



CONTENTS

EDITORIAL P1

Nano tech 2008, the place to be

- 2008 Nano Tech Awards P2-6

Technology trends

- Carbon nanotubes
- Instrumentation
- Photovoltaic cells P8-9

Japan, centre of the nano-tech world? P9-10

Yole Développement met NEDO organization at nano tech 2008 P12

Yole's vision P13

An International Presence

- Germany's nano strength
- Other European representatives Belgium Spain P15-21

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EDITORIAL

This year marked the seventh edition of the International Nanotechnology Exhibition & Conference, also known as nano tech 2008. The event showcased cutting-edge advances in nano technology research and development, not only from Japan but from around the world. It featured 522 exhibiting businesses occupying 884 booths: 324 were Japanese companies, while 198 businesses came from 23 foreign countries. 49,365 visitors came in Tokyo Big sight. A quick poll confirmed that 95% will come back next year as for the exhibitor (90% reconfirmation at the end of the show).

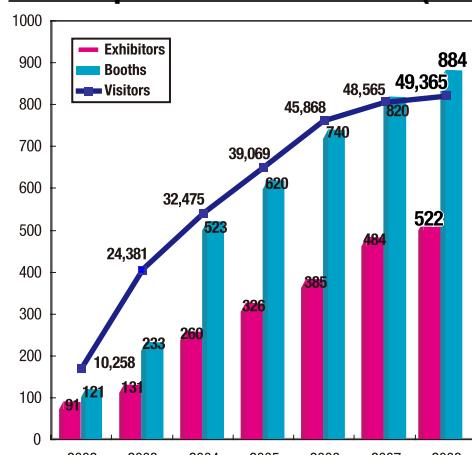
With 40% overseas exhibitors, nano tech 2008 is the world's largest nanotechnology-oriented exhibition and an important international market place.

The exhibition was organized by the nano tech executive committee and chaired by Prof. Tomoji Kawai from the Institute of Scientific and Industrial Research at Osaka University. It was made up of 20 nanotechnology specialists from the industry, academia and the government. It was supported by the Ministry of Internal Affairs and Communications, the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Agriculture, Forestry and Fisheries and the Ministry of Economy, Trade and Industry as well as by 15 embassies including the Embassy of the United States of America, the British Embassy, the Embassy of the Federal Republic of Germany, the Embassy of France, the Embassy of the Russian Federation, and the Embassy of the Republic of Korea; also supporting the committee were 10 other organizations including the National Institute for Materials Science, Advanced Industrial Science and Technology and the New Energy and Industrial Technology Development Organization. We are waiting for you next year in Tokyo.

Takahiro Matsui

Secretary General, nano tech executive committee

Development of nano tech (2002-2008)



Overseas Exhibitors
(with co-exhibitors)
2008

World's nanotech companies gathered to Tokyo Big Sight from all over the world



NANO TECH 2008, THE PLACE TO BE

Organized concurrently with Nano Bio Expo 2008, ASTEC 2008, METEC 2008, neo functional materials 2008 and Converttech Japan 2008, nano tech 2008 occupied 4 halls of the Tokyo Big Sight Exhibition Centre. In parallel to the exhibition, different conferences were organized in order to promote nanotechnologies, companies and initiatives. In particular, the conferences on Thursday focused on Germany, with

presentations about national initiatives and achievements by German businesses. Seeds and Needs Seminars provided an opportunity for companies to present their activities and latest products.

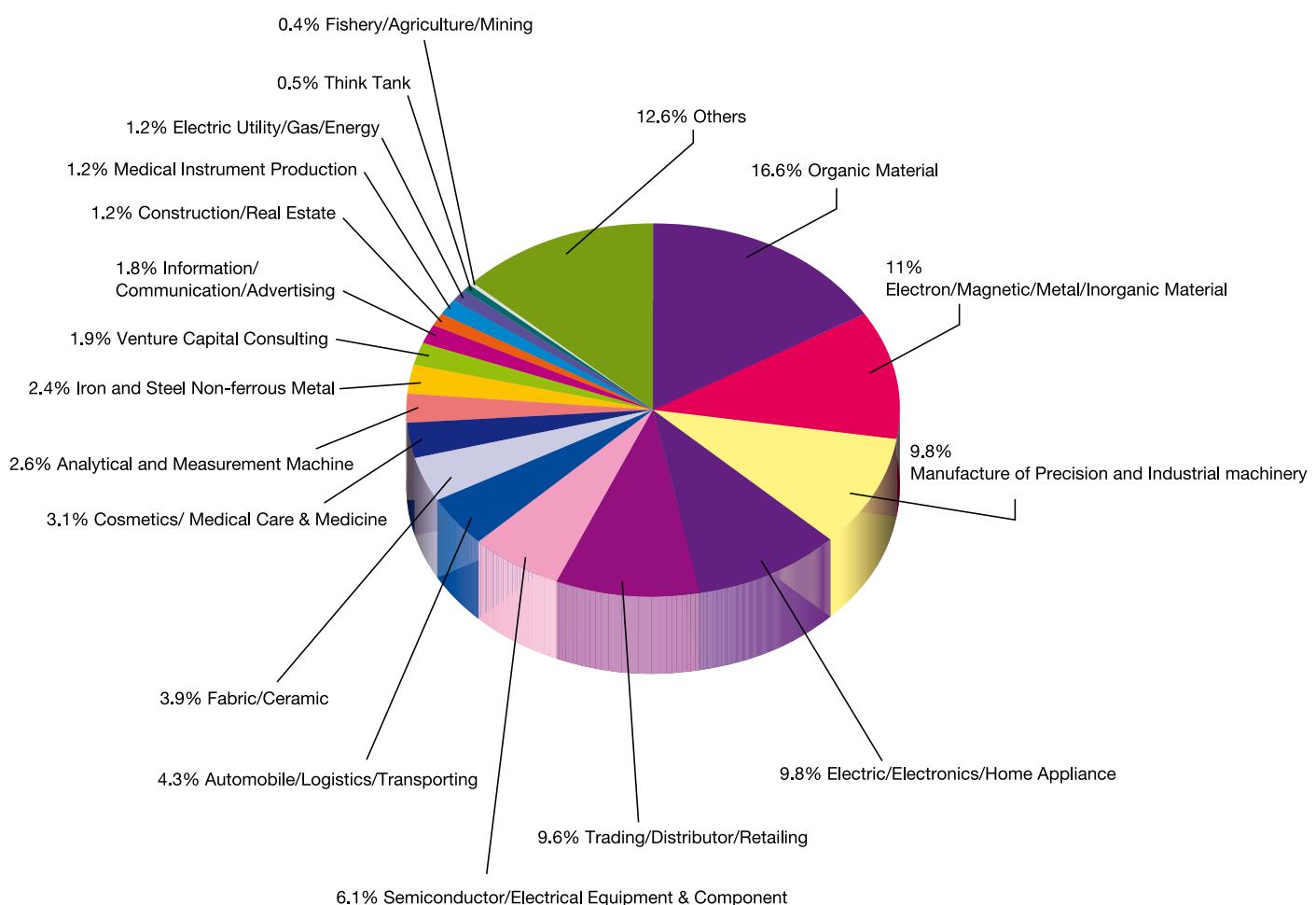
By the end of this 3-day exhibit, 80% of the slots for Nanotech 2009 had already been booked.



When 2007 event was showing the advancement of Nanotechnology in various sectors including telecommunications, biotechnology, environmental, energy , Nano tech 2008 show was still the place to be to have a large view of Nanotechnologies. Audience breakdown per industry was very similar to 2007's breakdown, with the predominance of materials and chemicals companies. Part of them to see the trends between chemical or physical manufacturing of nanomaterials, others to acquire or sell precision equipment.

The show also saw an increased number of visitors from applied research divisions of the consumer electronics and the semiconductor industries, with the objective to see how to take advantage (at an industrial or trading level) of these innovations.

Breakdown of nano tech 2008 visitors per industry



NANO BIZ NETWORKING

We recommend any visitor or exhibitor to book time and energy to attend the different networking sessions Japanese organizers are making during their shows.

It is both a way to have a flavor of Japanese

culture and to meet with your customers or partners in a good way. NANO BIZ NETWORKING RECEPTION on Thursday, February 14, 2008 was such a successful event.



2008 Nano Tech Awards : and the winner is...

nano tech Award 2008: German Area

From Germany, over 50 nanotech related corporations and research institutes have made presentations: from global corporations such as Bayer to national research institutions such as Fraunhofer. A wide variety of products, including automobiles and general merchandise, manufactured using nanotechnology are introduced, raising expectations for practical use in the future.

GLOBAL AWARD

Global Nanotech 2008 Award was received by Germany.

