



**A**CTIVITIES OF  
**I**NTERNATIONAL **J**OINT  
**U**SAGE/**R**ESEARCH  
**C**ENTER



# iJURC Cooperative Research Subjects 2023

(1 April 2023 ~ 31 March 2024)

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

Radiolysis of Concentrated Native Proteins by Accelerated Electrons

RAFFY, Quentin, Institut Pluridisciplinaire Hubert Curien (IPHC)  
**Host in iJURC** OGAWARA, Ryo I

Development of New Nano-Structure Target for ISOL  
OHNISHI, Tetsuya, Nishina Center for Accelerator-Based Science, RIKEN

**Host in iJURC** WAKASUGI, Masanori

High-Pressure synthesis and Li Conducting Study of Li-Al-Cl Compounds 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

Crystal Structures and Oxygen Conduction Properties Research of Metal Oxides at High Temperature

GUO, Haichuan, China Spallation Neutron Source Science Center (CSNS), Institute of High Energy Physics, Chinese Academy of Sciences

**Host in iJURC** SHIMAKAWA, Yuichi I

Development of Transformation of Lignin-Based Aromatic Building Blocks Using Organocatalyst

HASHIMOTO, Toru, Department of Applied Chemistry, Faculty of Engineering, Sanyo-Onoda City University

**Host in iJURC** NAKAMURA, Masaharu I

Synthesis of Phosphine-Protected Iron Clusters to Study Their Magnetic Properties

SHIGA, Takuya, Department of Chemistry, Institute of Pure and Applied Sciences, University of Tsukuba

**Host in iJURC** HIGAKI, Tatsuya

Catalytic Activation of Silicon-Oxygen Bond via Nucleophilic Activation of Silane

KAMEO, Hajime, Department of Chemistry, Graduate School of Science, Osaka Metropolitan University

**Host in iJURC** OHKI, Yasuhiro

Asymmetric Synthesis of Planar-Chiral Metallocenes by Plane-to-Plane Chirality Transfer

OGASAWARA, Masamichi, Department of Natural Science, Graduate School of Science and Technology, and Research Cluster on "Functional Material Development for Agro-/Medo-/Pharmaceuticals", and Tokushima International Science Institute, Tokushima University

**Host in iJURC** OHKI, Yasuhiro

Carbon Fixation Catalysts Composed of Well-Defined Cu-Hydride Complexes and Functionalized Organosilica

NAKAJIMA, Takayuki, Department of Chemistry, Faculty of Science, Nara Women's University

**Host in iJURC** OHKI, Yasuhiro

Development of Highly Active Metal Cluster Catalysts by Using Electron Transfer Network

KONDO, Mio, Division of Applied Chemistry, Graduate School of Engineering, Osaka University

**Host in iJURC** TANIFUJI, Kazuki F

Modulated Luminescence of Coordination Complex under Vibrational Strong Coupling

HIRAI, Kenji, Research Institute for Electronic Science Hokkaido University

**Host in iJURC** KANEMITSU, Yoshihiko

Spectroscopic Study of Dot-in-Crystal Perovskites toward Semiconductor Optical Refrigeration

YAMADA, Yasuhiro, Graduate School of Science, Chiba University

**Host in iJURC** KANEMITSU, Yoshihiko

Quantum Properties of Lead Perovskite Solar Cells by Two-Dimensional Optical Fourier Transform Spectroscopy

OGAWA, Yoshihiro, Joetsu University of Education

**Host in iJURC** KANEMITSU, Yoshihiko

Terahertz Laser by Topological Edge States in Non-Hermitian Systems

OBUSE, Hideaki, Faculty of Engineering, Hokkaido University

**Host in iJURC** HIRORI, Hideki

Controlling Hydrogen Spillover on Oxides

HOSOKAWA, Saburo, Faculty of Materials Science and Engineering, Kyoto Institute of Technology

**Host in iJURC** KAN, Daisuke

Development of Defective Nickel Oxide Catalysts for Highly Selective Functionalization

TAKETOSHI, Ayako, Faculty of Engineering, Yokohama National University

**Host in iJURC** NAKAMURA, Masaharu F

Efficient Synthesis and Physical Properties of  $\pi$ -Extended Molecules Bearing Difluoroboryl or Sulfonyl Groups

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

Evaluation of Prediction with MetNetComp Using Tensor Decomposition Based Unsupervised Feature Extraction

TAGUCHI, Yoshihiro, Faculty of Science and Engineering, Chou University

**Host in iJURC** TAMURA, Takeyuki

Control and Analysis of Complex Networks via Probabilistic Minimum Dominating Sets

NACHER, Jose, Department of Information Science, Faculty of Science, Toho University

**Host in iJURC** AKUTSU, Tatsuya

I: International Joint Research

F: Female PI

Elucidation of Host-Giant Virus Interaction Using Transcriptomics of Giant Virus-Infected *Acanthamoeba* Cells  
TAKEMURA, Masaharu, Institute of Arts and Sciences, Kagurazaka Division, Tokyo University of Science  
**Host in iJURC** OGATA, Hiroyuki

