

Past, Present and Future of Catalysis in Japan

# TOCAT

Tokyo Conference  
on Advanced Catalytic Science  
and Technology



## Introduction

Tokyo Conference on Advanced Catalytic Science and Technology (TOCAT) has been held at the midway year of International Congress on Catalysis and every four years since 1990. The number of conferences and symposiums in the field of catalysis is becoming large steadily all over the world like the number of catalysis journals because of higher importance of the catalytic science and technology relating to a sustainable society. TOCAT is one of the leading conferences

## History

### ◆ TOCAT July 1-5, 1990 Tokyo



Chair

**Yoshihiko Moro-oka**  
Tokyo Institute of Technology

### ◆ TOCAT2 August 21-26, 1994 Tokyo



Chair

**Satohiro Yoshida**  
Kyoto University

1990

### Plenary Lectures

**Wolfgang F. Hölderich** / BASF, Germany  
“Zeolitic Catalysts as Useful Tools for the Formation and the Cleavage of C–O Bonds in Fine Chemicals”

**Diek C. Koningsberger** / University of Utrecht, The Netherlands  
“X-Ray Absorption Spectroscopy: A Sensitive Tools for Studying the Structure of Heterogeneous Catalysts”

**Bruni Notari** / ENI-Research and Development, Italy  
“C-1 Chemistry: A Critical Review”

**Takeru Onoda** / Mitsubishi Kasei Corporation, Japan  
“Strategic Development of Catalytic Processes”

**James F. Roth** / Air Products and Chemicals, Inc., USA  
“Industrial Catalysis: Poised for a New Generation of Major Innovation”

**Gabor A. Somorjai** / University of California, Berkeley, USA  
“Adsorbate Induced Restructuring of Surfaces During Catalytic Reactions: The Dynamic Surface Structure Model of Reactivity”

1994

**John N. Armor** / Air Products and Chemicals, Inc., USA  
“The Remarkable Role of Cations in Molecular Sieves”

**Alexis T. Bell** / University of California, Berkeley, USA  
“Understanding Heterogeneous Catalysis at the Molecular Level: Challenges and Perspectives”

**Giuseppe Bellussi** / Eniricer S.p.A, Italy  
“Catalysis with TS-1: New Perspectives for the Industrial Use of Hydrogen Peroxide”

**Michel Che** / Université P. et M. Curie, France  
“Ion-Support Interactions and Catalysis”

**James A. Cusmano** / Catalytica, Inc., USA  
“Catalysis in the 21<sup>st</sup> Century: The Next Frontier”

**Charles T. Kresge** / Mobil Research and Development Corporation, USA  
“MCM-41: A New Family of Mesoporous Molecular Sieve Prepared with Liquid Crystal Templates”

**Yasuaki Tozuka** / Mitsui Toatsu Chemicals, Inc., Japan  
“MT-Chlor Process and Its Application to Global Environment”



and the status of TOCAT has already been established judging from long history, participants from a lot of countries and regions, and so on. According to the address of Prof. Yoshihiko Moro-oka in the proceedings of 1<sup>st</sup> TOCAT, most conferences were more inclined toward academic investigations, and a new type of meeting involving more industrial researchers and topics was necessary. At that time, academic investigations and industrial applications seemed to go their separate ways

and they had become nearly independent of each other. As a result, TOCAT was organized to fill in the gap between basic science and application technology, where the industrial session was succeeded by all the TOCAT conferences. The organizers always hope TOCAT to be a “catalyst” to promote communications among academic and industrial researchers.

## ◆ TOCAT3 July 19–24, 1998 Tokyo



Chair

**Tatsuaki Yashima**  
Tokyo Institute of Technology

## ◆ TOCAT4 July 14–19, 2002 Tokyo



Chair

**Hideshi Hattori**  
Hokkaido University

1998

2002

For the chairs of TOCAT affiliations at that time are shown.

**Philippe R. Courty** / Institut Français du Pétrole, France  
“Synthetic or Reformulated Fuels; A Challenge for Catalysis”

**Mark E. Davis** / California Institute of Technology, USA  
“New Horizons for the Use of Porous Materials as Catalysts”

**Pierre A. Jacobs** / Katholic University of Leuven, Belgium  
“Encapsulated Transition Metal Complexes as New Heterogeneous Redox Catalysts”

**Walter Kaminsky** / University of Hamburg, Germany  
“Metallocene Catalysts for Olefin Polymerization”

**Ryoji Noyori** / Nagoya University, Japan  
“Asymmetric Catalysis: Science and Opportunities”

**Takeru Onoda** / Mitsubishi Chemical Corporation, Japan  
“A New Direction for Research of Industrial Catalysis”

**Henrik Topsøe** / Haldor Topsøe Research Laboratories, Denmark  
“Advances in Deep Desulfurization”

**Avelino Corma** / Instituto de Tecnología Química, Spain  
“Acid and Base Catalysis for Production of Chemical and Fine Chemicals”

**Robert J. Farrauto** / Engelhard Corporation, USA  
“From the Internal Combustion Engine to the Fuel Cell: Moving towards the Hydrogen Economy”

**Hans-Joachim Freund** / Max Planck Institutes, Germany  
“Catalysis and Surface Science: How to Bridge the Gaps?”

**Masatake Haruta** / National Institute of Advanced Industrial Science and Technology, Japan  
“Catalysis and Application of Gold Nanoparticles”

**Wilhelm F. Maier** / Universität des Saarlandes, Germany  
“Combinatorial Chemistry in Materials and Catalysis Research”

**Krzysztof Matyjaszewski** / Carnegie Mellon University, USA  
“New Catalysts for Controlled/Living Atom Transfer Radical Polymerization (ATRP)”

**Setsuo Yamamatsu** / Asahi Kasei Corporation, Japan  
“Synergetic Design between the Catalyst System and the Reaction Field –Development of Palladium–Lead Intermetallic Compound Catalysts–”





## History

### TOCAT5 July 23–28, 2006 Tokyo



Chair

**Takashi Tatsumi**  
Tokyo Institute of Technology

### TOCAT6 /APCAT5 July 18–23, 2010 Sapporo



Chair

**Wataru Ueda**  
Hokkaido University

## 2006

### Plenary Lectures

**Enrique Iglesia** / University of California, Berkeley, USA  
“Structural Requirements and Reaction Pathways in Methane Reactions Catalyzed by Supported Metal Clusters”

**Kiyotomi Kaneda** / Osaka University, Japan  
“Opening New Avenues for Green Organic Syntheses Using Heterogeneous Metal Catalysts”

