ACTIVITIES OF INTERNATIONAL JOINT USAGE/RESEARCH CENTER

iJURC Cooperative Research Subjects 2022

(1 April 2022 ~ 31 March 2023)

STARTING-UP SUBJECTS
(IN SPECIFIC FIELDS CHOSEN BY iJURC)

Synthesis and Optical Characterization of Helical Gold Nanowires with Branches
NAKAGAWA, Makoto, Osaka Research Institute of Industrial Science and Technology
Host in iJURC KURATA, Hiroki

Development of New Nano-Structure Target for ISOL
OHNISHI,Tetsuya, SCRIT Team, Instrumentation Development Group, Nishina Center for Accelerator Based Science, RIKEN
Host in iJURC WAKASUGI, Masanori

Verification of Radiochemical Reaction Mechanism for FLASH Radiotherapy with Electron Beams
KODAIRA, Satoshi, Radiation Measurement Group, Department of Radiation Measurement and Dose Assessment, National Institute of Radiological Sciences, National Institutes for Quantum Science and Technology
Host in iJURC OGAWARA, Ryo

Computational Mechanistic Study on the Co-Catalyzed Nitrogenase Model Reactions
SAMEERA, W. M. C., Department of Chemistry, University of Colombo
Host in iJURC OHKI, Yasuhiro [I]

High-Pressure Synthesis and Ionic Conducting Study of Novel Na-Antiperovskites Containing Hydride and Cluster Anions as Solid Electrolytes in Batteries
KOEDTRUAD, Anucha, Chinese Academy of Science (CAS), Institute of High Energy Physics (IHEP), Chinese Spallation Neutron Source (CSNS),
Host in iJURC SHIMAKAWA, Yuichi [I]

Synthesis of Fe-Containing Phosphorus Ligands and Their Application in the Preparation of Metal-Cluster Molecules
OGASAWARA, Masamichi, Graduate School of Technology, Industrial and Social Sciences, Tokushima University
Host in iJURC OHKI, Yasuhiro

Synthesis of Self-Assembled Organoboran Compounds, Elucidation of Self-Assembly Process, and Creation of New Functions
WAKABAYASHI, Shigeharu, Department of Clinical Nutrition, Faculty of Health Science, Suzuka University of Medical Science
Host in iJURC OHKI, Yasuhiro

Synthesis of Alkyl Ethers Using Two Different Alcohols Catalyzed by Organosilane Compound
HASHIMOTO,Toru, Faculty of Engineering, Sanyo-Onoda City University
Host in iJURC NAKAMURA, Masaharu

Development of Heteroacenes with Excellent Photophysical and Electrochemical Properties
MITSUDO, Koichi, Graduate School of Natural Science and Technology, Okayama University
Host in iJURC WAKAMIYA, Atsushi

A Study on Statistical Machine Learning for Efficient Graph Structured Data Analysis
KARASUYAMA, Masayuki, Department of Computer Science, Nagoya Institute of Technology
Host in iJURC MAMITSUKA, Hiroshi [I]

Revealing Evolution Mechanism of Adaptation to High Temperature Based on Omics Data and Flux Balance Analysis
KISHIMOTO, Toshihiko, Faculty of Science, Biomolecular Science, Toho University
Host in iJURC TAMURA, Takeyuki

Control and Analysis of Complex Networks via Probabilistic Minimum Dominating Sets
NACHER, Jose C., Department of Information Science, Faculty of Science, Toho University
Host in iJURC AKUTSU, Tatsuya

Microbial Ecology in the Dark Sea
YOSHIDA,Takashi, Division of Applied Biosciences, Graduate School of Agriculture, Kyoto University
Host in iJURC OGATA, Hiroyuki

Investigations into Catalytic and Biochemical Behaviors of Nitrogenase Fe Protein Using ^{57}Fe Labeling
RIBBE, Markus W., Department of Molecular Biology and Biochemistry, University of California, Irvine
Host in iJURC TANIFUJI, Kazuki [I]

Precise Synthesis and Viscoelastic Properties of Ring Polymers with High Purity and High Molecular Weight
TAKANO, Atsushi, Department of Molecular and Macromolecular Chemistry, Nagoya University
Host in iJURC MATSUMIYA, Yumi [I]

Developing Bioinspired Molecular Catalysts for Materials Science and Medicinal Chemistry
OHTA, Takehiro, Department of Applied Chemistry, Faculty of Engineering, Sanyo-Onoda City University
Host in iJURC OHKI, Yasuhiro

Dinitrogen Fixation Based on Nickel→Z-Type (σ-Electron Acceptor) Ligand Interaction
KAMEO, Hajime, Department of Chemistry, Graduate School of Science, Osaka Prefecture University
Host in iJURC OHKI, Yasuhiro

Evaluation an Effect of Structure in Chiral Silica on Molecular Recognition
HIRAI, Tomoyasu, Department of Applied Chemistry, Osaka Institute of Technology
Host in iJURC TAKENAKA, Mikihito

Development of Organometallic n-Type Materials with High Electrical Conductivity
MURATA, Michihisa, Department of Applied Chemistry, Osaka Institute of Technology
Host in iJURC MURATA, Yasujiro

