



2005

Institute for Chemical Research Kyoto University

京都大学化学研究所

Division of Synthetic Chemistry

Division of Materials Chemistry

Division of Biochemistry

Division of Environmental Chemistry

Division of Multidisciplinary Chemistry

Advanced Research Center for Beam Science

International Research Center for Elements Science

Bioinformatics Center



Challenge and Innovation

2005

Institute for Chemical Research Kyoto University

京都大学化学研究所

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Director
ESAKI, Nobuyoshi

Institute for Chemical Research at Kyoto University will celebrate its 79th anniversary in 2005, but its true roots date back 90 years to 1915. World War I halted the import of salvarsan, which was much needed for medical treatment; to study and produce these compounds, the Special Institute of Chemical Research was founded at the Kyoto Imperial University College of Science. At virtually the same time, university officials realized that it was necessary to establish a major research organization that would be strictly devoted to the further development of chemistry. After extensive negotiations, the Japanese government also recognized this need; thus, in 1926, the Special Institute of Chemical Research was expanded to launch Institute for Chemical Research, Japan's first such institution attached to a university.

Initially, the size of the Institute was not substantial and it contained only a limited number of laboratories, but growth soon accelerated. In 1962, the Institute accepted its first graduate students, and, in 1964, a new research-division structure was introduced, establishing the foundation for the present organization. Through radical organizational changes in 1992, and restructuring in 2004, we have finally reached the current large-scale organization of three centers and five research divisions. Under this system, we have three leading-edge centers: the Bioinformatics Center, the International Research Center for Elements Science, and the Advanced Research Center for Beam Science. Currently, 104 faculty members and 240 graduate students are engaged in research activities in 31 laboratories supervised by full-time professors and five laboratories supervised by visiting professors.

The research within the Institute encompasses the fields of chemistry, physics, biology, and informatics. The chemical studies core covers fields including physical chemistry, inorganic chemistry, organic chemistry, materials chemistry, and biochemistry. The graduate school to which our laboratories belong spans diverse fields of science, engineering, agriculture, pharmaceutical sciences, medicine, informatics, and human/environmental studies. The labs at the graduate school are spearheading leading-edge research, and yielding outstanding results in their own research areas. The Institute is currently performing research activities either as the head or as a core member of three 21st Century Center of Excellence (COE) projects in the fields of chemistry, physics, and the interdisciplinary area of bioinformatics and pharmaceutical sciences. In addition, we are expanding our global reach by pro-actively recruiting researchers and students from abroad and promoting joint research programs with overseas entities. Moreover, we are encouraging community education to communicate the significance and appeal of cutting-edge research through our "Chemical Research for High School Students" and "Open Campus" programs.

Our founding vision is to "Excel in the investigation of basic principles of chemistry and chemical applications." This legacy continues to the present day and describes the essence of our research activities. With this vision in mind, we have entrusted our scientists to choose and pursue research topics at the forefront of advanced chemistry with bottom-up paradigms; this has resulted in substantial contributions to the development of scientific technology. Such accomplishments are proof of our vision of freedom and a bottom-up approach in chemical research.

Under the recently enacted statute of incorporation of universities, each university realizes the importance of balancing competition and collaboration, and searches for strong liaisons with other universities that create uniqueness within the framework of a competitive environment. We are genuinely pleased to announce the acceptance of a proposal for a Center of Excellence project concerning material synthesis made by the International Research Center for Elements Science at Kyoto University in collaboration with the Research Center for Materials Science at Nagoya University and the Institute for Materials Chemistry and Engineering at Kyushu University; this COE project has initiated active research activities in 2005. These three centers for chemical research, which were established as a direct outcome of the COE program, are willing to share research resources and collaborate, in order to form and maintain an open and interdisciplinary chemical research center. Furthermore, we believe that our plan will become a model for cooperation in science, a desirable outcome of the recent university incorporation.

Whether or not the human race can generate sustainable growth is a key issue of the 21st century. Therefore, in Institute for Chemical Research, in order to contribute to the future of our society, we encourage our scientists to be actively involved in research projects with bottom-up approach in mind, and to value the emergence of unique interdisciplinary research projects. Upon embracing the second year of incorporation of universities, and to further reinforce the leadership of the Institute, we are pleased to announce the appointments of Prof. Naoki Sato and Prof. Norihiro Tokitoh as Vice Directors. Under this new administration, we shall strive to further encourage the research activities and install effective management at the Institute.

Finally, we appreciate your continued encouragement and support.

A handwritten signature in black ink, appearing to read "Nobuyoshi Esaki".

History



The First Building of ICR was constructed in Takatsuki, Osaka in 1929.



In the 1930's, Scientists pursued their challenge to put the Saghalien Tundra Area to practical use.



In 1955, the Cyclotron facility was established in the Old Keage Water Power Plant.



Lecture given by Professor Toshio Watanabe, a faculty member of ICR (1925-1935).

The Scientist's Heritage ICR, Kyoto University Professor Ichiro Sakurada

In this booklet, the industrialize plan of the very first chemical fiber invented in Japan is described.

The fiber was originally named "Gousei 1-go," which literally meant "The first chemical fiber." This fiber was later known by the popular name of "Vinyon." This booklet was donated to us from Professor Ichiro Sakurada who enthusiastically led this artificial fiber research project at Institute for Chemical Research, Kyoto University. The excellent members in this project included, Dr. Benki Ri a Korean scientist, Dr. Tsukumo Tomonari a member of Kurashiki Kenshoku Co. (present Kuraray Co., Ltd.), and so on. They reported the first synthetic fiber out of polyvinyl alcohol in 1939. The Vinyon was industrialized in 1950's. This booklet was dated 30 September 1942, in which we can find effort to make synthetic fiber commercialized.



YEAR

HISTORICAL EVENTS

SUCCESSIVE DIRECTORS

1915

Specialized Center for Chemical Research, a predecessor of Institute of the Chemical Research was founded.

1926

Institute for Chemical Research (ICR) was chartered with the founding philosophy, to "Excel in the investigation of basic principles of chemistry and chemical applications."

CHIKASHIGE, Masumi
1927~1930 (1)

1929

The Main Building of ICR was constructed in Takatsuki, Osaka.

KITA, Gen-itsu
1930~1942 (2)

1931

Research Factory Building was constructed.

1933

Workshop, Research Factory for Colloidal Drugs and Research Factory for Chemistry of Nutrition were established.

1935

Special Glass Laboratory and Research Factory for Fiber were established.

1936

Laboratory of Electric Chemistry and Transformer Station were established.
Research Factory for the Tundra Area was constructed in Saghalien.

1937

Test Factory for Synthetic Oil was established.

1939

Laboratory of Saviol Production was established, due to lack of imported medical Saviol during the World War II.

1940

Research Factory for Ceramics Chemistry and Research Factory for Synthetic Rubber were established.

HORIBA, Shinkichi
1942~1945 (3)

1941

Research Factory for Colloidal Chemistry was established.

KONDO, Kinsuke
1945~1946 (4)

1942

Booklet of the plan to industrialize "Gousei 1-go (Vinyon)," the first invented chemical fiber in Japan, was written by Ichiro Sakurada.

NOZU, Ryuzaburo
1946~1948 (5)

1949

ICR became the first affiliated institute of Kyoto University. Hideki Yukawa was awarded the Nobel Prize in Physics for his prediction of the existence of mesons on the basis of theoretical work on nuclear forces.

UCHINO, Senji
1948~1953 (6)

HORIO, Masao
1953~1956 (7)

1955

Reconstruction of the Cyclotron was completed (in the Kyoto City Old Keage Water Power Plant).

TAKEI, Sankichi
1956~1959 (8)

NAKAI, Risaburo
1959~1961 (9)

1962

ICR established graduate schools to offer the advanced education for graduate students.

GOTO, Renpei
1961~1964 (10)

1964

The Division System was introduced. ICR organization was divided into 19 research divisions and 1 satellite facility. Nuclear Science Research Facility was established in Awataguchi, Sakyo-ku, Kyoto.

KUNICHIKA, Sango
1964~1967 (11)

TSUJI, Waichiro
1967~1970 (12)

In the 80 years of its history, ICR has continued the challenge to uncover the basis of chemistry and answer the frontier quests. The liberal atmosphere of ICR supports the BIG battles to conquer the TINY world of molecules.

※Photograph of the monument of ICR in Takatsuki

The Scientist's Heritage
ICR, Kyoto University

Professor Hideki Yukawa

In 1949, Professor Hideki Yukawa was awarded the Nobel Prize in Physics in recognition of his research on elementary particle. This is a poster of the "Special Public Lecture" held at ICR in 1953, where Professor Yukawa delivered his famous research theory on "What is an elementary particle?" He graduated Kyoto Imperial University (KIU) at the age of 22, and promoted to a lecturer at KIU at the age of 25. He then took professorship at an University in Osaka for a time. In 1939 he returned to KIU and became a Professor at the Faculty of Science at the age of 32. He had been a faculty at ICR since 1943, the same year he was awarded the honorable "Order of Culture" at the most youngest in Japanese history. He was very active and enthusiastically affiliated to Universities and Institute throughout the world. His devotion and great contribution to ICR goes beyond his last days in 1968.



The High-voltage Electron Microscopy was the first equipment placed at Gokasho, Uji, the present location of ICR. This led the way for following labs to move to Uji Campus.



Building to hold large seminars and research presentations. In 1999, ICR built the Joint Research Laboratory.

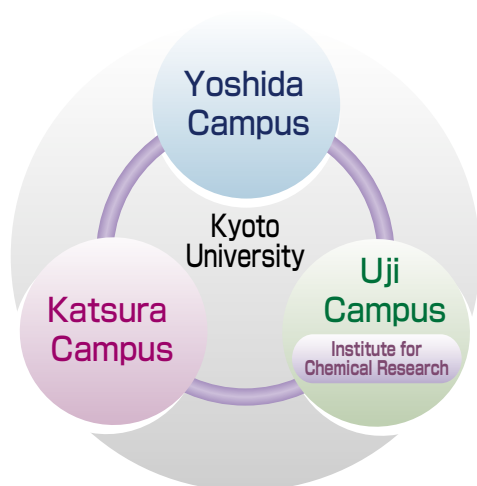


Speech addressed by President Oike of Kyoto University, on the completion of Uji Research Building in 2004.

YEAR	HISTORICAL EVENTS	SUCCESSIVE DIRECTORS
1968	High-Voltage Electron Microscopy was located at Gokasho, Uji (Uji Campus). ICR was moved to Uji Campus.	KUNICHIKA, Sango 1970~1972 (13)
1971	Low-Temperature Laboratory was established.	SUITO, Eiji 1972~1974 (14)
1975	Biotechnology Laboratory and Central Computer Facility were established	TAKEZAKI, Yoshimasa 1974~1976 (15)
1980	DNA Laboratory was established.	SHIGEMATSU, Tsunenobu 1976~1978 (16)
1983	Nucleic Acids Laboratory was built.	TASHIRO, Megumi 1978~1980 (17)
1987	The Division System was revised. ICR organization became 19 research divisions and 2 satellite facilities.	TAKADA, Toshio 1980~1982 (18)
1988	Accelerator Laboratory and Research Building were completed in Gokasho, Uji. Nuclear Science Research Facility was moved to the new building.	FUJITA, Eiichi 1982~1984 (19)
1989	High-Resolution Electron Spectromicroscope was established.	INAGAKI, Hiroshi 1984~1986 (20)
1992	ICR was reorganized into 9 research divisions and 2 satellite facilities. Supercomputer Laboratory was established.	KURATA, Michio 1986~1988 (21)
1999	Joint Research Laboratory Building was constructed.	TAKANAMI, Mituru 1988~1990 (22)
2000	Administration Departments of ICR and other institutes in Uji Campus were integrated.	SAKKA, Sumio 1990~1992 (23)
2001	Bioinformatics Center was established.	ODA, Jun-ichi 1992~1994 (24)
2002	Proteome Informatics was established with donation from SGI Japan. (It has finished on March, 2005.) Bioinformatics Training Unit was offered as one of the programs in Bioinformatics Center.	MIYAMOTO, Takeaki 1994~1996 (25)
2003	ICR was reorganized into 9 research divisions and 3 satellite facilities. International Research Center for Elements Science was established.	SHINJO, Teruya 1996~1998 (26)
2004	ICR was reorganized into 5 research divisions and 3 centers. Advanced Research Center for Beam Science was established. Uji Research Building was constructed.	SUGIURA, Yukio 1998~2000 (27)
2005	Laser Science Laboratory was built.	TAMAO, Kohei 2000~2002 (28)
		TAKANO, Mikio 2002~2005 (29)
		ESAKI, Nobuyoshi 2005~ (30)

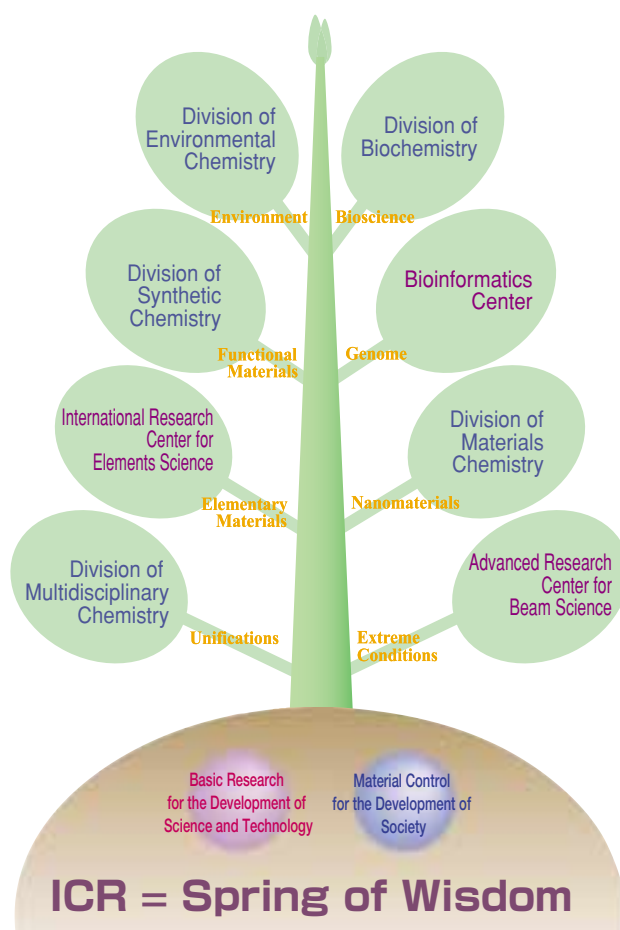
Research Activities

3 Campuses of Kyoto University



Institute for Chemical Research, Kyoto University

5 Research Divisions and 3 Research Centers



Faculties and Researchers

University Staffs

(As of August 1, 2005)

Professor	Associate Professor	Assistant Professor	Research Associate	Technician	Sub-total
30 (4)	25 (4)	40 [1]	5	8	108 [1] (8)
Researcher	Other Staff				Sub-total
38	52				90
Total					198 [1] (8)

The number in [] represents Fixed Term Program-specific Faculty.
The number in () represents Visiting Professors.

