from Tsukuba, Japan to the world

NIMS NOW International

National Institute for Materials Science

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SPECIAL FEATURES

International Cooperation I
-Joint Research with Sister Institutes-

From NIMS to I2MS
—On Publication of this Special Issue on International Cooperation—

Takahiro Fujita
General Manager
International Affairs and Materials Information Office

Beginning with the present issue, we will present a three-part series introducing recent results of joint research with co-operating international institutes. The featured topic in this month's issue is joint research with sister institutes. The November and December issues will cover topics on individual joint research.

NIMS has developed an active program of exchanges with foreign research institutes and researchers. In cooperation with institutes outside of Japan, we have concluded agreements establishing 7 sister institutes, 50 individual joint research projects, and 6 joint graduate schools. We are also carrying out grass-roots exchanges, which are not included in these numbers, on a scale several times larger than these formal arrangements. Because NIMS recognizes that interdisciplinary and cross-cultural exchanges are essential for activating research, we are continuing to expand our international cooperation through activities which press ahead in this direction.

One purpose of international cooperation is to collect information on materials research. As the central institute for materials research in Japan, we believe that it is our obligation to collect and organize information from various countries in databases, and to provide and disseminate this information as basic data for strategic policy-making on materials research not only at NIMS but also in Japan as a whole. In August, NIMS established the International Affairs and Materials Information Office for this purpose. The new Office has begun activities which are not limited to the traditional function of promoting international cooperation, but also include a role as a base for information on materials research in its mission. < Continued on p.3

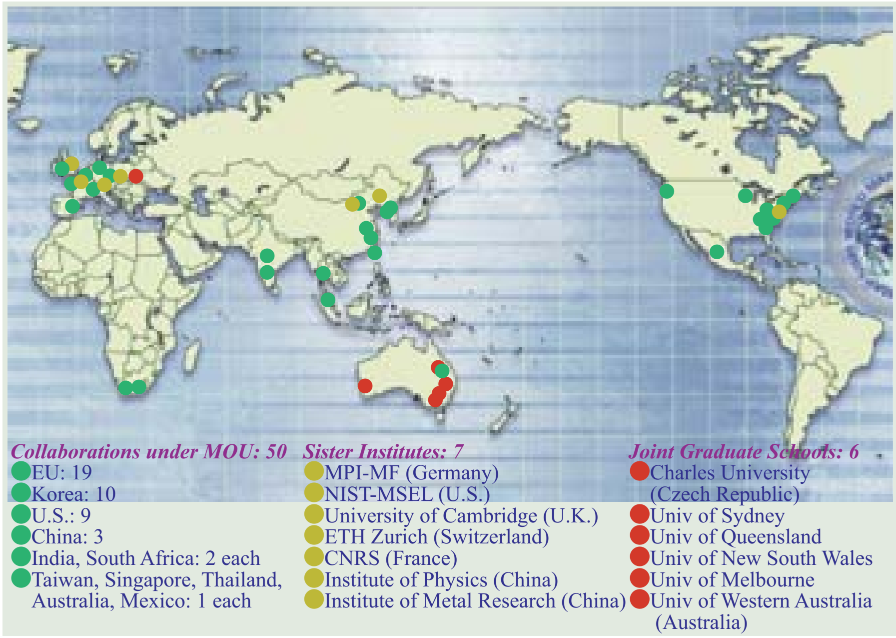

Fig: International cooperation at NIMS.

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Search for Metal Gate Material for Next-generation Integrated Circuits and Optimization of Device Structure

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Nanomaterials Assembly Group
Nanomaterials Laboratory (NML)

Thomas Wagner
Thin-Film Laboratory
Max Planck Institute for Metals Research

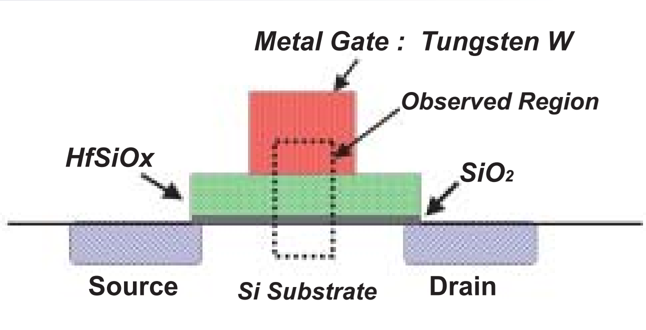

Fig. 1: Schematic diagram of next-generation MOSFET structure.

