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Abstract Book

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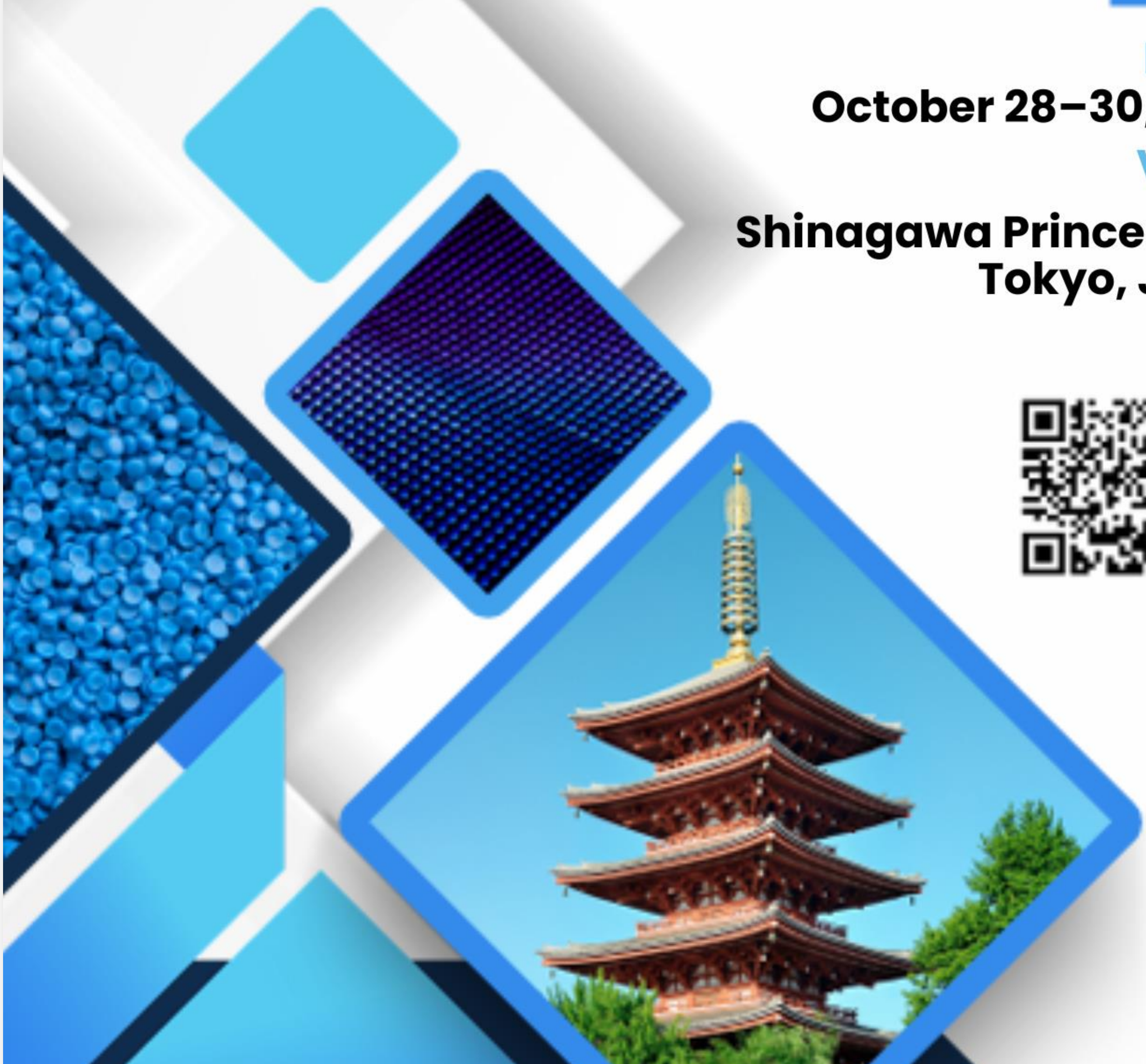

Plenary Talks:

CO_2-Captured Polymeric Amines as Functional Materials

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Abstract

The rapid increase in CO_2 concentrations has been intensifying global warming. To address this issue, polymeric amines offer an effective solution for capturing CO_2, providing several advantages over low-molecular-weight amines due to their non-volatility, thermal stability, ease of modification, and other benefits. This presentation focuses not only on the effective capture of CO_2 as carbonic acid (CA) in aqueous systems using polymeric amines but also on the utilization of CO_2-loaded polymers as polymer surfactants and pollutant removers through ion exchange reactions.

Polyallylamine (PAA) effectively captured CA in water through a simple acid-base reaction by introducing gaseous CO_2. The CA capture by PAA was verified through detection of carbonic anions by ^{13}C NMR, as well as changes in pH and electroconductivity (EC) of the solution. The EC changes, showing clear hysteresis with alternating CO_2 and N_2 introduction, demonstrated that the CA capture by PAA was completely reversible and repeatable. The CA-loaded polymer was transformed into a polymer surfactant via partial ion exchange with sodium dodecyl sulfate, producing nanoarchitectures with spherical, vesicular, or worm-like morphologies. The polymer also served as a remover of water-soluble pollutants, such as detergents and dyes. These applications of the CO_2-loaded polymer as functional materials should reduce CO_2 emissions, offering a promising solution to mitigate global warming.

Keywords: CO_2 capture; Polymeric amine; Polymer surfactant; Ion exchange; Nanoarchitectures; Self-assembly

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Biography

Eri Yoshida earned her Ph.D. in Polymer Engineering from the Tokyo Institute of Technology. She began her academic career as an Assistant Professor at the Kyoto Institute of Technology. In 1999, she expanded her research scope as a visiting scientist at the University of North Carolina at Chapel Hill. She joined Toyohashi University of Technology as an Associate Professor in 2004. In 2016, she participated in a faculty exchange program at Queens College, City University of New York, to advance engineering education. Dr. Yoshida serves on the editorial boards of international journals and has received several awards, including international recognition. Her current research interests include designing polymers for CO_2 capture, chemical recycling of waste plastics, and creating polymer giant vesicles as models of artificial biomembranes

Development of Element-Block MaterialsBased on Cage Silsesquioxanes

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Abstract

Cage octasilsesquioxanes, denoted as $(RSiO_{1.5})_8$, which are usually called polyhedral oligomeric silsesquioxanes (POSSs), have been regarded as important element-blocks for the construction of high-performance materials. We showed that incorporation of the POSS-unit in the poly(azomethine) or polyurea main chains formed supramolecular gels [1]. When the polymerization solutions were sufficiently concentrated under reduced pressure, a macroscopic gel was formed. Polyurea-based polymers with strong dipole moments have been reported to achieve higher dielectric constant (ε_r) (above 5.0) than most of the traditional polymer dielectrics. Incorporation of POSS units produced free volume, resulting in low ε_r [2]. Water vapor permeability measurementsrevealed a greater free volume content introduced by POSS co-oligomerization.

Among various surface modification methods, the use of surface segregation of surface modifiers in a polymer matrix is the most convenient and low-cost method. We demonstrated that segregation of octa(dimethylsilylhydroxyethoxypropyl)silicate (OS-EGMAE), as a hydrophilic siloxane-based cage compound, occurred on the surface and interface of PMMA casting films without assistance of contacting high-free-energy media[3]. Addition of small amounts of OS-EGMAE in PMMA significantly enhanced wettability and the lowest static contact angle of water of $28.9\pm0.5^{\circ}$ was observed for the cast film containing 4 wt% OS-EGMAE. These findings clearly suggest that the siloxane-based cage frameworks are promising candidates for promoting surface segregation because of their predominantly contributed entropy factor to the total free energy.