**Shū Kobayashi** / The University of Tokyo, Japan  
“Novel Catalysts toward Truly Efficient and Powerful Organic Synthesis”

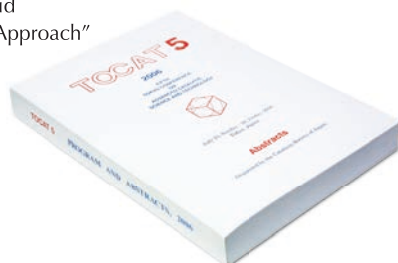
**Shin'ichi Matsumoto** / Toyota Motor Corporation, Japan  
“Advances in Automobile Exhaust Catalysts”

**Friedbert Nees** / BASF, Germany  
“Heterogeneous Catalysis: From Innovative Concepts to Industrial Catalysts and Adsorbents”

**Jun Okuda** / RWTH Aachen University, Germany  
“Polymerization Catalysis by Post-Metallocenes: Bridging the Gap between Ziegler–Natta and Single-Site Catalysts”

**John Pierce** / DuPont, USA  
“Biotechnology and Our Material Future”

**Joachim Sauer** / Humboldt University, Germany  
“Structure and Reactivity of Solid Catalysts –Quantum Chemical Approach”



## 2010

**Jean-Marie Basset** / CPE Lyon, France  
“Single Site Catalysis via Surface Organometallic Chemistry: A Predictive Approach of Heterogeneous Catalysis”

**Charles T. Campbell** / University of Washington, USA  
“Surface Science Studies in Catalysis: Mechanisms, Microkinetics, Thermodynamics and Materials”

**Kazunari Domen** / The University of Tokyo, Japan  
“Toward Large-Scale Solar Fuel Production Using Photocatalytic Materials”

**Terunori Fujita** / Mitsui Chemicals, Inc., Japan  
“FI Catalysts: Unique Olefin Polymerization Catalysis for the Formation of Value-Added Olefin-Based Materials”

**Johannes A. Lercher** / Technical University Munich, Germany  
“Hydrocarbon Transport, Activation and Catalytic Conversion in Confined Spaces”

**Lakshmi Kantam Mannepalli** / Indian Institute of Chemical Technology, India  
“Recent Developments on Catalytic Applications of Nano-Crystalline Metal Oxides”

**Noritaka Mizuno** / The University of Tokyo, Japan  
“Molecular Design of Polyoxometalate-Based Compounds for Environmentally-Friendly Functional Group Transformations –From Molecular Catalysts to Heterogeneous Catalysts–”

**Yoshihito Watanabe** / Nagoya University, Japan  
“Molecular Design of Catalytic Reactions in Proteins”





## ◆ TOCAT7 July 1-5, 2014 Kyoto



Chair  
**Koichi Eguchi**  
Kyoto University

## ◆ TOCAT8 August 5-10, 2018 Yokohama



Chair  
**Kazunari Domen**  
The University of Tokyo

2014

2018

For the chairs of TOCAT affiliations at that time are shown.

**Gabriele Centi** / University of Messina, Italy  
"Nanocarbons for The Development of Advanced Catalysts"

**Hirohito Hirata** / Toyota Motor Corporation, Japan  
"Recent Progress in Automotive Catalyst"

**Christopher W. Jones** / Georgia Institute of Technology, USA  
"Amine-Modified Silicates as Sorbents, Supports and Catalysts"

**Can Li** / Dalian Institute of Chemical Physics, China  
"Fundamental Understanding of Photocatalysis and Photoelectrocatalysis for Solar Fuel Production"

**Ulrich Müller** / BASF, Germany  
"Catalysis –Enabler for Sustainability"

**Tohru Setoyama** / Mitsubishi Chemical Corporation, Japan  
"Catalysis Contribution for the Realization of GSC in 21<sup>st</sup> Century"

**Galen J. Suppes** / University of Missouri, USA  
"Simulation of Catalyzed Urethane Polymerization –An Approach to Expedite Commercialization of Bio-Based Materials"

**Takashi Tatsumi** / Tokyo Institute of Technology, Japan  
"Role of Catalysis in Sustainable "Petro"Chemicals Production"



**Wha-Seung Ahn** / Inha University, Korea  
"Porous Materials for Catalysis and Sustainability"

**Xinhe Bao** / Dalian Institute of Chemical Physics, Fudan University, China  
"Novel Concept of C1 Chemistry"

**Edmund Carnahan** / The Dow Chemical Company, USA  
"New Performance from Old Monomers: Advances in Olefin Block Copolymers"

**Avelino Corma** / Instituto de Tecnología Química, Universitat Politècnica de València, Spain  
"Designing Zeolites for Catalytic Applications"

**Marvin Estenfelder** / Clariant, Germany  
"Shifting Frontiers in Applied Catalysis"

**Can Li** / Dalian Institute of Chemical Physics, China  
"The Dark Reaction of Artificial Photosynthesis: Catalytic Hydrogenation of CO<sub>2</sub>"