Today's advanced information society is supported by integrated circuits (IC), which are supported in turn by field-effect transistors with an electrode material/gate oxide film/Si structure. These are commonly called MOSFET (Metal Oxide Semiconductor Field Effect Transistor). Because increasingly higher levels of integration and speed are required in current ICs, production of MOSFET with a 45 nm gate width is expected in the near future. In manufacturing these ICs, it is assumed that a high dielectric amorphous oxide materials (HfSiOx, etc.) containing HfO_2, or so-called High-K material, will be used as the gate oxide film, and a metal material will be used in the gate (see **Fig. 1**). In this case, the interface between the metal gate and the gate oxide film becomes important. The voltage which controls On-Off switching in MOSFET is called the threshold voltage (V_{th}). To secure this value, it is necessary to maintain detailed control of the concentration of impurities, which control electrical conduction in Si, the dielectric constant (permittivity) of the gate oxide film, and the work function of the gate material. However, large deviations from the predicted value of the threshold voltage V_{th} had been a problem with High-K materials such as HfSiOx. In HfSiOx and other oxide materials, atomic electron holes occur in the film due to reaction with the gate material, resulting in the formation of positively-charged dangling bonds with two free electrons. These free electrons move from the oxide to the metal side, creating an electric double layer at the interface. This is the cause of deviations in the threshold voltage. To solve this problem, it is important to prevent the formation of holes in the metal gate and the gate oxide film. Max Planck Institute for Metals Research is a research organization which has actively pursued research on the interfacial reaction of oxides and metals. Here, the reactions of metals such as tungsten (W) with HfO_2 type oxides fabricated using NIMS' combinatorial methodology were investigated with a scanning electron microscope. As a result, it was found that virtually no reaction occurs between W and HfO_2 type oxides (HfSiOx), and a steep interface is formed. (see **Fig. 2**) The correctness of this result has also been demonstrated from the viewpoint of thermodynamics.

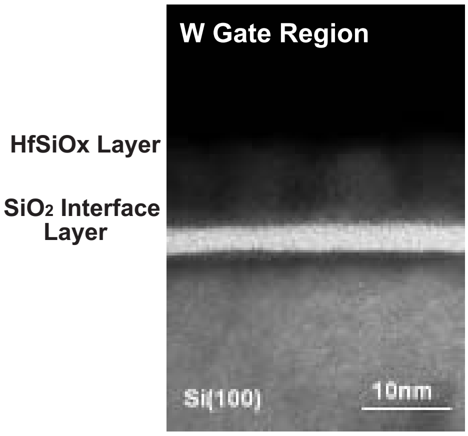

Fig. 2: MOS structure using tungsten (W) gate.

As described above, in this joint project, we discovered one candidate next-generation metal gate material. In the future, we intend to carry out further research on the reactivity of other HfO_2 type oxides with metal alloys while controlling the work function.

For further information, please visit: http://www.nims.go.jp/nanoassembly/

NIMS Sets New Japanese Record for Steady-State Magnetic Field at 37.9 T

A team led by Toshihisa Asano of the Magnet Development Group, High Magnetic Field Center (HMFC) succeeded in generating a steady-state magnetic field of 37.86 T for set time period, thereby establishing a new Japanese record. This result ranks No. 2 in the world, following only the 45.1 T field achieved by the National High Magnetic Field Laboratory (NHMFL) in the United States. The new Japanese record was set using a hybrid magnet which combines a newly-developed Bitter-type water-cooled magnet and an existing superconducting magnet. By applying innovations to the configuration and stacking method of the Bitter plates, which make up the coil of the water-cooled magnet, the Group increased the intensity of the generated field by more than 0.5 T while reducing passed power from the conventional 14.33 MW to 13.35 MW, or an improvement of approximately 1 MW, enabling generation of a high magnetic field over an extended period.

Comparison of the Bitter-disks used in the previous magnet and new magnet. Disk in the right side is the new disk.

For further information, please visit: http://akahoshi.nims.go.jp/TML/english/develop.html

Reversible Interconnection using Biological Attachment

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Ecomaterials Center (EMC)

Stanislav N. Grob
Evolutionary Biomaterials Group
Max Planck Institute for Metals Research

A design which enables easy disassembly is an important requirement for environment-friendly products, and interconnection disassembly techniques are the key technology for this purpose. In many cases, conventional joining techniques were developed with importance placed only on high joint strength, resulting in joints which are difficult to disassemble. Thus, while the reliability of the joint in use must be assured, environment-friendly next-generation joining techniques must also consider joint separation. This means that joining methods which combine the apparently-contradictory elements of resistance to separation and easy disassembly are required. Moreover, with progressive micro-scaling of parts, the development of new joining techniques which do not result in unnecessarily high strength and allow easy disassembly is also required in micro-assembly.

