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October 16, 2008

Mitsui Chemicals, Inc.

Mitsui Chemicals Hosted the "Professor Jean-Marie Lehn Symposium on Advanced Materials at Mitsui Chemicals" with Great Success

Mitsui Chemicals, Inc. ("MCI") announces that one of international symposiums it has hosted, the "Professor Jean-Marie Lehn Symposium on Advanced Materials at Mitsui Chemicals" drew to a successful close on October 15, 2008 at Mitsui Chemicals Inc., Sodegaura Center in Sodegaura City, Chiba Prefecture. The symposium was named after the 1987 Nobel Prize Laureate in Chemistry, Professor Jean-Marie Lehn (Université Louis Pasteur and Collège de France), and hosted in the presence of the Professor.

The symposium featured lectures from six of the world's front-line researchers in the advanced materials science. All the attendees were inspired by the enlightening lectures, including those presented by Professor Jean-Marie Lehn (See the appendix for details). The symposium hosted about 200 attendees from the industrial, governmental and academic research institutions. After the lectures, vigorous exchanges were held between the lecturers and attendees about the theme, "Creation of Functional Materials: Current Status and Future Prospects."

MCI has held international symposia since 2003 to build a solid global science network among researchers around the world and to contribute to advancement of science as a part of social contributions. Following this symposium, MCI will host the "2009 Mitsui Chemicals Catalysis Science Award" from March 11 to 12 under the theme of "Catalysis Science and Its Contribution to Future Human Development." It is the strong hope of MCI that these symposiums will serve as a forum of extensive interchange among participants from around the world and an excellent opportunity for creating new knowledge.

Appendix

Overview of the Symposium

1. Name of the Symposium:

The Professor Jean-Marie Lehn Symposium on Advanced Materials at Mitsui Chemicals

2. Date/Venue:

Date: October 15, 2008

Venue: Mitsui Chemicals, Inc. Sodegaura Center (Sodegaura, Chiba Prefecture, Japan)

3. Lectures, Lecture Themes and Lecture Overview (in order of speech)

<Plenary Lecture>

Prof. Jean-Marie Lehn

Université Louis Pasteur and Collège de France

"DYNAMATS: Dynamic Molecular and Supramolecular Materials"

Prof. Jean-Marie Lehn was jointly awarded the Nobel Prize in Chemistry in 1987 "for their development and use of molecules with structure-specific interactions of high selectivity", now termed "Supramolecular Chemistry", and at its core, Supramolecular Chemistry deals with complex entities through non-covalent interactions, and more recently, this has been developed into a new field under the name "Constitutional Dynamic Chemistry".

Supramolecular entities are by nature constitutionally dynamic in view of the lability of non-covalent interactions. Importing such aspects into molecular chemistry, through the introduction of reversible bonds into molecules, has lead to the emergence of Constitutional Dynamic Chemistry (CDC), which covers both the molecular and supramolecular levels. This allows chemical objects and systems to respond to physical or chemical internal or external factors through a continuous modification in constitution by the reorganization and exchange of building blocks. CDC is an invaluable tool for the exploration of synthetic systems, and for searching for bioactive substances and the development of dynamic materials, called DYNAMATS.

In his lecture, Prof. Lehn illustrated what molecular and supramolecular dynamic materials are, in particular, dynamic polymers, DYNAMERS, which express modification of function via incorporation, decorporation or exchange of monomeric components as a result of their dynamic features, thus giving rise to future materials exhibiting self-hearing and adaptive properties.

<Invited Lecture>

Prof. Takashi Kato

The University of Tokyo

"Design of Molecular Materials for the Induction of Function"

Prof. Takashi Kato is a leading scientist in the field of functional materials. His research has

focused on the design, syntheses, structural control, and functionalization of self-assembled materials such as liquid crystals, gels, electron and ion-active molecular assemblies and polymer/inorganic hybrids.
Prof. Kato has been developing functional (soft) material using a unique methodology that includes self-organization and a supramolecular self-assembly built on the molecular interaction involving hydrogen and ionic bonds. The soft materials developed by Prof. Kato have distinctive functions such as responsibilities to stimuli and the environment, anisotropic-ion conductivity, selective molecular transporting, etc. In his lecture, his recent research on functionalized soft materials based on nanostructured liquid crystals and related molecular assemblies were presented.

Prof. Bert Meijer
Eindhoven University of Technology
"Supramolecular Polymers: A Modular Approached to Advanced Materials"
Prof. Bert Meijer is one of the leading researchers in the field of supramolecular chemistry and he is a pioneer behind the development of supramolecular polymers, which are supramolecular assemblies that behave as polymers.
Prof. Meijer has designed a variety of supramolecular polymers consisting of polymeric arrays of monomer units held together by multiple hydrogen bonding. The high reversibility of non-covalent bonds ensures structural rearrangements triggered by external stimuli, and this leads to remarkable characteristics, for example, temperature- and pH-responses. At the symposium, Prof. Meijer lectured on the general strategy for designing supramolecular polymers as well as on the spectroscopic investigations into their formation mechanisms. Several items were focused on in his lecture such as the directionality of molecular arrangement and the helicity of polymeric arrays.

Prof. Eiji Yashima
Nagoya University
"Advanced Chiral Materials Based on Singe- and Double-Stranded Helical Polymers"
Prof. Eiji Yashima is a leading chemist in the field of helical polymers. His research is based on polymer chemistry and supramolecular chemistry and includes the designs, syntheses and applications of molecules and polymers with molecular recognition and chirality discrimination ability.
Natural biological macromolecules often form unique higher-order structures that can be seen in double helical DNAs and the α-helices of proteins. Building on this, Prof. Yashima, believing that helical structures are the key to biological functions, developed novel single- and double-stranded helical polymers in an effort to explore the specific functions exhibited by helical structures. In his lecture, he introduced his recent work on the development of artificial single- and double-stranded helical polymers with controlled helicity. Direct observations of helical structures pertaining to artificial helical polymers by Atomic Force Microscopy (AFM) were presented.

Prof. Jean M. J. Fréchet

University of California Berkeley

"Functional Polymers: from Catalytic Nanoreactors to Energy Materials and Therapeutic Carriers"

Prof. Jean M. J. Fréchet is an expert on functional polymers from fundamentals to applications and he has developed a number of unique functional polymer materials. These polymer materials are structurally created at the molecular level and can be tailored to specially intended functions.

At the symposium, Prof. Fréchet lectured on the strategies for design and application of functional polymers whilst focusing on the following: the catalytic polymer that is designed to form isolated domains as nanoreactors enabling efficient one-pot syntheses as a result of combining multiple catalyses, the optoelectronic polymer that is functionalized to be soluble in organic solvents giving rise to desirable characteristics that are much needed in electronic devices, and the acid- or photo-degradable polymer that is designed for better drug delivery and can encapsulate therapeutic substances to be released in vivo and in a controlled manner to specific areas.

Dr. Haruyuki Makio

Mitsui Chemicals, Inc.

"Creation of New Olefin-Based Materials Using Novel Catalysts"

Dr. Haruyuki Makio has always been interested in the creation of new olefin-based materials using olefin polymerization catalysts such as heterogeneous Ziegler-Natta catalysts, metallocene catalysts, and post-metallocene catalysts.

In his lecture, Dr. Makio touched on the design and synthesis of Mitsui's novel FI catalysts, and then focused on how these FI catalysts uniquely produce new olefin-based materials with value-added functionality, such as olefin block copolymers, chain-end functionalized polyolefins, polyolefin/polar polymer hybrid materials, and ultra-fine particle polyolefins.