Development of a Viral Genome Information Infrastructure for Elucidation of Viral Dark Matter  
NISHIMURA, Yosuke, JAMSTEC, Japan Agency for Marine-Earth Science and Technology, Research Center for Bioscience and Nanoscience  
**Host in iJURC** OGATA, Hiroyuki

Combining Tellurium Mediated Radical Polymerization and Multicomponent Polymerization towards Unique Stimuli Responsive Polypeptoids/poly(N-vinyl amide)s Copolymers  
DEBUIGNE, Antoine, Chemistry Department, Center for Education and Research on Macromolecules, University of Liege, Belgium  
**Host in iJURC** YAMAGO, Shigeru I

Studies of Geometric and Electronic Structure/Reactivity Correlation in Cofacial Metalloporphyrin Dimers  
OHTA, Takehiro, Department of Applied Chemistry, Faculty of Engineering, Sanyo-Onoda City University  
**Host in iJURC** OHKI, Yasuhiro

Synthesis of Self-Assembled Azulene Derivatives Utilizing Boron, and Creation of New Reactions and Functions  
WAKABAYASHI, Shigeharu, Department of Clinical Nutrition, Faculty of Health Science, Suzuka University of Medical Science  
**Host in iJURC** OHKI, Yasuhiro

Controlling of Secondary Structure in Polysiloxane Main Chain and Application for Chiral Silica  
HIRAI, Tomoyasu, Department of Applied Chemistry, Osaka Institute of Technology  
**Host in iJURC** TAKENAKA, Mikihito

Exploration of Novel Optical Phenomena in Semiconductors with High Quantum Efficiency of Radiation  
KOJIMA, Kazunobu, Graduate School of Engineering, Osaka University  
**Host in iJURC** KANEMITSU, Yoshihiko

Stoichiometry of Bioactive Trace Metals in the Osaka Bay and Its Inflowing River Waters  
NAKAGUCHI, Yuzuru, Faculty of Science and Engineering, Kindai University  
**Host in iJURC** SOHRIN, Yoshiki

Study on High Selective Membrane Separation of Metal Ions by Use of Polymer Inclusion Membranes of Ionic Liquid Containing the Metal Complexes  
MUKAI, Hiroshi, Faculty of Education, Kyoto University of Education  
**Host in iJURC** SOHRIN, Yoshiki

Fabrication and Characterization of Luminescent Thin Films of Lanthanide Complexes for Solid-State Ion Sensors  
MIEDA, Eiko, Department of Chemistry, Graduate School of Science, Osaka Metropolitan University  
**Host in iJURC** HASEGAWA, Takeshi F

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

Characterization of Molecular Orientation during Wear of Fluoropolymer  
KASUYA, Motohiro, Faculty of Production Systems Engineering and Sciences, Komatsu 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

Preparation and Precise Characterization of Model Two-Dimensional Sheet-Shaped Polymers  
DOI, Yuya, Department of Materials Physics, Nagoya University  
**Host in iJURC** SATO, Takeshi

Spin Signals in a Ferrimagnetic Film near the Compensation Temperature  
HIROHATA, Atsufumi, Nagoya University, Department of Materials Physics  
**Host in iJURC** ONO, Teruo I

Study on the Spin Injection Using Perpendicularly Magnetized Ferromagnetic Conductor Film  
TANAKA, Masaaki, Nagoya Institute of Technology  
**Host in iJURC** ONO, Teruo

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

#### EXPANDING SUBJECTS (IN SPECIFIC FIELDS CHOSEN BY iJURC)

Development of Energy Sensitive Muon Spin Rotation ( $\mu$ SR) Spectrometer  
MA, Yue, Meson Science Laboratory, RIKEN  
**Host in iJURC** TSUKADA, Kyo

On the Mechanism of the CO<sub>2</sub> Reduction Catalyzed by Cubic [Mo<sub>3</sub>S<sub>4</sub>Pd] Clusters: a Computational Study  
SAMEERA, W. M. C., Department of Chemistry, University of Colombo  
**Host in iJURC** OHKI, Yasuhiro I

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

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

High-Performance Materials for Energy Storage Electrochemical Devices  
GARCIA MARTIN, Susana, Departamento de Química Inorgánica, Facultad de Ciencias Químicas, Universidad Complutense  
**Host in iJURC** SHIMAKAWA, Yuichi I F

