List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
WENJING ZHOU	Masahiko Matsumiya	Recovery of iridium by solvent extraction and direct electrodeposition from loaded organic phase	The extraction behavior of Ir(IV) was investigated using an amine extractant. In addition, the electrochemical behavior of the extracted Ir(IV) species during electrodeposition was also studied. Voltammetry-based electrochemical analysis revealed that the reduction of Ir(IV) proceeded via an intermediate Ir(III) species in two steps, namely, $Ir(IV) + e^- \rightarrow Ir(III)$ and $Ir(III) + 3e^- \rightarrow Ir(0)$. Diffusion coefficients of the extracted Ir(IV) species were determined over the temperature range of 298–373 K using semi-integral and semi-differential analyses, and values obtained from the two analyses were consistent with each other. Furthermore, consecutive solvent extraction and electrodeposition of Ir metal were performed for 10 cycles. The entire Ir electrodeposit was in the metallic state, as is evident from the $4f_{7/2}$ spectrum obtained by XPS.
LIU HAO	Endo Akira	Study on Evaluation of Indoor Thermal Environment Characteristics of Large-Scale Food Retail Store Based on CFD Analysis	In existing energy calculation methods for evaluating energy conservation measures for large-scale food retail stores, it is assumed that the temperature inside the store is uniform due to perfect mixing. However, in reality, there is a strong temperature distribution in the store, and the assumption of perfect mixing results in a large error. The results showed that changing the air conditioning temperature setting has a strong effect on the air conditioning load because it affects the temperature distribution near the ceiling in the store in both summer and winter, while it has a weak effect on the SC cooling load. In addition, when the ventilation volume was varied, the temperature distribution throughout the store was affected in both summer and winter, indicating that both the SC cooling and air conditioning loads were affected.

Zou Liye	Endo Akira	Quality of place, urban scale, and innovation in Chinese cities: a study based on nighttime lighting data	Prior innovation research lacks urban scale analysis, especially in China, the impact of quality of place and urban scale on innovation remains unclear. This study examines their relationship, using City Innovation Indices, PCA ameniy indices and China urban scale indices based on Global NPP-VIIRS-like nighttime lighting data.The results indicate that a positive correlation between location quality and urban innovation, with urban scale positively moderating the relationship.
Huang Jun	Yasumoto Masanori	Research on the Influence of Proximity on the Capability of Enterprises' Technical Standard	This paper discusses the relevance of two key words: proximity and technology standardization capability. Rooted in the problematic issue of firms' choice of alliance partners, the aim was to identify the impact of the degree of difference in the characteristics of technical standards consortium members on firms' technical standardization capability, based on a multidimensional proximity perspective, viewed as a process from the formulation of technical standards to their survival. A binomial regression model and survival analysis were used to test the hypotheses. Conclusions, such as geographical proximity improving technical standard survival capacity, provide implications for companies' partner selection policies.

Amano Mitsuki	Kasai Naoya	Development of a Chloride Ion Sensor Using an Optical Fiber Core	Chloride ions adversely affect the corrosion of bridges and other civil engineering structures, so there is a need for early detection technology. In this study, we focused on optical fiber, which has many advantages as a sensor material. We focused on light absorption among the optical phenomena that occur on the surface of the optical fiber core, and aimed to develop a sensor that is highly sensitive and reflects only the effect of chloride ions in its spectrum by forming a silver film on the core surface that reacts with chloride ions and causes light absorption at a specific wavelength.
Arai satoshi	Hiroki Hondo	Effects of Anthropomorphism of Environmental Mascots on Environmental Awareness and Pro-Environmental Behavior	The aim of this study is to determine the influence of environmental mascots on the acceptance of photovoltaic power generations through anthropomorphism. A questionnaire survey is conducted on the impact of anthropomorphism of an environmental mascot in Iida City, Nagano Prefecture. The results of the analysis present the concept of civic anthropomorphism, which is different from anthropomorphism in previous studies, and show that two types of anthropomorphism may promote people's acceptance of photovoltaic power generations. The paper also discusses the mechanisms by which the two types of anthropomorphism increase acceptance of photovoltaic power generations and the relationship between them.

