List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Takeuchi Daiki	Kumasaki Mieko	Clarification of problems and issues faced by local residents in risk communication using KH Coder	Currently, there is an increasing demand for risk communication regarding chemical substances. However, due to restrictions on interactions and security concerns amid the spread of COVID-19, the results of businesses are not being seen. Therefore, in this study, we used KH Coder, a text mining method, to express the interests and concerns of local residents and businesses as objectively as possible. In addition, we also conducted text mining related to government administration to clarify issues and conduct comparative studies.
Desi Listianti	Kasai Naoya	Atmospheric Corrosion Monitoring of Low Carbon Steel with Machine Learning	After developing an atmospheric corrosion sensor based on strain measurement using the relationship between strain and thickness from the material's theory, machine learning techniques were applied to improve the evaluation accuracy of the thickness reduction of a low-carbon steel plate caused by atmospheric corrosion. The monitoring data used in this study is from an experiment conducted on corrosion product testing using an active-dummy Fiber Bragg Gauge (FBG) sensor method. Training data consisted of thickness reduction in a reference test piece and strain values recorded by the FBG sensor before the test piece after being treated with salt water. Multivariate Singular Spectrum Analysis (MSSA) was applied to preprocess data to isolate and eliminate undesirable noise data from environmental factors before processing through machine learning. The strain signals extracted via MSSA were used to create machine learning models, Neural Networks, and Long Short-Term Memory (LSTM), to predict the future corrosion processes and improve monitoring accuracy. The machine learning model’s output errors were reduced when models applied trained machine learning techniques compared to the data monitoring in this study.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Li Xianghui	Amemiya Takashi	Glycolytic Oscillations of Astrocytes in Brain Diseases	Astrocytes produce lactate via glycolysis to supply energy to neurons. Changes in cellular energy metabolism and reactive astrocyte formation are closely linked to neurodegenerative diseases. Inducing reactive astrocytes in vitro enhances glycolytic activity, and glycolytic oscillations were observed. This study discusses metabolic changes in two types of astrocytes through glycolytic oscillations and their indicators, elucidating the relationship between these changes and brain disease progression.
Liu Tianjin	Yasumoto Masanori	A Study on the "Ambidextrous" Strategy in Latecomer Firms − Case Studies of Companies in China, South Korea, and the United States in the Mobile Telecommunications Industry –	This study, based on the "ambidextrous management" theory, examines how latecomer firms in the mobile telecommunications industry achieve innovation through knowledge exploration, exploitation, and absorption. The findings reveal that latecomers prioritize exploration in the early stages and promote exploitation in later stages, enabling effective knowledge absorption and facilitating catch-up with incumbents. In particular, the study validates the hypothesis that exploration plays a leading role, exploitation becomes effective in the later stages, and absorptive capacity improves progressively. The results of this study contribute to advancing "ambidextrous management" theory and offer new implications for innovation strategies in latecomer firms.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Akiyama Taiga	Ito Akihiko	Synthesis of molybdenum-based films prepared using laser CVD method	Mo, MoO_2, MoO_3, and Mo_2N have interesting properties and are promising materials for metallic interconnectors for microelectronics, anode material for lithium-ion batteries, smart windows, and catalyst materials for nitrogen reduction reaction. The demand for these materials is increasing, and there is increasing momentum for the development of Mo metalorganic complexes. In the present study, Mo-based films were prepared by CVD method using two different Mo compounds provided by Tri Chemical Laboratories Inc. And we found that these Mo compounds are metalorganic complexes for the CVD method.
Isoda Ryota	Izato Yuichiro	Addition of Hydrazide Compounds to Improve Propellant Performance of Ammonium Dinitramide-Based Energetic Ionic Liquids	Ammonium dinitramide (ADN)-based energetic ionic liquids (EILs) are attracting attention as next-generation propellants because of their high specific impulse, low toxicity, and low environmental impact. In this study, additives were selected and evaluated to lower the melting point and improve the thermal reactivity of ADN/hydroxyethylhydrazinium nitrate (HEHN) mixture systems. In particular, the addition of acetohydrazide was found to improve the liquid holding capacity and specific impulse in low temperature environments. This provided important findings for the practical application of ADN-based EILs.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Ueda Yuta	Ito Akihiko	Preparation of cerium-doped yttrium aluminum perovskite film using chemical vapor deposition and their luminescence properties	Scintillators are phosphors that convert radiation into visible or ultraviolet light of lower energy. Ce:YAP has high scintillation light yield, rapid response, and is used as scintillator for detectors. In conventional methods, Ce:YAP scintillators can be obtained by cutting and polishing the bulk single crystal grown by melt-solidification process, the time and energy consumption and waste generation during crystal growth and thinning processes are costly. In this study, we synthesized Ce:YAP scintillators without any post-processing on single-crystal substrates using the LCVD method and evaluated their optical properties.