This award acknowledges, the fabulous work of Germany over the years to reach this level of diversity of Nanotechnology in Germany.

With 60 German companies and Research institutions exhibiting. Germany is reinforcing Nanotech 2008 as the place to be.

IT & ELECTRONICS

Last year, Toshiba announced a new three dimensional (3D) memory cell array structure that enhances cell density and data capacity without relying on advances in process technology and with minimal increase in the chip die size. The Japanese

chipmaker noted that this design could potentially meet future demand for higher-density NAND flash memory.

At nano tech 2008, the ICS and participants lauded a technology that achieves large capacity by

having columnar device arrays vertically penetrate the laminated electrode to form high-density arrays, as well as by relying on high storage density memory cells. ICS are very impressed with this miniaturization technology developed in the wake of the next-generation 2Xnm.

www.toshiba.com

BIOTECHNOLOGY

it4ip s.a. receives biotechnology award in Tokyo

it4ip's vision is to create a worldwide specialist technology company supplying track-etched products into high growth, high value-added market applications in the healthcare, energy, electronics, telecom and transport sectors.

it4ip s.a., a spin-off company from the 'Université

catholique de Louvain' in Belgium, develops, manufactures and commercialises precision membranes based on track etching technology; it4ip s.a. was created in early 2006 and it rests on a group of founders who come from the industry and academia. it4ip is currently located in the Activalis building in Seneffe, Belgium. Applications for these membranes are widely

diversified, ranging from healthcare (cancer diagnostic, cell culture media,...), energy (fuel cells), and nano- and microfiltration to the food and pharmaceutical/cosmetic industries for bacteria detection.

it4ip was selected by the organizers for its excellence and its innovative applications with significant business potential.

www.wallonnia-international.com

ENVIRONMENT & ENERGY

Ube Board, "Wings of technology and spirit of innovation"

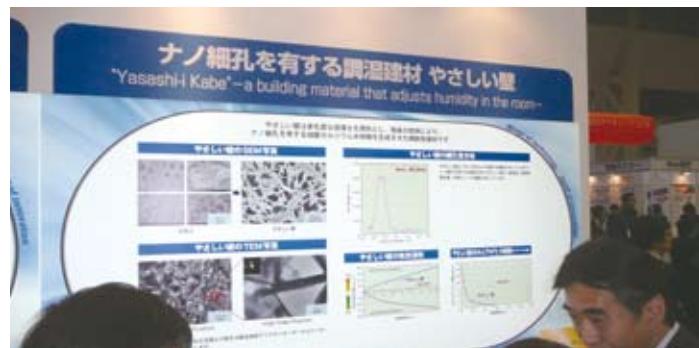
Ube Board exhibited a building material called "Friendly Wall" with nano fine pores. The fine pores, ranging from 10 nm to 200 nm in size, catch water vapor in the high-humidity range and release water vapor in the low-humidity range. Thanks to this property, the pores maintain a comfortable humidity level of 50 to 60%. At nano tech 2008, participants praised their capacity to absorb harmful substances that cause sick house syndrome.

Ube won the award for best special nano material for construction. This award acknowledges the fact that nanomaterials are virtually everywhere

and that special cements will be using them more and more.

Ube Board, a public company, is a diversified manufacturer with a core focus on the chemicals sector. Its chemicals are utilized in diverse applications ranging from articles for daily use to advanced applications for the aerospace industry. Ube's chemicals can be found in everything from digital consumer electronics and household goods to automotive parts and pharmaceuticals.

Ube also produces a wide range of products beyond the chemicals sector, supplying useful materials and goods such as cement, building materials and aluminum wheels.



www.ube-ind.co.jp

MATERIALS

Taiyo Kagaku collaborates with R&D laboratory to develop specific porous silica

Taiyo Kagaku won this award thanks to its Taiyo Kagaku Meso Porous Silicas (TMPS). Nano tech 2008 commended Taiyo Kagaku for launching the world's first demonstration plant this spring, with an annual production of 20 tons.

Taiyo Kagaku is large surfactants and emulsifiers producing company involved in the food ingredients and materials businesses and are a global leader in interface-control technologies. TMPS (Taiyo Kagaku Meso Porous Silica), a spin-off from university research, investigated within Toyota Central R&D Labs., inc. Later, Toyota

group undertook the joint collaboration with Taiyo Kagaku to develop a technology of mass production of Meso Porous Silica.

With its own efforts, Taiyo Kagaku established a mass production technology to manufacture the Meso Porous Silica by taking advantage of its unique interfacial control technology. TMPS are silicon oxides arranged in a well-defined symmetry, with a porous, uniformly ordered, honeycomb-like structure and nanometer controlled pore size. TMPS are synthesized using surfactants as a template and processes uni-dimensional atomic channel networks with regular nanoscale holes or pores, whose rigid mesostructure remains

stable, even after burning off the template in a process known as calcinations.

TMPS are available with a large specific surface area (~1300m²/g), a large pore volume of 1 cm³/g and variable control of uniform pore sizes ranging from 1.5 to 7 nm. Materials are suitable for encapsulation and stabilization of larger organic molecules (such as enzymes) for various applications. In TMPS, a simple adjustment of pore size could control even a drastic change of humidity via moisture absorption. Also, the water adsorbed in TMPS can easily be desorbed, through heating or drying.

TMPSs will be used as

- An adsorbent for heat pumps and air conditioners
- An adsorbent for deodorant and cosmetic applications
- An insulant, low dielectric constants
- A carrier for catalysts and enzymes
- A carrier for fragrant, antibacterial agents and physiologically active pharmaceutical components

www.taiyokagaku.com/

NANOFABRICATION TECHNOLOGY

Japan Steel Works presented a new transcription molding process, one which makes possible a uniform transcription and a high aspect ratio of fine patterns

Japan Steel Works presented a new transcription molding process, one which makes possible a uniform transcription and a high aspect ratio of fine patterns. The "melt fine transcription molding process", developed by the Japan Steel Works,Ltd. is excellent for uniform batch transcriptions and for achieving high aspect ratios. This technology applies molten thermoplastic resin to the stamper for pressured transcription. Compared to the nano imprint, this process enables more accurate transcription. nano tech 2008 saluted its broad applica-

bility to electronics displays, medical care, bioengineering, and optical media. Dr Kazutoshi Yakemoto, Deputy General Manager of the Machinery Research Laboratory, explained that the process does not create optical strain because there is no residual stress, no birefringence and no orientation; it also achieves high dimensional stability. The thickness of the part can vary from 100µm to 3 mm, and the fine patterns are from 100 nm to 2 mm with an aspect ratio above 5. Applications range from displays, bio and optical media to semiconductors.



www.jsw.co.jp

EVALUATION & MEASUREMENT

FEI Company is developing tools for nanotech

FEI Company has been contributing to nanotechnology ever since the release and practical application of the electronic microscope with aberration correction ("Titan") in 2005. This microscope has a higher resolution (0.1nm) than ordinary electronic microscopes, and it is ideal for analytical evaluation of nano-devices and nanomaterials. The latest development has enabled a resolution of 0.05 nm. A new "Titan" model with high resolution EELS that can analyze conditions in the nanoregion has been also put into practical use.

According to Dr Jens Greiser, Senior Manager, Strategic Planning & Corporate Development and Martijn Bogels, European Marketing Programs

Coordinator, this microscope allows for an improved resolution thanks to the correction of spherical and chromatic aberrations of lenses. Thanks to this atomic resolution, identification of individual atoms becomes possible and can help develop new nanoparticles, catalysts or semiconductor devices.

FEI also contributes to the TEAM (Transmission Electron Aberration-corrected Microscope) project, coordinated by Lawrence Berkeley National Laboratory's National Center for Electron Microscopy and funded by the US Department of Energy. In September 2007, they announced the highest-resolution images ever seen in S/TEM electron microscopy, with 0.5 Angstrom and below performance.



www.fei.com

SPECIAL AWARD

Quantitative synthesis approach to organic nanotubes

The National Institute of Advanced Industrial Science and Technology has successfully developed the Organic Nanotube AIST™, which has three primary colors, by separating, with high purity, carbon nanotubes (CNTs) into metallic CNTs and semiconductor CNTs. This has led to great progress in electronics applications.

The Institute also successfully developed a quantitative synthesis approach for organic nanotubes composed of macromolecules. We praise this material with new inclusive functions such as drug delivery (DDS) as a major step forward on the path leading to bioindustrial applications.

