers including Nobel Laureate, Prof W E Moerner and thirty six invited speakers gave a remarkable synopsis of recent developments in the field.

More information on this year's program, conference themes, symposia chairs and co-chairs can be accessed on the following http://www.ausnano.net/iconn2016/

Japan (Source: National Institute of Advanced Industrial Science and Technology (AIST)**)**

NANOTEC and AIST have had many collective researches in Nanotechnology field. This program targets to inherit this achievement for the next generation and to promote more exchanges. Furthermore, this program have more important goal to cultivate human resources capable of contributing research result to developments of societies in both countries. The researchers from NANOTEC had technical trainings with state-of-the-art and highest level facilities for 10 days in AIST. The technical trainings were Ultrafine Fabrication Process Course in Super Clean Room and Micro Electro Mechanical systems (MEMS). During their stay, they had events such as a meeting on nanotechnology with AIST researchers, visited NIMS and Rigaku corp., participated in International Nanotechnology Exhibition and Conference, "Nanotech 2016". Plus, they joined an exchange program of Nanotech CUPAL and had exchanges with Japanese young researchers. AIST would like to continue this program and deepen much more research exchange with Thailand.

Thailand (Source: National Nanotechnology Centre (NANOTEC)**)**

(1) Royal visit at Synchrotron Light Research Center

Synchrotron Light Research Center (SLRI) welcomed HRH Princess Maha Chakri Sirindhorn to the Royal Opening Ceremony of "Macromolecular Crystallography Beamline". As part of the opening ceremony program, the Ministry of Science and Technology and NANOTEC provided update on the BL5.2 (SUT-NANOTEC-SLRI Joint Research Facilities for Synchrotron Utilization') collaboration project to HRH. The aim of the project is to provide infrastructure facility to researchers for the studies of atomic arrangement and elemental speciation of material. BL5.2 is a

consortium beamline, jointly funded by Suranaree University of Technology, the National Nanotechnology Center and SLRI.

(2) NANOTEC and NECTEC mobilize to install nano filtration water unit at a local hospital (July 27)

Representatives from NANOTEC and NECTEC mobilize to install a nano filtration water unit (SOS V2) at Chandarubeksa Hospital in Kamphaeng Saen, Nankorn Pathom province for use at their staff housing facility. The housing unit currently receives water from an in-house water treatment facility operated by the hospital. The SOS V2 unit will help to eliminate the problem associated with water color, odor, and existence of heavy metal in the water supply which is a constant nagging problem for the hospital during the dry season.

The RTAF which oversees the operation of 10 hospitals in Thailand including Chandarubeksa will explore the possibility of installing additional SOS V2 units in other RTAF hospitals.

SOS V2 nano filtration unit is a result of research collaboration between NANOTEC and NECTEC. It is designed to use 2 nano filtration process (carbon nano and silver ceramic nano filter) for anti-bacterial functions and operated by embedded control system developed by NECTEC. The unit is capable of producing 300 liters of clean drinkable water per hour from wells and/or surface water ponds.

(3) Plasmonic Bio-sensor for detecting serious diseases in SE Asia

NIMS (Japan), IMS (Vietnam), and NANOTEC (Thailand) organized the symposium on “Plasmonic Bio-sensor for detecting serious diseases in SE Asia” at Thailand Science Park.

The NANOTEC-NIMS-IMS Research project entitled “Plasmonic Bio-sensor for detecting serious diseases in SE Asia” began in 2012 and is under the e-Asia Joint Research Program (e-Asia JRP).

The project was successful in utilizing bio-sensors technology to detect a serious infectious disease (Influenza A H1N1). The symposium marks the conclusion of Phase 1 of the project. Discussion to continue the project is on-going at present.

(4) Use of Slow Release Fertilizer at Royal Park Rajapruek in Chiang Mai

NANOTEC and Royal Park Rajapruek in Chiang Mai organized an official handover of Slow Release Fertilizer for use in the “Shaded Paradise” greenhouse facility this morning.

The Smart Soil and Fertilizer Flagship at NANOTEC developed and produced fertilizer formulations for controlled release of nutrients for crops, using polymer materials made from naturally porous and nano-sized particles (considered as nano-organic chemical). The amount and duration of release of nutrients can be controlled and optimized for particular

plants. The duration of the release can be as much as 3-6 months, depending on the type of crop it is being use for. The polymer coatings were formed by the phase inversion technique. The thickness and porosity and physical properties of the coatings influence the release rate of nutrients which are present in the core of the coated fertilizers.

Thailand (Source: King Mongkut's University of Technology Thonburi (KMUTT))

Nano@KMUTT Hosted Three Renowned Nanotechnologists (Bangkok, Thailand)

Nano@KMUTT had unique opportunities to welcome three prominent scientists from around the world. In 2015, Professor Pulickel Ajayan, a pioneer in the field of carbon nanotubes from Rice University (USA), came to share with us his current research activities in his talk "Material Science of 2D Atomic Layer." Later in the same year, we were fortunate to have with us Dr. Lerwin Liu, Managing Director of NanoGlobe and founding ANF Secretary. Dr. Liu highlighted the latest developments in nanotech start-up as well as nano educational programs in Asia. Lastly, during his visit in Feburary 2016, Proferror Nadrian Seeman from New York University gave a talk on the topic of "DNA: Not Merely the Secret of Life," summarizing his entire career to become the world-leading researcher in DNA nanotechnology.

Singapore (Source: Institute of Materials Research & Engineering (IMRE) http://www.imre.a-star.edu.sg/)

(1) Engineering the future of thermoplastics

In photo: (seated, from left to right) IMRE's Dr Chi Dongzhi, Head, Design and Growth, signed the RCA with Dr

Suracha Udomsak, R&D Director, SCG Chemicals. Witnessing the signing are: (standing, from left to right) Dr Wilaiporn Chetanachan, Director of Corporate Technology Office, SCG; Prof Hardy Chan,IMRE EXCO member; Mr Kan Trakulhoon, Director and Chairman of the Management Advisory Committee and Mr Yuttana Jiamtragan, Vice President, Corporate Administration, SCG. R&D Director, SCG Chemicals. Witnessing the signing are: (standing, from left to right) Dr Wilaiporn Chetanachan, Director of Corporate Technology Office, SCG; Prof Hardy Chan,IMRE EXCO member; Mr Kan Trakulhoon, Director and Chairman of the Management Advisory Committee and Mr Yuttana Jiamtragan, Vice President, Corporate Administration, SCG.