- Photocatalytic C-H Bond Functionalization  
ALAKANANDA, Hajra, Department of Chemistry, Visva-Bharati University  
**Host in iJURC** NAKAMURA, Masaharu I
- Development of Unsymmetrical  $\pi$ -Electron Systems of Heavier Main Group Elements and Elucidation of Their Property  
IWAMOTO, Takeaki, Department of Chemistry, Graduate School of Science, Tohoku University  
**Host in iJURC** MIZUHATA, Yoshiyuki I
- Creation of Effective Oxidation Scavenger for Efficient Perovskite-Based Solar Cells  
SASAMORI, Takahiro, Department of Chemistry, Faculty of Pure and Applied Sciences, University of Tsukuba  
**Host in iJURC** WAKAMIYA, Atsushi I
- A Caging Strategy for Cholinergic Optopharmacology  
ARAI, Satoshi, NanoLSI, Kanazawa University  
**Host in iJURC** OHMIYA, Hirohisa
- Development and Evaluation of THz-STM for Low-Temperature and High Magnetic Field  
TACHIZAKI, Takehiro, School of Information Science and Technology, Tokai University  
**Host in iJURC** KANEMITSU, Yoshihiko
- Regioselective C-H Activation Enabled by Substrate Recognition  
ILIES, Laurean, Center for Sustainable Resource Science, RIKEN  
**Host in iJURC** NAKAMURA, Masaharu
- Development of Co-Facial-Type Dinuclear Complexes  
YAMAGUCHI, Yoshitaka, Faculty of Engineering, Yokohama National University  
**Host in iJURC** NAKAMURA, Masaharu
- 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
- Ecology and Evolution of Large and Giant DNA Viruses  
DELMONT, Tom O., CNRS/Genoscope/UMR8030  
**Host in iJURC** OGATA, Hiroyuki I
- Application of Metagenomics and a Temperature-Driven Mathematical Model to Estimate the Global Distribution of Micromonas Viruses  
DEMORY, David, CNRS, UMR723  
**Host in iJURC** ENDO, Hisashi I
- Effective Biomolecular 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
- Investigations into Cofactor Biosynthesis of  $N_2$ -Reducing Enzyme via Semi-Synthetic Approach  
RIBBE, Markus W., Chancellor's professor at Department of Molecular Biology and Biochemistry, Department of Chemistry, University of California, Irvine  
**Host in iJURC** TANIFUJI, Kazuki I
- Radical-Polar Crossover Catalysis for Synthesis of Complex Natural Products  
HAN, Sunkyu, Department of Chemistry, KAIST  
**Host in iJURC** OHMIYA, Hirohisa I
- Development of Multi-Resonant TADF Emitters with Short Delayed Lifetimes and Their Use in Long Lifetime OLEDs  
ZYSMAN-COLMAN, Eli, Organic Semiconductor Centre, EaStCHEM School of Chemistry, University of St Andrews  
**Host in iJURC** KAJI, Hironori I
- Design and Synthesis of Linear Molecules for Improving Outcoupling Efficiency of Solution-Possessed OLEDs  
RAJAMALLI, Pachaiyappan, Materials Research Centre, Indian Institute of Science, Bangalore  
**Host in iJURC** KAJI, Hironori I
- 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
- Development of Lead Free Metal Halide Perovskite  
TACHIBANA, Yasuhiro, School of Engineering, PMT University  
**Host in iJURC** TERANISHI, Toshiharu I
- Synthesis of Graphene Nanoribbons Containing Non-Hexagonal Rings  
CHAOLUMEN, College of Chemistry and Chemical Engineering, Inner Mongolia University (IMU)  
**Host in iJURC** HASHIKAWA, Yoshifumi I
- Optoelectronic Materials with Open-Cage  $C_{60}$  Derivatives as Building Blocks  
ZHANG, Sheng, Engineering Research Center for Nanomaterials (ERCN), Henan University  
**Host in iJURC** MURATA, Yasujiro I
- The Reactivity of Guanidino-Isatins in Prato Cycloaddition Reaction  
MARGETIC, Davor, Laboratory for physical organic chemistry, Division of organic chemistry and biochemistry, Rudjer Boskovic Institute  
**Host in iJURC** MURATA, Yasujiro I
- Development of Functional Molecule for Efficient Perovskite Solar Cells  
SAEKI, Akinori, Department of Applied Chemistry, Graduate School of Engineering, Osaka University  
**Host in iJURC** WAKAMIYA, Atsushi I
- Electrochemical and Photochemical Degradation Reaction  
INAGI, Shinsuke, School of Materials and Chemical Technology, Tokyo Institute of Technology  
**Host in iJURC** OHMIYA, Hirohisa
- Light-Driven Organosulfur Catalysis for Sugar Modification  
HIRAI, Go, Graduate School of Pharmaceutical Sciences, Kyushu University  
**Host in iJURC** OHMIYA, Hirohisa

Synthesis of Polymers Having Carbazolophane Moiety and Their Application of Hole Transport and CPL Materials  
TANI, Keita, Osaka Kyoiku University  
**Host in iJURC** TSUJII, Yoshinobu

Elucidation of Design Principles of Covalent Organic Solid Solutions  
SUZUKI, Mitsuharu, Graduate School of Engineering, Osaka University  
**Host in iJURC** MURATA, Yasujiro

Synthesis and Properties of Emissive Triplet Diradicals  
SHIMIZU, Akihiro, Graduate School of Engineering Science, Osaka University  
**Host in iJURC** HIROSE, Takashi

