Institute for Materials Chemistry and Engineering, Kyushu University

IMCE

■ Chikushi Campus

6-1 Kasuga-koen, Kasuga-city, Fukuoka 816-8580
Fukuoka Airport→〔Subway Kuko Line〕→Hakata Station→〔Transfer JR Kagoshima Line〕→Onojyo Station→Chikushi Campus

■ Ito Campus

744 Motooka, Nishi-ku, Fukuoka 819-0395
Fukuoka Airport→〔Subway Kuko Line〕→[Meinohama Station→〔Transfer JR Chikuhi Line.〕]→Kyudai-Gakkentoshi Station
→〔Transfer Showa Bus〕→Ito Campus

http://www.cm.kyushu-u.ac.jp/

2017.4.1

IMCE

Institute for Materials Chemistry and Engineering

Kyushu University

KYUSHU UNIVERSITY

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Institute for Materials Chemistry and Engineering, Kyushu University

Director's greeting

Jun-ichiro HAYASHI

The institute for Materials Chemistry and Engineering, IMCE, was founded on April 1, 2003, by merging and reorganizing Institute of Advanced Material Study and Institute for Fundamental Research of Organic Chemistry. Ever since the foundation, we have been doing chemical and chemistry-based research works keeping the original mission of producing high quality results and thereby leading materials chemistry. IMCE is also expected to play the following roles: (1) COE of advanced and inter-disciplinary research in fields of science and technology of materials/devices, (2) promotion of collaboration with and contribution to chemical and other industries, and (3) contribution to innovation in life and green science/technology.

IMCE consists of five divisions; four divisions (Fundamental Organic Chemistry, Applied Molecular Chemistry, Integrated Materials, Advanced Device Materials) that correspond to a hierarchical order of material, and a brand-new/international division of Soft Materials. IMCE has professors, associate professors and assistant professors (total number; around 45 in recent 5 years), postdoc fellows and technical staff, who produced more than 1,200 referred original research papers and reviews in FY2010–2015. The rate of "adjusted Top 10% papers" for IMCE is 15.2%, and this may be an indication of the averaged quality and contribution to materials chemistry of our research works.

IMCE has been contributing to inter-university activities for promoting chemical/materials science and technology. IMCE has been in alliance with four research institutes; Institute for Multidisciplinary Research for Advanced Materials (Tohoku University), Laboratory for Chemistry and Life Sciences, Institute of Innovative Research (Tokyo Institute of Technology), The Institute of Scientific and Industrial Research (Osaka University) and playing roles of a core of "Network Joint Research Center for Materials and Devices," and "Dynamic Alliance for Open Innovation Bringing Human, Environment and Materials." IMCE is also a member of Integrated Research Consortium on Chemical Science and Technology (the other contributors; Institute for Catalysis (Hokkaido University), Research Center for Materials Science (Nagoya University), International Research Center for Elements Science Institute for Chemical Research (Kyoto University)).

IMCE is really keen in enhancing and expanding research collaboration with research institutes and industries over the world as well as recruiting capable researchers. Any inquiries and questions are welcome. We believe our contributions to your institutes with effective/sustainable win-win relationship.

Jun-ichiro Hayashi
Director
Institute for Materials Chemistry and Engineering
Kyushu University

History

1944	Research Institute for Wood, Kyushu Imperial University (3 divisions) founded.
April 1949	Reorganized as the Kyushu University Research Institute for Production Science (5 divisions).
May 1987	Reorganized as the Kyushu University Institute of Advanced Material Study (3 research divisions (13 research fi elds) + 2 temporary divisions)
April 1, 1993	Kyushu University Institute for Fundamental Research of Organic Chemistry (3 research divisions) founded.
April 1, 2003	Institute for Materials Chemistry and Engineering established following the merger and reorganization of the Kyushu University Institute of Advanced Material Study and the Kyushu University Institute for Fundamental Research of Organic Chemistry.
April 1, 2010	The IMCE has been designated as a network-style research core for the government-sponsored Joint Usage/Research Center Program.
April 1, 2014	Division of Soft Materials established.

Campus

IMCE is engaged in research activities in the two campus Chikushi and Ito.

Chikushi Campus

Ito Campus

Organization

Division of Fundamental Organic Chemistry

In addiion to clarifying the characteristics of organic molecules, especially substances that exhibit specific optical, magnetic, conductive or other physical properties, the aim of the Division of Fundamental Organic Chemistry is to develop molecules that exhibit distinctive functions through establishing design principles using theoretical chemistry and property analysis, and realizing empirically these principles. The division is also engaged in the development of ultra-efficient and highly-selective reactions of organic molecules, and the development of highly-controlled methods of material transformation.

