MANA Progress Report

Facts and Achievements 2011

World Premier International (WPI) Research Center
International Center for
Materials Nanoarchitectonics (MANA)

National Institute for Materials Science (NIMS)

Preface

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MANA Director-General
NIMS

MANA was shaken considerably by the Great Tohoku-Kanto earthquake that hit Japan on March 11th, 2011, and by its associated disasters, but fortunately none of us was hurt. Various research facilities at MANA were damaged to some extent, but the damage is repairable. After this disaster happened, lots of friends of MANA, from various countries, kindly sent us messages of sympathy. We appreciate those warm messages very much.

More than four years have passed since MANA was established in October 2007 as one of the five research centers in the WPI Program. In 2011, these five WPI research centers underwent an interim evaluation of their first five years in operation. We are proud that MANA got a high score "A", which means that MANA can continue its brisk activities for another 5 years at least. Next to the existing MANA Building at NIMS, the construction work of the new MANA and Environmental Research Building is steadily nearing completion. This can be seen as a symbol of the continued success of the MANA project.

For our readers' convenience, the MANA Progress Report consists of two booklets named "Facts and Achievement 2011" and "Research Digest 2011". This booklet, which is the part "Facts and Achievements 2011", serves as a summary to highlight the progress of the MANA project in 2011. The other booklet "Research Digest 2011" contains an overview of MANA research activities in the calendar year 2011.

Lastly, on behalf of MANA, I would like to ask you for your continued understanding and support to MANA.

MANA Progress Report
Facts and Achievements 2011

1. WPI Program Interim Evaluation of MANA

In 2011, 4 years after being launched in October 2007 and in the 5th year of operation, MANA, the International Center for Materials Nanoarchitectonics at NIMS, was subject to an Interim Evaluation by the WPI Program Committee. MANA was given a grade "A" (criteria: it should be possible for the center to achieve its initial goals by continuing its current efforts) and the following Interim Evaluation Report was released by the WPI Program Committee on December 14, 2011. The report was published on the website of Japan Society for the Promotion of Science (JSPS).
(www.jsps.go.jp/english/e-toplevel/)

Interim Evaluation Report of MANA:

1. Achievement of science

- Remarkable subjects of MANA include atomic switch, terahertz radiation from Josephson junctions using high Tc superconductor, STM and AFM manipulation technologies (Nano-system group), nano-sheets including high-k nanodielectrics, nano-tubes (Nano-materials group), photocatalytic materials (Nano-green group), and their applications.
- The shift of nanoarchitectonics from the nano-scale world to an integrated view is specific for MANA, which is based on NIMS, making it possible to achieve a specified research program.
- Researchers in the nano-bio area are relatively new and are not yet fully integrated into the MANA culture or fully engaged in the top level vision of the institute.

2. Implementation as a WPI Center

- **Fusion:** The MANA Fusion Research Fund is a successful top down approach to encouraging interdisciplinary research. Even more innovative is the idea of holding regular “Grand Challenge Meetings” and “Melting Pot Activities”. At such meetings, scientists are to present “crazy” ideas and discuss the main obstacles to realize them, so that other scientists can contribute to unsolved problems and start collaboration.
- **Globalization:** MANA has established 6 satellites at such universities as Cambridge, UCLA, etc. These satellites have served as initially planned to assemble researchers from around the world, and also as venues for training MANA’s researchers. MANA has accepted almost 90 interns, of whom 80 are foreigners. It provides both technical and clerical support to facilitate their research.
- **Support:** MANA’s research environment is well-functioning and well-organized in a manner that provides all researchers with full technical and clerical support bilingually.
- **Earthquake:** Although MANA’s facilities were damaged by the earthquake, they have been recovered by the efforts of its staffs and financial support from the government.
- **Management:** The management appears exemplary, maintaining a nice balance between top-down actions for efficiency and bottom-up proposals for curiosity.
- **Future plans:** The director listed the following three research areas as primary targets for the next five years: 1) neuromorphic computational circuits, 2) room temperature superconductivity, and 3) artificial photosynthesis. These challenging future projects in MANA are excellent.

3. Actions Required and Recommendations

1) In comparison to other WPI centers, MANA’s goals seem modest and not “earthshaking” outside of the material science community. It needs to create greater exposure outside of that field.
2) Nano-bio is still not well adopted in MANA, in which “nanoarchitectronics” expertise is not intensively used. Further efforts are needed to advance highly competitive research subjects e.g. nano-DDS and drug-eluting stent.
3) More theoreticians should be integrated into the projects in order to guide and support the research.
4) There is a concern about so few PI’s choosing to take sabbaticals to high quality foreign laboratories and institutions staffed with high-caliber researchers.
5) MANA relies on support by NIMS. Especially, shared use of big equipment and delivery of high-quality starting materials are essential for research at MANA. The high percentage of foreign scientists at MANA can only be maintained if the technical support by NIMS continues.

Interim evaluation: A

MANA has made considerable progress over these 4 years, becoming a world-leading institute in materials science attracting scientists from all over. Its proposal to become the hub of a network linking nanotechnology bases is being actually demonstrated.

The succession of ICYS (International Center for Young Scientists) has worked to secure able postdocs and young researchers internationally. The high proportion of foreign researcher (57%) is highly evaluated and MANA seems to be one of the best research organizations in Japan in terms of internationalization.

MANA has established very effective programs for fostering young scientists, such as “3D program” (Double mentor, Double affiliation, Double discipline), “MANA short-term research program”, “International graduate schools”, and teaching program at universities.

2. WPI Program and MANA

2.1 What is WPI Program ?

In Fiscal Year 2007, Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT) initiated the WPI Program (World Premier International Research Center Initiative), a highly challenging and long-term program to support the establishment of world-leading research centers.

The WPI Program aims ambitiously at creating globally visible and internationally opened top-world research centers in japan, in which the world's finest brains gather, outstanding research results are generated, and talented young researchers are nurtured. WPI research centers are expected to be highly innovative in both their concepts and practices.

Following four aspects are essential to being a WPI center.

- Top quality of science
- Internationalization
- Breakthroughs by fusion studies
- Reforming research and administration systems

Table 2-1: The six WPI Research Centers.

Host Institution	WPI Research Center	Research Field
Tohoku University	Advanced Institute for Materials Research (AIMR)	Materials Science
University of Tokyo	Institute for the Physics and Mathematics of the Universe (IPMU)	Astrophysics
Kyoto University	Institute for Integrated Cell-Material Sciences (iCeMS)	Meso-Control & Stem Cells
Osaka University	Immunology Frontier Research Center (IFReC)	Immunology
National Institute for Materials Science	**International Center for Materials Nanoarchitectonics (MANA)**	**Nanotechnology & Materials Science**
Kyushu University	International Institute for Carbon-Neutral Energy Research (I2CNER)	Energy & Environmental Sciences

The National Institute for Materials Science (NIMS) was one of the original five institutes selected for a WPI grant in 2007 and later in October of that year, established the International Center for Materials Nanoarchitectonics (MANA). In 2010, a sixth WPI center at Kyushu University was added. Table 2-1 summarizes the six WPI Research Centers with MANA being the only one not integrated into a university.

These WPI centers are supported for a period of 10 years as they meet the above four requirements. This support may possibly be extended for another 5 years for projects with outstanding outcomes. In 2011, the five WPI centers that were launched in October 2007 underwent an interim evaluation by the WPI program committee (Fig. 2-1). MANA received a high score "A" with the evaluation report shown in chapter 1, and has entered the second term of operation in April 2012.

Fig. 2-1: WPI Interim Evaluation Meeting in Tokyo on October 19, 2011. Mr. Masaharu Nakagawa (Minister of MEXT, left) and Dr. Masakazu Aono (MANA Director-General, right).

2.2 Mission and Research Target of MANA

● **What is MANA?**

Materials nanoarchitectonics is a new research paradigm of materials development, which attempts to extract and use the ultimate functions of materials based on a profound understanding of the mutual interaction between individual nanostructures and arbitrary arrangement of those nanostructures.

● **Vision of MANA**

Oriented towards a better global future: Pioneering a new paradigm for nanotechnology in materials development.

● **Mission of MANA**

To achieve goals of the WPI program, MANA aims to develop innovative materials and technology by using nano-technology under the original research concept of materials nanoarchitectonics. Its mission is summarized in the following four points:

1. Challenge the development of ground-breaking new materials on the basis of materials nanoarchitectonics.
2. Creating a "melting pot" where top-level researchers gather from around the world.
3. Fostering and securing young scientists who have courage to battle with challenging research.
4. Construction of a network of nanotechnology centers throughout the world.

● **Research Target of MANA**

When MANA was established in October 2007, a research organization was formed tailored to the five key technologies: "Controlled Self-Organization", "Chemical Nanomanipulation", "Field-induced Materials Control", "Atom/Molecule Novel Manipulation" and "Theoretical Modeling and Designing". The organization was reformed in October 2008 into four research fields: Nano-Materials, Nano-System, Nano-Green and Nano-Bio to make the research at MANA more explicit and clarify its missions (Fig. 2-2). The five key technologies of nanoarchitectonics were converged into these four fields to promote fundamental studies on nanomaterials and nanosystem and clarify the direction of applications in environmental and life sciences, which will lead to new innovations. MANA aims to become a unique hub of materials nano-science and nano-technology. Detailed research objectives for each field are as follows.

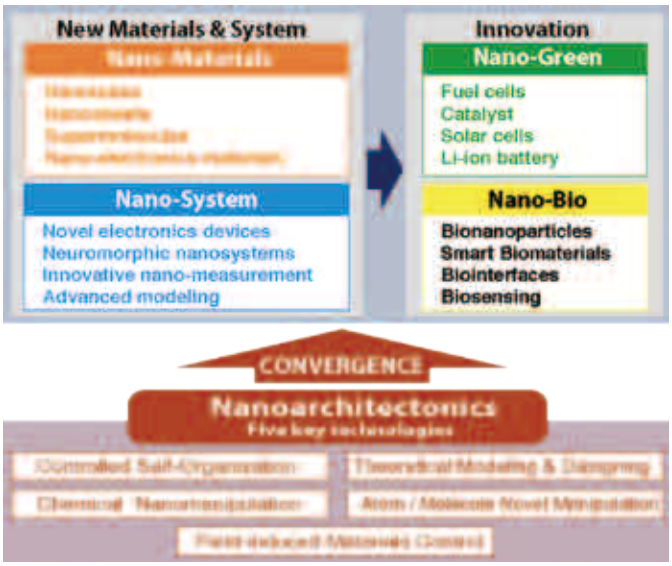


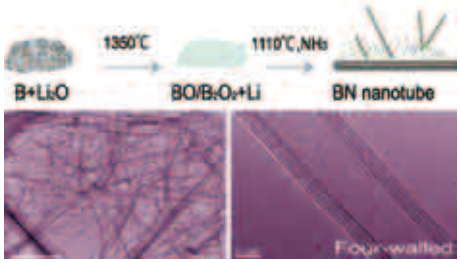
Fig. 2-2: Research Directions of MANA.

Nano-Materials Field:

Designing Nanoscale Materials With New Properties and Unprecedented Functions

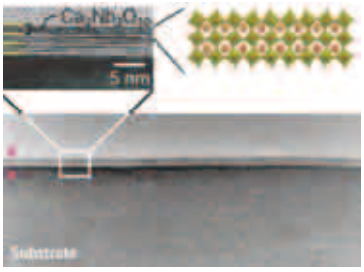
MANA is promoting research that explores new properties and functions intricately linked to nanoscale size and shape. This exploration covers a wide range of inorganic, metallic, and organic materials. Many new nanoscale materials are being created by utilizing unique synthetic techniques, involving soft-chemical, colloid chemical and supramolecular processes. The creation of nanoscale materials and the exploration of their applications have almost unlimited potential. Based on the concept of nanoarchitectonics, MANA is developing novel synthesis techniques to bring forth new materials and new processes that will spur innovation across a range of sectors including electronics, environment protection, and energy technology (see Fig. 2-3).

● **Creating functional nanotubes and nanowires**



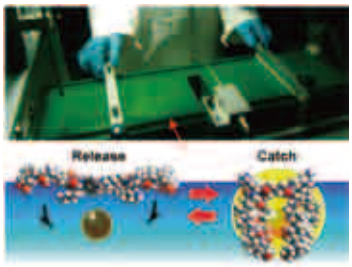
High-purity synthesis of BN nanotubes (top) and their TEM images (bottom).

● **Developing functional nanosheet films**



Cross-sectional TEM image of 3-layer film of $Ca_2Nb_3O_{10}$ nanosheet.

● **Operating a molecular machine by hands**



Hand-operation (top) and molecular conformation change dependent on pressure (bottom).

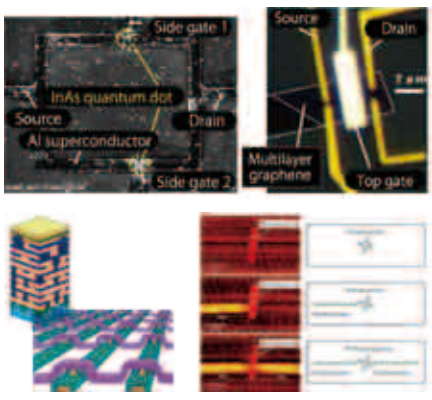
Fig. 2-3: Research Objectives of the Nano-Materials Field.

Nano-System Field:

Revolutionary Functionality Realized Through Mutual Interactions of Nanoscale Functional Units

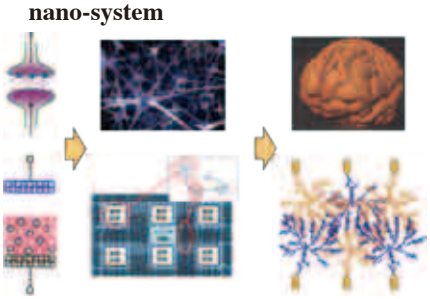
Our research activities encompass not only the discovery and exploration of nanoscale materials with a hitherto unknown functions, research also extends to the development of revolutionary functions that are created through mutual interactions of such nanoscale units. For this purpose, researchers investigate how nanoscale structures can produce novel linked functionalities on the basis of materials nanoarchitectonics. In the long run, such nano-systems have tremendous promise for various fields, but our research is focused on innovation in three areas, namely advanced information processing and communications, advanced environment sensing, and effective solar light application. The development of new nano-system evaluation methods and the new concepts of theoretical science also are important aspects that guide our work (see Fig. 2-4).

● **Creating revolutionary nano-system devices**



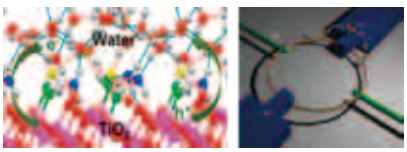
Top: Superconducting device (left) and Graphene device (right). Bottom: Integration of atomic switches (left) and Single-molecule device (right).

● **Towards a neural network type nano-system**



Neural network type computing circuit realized directly on the materials level.

● **Nano-system theory**



Dynamic processes on the molecule level (left) and Proposed new superconducting device (right).

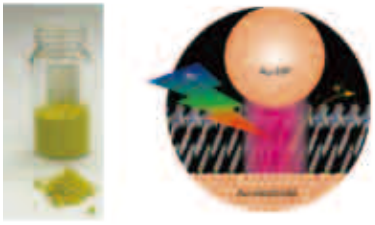
Fig. 2-4: Research Objectives of the Nano-System Field.

Nano-Green Field:

Effective Conversion of Materials and Energy is Crucial to the Realization of a Sustainable Society

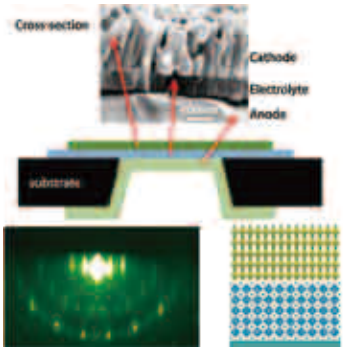
The biggest challenge facing humanity today is the move away from our dependence on energy that is derived from fossil fuels. Renewable energy is the key if we want to realize a sustainable society. Consequently, natural energy sources with the sun as the prime source must be converted with high efficiency into electricity and fuel. When storing, transporting, and retrieving energy through means such as secondary batteries and fuel cells, efficient transport of ions and electrons are required and controlled arrangement of atoms and molecules at interfaces is essential. The Nano-Green Field employs the concepts of surface nanoarchitectonics to directly control the nano structure on the atomic and molecular level. The research aims at illuminating and exploring methods and processes for interconversion between energy and matter with high efficiency (see Fig. 2-5).

- **Capturing the energy of the sun**



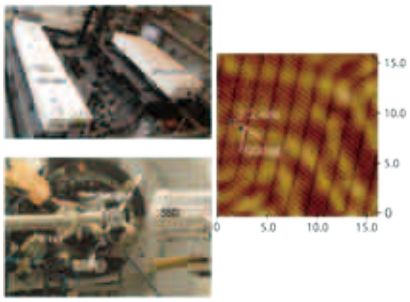
Left: Highly efficient photocatalyst for water oxidation responsive to visible light. Right: Enhancing photoelectric conversion efficiency through the use of nano gap light antenna effect.

- **Efficient storage and use of energy**



Top: Solid oxide fuel cell. Bottom: Highly oriented electrolyte for lithium ion battery.

- **Determination of Interfacial structure with spatial resolution of 1 billionth of a meter and time resolution of 10 trillionth of a second**



Top: Laser spectroscopy setup. Middle: STM image of molecule resolution in liquid. Bottom: X-ray absorption spectroscopy setup.

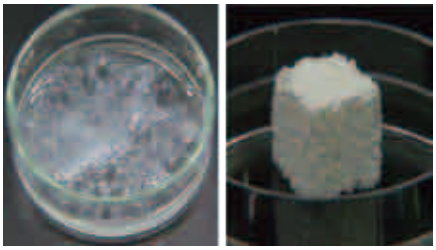
Fig. 2-5: Research Objectives of the Nano-Green Field.

Nano-Bio Field:

Innovative Medical Approaches May Draw on Nanoscale Biomaterial

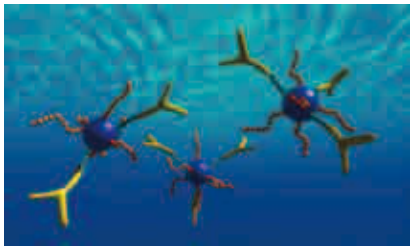
In the nano-bio field, enhancing the natural regenerative power of the human body is an important concept for treating diseases. The aim is to create materials suitable for "materials therapy", i.e. materials that sustainably elicit a regenerative and curative effect from the living tissue. Such materials designed and produced with nanoarchitectonics methods are expected to have an effectiveness that is comparable to conventional medicines. Drawing on the results of past research as inspiration, MANA is intensively working towards the development of such new nano-bio materials (see Fig. 2-6).

- **Artificial bone made of oriented open-pore apatite**



Left: Fiberized hydroxyapatite and collagen compound composite immediately after adjustment. Right: Hydroxyapatite and collagen compound composite made porous.

- **Drug delivery system/smart biomaterial research**



Conceptual image of intelligent particles with controlled nanostructure.

- **Drug-eluting stent**

Interior of blood vessel with drug-eluting stent currently under development. No blood clots are formed, and interior surface is smooth.

Fig. 2-6: Research Objectives of the Nano-Bio Field.

3. MANA Organization, Management and Evaluation

3.1 Organization and Members

In order to realize the MANA concept, it is extremely important to establish efficient organizational operation. An overview of the MANA organization is shown in Fig. 3-1. The role of MANA members are explained in Table 3-1.

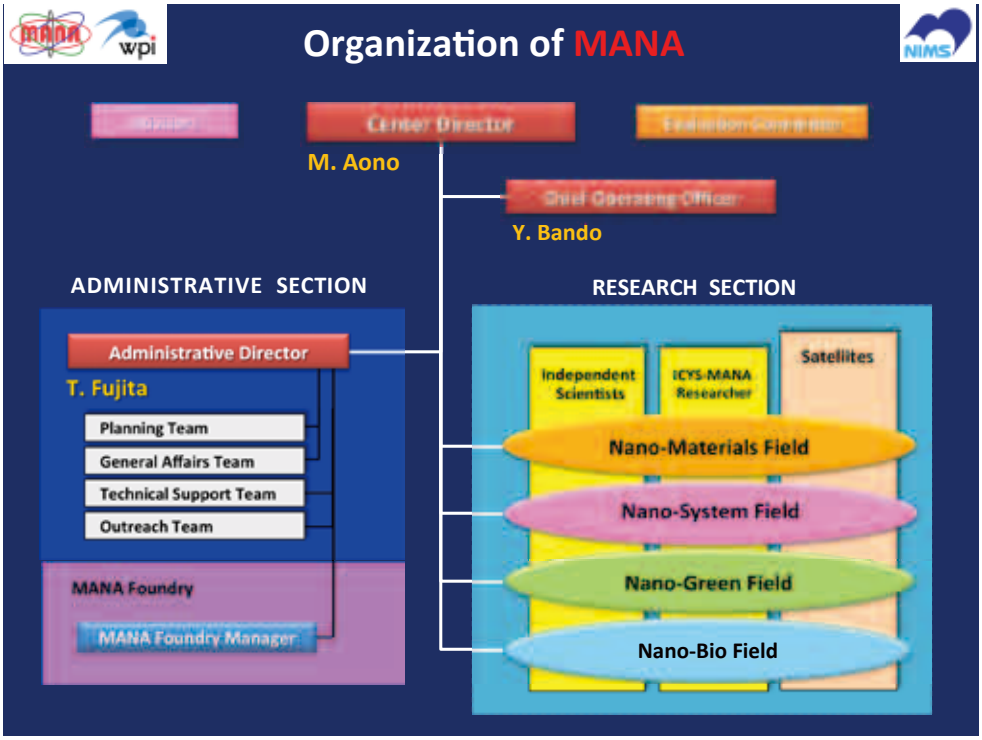


Fig. 3-1: Organization of MANA.

Table 3-1: MANA Members and Duties.

Director-General:	Center oversight.
Chief Operating Officer:	Assists the Director-General and supervises research.
Administrative Director:	Takes orders from the Director-General and supervises clerical and administrative duties.
Principal Investigators (PI):	Internationally known world top-class scientists who play leading roles in achieving MANA research targets and in fostering younger researchers through mentoring. Principal Investigators are selected from NIMS and other domestic and overseas institutes.
Group Leaders:	Group Leaders perform MANA research together with a Principal Investigator by heading an own group.
MANA Scientists:	Researchers from NIMS who perform MANA research together with Principal Investigators.
MANA Independent Scientists:	Younger researchers from NIMS who work full-time at MANA and can perform their own research independently in the 3D system.
ICYS-MANA Researchers:	Postdoctoral fellows selected from all over the world by open recruitment. They perform their research independently while receiving advice from mentors and Principal Investigators.
MANA Research Associates:	Postdoctoral fellows working in a group of Principal Investigators or MANA Independent Scientists.
Graduate Students:	Doctor-course students at institutions affiliated with NIMS. They participate in research at MANA under the tutelage of Principal Investigators, MANA Scientists and Independent Researchers.
Research Support Staff:	Technicians that support research work.
Administrative Staff:	Staff that supports administrative duties.

As of January 1, 2012, MANA employs 232 staff (see Fig. 3-2). Of this number, 206 are researchers. There are 116 foreign researchers, or 56.3% of the total, and the 46 female researchers constitute 22.3% of the total. MANA has developed a multinational work force with foreigners from 25 different countries (see Fig. 3-3). Foreign and female researcher numbers have increased steadily, but given the size of the Center, we feel these are appropriate levels and will continue to maintain them going forward.

Appendix 8.1: MANA Top Management
Appendix 8.2: MANA Research Staff

Current as of January 1, 2012

Classification	Number		Foreigner	Female
Principal Investigator (NIMS)	17	25	5	1
Principal Investigator (Satellite)	8		5	1
MANA Scientist	59	181	8	9
Independent Scientist	9		2	0
ICYS-MANA Researcher (Postdoc)	10		7	1
MANA Research Associate (Postdoc)	44		41	15
JSPS Fellow (Postdoc)	15		11	3
Junior Researcher (Graduate Student)	44		37	16
Technical Staff	8	26	0	2
Administrative Staff	18		1	14
Total	232		117	62

Proportion of Foreign Researchers: 56.3% (116/206)

Proportion of Female Researchers: 22.3% (46/206)

- increase from 12.4% on January 1, 2010 and from 19.6% on January 1, 2011

Fig. 3-2: Workforce of MANA.

Current as of January 1, 2012

Region	Country	MANA PI	MANA Scientist	Indep. Scientist	ICYS-MANA Researcher	Research Associate	JSPS Fellow	Graduate Student	Staff	Total
Asia	China	2	4		4	23	2	21		56
	India					9	2	3		14
	Korea				1	2		4		7
	Indonesia					1		2		3
	Malaysia					1				1
	Nepal				1					1
	Thailand							1		1
	Vietnam						1			1
Europe	Italia	1	3				2	1		7
	France	1		1			1			3
	Russia	1		1		1				3
	U.K.	2	1							3
	Poland					1	1			2
	Belgium						1			1
	Czech					1				1
	Germany							1		1
	Spain						1			1
	Switzerland								1	1
Near East	Iran							2		2
	Jordan				1					1
Africa	Egypt							2		2
	Algeria					1				1
America	USA	2								2
	Canada	1								1
	Argentine					1				1
Total		10	8	2	7	41	11	37	1	117

Fig. 3-3: Foreign Staff of MANA.

3.2 Management

● Allocation of authority between NIMS and MANA

The NIMS president, as the responsible person of the host institute, supports the operation of the MANA center to the fullest extent, while respecting the authority of the MANA Director-General the operation of MANA. However, upon some situations such as receipt of any advice from the Steering Committee and NIMS Executive Board, the NIMS president reserves the right to take various additional measures necessary for the center operation including, for example, improvement of the experimental space and additional assignment of permanent NIMS researchers.

The Director-General of MANA has authority over the center's operation in general. He possesses the authority to allocate Center resources such as budget funds and space. This includes employment and renewal of contracts for researchers and administrative staff members of the MANA center, except for those who are enrolled in the main body of NIMS.

● Decision-making system

The center, as its basic principle, intends to establish a decision-making system that can support strong leadership of the center director. In addition, the center intends to minimize the number of meetings in its operation so that the researchers can devote themselves to their studies. A principal investigators meeting led by the center director is held on a regular basis (about once every month). Matters concerning center operation in general are discussed and reported under the full leadership of the center director. Also, the principal investigators must clearly communicate the intentions of the center director to all the young researchers and graduate students. On October 1, 2008, a Chief Operating Officer was assigned to work under the Director-General in order to reduce the burden on the Director-General and to allow for more efficient and speedier Center management. The Administrative Director oversees administrative duties, while the Chief Operating Officer supervises research. In light of the Center's administrative issues, the MANA Executive Meeting was put in place to allow the Director-General, Chief Operating Officer and Administrative Director to confer at any time to make snap decisions on Center management.

There are currently five external stakeholders, including Nobel Prize winners and prominent researchers, serving as MANA Advisors (see Appendix 8.3). They provide advice on overall Center management and invaluable suggestions on individual research projects, as well as cooperate with our outreach activities by serving as lecturers in science seminars geared toward elementary and junior high school students.

Appendix 8.3: MANA Advisors

● MANA Administration

Starting in 2003, NIMS has about five years of experience in research, using English as the official language of ICYS activities. Therefore, it has the advantage of being able to perform both efficient and international administrative operation by making the best use of its experience and know-how acquired in ICYS. All the documents regarding, for example, office routine regulations, purchase of items, and official trips are today already available both in Japanese and English. As a result, an environment of supporting documentation is close to perfection so that foreigner researchers can devote themselves to their study without a language barrier. Based on the experience in ICYS, MANA has established three teams, *Planning Team*, *General Affairs Team*, *Technical Support Team* in October 2008 and added an *Outreach Team* in April 2010. All staff of the MANA Administration is fluent in English.

3.3 Committee Evaluation

● WPI Program Committee

The Evaluation of MANA by the WPI Program Committee (members are listed in Table 3-2) consists of an annual Site-Visit at MANA and an annual Follow-Up Meeting. Primary Evaluation criteria are the Achievements of Science as well as the Implementation as a WPI Research Center. In 2011, the fourth MANA Site Visit by the WPI Program Committee and MEXT and JSPS Officials was conducted on June 28-29 (see Fig. 3-4). The schedule included a briefing by the center director, presentations by selected PIs, and poster presentations by young researchers. In addition, a WPI Interim Evaluation Meeting was held in Tokyo on October 19, 2011.

Table 3-2: Members of the WPI Program Committee (Fiscal Year 2011).

Program Director (PD): WPI Program	Toshio Kuroki	Senior Advisor, Research Center for Science Systems, JSPS
Program Office (PO): MANA at NIMS	Gunzi Saito	Professor, Meijo University
Program Officer (PO): AIMR at Tohoku University	Yoshihito Osada	Senior Visiting Scientist, RIKEN
Working Group Member: MANA at NIMS	Yoshinobu Aoyagi	Professor, Ritsumeikan Global Innovation Research Organization, Ritsumeikan University
Working Group Member: MANA at NIMS	Takehiko Ishiguro	Professor Emeritus, Kyoto University
Working Group Member: MANA at NIMS	Tadashi Matsunaga	President, Tokyo University of Agriculture and Technology
Working Group Member: MANA at NIMS	Hiroshi Yoshida	Professor, Department of Materials Engineering Science, Osaka University
Working Group Member: MANA at NIMS	David L. Allara	Professor, Departments of Chemistry and Materials Science & Engineering, Pennsylvania State University, USA
Working Group Member: MANA at NIMS	Klaus von Klitzing	Director, Max Planck Institute for Solid State Research, Germany

Fig. 3-4: WPI Program Committee members at the fourth MANA Site Visit (June 28-29, 2011). Top from left to right: Prof. Toshio Kuroki (PD), Prof. Gunzi Saito (PO), Prof. Yoshihito Osada (PO) and Prof. Yoshinobu Aoyagi. Bottom from left to right: Prof. Takehiko Ishiguro, Prof. Tadashi Matsunaga, Prof. Hiroshi Yoshida, Prof. David L. Allara and Prof. Klaus von Klitzing.

● **MANA Evaluation Committee**

The MANA Evaluation Committee is comprised of 10 external stakeholders, 5 Japanese and 5 Foreigners (members are shown in Appendix 8.4), and Professor Anthony Cheetham of the University of Cambridge acts as Chairman. The committee has met every two years, in March 2008, March 2010 and March 2012, to evaluate MANA research activities and administration. The third MANA Evaluation Committee meeting was held in Tsukuba on March 2, 2012 (see Fig. 3-5). Presentation of the MANA Progress Report by MANA Director-General Prof. Masakazu Aono and MANA Chief Operating Officer Prof. Yoshio Bando was followed by longer discussions and comments from the Evaluation Committee members. MANA formulates Action Plans based on the Committee's suggestions and proposals.

Appendix 8.4: MANA Evaluation Committee

Fig. 3-5: Left: Participants of the third MANA Evaluation Committee meeting in Tsukuba on March 2, 2012. Right: Prof. Anthony Cheetham (Chair, left) and Prof. Horst Hahn.

4. Attractive International Research Environment

MANA is one of the most internationalized research centers in Japan. MANA is firmly advancing the development of an outstanding international research environment in an effort to create a "highly visible research center".

4.1 Melting Pot

When people from diverse backgrounds and with different opinions and view points are able to freely meet and interact, an environment highly conductive to innovation is created. MANA sees itself as a melting pot that offers researchers from a wide range of fields and with diverse cultural and national backgrounds the opportunity to work in such a cosmopolitan environment (Fig. 4-1). On the fifth floor of the MANA Building is a cafeteria called the Melting Pot Café, where there are always researchers relaxing and chatting. Researchers from various countries and clerical staff have a chat and enjoy their coffee. Various languages are spoken, but the common language is English. To foster this melting pot environment, MANA has increased the number of foreigners to over 50% of the MANA researchers. The melting pot at MANA is based on more than 8 years of know-how accumulated in the operation of the NIMS International Center for Young Scientists (ICYS) since 2003.

Fig. 4-1: "Melting-Pot" Environment at MANA.

As part of the Melting Pot activity, researchers from MANA are requested to present their research field at the MANA Seminars. When renowned researchers visit MANA, they held seminars to introduce their research projects to stimulate MANA researchers and promote interdisciplinary synergies. In 2011 MANA seminars were conducted with 19 speakers from MANA and 60 invited renowned researchers from around Japan and the world (total 79 speakers).

Appendix 8.5: MANA Seminars

4.2 Throughout Support for Foreign Researchers

The MANA Administration Office and the secretaries of PIs are in charge of office work in English, which is the common language at the institute. Accompanying families receive assistance in matters such as finding hospitals, child care facilities, schools, residences, and other necessary information through the support system of NIMS. For researchers from abroad, there is a guidebook in both English and Japanese that covers the necessary items for working at NIMS, including useful information about coming to Japan, starting work at NIMS, conducting research, and leaving NIMS. The guidebook

Fig. 4-2: Japanese Culture Class events at NIMS. Top from Left to Right: Edo Komon (Japanese traditional craft), Pottery craft, Yukata (Summer kimono) and Karate. Bottom from Left to Right: Japanese Herbs, Japanese drums (Wadaiko), Origami (Tanabata decoration) and Sado Tea Ceremony.

is revised about once a year. A laboratory tour, newcomers are required to join, is held every month using the guidebook. NIMS also offers regular Japanese culture classes (see Fig. 4-2) and Japanese language classes for foreign researchers to foster an understanding of the host country. In 2011, 153 participants joined the Culture Classes and 78 participants attended the Language Classes (Appendix 8.6).

