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March 11, 2011.
Mitsui Chemicals, Inc.

Mitsui Chemicals Successfully Hosts The Fifth Catalysis Science Symposium

Mitsui Chemicals, Inc. (MCI) announced today that the Fifth Mitsui Chemicals International Symposium on Catalysis Science (MICS2011), held on March 9th and 10th under the theme of Catalysis Science and Its Contribution to Sustainable Development, drew to a successful close (see attached Fact Sheet). The symposium was attended by 1,600 people from industry, government and academic institutions worldwide. This symposium series has been organized since 2003 to further the development of catalysis science in the hope of contributing to ”Dream-Inspiring Innovation”.

The event featured lectures from eleven of the world’s frontline researchers in catalysis science which plays a key role in resolving issues related to global warming, environmental pollution, and energy, water and food shortages in the 21st century. All the attendees were inspired by the enlightening lectures, including those presented by four Nobel Laureates, Professor Yuan T. Lee of Academia Sinica, Professor Sir John E. Walker of the Medical Research Council, Emeritus Professor Akira Suzuki of Hokkaido University, and Professor Ei-ichi Negishi of Purdue University. After the lectures discussions were held between the lecturers and attendees and everyone found it to be very inspirational.

At the symposium, MCI hosted the award ceremony for the 2011 Mitsui Chemicals Catalysis Science Award and the 2011 Mitsui Chemicals Catalysis Science Award of Encouragement after which commemorative lectures where given by the award winners. The awards are presented to researchers who have made outstanding achievements in catalysis science.

International Year of CHEMISTRY 2011

The Fifth Mitsui Chemicals International Symposium on Catalysis Science (MICS2011) is a recognized event by the International Year of Chemistry 2011.

Overview of the Symposium

1. Name and Theme of the Symposium:

The Fifth Mitsui Chemicals International Symposium on Catalysis Science
Catalysis Science and Its Contribution to Sustainable Development

2. Date/Venue:

Date: March 9th-10th, 2011.

Venue: Kazusa Akademia Hall (Kisarazu City, Chiba Prefecture, Japan)

3. Lecturers:

Plenary Lectures

Prof. Yuan T. Lee (Academia Sinica, Taiwan)
The 1986 Nobel Prize Laureate in Chemistry

Prof. Sir John E. Walker (Medical Research Council, U.K.)
The 1997 Nobel Prize Laureate in Chemistry

Special Lectures

Emeritus Prof. Akira Suzuki (Hokkaido University, Japan)
The 2010 Nobel Prize Laureates in Chemistry

Prof. Ei-ichi Negishi (Purdue University, U.S.A.)
The 2010 Nobel Prize Laureates in Chemistry

Invited Lectures

Prof. John E. Bercaw (California Institute of Technology, U.S.A.)
Prof. Mitsuo Sawamoto (Kyoto University, Japan)
Prof. Ei-ichi Nakamura (The University of Tokyo, Japan)
Prof. Kazunari Domen (The University of Tokyo, Japan)
Prof. Craig J. Hawker (University of California, Santa Barbara, U.S.A.)
Prof. Ken-ichiro Itami (Nagoya University, Japan)
Dr. Haruyuki Makio (Mitsui Chemicals, Inc., Japan)

Commemorative Lectures

Winner of the 2011 Mitsui Chemicals Catalysis Science Award
Prof. David W. C. MacMillan (Princeton University, U.S.A.)

Winners of the 2011 Mitsui Chemicals Catalysis Science Award of Encouragement
Associate Prof. Kazuya Yamaguchi (The University of Tokyo, Japan)
Associate Prof. Hideki Yorimitsu (Kyoto University, Japan)

