

## **Minutes of the IACS Council Meeting held in Munich on July 1, 2012**

**Participants:** Ahn (Korea), Apesteguia (Argentina), Bao (China), Bellot Noronha (Brazil), Bitter (Netherlands), Bowker (UK), Bustamante (Ibero-American Countries, substituting Gil Llambias), Centi (Italy), Claeys (South Africa), Corma (Spain), Cortes Corberan (Spain), Damyanova (Bulgaria), Domen (Japan), Eguchi (Japan), Erdohelyi (Hungary), Friedrich (South Africa), Fuentes (Ibero-American Countries), Fukuoka (Japan), Hargreaves (UK), Holmen (Nordic Countries), Iglesia (USA), Kasztelan (France), Lee (Korea), Lercher (Germany), Li (China), Lombardo (Argentina), Lopez Nieto (Spain), Maschmeyer (Australia), Mirodatos (France, substituting Duprez), Muhler (Germany), Murzin (Nordic Countries, substituting Salmi), Ng (Canada), Parmon (Russia), Perez de Scott (Venezuela, substituting Goldwasser), Petrov (Bulgaria), Reddy (India), Rempel (Canada, substituting Dalai), Sobalik (Czech Republic, substituting Kubicka), Stakheev (Russia), Stockenhuber (Australia), Teixeira da Silva (Brazil), Viswanathan (India), Wang (China), Weber (Netherlands), Witko (Poland), Ziolk (Poland).

**Observers:** Borgna (Singapore), Chen (Singapore), Uner (Turkey)

**Venue:** Room 05, ground floor, International Congress Center Munich (ICM), Munich, Germany; starting at 11:00

### **Agenda:**

**I. Welcome by the president Prof. Can Li**

**II. About the present ICC: a report by the chairman Prof. Johannes Lercher**

**III. IACS financial situation: a report by the treasurer Prof. Mike Bowker**

**IV. New societies and council members:**

- **Application by the Singapore Catalysis Society (SCS) presented by SCS vice president Dr. Armando Borgna**
- **Application by the Catalysis Society of Turkey presented by Prof. Deniz Uner**

**V. Election of officers: Vice president**

**VI. Discussion issue: selection rules for the Young Scientist Awards**

**VII. Venue of the 16<sup>th</sup> ICC**

**VIII. Other topics**

The meeting of the IACS council was accompanied by a buffet lunch. In attendance were 41 council members from 25 countries and all the IACS officers. The meeting was opened at 12.00 by Prof. Li, the president of IACS. He welcomed the IACS council and expressed his pleasure to meet the participants.

## **II. About the present ICC: a report by the chairman Prof. Johannes Lercher**

Prof. Lercher, the chairman of the 15<sup>th</sup> ICC, briefly reported on the ICC in Munich. The number of attendees was 2263, which is the highest number ever, resulting in a financial contribution to IACS of 62.366 € (levy 10% of the registration fees). About one quarter of the participants was from Germany. In addition to 6 plenary lectures and 2 award lectures (*International Catalysis Award*, *Heinz Heinemann Award*) the program comprised of 14 keynote lectures, 205 oral presentations in 3 parallel sessions supplemented by 4 cross-disciplinary workshops and 44 poster symposia including 370 posters. The total number of submissions was 2567. The matrix structure of the program had been extended by including the topics *physicochemical characterization* and *selective oxidation*.

## **III. IACS financial situation: a report by the treasurer Prof. Mike Bowker**

Prof. Bowker, the treasurer of IACS, briefly explained the financial situation of IACS. The updated report is attached to the minutes of the meeting. The financial situation was considered to be healthy, and further expenditure options were discussed including increasing the prize money and to support pre-conference schools for students in analogy to the tradition at the *International Zeolite Conference*. The treasurer's report was approved unanimously.

## **IV. New societies and council members:**

- **Application by the Singapore Catalysis Society (SCS) presented by SCS vice president Dr. Armando Borgna**
- **Application by the Catalysis Society of Turkey presented by Prof. Deniz Uner**

The Singapore Catalysis Society ([www.catalysis.org.sg](http://www.catalysis.org.sg)) had been founded in January 2008 and comprises of 64 regular members and 5 corporate members. Dr. Borgna presented its application. The application by its president Prof. Richard Wong is attached to the minutes. The secret balloting resulted in 41 votes in favor of the application out of 42.