Eto Nagi	Shiraishi Toshihiko	A Study of the Effect of Mechanical Vibration on the Differentiation of Cultured Osteoblasts and Its Mechanism	The effects of mechanical vibration on the differentiation of cultured osteoblasts and the mechanisms involved were examined by verifying the direction and frequency dependence of the gene expression of alkaline phosphatase and measuring the displacement of the cell nucleus under vibration. As a result, it was found that differentiation was significantly promoted by vibration at a specific frequency regardless of the vibration direction, and at the same time, the displacement of the cell nucleus increased. If the optimal vibration conditions for the promotion of differentiation can be clarified, it will contribute to the development of optimal methods for the therapeutic treatment of bone fractures using mechanical vibration.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Oga Terumasa	Ito Akihiko	Fabrication of $Gd_3Ga_5O_{12}$ films via chemical vapor deposition method and their optical properties	Scintillators are used for dose monitoring in nuclear reactors must be positioned in a high-dose rate condition. Under such harsh environments, scintillation photons can be detected remotely by using optical fiber with the CCD spectrometer placed in a low-dose area. Scintillation light in the red to near-infrared region can be transmitted efficiently through optical fibers. Gadolinium gallium garnet ($Gd_3Ga_5O_{12}$, GGG) doped with activator ions such as Eu_3+ or Cr_3+ is a promising host material for red or infrared-emitting scintillators due to its strong gamma-ray absorption cross section and excellent chemical stability. In the present study, GGG transparent films were synthesized using the chemical vapor deposition (CVD) method, and their optical properties were investigated.
Oyama Masataka	Hondo Hiroki	Regional economic impacts of onshore wind power generation considering the location of related industries	To link the introduction of renewable energy to economic growth in Japan and the region, there is a movement toward the formation of supply chains in Japan. This study focused on onshore wind power generation and aimed to quantify the socioeconomic effects on the domestic and regional economy, considering the location of related industries. Based on a survey on the potential for domestic and regional companies to participate in wind power-related industries, the lifecycle economic and industrial impacts were clarified through an Input-Output analysis targeting regional economic zones.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Kakimoto Taisei	Hoshino Yujiro	Synthesis of diphenylmethyl ether via organophotoredox catalysis	Diphenylmethyl ether has been found to be an integral part of pharmacologically active compounds such as benztropine (an antipsychotic agent), diphenylpyraline (an antihistamine), and vanoxerine analogues (potential treatments for cocaine addiction). Given its significance, diphenylmethyl ether is anticipated to play an important role in pharmacotherapy. In this study, we present a novel synthetic approach to diphenylmethyl ether from diphenylmethy dodecyl sulfide by employing a mild green light source and an organophotoredox catalyst. The objective of this research was to establish an innovative methodology for the synthesis of diphenylmethyl ether and to provide a practical example of the application of the TXT catalyst.
Kashihara Kirara	Shibutani Tadahiro	A study on the social acceptance of small modular reactor (SMR) technology: A comparative analysis of South Korea and Japan	In recent years, the demand for small modular reactor (SMR) technology has been increasing, and the spread and success of SMRs depends heavily on social acceptance. In this study, I aimed to analyze factors that are thought to affect the improvement of social acceptance of SMRs among nuclear experts in Japan and Korea, and to obtain concrete suggestions for promoting SMR demand. The survey results confirmed that both Japan and Korea place the highest importance on "Accident Prevention", and that there are differences in some issues such as " Cyber Security Measures".