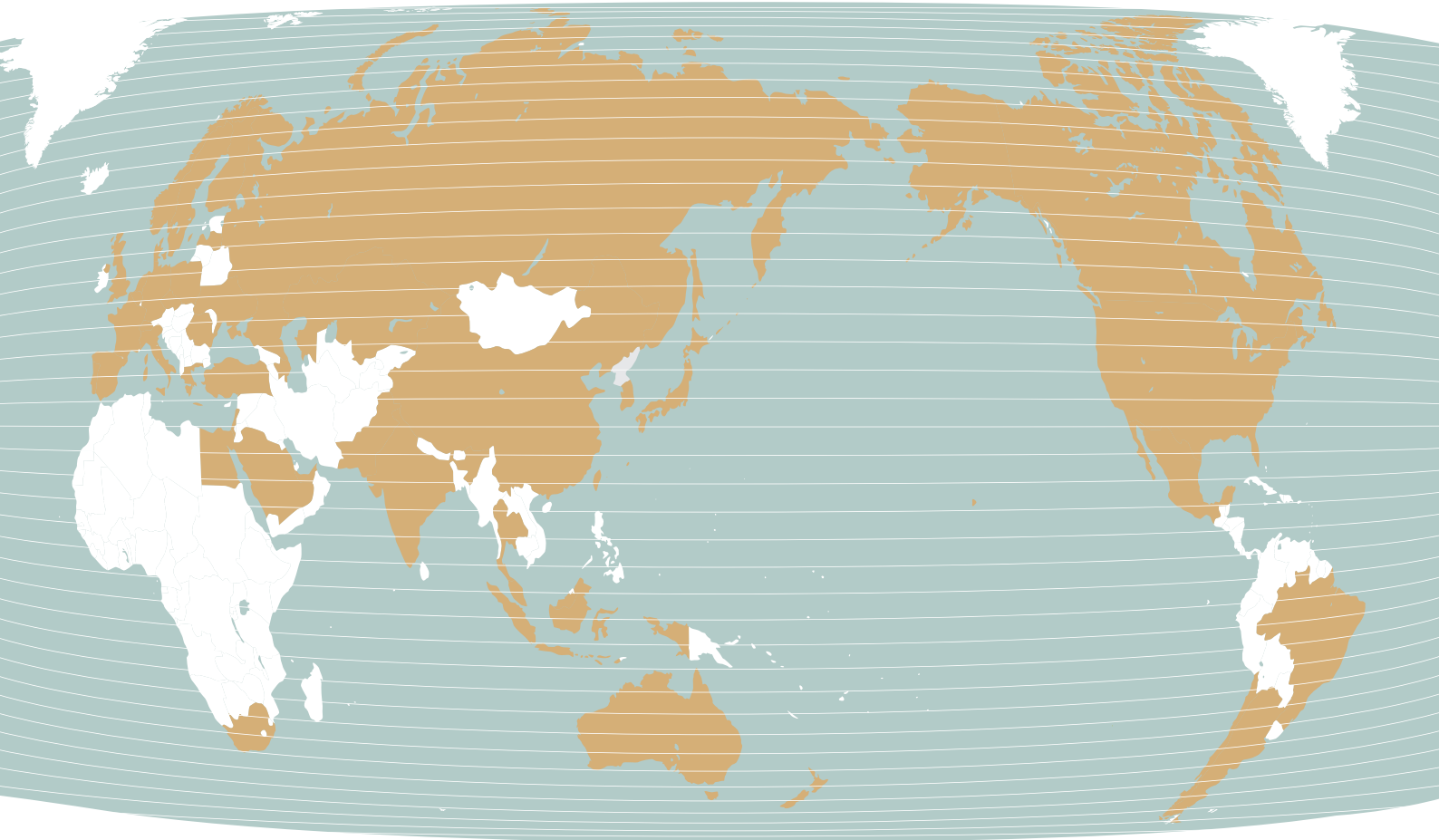
**Yoshimi Okada** / Chiyoda Corporation, Japan  
"Development of Novel Dehydrogenation Catalyst for Hydrogen Carrier System"

**Wataru Ueda** / Kanagawa University, Japan  
"Innovation in Complex Metal Oxide Catalysts for Selective Oxidation"

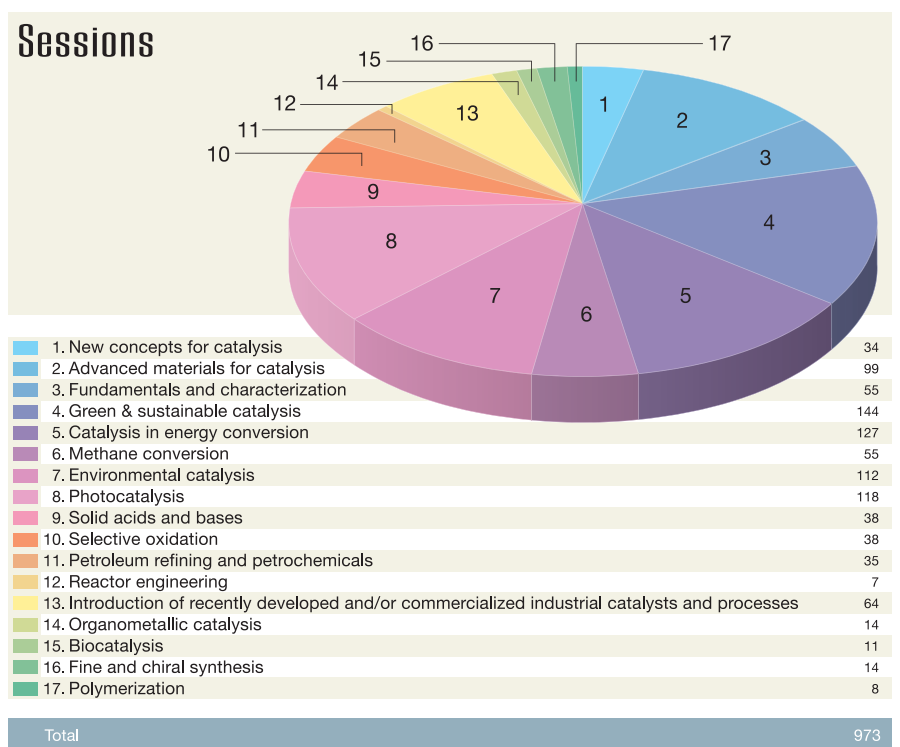
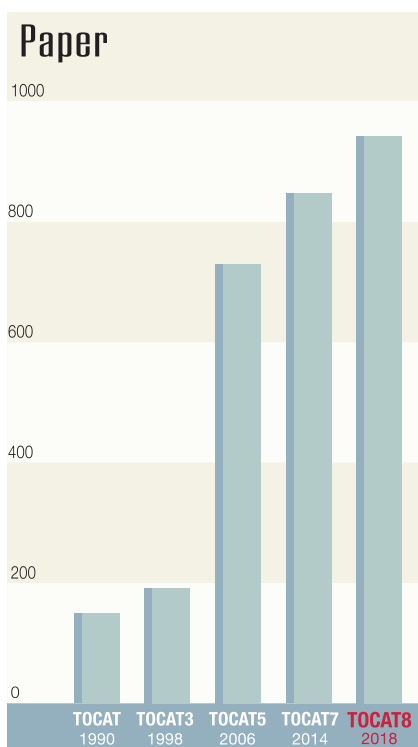
**Bert Weckhuysen** / University of Utrecht, The Netherlands  
"Catalysts Live and Up Close: Structure and Dynamics Probed with Operando Microscopy and Spectroscopy"