Prof. Uner presented the Turkish application, which is attached to the minutes. The Catalysis Society of Turkey had been established in 2006 and comprises 60 voting academic members and 5 corporate members. 37 out of 41 votes supported the application. Prof. Li congratulated the 2 new IACS member societies and asked their representatives to participate further in the council meeting.

## **V. Election of officers: Vice-president**

4 candidates were nominated for the IACS vice-president: Prof. Parmon (Russia, born 1948), Prof. Iwasawa (Japan, born 1946), Prof. Centi (Italy, born 1955), and Prof. van Santen (Netherlands, born 1945). The election of the new vice-president required 2 secret rounds of voting in the absence of Prof. Parmon and Prof. Centi. After the first round Prof. Parmon and Prof. Centi were the candidates with the largest number of votes. Prof. Centi was elected in the second round and Prof. Li congratulated and welcomed Prof. Centi as the new IACS vice-president.

## **VI. Discussion issue: selection rules for the Young Scientist Awards**

At the 13<sup>th</sup> ICC in Paris the Young Scientist Awards had been initiated with 42 awardees, and at the 14<sup>th</sup> ICC in Seoul 62 awardees had been selected. At the 15<sup>th</sup> ICC 44 young scientists received the award out of 84 applications including CV and recommendation letters. In addition to the official document, the Young Scientist Award recipients obtain a refunding of their registration fees, which is equally split between IACS and the local organizers. During the discussion numerous suggestions were made how to improve the selection of the awardees. It was suggested to provide travel awards similar to the Kokes Awards for the meetings of the *North American Catalysis Society*. Decision on this topic has been postponed to the next meeting of IACS.

## **VII. Venue of the 16<sup>th</sup> ICC**

Subsequent to the presentation of Beijing as the next venue of the ICC, it was unanimously elected. The 16<sup>th</sup> ICC will take place at the China National Convention Center (CNCC) from July 3 to 8, 2016 chaired by Prof. Li. The theme is “*Catalysis for Sustainable Development of the World*”.

Since there were no further agenda items, Prof. Li closed the meeting thanking all council members for their active and constructive participation.

Attachment I: IACS financial report (27th of June 2012)

Attachment II: applications of the Singaporean and Turkish catalysis societies

## International Association of Catalysis Societies (IACS)

FINANCIAL REPORT : 28<sup>th</sup> May 2008 to 30<sup>th</sup> March 2012

**Balance** on 28<sup>th</sup> May 2008  
as reported at the 2008 meeting of Council **£125,054.10**

### Income

1.	Refunds	£179.40
2.	14 <sup>th</sup> International Congress on Catalysis, Seoul 2008	£14,458.79
3.	Interest on reserve account received during the period 28.05.08 to 28.05.12 [Coutts & Co., London (Bankers)]	£1,877.40

**TOTAL INCOME** **£16515.59**

### Expenditure

1.	Costs for Website Maintenance	£6,259.05
2.	Expenses for SF meeting (sec)	£1,435.49
3.	Expenses (Tenenbaum)	£1,778.10
4.	Expenses (Breysse)	£1,002.72
3.	IACS Prize (30 June 2008)	£2,520.16
4.	Heinemann Prize (1 July 2008)	£2,520.16
5.	Bank charges on account during the period 28.05.08 to 30.03.12	£802.90

**TOTAL EXPENDITURE** **£16,318.58**

Balance on 28<sup>th</sup> May 2012

Accounts at Coutts & Co., London (Bankers)	
Business Reserve Account	£119,904.55
Current Account	£5,346.56

**TOTAL** **£125,251.11**

### Estimated Committed future expenditure

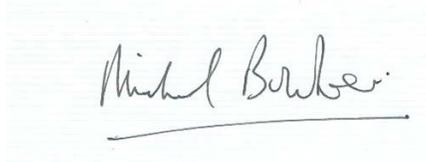
1.	2 International Congress Awards \$5000 @ 1.6\$/£	£6,250.00
2.	President's expenses at 15 <sup>th</sup> ICC	£3,000.00
3.	IUPAC fees	£100.00
4.	Bank charges associated with items 1,2	£100.00

TOTAL COMMITTED EXPENDITURE

£9,450.00

**Total available IACS balance**

**£115,801.11**

A handwritten signature in black ink that reads "Michael Bowker". The signature is written in a cursive style and is underlined with a single horizontal line.