Research Students, Fellows and Associates (As of May 1, 2005)

Research Student	Research Fellow	Sub-total
3	2	5
Postdoctoral Fellow of JSPS	Research Associate	Sub-total
6	12	18
Total		23

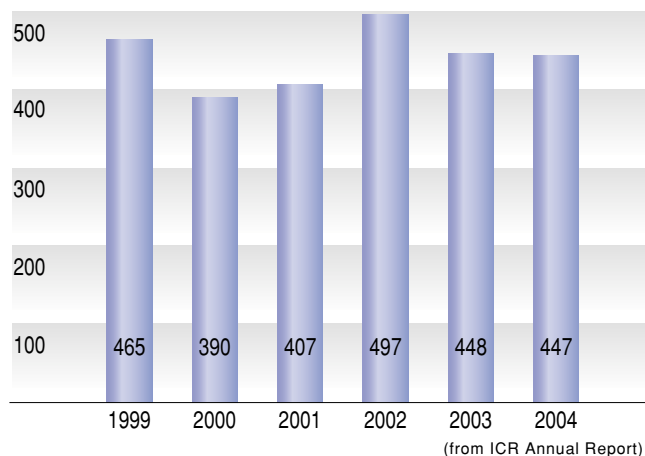
ICR is located in the Uji Campus of Kyoto University. 31 Laboratories constitute the system of "5 Research Divisions and 3 Research Centers" and more than 100 faculties and many researchers are engaging various research of science.

Diverse Research Fields

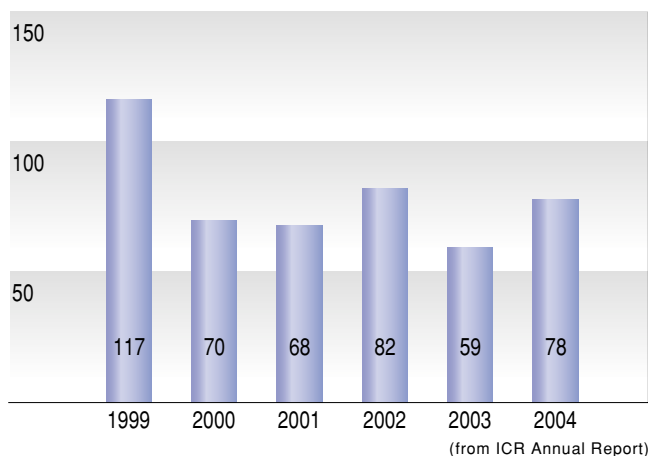


Chemistry, Physics, Biology, Informatics...
31 laboratories are covering a variety of scientific fields,
and developing novel technologies for the future.

Publications



Seminars



Major Research Projects

As of June, 2005

Ministry of Education, Culture, Sports, Science and Technology (MEXT), Center of Excellence 21st Century COE Programs

Center of Research and Knowledge Information Infrastructure for Genome Science

Joint program with Graduate School of Pharmaceutical
Science, and Kyoto University Hospital

Project Leader : KANEHISA, Minoru Term : 2003-2007



Genome Science is a new area of life science in the 21st century, endeavoring to gain an overall picture of high-level life systems such as cells, whole organisms, and ecosystems. The core of this field is bioinformatics, and our group is particularly aimed towards medicinal and industrial applications, pioneering a new field of study fusing genomics and chemistry in bioinformatics.

Laboratories, participate from ICR

Bioinformatics Center, Chemical Biology, Supramolecular Biology

Kyoto University Alliance for Chemistry

- Chemistry for Materials Conversion -

Joint Program with Graduate School of Science
and School of Engineering

Representative from ICR : TOKITOH, Norihiro Term : 2002-2006

This project is pushing on with the construction of a new alliance for chemical research of the highest standard by promoting an active interchange among the two graduate schools and one institute related to chemistry in Kyoto University with paying respect for the original, unique research environment of individual institutions. In addition, an effective higher education on chemistry is provided by the execution of a new educational program, which extends all over the alliance.



Laboratories, participate from ICR

Organoelement Chemistry, Structural Organic Chemistry, Chemistry of Polymer Materials, Inorganic Photonics Materials, Biofunctional Design-Chemistry, Solution and Interface Chemistry, Molecular Microbial Science, Electron Microscopy and Crystal Chemistry, Organic Main Group Chemistry, Advanced Solid State Chemistry, Organotransition Metal Chemistry

Center for Diversity and Universality in Physics

- Unified Research and Education on Elementary Particles,
Macroscopic Systems and the Universe -

Joint Program with Graduate School of Science, YITP,
Kwasan and Hida Observatories, and KU-IIC

Representative from ICR : NODA, Akira Term : 2003-2007

Aims at deep understanding of various physical processes peculiar to each level in nature, creation of new research fields and clarification of universal principle common to all over the levels. Making emphasis on training and education of young scientists, young researchers with good international competition are to be brought up through international collaborations, organizing of international conferences and sending to the ones overseas.



Laboratory, participate from ICR

Particle Beam Science

Major Research Projects

As of June, 2005

MEXT, Research and Education Funding for Inter-University Research Project

Joint Project of Chemical Synthesis Core Research Institutions

Joint Project with RCMS (Nagoya Univ.), and IMCE (Kyushu Univ.)

Representative from ICR : OZAWA, Fumiyouki Term : 2005-2009

The purpose of this joint research program is to develop novel synthetic chemistry for production of new materials through the intimate cooperation of three highly recognized research groups. The education and training of young scientists would also benefit from a research environment that exposes them to different branches of materials chemistry.



Laboratories, participate from ICR International Research Center for Elements Science, etc.

MEXT, Nanotechnology Support Project Nanotechnology Support Project in Kyoto University

Precise Analysis Support of Nanoscale Materials

Cooperative Project with KU-VBL, Advanced Research Institute of Nanoscale Science and Engineering

Representative from ICR : ISODA, Seiji Term : 2002-2006

As part of the nanotechnology support project promoted by the MEXT, the precise analysis support of nanoscale materials is offered under cooperation of three departments in Kyoto University. Many equipment are opened for nanotechnology users with support of university researchers having deep knowledge and plentiful experience.

MEXT, Leading Project Research and Development Project for Economic Activation

Practical Development of Nanoscale Electronic State Analysis

Cooperative Project with IMRAM (Tohoku Univ.), JAERI, and JEOL

Representative from ICR : KURATA, Hiroki Term : 2004-2006

It aims to develop a general-purpose analytical electron microscope for practical use in nanoscale electronic state analysis. To achieve high-resolution in electron energy loss spectroscopy and X-ray emission analysis, the microscope equips a highly-stabilized high-brightness nano-tip electron gun. These technical elements are newly developed as the core of future microscopes.

Special Coordination Fund of the MEXT, Bioinformatics Training Unit

Education and Research Organization for Genome Information Science

Cooperative Program with HGC (Univ. of Tokyo)

Representative : KANEHISA, Minoru Term : 2002-2006

We are training talented youth to be internationally active in bioinformatics, with a distance learning system for up to three-way simultaneous real-time broadcast, an e-learning system using WebCT and a video lecture library, and international workshops with universities in the US and Germany.

Laboratories, participate from ICR Bioinformatics Center

MEXT, National Research Grid Initiative (NAREGI) Computational Nanoscience

Grid Application Research in Nanoscience

Cooperative Project with IMS, ISSP (Univ. of Tokyo), IMR (Tohoku Univ.), KEK, AIST

Representative from ICR : NAKAHARA, Masaru Term : 2003-2007

A national project for the theoretical prediction and design of nano-scale materials. By introducing the grid technology into the physical and chemical researches, a new theory is developed and a huge-scale computation is performed by outstanding scientists in the field of theoretical-computational chemical sciences.

Grants-in-Aid for Specially Promoted Research

Science and Technology of Concentrated Polymer Brushes

Research Leader : FUKUDA, Takeshi Term : 2005-2008

This project aims at pioneering new fields of science and technology based on concentrated polymer brushes, which are turning out to be highly rigid and strong, extremely smooth, and effectively size-excluding surfaces comprising of highly extended flexible polymers.

Grants-in-Aid for Creative Scientific Research

Collaboratory on Electron Correlation -Toward a New Research Network between Physics and Chemistry-

Cooperative Network with ISSP (Univ. of Tokyo), IMR (Tohoku Univ.), KEK, IMS
Representative from ICR : KANAYA, Toshiji Term : 2001-2005

The project "Collaboratory on Electron Correlation - Toward a New Research Network between Physics and Chemistry" is supported by Grants-in-Aid for Creative Scientific Research. In this project strong scientific network among five big institutes in Japan have been constructed to promote the collaboration on materials science among them.

Laboratories, participate from ICR

Structural Organic Chemistry, Advanced Inorganic Synthesis, Chemistry of Polymer Materials, Solution and Interface Chemistry, Molecular Microbial Science, Polymer Materials Science, Electron Microscopy and Crystal Chemistry, Organic Main Group Chemistry, Advanced Solid State Chemistry, Bioknowledge Systems

Grants-in-Aid for Creative Scientific Research

The Chemistry of Unsaturated Compounds of Heavier Main Group Elements: Pursuit of Novel Properties and Functions

Research Leader : TOKITOH, Norihiro Term : 2005-2009

By taking advantage of the method for kinetic stabilization, the synthesis and isolation of a variety of unsaturated compounds containing heavier main group element(s) will be examined in the hope of developing novel functional materials with making use of the characteristics of each element. As a result, new research fields will be established for the chemistry in pursuit of novel physical properties and functions.

MEXT

Development of Advanced Compact Accelerator Components

Cooperative project with NIRS, The Graduate School for the Creation of New Photonics Industries, AIST, School of Engineering (Univ. of Tokyo), ADISM (Hiroshima Univ.), KEK, JASRI

Representative from ICR : NODA, Akira Term : 2002-2005

In order to realize widespread use of the frontier clinical treatment through the downsizing of the accelerator, key technologies of advanced accelerator components have been developed concerning with "compact hard X-ray radiation source" and "compact proton and heavy-ion synchrotron".



JST Bioinformatics Research & Development

Deductive Database of the Genome and the Biological System Based on Binary Relations

Cooperative project with HGC (Univ. of Tokyo)

R&D Leader : KANEHISA, Minoru Term : 2001-2005

We are conducting an upgrade and standardization of the KEGG database, aiming towards developing a logical framework and practical inference system for deciphering the function of high-level life systems from genomic data.



Major Grants and Funds in 2005

As of July, 2005

(Over ten million yen)

Specially Promoted Research	Science and Technology of Concentrated Polymer Brushes	FUKUDA, Takeshi
Creative Scientific Research	The Chemistry of Unsaturated Compounds of Heavier Main Group Elements: Pursuit of Novel Properties and Functions	TOKITOH, Norihiro
Priority Areas Research	Mathematical Analysis of Structure and Dynamics of Biological Information Networks	AKUTSU, Tatsuya
	Biological Systems Database	KANEHISA, Minoru
Scientific Research (S)	Chemistry and Physics of 3d Transition Metal Oxides Equipped with Deep 3d Levels: Search for New Materials and New Functions	TAKANO, Mikio
Scientific Research (A)	Control of Physical Properties by Utilizing Spin-polarized Current	ONO, Teruo
	Science and Functions of Organic Amorphous Materials - Approach from Precise Static and Dynamic Structural Analysis	KAJI, Hironori
	Creation of New Bio-interfaces Based on High-Density Polymer Brushes	TSUJII, Yoshinobu
Scientific Research (B)	Study of Relationship between Rheological Properties and Loop Fraction in Multi-block Copolymers	WATANABE, Hiroshi
	Development of Intracellular Targeting Peptide Vectors and the Real-time Observation of the Intracellular Delivery	FUTAKI, Shiroh
Young Scientists (A)	Science of (Semi-soft) Colloidal Crystals of High-Density Polymer Brush/Inorganic Fine Particle Hybrid Systems	OHNO, Kohji
MEXT, Leading Project	Practical Development of Nanoscale Electronic State Analysis	KURATA, Hiroki
Contact Research	Probing the <i>Plasmodium falciparum</i> Genome (JST)	GOTO, Susumu
Inter-University Research Project	Joint Project of Chemical Synthesis Core Research Institutions	OZAWA, Fumiyuki*
21st Century COE Program	Center of Research and Knowledge Information Infrastructure for Genome Science	KANEHISA, Minoru*
	Kyoto University Alliance for Chemistry -Chemistry for Materials Conversion-	TOKITOH, Norihiro*
Special Coordination Fund of the MEXT	Bioinformatics Training Unit; Education and Research Organization for Genome Information Science	KANEHISA, Minoru

* the Project Leader, or the Representative from ICR

Grants-in-Aid for Scientific Research

Partnership between Universities and Industry

Research and Education Funding

Other Funds

Major Grants and Funds in 2004

(Over ten million yen)

Specially Promoted Research (COE)	Elements Science: Construction of Organic and Inorganic Frameworks Focusing on Quality of Elements	TAMAO, Kohei
Priority Areas Research (2)	Construction and Retrieval of Highly-integrated Biological Databases	GOTO, Susumu
	Integrated Database of Genomes and Cellular Functions for Bacterial Species	KANEHISA, Minoru
	Science and Functions of Ultra-densely Grafted Surfaces	FUKUDA, Takeshi
Scientific Research (A) (2)	Interaction between Metallome and Proteome in the Marine Ecosystem.	SOHRIN, Yoshiki
	Molecular Mechanisms of Functional and Morphological Differentiation of Cell Membranes Based on Positional Information of Membrane Phospholipids	UMEDA, Masato
	Precise Solid-State NMR Analysis of the Noncrystalline Organized Structure and Dynamics for Polymeric Functional Materials	HORII, Fumitaka
Joint Research	Higher Order Structure Formation in Induction Period of PLA Crystallization and in External Fields (Collaboration Research with Toyota Motor Corporation and Toyota CRDL,INC.)	KANAYA, Toshiji
	Experimental Studies on Structure-magnetic Property Relationships of Nanocomposite Magnets (Collaborative Research with TOYOTA)	TAKANO, Mikio
MEXT, Research Revolution 2002	Nanotechnology Support Project; Precise Analysis Support of Nanoscale Materials	ISODA, Seiji
MEXT, Leading Project	Practical Development of Nanoscale Electronic State Analysis	KURATA, Hiroki
21st Century COE Program	Center of Research and Knowledge Information Infrastructure for Genome Science	KANEHISA, Minoru*
	Kyoto University Alliance for Chemistry -Chemistry for Materials Conversion-	TOKITOH, Norihiro*
Special Coordination Fund of the MEXT	Promoting Science and Technology; Nanospintronics Design and Realization	ONO, Teruo
	Bioinformatics Training Unit; Education and Research Organization for Genome Information Science	KANEHISA, Minoru
Industrial Technology Research	Development of Writing Technology for Gbit-MRAM by Using Current-driven Domain Wall Motion	ONO, Teruo
Grant Program by NEDO	Fundamentals and Applications of (Semi-soft) Colloidal Crystals of High-Density Polymer Brush/Inorganic Fine Particle Hybrid Systems	OHNO, Kohji