Polymerization of Functional Vinyltellurides Prepared by Flow Reactors  
NAGAKI, Aiichiro, Faculty of Science, Hokkaido University  
**Host in iJURC** YAMAGO, Shigeru

Study on Dependence of Electron Delocalization on Charged, Spin and Excited States in Conjugated Macrocycles  
KISHI, Ryohei, Graduate School of Engineering Science, Osaka University  
**Host in iJURC** KAYAHARA, Eiichi

A Study on Radicals in Macrocyclic Systems: SOMO-HOMO Energy Conversion  
ABE, Manabu, Graduate School of Advanced Science and Engineering, Hiroshima University  
**Host in iJURC** KAYAHARA, Eiichi

Synthesis and Functionally Development of Donor-Acceptor Cycloparaphenylene Derivatives through Reorganization of Macrocyclic Gold Complexes via Dynamic Gold-Carbon Bonds  
TSUCHIDO, Yoshitaka, Faculty of Science Division I, Tokyo University of Science  
**Host in iJURC** KAYAHARA, Eiichi

Trace Metal Elemental and Isotopic Composition in the North Pacific Ocean: Sources and Internal Cycling (4)  
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-III  
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

Ultrafast Exciton Dynamics in Thermally Activated Delayed Fluorescence Molecular Aggregates with Heterogeneous Conformational Distribution  
SOTOME, Hikaru, Division of Frontier Materials Science and Center for Promotion of Advanced Interdisciplinary Research, Graduate School of Engineering Science, Osaka University  
**Host in iJURC** KAJI, Hironori

Construction of Theoretical Guidelines for Designing Plasmonic Nanoalloys  
IIDA, Kenji, School of Engineering, PMT University  
**Host in iJURC** TERANISHI, Toshiharu

Characterization of Quantum Magnon Using Hybrid Magnonic Systems  
KIM, Kab-Jin, Department of Physics, Korea Advanced Institute of Science and Technology  
**Host in iJURC** ONO, Teruo I

Non-Reciprocity of Spin Wave Propagation Generated by Orbital Hall Effect in Transition Metal Dichalcogenides  
KIM, Sanghoon, Department of Physics, University of Ulsan  
**Host in iJURC** ONO, Teruo I

Research Toward Stable NV Centers at Shallow Region and Spin Dynamics in Diamond  
BALASUBRAMANIAN, Gopalakrishnan, Helmholtz-Zentrum Dresden-Rossendorf (HZDR), Germany  
**Host in iJURC** MIZUOCHI, Norikazu 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 High Sensitive NV Quantum Sensor in Diamond  
WRACHTRUP, Jörg, Stuttgart University  
**Host in iJURC** MIZUOCHI, Norikazu I

Development of Fe-Based D03 Type Alloys and Its Thermoelectric Property  
NAGAHAMA, Taro, Hokkaido University  
**Host in iJURC** ONO, Teruo

Research of Surface State for Diamond Quantum Sensor  
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, The National Institute of Advanced Industrial Science and Technology  
**Host in iJURC** MIZUOCHI, Norikazu

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

Fabrication of Novel Cell Culture Substrates Using Well-Defined Porous Materials  
YOSHIKAWA, Chiaki, National Institute for Materials Science (NIMS), Research Center for Functional Materials  
**Host in iJURC** TSUJII, Yoshinobu I F

Synthesis and Characterization of Raw and Polymerized Asian Lacquer Samples: towards the Development of a Comprehensive Collection of Lacquer Reference Samples for Materials Science and Conservations Studies  
BONADUCE, Ilaria, Department of Chemistry and Industrial Chemistry, University of Pisa  
**Host in iJURC** PINCELLA, Francesca I F

Analysis of Novel Transporters for Strigolactones or Their Biosynthetic Intermediates  
ZHAO, Yunde, Department of Cell and Developmental Biology, University of California San Diego  
**Host in iJURC** MASHIGUCHI, Kiyoshi 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

Evaluation of Mechanical Properties for Polymer Elastomers with Pseudo-Rotaxane Type Cross-Links  
URAKAWA, Osamu, Department of Macromolecular Science, Osaka University  
**Host in iJURC** MATSUMIYA, Yumi I

Involvement of Phospholipids in Cytoplasmic Streaming in Plant Cells  
UEDA, Haruko, Osaka University, Department of Macromolecular Science  
**Host in iJURC** AOYAMA, Takashi F

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

Studies on the Structures and Functions of Two Alanine Dehydrogenases in *Geobacillus kaustophilus*  
OMORI, Taketo, Department of Biomedical Engineering, Osaka Institute of Technology  
**Host in iJURC** KURIHARA, Tatsuo

Separation of Rare Earth Elements Using Solvent Impregnated Resin Using Surfactants  
KURAHASHI, Kensuke, Environmental and Materials Chemistry Course, Osaka Metropolitan University College of Technology  
**Host in iJURC** SOHRIN, Yoshiki

