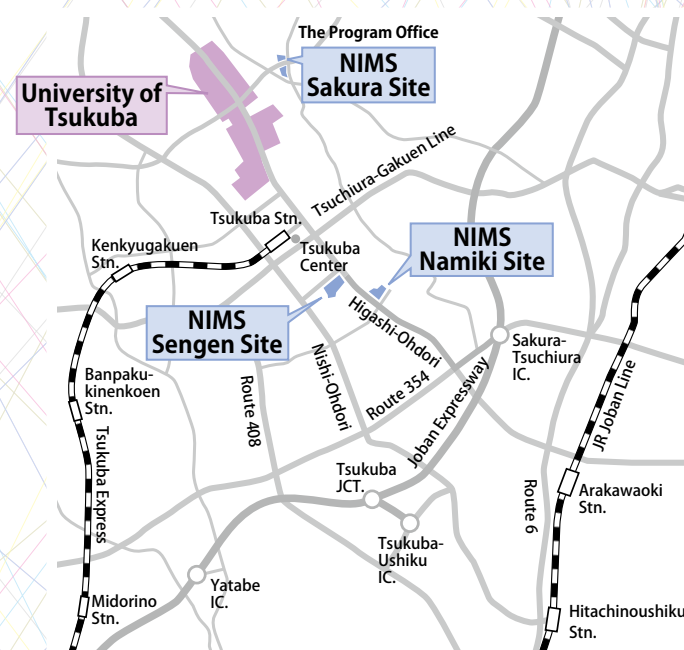


Doctoral Program in Materials Science and Engineering

Graduate School of Pure and Applied Sciences
University of Tsukuba



Doctoral Program in Materials Science and Engineering
Graduate School of Pure and Applied Sciences
University of Tsukuba
3-13 Sakura, Tsukuba, Ibaraki 305-0003, Japan
Tel: +81-29-863-5348, Fax: +81-29-863-5394
E-mail: nims_admin@pas.tsukuba.ac.jp
<http://www.pas.tsukuba.ac.jp/nims/>

Independent Administrative Agency
National Institute for Materials Science
<http://www.pas.tsukuba.ac.jp/nims/>



Greetings



Shinya Uji
Professor, Chairman

The Doctoral Program in Materials Science and Engineering is operated jointly by the Graduate School of Pure and Applied Sciences at the University of Tsukuba and the National Institute for Materials Science (NIMS). Selected scientists from NIMS have joined the graduate school faculty and supervise the students' thesis research for Ph.D. degrees.

Materials Science and Engineering is a discipline that helps to develop and use materials for various engineering applications. It is a key engineering field to support the infrastructure of modern society, such as energy, environment, information, communication, construction, transportation, medicine and welfare. This program is comprised of five fields: Organic- and Bio- Materials, Metals and Ceramics, Nanomaterials, Semiconducting Materials, and Condensed Matter Physics. It aims at educating students to become highly professional engineers or scientists in Materials Science and Engineering through hands-on research experience using the advanced experimental facilities and by participating in major research projects.

The faculty members of this program are involved in the education for the master's courses: Physics, Chemistry, Applied Physics, and Materials Science.

We would like to invite young graduate students to join the frontier research at NIMS.

History of Doctoral Program in Materials Science and Engineering

- 1992 - Collaboration between University of Tsukuba and NRIM/NIRIM (former institutes of NIMS) started, as Cooperative Graduate Program
- 2004 - Doctoral Program in Materials Science and Engineering was launched (18 Professors, 6 Students)
- 2005 The Special lecture on the latest topics of materials science, Nano Materials and Engineering, started
- 2007 9 new professors joined (total 27 professors)
- 2008 The special lectures given in English started in the Materials Science and Engineering Course (for Master's degree)
- 2014 24 professors are assigned to the program

State of the Art Research and Training

National Institute for Materials Science (NIMS), Japan's sole independent administrative institution in materials science, has been working on "Materials research for creating tomorrow". NIMS provides an ideal environment for materials science research, including metals, ceramics, organic materials and biomaterials.

The selected NIMS researchers supervise the doctoral and master's students as the university faculty members. The students can perform their own research using the advanced experimental facilities and are also expected to participate in the research projects in NIMS. Our program encourages the students to seek professional recognition while pursuing their studies.