The carbon nanotube inks are colorful, high-purity, metallic CNTs that are being considered for use in conductive color filters, transparent conductive films, and liquid crystal display panels. The organic nanotubes are amphiphilic molecules synthesized from naturally-derived renewable resources; they can encapsulate guest substances such as proteins and nucleic acids. These nanotubes can be dispersed in water, are biocompatible and are transparent under microscope. As a result, they are worthwhile for the transportation of fluorescent molecules. The fields of applications that can be expected are medical, health and nanobiotechnologies.

Currently, companies are being supplied with

samples of ONT-AIST with a view to rapidly transfer the technology. In the future, applications from companies that wish to conduct further research with AIST and commercialize ONT-AIST will be accepted.



www.aist.go.jp/index_en.html

THE NIKKAN KOGYO SHIMBUN AWARD

The 5 Tec.net is a network that provides services and where original technologies of the region are orchestrated. Nanotech 2008 regards highly the new manufacturing model that the organization has built up to offer the mobility that large companies lack and the arrays of facilities and processing technologies that small and medium-sized companies do not have.

5Tec.net is an alliance of 5 companies: Crystal Optics, Suzuki Precion, Tosei Electrobeam, PMT Corporation and Nakamura Choko. The technologies they have developed concern clear surface mirrors that create holographic images,

precision engineering, hard metals processing, nano-imprinting and laser cutting.



Good thing our ideas don't spark anything off.

Wherever danger lurks when sparks fly, Evonik defies conventional thinking with Separion®, an exceptional innovation. This ceramic separator makes it possible to build large lithium-ion batteries for motor vehicles or wind turbines that are safer, more efficient and more economical than conventional batteries. Separion® is one example of the many innovations that make Evonik, formerly known as Degussa, the creative force in specialty chemicals.

We create groundbreaking solutions at our more than 35 research and development sites worldwide, inspiring customers with our ideas in such diverse markets as automotive, coatings, cosmetics, plastics and pharmaceuticals. See for yourself: www.evonik.com/ideas



Evonik. Power to create.



EVONIK
INDUSTRIES

TECHNOLOGY TRENDS

In this post-show report, we wish to highlight three technological trends on display at the show. First, carbon nanotubes are still intriguing to a lot of researchers, yet developments in the past years have paved the way to commercial applications. Second, instrumentation

and metrology are a hot topic in the nanotech community, as they contribute to deepening our understanding of the nanoscale world and help foster innovation. Thirdly, photovoltaic cells, generating a lot of buzz these days, are gaining access to the nanoworld with the use of nano-

materials for purposes of higher efficiency and lower costs. For the first time, solar cell modules were presented at this show and solar applications were discussed at several booths.

CARBON NANOTUBES

Carbon nanotubes were once again a hot topic in the exhibition. Major carbon nanotube providers attended the exhibition: Arkema, Bayer MaterialScience, Nanocyl, Thomas Swan, Toray Industries... Carbon nanotube prices are lowering, meaning that new applications are becoming economically viable. Multiwall carbon nanotube prices are estimated at 150 per kg for semi-industrial orders. Prices depend on the quantity ordered, on the level of purity of the product, as well as on an optional functionalisation treatment that might be applied to improve the compatibility of the nanotubes with

the surrounding matrix. With this in mind, MWNT suppliers are collaborating with partners, as in the case of Arkema announcing the consolidation of its partnership with Zyxel Performance Materials. Increases in plant capacities have also been announced for the coming years, up to 260 tons for BMS by 2010 and several hundred tons for Arkema.

Conductive applications seem to currently be the most promising field for MWNT manufacturers, since nanotubes account for a greater percentage of the weight there than for mechanical reinforcement applications. The 2007 edition

displayed sports applications for nanotubes, for example in hockey sticks or snowboards. The 2008 edition focused more on larger scale industrial applications, such as reinforcement of epoxy structures or anti-static plastic containers.

Regarding Single Wall Carbon Nanotubes, prices are still significantly higher and production is more difficult. SWNT manufacturer Thomas Swan has a production capacity of 6 kg of purified SWNT per month, using a specialized CVD reactor.

INSTRUMENTATION & METROLOGY

Instrumentation is a key technology in the development of nanotechnologies, since nanoscience was made possible by the ability to "see" with nanoscale resolution. Therefore, nano tech 2008 decided to bring together the major players from the field of instrumentation and metrology for nanotechnology. We can mention large Japanese players such as FEI Company, JEOL, and Shimadzu, Veeco for the USA, and Nanosurf for Europe.

Shimadzu presented a nanoparticle size analy-

zer and nano microscopes. Veeco, the market leader in Atomic Force Microscopes, presented its SPM product family as well as optical profilometers.

Nanosurf's presence is described in detail on page 17. Other SPM manufacturers present were Nanotec Electronica, NTMDT and Park Systems.



PHOTOVOLTAIC CELLS

This year has seen the arrival of photovoltaic cells at the nano tech show. Solar cell prototypes were displayed by Fraunhofer Institut Solare Energiesysteme. These prototypes are organic solar cells and they are made using efficient production techniques, leading to a target price of € 1 per Wp. Their efficiency is 3 to 5%, which is much lower than current silicon solar cells, but they are not intended to compete with more traditional technologies; instead, their purpose is to rely on their flexibility and light weight to apply to new applications such as mobile consumer electronics. Another target is the replacement of ITO by a transparent polymer

anode supported by metal structures, which would enable cost cuts.

Photovoltaic applications were also at the heart of developments by Frontier Carbon Corporation, Bayer Technology Services and Nanogram.

Nanogram is a developer and producer of nano-

particles. Using Laser Reactive Deposition, the company achieves 30 µm polycrystalline films that enable cost reductions throughout the cell and module manufacturing process.



JAPAN, CENTRE OF THE NANOTECH WORLD?

Nano tech Japan is the meeting point for most Japanese companies that are active in nanotechnology. Large electronics companies such as Fujitsu Ltd, Hitachi, NEC and Toshiba come to the show to present their technological

breakthroughs in the use of nanoscale materials and in the achievement of nanoscale electronic features. Small and medium-sized enterprises are also present to increase their visibility, primarily with Japanese customers, but also to

seize opportunities for overseas contacts and contracts.

Here are examples of companies that illustrate Japan's involvement in nanotechnology:

NEC attended the nano tech exhibition for the sixth time, demonstrating the significance of nanotechnology for its business. As presented by Mr Toshio Baba, Executive Expert for Nano Electronics Research Laboratories, NEC is developing nanotechnology for high performance and environmentally friendly IT/network products. They are working on various IT projects, ranging from ultra-compact and low power photonic devices to optical interconnection technology for high speed computers or high power, thin, rechargeable batteries. Environmental concerns

are also at the heart of their work, with research in the fields of functional bioplastics and high performance, printable electronics using carbon nanotubes that are manufactured through printing, which reduces CO₂ emissions.



Fujifilm presented 9 innovative materials developed in their research centre. Mr Shogo Sano, from the Administration Group Fine Chemicals Business Division, introduced the following technologies:

- UV absorbers: sharp transmission spectrum
- Near infrared absorbers: invisible to the human eye, water and oil soluble
- Brilliant Insulating films: high reflection with low thermal conductivity
- Materials for fluoro-coating: soluble in organic solvents
- Materials for soluble polyimide: potential for resolvable polyimides
- Heat and chemical resistant materials: strong acid and strong bases resistance
- Super hydrophilic technology: anti-cloudy, self-cleaning
- High performance clear colorants: resistant to light and water
- Light modulating dyes: color of the glass changes as a function of the electric field



Hitachi presented nanocomposite magnetic powders for applications in motors with the aim of reducing energy consumption and

developing high power motors. The company is also involved in lead-free, low melting glasses based on vanadium, in direct methanol fuel cells (DMFC) and in nanoimprint. The

DMFC are small and high power and could find applications in out-of-field power supply (camping, on-site medical assistance...)

FrontierCarbonCorporation, a joint venture between Mitsubishi Chemicals and Mitsubishi Corp, produces fullerenes. Osamu Kajiwara, Sales & Marketing Center General Manager, explained that the company is focusing on two applications areas: semiconductors (hard mask for etching, e-beam resists) and organic solar cells. Very high

purity products are required for photovoltaic applications because any impurity will catch an electron and thereby decrease the efficiency of the cell. The company is developing C70 fullerenes because C70 may outperform C60 for organic photovoltaic cells as it is better at adsorbing solar energy when the wavelengths are longer.



MICROtech WORLD

NANO KOREA 2008 Special Exhibition & Conference

Micro-materials, Micro-Applications, Evaluation & Measurement, Fine-processing

Contact Int'l Microtech Committee Secretariat

Korea NANO KOREA Secretariat (NTRA/NanoTechnology Research Association)

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Japan nanotech Secretariat (ICS Convention Design, Inc.)

