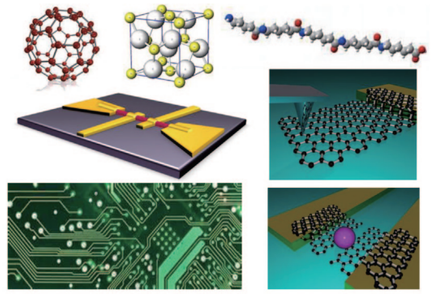
G1 Electronics Materials and Devices Research Project Group

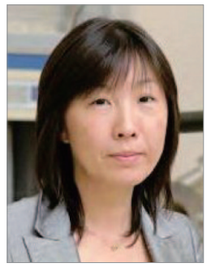
Outline of G1 Research

The object of the "Electronics Materials and Devices" group (G1) is to create and control organic, inorganic, and hybrid materials for the applications of electronics, photonics, and spintronics devices. External control of materials properties and integration technique of the novel devices will be investigated to realize the new functional devices. We aim science and technological contribution to human /environmental harmony.



Main members and their research subjects

<Group Leader>
Prof.
Shiyoshi YOKOYAMA (IMCE)
■Polymer photonics for high performance optical device application
Keywords: Nonlinear optical polymer, Nano photonics, Electro optic



<Planning and Promotion Leader>
Prof.
Kaoru TAMADA (IMCE)
■Innovative nanobio detection with plasmon nanoantenna
Keywords: Plasmonics, Nanomaterials, Bioimaging

<Vice-Leader>
Prof.
Keiji SASAKI (RIES)
■Optical manipulation of nanomaterials and their structures
Keywords: Optical force, Plasmonics, Nano-shaping, Optical vortex

Prof.
Hiromichi OHTA (RIES)
■Film growth, device fabrication, and electron transport modulation of conducting oxides
Keywords: Conducting oxides, Low-dimensional structure, Electric field, Water electrolysis

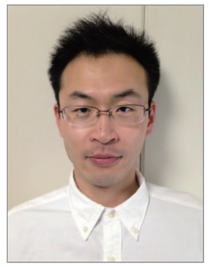
Assoc. Prof.
Hideo KAIJU (RIES)
■Creation of nanostructured spintronic devices
Keywords: Spintronics, Nanostructures, Magnetic materials, AC impedance

Assoc. Prof.
Hidekazu KUMANO (RIES)
■Applications of non-classical photons from semiconductor nanostructures
Keywords: Quantum dot, Single photon, Entanglement, Photonic nanostructure

Assoc. Prof.
Kenji KONDO (RIES)
■Theoretical study of spin transport and the calculation of electronic structure of low-dimensional electron gas systems
Keywords: Condensed matter theory, Spintronics, Semiconductor device engineering, First principle electronic structure calculation

Prof.
Takayoshi NAKAMURA (RIES)
■Development of novel electronic materials based on molecular rotators
Keywords: Molecular rotator, Supramolecules, Ferroelectrics, Multiferroics

Assoc. Prof.
Hideki FUJIWARA (RIES)
■Study on the application of resonance-controlled random structures
Keywords: Micro-nano cavity structures, Micro-nano lasers, Microspectroscopic imaging



Assoc. Prof.
Michihiko YAMANOUCHI (RIES)
■Study on oxide spintronics devices
Keywords: Pulsed laser deposition, Spintronics, Oxide halfmetal

<Vice-Leader>
Prof.
Masaru NAKAGAWA (IMRAM)
■Process/Material Science and Device Innovation in Nanoimprint Technology
Keywords: Print & imprint method, Lithography, Laser processing

Prof.
Tomoyuki AKUTAGAWA (IMRAM)
■Fabrication of new molecular devices with charge-transfer interactions
Keywords: Molecular crystal, Charge transfer, Ferroelectricity

Prof.
Kiyoshi UEDA (IMRAM)
■Analysis and control of electron and molecular dynamics
Keywords: X-ray free electron laser, Molecular movie, Multi-dimensional spectroscopy

Prof.
Hidetoshi OIKAWA (IMRAM)
■Creation of organic hybridized nanocrystals for optically functional materials
Keywords: Organic hybridized nanocrystal, Photonic material, Reprecipitation method

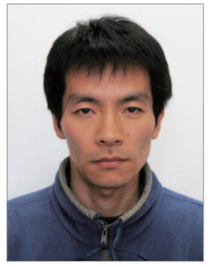
Prof.
Hiroshi OHTANI (IMRAM)
■Study on materials design based on the evolutionary algorithm
Keywords: First-principles calculations, CALPHAD, Evolutionary algorithm

Prof.
Hitoshi KASAI (IMRAM)
■Fabrication of The Novel Nanodrugs Composed of Poorly Water-Soluble Compounds
Keywords: Nano Drugs, Organic Nanoparticles, Anti-cancer Drugs

Prof.
Osamu KITAKAMI (IMRAM)

■Study on single nanomagnet for development of future memory devices

Keywords: Magnetism, Spin dynamics, Nanomagnet



Prof.
Hiroyuki KIMURA (IMRAM)

■Structural physics on novel condensed matter by complimentary use of SOR-X-ray- Neutron structure analysis

Keywords: SOR- X-ray- Neutron diffraction, Accurate magnetic and crystal structure analysis, Magnetoelectric oxides, Organic ferroelectric and magnetic materials

Prof.
Tadahiro KOMEDA (IMRAM)

■Development of single molecule devices with spin degree of freedom

Keywords: Molecule electronic, Molecular spintronics, Scanning tunneling probes

Prof.
Taku J SATO (IMRAM)