Ishikawa Tomori	Ken Nakano	Super-lubrication system of Concentrated Cellulose Nanofiber molding	In recent years, there has been a requirement to shift from petroleum resources to biomass materials, and cellulose nanofibers (CNFs) are one such material. The objective of this study is to clarify the lubrication mechanism of highly concentrated CNF moldings under dry conditions and temperature control. CNF molding vs. steel friction test was conducted simultaneously with a Raman spectrometer to determine the chemical structure. As a result, it was concluded that the friction properties of CNF moldings depend on the sliding temperature and that sliding at high temperatures exhibits low friction due to the formation of a transfer film composed of graphite.
Ishikawa Manami	Yasushi Oka	Improvement and Upgrading of Prediction Method for Dense Gas Advection Diffusion Based on Shallow-Layer Models	Twodee-2, one of the advection and diffusion prediction codes for dense gas, was improved in the following two ways. One is the application of Roache's method and the Lax method to the discretization scheme of the convection term, which improved the advection velocity of dense gas and the accuracy of gas concentration prediction. The other was to change the airflow field estimation method, which affects the advection phenomena of dense gas, to three-dimensional mass-consistent flow field model to improve the prediction accuracy of dense gas advection and diffusion around building-shaped obstacles on land.

ITO TAKUMA	HIROKI HONDO	Environmental, economic and social analysis of microgrid using photovoltaic power generation and storage batteries	The objective of this study is to develop a method to comprehensively evaluate the social benefits of microgrid (MG), a system in which photovoltaic power generation and storage batteries are installed in specific region and power sharing using a self-power cable and an energy management system. We design a resilient MG using HOMER(Hybrid Optimization Model for Multiple Energy Resources), and estimate CO2 reduction effects and economic ripple effects using REFIO(Renewable Energy Focused Input-Output Table), REFIO-Region and other input-output tables to quantify the social benefits of the MG from environmental, economic, and social perspectives.
Otaka Satoru	Kameya Takashi	Comparison of GC-MS/MS and GC-MS AIQS-DB method for identification of substances for Substances with Environmental Risk Concern	The GC-MS AIQS-DB method is studied for comprehensive management of chemical substances, but it has concerns about misidentification. In this study, it was investigated that the identification and quantification of substances that have been pointed out to be of high environmental risk concern in previous studies and AIQS-DB substances for which there are concerns about mutual interference due to similar retention times and mass spectra, using GC-MS/MS, which is superior in identification and quantification due to the ability to measure the mass spectrum derived from the molecular structure. The reliability of the AIQS-DB analysis results for identification/misidentification was verified using the GC-MS/MS method.

Onuma Moeka	Amemiya Takashi	Construction of an astrocyte-neuron mixed culture system and elucidation of the symbiotic metabolic oscillations	The metabolism of astrocytes and neurons is involved in various brain functions. Furthermore, the ANLS (Astrocyte Neuron Lactate Shuttle) suggests that astrocytes and neurons are metabolically symbiotic. The ANLS, which states that astrocytes transport the energy needed by neurons during neurotransmission in the form of lactate, has not yet been verified. Therefore, with the aim of verifying the ANLS using glycolytic oscillations, I attempted to construct a mixed culture system of astrocyte-neuron and to observe glycolytic oscillations. Although we could not observe glycolytic oscillations, by examining the culture environment including serum, were able to obtain a large glucose response, especially in fibrous astrocytes.
OMORI RYOSUKE	Atsumi Miyake	Analysis of ignition mechanism of energetic ionic liquids via applying voltage and development of combustor engineering model	The electrolysis ignition method directly applies voltage to an energetic ionic liquid (EILs) and electrolyzes it. This method is expected to address the poor ignitability of an ammonium dinitramide based EILs owing to its high electrical conductivity. However, the thruster performance has not been evaluated. The objective of this study is to analyse the ignition mechanism and demonstrate the feasibility of the electrolysis ignition method.

