



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



# JURC Cooperative Research Subjects 2017

(1 April 2017 ~ 31 March 2018)

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

Synthesis of Transition Metal Complexes with a Pincer-Type Phosphaalkene Ligand and Their Application to Catalytic Reactions  
MATSUO, Tsukasa, Faculty of Science and Engineering / Graduate School of Science and Engineering Research, Kindai University  
**Host in JURC** TAKEUCHI, Katsuhiko

Feasibility Study of Novel Cooling Devices with Perovskite Semiconductors  
YAMADA, Noboru, Department of science of technology Innovation, Nagaoka University of Technology  
**Host in JURC** KANEMITSU, Yoshihiko

Investigation of Carrier Transport Mechanism in Halide-perovskite-based Photodevices  
YAMADA, Yasuhiro, Department of Physics, Graduate School of Science, Chiba University  
**Host in JURC** KANEMITSU, Yoshihiko

Many Body Interactions between Excitons in Semiconductor Quantum Dots  
OGAWA, Yoshihiro, Joetsu University of Education  
**Host in JURC** KANEMITSU, Yoshihiko

Investigation on Quantum Properties of Luminescent Nanomaterials Using Novel Techniques of Laser Microscopic Spectroscopy  
IHARA, Toshiyuki, Advanced ICT Research Institute, National Institute of Information and Communications Technology  
**Host in JURC** KANEMITSU, Yoshihiko

Iron-Catalyzed Enantioselective C–C Bond Formation  
ILIES, Laurean, Department of Chemistry, School of Science, The University of Tokyo  
**Host in JURC** NAKAMURA, Masaharu

Study on First-row Late Transition-metal Complexes Bearing Anionic Tridentate Ligand  
YAMAGUCHI, Yoshitaka, Faculty of Engineering, Division of Materials Science and Chemical Engineering, Yokohama National University  
**Host in JURC** NAKAMURA, Masaharu

Analysis of Complex Networks with Degree Correlations  
TAKEMOTO, Kazuhiro, Department of Bioscience and Bioinformatics, Kyushu Institute of Technology  
**Host in JURC** AKUTSU, Tatsuya

Control and Analysis of Complex Networks via Minimum Dominating Sets  
JOSE, C. Nacher, Department of Information Science, Faculty of Science, Toho University  
**Host in JURC** AKUTSU, Tatsuya

Genome Analysis of New Giant DNA Virus Isolated from Hot Spring Water in Japan  
TAKEMURA, Masaharu, Faculty of Science, Tokyo University of Science  
**Host in JURC** OGATA, Hiroyuki

Establishment of a New Virus-evolution-hypothesis Through an Intensive Quest of Megaviruses in a Highly Enclosed Inlet, Uranouchi Bay, Where Various Algal Blooms Frequently Occur  
NAGASAKI, Keizo, Faculty of Agriculture and Marine Science, Kochi University  
**Host in JURC** OGATA, Hiroyuki

New Prediction Method for Metabolic Pathway from Genome and Metagenome by Combination of MAPLE and GENIES  
TAKAMI, Hideto, Research and Development Center for Submarine Resources, Japan Agency for Marine-Earth Science and Technology  
**Host in JURC** OGATA, Hiroyuki

Machine Learning Based on Sparsity Regularization with Auxiliary Genomic Information  
SHIGA, Motoki, Informatics Course, Department of Electrical, Electronic and Computer Engineering, Faculty of Engineering, Gifu University  
**Host in JURC** MAMITSUKA, Hiroshi I

Creation of Highly Active Polypodna Complexes and Their Intracellular Delivery  
NISHIKAWA, Makiya, Faculty of Pharmaceutical Sciences, Tokyo University of Science  
**Host in JURC** FUTAKI, Shiroh

Development of Novel Heteroazulene Oligomer Toward Organic Functional Dyes  
KUROTOBI, Kei, National Institute of Technology, Kurume College  
**Host in JURC** MURATA, Yasujiro