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2008. 8. 27 (wed.) - **29** (Fri.)

at **KINTEX, Korea**

<www.microtechworld.net>

Category of Exhibits

- MEMS Applications
- MEMS Manufacturing Equipment
- Microfabrication
- Evaluation & Measurement
- MEMS Materials

- Hosted by
Ministry of Knowledge Economy (MKE),
Ministry of Education, Science Technology (MEST)
- Organized by **NANO KOREA Organizing Committee**
- Managed by **Int'l Microtech Committee**
MEMS Technology Research Association (Korea)
Micromachine Center (Japan)
IVAM Microtechnology Network (Germany)
- Supported by **K-MEMS**
- Secretariat
NanoTechnology Research Association (NTRA/Korea),
ICS Convention Design, Inc. (Japan)

YOLE DÉVELOPPEMENT MET NEDO ORGANIZATION AT NANO TECH 2008

INTERVIEW

The New Energy and Industrial Technology Development Organization (NEDO) was established by the Japanese government in 1980 to develop new oil-alternative energy technologies. Eight years later, in 1988, NEDO's activities were expanded to include industrial technology research and development, and in 1990, environmental technology research and development. Activities to promote new energy and energy conservation technology were subsequently added in 1993. Following its reorganization as an incorporated administrative agency in October 2003, NEDO is now also responsible for R&D project planning and formation, project management and post-project technology evaluation functions.

Yole Développement: What were the major innovations that were presented on NEDO's booth this year? Can you detail two or three major project and their achievements?

NEDO: Only projects with notable results were exhibited in the NEDO booth. Therefore, all of our exhibits presented innovative technology achievements.

Yole Développement: How do you see the future of nanotechnologies in Japan ? How will NEDO contribute to this?

NEDO: I think nanotechnology is an important technology that can contribute to Japan's continuous growth in the future. For example, I expect that nanotechnology will encourage rapid development of the telecommunications, health and safety fields as well as the energy and environment fields. Nanotechnology will enable us to have a rich future. NEDO is aiming to construct an innovation cycle in nanotechnology by supporting it from various angles to promote the development of a nanotechnology industry.

Yole Développement: How are the innovations developed during NEDO's projects transferred to the industry? Have you seen the emergence of start-up companies to commercialize the innovations? Or is it rather large companies that integrate the new technologies in their development department?

NEDO: NEDO promotes high-risk technology development projects that are difficult for the private sector to carry out alone by drawing on the collaborative efforts of industry, government and academia and organizing optimal research teams. Therefore, there are few examples of innovation transfer to industry while a NEDO project is being carried out. More specifically, NEDO discontinues its support when commercialization by private sector enterprises becomes possible. There are many cases in which innovation is achieved based on the results of NEDO's projects. However, I think that it occurs on a case-by-case basis and involves both new companies and large enterprises.

Yole Développement: Does NEDO present its nanotechnology research projects at exhibitions outside Japan? Do you have research collaboration with overseas partners regarding

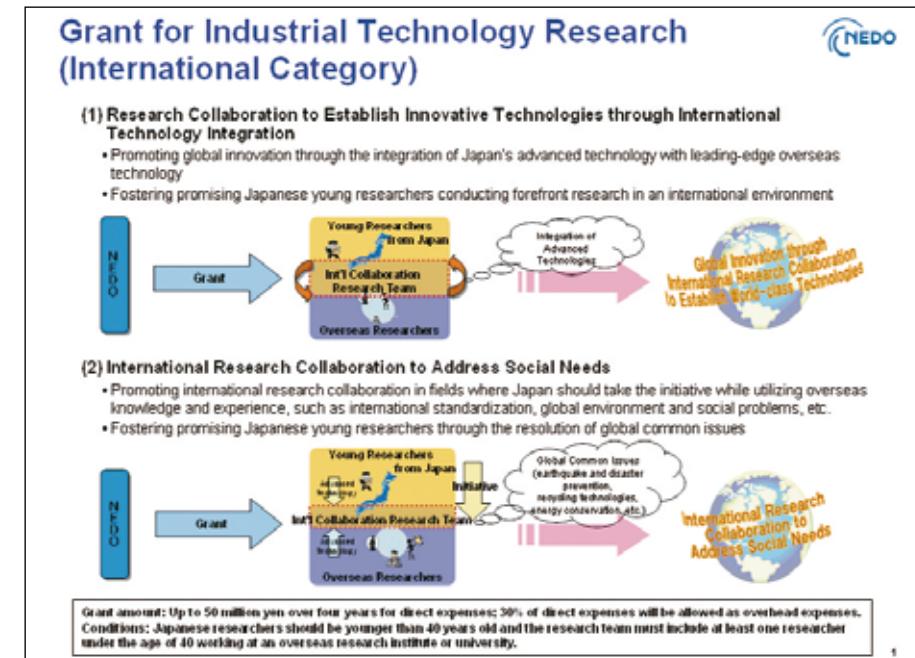
nanotechnology projects?

NEDO: Yes, we do present the results of our nanotechnology research projects at exhibitions outside of Japan. For example, we plan to exhibit the results for our ceramic reactor project at Hannover Messe in Germany during April 2008.

Joint research with foreign countries is not being carried out in the nanotechnology area at present. However, NEDO's Grant for Industrial Technology Research program includes international cooperation in other research fields.

Moreover, information exchanges among researchers and exchanges, etc. carried out by academic societies are encouraged as they enable NEDO to understand the level of international research in different research fields.

New Energy and Industrial Technology Development Organization (NEDO)
Nanotechnology and Materials Development
Atsuhiko Kiba, MUZA Kawasaki
Central Tower 19F Nanotechnology and Materials Development, 1310 Omiya-cho, Saiwai-ku, Kawasaki City, Kanagawa 212-8554, Japan
Fax : 044- 520-5223



source: NEDO

For more information : <http://www.nedo.go.jp/english/index.html>

YOLE'S VISION

Contact part: Yole Développement

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Being a European company, Yole's team was proud to see how well our continent was represented.

From Switzerland to Finland, from Spain to Germany, from Italy to the UK, from Wallonia to Flanders, large and midsize European companies flourished at the show amongst large Japanese companies such as Fujitsu, NEC, Toshiba and Fuji Film, first-rate Japanese universities and, as in past years, NEDO's large Japan Science and Technologies booth. European startups tried to find their way in this huge market that could be described as being the ultimate fine chemicals and disruptive materials market.

As French citizens however, we were disappointed with the last-minute decision not to have a French pavilion and to see that Arkema, the Lille Region and ARCIS were isolated, had come

with limited decorations and that they combined for less booth space than Saarland and about as much as Pennsylvania. Though last-minute marketing and no French decoration, the show was very good for them, as for example the Lille Region APIM made 85 qualified contacts.



Actually, there were French people present, many of whom were purchase managers from

the chemical, building and constructions, and sports equipments sectors, amongst others. France was busy sourcing: in a way, this is a good thing since the sought-after suppliers and partners are precisely the businesses Yole Développement follows !

Compared to other disruptive semiconductor technology shows we have followed in the past, we saw overall progress from Japanese companies: in most booths, one could find leaflets in English and a manager in charge of interacting with foreign visitors. Further improvement would be needed however, in order for foreign visitors to get a better grasp of who does what, in terms of production, distribution and ownership of patents and copyrights. Depending on your interests, you might want to do your homework before travelling to Japan.

Market Research and Strategy Consulting Company in Micro & Nanotechnologies

From technologies to markets, we help our clients to develop their business

Founded in 1998, Yole Développement is involved in different fields, with strong leadership worldwide in MEMS & nano materials applications. With more than 18 consultants with technology & marketing background, Yole team of micro and nano experts will provide your organisation high level synthesis for decision-making. Its staff of specialists is organised by technology and includes a dedicated team on micro and nanotechnologies for life science and chemistry.

Our mission is to deliver the technical and economic basis to enable our clients to take an informed decision:

- Prospective market analysis,
- Expertises appraisals and due diligence,
- Technology and strategy diagnosis.

Our methodology involves a diagnostic of industrial projects and interpreting the industrial and economic impact of new technologies on emerging markets (nano material applications, sensors specifications improvement, new use of microfluidics, semiconductor process breakthrough, etc.).