Okuda Yoji	Shibutani Tadahiro	Method of creating high-accuracy models for automation of large cranes	In recent years, the automation of cranes has been promoted. One of the methods being studied is to have an artificial intelligence system learn to operate an analytical model of a crane. When analyzing cranes, various elements are simplified to improve computability. This results in a large error compared to the actual crane. In this study, we clarify the factors that should be taken into account when promoting the automation of large cranes in the future. For this purpose, we focused on the bending elasticity of the rope and compared it with the double pendulum model, which is generally considered to improve the accuracy of crane models. This clarified the effect of bending elasticity on accuracy.
Okuno Tomoki	Masahiko Matsumiya	Investigation for extraction mechanism analysis of Pd(II) and electrodeposition behavior of extracted complex using amide-based extractant	The development of solvent extraction and direct electrodeposition processes is an important task to reduce the volume of secondary wastes. In this study, the extraction of Pd(II) using amide-based extractant in three diluents (acetophenone; AP, 1,2-dichloroethane; DCE, or 1-octanol; OC) was investigated. Slope analysis revealed that the extraction mechanism of Pd(II) was based on the anion exchange reaction. The electrochemical behavior of the extracted Pd(II) complex was investigated by an electrochemical quartz crystal microbalance (EQCM). Pd(II) was found to be reduced to Pd(0) metal via a two-electron transfer, and the cathodic reaction was found to proceed in the region between -2.38 V and -3.40 V based on the apparent molar mass of 105.22 evaluated by EQCM. Moreover, the alternation of $\Delta\eta\rho$ corresponded to the local decrease in the viscosity of the organic phase near the electrode. The potentiostatic electrodeposition of the extracted Pd(II) complex enabled us to recover the electrodeposits, which were identified as Pd metal through SEM/EDX, XPS, and XRD analyses.

Ohara Airu	Nakano Ken	Instability Exploration of Multi-point Contact Sliding Systems Based on Dynamic Stiction	Friction induced oscillations are complex in both time and space. However, a simple friction induced oscillation model based on Coulomb Friction (classical model) cannot express the complexity. Therefore, we developed a model that is simple but can express complexity by making the minimum necessary extensions. The numerical results confirm the complexity in both time and space because the amplitude and frequency vary with time and each point behaves differently. Following the convention in seismology, we focused on the magnitude the frequency of the magnitude and the direction of slip, and found that the model approached the real phenomenon compared to the classical model.
KASAHARA ATSUSHI	KASAI NAOYA	Development of pH sensor for high temperature and high pressure water using palladium-silver alloy electrode	In pH measurement in investigations of corrosion behavior in high-temperature, high-pressure water such as oil and gas wells and nuclear reactors, the difficulty of transporting the hydrogen required for the measurement system and the low durability of the electrode have become issues. In this study, we focused on a palladium-silver alloy electrode with improved durability by adding silver to palladium, which has excellent hydrogen storage properties. In the experiment, after hydrogen was absorbed into the electrode, pH measurement experiments were conducted in high-temperature, high-pressure water, and the pH measurement accuracy of the electrode was verified by comparing the actual measurement values with theoretical values.

KAWANA MIYU	Matsumoto Shinya	Crystal Structure and Absorption Spectra of Metal Complexes of Alizarine	Alizarine, known as a natural dye and lake pigment, forms metal complexes. The color of its metal complexes is known to change depending on the coordinating metal. In this study, crystals of Alizarine metal complexes were grown, and their X-ray crystal structure analysis and absorption measurements were performed. Three different solvated crystals of Cu(II)-Alizarine were obtained. Examination of the absorption properties of these solvated crystals and a Ca(II)-Alizarine complex suggested that the color changes of crystals of Alizarine metal complexes are caused by the difference in molecular structure.
Kuroki Yuri	Shiraisi Toshihiko	A Study of Understanding of Cell Mechanosensing under Mechanical Vibration via Measurement of Its Modes of Vibration	Cultured cells biochemically respond to mechanical vibration. However, the mechanisms of sensing mechanical vibration and being transduced to biochemical response have not been clarified. One of the previous studies reported that gene expression of ALP reached the maximum at 50 Hz with culturing osteoblastic cells under mechanical vibration. Considering a vibration model of a cell consisting of mass and spring, the modes of vibration of nucleus can be related to cellular mechanosensing mechanisms. In this paper, we experimentally measured nucleus displacement under mechanical vibration of 12.5-100 Hz, 0.5-2.0 G. The results indicated that phase-inversion occurs between 12.5 Hz and 50 Hz, suggesting the existing of a natural frequency of the cell.