One of the biggest polyolefin producers in Thailand, Siam Cement Group (SCG) Chemicals, signed two Research Collaboration Agreements (RCA) with IMRE, to further develop the technology in polyolefin composite materials. SCG Chemicals will be working closely with IMRE's research team on two projects - High strength and tough polyolefin composite/ High strength reinforced polyolefin composite.

Existing manufacturing capabilities are too costly for production/extrusion of polyolefin. IMRE scientists have discovered an optimal mix of materials to form a polyolefin composite that is more cost effective and efficient while being readily extruded for industrial use.

This collaboration with SCG Chemicals could potentially open a new dimension for polyolefin composite industries by replacing engineering plastics with polyolefin. The advantages of reinforced polyolefin over other engineering plastics are: light weight, low cost, and ease of resin modification. Target applications include the interior of automotive and aircrafts, building construction materials and infrastructure materials such as pipes.

(2) Exploring new frontiers at Molecular Materials Meeting (M3)

(From left): Prof Andy Hor, Executive Director of IMRE (Jun 2010- Aug 2015) and Mr Lim Chuan Poh, A*STAR Chairman, hosted His Excellency Haruhisa Takeuchi, Ambassador of Japan to Singapore; and Dr Yoichiro Matsumoto, Executive Director of RIKEN

"Science is without borders. It is on the strength of the mutual trust and confidence between the research communities that enduring and impactful strategic partnerships are forged and successful collaborations seeded," said Mr Lim Chuan Poh, Chairman, A*STAR, during his welcome speech for 5th Molecular Materials Meeting (M3).

M3 was a borderless scientific event as distinguished speakers and global scientific leaders from 25 countries shared latest developments in molecular materials.There were six parallel sessions, in addition to plenary talks.

M3's theme this year was "The Next 50 Years in Materials Re-search", to commemorate Singapore's Golden Jubilee. The fifth M3 attracted the highest number of participants, with more than 300 of them from outside of IMRE.

Two key events at M3 were the Asia Nano Forum and A*STAR-RIKEN Joint Symposium. This year also marks the 10th anniversary of A*STAR's and RIKEN's Science and Technology partnership.

"Molecular-materials research can affect everyday lives tremendously in the most fundamental ways. Thus, we have every reason to look forward to the next 50 years of national development and materials innovation," said Pr of Hor.

M3's first CTO forum, on the second day, provided the plat-form for intimate discussions about encouraging innovations in the private, public and academic sectors. There was also an industry fair for commercial partners.

At the end of three intellectually stimulating days, prizes for "Best Poster" and the inaugural Lubrizol Young Materials Science Investigator award were given out.

✧ Commercialization

Taiwan (Source: The Innovation and Application of Nanoscience Thematic Program (IANTP)**)**

(1) NanoMark Program, MOEA

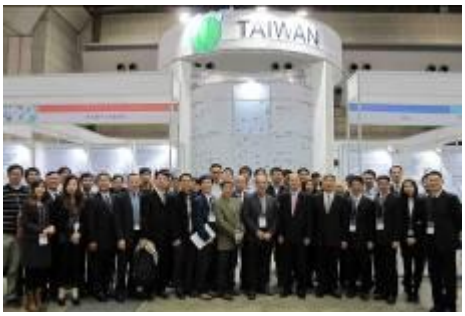
The nanoMark enhances the overall enterprise competitiveness. The nanoMark has been promoted for 10 years and has cumulative fruitful results. From 2004 to date, 52 certification specifications have been set up. At the same time, there are already 44 companies, 2355 products that passed the nanoMark certification. More than 90% of the products are building materials. The results of a market research indicated that not only can the nanoMark help the companies who have passed the nanoMark certification increase their "corporate image", gain customers' confidence and promote "market sales", it can even increase the selling price of their products by 20%.

(2) ISO/TC 229 Working Group Meetings

ISO Nanotechnology Committee (The International Organization for Standardization (ISO) Technical Committee (TC) 229 on Nanotechnologies, ISO/TC 229) was established in 2005 and has been developing standards related to the field of nanotechnologies. The ISO/TC 229 Working Group Meetings were held this year on Sep. 28 - Oct. 02 in Edmonton, Canada. On behalf of ANF (liaison member of ISO/TC 229), Taiwan attended the ISO/TC 229 meetings and participated in the

working groups of "Terminology and nomenclature", "Measurement and characterization", "Health, Safety and Environmental Aspects of Nanotechnologies", and "Material specifications" to discuss the global nanotechnology standards and Environment, Health and Safety (EHS) development. With this standard platform, Taiwan can share the experience of nanoMark program with other members and bring domestic industries the latest international standard policy or regulation.

(3) Taiwan Pavilion in nano tech 2016, Japan



"Nano tech 2016 – the 15th International Nanotechnology Exhibition & Conference" was held on 27-29 January 2016 in Tokyo, Japan. Taiwan Pavilion has been participating this event for 12 consecutive years. " Japan Nanotech 2016 Taiwan Pavilion Project, MOST" elected 31 technology and research achievements from 27 industry, academia, and research units to demonstrate Taiwan's latest nanotechnology status. Representative of Taipei Economic and Cultural Representative Office in Japan, Ssu-Tsun Shen, and staff visited Taiwan Pavilion during the exhibition. This year Taiwan Pavilion won the "Continuous Achievement Award", which represents Taiwan's continuous contributions and efforts to the development of nanotechnology. During the world's largest nanotechnology event, Japan's Nanotechnology Business Creation Initiative (NBCI) hosted the 8th Nanotech Association Conference in conjunction with the exhibition as usual. About 25 experts from Canada, Germany, Japan, Netherlands, Singapore, Taiwan and USA participated in the discussion and exchange of current development of nanotechnology. In Taiwan's presentation, the nanoMark program is the issue all countries are interested in.