Division of Applied Molecular Chemistry

The aim of the Division of Applied Molecular Chemistry is to establish the basic chemistry of atomic clusters, molecular clusters and supermolecules - which are unexplored areas of materials chemistry at the atomic and molecular levels - and to apply this to the design of molecular structures and electronic structures, synthesis, the development of physical properties and reactivity, and to functional molecules. Through the advanced control of physical properties and reactivity at the molecular level, the division aims to build macromolecules with higher-order structures, and to establish bottom-up nanotechnology. By creating molecules and molecular clusters that have new functional characteristics, and by evaluating the properties of these, the division aims to expand into nanomolecular materials.

Division of Integrated Materials

By freely using such techniques as molecular nanotechnology, the microfabrication of bulk materials and self-organization, the Division of Integrated Materials aims to create and apply hybrid materials that are positioned on the edge of conventional academic fields, such as organic-inorganic-bio and carbon-organic materials. In particular, the aim of the division is to develop new functional materials by blending dissimilar functions such as electronic functions and bio functions, and to establish a base for practical application. In addition to using the fusion of various types of materials to promote the development of physical/chemical/bio functional materials that are also biocompatible and compatible with the environment, the division is also engaged in the careful evaluation of the physical properties of each material.

Division of Advanced Device Materials

The Division of Advanced Device Materials aims to realize nanostructured bulk materials and to realize advanced devices through the measurement and functional analysis of the microstructures of precisely built molecular and atomic clusters, and through the development of processes to realize ordered arrays. In particular, with a focus on inorganic nanomaterials, the aim of the division is the clarification of the correlation between structure and function, the development of new optical materials that use nanoparticles, and the establishment of a fundamental engineering for the process design and controls that are necessary for the achievement of large-scale ordered arrays of nanostructures.

Division of Soft Materials

Through precise control of emerging functions and complex hierarchical structures of soft materials such as polymers, gels, colloids, liquid crystals etc, the division of soft materials aims to develop innovative and inventive technology on biocompatible materials, functional interfacial materials, nanobio-devices, and cell manipulation materials. In addition, this division pushes on constructing the international hub for extensive collaborations with overseas active research groups.

Evaluation Center of Materials Properties and Function

The center is engaged in the management and operation of large equipment for shared use, with an intensive allocation of technical staff with advanced expertise. This allows the implementation of advanced analysis of molecules and materials, as well as related education and instructions.
The center also carries out diverse activities pertaining to the environmental and safety management of the institute.

Master's degree and doctoral degree

The IMCE conducts its activities as a part of the graduate schools of Sciences, Engineering and Interdisciplinary Engineering Sciences, respectively across the Ito and Chikushi campuses.

Laboratories in Ito campus :
- Graduate School of Engineering, Department of Chemistry and Biochemistr /
- Graduate School of Sciences, Department of Chemistry

Laboratories in Chikushi campus :
- Interdisciplinary Graduate School of Engineering Sciences, Department of Molecular and Material Sciences /
- Interdisciplinary Graduate School of Engineering Sciences, Department of Applied Science for Electronics and Materials /
- Graduate School of Integrated Frontier Sciences, Department of Automotive Science

Inter- university research project

◆ Network Joint Research Center for Materials and Devices

The IMCE has been designated as a network-style research core for the government-sponsored Joint Usage/Research Center Program. This designation is shared with other centers located across Japan, including the RIES of Hokkaido University, the IMRAM of Tohoku University, the LCS of Tokyo Institute of Technology and the ISIR of Osaka University. The IMCE serves as a hub, where researchers in materials and devices can go beyond the framework of national, public or private universities.

◆ Dynamic Alliance for Open Innovation Bridging Human, Environment and Materials

Cooperation partner: RIES, Hokkaido University; IMRAM, Tohoku University; LCS, Tokyo Institute of Technology; ISIR, Osaka University.

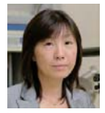
◆ Integrated Research Consortium on Chemical Sciences

Cooperation partner: Institute for Catalysis, Hokkaido University; RCMS, Nagoya University; IRCELS, Kyoto University.