Kodaka Mayu	Kenji Aramaki	Effect of Carbon Chain Length on α-Gel Structure and Physical Properties Based on a Cationic Surfactant-Fatty Alcohol Mixture	α-Gel is prepared from a mixture of surfactant, higher alcohol, and water. It has the ability to hold a large amount of water and is highly viscoelastic. And it works as a versatile platform to formulate various matters, such as water soluble, oil soluble, and non- soluble. Hence, α-gel has been used in some products, such as hair conditioners. In this study, surfactants and higher alcohols with different carbon chain lengths and hydrophilic groups investigate their effects on the internal structure and physical properties. Different combinations of hydrophilic groups and carbon chain lengths resulted in differences in the composition range, hardness, melting point, and internal structure.
Goto Yota	Yasushi Oka	Proposal of a Simplified Prediction Method for Smoke layer Properties Based on Numerical Calculation of Flow Field in Inclined Tunnel Fires	Fires in road tunnels cause significant social and economic losses, but most studies have focused on fire phenomena in horizontal tunnels. In this study, numerical simulations of smoke flow in inclined tunnels were performed and smoke layer properties were examined in detail in terms of smoke layer thickness, temperature and velocity. By applying the weighted average of two exponential functions, a prediction equation for the temperature attenuation of the smoke layer propagating along the up-slope ceiling was proposed. The coefficients in the equation are expressed as a function of the longitudinal gradient. It is shown that the reference position and its temperature rise can be predicted by modifying the existing equation for a horizontal tunnel under forced ventilation.

Shiko Keisuke	Mieko Kumasaki	Investigation of a method for predicting the burning rate of black powder using Machine learning with measurement data of hemp charcoal	Charcoals have many parameters to influence burning rates of their black powder. The variety causes difficulty in the prediction of parameters. This study aims the prediction of the burning rate of black powder by using machine learning with charcoal parameters. As a result, the neural network obtained a prediction accuracy of 0.79 for coefficient of determination and 0.68 for Mean Square Error . A decision tree provided high accuracy rates for both binary classification and multiclass classification.
Shimizu Daisuke	Kameya Takashi	Identification manual based on reliability evaluation of Automated Identification Analysis in GCMS-TIM Analysis of Environmental Samples	GCMS AIQS-DB method is expected to be applied to efficient environmental screening. However, differences in identification results may occur when different measuring instruments and analysis software are used, and concerns have been raised about the reliability of analytical results. In this study, we analyzed the effects of GCMS analysis on peak and spectrum identification, searched for automatic identification requirements that are consistent among different analysis software already in use, and examined identification judgment methods that take into account the possibility of misidentification.

Jozuka Wataru	Matsumoto Shinya	Polymorphs of two *N*-alkylated isoindigo dyes	Isoindigo is a reddish dye with a chromophore analogous to indigo. Isoindigo has been investigated as a functional dye for applications in electronic materials. In this study, we attempted to study polymorphism in *N*, *N*'-diethylated isoindigo derivative 1 and *N*, *N*'-dipropylated isoindigo derivative 2. As a result of crystallization, some crystal polymorphs were obtained from 1 and 2, respectively. The thermodynamic and spectroscopic properties of the obtained polymorphs of 1 and 2 were investigated. The results suggested that the introduction of the alkyl groups plays an important role in the observed polymorph occurrence.
Seki Takuya	Tadahiro Shibutani	Simulation of gaseous hydrogen diffusion in the ground and evaluation of odorant	In the diffusion of renewable energy, hydrogen energy is closely related, and efforts are underway to use hydrogen energy in place of city gas in the future. Therefore, CFD simulations are used to compare the diffusion shape of gaseous hydrogen in the ground with that of an odorant, and to evaluate the suitability of hydrogen as an odorant.