.....  
Professor Michael Bowker,  
Treasurer IACS  
School of Chemistry,  
Cardiff University  
Cardiff, UK  
CF10 3AT  
27th June 2012

Professor Richard M. W. Wong  
President, Singapore Catalysis Society  
Department of Chemistry  
National University of Singapore  
13th June, 2012

Professor Can Li  
President, International Association of Catalysis Society  
Director, State Key Laboratory of Catalysis  
Dalian Institute of Chemical physics  
Chinese Academy of Sciences

## **Application of Membership of the International Association of Catalysis Societies**

The Singapore Catalysis Society (SCS) would like to apply to be a member of the International Association of Catalysis Societies (IACS). Below please find the background, mission & objectives, key activities and research summary of our society.

### **Background of SCS**

#### **(1) Singapore**

Singapore is a Southeast Asian city-state off the southern tip of the Malay Peninsula. It has a population of 5 millions. The economy depends heavily on the industry and service sectors. Singapore is a world leader in several areas, e.g. it is the world's fourth-leading financial and the world's third-largest oil refining centre. The country has the world's third highest GDP PPP per capita, making Singapore one of the world's wealthiest countries.

#### **(2) Chemical Industry**

The Singapore economy depends heavily on exports and refining imported goods, especially in manufacturing. Petroleum refining, chemicals, and biomedical sciences are the key sectors in manufacturing industry. These sectors account for 40% of Singapore manufacture output. Jurong Island represents one of the key successes to support the chemical and energy industries. It is an offshore island with a total area of 30 km<sup>2</sup>, which worths S\$300 billions of fixed assets investments. Currently, it houses 100 chemical companies (with 8000 employees), include global companies such as Shell, ExxonMobil, Chevron, Invista, BASF, Sumitomo Chemicals, Mitsui Chemicals, and LANXESS, etc. Integration of utilities and logistics for production synergies and cost efficiencies are the main features of this island. One critical success factor is the ability for companies to create synergies through integration of feedstock. It is worth noting that 8 of top 10 pharmaceutical companies have located regional headquarter in Singapore as Singapore had rapidly expanded the biomedical industry in recent years.

#### **(3) Research Institutes and Universities**

The Agency for Science, Technology and Research (A\*STAR) is the lead agency for fostering scientific research for a knowledge-based and innovation-driven Singapore. A\*STAR oversees 14

biomedical sciences and physical sciences and engineering research institutes, and six consortia & centres, located in Biopolis and Fusionopolis. The Institute of Chemical and Engineering Sciences (ICES), Institute of Materials of Engineering Science (IMRE) and Institute of Bioengineering and Nanotechnology (IBN) are the key A\*STAR institutes related to catalysis research. In particular, ICES was established in 2002 to carry out world class scientific research and to develop novel technology to support economic growth in Singapore. The research area covers chemistry and chemical engineering science, combined with advanced analytical characterisation and measurement to develop state of the art technology for the petrochemical, general chemical, fine chemical and pharmaceutical industries.

There are four universities in Singapore, with two universities, namely National University of Singapore (NUS) and Nanyang Technological University (NTU), offer education and research in science. Both NUS and NTU are major global universities with excellent research. For instance, NUS is ranked 15<sup>th</sup> in 2011 QS World University Ranking by chemistry subject. The research institutes and universities have vigorous and intensive research programs in homogeneous, heterogeneous and bio-catalysis and published extensively in high-impact journals. Selective research highlights are given in the SCS website (<http://www.catalysis.org.sg/scs/content/53-research-highlights>). It is clear that catalysis research in Singapore is of world class standard.

#### (4) Research and Development (R&D)

Singapore is an established global chemical center. The Economic Development Board (EDB) of Singapore has a strategic plan to further develop Singapore as a world-class chemical and energy hub. Catalyst-based chemical synthesis accounts for majority of today's chemical products, ranging from petroleum products, pharmaceutical intermediates, specialty chemicals, to functional materials, and nearly all of current chemical processes. Therefore, catalysis is a crucial research area that requires long term investment in research and development and is of high priority for the chemical industry in Singapore.

In 2005, the Singapore government decided to increase its R&D spending from 2 to 3%, comparable to leading countries such as United States and Japan. As a consequence, billions of dollar was invested for R&D in academia and industry. In particular, the National Research Foundation (NRF) was set up in January 2006 to develop strategies, policies and plans for research, innovation and enterprise in Singapore. NRF funds strategic initiatives to build up Singapore's R&D capability and capacity, develop research talent and nurture a culture for innovation and entrepreneurship. In summary, significant funding is readily available recent years and in the future for research related to catalysis, e.g. energy and environment.