* the Project Leader, or the Representative from ICR

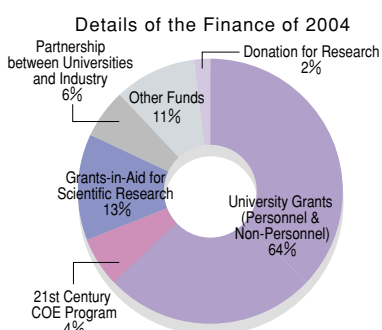
Grants-in-Aid for Scientific Research

Partnership between Universities and Industry

Other Funds

Finance

2000~2004



	Personnel	Non-Personnel	21st Century COE Program	Grants-in-Aid for Scientific Research	Partnership between Universities and Industry*1	Other Funds*2	Donation for Research	Total
2000	1,407,951	1,549,215	-----	954,280	418,314	-----	78,062	4,407,822
2001	1,397,585	1,725,272	-----	814,418	356,231	98,673	106,478	4,498,657
2002	1,471,582	1,680,788	65,000	677,913	130,578	514,748	109,766	4,650,375
2003	1,246,811	1,590,885	163,815	651,521	188,351	442,525	110,422	4,394,330
2004	1,458,777	1,318,372	149,759	567,740	254,884	485,301	81,638	4,316,471

*1 For 2000, including other competitive research funds of the Japanese Government (308,796)

For 2001, including other competitive research funds of the Japanese Government (315,230)

For 2002, including other competitive research funds of the Japanese Government (17,998)

For 2003, including other competitive research funds of the Japanese Government (16,286)

*2 Until 2000, "Other Funds" were included in the funds of Partnership between Universities and Industry

Facilities



Nucleic Acids Laboratory 1,207m²



Biotechnology Laboratory 540m²



High-Resolution Electron Spectromicroscope Laboratory 913m²
Low-Temperature High-Resolution Electron Microscope Laboratory 586m²
 (Advanced Research Center for Beam Science)



Laser Science Laboratory 242m²
 (Advanced Research Center for Beam Science)

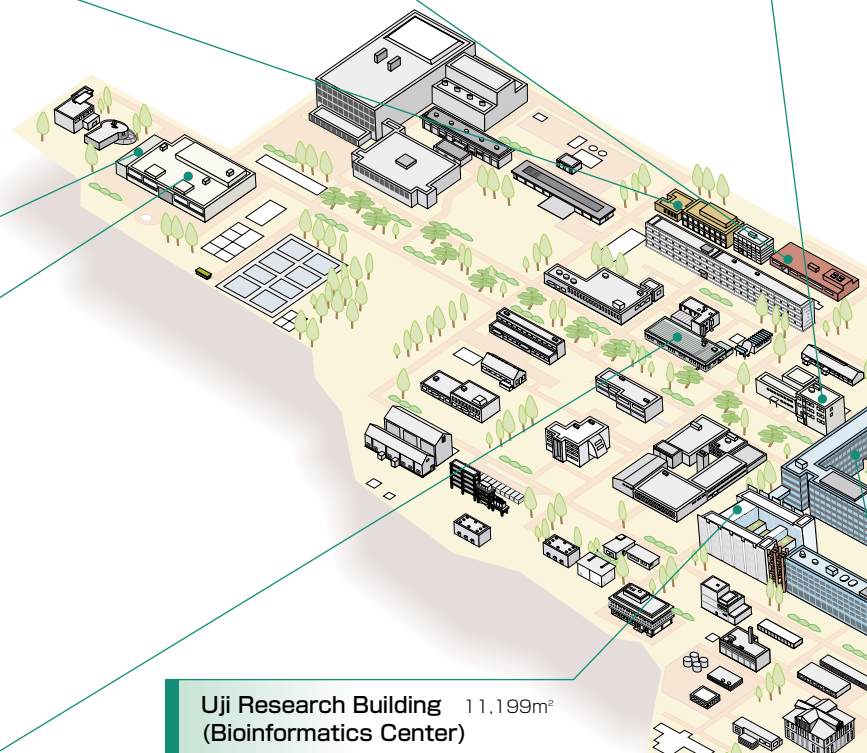
Accelerator Laboratory 2,910m²
 (Advanced Research Center for Beam Science)



Low-Temperature Laboratory 760m²



Uji Research Building 11,199m²
 (Bioinformatics Center)



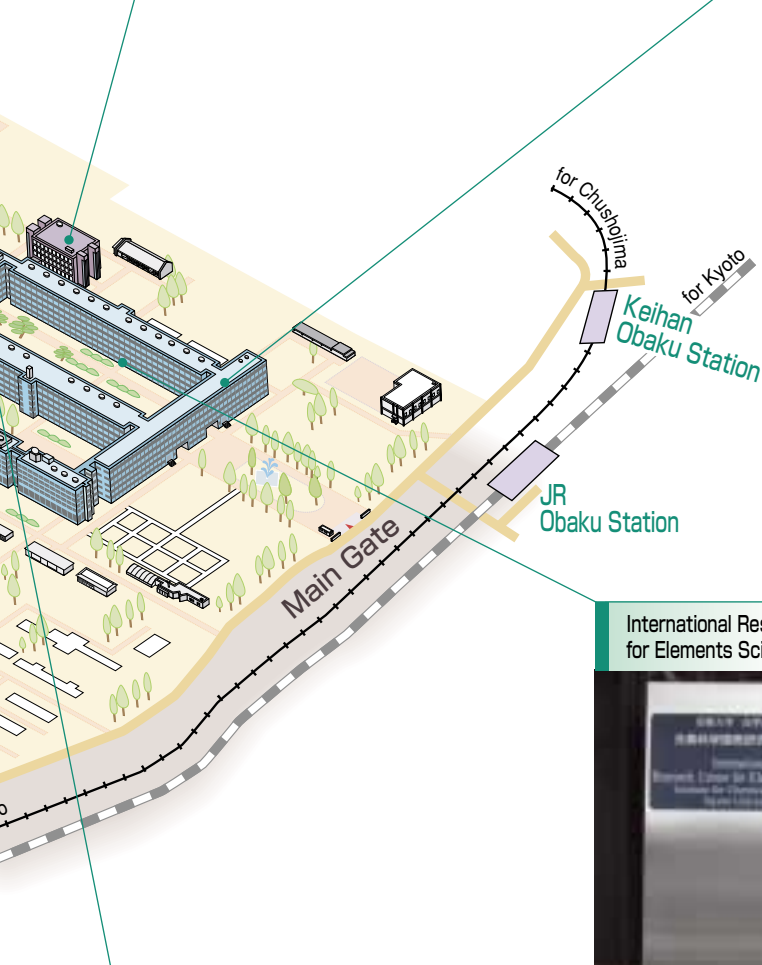
ICR is located on the Uji River side. It is one of the most important section of Kyoto University. There are 31 laboratories within about 10 buildings.



Joint Research Laboratory Building 3,777m²



Main Building 11,714m²
Administration Office (3rd Fl.)



Uji Campus

Institute for Chemical Research

Research Institute for Sustainable Humanosphere

Institute of Advanced Energy

Disaster Prevention Research Institute

- Graduate School of Engineering
- Graduate School of Agriculture
- Graduate School of Energy Science

- Graduate School of Informatics
- Research Center for Low Temperature and Materials Science
- International Innovation Center

Administration Office of Uji Campus

International Research Center for Elements Science



Uji Library, Kyoto University (3rd Fl.)

Uji is famous for its verdurous riverfront scenery. Here has been a strategic point between Kyoto and Nara, the old capitals of Japan. There are two world heritages, Byodoin Temple and Uji-gami Shrine. We endeavor to enrich the buildings and facilities those are suitable to the center for the most advanced studies and harmonious with nature and the local community.

Research Instruments

Main Building



1F

Mass Spectrometer

Triple stage quadruple MS/MS system: Finnigan mat TSQ7000. Mass range: m/z 1–100,000 (ESI), m/z 1–1,000 (APCI). Ion source: ESI, APCI (positive, negative)



1F

Mass Spectrometer

JEOL MStation JMS-700. Mass range: m/z 1–4,000; Ion source: EI, CI, FAB, ESI (positive, negative)



1F

Solution Nuclear Magnetic Resonance Apparatus

ECA600 supplied by Jeol Co. Ltd. can measure the ^1H to ^{14}N nuclei at world-record sensitivity and make possible in-situ observations for living cells and dynamic measurements for such nano-scale structures as membranes.



1F

Nuclear Magnetic Resonance Spectrometer

JEOL AL-300 (300 MHz) for multi purpose measurements with a 5 mm ϕ probe for multi nuclei.



2F

X-ray Data Collection System for Biological Macromolecular Crystals

An equipment which can digitalize diffraction images obtained on an IP detector by irradiating mirror-focused X-rays to biological macromolecular crystals. This enables cryo-crystallographic measurement.



2F

Rheometer

Rheometrics ARES: This rheometer enables us to accurately measure viscoelastic properties of various materials. Dynamic viscoelastic tests and steady flow tests can be made. With appropriate attachments, ARES can be used also for rheo-dielectric, rheo-scattering, and flow-birefringence measurements.



2F

Dielectric Bridge

Solartron 1260, 1296: This dielectric bridge enables us to accurately measure the dynamic dielectric constant and dielectric loss in a wide range of frequency.



1F

Solid-State Nuclear Magnetic Resonance Spectrometer

Chemagnetics CMX-400 (400 MHz): Solid-State NMR for multinuclear and multidimensional experiments. This is used for investigations of structure and dynamics for organic solid materials in relation to their properties and functionalities.



3F

CCD Single-Crystal X-ray Diffractometer

Bruker Model SMART APEX. A two-dimensional CCD X-ray detector enables high-speed collection and analysis of X-ray diffraction data. Used for precise structural analysis of organic molecules.



4F

Low Temperature Near-Field Scanning Optical Microscope

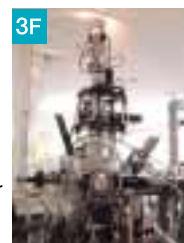
Optical microscope with high spatial resolution without restriction of diffraction limit of light. This enables to characterize local optical properties of materials at low temperature.



5F

Gas Chromatograph / Mass Spectrometer

PerkinElmer Turbomass spectrometer equipped with PerkinElmer Capillary Gas Chromatograph XL with various types of capillary columns. Mass spectra are obtained by either EI or CI ionization.



3F

Pulsed-Laser Deposition System

Thin-film samples are grown by deposition of ablated target materials with KrF excimer laser (λ :248nm). Atomic layer-by-layer film-growth can be monitored through in-situ RHEED system.

High-Resolution Electron Spectromicroscope Laboratory

High Resolution Electron Spectromicroscope

Structures of materials can be analyzed at atomic resolution by using 1000 keV electron beam, and EELS can investigate electronic states and elemental distributions in nanoscale regions.



Biotechnology Laboratory



Multifunctional Automatic Fermenter

A large-scale fermenter with a 500-L chamber operated under accurate control of temperature, pH, and aeration rates, and useful for large-scale production of biomolecules.

Laser Science Laboratory



Intense Short-Pulse Laser System

T^e-laser: the CPA-laser system consisting of a short-pulse mode locked oscillator and three amplifiers, emitting 200mJ in 100fs (2TW) (1J in 100fs, 10TW at maximum).



Laser Irradiation Room

Laser-matter interaction experiments with the T^e-laser can be performed. The laser beam line from the T^e-laser is divided multiply for several experimental theme.

ICR is engaged in wide range of research covering most fields of chemistry. High-performance and highly efficient instruments are equipped in ICR. These equipments are essential elements to enable advanced research in chemistry.

Joint Research Laboratory Building



1F Matrix-Assisted Laser Desorption Ionization Time-Of-Flight Mass Spectrometry (MALDI-TOFMS)

A MALDI-TOFMS can easily analyze molecular masses of macromolecules including proteins and synthetic polymers at high mass resolving powers of 15,000 with mass range greater than 100kDa.



1F (Magnetic) Circular Dichroism Spectrometer
JASCO J-820 equipped with a 1.5 T-electromagnet. VT-(M)CD and linear dichroism can also be measured.



1F Electron Spin Resonance Spectrometer
Bruker Model EMX 8/2.7. Equipped with a 9.5-kG magnet and a variable low temperature controller. Organic free radicals and inorganic paramagnetic materials can be studied.



1F High-Pressure Synthesis Equipment

This apparatus enables us to make samples under extreme conditions up to 50,000 atm and 2000°C (1cc sample volume). We also have another apparatus for material synthesis at 100,000 atm (0.04cc sample volume).



1F Angle-Resolved Photoemission Spectrometer

An apparatus to observe electronic states in solids and thin films using X-ray and/or vacuum ultraviolet light; information of geometrical as well as electronic structures is available with angle-resolved measurements.



2F High-Resolution Double-Crystal X-ray Spectrometer

This spectrometer gives us the information about the electronic structures in compounds.

Uji Research Building



GenomeNet Server

Origin3800 and Sun Fire 15K systems supercomputer systems are used for research in computational chemistry and bioinformatics as well as for the GenomeNet Service.



Low-Temperature Laboratory



High-Temperature and High-Resolution Nuclear Magnetic Resonance Apparatus

A molecular-level observation is made directly possible for noncatalytic organic chemical reactions in supercritical water, in strong connections to the development of environmentally friendly processes and to the understanding of the chemical evolution.



Electron Beam Writer

The electron beam writer is used for nano-scale patterning.

Accelerator Laboratory



Proton Linear Accelerator

Utilized for beam dynamics studies dominated with space charge effects concerning with generation of high intensity proton beam. Further used as an injector of 7 MeV protons for ion storage and cooler ring, S-LSR.



Electron Storage Ring, KSR

Accumulates electrons up to 300 MeV and can be utilized as a synchrotron light source. It is also used as a pulse stretcher of the time structure of the output beam from 100 MeV electron Linac. It is further applied for investigation of electron-ion interaction by combination with an ion trap.

Nucleic Acids Laboratory



Automated DNA Sequencer

Equipment automatically analyzing DNA sequences using primers labeled with fluorescent dye



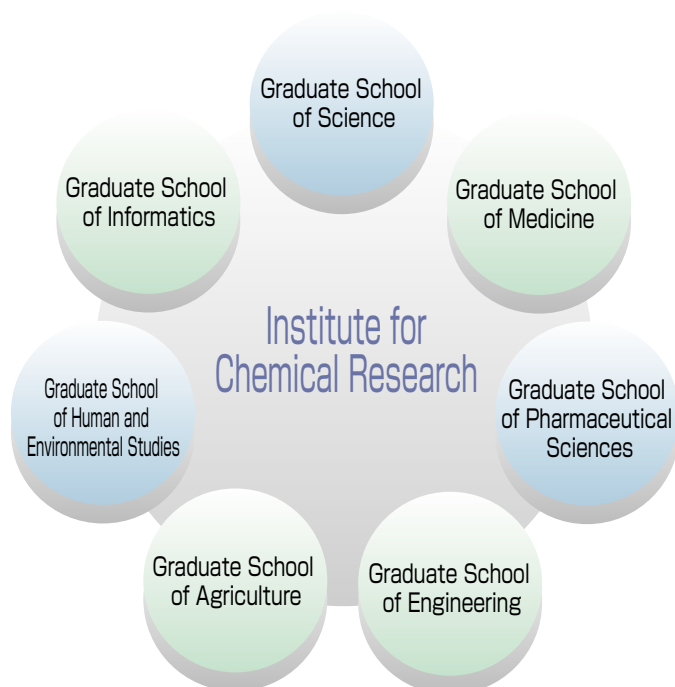
P3-Level Bio-Safety Room

A specific laboratory for recombinant DNA experiments requiring physical containment up to the P3 level

Education

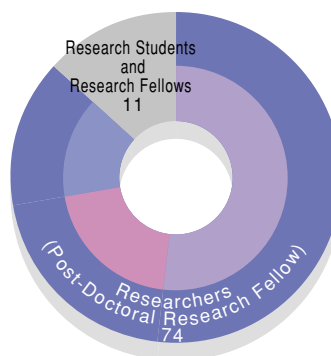
Education in the Graduate Schools

Every laboratory is affiliated with one of the Graduate Schools and has contributions to education.