Malaysia (Source: Nano Malaysia**)**

(1) NanoMalaysia-Tanida Signed & Exchanged MOU on Nanotechnology Development and Commercialization

TAIWAN, 12TH APRIL 2016 - Dr. Rezal Khairi Ahmad, Chief Executive Officer of NanoMalaysia and Prof. Chung-Yu (Peter) Wu, Chairman of Taiwan Nanotechnology Industrialization Promotion Association (TANIDA) signed a Memorandum of Understanding on nanotechnology product development, commercialization and mutual acceptance on

NANO*Verify* Programme implementation.

From left: Dr. Rezal Khairi Ahmad, CEO of NanoMalaysia Berhad and Prof. Chung-Yu (Peter) Wu, Chairman of TANIDA during the NanoMalaysia-TANIDA MOU Exchange Ceremony.

Thailand (Source: National Nanotechnology Centre (NANOTEC))

The 15th International Nanotechnology Exhibition and Conference on 26-30 January 2016 at Tokyo Big Sight, Tokyo, Japan

The 15th International Nanotechnology Exhibition and Conference is 6th year that Thailand have participated in what is considered "the world's largest event for nanotechnologies". A total of 16 exhibitions by both private sectors and research agencies under the theme "Nanotechnology in Thailand: For Healthy Life by Nature and Green" at Thailand Pavilion. The Thai delegation consisted of representatives from 5 companies and 5 products, namely, NANO ANTI BACTERIA WIPES from KEEEN Ltd., Controlled Release Fertilizer from Smart Vet Co., Ltd., The aromas from Thai Techno Glass Co., Ltd., Antibacterial Fine Powder from IRPC and Mouthwash and mouth spray from Greater Pharma and researchers from NANOTEC, TISTR, and TRF. Leading the Thai delegation was Prof. Pairash Thajchayapong, Chairman of NANOTEC Executive Board and Prof. Sirirurg Songsivilai, Executive Director of NANOTEC. In addition, the Thai delegates were involved in one-on-one business matching activities, attending technical seminars, and building networking opportunities for business and research collaborations. Over 50,000 visitors from 23 countries were participating in this mega event.

Thailand (Source: King Mongkut's University of Technology Thonburi (KMUTT)**)**

Quasense's Two Latest Developments (Bangkok, Thailand)

Quasense (http://www.quasense.co.th/), a spin-off led by Werasak Surareungchai, a scientist from nano@KMUTT, has established itself as a regional manufacturer of screen-printed electrodes for both commercial and academic applications. The symbiotic relationship results in continual technological transfer between the company,

nano@KMUTT, and other partners.

One of the outcomes of this lively engagement is Capsella, a detector of capsaicinoid compounds – US patent 8945370 B2, which causes burning sensation in spicy food. The machine helps food industries standardize spiciness by replacing human's subjective gustatory perception. This product won a gold medal from 2015 Taipei International Invention Show & Technomart.

By August this year, a new product from Quasense—a 16-channel potentiostat—will be released. This is a product from a fruitful business partnership started in Late 2015 between Quasense and Huasense, an expert in electrochemical instrumentation from Hanzhou, China.

✧ New Education/Research Programs

Thailand (Source: National Nanotechnology Centre (NANOTEC))

Awards

Five NANOTEC researchers who have received two big and important awards: The 2015 Office of the National Research Council of Thailand (NRCT) Excellence Research Award and the 2016 Thailand Research Fund (TRF) for Yong Research.

The 2015 Office of the National Research Council of Thailand (NRCT) Excellence Research Award:

1. Dr. Teerapong Yata, researcher from Nano Delivery System Laboratory (NDS) for Excellence thesis entitled "Bacteriophage: from bacteria to Targeted Gene Delivery to Mammalian cells"

2. The NANOTEC team lead by Dr. Nawin Viriyaempikul for their research on using modern catalysis from waste eggshell for biodiesel production.

The 2016 Thailand Research Fund (TRF) for Yong Research. Three researchers are consisted of

3. Dr. Noppadol Aroonyadet, Nano structures and Functional Assembly Laboratory (NFA), research entitled "Development

of Highly Sensitive Top-Down Fabricated Indium Oxide Nanoribbon Field Effect Transistor Biosensor Chips with Integrated the on-Chip Gate for Early Disease Diagnosis and Prognosis"

4. Dr. Katawut Namdee, Nano Delivery System Laboratory (NDS), research project entitled "Multifunctional Alginate Microfiber for Cell Encapsulation based on dual control release alginatelyase and Basic Fibroblast Growth Factor Nanoparticles"

5. Sineenart Thaiboonrod, Nanoengineered Soft Materials for Green Environment Laboratory (SOF), research entitled "A Novel preparation of poly (2-aminoethyl methacrylate hydrochloride) nanoparticles via one step reaction and engineering their surface structure"

Thailand (Source: King Mongkut's University of Technology Thonburi (KMUTT)**)**

Nanoscience and Nanotechnology Graduate Program at KMUTT (Bangkok, Thailand)

KMUTT has just launched a new international academic program offering master's and doctoral degrees. The program aims to nurture the new generation of researchers in nanotechnology. It is run by a team of vibrant investigators from around KMUTT. Its diverse working environment leads to multidisciplinary research including, but not limited to, smart nanomaterials, flexible nanoelectronics, DNA nanotechnology, photovoltaics, and point-of-care diagnostics. Students in the program will have research opportunities overseas with our international network partners as well as internships with regional industries. Full financial support is available for all qualified candidates. Please contact nano@kmutt.ac.th for more information.

Japan (Source: National Institute of Advanced Industrial Science and Technology (AIST) - http://www.aist.go.jp/index_en.html**)**

(1) Science and technology exchanges with young researchers who will lead the next generation nanotechnology field in Thailand.