Keywords: Cage silsesquoxane,POSS,Element-block, Hybrid material, Surface segregation.

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[3] I. Tokuami, R. Suzuki, M. Nagao, A. Okada, H. Imoto, K. Naka, ACS Appl. Polym. Mater.**4**, 5413 (2022).

Biography

Prof. Kensuke Naka received his Ph.D. from Kyoto University in 1991. He was appointed research assistant at Kagoshima University in 1990, research assistant at Kyoto University in 1996, and associate professor in 2000. In 2007, he was promoted to full professor at Kyoto Institute of Technology. He was awarded the SPSJ Wiley award in 2007 and the Award of The Adhesion Society of Japan in 2020. He is director of Materials Innovation Lab.

Oxidatively Degradable Polymer: Stable During Use And Highly Degradable After Use

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Abstract

The all-or-nothing degradability should be a key feature of degradable polymers. These polymers must be tough and stable during use, although they should decompose instantly when we decide to stop using them. To achieve such degradable polymers, specific functional groups that undergo degradation only in response to unnatural stimulusare necessary. One such degradable functional group is diacylhydrazine, which decomposes rapidly in the presence of artificial oxidants such as sodium hypochlorite[1], a cheap and readily available substance that can be easily handled under ambient conditions.

Epoxy resins can be cured using bisphenol containing diacylhydrazine[2]. The cured resin can be used as a strong adhesive for various materials. When materials bondedwith the oxidatively degradable epoxy resin were immersed in sodium hypochlorite solution, they separated spontaneously, revealing a fresh surface after complete degradation. When the polymer chains were crosslinked with the diacylhydrazine moiety, a strong crosslinked material was obtained, although it underwent degradation upon oxidative treatment, resulting in a soluble polymer[3]. The degradable superabsorbent polymer became soluble through oxidative treatment[4]. When the oxidatively degradable crosslinked polymer was used as the matrix for CFRP (carbon fiber reinforced polymer), the carbon fiber sheet could be recovered without any damage[5].

Keywords: Diacylhydrazine, Oxidative Degradation, Epoxy Resin, Crosslinked Polymer, Superabsorbent Polymer, Carbon Fiber Reinforced Polymer

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Biography

He studied at The University of Tokyo and then worked at the Research Institute of Resources Utilization at Tokyo Institute of Technology on the reaction of carbon dioxide with epoxide and the application of the resulting cyclic carbonate. He was a postdoctoral fellow at Fribourg University, Swiss, and worked as an Associate Professor at Osaka Prefecture University. He moved to Kanagawa University as a professor in 2005. His present research interest is on polycatenane, artificial molecular motor, the reaction field based on the molecular recognition, and the oxidatively degradable polymer.

Ecologically friendly organic polymer whiskers as outstanding filler in polymer composite

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ABSTRACT

Polyoxybenzoate (POB) is expected to have excellent performance due to its rigid structure, and has been expected to be a high-performance polymer. However, since POB is insoluble and infusible, it is difficult to obtain a high molecular weight form, and despite its attractive potential performance, its use as a material has been limited to a very small number of applications. Therefore, this POB has been developed as a thermotropic liquid crystalline polymer (LCP) that can be molded in a molten state while maintaining the orientation of the molecular chains by randomly adding copolymer components to the main skeleton. It is applied to electronic parts such as high-performance connectors for smartphones. Although some success has been achieved by making good use of the orientation state of liquid crystals, there is an order of magnitude difference between the crystalline elastic modulus of POB (140-200 GPa) and that of LCP (10-20 GPa) when defect-free extended chain crystals are formed, and it is difficult to say that LCP fully reflects the potential performance of the primary structure of the POB skeleton.

One way to overcome this problem is to incorporate non-equilibrium physical phenomena into the polymerization assumption that creates POB homopolymers, forming higher-order structures simultaneously with polymerization, and to use POB single crystal whiskers as a resin filler, and it has been suggested that POB single crystal whiskers will exhibit a value close to the theoretical elastic modulus. In this way, POB homopolymer is a very promising organic filler material that can achieve high strength and high elasticity. In addition, it can have a lower specific gravity than inorganic fillers, and because the raw material monomer, p-hydroxybenzoic acid, can be biosynthesized using bacteria, it can be provided as a 100% bio-derived polymer, and is therefore attracting attention as an environmentally friendly material.

In this study, the possibility of using this excellent bio-reachable POB homopolymer as a outstanding organic filler. A series of results will be presented.

Keywords: Polyoxybenzoate; Single crystal whisker; Nonlinear optical materials; Bio-reachable

Biography: Specially appointed Professor of Institute of Science Tokyo (ex. Tokyo Institute of Technology), Team Director of RIKEN, Chief Research Coordinator of Sumitomo Chemical Co., Ltd. He joined Sumitomo Chemical Industries in April 1996 and has been consistently engaged in new development and innovation. He succeeded in industrializing catalytic polymerization of liquid crystal polymers for the first time in the world, and while the market remained strong, he succeeded in developing a manufacturing method that satisfies both productivity and quality, which was incorporated into industrial production. He subsequently succeeded in developing a liquid crystal polymer that dissolves in common solvent, leading to its use in 5G antenna substrates, high thermal conductivity substrates, speaker diaphragms, etc. In addition, he engaged in the development of transparent polyimide film, which was also used in Foldable Phones. In 2017, he moved to the planning department at the company's headquarters, where he promoted open innovation and collaborated with ventures in areas such as odor sensors, synthetic biology, and ultra-long carbon nanotubes. Since April last year, he has also been working as a specially appointed professor at Tokyo Institute of Technology (now IST) and a team director at RIKEN, while working with academia to implement strongly correlated material.

Chemical Recycling of Waste Refractory Plastics Using Supercritical and Subcritical Fluids

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Abstract

Supercritical/subcritical fluids with strong decomposition power are promising solvents for the decomposition of refractory plastics. Chemical recycling of refractory plastics such as thermosetting plastics, composite plastics, engineering plastics and chlorine-containing mixed plastics was investigated, and good results were obtained.

(1) CFRP

CFRP is a typical composite plastic consisting of carbon fiber and thermosetting plastic such as epoxy resin. The epoxy resin in waste CFRP was decomposed and dissolved in supercritical methanol completely at 270 ºC and 10 MPa for 60 min and the clean carbon fiber was recovered. The recovered epoxy resin could be recurred to the recycled thermosetting epoxy resin. The tensile strength of the recovered carbon fiber only decreased by 3.8%, enabling its reuse in the industry.

(2) Silane cross-linked polyethylene

Silane cross-linked polyethylene (silane-XLPE) is a thermosetting plastic and it is widely used as an insulation material for wires and cables. The siloxane bond in the plastic was decomposed selectively using supercritical methanol at 300-340 ºC and above 5 MPa for 30 min. For the commercialization, an extruder was used to feed continuously silane-XLPE into a tube reactor containing supercritical methanol and decompose the siloxane bond.

(3) PVC-containing mixed plastics

PVC is widely used because it is cheap and has excellent properties, but it is a plastic that is difficult to recycle. When waste plastic mixture containing PVC is heated to convert it into oil, hydrogen chloride is generated from PVC, and chlorinated oil is produced. Recently chemical recycling of PVC + 3P (PE, PP, PS) mixture using subcritical water + $(NH_2)_2CO$ catalyst was investigated .PVC was almost completely dechlorinated at 220 ºC and 2.3 MPa for 30 min. Then the dechlorinated PVC+3P mixture was liquified at 475 ºC for 10min under atmospheric pressure. Low chlorine content less than 100ppm and high naphtha yield more than 50% were realized.