Synthesis of  $\pi$ -Extended Thienofuran Derivatives by Dehydrative Cyclization, and Their Properties  
SUGA, Seiji, Graduate School of Natural Science and Technology, Okayama University  
**Host in JURC** MURATA, Yasujiro

Synthesis of Metal Complexes with Three-dimensional  $\pi$ -Systems and their Performance as Organic Semiconductors  
MURATA, Michihisa, Department of Applied Chemistry, Osaka Institute of Technology  
**Host in JURC** MURATA, Yasujiro

Molecular Engineering of Highly Crystalline Organic Semiconductors via Precursor Approaches  
SUZUKI, Mitsuharu, Graduate School of Materials Science, Nara Institute of Science and Technology (NAIST)  
**Host in JURC** MURATA, Yasujiro

Study on Highly Efficient Transportation of Metal Ions through a Membrane Containing Ionic Liquid  
MUKAI, Hiroshi, Faculty of Education, Kyoto University of Education  
**Host in JURC** SOHRIN, Yoshiki

Elucidation of Hydrogen Distribution in Single-crystalline Pd Nanoparticles  
YAMAUCHI, Miho, International Institute for Carbon-Neutral Energy Research, Kyushu University  
**Host in JURC** TERANISHI, Toshiharu F

I: International Joint Research

F: Female PI

Design and Creation of New Functional Material Having Both Optical Diagnostic and Therapeutic Effects using Metal Nanoparticle

ISHIHARA, Miya, National Defense Medical College

**Host in JURC** TERANISHI, Toshiharu

[F]

Test of Resonant Effect in Plasmon Heating of Periodic Lattice of Metal Domain

SHIMADA, Ryoko, Department of Mathematical and Physical Sciences, Faculty of Science, Japan Women's University

**Host in JURC** WATANABE, Hiroshi

[F]

Fabrication and Evaluation of Dye-sensitized Solar Cells using Flavonoid Compounds, and Their Theoretical Studies Toward Improvement of the Efficiency

YOSHIDA, Kumi, Department of Complex Systems Science, Graduate School of Information Science, Nagoya University

**Host in JURC** MURATA, Yasujiro; WAKAMIYA, Atsushi

[F]

Structure Analysis of Monolayer Assembly with  $\pi$ -Conjugated Units Studied by pMAIRS

YAMAMOTO, Shunsuke, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University

**Host in JURC** HASEGAWA, Takeshi

## EXPANDING SUBJECTS

### (IN SPECIFIC FIELDS CHOSEN BY JURC)

Fundamental Study on Micro-fabrication of Metal with Controlling Laser Absorption

KUSABA, Mitsuhiro, Electronics, Information and Communication Engineering, Osaka Sangyo University

**Host in JURC** HASHIDA, Masaki

Advanced Functionality on Materials Induced by Intense THz Interaction

NAGASHIMA, Takeshi, Faculty of Science and Engineering, Setsunan University

**Host in JURC** HASHIDA, Masaki

A Study of Laser Driven High-intensity Terahertz Surface Wave

TOKITA, Shigeki, Institute of Laser Engineering, Osaka University

**Host in JURC** SAKABE, Shuji

Diagnostics of Li-Ion Batteries with Laser-Accelerated Protons

KATO, Yoshiaki, The Graduate School for the Creation of New Photonics Industries

**Host in JURC** SAKABE, Shuji

Development on a Repetitive Laser-driven Neutron Source

ARIKAWA, Yasunobu, Institute of Laser Engineering, Osaka University

**Host in JURC** INOUE, Shunsuke

Proposal of a CEP-stabilized Free-Electron Laser and Fabrication of a Superconducting Electron Accelerating Cavity Operated by Small Electricity Power

HAJIMA, Ryoichi, National Institutes for Quantum and Radiological Science and Technology, Quantum Beam Science Research Division

**Host in JURC** IWASHITA, Yoshihisa

Study on Magnification of the Pulsed-neutron Transmission Image Using the Sextupole Magnet, Aimed at Visualization of Charge and Discharge in the Electrode Materials of Li-ion Batteries

