List of Dissertation Abstract　(Department of Artificial Environment)

Name	Supervisor	Title	Abstract
YAN CHUYUE	Endo Satoru	Energy consumption forecast and low-carbon scenario construction for residential and transportation sectors in a medium mountain area	Depopulation and aging are becoming more and more serious in Japan's mountainous village areas. In order to minimize the environmental burden in rural areas and to solve social and environmental problems in an integrated manner, low-carbon scenarios were developed in Hidakagawa Town, Wakayama Prefecture, taking into account the consolidation of scattered depopulated villages, a migration measure, and energy-saving measures such as energy-saving renovations, solar
ZHAN GZIWEI	SHUSA YOSHIKAZU	The Impact of Knowledge Absorptive capacity on the Overseas Expansion of Chinese Unicorn Firms	Knowledge is an important resource for economic development and an important resource for firms to maintain their competitive advantage. This paper summarizes previous research on knowledge absorptive capacity, factors affecting knowledge absorptive capacity, and the relationship between knowledge absorptive capacity and firm innovation outcomes. Next, we summarize the characteristics of overseas expansion and the role of knowledge absorptive capacity factors for traditional manufacturing firms. Through interviews, we will gather information for the current study and analyze whether factors at different stages of overseas expansion play a commensurate role. According to the results, the influencing factors of knowledge absorptive capacity of Internet unicorn firms in the pre-, mid-, and late stages of overseas expansion are mainly developed from five influencing factors: firm's existing knowledge, employee training and institutional support,organizational structure, firm's change attitude, and external support.

AIDA Takuya	FUJII Makiko	The chemical-structure analysis for polyol esters using sub-critical fluid decomposition	In this study, the chemical-structure analysis method for functional molecules using sub-critical fluid decomposition was evaluated. The polyol esters with undisclosed chemical structure and composition were used as model samples. From the obtained mass spectra, the formulation of fatty acids and polyols used for the synthesis of these polyol esters could be identified. In addition, the chemical structure of the molecules contained in the model samples could be determined by the combination of fatty acids and polyols. As a results, it was revealed that the sub-critical fluid decomposition as a preprocessing for mass spectrometry enable us the precise chemical structure analysis.
Aoki Yusuke	Shiraishi Toshihiko	An experimental study of force field control under water by acoustic holography for ultrasound therapy	Recent studies reported that Low intensity pulsed ultrasound (LIPUS) stimulation could have effects on various disease. However, conventional devices cannot control force field. For promoting the healing effect or advanced therapy, acoustic holography providing desired force fields should be used for LIPUS. However, acoustic holography cannot form arbitrary shaped force fields and hasn't used in vivo and underwater for therapy. In this study, therefore, we designed a simple force field forming device under water and evaluate its performance experimentally. The experimental result indicates the possibility that acoustic holography can form effective shaped force field for therapy.

Abe Tetsuya	Hondo Hiroki	Impacts of different heat consumers and regions on CO_2 emissions of woody biomass heat supply systems	To mitigate global warming, there are expectations for wood biomass as energy sources that can contribute to the low-carbonization of the heat sector. The aim of this study is to provide information for technology selection by comparing and analyzing the CO_2 emissions of district and individual heat supply using wood biomass. The results of the estimation suggest that small-scale consumers may be suitable for the introduction of wood biomass district heating systems, as the advantages of heat source equipment consolidation are greater than the disadvantages of circulating pump power consumption.
Igosawa Tatsuki	Matsumiya Masahiko	Recovery of tungsten compounds from spent tungstophosphate catalyst by hydrometallurgy	A novel hydrometallurgical process involving leaching, precipitation, solvent extraction (SX) using phosphonium-based ionic liquids (ILs), and crystallization stripping was developed in this study. Alamine336 and phosphonium-based ILs were used as the extractant and the diluent, respectively. A series of hydrometallurgical process enabled us to conclude that small amount of PO_4^{3-} was separated and W(VI) was efficiently recovered from the spent tungstophosphate catalyst. In addition, the related thermodynamic result indicated that the positive enthalpy for W(VI) and favored the endothermic nature of the extraction and stripping reaction.