—"Japan-Asia Youth Exchange Program in Science" (SAKURA Exchange Program in Science)

Completion certificate ceremony for SAKURA Exchange Program in Science

(2) Technical training to young researchers

National Institute of Advanced Industrial Science and Technology (AIST) in Japan conducted a technical training to young generation researchers of National Nanotechnology Center (NANOTEC) in Thailand.

10 researchers from NANOTEC visited AIST for training organized by Japan Science and Technology Agency, "Japan-Asia Youth Exchange Program in Science" (SAKURA Exchange Program in Science) from Jan.11 to Jan.30, 2016.

Technical training in AIST

✧ General News

Taiwan (Source: The Innovation and Application of Nanoscience Thematic Program (IANTP)**)**

IANTP Call for Proposal 2016

Through the initiation of Call-for-Proposal 2016, Taiwan's Innovation and Application of Nanoscience Thematic Program (IANTP) encourages scholars to engage in translational research based on scientific discoveries, from a basic Technology Readiness Level (TRL) of "Concept Development" to a more advanced "Prototype Validation", to produce original nanomaterials, components/devices and technology, and to meet the societal needs and to strengthen the industry competitiveness. IANTP focuses on 4 key areas, including "Nanomedicine and Biotechnology", "Nanomaterials for Energy and Environment", "Nanoelectronics and Optoelectronics" and "Fabrication, Characterization and Mechanics of Nanostructures". The majority of submitted proposals this year are relevant to biomedicine just like last year. The funding list of full-proposal will be finalized by the Ministry of Science and Technology in late May 2016. Innovation of technology development and feasibility of marketable application are the main criteria of the review.

Malaysia (Source: Nano Malaysia**)**

NGAP 2020 MOU EXCHANGE CEREMONY

PUTRAJAYA, 3RD MARCH 2016 - National Graphene Action Plan 2020 (NGAP 2020) collaborating companies exchanged MoUs to cooperate and to take joint efforts in sharing positive insights, initiatives and implementations of collaborative projects aimed at enhancing downstream application of graphene relevant to Malaysia. This will eventually enable a local graphene eco-system to accelerate downstream adoption. These collaborations were projected to contribute RM 10 Billion towards Malaysia's GDP and estimated to contribute RM 20 Billion of GNI impact. In addition, about 9,000 jobs could be created with about 2,000 – 3,000 high-value jobs. Specifically, the collaborations involve downstream graphene-based application development for specialty and consumer products ranging from rubber additives, ultracapacitor, conductive inks and plastic additives.

"The year 2016 is the Malaysia Commercialisation Year and the Ministry of Science, Technology and Innovation (MOSTI) is trusted to elevate the commercialisation of innovative products. NGAP 2020 is realising the plan by strategically applying open innovation with inclusive innovation initiatives into the 10 projects. The 360 new products to be commercialised by 2020 are now being realise through the kick-off of the 10 projects conducted by these companies under NGAP 2020. Therefore, it is important to optimise resources and collaborate with other agencies and ministries in this area to realise our vision and mission. I hope through this initiative it will uplift the economy of the country towards a high income nation though science, technology and innovation." stressed YB Datuk Seri Panglima Madius Tangau, the Minister of Science, Technology and Innovation.

NanoMalaysia Berhad as the Agency under the Ministry of Science, technology and Innovation (MOSTI) and as the Lead Agency to execute the National Graphene Action Plan 2020 (NGAP 2020) exchanged 10 Memorandums of Understanding (MoUs) today with 10 companies under the NGAP 2020 programme at Dewan Banquette, Pejabat Utama Perdana Menteri, Putrajaya. Datuk Seri Panglima Madius Tangau, the Minister of Science, Technology and Innovation together with YBhg. Dato' Dr. Mohd Azhar Hj. Yahaya, Deputy Secretary General (Policy) of MOSTI, YBhg. Dato' Sri Idris Jala, the Chief Executive Officer of Performance Management and Delivery Unit (PEMANDU) and Prof. Emeritus Dato' Ir. Dr. Zawawi Ismail, Chairman of NanoMalaysia witnessed the exchange of the MoUs. The MoUs exchanged were to signify the embarking of 10 graphene-based product development, graphene-based prototype and graphene-based scale up production by the 10 companies under the action plan.

Thailand (Source: National Nanotechnology Centre (NANOTEC))

(1) NANOTEC Smart Health showcase at Medi Thai Fair

NANOTEC Smart Health Flagship showcase 2 research projects: INSpectDX (Smart Solution for Cervical Cancer Diagnosis) and Automated Clinical Analyzer (robotic screening and diagnosis for cervical cancer) at Medi Thai Fair which is being held from August 18-20 at IMPACT Forum, Muang Thong Thani.

Presiding at the Opening Ceremony was Prime Minister General Prayuth Chan-ocha and former Deputy Prime Minister Prof. Dr. Yongyuth Yuthavong.

(2) NANOTEC represented at ICCM4

Prof. Sirirurg Songsivilai, Executive Director of NANOTEC and Dr. Sirasak Teparkum, Deputy Executive Director represented NANOTEC at the 4th Session of the International Conference on Chemicals Management (ICCM4) meeting which began today in Geneva, Switzerland. ICCM-4 is organized by UNEP's Strategic Approach to International Chemicals Management (SAICM) and will conclude on 2 October.

The ICCM-4 program also included a nano related side event where Dr. Sirasak gave a presentation on the outcome of the recent Technical Workshop for the Asia-Pacific Region on Nanotechnology and Manufactured Nanomaterials:

Safety Issues which was held at Thailand Science Park on 10 & 11 September 2015. Both Prof. Sirirurg and Dr. Sirasak will also join the resolution discussion on "Emerging policy issues and other issues of concern"

ICCM brings together stakeholders and sectors that include agriculture, environment, health, industry, labour, economics, science and academia to catalyse achievement of the goal by 2020 "that chemicals are used and produced in ways that minimize adverse effects on human health and the environment."