[I] : International Joint Research
[F] : Female PI

Non-Linear Viscoelasticity of Unentangled Polymers
IANNIRUBERTO, Giovanni, Dipartimento di Ingegneria Chimica, dei Materiali e della Produzione Industriale, Università degli Studi di Napoli "Federico II"
Host in iJURC SATO, Takeshi [I]

Nonlinear Extensional Rheology of Entangled Poly(n-alkyl methacrylate) Melts with Fixed Number of Entanglements and Kuhn Segments per Chain
WU, Shilong, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences (CAS)
Host in iJURC MATSUMIYA, Yumi [I]

Control of Mechanical Properties in Polymer Blend Materials by Hydrogen Bonding Interaction
URAKAWA, Osamu, Department of Macromolecular Science, Graduate School of Science, Osaka University,
Host in iJURC MATSUMIYA, Yumi [I]

Effect of Microplastics on Distribution of Trace Heavy Metals in Seawater
NAKAGUCHI, Yuzuru, Faculty of Science and Engineering, Kindai University
Host in iJURC SOHRIN, Yoshiki

Exploration of Liquid Membrane Transportation of Metal Ions with a Polymer Membrane Containing Ionic Liquid by Use of Electric Field Response of Ions
MUKAI, Hiroshi, Faculty of Education, Kyoto University of Education
Host in iJURC SOHRIN, Yoshiki

Conformation Analysis on Polymer in Food-Grade Oil
OSAKA, Noboru, Okayama University of Science
Host in iJURC TAKENAKA, Mikihito

Physicochemical Characterization of Novel Hybrid Partially Fluorinated Phospholipid Bilayers
SONOYAMA, Masashi, Faculty of Science and Technology, Gunma University
Host in iJURC HASEGAWA, Takeshi

Identification of Active Gibberellins in the Basal Land Plant Marchantia Polymorpha
KOHCHI, Takayuki, Graduate School of Biostudies, Kyoto University
Host in iJURC YAMAGUCHI, Shinjiro

Investigation on High Efficient Spin-Orbit Torque Effect in Multilayers with Combine Anisotropy and DMI
OGNEV, Alexey, Department of General and Experimental Physics, Institute of High Technologies and Advanced Materials, Far Eastern Federal University
Host in iJURC ONO, Teruo [I]

Demonstration of Topological Phase Control in Chalcogenide Superlattices
MOROTA, Misako, Device Technology Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)
Host in iJURC ONO, Teruo [F]

Research and Development of Magnon Quantum Logic Gate Devices Using Synthetic Antiferromagnets
ISHIBASHI, Mio, Department of Physics, Faculty of Science & Graduate School of Science, The University of Tokyo
Host in iJURC ONO, Teruo [F]

EXPANDING SUBJECTS
(IN SPECIFIC FIELDS CHOSEN BY iJURC)

Crystal Structure Analysis of GraE from Root-Nodule-Forming Bacterium
OIKAWA, Tadao, Faculty of Chemistry, Materials and Bioengineering, Kansai University
Host in iJURC FUJII, Tomomi

Enhanced Production of Fast Ions by TNSA with Pre-Pulse Laser
HANAYAMA, Ryohei, The Graduate School for the Creation of New Photonics Industries
Host in iJURC WAKASUGI, Masanori

Design and Tailoring Advanced Functional Materials: Symmetry Operation and High Pressure Synthesis
CHEN, Wei-Tin, Center for Condensed Matter Sciences, National Taiwan University
Host in iJURC SHIMAKAWA, Yuichi [I]

Carboboration and Carbosilylation by Merging Iron and Visible-Light Photocatalysis
HAJRA, Alakananda, Department of Chemistry, Visva-Bharati University
Host in iJURC NAKAMURA, Masaharu [I]

Development and Device Evaluation of New D-π-A Emitters Based on Rigidified Triarylborone Acceptors
MARDER, Todd B., Julius-Maximilians-Universität Würzburg, Institut für Anorganische Chemie
Host in iJURC KAJI, Hironori [I]

High Pressure Synthesis of Novel Hexagonal Perovskite Oxides Containing Unusually High-Valence Fe Ions and Investigation of Their Magnetic Properties
TAN, Zhenhong, Institute of High Energy Physics (IHEP) of the Chinese Academy of Sciences, China Spallation Neutron Source (CSNS)
Host in iJURC SHIMAKAWA, Yuichi [I]

Preparation and Characterization of Novel Magnetic Quadruple Perovskites by High Pressure
AMANO PATINO, Midori Estefani, Institut Charles Gerhardt Montpellier (ICGM, CNRS), D4: Chemistry of Materials, Nanostructures, Materials for Energy
Host in iJURC SHIMAKAWA, Yuichi [I] [F]

Small Molecule Activation Using Anionic Crypto-FLPs
STREUBEL, Rainer, Institute for Inorganic Chemistry, University of Bonn
Host in iJURC TOKITOH, Norihiro [I]

Development of Unsymmetrical π-Electron Systems of Heavier Main Group Elements and Elucidation of Their Property
IWAMOTO, Takeaki, Department of Chemistry, Tohoku University
Host in iJURC MIZUHATA, Yoshiyuki [I]

Development of 1,4-Addition Reactions via Iron Catalysis
ADAK, Laksmikanta, Department of Chemistry, Indian Institute of Engineering Science and Technology
Host in iJURC NAKAMURA, Masaharu [I]