# Abstract Submission Statistics

Submitted papers from more than 40 countries



## TOCAT continues growing



# Publications

## Catalytic Science and Technology No.1

S. Yoshida, N. Takezawa, T. Ono (ed.), Kodansha, 1991

## Science and Technology in Catalysis 1994

Y. Izumi, H. Arai, M. Iwamoto (ed.), Kodansha, 1995

## Science and Technology in Catalysis 2002

M. Anpo, M. Onaka, H. Yamashita (ed.), Kodansha, 2003

## Science and Technology in Catalysis 2006

K. Eguchi, M. Machida, I. Yamanaka (ed.), Kodansha, 2007

## Catalysis Today –Innovations driven by catalysis –Selected papers from TOCAT6 / APCAT5, Vol. 164 (2011)

K. Asakura, A. Satsuma and T. Setoyama (ed.), Elsevier

## Catalysis Today

### –Selected papers from TOCAT7 Kyoto 2014, Vol. 251 (2015)

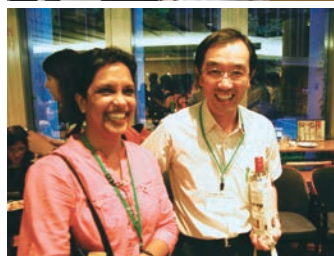
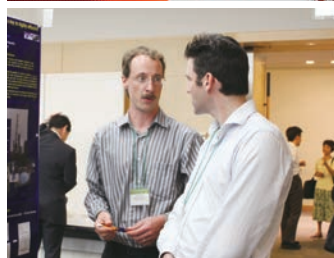
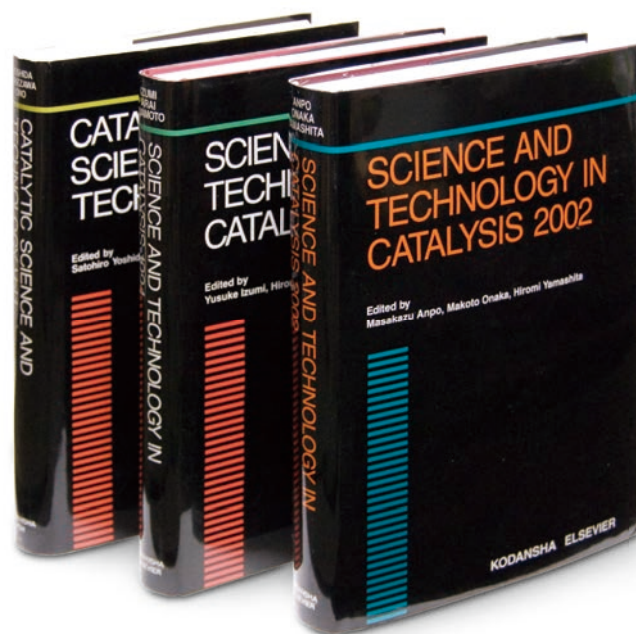
A. Satsuma, C. Hardacre, W. Ahn, M. Matsuoka, H. Matsuda (ed.), Elsevier

Plenary lectures and Invited lectures,  
review papers were published in  
**Catalysis Surveys from Asia, vol.18 (2014)**

Springer

Oral presentations were invited to  
**Research on Chemical Intermediates, vol.41 (2015)**

Springer



# CATSJ

Catalysis Society of Japan



## The 60th Anniversary

### Introduction

The Catalysis Society of Japan (CATSJ) was founded in 1958 to promote and encourage the growth and development of the catalytic science and technology. To pursue our missions, the CATSJ holds

### History



President  
**Takashi Tatsumi**  
Tokyo Institute of Technology

#### 103<sup>rd</sup> Meeting

March 30–31, Saitama

#### 104<sup>th</sup> Meeting

September 27–30, Miyazaki



President  
**Miki Niwa**  
Tottori University

#### 105<sup>th</sup> Meeting

March 24–25, Kyoto

#### 106<sup>th</sup> Meeting

September 15–18, Yamanashi



President  
**Masatake Haruta**  
Tokyo Metropolitan University

#### 107<sup>th</sup> Meeting

March 29–30, Tokyo

#### 108<sup>th</sup> Meeting

September 20–22, Hokkaido

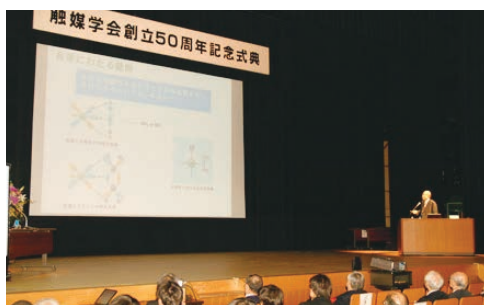
2008

2009

2010

2011

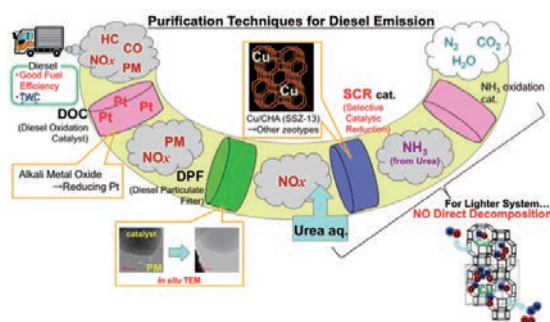
### 50<sup>th</sup> Anniversary



### CATSJ Award for Young Researchers

2008

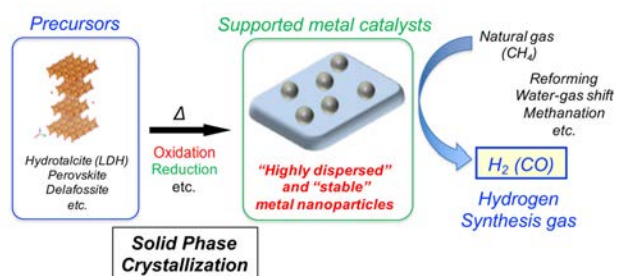
#### Design of Environmental Catalysis by Utilization of Zeolites



**Masaru Ogura**  
The University of Tokyo

2008

#### Preparation of Supported Metal Catalysts by Solid Phase Crystallization



**Tetsuya Shishido**  
Tokyo Metropolitan University



various academic conferences, meetings, and seminars, and publishes journals and books. Through the activities of the CATSJ, members and other related individuals can exchange the latest scientific information, make discussions in various scientific meetings, get educational services, and promote

international and interdisciplinary collaborations. With more than 2,500 members, academia, government and the industrial world are united in open activities. We are proud to contribute to the betterment of our society through our activities on catalysis.

