

## Director General Maki Kawai Received Medal with Purple Ribbon Honor in Autumn 2017

It is our great pleasure to report here that our Director General Maki Kawai was awarded Medal with Purple Ribbon Honor in autumn 2017. This medal is one of the prizes given by the Emperor to those who outstandingly contributed to the academic, artistic, technological, or sports achievements.

She graduated from the Department of Chemistry, Faculty of Science at the University of Tokyo in 1975 and received a PhD degree (Rigaku Hakushi) in 1980. She became chief scientist, director of Surface Chemistry Laboratory in Riken (Shunin Kenkyu-in) in 1991, professor at the University of Tokyo in 2004, executive director of Riken (Riji) in 2010, and eventually came to IMS as director general in 2016.

She has extensively been investigating surface physical chemistry such as catalytic reactions on solid surfaces, thin film growth of functional metal oxides, thermophysics and dynamics of surface adsorbed molecules, surface single molecule spectroscopy, single molecule reaction control, and so forth. She has provided numerous pioneering academic achievements that are now well known fundamental concepts in surface chemistry and physics.

During her stay at Riken and the University of Tokyo, she established a new scientific field of “nanomolecular science” on atomically well-defined solid surfaces. She exploited vibrational action spectroscopy and reaction control methodology of single molecules; using scanning tunnel microscopy (STM), chemical reactions of single molecules were successfully realized by exciting the adsorbed molecules electronically and/or vibrationally, and furthermore as vibrational spectroscopy of single molecules, action spectroscopy was developed by monitoring the probabilities of chemical reactions as a function of the kinetic energy of incident electrons. These methodologies are now well known techniques throughout the world for the dynamical analysis of adsorbed molecules on solid surfaces.

In the next stage, she has devoted her efforts to lower energy and more highly resolved spectroscopy of single molecules. She succeeded in the observation of electron spin resonant excitations of paramagnetic single molecules adsorbed on surfaces. This achievement is highly praised as a construction of a new scientific field of surface single molecular magnetism. In her sequential studies, she found a switching of magnetic anisotropy in Fe phthalocyanine molecules and discovered a peculiar Kondo effect in which orbital magnetic moments participate as well as spin magnetic moments. Especially, the latter finding gave a great influence to the field of solid state physics. We will here deeply respect her strong belief and consequent achievements to pursue lower energy and higher resolution in single molecular spectroscopy for the investigations of different scientific fields of chemical reactions and solid state physics using a unique method of scanning tunnel microscopy.

So far she has been awarded for many times, especially CSJ (Chemical Society of Japan) Award 2008, IUPAC 2015 Distinguished Women in Chemistry or Chemical Engineering, Gerhard Ertl Lecture Award 2015, AVS (American Vacuum Society) Medard W Welch Award 2016, 5<sup>th</sup> Diels-Planck-Lecture Award *etc.* In the meanwhile, she worked as a repre-



sentative researcher in Grant-in-Aid for Scientific Research on Priority Areas of “Surface Chemistry of Condensed Molecules” and “Electron Transport through a Molecule at Metal Electrode” and in JST Presto of “Structures and Control of Interfaces.” In these projects, she also promoted trainings of young scientists with an excellent leadership. She has also devoted her efforts to tremendous number of government committee members as Intellectual Property Strategy Headquarters Experts Committee (Cabinet Office, 2003–2007), Sciences Council Committee (Ministry of Education, Culture, Sports, Science and Technology, 2004–2005), Education Rebuilding Council (Cabinet Office, 2013– ) *etc.* to give important scientific and technological suggestions. Especially, in Intellectual Property Strategy Headquarters Experts Committee during the period of Prime Minister Koizumi Junichiro, she claimed importance of scientific and technological innovations leading to the present strategies in Japanese scientific and technological policies. In Education Rebuilding Council, she contributed significantly to the summaries of proposals concerning many kinds of contemporary issues as children bullying in compulsory educational schools, reforms in bridging between high schools and universities *etc.* Moreover, she worked quite actively also in foreign countries as Chair of Surface Science Division in International Union for Vacuum Science, Technique and Applications (IUVSTA), a committee member of European Research Council (for evaluation of large scale budgets), an evaluation committee member of Fritz-Haber-Institut in Max-Planck-Gesellschaft. Although Japanese researchers seldom work as members in these western committees, she has made valuable contributions to the developments of these international scientific communities and to important international presence of Japan as well.

Director General Maki Kawai has been engaged in deepening of scientific principles based on physical chemistry and exploiting analytical methodology, has led nanomolecular science all over the world, has devoted efforts to training young scientists, international relationship in research environments, and enrichment and development of education. She is definitely a rare researcher who can play an important role in scientific governmental administration, overlooking Japanese scientific communities from an international view point. She was awarded Medal with Purple Ribbon Honor in autumn 2017 for these reasons.