Peptide Bolaamphiphile Anchored Nickel-Based Metallohydrogel as Electrocatalyst for Hydrogen Production
DAS, Apurba K., Department of Chemistry, Indian Institute of Technology Indore
Host in iJURC NAKAMURA, Masaharu [I]

Highly Efficient Solution-Processed Organic Light-Emitting Diodes Employing Multiple Resonance-Induced Thermally Activated Delayed Fluorescence Emitter
ODA, Susumu, Department of Chemistry, Graduate School of Science and Technology, Kwansei Gakuin University
Host in iJURC KAJI, Hironori

Synthesis and Its Catalysis of Dinuclear Complexes Utilizing a Pincer-Type N,N,P Ligand
YAMAGUCHI, Yoshitaka, Graduate School of Engineering, Yokohama National University
Host in iJURC NAKAMURA, Masaharu

Creation of Effective Oxidation Scavenger for Efficient Perovskite-Based Solar Cells
SASAMORI, Takahiro, Faculty of Pure and Applied Sciences, University of Tsukuba
Host in iJURC WAKAMIYA, Atsushi

Developing Machine Learning Approaches for Prediction of Protein Stability Changes upon Missense Mutations
SONG, Jiangning, Biomedicine Discovery Institute, Monash University
Host in iJURC AKUTSU, Tatsuya I

Integrating Omics Data and Module-Based Network with Deep Learning to Develop Cancer Type Predictive Models
YANG, Jinn-Moon, Department of Biological Science and Technology, Institute of Bioinformatics & Systems Biology, National Yang Ming Chiao Tung University
Host in iJURC AKUTSU, Tatsuya I

Evolution of Giant Viruses and Relationships with the Origin of Life
MORGAN, Gaïa, Genoscope - Centre National de Séquençage, Institut François Jacob - CEA
Host in iJURC OGATA, Hiroyuki I

Revealing Marine Microbial-Viral Interactions Through Community Interactome Analyses
CHAFFRON, Samuel, Laboratoire des Sciences du Numérique de Nantes (LS2N), CNRS and Université de Nantes
Host in iJURC ENDO, Hisashi I

Development of a Comprehensive Detection Method for Coronaviruses Originated in Wildlife
WATANABE, Tokiko, Research Institute for Microbial Diseases (RIMD), Osaka University
Host in iJURC OGATA, Hiroyuki F

Effective Molecular Network Analysis and Application to Medical and Agricultural Research
KAYANO, Mitsunori, Research Center for Global Agromedicine, Obihiro University of Agriculture and Veterinary Medicine
Host in iJURC MAMITSUKA, Hiroshi

Precise Synthesis and Controlling Higher Order Structure of Tadpole-Like Janus Cellulose Nanocrystal
GOTO, Atsushi, School of Physical & Mathematical Sciences, Division of Chemistry & Biological Chemistry, Nanyang Technological University
Host in iJURC KINOSE, Yuji I

Exploration of Perovskite Solar Cell Composition: Correlating Device Performance and Fundamental Property
SAEKI, Akinori, Department of Applied Chemistry, Graduate School of Engineering, Osaka University
Host in iJURC WAKAMIYA, Atsushi I

Exploration of Cycloaddition Properties of Guanidine Functionalized Isatins
MARGETIC, Davor, Division of Organic Chemistry and Biochemistry, Laboratory for Physical Organic Chemistry, Rudjer Boskovic Institute
Host in iJURC MURATA, Yasujiro I

Synthesis of Novel Nanotube Molecules with Different Hole Directions by Introducing a Double Heptalene Structure
CHAOLUMEN, College of Chemistry and Chemical Engineering, Inner Mongolia University (IMU)
Host in iJURC HASHIKAWA, Yoshifumi I

Synthesis of Functional Vinyltellurides Using Flow Reactors
NAGAKI, Aiichiro, Faculty of Science, Hokkaido University
Host in iJURC YAMAGO, Shigeru

Host-Guest Complexation of Cyclohexa-2,7-Anthrylene Ethynylene Derivatives with [n]CPP
KOBAYASHI, Kenji, Research Institute of Green Science and Technology, Shizuoka University
Host in iJURC KAYAHARA, Eiichi

Elucidation of the Lubrication Properties of Hyperbranched Polymers and Their Optimization
TAKAHASHI, Yutaka, New Industry Creation Hatchery Center, Tohoku University
Host in iJURC TOSAKA, Masatoshi

Synthesis of Highly Strained Macrocyclic π-Conjugated Molecules via a Multinuclear Au(I)-Pt(II) Complex
TSUCHIDO, Yoshitaka, Department of Chemistry, Faculty of Science Division I, Tokyo University of Science
Host in iJURC KAYAHARA, Eiichi

Synthesis and Applications of Novel Azaazulene Trimer toward Electronic materials
KUROTOBI, Kei, National Institute of Technology, Kurume College
Host in iJURC MURATA, Yasujiro

Isolation of Ultra-Unstable Chemical Species toward Unprecedented Element Strategy
UENO, Hiroshi, Frontier Research Institute for Interdisciplinary Sciences, Tohoku University
Host in iJURC MURATA, Yasujiro