## GATSJ Award (Academic Field)

2009



**Noritaka Mizuno** / The University of Tokyo  
"Fine Design of Polyoxometalate Catalysts and Development of Highly Selective Reaction Systems"



**Wataru Ueda** / Hokkaido University  
"Studies on Structure and Catalytic Oxidation Property of Complex Metal Oxides"

2010



**Masakazu Anpo** / Osaka Prefecture University  
"Development of Structure-Controlled Photocatalysts and Elucidation of Photocatalytic Reaction Mechanisms"



**Terunori Fujita** / Mitsui Chemicals, Inc.  
"Development and Application of Non-Metallocene Olefin Polymerization Catalysts"

2011



**Koichi Eguchi** / Kyoto University  
"Development of Catalysts for Fuel and Energy Conversion Utilizing Interaction between Metals and Oxides"

## GATSJ Award (Industrial Field)

2009

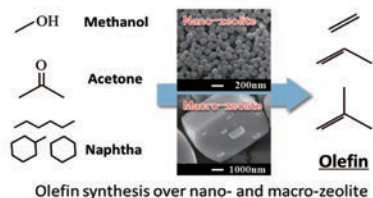
**Mitsuaki Echigo, Norihisa Shinke, Yukio Yasuda, Susumu Takami, Takeshi Tabata** / Osaka Gas Co., Ltd.  
"Development of Catalysts and Reactors for Hydrocarbon Reforming System for Residential Fuel Cell"

**Hiroaki Abekawa, Kiyoshi Iwanaga, Kohei Seki, Takuo Hibi, Masayuki Yoshii** / Sumitomo Chemical Corporation  
"Development and Commercialization of the Ruthenium-Based Catalyst for HCl Oxidation"

For the presidents of CATSJ and the award winners of academic field and industrial field, affiliations at that time are shown. For the young researchers award winners, current affiliations are shown.

2008

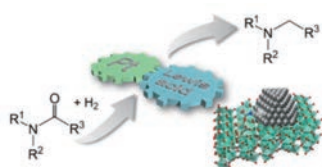
Effect of Crystal Size of Zeolite on Its Catalytic Performances



**Teruoki Tago**  
Tokyo Institute of Technology

2009

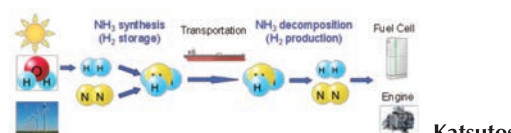
Cooperative Catalysis of Metal/Oxide Interface for Sustainable Production of Chemicals



**Ken-ichi Shimizu**  
Hokkaido University

2010

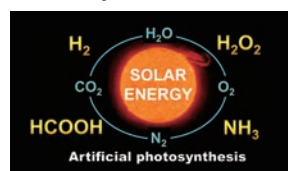
Catalysts for Synthesis/Decomposition of Ammonia as an Energy Carrier



**Katsutoshi Nagaoka**  
Oita University

2011

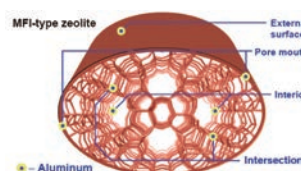
Artificial Photosynthesis on Noble-Metal-Free Powdered Photocatalysts



**Yasuhiro Shiraishi**  
Osaka University

2011

Development of Advanced Zeolites with the Distribution of Framework Heteroatom Controlled



**Toshiyuki Yokoi**  
Tokyo Institute of Technology

# History



President  
**Wataru Ueda**  
Hokkaido University

**109<sup>th</sup> Meeting**  
March 28–29, Tokyo

**110<sup>th</sup> Meeting**  
September 24–26, Fukuoka



President  
**Kazunari Domen**  
The University of Tokyo

**111<sup>th</sup> Meeting**  
March 25–26, Osaka

**112<sup>th</sup> Meeting**  
September 18–20, Akita



President  
**Hideaki Hamada**  
National Institute of  
Advanced Industrial  
Science and Technology

**113<sup>th</sup> Meeting**  
March 26–27, Aichi

**114<sup>th</sup> Meeting**  
September 25–27, Hiroshima

2012

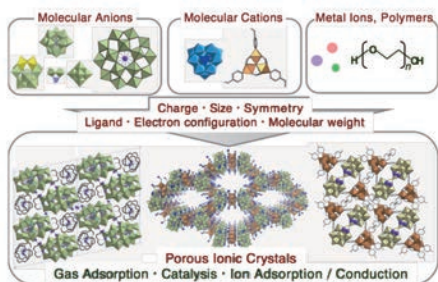
2013

2014

## GATSJ Award for Young Researchers

2012

Functional Porous Ionic Crystals Showing Unique Adsorption, Conduction, and Reaction of Molecules and Ions



**Sayaka Uchida**  
The University of Tokyo

2012

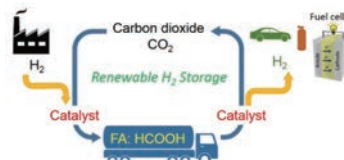
Photocatalytic Conversion of CO<sub>2</sub> by H<sub>2</sub>O as an Electron Donor



**Kentaro Teramura**  
Kyoto University

2012

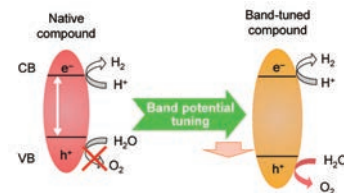
Formic Acid Synthesis and Decomposition Catalysts for Storage and Delivery of Hydrogen Energy



**Kohsuke Mori**  
Osaka University

2013

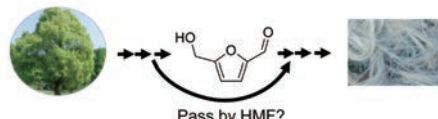
Band Potential Tuning of Photocatalysts



**Hideki Kato**  
Tohoku University

2013

“Sleeping Giant” HMF: Wake Up or Pass by?



**Yoshinao Nakagawa**  
Tohoku University

## CATSJ Award (Academic Field)

2012



**Takao Masuda** / Hokkaido University  
"Catalytic Process for Recovering Useful Chemicals from Biomass Wastes of High Water-Content"



**Makoto Onaka** / The University of Tokyo  
"Organic Reactions Confined in Inorganic Oxides Nanospace"

2013



**Bunsho Ohtani** / Hokkaido University  
"Mechanistic Studies and Design of Heterogeneous Photocatalysis"



**Tsuneji Sano** / Hiroshima University  
"Studies on Zeolite Synthesis and Its Application to Catalysts and Separation Materials"

2014



**Atsushi Fukuoka** / Hokkaido University  
"Depolymerization of Cellulose by Heterogeneous Catalysts"



**Hiromi Yamashita** / Osaka University  
"Design and Applications of Single-Site Photocatalysts"

## CATSJ Award (Industrial Field)

2012

**Ken Suzuki, Tatsuo Yamaguchi, Ken Matsushita** / Asahi Kasei Corporation  
"Development of Gold-Nickel Oxide Nanoparticle Catalysts with A Core-Shell Structure for Production of Methyl Methacrylate"