KINO, Koichi, Research Institute for Measurement and Analytical Instrumentation, National Institute of Advanced Industrial Science and Technology

**Host in JURC** IWASHITA, Yoshihisa

Research and Development on Future Accelerator Toward ILC Project

HAYANO, Hitoshi, Accelerator Laboratory, High Energy Accelerator Research Organization

**Host in JURC** IWASHITA, Yoshihisa

Research on the High-performance Superconducting Cavity with the Inner-surface Preparation

by Nitrogen-doping and Thin-film Creation Processes

SAEKI, Takayuki, Accelerator Laboratory, High Energy Accelerator Research Organization

**Host in JURC** IWASHITA, Yoshihisa

X-Ray Structural Studies on Reaction Mechanism of Maleylacetate Reductase

OIKAWA, Tadao, Faculty of Chemistry, Materials and Bioengineering, Kansai University

**Host in JURC** FUJII, Tomomi

X-ray Crystallographic Studies on Thermostability and Substrate Specificity of L-Asparaginase

KATO, Shiro, International Institute of Rare Sugar Research and Education, Kagawa University

**Host in JURC** FUJII, Tomomi

Activation of Small Molecules at the Reaction Sites Composed of Transition-metal and Heavier Typical Elements

OKAZAKI, Masaaki, Graduate School of Science and Technology, Hirosaki University

**Host in JURC** OZAWA, Fumiyuki

Development of Iron Polycarboxylate Complexes which Catalyze Oxidation Reactions

SUGIURA, Masaharu, Faculty of Life Sciences, Kumamoto University

**Host in JURC** NAKAMURA, Masaharu

Elucidation of Electronic Structures of Cycloparaphenylenes and Their Application to Materials Science

UCHIYAMA, Masanobu, Graduate School of Pharmaceutical Science, The University of Tokyo

**Host in JURC** YAMAGO, Shigeru

Efficient Molecular Network Analysis through Statistical Machine Learning

KAYANO, Mitsunori, Research Center for Global Agromedicine, Obihiro University of Agriculture and Veterinary Medicine

**Host in JURC** MAMITSUKA, Hiroshi

Cell Penetrating Peptide-based Intracellular Delivery of Inhibitors of Protein-protein Interactions

OHKANDA, Junko, Academic Assembly School of Science and Technology Institute of Agriculture, Shinsyu University

**Host in JURC** FUTAKI, Shiroh

[F]

A Study of Reactivity on Open-shell Molecules in Macrocyclic Systems

ABE, Manabu, Graduate School of Science, Hiroshima University

**Host in JURC** YAMAGO, Shigeru

Excited-state Dynamics of Cycloparaphenylene Dications

MAJIMA, Tetsuro, The Institute of Scientific and Industrial Research, Osaka University

**Host in JURC** YAMAGO, Shigeru

Host-guest Chemistry of Cycloparaphenylenes and Fullerene Derivatives

MATSUO, Yutaka, School of Chemistry and Materials Science, University of Science and Technology of China

**Host in JURC** YAMAGO, Shigeru

[I]

Exploration of Non-lead Perovskite Solar Cell and Development of Novel Efficient Organic Hole Transfer Layer  
SAEKI, Akinori, Graduate School of Engineering, Osaka University  
**Host in JURC** WAKAMIYA, Atsushi

Organic Photovoltaic Devices Composed of Novel Organic Semiconductors  
IE, Yutaka, The Institute of Scientific and Industrial Research, Osaka University  
**Host in JURC** MURATA, Yasujiro

Flux Study of Bioactive Trace Metals in the East China Sea  
NAKAGUCHI, Yuzuru, Faculty of Science and Engineering, Kindai University  
**Host in JURC** SOHRIN, Yoshiki