Trace Metal Elemental and Isotopic Composition in the North Pacific Ocean: Sources and Internal Cycling (3)
HO, Tung-Yuan, Research Center for Environmental Changes, Academia Sinica
Host in iJURC SOHRIN, Yoshiki I

Resolving the Structure-Dynamics-Property Relationship in Polymer Nanocomposites under Uniaxial Stretching-II
KOGA, Tadanori, Department of Material Science and Chemical Engineering, Stony Brook University
Host in iJURC TAKENAKA, Mikihito I

High Frequency Response of Polymeric Liquids: Rheology and Dielectric Relaxation
SUKUMARAN, Sathish K., Graduate School of Organic Materials Science, Yamagata University
Host in iJURC SATO, Takeshi I

Analyzing Structural Fluctuation in Thermally Activated Delayed Fluorescence Materials with Ultralow-Frequency Raman Spectroscopy
SATOME, Hikaru, Graduate School of Engineering Science, Osaka University
Host in iJURC KAJI, Hironori

Nano-Scale Structure Characterization of Organosulfur Polymer
FUJIWARA, Akihiko, School of Engineering, Kwansei Gakuin University
Host in iJURC TAKENAKA, Mikihito

Construction of Theoretical Guidelines for Designing Plasmonic Nanoalloys
IIDA, Kenji, Institute for Catalysis, Hokkaido University
Host in iJURC TERANISHI, Toshiharu

Characteristics of Quantum Magnon in Magnetic Insulators
KIM, Kab-Jin, Department of Physics, Korea Advanced Institute of Science and Technology
Host in iJURC ONO, Teruo [I]

Observation of Orbital Hall Effect in Transition Metal Dichalcogenides.
KIM, Sanghoon, Department of Physics, University of Ulsan
Host in iJURC ONO, Teruo [I]

Research on the Efficiency Enhancement of the NV Centers Creation in Nanodiamond
SEGAWA, Takuya F., Laboratory for Physical Chemistry, ETH Zürich
Host in iJURC MIZUOCHI, Norikazu [I]

Research toward Stable NV Centers at Shallow Region and Spin Dynamics in Diamond
BALASUBRAMANIAN, Gopalakrishnan, Leibniz Institute for Surface Engineering, Leipzig, Germany
Host in iJURC MIZUOCHI, Norikazu [I]

Research of Surface State for Diamond Quantum Information Device
TOKUDA, Norio, NanoMaterials Research Institute, Kanazawa University
Host in iJURC MIZUOCHI, Norikazu

Research of Quantum Technology and Diamond Synthesis for Higher Sensitivity of NV Quantum Sensor
MAKINO, Toshiharu, Advanced Power Electronics Research Center, National Institute of Advanced Industrial Science and Technology
Host in iJURC MIZUOCHI, Norikazu

STARTING-UP SUBJECTS
(ON-DEMAND FROM RELATED COMMUNITIES)

Intracellular Delivery of Biofunctional Proteins Using Artificial Protein Nanocages
AZUMA, Yusuke, Małopolska Center of Biotechnology, Jagiellonian University
Host in iJURC FUTAKI, Shiroh [I]

Real-Time Visualization of Cellular Phase-Separating Proteins
KIKUCHI, Kazuya, Tokyo University of Science
Host in iJURC UESUGI, Motonari

Remote Control of Cells by Synthetic Small Molecules
NISHIKAWA, Makiya, Tokyo University of Science
Host in iJURC UESUGI, Motonari

Fabrication of Luminescent Thin Films Using Amphiphilic Lanthanide Complexes
MIEDA, Eiko, Department of Chemistry, Graduate School of Science, Osaka City University
Host in iJURC HASEGAWA, Takeshi [F]

Molecular Characterization of Fluoropolymer at Frictional Interface
KASUYA, Motohiro, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University
Host in iJURC HASEGAWA, Takeshi

Construction of Heterologous Protein Secretion System at Low Temperatures by Using Cold-Adapted Microorganisms
DAI, Xianzhu, College of Resources and Environment, Southwest University
Host in iJURC KURIHARA, Tatsuo [I] [F]

Analysis of Novel Transporters for Strigolactones or Their Biosynthetic Intermediates
ZHAO, Yunde, Department of Cell and Developmental Biology, Division of Biological Sciences, University of California San Diego
Host in iJURC MASHIGUCHI, Kiyoshi [I]

Verification and Development of Dynamic Stiction Theory
NAKANO, Ken, Faculty of Environment and Information Sciences, Yokohama National University
Host in iJURC TSUJII, Yoshinobu [I]

Regulatory Role of Phytohormone Cytokinin on Leaf Epidermal Cell Differentiation
AKI, Shiori, Graduate School of Science and Technology, NAIST (Nara Institute of Science and Technology)
Host in iJURC AOYAMA, Takashi [F]

Establishment of the Thermally Activated Delayed Fluorescence Kinetics Incorporating the Dynamical Effects
URATANI, Hiroki, Department of Chemistry and Biochemistry, School of Advanced Science and Engineering, Waseda University
Host in iJURC KAJI, Hironori

Analysis of Membrane Lipid-Dependent Fermentation Stress Response in Acetic Acid Bacteria
TOYOTAKE, Yosuke, Department of Biotechnology, College of Life Sciences, Ritsumeikan University
Host in iJURC KURIHARA, Tatsuo