【 Latest facilities 】



EC-3DAP with delay line detector

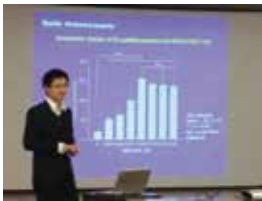


Atom-discriminating electron microscope

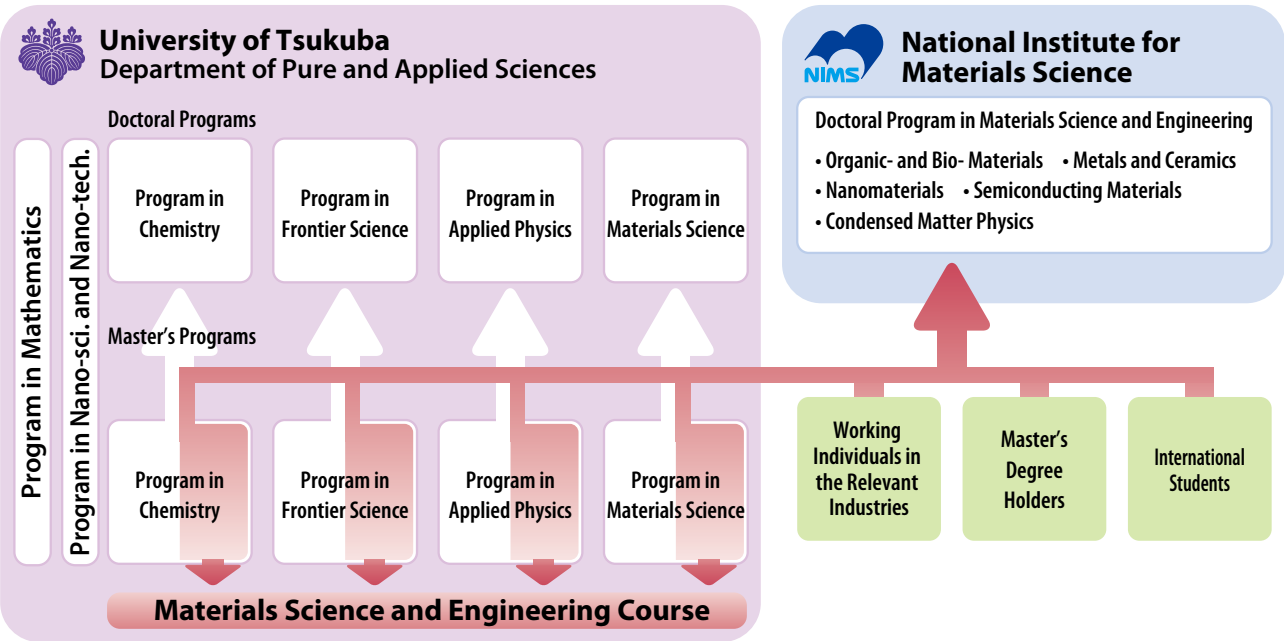


Student Seminar

Student Seminar is part of the curriculum, all students and faculty members in the program attend. It is designed for the students to discuss their research results with other researchers and develop their presentation skills in English. It also aims to promote more comprehensive understanding of the research performed at NIMS. Each presentation at the seminar is evaluated by all faculty members.



Framework of The Graduate Program



Professors and their Research Fields

Master's Programs and the faculty members assigned in Graduate School of Pure and Applied Sciences

Master's applicants will choose the course corresponding to their assignment.

Physics	Chemistry	Materials Science	Applied Physics	Research Fields
		Sakka, Hono, Tsuchiya, Mori, Kobayashi	Sakurai, Mitani, Takano	Metals and Ceramics
		Sasaki, Hashimoto	Miki, Takeda, Golberg Nakayama, Tang	Nanomaterials
	Takeuchi	Aoyagi, Chen, Taguchi		Organic- and Bio- Materials
Sakoda, Uji, Hu				Condensed Matter Physics
			Sekiguchi, Fukata	Semiconducting Materials

International Programs

70 % of the students in our program are from overseas (as of April 2014). Most of the curriculum and the events (such as enrollment orientation and the student seminar) are conducted in English. Moreover, the students have an opportunity to participate in international exchange programs organized by NIMS.



Admissions Statistics

Doctoral Program in Materials Science and Engineering

Entry year	Applications Submitted			Applicants Successful		
	Total	From University of Tsukuba	From other universities	Total	From University of Tsukuba	From other universities
2010	32 (24)	3 (0)	29 (24)	16 (11)	3 (0)	13 (11)
2011	35 (26)	6 (2)	29 (24)	16 (11)	3 (2)	13 (9)
2012	24 (22)	8 (7)	16 (15)	14 (13)	6 (6)	8 (7)
2013	32 (25)	10 (7)	22 (18)	16 (13)	9 (7)	7 (6)
2014	29 (22)	7 (4)	22 (18)	16 (11)	6 (4)	10 (7)

[() shows number of international students]

Materials Science and Engineering Course (for Master's degree)

Entry year	Examinees			Successful Applicants		
	Total	From University of Tsukuba	From other universities	Total	From University of Tsukuba	From other universities
2010	24 (16)	3 (1)	21 (15)	19 (12)	3 (1)	16 (11)
2011	14 (4)	0 (0)	14 (4)	12 (4)	0 (0)	12 (4)
2012	25 (17)	2 (0)	23 (17)	12 (6)	1 (0)	11 (6)
2013	21 (10)	3 (1)	18 (9)	13 (6)	3 (1)	10 (5)
2014	23 (13)	0 (0)	23 (13)	13 (7)	0 (0)	13 (7)

[()shows number of international students]

Statistics after their Graduation

Career path of the alumni in Doctoral Program in Materials Science and Engineering in 2006-2013

Total	Educational Sectors	Private Sectors	Public Sectors	Researchers	Others
60	1	11	2	38	14



Comments from Students



My Thi Diem Duong

from Vietnam, obtained her Master's degree from our joint graduate program (Materials Science and Engineering Course), started her PhD in the Nano-architecture Group in 2014.

Being a NIMS Junior Researcher for two years has been a valuable experience, which I could hardly find elsewhere. First of all, NIMS provides me highly qualified research environment. As working in the first-principle simulation group, I have received precious instruction from my supervisor and many kinds of help from other researchers. Besides, the frequently held student seminars have been good chances for me to practice my presentation skills and learn general knowledge in other fields. Secondly, NIMS takes so much care of my daily life in Japan by organizing

a Japanese language course and cultural classes throughout the years. Furthermore, the encouragement and warm concern that I have received from co-workers in our group makes me feel like I am living in my homeland.

In my opinion, studying in a serious scientific environment and being treated as a researcher in NIMS are great preparation for one who would like to become a leading researcher in the future!



Thomas Scheike

from Germany, undertook a NIMS internship in 2010, began his PhD in the Spintronics Group in 2013.

Before I started my PhD research in NIMS, I got the chance for an internship in the institute. At that time I learned and realized the vast variety in research groups, with researchers from all around the world, topics and facilities NIMS has to offer.

Beyond research activities, I enjoy the international life in Tsukuba with many friends from other countries around the world and learning about the Japanese culture.

I recommend NIMS and Tsukuba to everybody who is interested in Materials Science in an international environment.



Keiko Yoshizawa

from Japan, has been working on her PhD in the Biomedical Materials Group since 2012.

I started my Ph.D. student life in 2012. I currently continue my research activity in a group of NIMS belonging to the graduate school of materials science in the University of Tsukuba. The strong points of NIMS are as follows: good accessibility to get researching data with various facilities, many opportunities to be involved in the diverse cultures of the international researchers and

students. The NIMS Junior system supports the doctoral course students and we students can devote ourselves to study. All the students are very enthusiastic and their attitudes make good circulation between us. Moreover, the mentors give us a lot of good advice. The students can be absorbed in research activities, therefore, NIMS offers the best environment for the doctoral course students.



How and When to Apply

Please visit our website or contact our office for more details.

1 Clarify your interest

Check the faculty member listing. Find the matches between their research and your interested research field.

2 Contact a potential supervisor by email

Send your Curriculum Vitae with a cover letter expressing your interest in the research subject.

3 Apply for the entrance exam

If the faculty member agrees to act as the student's supervisor, submit the application to the University of Tsukuba admission office during the application period.

Please note: the original valid TOEIC or TOEFL score certificate is required for the application.

4 Take the entrance exam

The exam is held at the University of Tsukuba.

•Doctoral Program in Materials Science and Engineering :

The exam is comprised of a presentation (15 min) and an interview (15 min).