Laboratories

2017. 4. 1

Division of Fundamental Organic Chemistry
Nanomaterials and Interfaces
Ito Campus

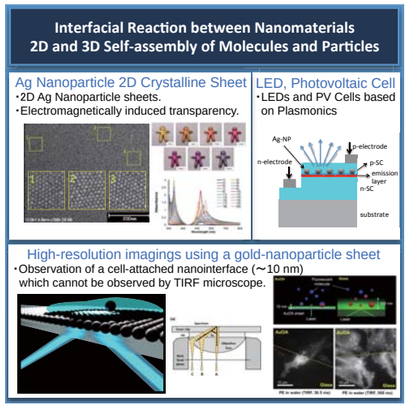


Professor
Kaoru
TAMADA

Associate Professor
Koichi
OKAMOTO

Assistant Professor
Sou RYUZAKI

Wang pangpang

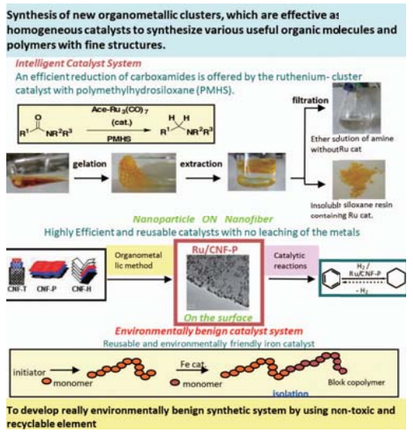


Interfacial Science, Nanomaterials, Plasmonics

Division of Applied Molecular Chemistry
Cluster Chemistry
Chikushi Campus

Professor
Hideo
NAGASHIMA

Assistant Professor
Atsushi TAHARA



Organic Chemistry, Organometallic Chemistry, Environmentally Friendly Catalysis

Division of Applied Molecular Chemistry
Chemistry of Molecular Assembly
Ito Campus

Associate Professor
Fumito TANI

Assistant Professor
Kenta GOTO

- Synthesis and function of supramolecular structures.
- Photoinduced electron transfer and high charge mobility in porphyrin-fullerene supramolecules.
- Synthesis and photoelectronic properties of novel polycyclic π-electronic compounds.
- Photomechanical effect and photochemical reaction of aromatic diimides.

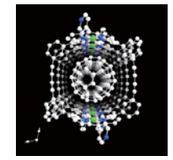


Fig . 1. Self-assembled porphyrin nanotube including linear array of fullerene C_{60}.

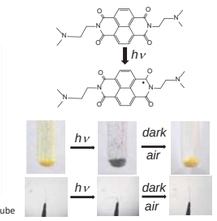


Fig . 2. Color change and crystal bending of naphthalene diimide upon photo-irradiation.

supramolecular assembly, π-electronic systems, porphyrins, fullerenes, photoinduced electron transfer, aromatic diimides, photomechanical effect,

Organic Chemistry, Structural Organic Chemistry, π-Electronic Systems

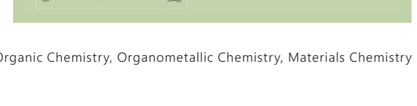
Division of Fundamental Organic Chemistry
Theoretical Chemistry
Ito Campus

Professor
Kazunari
YOSHIZAWA

Associate Professor
Yoshihito
SHIOTA

Research Assoc.Prof.
Hiromasa TANAKA

Assistant Professor
Yuta TSUJI



Theoretical Chemistry, Enzyme Chemistry, Material Chemistry

Division of Fundamental Organic Chemistry
Molecular Materials Chemistry
Ito Campus

Professor
Osamu
SATO

Assistant Professor
Shinji
KANEGAWA

Research Assist. Prof.
Su Shengqun

Photochrmistry, Materials Chemistry, Photomagnetic memory

Division of Applied Molecular Chemistry
System of Functional Molecules
Chikushi Campus

Professor
Katsuhiko
TOMOOKA

Associate Professor
Masato ITO

Assistant Professor
Kazunobu
IGAWA

Research Assist. Prof.
Yuya KAWASAKI

Organic Chemistry, Synthetic Chemistry・Structural Chemistry, Medicine・Chiral Material

Division of Applied Molecular Chemistry
Biomedical and Biophysical Chemistry
Ito Campus

Professor
Satoru
KIDOAKI

Associate Professor
Hirohiko ISE

Assistant Professor
Kuboki
Thasaneeya

Research Assist. Prof.
Saori SASAKI

Bioengineering, Biophysical Chemistry, Cell Manipulation Engineering

Division of Fundamental Organic Chemistry
Chemistry of Functional Molecules
Chikushi Campus

Professor
Yoichiro
KUNINOBU

Synthetic Organic Chemistry, Organometallic Chemistry, Materials Chemistry

Division of Fundamental Organic Chemistry
Advanced Organic Synthesis
Chikushi Campus