Thermal Conduction of Pseudo-Ordered Oxide Glasses
MASUNO, Atsunobu, Graduate School of Science and Technology, Hirosaki University
Host in iJURC SHIMAKAWA, Yuichi

Novel Functional Properties of Metal Oxides Explored by Electrochemical Proton Insertion
TSUCHIYA, Takashi, International Center for Materials Nanoarchitectonics (WPI-MANA), National Institute for Materials Science (NIMS)
Host in iJURC KAN, Daisuke

Syntheses of Novel Fluoride-Ion Conductors Using High pressures
SAITO, Takashi, High Energy Accelerator Research Organization (KEK)
Host in iJURC SHIMAKAWA, Yuichi

Metal Separation by Solvent Impregnated Resin Using Surfactant
KURAHASHI, Kensuke, Environmental and Materials Chemistry Course, College of Technology, Osaka Prefecture University
Host in iJURC SOHRIN, Yoshiki

Development of bi-Functional Catalysts by Modification of Supported Metal Surface with Metal Oxide Clusters
YAMAZOE, Seiji, Department of Chemistry, Graduate School of Science, Tokyo Metropolitan University
Host in iJURC TERANISHI, Toshiharu

Simultaneous Observation of Electron Transport Property and Phase Transition of a Single 3D Quantum Dot Superlattice in an Electron Microscope
ASAKA, Toru, Frontier Research Institute for Materials Science, Nagoya Institute of Technology
Host in iJURC SARUYAMA, Masaki

Development of Efficient Conversion Method of Woody Biomass, Renewable Biological Resources, to Advanced Chemical Materials
HATANO, Osamu, Fuculty of Medicine, Nara Medical University
Host in iJURC NAKAMURA, Masaharu

Study and Experiment of the High-Pressure Gas Generation by the High-Power Laserirradiation to the Stacked CNT Target
MATSUI, Kotaro, Graduate School of Energy Science, Kyoto University
Host in iJURC WAKASUGI, Masanori

EXPANDING SUBJECTS
(ON-DEMAND FROM RELATED COMMUNITIES)

Self-Assembling Adjuvant-Built-In Vaccines for Cancer Immune Therapy
LI, Yan-Mei, Department of Chemistry, Tsinghua University
Host in iJURC UESUGI, Motonari [I] [F]

Evaluation of $CaCO_3$ Dissolution Rates in Deep-Sea Sediments by a Novel Tracer Method
CAI, Pinghe, Department of Marine Chemistry and Geochemistry, Xiamen University
Host in iJURC SOHRIN, Yoshiki [I]

Advanced Oxygen – Mediated Flow Chemistry
THOMAS, Wirth, School of Chemistry, Cardiff University
Host in iJURC NAKAMURA, Masaharu [I]

Novel Strategy for Intracellular Delivery of Nanomedicines
PUJALS, Sílvia, Nanoscopy for Nanomedicine Group, Institute for Bioengineering of Catalonia (IBEC)
Host in iJURC FUTAKI, Shiroh [I] [F]

Structural and Functional Analysis of Curvature-Inducing Peptides and Application
ULRICH, Anne S., Institute of Organic Chemistry (IOC) and Institute of Biological Interfaces (IBG-2), Karlsruhe Institute of Technology (KIT)
Host in iJURC FUTAKI, Shiroh [I] [F]

In-Depth Analysis of Efficiency Roll-Off in Highly Efficient TADF-Based Organic Electroluminescence Devices
NAMDAS, Ebinazar B., School of Mathematics and Physics, Centre for Organic Photonics & Electronics, The University of Queensland
Host in iJURC KAJI, Hironori [I]

Construction of Two-Dimensional Donor-Acceptor Systems by the Collaboration of Organic Synthesis, Single-Molecule Measurement, and Computational Chemistry.
KIMURA, Kensuke, Surface and Interface Science Laboratory, RIKEN
Host in iJURC KAJI, Hironori

Design of Intracellular Delivery Systems for Extracellular Vesicles
NAKASE, Ikuhiko, Graduate School of Science, Osaka Metropolitan University
Host in iJURC FUTAKI, Shiroh

Investigation of Cellular Uptake Mechanism Using Extracellular Vesicles
EGUCHI, Akiko, Department of Gastroenterology and Hepatology, Graduate School of Medicine, Mie University
Host in iJURC FUTAKI, Shiroh [F]

Role of *PIP5K* Genes in Pollen Tube Development
QU, Li-Jia, School of Life Sciences, Peking University
Host in iJURC AOYAMA, Takashi [I]

Structural and Functional Analysis of the Surface Polysaccharides of Outer Membrane Vesicles Released by Bacteria
CORSARO, Maria Michela, Department of Chemical Sciences, University of Naples Federico II
Host in iJURC KURIHARA, Tatsuo [I] [F]

Molecular Mechanisms for the Inactivation of a Growth Hormone in Rice
HE, Zuhua, Chinese Academy of Sciences, CAS Center for Excellence in Molecular Plant Sciences, Institute of Plant Physiology and Ecology
Host in iJURC YAMAGUCHI, Shinjiro [I]

Phase Separation in Mixture of Nematic Liquid Crystal and Solvent
SHIMADA, Ryoko, Department of Mathematical and Physical Sciences, Japan Women's University
Host in iJURC SATO, Takeshi [F]