Observation of Photothermal Conversion in 3D Quantum Dot Superlattices Using Pump-Probe Transient Absorption Spectroscopy  
GONOME, Hiroki, Graduate School of Science and Engineering, Yamagata University  
**Host in iJURC** SARUYAMA, Masaki

Development of Cooperative Catalysis by Hybridization of Supported Metal Nanoparticles with Metal Oxide Clusters  
YAMAZOE, Seiji, Graduate School of Science, Tokyo Metropolitan University  
**Host in iJURC** TERANISHI, Toshiharu

Study and Experiment of the High-Energy Electron Generation by the High-Power Laser-Irradiation to the Stacked CNT Target  
MATSUI, Ryutaro, Graduate School of Energy Science, Kyoto University  
**Host in iJURC** TOKITA, Shigeki

#### **EXPANDING SUBJECTS (ON-DEMAND FROM RELATED COMMUNITIES)**

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

Molecular Mechanisms of mRNA Processing Governing 3'UTR Ends by Using Plant as a Model System  
JARMOLOWSKI, Artur, Department of Gene Expression, Adam Mickiewicz University, Institute of Molecular Biology and Biotechnology  
**Host in iJURC** TSUGE, Tomohiko I

Exploiting AtMYB60 Regulation for Water Use Efficiency and Drought Resistance in Crops  
GALBIATI, Massimo, National Council of Research (CNR), Institute of Agricultural Biology and Biotechnology (IBBA)  
**Host in iJURC** TSUGE, Tomohiko I

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

Self-Assembling Compounds That Selectively Inhibit Protein Phase-Separation  
ZHOU, Lu, School of Pharmacy, Fudan University  
**Host in iJURC** UESUGI, Motonari I

Development of Cancer Vaccine Adjuvants with Optimized Safety Profiles  
LI, Yan-Mei, Department of Chemistry, Tsinghua University  
**Host in iJURC** UESUGI, Motonari I F

Red and Near-Infrared Multi-Resonance Thermally Activated Delayed Fluorescence Emitters  
BEDNAREK, Christin, Karlsruhe Institute of Technology, Institut of Organic Chemistry, IOC  
**Host in iJURC** KAJI, Hironori I

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

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

High Pressure Synthesis of the Metastable Rare-Earth Nickelates with Ni-Site Substitutions for Synchronizing Their Electronic Phase Transition and Potential Magnetic Transitions  
CHEN, Jikun, School of Materials Science and Engineering, University of Science and Technology Beijing, RP China  
**Host in iJURC** SHIMAKAWA, Yuichi I

Formation of Authigenic CaCO<sub>3</sub> on the Ocean Floor below the Compensation Depth  
CAI, Pinghe, Department of Marine Chemistry and Geochemistry, Xiamen University  
**Host in iJURC** SOHRIN, Yoshiki I

Fabrication of Nanotopographical Polymer Surfaces for Bactericidal Properties-V  
ENDO, Maya, Department of Material Science and Chemical Engineering, Stony Brook University  
**Host in iJURC** TAKENAKA, Mikihiro I F

Interdisciplinary Approach to Nanostructured Materials for Applications  
BUCHER, Jean-Pierre, Strasbourg Institute of Material Physics and Chemistry  
**Host in iJURC** TERANISHI, Toshiharu I

Search for Four-Wave-Mixing in the Vacuum - Unveiling Dark Components in the Universe -  
HOMMA, Kensuke, Graduate School of Advanced Science and Engineering, Hiroshima University  
**Host in iJURC** TOKITA, Shigeki 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, Silvia, Institute for Advanced Chemistry of Catalonia (IQAC)

**Host in iJURC** FUTAKI, Shiroh

I F

Structural and Functional Analysis of Curvature-Inducing Eptides and Application

ULRICH, S. Anne, Karlsruhe Institute of Technology (KIT), Institute of Organic Chemistry (IOC) and Institute of Biological Interfaces (IBG-2)

**Host in iJURC** FUTAKI, Shiroh

I F

Molecular Mechanisms for the Inactivation of a Growth Hormone in Rice

HE, Zuhua, Institute of Plant Physiology and Ecology, Chinese Academy of Sciences

**Host in iJURC** YAMAGUCHI, Shinjiro

I

Cycloparaphenylenes and Chiral Fullerenes for Supramolecular Architectures in Chiroptical Applications

FUCHTER, Matthew J., Imperial College London (ICL), Chemistry

**Host in iJURC** YAMAGO, Shigeru

I

Chiral Cyclophenylene with an [2.2]Paracyclophane Core

BRÅSE, Stefan, Karlsruhe Institute of Technology, Institut of Biological and Chemical System, IBCS-FMS

**Host in iJURC** YAMAGO, Shigeru

I

Development of Multi-Dimensional Perovskite Light-Emission and Photo-Response Materials

LIN, Hao-Wu, Department of Materials Science and Engineering, National Tsing Hua University, Taiwan