(3) Nanosafety Workshop in Thailand

Participants from 11 nations gathered this morning at Sirindhorn Science Home, Thailand Science Park to participate in the 2 days' workshop on "Technical Workshop for the Asia-Pacific Region on Nanotechnology and Manufactured Nanomaterials: safety Issues". The closed door workshop is being hosted by NANOTEC, UNITAR, OECD, and Swiss Confederation.

The workshop aims to disseminate knowledge of nanotechnology and nanosafety, share experiences/lesson learned, strengthen regional networking, and explore opportunities for nanosafety programs initiations between participating countries.

(4) B-Fresh awarded the Most Interesting Technology for Investment

Dr. Gamolwan Tumcharern, a researcher at NANOTEC at Functional Nanomaterials and Interfaces Laboratory (FNI) received the Most Interesting Technology for Investment Award for her "B-Fresh" technology business pitch at NSTDA Investors' Day 2015 (NID2015).

"B-Fresh" is which is added inside freshly baked bread packages to extend the shelf life and slow the progress of microorganizsm growth which causes the development of mould on bread.

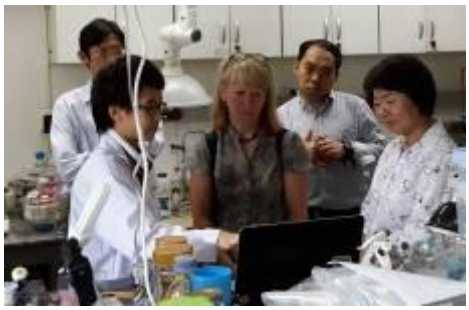
According to bakery shop owners, by being able to extend the shelf life of fresh bread will help increase profit and limit waste to the store owner.

(5) 15th of the Working Party on Manufactured Nanomaterials (WPMN), Organisation for Economic Co-operation and Development (OECD) Meeting

NANOTEC participated in the 3 days of 15th WPMN meeting in Paris on November 1, 2015. The meeting focused on development of nanotechnology and nanomaterials, resources support, and challenges related to safety of manufactured nanomaterials. A presentation on Thailand's nanotechnology development was presented at the meeting.

Thailand (Source: King Mongkut's University of Technology Thonburi (KMUTT)**)**

A Nano@KMUTT Research Facility Welcomed KMUTT's International Advisory Panel (Bangkok, Thailand)



KMUTT inaugurated the first international research advisory panel meeting to enhance the quality, impact, and visibility of the university. Among the reviewers are Professor Geraldine Richmond, the president of AAAS, and Professor Supapan Seraphin from University of Arizona. Our sensor technology laboratory, a part of nano@KMUTT, participated in this review from August 3–5, 2015. According to the meeting report, the laboratory has performed an "excellent combination of basic and applied research" with a "good sense of frontier areas and the areas where they can be competitive" resulting in their "excellent publications" and "excellent collaborations." On academic staff, the reviewers mentioned that we have an "excellent professor who could be at any university in the world," who is "lively with diverse graduate students and young researchers." Our laboratory is at the top rank among five groups under the same category.

RESEARCH BREAKTHROUGHS

Taiwan (Source: The Innovation and Application of Nanoscience Thematic Program (IANTP)**)**

Aluminum Plasmonic Multicolor Meta-Hologram

Yao-Wei Huang, Wei Ting Chen, Wei-Yi Tsai, Pin Chieh Wu, Chih-Ming Wang, Greg Sun, and Din Ping Tsai*, *Nano Lett.* **15(5)**, 3122 (2015)

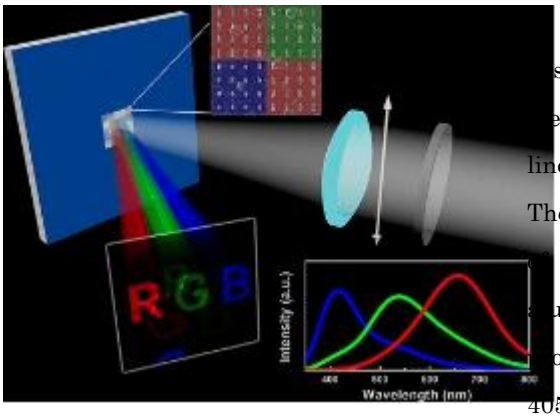


Fig. Illustration of the designed multicolor meta-hologram (MCMH) under linearly polarized illumination. The MCMH structure is made of a pixel array consisting of aluminum nanorods that produce images R, G, and B in 405, 532, and 658 nm, respectively. The pixels are patterned on a 30 nm thick SiO_2 spacer sputtered on an aluminum mirror.

We report a phase-modulated multicolor meta-hologram (MCMH) that is polarization-dependent and capable of producing images in three primary colors. The MCMH structure is made of aluminum nanorods that are arranged in a two-dimensional array of pixels with surface plasmon resonances in red, green, and blue. The aluminum nanorod array is patterned on a 30 nm thick SiO_2 spacer layer sputtered on top of a 130 nm thick aluminum mirror. With proper design of the structure, we obtain resonances of narrow bandwidths to allow for implementation of the multicolor scheme. Taking into account of the wavelength dependence of the diffraction angle, we can project images to specific locations with predetermined size and order. With tuning of aluminum nanorod size, we demonstrate that the image color can be continuously varied across the visible spectrum.