Chromatin, Epigenetic and Proteolytic Regulation of RNA Processing in Plant Morphogenesis
RUBIO, Vicente, Plant Molecular Genetics Dept, National Center of Biotechnology (CNB-CSIC)
Host in iJURC TSUGE, Tomohiko [I]

Site-Selective Protein Acetylation and Phosphorylation by Small Molecule
ZHOU, Lu, School of Pharmacy, Fudan University
Host in iJURC UESUGI, Motonari [I]

Developments of Highly Efficient and High Color Purity Organic Electroluminescent Devices Based on Thermally Activated Delayed Fluorescent Materials Exhibiting Ultrafast Reverse Intersystem Crossing Process
DUAN, Lian, Department of Chemistry, Tsinghua University
Host in iJURC KAJI, Hironori [I]

Fabrication of Nanotopographical Polymer Surfaces for Bactericidal Properties-IV
ENDOH, Maya K., Department of Material Science and Chemical Engineering, Stony Brook University
Host in iJURC TAKENAKA, Mikihito [I] [F]

Synthesis of Polyether Nanocomposite Solid Polymer Electrolytes for Lithium Ion Batteries
FERRIER, Robert C., Chemical Engineering and Materials Science, Michigan State University
Host in iJURC TSUJII, Yoshinobu [I]

Development and Characterization of Metal Oxide Nanocrystalline Films for Solar Water Splitting
TACHIBANA, Yasuhiro, School of Engineering, RMIT University
Host in iJURC TERANISHI, Toshiharu [I]

Interdisciplinary Approach to Nanostructured Materials for Applications
BUCHER, Jean-Pierre, Institut de Physique et Chimie des Matériaux (IPCMS), Université de Strasbourg
Host in iJURC TERANISHI, Toshiharu [I]

Search for Four-Wave-Mixing in the Vacuum - Unveiling Dark Components in the Universe -
HOMMA, Kensuke, Physics, Hiroshima University
Host in iJURC WAKASUGI, Masanori [I]

Tin-Perovskite Thin Film Crystallization on New Hole-Transporting Materials
ABATE, Antonio, Novel Materials and Interfaces for Photovoltaic Solar Cells, Helmholtz-Zentrum Berlin, Germany
Host in iJURC WAKAMIYA, Atsushi [I]

Biochemical Characterization of Aldehyde Dehydrogenases Involved in the Biosynthesis of Plant Volatile Benzenoids
KOEDUKA, Takao, Graduate School of Sciences and Technology for Innovation, Yamaguchi University
Host in iJURC TSUGE, Tomohiko

Electronic and Spintronic Properties of Multilayer System Including $NiCo_2O_4$ and Fe_3O_4
NAGAHAMA, Taro, Solid State Chemistry Laboratory, Faculty of Engineering, Hokkaido University
Host in iJURC ONO, Teruo

Structural Optimization of Amyloid Photooxygenation Catalysts for the Treatment of Alzheimer's Disease
KANAI, Motomu, Graduate School of Pharmaceutical Sciences, The University of Tokyo
Host in iJURC KAJI, Hironori

Analysis of the Physiological Functions of Extracellular Vesicles Produced by Intestinal Bacteria and Their Application
KURATA, Atsushi, Faculty of Agriculture, Kindai University
Host in iJURC KURIHARA, Tatsuo

Structural Analysis of Water in Polymer Brush Layer Using Attenuated Total Reflection Near-Infrared Spectroscopy
GENMEI, Makoto, Graduate School of Innovative Life Science, Toyama University
Host in iJURC OHNO, Kohji

Manipulation of Three Dimensional Structure of Polymer Monoliths by 3D Printer
MURASE, Hiroki, Department of Textile and Clothing, Faculty of Home Economics, Kyoritsu Women's University
Host in iJURC TSUJII, Yoshinobu

Giant Magnetic Resistance on Single-Electron Transistor
MAJIMA, Yutaka, Laboratory for Materials and Structures, Tokyo Institute of Technology
Host in iJURC TERANISHI, Toshiharu

Functional Analysis of Non-Canonical Strigolactones as Plant Hormones and Root-Derived Signals
SETO, Yoshiya, School of Agriculture, Meiji University
Host in iJURC YAMAGUCHI, Shinjiro

Preparation of Multi-Stimuli-Responsive Polymer via Controlled Radical Polymerization
YUSA, Shin'ichi, Graduate School of Engineering, University of Hyogo
Host in iJURC YAMAGO, Shigeru

Study of the Generation and Sustainment of High Energy Density Plasmas due to the Interaction between High Power Laser and Structured Medium
KISHIMOTO, Yasuaki, Graduate School of Energy Science, Kyoto University
Host in iJURC WAKASUGI, Masanori

SUBJECTS FOCUSING OF JOINT USAGE OF iJURC/ICR FACILITIES

Tackling the Electronic Instability of Charge-Density Waves by Electron Energy-Loss Spectroscopy
CHU, Ming-Wen, Center for Condensed Matter Sciences, National Taiwan University
Host in iJURC KURATA, Hiroki [I]

Micro- and Nano-Structural Characterization by Advanced Transmission Electron Microscopy of Novel Functional Materials
CHAIRUANGSRI, Torranin, Industrial Chemistry, Chiang Mai University
Host in iJURC KURATA, Hiroki [I]