Thanks to its specific marketing approach and its understanding of the technology & market environment, Yole Développement can assist companies at every stage of their growth, from the development of a new technology to fundings, through communication services.

www.yole.fr

 YOLE DÉVELOPPEMENT

Moving towards greater commercialization of Nanotech products

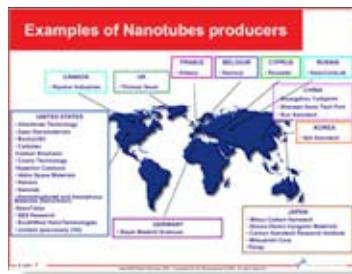
While Europe is still the world's largest public investor in nanotechnology, the United States lead in terms of commercialization of nanotech products, with over 50% of the total. According to the inventory made by the Project on Emerging Nanotechnologies, there are currently over 600 consumer products using nanotechnology. In 2005, consumer goods using nanotechnologies represented a market of over € 20 billion, while future robust growth in the coming years will take that figure up to

several trillion euros in 10 years time.

Though nanosilver is at present the most widely-used nanomaterial in nanotech products, carbon nanotubes are receiving constant interest. In 2007, scientists from the University of Cincinnati announced the growth of the longest carbon nanotubes ever synthesized, reaching 2 cm long, i.e. 900,000 times its diameter. In the meantime, industrial production of multi wall carbon nanotubes (MWNT) is getting structured, with companies announcing production capacity increases. Prices have

dramatically decreased and you can now buy 95 wt% pure multiwall carbon nanotubes for €150 per kg when purchasing by the ton, to be compared with 700€ to 1000€/kg a couple of years ago. This is leading the commercialization of MWNT products from high end sports goods to industrial applications. Single-wall carbon nanotubes are still much more expensive: for 90% pure SWNT, a gram costs about €100 and a kg will set you back €50,000. Applications are currently at the research stage.

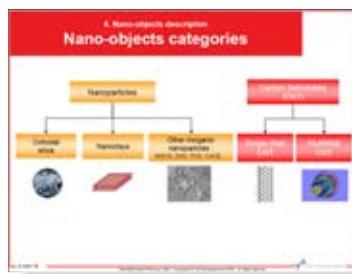
For more information: www.yole.fr or <http://www.imicronews.com/nanomaterial.asp>



> NanoSEE 2008 Report

UNIQUE ANALYSIS DESCRIBING NANO MATERIAL WORLD

This report is designed to present the opportunities offered by nanomaterials to potential industrial users as well as the different nano-objects, the players involved and market data. It highlights the technical functions made possible by nanomaterials to create our daily nanoproducts.



NanoSEE 08: Nanomaterials Industrial Status and Expected Evolution

This report answers to:

- > What are the benefits of nanomaterials?
 - > Who are the key players ?
 - > How is the industry organized?
 - > What is the market for nanomaterials (2007 – 2012)?

Contents of the report

- > Nano object description with special focus on nanoparticles and carbon nanotubes
 - > Main players and industry organization
 - > Market data

Who should buy this report?

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AN INTERNATIONAL PRESENCE

The Europeans were led by Germany, as was already the case in previous editions. There were different national pavilions representing some major European countries, namely the UK, Switzerland, Belgium (both Flanders and Wallonia) and Finland, as well as Italy and Spain. However, we must mention the absence of a French pavilion, and the fact that there were just 4 organizations from France in attendance. The Netherlands were represented by their NanoNed Network and they have already decided to have a national pavilion next year.

Korean representatives were also very active on the show, with their own national pavilion as

well as with their active networking, designed to increase their customer base.



Iran was the most surprising new international presence, showing that Nanotechnology is now entering into the priority of many developing countries

Taiwan, Australia, Canada and Russia also had national pavilions, bringing together research centres, companies and development agencies.

GERMAN NANO STRENGTH

Germany's strength in nanotechnology lies in its powerful and innovative chemical industry together with the German willingness to enter this new business and provide state guarantees to the emerging industries of the country. Sponsored and organized by the Federal Ministry of Economy and Technology, the Federal Ministry of Education and Research, the German Fair Trade Industry Association (AUMA) and the German Chemical Industry Association (VCI),

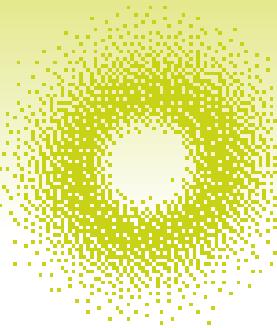


the 10,000 sqm booth hosted over 60 organizations, including research centres, SMEs and larger companies, as well as promotion agencies. The German presence at the show was impressive and illustrated Germany's leading position in nanotechnology. Complementing the German national booth, the Saarland region had its own booth to present the INM research centres and different spin-off companies from this institute, focusing in particular on coating technologies.

The "nano-strength" of Germany can also be



explained by the numerous networks, consortiums, development agencies and associations for innovation transfer. There were about 15 such agencies at the exhibition, fostering regional nanotech development by promoting either individual companies or competitiveness clusters for specific themes.



nano
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l'avenir des nanos est ici
nanotech's future is here

NanoQuébec is a not-for-profit organization with the mission to strengthen innovation in nanotechnology to ensure solid and sustained economic growth for Quebec and Canada. NanoQuébec funds an important part of the operations of many major central research facilities in nanotechnology in Québec. The funds allow access to the network's high quality services and state-of-the-art research equipment by the entire research and industrial community.

The organization aims at establishing partnerships between industrials and the research community, namely through its industry-university research and development support program. These actions, in line with NanoQuébec's positioning strategy, support Quebec's industrial competitiveness in specific sectors, namely electronics and photonics, life sciences, aerospace and wood products.

Through its agreements and partnerships (for example with Minatec in France and NBCI in Japan), NanoQuébec is working to improve the strategic position of Quebec both nationally and

Your Partner for Nanotech Innovation

internationally. It is constantly seeking new international research and industrial partnerships.

NanoQuébec supports responsible development in nanotechnology through its participation in the establishment of appropriate standards and through its active contribution to the creation of a network for sharing NE3LS knowledge. NanoQuébec is also committed to broadcast nanotechnology information through its website and its competitive intelligence service.

The organization is recognized as Canada's most dynamic nanotech organization.

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- ⌚ An international presence through agreements with Minatec (France) and NBCI (Japan)

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Small AFMs Make a Big Impact

Nanosurf is a leading provider of simple, easy-to-use atomic force and scanning tunneling microscopes. The company was founded in 1997 with a clear vision in mind: to produce scanning probe microscopes that would surpass all other products on the market in terms of user-friendliness, reliability, and cost-effectiveness. The outcome of this vision was a whole range of uniquely designed products, which are now enabling users all over the world to get a grip on nanoscale matters in education, science, and industry, and which are indispensable for anyone interested in the multidisciplinary fields of nanoscience and nanotechnology. The application of Nanosurf products now even extends into space, as Nanosurf was chosen by NASA to provide the atomic force microscopy module for the Phoenix Mars Lander Mission.



The Nanosurf Nanite AFM with Akiyama-Probe: compact design for automation
Source: Nanosurf

But Nanosurf's main market obviously remains on Earth, where the nano tech in Tokyo is the main event for everything new in Nanotechnology. Here, Nanosurf took advantage of the inherent technological curiosity of the Japanese public: Their booth adjacent to the Swiss Pavilion consistently drew crowds to their demonstration, which showed how to unpack, set up, and use an atomic force microscope (AFM) in less than five minutes. The visitors, impressed with the Nanosurf ease-of-use, stayed on to have a closer look at the object of the demonstration, the easyScan 2 AFM, or at other products such as the Mobile S Cordless edition and the Nanite automated AFM with Akiyama-Probe, which saw their first exposure to the Japanese market at the nano tech 2008. The simple probe exchange on the Nanite AFM with Akiyama-Probe in particular appealed to visitors who saw the need for high-end surface inspection to be performed by untrained personnel. Where standard AFM systems require fine motor skills, good eyes, and a subsequent mechanical laser alignment, the Nanite AFM with Akiyama-Probe allows anyone to exchange the probes with confidence — ideal for time-saving operation. The Mobile S Cordless edition meets the need of mobile users looking for a minimal footprint and for independence from mains power. The former attribute resonated

well with visitors familiar with clean room operations, and the latter with those interested in taking high-resolution measurements into the field or onto large samples.



The Nanosurf easyScan 2 draws a crowd. Insert: easyScan 2 close-up.
Source: Nanosurf

The excellent customer response to the Nanosurf presence at the nano tech 2008 in Tokyo confirms the world-wide need for easy-to-use surface inspection. Nanosurf systems are available worldwide through selected distribution partners such as Meiwafosis Co., Ltd, in Japan, who supported Nanosurf in this successful nano tech Tokyo venture.

Nanosurf will return to Tokyo again for the nano tech 2009, by which time the Phoenix Mars Lander Mission will have touched down, making Nanosurf's AFM the first on another planet.