•Materials Science and Engineering Course (for Master's students) :

The exam differs depending on the Master's programs (Chemistry, Physics, Applied Physics, and Materials Science). The selection will be based on written exam, Interview, and also either TOEIC/TOEFL score or English exam.

5 Result Announcement

The result will be posted on a noticeboard at the university. Meanwhile, the result certificate will be delivered to you.

6 Enrollment

The enrollment period will be April or October.

(October enrollment is available for the February exam applicants only)

▶ Exam in August
(for April admission)

▶ Exam in February
(for April or October admission)

1 Distribution of
Application
guide

2

3

▶ Application
period

4

▶ Exam

5

▶ Announcement
of the result

1 2

▶ Distribution of
Application
guide

3

▶ Application
period

4

▶ Exam

5

▶ Announcement
of the result

6

▶ Enrollment

▶ Enrollment

6

▶ Enrollment

NIMS Graduate Research Assistantship

NIMS offers NIMS Graduate Research Assistantship to excellent students in the doctoral/master's course of Materials Science and Engineering. The assistantship carries a monthly stipend to assist academically deserving students in fulfilling their academic goals. Those students appointed as NIMS Junior researchers will be enabled to gain insight into their research career by "hands on" experience of working on the latest research projects.

Monthly Stipend

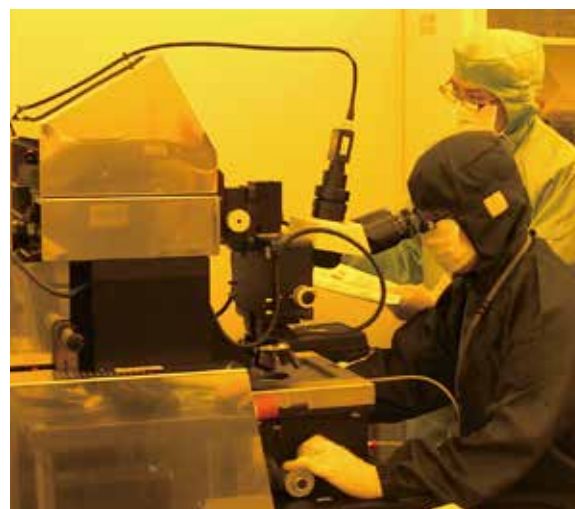
(For International Students)

Doctoral Course :

about 190,000 JPY

Master's Course :

about 160,000 JPY



Faculty Members

Metals and Ceramics

Fine Particle Processing Group (Sengen-site) E-mail: SAKKA.Yoshio@nims.go.jp	Professor Yoshio SAKKA Tel: +81-29-859-2461	(Master's course) Materials Science http://www.nims.go.jp/nc/
Magnetic Materials Group (Sengen-site) E-mail: kazuhiro.HONO@nims.go.jp	Professor Kazuhiro HONO Tel: +81-29-859-2718	(Master's course) Materials Science http://www.nims.go.jp/pmg/E-index.html
X-Ray Physics Group (Sengen-site) E-mail: SAKURAI.yuhgiri.nims.go.jp	Professor Kenji SAKURAI Tel: +81-29-859-2821	(Master's course) Applied Physics http://www.nims.go.jp/xray/lab/
Structural Function Materials Group (Sengen-site) E-mail: TSUCHIYA.Koichi@nims.go.jp	Professor Koichi TSUCHIYA Tel: +81-29-859-2117	(Master's course) Materials Science http://www.nims.go.jp/sfrg/
Spintronics Group (Sengen-site) E-mail: MITANI.Seiji@nims.go.jp	Professor Seiji MITANI Tel: +81-29-859-2137	(Master's course) Applied Physics http://www.nims.go.jp/apfim/index.html
Functional Inorganic Materials Group (Namiki-site) E-mail: MORI.Takao@nims.go.jp	Associate Professor Takao MORI Tel: +81-29-860-4323	(Master's course) Materials Science http://www.nims.go.jp/group/g_inorganic-nanostructure/index_e.html
Nano Frontier Materials Group (Sengen-site) E-mail: TAKANO.yoshihiko@nims.go.jp	Associate Professor Yoshihiko TAKANO Tel: +81-29-859-2842	(Master's course) Applied Physics http://www.nims.go.jp/NFM/
Heat Resistant Microstructure Design Group (Sengen-site) E-mail: KOBAYASHI.Satoru@nims.go.jp	Associate Professor Satoru KOBAYASHI Tel: +81-29-859-2691	(Master's course) Materials Science http://www.nims.jp/group/g_structural-engineering/index.html

Nanomaterials

Soft Chemistry Group (Namiki-site) E-mail: SASAKI.Takayoshi@nims.go.jp	Professor Takayoshi SASAKI Tel: +81-29-860-4313	(Master's course) Materials Science http://www.nims.go.jp/softchem/index-e.html
Nano-architecture Group (Namiki-site) E-mail: MIKI.Kazushi@nims.go.jp	Professor Kazushi MIKI Tel: +81-29-860-4718	(Master's course) Applied Physics http://www.nims.go.jp/nanoarchi_gr/
Nanotubes Group (Namiki-site) E-mail: GOLBERG.Dmitri@nims.go.jp	Professor Dmitri V. GOLBERG Tel: +81-29-860-4432	(Master's course) Applied Physics http://www.nims.go.jp/nanotube/index-e.html
Nano-function Group (Sakura-site) E-mail: TAKEDA.Yoshihiko@nims.go.jp	Professor Yoshihiko TAKEDA Tel: +81-29-863-5476	(Master's course) Applied Physics http://www.nims.go.jp/group/ionbeam/
Nano Functionality Integration Group (Namiki-site) E-mail: NAKAYAMA.Tomonobu@nims.go.jp	Professor Tomonobu NAKAYAMA Tel: +81-29-860-4129	(Master's course) Applied Physics http://www.nims.go.jp/NanoFIG/index.html
1D Nanomaterials Group (Sengen-site) E-mail: TANG.Jie@nims.go.jp	Associate Professor Jie TANG Tel: +81-29-859-2728	(Master's course) Applied Physics http://www.nims.go.jp/imel/en/index.php
Electron Microscopic Analysis Group (Sengen-site) E-mail: HASHIMOTO.Ayako@nims.go.jp	Associate Professor Ayako HASHIMOTO Tel: +81-29-859-2831	(Master's course) Materials Science http://www.nims.go.jp/group/g_electron-microscopy/index.html