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Kato Masaki	Kasai Naoya	Development of a Surface Defect Inspection Method for Magnetic Particle Testing Using Image Processing with Deep Learning	Magnetic particle testing is a non-destructive inspection method primarily used for detecting surface defects in welded joints and automotive parts. In this method, the indication patterns of defects are visually checked, which presents challenges such as the potential for oversight and difficulty in quantitative evaluation. A surface defect detection system using image processing based on deep learning has been developed to address these issues. The system combines anomaly detection techniques that do not use anomalous images for preprocessing and learning, and validation was carried out on the result images of the magnetic particle testing.
Kato Yuichi	Hoshino Yujiro	Synthesis of Flavanols Using Baeyer-Villiger Oxidation as the Key Reaction	In this study, we developed a novel synthetic method for 2-phenyl-3-chromanol via Baeyer–Villiger oxidation as the key reaction. The synthesis began with the preparation of 3-formyl-2H-chromene from salicylaldehyde and cinnamaldehyde, facilitated by the Hayashi–Jørgensen catalyst. The resulting intermediate underwent Baeyer–Villiger oxidation to yield the corresponding ester, which was subsequently hydrolyzed to produce the ketone. A final reduction step successfully converted the ketone into 2-phenyl-3-chromanol.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Kawano Shun	Aramaki Kenji	Hydrogel formation by Polymer-mediated gelation method	The aim of this study was to establish a "polymer-mediated gelation (PMG) method" to improve the solubility of water-insoluble 12-hydroxyoctadecanoic acid (12-HOA) and gelate water by forming an ionic complex with polyethyleneimine (PEI). Using PEI with molecular weights of 600, 1800, and 10,000, it was found that 12-HOA could gel at lower concentrations with PEI 10,000 compared to PEI 600 and 1800. Additionally, the sol-gel transition temperature and gel hardness were higher with PEI 10,000 than with PEI 600 and 1800.
Kawahara Daichi	Izato Yuichiro	Development of quantitative risk analysis method using disability-adjusted life years for life cycle impact assessment of process accidents	Process accident risks in chemical plants and other facilities are inseparable from manufacturing activities, and it is important to make it possible to evaluate the magnitude of risk and the effectiveness of safety-related measures from a life cycle perspective to reduce the impact throughout the life cycle. In this study, we developed a quantitative risk analysis method that utilizes the life year adjusted for disability, which is used as a damage indicator for human health effects in the life cycle impact assessment method, to enable comparison with the human health effects associated with steady-state manufacturing activities throughout the life cycle.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Kurihara Yamato	Nakai Satoshi	A Study on Identification of Persons Suspected Minamata Disease Based on Data from the Minamata Bay Area Resident Health Survey	An attempt was made to identify suspected Minamata disease based on data from the Minamata Bay area resident health survey conducted between 1971 and 1973. We used stepwise logistic regression analysis, a common statistical method, and attempted to simulate and identify classification criteria for subgroups considered to be highly exposed. As a result, both methods were able to create models with relatively good sensitivity and specificity, but the positive predictive value was not high and it could not be determined that identification was possible. Future work is expected to develop the method and examine the estimation of MeHg exposure, which was not possible in this study.
Goto Kurumi	Matsumoto Shinya	Crystal Structures of Dibromoindigo Derivative with Alkyl Substitution at the *N* Position	6,6'-Dibromoindigo is a purple dye with two bromine atoms in the indigo skeleton and is expected to be applied to semiconductor materials. In this study, I synthesized its derivatives with three different alkyl groups (propyl, butyl, and pentyl groups) introduced into one amino group, and compared their crystal structures with those of 6,6'-dibromoindigo. The result showed that the alkyl substituents have no significant influence on the conformation of the chromophore of indigo or the one-dimensional stacking motif of the dye molecules. On the other hand, the hydrogen bonding pattern and the interaction between bromine atoms were found to be significantly affected.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Goto Naoki	Nakai Satoshi	Air Pollution-Health Risk Assessment and Benefit Estimation for Achieving WHO 2021 Air Quality Guidelines	In recent years, health effects have been reported at concentrations of air pollutants below standard values, and revisions of standard values have been discussed and implemented worldwide. Therefore, it is considered that Japan should also discuss the revision. Therefore, for the purpose of obtaining information on the discussion on the revision of the standard values in Japan, Air Pollution-Health Risk Assessment and benefit estimation, which are used in discussions overseas, were carried out under the scenario of achieving the WHO air quality guidelines. As a result, the benefits were estimated to be approximately 3.9 trillion yen in Tokyo and 2.2 trillion yen in Kanagawa. In the future, cost estimates associated with the revision of standard values are desired.