Dr. Grob and Dr. Hosoda

The natural world offers valuable suggestions for this purpose. In particular, our attention was drawn to insects, which are similar in size to micro-machines. Single setae of the attachment device at the tip of the legs of insects such as flies and beetles are several microns in size and has evolved to attach to surfaces by adhesion. Moreover, it is an excellent mechanism for quick, precise, and reversible attachment. (see **Fig.1**) Using advanced methods, we investigated the adhesive characteristics of the attachment device of the leaf beetle and carried out research aimed at understanding its structure (**Fig.2**).

In the future, we plan to continue our investigation of the mechanism of attachment/ release systems from the viewpoint of the relationship between the attachment devices of insects and plant surfaces (**Fig.3**). We believe that this will be useful in the development of reversible joining methods for micro-devices.

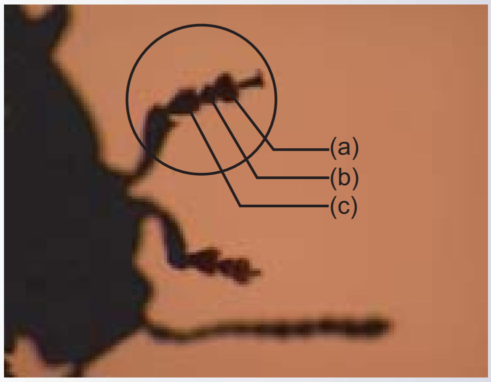

Fig. 1: Leaf beetle (*Gastrophysa viridula*) walking on glass surface. The circled area in the figure shows the attachment device.

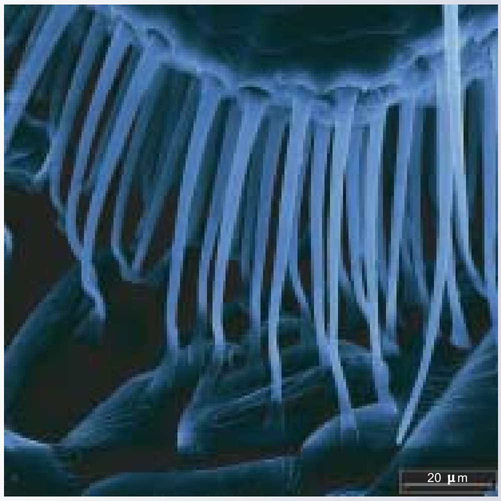

Fig. 2: Single setae of the leaf beetle sticking on the surface of Curly dock (*Rumex*).

(a)  (b)  (c) 

Fig. 3: Enlarged view of setae of the leaf beetle attachment device. The shape differs depending on the position.

< Continued from p.1

From NIMS to I2MS —On Publication of this Special Issue on International Cooperation—

Among important tasks for the organization as a whole, NIMS hopes to transform itself into a research institute which is open to the international community. This means that the operation of research facilities must be "barrier-free" from the international viewpoint. We face a number of challenges in achieving this, including management reform, use of English as a common language, and rationalization of our systems. One key part of our effort to meet these challenges is the International Center for Young Scientists (ICYS), which was established last year and is expected to play a major role in the internationalization of NIMS.

Our ultimate goal is to transform the National Institute for Materials Science (NIMS) into an International Institute for Materials Science (I2MS).

For further information, please visit: http://www.nims.go.jp/eng/cooperate/index.html

NIMS / Swiss Federal Institute of Technology Zurich (ETH Zurich)

Fabrication and Properties Evaluation of Surface One-dimensional Nanostructures

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Nanomaterials Laboratory (NML)

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Various types of nanostructures can be fabricated by performing appropriate treatment when extremely small amounts of atoms of types different from the matrix are accumulated on a solid clean surface. Nanostructures on a solid surface generally interact strongly with the substrate and frequently display unique properties different from those of the original bulk material due to the fact that the electrons are enclosed in a limited space. Moreover, the fact that these nanostructures are formed by self-organization makes it possible to produce extremely well-ordered structures at the atomic scale in large quantity. Great expectations are placed on this type of surface nanostructure as a structural element for future electronic and magnetic devices.

Within this field, our attention was particularly drawn to atomic-scale nanowire structures with one-dimensional properties. Our goal is to elucidate the electron transport properties of these nanowires experimentally, with the further aim of expansion to nanoelectronics. In general, surface nanostructures are susceptible to contamination and oxidation due to exposure to the atmosphere and easily lose their characteristics. To avoid these problems, we have developed the composite system shown in **Fig. 1**. With the system, operation for creating the nanostructure, attaching electrodes indispensable for measuring electric conductivity, observing samples with atomic-scale special resolution and measuring electrical conductivity are all performed under an ultrahigh vacuum environment.