4. Attendance: Ca. 1,600 persons

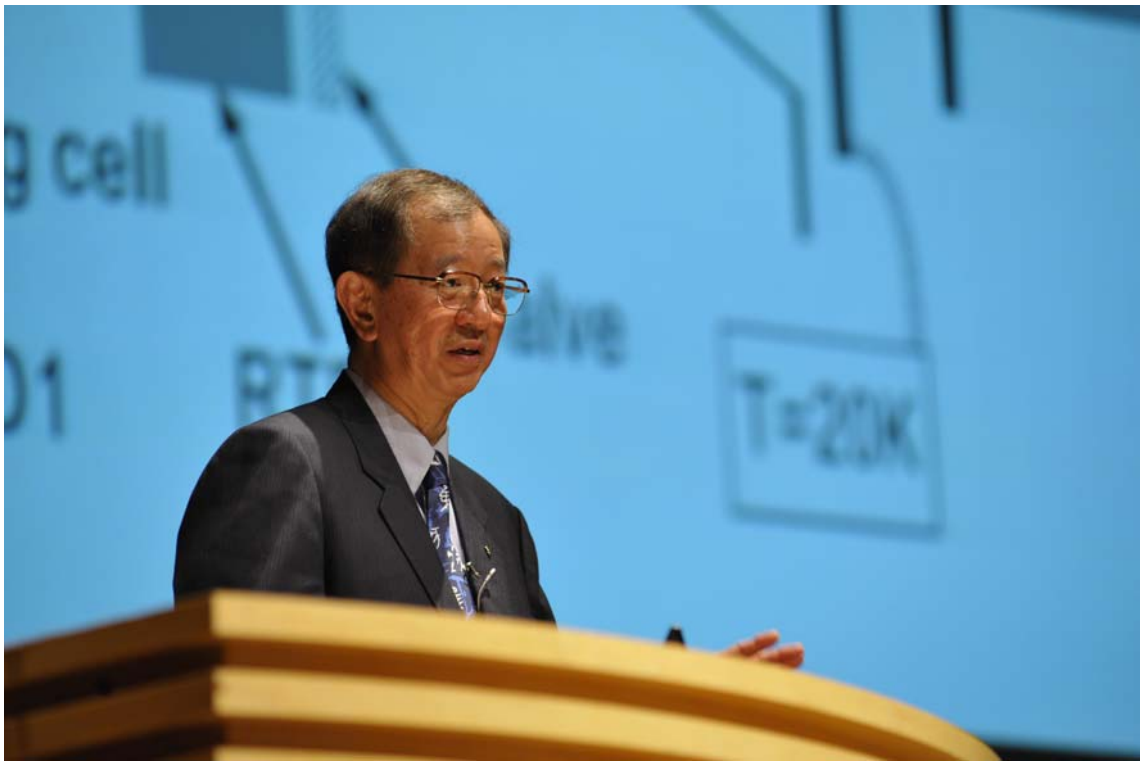
5. Sponsoring Organizations:

Hosted by:	Mitsui Chemicals, Inc.
Supported by:	
Government:	Chiba Prefecture, Sodegaura City, Ichihara City, Kisarazu City, Mobara City
Academia:	The Chemical Society of Japan
	The Society of Polymer Science, Japan
	Catalysis Society of Japan
	The Japan Petroleum Institute
	The Society of Synthetic Organic Chemistry, Japan
	The Society of Chemical Engineers, Japan

MICS2011Hall

Opening Speech Toshikazu Tanaka, President & CEO

Plenary lecture 1 Prof. Yuan T. Lee



Plenary lecture 1 Prof. Sir John E. Walker

Special Lecture 1 Emeritus Prof. Akira Suzuki

Special Lecture 2 Prof. Ei-ichi Negishi

Winners of the “2011 Mitsui Chemicals Catalysis Science Award”

Winners of the “2011 Mitsui Chemicals Catalysis Science Award of Encouragement”

Appendix－1

【Opening Ceremony】

Chairman of the MICS 2011 Organization Committee
President & CEO, Mitsui Chemicals, Inc.
Toshikazu Tanaka

Distinguished speakers, guests, ladies and gentlemen, on behalf of Mitsui Chemicals, I am delighted to welcome you all this morning to the opening of the Fifth Mitsui Chemicals International Symposium on Catalysis Science, or MICS2011.

As you may know, the Mitsui Chemicals International Symposium on Catalysis Science was established in 2003 with the objective of furthering the development of catalysis science, a fundamental technology that is the cornerstone behind the company's corporate mission which is to "Contribute broadly to society through innovations and the creation of materials while keeping in harmony with the global environment". Therefore, the fifth symposium has as its main theme, Catalysis Science and Its Contribution to Sustainable Development.

As you are aware, the world has changed dramatically since the world economic crisis of 2008. Economic stagnation, global warming, environmental pollution, and energy, water and food shortages have become world problems. Chemistry and the chemical industry must help solve these crucial issues for all of humanity, and thus one can say that the time of chemistry has come. In this respect, catalysis science is expected to play a key role in the development of technologies that save scarce resources, lower energy consumption, and the creation of environmentally friendly high-performance materials.

