

Nanotech Malaysia 2009 Conference and Exhibition

Abstract:

A three-day event of Nanotech Malaysia 2009, organized for the third time in Malaysia, was the highlight of Malaysia's National Nanotechnology Initiative (NNI) launched in 2006. It consisted of nanotechnology conference, business luncheon, forum (Nanotechnology: Evolution of Knowledge to Market) and exhibition. At the official opening of Nanotech Malaysia 2009, the Malaysia Nanotechnology Association (MNA) was officially launched. In addition to the summary on the event, this article highlights the national nanotechnology capabilities and government's commitment in nanotechnology.

Themed as Energy, Health & Environment, Nanotech Malaysia 2009 was the third annual nanotechnology event organized by the Universiti Kebangsaan Malaysia and co-organized by the Academy of Sciences Malaysia and the Ministry of Science, Technology and Innovation (MOSTI). It was held in Kuala Lumpur Convention Centre from 27-29 October 2009, attracted over 200 participants from government, research institutions, industry and public.

Nanotech Malaysia 2009 was officially opened by YB Minister of Science, Technology and Innovation Datuk Dr. Maximus Johnity Ongkili. In his keynote address, Datuk Dr. Ongkili mentioned that MOSTI will be launching National Nanotechnology Statement that will highlight the initial planning of the government to further pursue intensive development in the nanotechnology industry in Malaysia. The statement will take into account all perspectives from the industrialists, academia, researchers, and related government agencies.

Through MOSTI and MOHE (Ministry of Higher Education), the government has funded up to RM 124.3M in nanotechnology area under the 9th Malaysia Plan. In addition, the government will set up a National Innovation Centre and a network of Centres of Innovation Excellence for allowing faster commercialization and for the industry to provide fast feedback to the research work. Nanotechnology has now been included as one of the growth engines for the new economic policy, as announced also by the Prime Minister of Malaysia, Datuk Seri Najib Tun Razak, on a separate occasion.

(<http://www.bernama.com/bernama/v5/newsgeneral.php?id=450784>)

This year's conference also marked the inauguration of Malaysia Nanotechnology Association (MNA).



It was proposed in 2007 with 15 members and finally officially registered in September 2009. It is a platform for communication among scientists, researchers, and industry players and facilitating networking with the local community and international counterparts. One of its main activities is organizing the annual Nanotech Malaysia Conference and Exhibition, which has been started since 2007 as the highlight of Malaysia's National Nanotechnology Initiative (NNI) launched in 2006.

There were over 150 technical papers were presented, divided into 4 symposiums namely Nanomaterials and Nanostructured Devices, MEMS/NEMS & Nanoelectronic Devices, Nanobiotechnology & Healthcare, and Nanotechnology in Agriculture, Energy & Environment. It is interesting to note that the overseas participation for the technical paper presentation was mostly from Austria and Iran. The Austrians mostly took part in Nanobiotechnology & Healthcare, highlighting their research in nanobiotechnology as well as nanotechnology risk and safety.

One highlight of the Iranian participation in both the conference and exhibition was the participation of NanoPac Persia Company. Founded in 2005, it is one of the most successful nanotechnology companies in Iran, sold 250K units of nanofilter within the first two months of its product launch in 2007. An interesting application of its antibacterial and antifungal nanoparticles is NanoFarm for agricultural business, such as chicken farm. The use of NanoFarm reduces the pathogenic organisms in chicken farm environment and reduces pollutant gases such as ammonia and hydrogen sulfide. As a result, it reduces the number of periodic flock mortality and increases the yield.

Malaysia is also catching up in establishing her nanotechnology capabilities. Seen in the exhibition floor, Institute of Microengineering and Nanoelectronics (IMEN) showcased a few of its research activities such as zinc oxide nanowires, MEMS fingerprint sensor, lab-on-chip for DNA preparation, and piezoelectric micropump. IMEN was established in 2002 under the patronage of Universiti Kebangsaan Malaysia (UKM). Its research areas include MEMS & NEMS technology, photonics and nanophotonics technology, organic & printed electronics, semiconductor packaging, system design, and high frequency technology for telecommunications.

Universiti Teknologi Malaysia (UTM) is actively developing integrated device technology for terahertz and sensor applications. In addition, UTM has commercialized its breakthrough in synthesizing low cost silica aerogel from rice husks, called Maerogel. Besides being inert, non-toxic, and environmentally friendly, Maerogel can be synthesized at cost as low as 20% of today's aerogel production cost, making it affordable to be a commonplace material and used in widespread applications. Gelanggang Kencana Pte Ltd, who is taking the exclusive IP license for certain period from UTM will be in operation early 2010 with its first commercial plant to produce 5 tonnes of Maerogel

annually.