Saito Ayuta	Nakai Satoshi	Exposure and risk assessment of long-chain perfluorocarboxylic acids (LC-PFCA)	Long-chain perfluorocarboxylic acids (LC-PFCAs) are of concern due to their health effects, and future restrictions are expected in Japan. However, the exposure situation in Japan and the presence or absence of health risks are unclear, so in order to estimate these, we carried out (1) exposure and risk assessment from major exposure sources, and (2) exposure estimation from consumer products and comparison with major exposure sources. In (1), it was determined that there was no risk concern with the current exposure amount, and in (2), it was found that inhalation exposure from clothing sprays was comparable to the exposure from major exposure sources.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Saito Junki	Miyake Yuichi	Simultaneous determination of per- and polyfluoroalkyl substances (PFAS) in consumer products for evaluation of consumer exposure	Per- and polyfluoroalkyl substances (PFAS) have received worldwide attention because of their environmental persistence and toxicity. The Conference of the Parties of the Stockholm Convention on Persistent Organic Pollutants (POPs) listed PFOS, PFOA, PFHxS and their related compounds in Annex A or B. Previous studies showed that various consumer products contained PFAS-related compounds, suggesting that we should have concerns about the effects on the exposures to PFAS in our daily lives. In this study, we determined the concentrations of individual PFAS and total fluorine (TF) in consumer products by LC-MS/MS and combustion ion chromatography (CIC), respectively. The mass balance analysis was performed to provide information on the extent of unknown fluorinated chemicals in consumer products.
Sano Karin	Amemiya Takashi	Glycolysis oscillation of astrocytes	The purpose of this study was to observe glycolytic oscillations in astrocytes. First, we observed NADH fluorescence from mouse cerebellum-derived astrocytes C8-D1A based on the methods of previous studies. Next, we did experiments by focusing on the followings: i) nitric oxide which increases expression of glycolytic enzymes and transporters; ii) endothelial cells which have strong metabolic interactions with astrocytes; and iii) glycogen storage which increases glycolytic flux in astrocytes. However, we did not observe glycolytic oscillations. To generate glycolytic oscillations in astrocytes, it will be necessary to control metabolic flux based on other metabolic characteristics.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Sano Hayato	Kumasaki Mieko	Enzymatic nitration of azoles using horseradish peroxidase	Nitration is an essential process for the synthesis of energetic materials, but the conventional process has caused explosions and left hazardous residue. This study examined enzymatic nitration for exploring a safe and environmentally friendly synthetic method of energetic materials. An enzymatic nitration process with horseradish peroxidase (HRP) was adopted for azoles, which are five-membered heterocyclic compounds and are utilized as the framework of energetic materials. This study explored the potential of HRP-nitration for azoles and confirmed the successful synthesis of a nitroazole with the enzymatic nitration process.
Suzuki Yuki	Izato Yuichiro	Construction of a risk scenario identification method using the subgraph isomorphism problem	HAZOP has been used worldwide as a useful risk scenario identification method. In this study, we attempted to develop a risk scenario identification method that applies graph theory, which can represent the physical structure of a process.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Suzuki Yugo	Matsumoto Shinya	Crystal Structure of Indigo Derivatives with Alkyl Group at *N*-position	Indigo has recently been studied for its applications to organic electronic materials in addition to its use as a dyestuff. In this study, we synthesized two N-alkylated indigo dyes, mono N-ethyl derivative (M2) and mono N-propylated derivative (M3) and investigated the effect of the alkyl substitution in crystal structure. A comparison of the crystal structure of the unsubstituted indigo with those of M2 and M3 revealed that there is no significant impact on the molecular and one-dimensional stacking structures within the crystal due to the substituent introduction. However, the overall molecular arrangement in the crystal lattice of M2 and M3 was different from that of the unsubstituted indigo.