Organic- and Bio- Materials

'Smart' Biomaterials Group (Namiki-site) E-mail: AOYAGI.Takao@nims.go.jp	Professor Takao AOYAGI Tel: +81-29-860-4179	(Master's course) Materials Science http://www.nims.go.jp/bmc/group/smartbiomaterials/index_en.html
Macromolecules Group (Sengen-site) E-mail: TAKEUCHI.Masayuki@nims.go.jp	Professor Masayuki TAKEUCHI Tel: +81-29-859-2110	(Master's course) Chemistry http://www.nims.go.jp/macromol/english/
Biomaterials Group (Namiki-site) E-mail: Guoping.CHEN@nims.go.jp	Professor Guoping CHEN Tel: +81-29-860-4496	(Master's course) Materials Science http://www.nims.go.jp/bmc/index_e.html
Biomedical Materials Group (Namiki-site) E-mail: TAGUCHI.Tetsushi@nims.go.jp	Associate Professor Tetsushi TAGUCHI Tel: +81-29-860-4498	(Master's course) Materials Science http://www.nims.go.jp/personal/taguchi/index.html

Condensed Matter Physics

Nano Physics Group (Namiki-site) E-mail: SAKODA.Kazuaki@nims.go.jp	Professor Kazuaki SAKODA Tel: +81-29-860-4184	(Master's course) Physics http://www.nims.go.jp/units/apm/en
Quantum Transport Group (Sakura-site) E-mail: UJI.Shinya@nims.go.jp	Professor Shinya UJI Tel: +81-29-863-5512	(Master's course) Physics http://www.nims.go.jp/nqt/english.html
Condensed-Matter Physics Group (Namiki-site) E-mail: HU.Xiao@nims.go.jp	Professor Xiao HU Tel: +81-29-860-4897	(Master's course) Physics http://www.nims.go.jp/cmssc/scm/index_en.html

Semiconducting Materials

Optoelectronic Nanomaterial Group (Namiki-site) E-mail: SEKIGUCHI.Takashi@nims.go.jp	Professor Takashi SEKIGUCHI Tel: +81-29-860-4297	(Master's course) Applied Physics http://www.nims.go.jp/clsnom/english/e_index.html
Nanostructural Semiconducting Materials Group (Namiki-site) E-mail: FUKATA.Naoki@nims.go.jp	Associate Professor Naoki FUKATA Tel: +81-29-860-4769	(Master's course) Applied Physics http://www.nims.go.jp/imel/en/index.php

Research Groups

Metals and Ceramics

Fine Particle Processing Group Master's course: Materials Science



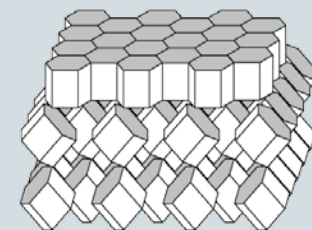
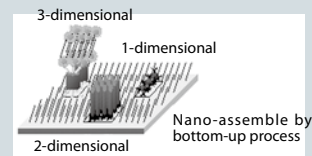
Fabrication and characterization of nanostructured ceramics fabricated from fine particles

Establishment of basic processing for fabricating controlled structure from the nano to the micro-meter order using fine particles in solution and nano-pore, and creating highly controlled structures with outstanding properties at various levels from 0-dimentional to 3-dimentional.

Professor
Yoshio SAKKA

Message Enjoy creating innovative ceramics through advanced particle processing

URL <http://www.nims.go.jp/ncc/>



Textured layer composites by colloidal process in strong magnetic field

Magnetic Materials Group Master's course: Materials Science



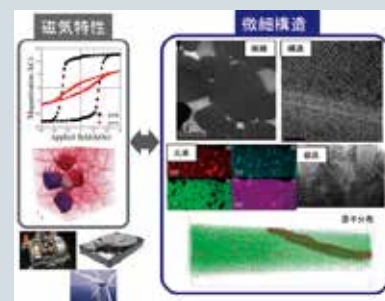
Structure-property relationships of nanostructured metallic materials

Studies on magnetic and spintronics materials for energy efficient data storage and automobiles using atomistic characterization techniques, i.e., the development of magnetic recording media and read sensors for next generation hard disk drives, spintronics devices using highly spin polarized ferromagnetic materials, and high performance permanent magnet without heavy rare earth elements.

Professor
Kazuhiro HONO

Message My group is truly international and many alumni are actively working all over the world.

URL <http://www.nims.go.jp/pmg/E-index.html>



Develop high performance magnetic materials by understanding the structure-property relationships

X-Ray Physics Group Master's course: Applied Physics



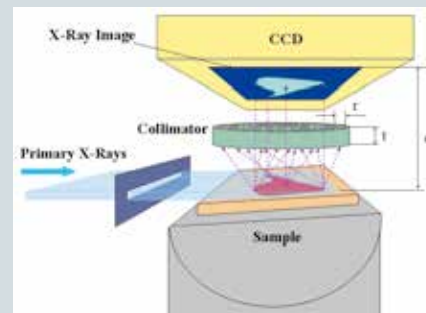
X-ray spectrometry and imaging for advanced characterization

Exotic X-ray scattering and spectroscopic methods based on new principles have been continuously developed in our laboratory, with special interests on analysis of surfaces and buried interfaces for multilayered thin films, chemical characterization of environmental/energy materials as well as evaluation of the roles of ultra trace elements. Some of experiments are performed at synchrotron facilities such as KEK and SPring-8.

Professor
Kenji SAKURAI

Message Science becomes exciting when you find mysteries.

URL <http://www.nims.go.jp/xray/lab/>



Development of new X-ray microscope (patented)

Research Groups

Metals and Ceramics

Structural Function Materials Group Master's course: Materials Science



Development of Structural Functions Materials

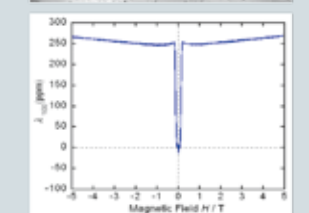
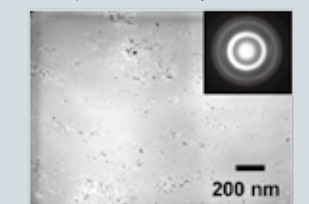
Our group focuses on development of functional metallic materials, such as, pseudo-elasticity, shape memory effect, smart damping and magnetostriction for medical devices and actuator applications, and property control using amorphization and nanocrystallization by severe plastic deformation for biomedical and actuator applications.

Professor
Koichi TSUCHIYA

Message Let's develop "active" metallic materials together !

URL <http://www.nims.go.jp/sfrg/>

Amorphous/nanocrystalline TiNi



Giant magnetostriction in Fe-Ga.