Training of Younger Researchers

Details of Researchers in ICR, 2005 (without Faculties and Graduate Students)



Details of Researchers (Post-Doctoral Research Fellows)



Affiliation of Researchers from Corporation (private), 2005

Central Glass	SEIKO EPSON
Credia Japan	SEIWA ELECTRIC MFG.
Keihanna Interaction Plaza	Sumitomo Electric Industries
Ohcera	Toray Research Center

Doctoral and Master's Degrees

Doctoral Degrees

(January 1-December 31, 2004)

Science	Engineering	Agricultural Sc.	Pharmaceutical Sc.	Medical Sc.	Informatics	Total
9	6	1	3	1	1	21

Master's Degrees

(April 1, 2004-March 31, 2005)

Graduate School of Science	Graduate School of Engineering	Graduate School of Agriculture	Graduate School of Pharmaceutical Sc.	Total
22	15	9	10	56

Graduate Students and their Origins

As of May 1, 2005

Graduate Schools	Course	Domestic		Foreign									Total
		Kyoto University	Other Universities	Brazil	Canada	China, P. R.	Indonesia	Italy	Korea, R.	Nepal	Thailand	USA	
Science	MC	18	36										54
	DC	37	11				1	1					50
Engineering	MC	44	7										51
	DC	9	7						2		1		19
Agriculture	MC	2	22		1	1							26
	DC	7	3			1							11
Pharmaceutical Sciences	MC	8	3										11
	DC	6	3						1				10
Medicine	MC												0
	DC	1											1
Informatics	MC	1	2	1								1	5
	DC	1	2							1			4
Human and Environmental Studies	MC		1										1
Sub-total	MC	73	71	1	1	1						1	148
	DC	61	26			1	1	1	3	1	1		95
Total		134	97	1	1	2	1	1	3	1	1	1	243

"Excellent Science" can only be achieved by "Excellent Scientists".
It is the responsibility of ICR to participate in the Education of the younger scientists.
ICR provides various opportunities for the next generation.

Training Programs for Young Researchers

Annual Schedule (from April, 2005 to March, 2006)

April	Orientation for New Graduate Students	
May	Education about Safety and Health for New Graduate Students Spring Sports Tournaments (HEKISUIKAI)	
July	Summer Party (HEKISUIKAI) The 8th Chemical Research for High School Students	
September	Autumn Sports Tournaments (HEKISUIKAI)	
October	The 12th Public Lectures	
December	The 105th ICR Annual Symposium The 10th ICR Award for Young Scientists	
February	Symposium of Graduate Students	

ICR holds various programs to educate young researchers and graduate students. Symposiums and poster sessions are held for the young scientists to discuss their latest research activities. Parties and sport events are also held to form the network among each other.



ICR Annual Symposium

This Annual Symposium will count its 105th meeting this December 2005. Many young scientists and graduate students give oral and poster presentations about their latest researches. There, ICR AWARD is presented to young scientists with excellent research.

ICR AWARD

ICR AWARD was established to celebrate the 70th Anniversary of ICR. The award encourages young scientists, under the age of 40, by recognizing their excellent research. Those with excellent academic papers and publications will compete for this honorable recognition at ICR.



After Graduation

The list of Corporation (private) and Universities, where ICR graduates work at (The past 3 years).

Master's Course Graduates

Corporation (private)

AIR LIQUIDE Japan, Ajinomoto, API Corporation, Asahi Glass, Asahi Kasei, Central Glass, Daiichi Pharmaceutical, Dowa Mining, Earth Chemical, EZAKI GLICO, Fuji Photo Film, Fuji Xerox, Fujisawa Pharmaceutical, Furukawa Electric, Glico Dairy Products, HITEC, Ishihara Sangyo Kaisha, Japan Tobacco, JASCO Corporation, JSR Corporation, Kansai TLO, KIRIN Beverage, Knorr Foods, Kowa Company, Kyoto Pharmaceutical Industries, KYOWA HAKKO KOGYO, LOTTE, Marukin Bio, Matsushita Electric Industrial, Mazda Motor Corporation, Morgan Stanley, NAIGAI Yakuhin, Nippon Paint, Nippon Sheet Glass, SANWA SHURUI, Sekisui Chemical, Sekisui Jushi, Sharp Corporation, Sumitomo Chemical, Sumitomo Electric Industries, Sumitomo Pharmaceuticals, Takeda Pharmaceutical, Takeda Analytical Research Laboratories, The Kansai Electric Power, Toppan Printing, Toray Industries, TOWA Pharmaceutical, Toyama Chemical, Toyobo, Unicharm Corporation, etc.

Academic Institutions in Japan

Kanazawa University, Kyoto University, MEXT, Private Junior and Senior High School, Shiga Prefecture, The Graduate University for Advanced Studies, Tokyo Institute of Technology, University of Tokyo, etc., as Graduate Students of Doctoral Course, Academic Staffs, Faculties, and Researchers (PD)

Positions after ICR

The past 3 years

Researchers (PD etc.)

Corporation (private)

Accelerator Engineering Corporation, Sumitomo Chemical, Sumitomo Electric Industries, Tokyo Kasei Kogyo, Toray Research Center, etc.

Academic Institutions in Japan

AIST, Doshisha Women's College of Liberal Arts, FFPRI, Kyoto Academy of Health Science and Technology, Kyoto University, etc., as Academic Staffs, Faculties, and Researchers (PD)

Foreign Academic Institutions

India: Tripura University, Korea, R.: Ajou University, Taiwan: Academia Sinica, UK: Trinity College, USA: Barn Institute, USA: Princeton University etc., as Academic Staffs, Faculties and Researchers (PD)

Research Students and Research Fellows

Graduate School of Kyoto University

Doctoral Course Graduates

Corporation (private)

Asahi Glass, Asahi Kasei, Kaneka Corporation, Novartis Pharma, Sekisui Chemical, Shiraimatsu, Takeda Pharmaceutical, etc.

Academic Institutions in Japan

AIST, JAMSTEC, Kochi University, Kyoto University, Nagaoka University of Technology, Nagoya University, NIMS, Osaka Bioscience Institute, Osaka University, Public High School in Kyoto Prefecture, etc., as Academic Staffs, Faculties, and Researchers (PD)

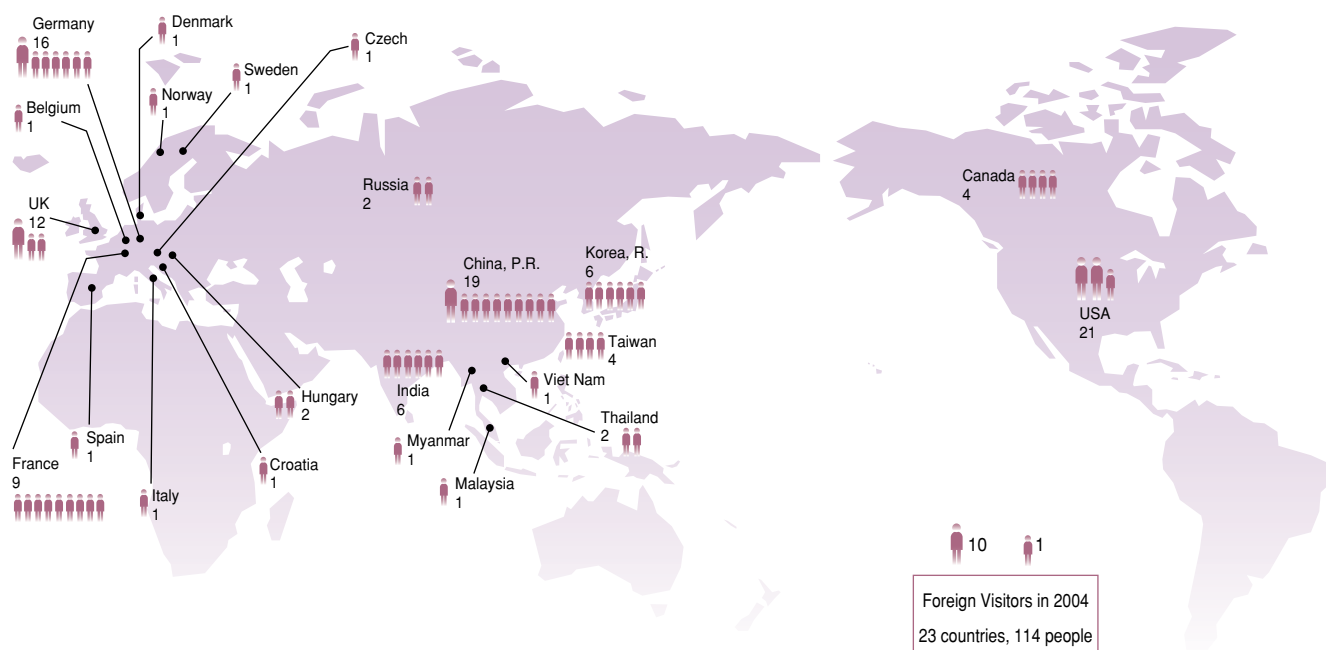
Foreign Academic Institutions

Canada: Queens University, Denmark: Royal Veterinary and Agricultural University, France: Ecole des Mines de Paris, Germany: Max-Planck Institute for Kernphysik, Mongolia: National University of Mongolia, Switzerland: University of Geneva, USA: The Scripps Research Institute, USA; University of California, USA; University of Washington, USA; Virginia Polytechnic Institute and State University, etc., as Academic Staffs, and Researchers (PD)



International Communication

Visitors from Foreign Countries



Visiting Professors from Foreign Countries



WANG,
Yu

Professor, Laboratory of Organotransition Metal Chemistry, International Research Center for Elements Science
(October - November, 2005)
Professor, National Taiwan University, Taiwan



ATTFIELD,
John Paul

Professor, Laboratory of Advanced Solid State Chemistry, International Research Center for Elements Science
(January - March, 2005)
Professor, University of Edinburgh, UK



YAN,
Chun-Hua

Professor, Laboratory of Advanced Solid State Chemistry, International Research Center for Elements Science
(October - December, 2004)
Professor, Peking University, China, P. R.



LIU,
Yunqui

Professor, Laboratory of Organic Main Group Chemistry, International Research Center for Elements Science (January - April, 2004)
Professor, Institute of Chemistry, Chinese Academy of Science, China, P. R.

Researchers and Students from Foreign Countries

Researchers and Students from Foreign Countries, and their Origins, 2005

Researchers (PD)

Canada	2
China, P. R.	6
Czech	1
France	2
India	1
Korea, R.	2
Spain	1
Sweden	1
USA	1
Viet Nam	1
Total	18

Students

Brazil	1
Canada	1
China, P. R.	2
Indonesia	1
Italy	1
Korea, R.	3
Nepal	1
Thailand	1
USA	1
Total	12



ICR is always promoting global research activities.
 Many scientists from all over the world visit here for collaboration.
 ICR has become the hub station for world-wide research.

General Memorandum for Academic Cooperation and Exchange

Universities and Institutes	Countries	Date of Agreement	Universities and Institutes	Countries	Date of Agreement
University of Duisburg	Germany	May 31, 1984	Laboratori Nazionali di Legnaro, Institute Nazionale di Fisica Nucleare	Italy	March 27, 1995
Central Research Institute for Chemistry of the Hungarian Academy of Science	Hungary	March 1, 1987	Faculty of Pharmaceutical Sciences Chulalongkorn University	Thailand	January 10, 1996
University of Mainz and Max-Planck Institute for Polymer Research	Germany	March 30, 1987	Max-Planck Institute for Kernphysik	Germany	May 25, 1997
Higher Institute of Chemical Technology Sofia, Bulgaria	Bulgaria	June 22, 1988	Institute Nazionale di Fisica Nucleare	Italy	March 2, 1998
Shanghai Institute of Optics & Fine Mechanics, Chinese Academy of Science	China, P. R.	January 27, 1989	Pohang Accelerator Laboratory Pohang Institute of Science and Technology	Korea, R.	March 15, 2000
Royal Institute of Technology Stockholm	Sweden	July 4, 1989	Bordeaux Institute of Condensed Matter Chemistry	France	May 22, 2003
Institute of Biotechnology Korea University	Korea, R.	May 1, 1990	Joint Institute for Nuclear Research, Dubna	Russia	July 31, 2003
Moscow Engineering Physics Institute	Russia	December 3, 1992	State Key Laboratory of Bioreactor Engineering (SKLBE), East China University of Science and Technology	China, P. R.	November 29, 2003
Institute of Nuclear Research of the Hungarian Academy of Sciences	Hungary	September 4, 1993	Institute of Chemistry, Chinese Academy of Sciences	China, P. R.	December 24, 2003
Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung M.B.H.	Germany	September 14, 1994			
					Total 19

International Meetings and Symposiums

The list below is about meetings and symposiums sponsored, or organized by ICR faculties. (Last 3 years, from ICR Annual Report)

January 10-11, 2003 (Kyoto)

The 2nd International Symposium of the Kyoto University COE Project "Elements Science": "Elements Selection Rule and Materials Science"

April 2-4, 2003 (Kyoto)

The 9th International Seminar on Elastomers (ISE 2003) by Institute for Chemical Research, Kyoto University

January 9-10, 2004 (Kyoto)

The 3rd International Symposium of the Kyoto University COE Project "Elements Science": "Elements Selection Rule and Materials Science" in Commemoration of the Opening of International Research Center for Elements Science

April 1-2, 2004 (Uji, Kyoto)

UK-Japan Polymer Workshop 2004

January 6-7, 2005 (Kyoto)

The 4th International Symposium of the Kyoto University COE Project "Elements Science": "Elements Selection Rule and Materials Science", and The 2nd International Symposium of International Research Center for Elements Science (IRCELS)



Social Activities

Outreaching Programs

Chemical Research for High School Students

Every summer, ICR provides courses for high school students to experience the joy of "Chemical Research". Each year, more than 100 students join to undergo chemical experiments and operation of huge research equipments. Scientists and graduate students give each unique and enjoyable program.



Public Lectures

Public Lectures are held on the same day of "Open Campus in Uji". This is a fruitful time for ICR to interact with the community. The professors introduce their latest research and the frontier of their science. These lectures are quite popular for their comprehensive presentation. The audience enjoys asking questions directly to the lecturers.



Open Campus in Uji

4 institutes and laboratories located in the Uji Campus hold this event to show their advanced research of science. From ICR, some laboratories participate as Open Laboratories, where they demonstrate their research activities and experiments.



Super Science High School (SSH)

MEXT designates "Super Science High Schools" that emphasize education on science, technology and mathematics. ICR sends its faculties as lecturers for SSH. In return, high school students will get the opportunity to visit the institute.



Science Partnership Program (SPP)

This program is promoted by MEXT to emphasize education on science, technology and mathematics with cooperation of high schools and universities. ICR scientists join it as lecturers for high school students and the institute accepts the visit of students.