Appendix 8.6: Japanese Culture and Language Classes

4.3 Fostering Young Researchers

One of the most stimulating experience for promising researchers is meeting world-leading scientists and hearing their stories first-hand. If the experience is personal, the impact is even more profound. For young researchers, MANA provides the real environment for this purpose. Most of MANA Independent Scientists are young researchers in their thirties and engaged in independent studies at MANA. They profit from the benefits of the Triple Double (3D) system (see Fig. 4-3, left). "3D" stands for Double mentor, Double discipline and Double affiliation. The objective is to cultivate independence in research allowing these scientists to obtain advice from two or more mentors, enhance interdisciplinary ability by requiring the study of two or more themes, and strengthen the spirit of independence by having them working at two or more organizations. MANA Satellite institutes and overseas cooperating institutes are fully used for this purpose. Dr. Naoki Fukata visited Prof. Zhong Lin Wang at the MANA Satellite at Georgia Institute of Technology and Dr. Tadaaki Nagao visited Prof. Venky Narayanamurti at Harvard University (see Fig. 4-3, middle and right). They were greatly stimulated, got outstanding research result and were both promoted in 2011 from Independent Scientist to Group Leader.

Fig. 4-3: Within the Triple Double (3D) System at MANA (left), Dr. Naoki Fukata (Group Leader) visited Prof. Zhong Lin Wang at the MANA Satellite at Georgia Institute of Technology (middle) and Dr. Tadaaki Nagao (Group Leader) visited Prof. Venky Narayanamurti at Harvard University (right).

ICYS-MANA is an evolution of the "International Center for Young Scientists" (ICYS) program originally hosted by NIMS. Gifted and ambitious young researchers from around the world can apply, and those who are selected are given the opportunity to conduct their respective research while having access to an interdisciplinary linkup in a "melting pot" environment. MANA's Principal Investigators also serve as mentors for ICYS-MANA Researchers.

4.4 Research Support and Access to Cutting-Edge Research Facilities

It is the research support that is the pride of MANA. The MANA Foundry, which is equipped with first-class facilities, is contained in the same building to support research of nanoarchitectonics. Moreover, MANA has many shared facilities in addition to the MANA Foundry that are supported by a technical support staff (TSS) that is proficient in English (see Fig. 4-4). The clean room facility at the MANA Foundry consists of six areas in its 235 m^2 floor space: Lithography Area, Dry Process Area, Nano Fabrication Area, Nano Structure Processing Area, Nano Measurement Area and Thermal Treatment Area. We are able to provide consistent process from test piece preparation to structural observation and functional verification including nano-gap electrode pattering by electric beam lithography on complicated structures such as nano dots, nano wires and nano sheets made of various materials like organic, inorganic, metal, insulator, superconductor and composite. Experienced technical and administrative staff, fluent in English, assist foreign researchers. The MANA TSS Team has 5 technicians that can speak English, and a variety of support is provided to allow researchers to focus on their research, such as equipment maintenance, laboratory cleaning, reagent support, safety measures, and technical studies, transport. and installation when purchasing equipment.

In addition, MANA researchers have full access to the world's most advances, medium- and large-scale user facilities at

Fig. 4-4: Left: Technical team providing research support. Right: The cleanroom facility in the MANA Foundry.

the host institute NIMS such as high field magnets, a dedicated beamline at Japan's SPring-8 synchrotron facility, high-voltage und ultrahigh vacuum electron microscopes, a belt-type high pressure apparatus, high energy X-ray photoemission spectroscopy and high precision powder X-ray diffractometers.

4.5 Top-Level Research Infrastructure

Next to the current MANA Building (13,000 m^2, 5-story) at NIMS Namiki-site, construction work of the new WPI-MANA Building (6,000 m^2, 5-story) and the Nano-Green Building has started in 2010 (see Figs. 4-5, 4-6). The new building is slated for completion by spring 2012 and will have a "Grand Melting Pot" zone with a cafeteria, a conference room, foyers and terraces. It is designed for Interdisciplinary Research, Barrier-free Environment and Friendly & Competitive Atmosphere. The new building is also designed to achieve the country's highest level of energy efficiency and environment-friendliness through the installation of solar panels on the roof and LED array lighting on the ceilings among other approaches.

Fig. 4-5: Next to the current MANA Building at NIMS Namiki-site (left), construction work of the new WPI-MANA Building and Nano-Green Building (right) has started in 2010.

Fig. 4-6: Construction site of new WPI-MANA Building and Nano-Green Building in May 2011 (left and middle) and June 2011 (right).

4.6 Natural Disasters in 2011

● **Text based on information published by the WPI Program Committee on December 14, 2011 in the Follow Up and Interim Evaluation report.**

The report was published on the website of Japan Society for the Promotion of Science (JSPS).
(www.jsps.go.jp/english/e-toplevel/)

A magnitude (M) 9.0 earthquake struck east Japan in the afternoon (14:46) of March 11, 2011. The epicenter was located 130 km off the coast of Sendai and 24 km deep under the Pacific Ocean, causing a devastating tsunami. The earthquake shook academic facilities in Tsukuba. Although nobody was killed or injured and nor were the buildings badly damaged, MANA sustained serious damage to their equipment. Cost to restore them are estimated to be approximately 200 million yen (US$ 2.4 million), which is covered by the government's supplementary budget. However, the most serious loss for the researchers is the loss of time. Although the TEPCO nuclear plant accident in Fukushima was followed by the earthquake and tsunami, environmental radioactivity at the WPI center in Tsukuba has been only marginally higher, as shown in Table 4-1. The triple disasters disquieted people, especially those from abroad. Although about 70% overseas researchers in MANA evacuated to outside the country shortly after the disasters, most of them returned after a few months. Short-time visitors are much more affected by the disasters: the number of visitors to MANA was reduced by 90% compared to last summer. It is anticipated that visitors eventually come back to normal level.

Table 4-1: Environmental radioactivity at MANA, Tsukuba.

WPI center	City	Distance from Fukushima nuclear plants	Environmental dose (μSv/h) (normal range: 0.02-0.13 μSv/h)	
			Maxium (Mar – Apr 2011)	Maximum (Oct 2011)
MANA	Tsukuba	170 km	0.32	0.14

● **Photos shown in Fig. 4-7 were taken by MANA in March 2011.**

Fig. 4-7: Photos taken by MANA on March 11, 2011, after the earthquake. Left: Evacuation of people on the sports ground at NIMS, Namiki site. Middle: Only minor damage to the MANA building. Right: Desk of researcher.

● **Message from the MANA Director-General**

What does this disaster teach us?

First of all, I would like to express once again my heartfelt gratitude for the many sympathetic messages and expressions of support that MANA has received from all over the world since the earthquake. This reminds us that MANA is linked to persons and institutions worldwide by strong bonds.

This natural disaster, which occurred in an island country in the Far East, has given rise to an extremely high degree of interest throughout the world. I don't think this is primarily because of the large scale of the disaster or the fact that Japan is an economic superpower. Rather, I think it is due to two other reasons.

First, foreign journalists have reported in the international news media, with some amazement, that there was virtually no looting or opportunistic price gouging in the wake of the disaster, and that the Japanese people have endeavored to help each other in an admirable spirit self-sacrifice. The New York Times extolled, in a top front-page story, "the quiet bravery in the face of tragedy that seems almost woven into the national character." Such reports surprised many Japanese people, who wondered why a lack of disorder, which seemed perfectly natural to them, deserved comment. Archeologists tell us that for a period around 10,000 years starting approximately 12,000 years ago (the late ice age), the Japanese archipelago saw the flourishing of the Jomon culture in which people lived in equality; disputes and conflict were practically unknown; food was divided up among the populace, who worked together in harmony; and there was general prosperity. It is unconceivable that the modern Japanese people are not related by blood to the people of that time to some extent. Article 1 of Japan's first constitution, written nearly 13 centuries ago, begins with the words, "Harmony is to be valued." I don't need to quote the Dalai Lama, but I believe that Japanese culture can awaken the people of the world to the fact that wars, which continue to arise out of mutual enmity throughout the world, produce nothing of value. If the disaster has created even a small opportunity for the world's people to recognize this, we can say that the blood of those who lost their lives in the catastrophe, and the sweat of those who survived, have not been expended for nothing.

The second reason is the fact that although an emergency shutdown of the reactors at the Fukushima Daiichi Nuclear Plant was successfully carried out when the earthquake struck, radioactive contamination of the air and seawater occurred due to the melting of nuclear fuel after the plant's cooling system was knocked out by the tsunami that followed the quake. This brought memories to people worldwide of the nightmare following the Chernobyl accident. The Fukushima accident was different qualitatively from Chernobyl, but they are alike in that both exposed the dangers inherent in nuclear power plants, erected as monuments of science and technology for the wellbeing of human society. It is not necessarily accurate to say that Chernobyl was a manmade disaster and Fukushima a natural disaster. The latter disaster could have been averted if only greater care had been paid to safety. For this reason the Fukushima accident provides an opportunity not only for nuclear plant engineers, but for researchers in general science and technology as well, to reexamine the relationship between science and technology and society.

We have lost many things as a result of the disaster. However, from it we can surely learn many new things and rise up once again.

Director-General
International Center for Materials Nanorachitectonics (MANA)
Masakazu Aono

5. Research Activities and Output

5.1 Research Activities

● **Research Digest 2011**

For an overview of MANA research activities, please refer to yearly published booklet "Research Digest" (see Fig. 5-1), which is part of the MANA Progress Report. Recent research achievements of MANA are:

- Nanosheet manipulation technology: MANA's unique technology for new materials development
- Novel photocatalyst: Big step toward the realization of artificial photosynthesis
- Surface superconductivity: Macroscopic surface superconductivity current observed for the first time
- Atomic Switch, the novel nanoelectronic device developed at MANA: Toward practical application
- Synaptic characteristics of the Atomic Switch: Toward inorganic neuromorphic network
- Novel single-molecule sensing method: Single molecule detection at any designated position

Fig. 5-1: Issues of the booklet "Research Digest".

● **MANA Research Highlights**

MANA started to distribute information about MANA Research Highlights by sending out more than 7000 e-mails to all over the world. Volume 1 (see Fig. 5-2) appeared in September 2011, Volume 2 (see Fig. 5-3) in January 2012. The information is also available on the MANA website. (www.nims.go.jp/mana/index.html)

Atomic nano-switches emulate human memory

MANA scientists discover that inorganic synapses mimic the human brain.

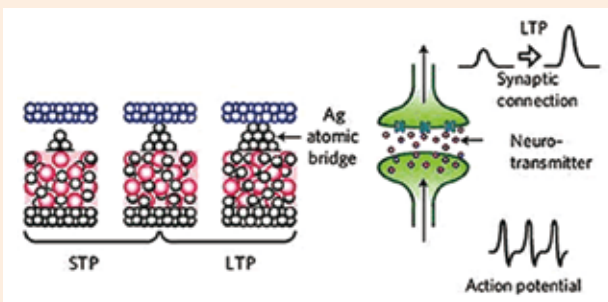
Publication:

T. Ohno, T. Hasegawa, T. Tsuruoka, K. Terabe, J.K. Gimzewski, M. Aono,

Short-term plasticity and long-term potentiation mimicked in single inorganic synapses,

Nature Materials **10**, 591 (2011).

doi: 10.1038/NMAT3054



An inorganic synapse showing short-term plasticity and long-term potentiality depending on input-pulse repetition time.

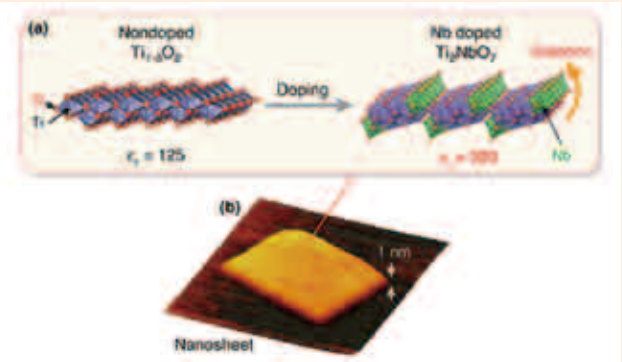
Fig. 5-2: MANA Research Highlight Volume 1, September 14, 2011.

High performance thin film boost for electronics research

MANA researchers have developed the world's highest performance thin-film capacitors using a new high-permittivity (high-$\varkappa$) dielectric sheet with molecular-level thickness (~1 nm). This technology may revolutionize the next-generation electronics.

Publication:

M. Osada, G. Takanashi, B.W. Li, K. Akatsuka, Y. Ebina, K. Ono, H. Funakubo, K. Takada, T. Sasaki, *Controlled Polarizability of One-Nanometer-Thick Oxide Nanosheets for Tailored, High-$\varkappa$ Nanodielectrics,* Advanced Functional Materials **21**, 3482 (2011). doi: 10.1002/adfm.201100580



Tailor-made dielectric nanosheet via controlled nanoscale doping. (a) Structural change induced by Nb doping. (b) AFM image of titanium-niobate nanosheet.

Fig. 5-3: MANA Research Highlight Volume 2, January 4, 2012.

● **Develop MANA's own original Nano-Bio**

In order to reinforce the Nano-Bio Field, MANA newly named Dr. Takao Aoyagi as the field coordinator and a Principal Investigator in September 2010, and reviewed both the research content and framework in this field. Research target has changed to the creation of biomaterials that make possible "material therapy," in which the material itself encourages sustained healing of biological tissue. In order to strengthen the Nano-Bio Field, MANA has increased the number of MANA Principal Investigators from 2 to 4 persons. In April 2011, MANA appointed Dr. Guoping Chen of NIMS and Prof. Françoise M. Winnik of University of Montreal to serve as new PIs.

● **Pursue "Grand Challenge Research" to create new Materials Science**

MANA has started a "camp"-type approach called "MANA Grand Challenge Meetings" that brings together researchers from different fields. Such meetings have proven to be highly beneficial in fusing various fields and motivating young researchers to tackle new challenges. The first MANA Grand Challenge Meeting was held in Miura Kaigan on January 27-28, 2011, with a total of 17 participants (see Fig. 5-4). The second MANA Grand Challenge Meeting is planned to be held in April 2012.

Fig. 5-4: Participants of the first MANA Grand Challenge Meeting in Miura Kaigan in January 2011.

As a reflection of the advice by the WPI Program Committee saying that "MANA should find some grand challenge projects that will attract world attention," MANA has decided to launch the Grand Challenge Research Program in Fiscal Year 2011. The purpose of this program is to foster risky but challenging ideas that may lead to remarkable discoveries. MANA offered two types of grants: Class-S and Class-G projects.

Class-S projects (Seed research)

Funding amount: up to 500,000 Yen

Research duration: half a year from October 2011 to March 2012

Class-G projects (Grand Challenge research)

Funding amount: up to 6,000,000 Yen

Research duration: less than one year from the date of award notification in November 2011

In Fiscal Year 2011, MANA has awarded 42 Class-S projects (by review of the submitted proposals) and 7 Class-G projects (by review of the 17 submitted proposals and interview of the short-listed proposers).

Table 5-1: List of 7 Class-G Grand Challenge projects awarded in Fiscal Year 2011.

	Name of Applicant	Title of Applicant	Title of Class-G Project
1	Minoru OSADA	MANA Scientist (Nano-Materials)	Nanosheet-Based Architectonics for Tailored Metamaterials
2	Takashi UCHIHASHI	MANA Scientist (Nano-System)	Demonstration of the Quantum Einstein-de Haas Effect and New Molecular Motors
3	Dmitri GOLBERG	MANA PI (Nano-Materials)	Novel Two-Dimensional Crystals: Synthesis, Properties and Energy Storage
4	Katsuhiko ARIGA	MANA PI (Nano-Materials)	New Paradigm for Materials Evolution of Life: Self-Organization of Inorganic Protocells
5	Genki YOSHIKAWA	MANA Independent Scientist	Development of a Nanomechanical Sensor for Identification of a Bacteria in Blood
6	Tadashi OZAWA	MANA Scientist (Nano-Materials)	Nanoarchitectonic design of high performance photoenergy conversion materials via oxide nanosheet flocculation
7	Yusuke YAMAUCHI	MANA Independent Scientist	Highly Active Fuel Cell Nanocatalysts with Low Pt Content

● **Invitation of Foreign Researchers**

To ensure that MANA is a research center that attracts all levels of researchers from around the world, MANA uses 2 researcher invitation programs.

NIMS Open Research Institute Program:

This program is run by NIMS and brings together all levels of researchers from young researchers to highly regarded scientists. By March 2012, 134 researchers were invited to MANA by this program.

MANA Short-Term Research Program:

This is an original MANA program that invites faculty members from foreign research institutes who can conduct joint research with MANA researchers. Invitees stay at MANA for 1 to 3 months. By March 2012, 38 researchers were invited by this program.

Furthermore, more than 260 researchers had been invited to MANA for seminars and collaborative discussions by March 2012.

5.2 Research Output

● Research Papers and Books

Research Papers and books from the MANA project continue to increase in number from 389 publications in 2008, to 560 in 2009, 618 in 2010 and 736 in 2011, reaching a total of over 2300 publications by end of December 2011. The list of research papers and books published in 2011 is given in Appendix 8.7. It contains the "digital object identifier" (DOI), which can be resolved at http://dx.doi.org/ . A digital object identifier (DOI) is a unique alphanumeric string assigned by a registration agency (the International DOI Foundation) to identify content and provide a persistent link to its location on the Internet. In 2011 researchers from MANA have published again many papers in high-impact factor journals as Nature Materials (1x), Nature Nanotechnology (1x), Nature Communications (1x), Journal of the American Chemical Society (17x), Advanced Materials (10x), Advanced Functional Materials (7x), Angewandte Chemie International Edition (5x), Nano Letters (16x), Biomaterials (7x), Physical Review Letters (4x), Physical Review B (25x) and Science and Technology of Advanced Materials (21x).

Appendix 8.7: Research Papers and Books

● Special Issues on Materials Nanoarchitectonics

As shown in Appendix 8.8, MANA has published two special issues on Materials Nanoarchitectonics in the high-ranked Materials Science journals “Science and Technology of Advanced Materials” in August 2011 and “Advanced Materials” in January 2012. This is the first time a Japanese research institute has been featured in its own special issue of the top-ranked journal “Advanced Materials” with a 2010 Impact Factor of 10.880.

Appendix 8.8: Special Issues on Materials Nanoarchitectonics

● Editorial Activities, Patents

In addition to writing research papers, many MANA scientists are also members of the board of a journal (see Appendix 8.9) and actively continue to apply for patents. The list of Patents from October 2007 until December 2011, shown in Appendix 8.10, contains more than 200 Japanese patent applications, more than 80 Japanese patent registrations and more than 50 international patent applications or registrations.

Appendix 8.9: Editorial Activities
Appendix 8.10: Patents

● Commendations

As shown in the list of Appendix 8.11 and in Fig. 5-5, MANA’s renowned researchers continue to win prestigious awards. Some recent Prizes are:

Appendix 8.11: Commendations

Sixth NIMS President's Research Award 2011

In April 2011, four MANA researchers received the 6th NIMS President's Research Award. Dr. Katsuhiko Ariga (MANA PI) for his outstanding accomplishments and publishing an excellent review article on supramolecular chemistry field. Dr. Tetsushi Taguchi (MANA Scientist) for the Development of tissue-adhesive materials and technology for biomedical applications. Dr. Emiliana Fabbri (MANA Scientist) and Dr. Daniele Pergolesi (MANA Scientist) for the Development of high performance and chemically stable oxide proton conductors.

Young Scientists' Prize 2011 from MEXT

In April 2011, Dr. Jun Nakanishi (MANA Independent Scientist) received the Young Scientist's Prize for the Commendation of Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (MEXT) for his work on "Development of Photoresponsive Cell Culture Substrates".

American Ceramic Society Ross Coffin Purdy Award 2011

At the ACerS 113th Annual Meeting in Columbus in October 2011, the ACerS Ross Coffin Purdy Award was given to the three MANA researchers Dr. Enrico Traversa, (MANA PI), Dr. Emiliana Fabbri (MANA Scientist) and Dr. Daniele Pergolesi (MANA Scientist) for their paper "High proton conduction in grain-boundary-free yttrium-doped barium zirconate films grown by pulsed laser deposition” that was published in Nature Materials in 2010.

Third Thomson Reuters Research Front Award for 2011

Dr. Yoshio Bando (MANA COO) and Dr. Dmitri Golberg (MANA PI) have been selected to receive the 3rd Thomson Reuters Research Front Award for 2011 for their outstanding contributions to the field of Materials Science through their work on "Novel Syntheses of One Dimensional Inorganic Nanomaterials and their Applications". The award ceremony was held at the Thomson Reuters Office, Tokyo, on February 21, 2012.

Chemical Society of Japan Academic Prize 2012

In February 2012, Dr. Takayoshi Sasaki (MANA PI) was awarded the CSJ Aceademic Prize 2012 for his work on "Synthesizing 2D nanosheet and development of its functionalities".

Fig. 5-5: Left: Four MANA researchers received the 6th NIMS President's Research Awards in April 2011. Photo from left to right: Dr. Tetsushi Taguchi (MANA Scientist), Dr. Katsuhiko Ariga (MANA PI), Dr. Sukekatsu Ushioda (NIMS President), Dr. Emiliana Fabbri (MANA Scientist), Dr. Daniele Pergolesi (MANA Scientist). Right Two MANA researchers received the 3rd Thomson Reuters Research Front Award for 2011. The photo shows Dr. Yoshio Bando (MANA Chief Operating Officer, second from left) and Dr. Dmitri Golberg (MANA PI, third from left) at the award ceremony in Tokyo in February 2012.

6. Global Network

6.1 MANA Satellites

One element that is absolutely essential to the carrying out of research by MANA is satellite research. There are 25 Principal Investigators (PIs) at MANA, and of these 8 are guest researchers affiliated with outside research institutions. Satellite offices are set up at the home institutions of these guest researchers. As of January 1, 2012, there are 7 MANA satellites, 2 in Japan, 3 in America and 2 in Europe (see Fig. 6-1). They collaborate closely with MANA to advance innovative research related to nanotechnology. Satellite institutions provide support for joint research in fields that cannot be covered by NIMS alone. The satellite PIs act as mentors to young researchers at MANA. It goes without saying that the satellites also serve as bases for disseminating and collecting information.

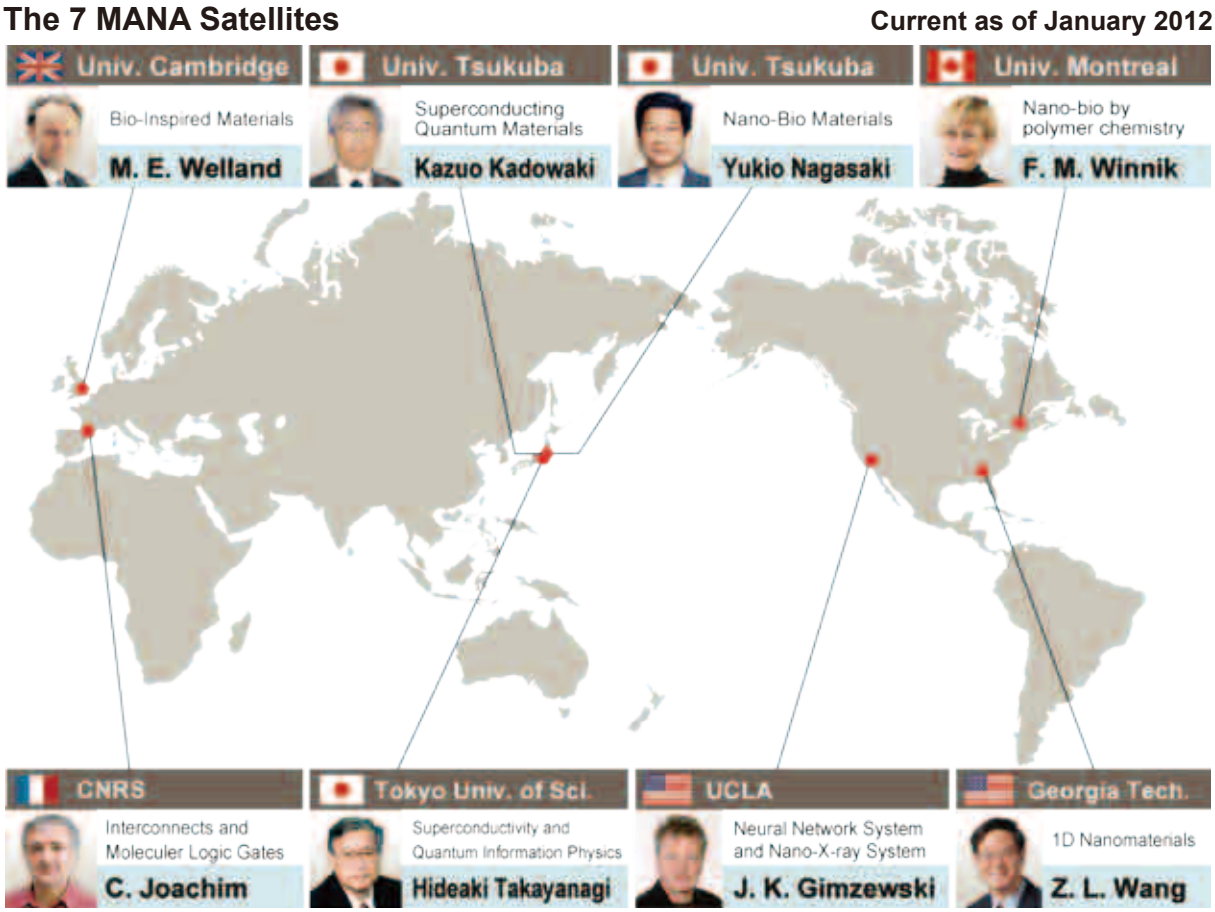


Fig. 6-1: The seven MANA Satellites.

1. University of Tsukuba (Japan)

Located adjacent to NIMS, this satellite engages in frequent mutual exchange with MANA in conducting research, joint intake of American students and joint seminars. The largest NIMS Graduate School is at the University of Tsukuba, where MANA has 7 faculty members and 18 PhD students who engage in research activities at MANA.

● **Prof. Kazuo Kadowaki**, *Graduate School of Pure and Applied Sciences*

MANA Satellite PI Kazuo Kadowaki conducts cutting-edge research in the Nano-System field on quantum nanoscience using high temperature superconductors. Together with 2 researchers and 7 graduate students, he is working on the following topics: elucidation of the mechanism of terahertz radiation after the discovery in the nano-fabricated mesa structures of high temperature superconductor $Bi_2Sr_2CaCu_2O_{8+\delta}$ single crystals, basic research on the topological insulators and the detailed electronic states of superconductors with multi-degree of freedoms. He also conducts joint research with MANA PI Xiao Hu.

● **Prof. Yasuo Nagasaki**, *Graduate School of Pure and Applied Sciences*

MANA Satellite PI Yukio Nagasaki conducts research in the Nano-Bio field on new nano-bio imaging and materials design for nanodiagnoses and treatment and evaluates of the attributes of these materials with the aim of creating novel biotools. He engages in research with a group that includes 3 postdoctoral researchers, 2 lecturers, 11 PhD students and 18 Master course students from the University of Tsukuba satellite. He also conducts joint research with MANA Independent Scientist Jun Nakanishi.



Fig. 6-2: Left: The MANA Satellite at University of Tsukuba. Middle: MANA Satellite PI Kazuo Kadowaki giving a talk at the 3rd MANA International Symposium 2010. Right: MANA Satellite PI Yukio Nagasaki giving a talk at the 5th MANA International Symposium 2012.

2. Tokyo University of Science (Japan)

● **Prof. Hideaki Takayanagi**, *Department of Applied Physics*

MANA Satellite PI Hideaki Takayanagi conducts research in the Nano-System field on Mesoscopic Superconductivity and Quantum Information Physics. He is based in Tsukuba and has offices and research space at MANA. Together with 3 MANA Research Associates and 2 Assistant Professors and graduate students from the Tokyo University of Science, he has developed the nano-SQUID, or nano superconducting quantum interference device, and coupled it with quantum dots. This combination of a highly controllable electronic system and the most highly sensitive magnetic flux meter available opens up new possibilities for quantum information devices. He also conducts joint research on quantum transport phenomena with a NIMS group.



Fig. 6-3: Left: The MANA Satellite at Tokyo University of Science. MANA Satellite PI Hideaki Takayanagi inviting Prof. Tord Claeson from Chalmers University, Sweden, to MANA (middle) and giving a talk at the 5th MANA International Symposium 2012 (right).

3. University of California, Los Angeles (United States)

● **Prof. James K. Gimzewski**, *Director of Nano/Pico Characterization Laboratory*

MANA Satellite PI James K. Gimzewski conducts research in the Nano-System field on the development of hardware-based, physically intelligent neural networks through a synergy of biological inspiration and advanced solid-state nanoelectronics. Prof. Gimzewski has visited MANA 14 times in 4.5 years, spending a total of 27 weeks in Japan. He continues joint research on new neurocomputation circuits that use the learning functions of atomic switches. The joint research of Prof. Gimzewski with MANA was featured in television in a documentary series about Nano Revolution, which was broadcasted in Japan (NHK, January 2012), in Canada (CBC, October 2011) and France (Arte, March 2012). Furthermore, UCLA has become a hub for cultivating young researchers, graduate students and young administrators.



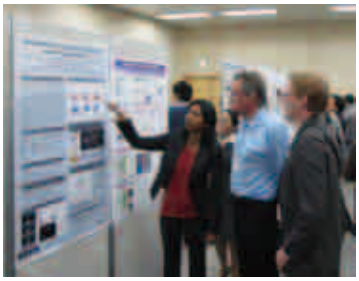


Fig. 6-4: Left: The MANA Satellite at the California NanoSystems Institute (CNSI) at the University of California, Los Angeles (UCLA). MANA Satellite PI James K. Gimzewski appears in Japanese television in a documentary series about Nano Revolution (middle) and visits the 5th MANA International Symposium 2012 in Tsukuba (right).

4. Georgia Institute of Technology (United States)

● **Prof. Zhong Lin Wang**, *Director of Center for Nanostructure Characterization*

MANA Satellite PI Zhong Lin Wang conducts research in the Nano-Materials field on photonic structures provided by nature and nanogenerators for harvesting mechanical energy. The GIT MANA Satellite in Atlanta has a rich history of personnel exchange with MANA. Prof. Wang is the mentor of MANA Group Leader Naoki Fukata, who has visited GIT already 12 times and stayed for a total of 23 weeks. Together they conduct joint research on the development of next-generation high mobility semiconducting nanowire transistors and Li ion battery anodes using Si-related nanostructures and have published their results in ACS Nano. One of Prof. Wang's graduate student is now a postdoctoral researcher at MANA in the group of Dr. Fukata.



Fig. 6-5: Left: The MANA Satellite at Georgia Institute of Technology, USA. Middle: MANA Group Leader Naoki Fukata visiting Prof. Z.L. Wang at the MANA Satellite. Right: MANA Satellite PI Zhong Lin Wang giving a talk at the 4th MANA International Symposium 2011 in Tsukuba.

5. University of Montreal (Canada)

● **Prof. Françoise M. Winnik**, *Faculty of Pharmacy and Department of Chemistry*

Prof. Winnik joined MANA in April 2011 as a new MANA Satellite PI at University of Montreal (UdeM) to conduct research in the Nano-Bio field on Nanoarchitectonics-inspired nanoparticles and interfaces for therapeutic applications. In FY 2011, this project started with active personnel exchange between researchers from UdeM and MANA. Prof. Winnik visited MANA 3 times and stayed a total of 22 weeks in Japan. Two postdocs from UdeM visited MANA for discussion and poster presentation at the 5th MANA International Symposium. One PhD student from UdeM performed research at MANA for 6 months. MANA Independent Scientist Jun Nakanishi is involved in this research project and visited UdeM for one week to meet the Montreal team members and Prof. Tanguay from Montreal Heart Institute.

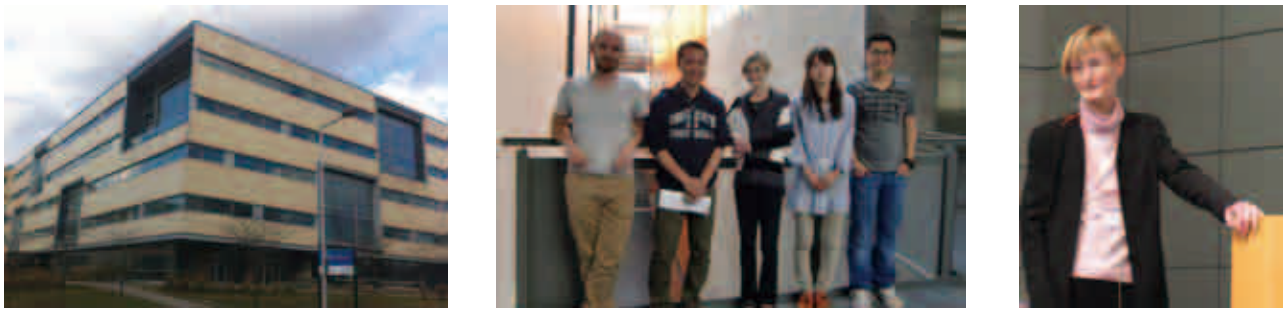


Fig. 6-6: Left: The MANA Satellite at University of Montreal (UdeM). Middle: Meeting of members of the research collaboration at UdeM. From left to right: Dr. Fabien Périneau (UdeM), Dr. Jun Nakanishi (MANA), Prof. Françoise M. Winnik (UdeM and MANA), Dr. Sayaka Toita (UdeM) and Mr. Baowen Qi (UdeM). Right: MANA Satellite PI Françoise M. Winnik giving a talk at the 4th MANA International Symposium 2011 in Tsukuba.