Takada michimasa	Ken Nakano	A study on modeling for tree vibration :Can tree vibration be represented by a model-	Trees have a high vibration-damping capability from the environment. In a previous study, when a tree was subjected to free vibration, the more branches and leaves were pruned, the less the tree's vibration was damped, indicating that the branches and leaves act as a "damper". There are two possible reasons for this: one is the "internal viscosity of the branches and leaves" and the other is the "aerodynamic drag of the branches and leaves". The free vibration model of a tree is used to determine which of these factors is dominant for the function of the damper.
Takemoto Keisuke	Mieko Kumasaki	Examination of occupational safety and health issues for people with mental and developmental disabilities using qualitative data analysis and development of risk management methods	The increase in the statutory employment rate of people with disabilities has led to their actual employment rate. However, the understanding of the occupational safety and health has been scarce for persons with mental and developmental disabilities. In addition, some companies are concerned about the lack of the understanding and their safety This study examined the development of developed a risk management tools which managers can use to continuously improve their workplaces and promote diversity and inclusion. Also, this study prepared the points in creating standard operation procedures for persons with disabilities.

TAMABAYASHI Asuka	ARAMAKI Kenji	Variation of Fiber Structure of Degree of Neutralization of Sodium N-Lauroyl Glycinate in Aqueous Media	The effects of degree of neutralization and cooling rate on the fiber structure formed in aqueous sodium N-lauroyl glycinate solution were investigated. Optical microscopy, transmission electron microscopy (TEM), and small-angle wide-angle X-ray scattering (SWAXS) measurements confirmed that the fiber structure formed by the different degrees of neutralization resulted in the formation of a thread-like fiber consisting of repeating lamellar layers and a hollow cylindrical fiber with a thin film, respectively. It was also suggested that the mechanism of fiber growth changes with the cooling rate, resulting in fibers with different widths and lengths.
TAMURA SHOTARO	Kenji Aramaki	Evaluation of mechanical properties for the development of an insertion training model using PVA gel	As a preliminary step toward the development of an insertion training model, this study was conducted to clarify the factors that determine the shape of the force curve obtained from a physical cross-linked gel of PVA by performing an insertion test on the sample. As a result, it was found that the shape of the force curve varied depending on the gelation conditions, such as solvent type and gelation temperature, and experimental conditions, such as needle shape and insertion speed, indicating that the shape can be controlled for model development.

Deguchi Yumiko	Akihiko Ito	Preparation of Ce^{3+}-doped Al_2O_3–Gd_2O_3 thick film phosphors using chemical vapor deposition and their luminescence properties	μm-Thick scintillators are required for selective detection of α-ray in a field of high β-ray and γ-ray background such as nuclear facilities. Laser-assisted chemical vapor deposition (LCVD) method can directly grow μm-thick crystalline films. Oxide materials based on Al_2O_3–Gd_2O_3, such as $GdAlO_3$ (GAP), $Gd_3Al_5O_{12}$ (GAG), and $Gd_3Al_2Ga_3O_{12}$ (GAGG) are expected as scintillator materials for high radiation stopping ability because of their high densities. Ce^{3+}-doped phosphors show fast decay due to 5d–4f allowed transition. In the present study, we prepared Al_2O_3–Gd_2O_3 based Ce^{3+}-doped oxide μm-thick films using LCVD method and evaluated their photoluminescence and α-ray induced scintillation properties.
Nakai Taichiro	Shinya Matsumoto	Polymorphs of Chlorinated Diketopyrrolopyrrole Derivative with a Pentyl Group at the *N* Position	The polymorphism of organic dyes and pigments has a significant impact on their application in the solid state. In this study, we have synthesized chlorinated diketopyrrolopyrrole (Cl-DPP) derivatives with a pentyl group to the *N*-position and explored their polymorphs. Two polymorphs were obtained by crystallization, one of which showed dynamic behavior upon heating accompanied by a phase transition. The three polymorphs showed differences in molecular and crystal structures, such as the molecular conformation of the pentyl groups and the number of asymmetric units.