Visit to ICR, and Open Campus (2004)

- May 20 Seoul Science High School
- June 29 Rakuohku Junior High School, Kyoto (SSH)
- July 6 Kokutaiji High School, Hiroshima (SSH)
- July 22 High School of Osaka Electro-Communication University
- July 31 The 7th Chemical Research for High School Students
- August 5 Ono Senior High School, Hyogo
- October 1-2 Open Campus in Uji
- October 2 The 11th Public Lectures
- October 29 Johoku Saitama High School
- November 2 Rakuohku Junior High School, Kyoto (SSH)
- November 18 "Kitayama-Kai", alumni association of Kyoto University
- November 24 Todo High School, Kyoto

Outreaching Activities (2004)

- June 24 Katsura High School, Kyoto Delivered Lecture
- July 1 Rakuohku High School, Kyoto SSH Invited Lecture
- July 11, 16 Momoyama Senior High School, Kyoto SPP Invited Lecture
- July 22-23 Waku Waku Shingaku Live (sponsored by RECRUIT)
- August 7-8 Genome Hiroba 2004 Exhibition
- October 22 Todo High School, Kyoto SPP Invited Lecture
- November 5, 19 Todo High School, Kyoto SPP Invited Lecture
- December 10 Rakusei Senior High School Seminar



ICR's Open Campus Programs;
The moment when "Passion" of the scientists bridge
the laboratories to the society.

Honors

Nobel Prize

Period of one's tenure of ICR

YUKAWA, Hideki	1949	Physics	1943~1968
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Order of Culture

YUKAWA, Hideki	1943	Atomic Physics	1943~1968
HAYAISHI, Osamu	1972	Biochemistry	1959~1976
SAKURADA, Ichiro	1977	Polymer	1936~1967
mitsuda, Hisateru	1994	Food Science	1955

Persons of Cultural Merits

YUKAWA, Hideki	1951	Atomic Physics	1943~1968
HORIBA, Shinkichi	1966	Physical Chemistry	1927~1947
HAYAISHI, Osamu	1972	Biochemistry	1959~1976
SAKURADA, Ichiro	1977	Polymer	1936~1967
mitsuda, Hisateru	1989	Nutrition, Food Science	1955
HORIO, Masao	1993	Polymer, Materials	1955~1970

The Japan Academy Prize

SASAKI, Nobuji	1944		1942~1959
SAKURADA, Ichiro	1955		1936~1967
INOUE, Yoshiyuki	1959		1943~1959
KIMURA, Ren	1959		1939~1956
KATAGIRI, Hideo	1960		1942~1960
HAYAISHI, Osamu	1967		1959~1976
SUZUKI, Tomoji	1979		1957~1965
mitsuda, Hisateru	1980		1955

Medal of Honor with Purple Ribbon

SAKURADA, Ichiro	1956		1936~1967
TAKEI, Sankichi	1961		1937~1959
ODA, Ryohei	1972		1955~1970
SUITO, Eiji	1977		1951~1975
TAKADA, Toshio	1987		1963~1986
SAKKA, Sumio	1996		1953~72/1983~94
SODA, Kenji	1997		1965~1996
SHINJO, Teruya	2000		1966~2002
TAMAO, Kohei	2004		1993~2005

Awards

Last 5 years

2005	AZUMA, Masaki	Young Scientists' Prize, The Commendation for Science and Technology by the MEXT
	ONO, Teruo	Marubun Academic Award
	KANEMITSU, Yoshihiko	Ichimura Academic Award

2004	MURATA, Yasujiro	The Chemical Society of Japan Award for Distinguished Young Chemists
	TSUBAKI, Kazunori	Kansai Branch Award, The Society of Synthetic Organic Chemistry, Japan
	KUSUDA, Toshiyuki	Kyoto Prefecture Governor's Award
	NAKAHARA, Masaru	Award of the Japan Society of High Pressure Science and Technology, 2004
	MATUBAYASI, Nobuyuki	Morino Award for Promotion of Molecular Sciences
	KURIHARA, Tatsuo	The Japan Bioscience, Biotechnology and Agrochemistry Society Award for the Encouragement of Young Scientists
	NISHIDA, Koji	Promotive Award of the Society of Fiber Science and Technology, Japan, Kansai
	HASHIDA, Masaki	2003 LSJ Award for Distinguished Achievements in Research
	TAMAO, Kohei	Herbert C. Brown Lecturer
	TSUJI, Hayato	The Society of Silicon Chemistry, Japan Award for Young Chemists
	INOUE, Hideyuki	Best Young Presenter Award, Society of Nano Science and Technology
	TOH, Hiroyuki	The Okawa Publications Prize

2003	KURATA, Hiroki	The Japanese Society of Microscopy Award (Setou Award)
	SOHRIN, Yoshiki	The 18th Oceanochemistry Award (Research Institute of Oceanochemistry)
	TAKAHASHI, Masahide	Ceramic Society of Japan / The Australian Ceramic Society (CIS/ACS) Joint Ceramic Award for 2003
	TSUJII, Yoshinobu	SPSJ Wiley Award
	NISHINAGA, Tohru	Konica Minolta Technology Center Award in Synthetic Organic Chemistry, Japan
	TOKITOH, Norihiro	The Division Award of the Chemical Society of Japan
	TOKITOH, Norihiro	Alexander von Humboldt Research Award
	TAKEDA, Nobuhiro	The Society of Silicon Chemistry, Japan Award for Young Chemists
	TAMAO, Kohei	The Asahi Prize 2002 (Asahi Culture Foundation)
	TAMAO, Kohei	The 14th Mukai Prize (Tokyo Ohka Foundation for the Promotion of Science and Technology)
	TAKANO, Mikio	2002 JSPM Award for Distinguished Achievements in Research

2002	AZUMA, Masaki	Japan Society of Powder and Powder Metallurgy Award for Innovatory Research
	KANAYA, Toshiji	The Society of Fiber Science and Technology, Japan Prize for Excellence in Fiber Research
	KOMATSU, Koichi	Alexander von Humboldt Research Award
	TAMAO, Kohei	The 42nd Toray Science & Technology Prize (2002) (Toray Science Foundation)
	TAMAO, Kohei	Frederic Stanley Kipping Award 2002, The American Chemical Society
	YAMAGUCHI, Shigehiro	The Chemical Society of Japan Award for Distinguished Young Chemists

2001	MURAKAMI, Syozo	The Chemical Society of Japan Award for Technical Achievements
	MATUBAYASI, Nobuyuki	Helmholtz Award, International Association for the Properties of Water and Steam
	UCHINO, Takashi	Vittorio Gottardi Prize, International Commission on Glass
	TAKAHASHI, Masahide	The Ceramic Society of Japan, Young Scientists Award
	OSAKI, Kunihiro	The Society of Rheology, Japan, Award
	KAWACHI, Atsushi	The Chemical Society of Japan Award for Distinguished Young Chemists

Publications



News Letter, "Obaku" (Japanese)



Profile of ICR (Japanese & English)



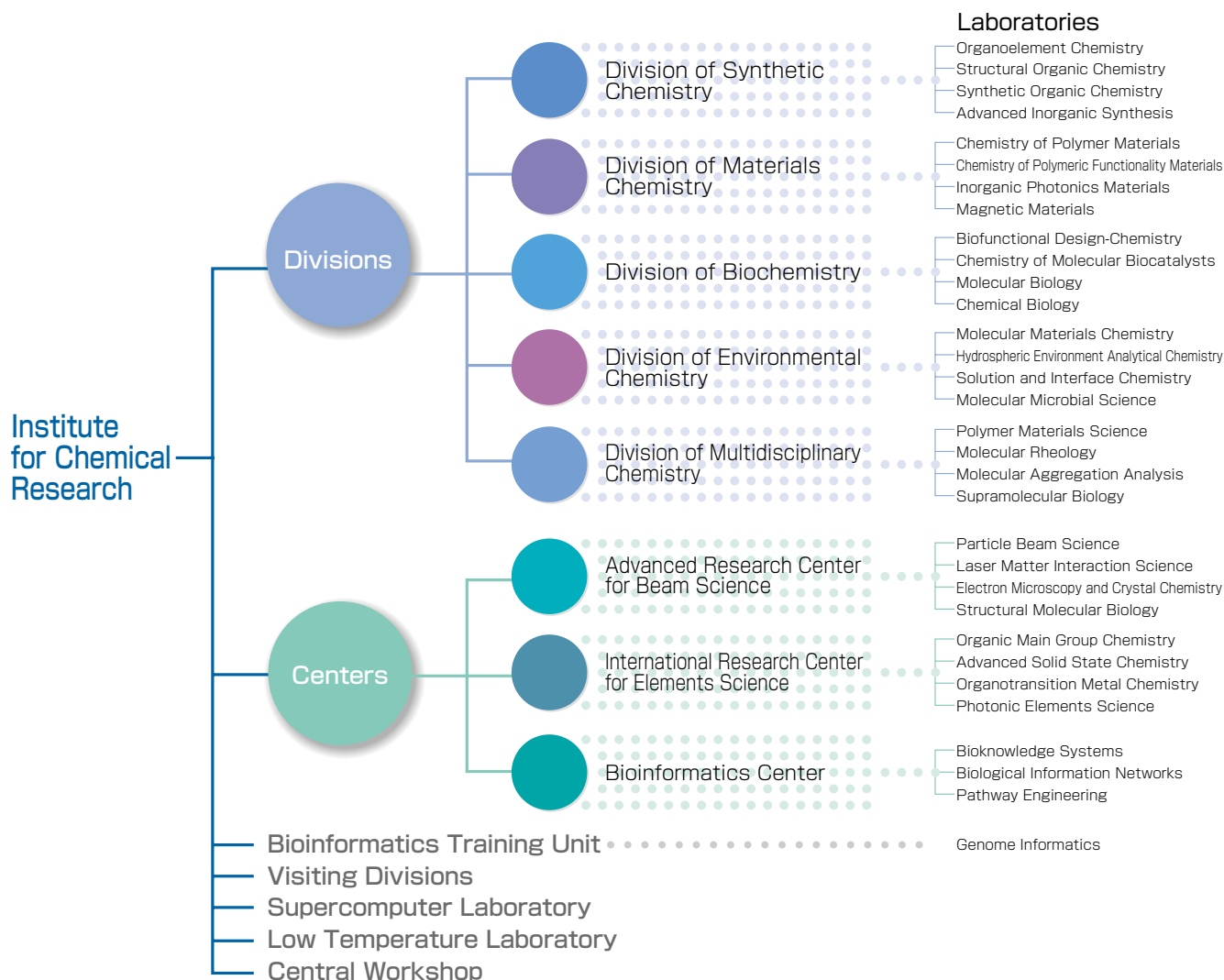
ICR Annual Report (English)



Website
<http://www.kuicr.kyoto-u.ac.jp/index.html>

Laboratories

5 Research Divisions and 3 Research Centers



Divisions and Their Historical Backgrounds

Original Research Subject	Primary Stage	Secondary Stage	Division / Graduate School	
1939 Nuclear Physics	Nuclear Reaction 1964 Nuclear Science R.F.	Nuclear Science R.F.	Nuclear Science R.F. S	2004 Reorganization
1941 Reaction in Gas Explosion	Crystal and Powder Chemistry 1956 Nuclear Radiation 1965 Polymer Crystals		States and Structures S · E	
1933 Colloidal Drugs·Paints 1944 Dielectrics	Surface Chemistry Dielectrics 1956 Radiochemistry		Interface Science S	
1929 Alloys 1939 Special Glass	Solid State Chemistry Ceramic Chemistry	Solid State Chemistry	Solid State Chemistry S · E	
1939 Rubbers, Resins and Plastics 1943 Synthetic Fibers	Polymer Physical Chemistry Fiber Chemistry	Fundamental Material Properties	Fundamental Material Properties E	
1937 Synthetic Wool 1937 Liquid Fuels	Polymer Separation and Characterization High Pressure Chemistry 1958 Petroleum Chemistry		Organic Materials Chemistry E	
1926 Production of Saviol	Physiological Activity	Cancer Drug Research	Synthetic Organic Chemistry E · P	
1943 Organic Resources	Organic Unit Reaction		Bioorganic Chemistry S · P · M	
1944 Pyrethroids-Mint Oils 1933 Exploitation of Tundra	Plant Products Chemistry Microbial Biochemistry		Biofunctional Molecules A	
1929 Chemistry of Nutrition 1929 Bacteria and Fungi 1944 Fermentation	Physical Chemistry of Enzyme Molecular Biology	1985 Molecular Design for Physiological Functions	Molecular Biology and Information Science S	
		1981 Nucleic Acids Lab.	2001 Bioinformatics Center S · I	
			1992.4 Reorganization	
			2002 Contributed Chair Proteome Informatics (SGI Japan)	
			2002 Bioinformatics Center Bioinformatics Training Unit	

Graduate School of

- S** : Science
- E** : Engineering
- P** : Pharmaceutical Sciences
- M** : Medicine
- A** : Agriculture
- I** : Informatics

Numerous researchers in "Science Frontier" meet each other to form novel fields of interdisciplinary research. ICR will make the scientists' ideal come true.

Graduate School of **S** Science, **M** Medicine, **P** Pharmaceutical Sc., **E** Engineering, **A** Agriculture, **H** Human and Environmental Studies, **I** Informatics

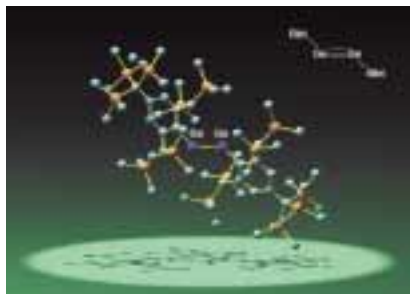
Organoelement Chemistry **S**

TEL 0774-38-3200 FAX 0774-38-3209
E-mail tokitoh@boc.kuicr.kyoto-u.ac.jp

Our research interests are the synthesis of heavier main group element compounds and transition metal complexes having reactive novel bond systems by taking advantage of kinetic stabilization using bulky substituents and the systematic elucidation of their properties, which leads to the application to the synthesis of functional molecules. Transformations using biocatalysts are also studied.



Prof
TOKITOH, Norihiro (D Sc)
Assoc Prof
NAKAMURA, Kaoru (D Sc)
Assist Prof
TAKEDA, Nobuhiro (D Sc)
SASAMORI, Takahiro (D Sc)
Technician
HIRANO, Toshiko



Molecular Structure of a Germanium-Germanium Triple-bond Compound (Bbt = 2,6-bis[bis(trimethylsilyl)methyl]-4-[tris(trimethylsilyl)methyl]phenyl)

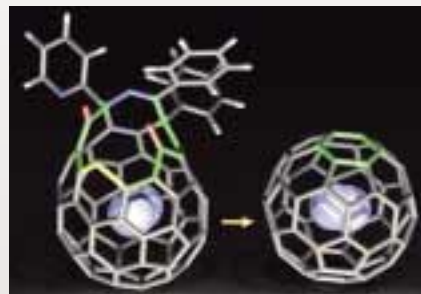
Structural Organic Chemistry **E**

TEL 0774-38-3172 FAX 0774-38-3178
E-mail komatsu@scl.kyoto-u.ac.jp

Fundamental studies are conducted on design, synthesis, and elucidation of the structure and properties of molecules, ions, and radicals, which have entirely novel π -conjugated structures. Recent results include super-stabilization of cationic species by σ - π conjugation, organic synthesis of an endohedral fullerene incorporating hydrogen by molecular surgery, and creation of a self-assembled monolayer made with adamantane trithiols.