Improved air stability of perovskite solar cells via solution-processed metal oxide transport layers

Jingbi You, Lei Meng, Tze-Bin Song, Tzung-Fang Guo (郭宗枋), Yang (Michael) Yang, Wei-Hsuan Chang, Ziruo Hong, Huajun Chen, Huanping Zhou, Qi Chen, Yongsheng Liu, Nicholas De Marco & Yang Yang*, *Nature Nanotechnology* **11**, 75-81 (2016)

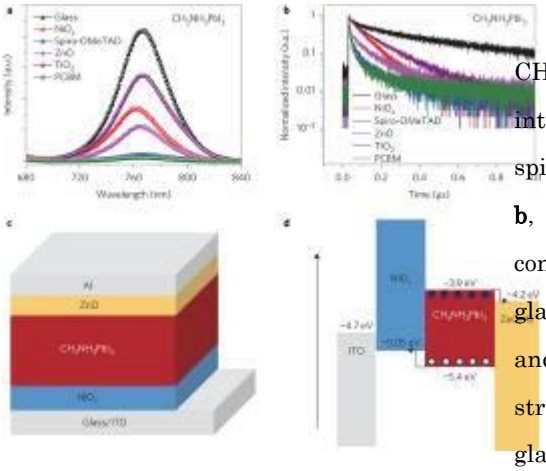


Fig. a, Photoluminescence of $CH_3NH_3PbI_3$ contacted with different interfaces: glass, NiO_x, spiro-OMeTAD, ZnO, TiO_2 and PCBM. **b**, TRPL data for $CH_3NH_3PbI_3$ contacted with different interfaces: glass, NiO_x, spiro-OMeTAD, ZnO, TiO_2 and PCBM. **c**, Overall device structure, consisting of glass/ITO/NiO_x/$CH_3NH_3PbI_3$/ZnO/Al. **d**, Energy band alignment of the metal-oxide-based perovskite solar cell according to UPS measurements from Fig. 2c,f.

Lead halide perovskite solar cells have recently attracted tremendous attention because of their excellent photovoltaic efficiencies. However, the poor stability of both the perovskite material and the charge transport layers has so far prevented the fabrication of devices that can withstand sustained operation under normal conditions. Here, we report a solution-processed lead halide perovskite solar cell that has p-type NiOx and n-type ZnO nanoparticles as hole and electron transport layers, respectively, and shows improved stability against water and oxygen degradation when compared with devices with organic charge transport layers. Our cells have a p–i–n structure (glass/indium tin oxide/NiOx/perovskite/ZnO/Al), in which the ZnO layer isolates the perovskite and Al layers, thus preventing degradation. After 60 days storage in air at room temperature, our all-metal-oxide devices retain about 90% of their original efficiency, unlike control devices made with organic transport layers, which undergo a complete degradation after just 5 days. The initial power conversion efficiency of our devices is 14.6 ± 1.5%, with an uncertified maximum value of 16.1%.

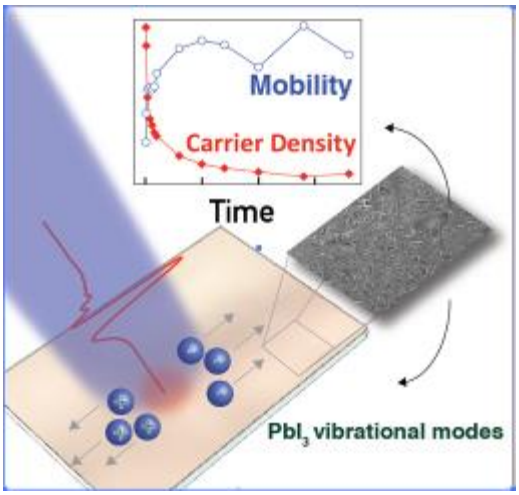
Thailand (Source: King Mongkut's University of Technology Thonburi (KMUTT)**)**

(1) Guided polymer patterns with nanoscale precision by DNA

Though normally known as the genetic material in living organisms, its distinctive physical and chemical properties make DNA a good candidate for self-assembly nanomaterials, such as a programmable nanomaterial for bottom-up manufacturing. Recently, Abhichart Krissana-prasit, a Nano@KMUTT member and postdoc at Aarhus University, has collaboratively with Gothelf lab published two articles in Nature Nanotechnology (2015) and ACS Nano (2016) on this exciting topic of DNA nanotechnology. They demonstrated spatial control and programmed switching of individual polymer conformations on predesigned DNA nanostructures so called DNA origami. The extended single-strand DNA tracks on DNA origami serves as a template for routing an individual conjugated polymer in a controllable fashion including a

straight line, 90° curves, U-shapes, circular shapes, and also zig-zag patterns. The demonstration paves a new route for the development of nanophotonic and self-assembled nanoelectronic circuitry in the future.

(2) An Inside View of Perovskite Solar Cells



What make perovskites so good as the next generation solar cells? Their high efficiency and easy fabrication via low-cost solution processes undoubtedly make them a super star of the age. But why are they so efficient? The answer is related to the microscopic behavior of charge carriers generated by sunlight. After photon absorpion, just like any semiconductor, electrons are excited across the band gap leaving out positive charges called holes behind. These pairs of positive and negative charge carriers could move around; as long as they travel fast and far enough to reach the electrode before any lost mechanisms occur, the solar cells will generate electricity. The ability to map out the characteristics and behaviors of carriers after photo excitation is indeed a very crucial piece of information for the optimization of perovskites.

A collaboration among KMUTT (Thailand), NTU (Singapore), and Caltech (USA) has led to the investigation of the photo-generated carriers by use of terahertz light. Their findings suggest that three factors play a role in the solar cell efficiency: the film orderliness, crystal phase, and phonon modes. The work is published in Nature Communications, 6, 7903 (2015) and Journal of Physical Chemistry Letters, 7, 1 (2016).

Japan (Source: Japan Science and Technology Agency (JST)**)**

A whole mouse made transparent

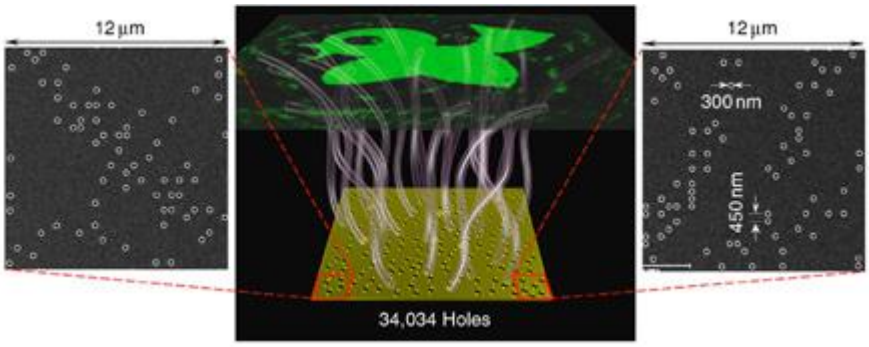
Entire mouse made transparent (the left figure shows the infant mouse, the right figure shows the adult mouse)-Image provided by