Source: NASA/JPL-Caltech/University of Arizona

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For Mars: Dominik Brändlin (braendlin@nanosurf.com)
Web: www.nanosurf.com

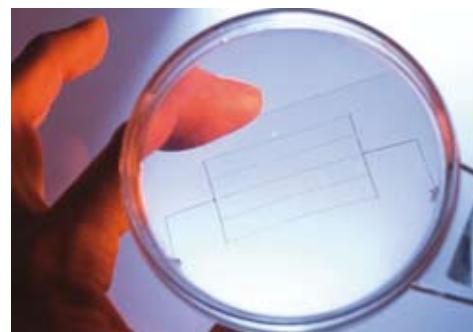
Bayer MaterialScience presented several ranges of nanoproducts. With recent developments in the nanoproducts field, BMS got to show off industrial applications of nanomaterials. According to Martin Schmid, Head of Carbon Nanotubes business, Bayer was not there to show ideas and posters but actual industrial technologies and real life products. First of all, the well-known Baytubes carbon nanotubes were presented, though not as mere powders, but rather as innovative products in their own right. BMS actually showed a flying camera, made of epoxy, carbon fibers and BayTubes. These carbon nanotubes are also used in PE antistatic packaging that could be FDA approved, which is not the case of carbon black that can migrate outside the polymer matrix. CNT can also be used for bipolar plates in fuel cells and as conductive TPU films for applications in heating car seats.

Bayer MaterialScience also presented a novel

sol-gel precursor for inorganic coatings. The new precursor allows the preparation of thick, crack-free sol-gel layers due to its high flexibility and high crosslinking density. Applications would initially concern sol-gel clearcoats but evaluation of pigmented coatings is underway.

BMS also introduced silver nanoparticle inks for printing of flexible electronics. This product achieves a bulk silver conductivity rate of 10% and can be cured at low temperatures (120–130°C). Another objective would be to replace silver with CNT in order to decrease the cost of the ink. Bayer Technology Services, a fully integrated technology partner for Bayer and the chemical and pharmaceutical industry, presented a new product line under the name Baydot® at "Nanotech".

These semiconductor nanoparticles – also known as quantum dots – change their color by tuning the particle size. An application would be low-cost solar cells with a target price of 1 € per watt



Source: BMS

BMS also emphasized its implication in Health and Safety issues regarding nanomaterials. The company wants to be sure that nanomaterials will not cause any harm during production processes and during use. BMS developed a website dealing with these aspects:

www.baycareonline.com.

The German booth also featured several instrument and equipment manufacturers, both large companies and start-ups, involved in nanoscale characterization and production equipment. Germany also presented coating companies

that develop anti-fog, anti-scratch, anti-glare and anti-microbial technologies. The range of applications for these coatings could be very broad, including the automotive sector, household goods, architecture and construction, as well as medical instruments.

OTHER EUROPEAN REPRESENTATIVES ...

The UK pavilion was attended by 18 companies and institutions involved in nanotechnologies in the UK. Nanotechnology activities in the UK are diversified, ranging from nanomaterials development and production (Exilica Ltd, Intrinsiq Materials Ltd., Nanoco Technologies Ltd, Oxonica, Promethean Particles Ltd, Thomas Swan), to contract research (Ilika Technologies Ltd) and instrumentation (Ionscope, NanoSight), not to mention various promotion agencies and networks.



Source: Yole Developpement

BELGIUM

Umcore presented Nanograin, its product range of nano particles, made up notably of zinc oxides, ceria and silver nanoparticles. Most of the business for zinc oxide nanoparticles is related to Chemical Mechanical Planarization for the semiconductor industry

and cosmetic sunscreens. Umicore is developing 30 nm diameter nanoparticles for CMP in order to fulfill the requirements of the next generation semiconductor process, i.e. 32 nm node, expected to enter production in 2010. Together with IMEC, Umicore is developing

silver nanoparticles as ingredients in inks for conductive electronics.



SPAIN

WHEN REGIONS, GOVERNMENT AND PRIVATE INSTITUTIONS INTERACT TO CREATE A STRONG NANOTECHNOLOGY CONTEXT IN SPAIN

At the end of the 90's, the Spanish scientific community put in place and promoted several initiatives such as networks (NanoSpain, etc.) and high-level conferences to strengthen research in nanotechnology and, at the same time, to raise the awareness of public administration and industry about the need to support this emergent field [1].

[1] Nanotechnology applications: a driving force for R&D investment, A. Correia, M. Pérez, J. J. Sáenz, and P. A. Serena, Phys. Stat. Sol. (a) 204, No. 6, 1611–1622 (2007).

Locally, the Generalitat of Catalonia played the most relevant role promoting nanotechnology through its Special Action for the development of Nanoscience and Nanotechnology in Catalonia, funding scholarships and two relevant institutions: the Nanoengineering Laboratory belonging to the "Catalan Bioengineering Institute (IBEC)" and the "Instituto Catalán de Nanotecnología".

Several regional initiatives were carried out in various regions:

- "Instituto de Nanotecnología de Aragón" (INA)
- "Unidad de Nanotecnología de la Universidad de Oviedo"
- "Círculo de Innovación Tecnológica en Microsistemas y Nanotecnologías de la Comunidad de Madrid"
- Regional networks such as "NanoGalicia"

All these facts demonstrate that Spanish administrations (regional and central) made a great effort to follow the directives proposed by the EU

concerning the construction of a European Research Area.

Other recent initiatives are the creation of: "The Madrid Institute of Advanced Studies in Nanoscience (IMDEA-Nanoscience)" funded by the Madrid regional government and the Spanish Ministry of Education and Research, several Cooperative Research Centers in the Basque Country (CIC nanoGUNE, CIC biomagUNE, etc.), the joint initiative between Portugal and Spain to establish in Braga (Portugal) a new International Iberian Nanotechnology Laboratory (INL), or the "Modelling for nanotechnology" initiative (M4nano).



There is also a clear approach to Nanotechnology coming from Technological Centers like TEKNIKER, INASMET, CIDETEC, IKERLAN, LABEIN, etc. or Science and Technology Parks associated to universities.

Thanks to Spanish researchers and EU influence, National Plan of R+D+I for the period 2004–2007 presented nanotechnology as a high-priority line of research. A Strategic Action in Nanoscience and Nanotechnology was allocated around 18 M€, while the Spanish Foundation of Science and Technology (FECYT) promoted a Pilot Action for the development of

the Nanotechnologies.

Intensive activity in nanotechnology is also developed by the Spanish National Research Council (CSIC) through the so-called "EJE NANO" (Nano Axis). This action includes the creation of five R&D Institutes as well as several initiatives to enhance the interaction with strategic industrial sectors.

More recently, the Spanish Government has established a new R&D Programme (Ingenio 2010) highly oriented towards the promotion of R&D activities with high added value to improve the excellence and competitiveness of national research teams and to increase the interconnection between public researchers and private companies, among others objectives. Within this framework, Consolider and CENIT calls allocated more than 700 M€ in 2006–2007 to reach these objectives (among which 40 M€ for Nanotechnology & Nanoscience projects).

Approved proposals within the first CENIT call included several nanobiotechnology-based projects. The first set of approved proposals within the Consolider Call included the funding for improving infrastructures of two Spanish Nanotechnology Centers. This impulse will be maintained for the next R&D National Programme, where Nanoscience and Nanotechnology will play, undoubtedly, a central role.

According to some Spanish experts, efforts have to be focused to improve the relation/cooperation between the Spanish research groups and the Spanish industry, to promote technology transfer activities and creation of spin-offs, to improve the scientific infrastructures or the cooperation among research groups, not only in the more consolidated areas (nanomedicine, nanobiology, nanophotonics or nanomaterials).

SPANISH PAVILION AT NANOTECH 2008

Within this context, the Phantoms Foundation and The Spanish Institute for Foreign Trade (ICEX), in cooperation with the Embassy of Spain (Commercial and Economical Office) in Tokyo, promoted the first Spanish Pavilion at nanotech2008 (Japan), as an initiative under the program España, Technology for Life.

This program, carried out by ICEX, focuses in the promotion in foreign markets of Spain's more innovative and leading industrial technologies and products.

The Spanish participation grouped 12 Companies and Research Centres providing an outlook of the most innovative projects and products in various fields of Nanoscience & Nanotechnology.

Participating companies/institutions within the Spanish Pavilion were CIC nanoGUNE, CIC microGUNE, CIC biomaGUNE, IMDEA nanoscience, CIBER BBN, Nanotec Electronica S.L., Endor Nanotechnologies S.L., Nanotex (Solutex Group), Grupo Antolin S.A., Nanogap S.A., Acciona S.A. and Phantoms Foundation (coordinator).