Keywords: Supercritical fluid, Subcritical fluid, CFRP, Silane cross-linked polyethylene, PVC

Biography

Takeshi Sako is Professor of Graduate School of Science and Technology at Shizuoka University. He has studied supercritical/subcritical fluid technology from 1985. His research field covers decomposition of toxic substances, plastic recycling, biomass decomposition, hydrogen production, polymerization, extraction and others using supercritical/subcritical water, supercritical alcohol and supercritical CO_2. He was awarded “Honda Prize for Recycling Technology Development” in 2023, “Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology” in 2011 and others.

Keynote Talks:

"Large-scale Manufacture of Composite and Functionalized Tocosomal Drug Delivery Systems Using Modified Mozafari Method"

M.R. Mozafari

President and Founder; Australasian Nanoscience and Nanotechnology Initiative(ANNI), Australia.

Abstract:

Controlled release of bioactive agents is a vital domain of pharmaceutical nanotechnology, as well as other health-related disciplines. Similar to other encapsulation technologies (e.g., niosomes, liposomes and nanoliposomes), tocosomes can encompass cholesterol, phytosterol, polypeptides and different types of polymers and biopolymers in their structure. Tocosomal vesicles can be formulated in the micron size as well as in the nanometric size ranges. The main ingredients of tocosomes are phosphorylated forms of alpha-tocopherol, known as alpha-tocopherol phosphate (TP) and di-alpha-tocopherol phosphate (T2P), that are naturally present in human and some animal tissues as well as in certain food components. It has been reported that the TP molecule is present in certain fruits, green vegetables, cereals, dairyproducts, as well as in different nuts and seeds. TP is composed of aphosphate group covalently linked to one hydrophobic chain (phytyl tail) made of three isoprene units. Di-alpha- to copherolphosphate, on the other hand, is a closely related molecule to TP. However,T2P is composed of two phytylchains. In this lecture, you will learn how to formulate and manufacture to cosomes using in gredients such as TP, T2P, some helper lipids and polymers via amodified and improved versionofa scalable and green-technology known as "Mozafari method" developed in our laboratory. The formulations prepared thus far have proved to be reproducible, safe, stable and effective for the encapsulation and delivery of several therapeutic compounds as will be explained in this lecture.

ResearchInterests:

Food and Pharmaceutical Nanotechnology, Biotechnology, Nanotechnology, Theragnostic Nanotherapy, Drug Delivery, Virology, Vaccine, Cancer Research

Biography:

Expert in Pharmaceutical Nano-biotechnology, Encapsulation and Targeting of Bioactive agents with substantial number of publications, 14 Patents, 5 Books & several Book-chapters. Author of the first book on Nanoliposomes(Oxford, UK); completed many industrial research projects, developed green- technology methods (e.g., "Heating Method" and “Mozafari Method”) for large-scale manufacture of controlled-release systems without employing toxic agents or harsh procedures. Recently introduced a novel system for the encapsulation and site-specific delivery of bioactive material called "Tocosome".

Development of a Novel Elastomer Using Multi-Network Technology

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Abstract

Thermoplastic elastomers are highly recyclable but have yet to fully replace vulcanized rubber due to the difficulty of balancing thermoplasticity, creep resistance, and tensile properties. These properties often involve trade-offs, making it challenging to optimize them simultaneously.

To overcome this, we developed a high-performance thermoplastic elastomer that successfully integrates thermoplasticity, exceptional creep resistance, and superior tensile properties. This was achieved through a multinetwork system incorporating hydrogen bonds, covalent bonds, and clay plane bonds.

Each type of cross-linking plays a critical role:

-Hydrogen bonds facilitate flowability by undergoing reversible bond cleavage upon heating, enabling easy processing and recyclability.

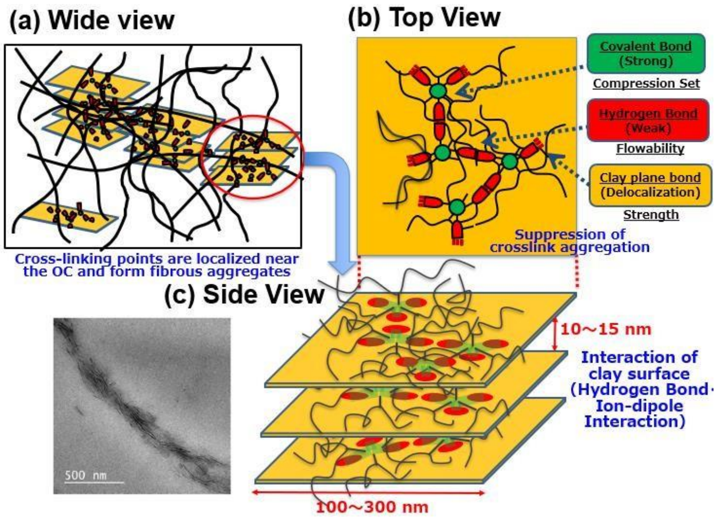
-Covalent bonds restrict polymer chain mobility, enhancing compression set resistance and ensuring dimensional stability.

-Clay plane bonds improve tensile properties by delocalizing the cross-linking network and increasing energy dissipation through the collapse of fibrous clay aggregates under elongation.

Furthermore, this elastomer exhibits self-healing properties, high heat resistance, and recyclability. A comparative study with hydrogen bond cross-linked elastomers (HBE) revealed the unique effect of organic clay addition in the multinetwork elastomer (MNE). SEM, TEM, and AFM analyses showed that when clay was mixed with maleated polymer, it was uniformly dispersed within the polymer matrix, unlike in HBE, where the clay tended to aggregate. In MNE, the clay formed fibrous aggregates, which collapsed under elongation, dissipating energy and significantly improving tensile properties.

Given its superior mechanical performance and recyclability, this elastomer holds great potential for high-performance applications.

Looking ahead, we aim to explore its use in tire materials, where its distinctive properties could contribute to enhanced durability and sustainability.



Keywords: *Multinetwork system, covalent bond, hydrogen bond, Clay planebond,thermoplasticity, tensile properties, creep resistance*

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Biography

Dr. Keisuke Chino is a Principal Researcher at the R&D Division of ENEOS Materials Corporation. He received his Doctorate in Polymer Chemistry from the Tokyo Institute of Technology in 1996. Dr. Chino began his career at The Yokohama Rubber Co., Ltd., where he contributed to the development of elastomers, rubber additives, and adhesives. In 2014, he joined ENEOS Corporation, focusing on advanced rubber materials. Since 2024, he has been seconded to ENEOS Materials Corporation, working on recyclable polymers and innovative rubber additives.His current research centers on multi-network polymer systems that combine thermoplasticity, heat resistance, and mechanical strength. Dr. Chino has received multiple awards, including the 15th Nikkei BP Technical Award. He has authored about 50 peer-reviewed publications and filed approximately 250 patent applications, reflecting his significant contributions to polymer science and materials innovation.