**Koichiro Harada, Takashi Baba, Hiroshi Yamada, Akihide Takami** / Mazda Motor Corporation

**Tatsumi Ishihara** / Kyusyu University  
"Development and Practical Realization of A Particulate Burning Catalyst Using A High Oxide-Ion Conducting ZrNd-Based Oxide"

2013

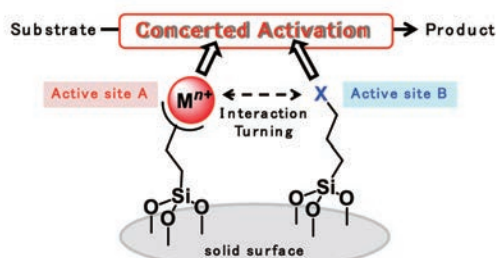
**Yasutaka Nagai, Kazuhiko Dohmae, Toshitaka Tanabe** / Toyota Central R&D Labs., Inc.  
**Takeishi Hirabayashi, Nobuyuki Takagi** / Toyota Motor Corporation

"Application of Synchrotron X-Ray Analysis to the Development of Automotive Three-Way Catalysts"

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2013

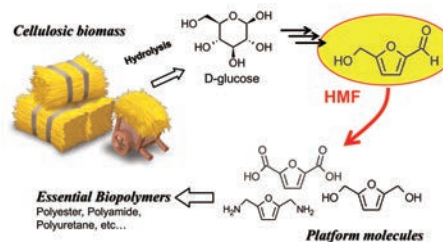
Development of Multiactive Site Catalysts for Efficient Organic Reactions



**Ken Motokura**  
Tokyo Institute of Technology

2014

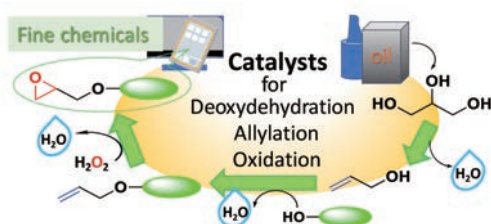
Lewis Acid Catalysis of Metal Oxides in H<sub>2</sub>O for the Valorization of Biomass-Derived Carbohydrates



**Kiyotaka Nakajima**  
Hokkaido University

2014

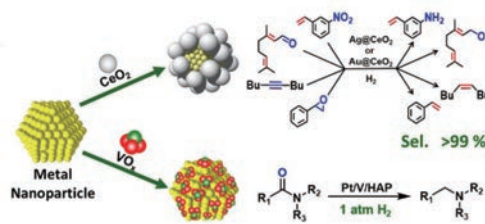
Synthesis of Epoxide by Environmentally Benign Catalytic Reaction



**Yoshihiro Kon**  
National Institute of Advanced Industrial Science and Technology (AIST)

2014

Development of Highly Active Core-Shell Metal Nanoparticle Catalysts



**Takato Mitsudome**  
Osaka University

## History



President

**Hajime Nagahara**

Asahi Kasei Corporation

**115<sup>th</sup> Meeting**

March 23–24, Tokyo

**116<sup>th</sup> Meeting**

September 16–18, Mie



President

**Makoto Onaka**

The University of Tokyo

**117<sup>th</sup> Meeting**

March 21–22, Osaka

**118<sup>th</sup> Meeting**

September 21–23, Iwate



President

**Koichi Eguchi**

Kyoto University

**119<sup>th</sup> Meeting**

March 21–22, Tokyo

**120<sup>th</sup> Meeting**

September 12–14, Ehime



President

**Atsushi Fukuoka**

Hokkaido University

**121<sup>st</sup> Meeting**

March 22–23, Tokyo

**122<sup>nd</sup> Meeting**

September 26–28, Hokkaido

2015

2016

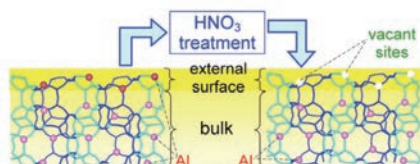
2017

2018

## CATSJ Award for Young Researchers

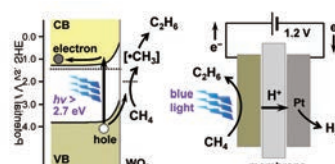
2015

Improvement of Catalytic Properties of Zeolites toward Post-Synthetic Treatments

**Satoshi Inagaki**  
Yokohama National University

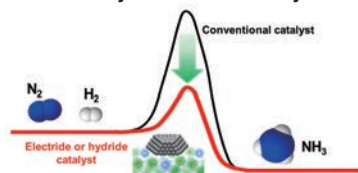
2016

Photoelectrochemical Cell for Dehydrogenative Coupling of Methane in the Gas Phase

**Fumiaki Amano**  
The University of Kitakyushu

2015

Low Temperature Ammonia Synthesis Using Electride- or Hydride-Based Catalysts

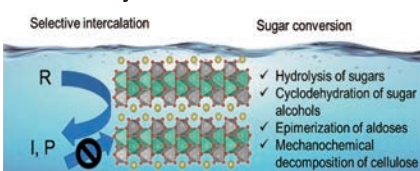
**Masaaki Kitano**  
Tokyo Institute of Technology

2016

Development of Acid-Base and Redox Catalysis of CeO<sub>2</sub> for Fine Chemical Synthesis**Masazumi Tamura**  
Tohoku University

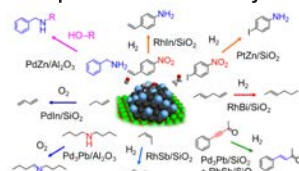
2015

Inorganic Layered Compounds as Solid Acid and Base Catalysts

**Atsushi Takagaki**  
Kyushu University

2016

Functional Catalytic Systems Using Intermetallic Compounds and Their Unique Surface Chemistry

**Shinya Furukawa**  
Hokkaido University

## CATSJ Award (Academic Field)

2015



**Kiyotaka Asakura** / Hokkaido University  
"In Situ Observations of Catalyst Structure Using Operando XAFS Spectroscopy and Studies on the Catalytic Reaction Mechanisms"

2016



**Akihiko Kudo** / Tokyo University of Science  
"Development of Semiconductor Photocatalyst Systems Showing High Activities for Water Splitting and CO<sub>2</sub> Reduction"

2017



**Satoshi Sato** / Chiba University  
"Selective Conversion of Biomass-Derived Polyols to Value-Added Chemicals over Heterogeneous Catalysts"



**Tsunehiro Tanaka** / Kyoto University  
"Development of Efficient Photocatalytic System on the Basis of the Analysis of the Reaction Mechanisms"

## CATSJ Award (Industrial Field)

2016

**Hiroyuki Seki, Masanori Yoshida** / JX Energy Corporation  
**Shogo Tagawa, Tomoyasu Kagawa** / JGC Catalysts and Chemicals Ltd.