In the observation of brain cells, the light is scattered by water, protein, and lipid in the cells, making it unclear to see. Professor Ueda thought that“ if it cannot be seen, it should be made see-through.” He has removed the lipid which causes the scattering of light and made the refractive index in the tissue uniform, and succeeded in obtaining a highly transparent brain sample. However, an effective method was needed for the removal of endogenous pigments that absorb lights in order to achieve transparency in organs with high content of endogenous pigments such as a heme in red blood cells, for example liver and spleen. Many researchers have attempted to make the organs transparent in the past; however no efficient method was discovered for the removal of pigment in tissues containing endogenous pigments without disruption of proteins. The solution to this problem was the transparency reagent (ScaleCUBIC reagent, hereinafter referred to as CUBIC reagent) used in CUBIC*, which Professor

Ueda and his colleagues developed as whole-brain imaging and analyzing technology. This reagent was accidently discovered to efficiently decolorize blood. They have clarified the mechanism where aminoalcohol, a component in CUBIC reagent, efficiently dissolves the red pigment heme in the blood, resulting in decolorization of the blood.

Singapore (Source: Institute of Materials Research & Engineering (IMRE) http://www.imre.a-star.edu.sg/**)**

(1) Light' technology prevents counterfeiting



Sketch of photon sieve hologram with a target plane located 500 µm away from its surface. Insets: scanning electron microscope images of the left and right bottom of the photon sieve.

Holographs typically suffer from twin image and high-order diffraction problems. A team of scientists, including Dr Teng Jinghua and Dr Liu Hong from IMRE, solved this problem through a new ap-proach of using nanoscale holey photon sieves in the visible light spectrum.

This technique can be used to create distinct super-sharp holograms that are not easily duplicated and thus be applied on bank notes and credit cards to prevent counterfeiting.

This new breakthrough came about from a hybrid approach of designing a random and aperiodic photon sieve that can be used for high-accuracy control of the amplitude, phase and polarisation of visible light. The scientists overcame the chal-lenge of accurately handling numerous unit elements (of light) in a miniaturised device. The random photon sieve forms a uniform, twin-image free and high diffraction-efficiency hologram while a non-periodic photon sieve focuses light into a super-resolution spot.

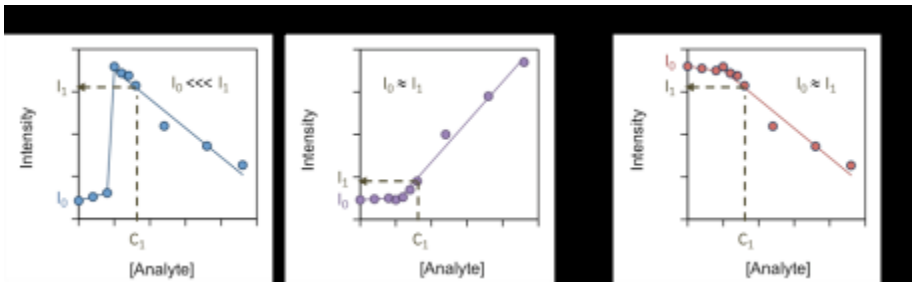
A randomly distributed photon sieve to realize high-uniformity optical holography is schematically shown in the illustration. The photon sieve was fabricated with 34,034 holes of 150nm radius randomly distributed in a 100-nm-thick chromium film via electron-beam lithog-raphy. Electron microscope images, as depicted in the inset, clearly show random-ness with the minimum centre-to-centre distance of 450nm between two neighbouring holes. This demonstrates an

improvement by nearly 200 times in spatial resolution than the similar halftone-based hologram with the smallest pixel pitch of 80 μm.

The team has already applied for a patent on their new method and is currently exploring the practical use of the technology with a mint.

(2) Cancer diagnosis made easier and faster

In analytical chemistry, the low reliability for low analyte concentrations near the limit of detection (LOD) is a common problem. Current solutions such as signal amplification involving enzymatic reactions and/or labelling the analyte with large



(A) Inverse sensitivity response and (B & C) traditional proportional responses.

tags increase the complexity of the designs and resource investment as they are very difficult to increase signal-to-noise (S/N) ratio due to the amplified back-ground signal. IMRE scientists have discovered a plasmonic nanosensor for detecting circulating cell-free DNA (cfDNA) with inverse sensitivity (the lower the concentration of the analyte is, the higher the response intensity). This method employs gold nanorods (AuNRs) coated with hexadecyltrimethylammonium bromide (CTAB) and their electrostatic interactions with double stranded DNA (dsDNA). The inverse sensitivity is achieved by the unusual DNA concentration-dependent AuNR aggregation, which can be measured by UV-Vis spectroscopy. This nanosensor has high accuracy for low concentration detection with a tunable dynamic range, making it suitable for monitoring cfDNA levels associated with a wide range of cancer types. Furthermore, results from a patient's therapeutic response and dis-ease progression can be made known much easier and quicker. This analytical method can be easily implemented in most hospital laboratories that are equipped with a simple photospectrometer or a microplate reader.

Japan (Source: National Institute for Materials Science (NIMS)**)**

World's Highest Magnetic Field* (1,020MHz) NMR developed : A New Powerful Tool for Nanotechnology

Application of High-Temperature Superconductor Was the Key.

The research team consisting of researchers at NIMS, RIKEN, Kobe Steel and JEOL RESONANCE (a consolidated subsidiary company of JEOL) successfully developed the NMR (nuclear magnetic resonance) system equipped with world's highest magnetic field, 1,020 MHz, during engagement in the JST-SENTAN program "Development of Systems and Technology for Advanced Measurement and Analysis". In addition, taking actual measurements with this new system, the

team confirmed its considerably enhanced performance compared to conventional NMR systems in terms of sensitivity and resolution.