Recent Advances on Redox-active Triarylamine-Based Materials for Energy-related Applications

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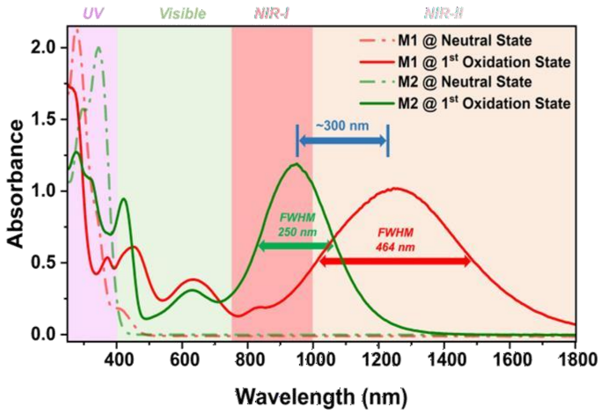
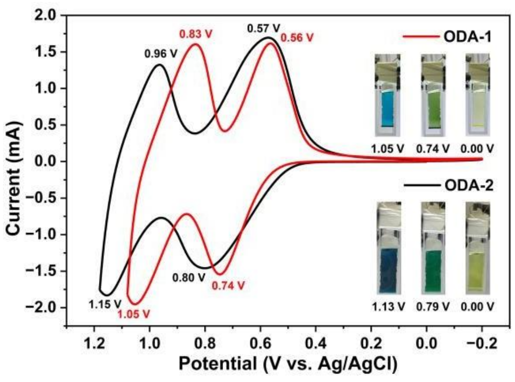
This talk describes the recent development of triphenylamine (TPA)-based advanced materials for various optoelectronic applications. These materials have experienced an exponential growth of research interests and have rapidly developed into an emerging field. The newly developed TPA-containing derivatives and polymers in the past few years are summarized, emphasizing the synthetic approaches and their potential applications.

We herein systemically discuss the structural design and electrochemical stability of different TPA-based polymers that will benefit polymer chemists and the scientific community to have a deeper and broader understanding of the recent developments and further prompt the engineering and conceptual design of materials for some advanced applications. Thus, the novel arylamine/TPA-containing derivatives and the resulting solution-processable functional polymers for EC-related applications with interesting color transitions and good EC reversibility in the visible and NIR range will be discussed.

The relation between structures and properties of the resulting materials will be presented in terms of their energy-related functionality, primarily focusing on valuable insights with elevated redox stability to meet the emerging demands.[1-5]





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Biography

Guey-Sheng Liou is a distinguished professor at the Institute of Polymer Science and Engineering, National Taiwan University, Taiwan. He received his Ph.D. from the Department of Organic and Polymeric Materials at Tokyo Institute of Technology in 1993 under the supervision of Prof. Yoshio Imai and Prof. Masaaki Kakimoto. He then worked as a researcher at Union Chemical Laboratory, Industrial Technology and Research Institute, Taiwan, until July1996. He joined I-Shou University and became a professor in 2000. He moved to National China University from 2001 to 2007 and then to the Institute of Polymer Science and Engineering, National Taiwan University (2007-present). His research interests include developing organic redox-active materials, light-emitting aromatic polymers, thermally stable polymers for microelectronics and energy-related applications, and polymer-inorganic hybrid materials for optical applications. He was awarded Outstanding Research Awards from the Polymer Society Taipei and the Ministry of Science and Technology Taiwan in 2009, 2016, and 2021 respectively. He is a Fellow of the Royal Society of Chemistry and serves onthe Advisory Board for Reactive and Functional Polymers and Polymer Chemistry.

Development of Functional Polyurethane Elastomers

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Abstract

Polyurethanes (PUs) made up of isocyanates, alkylene glycols, and curing agents are used for many industrial and commercial products such as rubbers, films, fibers, paints, forms, and so on.In this presentation, We will talk two topics.

Topic 1.We so far synthesized PUs crosslinked by polyrotaxanes[1] in which plural ring molecules are interlocked by a long axle molecule bearing bulky end cap groups that prevent the ring molecules from being released and characterized their thermal and physical properties.[2-4] We will briefly talk their results.

Topic 2. A certain PU forms a microphase-separated structure consisting of a hard segment domain and soft segment domain that affect its thermal and elastic properties.[5-6] We have recently found that the mixing of deep eutectic solvents (DES), are mixtures consisting of two or more hydrogen-bonded donor and hydrogen-bonded acceptor and are liquids at room temperature in which the melting point of the mixture is significantly lower than the melting point of each component, in the soft-segment moieties results in apperance of ionic conductivity.

We will talk their results in detail.

Keywords: *Polyurethane, Polyrotaxane,Deep Eutectic Solvent, Ion Conductivity*

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Biography

Dr. Hiroto Murakami is a professor at Nagasaki University, Japan. He received doctor's degree from Kyushu University in 1994. Thereafter, he became a research associate at Nagasaki University in 1995, and then an associate professor in 2005. He has been in his current position since 2021. He also serves on the board of directors of the Society of Rubber Science and Technology, Japan, and as a vice president of the Japan Society of Polymer Processing.

Preparation of Alloy Nanoparticles and their Functionalization with Antibodies

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Abstract

Gold nanoparticles can serve as mass probes that generate specific ions upon pulsed-laser irradiation [1, 2]. These ions act as reporter signals, indicating the presence of target molecules within the laser-irradiated area. Using imaging mass spectrometry, the spatial distribution of target peptides can be visualized by mapping these probe ions. Silver and palladium nanoparticles are potential candidates for generating different reporter ions; however, their chemical stabilities are insufficient to use them as a mass probe in an aqueous solution. Alloying these metals with gold offers a promising strategy to enhance the nanoparticle stability [3].

In this study, we introduce a nobel technique for detecting the conjugation of two kinds of alloy nanoparticles.These alloy nanoparticles can generate a variety of ions upon laser irradiation. When gold-silver (AuAg) and gold-palladium (AuPd) nanoparticles are in close proximity,pulsed-laser irradiation generates $AgPd^+$ ions—species that are not produced by isolated AuAg or AuPd nanoparticles. If immune interaction conjugates the two-kinds of alloy nanoparticles, the resultingAgPd$^+$ ions serve as reporter signalsindicating the presence of specific antigens. Owing to the high sensitivity of mass spectrometry, the use of $AgPd^+$ as a reporter ion enables the detection of even a small number of conjugated nanoparticles.

Figure 1 shows the *m/z* values of $AgPd^+$ ions that result from isotopic combination. Although, sevenkinds of $AgPd^+$ ionsare theoretically expected, five of them (*m/z* 211, 212, 213, 213, and 215) overlap with signals from Ag_2^+ and Pd_2^+ ions. In contrast, the signals at *m/z* 217 and 219 do not overlapp with Ag_2^+ and Pd_2^+ions, andare therefore considered promising candidates for specific reporter ions.

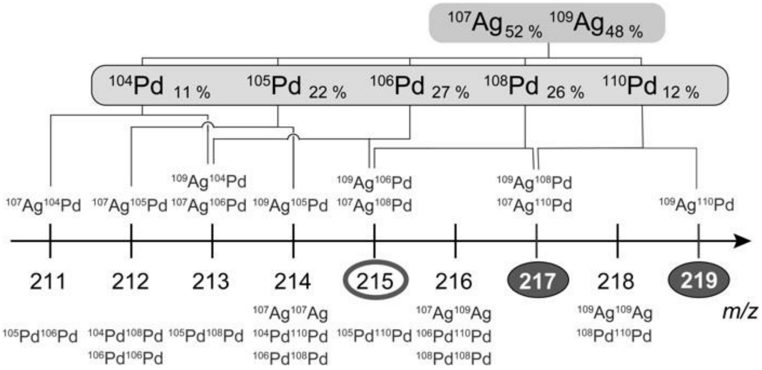

Figure 1. *m/z* values of $AgPd^+$ ions. *m/z* values of Ag_2^+ and Pd_2^+ ions are shown at the bottom. The percentages beside the chemical symbols are the abundances of the isotopes.

Keywords: *Alloy Nanoparticles, Laser Desorption/Ionizetion Mass Spectrometry, Cluster Ions*

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Biography

Professor Yasuro Niidome received his Ph.D. in photofunctional molecular assemblies from the Tokyo Institute of Technology in 1994. He began his academic career as an assistant professor at Kyushu University in Japan, focusing on the preparation of anisotropic gold nanoparticles and their applications in biosensing and plasmonic nanomaterials. In 2012, he joined Kagoshima University, where he currently serves as a professor in the Department of Science.