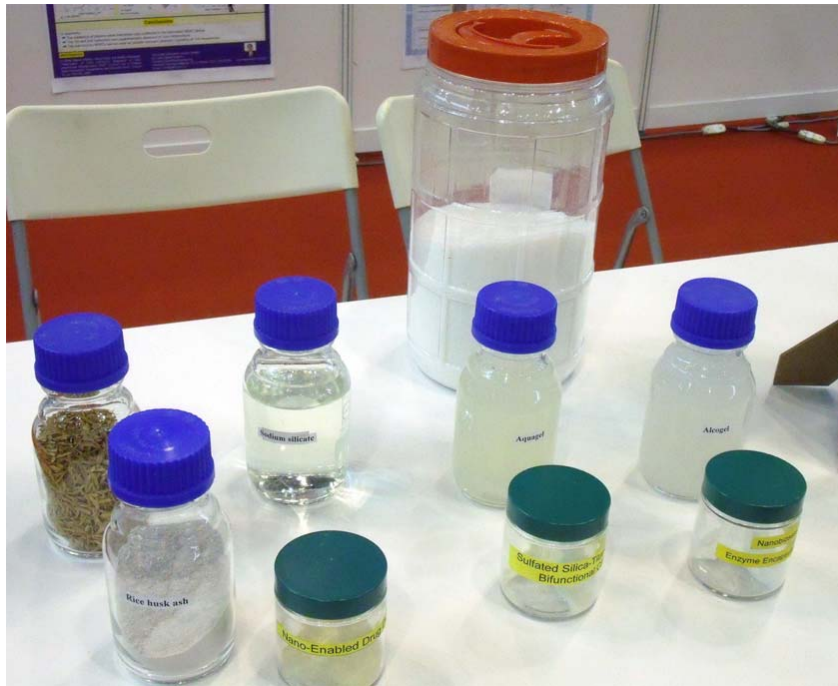
SIRIM Berhad is a national research and technology development corporation with established infrastructure for its research activities namely National Centre for Machinery and Tooling Technology, Advanced Manufacturing Technology Centre, Advance Materials Research Centre (AMREC), Environment and Bioprocess Technology Centre, and Techno-Economy and Commercialization Centre. Nano Materials Program at AMREC was presented in the exhibition, with some examples of research projects such as study on silver nanoparticles, sonochemistry synthesis of nanometal and nanometal oxides, and synthesis of vanadium doped nano-TiO₂.

Microelectronics & Nanotechnology Shamsuddin Research Centre (MiNT-SRC) is one of the Centre of Excellence in Universiti Tun Hussein Onn Malaysia (UTHM) established in 2006. Its research scopes include microelectronics and semiconductor devices, thin film technology and applications, MEMS, VLSI design, medical electronics, and biomaterials. A few of research projects on-going in UTHM include study of nano-TiO₂ for wastewater treatment, UV biosensor system using periodic nanoparticle arrays, and nanoscale in-situ monitoring system for nano-devices fabrication and analysis.

Nanotech Malaysia 2009 was an impressive effort to show Malaysia's commitment to nanotechnology development. It highlighted the government recognition to nanotechnology as one of the growth engines of the new economic policy. The event also showed the enthusiasms of the Malaysian community in nanotechnology R&D and their active engagement of international collaboration.



The organizing committee of Nanotech Malaysia 2009 including Datuk Dr. Maximus Johnity Ongkili, Prof. Burhanuddin Yeop Majlis, Prof. Halimatun Hamdan and Prof. Ille C. Gebeshuber



Rice husk R&D achievements of Universiti Teknologi Malaysia

MEMS for Bio-Medical Applications in IMEN

Institute Of Microengineering and nanoelectronics

Conventional technique:
Penetration of needle through skin

The conventional technique PAINFUL !!!

Portable Pump with infusion set

THE ULTIMATE !

MICROPUMP

- Micropumps cover a fundamental role in drug delivery system, whose primary aim is the controlled dosing of small doses of drug amount.
- A microelectro-mechanical micropump is found suitable for being used in the controlled drug delivery application.
- The characteristics of the micropump can be controlled by changing either the applied voltage or the input frequency.
- Micropump can pump medicinal amounts of drug into a subcutaneous system, which is possible for delivering modern biotechnological drugs that cannot be delivered by conventional delivery techniques.

3D cross section of the designed MEMS

Close up view of the fabricated micropump nozzle (MEMS device)

Fabricated micropump nozzle

MICROVALVE

Micro valve is a Bio MEMS application in drug delivery system which allows better control of drug release through human body. The insulin can be released gradually to human body automatically based on the glucose concentration in human blood.

Cross section of complete MEMS microvalve

Microscopic view of microvalve and device

Microscopic view of microvalve and device

Actuator part of MEMS microvalve

MICRONEEDLES

Microneedles are needle-like structures which are fabricated in silicon using MEMS technology. Amongst them in many parameters larger blood absorption in the skin. Two types of microneedles were developed: solid microneedles and hollow microneedles.

Microscopic view of microneedles

Microscopic view of microneedles

BIOSENSOR

MEMS provides a platform for fabricating biosensors. The biosensors are fabricated using MEMS technology. The biosensors are used for detecting the presence of various substances in the body. The biosensors are used for detecting the presence of various substances in the body.

Microscopic view of a biosensor

Microscopic view of a biosensor

One of research areas in Institute of Microengineering and Nanoelectronics (IMEN)

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Dr. Liu with NanoPac Persia Co's Directors Dr. Farshid Soheili (second from right) and Mr. Mehran Hajirasouliha (most right)