NMR systems have been used for various purposes including 3D conformational analysis of biopolymers such as proteins, organic chemistry and materials research. In particular, it is one of the indispensable tools for the development of new drugs. In the development of a new drug, it is vital to understand protein structures in a quick and accurate manner. In this view, improving the performance of NMR systems is of great importance. Magnetic field strength is a key indicator of the performance of NMR systems, and thus there had been fierce competition to develop NMR systems with magnetic fields greater than 1,000 MHz. For a long time, it was broadly expected that the use of high-temperature superconducting technology would enable producing magnetic fields above 1,000 MHz. However, because high-temperature superconductors had problems such as being fragile and difficult to process, no party had achieved their practical use for a long run.

Through developing several new technologies including the conversion of the high-temperature superconductor developed by NIMS in 1988 into the form of wire material, the research team recently created the NMR system equipped with world's highest magnetic field at 1,020 MHz. Before making this accomplishment, the team spent 20 years of planning, designing and construction, as well as overcoming many hardships such as suspension of the project due to the damage to the nearly completed system caused by the Great East Japan Earthquake, encountering a serious worldwide shortage of helium supply, and the sudden passing of the team leader.

It is expected that the super-high magnetic field NMR will greatly contribute to various fields such as structural biology, analytical chemistry and materials engineering. Furthermore, considering that NMR requires a magnetic field with extraordinary precision, the high-temperature superconducting technology that was cultivated during the development of NMR is applicable to various high-tech systems such as MRI (magnetic resonance imaging), nuclear fusion, linear motor trains and superconducting power cables.

This research result was published in Journal of Magnetic Resonance, 256, 30-33 (2015). (Kenjiro Hashi, Shinobu Ohki, Shinji Matsumoto, Gen Nishijima, Atsushi Goto, Kenzo Deguchi, Kazuhiko Yamada, Takashi Noguchi, Shuji Sakai, Masato Takahashi, Yoshinori Yanagisawa, Seiya Iguchi, Toshio Yamazaki, Hideaki Maeda, Ryoji Tanaka, Takahiro Nemoto, Hiroto Suematsu, Takashi Miki, Kazuyoshi Saito and Tadashi Shimizu, Title:"Achievement of 1,020 MHz NMR", DOI:10.1016/j.jmr.2015.04.009).

*World's Highest Magnetic Field: 1020MHz (24.0T) As of Apr 17, 2015

Photo: A part of the recently developed 1,020 MHz-NMR system equipped with superconducting magnets (about 5 m high and weighing about 15 tons). This part contains coils made of a high-temperature superconductor. Liquid helium is used for cooling.

UPCOMING EVENTS - 2016

Date	Avenue	Events
15/06/2016-17/06/2016	Taipei, Taiwan	**Nano Taiwan 2016 - The 14th Int'l Nano Exhibition** Due to the interaction among electrons, photons and phonons, the physical, chemical and biological properties and phenomena of materials, components and systems are significantly altered in the nanometer scale. Therefore, nanotechnology has created vast possibilities for new materials, devices, applications and measuring skills, which have great influences on photonics, computers, recording media, energy storage, medics, environment / resource, and chemical industry, and the like. Starting from 2015, Nano Taiwan exhibition will be held concurrently with Photonics Festival in Taiwan. Contact e-mail: jason.cheng@mail.pida.org.tw (Mr. Jason Cheng) Website: http://www.nano-taiwan.com/?lang=eng
27/06/2016-29/06/2016	Coogee Beach, Sydney	**7th International Nanomedicine Conference** The purpose of the conference is to bring together leading clinicians and science researchers in the field of nanomedicine to share results and build collaborations based on this years themes: Sensors & Imaging, Drug Delivery, Vaccines, Systems Biology, Bioactive Materials and Clinical Challenges. more info
27/06/2016-29/06/2016	Graz, Austria	**2nd International Conference - Integrated Functional nano Systems(nanoFIS 2016)** NanoFIS 2016 intends to contribute to challenges and topics covered by the Mission, Vision & Strategy of the European Micro- & Nanoelectronics and to increase visibility in particular in the More-Than-Moore domain. The nanoFIS 2016 conference focuses on implementation of Key Enabling Technologies for Novel Device Development and 3D System Integration.
11/07/2016-14/07/2016	Griffith University - Brisbane Australia	**5th International Symposium on Graphene Devices (ISGD-5)** The 5th International Symposium on Graphene Devices (ISGD-5), is the principal meeting addressing advanced graphene applications, offering a unique forum to review the present status, the latest developments, future prospects and related fundamental covering both state-of-the-art experimental and theoretical discoveries.more info
12/07/2016-15/07/2016	Seoul, Korea	**Asia Nano Forum Summit 2016 &NANO KOREA 2016** Asia Nano Forum Summit 2016 (ANFoS2016), hosted by Korea Nano Technology Research Society (KoNTRS), will be held in Korea during 12-15 July 2016, in conjunction with the NANO KOREA 2016. NANO KOREA has been an annual event since 2003, co-hosted by the Ministry of Science, ICT & Future Planning and the Ministry of Trade, Industry & Energy. In

		particular, the Symposium is Korea's largest symposium on nanoscale science and technology. ANFoS is an annual meeting, wherein top leaders and experts from industry, government, academia and other bodies from ANF member economies meet to update the developments on Nanotechnology and discuss related issues such as policy, R&D, EHS-Standardization, education and commercialization. The ANF annual general meeting (AGM) will also be held during the summit. For more information, please refer to the attached agenda. Information about previous ANF Summits can also be found here.
13/07/2016- 16/07/2016	Brisbane, Australia	**8th International Symposium on Nano and Supramolecular Chemistry** We aim to bring 150-200 delegates to the symposium from all over the world, working in nano- and supramolecular chemistry and the applications of functional materials in diverse areas. This conference will also be a dedication symposium to celebrate the 80th birthday of Prof. Leonard F. Lindoy (University of Sydney, Australia), to commemorate his achievements in chemistry and contribution to a broad research community. More info