Nakada Kakeru	Hoshino Yujiro	Synthesis of Benzodioxole from 2-(Hydroxydiphenyl)phenols by Photodedox Catalysis Using TXT	Benzodioxole is a compound in which a methylenedioxy group is bonded to the benzene ring, and is in general synthesized by alkylation of catechol under strong acid conditions. The benzodioxole skeleton is found in many natural products and has not been synthesized using organic photoredox catalysts. In this study, we investigated the TXT-catalyzed reaction of 2-(hydroxydiphenylmethyl)phenol under visible light irradiation, with the aim of developing a synthetic method for benzodioxole under mild conditions.
Nakamura Shunta	Hondo Hiroki	Local socio-economic effects of geothermal binary power generation	The purpose of this study is to evaluate the socioeconomic effects that will occur within the region where the geothermal binary power plant is located. By using the Renewable Energy Focused Input-Output model for Region (REFIO-Region), we estimated the socioeconomic impacts inside and outside the region over the life cycle of geothermal binary power generation. This clarified the socioeconomic effects of the introduction of geothermal binary power plants on the local economy and industry.

Nunomura Yuto	Aramaki Kenji	OCT in-situ observation of the external shape change during sintering of 8YSZ laminates	Density non-uniformity and anisotropic firing can cause cracking and deformation of ceramics. Anisotropic firing of non-uniform density compacts may cause complex deformation, but the shrinkage behavior has not yet been clarified. Therefore, using a laminate with different densities at the top and bottom as a model of a molded object with non-uniform density, we observed the external and internal changes when the object was fired by unidirectional heating from the bottom using OCT. It was found that the density after firing differed by changing the firing method.
Nohara Shoya	Yujiro Hoshino	In Situ Generation of ortho-Quinone Methides by Organic Photoredox Catalysis and [4+2] Cycloaddition Reactions	Organic photoredox catalyzed oxidative generation of o-quinone methides (o-QMs) for inverse-electron-demand [4 + 2] cycloaddition has been developed. One-electron oxidation of 2-(phenyl(phenylsulfanyl)methyl)phenol catalyzed by thioxanthylium salt under the irradiation with green light generated o-QMs, which reacted in situ with various styrenes to furnish 2,4-diarylchromanes with high regioselectivity. This reaction provides a powerful means of producing o-QMs and synthesizing diverse 2,4-diarylchromanes by a one-electron oxidation process under mild green light irradiation.

Hashimoto Yuka	Ito Akihiko	Preparation of free-standing HfO_2 films using laser chemical vapor deposition	Free-standing ceramic films are potential scintillator for X-ray imaging and HfO_2 is a candidate material because of high stopping power. However, transparent free-standing ceramic films without large cracks or voids were rarely prepared. Laser-assisted chemical vapor deposition (LCVD) method can deposit coatings with controlling crystal microstructures by synthesis conditions. In the present study, I have investigated the effect of deposition conditions on preparation of free-standing Eu^{3+}-doped HfO_2 transparent films.
Hase Kento	Ken Nakano	The super-low ice-adhesion mechanism of concentrated polymer brushes: in-situ observation and mechanical measurement of ice adhesive interface	Techniques preventing icing and ice accumulation on surfaces are required to solve snow and ice-induced accidents and disasters. This study aimed to investigate the potential of a new anti-icing polymer material: concentrated polymer brushes (CPB). The rupture process of the ice adhesive interface was monitored by a homemade ice adhesion-strength measurement apparatus coupled with a video camera. The results showed that the CPB system exhibited very low icing force with no cohesive breakdown of the ice-adhesive interface. From the experimental verification, it was concluded that the ice-adhesive characteristics of CPB are dominated by a viscous fluid layer, which is presumed to be antifreeze water.