Suzuki Ryodai	Aramaki Kenji	Effect of oil content in emulsion on hydrogel properties by Nanoemulsion mediated gelation method	The effects of different oil concentrations on the hydrogel properties in the nanoemulsion-mediated gelation (NMG) method were investigated. The ability to form gelation varied depending on the concentrations of the oil and 12-HOA in the samples. As the decane concentration increased, a tendency for the fiber width to decrease was observed. Furthermore, it was found that the hardness of the NMG gel increased or decreased depending on the decane concentration. It was suggested that the gel hardness was particularly influenced by three factors: crosslinking by oil droplets, fiber width, and the proportion of gelled oil droplets.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Tagawa Eri	Miyake Yuichi	The effects of meteorological factors on silicone passive sampling method for polycyclic aromatic hydrocarbons and their halogenated derivatives	Polycyclic aromatic hydrocarbons (PAHs) and their halogenated derivatives (XPAHs) are emitted by anthropogenic activities with incomplete combustion. Some PAHs and XPAHs have adverse effects for human health such as carcinogenicity. Silicone passive sampling method has been employed in the individual exposure assessment to PAHs and XPAHs over the past decade. This sampling method, requires no electric power, is low burden for participants because of no noise and compact. However, passive samplers are generally affected by meteorological factors (e.g., wind speed). For accurate assessment of the individual exposure to PAHs and XPAHs by using silicone passive sampling method, the effects of wind speed on the sampling rate were evaluated and corrected by a proposed method in this study.
Tanaka Koharu	Aramaki Kenji	Construction of orthogonal molecular assembly systems by surfactant-mediated gelation method using hexagonal liquid crystals	Orthogonal systems in which two assembly structures, surfactant molecular aggregates and gel networks, coexist are expected to exhibit high functionality. In this study, we formed gelled hexagonal liquid crystals using the surfactant-mediated gelation (SMG) method, where the water-insoluble 12-HOA is solubilized within surfactant molecular assemblies. We then investigated their properties and orthogonality. As the temperature increases, the structure transitions in the following order: a gel with coexisting hexagonal liquid crystal and gel fibers, followed by a hexagonal liquid crystal, and finally a sol.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Tanizaki Shunsuke	Hoshino Yujiro	Synthesis of 9-arylthioxanthenes from 2-(arylsulfanyl)benzhydrols using photoredox catalysis under visible light irradiation and the effect of phenolic additives	We report a green light-induced synthesis of 9-arylthioxanthenes via intramolecular cyclization using TXT catalysts and phenols. This method enables efficient synthesis under mild conditions with organophotocatalysts, avoiding strong acids or UV irradiation.
Temmyo Sakura	Shibutani Tadahiro	FRP PRESSURE VESSEL DESIGN CALCULATION FOR IN-PLANE WINDING PATTERN	Pressure vessels are used for the purpose of transporting gas, so they are required to be lightweight. Currently, a filament winding with helical pattern is often adopted. However, in helical pattern, the original strength of the filament-composite material is not fully utilized due to the intersections of filaments. On the other hand, the filament winding with in-plane pattern, which has fewer intersections than helical pattern, so vessels with in-plane filament winding can demonstrate higher strength. In this study, design by analysis for in-plane filament winding is proposed and verified by comparing with helical winding.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Nakami Shun	Kumasaki Mieko	Change in thermal hazard of Sodium Percarbonate due to carbon dioxide	This thesis is about the thermal hazards of Sodium percarbonate: SPC. While SPC is commercially used as an oxygen bleaching agent, it also has thermal hazards that can lead to accidents. This study aims to contribute to the prevention of accidents triggered by SPC. Since carbon dioxide may contact SPC during storage, I investigated the effect of carbon dioxide on the thermal hazards of SPC. The results suggest that exposure to carbon dioxide generated products, and that the thermal hazard changes due to exothermic reactions of the products at lower temperatures than the thermal decomposition of SPC.