6. CNRS (France)

● **Prof. Christian Joachim**, *Center for Material Elaboration & Structural Studies (CEMES) at CNRS, Toulouse, France*

MANA Satellite PI Christian Joachim conducts research in the Nano-System field on the design, synthesis and atom manipulation of nano-calculating units and the theory of surface electronics interconnections. The CNRS MANA satellite in Toulouse is exploring the limit of atomic scale logic gate design either embedded in a single molecule or atom by atom constructed on a surface. The theoretical calculations of logic gate functions are done at the MANA satellite in Toulouse. The main parts of the experiments are performed at MANA in Tsukuba, for example in the group of MANA PI Tsuyoshi Hasegawa, and are step by step also starting at the MANA satellite. Starting in April 2012, the CNRS MANA satellite will move to a fully refreshed building of 2500 m^2 floor area with 600 m^2 of clean rooms and 6 vibration free LT-UHV-STM laboratories. In Fiscal Year 2011, Christian Joachim visited MANA 3 times and stayed for a total of 3 weeks in Tsukuba.

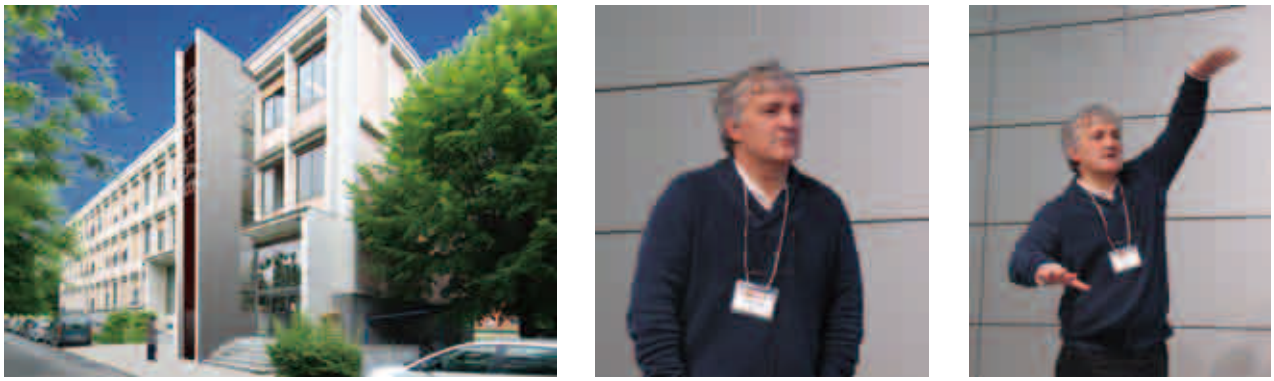


Fig. 6-7: Left: The new CEMES-CNRS Pico-Lab in Toulouse, where the CNRS MANA Satellite will be located starting in April 2012. Middle and right: MANA Satellite PI Christian Joachim giving a talk at the 5th MANA International Symposium 2012 in Tsukuba.

7. University of Cambridge (United Kingdom)

● **Prof. Mark E. Welland**, *Director of Cambridge Nanoscience Centre*

MANA Satellite PI Mark E. Welland conducts research in the Nano-System field on the application of biologically-inspired materials to highly efficient solar cells. University College London (UCL) was added as a new partner to the Interdisciplinary Research Collaboration (IRC) in Nanotechnology. Prof. Welland's group at University of Cambridge is conducting the experiments while Dr. David Bowler at UCL is handling the calculations. Dr. Bowler and MANA Group Leader Yoshitaka Tateyama visit each other's labs frequently and engage in research exchange. In June 2011, Prof. Sir Mark Welland has been awarded knighthood in the Queen's Birthday Honors. In September 2011, the Japan-UK-US Nanotechnology Summer School was held at the MANA Satellite at University of Cambridge.



Fig. 6-8: Left: The MANA Satellite at University of Cambridge. MANA Satellite PI Mark E. Welland visiting MANA in May 2011 (middle) and giving a talk at the 7th Japan-UK-USA Nanotechnology Summer School in September 2011 (right).

6.2 Partnership with Foreign and Domestic Universities

Since MANA is a part of a public research center and not a university, we strive to collaborate with foreign and domestic universities. In 2011 MANA continued to held joint symposiums and a summer school with the aim of promoting research exchange and boosting MANA's name recognition in order to scout for talent.

● **Examples of Joint Symposiums in 2011**

7th Japan-UK-USA Nanotechnology Summer School

The 7th Japan-UK-USA Nanotechnology Students' Summer School was held at Nanoscience Centre, University of Cambridge, UK, on September 5-8, 2011. The summer school with the participants shown in Fig. 6-9 was organized by the collaboration of the 3 institutes, MANA of NIMS, Japan, Nanoscience Centre of University of Cambridge, UK, and California NanoSystems Institute of UCLA, USA. The 26 participating students from Japan, UK and USA had active discussions during the various events, which deepened their knowledge of advanced nanotechnology, and also learned the importance to conduct research in an interdisciplinary way.

Osaka University - MANA Joint Symposium

The joint symposium on "Advanced Structural and Functional Materials Design", co-organized by Osaka University and MANA, was held at Osaka University on October 7, 2011. Researchers from both institutes presented their latest results at 8 oral and 10 poster presentations.

NIMS/MANA-Flinders University Joint Symposium

The NIMS/MANA-Flinders University Joint Symposium on "Nanoscience and Nanotechnology" was held at NIMS Namiki-site on October 31, 2011, as a part of the recently signed MOU between the two institutes. After the opening address by MANA Director-General Masakazu Aono, five leading researchers from both institutes presented their latest research results: Prof. Amanda Ellis and Prof. Gunther Andersson from Flinders University, and the MANA PIs Dmitri

Golberg, Tsuyoshi Hasegawa and Takao Aoyagi.

3rd NIMS/MANA-Waseda University International Symposium

The 3rd NIMS/MANA-Waseda University International Symposium was held at Waseda University on November 1, 2011, as a part of the Waseda-NIMS Joint Graduate Program launched in 2008. The symposium with the participants shown in Fig. 6-9 focused on research in the fields of new ceramics, inorganic materials, semiconductors, biomaterials, polymer materials, and metallic crystal. After opening addresses by Prof. Kazuyuki Kuroda, Waseda University, and MANA PI Toyohiro Chikyow, there were 8 oral and about 50 poster presentations by researchers from both institutes.

Fig. 6-9: Left: Participants of the 7th Japan-UK-USA Nanotechnology Summer School, held in Cambridge, in September 2011. Right: Participants of the 3rd NIMS/MANA-Waseda University International Symposium, held at Waseda University in November 2011.

● Programs for attracting Junior Researchers to MANA

NIMS Graduate Schools

NIMS operates the "NIMS Graduate Schools" having concluded agreements with selected Japanese universities, and graduate students are taught advanced research by NIMS researchers on the frontlines of their fields. As of January 2012, 15 scientists at MANA are teaching in the NIMS Graduate Schools. Students in the NIMS Graduate Schools who possess especially outstanding skills are appointed as Junior Researchers and are paid a salary for their contribution to NIMS research. As of January 2012, there are 44 Junior Researchers working at MANA, of which 37 are foreigners and 16 are females. In September 2009, the graduate school at University of Tsukuba established a Master's curriculum in which students can take all of their required credits in English. The objective is to attract outstanding foreign students from the Master's program to the NIMS Graduate Schools.

Table 6-1: Number of MANA members at the NIMS Graduate Schools as of January 2012.

School	No. of Faculties	No. of Students
University of Tsukuba	7	18
Hokkaido University	3	12
Waseda University	4	11
Kyushu University	1	3

International Joint Graduate Schools

The International Joint Graduate School is a program in which PhD students from renowned universities around the globe spend several months to one year researching under the supervision of NIMS researchers. By March 2012, MANA brought in 37 students within this program from 9 different universities (see Fig. 6-10): Moscow State University (Russia), Charles University and the University of Pardubice (Czech Republic), Warsaw University of Technology (Poland), Xian Jiatong University (China), Yonsei University (Korea), Jawaharlal Nehru Centre for Advanced Scientific Research and Anna University (India), Flinders University (Australia).

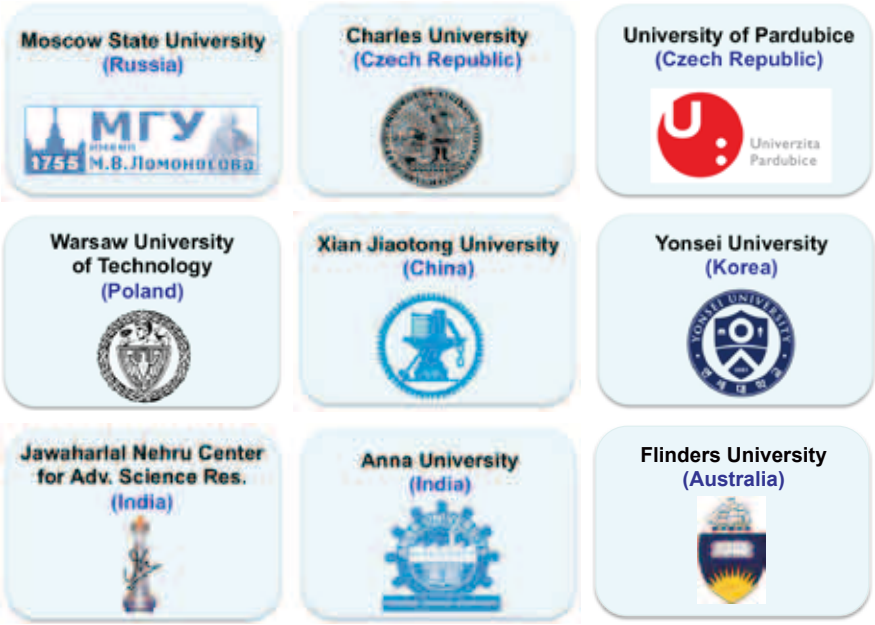


Fig. 6-10: The 9 International Graduate Schools with MANA participation.

Internship Program

NIMS established an internship system to proactively accept students from universities throughout Japan and the world which have not concluded agreements with NIMS and provide them with opportunities to partake in materials and nanotechnology research. By March 2012, MANA has accepted 117 interns, of which 100 have been foreigners. MANA has welcomed 11 US students from the NSF's National Nanotechnology Infrastructure Network (NNIN) Research Experience for Undergraduates (REU) Program.

7. Enhancement of National and International Recognition

7.1 MANA International Symposium

Once per year, MANA hosts the MANA International Symposium intended to disseminate research results to a wider audience. In addition to invited presenters, all the MANA affiliated scientists participate in three days of presentations and poster sessions, covering the latest research activities. The 5th MANA International Symposium was held in Tsukuba on February 29 – March 2, 2012 (Figs. 7-1, 7-2) with 389 participants from 35 countries. Invited speakers from outside MANA included two Nobel Prize Laureates (Fig. 7-3) and 10 renowned scientists from all over the world (Fig. 7-4).

Fig. 7-1: The 5th MANA International Symposium in February/March 2012.

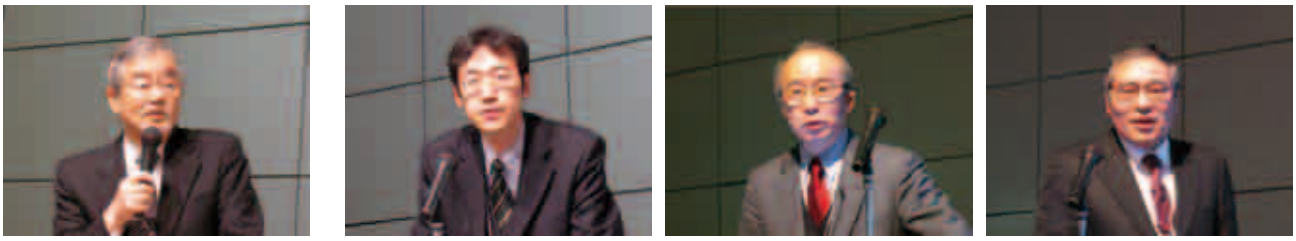


Fig. 7-2: From left to right: Opening address by Dr. Sukekatsu Ushioda (NIMS President) and subsequent greeting addresses by Dr. Koki Uchimaru (Director of Basic Research Promotion Division, MEXT), Prof. Toshio Kuroki (Director of WPI Program) and Prof. Gunzi Saito (WPI Program Officer of MANA).

Fig. 7-3: Invited lectures at the 5th MANA International Symposium by Nobel Prize Laureates. Left: Prof. Ei-ichi Negishi (Nobel Laureate in Chemistry 2010, Purdue University, USA) gave a Special Lecture entitled "Magical Power of d-Block Transition Metals - Past, Present, and Future". Right: Dr. Heinich Rohrer (Nobel Laureate in Physics 1986, former IBM, Switzerland) talked in a Special Session entitled "Celebration of the 30th anniversary of the first paper about the scanning tunneling microscope (STM)".

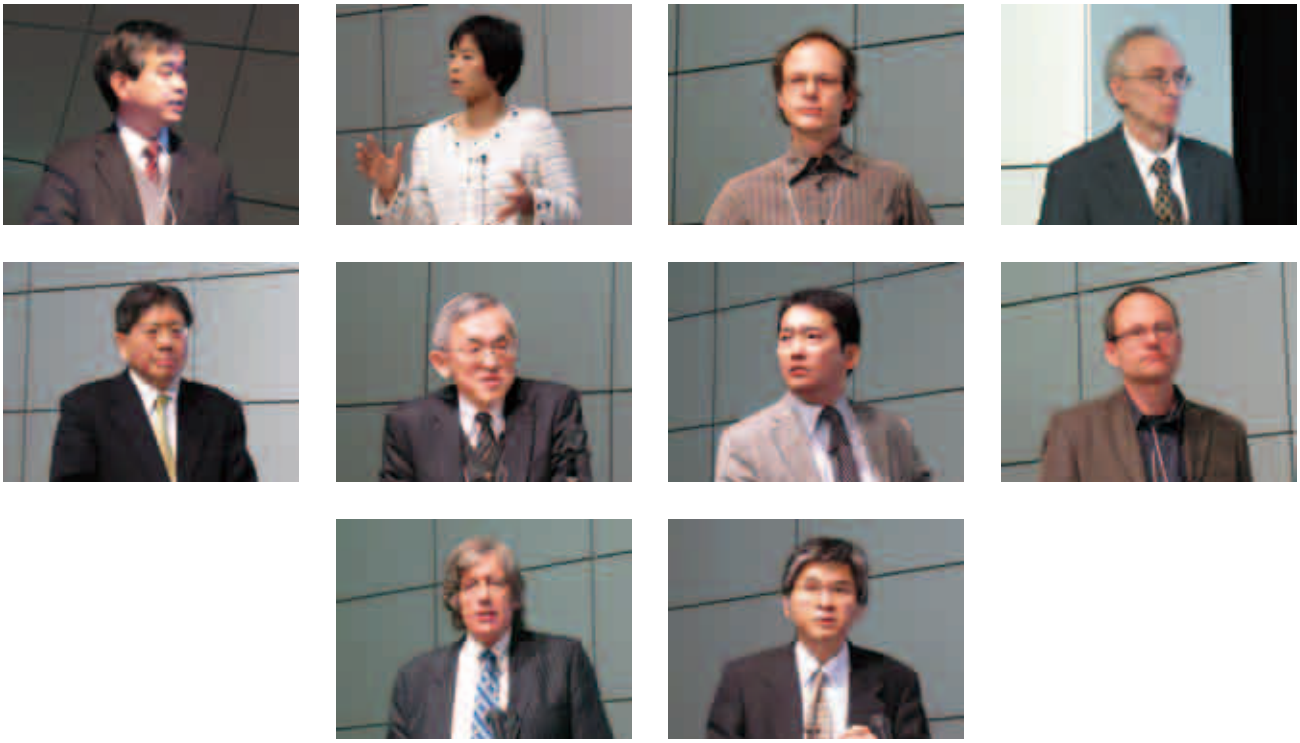


Fig. 7-4: Invited lectures at the 5th MANA International Symposium by renowned scientists from outside MANA. Top row from left to right: Dr. Naoki Yokoyama, (AIST, Japan), Prof. Motoko Kotani (WPI-AIMR, Tohoku University, Japan), Prof. Adrian Bachtold (Catalan Institute of Nanotechnology, Spain) and Prof. Nenad M. Markovic (Argonne National Laboratory, USA). Middle row from left to right: Prof. Hiroyuki Nishide (Waseda University, Japan), Prof. Tsutomu Katsuki (WPI-I^{2}CNER, Kyushu University, Japan), Prof. Hiroshi Kitagawa (WPI-iCeMS, Kyoto University, Japan) and Prof. Mikael Käll (Chalmers University of Technology, Sweden). Bottom row from left to right: Prof. David F. Williams (Wake Forest Institute for Regenerative Medicine, USA) and Dr. Yoshihiro Ito (Chief Scientist, RIKEN, Japan).

7.2 International Cooperation

Memorandum of Understanding (MOU) is a memorandum exchange between MANA and top institutes from overseas to create joint research in nanotechnology. Main points of these memorandums are communication between researchers, exchange of research information, and providing facility for joint research. The term of validity of a MOU is five years, and it can be extended if both institutes agree. Between its foundation in October 2007 and March 2012, MANA has concluded MOUs with 36 institutions from 14 countries.

Appendix 8.12: International Cooperation

By various methods, MANA intends to become a true international research institute, to progress research, and to produce fruitful results. Recent examples are shown in Fig. 7-5. In July 2011, MANA has signed a MOU with Flinders University of South Australia, for collaborative research in Nanotechnology. The agreements include the establishment of a joint graduate school that facilitates the visit of Australian students to NIMS and the exchange of researchers between the parties. In December 2011, MANA has signed a MOU with the Biomaterials and Tissue Engineering Research Center, Shanghai Institute of Ceramics, Chinese Academy of Science (CAS), China. The objective of this MOU is research collaboration on the Development of Three-Dimensional Porous Scaffolds for Tissue Engineering.

Fig. 7-5: Left side: Signing Ceremony of MANA MOU with Flinders University of South Australia, in July 2011. Photo from left to right: Prof. David Lewis (Director, Flinders Centre for NanoScale Science and Technology), Prof. Michael Barber (Vice Chancellor), Dr. Masakazu Aono (MANA Director-General) and Dr. Kohei Uosaki (MANA Field Coordinator and Principal Investigator). Right Side: Signing Ceremony of MANA MOU with Shanghai Institute of Ceramics, China, in December 2011. Photo from left to right: Prof. Jiang Chang (Managing Director, Biomaterials and Tissue Engineering Research Center, Shanghai Institute of Ceramics), Dr. Masakazu Aono (MANA Director-General) and Dr. Guoping Chen (MANA Principal Investigator).

7.3 MANA Website

The official English MANA website (http://www.nims.go.jp/mana/) was launched in February 2008 and is continuously being improved. It provides an overview of MANA, introduces researchers, research projects and output, and informs about events and recent news. In February 2011 the new Japanese MANA website (http://www.nims.go.jp/mana/jp/index.html) was launched.

7.4 MANA Newsletter

The MANA newsletter named “CONVERGENCE” is published with separate English and Japanese issues three times per year and covers activities and progress of the MANA project. It contains interviews with famous researchers (see Fig. 7-6) and articles about top-ranked institutions in Japan and the world with the aim of allowing even the casual reader to gain an affinity with MANA. In order to boost MANA’s global name recognition and contribute to expanding its global networks, approximately 2000 copies of the English and Japanese versions of CONVERGENCE are distributed to domestic and overseas researchers, institutions, government offices and private companies in over 100 countries.

MANA Newsletter "CONVERGENCE"

No. 1
February 2009


Prof. Hiroo IMURA

No. 2
June 2009


Prof. Hiroyuki SAKAKI

No. 3
October 2009


Prof. Hideo HOSONO

No. 4
February 2010


Prof. Harry KROTO

No. 5
June 2010


Prof. Akira TONOMURA

No. 6
October 2010


Prof. Masuo AIZAWA

No. 7
February 2011


Prof. Akira FUJISHIMA

No. 8
June 2011


Prof. Masakazu AONO

No. 9
December 2011


Prof. Koichi KITAZAWA

Fig. 7-6: First Issues of the MANA newsletter "Convergence".

7.5 Outreach Activities

It is one of the important roles for researchers to disseminate the practical side of research results and activities to citizens arouse their interest in science and technology. MANA appeals the importance of science research through the active outreach to the general public and children to win recognition. The 1st MANA Science Café "Melting Pot Club" has been held in October 2012 by Dr. Masakazu Aono (MANA Director-General) and Dr. Rohrer's Science Class 2011" was held in March 2011 by Dr. Heinrich Rohrer (Nobel laureate in Physics). These first MANA outreach events, illustrated in volume "Facts and Achievements 2010" of the MANA Progress Report, were very popular and MANA is continuing with various outreach events.

● **Prof. Kroto's Science Class 2011**

As a part of the outreach activities, on September 17, 2011, MANA hosted "Prof. Kroto's Science Class 2011" for preliminary school students (third and fourth grade) and their parents (Fig. 7-7). This program was given by Prof. Kroto, Nobel Prize laureate in Chemistry in 1996, to help children and their parents to understand the fun of science. This time, we had 50 pairs of participants. The students were very actively involved in the class. First they eagerly listened to Prof. Kroto's

English lecture through simultaneous interpreting device. Then they made a buckyball, a molecular model of fullerene, with help by their parent and Prof. Kroto. Finally the students asked many questions to Prof. Kroto, which surprised him.

Fig. 7-7: "Prof. Kroto's Science Class 2011" was successfully held at NIMS Sengen-site in September 2011. Top: The participants of the class together with Prof. Kroto. Bottom: Prof. Kroto gives a lecture (left), helps a student to make a buckyball (middle) and answers a question from a student (right).

● **MANA published two books**

As shown in Fig. 7-8 (left and middle), MANA published two books in October 2011. One is a Manga-type guidebook in English, entitled "The Challenging Daily Life", published by Bunkakobo Inc., which provides advice for foreigners living in Japan. The other is an illustrated book in Japanese, entitled "Nima's Adventure", published by Shonen Shashin Shimbusha, which explains about nanotechnology to children.

● **MANA exhibited a booth at "Science Festa in Kyoto 2011"**

MANA had a booth at "Science Festa in Kyoto 2011", held at Kyoto International Conference Center on December 17-18, 2011. MANA showed a "Highly Sensitive General-Purpose Sensor" with a demonstration of the sensor by a MANA researcher. On December 18, Mr. Nakagawa (Minister of MEXT) and Mr. Furukawa (Minister of State for Science and Technology Policy) visited the MANA booth and all other WPI booths (see Fig. 7-8, right).

Living guide for foreign researchers (in English)

Nima's Adventure (in Japanese)

Fig. 7-8: Left and middle: In October 2011, MANA published two books, one for foreigners and one for children. Right: Mr. Nakagawa (former Minister of MEXT, third from left) visits the MANA booth at "Science Festa in Kyoto 2011".

7.6 Media Coverage

As shown in Appendix 8.13, MANA has been featured in newspaper articles, on television and in international academic journals.

In 2010 the number of press releases about MANA in Japanese newspapers rapidly increased from 37 in 2007, 34 in 2008, 28 in 2009 to 84 in 2010 and 59 in 2011 (see Fig. 7-9, left). In addition to the fact that research at MANA is starting to bear fruit, one reason for this is that MANA has setup a support system to encourage foreign researchers to issue press releases.

MANA's researchers continue to be featured in Japanese television several times. Two recent examples are shown in Fig. 7-9 (middle and right):

• On December 19, 2011, a MANA researcher appeared in the NHK twelve o'clock news. The program reported that the research group headed by Dr. Yusuke Yamauchi (MANA Independent Scientist) succeeded in the synthesis of a new crystal of Prussian Blue, with an amount of cesium adsorption that is more than eight times higher than the crystals currently in use.

• On January 1, 2012, 3 MANA researchers were featured in NHK BS Premium Program "Atom changes life". It was the first part of the series "Nano Revolution" about the latest research results of nanotechnology. First MANA Satellite PI Prof. James Gimzewski talked about the development of new functional materials by nanotechnology and their future applications. Next was Dr. Masakazu Aono (MANA Director-General). His work, the development of an atomic switch, was highlighted as key research to realize a novel brain-type device. The later part of the program featured the development of a highly sensitive sensor by Dr. Genki Yoshikawa (MANA Independent Scientist) with future applications in monitoring and security fields.

Appendix 8.13: Media Coverage

Fig. 7-9: Newspaper Coverage of MANA (left) and TV coverage of MANA (middle: Dr. Yusuke Yamauchi in an interview on 19 December 2011, and right: Dr. Masakazu Aono explains the development of an atomic-scale switch on 1 January 2012).

7.7 Visitors to MANA

In 2011, 175 persons from around the world (46 from Europe, 27 from America, 90 from Asia and 12 from other regions) have visited MANA. Visitors include officials from the Japanese government (Fig. 7-10), and delegations from foreign universities and other WPI research centers of Japan (Fig. 7-11). Compared to the previous year 2010, the number of visitor to MANA has decreased to 69% for the whole year 2011, and to only 10% for the 6 months from April to September 2011. This is considered to be a temporary effect of the Natural Disasters in Japan in March 2011, and the number of visitors to MANA is expected to clearly increase again in 2012.

Appendix 8.14: Visitors to MANA

Fig. 7-10: MANA Visit of Mr. Tenzo Okumura (left), Vice Minister of MEXT, and Ms. Mieko Kamimoto (middle), Parliamentary Secretary for MEXT, on October 12, 2011. Mr. Masaharu Nakagawa (right), Minister of MEXT, visited MANA on November 19, 2011. The photo shows Mr. Nakagawa together with MANA researchers from Italy.

Fig. 7-11: MANA Visits of professors from University of California Santa Barbara (UCSB) on October 12, 2011 (left) and of delegates from the International Institute on Carbon-Neutral Energy Research (I2CNER), headed by Prof. Petros Sofronis, the Director of I2CNER, on October 21, 2011 (right).

7.8 MANA History

The MANA History between September 2007 and March 2012 can be found in Appendix 8.15.

Appendix 8.15: MANA History

Appendix 8.1: MANA Top Management

Sukekatsu USHIODA
NIMS President
MANA Chief Project Officer

Masakazu AONO
MANA Director-General

Yoshio BANDO
MANA Chief Operating Officer

Takahiro FUJITA
MANA Administrative Director

Appendix 8.2: MANA Research Staff

MANA Principal Investigators (25):

Current as of January 1, 2012

Nano-Materials Field (7)

Coordinator

Takayoshi SASAKI
NIMS

Katsuhiko ARIGA
NIMS

Yoshio BANDO
NIMS

Toyohiro CHIKYOW
NIMS

Dmitri GOLBERG
NIMS

Kazuo KADOWAKI
Univ. Tsukuba (Satellite)

Zhong Lin WANG
Georgia Tech (Satellite)

Nano-System Field (9)

Coordinator

Masakazu AONO
NIMS

James K. GIMZEWSKI
UCLA (Satellite)

Tsuyoshi HASEGAWA
NIMS

Xiao HU
NIMS

Christian JOACHIM
CNRS (Satellite)

Tomonobu NAKAYAMA
NIMS

Hideaki TAKAYANAGI
Tokyo Univ. Sci. (Satellite)

Kazuhito TSUKAGOSHI
NIMS

Mark WELLAND
Univ. Cambridge (Satellite)

Nano-Green Field (5)

Coordinator

Kohei UOSAKI
NIMS

Kazunori TAKADA
NIMS

Enrico TRAVERSA
NIMS

Omar YAGHI
UCLA

Jinhua YE
NIMS

Nano-Bio Field (4)

Coordinator

Takao AOYAGI
NIMS

Guoping CHEN
NIMS

Yukio NAGASAKI
Univ. Tsukuba (Satellite)

Françoise M. WINNIK
Univ. Montreal (Satellite)

MANA Scientists (59):

Current as of January 1, 2012

Nano-Materials Field (22)


Naoki FUKATA (Group Leader)


Takao MORI (Group Leader)


Takashi SEKIGUCHI (Group Leader)


Jun CHEN


Yasuo EBINA


Masahiro GOTO


Jonathan HILL


Qingmin JI


Jin KAWAKITA


Naoyuki KAWAMOTO


Renzhi MA


Masanori MITOME


Takahiro NAGATA


Takayuki NAKANE


Minoru OSADA


Tadashi OZAWA


Ryutaro SOUDA


Yutaka WAKAYAMA


Shinjiro YAGYU


Yoshiyuki YAMASHITA


Michiko YOSHITAKE


Chunyi ZHI

Nano-Systems Field (13)


Tadaaki NAGAO (Group Leader)


Yoshitaka TATEYAMA (Group Leader)


Kazuya TERABE (Group Leader)


Hideo ARAKAWA


Masanori KOHNO


Osamu KUBO


Takeo MINARI


Katsumi NAGAOKA


Yuji OKAWA


Makoto SAKURAI


Yoshitaka SHINGAYA


Tohru TSURUOKA


Takashi UCHIHASHI

Nano-Green Field (7)


Emiliana FABBRI


Tamaki NAGANUMA


Hidenori NOGUCHI


Tsuyoshi OHNISHI


Daniele PERGOLESI


Kentaro TASHIRO


Satoshi TOMINAKA

Nano-Bio Field (17)

Nobutaka
HANAGATA
(Group Leader)

Masanori
KIKUCHI
(Group Leader)

Hisatoshi
KOBAYASHI
(Group Leader)

Akiyoshi
TANIGUCHI
(Group Leader)

Akiko
YAMAMOTO
(Group Leader)

Mitsuhiro
EBARA

Giancarlo
FORTE

Sachiko
HIROMOTO

Yoshihisa
KAIZUKA

Chiho
KATAOKA

Kohsaku
KAWAKAMI

Naoki
KAWAZOE

Norio
MARUYAMA

Yasushi
SUETSUGU

Tetsushi
TAGUCHI

Tomohiko
YAMAZAKI

Chiaki
YOSHIKAWA

MANA Independent Scientists (9):

Current as of January 1, 2012

MANA Independent Scientists


Ryuichi ARAFUNE


Alexei A. BELIK


Satoshi MORIYAMA


Jun NAKANISHI


Naoto SHIRAHATA


Lionel VAYSSIERES


Katsunori WAKABAYASHI


Yusuke YAMAUCHI


Genki YOSHIKAWA

ICYS-MANA Researchers (10):

Current as of January 1, 2012

ICYS-MANA Researchers


Fatin HAJJAJ


Ryoma HAYAKAWA


Song-Lin LI


Lok Kumar SHRESTHA


Yoshihiro TSUJIMOTO


Ken WATANABE


Xianlong WEI


Jung-Sub WI


Tianyou ZHAI


Yuanjian ZHANG

MANA Research Associates (44):

Current as of January 1, 2012

Nano-Materials Field (12)

Shimou CHEN
China

Nethravathi CHIKKAVENKATASWAMY
India

Fengxia GENG
China

Ming HU
China

Venkata KRISHNAN
India

Jan LABUTA
Czech

Baowen LI
China

Ying SUN
China

Daiming TANG
China

Chengxiang WANG
China

Wei YI
China

Xiaomei ZHANG
China

Nano-System Field (21)

Mei Yin CHANG
Singapore

Peter DARMAWAN
Indonesia

Batu GHOSH
India

Gui HAN
China

Takami HINO
Japan

Bhaskar KAVIRAJ
India

Sunmi KIM
Korea

Qifeng LIANG
China

Chuan LIU
China

Kewei LIU
China

Marina MAKAROVA
Russia

Puneet MISHRA
India

Sasmita MOHAKUD
India

Saumya Ranyan MOHAPATRA
India

Alpana NAYAK
India

Masato SUMITA
Japan

Kohei TSURUMA
Japan

Qi WANG
China

Zhi WANG
China

Jianxun XU
China

Rui YANG
China

Nano-Green Field (8)

Lei
BI
China

Alejandro
FRACAROLI
Argentine

Hicham
HAMOUDI
Algeria

Qing
KANG
China

Taeri
KWON
Korea

Lequan
LIU
China

Lakshminarayanan
PIRAMUTHU
India

Han
ZHOU
China

Nano-Bio Field (3)

Yiu Ting
Richard LAU
China

Hongxu
LU
China

Ewelina
ZAWADZAK
Poland

JSPS Fellows (15):

Current as of January 1, 2012

Nano-Materials Field (6)

Nobuya
HIROSHIBA
Japan

Noelia Maria
SANCHEZ BALLESTER
Spain

Norihiro
SUZUKI
Japan

Wim Gustaaf Frans
VAN ROSSOM
Belgium

Julien
VIEAUD
France

Xi
WANG
China

Nano-System Field (3)

Sudipta
DUTTA
India

Marco
FRONZI
Italy

Chung Vu
HOANG
Vietnam

Nano-Green Field (1)

Stefania
PAGLIARI
Italy

Nano-Bio Field (5)

Monika
BIL
Poland

Subhadip
BODHAK
India

Song
CHEN
China

Naokazu
IDOTA
Japan

Yohei
KOTSUCHIBASHI
Japan

Appendix 8.3: MANA Advisors

Advisors such as Nobel Prize Winners and world prominent researchers provide their experience and guide MANA researchers and scientists.