Ishida Miwa	Matsumoto Shinya	Crystal morphology of a bisazomethine dye	The crystals of a bisazomethine dye called DE2, a kind of functional dye, were found to exhibit a reversible single-crystal phase transition at around 430 K with a reversible dynamical behavior. The crystal of DE2 was also known to exhibit a variety of crystal shapes such as platelets, needles and prisms. This work was devoted to investigation of the relationship between crystallization conditions and crystal morphology of DE2 crystals. I found 6 unusual-shaped crystals of DE2 from different crystallization conditions. The observed unusual-shaped crystals were also analyzed by using X-ray crystallography and they were all characterized as the same crystal phase of the reported room temperature phase of DE2.
Iwamoto Chisaki	Oka Yasushi	A new model to predict density jump position of ceiling-jet and attenuation of ceiling-jet temperature in tunnel fires	A model tunnel fire experiment was conducted to propose a prediction formula that can consider the effect of the not only the cross-sectional shape but also the heat release rate for the density jump position, which is the starting point of the normal flow area of the ceiling-jet that occurs during a tunnel fire. Then, this prediction formula was introduced as a reference position of the simple temperature attenuation formula, and the attenuation formula was made into a closed equation system.

UETA RYOHEI	SHIRAISHI TOSHIHIKO	Study of the Effect of Mechanical Vibration on the Migration of Cultured Osteoblast	The contents of the cell's dynamic sensing mechanisms are unknown. The same is true for osteoblasts, whose mechanism for promoting bone formation in response to mechanical stimuli is unknown. In a previous study, when vibrations are applied, the cells become multilayered, unlike normal monolayer growth, and can be cultured in large quantities. To elucidate the mechanism, we focused on cell migration and performed a single Wound healing assay and found that the migration speed of the group subjected to vibration was slower than that of the control group. In this study, reproducibility was examined, but this was not found, and no difference in speed was observed between the two groups. In the future, it is necessary to change the vibration conditions and the movement indexes of interest.
Usuki Kyoshiro	Kumasaki Mieko	Synthesis of ferrocene derivatives with flame retardant structures and evaluation of their fire suppression effects.	The number of fire fatalities is expected to increase in Japan, where the population is ageing, and there is a need for high-performance fire extinguishing agents for fire extinguishers that contribute to achieving initial fire extinguishing. This study aimed to improve the combustion-suppressing effect by adding a flame-retardant structure to the ferrocene, a metal complex. The synthesis of the target substance was confirmed using analytical equipment and its performance was evaluated using the filter paper combustion method and the cup burner method. The results showed that the substance did not have a fire suppression effect.

Umebori Mizuki	Ito Akihiko	Synthesis of AlCrN hard coatings using chemical vapor deposition	Cubic AlCrN (c-AlCrN) has excellent mechanical properties and oxidation resistance, and thus c-AlCrN coatings on cemented carbide tools improve tool performance and reduce material comsumption. In the present study, AlCrN-based films were synthesized on cemented carbide substrate using chemical vapor deposition and their phase composition, microstruture, and mechanical properties were studeid.
Okamura Riku	Shiraishi Toshihiko	Vibration Suppression by Variable Stiffness Device Using Magnetorheological Grease	We investigate a control law to realize variable stiffness by using the shear-type magnetorheological (MR) grease device. MR grease changes its own apparent viscosity depending on applied magnetic field. Variable stiffness device enables vibration suppression by changing structural natural frequencies according to the vibration condition. In this study, using the shear-type device which has a very wide dynamic range, we propose a control law to realize variable stiffness. Furthermore, we experimentally investigated the effect of the variable stiffness, especially the negative stiffness with the control law using a one-DoF small structure.

Kawamura Yuka	Oya Masaru	Good tactile sensation and physicochemical properties of foaming hand soap	In recent years, there has been an increasing need for body cleansers to improve the feeling of use, such as the tactile feel of the foam, so it is necessary to evaluate these foams correctly. Therefore, in this research, in order to find out what kind of feeling is preferred by people when comparing products with good "foaming", we focused on foaming hand soap and conducted an experiment to establish a quantitative evaluation method for foam. gone. Structural covariance analysis was used to uncover the complex components of foam tactile feel and to explore correlations with physicochemical test measurements.
Kitadani Hoshito	Tanaka Yoshimi	Frictional force measurement of a metal wire sliding in a circular channel using hydrogel	Soft tubes made of dry materials such as plastic, rubber, and elastomer are widely used as practical products. On the other hand, hydrogel tubes as wet materials are known to achieve much lower friction than dry materials. In this study, we measure the frictional force due to the line contact of a metal wire sliding in a channel with a complicated shape in cylindrical hydrogels prepared under various gelation conditions, and clarify the relationship between the gelation conditions and the frictional force.