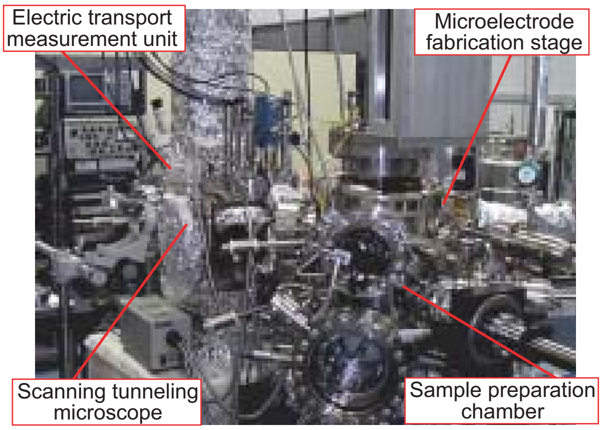

Fig. 1: Ultrahigh vacuum transport measurement/scanning tunneling microscope composite system.

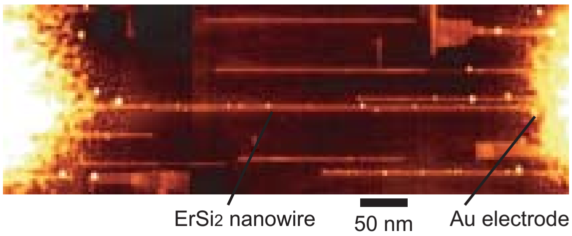

Fig. 2: Rare earth metal silicide nanowire connected to gold microelectrode.

The systems equipped with all these functions are rare worldwide, and the present system was developed independently as part of this joint research project. Using the device, we succeeded for the first time in verifying electric conduction through indium atomic wire arrays on a silicon substrate and their phase transition phenomena.

In our current research, we are measuring the electrical conduction of single rare earth (RE) metal silicide nanowires. To date, we have succeeded in connecting silicide nanowires to a gold microelectrode and confirming the morphology of the nanostructure using a scanning tunneling microscope (**Fig. 2**). In particular, based on the fact that the composition system contains RE atoms, there is a possibility that it possesses magnetic order at low temperatures, and we are also interested in this magnetism. Moreover, because the wire width is on the same size order as organic molecules, this is a promising structure for use in wiring networks connecting individual organic molecules (see **Fig. 3**). This research on metal nanowires is also expected to contribute to the development of spin electronics and molecular electronics.

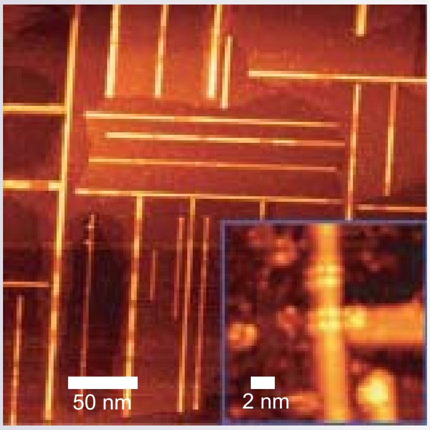

Fig. 3: Erbium silicide nanowire network grown on a silicon substrate and organic molecules adsorbed on a junction.

For further information, please visit: http://www.nims.go.jp/nanomat_lab/ResGroup/Electronano/elec.html
http://www.solid.phys.ethz.ch/pescia/

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President Kishi in Round of Visits to Central Europe

President Kishi visited Hungary and Poland during the period August 23-27 to explore the possibility of future international cooperation with those two nations, which joined the EU in May of this year.

On this visit, President Kishi was accompanied by NIMS researchers, who held workshops and toured laboratories to exchange information and heighten mutual understanding with their European counterparts. Although the Central European nations have seemed somewhat distant in the past, through this visit, the members of the NIMS mission gained a fresh recognition of the high research potential of the two nations. Future plans call for continuing talks on concrete cooperation, including exchanges of researchers and joint research.

Among developments in the area of researcher exchanges during the visits, the two sides agreed to begin a study assuming the start of an international joint graduate school with universities in Poland, with the Warsaw University of Technology as a key partner. NIMS will also invite one young researcher from each of the two countries to its International Center for Young Scientists (ICYS).