He has authored more than 150 peer-reviewed papers, filed 35 patent applications, and has an h-index of 41. His primary research interests include the preparation of alloy nanoparticles composed of gold and base metals. His notable contributions to the field of nano-biosciences include chemical treatments to stabilize colloidal dispersions of the alloy nanoparticles under physiological conditions, as well as surface functionalization with bioactive peptides such as antibodies.

Composite developments for next generation airliners

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Abstract

The Wright Brothers are probably best known for inventing, building, and flying the world's first successful airplane with the Wright Flyer in 1903. But they were also printers and had a bicycle repair and sales shop and even manufactured their own brand. Comparing the bicycle from that time with nowadays it seems not much has changed in the basic design and looks. However, airplanes have changed dramatically compared to 1903. Starting with linen and wood a major step was the mainstream adoption of aluminium in the 1930s after which it remained the mainstay material in aerospace even up to this day. From the 1980 composites started to be used more and more, with Airbus using it on the iconic A300/310. From then on it seems like there is an exponential growth in the use of composites with the B787 and A350 being the pinacle. The question now is what role composites will play in the successors of the B737 and A320. The A220, former C-series, already provides a bit of a clue. In this keynote speech I will address several developments that will enable further optimal use of composites in the next generation airliners.

Keywords: *Aerospace, Thermoplastics, Welding, Infusion, High Temperature Resins*

Biography

Ronald is Senior R&D Engineer with several years of experience with conceptual and detail design, analysis and fabrication of structural components of composite materials, for aerospace, defence and non-aerospace applications. Graduated at TU Delft Aerospace Engineering in 1998. Working at the Royal Netherlands Aerospace Centre NLR since 2008 and participated in several national and international R&D projects and as coordinator for the EU project AUTOW on Dry Fibre Placement (DFP) development and its follow-up CANAL on Non-Conventional Laminates in combination with DFP. For the AUTOW project Ronald was awarded the Outstanding Paper at SAMPE's Fall Tech 2011 Outstanding Paper. Current R&D work involves development of processing and design of high temperature composites (BMI, Cyanate-ester, Polyimides & Phthalonitrile resins), DFP and vacuum infusion and multi-functional composites. Ronald is married and has three daughters and three cats.

One-pot/One-step Synthesis of Multiblock Copolyester Using Organocatalysts

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Abstract

I reportone-pot/one-step self-switchable polymerization system that bridges ring-opening alternating copolymerization (ROAC) of anhydrides/epoxides and ring-opening polymerization (ROP) of cyclic esters based on alkali metal carboxylate catalysts as a substitute for conventional procedures using transition metal complex catalysts, and systematically studied the structure-activity relationships of these catalysts for such polymerization. This self-switchable polymerization system 1) achieves green and highly controllable copolymerization using simple catalysts; 2) provides easy access to the synthesis of sequentially and architecturally controlled multiblock polyesters; and 3) shows a great capability for expanding the synthetic scope to various functional monomers. Without an external trigger, the catalyst polymerization spontaneously connects some catalytic cycles in an orderly manner, involving anhydride/epoxide ROAC and cyclic ester ROP, creating a one-pot/one-stepsynthetic pathway. Following this autotandem catalysis, reasonable combinations of different catalytic cycles allow the direct preparation of diverse, sequence-controlled, multiblock copolymers, even containing various hyperbranched architectures[1-6].

Keywords: *Ring-opening polymerization, Ring-opening alternating copolymerization, Self-switchable polymerization, One-pot/one-step synthesis,Polyester*

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Biography

Toshifumi Satoh is a Professor of the Faculty of Engineering, Hokkaido University, Japan. He worked in the group of Prof. Bruce M. Novak at the University of Massachusetts Amherst and at North Carolina State University, USA, from 1998-2000 as a post-doctoral fellow. He is now an editor of Polymer, Elsevier. His current fields of interest include topological polymer synthesis and controlled/living polymerization using organocatalysts.

Crystallinity modulation for shrinkage and warpage control in 3D printing process using Differential Scanning Calorimetry.

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Abstract

The challenges of shrinkage and warpage in 3D printing often originated from the crystallization behaviour of semi-crystalline thermoplastic polymers. This study explores the modulation of crystallinity to address these issues by leveraging Differential Scanning Calorimetry (DSC) as an analytical tool. The crystallinity modulation was achieved through incorporation of different types of mineral fillers, compounded with post-consumer high-density polyethylene (HDPE) using a heated two-roll mill. HDPE filaments were subsequently produced using a melt extruder for use in the additive manufacturing process. By understanding the relationship between thermal properties, crystallization behaviour, and filler incorporation, the research identifies optimal processing conditions to reduce dimensional inaccuracies. Experimental results revealed that controlled crystallinity impacted the shrinkage and warpage occurrence and thus offered a practical approach to improve 3D printed part reproducibility and performance. These findings also give indication of the possibility of using post-consumer HDPE as 3D printing materials despite its inherent crystallization behaviour.

Keywords: *3D Printing, Post-Consumer HDPE, Crystallization, Shrinkage, Warpage*

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Biography

Zulkifli Mohamad Ariff is an academic lecturer at the School of Materials & Mineral Resources Engineering, Universiti Sains Malaysia. His main areas of research are polymeric foams and polymer melt rheology. He has published more than 80 scientific peer-reviewed indexed journal papers in several fields of his research interests. He is a member of Society of Plastics Engineers (USA), Plastics and Rubber Institute Malaysia (PRIM) and Editorial Board Member for Journal of Cellular Plastics published by Sage Publication Ltd.

Invited Talks:

Photochemical Advanced Oxidation: An Eco-Friendly, Non-Halogen Bleaching Method for Cotton Fabrics

N.Kimura[1*],A.Koibuchi[1],Y.Tsuchida[1],H.Makado[1],R.Akiyama[1],K.Hirose[1], Y.Kamata[1],K.Yuda[1],K.Hamada[2],T.Ochiai[2],M.Igarashi[3],Y.Ishikawa[3],T.Nagura[3]

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Abstract

Cotton fabrics have traditionally been bleached using chlorine-based reagents at high temperatures. However, these halogen-based methods are becoming less favored due to environmental concerns. Photochemical advanced oxidation processes (AOPs) have emerged as alternative bleaching methods. We previously applied AOPs combining hydrogen peroxide or ozone with ultraviolet light to bleach cotton, but faced issues with color reversion upon ironing and prolonged bleaching times.

This study explores the use of a high-power UV- LED with a narrow emission spectrum (365nm, excluding UV-B and UV-C) to address these issues. Cotton fabrics were treated with 3% hydrogenperoxide and irradiated with UV-LED light. After ironing at approximately 200°C for one minute, whiteness comparable to chlorine-bleached fabrics was achieved within 10 minutes—a significant reduction from the 100 minutes required by high-pressure mercury lamps.

The presentation will also cover kinetic analysis of whiteness development, the impact of inorganic salt additives on color reversion, and mechanistic insights via NMR spectroscopy.

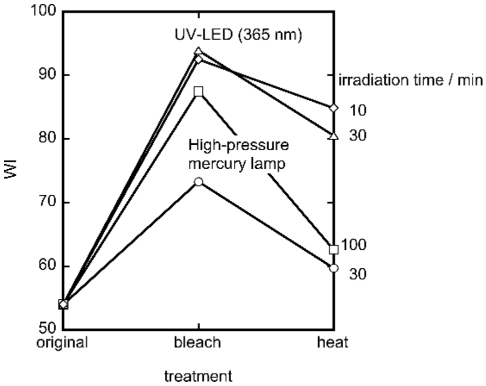

Fig. 1. Whiteness of cotton fabrics after bleaching and heating.