Kinoshita Ryoma	Matsumiya Masahiko	Ion-pairing extraction and their reaction modeling of anionic M-Cl species with cationic NTAamide(C6) extractant	Solvent extraction is conducted using a total of 20 di-, tri-, and tetravalent metals, revealing high stability constants with Cl^- and the *N,N,N′,N′,N″,N″*-hexahexyl-nitrilotriacetamide (NTAamide(C6)) extractant. Most of the metal ions in this study display higher distribution ratios (D(M)) from HCl than those from HNO_3, although NO_3^- hardly forms metal-complexes, and exhibit 1:1 stoichiometries with NTAamide, based on the slopes of acid and metal extraction. Following the experimental results, the association constants and distribution coefficients of the group 12 elements Zn^{2+}, Cd^{2+}, and Hg^{2+} are calculated via ion-pair extraction modeling using DFT calculations. and the simulations of D yield calculated values with the same trend as that of the measured values.
Koizumi Katsuhiro	Aramaki Kenji	Media effect on fiber formation in surfactant-mediated gelation method	Previous studies have reported that hydrogels can be formed using surfactant molecular aggregates and low-molecular-weight organogelators. The purpose of this study was to investigate the change of fibers caused by changing the gel medium. As a result, differences were confirmed in the formation process of gel fibers and the characteristics of fibers such as length, thickness, and number of fibers. In addition, it was confirmed that the correlation of the sol-gel transition temperature is reversed in the gel with the cubic phase as the medium.

Kosuge Tonan	Ito Akihiko	Preparation of $MgWO_4$ films using chemical vapor deposition and their luminescence properties	Metal tangstates is used as phosphors and scintillators. Magnesium tungstate ($MgWO_4$) is a promising scintillation material; however, reported values on scintillation light yield are smaller than expected value. It might be due to phase transition or contamination during melt-solidification process. In the present study, $MgWO_4$ films were prepared by chemical vapor deposition and their photo- and radio-luminescence properties were studied.
Kondo Yuhei	Shibutani Tadahiro	Analysis of Fracture Behavior of Nuclear Piping under Seismic Loading	The safety of nuclear power systems must be further enhanced in the future. Among the many factors that contribute to accident risk, we will focus on nuclear piping and elaborate material properties up to the point just prior to rupture in order to accurately evaluate the ultimate event that exceeds the design limit. For this purpose, we aim to improve the accuracy of the analysis of piping systems by conducting tensile tests using specimens cut from the pipes and applying the true stress-strain diagram up to the rupture to the analysis.

Saiki Ayaka	Oya Masaru	Removal mechanism of mud, wine, and curry stains and evaluation of cleaning power	Stain removal is widely used in households. However, few studies have numerically or chemically investigated which cleaning method is best. In this study, we focused on three types of difficult-to-remove stains: mud, red wine, and curry stains, which have different properties. The data were quantified by calculating the cleaning rate from the stained cloths before and after cleaning, and the cleaning power was evaluated for each condition. Furthermore, we investigated the mechanism of stain removal and effective cleaning methods for each stain.
Sato Masaya	Miyake Atsumi	Estimation of heat of formation for chlorosilanes based on group additivity values obtained by machine learning	The aim of this study is to extend group additivity methods to Si-H-O-Cl containing species. Heats of formation for small silane compounds were obtained using quantum chemical calculation, and groups of each compounds were counted. These were used as training data and the group additivity values (GAVs) were determined by machine learning. To validate GAVs, comparison between estimated heats of formation and quantum chemical calculation results was conducted, with estimated results and quantum chemical calculation results showing good agreement. Heats of formation for large silane compounds containing Si-H-O-Cl were estimated based on GAVs.

Shigemura Meguru	Endo Akira	Regional Impact of Japanese Prefectural Capitals on Technological Diversification: Quantitative Analysis Using Patent Data	With economic globalization and the shift to a knowledge economy, there is a demand for the development of knowledge economy centers. While large cities are attracting attention as leading cities, autonomous development of local economies in small and medium-sized cities is also an issue. Using Japan as a case study, we conducted a quantitative analysis of the impact on technological diversification among multilayered centers using patent data, suggesting that knowledge spillovers and technology transfers from wide-area knowledge economy centers may support technological diversification in local centers.
Shinato Tomoya	Shiraishi Toshihiko	A Study of a Force Field Control Algorithm by Acoustic Holography for Ultrasound Therapy	We focus on phased array transducers (PATs) to render force fields and realize the improvement in medical equipment to enhance this therapy. This can both render an arbitrary acoustic field and quickly change it by controlling the output and phase of each transducer. We propose a novel algorithm to control PATs at many and close control points in this research. We compare the proposed algorithm with previous ones and assess the avoidance of negative effects outside the target area. The findings show that the proposed algorithm achieves both excellent reconstruction performance and low computational cost, and it can render an acoustic field sufficient to prevent negative effects on the body.