Spintronics Group Master's course: Applied Physics



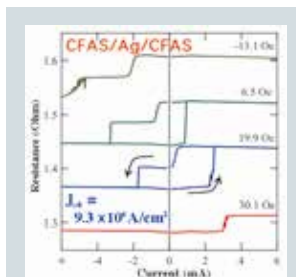
Development of Spintronic Materials and Devices

Development of magnetic materials and nanostructures by atomic scale control based on state-of-the-art thin film growth techniques. Searching and understanding new functionalities in spin transport and their application to spintronic devices.

Professor
Seiji MITANI

Message Enjoy studying in an emerging field of electronics.

URL <http://www.nims.go.jp/apfim/index.html>



Spin-transfer-torque magnetization switching using highly spin-polarized materials



Ferromagnetic tunnel junctions

Functional Inorganic Materials Group Master's course: Materials Science

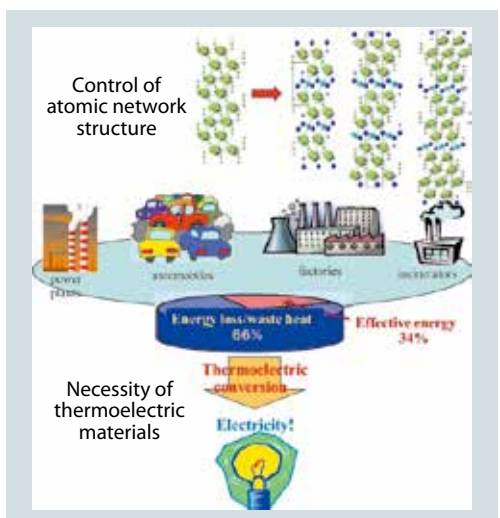


Development of Energy & Environment Materials

Our group focuses on development of novel energy & environment materials, such as, thermoelectric and battery materials. Mankind wastes around two thirds of the energy like gasoline and gas that it consumes, and much of the waste is in the form of waste heat, so the need is extremely high. Through atomic network control, synthesis of new materials, nano/microstructure control of materials with strong structure-property relationships from their topology, we aim to develop highly functional and useful materials.

Message Let's develop the world's first wide-ranging applicable thermoelectric material and other highly functional materials together !

URL http://www.nistep.go.jp/achiev/ftx/jpn/stfc/stt103j/0910_03_featurearticles/0910fa02/200910_fa02.html



Research Groups

Metals and Ceramics

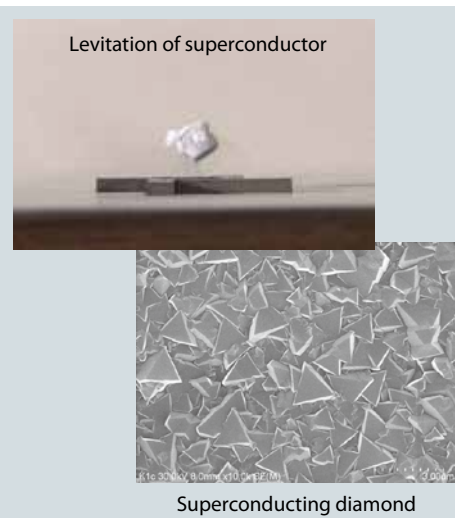
Nanomaterials

Nano Frontier Materials Group Master's course: Applied Physics



Research of new phenomena in superconducting nanomaterials

We are focusing on the physical properties of Fe-based superconductor, diamond superconductor, high-Tc superconductor and carbon nanotube. Development of novel devices, including optical and field effect devices, using superconductors and nano-technologies are targets.

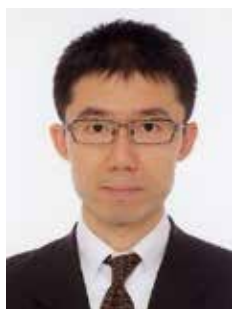


Associate Professor
Yoshihiko TAKANO

Message Join us, and explore the wonders of the book of nature.

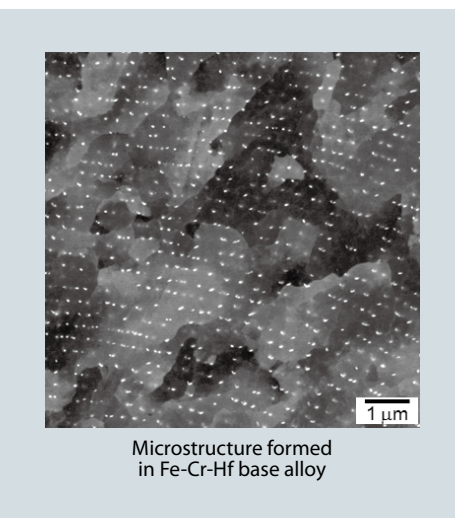
URL <http://www.nims.go.jp/NFM/>

Heat Resistant Microstructure Design Group Master's Course: Materials Science



Microstructure Control of Heat Resistant Steels and Alloys

Heat resistant metals and alloys are critical materials in the field of energy and circumstance such as coal fired power generation, and the improvement of their heat resistant temperature and their creep lifetime is thus a worldwide issue. We investigate the formation and control of microstructure to improve mechanical properties of heat resistant alloys, especially of heat resistant steels. The right hand photograph shows a microstructure formed in an Fe-9Cr base alloy/steel with a small amount of Hf. This microstructure was formed through the interphase precipitation of Fe,Hf type Laves phase during the phase transformation from δ ferrite to γ austenite and a following $\gamma \rightarrow \alpha$ ferrite transformation. We are currently working to apply this type of microstructure related knowledge to improve long-term creep strength of ferritic steels.



Associate Professor
Satoru KOBAYASHI

Message Heat resistant alloys research is society-needs-driven. Worth to do it!!

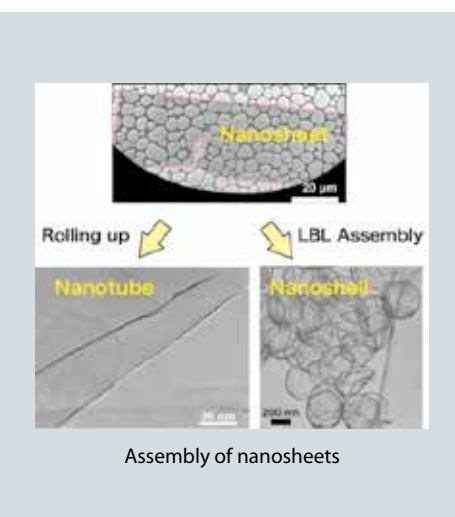
URL http://www.nims.jp/group/g_structural-engineering/index.html

Soft Chemistry Group Master's course: Materials Science



Materials Synthesis via Soft-chemical Processings

Synthesis of functional nanosheets as a new class of nanomaterials and organization of the nanosheets as a building block into nanostructured integrated systems with a sophisticated function. Particular attention is focused on the development of new materials with efficient photocatalytic properties, energy-conversion capabilities, and gigantic magneto-optical functions.