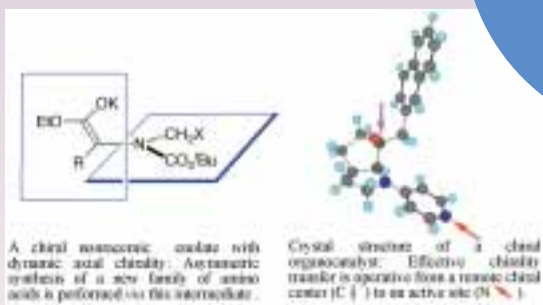
Prof
KOMATSU, Koichi (D Eng)
Assoc Prof
KITAGAWA, Toshikazu (D Eng)
Assist Prof
MURATA, Yasujiro (D Eng)



Organic synthesis of $H_2@C_{60}$ by molecular surgery

Research is conducted for creation of "Novel Materials" from viewpoints of organic and inorganic chemistry and for clarification of their structures, functions, and properties.

Division of Synthetic Chemistry



Synthetic Organic Chemistry **P**

TEL 0774-38-3190 FAX 0774-38-3197
E-mail kawabata@scl.kyoto-u.ac.jp

Research in this laboratory focuses on molecular chirality. Programs are active in the areas of asymmetric synthesis based on memory of chirality, nucleophilic catalysis for fine organic synthesis, visualization of molecular information by functionalized phenolphthaleins, and the structural and functional investigation of homo- and heterochiral oligomers.



Prof
KAWABATA, Takeo (D Pharm Sc)
Assoc Prof
TSUBAKI, Kazunori (D Pharm Sc)
Technician
TERADA, Tomoko

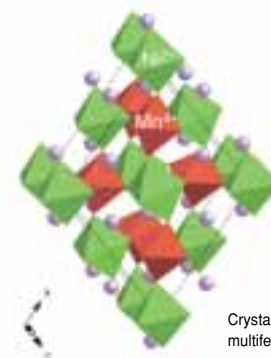
Advanced Inorganic Synthesis **S**

TEL 0774-38-3110 FAX 0774-38-3125
E-mail shimakawa@scl.kyoto-u.ac.jp

We are focusing on the fundamental physics and chemistry of "functional oxides" and seeking new materials with new functions. We recently pay much attention to researches on multiferroics, which show both ferroelectricity and ferromagnetism. New materials with strong correlation of both properties are expected to be used for new memory devices.



Prof
SHIMAKAWA, Yuichi (D Sc)
Assoc Prof
AZUMA, Masaki (D Sc)
Assist Prof
IKEDA, Yasunori



Crystal structure of a new multiferroic material Bi_2NiMnO_6 .

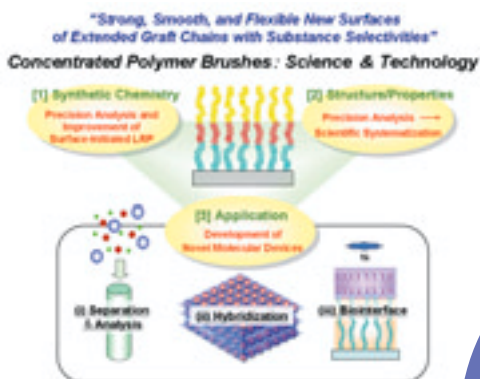
Chemistry of Polymer Materials E

TEL 0774-38-3161 FAX 0774-38-3170
E-mail fukuda@scl.kyoto-u.ac.jp

Fundamental and applied studies on living radical polymerization: current projects include development of living radical graft polymerization initiated from various organic, inorganic, and metallic surfaces and studies on the structure, properties, and functions of thereby created new surfaces "concentrated polymer brushes".



Prof
FUKUDA, Takeshi (D Eng)
Assoc Prof
TSUJII, Yoshinobu (D Eng)
Assist Prof
OHNO, Kohji (D Eng)
GOTO, Atsushi (D Eng)



Chemistry of Polymeric Functionality Materials E

TEL 0774-38-3066 FAX 0774-38-3067
E-mail kohjshin@scl.kyoto-u.ac.jp

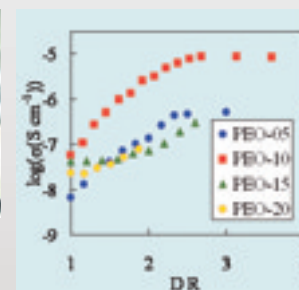
Our main research interests involve the investigation on correlation of structure and properties in polymeric functionality materials through the evaluation of the design, analysis and functionality of the higher-order structure. Our group focuses in particular on studies of the role of the crystal chain and region in soft materials such as a natural rubber and a polymer gel.



Prof
KOHJIYA, Shinzo (D Eng)
Assoc Prof
TSUJI, Masaki (D Eng)
Assist Prof
TOSAKA, Masatoshi (D Eng)
SENOO, Kazunobu (D Eng)



Ionic conductivity measurement with uniaxially stretched PEO.

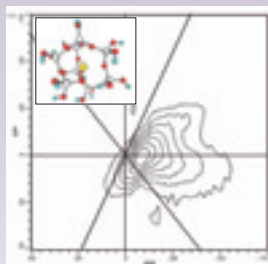


The relationships between ionic conductivity and draw ratio of PEO doped with 5~20 mol% of Li.

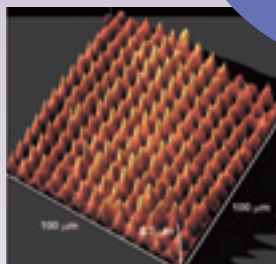
Emphasizing hybridization and/or composite-preparation from incompatible combinations, creation of novel functionality materials is aimed.

Division of Materials Chemistry

²³Na MQMAS NMR spectra of a sodium silicate glass
Inset: a glass structure model obtained by ab initio molecular orbital calculation



AFM image of TiO₂ film having a 2-D photonic structure prepared by a photo-induced phase separation method



Inorganic Photonics Materials E

TEL 0774-38-3130 FAX 0774-33-5212
E-mail yokot@vidrio.kuicr.kyoto-u.ac.jp

We are studying on the preparation and characterization of new functional, especially photonics-related inorganic materials such as glasses and ceramics. Our major research subjects are as follows:

- (1) Synthesis of novel organic-inorganic hybrid low-melting glasses for new type photonics applications,
- (2) Glass structure as studied by MQ/MAS NMR spectroscopy and so on,
- (3) Development of optical micro devices utilizing photo-induced phenomena,
- (4) Nanoporous TiO₂ thin films.



Prof
YOKO, Toshinobu (D Eng)
Assoc Prof
TAKAHASHI, Masahide (D Sc)
Assist Prof
TOKUDA, Yomei (D Eng)

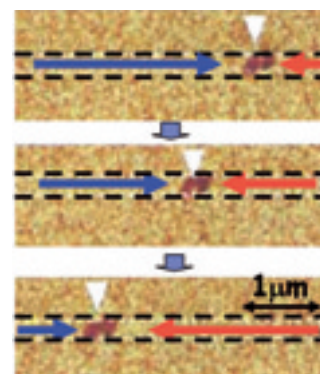
Magnetic Materials S

TEL 0774-38-3107 FAX 0774-38-3109
E-mail ono@scl.kyoto-u.ac.jp

Spintronics, which aims at the complete control of the spins in solids, is one of the most active fields for its impact on information technology. By combining the atomic-layer deposition with nanofabrication, we focus on the development of spin properties of various materials and the control of quantum effects in mesoscopic systems for novel spintronics devices.



Prof
ONO, Teruo (D Sc)
Assoc Prof
KOBAYASHI, Kensuke (D Sc)
Assist Prof
KASAI, Shinya (D Sc)
NEEDO Assist Prof
YAMAGUCHI, Akinobu (D Sc)
Technician
KUSUDA, Toshiyuki



Magnetic force microscopy observation of the current-driven domain wall motion

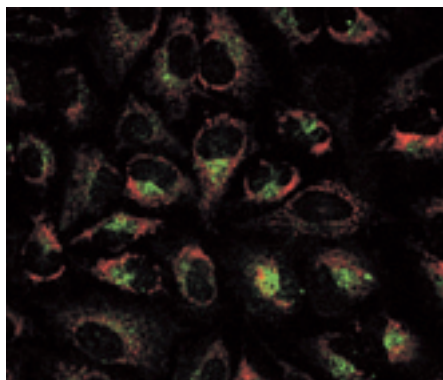
Biofunctional Design-Chemistry P

TEL 0774-38-3210 FAX 0774-32-3038
E-mail futaki@scl.kyoto-u.ac.jp

The ultimate goal of our research is the regulation of cellular functions by designed peptides and proteins. Current projects include "Development of membrane permeable peptide vectors", "Creation of novel zinc finger peptides with desired DNA binding characteristics", and "Design of functional peptides responsive to external signals".



Prof
FUTAKI, Shiroh (D Pharm Sc)
Assist Prof
IMANISHI, Miki (D Pharm Sc)



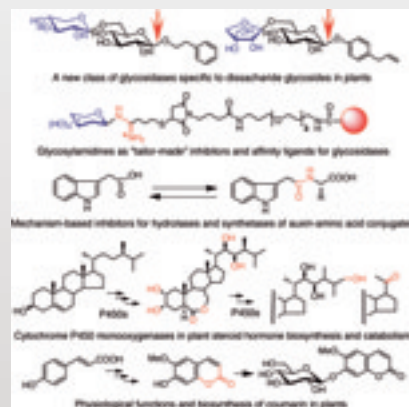
Chemistry of Molecular Biocatalysts A

TEL 0774-38-3230 FAX 0774-38-3229
E-mail ksakata@scl.kyoto-u.ac.jp

The aim of our research is to gain comprehensive understanding of the reaction mechanisms and the specificity of biocatalysts (enzymes) that are involved in important biological and biochemical events. Our studies cover a wide field of researches, from natural product chemistry, organic synthetic chemistry, and biochemistry to molecular biology and structural biology.

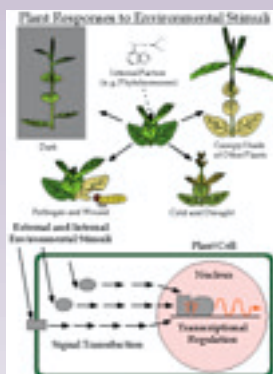


Prof
SAKATA, Kanzo (D Agr)
Assoc Prof
HIRATAKE, Jun (D Agr)
Assist Prof
MIZUTANI, Masaharu (D Agr)
SHIMIZU, Bun-ichi (D Agr)



Biology meets Chemistry; elucidating the mechanisms behind intra/inter-cellular recognition, stimuli response, and biomolecular synthesis in living matters for pioneering novel materials.

Division of Biochemistry



Plants are exposed to a variety of environmental stimuli and respond appropriately through the recognition of stimuli and the subsequent signal transduction, a considerable portion of which includes transcriptional modulation of particular genes by transcription factors (TF).

Molecular Biology S

TEL 0774-38-3260 FAX 0774-38-3259
E-mail oka-lab@molbio.kuicr.kyoto-u.ac.jp

This laboratory aims at clarifying the framework of regulatory network between genetic programs and environmental stress responses through the study on structure-function relationships of genetic materials and cellular proteins in a higher plant, *Arabidopsis thaliana*.



Prof
OKA, Atsuhiko (D Sc)
Assoc Prof
AOYAMA, Takashi (D Sc)
SUGISAKI, Hiroyuki (D Sc)
Assist Prof
TSUGE, Tomohiko (D Sc)
Technician
YASUDA, Keiko

Chemical Biology M

TEL 0774-38-3225 FAX 0774-38-3226
E-mail uesugi@scl.kyoto-u.ac.jp

In human history, small organic molecules have been utilized for improving human health and for revealing secrets of life. Discovery or design of small organic molecules with unique biological activity permits small-molecule-initiated exploration of biology and further understanding of human diseases. Our laboratory has been discovering small organic molecules that modulate transcription or differentiation to use them as tools to explore biology.



Prof
UESUGI, Motonari (D Pharm Sc)
Assoc Prof
TANAKA, Seigo (D Med Sc)
Assist Prof
KAWAZOE, Yoshinori (D Med Sc)

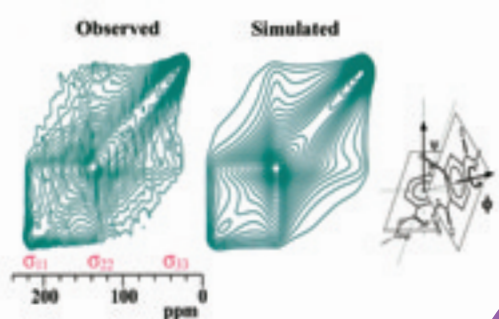
Molecular Materials Chemistry E

TEL 0774-38-3150 FAX 0774-38-3148
E-mail horii@scl.kyoto-u.ac.jp

The structure and dynamics of functional organic thin films and of carrier transport and light-emitting materials in organic EL diodes are characterized by advanced solid-state NMR. Hybridization of bacterial cellulose with functional materials is also examined at different levels of the hierarchical structure.



Prof
HORII, Fumitaka (D Eng)
Assoc Prof
KAJI, Hironori (D Eng)
Assist Prof
HIRAI, Asako (D Eng)
Technician
OHMINE, Kyoko



Precise analysis of the noncrystalline structure of organic materials by 2D DOQSY solid-state NMR (Determination of the distance, Eulerian angles, and their distributions)

Hydrospheric Environment Analytical Chemistry S

TEL 0774-38-3100 FAX 0774-38-3099
E-mail sohrin@scl.kyoto-u.ac.jp

(1) Biogeochemistry of trace elements in the hydrosphere: Novel analytical methods are developed for multi-elemental determination, isotope ratio determination, speciation, and in situ measurement. Distribution of trace elements in the hydrosphere and its effects on ecosystem are investigated. The study also covers hydrothermal activity and deep biosphere. (2) Ion recognition: Novel ligands and ion recognition systems are designed, synthesized, and characterized. (3) Simulation of non-linear chemical reactions.

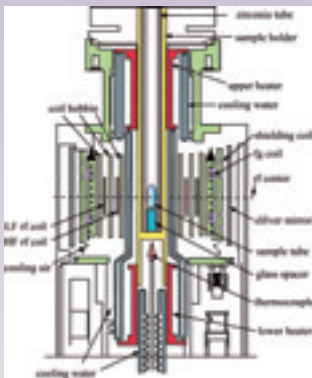


Prof
SOHRIN, Yoshiki (D Sc)
Assoc Prof
UMETANI, Shigeo (D Sc)
Assist Prof
SASAKI, Yoshihiro (D Sc)
OKAMURA, Kei (D Sc)
Res Associate
NORISUYE, Kazuhiro
Technician
MINAMI, Tomoharu



This research group aims to contribute to the development of a sustainable society through fundamental studies such as structural characterization and dynamics of solutions and polymers, in particular under extreme conditions, biogeochemistry in the hydrosphere, and biotechnology with useful enzymes and microorganisms.

