

AWARDS

Emeritus Professor Kimura's Scientific Achievements

Dr. Katsumi Kimura, a professor emeritus (professor: 1979-1992), was honored as the 1998 Purple Ribbon by the Government for his distinguished contributions to physical chemistry. The Purple Ribbon is given to distinguished people in science and art in Japan. His scientific achievements are summarized as following.

1. Vacuum ultraviolet photoelectron spectroscopic studies of whole valence electron structure for various fundamental organic molecules.
2. The development and application of synchrotron radiation ionization spectroscopy for studying molecular clusters.
3. The development and application of laser multi-photon ionization photoelectron spectroscopy for studying excited-state molecules.
4. The development and application of zero-kinetic-energy photoelectron spectroscopy for cation vibrational spectroscopy of jet-cooled molecules and van der Waals complexes.

Associate Professor Suzuki's Scientific Achievements

Associate Professor Toshinori Suzuki of the Department of Electronic Structure received the Award of the Spectroscopical Society of Japan in 1998 for his contribution entitled "Studies on Chemical Reaction Dynamics by Photoion Imaging" published in Journal of the Spectroscopical Society of Japan.

The final state distribution of products and their dependence on the initial state of reactants are key to understanding the chemical reaction mechanism. The photoion imaging presented by Professor Suzuki enables us to measure the product distribution in space and energy with a single quantum state selectivity. Professor Suzuki has combined the photoion imaging with laser spectroscopy and has revealed the photodissociation mechanism of a small molecule, such as NO₂ and OCS with clear experimental evidence. His works summarized in the paper were thus evaluated as the creative contribution in spectroscopy and dynamics in the year.

Associate Professor Inoue's Scientific Achievements

Associate Professor Katsuya Inoue of Department of Applied Molecular Science received the Morino Science Award for Molecular Scientists in 1997 for his contribution to "The Design and Synthesis of Molecular-based Magnets by the Self-Assemblage of Nitroxide Radicals and Transition Metal Ions". His scientific achievements relevant to the award are summarized as follows.

1. Synthesis of high-spin polynitroxides.
2. Construction of molecular-based ferrimagnets by self-assemblage of transition metal ions with high-spin polynitroxide radicals.

Associate Professor Sarukura's Scientific Achievements

Associate professor Nobuhiko Sarukura of Laser Research Center for Molecular Science received the Researcher Paper Award (original) of the Laser Society of Japan in 1998 for their contributions on "Broad-Band, Low-Loss Mirror for Tunable Laser", together with Dr. N. Yamamura, Dr. R. Uchimura, Dr. M. Maeda, Dr. S. Kimura, and Dr. Izawa in Showa Optronics Corporation.

Their main scientific contribution is that they developed an extremely broad-band, super high reflection mirror. Typically, it is requested to change 4 sets of optics for obtaining full tuning of Ti:sapphire laser (670-1100 nm). This inconvenience was due to the restricted performance of a dielectric coated mirror. Owing to the sophisticated design of gradually varying thickness quarter wave dielectric coatings and improved electron-beam deposition technique, they have succeeded in fabricating broad-band, high reflection mirrors which meet the requirements for full tuning of a cw Ti:sapphire laser. Using these mirrors in a Ti:sapphire laser, they have demonstrated the tuning from 663 nm to 1095 nm. This technological breakthrough will make all tunable-laser systems including Ti:sapphire lasers and OPO's much more powerful and attractive.

Emeritus Professor Iwamura's Scientific Achievements

Emeritus Professor Hiizu Iwamura, currently Professor of National Institution for Academic Degrees, received the Fujiwara Science Award in 1998 for his contribution to "The Design and Synthesis of Molecular-based Magnetic Materials by the Assembly and Spin Ordering of Free Radicals". His scientific achievements relevant to the award are summarized as follows.

1. Synthesis of super-high-spin polycarbenes (up to $S = 9$).

2. Systematization of the molecular ferromagnetic coupling units.
3. Synthesis of a number of stable triplet bis- and quartet trisaminoxyl radicals.
4. Construction of molecular-based ferro- and ferrimagnets (T_c in the range 3.4-46 K) by self-assembly of magnetic metal ions with high-spin oligoaminoxyl radicals as ligands.
5. Approaches to photomagnetic ferri- and ferromagnetic materials.

It is to be noted that the original work was initiated in the early 80s at IMS when he was Director and Professor of Division of Applied Molecular Science.

Nagakura Award to Mr. Takeshi Tomita

This award was founded in 1995 on the basis of donation from Prof. Saburo Nagakura, the first president of the Graduate University for Advanced Studies, to encourage students to open a new field of science and/or to challenge some pioneering work and is yearly given to a few promising students of this university. T. Tomita is the first winner in this institute.

Mr. Tomita has graduated from the Engineering Department of Kyoto University, where he learned theoretical chemistry based on ab initio MO calculations (Prof. Hiroshi Nakatsuji's lab). Subsequently he studied solvent extraction under the supervision of Prof. Masakazu Matsui in Institute of Chemistry, Kyoto University. After two years of master course in analytical chemistry, he entered into the Graduate University for Advanced Studies, and started the investigation of structure-function relationship of heme proteins in my laboratory.

Tomita has succeeded in isolating soluble guanylyl cyclase (sGC), which is a physiological receptor of NO in animal tissues and catalyzes the formation of cGMP from GTP. He used rat brain first but he could not observe even the strongest absorption band for the preparations obtained from 100 pieces of rats. Second he tried bovine lung. After long struggles including chemical modifications of column materials, he succeeded in obtaining 3 mg of sGC from 4 kg of bovine lung. Accordingly, he established the method of purification. He found that this protein has one heme per a molecule consisting of two subunits and is ADP-ribosylated in the presence of a toxin similar to general G proteins. The enzymatic activity of the ADP-ribosylated enzyme became higher ~ 10 fold but it was only the subunit that underwent ADP-ribosylation. Upon binding of NO to sGC, the enzymatic activity was raised by 200 fold. Resonance Raman spectra of the NO-bound sGC indicated cleavage of the Fe-histidine bond which is stable before incorporation of NO. Furthermore, Tomita found that the NO stretching Raman band of the NO-bound sGC exhibits splitting as the proceed of the enzymatic reaction. He ascribed it to the binding of a product, cGMP, to the heme pocket, and inferred it a negative feedback regulation. To understand the meaning of splitting of the NO stretching band, he investigated resonance Raman spectra of the NO complex of myoglobin and its mutants at neutral and acidic pH. He observed a shift of NO stretching mode upon mutation of some residues and deduced the origin of the splitting in sGC from the studies of myoglobin.

He worked not only very hard but also challenged difficult problems with an indomitable will. He learned something from failures. I want to bless him and wish his good luck as a research associate in Tohoku University.

Mr. Liu's Scientific Achievements

Mr. Zhenlin Liu, who is a graduate student studying in the Laser Research Center for Molecular Science, received the Excellent Presentation Award of the Laser Society of Japan in 1998 for his contributions on "All Solid State Tunable Ultraviolet Picosecond Ce:LuLiF₄ Laser".

This award is given to young scientists (under 35 years old) who made contributions to the development of laser science and gave excellent presentation at the Annual Meeting of the Laser Society of Japan.