■Spin dynamics in condensed matter by neutron inelastic scattering

Keywords: Neutron inelastic scattering, Unconventional superconductor, Quantum spin systems

Prof.
Daisuke SHINDO (IMRAM)

■Multidisciplinary research of microstructure, electromagnetic field and conductivity by advanced electron microscopy

Keywords: Electron holography, Lorentz microscopy, Microprobes

Prof.
Hiroshi JINNAI (IMRAM)

■"In-situ" 3D observations of selfassembling processes soft materials with advanced electron tomography

Keywords: Electron tomography, In-situ visualization, Self-assembling processes, Soft materials

Prof.
Yuji TAKAKUWA (IMRAM)

■Synthesis of functional materials and development of nanoprocesses

Keywords: Surface physics, Material science, Process engineering, Development of surface analysis methods

Prof.
Masaki TAKATA (IMRAM)

■Development of materials visualization photon science

Keywords: Synchrotron radiation, X-ray diffraction, Maximum entropy method, Charge density study

Prof.
Shigefusa CHICHIBU (IMRAM)

■Light-matter coupling and ultrafast spectroscopy in semiconductor nanostructures

Keywords: Femtosecond electron beam, Nitide semiconductors, Oxide semiconductors

Prof.
Masaya MITSUISHI (IMRAM)

■Hybrid polymer nanoassemblies for optoelectronic applications

Keywords: Polymer nanoassembly, Hybrid polymers, Optoelectronics

Prof.
Chiaki YOKOYAMA (IMRAM)

■Development of environmentally conscious materials using ionic liquids

Keywords: Ionic liquid, Supercritical fluid, Gallium nitride

<Vice-Leader>
Prof.
Atsushi SHISHIDO (LCLS)

■Development of functional soft materials and its application to optoelectronics

Keywords: Soft material, Liquid crystal, Photonics, Polymer

Assoc. Prof.
Takane IMAOKA (LCLS)

■Functionality programming of metal clusters based on an exact atomicity control

Keywords: Nanoparticles, Clusters, Catalysis, Photoluminescence

Prof.
Tomokazu IYODA (LCLS)

■Nanofluidic Device and Innovative Membrane with Integrated Transport Channels

Keywords: Nanofluidics, Integrated Transport Channel, Self-assembled Nanostructure, Innovative Membrane

Prof.
Takanori FUKUSHIMA (LCLS)

■Development of new soft materials using strategically designed π-electronic systems

Keywords: π-Electronic Materials, Self-assembly, Soft materials, Organic electronics

<Vice-Leader>
Prof.
Tsuyoshi SEKITANI (ISIR)

■Flexible integrated circuits for large-area sensor applications

Keywords: Social devices, Flexible transistors, Integrated circuits, Large-area sensors

Prof.
Yoshio ASO (ISIR)

■Development of organic semiconductors for high performance electronics

Keywords: Conjugated compounds, Molecular wires, Organic and molecular devices

Prof.
Akira OIWA (ISIR)

■Research on novel quantum hybrid devices based on spins and photo

Keywords: Low-dimensional semiconductor physics, Quantum information processing, Quantum hybrid system, Spintronics

Prof.
Tamio OGUCHI (ISIR)

■First-principles predict ion of properties for materials design

Keywords: First-principles calculations, Transition metal systems, Surfaces and interfaces, Materials informatics

Prof.
Takahiro KOZAWA (ISIR)

■Development of lithography process and materials for semiconductor devices

Keywords: Quantum beam, Lithography, Biomaterials, Pulse radiolysis

Prof.
Hidekazu TANAKA (ISIR)

■Development of 3 dimensional oxide nano-structured electronics

Keywords: Nanostructures, Functional Oxide, Nano/Spin-electronics

Assoc. Prof.
Masaya NOGI (ISIR)

■Nanocellulose materials for flexible electronics

Keywords: Nanocellulose, Transparent nanopaper, Flexible substrate

Prof.
Kazuhiko MATSUMOTO (ISIR)

■Nano carbon devices & applications

Keywords: Nanocarbon, Quantum memory, Bio Sensor

Prof.
Yoichi YOSHIDA (ISIR)

■Research of the radiation induced chemical reactions by using the atto-second electron beam

Keywords: Atto-second electron beam, Atto-second pulse radiolysis, Radiation chemistry

Prof.
Takashi WASHIO (ISIR)

■Machine Learning for Advanced Nano-electronics Devices

Keywords: Machine Learning, Advanced Sensing, Statistical Estimation

<Vice-Leader>
Prof.
Hirotsugu KIKUCHI (IMCE)

■Three dimensional lattice structure and Kerr effect of liquid crystal blue phases

Keywords: Liquid crystal blue phase, Electro-optic Kerr effect, Soft matter

Assoc. Prof.
Yasushi OKUMURA (IMCE)

■Dynamics of dissipative system with asymmetric interaction

Keywords: Soft matter, Liquid crystal, Nanoparticle

Assoc. Prof.
Fumito TANI (IMCE)

■Development of porphyrin-fullerene supramolecules

Keywords: Supramolecules, Organic pi-compounds, Electron transfer

Assoc. Prof.
Katsuhiko FUJITA (IMCE)

■Development of fabrication process and materials for organic electronic devices

Keywords: Organic electronics, Organic photovoltaic cells, OLED

Prof.
Takeshi YANAGIDA (IMCE)

■Creation of functional nanowire materials/properties/devices towards next generation electronics

Keywords: Functional Nanodevices, Nanowires, Electronics