Keywords: cotton fabrics, advanced oxidation processes, bleaching, UV-LED, color reversion

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Biography

Dr. Noritaka Kimura received his Doctor of Engineering degree in 1992 from the Department of Polymer Chemistry, Graduate School of Engineering, Tokyo Institute of Technology. He began his academic career at Nagaoka University of Technology in 1993 as a Research Associate, was promoted to Associate Professor in 1996. His research interests include the development of novel materials incorporating polysaccharides, studied through computational simulations. He is also involved in the scientific investigation of yukizarashi, the traditional now- bleaching method for Japanese paper(washi), and inthead vancement of environmentally friendly bleaching processes for cotton.

Dual Stimuli-Sensitive Polymers which Generate Bubbles - Toward Reducing Environmental Impact

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Abstract

Generation of gaseous compounds in composite materials has attracted much attention for the application of a circular economy. The degradation of polymeric adhesives, which generate isobutene gas, can easily delaminate the polyethylene terephthalate (PET)-laminated stainless steel plate [1]. Poly(*p*-*tert*-butoxycarbonyloxystyrene) (PBOCS) was effective to form gaseous compounds, such as CO_2 and isobutene, in combination with ultraviolet light (UV)-irradiation and the subsequent heating in the presence of a UV-sensitive photoacid generator (PAG). We reported that enhanced delamination efficiency of polyimide-copper bilayers with UV/heat-activated foamableadhesive [2]. We recently reported the degradation of PBOCS using near infrared light (NIR) and subsequent heating in the presence of photon upconversion nanoparticles and a PAG [3,4]. Ultrasound-assisted decomposion of PBOCS was also achieved [5]. The development of dual stimuli-sensitive polymers which generate bubbles is a promising candidate to contribute the reduction of envirmental impact.

Keywords: *Degradation, Polymer, Dual Stimuli, Bubbles, Circular Economy*

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Biography

Haruyuki Okamura received his B.S. degree in 1994, M.S. degree in 1996, and Ph.D. degree in 1998 from Kyoto University for the study on synthesis and properties of fullerene-containing polymers with well-defined structures. He joined Osaka Prefecture University as a research associate in 1999. After being a visiting scientist (2009-2010) at Cornell University (USA), he was promoted to Associate Professor in 2011. He is now in Osaka Metropolitan University from 2022. His research interests include the synthesis of resist materials, photoacid generators, and reworkable resins. He is a member of the Society of Polymer Science, Japan.

Surface Chemistry-Driven Innovations in Nanobioceramic Design

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Abstract

The adhered cell functions sensitively respond with the bioceramicsurface properties such as wettability, nanostructures, and chemical compositions. Thus, the understanding of cellular response to the nanobioceramic surfaces is crucial for successful biomedical applications.[1]We have focused on the synthesis of innovative nanobioceramics and their interfaces (i.e., "(a) the nanobioceramic-controlled cell functions through the cell-material interfacial interactions and (b) the effective cellular uptakes by the ligand-interactions").[2, 3]We have researched how to clarify interfacial phenomena of the cell adhesion on the nanobioceramics using various interfacial analyses, suggesting the controllable cytocompatibility.[4] Based on the results, we clarifiedthe enhanced interfacial biocompatibility by explaining the role of highly-ordered nanostructures.[5] As a result, the interesting mesostrucuterd silica hybrid films with biomolecules have successfully been prepared, and the different cell adhesion processes have been demonstrated depending on the structures.[6]These approaches clarify several ambiguities of the interfacial phenomena, and help to design highly-cytocompatiblenanobioceramics. In future, these surface-engineering technologies ofnanobioceramics will effectively encourage and improve cell theranostics.

Keywords: *Nanobio Materials; Nanobioceramics; Inorganic/Organic Nanohybrids; Cell theranostics; Bio-imaging; QCM-D*

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Biography

Prof. Dr. Motohiro Tagaya received his B.S. degree (Bachelor of Science) from Waseda University in 2004, and Master degree (Master of Engineering) from Tokyo Institute of Technology (Tokyo Tech.) in 2006. He then joined the Materials Laboratory of Sony Co. as a Research Scientist. He received his Doctorate from Tokyo Tech. in 2010. He then moved to a Japan Society for the Promotion of Science (JSPS) Research Fellowships for Young Scientists (PD). In 2011, he became an Assistant Professor in Department of Materials Science and Technology at Nagaoka University of Technology (NUT). In 2014, he promoted to be a Tenure-Track Associate Professor in NUT. In 2017, he became and Associate Professor in Department of Materials Science and Technology of NUT

Multiple stimuli-responsive liquid plasticine

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Abstract

This study focuses on the development of liquid plasticines (LPs) with pH- and photo-responsive behaviors, aiming to create new materials for microreactor vessels. LPs are a variant of liquid marbles (LMs), which are water droplets encapsulated by hydrophobic particles. While LMs are opaque and not easily observable, LPs use smaller hydrophobic silica particles (less than 50 nm), resulting in transparent structures. This transparency allows for internal observation and manipulation, making LPs ideal for small-scale reactors and culture vessels. In this work, two types of silica particles were prepared: superhydrophobic silica (SD_0) and pH-responsive silica (SD_1) [1]. SD_1 particles were synthesized by grafting poly(2-(diisopropylamino)ethyl methacrylate) (PDPA) onto the surface of SD_0 particles. Under basic to neutral conditions, PDPA retains hydrophobicity, but it becomes hydrophilic when exposed to acidic conditions due to the protonation of tertiary amine groups. SD_1 alone was unsuitable for LP preparation due to excessive hydrophilicity. Therefore, a mixture of SD_0 and SD_1 (7:3 ratio) was used to prepare LPs. These LPs exhibited pH-responsive behavior and disintegrated when exposed to HCl gas, allowing the internal water to leak out and be absorbed by adjacent materials like paper (Figure 1). Furthermore, LPs prepared using an aqueous solution containing a photoacid generator (PAG) disintegrated upon UV light irradiation. The PAG generated acid under light, which protonated the PDPA chains in SD_1, leading to LP breakdown.

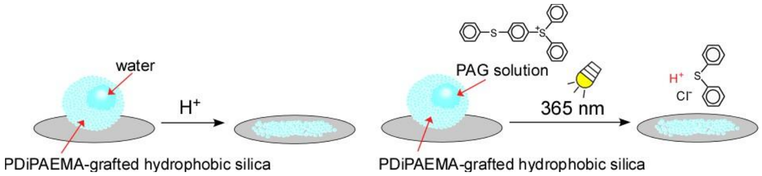

Figure 1. Conceptual illustration of pH- and photo-responsive liquid plasticine (LP).

Keywords: *liquid plasticine, silica-gel, pH-responsive polymers, photoacid generator (PAG), surface initiated-atom transfer radical polymerization (SI-ATRP), contact angle*

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Biography

Shin-ichi Yusa is a native of Japan and received B.S. (1993) and M.S. (1995) degrees in polymer chemistry from Osaka University under the direction of Prof. MikiharuKamachi and Prof. Yotaro Morishima. He received a Ph.D. from Osaka University (2000). He joined Himeji Institute of Technology as an assistant professor in 1997. He became associate professor of University of Hyogo (2008). His research interests are in controlled radical polymerization and characterization of water-soluble polymers. He is currently on Section Editor-in-Chief of Polymers (MDPI) and Editorial Advisory Board of Langmuir (ACS).