"Development and Commercialization of Calcination-Type Hydrodesulfurization Catalysts by Controlling the Interaction between Metals and Supports"

## CATSJ Award for Technological Progress

2017

**Hiroyuki Seki, Masakazu Ikeda, Masahiro Higashi, Masahiro Kamata** / JXTG Nippon Oil & Energy Corporation  
**Hisaya Ishihara** / JGC Catalysts and Chemicals Ltd.

"Development of Novel Catalysts for FT-Synthesis and Wax-Hydrocracking to Produce Super-Clean Fuels"

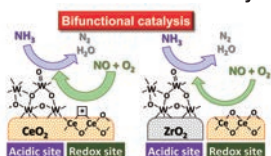
**Masaru Kirishiki, Yukihide Hashimoto, Yasuhiko Sato, Fumiaki Morishita** / NIPPON SHOKUBAI CO., LTD.

"Development of the Higher Secondary Alcohol Ethoxylates Synthesis Process via Addition Reaction to Olefins"

For the presidents of CATSJ and the award winners of academic field and industrial field, affiliations at that time are shown. For the young researchers award winners, current affiliations are shown.

2016

**WO<sub>3</sub>/CeO<sub>2</sub> Catalysts for NO<sub>x</sub> Selective Catalytic Reduction with NH<sub>3</sub> via Bifunctional Pathway**



**Masaaki Iwasaki**

TOYOTA Central R&D Labs., Inc.

2017

**Development of Artificial Photosynthesis Systems Consisting of Reduced Graphene Oxide and Photocatalysts**



**Akihide Iwase**

Tokyo University of Science

**Development of Catalytic Materials Derived from Aromatic Polymers**



**Yuta Nabae**

Tokyo Institute of Technology

**Development of Nanostructured TiO<sub>2</sub>-Based Powder and Thin Film Photocatalyst**



**Takashi Kamegawa**

Osaka Prefecture University

**Design of Intercalation Catalysts by Use of Anion-Exchangeable Ni-Zn Hydroxy Double Salt**

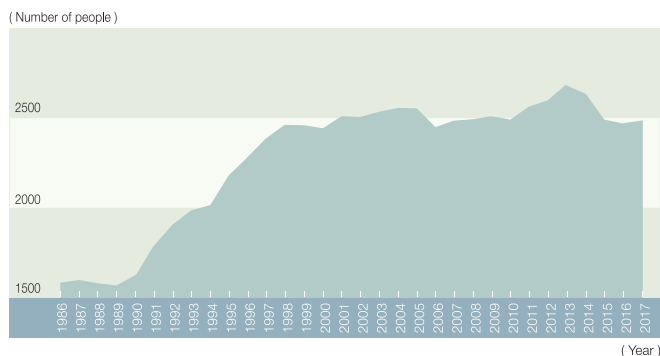


**Takayoshi Hara**

Chiba University

## Membership

CATSJ holds more than 2,500 individual members whose interests span a wide range of the science of catalysis. Membership is fully opened to qualified persons abroad as overseas members. The activities of the CATSJ are strongly supported by more than 100 corporate members, including major companies in chemical, automobile, oil, steel and machine industries.



**MITSUBISHI CHEMICAL**

**Mitsui Chemicals** **N.E. CHEMCAT**  
Creating Change for the Future

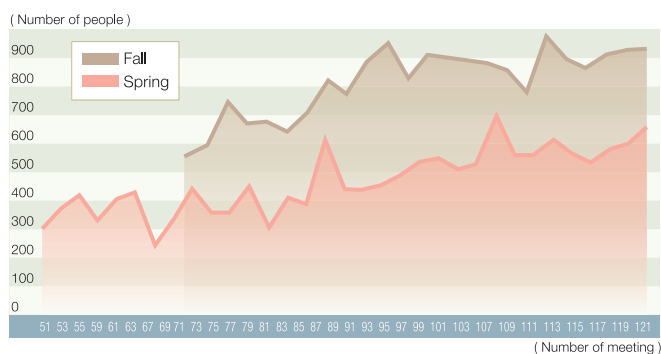
**SUMITOMO CHEMICAL** **AsahiKASEI**

**MITSUBISHI GAS CHEMICAL** **NIPPON SHOKUBAI** **Nissan Chemical CORPORATION** **CHIYODA CORPORATION** **SHOWA DENKO** **CLARIANT**

## CATSJ Meeting

CATSJ normally has regular meetings (CATSJ Meeting) twice a year, in spring and fall. The meetings have been held more than 120 times in many cities in Japan so far, and are consists of three categories, oral-A, oral-B and poster-A, as well as plenary and invited lectures. Remarkably, the oral-B session is highlighted because we have a longer presentation time (10 min talk + 15 min Q&A), which is enough for in-depth discussion. In the fall meeting, the research divisions offer more than ten symposia on selected topics, while special symposia are organized occasionally.