**Host in iJURC** WAKAMIYA, Atsushi

I

Correlation of Concentration and Orientation Fluctuations in Mixture of Liquid Crystal/Solvent Isotropic One-Phase State

SHIMADA, Ryoko, Department of Mathematics, Physics and Computer Science, Japan Women's University

**Host in iJURC** SATO, Takeshi

I F

Real-Time Visualization of Cellular Phase-Separating Proteins

KIKUCHI, Kazuya, Graduate School of Engineering, Osaka University

**Host in iJURC** UESUGI, Motonari

Remote Control of Cells by Synthetic Small Molecules

NISHIKAWA, Makiya, Faculty of Pharmaceutical Sciences, Tokyo University of Science

**Host in iJURC** UESUGI, Motonari

Investigation of Donor-Acceptor Molecular Systems by Quantum Chemical Calculations and Atomic-Scale Spectroscopy

KIMURA, Kensuke, Surface and Interface Science Laboratory, RIKEN

**Host in iJURC** KAJI, Hironori

Functional Analysis and Applications of Extracellular Vesicles Produced by Intestinal Bacteria

YAMASAKI, Shino, Department of Life Science and Biotechnology, Kansai University

**Host in iJURC** KURIHARA, Tatsuo

F

Electrochemical Control of Metal Oxides and Exploration of Their Functional Properties

TSUCHIYA, Takashi, International Center for Materials Nanoarchitectonics, National Institute for Materials Science

**Host in iJURC** KAN, Daisuke

Polymer-Brush-Decorated Hybrid Particles as Lubricant Additives

OHNO, Kohji, Osaka Metropolitan University

**Host in iJURC** TSUJII, Yoshinobu

Manipulation of Three Dimensional Structure of Polymer Monoliths by 3D Printer

MURASE, Hitoki, Kyoritsu Women's University

**Host in iJURC** TSUJII, Yoshinobu

Room Temperature Operable CdS/CdTe Type II Dimer-Quantum-dot Diode

MAJIMA, Yutaka, Institute for innovative Research, Tokyo Institute of Technology

**Host in iJURC** TERANISHI, Toshiharu

Measurement of Quasi-Stable Strong Magnetic Field by the Interaction between a High-Power Laser and Structured Medium

KISHIMOTO, Yasuaki, Graduate School of Energy Science, Kyoto University

**Host in iJURC** TOKITA, Shigeaki

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

Design of Intracellular Delivery Systems for Extracellular Vesicles

NAKASE, Ikuhiko, Department of Biological Chemistry, Graduate School of Science, Osaka Metropolitan University

**Host in iJURC** FUTAKI, Shiroh

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

Development of Structurally Well-Defined Branched Supramolecular Polymers

HAINO, Takeharu, Graduate School of Advanced Science and Engineering, Hiroshima University

**Host in iJURC** YAMAGO, Shigeru

## SUBJECTS FOCUSING OF JOINT USAGE OF iJURC/ICR FACILITIES

Microstructural Investigation by Atomic Resolution Transmission Electron Microscopy of Novel Alloys

CHOMSAENG, Natthaphol, Advanced Materials Engineering, Burapha University

**Host in iJURC** HARUTA, Mitsutaka

I

Electron Energy Loss Spectroscopy and High-Resolution Transmission Electron Microscopy of Novel Functional Materials

CHAIRUANGSRI, Torranin, Industrial Chemistry, Chiang Mai University

**Host in iJURC** HARUTA, Mitsutaka

I

Plasmon Excitations in Charge-Density-Wave Systems: A Momentum-Dependent Electron-Energy Loss Spectroscopy Investigation

CHU, Ming-Wen, Center for Condensed Matter Sciences, National Taiwan University

**Host in iJURC** HARUTA, Mitsutaka I

High-Pressure Synthesis of Transition Metal Oxides with Novel Properties

Jl, Kunlang, Centre for Science at Extreme Conditions and School of Chemistry, University of Edinburgh

**Host in iJURC** SHIMAKAWA, Yuichi I

Elucidation of Hydrogen and Helium Retention Behavior in Fusion Materials

MIYAMOTO, Mitsutaka, Interdisciplinary Faculty of Science and Engineering, Shimane University

**Host in iJURC** HARUTA, Mitsutaka

Nano Structural Analysis of Cs<sub>4</sub>PbBr<sub>6</sub>/CsPbBr<sub>3</sub> Composite for the Development of a Scintillator for Fast Electron Beam Detection with High Efficiency

SAITO, Hikaru, Institute for Materials Chemistry and Engineering, Kyushu University

**Host in iJURC** HARUTA, Mitsutaka

Optimization of Laser Irradiation Conditions for High-Quality Ion beam Generation by Laser-Driven Ion Acceleration

KOJIMA, Sadaoki, Kansai Institute for Photon Science, National Institutes for Quantum Science and Technology