Measurement of Potential Distribution at Diamond Interface

—Aiming at the Development of Practical Optoelectronic Devices—

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Super Diamond Group
Advanced Materials Laboratory (AML)

Colin Humphreys
Department of Materials Science and Metallurgy
University of Cambridge

The Super Diamond Group is expanding its research on applications of diamond semiconductors in optoelectronic devices with the aim of achieving practical application and industrialization. Excellent metal/diamond junctions and heterojunctions are necessary when attempting to develop semiconductor optoelectronic devices for practical applications. In general, transfer of a carrier (electrons or holes) through the interface occurs naturally at the junction interface, resulting in the formation of a carrier-depleted region (called the "depletion layer") and an energy (potential) barrier in the vicinity of the interface (see **Fig. 1**). The height of the energy barrier and the width of the depletion layer depend significantly on the density of defects at the junction interface. Thus, in cases where nanoscale processing, such as etching and deposition, is performed on the junction interface, these values are thought to have a great influence on the performance and reliability of optoelectronic devices.

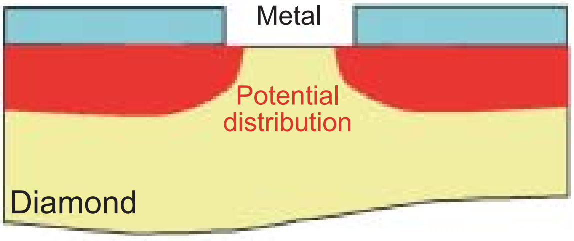

Fig 1: Cross-sectional view of diamond device.

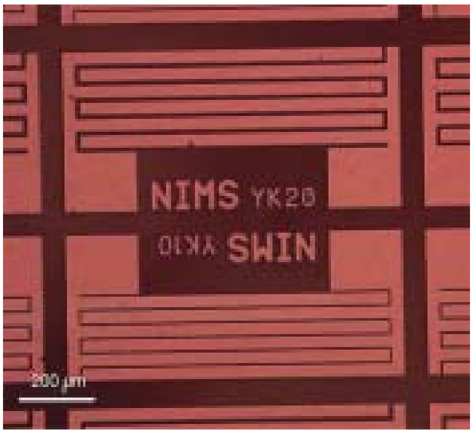

Fig. 2: Diamond deep UV light sensor device for observing the potential distribution at the diamond junction interface.

Because p-type and n-type dopants in diamond semiconductors have quite high energy levels in the forbidden band in comparison with other semiconductors, the potential distribution (drop) at the edge of the depletion layer is predicted theoretically to reach a several micron order at room temperature. This phenomenon is called the "deep-dopant effect" and is a distinctive feature of diamond semiconductors. Accordingly, the development of a technique for measuring the potential distribution at the metal/diamond interface and diamond heterojunction interface, and their measured values, are indispensable for the design of optoelectronic device structures.

The aims of this joint research were non-destructive observation of the junction interface using a nanoscale high resolution secondary electron microscope, and simultaneously, actual measurement of the potential distribution with an accuracy of at least 0.1 eV.

Fig. 2 shows a photograph of a diamond deep UV light sensor device in which the potential distribution will be observed in this work. The accumulation of this kind of data on basic physical properties is expected to accelerate the development of optoelectronic devices.

For further information, please visit: http://www.nims.go.jp/superdiamond/index.html
http://www.msm.cam.ac.uk/index.html

4th Meeting of NIMS Advisory Board

The 4th meeting of the NIMS Advisory Board was held on August 19. At these meetings, NIMS invites eminent Japanese and foreign advising researchers with a high knowledge of materials science to serve as Advisors and give advice on the operation of institute. Because the current Mid-Term Plan ends in fiscal year 2005, NIMS established a Future Planning Committee in January to discuss future concepts for the institute and the next Mid-Term Plan. The Committee recently completed a draft entitled "Future Vision of NIMS," which was presented at the 4th Advisory Board meeting. Due to the nature of the discussions, attendance was limited to the Japanese Advisors, who gathered to give their views on the proposal. In spite of the short time, NIMS received a number of suggestive ideas from its Advisors.

Information on Data Sheet Publication

As part of efforts to improve the intellectual infrastructure, which is one objective of the NIMS Mid-Term Plan, the Materials Information Technology Station (MITS) prepares material data and issues data sheets on creep, fatigue, corrosion, and space-use materials strength. The Station recently issued Creep Data Sheets No.36B and M-3, Fatigue Data Sheets No. 93, 94, 95, and 96, and Space Use Materials Strength Data Sheets No. 3 and 4.

For further information, please visit: http://www.nims.go.jp/mits/english/E_index.htm

Research on Strongly-Correlated Electron Systems using Neutron Scattering

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Aperiodic Materials Group, Materials Engineering Laboratory (MEL)
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Jeff W. Lynn
Neutron Condensed Matter Physics
Center for Neutron Research (NCNR), NIST

Neutron scattering is an indispensable powerful tool for investigating structure and dynamics of atoms and spins in materials, which can hardly be done by other techniques. However, only a small number of laboratories are capable of performing neutron scattering experiments, as a nuclear reactor or large-scale accelerator is necessary to generate the neutron beam. NIMS has therefore been conducting research on the basic physical properties of various substances jointly with the NIST Center for Neutron Research (NCNR), in the United States. As one representative example, this article will describe research on the ferromagnetic transition in CoS_2.