We will be courteously pleased with her present decoration and will expect her excellent perspective decisions in the administration of Institute for Molecular Science as well as further development of IMS. Congratulations.

### 2018 Wolf Prize in Chemistry “Pioneering Reticular Chemistry via Metal-Organic Frameworks and Covalent Organic Framework”

The 2018 Wolf Prize in Chemistry has been awarded to Professor Makoto Fujita for his research on metal-guided synthesis and “for conceiving metal-directed assembly principles leading to large highly porous complexes.”

Professor Fujita introduced the concept of “metal-guided synthesis” or “metal-directed self-assembly” for creating large, stable cyclic and three-dimensional molecular structures. The 3D structures form a regular “cage” that can be used as “containers” for other molecules. One revolutionary application of these structures is to capture other molecules within those spaces allowing the use of standard X-ray crystallography to determine structures without the need to obtain a



crystallized sample. This method, also known as the “crystalline sponge method,” should make a paradigm shift in a wide variety of scientific fields.

OHMORI, Kenji  
Photo-Molecular Science

Hiroshi Takuma Memorial Prize of Matsuo Foundation  
“Development of Coherent Control with Attosecond Precision and Its Applications”  
The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology Prizes for Science and Technology Research Category  
“Development of Coherent Control with Attosecond Precision and Its Applications”

NOBUSADA, Katsuyuki  
Theoretical and Computational  
Molecular Science

The HPCI Research Project Award for Excellent Achievement  
“Computational Design of Functional Fields with Novel Optical Properties Induced by Near-Field Light Excitation”

SUGIMOTO, Toshiki  
Materials Molecular Science

Morino Foundation for Molecular Science 2018  
“Emergent Properties and Dynamics of Molecular Aggregates Induced by Inversion-Symmetry Breaking at Solid Surfaces”

KOBAYASHI, Genki  
Materials Molecular Science

The 39<sup>th</sup> Honda Memorial Young Researcher Award  
“Study on Ion Conductive Materials for Next-Generation Energy Devices”

KOGA, Nobuyasu  
Research Center of Integrative  
Molecular Systems

Morino Foundation for Molecular Science 2018  
“Studies on Design Principle for Ideal Protein Structures”

TAIRA, Takunori  
Center for Mesoscopic Sciences

The Commendation for Lazer Advancement of Taizan Prize  
“Pioneer Work in Downsizing of Solid-State Lasers and Nonlinear Optics”

NAGASAKA, Masanari  
Photo-Molecular Science

The 10<sup>th</sup> Young Scientist Awards of the Japan Society for Molecular Science  
“Operando Observation of Liquid and Liquid–Liquid Interface by Soft X-Ray Absorption Spectroscopy”

IWAYAMA, Hiroshi  
UVSOR Synchrotron Facility

The 19<sup>th</sup> Young Scientist Awards of the Atomic Collision Society of Japan  
“Interaction and Relaxation Process of Rare Gas Clusters Irradiated by Intense EUV-FEL Pulses”

YAGI-UTSUMI, Maho  
Life and Coordination-Complex  
Molecular Science

The Pharmaceutical Society of Japan Award for Young Scientists '18  
“NMR Characterization of Conformational Dynamics and Molecular Assemblies of Proteins”

ANDO, Jun  
Life and Coordination-Complex  
Molecular Science

Young Scientist Presentation Award of the Spectroscopical Society of Japan 2017  
“Alkyne-Tag SERS Screening for Identifying Small-Molecule-Binding Sites in Proteins”

OSAKO, Takao  
Life and Coordination-Complex  
Molecular Science

Thieme Chemistry Journals Award 2018

HAMASAKA, Go  
Life and Coordination-Complex  
Molecular Science

Mitsubishi Gas Chemical Award in Synthetic Organic Chemistry, Japan  
“Development of Highly Efficient Aquacatalytic Systems Based on Immobilization of Amphiphilic Transition Metal Complexes onto Solid Supports”  
The Chemical Society of Japan Lecture Award for Young Chemists  
“Development of New Reaction Systems Driven by Assembly of Molecular Transition Metal Catalysts”

KONDO, Mio  
Life and Coordination-Complex  
Molecular Science

The Chemical Society of Japan Award for Outstanding Young Women Chemists  
“Development of Function-Integrated Metal Complex Catalysts for Small Molecule Conversion”  
The 7<sup>th</sup> Young Scientist Award of National Institutes of Natural Sciences  
“Development of Function-Integrated Metal Complex Catalysts for Production of Chemical Fuels”

SUDA, Masayuki  
Research Center of Integrative  
Molecular Systems

The 12<sup>th</sup> Condensed-Matter Science Prize  
“Phase Control between Mott Insulators and Superconductors Utilizing Photoisomerization Reactions”  
The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology The Young Scientists' Prize  
“Development of Novel Molecular Devices Based on a New Photo-Control Method for Interface Dipoles”