**Host in iJURC** TOKITA, Shigeki

Mass Spectrometry Analysis for the Production of Advanced Chemical Materials from the Efficient Chemical Decomposition Process of Cedar Wood Tissue Structure

HATANO, Osamu, Faculty of Medicine, Nara Medical University

**Host in iJURC** NAKAMURA, Masaharu

Theoretical Design of Low-Dimensional Silicon Material Embedded in a Flat Two-Dimensional Sheet and Exploration for Operating Principles

TAKAHASHI, Masae, Graduate School of Science, Tohoku University

**Host in iJURC** MIZUHATA, Yoshiyuki F

## SUBJECTS ENCOURAGING JOINT PROGRAM

Determine the Three-Dimensional Structure of <sup>13</sup>C=<sup>18</sup>O Labeled  $\alpha$ -Synuclein(61-95) in the Langmuir-Blodgett Film and Supported Phospholipid Bilayer by MAIRS2

WANG, Chengshan, Department of Chemistry, Middle Tennessee State University

**Host in iJURC** HASEGAWA, Takeshi I

High-Efficacy Protein Chemical Synthesis

HOJO, Hironobu, Institute for Protein Research, Osaka University

**Host in iJURC** FUTAKI, Shiroh I

Modulation of In-Cell Protein-Protein Interactions Using Mid-Sized Peptides

TAMAMURA, Hirokazu, Institute of Biomaterials and Bioengineering (IBB-TMDU), Tokyo Medical and Dental University

**Host in iJURC** FUTAKI, Shiroh I

The 17th International Workshop for East Asian Young Rheologists

INOUE, Tadashi, Department of Macromolecular Science, Osaka University

**Host in iJURC** MATSUMIYA, Yumi I

A novel Interdisciplinary Approach to Cancer Metabolism Research by Solid State Nuclear Magnetic Resonance Spectroscopy

ITO, Takahiro, Institute for Life and Medical Sciences, Kyoto University

**Host in iJURC** KAJI, Hironori



## Field-Free Superconducting Diode Effect in Noncentrosymmetric Superconductor/Ferromagnet Multilayers

Narita, H.; Ishizuka, J.; Kawarazaki, R.; Kan, D.; Shiota, Y.; Moriyama, T.; Shimakawa, Y.; Ogniev, A. V.; Samardak, A. S.; Yanase, Y.; Ono, T., *Nat. Nanotechnol.*, **17**, 823-828 (2022).

### Abstract

The diode effect is fundamental to electronic devices and is widely used in rectifiers and a.c.–d.c. converters. At low temperatures, however, conventional semiconductor diodes possess a high resistivity, which yields energy loss and heating during operation. The superconducting diode effect (SDE), which relies on broken inversion symmetry in a superconductor, may mitigate this obstacle: in one direction, a zero-resistance supercurrent can flow through the diode, but for the opposite direction of current flow, the device enters the normal state with ohmic resistance. The application of a magnetic field can induce SDE in Nb/V/Ta superlattices with a polar structure, in superconducting devices with asymmetric patterning of pinning centres or in superconductor/ferromagnet hybrid devices with induced vortices. The need for an external magnetic field limits their practical application. Recently, a field-free SDE was observed in a NbSe<sub>2</sub>/Nb<sub>3</sub>Br<sub>8</sub>/NbSe<sub>2</sub> junction; it originates from asymmetric Josephson tunnelling that is induced by the Nb<sub>3</sub>Br<sub>8</sub> barrier and the associated NbSe<sub>2</sub>/Nb<sub>3</sub>Br<sub>8</sub> interfaces. Here, we present another implementation of zero-field SDE using noncentrosymmetric [Nb/V/Co/V/Ta]<sub>20</sub> multilayers. The magnetic layers provide the necessary symmetry breaking, and we can tune the SDE by adjusting the structural parameters, such as the constituent elements, film thickness, stacking order and number of repetitions. We control the polarity of the SDE through the magnetization direction of the ferromagnetic layers. Artificially stacked structures, such as the one used in this work, are of particular interest as they are compatible with microfabrication techniques and can be integrated with devices such as Josephson junctions. Energy-loss-free SDEs as presented in this work may therefore enable novel non-volatile memories and logic circuits with ultralow power consumption.

## Synergistic Surface Modification of Tin–Lead Perovskite Solar Cells

Hu, S.; Zhao, P.; Nakano, K.; Oliver, R. D. J.; Pascual, J.; Smith, J. A.; Yamada, T.; Truong, M. A.; Murdey, R.; Shioya, N.; Hasegawa, T.; Ehara, M.; Johnston, M. B.; Tajima, K.; Kanemitsu, Y.; Snaith, H. J.; Wakamiya, A., *Adv. Mater.*, **35**(9), 2208320 (2023).