Professor
Takayoshi SASAKI

Message Join us to enjoy finding new materials and unexpected properties in them!

URL <http://www.nims.go.jp/softchem/index-e.html>

Research Groups

Nanomaterials

Nano-architecture Group Master's course: Applied Physics

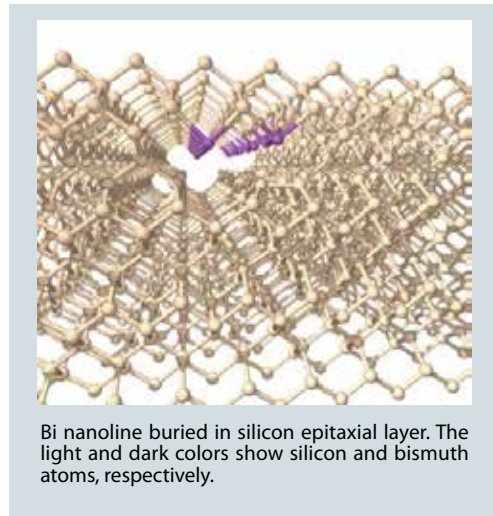


Nanoarchitecture: R&D towards realization of nano device systems.

Development of NANO ARCHITECTURE (functional nanometer scale material system) to contribute to innovate technologies in fields of environmental, energy, IT field, such as photosynthesis reactor with near-field light and spintronics of silicon semiconductor.

Message Our target is combining physics, biology, chemistry, and electronics together to make new functional devices. In my laboratory, we conduct this emerging research internationally, with American, British, Chinese, and Indian research fellows. I will supervise energetic students who wish to work internationally within our new research field of Nanoarchitecture.

URL http://www.nims.go.jp/nanoarchi_gr/



Bi nanoline buried in silicon epitaxial layer. The light and dark colors show silicon and bismuth atoms, respectively.

Nanotubes Group Master's course: Frontier Science



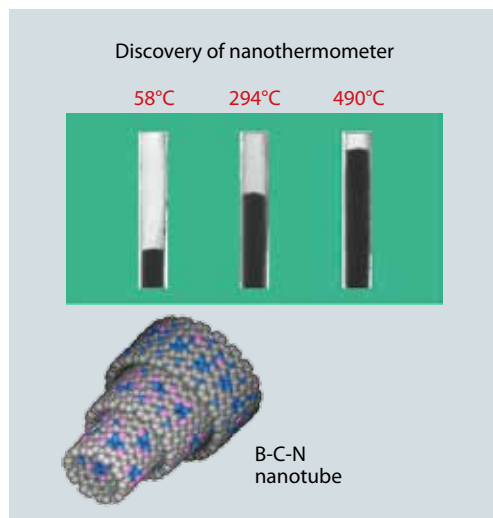
Synthesis, properties and analysis of new nanotubes

We intend to explore and synthesize new nanotubes and nanowires and to characterize their specific structures by using modern analytical transmission electron microscopy. Special attention will be paid to production of semiconducting boron nitride, silicon and other nanotubes to clarify their thermal, electrical and mechanical properties.

Professor
Dmitri GOLBERG

Message Let's create new nanotubes !
A big discovery is a way for R&D of Nanotechnology.

URL <http://www.nims.go.jp/nanotube/index-e.html>



Nano-function Group Master's course: Applied Physics

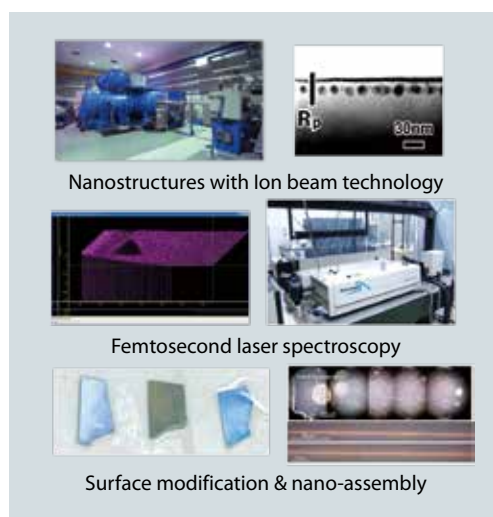


Creation of Functional Nanomaterials with Advanced Control and Characterization of Nanofunctions

We study surface modification of organic and inorganic materials and fabrication of nanoparticles and nano-scale structures with advanced ion beam technology and kinetic synthesis methods. Combinations of external fields with ion beam and extra fields improve the controllability of modification with nano-patterns on materials and of morphology of nanoparticles. We also investigate on nanoparticle assembly with biomolecules and femtosecond spectroscopy of inorganic-organic nanocomposites to develop of functional materials and applications to novel nano-photonics devices, arrays and sensors.

Message Together we can advance our minds and our research.

URL <http://www.nims.go.jp/group/ionbeam/>



Research Groups

Nanomaterials

Nano Functionality Integration Group Master's course: Applied Physics



Research on properties and functionalities of individual and integrated nanostructures

We have developed multiple-probe scanning probe microscopes and are using them for investigating properties of individual nanostructures comprising of inorganic, organic and even biomaterials. The research aims at innovating information technology by integrating the nanomaterials into highly networked and functionalized materials system, namely, neuromorphic network.

Professor
Tomonobu NAKAYAMA

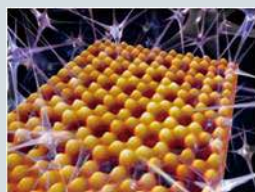
Message

Innovative and challenging mind is necessary for changing the world. I really welcome a student who tackles to a problem rather than seeks for reasons of possible difficulties.

URL <http://www.nims.go.jp/NanoFIG/index.html>



[Top]
Multiprobe STM and a measurement on a nanowire with it.



[Bottom]
Single-molecule data-storage (STM image) together with an illustration of a neuromorphic network.