It is pertinent to mention that the year 2011 coincides with the 100th anniversary of the Nobel Prize awarded to Madame Marie Curie. It is also the International Year of Chemistry, a worldwide celebration of the achievements of chemistry and its contributions to the well-being of humankind. Events are planned for the whole year to increase the public appreciation of chemistry, to encourage interest in chemistry among young people, and to emphasize that chemistry is a science essential for sustainability. It is against such a backdrop that Mitsui Chemicals is hosting MICS2011.

At this symposium, we are fortunate to welcome 14 world famous scientists, four of whom are Nobel Prize Laureates in Chemistry. I wish to extend a most cordial welcome to:
Professor Yuan T. Lee from Academia Sinica, Taiwan,
Professor Sir John E. Walker from the Medical Research Council in the United Kingdom,
Dr. Akira Suzuki, Emeritus Professor from Hokkaido University, and
Professor Ei-ichi Negishi of Purdue University, U.S.A.

I also cordially welcome:
Professor John E. Bercaw of the California Institute of Technology, U.S.A.,
Professor Mitsuo Sawamoto of Kyoto University,

Professor Ei-ichi Nakamura of the University of Tokyo,
Professor Kazunari Domen of the University of Tokyo,
Professor Craig J. Hawker of the University of California, U.S.A.,
Professor Ken-ichiro Itami of Nagoya University, and
Dr. Haruyuki Makio from Mitsui Chemicals.

This afternoon, we will have the Mitsui Chemicals Catalysis Science Award ceremony and three commemorative lectures by the award winners:
Professor David W. C. MacMillan from Princeton University, U.S.A.,
Dr. Kazuya Yamaguchi from the University of Tokyo, and
Dr. Hideki Yorimitsu from Kyoto University.

I wish to take this opportunity to express my deepest gratitude to all those persons and organizations, in particular, six academic societies as well as five local and regional governments, plus others concerned, who have helped make this symposium possible.

In closing, honored guests, ladies and gentleman, I wish you all, and especially the speakers, every success at this symposium. To all present here, thank you for coming.

I thank you very much for your kind attention.

【Summary of lectures】

〔Plenary Lectures〕

＜Plenary lecture ①＞［3/9（Wed.）10:10 – 11:00］

Dynamics of Chemical Reactions and Photochemical Processes

Prof. Yuan T. Lee (Academia Sinica, Taiwan)

Prof. Lee is an experimental physical chemist who was the first Taiwanese to receive the Nobel Prize in 1986. He developed crossed molecular beam techniques and has succeeded in observation of the dynamics of certain chemical reaction processes.

In the lecture, in addition to the crossed molecular beam method, recent investigation of the ozone hole photochemistry was given in order to demonstrate the dynamics of chemical reactions and photochemical processes that can be obtained.

＜Plenary lecture ②＞［3/10（Thu.）10:00 – 10:50］

The Structure and Mechanism of ATP Synthase

Prof. Sir John E. Walker (Medical Research Council, U.K)

Prof. Sir John Ernest Walker is a leading authority in the field of molecular biology and is well known for his contribution to mitochondria research. After he established the details of the genetic code of mitochondrial DNA, Prof. Sir John Walker began studying adenosine triphosphate (ATP) synthase from mitochondria and bacteria. He has identified their subunit composition and structure including the catalytic domain, and has elucidated the mechanism of ATP synthesis in detail. For these contributions he was awarded the Nobel Prize in 1997 jointly with Prof. Boyer, and he received his knighthood in 1999.

In the lecture, the latest findings on the structure of ATP synthase and the enzymatic mechanism underlying the ATP synthesis were given.

〔Special Lectures〕

＜Special lecture ①＞［3/9（Wed.）13:20 – 14:10］

Cross-coupling Reactions of Organoboron Compounds: Carbon-Carbon Bonding Made Easy

Emeritus Prof. Akira Suzuki (Hokkaido University, Japan)

Emeritus Prof. Suzuki is a leading authority on organo-boron chemistry and is an authority on synthetic organic chemistry. The Suzuki coupling, which uses stable, easily usable, and non-toxic organo-boron reagents is widely used in industrial manufacturing, in pharmaceuticals, agrochemicals, liquid crystals and organic EL materials. He was awarded the 2010 Nobel Prize jointly with Prof. Negishi and Emeritus Prof. Heck.

In the lecture, an overview of the Suzuki coupling reaction and examples of the industrial

applications were given.

