



Global Nanotechnology Commercialization Giants Meet in Japan

Insight at the Japan nanotech 2010, Feb. 17-19, Tokyo

Abstract:

The world's largest international nanotechnology exhibition and conference, nano tech 2010, attracted over 42,000 visitors and more than 650 exhibitors from 19 countries. Exhibitors continued to demonstrate their state of the art R&D activities, instrumentation, ready to be commercialized platform technologies and products. We observed that production capacity of carbon nanotubes and nanoparticles continues to grow to hundreds of ton scale, and their application on composites, flexible transparent conductive coating and nanoink have become increasingly competitive. We didn't see much highlight on lithium ion battery and electric vehicle this year. We share in this article our insights through observations and interviews we have conducted over the three days of exhibition.

The most recent and the world largest nanotech event nanotech 2010 held in Tokyo during Feb. 17-19 showcased nanotech R&D activities and products from not only nanotech leaders in Japan but also from 19 overseas countries and regions (30% of the total exhibitors) who came to Japan to demonstrate their best research and commercial activities in order to seek R&D and business partnerships. The 3 day event attracted over 42,000 visitors and 654 exhibitors in total. Please refer to nano tech 2010 official press release dated 11 March 2010 for more details especially on nanotech Award winners (http://www.nanotechexpo.jp/en/pdf/pressrelease100311_e.pdf). From our earlier articles, we indicated that Japan has been focusing on advancing its manufacturing capability through developing nanotechnology, research institution and companies come to Japan to seek manufacturing partners to commercialize their Intellectual Property or platform technologies.

In the past year at various nanotech shows, we observed increasing competition in developing cheaper and better transparent conductive and flexible coating (replacing Indium Tin Oxide) for display applications. Materials such as carbon nanotubes, ZnO, nano silver are being used. Companies such as Toray showed its high performance film using double wall carbon nanotubes, and Fuji film developed nano silver based film and Toda Kogyo (partner of Cima Nanotech in the US) showed its high performance nano silver film. In the ITO replacement race, companies in the Germany, Japan, USA, and Korea are in the lead and the application manufacturers are the usual suspects in the display industry in Asia.

Another hot material is nano ink for printed electronics and thin film solar cell applications. Bayer



promoted its high performance nano inks made by CNT and Silver at this event. Nanotechnology enables simpler, cheaper, greener manufacturing processes, eliminating toxic chemicals used in lithography, and providing better performance devices/products. In the case of thin film solar cell manufacturing process, nano ink enables the use of thinner wafer saving the cost of silicon and improving overall efficiency.

Our team went to Tokyo again this year along with the Singapore delegation. In addition to presenting Singapore nanotechnology capability and promoting Singapore nanotech companies at the Singapore pavilion, we conducted extensive interviews with various exhibitors and this allows us to obtain insights on nanotechnology commercialization and competitive development today.

Nanotech 2010 was held concurrently with Nano Bio Expo 2010, nano&neo functional material 2010, InterAqua 2010, ASTEC (Advanced Surface Technology) 2010 and METEC (Surface Finishing) 2010. We see RusNano is gearing up its global presence and joined this event the first time, while Australia Pavilion has missed this year's participation due to government restructuring. We noticed the absence of some big Japanese players such as NEC, Toshiba, Fujitsu, Nippon Paint, and JEOL this year. Instead they took part in consolidated NEDO big booth, displaying their collaborated projects with the Japanese government. Some country pavilions shrank size including Germany, UK and Canada Pavilion, presumably due to budget cut as a result of economic downturn happening since end 2008 that only kicked in to affect 2009 companies' financial budget.

As far as commercialization of nanotechnology goes, we noticed increasing players in carbon nanotubes (CNTs), Silver and oxides nanoparticles production and their related product applications. CNTs mostly are used for composite ingredient (masterbatch) of high performance engineering polymers as well as metals for structural strength, thermal & electronics application, and main component of conductive ink for printed electronics application and of transparent conductive electrode for ITO replacement. Silver nanoparticles are mostly used for anti-bacterial agent and similarly to CNTs, increasing development in conductive ink for printed electronics application and of transparent conductive electrode for ITO replacement. There were many kinds of oxides nanoparticles exhibited for various applications, such as zinc oxide for anti-bacterial and UV protection agent, nanoclay for packaging barrier material, TCP (tricalcium phosphate) for biomaterial application, silica for scratch-resistance application, iron oxide for medical application and titanium dioxide for dye sensitized solar cells application.

In the area of devices, we found an interesting Finnish company Printocent, which will launch its product mid 2010. Having expertise in printed intelligence and optical measurement, Printocent has

developed a portable optical microscope with resolution down to 10 micron that can easily be attached to any camera-equipped mobile phones. The new product will significantly reduce inspection time for quality analysis, for example, that translates to faster decision making process and response time. Nevertheless, instead of targeting industries as their first customers, Printocent is targeting at schools to provide better, advanced and more enjoyable education instruments.

Another impressive technology was exhibited by NanoIntegris, a USA spin off supplying high purity of metallic and semiconducting single wall CNTs. Their proprietary technology called Density Gradient Ultracentrifugation (DGU) well separates the metallic and semiconducting CNTs from an unsorted CNT supply without much sophisticated process and with scale up capability. Other exhibited products include equipment for nanoparticles synthesis, characterization equipment and nanoimprint lithography equipment including the resins and molds.

Interestingly, as compared to last year we observed this year exhibition was not much about lithium ion batteries, especially for electric vehicle application. It was presumably due to the fact that the battery products had been launched some time last year, and the industry now is moving on to hotter topics such as transparent conductive electrode for ITO replacement and functional coatings. In addition, based on our discussions with selected company exhibitors, it seemed that application development partners are crucial in order to move forward in their commercialization effort.

In conclusion, this year trend seems to revolve around nanoparticles and their composites production, with only few application developments currently being highlighted. Most applications currently revolve around electronics application, such as transparent conductive electrodes/films and consumer goods such as anti-bacterial and UV protection products. And we noted a strong race in nanotech commercialization among USA, Japan, Germany and Korea.