CoS_2 has the pyrite structure and exhibits ferromagnetic order at 122 K. Ferromagnetism in CoS_2 is thought to be originated from a single electron occupying the e_g orbit of the Co 3d electron levels. Furthermore, because the e_g electron which shows ferromagnetism is also responsible for electric conduction, it is expected that the conduction electrons are spin-polarized in the ferromagnetic phase. Based on this feature, application in spin polarized devices is also expected.

As one puzzling aspect of CoS_2, its ferromagnetic transition temperature decreases to 90 K when S is replaced with only 5 % Se, and the transition becomes first-order (discontinuous). To clarify this phenomenon, we made a detailed investigation of the motion of magnetic moment using inelastic neutron scattering.

The **accompanying figure** shows the results of an inelastic neutron scattering experiment using the powder sample of $CoS_{1.9}Se_{0.1}$. Temperature dependence of inelastic scattering spectrum in the small-angle scattering region, where q = 0.07 Å^{-1}, is shown. From the **figure**, it can be understood that there are peaks at +0.6 meV and -0.6 meV at T = 80 K (ferromagnetic phase). These are peaks due to collective spin motion, which is called spin wave. However, in addition to these two peaks, at T = 87.5 K, which is just below the ferromagnetic transition temperature, a new peak appears in the vicinity of E = 0 meV. This indicates that diffusive spin motion has emerged in the ferromagnetic phase. The fact that these two types of spin motion co-exist suggests that the ferromagnetic phase of $CoS_{1.9}Se_{0.1}$ is electronically inhomogeneous. Thus, it was found that the first-order ferromagnetic transition in this system differs from first-order transitions in ordinary magnetic materials, and is associated with the micro-inhomogeneity, which is frequently observed in strongly-correlated electron systems.

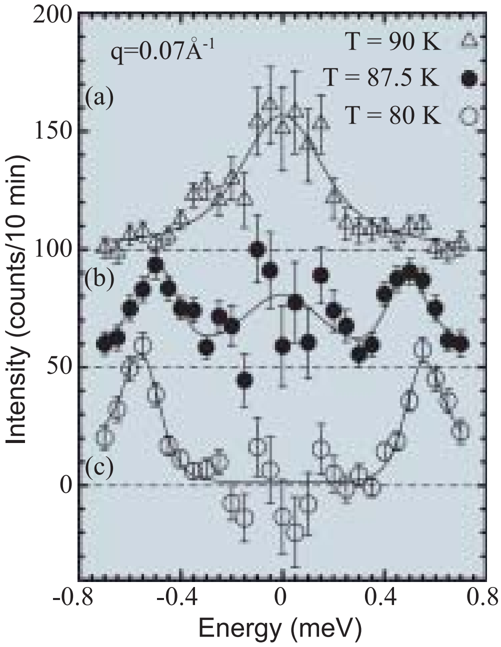

Fig: Inelastic neutron scattering spectrum of $CoS_{1.9}Se_{0.1}$. The ferromagnetic transition temperature of this composition is 90 K. (Measured at NCNR.)

For further information, please visit: http://www.issp.u-tokyo.ac.jp/labs/neutron/sato/index.html
http://www.ncnr.nist.gov/

Room Temperature Far UV Laser Oscillation using Electron Beam Excitation

—Discovery of High Efficiency Far UV Light Emission Property of Hexagonal BN—

Kenji Watanabe, Super Diamond Group
Takashi Taniguchi, High Pressure Group
Advanced Materials Laboratory (AML)

In recent years, there has been increasing demand for the development of light-emitting element materials for the previously-unexplored far UV wavelength region (around 200 nm) for use in semiconductor light-emitting elements. Although hexagonal boron nitride (hBN), which is a stable BN structure, had been used as an insulating material and in similar applications where its chemical stability is important, its properties were not well known.

In the present research, we succeeded in growing high purity single crystals of hBN (**Fig. 1**) by applying a high temperature, high pressure process to carefully-refined raw materials. As a unique property of this substance, we discovered that it emits extremely strong light (wavelength: 215 nm) with an intensity more than 1000 times stronger than that of high purity diamond light emission.