Electroreduction of CO_2 at Pt-Based Catalysts in a Polymer Electrolyte Cell

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Abstract

Treating CO_2 as an unused resource and converting it into value-added chemicals and fuels are important. CO_2 electroreduction has been receiving significant levels of attention as one of the technologies. There are many reports on CO_2 electroreduction at various metal electrodes, mainly Au, Ag, and Cu catalysts. However, almost all these techniques still require high overpotentials for CO_2 reduction. The use of Pt-based electrocatalyst is found to be a breakthrough to overcome the issue,[1] and has recently reported to exhibit the excellent performance as a technique of converting CO_2 into CH_4. The use of Cu-based electrocatalyst is conventionally known to be effective for the CH_4 generation reaction by CO_2 reduction. On the other hand, we found the reaction proceeds with extremely low overpotential for the first time by preparing a polymer electrolyte cell equipped with a Nafion-based membrane electrode assembly containg the Pt-based electrocatalyst and by diluting supplied CO_2 with Ar as shown in Fig. 1.[2] Remarkably, we have successfully developed a technology that converts CO_2 to CH_4 with a faradaic efficiency of ~60% without overpotential.[3]

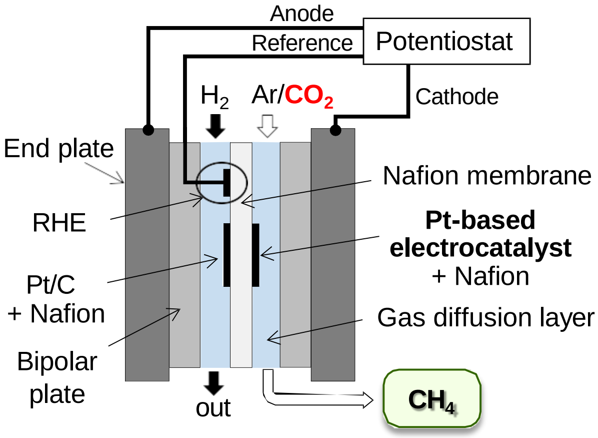

Fig. 1 Schematic overview of our CO_2 reduction using a polymer electrolyte cell.

Keywords: *CO_2 reduction, CH_4, Platinum, Polymer electrolyte cell*

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Biography

Dr. Shofu Matsuda received his B.Eng., M.Eng, and Dr.Eng. degrees from Waseda University in 2012, 2014, and 2016, respectively. He was a visiting student at University of Rochester, NY USA, in 2015. He had been an Assistant Professor at Nagaoka University of Technology since 2017 to 2022. He is now an Assistant Professor (Principal Investigator) at Hirosaki University. He is a member of the Electrochemical Society of Japan, the International Society of Electrochemistry, and the Chemical Society of Japan. His research interests focus on electroreduction of carbon dioxide (CO_2) and polymer electrolyte fuel cells.

Young Research Forum:

Influence of Hygrothermal Ageing on the properties of Vinyl Ester/Carbon Composites

Abdullah Iftikhar[1*], Allan Manalo[1], Zaneta Senselova[1], Wahid Ferdous[1], Mazhar Peerzada[1], Hannah Seligmann[1], Kate Nguyen[2], and Brahim Benmokrane[3]
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Abstract

Fibre-reinforced polymer (FRP) components in civil infrastructure are commonly exposed to combined effect of moisture and elevated temperatures. The degradation mechanisms and the quantification of damage in constituents of FRP composites are not well understood. This study involves the investigation of effect of hygrothermal ageing on the properties of carbon/vinyl-ester system by conditioning 68 Tex carbon-fibre yarns, vinyl-ester infusion resin (SPV6036), and single-yarn carbon/vinyl-ester composites at 60 °C and 98% RH for 1000, 2000, and 3000 hours. This was followed by thermal, mechanical, and microstructural characterization of each constituent to identify the reduction in the properties after ageing. Vinyl ester resin showed a thermal stability with T_g of 103°C that remained unchanged after exposure.FTIR analysis revealed that all the peaks have similar positions after ageing but the intensities of some peaks were changed indicating chemical changes. Neat-resin tensile strengthdecreased by 17% at 3000 h, fibre-yarn tensile strength dropped by 34%, and interfacial shear strength inferred from single-yarn fragmentation declined by 11%. Scanning electron microscopy revealed matrix microcracking, fibre–matrix debonding, fibre pull-out, and localized fibre breakage, implicating moisture-induced plasticization and progressive interfacial weakening as primary degradation mechanisms. The outcomes of this study provided a better understanding of the role of each constituent material in the overall degradation of vinyl ester/carbon composites. The degradation mechanisms identified in the study along with the strength reduction data can be utilized in the qualification criteria for FRP systems deployed in hygrothermal service environments.

Keywords: *Hygrothermal Ageing, Durability, Polymer Composites, Interface, Degradation mechanisms.*

Biography

A PhD researcher in structural/civil engineering focused on the environmental durability of fibre-reinforced polymer (FRP) composites. My work isolates degradation mechanisms in fibres, resins, and the fibre/matrix interface under hygrothermal, saline, and UV exposures. My goal is mechanism-based service-life prediction and qualification guidance for FRP composites in civil infrastructure.

Impact Behaviour of Pultruded GFRP Composite Sections

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Hannah Seligmann [1]

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Abstract

The prevailing method for constructing support piles for navigational aids involves using steel, which is susceptible to corrosion in a marine environment, necessitating frequent maintenance[1]. Non-corrosive, high strength, and light weight material properties of glass fibre-reinforced polymer (GFRP) composites can be an effective alternative for the pile foundation of A-to-N structures[2]. In this application, pile structure should resist axial and lateral impacts caused during driving and impacts from small vessels, respectively. GFRP composite pile has relatively lower stiffness than steel and has thin walls which requires careful consideration while driving[3, 4]. Therefore, it is imperative to understand the impact performance of GFRP CHS during and post-driving[5]. The proposed study will evaluate the energy absorption capacity and overall behaviour of pultruded GFRP composite sections with different geometries (circular, square, and rectangular) under axial and lateral impact. Axial impact on the profile revealed that the CHS profile has superior impact resistance than square (SHS) and rectangular (RHS) sections by withstanding the highest impact energy without damage. The continuity of fibers within CHS minimizes stress concentrations at corners due to impact forces.

Keywords: *GFRP, A-to-N structure, pile foundation, axial, lateral, impact*

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Biography

I am a Civil Engineering professional with a research-based master's degree in Geotechnical Engineering, and I am currently undertaking a PhD at the University of Southern Queensland. My doctoral research focuses on the impact behaviour of Glass Fibre Reinforced Polymer (GFRP) composite piles for aid-to-navigation structures. Specifically, I investigate their structural response, failure mechanisms, and energy absorption characteristics under various impact scenarios. This work aims to improve the understanding and design of resilient, durable, and sustainable composite materials for marine and coastal infrastructure, especially in environments exposed to vessel collisions and harsh loading conditions.

Poster Presentations:

Rubbery Soft Polymer Electrolyte Membrane with Nanomatrix Channel Prepared from Natural Rubber

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Abstract

Rubbery soft polymer electrolyte membranes (PEMs) with a nanomatrix channel [1] prepared from natural rubber are sustainable functional materials that can potentially achieve an efficient proton transportation, which is required for flexible polymer electrolyte fuel cells to generate green electrical energy. This may be achieved by forming the nanomatrix channel consisting of hydrophobic polymer particles with a diameter of approximetly 1 μm and nano- channel of hydrophilic polymer that possesses a proton conductivity. In our previous studies [2, 3], the polymer electrolyte membrane with the nanomatrix channel was prepared by graft- copolymerization of styrene on the surface of natural rubber particles followed by sulfonation with chlorosulfonic acid. The resulting membrane accomplished high proton conductivity of 0.095 S/cm, which was higher than that of Nafion. However, the membrane was too brittle for application in polymer electrolytefuel cells because chlorosulfonic acid resulted in not only the sulfonation of grafted polystyrene but also the cyclization of natural rubber. The cyclization may be avoided by graft-copolymerization of styrene substituted with sulfonic acid precursor. In the present study, polymer electrolyte membrane with the nanomatrix channel was prepared by graft- copolymerization of ethyl *p*-styrene sulfonate(SSEt) on to the surface of natural rubber particles in

Latex stage followed by hydrolysis with
NaOH.