Shima Tomoki	Kobayashi Takeshi	Development of a virtual safe and purification-enhancing technology for high-concentration organic chlorinated compounds infiltrated in clay through heating	Soil and groundwater pollution caused by volatile organic chlorinated compounds (CVOCs) is potential in tens of thousands of locations in Japan. When high concentrations of CVOCs infiltrate deep into clay layer, purification becomes extremely difficult. Even if the aquifer adjacent to the contaminated clay layer is purified below the environmental standard, sites with rebound pollution are revealed, making it difficult to determine when the purification is completed. This study examined a purification-enhancing method using high-temperature heating. In addition, we proposed a concept of practically safe purification completion judgment that does not spread contamination to the surrounding environment even if rebound occurs.
Shimizu Sae	Oya Masaru	Analysis of enzyme effectiveness against denatured protein stains by probability density functional method	Proteins are denatured when exposed to high temperatures, acidic or alkaline conditions, or when other substances are added. Denaturation refers to the breakage of non-covalent bonds necessary to maintain the regular three-dimensional structure of proteins, resulting in a change to an irregular structure. Proteolytic enzymes are effective against denatured protein stains that are difficult to clean with surfactants. However, the extent to which proteolytic enzymes contribute to stain removal has not been clarified. In this study, we analyzed the effectiveness of enzymes on denatured protein stains using the probability density function method, and attempted to quantify the detergency of enzymes.

Shimosako Shinpei	Shibutani Tadahiro	Investigation of weight reduction and optimization of safety factor for Type-3 cylinders using high modulus carbon fiber	Type-3 containers have a structure in which the metal container is reinforced by wrapping carbon fibers around the circumference and axial direction. The characteristics of the product are light and strong, but further weight reduction and an excessive safety factor are issues to be discussed. In this study, I will select new materials focusing on the modulus of elasticity of carbon fiber. Then, a test production of the cylinder and stress analysis using the finite element method were conducted. In the examination of the results, we will select the most appropriate material for the cylinder design, and will study the possibility of achieving the weight reduction and optimization of the safety factor of the cylinder.
Sunohara Takumi	Shiraishi Toshihiko	A Study of Source Separation of Noise in Mixture and Its Control by Neural Networks	Active noise control forms a quiet area by superposing the wave of anti-phase and same amplitude as noise. However, its system alone reduces not only noise but also target sound. To solve this issue, we proposed a noise control system combined with a sound source separation system. By using neural networks, the proposed system may control following the movement of the evaluation point. For that reason, we verified its performance through the experiment. The results show that noise is reduced by 5 to 6 dB also at moving evaluation point.

Takata Shungo	Fujii Makiko	Evaluation of migration of phthalates with DIP-IA/MS	It is known that Phthalates have the nature of migration caused by contact. In this study, the PVC films, to which Phthalates migrated under the different condition of temperature and time, were measured with DIP-IA/MS, and the difference of migration property was evaluated. As a result, it was found that the peak shape of mass chromatogram changed depending on the shape of samples. Besides, it was revealed that the migration property was strongly affected by the chemical structure of phthalates. The method proposed in this study enabled the qualitative and quantitative evaluation of phthalates migrated into PVC film.
Taguchi Jun	Hondo Hiroki	Analysis of Life Cycle CO_2 Emissions for Next-generation Greenhouse Horticulture and Its Reduction Potential	Currently, next-generation horticulture, which is stable and highly productive and utilizes renewable energy sources, is attracting attention, but its life cycle CO_2 emissions have not been fully evaluated. Therefore, the purpose of this study was to reveal the LC-CO_2 emissions of next-generation horticulture and its reduction potential. Using a tomato production system as an example, LC-CO_2 emissions were estimated by using the process analysis and the I/O analysis, and its reduction potential of the use of wood chips for heating was also analyzed.

Tanaka Yuuki	Aramaki Kenji	Hydrogels Formed By Nanoemulsion Mediated Gelation Method	Nanoemulsion mediated gelation method in which a low molecular weight organogelator is dissolved in a nanoemulsion instead of micelle to form a hydrogel can be used with a wide variety of materials, regardless of molecular size. Therefore, the aim of this research is to optimize the conditions for gel formation in the nanoemulsion mediated gelation method and to elucidate the microstructure of the gel. In this study, optimal homogenization time, rotation speed, and cooling speed were established based on the results of visual observation, optical microscopic observation, and particle size distribution measurement. It was also suggested that the less soluble the gelling agent is in the oil, the more uniform the gel may form.
Taniguchi Yoshimi	Nakano Ken	Experimental extraction of viscoelastic components in rubber friction	Rubber is often used in products closely related to friction, such as tires, oil seals and shoe soles. In rubber products, it is extremely important to control hysteresis friction. In order to understand and control hysteresis friction based on dynamics, I conducted friction tests under lubrication, and developed a method to extract hysteresis friction from rubber friction by using the foundation theory and the lubrication theory. In addition, I verified the validity of the extracting method by comparing it with the foundation theory.