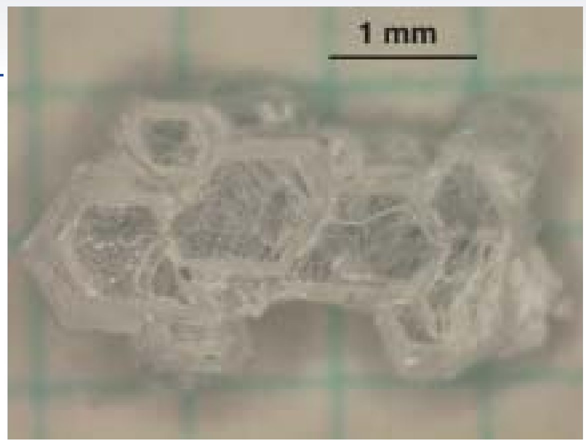

Fig. 1: Single crystal of high purity hexagonal BN. The crystal has a plane which is easily fractured parallel to the paper surface.

New Record for World's Highest Magnetic Field with NMR Magnet

—Development of 930 MHz NMR Magnet —

Tsukasa Kiyoshi
Deputy Director-General
High Magnetic Field Center (HMFC)

RESEARCH FRONTIER

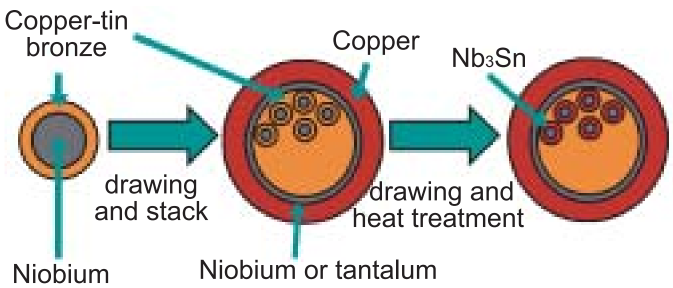

Fig. 1: Manufacturing process for bronze-processed Nb_3Sn conductor.

NMR spectrometers using nuclear magnetic resonance (NMR) are employed widely in analysis and structural determination of materials such as proteins. Because the sensitivity and resolution of NMR spectrometers increase dramatically as the magnetic field in which the sample is placed is increased, higher magnetic fields have been desired.

The high magnetic field region of NMR magnets uses bronze-processed Nb_3Sn conductors, which were developed by the former National Research Institute for Metals (NRIM; one of NIMS' predecessor institutes). However, because these devices were already being used at virtually the upper limit field, development/improvement of the conductor itself was needed to realize further increases in the magnetic field.

In 2001, the High Magnetic Field Center and Kobe Steel., Ltd. jointly developed an NMR magnet which operates at 920 MHz (generated field: 21.6 T). This magnet is currently being operated as a 920 MHz high-resolution NMR spectrometer, which is the world's highest level, and is used in determining the 3-dimensional structure of unknown proteins in joint research with RIKEN.

In the present work, a new 930 MHz high-resolution NMR magnet was developed based on the 920 MHz NMR magnet described above using a newly-developed bronze-processed Nb_3Sn conductor with a tin content of 16 % in the innermost coil. As shown in **Fig. 1**, the bronze-processed Nb_3Sn conductor forms superconducting Nb_3Sn by a reaction between bronze (copper-tin alloy) and niobium. Increasing the concentration of Sn in the bronze results in increased formation of Nb_3Sn, making it possible to pass a larger current even in high magnetic fields. However, because the material is susceptible to cracking in the drawing process, the Sn content had been limited to around 13 %. The Sn content was successfully increased to 15 % in the 920 MHz NMR magnet, but as one important feature of the new 930 MHz magnet, the Sn content was increased to 16 %, which exceeds the solution limit (15.8 %) of Sn. Because this increases the critical current density by approximately 10 % in comparison with 15 % Sn conductor, it is possible to pass the same current with thinner wire, thereby achieving a higher magnetic field.

The newly-developed magnet is installed in the NMR Laboratory II at the NIMS Sakura Site, which was completed in September 2003, and began operating in a permanent current mode at 930.7 MHz (generated magnetic field: 21.9 T), which set a new record. (**Fig. 2**) The generated field of 21.9 T is also the world's highest value for a superconducting magnet having the room temperature sample space. The High Magnetic Field Center plans to use the new magnet in high-resolution NMR for solids applying to research on high performance catalysts, recycling of steelmaking slag, and other areas of study.

Fig. 2: New 930 MHz high resolution NMR magnet.

For further information, please visit: http://akahoshi.nims.go.jp/TML/english/

RESEARCH FRONTIER

Taking advantage of the property that hexagonal BN fractures easily in the direction of the hexagonal planes, we fabricated a laser resonator structure using the back and front sides as reflecting planes and excited the samples by electron beam (EB) irradiation. As a result, we found that light emission at this 215 nm wavelength causes several characteristic phenomena in laser behavior, as shown in **Fig. 2**.