Structural Analyses for Adhesive Mechanism in Tri-block Polymer Thin Films Using Neutron Reflectivity and Grazing Incidence X-ray Scattering Measurement  
MIYAZAKI, Tsukasa, Comprehensive Research Organization for Science and Society  
**Host in JURC** TAKENAKA, Mikihiro

Dynamics of Guest Chains in Polymer Networks with Different Crosslinking Types  
KATASHIMA, Takuya, Graduate School of Science, Osaka University  
**Host in JURC** MATSUMIYA, Yumi

Dynamical Correlations between Molecules in Polymeric Liquids  
SUKUMARAN, Sathish Kumar, Graduate School of Organic Materials Science, Yamagata University  
**Host in JURC** WATANABE, Hiroshi

Development of Catalysts for Regio- and Stereoselective Oxidation  
ITO, Akichika, Gifu Pharmaceutical University  
**Host in JURC** KAWABATA, Takeo

Selective Chemical Modification of Biomolecules in Membrane by Functionalized Catalysts  
KUNISHIMA, Munetaka, Faculty of Pharmaceutical Sciences, Institute of Medical, Pharmaceutical, and Health Sciences, Kanazawa University  
**Host in JURC** KAWABATA, Takeo

Characteristics of Membrane Vesicles Produced by Intestinal Bacteria and Their Biogenesis  
KURATA, Atsushi, Faculty of Agriculture, Kindai University  
**Host in JURC** KURIHARA, Tatsuo

Structural Control and Functional Development of Alkali Silicate Glasses by High Pressure Synthesis  
MASAI, Hirokazu, Department of Materials and Chemistry, National Institute of Advanced Industrial Science and Technology  
**Host in JURC** SAITO, Takashi

Application of Surfactants for Separation of Boron Group Elements as Synergist  
KURAHASHI, Kensuke, Environmental and Materials Chemistry Course, Osaka Prefecture University College of Technology  
**Host in JURC** SOHRIN, Yoshiki

Development of Organic Reagents Highly Selective for the Extraction and Adsorption of Rare Metals  
YAMAZAKI, Shoko, Department of Chemistry, Nara University of Education  
**Host in JURC** UMETANI, Shigeo

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

Study on the Regulatory Mechanism of Plant Epidermal Cell Differentiation  
TOMINAGA, Rumi, Graduate School of Biosphere Science, Hiroshima University  
**Host in JURC** AOYAMA, Takashi

Study on Lipid Secretion Pathways of Plant Cells  
YAZAKI, Kazufumi, Research Institute for Sustainable Humano-sphere, Kyoto University  
**Host in JURC** AOYAMA, Takashi

Dynamics of the Transcription Factor ARR1 on Plant Chromosomal DNA  
KIM, Jong-Myong, RIKEN Center for Sustainable Resource Science  
**Host in JURC** AOYAMA, Takashi

New Cellular Functions of Acyl-dopamine  
ITO, Akihiro, RIKEN Center for Sustainable Resource Science, Chemical Genomics Research Group  
**Host in JURC** UESUGI, Motonari

Study of Spin-filtering Effect of the Magnetic Insulator Films with Perpendicular Magnetic Anisotropy  
TANAKA, Masaaki, Department of Physical Science and Engineering, Nagoya Institute of Technology  
**Host in JURC** ONO, Teruo

Electric Field Induced Skyrmion Motion  
NAKATANI, Yoshinobu, Department of Communication Engineering and Informatics, The University of Electro-Communications  
**Host in JURC** ONO, Teruo

Precise Analyses of Hierarchical Structure of Polymer Composite Materials by Electron/X-ray/Neutron Beams  
MURASE, Hiroki, Faculty of Home Economics, Kyoritsu Women's University  
**Host in JURC** TSUJII, Yoshinobu

Room Temperature Operation of Au<sub>25</sub> Cluster Single-electron Transistor  
MAJIMA, Yutaka, Laboratory for Materials and Structures, Institute of Innovative Research, Tokyo Institute of Technology  
**Host in JURC** TERANISHI, Toshiharu