Nakamura Genki	Oka Yasushi	Synthesis of Trifluoroethylferrocene and Factors Affecting Its Combustion Inhibition Effect	Organometallic iron complexes exhibit high combustion inhibition effects, and compounds containing CF_3 groups have also been reported to exhibit combustion inhibition effects. In this study, I aimed to achieve a synergistic effect on combustion inhibition by synthesizing Fec-CH_2-CF_3, an organometallic iron complex containing CF_3 group, and investigating its combustion inhibition effect. I synthesized the precursor Fec-CH_2-I and successfully obtained Fec-CH_2-CF_3 by reacting it with Et_3SiCF_3. However, combustion inhibition experiments did not show a significant inhibition effect. This was attributed to Fec-CH_2-CF_3 promoting the thermal decomposition of cellulose, leading to the formation of FeF_2 as a decomposition product, which is stable and does not exhibit a combustion inhibition effect.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Nakamura Kota	Hondo Hiroki	CO_2 Emission Analysis of Perovskite Solar Cell Installation in Agricultural Greenhouses	Perovskite solar cells (PSCs), which are lightweight and flexible, are expected to be introduced in places where it is difficult to install silicon-based solar cells, and there is a need to evaluate the associated CO_2 reduction effect. This study analyzed the potential life cycle CO_2 reduction associated with the introduction of PSCs, assuming that the power consumption of agricultural greenhouses will be switched from grid electricity to in-house power generation using PSCs installed in greenhouses. As a result, it was shown that the installation of PSCs reduces approximately 27 tons of CO_2 over 20 years.
Nakayama Tatsuyuki	Ito Akihiko	Preparation of lutecia films by chemical vapor deposition and microfabrication of structured scintillator	Scintillators are phosphors that convert radiation into visible light are used in X-ray imaging. Spatial resolution, which is the clarity of radiographs, is important in X-ray imaging. Resolution can be improved by thinning or structuring scintillator crystals. Structured scintillators are prepared by synthesizing columnar films or post-processing single crystals, but post-processing needs much cost and time. In the present study, using the chemical vapor deposition method, we controlled the microstructures of Yb^{3+}:Lu_2O_3 films to prepared dense or columnar films. In addition, we directly synthesized structured scintillators by deposition on lattice-processed substrate.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Ninoyu Itsuki	Endo Akira	The impacts of an environmentally oriented company on local groundwater governance A case study of regions with Suntory	The concept of groundwater governance involving various actors is taken notice on the management of groundwater. However, the discussion about the impact of companies is limited. Furthermore, we need to see not only the involvement of corporate social responsibility but also the relationship with a modern environmentally oriented company. So, I analyzed how regional groundwater governance is transformed by changes of the relationship between a region and an environmentally oriented company and what makes differences between regions. As a result, there is a possibility that regional groundwater governance is promoted by the involvement of an environmentally oriented company. Moreover, there are differences in the actual system due to the originalities of the regions.
Nose Kanako	Shiraishi Toshihiko	A Study of the Mechanosensing Mechanism of Dynamic Stimulation through Focal Adhesions in a Cultured Osteoblast	Osteoblasts show a biochemical response to mechanical vibration, but the mechanism is not clear. In this study, to elucidate a part of the local dynamical stimulus sensing system of a cultured osteoblast, the intracellular calcium response and chromatin condensation were observed when cyclic strain was applied near the focal adhesions by magnetic micropillars, and the amplitude and vibration frequency dependence were investigated. As a result, the strain dependence of the calcium response at the cellular localization and the possibility of vibration transmission to the cell nucleus were shown.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Hatano Keita	Kumasaki Mieko	Improvement of Corrosion Resistance of Magnesium Powder for fireworks by Chemical Treatment	Magnesium powder for fireworks corrodes in humid environments. To prevent corrosion, harmful potassium dichromate has been used for surface modification. In this study, two types of surface modification, using electron acceptors and silane coupling agents, were investigated in an attempt to find a non-hazardous method. Humidity tests showed that silane coupling agents improved the corrosion resistance of magnesium powder, while electron acceptors showed no effect. In addition, magnesium surface modified with silane coupling agents had little effect on its performance as a firework. Silane coupling agents can therefore be an alternative surface modifier to potassium dichromate.