### Participants

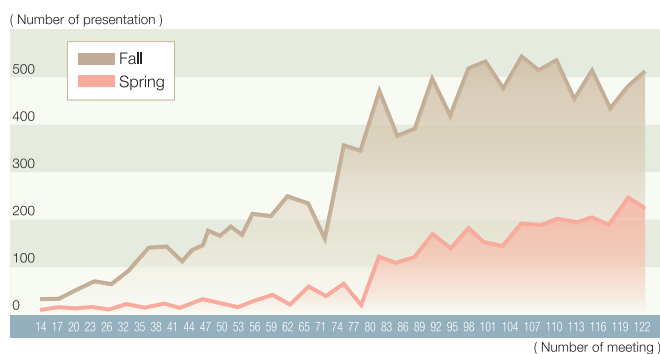


### Special Symposia

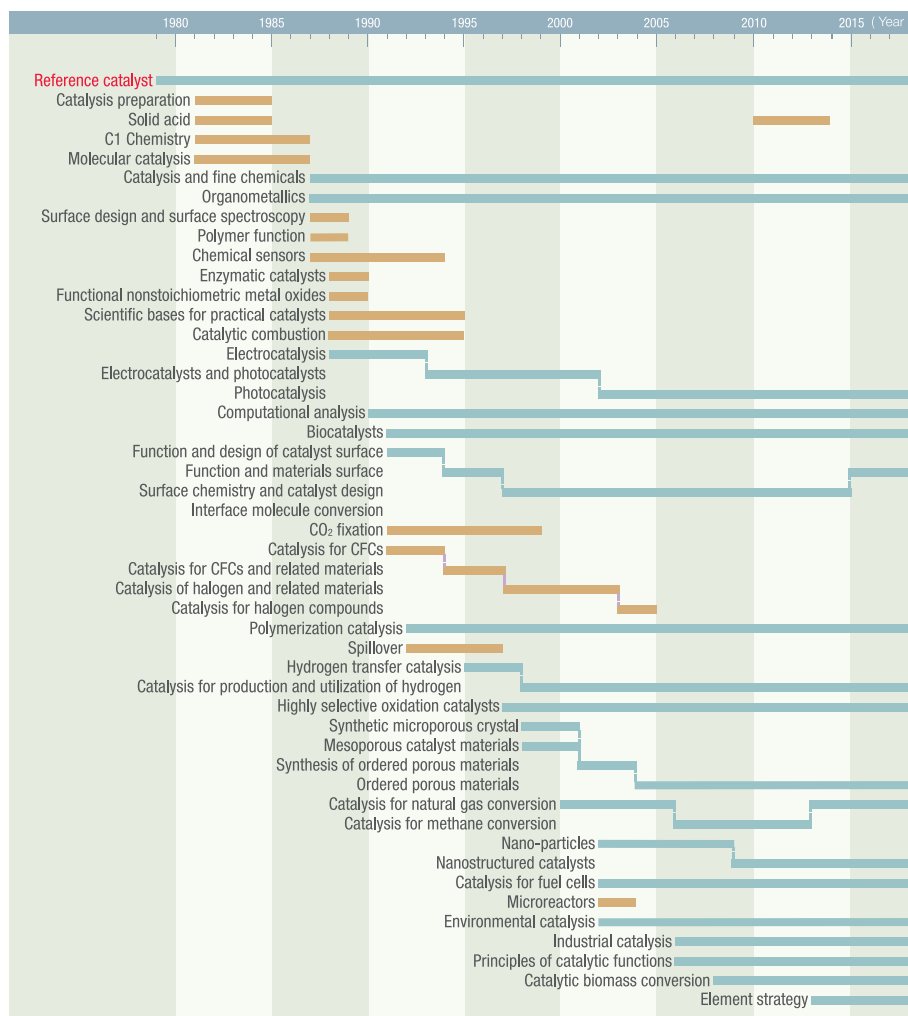
Special Symposia include attractive invited lectures which includes cutting-edge topics in catalysis. The symposium in 2018 spring collected more than 500 audiences.



### Presentation



## Research Divisions



### The History of the CATSJ Research Divisions

The Science and Technology Committee has 17 research divisions presently covering various fields of catalytic science and technology as listed below. Each research division conducts various events actively and holds several symposia (sometimes international symposium) beside the CATSJ Meetings. Depending on the needs of era these research divisions have been restructured as shown in the following figure.

## ◆ Catalysts and Catalysis

“Shokubai (Catalysts and Catalysis)” is a Japanese scientific journal published by the Catalysis Society of Japan. The journal was established in 1959, and now it is published six times every one year. Until the end of 2017, 396 issues in all have been published. The journal mainly includes invited review papers and special topics related to all aspects of catalysis, while special issues are organized occasionally. From 2008, all issues are available online (<https://www.shokubai.org/jnl/>). The journal “Shokubai” is an indispensable source of information for all academic and industrial researchers in the field of catalysis.



## ◆ Our Outreach Activities



### Events

CATSJ organized and provided events “Catalysis Park” for the biggest science communication event in Japan “Science Agora” (2009, 2011, 2013, 2015, 2017), and “CATALYSIS square” (2011, International Year of Chemistry). These events aim to encourage elementary and junior high school students, parents and the general public to deepen their understanding of catalysts through experiments/demonstrations and seminars. “Catalysis Park” was awarded with “Science Agora Award” which is given for outstanding exhibition in 2013. CATSJ regularly holds “CATCHEM Laboratory”. In order to learn “catalysts and catalysis”, it provides fascinating experiments, demonstrations, hand-on exhibitions and seminars to elementary and junior high school students, parents and the general public. Through these outreach activities, CATSJ steadily achieved fruitful results and CATSJ was presented the Chemical Communication Award by Japan Union of Science and Technology in 2015.

### Publications

CATSJ published yearbook, handbook, and introductory books. A yearbook “Annual Survey of Catalytic Science and Technologies” is an extensive overview of recent progress and activities in catalytic science and technology which includes summaries of various activities of the CATSJ research divisions and local branches. The 2012 edition is available in English. The 2017 edition was published in Chinese. **Catalyst Handbook** consists of contributions from the most active 200 researchers and engineers of Japan and it is the most reliable reference book covering important information on all aspects of catalysis, as well as analytical methods and techniques, and industrial processes. **A History of Industrial Catalysts in Japan** was compiled by the CATSJ in order to record the history of industrial catalysts in Japan. This book features researchers and engineers who made significant contributions to the development and the commercialization of industrial catalysts. It also offers scholarly comments and reviews from leading researchers in major fields of catalysis sciences. **Very Basic of Industrial Catalysts** provides the best introduction to both basic and applied technology of industrial catalysts essential in current industrial society. **The Easiest Way to Understanding Catalyst and Catalysis Science** is a general introduction to “catalyst and catalysis” and targeted at high school students, vocational college students, university students, and general citizens.



#### 触媒年鑑: 触媒技術の動向と展望

A year book “Annual survey of catalytic science and technologies”

#### 触媒便覧 Catalyst Handbook

#### わが国の工業触媒の歴史

A history of industrial catalysts in Japan

#### よくわかる工業触媒 Very basic of industrial catalyst

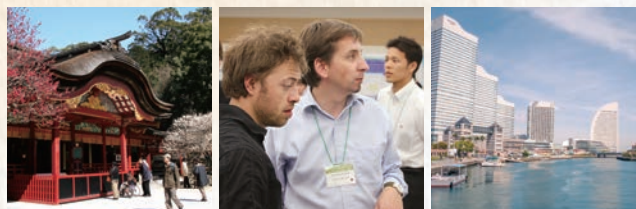
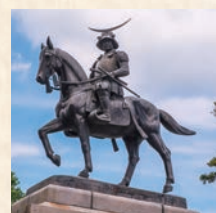
#### トコトンやさしい触媒の本

The easiest way to understanding catalyst and catalysis science

# From Japan to the World



 **TOCAT**  
 **CATSJ Meeting**



<http://www.shokubai.org/>

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