High-Pressure Synthesis of Transition Metal Oxides with Novel Physical Properties.
JI, Kunlang, Centre for Science at Extreme Conditions and School of Chemistry, University of Edinburgh
Host in iJURC SHIMAKAWA, Yuichi [I]

Synthesis and Characterization of Novel Group 16 Element Compouds
MINOURA, Mao, Department of Chemistry, College of Science, Rikkyo University
Host in iJURC MIZUHATA, Yoshiyuki [I] [F]

Analyzing Chemical Properties and Origins of Dissolved Organic Matter in Lakes and Soils by FT-ICR-MS
KIDA, Morimaru, Graduate School of Agricultural Science, Kobe University
Host in iJURC NAKAMURA, Masaharu [I]

Preparation of High-Efficiency Spin-Injection Materials Using Optimization of Magnetism and Crystal Structure
TANAKA, Masaaki, Department of Physical Science and Engineering, Nagoya Institute of Technology
Host in iJURC ONO, Teruo

Development of a Highly Efficient $CsPbBr_3$ Scintillator
SAITO, Hikaru, Institute for Materials Chemistry and Engineering, Kyushu University
Host in iJURC KURATA, Hiroki

High Accuracy Measurement of Hydrogen and Helium Behavior in Plasma Facing Materials for Nuclear Fusion Devices
MIYAMOTO, Mitsutaka, Interdisciplinary Faculty of Science and Engineering, Shimane University
Host in iJURC KURATA, Hiroki

Synthesis and Structural Characterization of Lewis Base Adducts of Tetrylenes
MATSUO, Tsukasa, Faculty of Science and Engineering, Kindai University
Host in iJURC MIZUHATA, Yoshiyuki

Synthesis and Structures of Cationic Aromatics Bearing Chalconenopyrylium units
NAGAHORA, Noriyoshi, Department of Chemistry, Faculty of Science, Fukuoka University
Host in iJURC MIZUHATA, Yoshiyuki

Theoretical Design of Low-Dimensional Silicon Material Embedded in a Flat Twodimensional Sheet and Exploration for Operating Principles
TAKAHASHI, Masae, Graduate School of Agricultural Science, Tohoku University
Host in iJURC MIZUHATA, Yoshiyuki F

SUBJECTS ENCOURAGING JOINT PROGRAM

Determine the Three-Dimensional Structure of ^{13}C Labeled α-Synuclein(61-95) in the Langmuir-Blodgett Film and Supported Phospholipid Bilayer by MAIRS2
WANG, Chengshan, Chemistry, Middle Tennessee State University
Host in iJURC HASEGAWA, Takeshi I

The 16th International Workshop for East Asian Young Rheologists
INOUE, Tadashi, Department of Macromolecular Science, Osaka University
Host in iJURC MATSUMIYA, Yumi I

iJURC Publications (Selected Examples)

(until 31 May 2022)

Fused-Nonacyclic Multi-Resonance Delayed Fluorescence Emitter Based on Ladder-Thiaborin Exhibiting Narrowband Sky-Blue Emission with Accelerated Reverse Intersystem Crossing

Nagata, M.; Min, H.; Watanabe, E.; Fukumoto, H.; Mizuhata, Y.; Tokitoh, N.; Agou, T.; Yasuda, T., *Angew. Chem. Int. Ed.*, **60,** 20280-20285 (2021).

Abstract

Developing organic luminophores with unique capability of strong narrowband emission is both crucial and challenging for the further advancement of organic light-emitting diodes (OLEDs). Herein, a nanographitic fused-nonacyclic π-system (**BSBS-N1**), which was strategically embedded with multiple boron, nitrogen, and sulfur atoms, was developed as a new multi-resonance thermally activated delayed fluorescence (MR-TADF) emitter. Narrowband sky-blue emission with a peak at 478 nm, full width at half maximum of 24 nm, and photoluminescence quantum yield of 89% was obtained with **BSBS-N1**. Additionally, the spin-orbit coupling was enhanced by incorporating two sulfur atoms, thereby facilitating the spin-flipping process between the excited triplet and singlet states. OLEDs based on **BSBS-N1** as a sky-blue MR-TADF emitter achieved a high maximum external electroluminescence quantum efficiency of 21.0%, with improved efficiency roll-off.

Determinants of Crystal Structure Transformation of Ionic Nanocrystals in Cation Exchange Reactions

Li, Z.; Saruyama, M.; Asaka, T.; Tatetsu, Y.; Teranishi, T., *Science*, **373,** 332-337 (2021).

Abstract

Changes in the crystal system of an ionic nanocrystal during a cation exchange reaction are unusual yet remain to be systematically investigated. In this study, chemical synthesis and computational modeling demonstrated that the height of hexagonal-prism roxbyite ($Cu_{1.8}S$) nanocrystals with a distorted hexagonal close-packed sulfide anion (S^{2-}) sublattice determines the final crystal phase of the cation-exchanged products with Co^{2+} [wurtzite cobalt sulfide (CoS) with hexagonal close-packed S^{2-} and/or cobalt pentlandite (Co_9S_8) with cubic close-packed S^{2-}]. Thermodynamic instability of exposed planes drives reconstruction of anion frameworks under mild reaction conditions. Other incoming cations (Mn^{2+}, Zn^{2+}, and Ni^{2+}) modulate crystal structure transformation during cation exchange reactions by various means, such as volume, thermodynamic stability, and coordination environment.