Nakajima Kota	Nakano Ken	Mechanism of increase in friction force for brake materials under semi-dry conditions	Understanding the mechanism of increase in friction force under semi-dry condition is important for the quiet operation of automobiles. Therefore, we do in-situ observation of the friction surface by the frustrated total internal reflection and force measurement simultaneously. The results showed that under semi-dry conditions, clustered particles are moved into the contact surface and gathered at the center of the contact surface with increase in frictional force. I predict about mechanism of increase in friction force under semi-dry conditions, clusters of particles enter the contact surface and generate drag force between the two contact surfaces.
Nakajima Kohei	Ito Akihiko	Preparation of Lu_2O_3–MgO composite films using chemical vapor deposition	Compounds in Lu_2O_3–MgO systems possess excellent optical and mechanical properties. Although Lu_2O_3–MgO composite material would have ordered microstructure, which is associated with eutectic nature of the system, there are few studies on the preparation of Lu_2O_3–MgO composites. In the present study, Lu_2O_3–MgO films were prepared using laser-assisted chemical vapor deposition, and the effects of deposition conditions on crystalline phase and microstructure were investigated.

Nakata Keisuke	Miyake Atumi	Prediction of dynamic behavior during abnormal reactions by chemical process modeling using complex physical domain modeling	Chemical reaction processes are designed to cause reactions that produce desired results. However, temperature changes and other factors can cause abnormal reactions such as runaway reactions and unexpected events that may lead to accidents. Therefore, it is important to model chemical reaction processes with various physical domains and predict accident scenarios. In this study, we incorporate chemical reaction information obtained from reaction kinetic analysis and quantum chemical calculations into the complex physical domain model we have constructed, and contribute to the prediction of dynamic behavior when abnormal reactions occur.
Nakamura Miku	Kumasaki Mieko	Electrochemical oxidation of triazoles with ammonium nitrate as electrolyte	As a result of electrolytic oxidation of 3-amino-1,2,4-treiaozle using ammonium nitrate as electrolyte, and the resulting crystals were identified, we succeeded in synthesizing 3-amino-1,2,4-treiaozle nitrate and elucidating its crystal structure. Therefore, it was suggested that electrolytic oxidation using ammonium nitrate as a support electrolyte is effective for the synthesis of energy substances with lower environmental impact and their structural elucidation.

Nakamura yuuki	Endo Akira	Cost-effectiveness of urban heat island countermeasures Study on the relationship between regional characteristics and the introduction of countermeasures	Recently, rising temperatures, especially in urban areas (heat island phenomenon), have become more pronounced. In this paper, a cost-benefit analysis is conducted based on the energy reduction effect of heat island countermeasures and the cost of introducing the countermeasures, and regional characteristics of heat island countermeasures are examined based on differences in cost-benefit analysis between sites with different weather conditions and geographical characteristics (Osaka Prefecture and Los Angeles). As a result, it was found that although the cost-benefit analysis for the city as a whole was greater in Osaka Prefecture, the effects of heat island countermeasures were more readily apparent in Los Angeles.
NISHIGUCHI HARUKI	NAKANO KEN	Analysis of abnormal noise of mechanical seals based on dynamic stiction theory	In order to elucidate the mechanism of the abnormal noise generated when rotating the mechanical seal, we created a physical model of the mechanical seal, conducted numerical analysis, and grasped the characteristics of vibration. Offset is taken into consideration for the model. Dynamic stiction theory is used for the model. The theory is a theory that there is always a slight angular deviation between the rigid main shaft and the driving direction. I found that a large vibration occurred in the direction opposite to the offset direction and that the waveform of frictional vibration had speed characteristics. I obtained the parameter conditions that can suppress the vibration.