Division of Environmental Chemistry



High-Temperature Multinuclear Field-Gradient NMR Probe

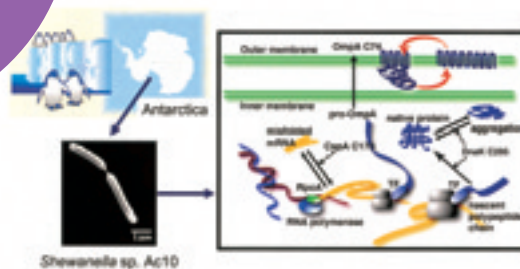
Solution and Interface Chemistry S

TEL 0774-38-3076 FAX 0774-38-3076
E-mail water@nmr.kuicr.kyoto-u.ac.jp

The structure, dynamics, and reaction of solutions under extreme conditions and/or with nanoscale inhomogeneity are investigated by NMR spectroscopy and computer simulation. Hydration is elucidated in supercritical conditions, and noncatalytic reactions of environmental importance are developed. The role of water is investigated for micelle, vesicle, protein, and membrane.



Prof
NAKAHARA, Masaru (D Sc)
Assoc Prof
MATUBAYASHI, Nobuyuki (Ph D)
Assist Prof
OKAMURA, Emiko (D Pharm Sc)
WAKAI, Chihiro (D Sc)



Mechanism of cold adaptation of *Shewanella* sp. Ac10 isolated from Antarctic seawater

Molecular Microbial Science A

TEL 0774-38-3240 FAX 0774-38-3248
E-mail esaki@scl.kyoto-u.ac.jp

Structure and function of biocatalysts are studied to elucidate the fine mechanism of catalysis in the light of recent advances in gene technology, protein engineering and crystallography. Development and application of new biomolecular functions of microorganisms are also studied to open the door to new fields of biotechnology.



Prof
ESAKI, Nobuyoshi (D Agr)
Assoc Prof
KURIHARA, Tatsuo (D Eng)
Assist Prof
MIHARA, Hisaaki (D Agr)
Res Associate
KAZUOKA, Takayuki (D Eng)

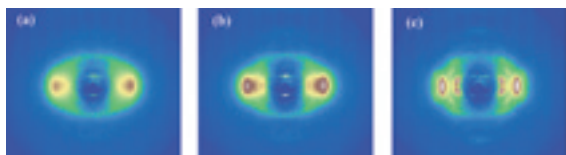
Polymer Materials Science E

TEL 0774-38-3140 FAX 0774-38-3146
E-mail kanaya@scl.kyoto-u.ac.jp

Higher order structure and its formation process of polymer systems are investigated using scattering methods (neutron scattering, X-ray scattering, light scattering) and microscopes (optical microscope, electron microscope, atomic force microscope), aiming at revealing the relationship between higher order structure and polymer properties.



Prof
KANAYA, Toshiiji (D Eng)
Assoc Prof
NISHIDA, Koji (D Eng)
Assist Prof
MATSUBA, Go (D Eng)

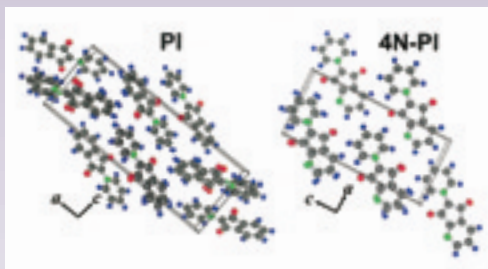


Wide-angle X-ray diffraction during crystallization process from mesomorphic phase of PBN.



Phase separation process of polyelectrolyte solution

Comparison of crystal structures of pyridinium 1,3-dihydro-1,3-dioxo-2*H*-inden-2-ylide (PI) and one of its aza-compounds. The replacement by a nitrogen atom transforms a centrosymmetric structure into a non-centrosymmetric one.



Molecular Aggregation Analysis S

TEL 0774-38-3080 FAX 0774-38-3084
E-mail naokis@e.kuicr.kyoto-u.ac.jp

Correlation studies between structures and properties of molecular aggregates are carried out; solid-state chemistry of organic semiconductor thin films based on direct observation of electronic structures of their frontier orbital states is a major subject and, further, includes fabrication of new molecular systems to be useful for their electronic applications.



Prof
SATO, Naoki (D Sc)
Assoc Prof
ASAMI, Koji (D Sc)
Assist Prof
KITA, Yasuo (D Sc)
YOSHIDA, Hiroyuki (D Sc)

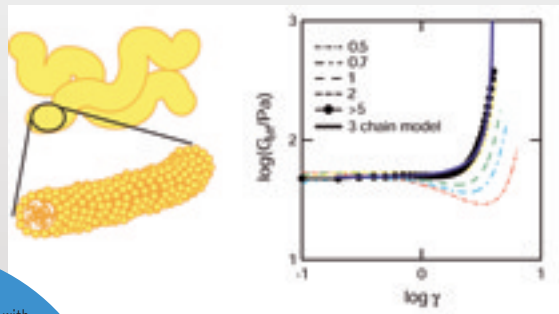
Molecular Rheology E

TEL 0774-38-3135 FAX 0774-38-3139
E-mail hiroshi@scl.kyoto-u.ac.jp

Rheological properties and dynamics of soft matters are investigated from a molecular view point. The materials of main interest are polymers, emulsions, suspensions, and surfactants. For example, a recent study revealed that the stiffness of wormlike surfactant micelles determines their strain-hardening behavior (see Figure).



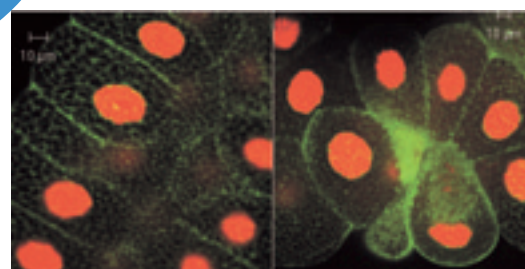
Prof
WATANABE, Hiroshi (D Sc)
Assoc Prof
INOUE, Tadashi (D Eng)
Assist Prof
MATSUMIYA, Yumi (D Eng)
Technician
OKADA, Shinichi



Schematic illustration of wormlike micelles of surfactant (left) and typical dependence of their effective modulus on the strain γ (right). Divergence of the modulus due to stretching of the micelles, seen at $\gamma \cong 4$, allows us to evaluate their flexibility.

By exploring viewpoints aiming at merging science with engineering, we are going to upgrade the paradigm of our research in the boundary region among chemistry, physics and biology. In cooperation with other divisions and centers in our institute, we will develop exploratory basic researches for founding advanced materials science.

Division of Multidisciplinary Chemistry



Supramolecular Biology S

TEL 0774-38-3250 FAX 0774-38-3256
E-mail umeda@scl.kyoto-u.ac.jp

Biological membrane is an extremely soft supramolecular complex formed by a self assembly of lipid molecules. We have undertaken molecular biology, cell biology, and behavioral genetics approaches to elucidate the role of molecular motion of membrane lipids in animal morphogenesis and thermoregulation.



Prof
UMEDA, Masato (D Pharm Sc)
Assist Prof
TAKEUCHI, Ken-ichi (D Pharm Sc)
KATO, Utako (D Sc)
Res Associate
INADOME, Hironori (D Agr)

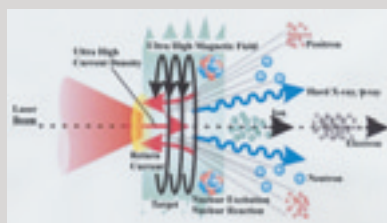
Particle Beam Science S

TEL 0774-38-3281 FAX 0774-38-3289
E-mail noda@kyticr.kuicr.kyoto-u.ac.jp

Generation of beam composed of the same particles and its improvement for the high quality beam is our main research scope. Ion production from laser-produced plasma and reduction of its energy spread by phase rotation, approaches to crystalline beam with beam cooling and super-fine beam oriented for linear collider are studied. Downsizing of accelerator for cancer therapy is also pursuit.

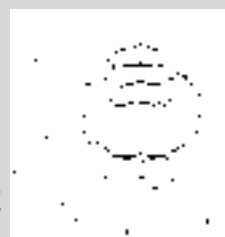


Prof
NODA, Akira (D Sc)
Assoc Prof
IWASHITA, Yoshihisa (D Sc)
Assist Prof
SHIRAI, Toshiyuki
Technician
TONGU, Hiromu



Ion beam generation from laser-produced plasma

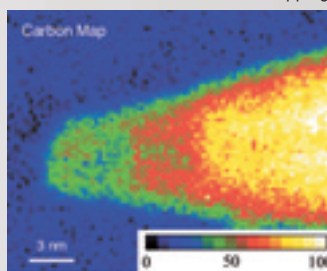
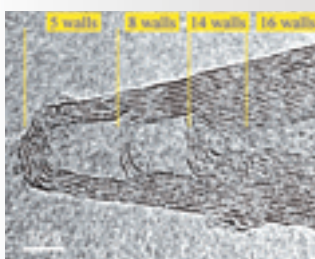
Ultra-cold ion beam (crystalline beam) aimed at by beam cooling-expected by the simulation with molecular dynamics



Development of new capabilities with combination of various beams. Development of new method for space-time analysis with extreme resolution. Multidimensional analysis of functional chemical materials oriented for application, and Preparation for collaborative research scheme.

Advanced Research Center for Beam Science

Carbon distribution mapping



High resolution image of carbon-nanotube

Laser Matter Interaction Science S

TEL 0774-38-3291 FAX 0774-38-3289
E-mail sakabe@laser.kuicr.kyoto-u.ac.jp

Ultra-intense ultra-short pulse laser-matter interaction and its applications are studied. The physics of femtosecond laser nano-ablation of solids are investigated for the new laser nano-processing. The process of ionization of large molecules with short pulse lasers is also studied to develop new mass spectrometers. The physics of high energy radiation generation and its applications are done research into.



Prof
SAKABE, Shuji (D Eng)
Assist Prof
HASHIDA, Masaki (D Eng)
SHIMIZU, Seiji (D Sc)

Electron Microscopy and Crystal Chemistry S

TEL 0774-38-3051 FAX 0774-38-3055
E-mail post@eels.kuicr.kyoto-u.ac.jp

Direct imaging of structural arrangement of atoms or molecules by high-resolution electron microscopy and scanning probe microscopy is utilized to investigate the crystal growths of organic thin films, surface chemical reactions and the formation of nano-materials. The local electronic structure analysis and elemental mapping are also performed to explore chemical information by measuring the energy of inelastically scattered electrons.



Prof
ISODA, Seiji (D Sc)
Assoc Prof
KURATA, Hiroki (D Sc)
Assist Prof
OGAWA, Tetsuya (D Sc)
NEMOTO, Takashi (D Sc)
Res Associate
MORIGUCHI, Sakumi (D Sc)

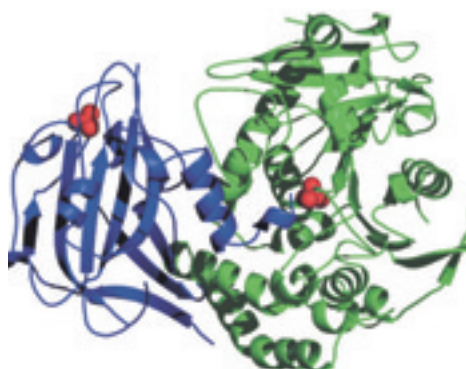
Structural Molecular Biology H

TEL 0774-38-3040 FAX 0774-38-3045
E-mail hata@sci.kyoto-u.ac.jp

X-ray studies to obtain structural information of proteins and inorganic materials are performed by analyzing a distribution and state of electrons. The main themes are structure determination of proteins and structural elucidation of protein functions, and experimental and theoretical investigation of the natural line width of K- and L-emissions.



Prof
HATA, Yasuo (D Sc)
Assoc Prof
ITO, Yoshiaki (D Sc)
Assist Prof
FUJII, Tomomi (D Sc)



Protein-Protein Interaction in Enzyme-Inhibitor Complex

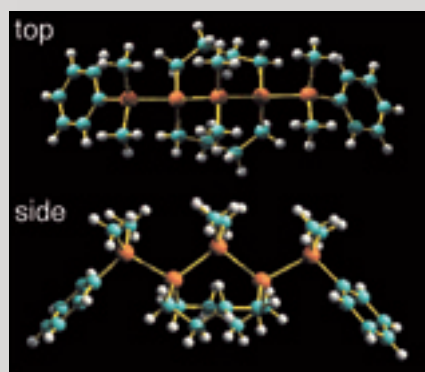
Organic Main Group Chemistry E

TEL 0774-38-3183 FAX 0774-38-3186
E-mail tsuji@scl.kyoto-u.ac.jp

Our research is concerned with new aspects in the elemento-organic chemistry such as (1) properties control of one dimensional materials containing heavy main group elements on the basis of structural constraint, (2) electron- and energy-transfer through oligosilane chain, and (3) development of efficient reactions using main group element reagents and transition metal complex catalysts.

Professor,
to be filled

Assist Prof
TSUJI, Hayato (D Eng)

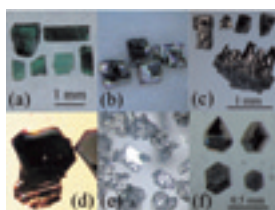


X-ray structure of conformation-controlled oligosilane



Proposal of a guideline for creation of novel elementary materials through the uncovering of role of key elements which determine the functions of materials.

International Research Center for Elements Science



Crystals grown at 2-5 GPa and 1000°C: (a) $(VO)_2P_2O_7$, (b) $BiMnO_3$, (c) $PrNiO_3$, (d) $Ca_{1.9}Na_{0.1}CuO_2Cl_2$, (e) $CaFeO_3$, (f) $SrCo_6O_{11}$ and (g) the photoluminescence in blue of oxygen-deficient $SrTiO_3$.

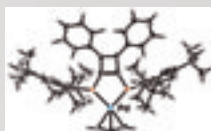
Advanced Solid State Chemistry S

TEL 0774-38-3120 FAX 0774-38-3125
E-mail takano@scl.kyoto-u.ac.jp

We are trying to discover new 3d transition metal oxides using a high-pressure technique (up to 10Gpa, 1500°C), film technique (pulsed laser deposition), microfabrication, and a solution technique. The properties and functions of our interest are magnetism, ferroelectricity, high-Tc superconductivity, and photoluminescence.



Prof
TAKANO, Mikio (D Sc)
Assist Prof
SAITO, Takashi (D Sc)
REF Assist Prof
YAMAMOTO, Shinpei (D Eng)



Organotransition Metal Chemistry E

TEL 0774-38-3035 FAX 0774-38-3039
E-mail ozawa@scl.kyoto-u.ac.jp

Our research interest is focused on new organotransition metal complexes with useful chemical properties. Recent topics include: (1) Organometallic complexes with sp^2 -hybridized phosphorus ligands. (2) Transition metal clusters with ethynyl and diethynyl cations. (3) Stereocontrolled synthesis of extended π -conjugation molecules.



Prof
OZAWA, Fumiyuki (D Eng)
Assoc Prof
OKAZAKI, Masaaki (D Sc)
Assist Prof
KATAYAMA, Hiroyuki (D Eng)

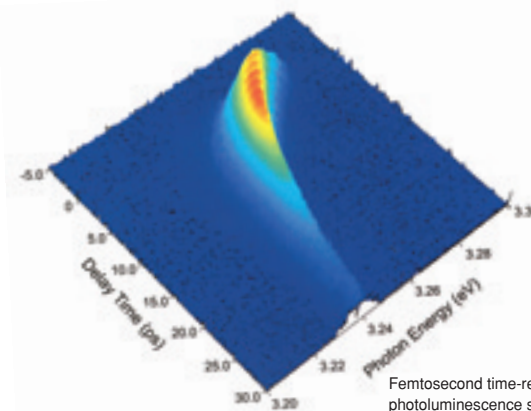
Photonic Elements Science S

TEL 0774-38-4510 FAX 0774-38-4511
E-mail kanemitsu@scl.kyoto-u.ac.jp

Our research interest is to understand optical and quantum properties of nanometer-scale materials and to develop opto-nanoscience for creation of innovative functional materials. In particular, we study optical properties of single nanoparticles and arranged nanoparticle superlattice solids by means of space- and time-resolved laser spectroscopy.