Dielectric Relaxation of Linear Rouse Chains having Type-A Dipole and Undergoing Head-to-Head Association and Dissociation  
KWON, Youngdon, School of Chemical Engineering, Sungkyunkwan University  
**Host in JURC** MATSUMIYA, Yumi

The Sequence Control of Two-component Multiblock Copolymers and the Investigation of Bulk and Surface Properties  
TAKANO, Atsushi, Graduate School of Engineering, Nagoya University  
**Host in JURC** WATANABE, Hiroshi

Mode of Action Study of Benzoylphenylurea Insecticides at the Molecular Level  
NAKAGAWA, Yoshiaki, Graduate School of Agriculture, Kyoto University  
**Host in JURC** WATANABE, Bunta

Synthesis and Application of Macrocyclic Compounds Incorporating Triphenylamine Units  
IWANAGA, Tetsuo, Department of Chemistry, Faculty of Science, Okayama University of Science  
**Host in JURC** MURATA, Yasujiro

Study of Surface Enhanced Infrared Absorption by Using Multiple-angle Incidence Resolution Spectrometry  
SHIMADA, Toru, Faculty of Education, Hirosaki University  
**Host in JURC** HASEGAWA, Takeshi

Even-odd Effects on Film Structures of Dicarboxylic Acids on Air/Water Interface and Their Atmospheric Implications  
HAMA, Tetsuya, Institute of Low Temperature Science, Hokkaido University  
**Host in JURC** HASEGAWA, Takeshi

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

Modulation of New Cellular Functions of Vitamin D  
NAGASAWA, Kazuo, Department of Biotechnology and Life Science, Tokyo University of Agriculture and Technology  
**Host in JURC** UESUGI, Motonari

Developments of Highly Functional Spinel Ferrite Thin Films as a Novel Spintronic Materials  
NAGAHAMA, Taro, Laboratory of Advanced Materials Chemistry, Graduate School of Engineering, Hokkaido University  
**Host in JURC** ONO, Teruo

Measurements of Giant Magnetoresistance Effect in Magnetic Nanowires with Multilayer Structure  
YAMADA, Keisuke, Faculty of Engineering, Gifu University  
**Host in JURC** ONO, Teruo

Magnetic Nanostructures Confined or Created by Electric Field  
CHIBA, Daichi, School of Physical Science and Engineering, Nagoya Institute of Technology  
**Host in JURC** ONO, Teruo

A Study on the Relationship between Structures and Functions for Organic Devices  
FUKUSHIMA, Tatsuya, Department of Chemical Science and Engineering, Kobe University  
**Host in JURC** KAJI, Hironori

Theoretical Study on Chemoselective Acylation Catalyzed by 4-Pyrrolidinopyridine Derivatives  
YAMANAKA, Masahiro, Department of Chemistry, College of Science, Rikkyo University  
**Host in JURC** KAWABATA, Takeo

Studies on the Function and Formation Mechanism of the Bound D-Amino Acids in Food Proteins  
OMORI, Taketo, Faculty of Engineering, Osaka Institute of Technology  
**Host in JURC** KURIHARA, Tatsuo

Functional Study of Metal-induced Membrane Proteins in Microbial Metal Respiration  
MIHARA, Hisaaki, Department of Biotechnology, College of Life Sciences, Ritsumeikan University  
**Host in JURC** KURIHARA, Tatsuo

Search for Four Wave-mixing in the Vacuum  
HONMA, Kensuke, Graduate School of Science, Hiroshima University  
**Host in JURC** SAKABE, Shuji

Exploration of Electric-field-effect-induced Functional Properties of Transition Metal Oxides  
HATANO, Takafumi, Department of Crystalline Materials Science, Nagoya University  
**Host in JURC** KAN, Daisuke

In-situ Measurements of Physical Properties and Crystallization Process of Glasses Under High Temperatures and High Pressures  
MASUNO, Atsunobu, Graduate School of Science and Technology, Hirosaki University  
**Host in JURC** SHIMAKAWA, Yuichi