More than 50% of the companies represented in the Spanish Pavilion focus their research activity in nanobiology or nanobiomedicine areas (CIC nanoGUNE, CIC biomaGUNE, CIBER BBN, Endor Nanotechnologies S.L., Nanogap S.A., Nanotex).

The Spanish Pavilion promoted the "Spanish Nanoscience and Technological Offer", allowing to:

- 1.-Represent the Scientific, Technological and Innovative agents of the country as a whole.
- 2.-Foster relationships with other nanotech2008 participants.
- 3.-Promote country culture of innovation.
- 4.-Better integrate the Spanish "Science-Technology-Company-Society" system in Europe and Far East.

- 5.-Generate and develop scientific and technological knowledge.
- 6.-Improve competitiveness and contribute to the economic and social development of Spain.



The Spanish Institute for Foreign Trade (ICEX)

("Instituto Español de Comercio Exterior") is the Spanish Government agency serving Spanish companies to promote their exports and facilitate their international expansion, assisted by the network of Spanish Embassy's Economic and Commercial Offices and, within Spain, by the Regional and Territorial Offices.

It is part of the Spanish Ministry of Industry, Tourism and Trade ("Ministerio de Industria, Turismo y Comercio").



ICEX: <http://www.icex.es>

Espana Technology for life: <http://www.spainbussiness.com>

Phantoms Foundation: <http://www.phantomsnet.net>

Spain Business (Japan): <http://www.spainbusiness.jp>

Phantoms Foundation: <http://www.phantomsnet.net>

PHANTOMS foundation

Nanoscience & Nanotechnology Platform

TNT2008

Trends in NanoTechnology

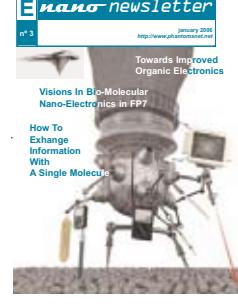
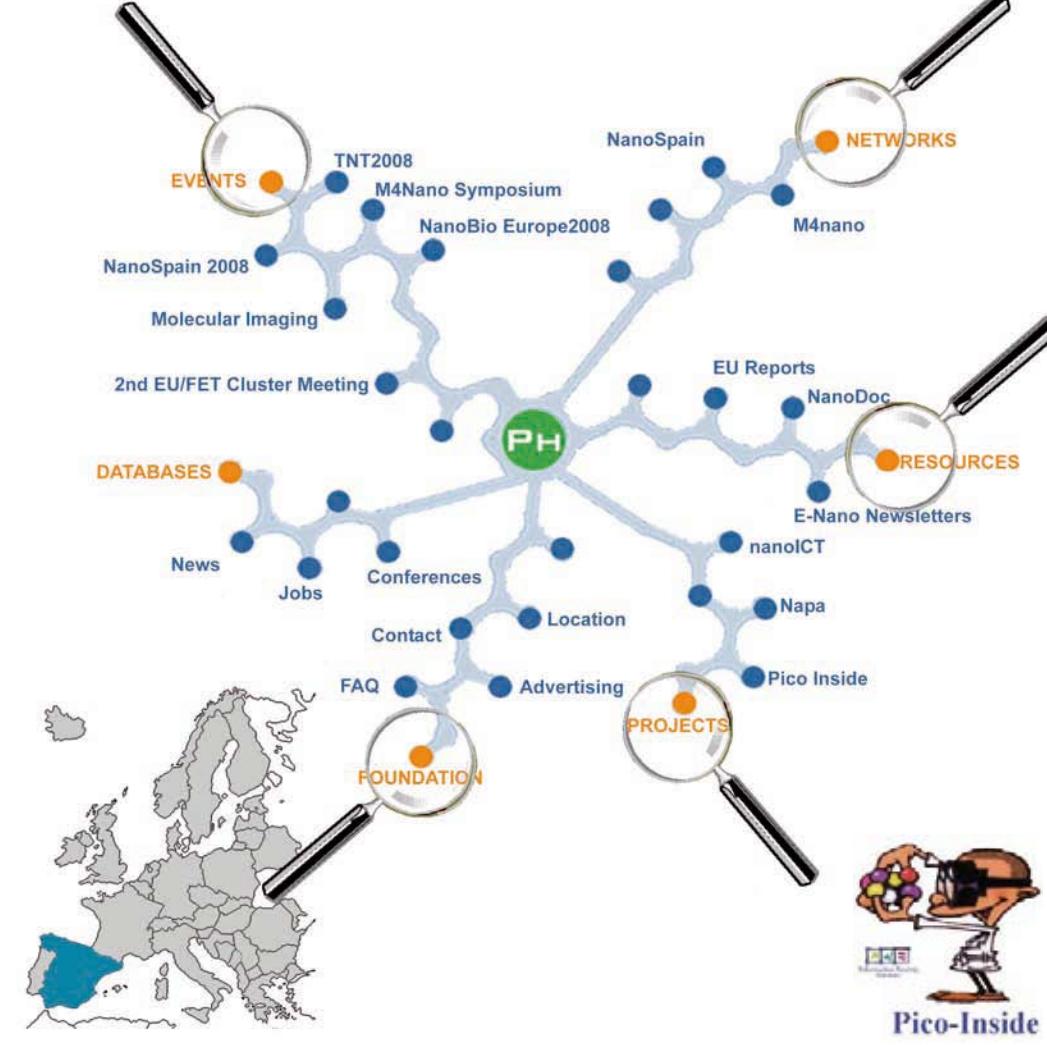
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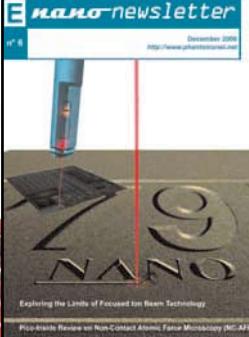
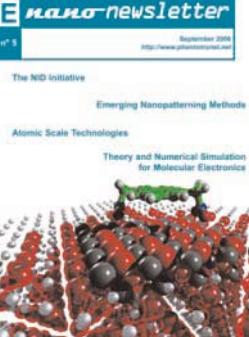
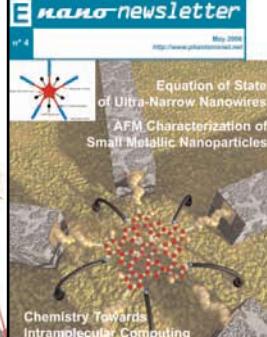
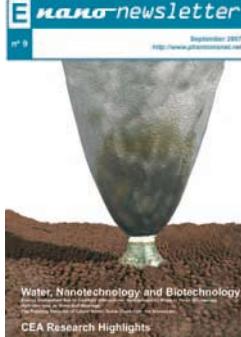


NaPa
Emerging Nanopatterning Methods



nanoICT
coordination action

<http://www.phantomsnet.net/>



PHANTOMS FOUNDATION NANOSCIENCE & NANOTECHNOLOGY PLATFORM



The Phantoms Foundation (non-profit organisation) was established on November 26, 2002 (in Madrid, Spain) in order to provide high level Management profile to National and European scientific projects.

The Phantoms Foundation works in close collaboration with Spanish and European Governmental Institutions such as MEC (Spanish Ministry of Science), ICEX (Spanish Institute for Foreign Trade) or the European Commission to provide focused reports on Nanoscience & Nanotechnology related research areas (infrastructure needs, emerging research, etc.) and develops activities to stimulate commercial nanotechnology applications (Spanish Pavilion at nanotech2008).

The Phantoms Foundation focuses its activities on Nanoscience, Nanotechnology and Emerging Nanoelectronics and is now a key actor in structuring and fostering European Excellence and enhancing collaborations in these fields. This non-profit Association is also playing an important role as a dissemination platform in national and 6th-7th framework programs European funded projects to spread excellence among a wider audience and help in forming new networks.

In particular, the Phantoms Foundation agglutinates and coordinates the efforts made in the field of Nanoscience and Nanotechnology by Spanish groups from universities, research institutes and companies through several initiatives such as scientific events, networking and participation to International Exhibition events such as nanotech2008.

Current projects and activities:

- Coordinator of the **nanoICT Coordination Action (FP7-ICT/FET): Nanoscale ICT Devices and Systems**

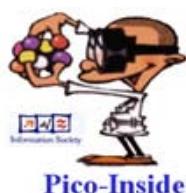
The NanoICT Coordination Action activities will reinforce and support the whole European Research Community in "ICT nanoscale devices to demonstrate unconventional solutions beyond the expected limits of CMOS technology.



- Coordinator of the dissemination activities within the **Integrated Project Pico-Inside (FP6-IST/FET): Computing Inside a Single Molecule**

In the IST priority 2 of the FP6 (Emerging Nanoelectronics FET proactive initiative), the Pico-Inside consortium will explore Atomic Scale Technology with the final goal of integrating a complex logic gate inside a single molecule.