＜Special lecture ②＞［3/10（Thu.）13:10 – 14:00］
Magical Power of Transition Metals: Past, Present, and Future

Prof. Ei-ichi Negishi (Purdue University, U.S.A.)

Prof. Negishi has made a number of significant contributions in the field of organometallic chemistry. Reactions between organometallic compounds and organo halide using palladium catalysts are known as Negishi coupling, and for these findings he was awarded the 2010 Nobel Prize together with Emeritus Prof. Suzuki and Emeritus Prof. Heck. In addition, he has developed carbo-alumination using zirconium catalysts and its asymmetric version (ZACA reaction*).

In the lecture, in addition to the distinctive features of transition metals in the catalytic reactions, the progress of the ZACA reaction using chiral zirconium catalysts and its applications for the synthesis of chiral compounds of biological and medicinal interest were given.

* : Zr-Catalyzed Asymmetric Carboalumination of Alkenes

〔Invited Lectures〕

＜Invited Lecture ①＞［3/9（Wed.）11:00 – 11:50］
Hydrocarbon Upgrading to Fuels and Chemicals: Progress towards Homogeneous Catalysts

Prof. John E. Bercaw (California Institute of Technology, U.S.A.)

Prof. Bercaw, whose research interests include synthetic, structural, and mechanistic organo-transition metal chemistry is deeply involved in inorganic and organometallic chemistry. His recent research topics include olefin polymerization catalysts, the hydroxylation reaction for hydrocarbons using transition metal complexes and useful chemicals production through synthesis gas ($CO+H_2$) conversion.

In the lecture, in addition to a mechanistic study of the Shilov System*, an overview of the recent progress towards both *direct* and *indirect* (via synthesis gas ($CO + H_2$)) conversion of light alkanes to value-added products and to more valuable chemicals and liquid fuels was given.

* : catalytic oxidation reaction for alkanes to alcohols with Pt complexes

＜Invited Lecture ②＞［3/9（Wed.）14:10 – 15:00］
Water Splitting on Heterogeneous Photocatalysts

Prof. Kazunari Domen (The University of Tokyo, Japan)

Prof. Domen is a leading authority on hydrogen production from water using heterogeneous photocatalysts and has promoted the development of photocatalysts for efficient solar energy conversion. Although titanium oxide, tantalum and niobium are generally used in this field, Prof. Domen decided to focus on (oxy)nitrides of gallium or germanium for the development of photocatalysts, and this has resulted in water splitting by the use of visible light existent within solar light.

In the lecture, the art and future challenges of photocatalytic water splitting using visible light as a result of employing solid solution photocatalysts such as GaN-ZnO and $ZnGeN_2$-ZnO, in addition to the Z-scheme photocatalyst systems mimicking photosynthesis in green plants, were given.

＜Invited Lecture ③＞［3/9（Wed.）15:00 – 15:50］

Challenges in Arene Assembling Chemistry

Prof. Ken-ichiro Itami (Nagoya University, Japan)

Prof. Itami is a synthetic organic chemist who has been promoting interdisciplinary organic synthesis. He has developed a highly selective and a highly efficient synthetic methodology through a novel proposal involving the ligands of palladium catalysts. His new methodology, which can assemble arenes in a simple way, is drawing a lot of attention for pharmaceutical and carbon material applications.

In the lecture, (1) catalytic C–H bond direct arylation of arenes, (2) rapid synthesis of pharmaceuticals and natural products, and (3) synthesis of novel carbon nano-materials were given.

＜Invited Lecture ④＞［3/10（Thu.）10:50 – 11:40］

Iron Catalysis in Organic Synthesis

Prof. Ei-ichi Nakamura (The University of Tokyo, Japan)

Prof. Nakamura's career has ranged over the entire field of chemistry and his research interests include the development of reactions using organo-metals, mechanistic studies of a series of organic reactions on the basis of theoretical studies and the chemistry of carbon cluster compounds such as fullerenes and carbon nanotubes. He has also recently been investigating reactions using iron catalysts which are abundant and environmentally benign.

In the lecture, a series of iron-catalyzed C-C bond formation reactions which include 1) (asymmetric) carbo-metalation of olefins, 2) cross-coupling of alkyl halides, and activation of sp^2- and sp^3 C-H bonds was given.

＜Invited Lecture ⑤＞［3/10（Thu.）14:00 – 14:50］

Applications of Orthogonal, "Click" Chemistries in the Synthesis of Functional Soft Materials

Prof. Craig J. Hawker (University of California, Santa Barbara, U.S.A.)