Nishida Masaki	Amemiya Takashi	The role of mitochondria in glycolytic oscillations	Conventionally, it has been thought that the reaction of glycolytic oscillations in cancer cells occurs only in the glycolytic system without mitochondria because of Warburg effect. However, in recent research, cancer cells drive mitochondrial metabolism to obtain energy and metabolite, and we do an experiment how the metabolism in mitochondria affects glycolytic oscillations. It was suggested that the NADH shuttle on the mitochondrial inner membrane contributes to glycolytic oscillations.
Hirayama kanji	Endo Akira	Cost-benefit analysis of urban heat island countermeasures for Osaka Prefecture	The Ministry of the Environment and local governments are increasingly promoting heat island countermeasures, and there is a need to evaluate the effects of heat island countermeasures. We evaluated the reduction in energy consumption and human health hazards due to the effect of temperature reduction, as well as the reduction in energy consumption due to changes in the indoor environment, using rooftop hyper-reflection, rooftop greening, and rooftop sprinkling as evaluation targets. As a result, rooftop watering provided the most benefits, with an annual benefit of 31.3 billion yen. Energy consumption was reduced by 10.6 PJ through indirect effects and 1.5 PJ through direct effects. Human health damage was reduced by 2,440 DALYs, resulting in a cost-effectiveness ratio of 11.1%.

Fukazawa Shiori	Endo Akira	Study of intention to switch to Stadtwerke business model and power supply and demand regarding feasibility	We examined the acceptance and feasibility of introducing the German Stadtwerke, a locally produced, locally consumed electric power company, to Japan, as well as the acceptance of local residents. First, a nationwide survey was conducted to ask the factors and reasons for switching to a new electric power company. Then, in Maniwa City, Okayama Prefecture, we conducted a survey of residents related to the local power company and environmental issues, as well as an analysis of electricity supply and demand for households, to examine the feasibility of the project. The results showed a correlation between satisfaction with the local community, environmental awareness, and acceptance, indicating that narrowing the scope of the project would make it highly feasible.
FUKIHARU AKIRA	OYA MASARU	Analysis of removal behavior of oily stains by detergency evaluation system with HPLC	In this study, I constructed a new detergency evaluation system that can observe the removal behavior of oily stains caused using a surfactant by setting the contaminated cloth on which the stains are attached on the flow path of HPLC. With this system, it is possible to evaluate the removal process of stains by dividing it into mechanical factors and chemical factors. In addition, the waveform of the removal behavior can be obtained continuously during the washing process, and it is thought that this system can be used for the kinetic analysis of washing.

MAEDA Yutaro	HONDO HIROKI	Evaluation of Narrative Workshop for Creating Decarbonized Regional Areas: Using Qualitative Analysis Focusing on the Content of Statements	There is a need for citizen-led discussion for the creation of future decarbonized regions, but there are no examples of the development and evaluation of these workshops using the effects of narratives. The purpose of this study is to examine the effectiveness of the narrative workshop attended by university students, focusing on the content of participants' statements. The analysis will use coding to interpret the content of the statements and organize the codes to show the effective factors and interactions that led to the completion of the narrative-type scenarios of the community targeted by the workshop.
Murokasa Yuka	Arataki Kenji	Boosting effect of water based thickeners on gel fiber growth by surfactant mediated gelation method	Surfactant mediated gelation method is a technipue that utilizes the surfactants to solubilize organogelator to form hydrogels. It is thought that increasing the viscosity prevents rapid fiver growth and results in homogeneous formation. Therefore, the purpose of this study is to investigate the boosting effect of thickeners on fiber growth. It was found that the effect of thickener is that the fibers grow slowly and homogeneously, and that the length, amount, and volume fraction are increased. Furthermore, the sol-gel transition temperature increased and minimum gelation concentration decreased.

Yagi Kento	Hondo Hiroki	Life-Cycle economic impacts of an offshore wind farm in Japan	Offshore wind energy has great potential in Japan and it is one of the renewable energy technologies that are expected to be introduced in order to achieve carbon neutrality by 2050. At the same time, this technology is expected to have significant economic benefits among many different industries through installation and operation. Therefore, quantitative information on the economic impact by industry is required to promote the introduction of this technology in the future. This study aims to assess the economic ripple effects over the life cycle of a typical wind farm that is expected to be introduced in Japan in the future. In this study, an Input-Output analysis is conducted using the 2015 I-O table. In addition, we created our own final demand vectors for construction and operation phase based on several literature sources and interview information. This allows for an analysis that reflects the technology-specific cost structure of implementing offshore wind farm in Japan. The analysis resulted in a life-cycle economic ripple effect of approximately 1,020 billion yen. In particular, the direct investment amounted to approximately 660 billion yen, and approximately 360 billion yen was shown to be induced indirectly. It should be noted that the manufacturing and construction stages, approximately 227 billion yen was induced in the upstream of the project for an investment of approximately 176 billion yen. This result suggests the characteristics of the technology, which covers a wide range of related industries.