MANA Advisors (5):

Current as of January 1, 2012

Prof. Heinrich Rohrer
1986 Nobel Prize Winner in Physics
Switzerland

Prof. Sir Harry Kroto
1996 Nobel Prize Winner in Chemistry
Florida State University
USA

Prof. C.N.R. Rao
Honorary President of the
Jawaharlal Nehru Centre
for Advanced Scientific Research
India

Prof. Galen D. Stucky
University of California
Santa Barbara
USA

Prof. Teruo Kishi
Former President of NIMS
Japan

Appendix 8.4: MANA Evaluation Committee

Evaluation Committee members provide us their critical comments and expert recommendations on the operation and research strategy of the MANA project.

MANA Evaluation Committee members (10):

Current as of January 1, 2012

Chair

Anthony K. Cheetham
Professor
University of Cambridge,
UK

Takuzo Aida
Professor
University of Tokyo,
Japan

Morinobu Endo
Professor
Shinshu University,
Japan

Horst Hahn
Professor
Forschungszentrum Karlsruhe,
Germany

Kazuhito Hashimoto
Professor
University of Tokyo,
Japan

Yoshio Nishi
Professor
Stanford University,
USA

Manfred Rühle
Professor
Max Planck Institute,
Germany

Rodney S. Ruoff
Professor
The University of Texas,
USA

Louis Schlapbach
Professor
Former Director of EMPA
Switzerland

Kazunori Tanaka
Principal Fellow, JST
Center for Research and
Development Strategy
Japan

Appendix 8.5: MANA Seminars

List of MANA Seminars (January – December 2011):

Date (2011)	Speaker	Title
Jan 11	**Dr. Motohiro Nishio** The CHPI Institute, Japan	The CH/π Hydrogen Bond Implication in Supramolecular Chemistry, Conformation, and Biological Science
	Dr. Prasanth Jose School of Basic Science, Indian Institute of Technology, India	Microscopic Origin of Anisotropic Scattering Patterns in Semi-dilute Polymer Solutions under steady Shear Flow
Jan 12	**Prof. Ying Ma** Key Laboratory of Photochemistry, Institute of Chemistry, Chinese Academy of Sciences (ICCAS), China	Controlled Synthesis and Assembly of Transition Metal Oxide Nanomaterials via Solution Routes
Jan 18	**Prof. Oliver G. Schmidt** Institute Director, IFW Dresden, Germany	Engineering Artificial Engines at the Micro-/Nanoscale
Jan 24	**Prof. Rasmita Raval** University of Liverpool, UK	Molecular Assembly at Surfaces: Chirality from the Nanoscale to the Macroscale
Jan 27	**Dr. Oliver Gutfleisch** Leibniz Institute for Solid State and Materials Research, Dresden, Germany	Magnetic Materials in Sustainable Energy
Jan 28	**Prof. Mehmet Sarikaya** Director of GEMSEC, NSF-MRSEC, University of Washington, USA	Genetically Designed Peptide-based Molecular Materials for Technology and Medicine
Feb 1	**Prof. Laure Bourgeois** Monash Centre for Electron Microscopy, Department of Materials Engineering, Monash University, Australia	Structure of Nanoscale Precipitates in Light Alloys
Feb 17	**Dr. Giuliano Gregori** Max Planck Institute for Solid State Research, Germany	Going Nano: The Role of Boundary Effects on the Electrical Properties of Ionically and Mixed Conducting Oxides
Feb 18	**Prof. Kirk S. Schanze** Chairman, Organic Chemistry Division, University of Florida, USA	Conjugated Polyelectrolytes: Fundamentals, Layer-by-Layer Films and Solar Cell Applications
	Dr. Genki Yoshikawa ICYS-MANA Researcher, NIMS, Japan	Optimization of Piezoresistive Cantilever Sensors towards Highly Sensitive Membrane-type Surface Stress Sensor (MSS)
Feb 24	**Prof. Junichiro Kono** Departments of Electrical & Computer Engineering and Physics & Astronomy, Rice University, USA	Dynamics of One-Dimensional Electrons, Phonons, and Excitons in Carbon Nanotubes
Feb 25	**Dr. Tomonobu Nakayama** MANA PI, NIMS, Japan	Research and Development in Nano Functionality Integration Group
Mar 8	**Dr. Paolo Di Nardo** Laboratory of Cellular and Molecular Cardiology, University of Rome Tor Vergata, Italy	Tissue Engineering Strategies to Deliver Stem Cell-derived Cardiomyocytes to the Damaged Myocardium

Date (2011)	Speaker	Title
Mar 10	**Prof. Andrea Hodge** Aerospace and Mechanical Engineering Department, University of Southern California, USA	Synthesis and Mechanical Behavior of Nano-Twinned Materials
Apr 7	**Dr. David Bowler** Department of Physics & Astronomy, University College London, UK	First Principles Modelling for Dye-Sensitised Solar Cells
Apr 8	**Prof. Philip A. Gale** School of Chemistry, Supramolecular Chemistry, University of Southampton, UK	New Anion Receptors and Transporters
May 13	**Prof. Hideaki Takayanagi** MANA Satellite PI, Tokyo University of Science, Japan	Mesoscopic Superconductivity
May 20	**Dr. Lok Kumar Shrestha** ICYS-MANA Researcher, NIMS, Japan	C_{60} microcrystals with diverse morphologies via liquid-liquid interface
	Dr. Han Zhang ICYS-Sengen Researcher, NIMS, Japan	LaB_6 Field Emission Gun: Making a Decades Old Dream Come True with Nanotechnology
May 23	**Prof. Martin Pumera** School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore	Electrochemistry of Graphene
May 27	**Prof. Takaaki Sato** International Young Researcher Empowerment Center, Shinshu University, Japan	The Latest Approaches and Diverse Applications of Small-Angle X-ray Scattering (SAXS)
Jun 3	**Prof. Kazue Kurihara** WPI-AIMR, IMRAM, Tohoku University, Japan	Surface Forces Measurement for Nano-Materials Science
	Dr. Qingsong Mei ICYS-Sengen Researcher, NIMS, Japan	On the Deformation-Induced Reverse Martensitic Transformation in NiTi Alloy
	Dr. Ken Watanabe ICYS-MANA Researcher, NIMS, Japan	Oxygen Permeation Through Mixed Ionic-Electronic Conductive Membranes
Jun 10	**Dr. Toyohiro Chikyow** MANA PI, NIMS, Japan	Materials Research and Screening for Future Nano Electronics with New Characterization Tools
	Prof. Peter Khalifah Department of Chemistry, Stony Brook University and Brookhaven National Laboratory, USA	Design and Synthesis of Materials for Energy Applications
Jun 17	**Dr. Xianlong Wei** ICYS-MANA Researcher, NIMS, Japan	Phonon-Assisted Electron Emission from One-Atom-Thick Carbon Nanotube Shells
	Dr. Rudder Wu ICYS-Sengen Researcher, NIMS, Japan	Ubiquitous Element Strategies for Precious Metal Containing Protective Coatings
Jun 24	**Prof. Amar P. Yadav** Central Department of Chemistry, Tribhuvan University, Nepal	Electroploymerization of Aniline onto Active Metal Substrate

Date (2011)	Speaker	Title
Jul 1	**Dr. Hiroyuki Takeda** ICYS-Sengen Researcher, NIMS, Japan	Semi-Classical Theory for Population Inversion of Two-Level Atoms using Photonic Crystals in Three-Dimensional Systems
	Dr. Yoshihiro Tsujimoto ICYS-MANA Researcher, NIMS, Japan	Successful Synthesis of Nanostructured Reduced Titanium Oxides using an Easy-To-Prepare Reduction Technique
Jul 8	**Prof. Ming-Fa Hsieh** Department of Biomedical Engineering, Chung Yuan Christian University, Taiwan	Tubular Scaffold using Gelatin and Poly (ε-caprolactone) - Poly (γ-glutamic acid) Block Copolymer
	Dr. Kenji Kitamura (Former MANA PI) Group Leader, Polar Domain Engineering Group, Optical & Electronic Materials Unit, NIMS, Japan	Pyroelectric and Photovoltaic Surface Potential in Ferroelectrics: New Applications for Molecule Manipulation, Solar Cell, Crystal Accelerator
Jul 15	**Dr. Tianyou Zhai** ICYS-MANA Researcher, NIMS, Japan	One-Dimensional CdS Nanostructures: From Synthesis to Applications
	Dr. Xudong Yang ICYS-Sengen Researcher, NIMS, Japan	Lost Charges from Short-Circuit Photocurrent in Dye-Sensitized Solar Cells with High Open-Circuit Voltage
	Prof. Ryo Yamada Division of Materials Physics, Graduate School of Engineering Science, Osaka University, Japan	Charge and Spin Transport through Single Molecular Junctions: Experimental Studies
Jul 22	**Dr. Alexei Belik** MANA Independent Scientist, NIMS, Japan	High-Pressure Synthesis and Characterization of New Multiferroic Indium-Based Perovskites
Jul 28	**Dr. Christian Joachim** MANA Satellite PI, Center for Material Elaboration & Structural Studies (CEMES), Toulouse, France	The Different Possible Designs of Atomic Scale Logic Gates
Aug 19	**Prof. Songqin Liu** School of Chemistry and Chemical Engineering, Southeast University, China	Functionalized Nanostructured Materials for Biosensing
Aug 26	**Prof. Ayyappanpillai Ajayaghosh** National Institute for Interdisciplinary Science and Technology, India	Potential Applications of Self-Assembled π-Systems
Aug 29	**Dr. Simon Hall** School of Chemistry, University of Bristol, UK	Control of Complex Oxide Crystal Growth using Biopolymers
	Prof. Qing Chen Department of Electronics, Peking University, China	Nanodevices Based on Individual Nanotubes and Nanowires
Sep 2	**Dr. Hong-Tao Sun** ICYS-Sengen Researcher, NIMS, Japan	Functional Photonic Materials Activated by Subvalent Bismuth
	Dr. Hisanori Ueki ICYS-MANA Researcher, NIMS, Japan	Novel Shape-Persistent Nano-Sized Triangle-Shaped Macrocycles Comprising Three 2,2'-Bipyridine Units: Synthesis and the Future Prospects

Date (2011)	Speaker	Title
Sep 9	**Prof. Michiel Sprik** Chemistry Department, University of Cambridge, UK	The Thermochemistry of Oxidative Dehydrogenation of a Water Molecule at a TiO_2/Water Interface
Sep 12	**Prof. Jonathan L. Sessler** Department of Chemistry and Biochemistry, The University of Texas, USA	Pyrrolic Receptors: From Sensors and Recognition to Self-Assembly
Sep 16	**Prof. Toru Maekawa** Director of Bio-Nano Electronics Research Center, Toyo University, Japan	Creation of Nanostructures via Self-Assembly and Self-Organisation and their Application to Bio-Nano Science and Technology
	Dr. Jesse Williams ICYS-MANA Researcher, NIMS, Japan	Controlling the Crystallographic Polarity of Wurtzite Structure Thin-Films
	Dr. Zoe Schnepp ICYS-Sengen Researcher, NIMS, Japan	Nanocomposites for Sustainable Photocatalysis
Sep 30	**Prof. Kazushige Machida** Mathematical Physics Laboratory, Department of Physics, Okayama University, Japan	FFLO, Gap Determination and Vortex Lattice Morphology: A Unified View of Superconductivity from Microscopic Quasi-Classical Theory
Oct 6	**Dr. Michal J. Wozniak** Biomaterials Group, University Research Centre, Functional Materials, Warsaw University of Technology, Poland	The Investigation of Nanoarchitecture and Physical Properties of Three Dimensional Nanocomposite by Atomic Force Microscopy
Oct 11	**Dr. Zhaohua Cheng** Institute of Physics, Chinese Academy of Sciences, Beijing, China	Manipulation of Magnetic Anisotropy in Magnetic Nanodots and Nanowires
Oct 14	**Ms. Hyo-Jin Lee** Department of Dental Biomaterials, School of Dentistry, Kyungpook National University, Korea	Cytotoxic Effect of Pulp Capping Materials Containing Various Calcium Hydroxide Cements on Dental Pulp stem Cells
Oct 21	**Dr. Ryoma Hayakawa** ICYS-MANA Researcher, NIMS, Japan	Photocontrol of Single-Electron Tunneling via Molecular Dots in a Metal-Insulator-Semiconductor Structure
	Dr. Jin-Hua Gao ICYS-Sengen Researcher, NIMS, Japan	Fabrication of Graphene and Hexagonal Boron Nitride Layers on Metal Substrates
Oct 28	**Dr. Xiao Hu** MANA PI, NIMS, Japan	When Superconductivity Meets Nano Materials and Nano Systems
Nov 4	**Dr. Yuanjian Zhang** ICYS-MANA Researcher, NIMS, Japan	Wet Chemical Synthesis of Nitrogen-Doped Carbon towards Sustainable Oxygen Reduction Electrocatalysts
	Dr. Qingsong Mei ICYS-Sengen Researcher, NIMS, Japan	How the Grains of Metals are Refined by Plastic Deformation: A Study on Cu by Surface Rolling
Nov 7	**Prof. Marie-Josè Goumans** Department of Molecular Cell Biology, Leiden University Medical Center, Netherlands	Smart Microtissues for Cardiac Repair

Date (2011)	Speaker	Title
Nov 10	**Prof. Mikhail V. Lebedev** A.F. Ioffe Physico-Technical Institute, Russian Academy of Sciences, Russia	Chemical Modification of the Surface Electronic Properties of III-V Semiconductors and Optoelectronic Devices
Nov 11	**Prof. Anthony Cheetham** Department of Materials Science and Metallurgy, University of Cambridge, UK	Recent Advances in Inorganic-Organic Framework Materials
Nov 18	**Dr. Han Zhang** ICYS-Sengen Researcher, NIMS, Japan	The Coexistence of Low Work Function and High Inertness in an Electric Dipole Surface
	Dr. Irene Paola De Padova The Institute of Structure of Matter, the Italian National Research Council, Italy	Structural and Electronic Properties of Silicene Growth on Ag(110) and Ag(111)
Nov 21	**Prof. Fuyu Tamanoi** Jonsson Comprehensive Cancer Center, NanoMachine Center/CNSI, University of California, Los Angeles, USA	Development of Nanomachine Equipped Nanoparticles for Cancer Therapy
Nov 25	**Prof. Sung-Min Choi** Nuclear and Quantum Engineering Department, Korea Advanced Institute of Science and Technology, Korea	Neutron and X-ray Investigations of Soft Nano- and Bio- Materials
	Dr. Lionel Vayssieres MANA Independent Scientist, NIMS, Japan	Metal Oxide Quantum Rod & Dot-Based Structures & Devices: Aqueous Design, Electronic Structure & Applications for Solar Energy Conversion
Dec 1	**Prof. Jiang Chang** Biomaterials and Tissue Engineering Research Center, Shanghai Institute of Ceramics, Chinese Academy of Sciences, China	Biomaterials with Bioactive Composition and Nano-Structure for Tissue Regeneration
Dec 2	**Dr. Jung-Sub Wi** ICYS-MANA Researcher, NIMS, Japan	Physical Synthesis of Plasmonic Nanoparticles with Engineered Internal Sub-Structures
	Dr. Sharali Malik Institute of Nanotechnology, Karlsruhe Institute of Technology, Germany	Characterization of Graphene Nanosheets: from Graphite to GO/RGO
Dec 5	**Prof. Murugan Ramalingam** National Institute of Health and Medical Research, Faculty of Dental Surgery, University of Strasbourg, France	Combinatorial Screening of Stem Cell Response to Gradient Nanobiomaterials
Dec 7	**Dr. Lanyuan Lu** School of Biological Sciences, Nanyang Technological University, Singapore	Coarse-Graining via Force-Matching
	Dr. Zhifang Peng School of Power and Mechanical Engineering, Wuhan University, China	Phase Chemistry Quantifications and Their Applications by EPMA/SEM-EDS + MPST

Date (2011)	Speaker	Title
Dec 9	**Prof. Yong-Kuan Gong** College of Chemistry & Materials Science, Northwest University, China	Cell membrane mimetic polymers and their biomedical applications
	Prof. Akon Higuchi Department of Chemical & Materials Engineering, National Central University, China	Stem Cell Culture on Surface having Nano-segments: (a) Xeno-Free Preparation and Culture of iPS Cells and (b) Preservation of Hematopoietic Stem Cells
Dec 13	**Prof. Zhengjun Zhang** Advanced Materials Laboratory, Department of materials Science and Engineering, Tsinghua University, China	PCBs Detection Using Silver Nanorods by Glad
Dec 16	**Prof. Osvaldo N. Oliveira Jr.** University of Sao Paolo, Brazil	e-Science Meets Nanotechnology: Information Visualization to Enhance Biosensing Performance
	Dr. Fatin Hajjaj ICYS-MANA Researcher, NIMS, Japan	Magnetically Reconfigurable Ionic Liquid Crystals
Dec 21	**Prof. Guy Le Lay** Aix-Marseille University, CNRS-CINaM, Marseille-Luminy, France	Beyond Graphene: Synthesis of Epitaxial Silicene Sheets

Appendix 8.6: Japanese Culture and Language Classes

Schedule of Japanese Culture Classes 2011:

Date	Class Name	Number of Participants
Jan 14	Furoshiki Wrapping Class	16
Feb 26	Aizome & Hina Doll Festival	18
Mar 18	Discover Japan	9
May 27	Karate	11
Jun 24	Japanese Green Tea	17
Jul 29	Japanese Herbs	15
Aug 11	Japanese Drums (Wadaiko)	11
Sep 20	Tea Ceremony	13
Oct 7	Pottery Craft	16
Nov 11	Japanese Baths	14
Dec 3	Seal Engraving	13

Participants of Japanese Language Classes 2011:

Namiki Site	Number of Participants		
	Jan ~ Mar	May ~ Jul	Sep ~ Dec
Introductory Level		6	6
Beginner Level	4	5	5
Intermediate Level	9		

Sengen Site	Number of Participants		
	Jan ~ Mar	May ~ Jul	Sep ~ Dec
Introductory Level	10	4	5
Beginner Level		3	8
Intermediate Level	13		

Appendix 8.7: Research Papers and Books

List of Research Papers and Books 2011:

1. E. Abdullayev, K. Sakakibara, K. Okamoto, W. Wei, K. Ariga, Y. Lvov, *Natural Tubule Clay Template Synthesis of Silver Nanorods for Antibacterial Composite Coating*, ACS Applied Materials & Interfaces **3**, 4040 (2011). doi: 10.1021/am200896d
2. H. Abe, K. Ariga, *Development of substitution materials for rare metals and rare earths*, in "Development of catalysts for gas exhaust resisting heat condensation to decrease consumption of rare metals"; Gijyutsu Johou Kyokai, p. 223 (2011), in Japanese. doi: -
3. Y. Adachi, N. Ohashi, T. Ohgaki, T. Ohnishi, I. Sakaguchi, S. Ueda, H. Yoshikawa, K. Kobayashi, J.R. Williams, T. Ogino, H. Haneda, *Polarity of heavily doped ZnO films grown on sapphire and SiO(2) glass substrates by pulsed laser deposition*, Thin Solid Films **519**, 5875 (2011). doi: 10.1016/j.tsf.2011.02.087
4. T. Akazaki, T. Yokoyama, Y. Tanaka, H. Munekata, H. Takayanagi, *Evaluation of spin polarization in p-$In_{0.96}Mn_{0.04}As$ using Andreev reflection spectroscopy including inverse proximity effect*, Physical Review B **83**, 155212 (2011). doi: 10.1103/PhysRevB.83.155212
5. M. Akhtaruzzaman, A. Islam, F. Yang, N. Asao, E. Kwon, S.P. Singh, L. Han, Y. Yamamoto, *A novel metal-free panchromatic TiO_2 sensitizer based on a phenylenevinylene-conjugated unit and an indoline derivative for highly efficient dye-sensitized solar cells*, Chemical Communications **47**, 12400 (2011). doi: 10.1039/c1cc15580f
6. S. Alam, C. Anand, S.M.J. Zaidi, T.S. Naidu, S.S. Al-Deyab, A. Vinu, *Iron Oxide Nanoparticles Embedded onto 3D Mesochannels of KIT-6 with Different Pore Diameters and Their Excellent Magnetic Properties*, Chemistry - An Asian Journal **6**, 834 (2011). doi: 10.1002/asia.201000456
7. N.A. Al-Hajaj, A. Moquin, K.D. Neibert, G.M. Soliman, F.M. Winnik, D. Maysinger, *Short Ligands Affect Modes of QD Uptake and Elimination in Human Cells*, ACS Nano **3**, 4909 (2011). doi: 10.1021/nn201009w
8. F. Ample, I. Duchemin, M. Hliwa, C. Joachim, *Single OR molecule and OR atomic circuit logic gates interconnected on a Si(100)H surface*, Journal of Physics: Condensed Matter **23**, 125303 (2011). doi: 10.1088/0953-8984/23/12/125303
9. E.R. Andrievskaya, O.A. Kornienko, A. Sayir, O.O. Vasylkiv, Y. Sakka, *Phase Relation Studies in the ZrO_2–CeO_2–La_2O_3 System at 1500°C*, Journal of the American Ceramic Society **94**, 1911 (2011). doi: 10.1111/j.1551-2916.2010.04316.x
10. M. Aono, *Focus on Materials Nanoarchitectonics (Preface)*, Science and Technology of Advanced Materials **12**, 040301 (2011). doi: 10.1088/1468-6996/12/4/040301
11. S.K. Apte, S.N. Garaje, G.P. Mane, A. Vinu, S.D. Naik, D.P. Amalnerkar, B.B. Kale, *A Facile Template-Free Approach for the Large-Scale Solid-Phase Synthesis of CdS Nanostructures and Their Excellent Photocatalytic Performance*, Small **7**, 957 (2011). doi: 10.1002/smll.201002130
12. R. Arena, M.S. Wang, Z. Xu, A. Loiseau, D. Golberg, *Young modulus, mechanical and electrical properties of isolated individual and bundled single-walled boron nitride nanotubes*, Nanotechnology **22**, 265704 (2011). doi: 10.1088/0957-4484/22/26/265704
13. K. Ariga, *Mutual absorbent films with hierarchical structure and their functions*, Hyomen **49**, 35 (2011), in Japanese. doi: -
14. K. Ariga, *System of supramolecular bridges: from molecule to macro, and from macro to molecule*, Kagaku Kogyo **62**, 922 (2011), in Japanese. doi: -
15. K. Ariga, *Bridge between the nano world and the visible world: Supramolecule Science*, Kagaku to Kyoiku **59**, 542 (2011), in Japanese. doi: -
16. K. Ariga, *Which is the paper with the world's highest citation number in material science?*, Material Stage **11**, 12 (2011), in Japanese. doi: -
17. K. Ariga, *Materials innovation through interfacial physics and chemistry*, Physical Chemistry Chemical Physics **13**, 4780 (2011). doi: 10.1039/c1cp90016a
18. K. Ariga, *Most important concepts and innovative experimental data: mutual absorption*, Chapter 4 in "CSJ current review: Boundary molecule science – Boundary design and boundary measurement"; Kagakudojin, p. 28 (2011), in Japanese. doi: -
19. K. Ariga, *Environment and energy materials handbook*, Chapter 9 in "Future materials: Nano structure and its effects"; OMU Ltd., p. 557 (2011), in Japanese. doi: -
20. K. Ariga, J.P. Hill, *Monolayers at air-water interfaces: from origins-of-life to nanotechnology*, The Chemical Record **11**, 199 (2011). doi: 10.1002/tcr.201100004
21. K. Ariga, J.P. Hill, Q. Ji, *Organic-Inorganic Supramolecular Materials*, in "Supramolecular Soft Matter: Applications in Materials and Organic Electronics", Editor: T. Nakanishi; John Wiley & Sons, Ltd., p. 43 (2011). doi: -
22. K. Ariga, S. Ishihara, H. Izawa, H. Xia, J.P. Hill, *Operation of micro and molecular machines: a new concept with its origins in interface science*, Physical Chemistry Chemical Physics **13**, 4802 (2011). doi: 10.1039/c0cp02040k
23. K. Ariga, S. Ishihara, J. Labuta, J.P. Hill, *Supramolecular Approaches to Nanotechnology: Switching Properties and Dynamic Functions*, Current Organic Chemistry **15**, 3719 (2011). doi: -
24. K. Ariga, Q. Ji, *Layer-by-Layer Assembly*, in "Encyclopedia of Nanoscience and Nanotechnology, 2nd Edition", Editor: H.S. Nalwa; American Scientific Publishers, Los Angeles, vol. 15, p. 383 (2011). doi: -
25. K. Ariga, M. Li, G.J. Richards, J.P. Hill, *Nanoarchitectonics: A Conceptual Paradigm for Design and Synthesis of Dimension-Controlled Functional Nanomaterials*, Journal of Nanoscience and Nanotechnology **11**, 1 (2011). doi: 10.1166/jnn.2011.3839
26. K. Ariga, Y.M. Lvov, K. Kawakami, Q. Ji, J.P. Hill, *Layer-by-layer self-assembled shells for drug delivery*, Advanced Drug Delivery Reviews **63**, 762 (2011). doi: 10.1016/j.addr.2011.03.016
27. K. Ariga, M. McShane, Y.M. Lvov, Q. Ji, J.P. Hill, *Layer-by-layer assembly for drug delivery and related applications*, Expert Opinion on Drug Delivery **8**, 633 (2011). doi: 10.1517/17425247.2011.566268
28. K. Ariga, T. Mori, J.P. Hill, *Control of nano/molecular systems by application of macroscopic mechanical stimuli*, Chemical Science **2**, 195 (2011). doi: 10.1039/c0sc00300j

29	K. Ariga, K. Sakakibara, *Tailoring of functional molecules on surfaces: recent research,* Hyomen **49**, 237 (2011), in Japanese. doi: -
30	K. Ariga, K. Sakakibara, G.J. Richards, J.P. Hill, *Dynamic supramolecular systems at interfaces,* Supramolecular Chemistry **23**, 183 (2011). doi: 10.1080/10610278.2010.521830
31	H. Ataee-Esfahani, Y. Nemoto, L. Wang, Y. Yamauchi, *Rational synthesis of Pt spheres with hollow interior and nanosponge shell using silica particles as template,* Chemical Communications **47**, 3885 (2011). doi: 10.1039/c0cc05233g
32	P. Badica, A. Crisan, G. Aldica, K. Endo, H. Borodianska, K. Togano, S. Awaji, K. Watanabe, Y. Sakka, O. Vasylkiv, *'Beautiful' unconventional synthesis and processing technologies of superconductors and some other materials,* Science and Technology of Advanced Materials **12**, 013001 (2011). doi: 10.1088/1468-6996/12/1/013001
33	J. Bae, Y.J. Park, M. Lee, S.N. Cha, Y.J. Choi, C.S. Lee, J.M. Kim, Z.L. Wang, *Single-Fiber-Based Hybridization of Energy Converters and Storage Units Using Graphene as Electrodes,* Advanced Materials **23**, 3446 (2011). doi: 10.1002/adma.201101345
34	J. Bae, M.K. Song, Y.J. Park, J.M. Kim, M. Liu, Z.L. Wang, *Fiber Supercapacitors Made of Nanowire-Fiber Hybrid Structures for Wearable/Flexible Energy Storage,* Angewandte Chemie International Edition **50**, 1683 (2011). doi: 10.1002/anie.201006062
35	N. Banno, T. Sakamoto, M. Tada, M. Miyamura, K. Okamoto, H. Hada, M. Aono, *ON-State Reliability of Solid-Electrolyte Switch under Pulsed Alternating Current Stress for Programmable Logic Device,* Japanese Journal of Applied Physics **50**, 074201 (2011). doi: 10.1143/JJAP.50.074201
36	A.A. Belik, *Local distortions in multiferroic $BiMnO_3$ as a function of doping,* Science and Technology of Advanced Materials **12**, 044610 (2011). doi: 10.1088/1468-6996/12/4/044610
37	A.A. Belik, A.M. Abakumov, A.A. Tsirlin, J. Hadermann, J. Kim, G. Van Tendeloo, E. Takayama-Muromachi, *Structure and Magnetic Properties of $BiFe_{0.75}Mn_{0.25}O_3$ Perovskite Prepared at Ambient and High Pressure,* Chemistry of Materials **23**, 4505 (2011). doi: 10.1021/cm201774y
38	A.A. Belik, T. Furubayashi, H. Yusa, E. Takayama-Muromachi, Perovskite, *$LiNbO_3$, Corundum, and Hexagonal Polymorphs of $(In_{1-x}M_x)MO_3$,* Journal of the American Chemical Society **133**, 9405 (2011). doi: 10.1021/ja2010362
39	A.A. Belik, Y. Matsushita, Y. Katsuya, M. Tanaka, T. Kolodiazhnyi, M. Isobe, E. Takayama-Muromachi, *Crystal structure and magnetic properties of 6H-$SrMnO_3$,* Physical Review B **84**, 094438 (2011). doi: 10.1103/PhysRevB.84.094438
40	A.A. Belik, Y. Matsushita, M. Tanaka, E. Takayama-Muromachi, *Low-Temperature Vacuum Reduction of $BiMnO_3$,* Inorganic Chemistry **50**, 7685 (2011). doi: 10.1021/ic2007233
41	A.A. Belik, P. Naumov, J. Kim, S. Tsuda, *Low-temperature structural phase transition in synthetic libethenite Cu_2PO_4OH,* Journal of Solid State Chemistry **184**, 3128 (2011). doi: 10.1016/j.jssc.2011.09.026
42	T.M. Bennseman, A.E. Koshelev, K.E. Gray, W.K. Kwok, U. Welp, K. Kadowaki, M. Tachiki, T. Yamamoto, *Tunable terahertz emission from $Bi_2Sr_2CaCu_2O_{8+\delta}$ mesa devices,* Physical Review B **84**, 064523 (2011). doi: 10.1103/PhysRevB.84.064523
43	D. Berthebaud, T. Nishimura, T. Mori, *Microstructure and Thermoelectric Properties of Dense YB22C2N Samples Fabricated Through Spark Plasma Sintering,* Journal of Electronic Materials **40**, 682 (2011). doi: 10.1007/s11664-011-1509-0
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734	Q. Zhu, J.G. Li, X. Li, X. Sun, Y. Sakka, *Monodisperse colloidal spheres for $(Y,Eu)_2O_3$ red-emitting phosphors: establishment of processing window and size-dependent luminescence behavior,* Science and Technology of Advanced Materials **12**, 055001 (2011). doi: 10.1088/1468-6996/12/5/055001
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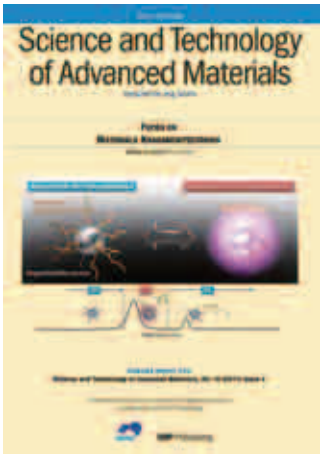
736	M. Zunic, L. Chevallier, E. Di Bartolomeo, A. D'Epifanio, S. Licoccia, E. Traversa, *Anode Supported Protonic Solid Oxide Fuel Cells Fabricated Using Electrophoretic Deposition,* Fuel Cells **11**, 165 (2011). doi: 10.1002/fuce.200900104

Appendix 8.8: Special Issues on Materials Nanoarchitectonics

MANA has published special issues in the high-ranked Materials Science journals **Science and Technology of Advanced Materials** (2010 Impact Factor: 3.226) and **Advanced Materials** (2010 Impact Factor: 10.880) that explain "Nanoarchitectonics" and contain a collection of scientific papers.