Prof. Hawker is a leading authority on the development of novel well-defined functional macromolecules by the combination of the controlled radical polymerization technique with high-yielding chemical reactions that are so-called “Click chemistries”.

In the lecture, some synthetic examples of supramolecular block copolymers possessing reactive domains utilizing “Click chemistries” and the applications of supramolecular copolymers for nanoporous thin films and hydrogels were given.

＜Invited Lecture ⑥＞［3/10（Thu.）15:10 – 16:00］

Phenoxy–Imine Ligand as a Basis of the Highly Active and Selective Industrial Catalysts: Principles and Practice

Dr. Haruyuki Makio (Mitsui Chemicals, Inc., Japan)

Dr. Makio is engaged in projects related to transition-metal catalyzed olefin polymerization and he is currently working on the creation of new olefin-based value-added polymer materials　using heterogeneous and homogeneous catalysts.

In the lecture, the reaction mechanisms and the structure–reactivity relationships that take place in olefin polymerization using Mitsui Chemicals' post-metallocene FI catalysts were given. In addition, the creation of novel olefin polymer materials using FI catalysts and the design and development of ethylene trimerization catalysts based on the technology of FI catalysts were also given.

＜Invited Lecture ⑦＞［3/10（Thu.）16:00 – 16:50］

Precision Radical Polymerization with Transition-Metal Catalysis: A Bridge between Polymer Chemistry and Catalysis Science

Prof. Mitsuo Sawamoto (Kyoto University, Japan)

Prof. Sawamoto is an inventor of the transition metal-catalyzed precision (living) radical polymerization technique which is industrially available for the development of well-defined polymer syntheses due to an inherent simple and easy methodology.

In the lecture, recent progress in catalyst development and mechanistic understanding were given in addition to the precision synthesis of functionalized and/or sequence-controlled polymers and macromolecules via radical/metal catalysis.

〔Commemorative Lectures〕

＜“2011 Mitsui Chemicals Catalysis Science Award” ①＞

Photoredox Catalysis and Accelerated Serendipity

Prof. David W. C. MacMillan (Princeton University, U.S.A.)

Prof. MacMillan has made a great contribution to the field of organocatalysis. He has realized a number of asymmetric reactions using organocatalysts having a chiral

imidazolidinone framework (the MacMillan's catalyst). Recently, he has developed a novel activation methodology of substrates via a radical mechanism (SOMO-Activation) which uses chiral organocatalysts in combination with the one-electron oxidant. Furthermore, he has expanded this concept to organocatalytic photoredox reactions using a ruthenium complex as a photoredox agent.

In the lecture, the development of SOMO and photoredox catalysis as well as an introduction to accelerated serendipity were given.

＜"2011 Mitsui Chemicals Catalysis Science Award of Encouragement" ②＞

Development of Highly Active Heterogeneous Catalysts Based on the Properties of Metal Hydroxides

Associate Prof. Kazuya Yamaguchi (The University of Tokyo, Japan)

Associate Prof. Yamaguchi has developed highly active heterogeneous catalysts based on the concept of "*concerted activation*" using metal hydroxides which have both Lewis acid sites and Brønsted base sites. Concretely, he has developed catalysts upon which ruthenium hydroxide is monomerically dispersed for the oxidation of various kinds of alcohols. Besides alcohol oxidation, he has revealed that these catalysts can promote other transformations including hydrogen transfer reactions and hydrations.

In the lecture, concepts for developing highly active heterogeneous catalysts based on the properties of metal hydroxides and the use of these for green functional transformation were given.

＜"2011 Mitsui Chemicals Catalysis Science Award of Encouragement" ③＞

Unsaturated Alcohols as Surrogates of Organometallic Reagents in Palladium–Catalyzed C–C Bond Formation

Associate Prof. Hideki Yorimitsu (Kyoto University)

Associate Prof. Yorimitsu has investigated novel palladium-catalyzed C-C bond formations and has found that homoallyic alcohols act as allylic metal equivalents via retro-allylation in the allylation of aryl halides. His strategy uses the properties of neutral molecules and realizes universally regio- and stereoselective allylations which have been difficult to achieve with conventional cross-coupling reactions. Moreover, he has developed a new methodology for constructing heterocycles like epoxides using the palladium-catalyzed cyclization of allylic alcohols with aryl halides.

In the lecture, descriptions of these two reactions including the reaction mechanisms that can realize high selectivities were given.