Professor
Mitsuru
SHINDO

Associate Professor
Arihiro KANO

Assistant Professor
Takayuki IWATA
Junji TANAKA

Organic Chemistry, Life Science, Medicine/Agrochemical

Division of Applied Molecular Chemistry
Hybrid Molecular Assemblies
Ito Campus

Professor
Atsushi
TAKAHARA

Associate Professor
Ken KOJIO

Assistant Professor
Yuji HIGAKI
Tomoyasu
HIRAI

Research Assist. Prof.
Masaru MUKAI

Polymer Chemistry, Surface Chemistry, Soft Materials

Division of Integrated Materials
Design of Nano-systems
Chikushi Campus

Professor
Hirotsugu
KIKUCHI

Associate Professor
Yasushi
OKUMURA

Assistant Professor
Hiroki HIGUCHI

Soft Matter Science（Liquid Crystal, Polymer）, Self-organization, Next-generation LCD

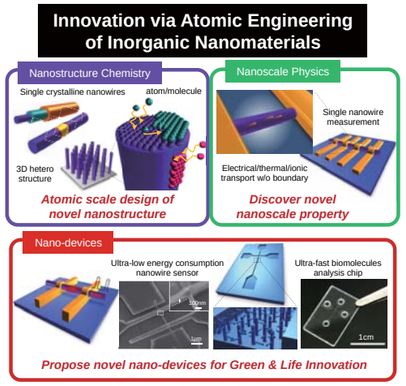
Division of Integrated Materials
Nanostructured Integrated Materials
Chikushi Campus

Professor
Takeshi YANAGIDA

Assistant Professor
Kazuki NAGASHIMA

Research Assist. Prof.
Tsunaki TAKAHASHI

Research Associate
Zhang Guozhu



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Material Science, Nanoscale Science, Green/Life Innovation Devices

Division of Advanced Device Materials
Nano Scale Evaluation
Chikushi Campus

Professor
Shiyoshi YOKOYAMA

Assistant Professor
Kazuhiro YAMAMOTO

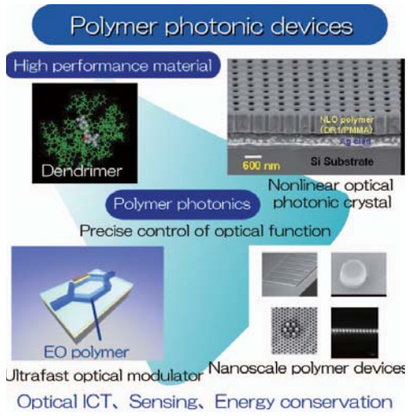
Andrew Marc Spring

Research Assist. prof.
Qui Feng

Research Associate
Hong Jianxun

Associate Professor
Yoshiaki TAKAHASHI

Assistant Professor
Akihiko TAKADA

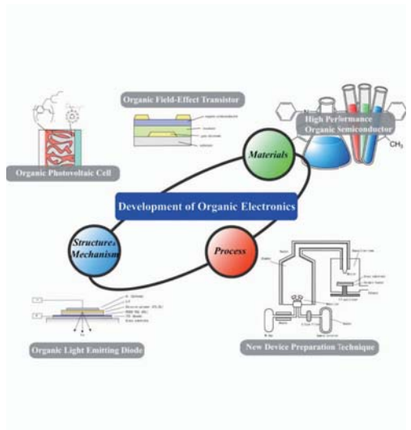


Polymer Chemistry, Nanotechnology, Optoelectronics

Division of Advanced Device Materials
Photonic Materials
Chikushi Campus

Associate Professor
Katsuhiko FUJITA

Research Assist. Prof.
Kenichi MATSUOKA



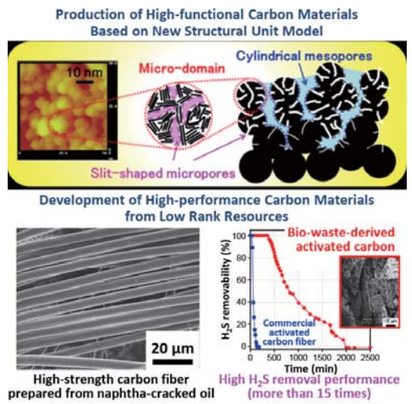
Organic Materials Chemistry, Organic Electronics, Organic Device

Division of Advanced Device Materials
Carbon Materials Science
Chikushi Campus

Professor
Seong-Ho YOON

Associate Professor
Jin MIYAWAKI

Assistant Professor
Koji NAKABAYASHI



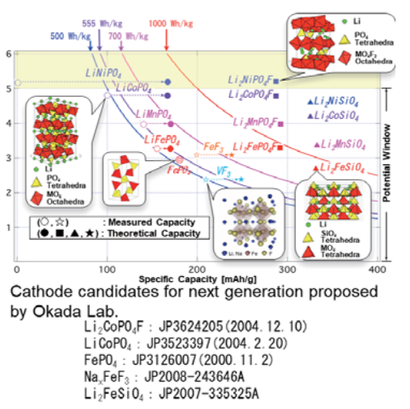
Material Science, Functional Carbon Materials, Energy & Environment