August 2011:

Science and Technology of Advanced Materials

Volume 12, Issue 4, August 2011

Focus on Materials Nanoarchitectonics

List of Content:

Preface

Article 040301 (2pp)
M. Aono,
Focus on Materials Nanoarchitectonics
doi: 10.1088/1468-6996/12/4/040301

Focus papers

Article 044601 (11pp)
T.C. Ozawa, K. Fukuda, Y. Ebina, K. Kosuda, A. Sato, Y. Michiue, K. Kurashima, T. Sasaki,
A bona fide two-dimensional percolation model: an insight into the optimum photoactivator concentration in $La_{2/3-x}Eu_xTa_2O_7$ nanosheets
doi: 10.1088/1468-6996/12/4/044601

Article 044602 (9pp)
K.P.S. Prasad, D.S. Dhawale, T. Sivakumar, S.S. Aldeyab, J.S.M. Zaidi, K. Ariga, A. Vinu,
Fabrication and textural characterization of nanoporous carbon electrodes embedded with CuO nanoparticles for supercapacitors
doi: 10.1088/1468-6996/12/4/044602

Article 044603 (6pp)
C. Hu, Y. Sakka, T. Nishimura, S. Guo, S. Grasso, H. Tanaka,
Physical and mechanical properties of highly textured polycrystalline Nb_4AlC_3 ceramic
doi: 10.1088/1468-6996/12/4/044603

Article 044604 (7pp)
X. Chen, P. Li, H. Tong, T. Kako, J. Ye,
Nanoarchitectonics of a Au nanoprism array on WO_3 film for synergistic optoelectronic response
doi: 10.1088/1468-6996/12/4/044604

Article 044605 (6pp)
X. Wei, M.S. Wang, Y. Bando, D. Golberg,
Thermal stability of carbon nanotubes probed by anchored tungsten nanoparticles
doi: 10.1088/1468-6996/12/4/044605

Article 044606 (10pp)
M. Harada, H. Noguchi, N. Zanetakis, S. Takakusagi, W. Song, K. Uosaki,
Construction of multilayers of bare and Pd modified gold nanoclusters and their electrocatalytic properties for oxygen reduction
doi: 10.1088/1468-6996/12/4/044606

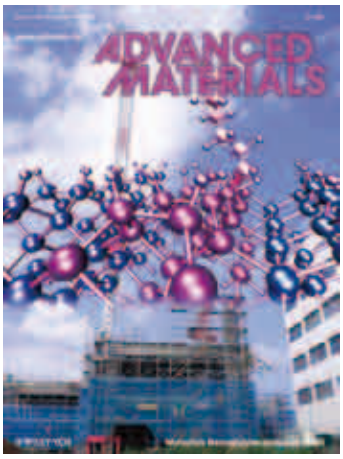
Article 044607 (7pp)
Y. Horiguchi, S. Kudo, Y. Nagasaki,
Gd@C82 metallofullerenes for neutron capture therapy?fullerene solubilization by poly(ethylene glycol)-block-poly(2-(N, N-diethylamino)ethyl methacrylate) and resultant efficacy in vitro
doi: 10.1088/1468-6996/12/4/044607

Article 044608 (8pp)
J. Nakanishi, H. Nakayama, K. Yamaguchi, A.J. Garcia, Y. Horiike,
Dynamic culture substrate that captures a specific extracellular matrix protein in response to light
doi: 10.1088/1468-6996/12/4/044608

Article 044609 (7pp)
P. Techawanitchai, K. Yamamoto, M. Ebara, T. Aoyagi,
Surface design with self-heating smart polymers for on?off switchable traps
doi: 10.1088/1468-6996/12/4/044609

Article 044610 (6pp)
A.A. Belik,
Local distortions in multiferroic $BiMnO_3$ as a function of doping
doi: 10.1088/1468-6996/12/4/044610

Article 044611 (10pp)
D. Fujita,
Nanoscale synthesis and characterization of graphene-based objects
doi: 10.1088/1468-6996/12/4/044611



January 2012:

Advanced Materials

Volume 24, Issue 2, January 10, 2012

Special Issue: WPI Research Center for Materials Nanoarchitectonics, NIMS
Guest Editors: M. Aono, Y. Bando, K. Ariga

List of Content:

Appendix 8.9: Editorial Activities

Members of Board of Journals (2011):

No.	Name of Member	Name of Journal	Editorial Status
1	Masakazu Aono (MANA Director-General)	**ACS Nano** ISSN: 1936-0851	Editorial Advisory Board
2	Masakazu Aono (MANA Director-General)	**International Journal of Nanoscience** ISSN: 0219-581X	Associate Editor
3	Masakazu Aono (MANA Director-General)	**Small** ISSN: 1613-6810	Editorial Board
4	Yoshio Bando (MANA Chief Operating Officer)	**International Journal of Nanotechnology** ISSN: 1475-7435	Editorial Board
5	Yoshio Bando (MANA Chief Operating Officer)	**Journal of Ceramic Science and Technology** ISSN: 2190-9385	Editorial Board
6	Yoshio Bando (MANA Chief Operating Officer)	**Journal of Electron Microscopy** ISSN: 0022-0744	Editor-in-Chief
7	Yoshio Bando (MANA Chief Operating Officer)	**Nanotechnology** ISSN: 0957-4484	Editorial Board
8	Yoshio Bando (MANA Chief Operating Officer)	**Small** ISSN: 1613-6810	Editorial Board
9	Katsuhiko Ariga (MANA Principal Investigator)	**ACS Applied Materials & Interfaces** ISSN: 1944-8244	Editorial Advisory Board
10	Katsuhiko Ariga (MANA Principal Investigator)	**Advanced Science Letters** ISSN: 1936-6612	Asian Editor
11	Katsuhiko Ariga (MANA Principal Investigator)	**Chemistry Letters** ISSN: 0366-7022	Associate Editor
12	Katsuhiko Ariga (MANA Principal Investigator)	**Chemistry of Materials** ISSN: 0897-4756	Editorial Advisory Board
13	Katsuhiko Ariga (MANA Principal Investigator)	**Hyomen** (in Japanese) ISSN: 0367-648X	Associate Editor
14	Katsuhiko Ariga (MANA Principal Investigator)	**Journal of Nanoscience and Nanotechnology** ISSN: 1550-7033	Asian Editor
15	Katsuhiko Ariga (MANA Principal Investigator)	**Langmuir** ISSN: 0743-7463	Editorial Advisory Board
16	Katsuhiko Ariga (MANA Principal Investigator)	**Nanoscience and Nanotechnology Letters** ISSN: 1941-4900	Asian Editor
17	Katsuhiko Ariga (MANA Principal Investigator)	**Physical Chemistry Chemical Physics** ISSN: 1463-9076	Associate Editor
18	Katsuhiko Ariga (MANA Principal Investigator)	**Science and Technology of Advanced Materials** ISSN: 1468-6996	Associate Editor

No.	Name of Member	Name of Journal	Editorial Status
19	Guoping Chen (MANA Principal Investigator)	**International Journal of Cell Biology** ISSN: 1687-8876	Guest Editor
20	Guoping Chen (MANA Principal Investigator)	**Journal of Biomaterials and Tissue Engineering** ISSN: 2157-9083	Regional Editor
21	Daisuke Fujita (MANA Principal Investigator until March 31, 2011)	**Journal of the Vacuum Society of Japan** ISSN: 1882-2398	Editor-in-Chief
22	Katsuhiro Hono (MANA Principal Investigator until March 31, 2011)	**Acta Materialia** ISSN: 1359-6454	Editor
23	Katsuhiro Hono (MANA Principal Investigator until March 31, 2011)	**Scripta Materialia** ISSN: 1359-6462	Principal Editor
24	Kenji Kitamura (MANA Principal Investigator until March 31, 2011)	**Functional Materials Letters** ISSN: 1793-6047	Editorial Board
25	Kenji Kitamura (MANA Principal Investigator until March 31, 2011)	**Materials Research Bulletin** ISSN: 0025-5408	Guest Editor
26	Yukio Nagasaki (MANA Principal Investigator)	**Acta Biomaterialia** ISSN: 1742-7061	Editorial Board
27	Yukio Nagasaki (MANA Principal Investigator)	**Biointerphases** ISSN: 1559-4106	Co-Editor
28	Yukio Nagasaki (MANA Principal Investigator)	**Bulletin of the Chemical Society of Japan** ISSN: 0009-2673	Associate Editor
29	Yukio Nagasaki (MANA Principal Investigator)	**e-Journal of Soft Materials** ISSN: 1349-7308	Associate Editor
30	Yukio Nagasaki (MANA Principal Investigator)	**Reactive and Functional Polymers** ISSN: 1381-5148	Editorial Board
31	Naoki Ohashi (MANA Principal Investigator until March 31, 2011)	**International Journal of Applied Ceramic Technology** ISSN: 1546-542X	Associate Editor
32	Yoshio Sakka (MANA Principal Investigator until March 31, 2011)	**Journal of Ceramic Society of Japan** ISSN: 1882-0743	Editor-in-Chief
33	Yoshio Sakka (MANA Principal Investigator until March 31, 2011)	**Journal of the Society of Inorganic Materials** ISSN: 1345-3769	Associate Editor
34	Yoshio Sakka (MANA Principal Investigator until March 31, 2011)	**Materials Transactions** ISSN: 1345-9678	Associate Editor
35	Yoshio Sakka (MANA Principal Investigator until March 31, 2011)	**Science and Technology of Advanced Materials** ISSN: 1468-6996	Co-Editor
36	Yoshio Sakka (MANA Principal Investigator until March 31, 2011)	**Scripta Materialia** ISSN: 1359-6462	Deputy of Principal Editor

No.	Name of Member	Name of Journal	Editorial Status
37	Yoshio Sakka (MANA Principal Investigator until March 31, 2011)	**Zairyo no Kagaku to Kogaku** (in Japanese) ISSN: 1347-4774	Associate Editor
38	Enrico Traversa (MANA Principal Investigator)	**Cerâmica** ISSN: 0366-6913	Editorial Board
39	Enrico Traversa (MANA Principal Investigator)	**Journal of Electroceramics** ISSN: 1385-3449	Editorial Board
40	Enrico Traversa (MANA Principal Investigator)	**Journal of Nanoparticle Research** ISSN: 1388-0764	Associate Editor
41	Enrico Traversa (MANA Principal Investigator)	**Science and Technology of Advanced Materials** ISSN: 1468-6996	Associate Editor
42	Kohei Uosaki (MANA Principal Investigator)	**Electrochemistry Communications** ISSN: 1388-2481	Editorial Board
43	Zhong Lin Wang (MANA Principal Investigator)	**Advanced Functional Materials** ISSN: 1616-301X	Advisory Board
44	Zhong Lin Wang (MANA Principal Investigator)	**Applied Physics Letters** ISSN: 0003-6951	Editorial Board
45	Zhong Lin Wang (MANA Principal Investigator)	**Journal of Materials Science** ISSN: 0022-2461	Editorial Board
46	Zhong Lin Wang (MANA Principal Investigator)	**Journal of Physical Chemistry B** ISSN: 1520-6106	Advisory Board
47	Zhong Lin Wang (MANA Principal Investigator)	**Micron** ISSN: 0968-4328	Advisory Board
48	Zhong Lin Wang (MANA Principal Investigator)	**Nano Energy** ISSN: 2211-2855	Editor in Chief and Founding Editor
49	Zhong Lin Wang (MANA Principal Investigator)	**Nano Letters** ISSN: 1530-6984	Advisory Board
50	Zhong Lin Wang (MANA Principal Investigator)	**Nano Today** ISSN: 1748-0132	Editorial Advisory Panel
51	Zhong Lin Wang (MANA Principal Investigator)	**Nanotechnology** ISSN: 0957-4484	Editorial Board
52	Zhong Lin Wang (MANA Principal Investigator)	**Progress in Natural Sciences** ISSN: 1002-0071	Editorial Board
53	Mark E. Welland (MANA Principal Investigator)	**Nanotechnology** ISSN: 0957-4484	Editorial Board
54	Françoise M. Winnik (MANA Principal Investigator)	**Langmuir** ISSN: 0743-7463	Executive Director
55	Françoise M. Winnik (MANA Principal Investigator)	**Polymer Science** (Russia) ISSN: 0965-545X	International Advisory Board
56	Jinhua Ye (MANA Principal Investigator)	**NPG Asia Materials** ISSN: 1884-4049	Editorial Advisory Board
57	Jinhua Ye (MANA Principal Investigator)	**Progress in Natural Science: Materials International** ISSN: 1002-0071	Editorial Board
58	Jinhua Ye (MANA Principal Investigator)	**Science and Technology of Advanced Materials** ISSN: 1468-6996	Associate Editor

No.	Name of Member	Name of Journal	Editorial Status
59	Nobutaka Hanagata (Group Leader)	**Materials Express** ISSN: 2158-5849	Associate Editor
60	Hisatoshi Kobayashi (Group Leader)	**Advanced Materials Letters** ISSN: 0976-3961	Guest Editor
61	Hisatoshi Kobayashi (Group Leader)	**Bioinspired, Biomimetic and Nanobiomaterials** ISSN: 2045-9858	Editorial Board
62	Takao Mori (Group Leader)	**Journal of Flux Growth** ISSN: 1881-5316	Editorial Board
63	Tadaaki Nagao (Group Leader)	**e-Journal of Surface Science and Nanotechnology** ISSN: 0000-0957	Editorial Board
64	Tadaaki Nagao (Group Leader)	**Hyomen Kagaku** (in Japanese) ISSN: 0388-5321	Editorial Board
65	Tadaaki Nagao (Group Leader)	**Radiation Effects and Defects in Solids** ISSN: 1042-0150	Associate Editor
66	Akiyoshi Taniguchi (Group Leader)	**Current Biotechnology** ISSN: 2211-5501	Editorial Advisory Board
67	Akiyoshi Taniguchi (Group Leader)	**Journal of Biosensors and Bioelectronics** ISSN: 2155-6210	Editorial Board
68	Akiyoshi Taniguchi (Group Leader)	**Journal of Japanese Society for Biomaterials** ISSN: 1347-7080	Editorial Board
69	Akiyoshi Taniguchi (Group Leader)	**Sensors** ISSN: 1424-8220	Guest Editor
70	Akiyoshi Taniguchi (Group Leader)	**The Open Biotechnology Journal** ISSN: 1874-0707	Editorial Advisory Board
71	Kohsaku Kawakami (MANA Scientist)	**Hyomen** (in Japanese) ISSN: 0367-648X	Guest Editor
72	Kohsaku Kawakami (MANA Scientist)	**Journal of Pharmaceutical Science and Technology** (in Japanese) ISSN: 0975-5772	Editor
73	Kohsaku Kawakami (MANA Scientist)	**Journal of the Society of Powder Technology** (in Japanese) ISSN: 0386-6157	Guest Editor
74	Kohsaku Kawakami (MANA Scientist)	**Netsu Sokutei** (in Japanese) ISSN: 1884-1899	Editor
75	Jin Kawakita (MANA Scientist)	**Journal of the Surface Finishing Society of Japan** ISSN: 0915-1869	Editor
76	Chunyi Zhi (MANA Scientist)	**Journal of Nanomaterials** ISSN: 1687-4110	Editorial Board
77	Jun Nakanishi (MANA Independent Scientist)	**Bunseki** (in Japanese) ISSN: 0386-2178	Editorial Board
78	Lionel Vayssieres (MANA Independent Scientist)	**International Journal of Nanotechnology** ISSN: 1475-7435	Editor-in-Chief

No.	Name of Member	Name of Journal	Editorial Status
79	Ajayan Vinu (MANA Independent Scientist until September 2, 2011)	**Journal of Nanoscience and Nanotechnology** ISSN: 1550-7033	Editorial Board
80	Ajayan Vinu (MANA Independent Scientist until September 2, 2011)	**The Open Biomaterials Journal** ISSN: 1876-5025	Editorial Advisory Board
81	Ajayan Vinu (MANA Independent Scientist until September 2, 2011)	**The Open Catalysis Journal** ISSN: 1876-214X	Editorial Advisory Board
82	Ajayan Vinu (MANA Independent Scientist until September 2, 2011)	**The Open Materials Science Journal** ISSN: 1874-088X	Editorial Advisory Board
83	Lok Kumar Shrestha (ICYS-MANA Researcher)	**ISRN Physical Chemistry** ISSN: 2090-7761	Editorial Board
84	Tianyou Zhai (ICYS-MANA Researcher)	**Chemical Sensors** ISSN: 2231-6065	Editorial Board
85	Tianyou Zhai (ICYS-MANA Researcher)	**Journal of Nanomaterials** ISSN: 1687-4110	Editorial Board

Appendix 8.10: Patents

List of Japanese Patent Applications (October 2007 – December 2011):

No.	Name of Invention	Application Number	Date of Application
1	Method of mass production of ZnO nanowires	2007-272490	2007 Oct 19
2	Thermally stable resin composition having excellent mechanical properties and process for production thereof	2007-275072	2007 Oct 23
3	Co based Heusler alloy half-metal	2007-276353	2007 Oct 24
4	A metal compound probe for Raman spectroscopy	2007-276691	2007 Oct 24
5	Gel of BN nanotubes, alkylation of BN nanotubes and their fabrication process	2007-282523	2007 Oct 30
6	Synthetic method for anion-exchangeable layered double hydroxides	2007-314339	2007 Dec 5
7	A nanoscale pH sensor	2007-323034	2007 Dec 14
8	Optical devices and their applications to display devices	2007-325022	2007 Dec 17
9	High strength sintered steel	2007-329408	2007 Dec 21
10	Mesoporous Carbon (MC-MCM-48) and Method for Producing the Same	2007-334245	2007 Dec 26
11	Cage Type Mesoporous Silica (SNC-2), Method for Producing the Same and Absorbent Using the Same	2007-334246	2007 Dec 26
12	Mesoporous Carbon (CNP-2) and Method for Producing the Same	2007-334247	2007 Dec 26
13	BN nanofibers and their fabrication process	2007-336861	2007 Dec 27
14	Dope solution for molding	2008-000645	2008 Jan 7
15	Swellable layered double hydroxides and sol, gel and nanosheets derived from them	2008-012914	2008 Jan 23
16	Layered oxide phosphors and oxide nanosheet phosphors	2008-014606	2008 Jan 25
17	Layered rare-earth hydroxides and their photoluminescent material	2008-025833	2008 Feb 6
18	Synthetic method of layered rare-earth hydroxides	2008-025834	2008 Feb 6
19	Rechargeable solid-state lithium battery	2008-032828	2008 Feb 14
20	Electrode element, method of manufacturing electrode element, and lithium ion secondary battery	2008-036537	2008 Feb 18
21	Frequency conversion devices made of lithium tantalite single crystal	2008-039835	2008 Feb 21
22	Cobalt hydroxide crystals, cobalt hydroxide unilamellar nanosheets and their fabrication process	2008-043681	2008 Feb 26
23	Electronic devices and method of their fabrication	2008-054671	2008 Mar 5
24	An instrument for sample preparation and characterization	2008-062344	2008 Mar 12
25	Storage media, recording system, and methods for data recording and erasing	2008-054917	2008 Mar 13
26	Recording media, its implementation, and the methods of recording and erasing information	2008-505219	2008 Mar 17
27	Apparatus for producing artificial opal film	2008-076953	2008 Mar 25
28	Characterization methods for substrates of semiconductor solid solutions	2008-079863	2008 Mar 26
29	Fabrication method of nano electron emitters	2008-080358	2008 Mar 26

No.	Name of Invention	Application Number	Date of Application
30	Metal-doped Mesoporous Silica (MeKIT-5) and Method for Producing the Same	2008-100264	2008 Apr 8
31	Polymer electrolytes having excellent mechanical properties, dimension stabilities and their fabrication process	2008-110103	2008 Apr 21
32	Polarization-tailored devices	2008-118118	2008 Apr 30
33	Transparent magnetic films, reading techniques for magnetic patterns, fabrication methods for transparent magnets, and magnetic patterns	2008-118785	2008 Apr 30
34	Synthetic method of anion-exchangeable layered double hydroxides	2008-119873	2008 May 1
35	TiN-based crystals and their bonding bodies	2008-131424	2008 May 20
36	Transparent magnetic films, reading techniques for magnetic patterns, fabrication methods for transparent magnets, and magnetic patterns	2008-135379	2008 May 23
37	TiN-based crystals	2008-131429	2008 Jun 5
38	Photocatalytic nanosheets and their coating films	2008-147592	2008 Jun 5
39	Electro-magnetic absorbers	2008-151636	2008 Jun 10
40	Superconducting sintered bodies and their preparation method	2008-170178	2008 Jun 30
41	Nanosheet phosphor materials and fluorescent lighting, solar cells and color displays utilizing nanosheet phosphors	2008-180826	2008 Jul 11
42	Nanosheet paint	2008-180828	2008 Jul 11
43	Photoresponsive drug delivery system (DDS) and drug-conjugated photoresponsive DDS	2008-184326	2008 Jul 15
44	Environment friendly Yellow pigment	2008-194346	2008 Jul 29
45	Co based Heusler alloy half-metal	2008-199712	2008 Aug 1
46	Current perpendicular to plan giant magnetoresistance device	2008-219619	2008 Apr 28
47	Age hardening Magnesium Sn alloy	2008-243311	2008 Sep 22
48	Age hardening Magnesium Mg-Sn alloy	2008-243342	2008 Sep 22
49	Polymer brush-solid hybrid material and its manufacturing	2008-247361	2008 Sep 26
50	Graphene-coated materials and the fabrication method	2008-261875	2008 Oct 8
51	Prepregs having high thermal conductivities, process for production thereof and laminates	2008-269820	2008 Oct 20
52	Cage-type mesoporous silica (SNC-2): its synthetic method and application as adsorbents	2008-271929	2008 Oct 22
53	Mesoporous carbon (CNP-2) and its synthetic method	2008-272012	2008 Oct 22
54	Mesoporous carbon (MC-MCM-48) and its synthetic method	2008-274047	2008 Oct 24
55	Preparation of crystalline-oriented titania photoelectrodes	2008-288304	2008 Nov 11
56	Synthesis of semiconductor nanowires and fabrication of vertical-type field effect transistors using semiconductor nanowires	2008-296940	2008 Nov 20
57	ZnS/ZnO biaxial nanowires and their fabrication process	2008-297575	2008 Nov 21
58	Co based Heusler alloy and manetic device	2008-299551	2008 Nov 25
59	Calibration method of dopant impurities	2008-308073	2008 Dec 3
60	Organic field effect transistor	2008-321975	2008 Dec 18
61	A nanorod blend for liquid crystal display for polarization-tailored electro-optic devices	2008-322401	2008 Dec 18
62	Nano-conductance materials and their fabrication process	2009-006731	2009 Jan 15
63	Dry process apparatus	2009-007329	2009 Jan 16

No.	Name of Invention	Application Number	Date of Application
64	PH sensitive nanomaterials and their fabrication process	2009-010581	2009 Jan 21
65	An ordered mesoporous fullerene with high specific surface area and fabrication method thereof	2009-021407	2009 Feb 2
66	TiO_2 nanoparticle	2009-021457	2009 Feb 2
67	BN nanoparticles and their fabrication process	2009-002174	2009 Feb 3
68	Nanocrystal particle terminated with organic monolayers and preparation method of nanocrystal particle terminated with organic monolayers	2009-037746	2009 Feb 20
69	Hetero pn junction semiconductor and its fabrication method	2009-045406	2009 Feb 27
70	Surface-enhanced Raman scattering-responsive nanoscale pH sensor	2009-048844	2009 Mar 3
71	High thermal conductive prepregs, their fabrication process and laminates	2009-051914	2009 Mar 5
72	Light-emitting device	2009-052779	2009 Mar 6
73	Chip-based immunosensor	2009-077715	2009 Mar 26
74	Layered rare earth hydroxides and their films and their fabrication method	2009-081303	2009 Mar 30
75	Silicon nanoparticles light emitting devices	2009-089645	2009 Apr 2
76	Rare earth oxide phospors and their films and their fabrication method	2009-090042	2009 Apr 2
77	Light emitting sheets	2009-097564	2009 Apr 14
78	Ferromagnetic tunnel junctionand its applications to magnetoresistive devices	2009-099483	2009 Apr 16
79	Luminous nanosheets and their applications in phosphor materials, solar cells and color displays	2009-099595	2009 Apr 16
80	Nanosheet paint	2009-101578	2009 Apr 20
81	Lithium Tantalate Single Crystal, Frequency Conversion device and Frequency Conversion Apparatus	2009-107382	2009 Apr 27
82	High anti-corrosive resin composition materials of fluorocarbon system and fabrication method of the same	2009-107770	2009 Apr 27
83	Photodegradable heterobifunctional crosslinker	2009-114028	2009 May 8
84	Anode material and lithium battery using the same	2009-117114	2009 May 14
85	Hydrogen evolution material	2009-125016	2009 May 25
86	ZnS nanobelts, their fabrication process and UV sensitive devices	2009-131847	2009 Jun 1
87	Hetero pn junction semiconductor and its fabrication method	2009-132693	2009 Jun 2
88	Molecular electronic devices and method of their fabrication	2009-169740	2009 Jul 21
89	Thermoelectric device/element	2009-171907	2009 July 23
90	Rare earth boride thermoelectric device/element and thermoelectric power generating device/element	2009-171979	2009 July 23
91	Thermoelectric semiconductor and thermoelectric power generating device/element	2009-172597	2009 July 24
92	Current perpendicular plane giant magnetoresistive devices	2009-182968	2009 Aug 6
93	Rubber composites having excellent mechanical properties and process for production thereof	2009-183438	2009 Aug 6
94	Nano-ribbon and its fabrication method, nano-ribbon FET and its fabrication method, DNA sequencing method and apparatus using nano-ribbon	2009-194892	2009 Aug 6

No.	Name of Invention	Application Number	Date of Application
95	Fabrication method of graphene film	2009-199126	2009 Aug 31
96	Production of substrates for dielectric and conductive films, their device and electronics	2009-205911	2009 Sep 7
97	Methodology and an instrument for simultaneous thermal analysis of multiple samples	2009-219189	2009 Sep 24
98	Single-crystalline ZnSe blue/ultraviolet-light photodetectors and its fabrication method	2009-232381	2009 Oct 6
99	Ultrathin BN nanosheets, their fabrication process and photo devices including their sheets	2009-234651	2009 Oct 8
100	Boron doped semiconductor nanowires and their synthesis methods	2009-236883	2009 Oct 14
101	Derivatives of boron nitride nano-tube, dispersion liquid of the same and fabrication method of the same derivatives of boron nitride nano-tube	2009-257104	2009 Nov 10
102	Analysis of dopant atoms in dopant doped Ge	2009-258108	2009 Nov 11
103	Fabrication method of contact and structure in the organic transistor	2009-268309	2009 Nov 26
104	BN nanofibers, their fabrication process and production process of nanotubes	2009-279375	2009 Dec 9
105	UV micro-sensors and their fabrication process	2009-279520	2009 Dec 9
106	Nanoparticle preparing equipment and preparation method of nanoparticle using it	2009-280039	2009 Dec 10
107	Highly porous solid material made of biodegradable polymer and method of fabricating the same	2010-003539	2010 Jan 12
108	Use of 5-aminolevulinic acid as targeting ligands	2010-005160	2010 Jan 13
109	Vertical magnetic memory devices and fabrication method of the same	2010-005598	2010 Jan 14
110	Immuno-latex particles and methods of producing thereof	2010-050661	2010 Jan 14
111	Bio friendly devices	2010-022565	2010 Feb 3
112	Bio resorbable polymers and their medical devices and blood vessels	2010-023909	2010 Feb 5
113	Smart window using organic/metal hybrid polymers and fabrication method of the same and smart window system	2010-025058	2010 Feb 8
114	Compositions comprosing small molecule anti-oxidantagents and polymeric compound containing ring compound possessing nitroxyl radical	2010-028199	2010 Feb 10
115	Electrode structure, device and its fabrication process	2010-034179	2010 Feb 19
116	Polymeric micelle containing nitric oxide donors responsive to photoirradiation	2010-037558	2010 Feb 23
117	Metal complex compound array and fabrication method of the same	2010-038460	2010 Feb 24
118	Method for epitaxial growth of graphene film	2010-047225	2010 Mar 4
119	Synthesis of brookite	2010-048998	2010 Mar 5
120	Perovskite oxide nanosheets dispersed in organic solvents, their synthetic process, and fabrication of oxide films using them	2010- 054207	2010 Mar 11
121	Titania nanosheets dispersed in organic solvents, their synthetic process, and fabrication of titania films using them	2010-054215	2010 Mar 11
122	Method for forming polarization reversal	2010-081377	2010 Mar 31

No.	Name of Invention	Application Number	Date of Application
123	Transparent alumina and Method of producing thereof	2010-082042	2010 Mar 31
124	Fullerene structure materials, fabrication method of the same and usage using of the same	2010-087058	2010 Apr 5
125	Carbohydrate-modified oligonucleotide-conjugates with rare metal	2010-095337	2010 Apr 16
126	Inductor composed of arrayed capacitors	2010-096217	2010 Apr 19
127	Electro-conductive poly-rotaxane (PCT application)	2010-057178	2010 Apr 22
128	Textured Max Phases and method of fabrication thereof	2010-104687	2010 Apr 30
129	Hybrid materials of Si nanocrystals and Si nanowires application for solar cells and light emitting devices and their fabrication methods	2010-113778	2010 May 18
130	Fabrication method of rare- earth permanents magnet and rare- earth permanents magnets	2010-116531	2010 May 20
131	Superhard Composite Material and Method of Producing the Same	2010-116823	2010 May 21
132	Surface Stress Sensor	2010-118859	2010 May 24
133	Electric field spinning fiber mat composite materials and glucose sensor	2010-118973	2010 May 25
134	Method of production and thermoelectric module of transition metal doped rare earth boron carbide semiconductor	2010-122311	2010 May 28
135	Electrode catalysts for fuel cells and their production	2010-124715	2010 May 31
136	Electrode catalysts for fuel cells and their production	2010-124716	2010 May 31
137	Display devices and color electric paper using the same	2010-059638	2010 Jun 7
138	Dry Powder Inhaler	2010-136369	2010 Jun 15
139	Counting method of two-dimensional atomic film and counting system	2010-145314	2010 Jun 25
140	Formation method of organic semiconductor thin film	2010-148435	2010 Jun 30
141	Electochromic complex compounds and electrochromic devices using the same	2010-153792	2010 Jul 6
142	Fabrication method of rare- earth permanents magnet and rare- earth permanents magnets	2010-171905	2010 Jul 30
143	Derivatives of boron nitride nano-tube, dispersion liquid of the same and fabrication method of the same derivatives of boron nitride nano-tube	2010-178678	2010 Aug 9
144	Fiber probe and its fabrication method	2010-193012	2010 Aug 31
145	Apparatus for forming polarization inversion region	2010-193460	2010 Aug 31
146	Fabrication method of fibrous leaves	2010-197279	2010 Sep 3
147	High hardness B4C oriented via strong magnetic field technique and method of manufacturing same	2010-206450	2010 Sep 15
148	Electrochemical Transistor	2010-211492	2010 Sep 22
149	Use of polymeric compounds containing ring compound possessing nitroxyl radical for enhancing the effect of therapeutically active agent	2010-211826	2010 Sep 22
150	Electrolyte materials and its fabrication method for solid fuel cell	2010-213251	2010 Sep 24
151	Chiral shift chemicals for NMR and method determining optical purity or absolute configuration using of the same	2010-216279	2010 Sep 28
152	Tissue adhesive membranes and their fabrication methods	2010-225360	2010 Oct 5
153	Tissue adhesive and their fabrication methods	2010-225368	2010 Oct 5

No.	Name of Invention	Application Number	Date of Application
154	Fabrication method of sulfides and selenides	2010-226230	2010 Oct 6
155	Mixing and expelling devices	2010-229851	2010 Oct 12
156	Ferroelectric films based on superlattice structures, their device, and their production	2010-230132	2010 Oct 13
157	Fabrication method of field effect transistors	2010-231352	2010 Oct 14
158	Switching devices and switch array	2010-242874	2010 Oct 29
159	Graphene film formation and film	2010-247122	2010 Nov 4
160	Fabrication method of dens electrolyte materials for solid fuel cell	2010-250535	2010 Nov 9
161	Bio hybrid materials, their fabrication methods and stents	2010-263403	2010 Nov 26
162	Metal complex compounds, ligands and dye-chromic sensitization solar cells using the metal complex compounds	2010-264260	2010 Nov 26
163	Stent made from nickel-free stainless	2010-264359	2010 Nov 26
164	Metal complex compounds and Dye-chromic sensitization solar cell using the complex compound	2010-264427	2010 Nov 26
165	Metal complex compounds, dye-chromic sensitization solar oxide semiconductive electrodes and dye-chromic sensitization solar cells	2010-268761	2010 Dec 1
166	Zirconium diboride power and method of synthesizing thereof	2010-286891	2010 Dec 24
167	Highly Porous Solid Materials Made of Biodegradable Polymer and Method of Fabricating, Processing, and Cell-Seeding the Same	2011-002204	2011 Jan 5
168	Layered rare-earth hydroxides and their production process	2011-005297	2011 Jan 13
169	Precursor for making bivalence nucleic acid conjugated molecules and their usage	2011-009695	2011 Jan 20
170	Process for producing anion-exchangeable layered double hydroxides (LDHs)	2011-014710	2011 Jan 27
171	Nobel water-swellable layered double hydroxides (LDHs) and process for producing them; and gel, sol, and hydroxide nanosheet materials derived from the water-swellable LDHs and process for producing them.	2011-014742	2011 Jan 27
172	Double oxide stacks, solid electrolyte membrane-electrode junction with the double oxide stacks, lithium secondary batteries, and the production methods of the double oxide stacks	2011-032043	2011 Feb 17
173	Sheet scaffolds for tissue regeneration	2011-051475	2011 Mar 9
174	Single crystallites of metal oxide platelets, corresponding thin films, fabrication method and application in resistive-switching device	2011-052950	2011 Mar 10
175	Structured materials for metal catalysts and their fabrication method	2011-066987	2011 Mar 25
176	Isopropylacrylamide drivatives with azido or alkyne group	2011-067969	2011 Mar 25
177	Immunostimulatory Oligonucleotides	2011-070049	2011 Mar 28
178	Synthetic method for reduced titanium oxides	2011-081599	2011 Apr 1
179	Methods to produce evaluation samples and embedded evaluation samples, and evaluation methods for cell penetration into porous materials	2011-084130	2011 Apr 6
180	Cathode Complex Materials for Solid Oxide Fuel Cells Consisting of a First Material Having Proton or Proton/Electron Conductivities and a Second Material Having Oxide Ion/Electron Conductivity	2011-095576	2011 Apr 22