Photochemical Control of Gel-gel Transitions in Polymer-brush-  
afforded Silica Particle/Photoresponsive Liquid Crystals  
YAMAMOTO, Takahiro, Research Institute for Sustainable Chemistry, National Institute of Advanced Industrial Science and Technology (AIST)  
**Host in JURC** OHNO, Kohji

Synthesis and Characterization of Novel Narrow Band Gap Semiconductor Nanocrystals  
TACHIBANA, Yasuhiro, School of Aerospace, Mechanical and Manufacturing Engineering, RMIT University  
**Host in JURC** TERANISHI, Toshiharu I

Identification of Proteins Interacting with Cell-penetrating Peptides for Cancer Targeting  
KUWATA, Keiko, Institute of Transformative Bio-Molecules, Nagoya University  
**Host in JURC** FUTAKI, Shiroh F

Electrical Control and Detection of Spin of NV Center  
MAKINO, Toshiharu, Energy Technology Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)  
**Host in JURC** MIZUOCHI, Norikazu

Toward Long Spin Coherence Time of NV Center at Diamond Surface Region  
TOKUDA, Norio, Faculty of Electrical and Computer Engineering, Institute of Science and Engineering, Kanazawa University  
**Host in JURC** MIZUOCHI, Norikazu

Characterization Toward Ultra-high Sensitivity Sensor by Using Diamond  
HATANO, Mutsuko, Tokyo Institute of Technology, School of Engineering, Department of Electrical and Electronic Engineering  
**Host in JURC** MIZUOCHI, Norikazu F

Study on the Biosynthetic Pathway of Steroidal Glycoalkaloids in *Solanaceae* Plants  
MIZUTANI, Masaharu, Graduate School of Agricultural Science, Kobe University  
**Host in JURC** WATANABE, Bunta

#### **SUBJECTS FOCUSING OF JOINT USAGE OF JURC/ICR FACILITIES**

Elucidation of a Mechanism of Crystalline-to-amorphous Framework Transformation in Coordination Polymers  
INUKAI, Munehiro, Faculty of Science and Technology, Tokushima University  
**Host in JURC** KAJI, Hironori

Nano-electron Spectroscopic Study on Hydrogen and Helium Behavior in Plasma Facing Materials for Nuclear Fusion Devices  
MIYAMOTO, Mitsutaka, Interdisciplinary Faculty of Science and Engineering, Shimane University  
**Host in JURC** KURATA, Hiroki

Fabrication of Helical Ultrathin Au Nanowires with Chiral Photonic-metamaterial Property  
KAWAI, Takeshi, Faculty of Engineering, Tokyo University of Science  
**Host in JURC** KURATA, Hiroki

Analysis of Local Magnetic Moment in Nd-Fe-B Magnet by Electron Energy-loss Spectroscopy  
SAITO, Hikaru, Interdisciplinary Graduate School of Engineering Sciences, Kyushu University  
**Host in JURC** KURATA, Hiroki

Elucidation of the Fluorous Interactions in the Crystal Structures of Fluorine-containing Conjugated Molecules by the Single-crystal X-ray Structural Analysis  
AGOU, Tomohiro, Department of Biomolecular Functional Engineering, College of Engineering, Ibaraki University  
**Host in JURC** TOKITOH, Norihiro

Synthesis and Elucidation of Properties of Unsymmetrically-Substituted Disilyne and Related  $\pi$ -Electron Systems  
IWAMOTO, Takeaki, Graduate School of Science, Tohoku University  
**Host in JURC** TOKITOH, Norihiro

Synthesis and Structural Elucidation of Unsaturated Compounds of Germanium  
MATSUO, Tsukasa, Faculty of Science and Engineering, Kindai University  
**Host in JURC** TOKITOH, Norihiro

Experimental Electron Density Distribution Analysis of Organosilicon Compounds  
HASHIZUME, Daisuke, Center for Emergent Matter Science, RIKEN  
**Host in JURC** TOKITOH, Norihiro

