

# InnoTech Month

Achieving excellence in technology

Sponsored Feature

## Applied research in Nanotechnology to benefit Hong Kong industries

Not everything in life must necessarily be big to create an impact. Nanotechnology, an application of scientific knowledge on matters at the scale of a billionth of a metre, not only pushes forward the frontier of man's abilities, but also widens the possibilities man holds in his hands. In Hong Kong, Nano and Advanced Materials Institute Limited (NAMI) helps local industries make the best use of nanotechnology and advanced materials to streamline processes, lower production costs, gain competitive edges and more ...



Prof. Ng Ka Ming, Chief Executive Officer of NAMI

Mr. George N Chung, JP Chairman of NAMI

### Market-driven Research Focuses

"For innovation to occur, for knowledge to convert into value, NAMI links up between researchers and businesses. One of NAMI's missions is to incubate technology and provide market-driven, innovative solutions to support industrial development. For instance, we offer expertise in industrial chemistry – a less ventured area where most Hong Kong industries lack the expertise," said Mr. George Chung, Chairman of NAMI. NAMI is a government-funded organisation incorporated by the Innovation and Technology Commission and hosted at the Hong Kong University of Science and Technology.

"Nanotechnology has become commercially viable across an expanding range of industry sectors. Our research focuses on renewable energy, solid state lighting, environmental technologies, building and construction materials, medical and healthcare, as well as coatings or surface treatment for both industrial and consumer products," Professor Ng Ka Ming, Chief Executive Officer of NAMI, illustrated.

### Innovative Photovoltaic: Highly Efficient CIGS and Low Cost OPV

Apart from working with DuPont on increasing the conversion efficiency of amorphous silicon solar cells, NAMI, partnering with other partners, conducts research and development on other promising areas of solar energy, namely CIGS (copper indium gallium selenide) and OPV (organic photovoltaic).

For CIGS, NAMI is developing a non-toxic selenisation process to fabricate CIGS thin film with optimal optical properties. For OPV, the use of newly developed materials, improved optical designs and production knowhow lead to a more economical green technology that can be applied on consumer goods, enabling the surface of backpack, tent, or even curtains to become solar energy collectors. The project has attracted much interest from the industries and negotiations are making headway. One can certainly get access to energy without a generator!

### Enhanced Service Life for Steel

"Hong Kong's humid subtropical climate, along with high air pollutant concentration, reduces the life time of outdoor steel structures. To prolong the service life that meets or even



Low cost organic photovoltaic cells



Non-stick cookware without carcinogenic PFOA



LEDoS display

exceeds those of stainless steel, nano-additives are put in the hot-dip galvanisation process," said Mr. Chung. At lower cost to stainless steel, a cost-effective hot-dip galvanisation with nano-coating would increase the applications of galvanised steel in infrastructure and can be promoted to our neighbouring countries for adoption. NAMI is working with a number of government departments and industrial establishments to develop field trials for this technology.

### A Brighter Solution for Pico-Projector

Looking for sharper images from your new hand-held projectors? You need a light emitting product without backlight, color filters and polarisation optics. Using silicon substrate and flip-chip technology, the LED on Silicon (LEDoS) offers simplified structure, high brightness and excellent luminance uniformity to display industry.

### Environmentally Friendly Mirror-like Nano-coating

Conventional electroplating produces a large amount of heavy metal and chemical waste that pollute the environment. "As an alternative, a new nano-coating is developed to be sprayed on metals like zinc alloy and steel, to provide a smooth and fine touch to the surface that resembles a mirror yet meeting the relevant regulatory requirements," Professor Ng explained. In addition, the nano-coated surface is durable, water-proof, and resistant to UV.

### White Anodised Aluminum Oxide Products

Electronic products with white enclosures are often made by plastic or paint. NAMI came up with an anodising technique for white finishing which is more durable than other existing alternatives and includes other features such as anti-scratch,

### Partnership with the Industry

To translate promising research and development outcomes of nanotechnology and advanced materials projects, may it be new products, more effective manufacturing processes, patentable materials, or designs that enhance competitive advantage, into tangible impacts for the industry, effective partnership between researchers and industrialists is essential.

"NAMI organises symposiums of specific themes for academia and the industry regularly. We also disseminate technology updates to our consortium members through quarterly newsletters. Keeping close contact with academia and industry leaders is crucial in being a facilitator in meaningful industry-academia collaboration," said Dr. Eric Liu, Director of Business Development of NAMI.

"Holding the key to future innovation and economic success, advances in nanotechnology are bringing a plethora of breakthroughs in science, medicine, and industry. NAMI is working diligently to ensure that local industries are benefiting from some of those fantastic accomplishments," Mr. Chung concluded.

hardness, corrosive-resistance, and water-proof. Applications include building materials, furniture, watches, laptops, cameras, and other electronics.

### Healthier Non-Stick Cookware

Non-stick cookware is almost a necessity in modern kitchens. However, since Teflon, a common material used on non-stick pan surface, releases carcinogenic PFOA and will be banned in the European and American markets, a new non-stick coating has been invented through Sol-Gel technology. This invention gives cookware extra hard surface and a safe way of healthy cooking for families.



White anodised aluminum oxide prototypes

Nano-enhanced galvanised steel with high corrosion resistance

## InnoCarnival 2010

### InnoCarnival at Science Park Now!

Opening Ceremony of InnoCarnival 2010  
Date : 6 November 2010 (Saturday)  
Time : 3:00 pm  
Venue: Lakeside 2, Hong Kong Science Park, Shatin, New Territories

Exciting robotic and science competitions:

1. Hong Kong Green MECH Contest
2. HK Inter-school Science Competition 2010
3. The Hong Kong Tech Challenges 2010
4. 2010 Robot Olympiad
5. Hong Kong Tree 2010
6. PowerTech Inter-City 2010 - Hong Kong Preliminary Selection Contest
7. Award Presentation Ceremony of the Hong Kong Youth 3D Animation Competition 2010

For details, please visit: <http://ce.hkfyg.org.hk/itm/> Enquiry Number: 2561 6149

### Redeem the Souvenir Cover

Visit InnoCarnival 2010 and redeem a souvenir cover with this coupon at the InnoCarnival Workshop registration counter, Core Building 1, Hong Kong Science Park from 6 to 14 November, 2010. While stock lasts.