No.	Name of Invention	Application Number	Date of Application
181	Shortened fiber scaffold and it's aggregated with cells	2011-102759	2011 May 2
182	Adhesives and its manufacturing	2011-104571	2011 May 9
183	I_3^- intercalated layered double hydroxides and fabrication method	2011-111055	2011 May 18
184	Multilayer assemblies of high-k dielectric nanosheets and fabrication methods for multilayer assemblies of high-k dielectric nanosheets, high-k dielectric devices and high-k dielectric thin film devices	2011-112462	2011 May 19
185	Elimination methods of active oxygen and medicines for this purpose	2011-123628	2011 Jun 2
186	Porous carbon films, their fabrication methods and their uses	2011-125485	2011 Jun 3
187	Porous thin films of carbon nitrides, their fabrication methods and their uses	2011-125611	2011 Jun 3
188	Porous copper sulfides, their fabrication methods and their uses	2011-126344	2011 Jun 6
189	Magneto-optical materials, magneto-optical devices, and synthesis method for magneto-optical materials	2011-128998	2011 Jun 9
190	Method of organic thin film formation, organic semiconductor device and organic field effect transistors	2011-141945	2011 Jun 27
191	Dielectric thin films, dielectric thin film devices, and thin film condensers	2011-149486	2011 Jul 5
192	Meso-porous carbon cage finctionalized by amino radicals and their fabrication methods	2011-156513	2011 Jul 15
193	Formation method of composite of conducting polymer and metal and composite materials of conducting polymer and metal	2011-168502	2011 Aug 1
194	Method for predicting interface termination species and an algorithm of the method for computer simulation	2011-173575	2011 Aug 9
195	Method of functionalized HVJ-E	2011-179272	2011 Aug 19
196	Process for producing anion-exchangeable layered double hydroxides (LDHs)	2011-188138	2011 Aug 31
197	Formation of single crystal organic semiconductor and Organic semiconductor device	2011-197147	2011 Sep 9
198	Three-dimensional porous scaffolds with micropatterned structures and the preparation method	2011-200013	2011 Sep 13
199	Sample heating system for measurement of friction force and wear	2011-223559	2011 Oct 11
200	Sputter gun	2011-258456	2011 Oct 11
201	Fabrication process of nanosheet monolayer films by spin-coat method	2011-233848	2011 Oct 25
202	Luminescent Germanium Nanoparticles and method for manufacturing the same	2011-239933	2011 Nov 1
203	Ultra high speed shutter system for vacuum use	2011-258444	2011 Nov 28
204	Polymer electrolyte type anode materials with high CO refractoriness for fuel cells	2011-260234	2011 Nov 29
205	Rolling and elongation process for nickel free and high nitrogen stainless materials, thin tubes made from nickel free and high nitrogen stainless materials, and their fabrication methods	2011-261664	2011 Nov 30
206	New branched polyethylene glycols and their uses	2011-273122	2011 Dec 14

No.	Name of Invention	Application Number	Date of Application
207	Nanomaterials containing polymer nanowires and wire-fabrication method	2011-273538	2011 Dec 14
208	Device for the visualization of the measured results using a sensor array	2011-274223	2011 Dec 15
209	Vertically Stacked Plasmonic Metal Disk Array for Trapping Broadband Light	2011-279027	2011 Dec 20
210	Noble metal nanoparticles of three dimensional dendrite structure and their preparation method	2011-241119	2011 Dec 23

List of Japanese Patent Registrations (October 2007 – December 2011):

No.	Name of Invention	Registration Number	Date of Registration
1	Ga_2O_3 nanowires and their fabrication process	4025869	2007 Oct 19
2	Fabrication process of MgO nanocables and nanotubes	4025872	2007 Oct 19
3	Process for production of BN nanowires	4025873	2007 Oct 19
4	Fabrication process of GaN nanowires covered with gallium oxides	4025876	2007 Oct 19
5	Process for production of BN nanotubes included magnesium peroxides	4029158	2007 Oct 26
6	Manganese oxide nanosheet	4035599	2007 Nov 9
7	Layered cobalt oxide hydrate	4041883	2007 Nov 22
8	Electrochromic film	4051446	2007 Dec 14
9	Porous manganese oxide pillared with aluminum polyoxoions	4065953	2008 Jan 18
10	Single crystalline α-, β-Si_3N_4 nanoribbons and their fabrication process	4072622	2008 Feb 1
11	Lithium tantalate single crystal, its optical devices and growth method	4107365	2008 Apr 11
12	Photorefractive material	4139881	2008 Jun 20
13	Poling method of ferroelectric single crystals	4148451	2008 Jul 4
14	Shape control method of nanostructures	4192237	2008 Oct 3
15	ZnCdS nanocables and their fabrication process	4072622	2009 Feb 20
16	Textured sintered bodies of β-alumina and β''-alumina, and their preparation method	4269049	2009 Mar 6
17	Thin film with ferroelectric mesocrystals and its synthesis method	4360467	2009 Aug 21
18	Hydrous sodium cobalt oxide	4370382	2009 Sep 11
19	Optical Modulator	4420202	2009 Dec 11
20	Ultrahigh Vacuum Scanning Probe Microscope	4431733	2010 Jan 8
21	Semiconductor substrates and production process of them	4441605	2010 Jan 22
22	Aluminum nitride nano tube and method for producing the same	4441617	2010 Jan 22
23	Zinc sulfide nano tube of hexagonal crystal system and method for producing the same	4452813	2010 Feb 12
24	Single crystal α-Alumina tube and its fabrication method	4469982	2010 Mar 12
25	Ceramic porous materials	4478777	2010 Mar 26

No.	Name of Invention	Registration Number	Date of Registration
26	Hologram recording medium and hologram recording/ reproducing device	4496328	2010 Apr 23
27	Method for forming polarization reversal	4521859	2010 Jun 4
28	Biomaterials	4529005	2010 Jun 18
29	Calcium Zirconate Powder	4534001	2010 Jun 25
30	Fabrication method of high pure boron nitride tube	4534016	2010 Jun 25
31	Lithium Niobate single crystal, optical element thereof and method for producing the same	4553081	2010 Jul 23
32	Wavelength conversion element consisting of lithium tantalate single crystal	4569911	2010 Aug 20
33	Electric device by use of solid electrolyte	4575664	2010 Aug 27
34	Highly structural controlled multi-layered ceramics and method of making thereof	4576522	2010 Sep 3
35	Fabrication method of single crystal indium nitride nano tube	4576604	2010 Sep 3
36	Single crystal zinc phosphate nano tube and method for producing the same	4576607	2010 Sep 3
37	Biodegradable and pressure-sensitive material for medical use	4585743	2010 Sep 10
38	Method for forming polarization reversal	4587366	2010 Sep 17
39	Optical element consisting of lithium niobate single crystal wafer and method for producing lithium niobate single crystal body for the wafer	4590531	2010 Sep 24
40	Micro-patterning method	4595119	2010 Oct 1
41	Production of zinc oxide wafers	4610870	2010 Oct 22
42	Cerium phosphate nano tube and method for producing the same	4613342	2010 Oct 29
43	Method for producing optical element with back-switch phenomena and wavelength conversion element obtained by the method	4613347	2010 Oct 29
44	Optical wavelength conversion element and method for producing the same	4613358	2010 Oct 29
45	Ferroelectric material, two-color holographic recording medium and wavelength select filter	4614199	2010 Oct 29
46	The method for preparation of poly (malic acid) copolymers	4621885	2010 Nov 12
47	Zinc oxide phosphor	4635184	2010 Dec 3
48	Controlling method of orientation angle for components consisting of textured single crystals	4635189	2010 Dec 3
49	Method for inverting polarization by controlling charge and wavelength conversion element obtained by the method	4635246	2010 Dec 3
50	Manufacturing method of polymeric fibers	4670080	2011 Jan 28
51	(1) Perfectly Dissolve boron nitride nanotubes by Polymer wrapping. (2) Purification of boron nitride nanotubes through functionalization	4670100	2011 Jan 28
52	Guided bone regeneration membrane	4674315	2011 Feb 2
53	Hydrothermal synthesis of birnessite-type MnO2 nanobelts and the electrochemical measurements	4674347	2011 Feb 4
54	The First Template-Free Growth of Crystalline Silicon Microtubes	4674349	2011 Feb 4
55	Fluorination and electrical conductivity of BN nanotubes	4674353	2011 Feb 4

No.	Name of Invention	Registration Number	Date of Registration
56	Porous composite containing calcium phosphate and process for producing the same	4680771	2011 Feb 10
57	Copper Oxide Thin Film Low-Friction Material and Film-Forming Method Therefore	4686360	2011 Feb 18
58	Apatite/collagen cross-linked porous material containing self-organized apatite/collagen composite and process for producing the same	4699759	2011 Mar 11
59	Fabrication of ZnS/SiC Nanocables, SiC-Shelled ZnS Nanoribbons(and Sheets), and SiC Nanotubes(and tubes)	4701451	2011 Mar 18
60	Large-scale fabrication of Boron nitride nanohorn	4706077	2011 Mar 25
61	Fabrication of Highly Crystalline Side-to Side Biaxial ZnO-Ge, Coaxial ZnO-Ge-ZnO and ge-ZnO-Ge heterostructures	4706078	2011 Mar 25
62	Process of manufacturing of boron nitride nanotubes with decentralized liquids and acile polymeric	4725890	2011 Apr 22
63	Spatially defined positioning technique of materials	4742327	2011 May 20
64	Single-Crystalline Sub-Micrometer ZnSe Tubes	4756236	2011 Jun 10
65	Highly Luminescent Semiconductor GaN Hollow Spheres with very Small Shell Thickness	4756239	2011 Jun 10
66	Cell-immobilized substrates and their preparation method	4761731	2011 Jun 17
67	Two-layer bioreactor	4771123	2011 Jul 1
68	Transmission electron microscope	4788887	2011 Jul 29
69	Artificial vertebra	4790917	2011 Jul 29
70	Manufacturing of porous boron nitrides	4803422	2011 Aug 19
71	Bone outgrowth agent and therapeutic agent for osteoporosis	4814477	2011 Sep 2
72	Single-source precursor for chemical vapor deposition of collapsed boron nitride nanotubes	4817103	2011 Sep 9
73	Magneto-optical materials, synthesis method for magneto-optical materials, and magneto-optical devices utilizing magneto-optical materials	4831595	2011 Sep 30
74	Magnetic artificial superlattices and their fabrication method	4831629	2011 Sep 30
75	Metallic boride doped rare earth higher boride thermoelectric material and its fabrication method	4840755	2011 Oct 14
76	Porous ceramic material and method of producing the same	4844932	2011 Oct 21
77	Production method of molded solid electrolyte	4859007	2011 Nov 11
78	Superconducting materials with high critical current properties and their fabrication method	4859165	2011 Nov 11
79	Method of Warm Spraying	4863487	2011 Nov 18
80	Method of boron nitride nanotube wall diameter control	4873690	2011 Dec 2
81	Micro-patterned nanofibrous nonwoven mat and it manufacturing	4883498	2011 Dec 16

List of International Patent Applications and Registrations (October 2007 – December 2011):

No.	Name of Invention	Application/ Registration Number	Date of Application/ Registration
1	Dielectric devices and their fabrication methods	PCT/JP2007/074552	2007 Dec 20
2	Lead-free magneto-optical devices and their fabrication methods	PCT/JP2008/054656	2008 Mar 13
3	Recording media, its implementation, and the methods of recording and erasing information	PCT/JP2008/054917	2008 Mar 17
4	Mesoporous carbon nitride and its synthetic method	PCT/JP2008/056802	2008 Apr 4
5	High strength and high ductility magnesium alloys	PCT/JP2008/058677	2008 May 9
6	Magnetio Film, Magnetio Recording/Reproducing Device, and Polarization Conversion Component	US Patent 12/135472	2008 Jun 9
7	Method of inverting polarization by controlling defect density or degree of order of lattice points, and optical wavelength conversion element	German Patent 602004014399.5-08	2008 Jun 11
8	Method of inverting polarization by controlling defect density or degree of order of lattice points, and optical wavelength conversion element	UK Patent 1684112	2008 Jun 11
9	Wavelength conversion element having multi-gratings and light generating apparatus using said element, and wavelength conversion element having cylindrical ferroelectric single crystals and light generating apparatus using said element	US Patent 7403327	2008 Jul 22
10	Organic solvent dispersion of titania nanosheet and its film	PCT/JP2008/065989	2008 Sep 4
11	Fabrication method of sensor material for surface enhanced infrared absorption	PCT/JP2008/066107	2008 Sep 5
12	Optical electric field amplifying element and probe using the same	PCT/JP2008/069366	2008 Oct 24
13	Method of inverting polarization by controlling defect density or degree of order of lattice points, and optical wavelength conversion element	US Patent 7446930	2008 Nov 4
14	Totally-solid lithium secondary battery	PCT/IB2009/000240	2009 Feb 12
15	Electrode element, method of manufacturing electrode element, and lithium ion secondary battery	PCT/IB2009/000279	2009 Feb 17
16	Hollow spheres and flakes of titanium dioxide and their production method	US Patent 7531160	2009 May 12
17	Dielectric films, high-k devices and their fabrication methods	PCT/JP2009/059550	2009 May 25
18	Dielectric Film, Dielectric Element, and Process for Producing the Dielectric Element	US Patent 12/933952	2009 May 25
19	Dielectric Film, Dielectric Element, and Process for Producing the Dielectric Element	Korea Patent 2010-7025789	2009 May 25
20	Electromagnetic wave absorbers	PCT/JP2009/060636	2009 Jun 10
21	Luminous nanosheets and their applications in phosphor materials, solar cells, color displays, nanosheet paint	PCT/JP2009/062681	2009 Jul 13
22	Cantilever based Sensors and Transducers	US Patent 7560070 B1	2009 Jul 14
23	High-performance all-solid lithium battery	Chinese Patent ZL200580018142.X	2009 Jul 15
24	Alloy particles and wires used for atmospheric plasma spray and wire arc spray	PCT/JP2009/066508	2009 Sep 24

No.	Name of Invention	Application/ Registration Number	Date of Application/ Registration
25	High thermal conductive prepregs, their fabrication process and laminates	PCT/JP2009/068293	2009 Oct 19
26	Fabrication of dual structure ceramics by a single step process	US Patent 61/255645	2009 Oct 28
27	Analysis of Ex vivo cells for disease state detection and therapeutic agent selection and monitoring	PCT/JP2008/085194	2009 Nov 26
28	Process for producing flaky titanium oxide capable of absorbing visible light	US Patent 7651675	2010 Jan 26
29	TiO_2 nano particles	PCT/JP2010/051256	2010 Jan. 29
30	Boron nitride spherical nano-grains and fabrication method of the same	US Patent 12/698897	2010 Feb 2
31	Nested Modulator	US Patent 7689067	2010 Mar 30
32	Ultra thin boron nitride nano-sheets, fabrication method of the same and optical devices containing sheets of the same	US Patent 12/758787	2010 Apr 12
33	Anode material and lithium secondary battery with the same	PCT/JP2010/058110	2010 May 13
34	Hydrogen generation equipment and making materials thereof	PCT/JP2010/058770	2010 May 24
35	Counting method of two-dimensional atomic film and its system	PCT/JP2010/145314	2010 Jun 25
36	Solid electrolyte switching device, FPGA using same, memory device, and method for manufacturing solid electrolyte switching device	US Patent 77503332	2010 Jul 6
37	Biological low molecular weight derivatives	US Patent 7741454	2010 Jul 22
38	Scaffold for regenerating hard/soft tissue interface	Canada Patent 2489156	2010 Sep 7
39	Method of controlling average pore size of porous materials containing apatite/collagen composite fiber materials	Australia Patent 2005/230313	2010 Sep 16
40	Method of controlling average pore size of porous materials containing apatite/collagen composite fiber materials	Singapore Patent 125780	2010 Oct 29
41	Fabrication method and structure of electrode for organic device	PCT/JP2010/071096	2010 Nov 26
42	Composite porous materials containing calcium phosphate and fabrication method of the same	European Patent 1642599	2010 Dec 1
43	Process for producing anion-exchangeable layered double hydroxides (LDHs)	PCT/JP2011/014710	2011 Jan 27
44	Nobel water-swellable layered double hydroxides (LDHs) and process for producing them; and gel, sol, and hydroxide nanosheet materials derived from the water-swellable LDHs and process for producing them	PCT/JP2011/014742	2011 Jan 27
45	Solid battery	Chinese Patent 2011-10036463.X	2011 Feb 9
46	All-solid battery	PCT/JP2011/056989	2011 Mar 23
47	Artificial vertebra	European Patent 1362565	2011 May 4
48	Surface stress sensor	PCT/JP2011/060673	2011 May 9
49	Polymeric fibers and its manufacturing method and its production devices	PCT/JP2011/60758	2011 May 10

No.	Name of Invention	Application/ Registration Number	Date of Application/ Registration
50	Nano-materials Transfer Printing Conserving the Atomic Surface Cleanness of the Recipient	European Patent 2011-047362	2011 Jun 27
51	Electrode element, method of manufacturing electrode element, and lithium ion secondary battery	Australia Patent 2009/215336 B2	2011 Jul 14
52	All-solid lithium battery	US Patent 7993782 B2	2011 Aug 9
53	Temperature measuring method using micro temperature sensing element	European Patent 1640695	2011 Aug 10
54	Method of controlling average pore diameter of porous material containing apatite/collagen composite fiber	US Patent 8008357	2011 Aug 30
55	Boron nitride based fiber paper and manufacturing process thereof	US Patent 8025766 B2	2011 Sep 27
56	Ferroelectric thin films with superlattice structures, fabrication method for ferroelectric thin films, ferroelectric devices, and fabrication method for ferroelectric devices	PCT/JP2011/072844	2011 Oct 4
57	Magnesium-based Biodegradable Metallic Material	US Patent 8034101 B2	2011 Oct 11
58	Lithium ion-conductive solid electrolyte	US Patent 8053116 B2	2011 Nov 8

Note: Additional MANA patents applications are not listed in this Appendix, because of privacy reason of the involved MANA researchers.

Appendix 8.11: Commendations

List of Commendations (October 2007 – March 2012):

Date	Prize	Prize Winners from MANA	Research for Commendation
2007 Oct	Poster Award at the Second International Symposium on Atomic Technologies	Yukio Nagasaki	Artificial chaperon system of amphiphilic polymer in combination with small additives to prevent protein aggregation
2007 Oct	Poster Award at the Second International Symposium on Atomic Technologies	Yukio Nagasaki	Nanobiomaterials-design of pH-sensitive PEGylated nanogels containing fluorinated compounds as tumor-specific smart ^{19}F MRI probes
2007 Nov	Days highlighted talk in MRS Fall Meeting 2007, Boston, USA	Somobrata Acharya	Ultra-thin Nanosheet Fabrication from Ultra-narrow PbS Nanowires
2007 Nov	SSSJ Review Paper Award	Kazuya Terabe, Tsuyoshi Hasegawa, Tomonobu Nakayama, Masakazu Aono	Atomic switch-a nano device using motion of atoms and ions
2007 Dec	Papers of Editors' Choice of Journal of the Physical Society of Japan	Shin Yaginuma, Katsumi Nagaoka, Tadaaki Nagao, Tomonobu Nakayama	Electronic structure of Ultrathin Bismuth Films with A7 and Black-Phosphorus-like Structures
2008 Jan	Best Cover Image, Competition of the Year 2007, Journal: Materials Today	Dmitri Golberg, Guoshen Shen, Masanori Mitome, Yoshio Bando	"Solar Flares", an image of a CdS nanobelt deformed inside a transmission electron microscope
2008 Jan	Best Poster Presentation Award at the Meeting of Special Postdoctoral Researchers Program, RIKEN, Japan	Satoshi Moriyama	Shell structures and spin configurations in carbon nanotube artificial atoms
2008 Feb	Poster Award at the 18th Symposium of Materials Research Society of Japan	Yukio Nagasaki	Synthesis of acetal-poly(ethyleneglycol)-b-poly (chloromethylstyrene) and application for functional bioimaging nanosphere
2008 Feb	Khwarizmi International Award by IRST Iran, Laureate of KIA	Ajayan Vinu	Multifunctional Nanoporous Materials
2008 Feb	Poster Award at WPI-AIMR & IFCAM Joint Workshop	Genki Yoshikawa	Evaluation of Sensitivity and Selectivity of Piezoresistive Cantilever-Array Sensors
2008 Mar	Poster Award at the First International Symposium on Interdisciplinary Materials Science	Yukio Nagasaki	Preparation and Characterization of Tumor-Specific Imaging Probes Utilizing the pH-sensitive PEGylated Nanogels Containing ^{19}F Compounds
2008 May	Asian Excellent Young researcher Lectureship Award 2008, Chemical Society of Japan	Ajayan Vinu	Discovery of Mesoporous Carbon Nitride (MCN), Boron Nitride and Boron carbon Nitride

Date	Prize	Prize Winners from MANA	Research for Commendation
2008 May	Best Poster Award at the International Workshop on Nanomechanical Cantilever Sensors	Genki Yoshikawa	Evaluation of Sensitivity and Selectivity of Piezoresistive Cantilever-Array Sensors
2008 Jul	Award for Best Research by Young Scientist at the International Conference on Carbon (Carbon 2008), Nagano, Japan	Yoshio Bando, Ujjal Gautam, Dmitri Golberg	Manipulating the current conductivity of halide-filled multi-walled carbon nanotubes
2008 Jul	Inoue Harushige Award of Japan Science and Technology Agency	Kenji Kitamura	Advancing Optical Technology by Controlling Single Crystal Defects
2008 Jul	2008 Tsukuba Prize	Takayoshi Sasaki, Minoru Osada	Synthesis of inorganic nanosheets and their organization into functional materials
2008 Aug	Best Oral Paper Award at IUMRS-ICEM 2008, Australia	Xiaosheng Fang, Yoshio Bando, Ujjal K Gautam, Dmitri Golberg	1D ZnS Nanostructures: Controlled Growth and Field-emission Applications
2008 Sep	SPSJ Hitachi Chemical Award	Masayoshi Higuchi	Discovery of electrochromic properties in organic-metallic hybrid Polymer and application to color electronic paper
2008 Sep	Outstanding Research Award of the Magnetic Society of Japan	Kazuhiro Hono	Excellent research on the microstructure-property relationships of magnetic materials
2008 Sep	Fellow of the International Society of Electrochemistry	Kohei Uosaki	Scientific achievements within the field of electrochemistry
2008 Oct	Fellow of the American Ceramic Society	Yoshio Bando	Studies of inorganic nanotubes
2008 Oct	5th Osawa Award of the Fullerenes and Nanotubes Research Society	Yasuhiro Shirai	Design, Synthesis, and Testing of Fullerene-wheeled Nanocars
2008 Nov	IWDTF Young Researcher Award	Jun Chen	Study on carrier transport in high-K gate dielectric
2008 Dec	Award for Encouragement of Research in Materials Science at the IUMRS International Conference in Asia 2008	Alexei Belik	Effects of doping on structural, physical, and chemical properties of multiferroic $BiMnO_3$ and $BiCrO_3$
2008 Dec	MRS Best Poster Award at MRS Fall Meeting, Boston, USA	Naoki Fukata	Phosphorus Donors and Boron Acceptors in Silicon Nanowires Synthesized by Laser Ablation
2008 Dec	Award for Encouragement of Research in Materials Science at the IUMRS International Conference in Asia 2008	Pavuluri Srinivasu, Ajayan Vinu	Pore-size control of mesoporous materials using high temperature microwave treatment
2009 Jan	Journal of Materials Chemistry, Cover Image Winner	Junqing Hu, Yoshio Bando, Dmitri Golberg	Novel semiconductor nanowire heterostructures: synthesis, analysis, properties and applications
2009 Mar	Incentive Award for Excellent Presentation	Masakazu Aono, Tomonobu Nakayama	Ultra-high density data storage into a C_{60} thin film using an STM probe

Date	Prize	Prize Winners from MANA	Research for Commendation
2009 Mar	Excellent Poster Award at the 3rd International Symposium on Atomic Technology (ISAT-3)	Yukio Nagasaki	Preparation and Characterization of pH-sensitive 19F-MRI Nano-probes Based on the PEGylated Nanogels
2009 Mar	CSJ Award for Young Chemists by the Chemical Society of Japan	Ajayan Vinu	Research on Nanoporous carbons and nitrides
2009 Apr	The Young Scientists' Prize by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT)	Minoru Osada	Nanoscale structural control and novel physical properties in transition metal oxides
2009 May	Advanced Materials, Cover Image Winner	Xiosheng Fang	Single-crystalline ZnS nanobelts as ultraviolet-light UV sensors
2009 May	Journal of Materials Chemistry, Cover Image Winner	Ujjal Gautam, Yoshio Bando, Xiosheng Fang, Dmitri Golberg	Synthesis of metal-semiconductor heterojunctions inside carbon nanotubes
2009 May	Fellow of the Royal Society	James K. Gimzewski	Pioneering the use of the scanning tunneling microscope to image, characterize and manipulate molecules on surfaces
2009 May	2009 Honda Frontier Award by the Honda Memorial Foundation	Kazuhiro Hono	Research on nano-structures and characterizations of metallic materials
2009 Jun	Best paper award in 2009 of the Thermal Spraying Society, Japan	Jin Kawakita, Sachiko Hiromoto, Akiko Yamamoto, Norio Maruyama	Fabrication and mechanical properties of composite structure by Warm Spraying of Zr-base metallic glass
2009 Jun	Best Paper Award at the 62th Meeting of the Japanese Oxidative Stress Society	Yukio Nagasaki	Radical-containging Nanoparticle for Cerebral Ischemia-reperfution Damage
2009 Jun	Best Poster Award at the 10th International Conference on Science and Technology of Nanotubes	Mingsheng Wang, Dmitri Golberg, Yoshio Bando	Interface dynamic behavior between carbon nanotube and metal electrode
2009 Jun	Advanced Functional Materials, Cover Image Winner	Chunyi Zhi	Towards highly thermo-conductive electrically insulating polymeric composites with boron nitride nanotubes as fillers
2009 Jul	Special Prize at the 3rd Grand Prize for Japan MONOTSUKURI, by the Ministry of Education, Culture, Sports, Science and Technology (MEXT)	Kenji Kitamura	Commercialization of highly functional optical single crystals grown under defect density control and optical devices using them
2009 Jul	Best Poster Award at the 38th Symposium on Polymer for Biomaterial Science	Yukio Nagasaki	Design of pH-sensitive Radical-containing Nanoparticle for Bioimaging of Oxidative Stress in vivo
2009 Jul	Academician of World Academy of Ceramics	Yoshio Sakka	Ceramic processing

Date	Prize	Prize Winners from MANA	Research for Commendation
2009 Aug	The 41st Ichimura Award by the New Technology Development Foundation, Japan	Daisuke Fujita	Development of active nanoprobe measurement technology under controlled environments
2009 Aug	Advanced Functional Materials, Cover Image Winner	Tianyou Zhai	Characterization, cathodolumenescence and field-emission properties of morphology-tunable CdS micro/nanostructures
2009 Sep	Honorary Doctorate of the University of the Mediterranean, Aix-Marseille II, in France.	James K. Gimzewski	Exploration of Creativity and Imagination in fields of Nanotechnology and its future Role on Society with emphasis on Nano-Neuromorphic Information Technology and Material Nanoarchitectonics
2009 Sep	JSCTA Award for Young Scientists	Kohsaku Kawakami	Thermal Analysis of Physical State of Crystalline/Grassy Pharmaceuticals
2009 Sep	Excellent Poster Award at the International Forum on Post-Genome Technologies (IFPT' 6)	Yukio Nagasaki	Advanced genome sequencing Completely stable streptavidin immobilized on magnetic beads in terms of thermal treatment cycles
2009 Sep	Award for Younger Researchers by Japan Society for Analytical Chemistry	Jun Nakanishi	Fluorescence imaging of protein conformational change in living cells and photopatterning of cells
2009 Oct	The Richard M. Fulrath Award from the American Ceramics Society	Naoki Ohashi	Contribution to thin film synthesis and properties of functional ceramics
2009 Oct	BCSJ Award of the Chemical Society of Japan	Kohei Uosaki,	In situ Scanning Tunneling Microscopy Observation of Metal-Cluster Redox Interconversion and CO Dissociation Reactions at a Solution/Au(111) Interface
2009 Oct	Fellow of the Electrochemical Society	Kohei Uosaki	Scientific achievements within the field of electrochemistry
2009 Nov	The Best Poster Award at the 4th International Symposium of Atomic Technology	Yukio Nagasaki	Enhanced Stability of Biodegradable Polymeric Micelles Encapsulating Boron Cluster for Boron Neutron Capture Therapy
2009 Nov	MNC 2008 Award for Most Impressive Presentation Award	Yuji Okawa, Tsuyoshi Hasegawa, Masakazu Aono	Fabrication of nanostructures composed of copper-phthalocyanine and diacetylene molecules
2009 Dec	Best Poster Award at Winter School on the Chemistry and Physics of Materials	Mamiko Kawakita, Jin Kawakita, Yoshio Sakka	Orientation dependence of energy level in anatase TiO_2 polycrystalline aggregates
2009 Dec	Dalton Transactions, Hot Article	Takao Mori	Effect of Zn doping on improving crystal quality and thermoelectric properties of borosilicides
2009 Dec	Award of Excellence in the field of Chemical Sciences from the Indian Society of Chemists and Biologists (ICSB)	Ajayan Vinu	Research on nanoporous carbons and nitrides

Date	Prize	Prize Winners from MANA	Research for Commendation
2009 Dec	Advanced Materials, Cover Image Winner	Mingsheng Wang, Dmitri Golberg, Yoshio Bando	Multi-branched junctions of carbon nanotubes via metal particles
2010 Jan	Poster Award at the 22nd Symposium of Research Group on Polymer Gels	Yukio Nagasaki	Enhanced Serum Cholesterol Reduction in Vivo by PEGylated Nanogels Containing Quaternary Polyamine Core as a Bile Acid Adsorbent
2010 Jan	Elected in the Advisory Board of the World Academy of Ceramics	Enrico Traversa	Electroceramics
2010 Jan	Dr. Sistala Kameswari Young Scientist award from the Catalysis Society of India	Ajayan Vinu	Multifunctional Nanoporous Materials
2010 Feb	Journal Issue Cover Image Winner	Xiaosheng Fang, Yoshio Bando, Dmitri Golberg	An efficient way to assemble ZnS nanobelts as ultraviolet-light sensors with enhanced photocurrent and stability
2010 Feb	Research highlighted in Nanotechnology Thought Leaders Series	Dmitri Golberg	Boron nitride nanotubes and nanosheets: Introduction and recent advances
2010 Feb	Best Presentation Award at the 10th RGM1 Meeting, Japan	Yukio Nagasaki	Evaluation of the tumor targeting potency of 5-aminolevulinic acid
2010 Feb	Inoue Research Aid for Young Scientists	Yusuke Yamauchi	Synthesis and characterization of mesoporous metals and related nanomaterials from lyotropic liquid crystalline media
2010 Mar	Marubun Science Award	Masayoshi Higuchi	Development of organic-metallic hybrid polymer materials and their application to electronics
2010 Mar	Young Scientist Award of the Physical Society of Japan	Masanori Kohno	Spinons and triplons in spatially anisotropic frustrated antiferromagnets
2010 Mar	American Chemical Society Nano Web Highlight	Chun Li, Yoshio Bando, Dmitri Golberg	Current imaging and electromigration-induced splitting of individual GaN nanowires as revealed by conductive atomic force microscopy
2010 Mar	Young Investigator Award of the Oxygen Club of California	Yukio Nagasaki	Design of pH-sensitive polymeric micelle possessing reduced forms of TEMPO for imaging of ROS
2010 Mar	Chemical Society of Japan Award	Kohei Uosaki	In situ nanoscale structural determination and construction of functional phases at solid/liquid interfaces
2010 April	Honorary Doctorate from the University of Strathclyde, Glasgow, Scotland	James K. Gimzewski	For the development of the use of scanning tunnelling microscopy (STM) in the imaging of molecules and the use of the method to identify cancerous cells in patients with lung, breast and pancreatic cancers