Synthesis and Emission Properties of Aromatic Compounds Containing a Phosphorus Atom  
NAGAHORA, Noriyoshi, Department of Chemistry, Faculty of Science, Fukuoka University  
**Host in JURC** TOKITOH, Norihiro

Synthesis and Structure of Kinetically Stabilized Main Group Element Compounds using 9-Triptycylmethyl Groups  
MINOURA, Mao, Faculty of Science, Rikkyo University  
**Host in JURC** TOKITOH, Norihiro

Study of the Mechanism of Steroid Hormone Production Using Imaging Mass Spectrometry and Targeted Proteomics  
HATANO, Osamu, Department of Anatomy and Cell Biology, Nara Medical University  
**Host in JURC** ISOZAKI, Katsuhiro

Isolation and Mass Spectrometry of Intermediate Clusters Synthesized by Ligand Exchange Reaction  
NEGISHI, Yuichi, Faculty of Science, Department of Applied Chemistry, Tokyo University of Science  
**Host in JURC** ISOZAKI, Katsuhiro

## SUBJECTS ENCOURAGING JOINT PROGRAM

Exploring for Novel Functional Transition-metal Oxides by High-pressure Synthesis  
CHEN, Wei-Tin, Center for Condensed Matter Sciences, National Taiwan University  
**Host in JURC** SHIMAKAWA, Yuichi I

Elucidating the Cycle of Dissolved and Particulate Trace Metals in the Ocean Based on Stable Isotope Analysis  
HO, Tung-Yuan, Research Center for Environmental Changes, Academia Sinica  
**Host in JURC** TAKANO, Shotaro I

Precise Synthesis of Photo-functional Polymers Using Organocatalyzed Living Radical Polymerization  
GOTO, Atsushi, School of Physical and Mathematical Sciences, Nanyang Technological University  
**Host in JURC** TSUJII, Yoshinobu I

Novel Drug-delivery System Using Albumin as a Reservoir  
SAGAN, Sandrine, Laboratoire des Biomolécules, UMR7203 CNRS–University Pierre et Marie Curie –École Normale Supérieure Paris  
**Host in JURC** FUTAKI, Shiroh I

The Twelfth International Workshop for East Asian Young Rheologists  
INOUE, Tadashi, Graduate School of Science, Osaka University  
**Host in JURC** WATANABE, Hiroshi I

# JURC Publications (Selected Examples)

(until 31 May 2017)

## A Square-Planar Complex of Platinum(0)

Takeuchi, K.; Taguchi, H.; Tanigawa, I.; Tsujimoto, S.; Matsuo, T.; Tanaka, H.; Yoshizawa, K.; Ozawa, F., *Angew. Chem. Int. Ed.*, **55**, 15347-15350 (2016).

### Abstract

The Pt<sup>0</sup> complex [Pt(PPh<sub>3</sub>)(Eind<sub>2</sub>-BPEP)] with a pyridine-based PNP-pincer-type phosphalkene ligand (Eind<sub>2</sub>-BPEP) has a highly planar geometry around Pt with  $\sum(\text{Pt})=358.6^\circ$ . This coordination geometry is very uncommon for formal d<sup>10</sup> complexes, and the Pd and Ni homologues with the same ligands adopt distorted tetrahedral geometries. DFT calculations reveal that both the Pt and Pd complexes are M<sup>0</sup> species with nearly ten valence electrons on the metals whereas their atomic orbital occupancies are evidently different from one another. The Pt complex has a higher occupancy of the atomic 6s orbital because of strong s–d hybridization due to relativistic effects, thereby adopting a highly planar geometry reflecting the shape and orientation of the partially  $d_{x^2-y^2}$  unoccupied orbital.

## Interfacial Charge-Carrier Trapping in CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>-Based Heterolayered Structures Revealed by Time-Resolved Photoluminescence Spectroscopy

Yamada, Y.; Yamada, T.; Shimazaki, A.; Wakamiya, A.; Kanemitsu, Y., *J. Phys. Chem. Lett.*, **7**, 1972-1977 (2016).