Hirata kodai	Shibutani Tadahiro	Analytical study on the determination method of material parameters and the effect of shear stress in the GTN model	In cases where shear stress is dominant under multiaxial stresses, such as in out-of-plane bending tests of elbow pipes, conventional evaluations based on accumulated equivalent plastic strain may not align with actual measurements. Consequently, analysis using GTN and extended GTN models were conducted . Experimental results were compared to examine the validity of determining material parameters, and discussions based on Lode parameters were undertaken to verify the necessity of introducing the shear GTN model.
Fujita Ikuma	Amemiya Takashi	Effects of HIF on glycolytic oscillations in HeLa cervical cancer cells	We aimed to investigate the effect of hypoxia-inducible factor HIF on glycolytic oscillations by hypoxia treatment of HeLa cells. Glycolytic oscillations were observed in many cells in hypoxic compared to normal oxygen concentrations. The cause was thought to be an increase in expression of the lactate transporter MCT4 mediated by HIF associated with hypoxic culture. Since HIF is involved in malignant transformation of cancer, if the increased expression of MCT4 is found, it will be possible to show the relationship between glycolytic oscillation and malignant.

Funaki Maki	Aramaki Kenji	on the Structure and Properties of Hydrogels Prepared by Surfactant-mediated Gelation	Low-molecular-weight gelators (LMGs) form physical gels by non-covalent bonds which have reversible sol-gel transition and responsiveness to various stimuli. Organogelators such as 12-hydroxyoctadecanoic acid (12-HOA), typical LMGs, are insoluble in water and cannot form hydrogels. However, hydrogelation with 12-HOA is possible by the help of the surfactant solubilization function, which is called the surfactant-mediated gelation (SMG). SMG hydrogelation with glutamic acid-based organogelators, N-lauroyl-L-glutamic acid dibutylamide (LGD) and N-2-ethylhexanoyl-L-glutamic acid dibutylamide (EHGD), were also reported. In this study, we compared the differences in structures and properties of SMG hydrogels prepared by 12-HOA and LGD-EHGD.
Munakata Yu	Nakano Ken	Visualization of the contact surface and force measurement for objective estimation of tactile sensation	The tactile sensation when doing skincare is an important characteristic that significantly influences consumer satisfaction, however, it lacks objectivity. In this study, I aimed to understand the mechanical phenomena during skin contact to facilitate the objective estimation of tactile sensation. Using an apparatus developed independently, we confirmed that the real contact area increased during contact retention, and the dynamic friction coefficient during sliding increased linearly with the ratio of the increase in it. By comparing these findings with sensory evaluations, we identified the potential of the increase in the real contact area ratio as an objective indicator of the sensation of moisturization.

Morita Yuzuki	Takashi Amemiya	Glycometabolism oscillations and leptin secretion in white adipocytes	Leptin, secreted by white fat cells, is an important hormone that suppresses appetite, but the detailed secretory mechanism is still unknown. In pancreatic beta cells that secrete insulin, oscillations in glucose metabolism and insulin secretion are linked via Ca2+. Since ATP and Ca2+ are involved in leptin secretion and leptin oscillations have been observed, although unclear, we hypothesized that the secretory mechanism of leptin is similar to that of insulin. In this study, we aimed to observe glucose metabolism oscillations in white adipocytes and to clarify the relationship with leptin.
Yamashita Temma	Mieko Kumasaki	Research on Improvement of Moisture Resistance of Magnesium for Fireworks by Surface Treatment	A new surface treatment agent for fine magnesium powder for smoke fire was examined. A fluorocarbon polymer was selected as the surface treatment agent, and a coating was performed to adhere to it. As an evaluation, water resistance evaluation and flammability evaluation were conducted. In the former, the treated samples showed improved moisture resistance and resistance to oxidizing agents. In the latter, the combustion rate was measured and confirmed that the combustion rate was sufficient. Through this study, we aimed to acquire knowledge about the surface treatment of magnesium and its effects.