Date	Prize	Prize Winners from MANA	Research for Commendation
2010 Apr	NIMS President's Research Achievement Award 2010	Tsuyoshi Hasegawa, Kazuya Terabe	Significant contributions to the area of the Atomic Switch: from its invention and fundamental research, to studies of its practical use
2010 Apr	American Chemical Society Nano Web Highlight	Jing Lin, Yoshio Bando, Dmitri Golberg	Synthesis of In_2O_3 nanowire decorated Ga_2O_3 nanobelt heterostructures and their electrical and field-emission properties
2010 Apr	Award for the best poster at the 3rd Hsinchu - Tsukuba Joint Workshop on Nano and Bio-related Materials and Technologies	Yukio Nagasaki	Nitric oxide photo-generative polymer micelle for new cancer therapy
2010 Apr	Young Scientist's Prize for the Commendation of Science and Technology by the Ministry of Education, Culture, Sports, Science and Technology (MEXT)	Katsunori Wakabayashi	Research for the nano-scale effect on electronic properties of graphene
2010 Apr	The Ceramic Society of Japan Award for Advancements in Ceramic Science and Technology	Yusuke Yamauchi	Mesostructural controls by utilizing strong magnetic field and confined spaces
2010 May	Advanced Functional Materials, Cover page	Corrado Mandoli, Giancarlo Forte, Enrico Traversa	Stem Cell Aligned Growth Induced by CeO_2 Nanoparticles in PLGA Scaffolds with Improved Bioactivity for Regenerative Medicine
2010 May	Collaborative Research Award of Tohoku University and Institute for Materials Research (IMR)	Takao Mori	Development of Novel High Temperature Thermoelectric Materials
2010 May	JSPM Award for Distinguished Achievements in Research	Yoshio Sakka	Texture control of feeble magnetic ceramics by colloidal processing in strong magnetic field
2010 May	JSPM Award for Innovatory Research	Yoshihiro Tsujimoto	Synthesis of novel infinite layer iron oxide $SrFeO_2$ by low-temperature reduction method
2010 Jun	Poster Award at the 63th Meeting of the Society for Free Radical Research of Japan	Yukio Nagasaki	PEGylated polymer micelle-based nitric oxide (NO) photodonor with NO-mediated antitumor activity
2010 Jun	Award of the Adhesion Society of Japan	Tetsushi Taguchi	Development of tissue adhesives for the prevention of catheter infection
2010 Jun	Presentation at 11th ICAM 2009 & 8th Brazilian MRS Meeting 2009, reported in MRS Bulletin	Enrico Traversa	Fuel Cells for Sustainable Energy Production: With or Without Hydrogen
2010 Jun	Presentation at 11th ICAM 2009 & 8th Brazilian MRS Meeting 2009, reported in MRS Bulletin	Enrico Traversa	Tuning Hierarchical Architectures of 3D Polymeric Scaffolds for Cardiac Tissue Engineering

Date	Prize	Prize Winners from MANA	Research for Commendation
2010 Jul	Advanced Functional Materials paper reported in MRS Bulletin	Corrado Mandoli, Giancarlo Forte, Enrico Traversa	Stem Cell Aligned Growth Induced by CeO_2 Nanoparticles in PLGA Scaffolds with Improved Bioactivity for Regenerative Medicine
2010 Aug	Best Poster Award at the 18th International Vacuum Congress (IVC-18)	Daisuke Fujita	High temperature in situ AFM/STM observation of decomposition and cleaning process of ultrathin SiO_2 films on Si(111) surfaces in ultra-high vacuum
2010 Aug	Journal Issue Cover Image Winner	Tianyou Zhai, Yoshio Bando, Dmitri Golberg	Morphology-tunable In_2Se_3 nano-structures with enhanced electrical and photoelectrical performances via sulfur doping
2010 Sep	Poster Award at the 4th AEARU Advanced Materials Workshop on Artificial and Self-Organized Nanostructure Sciences and Nano-Technologies for the Sustainable World	Kadowaki Kadowaki	Study on the Geometrical Resonance in a Nearly Square Mesa and the Frequency Spectrum from the Inner Branches of Intrinsic Josephson Junctions in $Bi_2Sr_2CaCu_2O_{8+\delta}$
2010 Sep	Best Paper Award of the Japan Institute of Metals, Section Microstructures	Naoyuki Kawamoto	Precise resistivity measurements of submicrometer-sized materials by using TEM with microprobes
2010 Sep	Mitsubishi Chemical Award by the Society of Polymer Science	Yukio Nagasaki	Engineering of poly(ethylene glycol) chain-tethered surfaces
2010 Sep	Tsukuba Encouragement Prize for Young Researchers	Tetsushi Taguchi	Development of tissue adhesive material and technology for the next generation of medicine
2010 Sep	Small paper, reported in the MRS website at Materials News	Enrico Traversa	Enhancement of Ionic Conductivity in SDC/YSZ Heteroepitaxial Structures
2010 Sep	Lectureship Award 2010 of the Japanese Photochemistry Association	Kohei Uosaki	Construction of Organic Monolayers on Solid Surfaces and Their Photo Functions
2010 Oct	Polymer Chemistry Poster Prize at the International Symposium on Stimuli-Responsive Materials	Mitsuhiro Ebara, Takao Aoyagi	Stimuli-responsive Self-assembly System That Can Form and Stabilize Nanoparticles at the Desired Size by Simple Mixing and Heating/Cooling of the Selected Block Copolymers
2010 Oct	Macromolecular Bioscience, Cover page	Corrado Mandoli, Giancarlo Forte, Enrico Traversa	Thick Soft Tissue Reconstruction on Highly Perfusive Biodegradable Scaffolds
2010 Nov	Research Spotlight on Nanowerk.com	Yoshio Bando, Dmitri Golberg	The rise of “white” graphene
2010 Nov	Energy and Environmental Science paper, reported on the Materials News website of Wiley	Lei Bi, Emiliana Fabbri, Enrico Traversa	A Novel Ionic Diffusion Strategy to Fabricate High-Performance Anode-Supported Solid Oxide Fuel Cells (SOFCs) with Proton-Conducting Y-Doped $BaZrO_3$ Films

Date	Prize	Prize Winners from MANA	Research for Commendation
2010 Nov	Advanced Functional Materials paper, reported in the Materials News website of Wiley	Emiliana Fabbri, Lei Bi, Hidehiko Tanaka, Daniele Pergolesi, Enrico Traversa	Chemically Stable Pr an Y Co-Doped Barium Zirconate Electrolytes with High Proton Conductivity for Intermediate Temperature Solid Oxide Fuel Cells
2010 Nov	The research-related interview broadcasted on the 1st State Channel of Russian TV (ORT)	Dmitri Golberg	Boron nitride nanotubes
2010 Nov	Young Ceramist Best Presentation Award at the 26th International Japan-Korea Seminar on Ceramics	Sachiko Hiromoto	Formation of Hydroxyapatite Coatings on Bioabsorbable Magnesium to Improve its Corrosion Resistance.
2010 Nov	Young Investigator Award at the 2010 International Symposium of Materials on Regenerative Medicine	Hongxu Lu	Development of Funnel-Like Scaffolds for Cartilage Tissue Engineering Using Embossing Ice Particulate Templates
2010 Nov	Young Investigator Award at the 17th Annual Meeting of the Society for Free Radical Biology and Medicine, Orlando, Florida	Yukio Nagasaki	Design of redox imaging nanoprobe using nitroxyl radical containing nanoparticle
2010 Nov	Electrical Science and Engineering Award	Kazuhito Tsukagoshi	Development of Organic transistor based on metal/organic interface control
2010 Nov	Award for Excellence 2010 of the Indian Society of Chemists and Biologists	Ajayan Vinu	Outstanding research accomplishments in the field of nanoporous materials.
2010 Nov	Wilhelm Friedrich Bessel Award 2010 by the Alexander von Humboldt Foundation	Ajayan Vinu	Outstanding research accomplishments in the field of nanoporous materials.
2010 Nov	Featured highlight on MaterialsViews.com	Mingsheng Wang, Yoshio Bando, Dmitri Golberg	Superstrong low resistant carbon nanotube–carbide–metal nanocontacts
2010 Dec	Feynman Prize 2010	Masakazu Aono	His pioneering and continuing work, including research into the manipulation of atoms, the multi-probe STM and AFM, the atomic switch, and single-molecule-level chemical control including ultra-dense molecular data storage and molecular wiring
2010 Dec	Nice Step Researcher 2010	Katsuhiko Ariga	World excellent contribution on application of supramolecular materials
2010 Dec	Best research in frontier area at the TX Technology Showcase	Katsuhiko Ariga	Auto-modulated drug derivery
2010 Dec	Best Paper Prize of the Science and Technology of Advanced Materials	Katsuhiko Ariga, Jonathan P. Hill, Michael V. Lee, Ajayan Vinu, Richard Charvet, Somobrata Acharya	Challenges and breakthroughs in recent research on self-assembly

Date	Prize	Prize Winners from MANA	Research for Commendation
2010 Dec	Materials featured highlight, Nature Publishing Group Asia	Yoshio Bando, Dmitri Golberg	White graphenes: Boron nitride nanoribbons via boron nitride nanotube unwrapping
2010 Dec	Best Collaborative Research Award at the 10th TX Technology Showcase in Tsukuba	Naoki Kawazoe, Guoping Chen	Development of synthetic polymer-collagen hybrid meshes for regenerative medicine
2010 Dec	Award at the 25th Kanto Area Regional Meeting of Society for Free Radical Research Japan, SFRR Japan	Yukio Nagasaki	Novel Nano-therapy of renal ischemia-reperfusion injury
2010 Dec	Nature Materials paper, reported in MRS Bulletin	Daniele Pergolesi, Emiliana Fabbri, Enrico Traversa	High Proton Conduction in Grain-Boundary-Free Yttrium-Doped Barium Zirconate Films Grown by Pulsed Laser Deposition
2011 Jan	Excellent Presentation Prize at the 22nd Symposium of Research Group on Polymer Gels	Yukio Nagasaki	Study on stabilization of B-containing polymer micelles and their development to medical treatments by B neutron trapping
2011 Jan	Physical Review Letters, Cover Image Winner	Zhi Wang, Xiao Hu	Interference and Switching of Josephson Current Carried by Nonlocal Spin-Entangled Electrons in a SQUID-like System with Quantum Dots
2011 Feb	ISCB Award for Excellence	Katsuhiko Ariga	Excellent Research on Supramolecular Science
2011 Mar	Naito Taisyun Memorial Award of the Naito Taisyun Science and Technology Foundation	Tadaaki Nagao	Measurement and applications on atomic-scale and mesoscale infrared plasmonic materials
2011 Apr	NIMS President's Research Award	Katsuhiko Ariga	Excellent Research on Supramolecular Science and Publication of Excellent Review Articles
2011 Apr	NIMS President's Research Award	Emiliana Fabbri, Daniele Pergolesi	For development of high performance and chemically stable oxide proton conductors
2011 Apr	Small, Frontispiece Image winner	Xiaosheng Fang, Tianyou Zhai, Yoshio Bando, Dmitri Golberg	Tube-in-Tube TiO_2 Nanotubes with Porous Walls: Fabrication, Formation Mechanism, and Photocatalytic Properties
2011 Apr	Outstanding Poster Award	Takahiro Nagata	Oxygen migration at Pt or Cu/HfO_2 interface under bias operation: oxide based ReRAM application
2011 Apr	Young Scientist's Prize for the Commendation of Science and Technology by the Ministry of MEXT	Jun Nakanishi	Development of Photoresponsive Cell Culture Substrates
2011 Apr	NIMS President's Research Award	Tetsushi Taguchi	Development of tissue-adhesive materials and technology for biomedical applications

Date	Prize	Prize Winners from MANA	Research for Commendation
2011 May	Journal of Materials Chemistry, Cover Image Winner	Liang Li, Xiaosheng Fang, Tianyou Zhai, Yoshio Bando, Dmitri Golberg	WO_3 nanowires on carbon papers: electronic transport, improved ultraviolet-light photodetectors and excellent field emitters
2011 May	Award of the Outstanding Papers 2010, published in the JCerSJ	Naoto Shirahata, Yoshio Sakka	Controlled Organic/Inorganic Interface Leading to the Size-tunable Luminescence from Si Nanoparticles
2011 May	IUMAS-V Best Poster Award, Gold Prize, Seoul, Korea	Xianlong Wei, Yoshio Bando, Dmitri Golberg	Post-synthesis substitutional doping of individual multiwalled boron nitride nanotubes via in situ electron beam irradiation
2011 Jun	Small, Journal Cover Image Selection	Xiaosheng Fang, Tianyou Zhai, Yoshio Bando, Dmitri Golberg	Tube-in-tube TiO_2 nanotubes with porous walls
2011 Jun	Most Cited Award of Analytical Sciences 2010	Jun Nakanishi	Recent Advances in Cell Micropatterning Techniques for Bioanalytical and Biomedical Sciences
2011 Jun	Knighthood in the Queen's Birthday Honors list	Mark E. Welland	Science & Engineering
2011 Jul	Journal of Materials Chemistry Cover Image Selection	Xiaosheng Fang, Tianyou Zhai, Yoshio Bando, Dmitri Golberg	WO_3 nanowires on carbon papers: electronic transport, improved ultraviolet-light photodetectors and excellent field emitters
2011 Jul	Excellent Presentation Prize, The 40th Meeting of the Research Group on Biomedical Polymers	Yukio Nagasaki	Fine design and functional evaluation of PEG-reacted poly amine Au nano-particles aiming to gen therapies
2011 Jul	Excellent Presentation Prize at the 64th Meeting of the Society for Free Radical Research Japan	Yukio Nagasaki	Anti-cancer therapies using nanoparticles containing nitroxide radicals – effects of active adjuvant by ROS eliminated anti-cancer drags
2011 Jul	Promotion Prize at the 64th Meeting of the Society for Free Radical Research Japan	Yukio Nagasaki	Therapies for anti-liver ischemic reperfusion using redox reactive nano-particles
2011 Jul	Nanoscale Poster Prize at the International Conference on Materials for Advanced Technologies (ICMAT 2011)	Lok Kumar Shrestha, Katsuhiko Ariga	Structure and Dynamics of Nonionic Surfactant Micelles in Non-aqueous Media
2011 Aug	The Fellow of the Institute of Physics, UK	Tadaaki Nagao	Pioneering research on the atomic-scale and mesoscale infrared plasmons
2011 Sep	RIKEN Research Cover Highlight	Fatin Hajjaj, Kentaro Tashiro	Locking in Molecular Magnetism
2011 Sep	Healthcare Young Investigator Award at the 5th Biennial Meeting of Society for Free Radical Research	Yukio Nagasaki	Ulcerative Colitis Treatment by Nitroxide Radical-Containing Nanoparticle

Date	Prize	Prize Winners from MANA	Research for Commendation
2011 Sep	Gold Medal of the Department of Energy, USA	Mark E. Welland	Outstanding leadership and wise counsel as Chief Scientific Advisor to the United Kingdom
2011 Sep	Defense Medal for Exceptional Public Service of the Department of Defense, USA	Mark E. Welland	Exceptional public service and highlights his many contributions to anti-proliferation
2011 Sep	ACS Applied Materials & Interfaces, Web Highlight Selection	Chunyi Zhi, Yoshio Bando, Dmitri Golberg	Noncovalent functionalization of disentangled boron nitride nanotubes with flavin mononucleotides
2011 Oct	Award for the Review and Assessment of Grand-in-Aids for Scientific Research, JSPS, Japan	Kazuo Kadowaki	Excellent Contribution for Review and Assessment of Grant-in-Aids for Scientific Research
2011 Oct	Paper of Editors' Choice of Japanese Journal of Applied Physics	Baowen Li, Minoru Osada, Yasuo Ebina, Tadashi C. Ozawa, Takayoshi Sasaki	Solution-based fabrication of perovskite multilayers and superlattices using nanosheet process
2011 Oct	Presentation Award at the International Conference on Advanced Materials and Nanotechnology (ICAMN-2011)	Tadaaki Nagao	Electromagnetic standing waves in nano-objects
2011 Oct	American Ceramic Society Ross Coffin Purdy Award 2011 for the best paper on ceramics published in 2010	Daniele Pergolesi, Emiliana Fabbri, Enrico Traversa	High proton conduction in grain-boundary-free yttrium-doped barium zirconate films grown by pulsed laser deposition
2011 Nov	Sixth Young Scientist Award of the Physical Society of Japan	Katsunori Wakabayashi	Research in the field of molecular solids and organic conductors
2011 Nov	Award for Encouragement of Research in Thin Films (ICTF-15)	Genki Yoshikawa	Nanomechanical Membrane-type Surface Stress Sensor (MSS) for Medical, Biological, Security, and Environmental Applications
2011 Nov	Journal of Materials Chemistry, Cover Image Selection	Tianyou Zhai, Yoshio Bando, Dmitri Golberg	Multishelled Co_3O_4-Fe_3O_4 hybrid hollow spheres with even magnetic phase distribution: synthesis, magnetic properties and application in water treatment
2011 Dec	Committee Membership, Jonsson Comprehensive Cancer Center, David Geffen School of Medicine, UCLA	James K. Gimzewski	Nanotechnology Program
2011 Dec	Best Poster Award at the 6th International Symposium on Surface Science (ISSS-6)	Chung Vu Hoa, Tadaaki Nagao	Photon and Electron induced Excitations in Plasmonic Silver Nanostructures
2011 Dec	ABC Award 2011	Masanori Kikuchi	Influence of Ca^{2+} And Mg^{2+} Supplementation on *In Vitro* Biological Properties of Hydroxyapatite/Collagen Nanocomposite Membrane
2011 Dec	ABC Award 2011	Masanori Kikuchi	Preparation of Injectable Artificial Bone Constituted of Hydroxyapatite/Collagen Nanocomposite

Date	Prize	Prize Winners from MANA	Research for Commendation
2011 Dec	Advanced Materials Letters Scientist Award, AML Medal 2011	Hisatoshi Kobayashi	Notable and outstanding editorship contribution to the Advanced Materials Letters in 2011
2011 Dec	American Chemical Society Nano Web Highlight Selection	Amir Pakdel, Chunyi Zhi, Yoshio Bando, Tomonubu Nakayama, Dmitri Golberg	Boron nitride nanosheet coatings with controllable water repellency
2011 Dec	The Best Poster Award at ISSS-6	Genki Yoshikawa	Optimization of piezoresistive cantilever sensors towards highly sensitive membrane-type surface stress sensor (MSS) for medical, security, and environmental applications
2011 Dec	Chemical Communications, Cover Image Winner	Tianyou Zhai, Daiming Tang, Yoshio Bando, Dmitri Golberg	Self-stacked Co_3O_4 nanosheets for high-performance lithium ion batteries
2011 Dec	Energy & Environmental Science, Cover Image	Yuanjian Zhang	Non-Covalent Doping of Graphitic Carbon Nitride Polymer with Graphene: Controlled Electronic Structure and Enhanced Optoelectronic Conversion
2012 Jan	Macromolecular Science and Engineering Award of the Chemical Institute of Canada	Françoise M. Winnik	Distinguished contribution to macromolecular science and engineering
2012 Feb	Third Thomson Reuters Research Front Award for 2011	Yoshio Bando, Dmitri Golberg	Outstanding contributions to the field of Materials Science through their work on "Novel Syntheses of One Dimensional Inorganic Nanomaterials and their Applications"
2012 Feb	Chemical Society of Japan Academic Prize	Takayoshi Sasaki	Synthesizing 2D nanosheet and development of its functionalities

Appendix 8.12: International Cooperation

Joint Research under Memorandum of Understanding (MOU) Agreements:

List of MOU agreements of MANA with overseas institutions signed between January 2008 and March 2012.

No.	Organization	Country	Date of Agreement
1	Kent State University, Department of Chemistry	USA	2008 Jan 10
2	Rensselaer Polytechnic Institute, Chemistry and Biological Engineering	USA	2008 Feb 28
3	University of California, Los Angeles (UCLA)	USA	2008 Mar 24
4	Georgia Institute of Technology (GIT), Center for Nanostructure Characterization	USA	2008 May 6
5	CNRS, Centre d'élaboration de matériaux et d'études structurales (CEMES)	France	2008 May 30
6	University of Cambridge, Nanoscience Centre	UK	2008 Jun 20
7	Indian Institute of Chemical Technology (IICT)	India	2008 Jul 3
8	University of Basel, Institute of Physics, National Center of Competence for Nanoscale Science	Switzerland	2008 Jul 20
9	Yonsei University, Seoul	Korea	2008 Sep 1
10	Indian Institute of Science, Education and Research	India	2008 Dec 19
11	University of Karlsruhe, Institute for Inorganic Chemistry, Supramolecular Chemistry Group	Germany	2009 Jan 29
12	Fudan University, Department of Chemistry, New Energy and Materials Laboratory (NEML)	China	2009 Mar 16
13	Indian Institute of Technology Madras, National Centre for Catalysis Research (NCCR)	India	2009 Apr 5
14	University of Cologne, Institute of Inorganic Chemistry, Inorganic and Materials Chemistry	Germany	2009 May 28
15	École Polytechnique Fédérale de Lausanne (EPFL), Institute of Microengineering	Switzerland	2009 Jul 20
16	University of Rome Tor Vergata, Center for Nanoscience & Nanotechnology & Innovative Instrumentation (NAST)	Italy	2009 Jul 30
17	University of Heidelberg, Kirchhoff Institute of Physics	Germany	2009 Aug 31
18	Loughborough University	UK	2009 Oct 28
19	Lawrence Berkeley National Laboratory (LBNL)	USA	2010 Feb 9
20	University of Valenciennes	France	2010 May 20

No.	Organization	Country	Date of Agreement
21	Friedrich-Alexander University, Erlangen-Nürnberg	Germany	2010 June 21
22	Fudan University, Department of Materials Science	China	2010 July 23
23	EWHA Womans University Seoul, Department of Chemistry and Nanoscience	Korea	2010 Aug 27
24	Karlsruhe Institute of Technology	Germany	2010 Sep 16
25	Univesité de la Méditerranée, Marseille	France	2010 Sep 20
26	Anhui Key Laboratory of Nanomaterials and Nanostructures	China	2010 Oct 6
27	Multidisciplinary Center for Development of Ceramic Materials	Brazil	2010 Oct 26
28	Vietnam National University Ho Chi Minh City	Vietnam	2011 Jan 24
29	King Saud University	Saudi Arabia	2011 Jan 25
30	LMPG, Grenoble	France	2011 Feb 1
31	Université de Montréal (UdeM)	Canada	2011 Jul 4
32	Flinders University	Australia	2011 Jul 19
33	University of Melbourne	Australia	2011 Sep 21
34	Shanghai Institute of Ceramics	China	2011 Dec 1
35	Tsinghua University	China	2012 Jan 28
36	Hanoi University of Science and Technology (HUST)	Vietnam	2012 Feb 7

Appendix 8.13: Media Coverage

List of Media Coverage of MANA (September 2007 – March 2012):

Date	Media	Description
2007 Sep	Science	Dr. Masakazu Aono (MANA Director-General) was interviewed on interdisciplinary collaboration at MANA
2007 Dec	ACS Nano	An interview with Dr. Masakazu Aono (MANA Director-General) about "Leader in Atomic Scale Control and Nanomanipulation" was published in ACS Nano
2008 Apr 2008 May	World Times, Joyo Newspaper, Science News	Dr. Masayoshi Higuchi (MANA Independent Scientist) succeeded in developing Multi-Color Electronic Paper using an organic/metal hybrid polymer
2008 Jun	Science News	Dr. Yusuke Yamauchi (MANA Independent Scientist) succeeded in fabricating mesoporous metal with a giant mesocage structure using an electrochemical technique
2008 Jul 2008 Oct	Nikkan Kogyo Shimbun, Mainichi Newspapers, Sankei Shimbun, Ibaraki Shimbun, Nikkei News, Joyo Newspaper	Dr. Takayoshi Sasaki (MANA PI) and Dr. Minoru Osada (MANA Scientist) won the 2008 Tsukuba Prize for "Synthesis of inorganic nanosheets and their organization into functional materials"
2008 Jul	Nikkei News, Science News	Dr. Kenji Kitamura (MANA PI) won the 2008 Inoue Harushige Prize for "Highly functional single crystals for optics grown by a method under defect control"
2008 Jul	Nikkei News	Dr. Jinhua Ye (MANA PI) and the WPI program were introduced in "Rapid rise of NEW Chinese Abroad"
2008 Jul	Shikizai	Introduction of MANA as WPI program
2008 Jul 2008 Nov	The Chemical Daily, Joyo Newspaper, The Chemical Times, Nikkan Kogyo Shimbun, Science News, Asahi Shimbun	Success in Development of Novel Photocatalyst with High Activity in Visible Light
2008 Sep	Denki Shimbun	Focus on the Sunlight basic research
2008 Dec	NHK (TV)	MANA as a WPI program was introduced in "Good Morning Japan"
2008 Dec	Nikkan Kogyo Shimbun, Nikkei News	NIMS/MANA and Waseda University (Faculty of Science and Engineering) concluded a "Joint Doctoral Program Agreement"
2008 Dec	Physics Today	Japan aims to internationalize its science enterprise
2008 Dec	Physics Today	The work of Dr. Masakazu Aono (MANA Director-General) and Dr. Yuji Okawa (MANA Scientist) on "the creation of single conductive polymer chains at designated positions by initiating chain polymerization using a scanning tunneling microscope tip" appeared on the cover of the December 2008 issue of Physics Today
2009 Apr	Asahi Shimbun	Dr. Liyuan Han (MANA PI) and Dr. Jinhua Ye (MANA PI) were featured in a report on the lives of researchers
2009 Apr	Yomiuri Shimbun	Dr. Ajayan Vinu (MANA Independent Scientist) appeared in an article on the research environment for foreign researchers at MANA
2009 May	Fuji TV	Dr. Masanori Kikuchi (MANA Scientist) and Dr. Guoping Chen (MANA Scientist) explained about" the possibility of regenerative medicine" in the Lab-meister TV Program "Can human body be generated like a newt?"

Date	Media	Description
2009 Jun 2009 Jul	Asahi Shimbun Kagaku Shimbun	A study by Dr. Yusuke Yamauchi (MANA Independent Scientist) and colleagues on platinum nanoparticles with an ultra-fine candy-ball-like structure was featured in two reports
2009 Jul	Science News	Dr. Katsuhiko Ariga (MANA PI) was interviewed on his research of functional material which can automatically switch between ON and OFF states without additional stimuli
2009 Aug	Fuji TV	Dr. Tsuyoshi Hasegawa (MANA PI) and Dr. Masayoshi Higuchi (MANA Independent Scientist) appeared in the Kyodo TV program "Lab Meister: In Search for Future of TV and PC"
2009 Sep	Nihon Keizai Shimbun	Dr. Yoshio Bando (MANA Chief Operating Officer) was interviewed on the internationalization at MANA and ICYS
2009 Sep	United States National Public Radio (NPR)	Prof. James K. Gimzewski (MANA PI) spoke about "How Tiny Nanoparticles Are Transforming Technology" with host Ira Flatow and took calls from listener's on NPR's weekly program "Science Friday"
2009 Nov	NHK TV	Outreach activities of MANA were featured in the NHK program "Ohayou Nippon (Good Morning Japan)"
2009 Dec	Nano-Magazine	An interview with Prof. James K. Gimzewski (MANA PI) appeared in Issue 7 of Nano-Magazine (Institute of Nanotechnology, UK)
2009 Dec	NIMS NOW	The first two years of the WPI program MANA "Progress in Internationalization" were featured in Volume 7, Number 9 of NIMS NOW International
2010 Jan 2010 Feb	NHK BS-1 TV NHK BS-hi TV	In the TV program "The proposal for the future - Nanotech revolution changes the world," Prof. James K. Gimzewski (MANA PI) was interviewed on the future of nanotech and his collaborative work of science and art
2010 Aug	Nikkei Online	Research results of Dr. Ajayan Vinu (MANA Independent Scientist) on "a new fabrication of gold nanoparticles by self-assembly of nanoporous materials" were reported in Nikkei Online
2010 Oct	Nikkei Online	Research on "Development of Exhaust Gas Catalyst with Thermal Agglomeration Resistance 10x Higher than Conventional Materials" conducted by Dr. Katsuhiko Ariga (MANA PI) and Dr. Hideki Abe (NIMS Advanced Electronic Materials Center) was introduced in the October 22 issue of Nikkei Online
2010 Oct	Sankei News, Nikkei Online	Research of Dr. Daniele Pergolesi (MANA Scientist), Dr. Emiliana Fabbri (MANA Scientist) and Dr. Enrico Traversa (MANA PI) on "Record High Proton Conduction in Grain Boundary Free Films for Micro-Solid Oxide Fuel Cells" was introduced on Sankei News and Nikkei Online
2010 Nov	Essential Science Indicators (Thomson Reuters)	A paper of Dr. Katsuhiko Ariga (MANA PI) published in the March 2008 issue of STAM was ranked as "No. 1 Hot Paper in Materials Science"
2010 Nov	Science Watch (Thomson Reuters)	Dr. Lionel Vayssieres (MANA Independent Scientist) was interviewed on his highly cited paper, which is among the top 1% of papers published in the field of Chemistry over the past decade
2011 Jan	NHK TV	The researchers Dr. Jinhua Ye (MANA PI) and Dr. Yusuke Yamauchi (MANA Independent Scientist) were featured in the NHK Special program "Can Japan Survive?"
2011 Feb	NHK English radio	Research of Dr. Tsuyoshi Hasgawa (MANA PI) on "Development of Novel Transistor with Combined Logic and Memory Functions with Power Consumption Reduced to One-Millionth that of Conventional Devices" was introduced in the NHK English radio program "Japan and World Update"

Date	Media	Description
2011 Feb	NHK TV ECO channel	Research of Dr. Jinhua Ye (MANA PI) on a new visible-light sensitive photosynthesis catalyst was introduced in the NHK Eco Channel
2011 Apr	Nikkei Shimbun	The newspaper article "A Logic Inverter with Graphene Atomic Layer" introduced the research of the MANA PI Dr. Kazuhito Tsukagoshi. He deposited graphenes from liquid Germanium on the substrates producing thin sheet tips
2011 May	Nikkan Kogyo Shimbun, Nikkei Sangyo Shimbun	The newspaper article "Chemical Wiring and Soldering of Single Molecules" reported about research by the group of MANA Director-General Dr. Masakazu Aono. The established technology will be extended to mono molecular device circuits and will be used in small organic electronics devices
2011 Jun	Mainichi Shimbun, Nikkan Kogyo Shimbun, Ibaraki Shimbun, Nikkei Sangyo Shimbun, Nikkei Shimbun	The newspaper article "New Brain-type Device with Human-like Memorizing and Forgetting Behavior" reported about a development by MANA PI Dr. Tsuyoshi Hasegawa which can be used to make smart brain-like computers
2011 Jun	Nikkei Sangyo Shimbun	The newspaper article "Success in changing the color of luminescence of germanium nano-particles" reported about research by MANA Independent Scientist Dr. Naoto Shirahata
2011 Jun	WILEY-VCH	A focus review article in "Chemistry – An Asian Journal" co-authored by Dr. Yusuke Yamauchi (MANA Independent Scientist) has been listed as one of the most highly cited papers published in 2008 and 2009
2011 Jul	Nikkan Kogyo Shimbun	The newspaper article "World's Highest Performance Nanodielectrics" reported about the fabrication of high dielectric Ti-Nb oxide thin films by MANA Scientist Dr. Minoru Osada. The films can be used for making a smaller high performance personal computer
2011 Aug	Nikkan Kogyo Shimbun, Tekko Shimbun, Nikkei Sangyo Shimbun	The newspaper article "World-First Localized Dynamic Temperature Profiling Along and Across Carbon Nanotube Interconnects" reported about the developed of a new temperature measurement method by MANA PI Dr. Dmitri Golberg
2011 Oct	Canadian Broadcasting Corporation (CBC) Television, in French	Prof. James K. Gimzewski (MANA Satellite PI) appeared in a Documentary Series about Nano Revolution
2011 Oct	The Nikkei Weekly	The newspaper article "From new chips to global warming, MANA seeks material solutions" introduced the research of the MANA PIs Dr. Dmitri Golberg and Dr. Jinhua Ye
2011 Oct	The Nikkei Weekly	The newspaper article "MANA mantra: Work with private sector to create new industries" introduced the collaboration of MANA PI Kazunari Takada with Toyota Motor Corp. to develop a solid-state battery that can power cars safely for long distances
2011 Nov	Nikkan Kogyo Shimbun, Nikkei Sangyo Shimbun, Kagaku Shimbun, Asahi Shimbun	The newspaper article "World's First Proof of Single Atomic Layer Material with Zero Electrical Resistance" introduced research results of the group of Dr. Tomonobu Nakayama (MANA PI)
2011 Dec	Kagaku Kogyo Nippo, Nikkan Kogyo Shimbun	The newspaper article "Development of World's First Functional Polymer Nanowire Fabrication Technology by Pulsed Laser Irradiation" introduced research results of Dr. Takayoshi Sasaki (MANA PI)
2011 Dec	Nikkan Kogyo	The newspaper article "Development of "Matrix" Material Controlling Differentiation of Stem Cells" introduced research results of Dr. Guoping Chen (MANA PI)