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### Abstract

The fast-decaying component of photoluminescence (PL) under very weak pulse photoexcitation is dominated by the rapid relaxation of the photoexcited carriers into a small number of carrier-trapping defect states. Here, we report the subnanosecond decay of the PL under excitation weaker than 1 nJ/cm<sup>2</sup> both in CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>-based heterostructures and bare thin films. The trap-site density at the interface was evaluated on the basis of the fluence-dependent PL decay profiles. It was found that high-density defects determining the PL decay dynamics are formed near the interface between CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> and the hole-transporting Spiro-OMeTAD but not at the CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>/TiO<sub>2</sub> interface and the interior regions of CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> films. This finding can aid the fabrication of high-quality heterointerfaces, which are required improving the photoconversion efficiency of perovskite-based solar cells.

## Critical Controllability in Proteome-wide Protein Interaction Network Integrating Transcriptome

Ishitsuka, M.; Akutsu, T.; Nacher, J. C., *Sci. Rep.*, **6**, [23541-1]-[23541-13] (2016).

### Abstract

Recently, the number of essential gene entries has considerably increased. However, little is known about the relationships between essential genes and their functional roles in critical network control at both the structural (protein interaction network) and

dynamic (transcriptional) levels, in part because the large size of the network prevents extensive computational analysis. Here, we present an algorithm that identifies the critical control set of nodes by reducing the computational time by 180 times and by expanding the computable network size up to 25 times, from 1,000 to 25,000 nodes. The developed algorithm allows a critical controllability analysis of large integrated systems composed of a transcriptome- and proteome-wide protein interaction network for the first time. The data-driven analysis captures a direct triad association of the structural controllability of genes, lethality and dynamic synchronization of co-expression. We believe that the identified optimized critical network control subsets may be of interest as drug targets; thus, they may be useful for drug design and development.

## Detailed Analysis of Charge Transport in Amorphous Organic Thin Layer by Multiscale Simulation without Any Adjustable Parameters

Uratani, H.; Kubo, S.; Shizu, K.; Suzuki, F.; Fukushima, T.; Kaji, H., *Sci. Rep.*, **6**, 39128, doi: 10.1038/srep39128 (2016).

### Abstract

Hopping-type charge transport in an amorphous thin layer composed of organic molecules is simulated by the combined use of molecular dynamics, quantum chemical, and Monte Carlo calculations. By explicitly considering the molecular structure and the disordered intermolecular packing, we reasonably reproduce the experimental hole and electron mobilities and their applied electric field dependence (Poole–Frenkel behaviour) without using any adjustable parameters. We find that the distribution of the density-of-states originating from the amorphous nature has a significant impact on both the mobilities and Poole–Frenkel behaviour. Detailed analysis is also provided to reveal the molecular-level origin of the charge transport, including the origin of Poole–Frenkel behaviour.

## Activation of Dihydrogen by Masked Doubly Bonded Aluminum Species

Nagata, K.; Murosaki, T.; Agou, T.; Sasamori, T.; Matsuo, T.; Tokitoh, N., *Angew. Chem. Int. Ed.*, **55**, 12877-12880 (2016).

### Abstract

Activation of dihydrogen by masked dialumenes (Al=Al doubly bonded species) is reported. Reactions of barrelene-type dialumenes, which have the reactivity as masked equivalents of 1,2-diaryldialumenes ArAl=AlAr, with H<sub>2</sub> afforded dihydroalumanes ArAlH<sub>2</sub> at room temperature (Ar: bulky aryl groups). These dihydroalumanes form hydrogen-bridged dimers [ArHAL(μ-H)]<sub>2</sub> in the crystalline state, while a monomer–dimer equilibrium was suggested in solution. The 1,2-diaryldialumenes generated from the barrelene-type dialumenes are the putative active species in the cleavage of H<sub>2</sub>.