To prepare the future FPX (Framework Programme) of European Research with X = 7 and 8, Pico-Inside will provide a full range of roadmapping for interconnect and nano-communication, for chemistry of supermolecules and for intramolecular computing.



- Coordinator of the dissemination activities within the **Integrated Project NaPa (FP6-NMP): Emerging Nanopatterning Methods**



- Coordinator of the **Spanish Nanotechnology Network "NanoSpain" (241 groups)**

In order to ensure that Spanish industry and R&D facilities play a key role in Nanoscience and Nanotechnology, the NanoSpain Network scheme aims to promote Spanish science and research through a multi-national networking action and to stimulate commercial Nanotechnology applications.



Red Española de Nanotecnología
Spanish Nanotechnology Network

- Coordinator of the **Modelling for Nanotechnology "M4nano" Initiative**



• Organisation of high-level scientific conferences/workshops on Nanoscience & Nanotechnology: "**Trends in Nanotechnology International Conference (TNT2007 / TNT2008)**, **NanoSpain2008**, **Nanobio-Europe2008** and events co organised with the European Commission (**SMS2007 / 2nd EU/FET Cluster Meeting**).



- Publication of a printed **Newsletter on Nanotechnology (E-Nano)** aiming at promoting European Nanotechnology results and enhancing collaborations between groups.

Published by the Phantoms Foundation, this journal provides three-monthly scientific articles, reports and general information in the field of Nanoscience & Nanotechnology and gives relevant information about Integrated Projects funded by the European Commission such as NaPa or Pico-Inside. First issue was published beginning of June 2005.

- Publication of **focused reports on specific areas of interest for the Nanoscience/Nanotechnology Community** (prepared in collaboration with the European Commission or Spanish Governmental Institutions). These reports provide focus and accelerate progress in identified R&D directions for the EC programs, guide public research institutions keeping Europe at the forefront in research and also provide a valid source of guidance for governmental Institutions.
- Development of a multidisciplinary WEB site providing information on

Nanoscience and Nanotechnology. Such initiative allows to strengthen excellence, allow research for the advancement of knowledge and its industrial application; and increase the impact of Nanotechnology worldwide.

Phantoms Foundation: <http://www.phantomsnet.net>

PicoInside IP: <http://www.picoinside.org>

NaPa IP: <http://www.napaip.org>

nanolCT: <http://www.phantomsnet.net/nanolCT/index.php>

NanoSpain Network: <http://www.nanospain.org>

M4nano Initiative: <http://www.m4nano.com>

TNT2008: <http://www.tntconf.org>

CIC NANOGUNE, THE BIG CHALLENGE OF THE SMALL

The Department of Industry, Commerce and Tourism of the Basque Government, Basque Country (Spain), manages the strategic action "nanoBASQUE2015".

This initiative promotes nanotechnology as an enabling tool that should increase the competitiveness of the Basque industry. The nanoBASQUE2015 Strategy will provide a sustained funding over the next years with the aim of making the Basque Country an international benchmark in the research and business development of nanoscience and nanotechnology. The creation of the Nanoscience Cooperative Research Center, CIC nanoGUNE, is a key initiative within the nanoBASQUE2015 Strategy. The CIC nanoGUNE is a new research center, with legal personality, created in 2006 with the mission of addressing world-class nanoscience research for the competitive growth of the Basque Country. NanoGUNE will develop the Cooperative Research Center (CIC) concept which has been successfully implemented in various cases in the Basque Country. CIC accounts for "Centro de Investigación Cooperativa", which means Cooperative Research Center in Spanish. The CICs are promoted by the Department of Industry, Trade and Tourism of the Basque Government and are designed with the aim of creating an effective framework of collaboration that strengthens interdisciplinary basic and applied world-class research in order to provide technology transfer and promote competitiveness of the Basque industry in strategic areas. Besides, nanoGUNE has been awarded as the first Consolider center by the Spanish Education and Science Council. Consolider centers are created under the Consolider-Ingenio 2010 Program which funds the highest ranked Spanish research consortiums with world-class research lines at the forefront of Science and Technology.

As well as other cooperative research centers, nanoGUNE is composed of a newly created physical section, the core of the center, and what it is called the virtual section. While the newly created physical section is oriented to open new areas of strategic research, in the virtual section cooperation will be fostered among existing research groups at universities, technological centers, and other institutions in the Basque Country.

The main objectives of nanoGUNE are:

- To lead, support and coordinate research and development in nanoscience and nanotechnology in the Basque Country.



- To promote technology transfer and the development of a nanotechnology-based industry.
- To support new academia curricula and high-level training of researchers in nanoscience and nanotechnology.
- To foster networking and the creation of alliances with entities and regions all over the world.
- To strengthen the social use of research and the public understanding of science, including science and society issues.

NanoGUNE focuses its research activities on the following four major strategic areas:

- Physics of low-dimensional structures, nanostructures and nanoscale structured complex systems.
- Synthesis, assembling, and nanofabrication of nanomaterials (nanoparticles, nanotubes, thin films, nanocomposites) and nanostructured materials.
- Development of nanodevices and its impact on molecular electronics, spintronics, nanomagnetism, and nanophotonics.
- Biofunctional nanoparticles and nanobiotechnology.

The research activity of nanoGUNE will be implemented through 7 research groups as follows:

- Nanomagnetism and nanoelectronics.
- Nano optics.
- Synthesis and functionalization of nanostructures.
- Nanobiotechnology.
- Nanodevices.
- Nanoscale imaging.
- Theory and simulation of nanosystems and complex materials.

CIC nanoGUNE: <http://www.nanogune.eu>

CIC BIOMAGUNE: A NEWBORN SINGULAR COOPERATIVE RESEARCH CENTRE IN BIOMATERIALS

The Centre for Cooperative Research in Biomaterials - CIC biomaGUNE located in Donostia-San Sebastián (Spain) was officially opened in December 2006. Cooperative Research Centres (CICs) are non-profit organisations whose mission is to contribute to the country's social and economic development by generating knowledge while trying to speed up the process leading to technological innovation. The main aim of CIC biomaGUNE is to produce, promote and apply scientific and technological knowledge in the biomaterials and molecular imaging fields by carrying out systematic research and experimental work in order to boost a new bioscience-based business sector in the Basque Country in the framework of the BioBasque 2010 strategy (www.biobasque.net). Established by the Department of Industry, Technology and Innovation of the Government of the Basque Country, CIC biomaGUNE constitutes one of the Centres of the CIC network, the largest Basque Country research network on specific strategic areas. The transfer and dissemination of the results to social and business sectors are also part of the objectives of CIC biomaGUNE, its activities being open to third parties rather than restricted to its associates. The centre employs 54 people, 90% of whom being highly qualified research staff.

To develop the research programs, three Research Units - Biofunctional Nanomaterials, Biosurfaces and Molecular Imaging - comprising several laboratories led by an outstanding team of international scientists, have been already established. CIC biomaGUNE consists of ten research teams up to now. Apart of the basic instruments for the characterization of chemical substances (like FT-IR, UPLC-MS, HPFC), CIC biomaGUNE has all the necessary equipments for the analysis and characterization of (bio)interphases: QCM-D, Scanning Probe Microscopes for AFM, Non-contact Microarraying Systems, TEM (equipped with STEM and EDX), SEM,



RICM, SPR analysers, ellipsometers, Z-sizer and fluorescence instruments, among others. Furthermore, a P2 cell culture laboratory is also present. The NMR laboratory is equipped with a 500 Avance III Bruker spectrometer (coupled with an Automatic Sample Changer), along with a triple resonance ¹H/¹³C/³¹P HR-MAS probe and a Minispec.

The Molecular Imaging Unit covers basic sciences and preclinical research and provides radioactive tracers to potential customers. It is equipped with the biggest technology platform in Spain. The facility includes an animal imaging department (with micro-MRI, micro-CT, micro-SPECT and micro-PET cameras, and 11.7T/16cm MRI) and a fully equipped radiopharmaceutical unit, equipped with an IBA 18/9 Cyclotron. This Unit counts with the necessary equipment to carry out studies in rodents, having a big animal facility that contains anesthesia equipments, biosafety cabinets and an area for microsurgery and dissection.

CIC biomaGUNE: <http://www.cicbiomagune.es>

CIC Network magazine: <http://www.cicnetwork.es>

The World's Largest Nanotechnology Show



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International Nanotechnology Exhibition & Conference
www.ics-inc.co.jp/nanotech

Nano Bio Expo 2009

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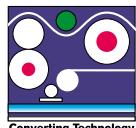
ASTEC2009

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METEC'09

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