Hanada Rumi	Hoshino Yujiro	Synthesis of Novel Thioxanthylium Salts from Bis(3,5-dimethoxyphenyl) Sulfide and Their Characterization	Thioxanthylium salts represent a significant structural motif present in biologically active compounds and photochemical systems. In our laboratory, we have developed an efficient and versatile synthetic method for thioxanthylium salts via Friedel-Crafts reaction as the key reaction. These salts have demonstrated remarkable utility as photoredox catalysts in synthesis of cyclic compounds. Based on these findings, we further explored the chemistry of thioxanthylium skeletons and synthesized four novel thioxanthylium salts using the Friedel-Crafts reaction. Their physical properties were subsequently characterized, providing valuable insights into their structural and photochemical attributes.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Hirakawa Honoka	Shibutani Tadahiro	Development of Analytical Model for Failure Behavior and Nonlinear Load–Displacement Characteristic of Piping Support Subjected to Seismic Loading	At present, conservative evaluations of nuclear power plants are mainly based on elastic analysis. This is an analytical model that deviates greatly from the digital twin. Therefore, in this study, we aimed to construct a high-precision simulation model that incorporates the inelastic phenomena of piping and pipe support structures in order to accurately reproduce the actual phenomenon. Considering inelastic properties of supports provides good agreement with experimental results and is important factor for assessing seismic behavior of piping systems.
Hirata Masataka	Fujii Makiko	Study on novel chemical-structure analysis of polymers using sub-critical fluid decomposition	Since the properties of polymeric compounds depend on their chemical structures, highly precise chemical-structure analysis methods are essential for the development of new materials. However, it is difficult to obtain chemical-structure information on high molecular weight polymers and network polymers with mass spectrometry. We have been developing a sub-critical fluid decomposition method as preparation for mass spectrometry. In this study, the dependence on time and solvents were investigated to evaluate the potential of a sub-critical fluid decomposition method for selective chemical bond cleavage. As a result, the sub critical fluid decomposition using different solvents provided chemical-structure information, indicating that the method is useful for chemical-structure analysis.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Hirahara Rikuto	Amemiya Takashi	Functional evaluation of brown adipocytes using metabolic oscillations	Brown adipocytes generate heat via uncoupling protein 1 (UCP1), essential for energy metabolism and thermoregulation. This thermogenic function is a potential target for obesity treatment. Metabolic oscillations, including glycolytic and mitochondrial membrane potential oscillations, may regulate energy metabolism in brown adipocytes. This study investigates their role in thermogenesis. Differentiated brown adipocytes were treated with linoleic acid (LA) and isoproterenol (ISO), and fluorescence measurements assessed mitochondrial membrane potential and intracellular temperature. The results indicate that metabolic oscillations occur after LA and ISO treatment, suggesting their involvement in thermogenesis. Further research is required to elucidate their regulatory mechanisms.
Fujimura Naoki	Ito Akihiko	Chemical vapor deposition of Al_2O_3–Lu_2O_3 films and development of in-situ observation technology	Eutectic ceramics are synthesized by melt solidification method using raw materials with eutectic composition, forming phase-separated structure. Our research group is studying chemical vapor deposition (CVD) of eutectic ceramics. However, there are few reports on eutectic growth from the gas phase, and the growth mechanism is not clear. Therefore, we will assemble a new apparatus that combines an in-situ observation system and a CVD process to clarify the growth mechanism.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Fuseya Ryusuke	Ito Akihiko	Preparation of La_2O_3–Ga_2O_3 and Y_2O_3–Ga_2O_3 films using chemical vapor deposition	$LaGaO_3$ exhibits high ionic conductivity and is therefore expected to be used in SOFCs. On the other hand, chemical reactions with metal anodes and low deposition rates are problems. $Y_3Ga_5O_{12}$, one of the Y_2O_3–Ga_2O_3 materials, is expected to be applied to phosphor materials. $YGaO_3$, a metastable phase of Y_2O_3–Ga_2O_3 materials, has also been reported. The synthesis of $YGaO_3$ is expected to be possible by selecting appropriate single-crystal substrates. Laser-assisted CVD is a technique capable of low-temperature and fast synthesis, and epitaxial growth of materials. In this study, We have synthesized $LaGaO_3$ films at low temperatures and high speed, and Y_2O_3–Ga_2O_3 films on single crystal substrates.