If a compact, high efficiency light-emitting element for the far UV region can be developed, a diverse range of applications is conceivable. Such a device would have an incalculable effect on industry, for example, as a light source for environmental pollutant decomposition treatment processes using photocatalysts, where is currently an area of active research, in high integration of optical recording devices for DVDs and similar devices, as an excitation light source for fluorescent lights, and as a replacement for anti-microbial mercury lamps used in hospitals and food processing with semiconductor light-emitting elements, among other applications. By combining our discovery and compact EB sources (carbon nanotubes, diamonds, etc.), which have been the object of considerable research in recent years, we believe that practical application of compact UV lasers and UV light sources can be easily realized.

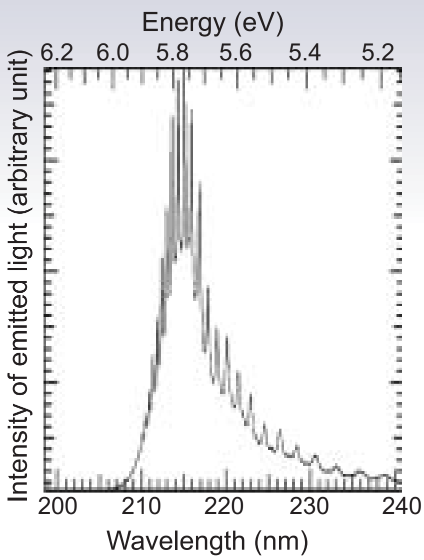

Fig. 2: Example of laser oscillation spectrum.

For further information, please visit: http://www.nims.go.jp/superdiamond/index.html

Harmonious and Inspiring Research Atmosphere at NIMS

Di Li (China)
Senior Researcher (Oct. 2000-Mar. 2005)
Electroceramics Group
Advanced Materials Laboratory (AML)

I came to Japan from China in April 1995 as a foreign student and received my PhD in applied chemistry from Chiba University in 1999. I joined Prof. Haneda's group at NIMS in October 2000. My current research focuses on the development of visible-light-active photocatalysts for application to air purification.

In my laboratory, I have close contact with top-level researchers and can access all the state-of-the-art techniques required for catalysis study. We also have a marvelous library and documentation system. However, I think that the most essential parameter for a researcher is a harmonious and inspiring working atmosphere. In this respect, I am thankful to Prof. Haneda and all the other members of the Group for their earnest instruction and close cooperation. Since I began my work at NIMS, I have been deeply impressed by the high research standards, the extremely high levels of motivation of the staff, their efficiency, the deeply rooted feeling of teamwork, and beneficial discussions among the group members. These will ensure that you can rapidly take up your role in research, put your ability to good use to the greatest extent possible, and do your best work.

To date, I have been in Japan for nine years and personally have felt many fascinating aspects of Japanese society. It is a wonderful experience not to have to care for your belongings all the time. It is a great pleasure to go out at night without any fear. Living in Tsukuba will give you a memorable impression for life due to its silent nights and beautiful sakura. Doing research in NIMS will be a delight for you.

First Time in Japan

[With colleagues, center front]

My greetings to "NIMS NOW International" readers all over the world!

I am Libor Sedláček, a PhD student from Czech Republic. At NIMS, I have got a pleasure to work in Dr. Toshiyuki Mori's subgroup of the Eco-energy Materials Group for one year.

The object of my research is bimetallic systems, especially their applicability to heterogeneous catalysis. Here at NIMS, I can exploit experimental devices and methods, which weren't available for me previously. Under such conditions, I can work out comprehesive study of low temperature bimetallic catalysts for CO oxidation, based on palladium, which I am interested in now. I want to study the applicability of these systems for fuel cells, too.

Libor Sedláček(Charles University, Czech Republic)
Joint International Graduate School Program
(Jul. 2004-Jun. 2005)
Eco-Energy Materials Group, Ecomaterials Center (EMC)

[With friends at the top of Mt. Fuji, front right]

This is my first time in Japan and living here was difficult for me during the first couple of weeks. I didn't talk nor read Japanese, but in spite of this, I didn't feel lost nor strange, because many people from NIMS were very helpful and kind to me. Japanese culture and mentality are very different from my ones, which can sometimes be the reasons for funny affairs. But I am slowly learning more about Japanese and I hope I will be able to better understand them soon.

Japan is a very nice country and I am happy that I can discover its amenities with new friends. I have visited Matsushima and Iwaki waterfalls, and also seen the sunrise from the top of Mt. Fuji. There were many other interesting places all around and I am looking forward to enjoy further meetings with Japanese people and the country.

NIMS

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