Yamai Taisei	Ito Akihiko	Preparation of $Mg_2Hf_5O_{12}$ films using chemical vapor deposition and their luminescence properties	$Mg_2Hf_5O_{12}$ has high relative density and large effective atomic number, and thus has potential for scintillator applications. However, since $Mg_2Hf_5O_{12}$ is a incongruent melting compound and difficult to synthesize, there are no reports on single crystal growth or phosphor applications. In the present study, rare-earth-ion doped $Mg_2Hf_5O_{12}$ films were epitaxially grown on c-cut sapphire substrate using laser-assisted chemical vapor deposition and their luminescence properties were studied.
Yamaguchi Takumi	Aramaki Kenji	Hydrogel formation using complex of cationic polymers and low-molecular-weight organogelators	Gels are used in various fields, including pharmaceuticals and cosmetics. The low-molecular-weight organogelator 12-hydroxyoctadecanoic acid (12-HOA) is insoluble in water. However, if its solubility in water is increased, hydrogels can be formed. In this study, we propose a polymer-mediated gelation (PMG) method using the cationic polymer polyethyleneimine (PEI), which forms ionic complex with 12-HOA. The complex can be solubilized in water. The structure of the gel fibers is found to be hollow nanotubes. And, it is suggested that a complex network of 12-HOA fibers and PEI cross-linked is formed.

Yamashita Mao	Kumasaki Mieko	Research on the accuracy improvement for the time constant correction with numerical evaluation process for reaction calorimetry	Reaction calorimeters have heat transfer delays caused by heat conduction within the apparatus and sample. Existing time constant correction methods, which improve the heat transfer delays, have the problem of not being able to determine the time constant during a chemical reaction. A previous study has proposed the method with a numerical evaluation process and this method was shown to be valid when simulated under ideal heat transfer conditions. The purpose of this study is to examine the conditions for applying this theory to real chemical reactions.
YAMADA TAIGA	Otani Hiroyuki	Synthesis, Structure, and Properties of Double-Decker Cyclic Bitroponoid Divalent Transition Metal Ion Complexes	2-Aminotropone, a representative 7-membered ring non-benzenoid aromatic compounds, is a molecular stabilized by the resonance contribution of its polarized structure. I investigated synthesis, structure and properties of double-decker-type dinuclear complexes 1 and 2 prepared from 10-dodecyl-1,8-bis[(2-N-dodecylaminotropon-5-yl)ethynyl]anthracene and divalent transition metal ions. 1 was oxidized with 1.0 or 2.0 equivalents of AgSbF6, and radical cation and dication 1 showed absorption bands in the NIR region. The optical and electronic properties of the dinuclear complexes 1 and 2 will be discussed by comparison with those of the mononuclear complexes 3 and 4.

Ren Zonghan	Ito Akihiko	Preparation of HfO_2–Lu_2O_3 and ZrO_2–Lu_2O_3 films using chemical vapor deposition	The compounds of HfO_2-Lu_2O_3 system are promising materials for scintillators. Although these compounds have fluorite-related structures, there are only a few reports on fabricating these compounds and the effct of the Lu composition ratio on their crystal phases are not well investigated to date. In the present study, we prepared Eu3+-doped HfO_2-Lu_2O_3 films via chemical vaopor deposition and studied the effects of Lu composition ratio on their phase transitions and photoluminescence spectra.
WATANABE KOTA	Miyake Atsumi	Detailed pyrolysis mechanism of ammonium nitrate/chloride mixtures	It is well-known that the exothermic decomposition reaction of ammonium nitrate is promoted by chloride, but the detailed decomposition mechanism has not yet been fully understood. In this study, we aimed to elucidate the decomposition mechanism of ammonium nitrate/chloride mixtures using a detailed kinetic model. Quantum chemical calculations were used to identify the reaction pathways. In the construction of a detailed kinetic model in the condensed phase, we focused on the method of assigning kinetic parameters in concentrated systems such as molten salts, which had been a challenge in previous methods, and worked on parameter calculations using molecular dynamics simulations. As a result, we constructed a model that reproduces the macroscopic properties obtained by experiments well. Using this model, we identified that the reaction pathway of generating N2H4 via NH2Cl, which is specific to chloride mixtures, plays an important role in the decomposition mechanism of the detailed reaction model/chloride mixture system.