Prof
KANEMITSU, Yoshihiko (D Eng)
Assoc Prof
MATSUDA, Kazunari (D Eng)
Assist Prof
INOUE, Hideyuki (D Eng)



Femtosecond time-resolved photoluminescence spectrum of $InGa_{1-x}N$

Bioknowledge Systems S

TEL 0774-38-3270 FAX 0774-38-3269
E-mail kanehisalab@kuicr.kyoto-u.ac.jp

Our objective is to solve life's mysteries from the genome project's massive data. We are engaged in the construction of an advanced database, information technology development for handling this data, functional annotation, and other activities analyzing the biological meaning behind experimental data. These results are available at GenomeNet (<http://www.genome.jp>).

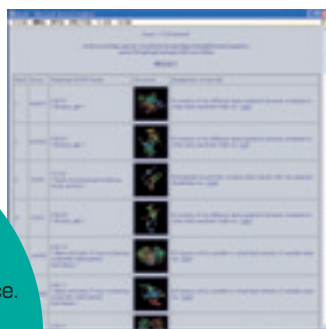


Prof. **KANEHISA, Minoru** (D.Sc.)
Assoc. Prof. **GOTO, Susumu** (D.Eng.)
Assist. Prof. **HATTORI, Masahiro** (D.Sc.)
Visiting Assist. Prof. **KINOSHITA, Kiyoko F.** (Ph.D.)
ITOH, Masumi



Our laboratories promote research in Bioinformatics and the development of the foundation for an integrated and extensive resource for the Bioscience.

Bioinformatics Center



Snapshot of a software tool for analysis of protein sequences

Biological Information Networks I

TEL 0774-38-3015 FAX 0774-38-3022
E-mail akutsulab@kuicr.kyoto-u.ac.jp

This laboratory develops algorithms and mathematical models for bioinformatics and systems biology. The research topics include inference and analysis of various types of biological networks, prediction and analysis of protein/RNA structures, statistical models for sequence analysis, and scale-free networks.



Prof. **AKUTSU, Tatsuya** (D.Eng.)
Assist. Prof. **UEDA, Nobuhisa** (D.Eng.)
Visiting Assist. Prof. **HAYASHIDA, Morihiro** (D.Inf.)

Pathway Engineering I

TEL 0774-38-3023 FAX 0774-38-3037
E-mail bic4@kuicr.kyoto-u.ac.jp

With the recent advance of experimental techniques in molecular biology, the research of modern life science is shifting to the comprehensive understanding of a biological mechanism consisting of a variety of molecules. The research objective is to develop techniques based on computer science and/or statistics to systematically understand the mechanism at the cellular and organism level.



Prof. **MAMITSUKA, Hiroshi** (D.Sc.)
Assist. Prof. **TAKIGAWA, Ichigaku** (D.Eng.)

Bioinformatics Training Unit Genome Informatics

TEL 0774-38-3093 FAX 0774-38-3059
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Evolutionary study based on molecular data is called "molecular evolutionary biology". Our major research interest is the extraction of biological knowledge from various biological data, such as nucleotide sequences, amino acid sequences, and protein structures, from the evolutionary view points. We also develop new methodologies and tools for the analyses. One of such tools, a multiple alignment program mafft, is now widely utilized in the field of molecular biology.
(<http://timpani.genome.ad.jp/~mafft/server/>)

Visiting Assoc. Prof. **KUMA, Keiichi** (D.Sc.)
Visiting Assist. Prof. **ICHIHARA, Hisako**



Visiting Professors



Prof. KIRA,
Mitsuo

Division of Synthetic
Chemistry

Graduate School of Science,
Tohoku University, Professor

The central theme of my research is to create silicon and germanium compounds with unique electronic properties and structures and to elucidate their physical properties and reactivity. Our recent studies are focused on the synthesis, structure, and reactions of (1) stable doubly-bonded compounds of heavier group-14 elements, (2) transition metal complexes with silicon-silicon doubly-bonded and silicon divalent compounds, (3) oligosilanes and polysilanes with unique photophysical and photochemical properties, and (4) sila-macrocycles.



Prof. TABATA,
Satoshi

Division of
Biochemistry

Kazusa DNA Research
Institute, Vice-Director

We have conducted genomics on flowering plants (*Arabidopsis thaliana* and *Lotus japonicus*) and plant-related microbes (cyanobacteria and rhizobia) by sequencing the entire genomes of these organisms to collect fundamental information to perform functional genomics and by analyzing protein-protein interactions at the genome-wide level. I would like to continue this effort to understand the entire genetic systems of living organisms by means of experimental and bioinformatics approaches.



Prof. NISHIO,
Taichi

Division of Multidisciplinary
Chemistry

Sanzen Kako Co.Ltd.,
(Sumitomo chemical Group),
Vice president

My main research scope is polymer blends and alloys based on polyolefin. Social circumstance and safety problems become more important in the world wide. Polyolefin products, especially refined polyolefin blends and alloys are expected to solve these problems. In Institute for Chemical Research Kyoto University, I will study "Molecular Structure and Design of Polyolefin products for solution of these problems".



Prof. NAGASHIMA,
Hideo

International Research Center
for Elements Science

Institute for Materials
Chemistry and Engineering,
Kyushu University, Professor

Organometallic clusters have attracted attention from chemists for their unique metal-metal and metal-ligand interactions. We have focused our attention on the development of transition metal cluster catalysts by combination of organoelement chemistry, organic chemistry, and polymer chemistry, expecting that collaboration with the researchers of IRCELS on the reaction mechanisms will bring about substantial progress of our cluster chemistry and the organoelement chemistry of ICR.



Prof. WANG,
Yu

International Research Center
for Elements Science

Department of Chemistry,
National Taiwan University,
Professor

My research interest is on the chemical bonding characterization of 3d transition metal complexes using precise single crystal diffraction data and sophisticated molecular orbital calculations. Chemical bonding plays important role on the physical and chemical properties of the material. Using x-ray absorption spectra to monitor the exact change in spin state of a metal ion is successful. The spin transitions due to the variation of temperature, pressure, counter ions and guest solvent molecules are fascinating. The LIESST phenomena have been observed at extreme low temperature, the changes in structure and in spin occur concurrently. Hopefully my stay in ICR will bring close collaboration on some common interests.



Assoc
Prof. KATO,
Atsushi

Division of Materials
Chemistry

NISSAN ARC, LTD.
Research Department,
Senior Researcher

We have examined the basic technology of the fatigue life prediction and fractography for the failure analysis of automobile polymer parts. Furthermore, in order to find a solution to polymer molding troubles, various higher-order structures and filler dispersion etc. in the cross-section of polymer moldings, have been also investigated. Recently, Prof. S. Kohjiya (Institute for Chemical Research) and Dr. Y. Ikeda (Kyoto Institute of Technology) have powerfully supported us to observe nano filler (e. g. silica, carbon black) aggregate in the natural rubber (NR) vulcanizate by using of three-dimensional transmission electron microscopy / electron tomography technique (the general name is 3D-TEM). We hope to find out the hierarchical relationship between the 3D-morphology and material properties from a nano meter to a micro meter region. Thank you.



Assoc
Prof. MORITA,
Akihiro

Division of Environmental
Chemistry

Department of Computational
Molecular Science
Institute for Molecular Science,
Associate Professor

We are interested in structure and dynamics at liquid interfaces via electronic structure calculations and molecular simulation, including surface specific reaction mechanisms at liquid interfaces and on atmospheric aerosols. In particular, our recent research activity focuses on the development of theory and simulation methods of interface Sum Frequency Generation spectroscopy. We wish to strengthen collaboration with researchers in ICR toward application of our theory and simulation to a variety of interfacial phenomena.

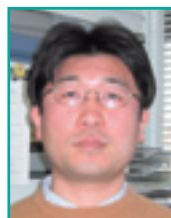


Assoc
Prof. TSUKISHIMA,
Chihiro

Advanced Research Center
for Beam Science

Mitsubishi Electric Corporation,
Advanced R&D Center,
High Frequency Electro-
magnetics Group Manager

I am researching the particle accelerators and electromagnetic equipments in Mitsubishi Electric Corporation. The accelerator is useful for a lot of public welfare fields for industrial use and the medical treatment etc. The topic for these several years is the cancer treatment by charged particles (proton and carbon ion). The advantages of cancer therapy is a little load to the human body, and brings high Quality of Life to the patient. On the other hand, the device is large, and the cost is higher than ordinary method. Maker's obligation is the achievement of a device that is cheap and easily spread to the society. I hope the high accelerator technologies and the laser technologies of this center can change the particle therapy dramatically.



Assoc
Prof. MARUYAMA,
Osamu

Bioinformatics Center

Graduate school of Mathematical
Sciences, Kusu University,
Associate Professor

I am interested in developing efficient algorithms and software for computational problems in molecular biology and genomics. My recent work includes efficient algorithms for motif-finding of regulatory elements of transcription factor and alternative splicing, reconstruction of phylogenetic trees, and inference of genetic networks. I'm looking forward to working there. Thank you.



Science for Society and Science for Science



Science for Society
and
Science for Science

The concept of "Science for Society" originates in "The Declaration on Science and the Use of Scientific Knowledge" presented at UNESCO's "World Conference on Science" in 1999. This concept encourages science to make more contribution to the society. Although Science has made progress hand in hand with economical achievements, Science itself should be the most important interest for the Scientists to answer the unknown questions. Institute for Chemical Research not only recognizes "Science for Society" but also promotes the concept of "Science for Science," the words that the scientists should always keep in their hearts.





Science for Society
and
Science for Science

Science for Society
and
Science for Science



Our Vision

The founding philosophy of the Institute for Chemical Research is to “excel in the investigation of basic principles of chemistry and chemical applications.” Research is grounded on the core values of freedom, independence, and harmony. As a key part of Kyoto University, the institute is committed to contributing to the harmonious development of the global community by solving fundamental chemical issues.

Research:

We regard chemistry as a broad area of the natural sciences, and strive for balanced development: the platform of basic research into the true nature of matter serves as a foothold for more applied studies that strive to be flexible and responsive to the challenges of our global society.

Education:

Through research in an integrated environment of world-class laboratories, we aim to train and develop talented people with broad experience and a high level of problem solving skills, capable of providing leadership towards the harmonious development of the global community.

Relationship with Society:

As researchers and educators of chemistry, we endeavor to deepen our exchanges with local communities and the Japanese society. We envision contributing to solving global problems through active scientific exchange with international researchers and institutions. Lastly, we commit to our accountability to society through internal review and information disclosure.



Published by:

Institute for Chemical Research, Kyoto University
Director; ESAKI, Nobuyoshi

Editors:

Public Relations Committee

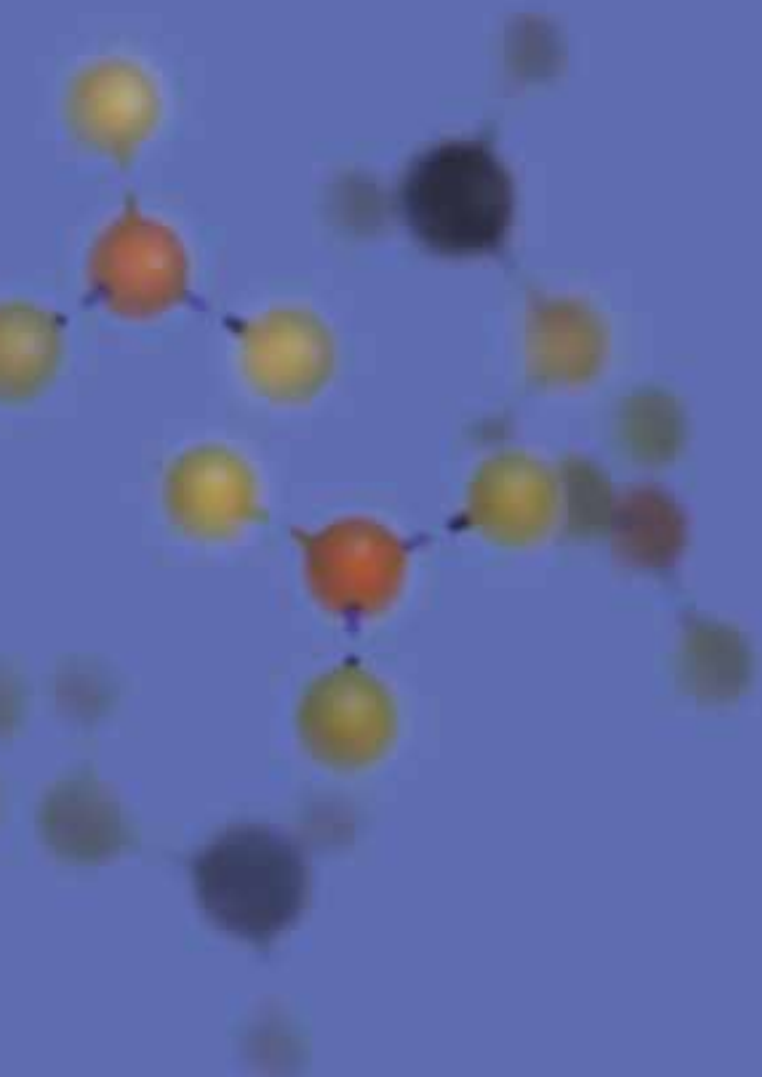
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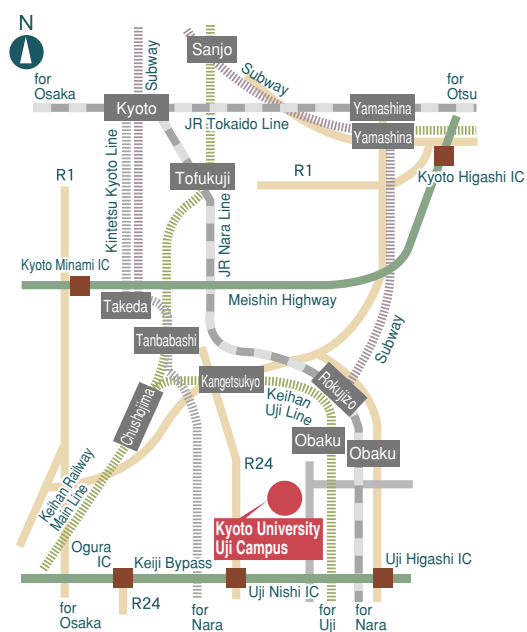
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Location and Transportation

From Obaku Station on the Keihan Uji Line: 10 min by walk
(from Keihan-Sanjo Station to Obaku Station: 35 min)

From Obaku Station on the JR Nara Line: 7 min by walk
(from Kyoto Station to Obaku Station: 20 min)

From Kyoto-Minami IC: 20 min by car From Uji-Higashi IC: 10 min by car
From Uji-Nishi IC: 10 min by car