### Abstract

Interfaces in thin-film photovoltaics play a pivotal role in determining device efficiency and longevity. In this work, the top surface treatment of mixed tin–lead ( $\approx 1.26$  eV) halide perovskite films for p–i–n solar cells is studied. Charge extraction is promoted by treating the perovskite surface with piperazine. This compound reacts with the organic cations at the perovskite surface, modifying the surface structure and tuning the interfacial energy level alignment. In addition, the combined treatment with C<sub>60</sub> pyrrolidine tris-acid (CPTA) reduces hysteresis and leads to efficiencies up to 22.7%, with open-circuit voltage values reaching 0.90 V,  $\approx 92\%$  of the radiative limit for the bandgap of this material. The modified cells also show superior stability, with unencapsulated cells retaining 96% of their initial efficiency after  $>2000$  h of storage in N<sub>2</sub> and encapsulated cells retaining 90% efficiency after  $>450$  h of storage in air. Intriguingly, CPTA preferentially binds to Sn<sup>2+</sup> sites at film surface over Pb<sup>2+</sup> due to the energetically favored exposure of the former, according to first-principles calculations. This work provides new insights into the surface

chemistry of perovskite films in terms of their structural, electronic, and defect characteristics and this knowledge is used to fabricate state-of-the-art solar cells.

## LiNbO<sub>3</sub>-Type Polar Antiferromagnet InVO<sub>3</sub> Synthesized under High-Pressure Conditions

Tan, Z.; Lussier, J. A.; Yamada, T.; Xu, Y.; Saito, T.; Goto, M.; Kosugi, Y.; Vrublevskiy, D.; Kanemitsu, Y.; Bieringer, M.; Shimakawa, Y., *Angew. Chem. Int. Ed.*, **61**(25), e202203669 (2022).

### Abstract

The ambient pressure cation disordered InVO<sub>3</sub> bixbyite has been predicted to form a GdFeO<sub>3</sub>-type perovskite phase under high pressure and high temperature. Contrary to the expectation, InVO<sub>3</sub> was found to crystallize in the polar LiNbO<sub>3</sub>-type structure with a calculated spontaneous polarization as large as 74  $\mu\text{C cm}^{-2}$ . Antiferromagnetic coupling of V<sup>3+</sup> magnetic moments and a cooperative magnetic ground state below about 10 K coupled with a polar structure suggest an intriguing ground state of the novel LiNbO<sub>3</sub>-type high-pressure InVO<sub>3</sub> structure.

## Nitrogen Reduction by the Fe Sites of Synthetic [Mo<sub>3</sub>S<sub>4</sub>Fe] Cubes

Ohki, Y.; Munakata, K.; Matsuoka, Y.; Hara, R.; Kachi, M.; Uchida, K.; Tada, M.; Cramer, R. E.; Sameera, W. M. C.; Takayama, T.; Sakai, Y.; Kuriyama, S.; Nishibayashi, Y.; Tanifuji, K., *Nature*, **607**, 86-90 (2022).

### Abstract

N<sub>2</sub> fixation by Nature is performed by nitrogenase, which employs a unique transition metal-sulfur-carbon cluster as its active-site cofactor ([(*R*-homocitrate)MoFe<sub>7</sub>S<sub>9</sub>C], FeMoco). Whereas synthetic counterparts of FeMoco, metal-sulfur clusters, have displayed binding of N<sub>2</sub> in a few examples, the reduction of N<sub>2</sub> by this class of compounds has been unknown. Here we show that the Fe atoms in our [Cp<sup>R</sup><sub>3</sub>Mo<sub>3</sub>S<sub>4</sub>Fe] cubes (Cp<sup>R</sup> = C<sub>5</sub>Me<sub>5</sub>, C<sub>5</sub>Me<sub>4</sub>SiMe<sub>3</sub>, and C<sub>5</sub>Me<sub>4</sub>SiEt<sub>3</sub>) capture an N<sub>2</sub> molecule and catalyze N<sub>2</sub> silylation to form N(SiMe<sub>3</sub>)<sub>3</sub> under treatment with excess Na and Me<sub>3</sub>SiCl. These results exemplify the first catalytic N<sub>2</sub> reduction by a synthetic metal-sulfur cluster with an Fe center supported only by S ligands. This work demonstrates the N<sub>2</sub>-reducing capability of Fe atoms in a S-rich environment, which Nature has selected to accomplish a similar purpose.

## “Mamonoviridae”, a Proposed New Family of the Phylum Nucleocytoviricota

Zhang, R.; Takemura, M.; Murata, K.; Ogata, H., *Arch. Virol.*, **168**, 80 (2023).

### Abstract\*

Acanthamoeba castellanii medusavirus J1 is a giant virus that was isolated from a hot spring in Japan in 2019. Recently, a close relative of this virus, named medusavirus stheno T3, was isolated in Japan. Here, we describe their morphological, genomic, and gene content similarities and also propose to create a new family, “Mamonoviridae”, a new genus, “Medusavirus”, and two species, “Medusavirus medusae” and “Medusavirus sthenus”, to classify these two viruses within the phylum Nucleocytoviricota.

\*Permission to use this abstract was obtained from Springer Nature by Hiroyuki Ogata.