Institute of Materials Research and Engineering A*STAR

Singapore Institute of Manufacturing Technology A*STAR

KIMM 한국기계연구원 KOREA INSTITUTE OF MACHINERY & MATERIALS

**NEWS RELEASE**

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**Singapore and Korea research institutes embark on landmark collaboration for breakthroughs in micro- and nanotechnologies**

1. A landmark collaboration agreement has been inked among the national research institutes of Singapore and Korea to develop novel and commercially-significant micro- and nanotechnologies that will have wide-ranging applications across the medical, biomedical, environment, electronics, automotive, and aerospace sectors.

2. Spearheaded by the Institute of Materials Research and Engineering (IMRE) and the Singapore Institute of Manufacturing Technology (SIMTech) of Singapore's Agency for Science Technology and Research (A*STAR) and Korea's Institute of Machinery and Materials (KIMM), the collaboration will see researchers from both community embarking on joint academic meetings, symposia and R&D projects to advance the development of micro- and nanotechnologies.

3. Micro- and nanotechnologies are widely touted as among the key waves in science and technology that will shape future living as they will bring about the creation of new materials and manufacturing possibilities. This is because new materials can be fabricated molecule-by-molecule to meet needs such as increased strength, decreased weight, greater electrical connectivity, or the ability to change shape or colour on demand. Applications for micro- and nanotechnologies are wide-ranging. These include clean energy – through the development of materials for renewable energy materials; healthcare – through tissue engineering or embedded intelligent chips that can perform targeted drug delivery or even surgery; and lifestyle products.

Technology advancements in micro- and nanotechnologies are aligned to Singapore's long-term R&D thrusts to grow the clean energy, environment and biotechnology industries. In 2006, market research company Luxresearch projected that the market for nano-enabled products would reach more than US$2 trillion by 2014, a more than ten-fold increase from today.

4. The five-year collaboration between the national research institutes of the two countries will build on the collective and complementary research expertise in materials science and engineering of IMRE, process and measurements technologies in SIMTech, and systems and materials technologies in KIMM. Specific research collaboration areas include joint R&D on laser and mechanical micro-nanomachining, nanocomposites, nano-structured functional coatings, roll-to-roll printed electronics, nanoimprint lithography, nanometric measurements, microfluidics manufacturing, micro-nanopatterning for green energy applications, and other topics related to micro-nano processes and materials.

5. Said Dr Lim Ser Yong, Executive Director of SIMTech, "We are excited about the collaboration as we see much synergy among the three parties. The pooling of resources would enable us to make greater and faster progress in the field of micro-and nanotechnology for economic and societal outcomes. The launch of the micro- and nanotechnologies research collaboration is timely as Nanotechnology in Manufacturing is the central theme in SIMTech's Annual Manufacturing Forum on 23 July 2009."

6. "IMRE looks forward to collaborating with KIMM and SIMTech to build platform technologies that will support Singapore industry, " said Dr Lim Khiang Wee, Executive Director of IMRE. IMRE's experience in nanotechnology includes nanoimprinting lithography, which is a process for making very complex, 3-D nanosized structures. These can be used to create biomimetic structures that mimic the morphology of natural surfaces. These artificial structures recreate the unique properties that the natural surfaces endow on their hosts, such as the iridescent colours of a butterfly's wings.

7. "I hope all of the participating institutes can benefit practically from this partnership in micro-nano technology so that the R&D capability and global networking be more strengthened. Also I expect this partnership advances to be an ideal case of global collaborations in the field of micro-nano technology," said Dr Lee Sang-Chun, President of KIMM.

[1] nanoscienceworks

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**Notes to Editor:**

Microtechnologies basically involve the miniaturisation of products while nanotechnologies relate to structures with dimensions less than or around 100 nanometres (nm). These technologies span across the entire spectrum of the manufacturing chain from material development to processes, production, measurement and instrumentation techniques, and finally to components and systems.

The Woodrow Wilson Centre reported in 2006 that more than 320 nano-products are already in the market. These products include coatings, lifestyle and personal care products, food and food packaging, and light emitting diodes used in computers, cell phones and digital cameras.

Among A*STAR's key achievements in nanotechnology is IMRE's plastic, flexible barrier film technology that is 1000 times more effective at keeping out moisture and air than any other technology available in the market. The innovative film uses nanoparticles to ensure that tiny 'pores' in plastics are sealed better to prevent moisture and air seepage that degrades and damages the sensitive materials that the plastic films encapsulate. The films will be a boon to such devices like organic solar cells and organic light emitting devices (OLEDs).

SIMTech's anti-slip coating is a unique technology to enhance the safety of glass flooring without modifying the transparency or clarity of glass. The coating, based on sol-gel technology, using a hybrid material with nanometric-sized phase separation for improved durability, can increase the friction between shoe sole material and glass floor to safe levels even when the floor is wet. The coating enables the use of glass flooring in interior design projects and in novel architectural concepts without compromising safety.

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**About the Agency for Science, Technology and Research** **Annex 1**

A*STAR is Singapore's lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based Singapore. A*STAR actively nurtures public sector research and development in Biomedical Sciences, Physical Sciences and Engineering, with a particular focus on fields essential to Singapore's manufacturing industry and new growth industries. It oversees 22 research institutes and consortia and supports extramural research with the universities, hospital research centres and other local and international partners. At the heart of this knowledge intensive work is human capital. Top local and international scientific talent drive knowledge creation at A*STAR research institutes. The Agency also sends scholars for undergraduate, graduate and post-doctoral training in the best universities, a reflection of the high priority A*STAR places on nurturing the next generation of scientific talent.
For more information, please visit http://www.a-star.edu.sg

**About the Institute of Materials Research and Engineering**

The Institute of Materials Research and Engineering (IMRE), is a research institute of the Science and Engineering Research Council (SERC), Agency for Science, Technology and Research (A*STAR). Established in September 1997, we have built strong capabilities in materials analysis, characterisation, materials growth, patterning, fabrication, synthesis and integration. IMRE is an institute of talented researchers equipped with state-of-the-art facilities such as the SERC Nanofabrication and Characterisation Facility to conduct world-class materials science research. Leveraging on these capabilities, R&D programmes have been established in collaboration with industry partners. These include research on organic solar cells, nanocomposites, flexible organic light-emitting diodes (OLEDs), solid-state lighting, nanoimprinting, microfluidics and next generation atomic scale interconnect technology.
For more information, please visit http://www.imre.a-star.edu.sg

**About the Singapore Institute of Manufacturing Technology**

The Singapore Institute of Manufacturing Technology (SIMTech) is a research institute of the Science and Engineering Research Council (SERC), Agency for Science, Technology and Research (A*STAR). SIMTech develops high value manufacturing technology and human capital to contribute to the competitiveness of the Singapore industry. It collaborates with multinational and local companies in the precision engineering, electronics, semiconductor, medical technology, aerospace, automotive, marine, logistics and other sectors
For more information, please visit http://www.SIMTech.a-star.edu.sg

**About Korea Institute of Machinery & Materials**

KIMM (Korea Institute of Machinery & Materials) is one of the public research institutes in the field of mechanical engineering, materials, mechatronics, micro-nanomanufacturing and machining, sponsored by the ministry of knowledge economics. With its 30 year of experience and research capabilities, KIMM is determined to pool all its capabilities to develop into an agency that will lead the industry, academia and research institute. Specific research areas are divided into five divisions; nanomechanical system including nano-micro machining and manufacturing infrastructure technology, intelligence manufacturing systems, eco-machinery and system technology engineering. For more information, please visit http://www.kimm.re.kr

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