Division of Advanced Device Materials
Energy Storage Materials
Chikushi Campus

Professor
Shigeto OKADA

Assistant Professor
Ayuko KITAJYO

Atsushi INOISHI

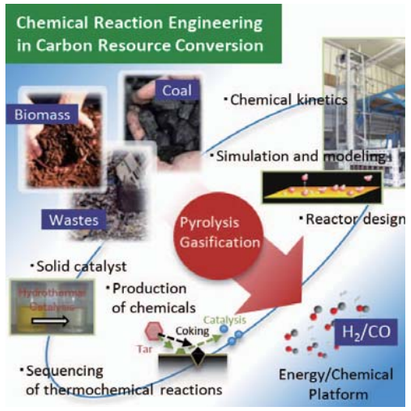


Electrochemistry, Material Science, Secondary Battery

Division of Advanced Device Materials
Microprocess Control
Chikushi Campus

Professor
Junichiro HAYASHI

Assistant Professor
Shinji KUDO



Chemical reaction engineering, Chemical energy conversion, Carbonaceous resource conversion

International Collaborative and Interdisciplinary Laboratory

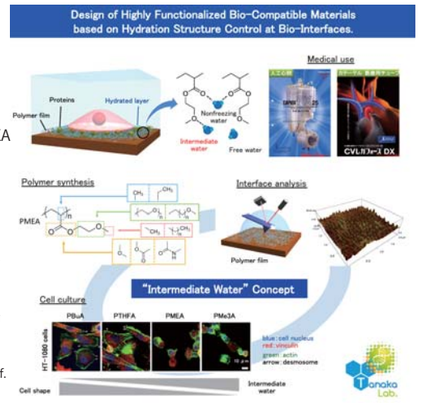
Division of Soft Materials
Soft Materials Chemistry
Ito Campus

Professor
Masaru TANAKA

Associate Professor
Shingo KOBAYASHI

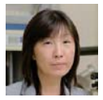
Assistant Professor
Daiki MURAKAMI

Research Assist. Prof.
Fumihiro ARATSU



Biomaterial, Bio-compatibility, Hydrated water

Division of Soft Materials
Nano-bio Device
Ito Campus



Professor
Kaoru TAMADA

Assistant Professor
Sou RYUZAKI

Division of Soft Materials
Mechanobio-materials
Ito Campus

Professor
Satoru KIDOAKI

Assistant Professor
Kuboki Thasaneeya

Division of Soft Materials
Soft Interface Chemistry
Ito Campus

Professor
Atsushi TAKAHARA

Assistant Professor
Yuji HIGAKI

Evaluation Center of Materials Properties and Function

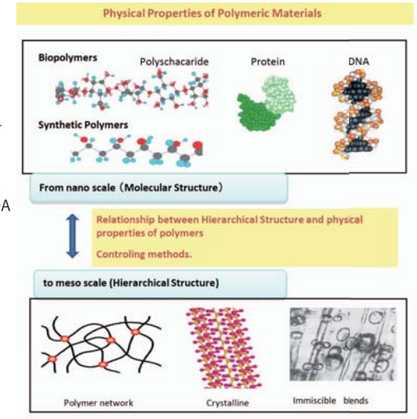
Center Director
Mitsuru SHINDO

The center is engaged in the management and operation of large equipment for shared use, with an intensive allocation of technical staff with advanced expertise. This allows the implementation of advanced analysis of molecules and materials, as well as related education and instructions. The center also carries out diverse activities pertaining to the environmental and safety management of the institute.

Evaluation Office of Materials Properties and Function
Chikushi Campus

Chief
Associate Professor
Yoshiaki TAKAHASHI

Assistant Professor
Akihiko TAKADA



Polymer Science, Soft Matter Physics, Environment-conscious polymers

Office of Research Support

Chief
Assistant Professor
Junji TANAKA

Technical staff
Mitsutaka UMEDU
Keiko IDETA
Taisuke MATSUMOTO
Takeshi TANAKA
Satoko GONDO

The Evaluation Office of Materials Properties and Function also offers consultations on research related to advanced analyses to external researchers. The main activities of the Office of Research Support are related to environmental and safety management of the institute as well as analysis support for internal and external researchers and students.

■The main equipment

NMR, Solid state NMR, Single-crystal X-ray structure analysis, XRD, SAXS, TEM, MASS, ESR