Matsubara Ryoya	Nakai Satoshi	Changes in the concentration of harmful substances in the air due to heated tobacco and electronic cigarette smoking	Heated tobacco and e-cigarettes are relatively new, with limited data on the concentration of harmful substances in the air. Therefore, in order to obtain information on the effect of the amount of air breathed during smoking on the concentration of hazardous substances, I assumed that the concentration of PM2.5 reflects the amount of air breathed and calculated correlation coefficients with the concentration of other substances. In addition, I combined a smoking experiment and a survey of actual smoking conditions to estimate the concentration increase value considering the amount of smoking by each smoker. As a result, no consistent trend was observed in the correlation coefficients, and the concentration increase values for smoking heated tobacco and electronic cigarettes were much lower than the reference values.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Miyagawa Yuki	Hoshino Yujiro	In Situ Generation of *ortho*-Quinone Methides by Organic Photoredox Catalysis and Its Application for the Synthesis of chromanes	Organic photoredox catalyzed oxidative generation of o-quinone methides (o-QMs) from 2-hydroxybenzhydrol for inverse-electron-demand [4 + 2] cycloaddition has been developed. One-electron oxidation of catalyzed by thioxanthylium salts 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 2,4-diarylchromanes by a one-electron oxidation process under mild green light irradiation.
Yamada Chiaki	Matsumoto Shinya	Development of education materials for Basic Chemistry to consider the sustainable use of plastics	In this study, I developed teaching materials focusing on the scientific literacy of plastics used in daily life and their environmental impact based on the concept of life cycle. The aim of the developed materials was set as the following three items: to recognize the connection between science and technology and everyday life, to raise environmental awareness, and to promote environmentally conscious behavior. Environmental impact calculation exercises were also incorporated into the teaching materials. A survey conducted after a program using the developed teaching materials confirmed that the participants recognized the connection between everyday life and environmental issues and had acquired basic knowledge about plastics and its environmental load.

List of Dissertation Abstract (Department of Artificial Environment)

Name	Supervisor	Title	Abstract
Yoshino Kyohei	Matsumiya Masahiko	Analysis of extraction and electrodeposition behaviors for Au(III) using phosphonium-based ionic liquids	In this study, phosphonium-based ionic liquids (IL), i.e., triethyl-n-pentyl, triethyl-n-octyl, and triethyl-n-dodecyl phosphonium bis(trifluoromethyl-sulfonyl)amide were investigated for Au(III) extraction. Slope analyses with the concentration dependence of [P222X+] confirmed the anion-exchange mechanism of Au(III) extraction. Moreover, the enthalpy, entropy, and Gibbs free energy for Au(III) extraction were determined using thermodynamic analysis, indicating that lower temperatures had a positive effect on the Au(III) extraction. Electrodeposition analysis revealed that extracted Au(III) can be reduced in two steps. Furthermore, the diffusion coefficients of the extracted Au(III) species were evaluated from 323 to 373 K using semi-integral analyses. As a result, the VTF parameters for the diffusion of extracted Au(III) complex were revealed in this study.
Sun Haoyang	Ando Takatoshi	Association between Organizational Operations of Friendship Activities and Regional Acceptance -A Case Study of the Friendship Teams in the Yokohama City Federation of Senior Citizens' Clubs-	In this study, we explored the association between the organizational operations of Friendship activities and the level of understanding of elderly activities in the community using logistic regression analysis. The analysis was based on survey data regarding Friendship Teams conducted by the Yokohama City Federation of Senior Citizens' Clubs in 2023. The results suggest that improving the organizational structure of senior citizen groups can enhance the understanding and perceived importance of elderly activities in the community, contributing to the development of a sustainable aging society.

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Name	Supervisor	Title	Abstract
Cheng Yichun	Oka Yasushi	Evaluation of Practical Turbulent Diffusion Coefficient Models for Atmospheric Dispersion	To estimate turbulent viscosity coefficients necessary for quickly predicting damage areas using real-time wind direction and speed data, a high-accuracy and fast numerical prediction method is being developed. Model verification and adjustments have enabled asymmetric turbulent viscosity distributions, similar to CFD results, around obstacles. However, accurately reproducing quantitative distributions near obstacles remains a challenge. Developing a simplified yet realistic method to quantitatively reproduce these distributions is a key objective for future research.