Date	Media	Description
2012 Jan	NHK BS	Three MANA researchers were featured in the NHK BS Premium Program "Atom changes life." Prof. James K. Gimzewski (MANA Satellite PI) talked about the development of new functional materials by nanotechnology and their future applications. The development of an atomic switch by Dr. Masakazu Aono (MANA Director-General) was highlighted as key research to realize a novel brain-type device. Dr. Genki Yoshikawa (MANA Independent Scientist) showed his highly sensitive nanomechanical sensor with future applications in monitoring and security fields
2012 Jan	Nikkei Sangyo Shimbun	The newspaper article “Shape-Memory Surface with Dynamically Tunable Nano-Geometry Activated by Body Heat” introduced research results of Dr. Tako Aoyagi (MANA PI)
2012 Feb 2012 Mar	Nikkei Sangyo Shimbun Nikkan Kogyo Shimbun	The newspaper article “Nature of Mott Transition Revealed” introduced results of a theoretical study by Dr. Masanori Kohno (MANA Scientist)
2012 Mar	Arte Television, France	Prof. James K. Gimzewski (MANA Satellite PI) appeared in a Documentary Series about Nano Revolution

Appendix 8.14: Visitors to MANA

List of Visitors to MANA (January – December 2011):

Date (2011)	Name	Affiliation
Jan 4 - 13	Prof. Ying Ma	Institute of Chemistry, Chinese Academy of Sciences, China
Jan 5 - 14	Prof. Prasanth Jose	Indian Institute of Technology, India
Jan 5 - Feb 23	Prof. Chia-Wen Wu	National Taiwan University, Taiwan
Jan 5 - Mar 5	Dr. James Edward Stott	University College London, UK
Jan 7 - Feb 3	Dr. Laure Bourgeois	Monash University, Australia
Jan 11	Dr. Motohiro Nishio	The CHPI Institute, Japan
Jan 12	Prof. Oliver G. Schmidt	IFW Dresden, Germany
Jan 16 - 19	Prof. Loh Kian Ping	National University of Singapore, Singapore
Jan 17 - 19	Prof. Klaus Müllen	Max Planck Institute for Polymer Research, Germany
Jan 18	Prof. Rasmita Raval	University of Liverpool, UK
Jan 23 - Feb 10	Prof. Oliver Gutfleisch	IFW Dresden, Institute of Metallic Materials, Germany
Jan 24 - 26	Mr. S. Shanmugavel	Anna University, India
	Prof. K. Baskar	Anna University, India
	Prof. G.M. Samuel Knight	Anna University, India
	Prof. L. Karunamoorthy	Anna University, India
	Prof. A. Jothilingam	Anna University, India
	Prof. V. Arumugam	Anna University, India
	Prof. N. Kumaravel	Anna University, India
	Prof. M. Madhusoothanan	Anna University, India
Jan 27	Prof. Mehmet Sarikaya	University of Washington, USA
Jan 28	Dr. Edwin Rudolph Fuller	The American Ceramics Society, USA
Feb 1	Dr. Giuliano Gregori	Max Planck institute for Solid State Research, Germany
Feb 3 - 4	Mr. Kiyoshi Iwasaki	Taiyo Yuden Co., Ltd., Japan
Feb 4	Prof. Olivér Krammer	University of Technology and Economics Ph.D. School, Hungary
Feb 7 - 10	Prof. Yu Tzu Huang	Chung Yuan Christian University, Taiwan
Feb 8 - Mar 10	Dr. Haizheng Zhong	Beijing Institute of Technology, China
Feb 9 - 17	Prof. Miroslaw Derewinski	Polish Academy of Sciences, Poland
Feb 14	Mr. Joao Batista Lanari Bo	Industry and Foreign Trade, Innovation Bureau, Brazil
Feb 15	Mr. Federico Balmas	Italian Trade Commission, Italy
	Dr. Alberto Mengoni	Embassy of Italia, Tokyo, Italy
	Mr. Nicola Trevisan	Veneto Nanotech s.c.p.a., Italy
	Dr. Elvio Mantovani	AIRI/Nanotec IT, Italy
	Prof. Masanori Kurosawa	University of Tsukuba, Japan
	Dr. Arthur Carty	Waterloo Institute for Nanotechnology, Canada
	Mr. Alain Francq	Waterloo Institute for Nanotechnology, Canada
	Dr. Holger Kleinke	Waterloo Institute for Nanotechnology, Canada
	Dr. Frank Gu	Waterloo Institute for Nanotechnology, Canada
	Dr. Michael Olbecht	Waterloo Institute for Nanotechnology, Canada
Feb 17	Prof. Kirk S. Schanze	University of Florida, USA
Feb 18	Prof. Junichiro Kono	Rice University, USA

Date (2010)	Name	Affiliation
Feb 18	Mr. H.E. Virachai Virameteekul	Minister of Science and Technology, Thailand
	Mr. Komjit Lusawat	Ministry of Science and Technology, Thailand
	Dr. Krithpaka Boonfueng	Ministry of Science and Technology, Thailand
	Prof. Sirirurg Songsivilai	Ministry of Science and Technology, Thailand
	Ms. Siritham Na Ra-nong	Ministry of Science and Technology, Thailand
	Ms. Supapan Bunnag	Ministry of Science and Technology, Thailand
	Ms. Duangporn Tanatipkul	Ministry of Science and Technology, Thailand
Feb 25	Dr. Paolo Di Nardo	University of Rome "Tor Vergata", Italy
Feb 27 - Mar 6	Prof. Heinrich Rohrer	Nobel Laureate, Switzerland
Feb 28 - Mar 3	Prof. Anthony Cheetham	University of Cambridge, UK
Feb 28 - Mar 4	Dr. Adam Stieg	University of California, Los Angeles (UCLA), USA
Feb 28 - Mar 8	Prof. James Gimzewski	University of California, Los Angeles (UCLA), USA
Mar 2	Dr. Ching-Ray Chang	National Science Council, Taiwan
Mar 2 - 5	Prof. Zong-Lin Wang	Georgia Institute of Technology, USA
Mar 6 - 12	Prof. Stanislaus Wong	Stony Brook University (SUNY), USA
Mar 8	Prof. Andrea Hodge	University of Southern California, USA
	Dr. Kenji Uchino	Office of Naval Research - Global, Tokyo, USA
Mar 10 - 12	Prof. Kazuto Akagi	Tohoku University, Japan
Mar 21 - 27	Prof. Annie Pawell	University of Karlsruhe, Germany
Mar 25	Prof. Andy Hor Tzi Sum	IMRE, A*STAR, Singapore
	Dr. Abdur Rub Abdur Rahman	Institute of Microelectronics (IME), Singapore
	Dr. Jonathan Hobley	IMRE, Singapore
	Dr. Xiaodi Su	IMRE, Singapore
	Dr. Han Mingyon	IMRE, Singapore
Apr 8	Prof. Philip A. Gale	University of Southampton, UK
May 15 - Jun 11	Prof. Samuthira Pandian Nagarajan	Annamalai University, India
May 21 - 26	Prof. Martin Pumera	Nanyang Technological University, Singapore
May 27	Prof. Takaaki Sato	Shinshu University, Japan
May 31	Prof. Mark Welland	Ministry of Defense, UK
	Dr. Kirsty Carter Brown	Secretary to Prof. Welland, UK
	Capt. Andy Edney	British Embassy, Tokyo, Japan
	Mr. Joseph Orcino	British Embassy, Tokyo, Japan
Jun 3	Prof. Kazue Kurihara	Tohoku University, Japan
Jun 8 – Jul 6	Prof. Françoise Winnik	University of Montreal, Canada
Jun 10	Prof. Peter Khalifah	Stony Brook University, and Brookhaven National Laboratory, USA
Jun 19 - 25	Prof. Amar Prasad Yadav	Tribhuvan University, Nepal
Jun 21 - Jul 6	Prof. James Gimzewski	University of California, Los Angeles (UCLA), USA
Jun 26 - Jul 1	Prof. David Bowler	University College London, UK
Jun 30 - Jul 9	Prof. Meng-Bo Luo	Zhejiang University, China
Jul 6 - 9	Dr. Nitin Kumar Labhasetwar	National Environmental Engineering Research Institute (NEERI), India
Jul 8	Prof. Ming-Fa Hsieh	Chung Yuan Christian University, Taiwan
Jul 12 - Aug 19	Mr. Ya-Dong Chiang	National Taiwan University, Taiwan

Date (2010)	Name	Affiliation
Jul 13 - 15	Dr. YanZhen Zheng	The University of Manchester, UK
	Dr. Alexis Vlandas	Max Planck Institute for Solid State Research, Germany
Jul 15	Prof. Ryo Yamada	Osaka University, Japan
Jul 19	Mr. H. E. Marcos Beserra Abbott Galvao	Brazilian Embassy, Brazil
	Mr. Rodrigo Mendes Araujo	Brazilian Embassy, Brazil
Jul 24 - 30	Prof. Christian Joachim	Centre national de la recherche scientifique (CNRS), France
Jul 25 - Aug 6	Prof. Chia-Wen Wu	National Taiwan University, Taiwan
Jul 27 - 30	Prof. Omar Yaghi	University of California, Los Angeles (UCLA), USA
Jul 28	Dr. R. Clive Woods	National Science Foundation, USA
	Ms. Anne Emig	National Science Foundation, USA
Aug 1 - 6	Mr. Mohamed Barakat Zakaria Mohamed	Tanta University, Egypt
Aug 18 - 24	Prof. Songqin Liu	Southeast University, China
Aug 24 - 30	Prof. Qing Chen	Peking University, China
Aug 26	Prof. Ayyappanpillai Ajayaghosh	National Institute for Interdisciplinary Science and Technology, India
Aug 29	Dr. Simon Hall	University of Bristol, UK
Sep 6	Dr. Tsung-Tsan Su	Industrial Technology Research Institute (ITRI), Taiwan
	Dr. Jia-Ming Liu	MCL-ITRI, Taiwan
	Ms. Katie Yang	ITRI, Taiwan
Sep 8 - 21	Prof. Michiel Sprik	University of Cambridge, UK
Sep 11 - 13	Prof. Jonathan L Sessler	The University of Texas, USA
Sep 13	Mr. Shu-Yen Lee	Taipei Economic and Cultural Representative Office in Japan, Taiwan
	Mr. Hsin-Yi Tseng	Taipei Economic and Cultural Representative Office in Japan, Taiwan
	Mr. Ta-We Sung	Taipei Economic and Cultural Representative Office in Japan, Taiwan
Sep 15 - Dec 13	Dr. Alma B. Santibanez M.	University of Rome “Tor Vergata”, Italy
Sep 15	Dr. Qiu Huasheng	Chinese Academy of Science, China
Sep 16 - 17	Prof. Sir Harold W. Kroto	Florida State University, USA
	Prof. Toru Maekawa	Toyo University, Japan
Sep 16 - Sep 15, 2012	Dr. Alex Aparecido Ferreira	Universidade Federal de Minas Gerais, Brazil
Sep 29	Prof. Heneri Dzinotyiweyi	Minister of Science and Technology, Zimbabwe
	Mr. H.E. Stuart Harold	Ambassador, Zimbabwean Embassy, Zimbabwe
	Mr. Willy D. Ganda	Ministry of Science and Technology Development, Zimbabwe
	Mr. Diamond Njow	Zimbabwean Embassy, Zimbabwe
Sep 30	Prof. Kazushige Machida	Okayama University, Japan
Oct 6	Dr. Michal J. Wozniak	Warsaw University of Technology, Poland
	Dr. Krisda Suchiva	MTEC, Thailand
	Dr. Somnuk Sirisoonthorn	MTEC, Thailand
Oct 10 - 21	Ms. Hyo-Jin Lee	Kyungpook National University, Korea
Oct 11	Dr. Zhaohua Cheng	Chinese Academy of Sciences, Beijing, China
Oct 14	Prof. Jiajun Li	Tianjin University, China

Date (2010)	Name	Affiliation
Oct 15 - 19	Prof. James Gimzewski	University of California, Los Angeles (UCLA), USA
Oct 15 - Nov 16	Prof. Anthony K. Cheetham	University of Cambridge, UK
Oct 17 - Dec 16	Prof. Françoise Winnik	University of Montreal, Canada
Oct 24 - Jan 13	Dr. Sharali Malik	Institute of Nanotech. Karlsruhe GmbH, UK
Oct 28	Dr. Bharat Doshi	Johns Hopkins University Applied Physics Laboratory, USA
Nov 6 - 12	Dr. Mikhail V. Lebedev	Russian Academy of Sciences, Russia
Nov 7	Prof. Marie-Josè Goumans	Leiden University Medical Center, Netherlands
Nov 9	Dr. Tung-Chuan Wu	ITRI, Taiwan
Nov 17	Dr. Florence Riviere-Bourhis	French Embassy, France
	Mr. Jacques Maleval	French Embassy, France
	Dr. Jean-Jacques Benattar	French Embassy, France
	Dr. Pierre Destruel	French Embassy, France
Nov 18	Dr. Irene Paola De Padova	The Institute of Structure of Matter, the Italian National Research Council, Italy
Nov 21	Prof. Fuyu Tamanoi	University of California Los Angeles, USA
Nov 25	Prof. Sung-Min Choi	Korea Advanced Institute of Science and Technology, Korea
Nov 28	Prof. László Jakab	Budapest University of Technology and Economics (BME), Hungary
	Dr. Balázs Illés	Budapest University of Technology and Economics (BME), Hungary
Nov 30 - Dec 4	Prof. Jiang Chang	Shanghai Institute of Ceramics, Chinese Academy of Sciences, China
Dec 1 - Jan 31	Prof. Somobrata Acharya	Centre for Advanced Materials (CAM) Indian Association for the Cultivation of Science, India
Dec 4 - 9	Prof. Vinokur Valerii	Argonne National Laboratory, USA
Dec 4 - 10	Prof. Meng-Bo Luo	Zhejiang University, China
Dec 5	Prof. Murugan Ramalingam	University of Strasbourg, France
Dec 7	Dr. Lanyuan Lu	Nanyang Technological University, Singapore
	Dr. Zhifang Peng	Wuhan University, China
Dec 9	Prof. Yong-Kuan Gong	Northwest University, China
	Prof. Akon Higuchi	National Central University, China
Dec 11 - 16	Prof. Christian Joachim	Centre national de la recherche scientifique (CNRS), France
Dec 11 - 23	Prof. Ajayan Vinu	Australian Institute for Bioengineering and Nanotechnology, Australia
Dec 13	Prof. Zhengjun Zhang	Tsinghua University, China
Dec 16	Prof. Osvaldo N. Oliveira Jr.	Institute of Physics at Sao Carlos, University of Sao Paolo, Brazil
Dec 21	Prof. Guy Le Lay	CNRS-CINaM, Marseille-Luminy, France
Dec 22	Prof. Arjum Yodh	LRSM, University of Pennsylvania, USA
	Prof. James M. Skinner	LRSM, University of Pennsylvania, USA
	Prof. Andrew Rappe	LRSM, University of Pennsylvania, USA
	Prof. Dennis Discher	LRSM, University of Pennsylvania, USA
	Prof. Shu Yang	LRSM, University of Pennsylvania, USA
	Prof. Ritesh Agarwal	LRSM, University of Pennsylvania, USA

Appendix 8.15: MANA History

MANA History (October 2007 – March 2012):

Date	Event
2007 Sep 12	NIMS with the project called "International Center for Materials Nanoarchitectonics (MANA)" has been selected to participate as one of five institutions in the World Premier International (WPI) Research Center Initiative, a program sponsored by the Ministry of Education, Culture, Sports, Science and Technology (MEXT)
2007 Oct 1	Official Inauguration of MANA
2007 Oct 18	The launching Ceremony of MANA was held at Okura Frontier Hotel, Tsukuba
2008 Jan 10	MANA signed a Memorandum of Understanding (MOU) with Kent State University, USA
2008 Feb 1	Launch of the new MANA Website in English
2008 Feb 7	The 1st MANA Seminar entitled "Nanotechnology, a Key to Sustainability" was given by Dr. Heinrich Rohrer (Nobel Laureat in Physics 1986 and MANA Advisor)
2008 Feb 28	MANA signed a Memorandum of Understanding (MOU) with Rensselaer Polytechnic Institute, USA
2008 Mar 10-13	The 1st MANA International Symposium was held in Tsukuba
2008 Mar 12	1st MANA Evaluation Committee Meeting
2008 Mar 24	MANA signed a Memorandum of Understanding (MOU) with University of California, Los Angeles (UCLA), USA
2008 Apr 1	Start of ICYS-MANA Program
2008 Apr 16	1st MANA Site Visit by the WPI Program Committee
2008 May 6	MANA signed a Memorandum of Understanding (MOU) with Georgia Institute of Technology (GIT), USA
2008 May 7	Dr. Ajayan Vinu (MANA Independent Scientist) received the Asian Excellent Young researcher Lectureship Award 2008 by the Chemical Soceity of Japan
2008 May 20	1st Follow-up Meeting by the WPI Follow-Up Committee
2008 May 30	MANA signed a Memorandum of Understanding (MOU) with CNRS, France
2008 Jun 2	NIMS Overseas Operation Office opened at the University of Washington, USA
2008 Jun 20	MANA signed a Memorandum of Understanding (MOU) with University of Cambridge, UK
2008 Jul 3	MANA signed a Memorandum of Understanding (MOU) with Indian Institute of Technology (IICT), Hyderabad, India
2008 Jul 9	Dr. Kenji Kitamura (MANA PI) received the “Inoue Harushige Prize” given by the Japan Science and Technology Agency
2008 Jul 16	Dr. Takayoshi Sasaki (MANA PI) and Dr. Minoru Osada (MANA Scientist) received the “2008 Tsukuba Prize”
2008 Jul 19	Prof. Sir Harry W. Kroto visited MANA
2008 Jul 20	MANA signed a Memorandum of Understanding (MOU) with University of Basel, Switzerland
2008 Jul 28 – Aug 1	The 5th NIMS-IRC-UCLA Nanotechnology Summer School was held at NIMS
2008 Sep 1	MANA signed a Memorandum of Understanding (MOU) with Yonsei University, Seoul, Korea
2008 Sep 11	Dr. Kohei Uosaki (MANA PI) was named “International Society of Electrochemistry Fellow”
2008 Sep 25	Dr. Masayoshi Higuchi (MANA Independent Scientist) received the "SPSJ Hitachi Chemical Award" given by the Society of Polymer Science, Japan (SPSJ)
2008 Oct 1	Celebration of 1st Anniversary of MANA. Organizational Reform of MANA

Date	Event
2008 Oct 6	Dr. Yoshio Bando (MANA Chief Operating Officer) was named "American Ceramic Society Fellow"
2008 Nov 27-28	2nd MANA Site Visit by the WPI Program Committee
2008 Dec 11	MANA activities were introduced in the NHK Program “Ohayou Nippon (Good Morning Japan)”
2008 Dec 13	Dr. Alexei Belik (MANA Independent Scientist) and Dr. Pavuluri Srinivasu (ICYS-MANA Researcher) received the "Encouragement of Research in Materials Science Award” given by the Materials Research Society of Japan
2008 Dec 19	MANA signed a Memorandum of Understanding (MOU) with Indian Institute of Science, Education and Research, India
2009 Jan 29	MANA signed a Memorandum of Understanding (MOU) with University of Karlsruhe, Germany
2009 Feb 25-27	The 2nd MANA International Symposium was held in Tsukuba
2009 Mar 16	MANA signed a Memorandum of Understanding (MOU) with Fudan University, China
2009 Mar 17	2nd Follow-up Meeting by the WPI Follow-Up Committee
2009 Mar 28	Dr. Ajayan Vinu (MANA Independent Scientist) received the "CSJ Award for Young Chemists" given by the Chemical Society of Japan
2009 Apr 5	MANA signed a Memorandum of Understanding (MOU) with Indian Institute of Technology, Madras, India
2009 Apr 14	Dr. Minoru Osada (MANA Scientist) received the "Young Scientists' Prize" given by the Minister of Education, Culture, Sports, Science and Technology (MEXT)
2009 May 8	Dr. Kazuhiro Hono (MANA PI) received the "2009 Honda Frontier Award" given by the Honda Memorial Foundation
2009 May 19	Prof. James K. Gimzewski (MANA PI) was elected as "Fellow of the Royal Society"
2009 May 28	MANA signed a Memorandum of Understanding (MOU) with University of Cologne, Germany
2009 Jun 15-17	The 8th Japan-France Workshop on Nanomaterials held at NIMS
2009 Jul 3	The 1st MANA-NSC Joint Workshop on Fusion of Nanotechnology and Bioscience was held at the MANA Satellite at University of Cambridge, UK
2009 Jul 14	A delegation from U.S. Department of Energy (DOE) and U.S. Department of Defense (DOD) visited MANA
2009 Jul 20	MANA signed a Memorandum of Understanding (MOU) with EPFL, Switzerland
2009 Jul 30	MANA signed a Memorandum of Understanding (MOU) with University of Rome Tor Vergata, Italy
2009 Jul 27-31	The 6th MANA-NSC-CNSI Nanotechnology Students’ Summer School held at the MANA Satellite at UCLA, Los Angeles, USA
2009 Aug 31	MANA signed a Memorandum of Understanding (MOU) with University of Heidelberg, Germany
2009 Sep 20-22	XJTU-NIMS/MANA Workshop on Materials Science 2009 was held at Xi’an Jiaotong University, China
2009 Sep 25	Dr. Jun Nakanishi (MANA Independent Scientist) received the "Japan Society for Analytical Chemistry Award for Younger Researchers"
2009 Sep 29	Dr. Kohsaku Kawakami (MANA Scientist) received the "JSCTA Award for Young Scientists" given by the Japan Society of Calorimetry and Thermal Analysis
2009 Oct 2	Prof. Svante Lindqvist, Nobel Museum Director and Chair at the Royal Institute of Technology, Stockholm, visited MANA

Date	Event
2009 Oct 5	Dr. Kohei Uosaki (MANA PI) received the "ECS Fellow Award" given by the Electrochemical Society
2009 Oct 9	Prof. Sir Harry W. Kroto visited MANA for one-on-one meetings with young scientists
2009 Oct 10-12	Tsukuba-Shinchu Bilateral Symposium on "Advanced Materials Science and Technology" was held at National Tsing Hua University, Taiwan
2009 Oct 13	MANA-URTV Joint Workshop on Nanostructured Materials for Sustainable Development was held at University Rome Tor Vergata, Italy
2009 Oct 13-14	The 1st MANA-CEMES Joint Workshop on Fusion of Theory and Experiment was held at the MANA Satellite in CNRS Toulouse, France
2009 Oct 26	Dr. Naoki Ohashi (MANA PI) received the "Richard M. Fulrath Award" given by the American Ceramics Society
2009 Oct 28	MANA signed a Memorandum of Understanding (MOU) with Loughborough University, UK
2009 Nov 10	Nanjing University-Anhui Normal University-Hokkaido University-MANA Joint Symposium was held at Nanjing University, China
2009 Dec 2	Dr. Ajayan Vinu (MANA Independent Scientist) received the "ICSB Award of Excellence" given by the Indian Scociety of Chemists and Biologists
2009 Dec 10	Osaka University-MANA/NIMS Joint Symposium on "Advanced Structural and Functional Materials Design" was held at Osaka University
2009 Dec 18	Visit of the MANA Satellite at UCLA by WPI Program Director Prof. Toshio Kuroki
2010 Jan 7-8	3rd MANA Site Visit by the WPI Program Committee
2010 Jan 14	The 1st Waseda University-MANA/NIMS Joint Symposium on "Advanced Materials Designed at Nano- and Meso-scales toward Practical Chemical Wisdom" was held at Waseda University
2010 Jan 31 2010 Feb 4	Prof. James Gimzewski (MANA Satellite Principal Investigator) was featured in the NHK's satellite TV program "The proposal for the future (mirai-e-no teigen)"
2010 Feb 4	Dr. Yusuke Yamauchi (MANA Independent Scientist) received "Inoue Research Aid for Young Scientists"
2010 Feb 9	MANA signed a Memorandum of Understanding (MOU) with Lawrence Berkeley National Laboratory (LBNL), USA
2010 Feb 16	Dr. Takayoshi Sasaki (MANA PI) ranked as the 18th most-prolific author in the high quality journal "Chemistry of Materials" (Impact Factor 5.046)
2010 Mar 3	Dr. Masayoshi Higuchi (MANA Independent Scientist) received the "Marubun Academy Award"
2010 Mar 3-5	The 3rd MANA International Symposium was held in Tsukuba
2010 Mar 5	2nd MANA Evaluation Committee Meeting
2010 Mar 21	Dr. Masanori Kohno (MANA Scientist) received the "Young Scientist Award" given by the Physical Society of Japan (PSJ)
2010 Mar 24-26	The Workshop on "Materials Nanoarchitectonics for Sustainable Development" as a part of the "Invitation Program for Advanced Research Institutions in Japan" sponsored by the Japan Society for the Promotion of Science (JSPS), was held in Gora, Hakone, Japan
2010 Mar 27	Dr. Kohei Uosaki (MANA PI) received the "Chemical Society of Japan Award"
2010 Apr 1	Dr. Tsuyoshi Hasegawa (MANA PI) and Dr. Kazuya Terabe (MANA Scientist) received the "NIMS President's Research Achievement Award"
2010 Apr 1	Dr. Yusuke Yamauchi (MANA Independent Scientist) received the "Ceramic Society of Japan Award"
2010 Apr 13	Dr. Katsunori Wakabayashi (MANA Independent Scientist) received the "Young Scientists' Prize" given by the Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Date	Event
2010 May 20	MANA signed a Memorandum of Understanding (MOU) with University of Valenciennes, France
2010 May 25	Dr. Yoshihiro Tsujimoto (ICYS-MANA Researcher) received the “Research Progress Award” given by the Japan Society of Powder and Powder Metallurgy (JSPM)
2010 Jun 14-15	The joint IBM and NIMS/MANA symposium on "Characterization and manipulation at the atomic scale" was held in Tsukuba
2010 Jun 21	MANA signed a Memorandum of Understanding (MOU) with Friedrich-Alexander University Erlangen-Nürnberg, Germany
2010 Jul 23	MANA signed a Memorandum of Understanding (MOU) with Fudan University, China
2010 Aug 9	Research results of Dr. Ajayan Vinu (MANA Independent Scientist) on “a new fabrication of gold nanoparticles by self-assembly of nanoporous materials” were reported in Nikkei Online
2010 Aug 18	MANA received a high appraisal from the WPI program committee for the activity in Fiscal Year 2009
2010 Aug 25	Three research subjects proposed by MANA researchers were selected for funding from Core Research of Evolutional Science & Technology (CREST) and Precursory Research for Embryonic Science and Technology (PRESTO) by the Japan Science and Technology Agency
2010 Aug 27	MANA signed a Memorandum of Understanding (MOU) with EWHA Womans University Seoul, Korea
2010 Aug 27	The 1st NIMS-EWHA workshop on “ Advanced Functional Materials” (NEWAM-10) was held in Tsukuba
2010 Sep 9	Dr. Kohei Uosaki (MANA PI) received the “Japanese Photochemistry Association Lectureship Award 2010”
2010 Sep 16	MANA signed a Memorandum of Understanding (MOU) with Karlsruhe Institute of Technology, Germany
2010 Sep 20	MANA signed a Memorandum of Understanding (MOU) with Université de la Méditerrannée, Marseille, France
2010 Oct 6	MANA signed a Memorandum of Understanding (MOU) with Anhui Key Laboratory of Nanomaterials and Nanostructures, China
2010 Oct 11	Research results of the Traversa Group (MANA) on “Micro-Solid Oxide Fuel Cells” was introduced on Sankei News and Nikkei Online
2010 Oct 22	Research results on the “Development of an Exhaust Gas Catalyst” by Dr. Katsuhiko Ariga (MANA PI) and Dr. Hideki Abe (NIMS Advanced Electronic Materials Center) were introduced in the October 22 issue of Nikkei Online
2010 Oct 26	MANA signed a Memorandum of Understanding (MOU) with Multidisciplinary Center for Development of Ceramic Materials, Brazil
2010 Nov 11	Outreach activities of MANA were featured in the NHK program "Ohayou Nippon (Good Morning Japan)
2010 Nov 11	Dr. Ajayan Vinu (MANA Independent Scientist) has been selected as the recipient of the prestigious “Friedrich Wilhelm Bessel Research Award 2010” given by the Alexander von Humboldt Foundation, and as recipient of the “Catalysis Society of India Award 2010”
2010 Nov 24-26	The 9th Japan-French International Workshop was held in Toulouse, France
2010 Dec 1	The 2nd Waseda University-MANA/NIMS Joint Symposium was held at NIMS
2010 Dec 9	Ms. Kumiko Hayashi, Parliamentary Secretary for Education, Culture, Sports, Science and Technology (MEXT) visited MANA
2010 Dec 15	Mr. Lim Chuan Poh, Chairman, Agency for Science, Technology and Research (A*STAR), Singapore, visited MANA

Date	Event
2010 Dec 21	Dr. Masakazu Aono, MANA Director-General, was selected as a winner of the "2010 Feynman Prize in Nanotechnology" given by Foresight Institute, USA
2011 Jan 1	The researchers Dr. Jinhua Ye (MANA PI) and Dr. Yusuke Yamauchi (MANA Independent Scientist) were featured in the NHK Special program "Can Japan Survive?"
2011 Jan 17	Dr. Katsuhiko Ariga (MANA PI) received the "2010 Nice-Step Scientist (NISTEP) Award" by the National Institute of Science and Technology Policy
2011 Jan 19	The satellite workshop "Dirac Electron Systems 2011" of the workshop "Graphene Workshop in Tsukuba 2011" was held at NIMS Namiki-site.
2011 Jan 24	MANA signed a Memorandum of Understanding (MOU) with Vietnam National University Ho Chi Minh City, Vietnam
2011 Jan 25	MANA signed a Memorandum of Understanding (MOU) with King Saud University, Saudi Arabia
2011 Jan 27-28	The 1st MANA Grand Challenge Meeting in Miura Kaigan
2011 Jan 29	Mr. Yoichiro Genba, Minister of State for Science and Technology Policy, visited MANA
2011 Feb 1	Launch of the new MANA Website in Japanese
2011 Feb 1	MANA signed a Memorandum of Understanding (MOU) with LMPG, Grenoble, Fance
2011 Feb 4	Research of Dr. Jinhua Ye (MANA PI) was introduced in the NHK Eco Channel
2011 Feb 6	Dr. Katsuhiko Ariga (MANA PI) received the "ISCB Award for Excellence 2011" in the area of Chemical Sciences given by the Indian Society of Chemists and Biologists (ISCB)
2011 Feb 18	Dr. H.E. Virachai Virameteekul, Minister of Science and Technology, Thailand, visited MANA
2011 Feb 18	Dr. Masayoshi Higuchi (MANA Independent Scientist) received the "Gottfried Wagener Prize 2010" given by German Innovation Award
2011 Feb 28	The workshop on "Advanced Functional Nanomaterials" was held in Chennai, India
2011 Feb 28	Research of Dr. Tsuyoshi Hasegawa (MANA PI) was introduced in the NHK English radio program "Japan and World Update"
2011 Mar 2-4	The 4th MANA International Symposium was held in Tsukuba
2011 Mar 5	Prof. Heinrich Rohrer's Science Class 2011 was held at NIMS Namiki site
2011 Mar 11	MANA was hit by the Great Tohoku-Kanto earthquake
2011 Apr 1	Four MANA researchers, MANA PI Dr. Katsuhiko Ariga, MANA Scientist Dr. Emiliana Fabbri, MANA Scientist Dr. Daniele Pergolesi and MANA Scientist Dr. Tetsushi Taguchi received NIMS President's Research Awards
2011 Jun 28-29	4th MANA Site Visit by the WPI Program Committee
2011 Jul 4	MANA signed a Memorandum of Understanding (MOU) with Université de Montréal (UdeM), Canada
2011 Jul 19	MANA signed a Memorandum of Understanding (MOU) with Flinders University, Australia
2011 Sep 5-8	The 7th Japan-UK-USA Nanotechnology Students' Summer School was held at the MANA Satellite at University of Cambridge, UK
2011 Sep 21	MANA signed a Memorandum of Understanding (MOU) with University of Melbourne, Australia
2011 Oct 7	Osaka University-MANA/NIMS Joint Symposium on "Advanced Structural and Functional Materials Design" was held at Osaka University
2011 Oct 31	The NIMS/MANA-Flinders University Joint Symposium on "Nanoscience and Nanotechnology" was held at NIMS
2011 Nov 1	The 3rd Waseda University-MANA/NIMS Joint Symposium was held at Waseda University
2011 Nov 19	MANA Visit of Minister Masaharu Nakagwa (MEXT)

Date	Event
2011 Dec 1	MANA signed a Memorandum of Understanding (MOU) with Shanghai Institute of Ceramics, China
2011 Dec 14	MANA was given the grade "A" in the WPI Program Interim Evaluation
2012 Jan 10	MANA was featured in a special issue of the journal Advanced Materials (IF 10.88) published by John Wiley & Sons, Inc.
2012 Jan 28	MANA signed a Memorandum of Understanding (MOU) with Tsinghua University, China
2012 Feb 7	MANA signed a Memorandum of Understanding (MOU) with Hanoi University of Science and Technology, Vietnam
2012 Feb 29 – Mar 2	The 5th MANA International Symposium was held in Tsukuba
2012 Mar 2	3rd MANA Evaluation Committee Meeting

MANA is operating with the financial support of
the World Premier International Research Center
Initiative (WPI) of the Ministry of Education,
Culture, Sports, Science and Technology (MEXT)

International Center for Materials Nanoarchitectonics (MAN A)
National Institute for Materials Science (NIMS)

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April 2012