### **History of SCS**

Below is a brief chronological summary history of the Singapore Catalysis Society (SCS).

(1) In 2006, an interest group on catalysis was formed informally, with representatives from ICES, NUS and NTU.

(2) The Catalysis Society Protem Committee was formed in May 2007. During the meeting, the name of the society, constitution, membership qualification and rights were formalized. A management committee of 14 members, with a 2-year term of office, was established. Dr P.K. Wong, ICES, was nominated to be the President of the newly formed society.

(3) The first SCS Committee Meeting was held on 3rd August 2007. The SCS website was discussed and formalized during the meeting.

(4) In January 2008, the Singapore Catalysis Society was formally registered with the Registry of Societies (ROS) in Singapore.

(5) A new committee of 17 members was elected during the 3rd annual general meeting of SCS, on 20th May 2011. Prof. Richard Wong, NUS, was elected to be the Second President of SCS.

(6) In the most recent annual general meeting (AGM), which held on 18th May, 2012, there were 5 corporate members (Bruker, Codexis, Dow Chemicals, ICES and Mitsui), 64 ordinary members and 36 student members.

## **Mission & Objectives of SCS**

The vision of SCS is to promote the growth and development in catalytic research and application in Singapore. The society aims to bring together members from the industry, research institutes, tertiary institutions, government departments and other professional bodies to achieve its long term vision for Singapore to become a regional hub for catalysis research and application.

The objectives of SCS are to to serve professionals working in the field of catalysis by:

- (a) fostering interaction among scientists and engineers involved in the field of catalysis;
- (b) promoting an interdisciplinary approach to catalysis research;
- (c) sponsoring and organising interdisciplinary meetings of interest to scientists and engineers in catalysis; and
- (d) disseminating information relevant to the interest of the catalysis community.

## **Key Activities of SCS**

There are four categories of SCS activities:

### (1) Annual Catalysis Forum

This is an annual event to bring together local catalysis community to share latest advances in homogeneous, heterogeneous and bio catalysis. It provides opportunity to enhance communication and collaborations among research groups and between academia and industry. It is also a good chance for graduate students to present their research through poster presentations. For the recent 5th Catalysis Forum held on 18th May 2012, there were 14 invited talks, attended by about 100 participants.

### (2) Public Lectures

Throughout the year, SCS presents several public lectures that aim to enthuse and engage the public in the latest developments in catalysis research. These free events bring eminent international scientists, e.g. Prof. Ei-ichi Negishi and Prof. Akira Suzuki (Nobel Laureates), to give general talk which help the general public to appreciate and understand the exciting development in catalysis research.

### (3) Workshops

Workshops of specific catalysis topics of current interest were conducted for professionals and graduate students to deepen their knowledge and insights on catalytic processes. Most of these workshops focus on the potential applications and implications of recent technological achievements across related scientific fields. These workshops were conducted by local and/or international experts. For example, a one-day workshop on "catalysis for energy and environment" was conducted in April 2011.

### (4) Education Courses

A general introductory short course is currently designed to meet a broad spectrum of needs of in-service teachers from secondary schools and junior colleges. We are planning to conduct such short education course in the near future.

## **Summary of Catalysis Research**

### (A) Heterogeneous catalysis

(1) Development of state-of-the-art integrated nanocatalysts for heterogeneous catalysis. These membrane reactor like complex nanocomposites are characterized by desirable shell texture and pore size and extra functionality in separation. e.g. synthesis of photosensitized semiconducting nanostructures for photocatalysis.

(2) Development of supported noble metallic nanoparticles as efficient heterogeneous catalysts for organic transformation (e.g. selective oxidation of alcohols). By choosing an appropriate support with well-defined structure and suitable surface chemistry, one can make metal nanoparticles with specific size, shape, structure, and to avoid agglomeration leading to catalytic deactivation.

(3) C1 chemistry, such as F-T synthesis, partial oxidation of methane and steam reforming of methane, CO oxidation using various heterogeneous catalysts.

(4) Modelling catalyst surfaces, include metal oxides and metals, using DFT calculations and applications in understanding reactivity of surfaces, e.g. (i) catalytic cycle and the nature of the active sites in Co catalysts for Fischer-Tropsch synthesis and (ii) steam reforming of formaldehyde on Cu, PdZn and Ir surfaces.