Watanabe Taiga	Ito Akihiko	Preparation of rare-earth doped Y_2O_3-based films using chemical vapor deposition and their luminescence properties	Y_2O_3, YAG, and Al_2O_3 are promising material for optical applications. YAG is also known to form composite oxides with Al_2O_3. In the present study, we focused on the chemical vapor deposition method to synthesize Y_2O_3 films and YAG-Al_2O_3 composite films and studied their photo- and radio-luminescence properties.
Watanabe Taiga	Nakano Ken	Stabilization of sliding systems with rotational freedom	In order to obtain a design guideline for stabilizing a rotating 1-DOF sliding friction system, I made a physical model of the system, conduct numerical analysis empirical experiments on the results. Yaw angle misalignment theory was taken into the physical model. It was found that in the case of one point of contact, a damping effect can be obtained due to setting a smaller sum of misalignments caused by the driving direction and the position of the contact point. In a 2-DOF system added translational motion to the 1-DOF system, it is important to consider the combination of misalignments caused by it and the position of the contact point.

Watanabe yuta	otani hiroyuki	Synthesis, Structure, and Properties of Novel Phenyl-Substituted Cyclic π-Extended Thiophene Hexamer	π-Extended macrocyclic thiophenes have large inner cavity and exhibit a unique solid structure. Synthesis of novel phenyl-substituted cyclic tetramers (4T2A-Ph and 4T-Ph) and hexamer (6T3A-Ph) by McMurry coupling reaction was investigated. Tetramers are unstable and it has been difficult to investigate these properties. However, hexamers exhibited morphological changes with color and shape changes depending on the solvent in which they were concentrated. In addition, it was found that crystals strongly incorporated hydrocarbons such as pentane, reflecting the crystal structure with many pores. 6T3A-Ph and 6T4A-Ph have different vinylene numbers, with 6T3A-Ph exhibiting a bowl-shaped structure, and 6T4A-Ph exhibiting a pseudo planar structure.
Wachi Fumika	Matsumoto Shinya	Preparation of crystalline thin films of chlorinated diketo-pyrrolo-pyrrole derivative with a propyl group at the N-position	In a previous study, three polymorphs with different color and physical properties were observed in the crystalline state of a chlorinated diketopyrrolopyrrole derivative with a propyl group at the N-position. In this study, the title dye was thin-filmed using the vacuum evaporation method, and the basic properties in the thin-film state were investigated, and the changes in the properties and crystal structure by external stimulation of the thin-film were examined. As a result, changes in color tone and crystal structure were observed when the thin films were exposed to various solvent vapors and when the thin films were heated.

Riaz Ayesha	Nakai Satoshi	Temporal variation of ambient air pollutants and meteorological influences on their concentrations in Lahore during 2018-2021	This work aims to analyze the temporal and seasonal variation of selected air pollutants in Lahore for four years, 2018–2021. It is needed because there are very few studies in this direction, especially at the city level. The current study can provide deeper insight and understanding of pollution trends and how they change with seasons/environmental conditions as it is related to a specific part of the city and also considers the effect of precipitation. It will also validate dependence of seasonal variation of pollutants on meteorological conditions, presented in previous studies during different durations along with the precipitation effect.
YIN MENGYUE	NAKAI SATOSHI	Evaluation of health effects of long-term OX exposure in Yokohama City based on SOMO35	OX is a kind of air pollutant. Long-term exposure to OX can impair lung function. Currently, Japan's OX environmental standard is set at 0.06ppm or less per hour, and the level of achievement is still extremely low. Based on SOMO35, this study aimed to provide basic information for formulating future pollution prevention measures. I estimated the number of annual deaths that could be reduced if achieved the aim concentration (attributable cases) and its attributable proportion.

WU TONG	Oya Masaru	Development of the Efficient Washing Evaluation System Using UV-Vis Image Analysis	Cleaning is necessary for a wide range of fields, including daily life. Detergency evaluation is essential to quantitatively know how much adhered soil is removed from the object to be cleaned.This study aims to realize more efficient detergency evaluation using image analysis and to expand the applicable object of detergency evaluation by image analysis. Therefore, we considered the combination of image analysis with the mini-scale cleaning test method developed in the previous study. At the same time, we examined the optimal experimental conditions and analysis methods for quantitative detergency evaluation by UV image analysis.
Wan Shengji	Kobayashi Takeshi	A Study of Application Methods and Countermeasures for Sustainable Remediation in Lead Surface Soil Contaminated Land	Using the results of a detailed soil survey at a site contaminated by lead in surface soil, this study not only evaluated the soil contamination by comparing it with the standard values, but also evaluated the risk by assuming various exposure pathways, and established 14 environmental, 4 economic, and 3 social parameters that can be used to quantify the adverse environmental, economic, and social effects of each countermeasure method. The calculation method was determined. Furthermore, this study developed an example of sustainable remediation (SR) evaluation for each remediation method, and proposed a SR method for surface soil contamination based on an application case study.