YOKOYAMA KODAI	ARAMAKI KENJI	Phase invertion temperature of emulsion system with Diisostearyl malate	In this study, three components of the water/nonionic surfactant/diisostearyl malate system were studied to evaluate the interfacial chemical positioning of diisostearyl malate. Experiments included visual observation and electrical conductivity measurements. We found that (1) the HLB temperature increases with the use of mixed surfactants, and (2) the range of increase depends on the type of surfactant in the mixture.(1) The surfactants with lower HLB values dissolve more on the oil phase side. As a result, the solubility of the mixed surfactant in the NHLB-THLB graph is considered to be higher than pure surfactant. (2) The lower the HLB value of the mixed surfactant, the larger the temperature shift.
yokoyama ryotaro	Hoshino Yujiro	One-Electron-Oxdative Generation of ortho-Quinone Methide via Organic Photoredox Catalysis under Visible Light Iradiation and Their Application to Michael Addition	ortho-Quinone metides are highly reactive synthetic intermediates used in a variety of reactions. In recent year, several studies have focused on the development of methods for the synthesis of these intermediates under mild conditions without the use of strong acids or ultraviolet light. In this work, we report on a green light-driven Michael addition reaction via ortho-quinone methides catalyzed by thioxanthylium-based organophotoredox catalysts.The photoredox catalytic system presented herein offers a novel approach to the formation of ortho-quinone methids, achievable under mild reaction conditions utilizing a green light source.

Yoshizawa Hayate	Fujii Makiko	Elucidation of Formation Mechanism of Secondary Ions by Gas Cluster Ion Beam Irradiation	Understanding the formation mechanism of secondary ions is essential to achieve a drastic sensitivity enhancement of secondary ion mass spectrometry (SIMS) measurements using Ar gas cluster ion beam (Ar-GCIB). The objective of this study was to elucidate the formation mechanism of secondary ions in Ar-GCIB SIMS. The influence of the matrix on the ionization process was discussed by comparing the sensitivity change due to the addition of different matrices. As a result, a mechanism was proposed that the matrix acts with the cationization agent to promote the release of cations, which in turn promotes the formation of secondary ions.
Watanabe Hayato	Takashi Amemiya	Relationship between Glycolytuc Oscillations and Malignancy in Pancreatic Cancer Cells	Using two pancreatic cancer cell lines that differed in terms of malignancy, I attempted to link the relationship between glucose metabolism oscillations observed in cancer cell metabolism and malignancy. While both pancreatic cancer cell lines showed oscillations in a specific culture environment, the rate of oscillation differed between the two cell lines. Further validation of the experimental results by mathematical modeling suggested that pancreatic cancer cells may be more malignant the higher the activity of glucose uptake, which is essential for glucose metabolism.

SUN SHUQI	SHUSA YOSHIKAZU	The Influence of Social Capital on the Process of Female Entrepreneurship	In order to investigate the mechanism by which Chinese women entrepreneurs break through the gender-based constraints of lacking social capital, the definition and classification of social relational capital are clarified, and Strength of Weak Ties theory and Structural Hole theory are used as the theoretical basis for the study of Chinese women entrepreneurs through case studies. The impact of the bonding and bridging type of social relational capital on women's entrepreneurial process is discussed through case studies of three women entrepreneurs in China.
BAI DONGLIN	Takeshi KOBAYASHI	Method of estimating the level of residual contamination during operation and soil vapor extraction of volatile organochlorine compounds	If high concentrations of soil contamination by volatile organochlorine compounds (CVOCs) are left uninvestigated, CVOCs can deeply penetrate the soil and aquifers, lead remediation to be more difficult. We desire to investigate the high-concentration area without leaving it unattended, and to clean up the high-concentration contamination as soon as possible. Soil vapor extraction (SVE) can clean up contamination in unsaturated layers with low cost, but it is expensive to investigate the pollution level by boring test, and it is difficult to grasp the residual pollution level during operation. Therefore, in this study, we were able to propose a prediction formula that can estimate the residual contamination level in the soil with a probability of 86% in the range of 1/3～3 times using information such as the concentration of suction gas during operation and during purification in SVE to worsen the high-concentration contamination of the unsaturated zone and reduce the remediation cost.