1D Nanomaterials Group Master's course: Applied Physics



Development of New 1D Nanomaterials

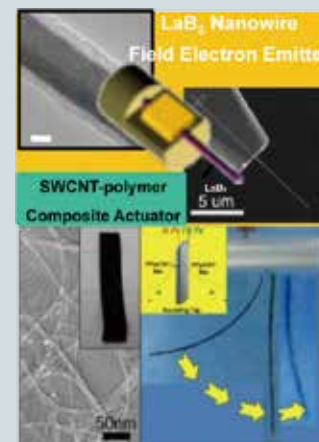
We are the first in the world to succeed in fabricating rare-earth boride nano-structure. Our recent research is focused on the design and fabrication of functional structures, characterization of properties, and development for industrial applications of one-dimensional nanomaterials including carbon nanotubes and rare-earth boride nanowires.

Associate Professor
Jie TANG

Message

Let us make the world better with our nanotechnology!

URL <http://www.nims.go.jp/nanotube/index-e.html>



Electron Microscopic Analysis Group Master's Course: Materials Science



Analysis of material structures at the atomic scale by transmission electron microscopy

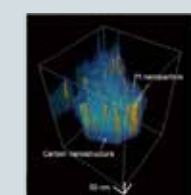
It is indispensable to understand nanostructures of materials for fabricating new materials with outstanding properties, as their structures are related to their properties. Transmission electron microscopy (TEM) is one of effective methods for characterizing materials at the atomic scale. In our laboratory, we develop observation techniques and systems for advanced TEM aiming at contributing to development of new materials.

Associate Professor
Ayako HASHIMOTO

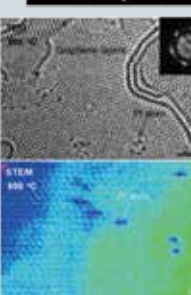
Message

Let's see interesting structures and phenomena of advanced materials at atomic scale!

URL http://www.nims.go.jp/group/g_electron-microscopy/index.html



[Top] Three-dimensional imaging by scanning confocal electron microscopy (Pt nanoparticles dispersed on carbon nanostructures)



[Bottom] High-resolution in-situ observation under high temperature by using a heating specimen holder (Pt atoms on graphene layers)

Research Groups

Organic- and Bio- Materials

'Smart' Biomaterials Group Master's course: Materials Science



Development of 'Smart' polymer-based Biotechnologies

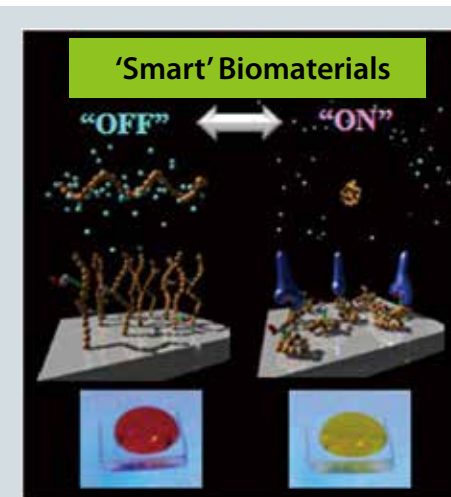
Our research group is interested in developing 'smart' biotechnologies using stimuli-responsive polymers that respond to small changes in external stimuli with large discontinuous changes in their physical properties. These 'smart' biomaterials are designed to act as an "on-off" switch for drug delivery technologies, gene therapy, affinity separations, chromatography, diagnostics etc.

Professor
Takao AOYAGI

Message

Let's join us and work 'smart'!

URL http://www.nims.go.jp/bmc/group/smartbiomaterials/index_en.html



Macromolecules Group Master's course: Chemistry



Organic Nanomaterials of Functional Molecules and Polymers

Creation of new organic nanochemistry through the design, synthesis, and characterization of organic, macromolecular, and supramolecular materials with photo- and electro-active components, chemosensing functions, dynamic mechanical characters.

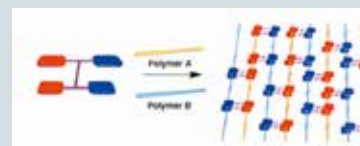
Professor
Masayuki TAKEUCHI

Message

Enjoy new organic nanomaterials field.

URL <http://www.nims.go.jp/macromol/english/>

Assemblies of Conjugated Molecules



Nanoscale alignment of polymers

Biomaterials Group Master's course: Materials Science



Development of Polymeric Biomaterials for Tissue Engineering

Synthesis of biodegradable polymers, fabrication of porous scaffolds and surface modification with proteins and peptides are performed to develop novel biomaterials with excellent biocompatibility. The interaction between biomaterials and cell is investigated to disclose the effects of biomaterials on cell adhesion, proliferation and differentiation, and to regenerate tissues and organs such as cartilage and skin.

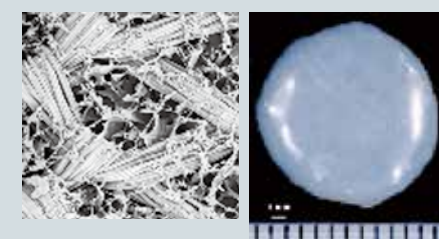
Professor
Guoping CHEN

Message

Join us and enjoy the science "from corn to human body".

URL http://www.nims.go.jp/bmc/index_e.html

Biodegradable Porous Scaffold Regenerated Cartilage



Tissues Engineering of Cartilage Using Biodegradable Porous Scaffolds

Research Groups

Organic- and Bio- Materials

Condensed Matter Physics

Biomedical Materials Group Master's course: Materials Science



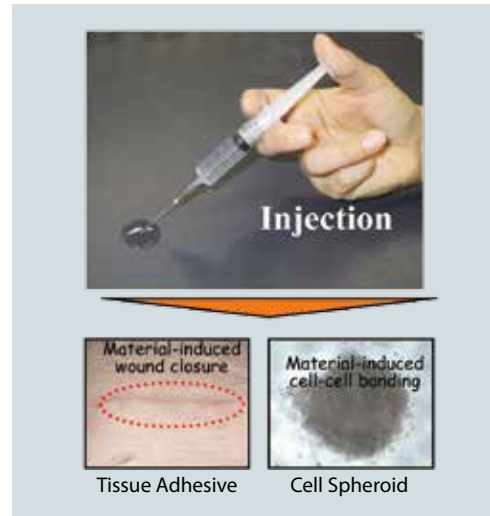
Development of Injectable Materials for Tissue Regeneration

Using covalent bonding and intermolecular interaction, biomedical materials which show sol-gel transition under the physiological environment have been prepared to develop adhesives for tissue-tissue and cell-cell bonding. Combining these materials with drugs and cells, novel injectable materials for tissue regeneration have been developed.