Table 1 shows the ion exchanged capacity (IEC) and proton conductivity (*σ*) measured at 50°C for DPNR, DPNR-*graft*-poly(styrenesulfonicacid) DPNR-*graft*-PSS, and Nafion117. The IEC and *σ* of DPNR were0.00meq/gand0.0S/cm, respectively, owing to the lack of a sulfonic acid group. The IEC of DPNR-*graft*-PSS(1.0) was about one-fourth that of Nafion117(0.87meq/g).

Table1IECandconductivityofDPNR,DPNR-*graft*-PSS,and Nafion117.

Specimen	IEC (meq/g)	Conductivity, *σ*(S/cm)a	*σ** ((S/cm)/meq)b
DPNR	0.00	0.0	0.0
DPNR-*graft*-PSS	0.22	8.1×10-3	2.6
Nafion117	0.87	4.6×10-2	1.9

aMeasuredat50°C,

b*σ**= *σ*
t:thickness,*A*:surfacearea,*d*:density

IEC*tA*

The σ of DPNR-*graft*-PSS was 8.1×10^{-3} S/cm, but it was lower than that of Nafion117 (4.6×10^{-2}S/cm). The proton conductivity per unit equivalent of sulfonic acid(σ^*) of DPNR-*graft*-PSS was approximately 1.4 times higher than that of Nafion117, 1.9 (S/cm)/meq. The high σ^* maybe attributed to the nanomatrix channel promoting the effective transportation of protons.

Keywords: Naturalrubber, Nanomatrix channel, graft-copolymerization,

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Biography

Dr. Yoshimasa Yamamoto is an Associate Professor at the National Institute of Technology, Tokyo College. He earned his Doctor of Engineering degree from Nagaoka University of Technology in 2004. Following his doctoral studies, he served as a Postdoctoral Fellow at Nagaoka University of Technology (2004–2005) and Kyoto University (2005–2006). He later joined Nagaoka University of Technology as an Assistant Professor (2006–2011) before taking up his current position in 2011.

Surface State Control of Apatite Nanoparticles for Biocompatible Coatings

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Abstract

Apatite nanoparticles are highly biocompatible materials with the significant potential for forming bioactive films on biodevices, enabling the effective interactions with living organisms.[1] In this study, we explored the biomolecular adsorption properties of apatite nanoparticle-coated Quartz Crystal Microbalance with Dissipation (QCM-D) sensor. To further advance the development of the sensor device, it is crucial to comprehensively understand the physicochemical characteristics of the device-apatite at the interfaces. Herein, we investigated the surface properties by synthesizing the apatite nanoparticles using three different pH-adjusting agents—tetramethylammonium hydroxide, sodium hydroxide, and potassium hydroxide—varying the OH^- concentration as a key parameter to control the nanoparticle surface states. The synthetic conditions were systematically modulated under three concentration levels to examine the impact on electrophoretic properties. Our results demonstrated that by fine-tuning the OH^- concentration, the ion content ratio within the nanoparticle surface phases could be precisely controlled,[2,3] leading to the distinct changes in the surface ion composition and electrophoretic deposition properties. These findings offer the valuable insights into the surface engineering strategies for apatite nanoparticle synthesis and coating.[4] The developed methods hold the potential application in conductive substrate coating aimed at biomedical uses.

Keywords: *Hydroxyapatite Nanoparticles; Non-apatitic Layer; Thin Film Formation on Biomedical Devices; Hydration layer; Surface Properties of Nanobioceramics*

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Biography

Kazuto Sugimoto received his B.S. and M.Eng. degrees in Engineering from Nagaoka University of Technology (NUT) in 2020 and 2022, respectively. After completing his master’s program, he joined Shinsei Financial Co., Ltd. In 2025, he began his doctoral program at NUT, where he was awarded a prestigious Japan Society for the Promotion of Science (JSPS) Research Fellowship for Young Scientists (DC1). He has authored four research papers and two review articles, thereby actively contributing to the advancement of his field.

Preparation of Gold-Copper Alloy Nanoparticles in Aqueous Solutions

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Abstract

Gold nanoparticles can serve as mass probes that generate specific ions, “reporter ions”, upon pulsed-laser irradiation [1, 2]. These ions indicate the presence of target molecules within the laser-irradiated region. Silver and palladium alloy nanoparticles are potential candidates for generating the reporter ions. Variation in alloy metals enables simultaneous detection of multiple target molecules; however, base metals other than gold, silver, platinum, and palladium, are not stable in aqueous solutions for use as a mass probe. Alloying base-metals with gold offers a promising strategy to enhance nanoparticle stability. In this study, we attempted to prepare gold-copper (AuCu) alloy nanoparticlesthat can be functionalized with antibodies under physiological conditions.

Copper chloride (II) was added toa colloidal solution of gold nanoparticles. Molar ratios of copper and gold atoms were set at 2:1, 1:1, and 1:2. Copper nanoparticles were generated by adding$NaBH_4$to the mixed solution, and subsequently fused with the gold nanoparticles to form AuCu alloy nanoparticles by pulsed-laser irradiation (532 nm, ~10 ns, ~10 mJ/pulse).Since the $NaBH_4$reducesdissolved oxygen, the copper nanoparticles in the aqueous solutions were expected to be transiently stable.

Figure 1 shows extinction spectra of the sample(Au:Cu=1:2) after laser irradiation. The surface plasmon (SP) band at around 520 nm indicates the presence of gold-rich colloidal nanoparticles. The nanoparticles remained stably dispersed in colloidal form even 7 days after preparation, and the surface plasmon band showed no significant shift or change. Laser desorption/ionization measurements of the nanoparticles indicated efficient desorption of gold and copper ions. Consequently, the alloy nanoparticles composed of gold and copper were able to remain dispersed for at least 7 days under physiological conditions.

The AuCu alloy nanoparticles could be modified with antibodies using the same protocols as those applied to gold nanoparticles. The antibodies on the AuCu alloy nanoparticles retained their functionality and were able to bind specifically to their target antigens.

Keywords: *Alloy Nanoparticles, Laser Desorption/Ionization Mass Spectrometry*

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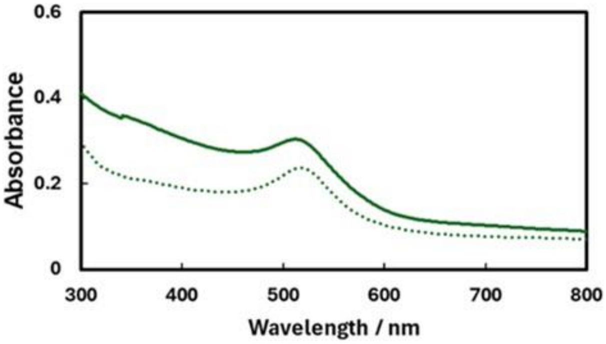

Fig.2. Extinction spectra of the Laser-irradiated solution (Au:Cu=1:2) soon after laser irradiation (solid line) and 7 days after preparation (dotted line).

Biography

Ms. Kanako Koga is a master course student in Chemistry Program, Graduate School of Science and Engineering in Kagoshima University. She is conducting her research under the supervision of Professor Niidome in Kagoshima University, and workingon the preparation of alloy nanoparticles composed of gold and base metals.In her free time, she enjoys cooking a variety of dishes, especially traditional Japanese meals.

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