1,3-Diradicals Embedded in Curved Paraphenylene Units: Singlet versus Triplet State and In-Plane Aromaticity

Miyazawa, Y.; Wang, Z.; Matsumoto, M.; Hatano, S.; Antol, I.; Kayahara, E.; Yamago, S.; Abe, M., *Angew. J. Am. Chem. Soc.*, **143,** 7426-7439 (2021).

Abstract

Curved π-conjugated molecules and open-shell structures have attracted much attention from the perspective of fundamental chemistry, as well as materials science. In this study, the chemistry of 1,3-diradicals (**DR**s) embedded in curved cycloparaphenylene (**CPP**s) structures, **DR**-(*n*+3)**CPP**s (*n* = 0–5), was investigated to understand the effects of the curvature and system size on the spin–spin interactions and singlet versus triplet state, as well as their unique characteristics such as in-plane aromaticity. A triplet ground state was predicted for the larger 1,3-diradicals, such as the seven- and eight-paraphenylene-unit-containing diradicals **DR-7CPP** (*n* = 4) and **DR-8CPP** (*n* = 5), by quantum chemical calculations. The smaller-sized diradicals **DR**-(*n*+3)**CPP**s (*n* = 0–3) were found to possess singlet ground states. Thus, the ground-state spin multiplicity is controlled by the size of the paraphenylene cycle. The size effect on the ground-state spin multiplicity was confirmed by the experimental generation of **DR-6CPP** in the photochemical denitrogenation of its azo-containing precursor (**AZ-6CPP**). Intriguingly, a unique type of in-plane aromaticity emerged in the smaller-sized singlet states such as S-**DR-4CPP** (*n* = 1), as proven by nucleus-independent chemical shift calculations (NICS) and an analysis of the anisotropy of the induced current density (ACID), which demonstrate that homoconjugation between the 1,3-diradical moiety arises because of the curved and distorted bonding system.

Colossal Barocaloric Effect by Large Latent Heat Produced by First-Order Intersite-Charge-Transfer Transition

Kosugi, Y.; Goto, M.; Tan, Z.; Fujita, A.; Saito, T.; Kamiyama, T.; Chen, W.; Chuang, Y.; Sheu, H.; Kan, D.; Shimakawa, Y., *Adv. Funct. Mater.*, **31,** 2009476 (2021).

Abstract

Materials which show novel thermal properties can be used to make highly efficient and environmentally friendly energy systems for thermal energy storage and refrigeration through caloric effects. An *A*-site-ordered quadruple perovskite-structure oxide, $NdCu_3Fe_4O_{12}$, is found to release significant latent heat, 25.5 kJ kg^{-1} (157 J cc^{-1}), at the intersite-charge-transfer transition temperature near room temperature. The transition is first-order and accompanied by an unusual magnetic ordering and a large negative-thermal-expansion-like volume change, and thus, it causes a large entropy change (84.2 J K^{-1} kg^{-1}). The observed entropy change is comparable to the largest changes reported in inorganic solid materials, and more importantly, it is utilized through a colossal barocaloric effect. The adiabatic temperature change by applying 5.1 kbar pressure is estimated to reach 13.7 K, which means efficient refrigeration can be realized through this effect.

Tracing the Incorporation of the "Ninth Sulfur" into the Nitrogenase Cofactor Precursor with Selenite and Tellurite

Tanifuji, K.; Jasniewski, A. J.; Villarreal, D.; Stiebritz, M. T.; Lee, C. C.; Wilcoxen, J.; Okhi, Y.; Chatterjee, R.; Bogacz, I.; Yano, J.; Kern, J.; Hedman, B.; Hodgson, K. O.; Britt, R. D.; Hu, Y.; Ribbe, M. W., *Nat. Chem.*, **13,** 1228-1234 (2021). Springer Nature

Abstract

Molybdenum nitrogenase catalyses the reduction of N_2 to NH_3 at its cofactor, an [(*R*-homocitrate)$MoFe_7S_9C$] cluster synthesized via the formation of a [Fe_8S_9C] L-cluster prior to the insertion of molybdenum and homocitrate. We have previously identified a [Fe_8S_8C] L*-cluster, which is homologous to the core structure of the L-cluster but lacks the 'ninth sulfur' in the belt region. However, direct evidence and mechanistic details of the L*- to L-cluster conversion upon 'ninth sulfur' insertion remain elusive. Here we trace the 'ninth sulfur' insertion using SeO_3^{2-} and TeO_3^{2-} as 'labelled' SO_3^{2-}. Biochemical, electron paramagnetic resonance and X-ray absorption spectroscopy/extended X-ray absorption fine structure studies suggest a role of the 'ninth sulfur' in cluster transfer during cofactor biosynthesis while revealing the incorporation of Se^{2-}- and Te^{2-}-like species into the L-cluster. Density functional theory calculations further point to a plausible mechanism involving in situ reduction of SO_3^{2-} to S^{2-}, thereby suggesting the utility of this reaction to label the catalytically important belt region for mechanistic investigations of nitrogenase.