Associate Professor
Tetsushi TAGUCHI

Message Let's enjoy studying unique materials for biomedical application.

URL <http://www.nims.go.jp/personal/taguchi/index.html>



Nano Physics Group Master's course: Frontier Science



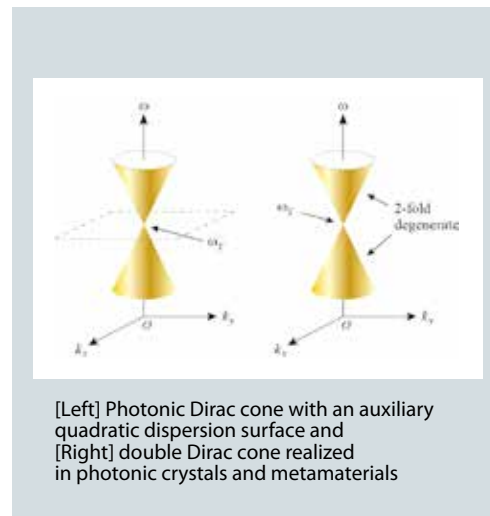
Optical Quantum Science of Nanostructures

Theoretical study and specimen design for controlling the radiation field with photonic crystals and metamaterials. Analysis and application of photonic Dirac cones in particular. Analysis of electronic states in semiconductor nano structures. Theoretical study on the control of the effective mass and mobility of electron by realizing artificial Dirac cones.

Professor
Kazuaki SAKODA

Message Let's study the technology for controlling optical waves and electronic waves at will.

URL <http://www.nims.go.jp/units/apm/en/>



Quantum Transport Group Master's course: Physics



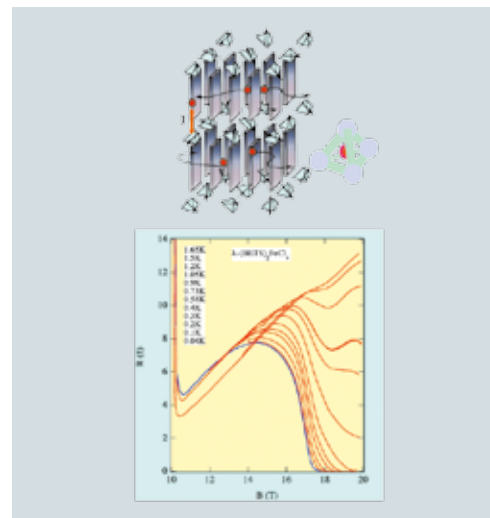
Quest for novel quantum transport phenomena

In strongly correlated electron systems, various fascinating phenomena such as superconductivity due to novel mechanisms emerge at low temperatures. We investigate the electronic structures of various superconductors and their related materials, and try to clarify the novel mechanisms of the superconductivity. Using world-class superconducting magnet systems, we perform systematic measurements of quantum oscillations, transport properties, and spectroscopies for various superconductors and their related materials.

Professor
Shinya UJI

Message Let's enjoy research and quest for novel quantum phenomena !!

URL <http://www.nims.go.jp/nqt/english.html>



Condensed Matter Physics

Semiconducting Materials

Condensed-Matter Physics Group Master's course: Applied Physics



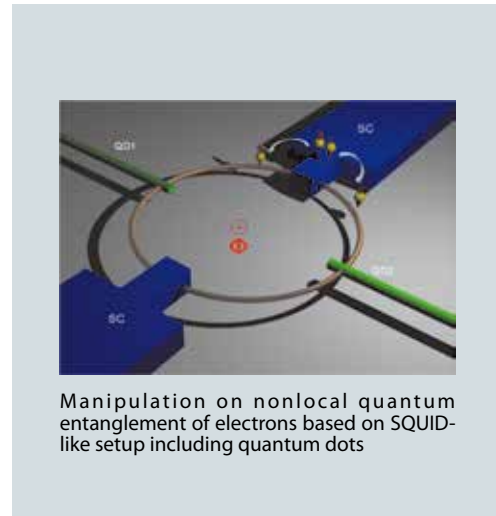
Theory for strongly correlated systems

Material design and multifunction are the main trends in materials science. In order to achieve this goal, we engage in establishing new condensed-matter physics which treats many-body quantum systems in high accuracy. Current topics cover spin-orbit-charge interacting systems and superconductivity.

Professor
Xiao HU

Message Innovation is impossible without understanding the basics.

URL http://www.nims.go.jp/cmssc/scm/index_en.html



Optoelectronic Nanomaterial Group Master's course: Applied Physics



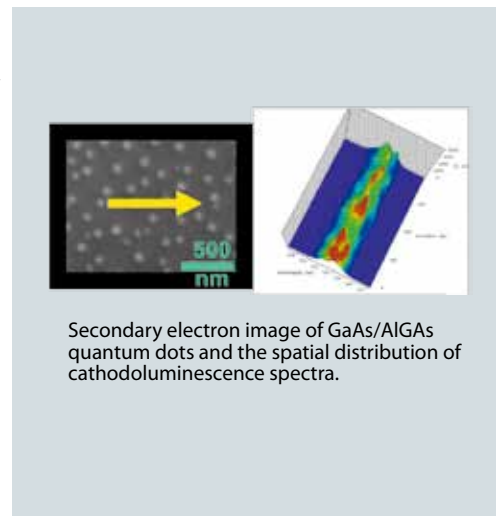
Fabrication and characterization of semiconductor nanomaterials

Studies of electrical and optical properties of semiconducting materials in nanoscale and development of optoelectronic nanomaterials. Semiconductor nanostructures are grown by using various methods and their properties are characterized by nanoscaled electron beam and light injection.

Professor
Takashi SEKIGUCHI

Message Let's see the material wonderland !

URL http://www.nims.go.jp/clsnom/english/e_index.html



Nanostructural Semiconducting Materials Group Master's course: Applied Physics



Development of Functionalized Materials using semiconductor nanostructures

Our group focuses on development of the next-generation energy related materials such as high efficiency solar cell and high capacity Li ion battery anodes and also high speed/low energy consumption transistor using one-dimensional semiconductor nanowires and 0-dimensional semiconductor nanocrystals.

Associate Professor
Naoki FUKATA

Message Let's develop "New Functions" in Si-related materials using nanostructures !

URL <http://www.nims.go.jp/imel/en/index.php>