(5) Development of molecular photocatalysts based on less expensive metal oxides or metal sulfides (e.g. NiS/CdS system) for water splitting under visible light for renewable hydrogen production.

(6) CO<sub>2</sub> capture and utilization, such as adsorption enhanced water gas shift reaction; chemical looping combustion and dry reforming of methane using various heterogeneous catalysts.

- (7) Development of supported gold catalysts, e.g. a colloid-based and sonication-assisted method for rapid preparation of supported Au catalysts with high dispersion, with application in surface "OH" regeneration for CO oxidation in Au/TiO<sub>2</sub> catalysts.
- (8) Development of thermally stable support materials like zirconia, alumina, titania, and ceria-zirconia with desirable pore size, surface area and redox capability, with applications in wastewater treatment and carbon dioxide capture.
- (9) Biomass to fuels and chemicals, such as pyrolysis oil upgrading, bio-ethanol to light olefins using various heterogeneous catalysts.
- (10) Use of zeolites and mesoporous oxides in organic reactions and fine chemical synthesis and environmental catalysis.
- (11) Exploring novel methods to heterogenize catalysts, for example by dissolving the catalytically active species in an ionic liquid, which is itself immobilized as a thin film on a solid catalyst carrier.
- (12) Development of supported Ni catalyst made by electroless Ni-B plating, e.g. Ni/CGO catalysts display excellent catalytic activity and chemical stability against coking and sulfur poisoning in catalyzing autothermal reforming of a surrogate diesel fuel.

#### (B) Homogeneous catalysis

- (1) Single-site olefin polymerization, carbonylation, hydroformylation, C-C coupling, C-H activation, C-O and C-N cross coupling, metathesis, asymmetric synthesis using organometallic catalysts, catalytic fluorination, reductive amination of carboxylic acid, and anti-Markonikov functionalization of olefins
- (2) Asymmetric organocatalysis - development multi-functional organocatalysts which can be easily derived from natural chiral pool, e.g. chiral primary amine-catalysts, cinchona alkaloids and their novel structural derivatives.
- (3) Computational catalysis - understand catalytic mechanisms and origin of stereoselectivity and "in silico" of novel catalysts, e.g. catalyst mimics enzyme catalysis
- (4) Development of novel organic catalysis via controlling the activation modes of enals and esters under N-heterocyclic carbene (NHC) and cooperative NHC/acid catalysis for both C-C bond forming and breaking transformations
- (5) Design of improved palladium catalysts for Heck reactions in (i) regioselective reactions of terminal olefins with high terminal selectivity; (ii) asymmetric reaction of cyclic olefins and related cascade reactions; and (iii) asymmetric Heck reaction using benzylic electrophiles.
- (6) Development of chiral amino-thiocarbamate catalyst in asymmetric bromocyclization reactions, e.g. synthesis of chiral, non-racemic lactones and pyrrolidines with good yields and enantioselectivities.
- (7) Application of chiral brønsted base catalysts, e.g. bicyclic guanidines, for stereoselective C-C bond forming reactions such as Diels-Alder, conjugate Michael addition, etc.
- (8) Synthesis of *N*-heterocyclic carbenes (NHC), e.g. *N,S*-heterocyclic carbenes and Carbene-carboxylate complexes of Pd(II), transition metal complexes and their application in catalysis.

#### (C) Biocatalysis

- (1) Conversion of renewable resources such as lignocellulose and various organic wastes to fuels and chemicals using enzymes (e.g. cellulolytic enzyme) and microorganisms (e.g. fungal) as biocatalysts.
- (2) Screening of enzymes and microbes from nature or commercial sources and further develop to cost-effective biocatalytic processes for industrial applications. The target products include lactic acid, ethanol, glycerol, adipic acid, 3-hydroxypropionic acid, amino acids and proteins.
- (3) Biocatalyst discovery by biocatalyst optimization by genetic and protein engineering, biotransformation with whole cells and isolated enzymes, enzyme purification, characterization, and biochemistry, enzyme catalysis in organic solvent, multi-step enzymatic reactions, and bioprocess development. Applications on stereoselective reactions such as epoxidation, reduction of ketones, reductive amination and hydrolysis of epoxides.
- (4) Development of biodegradable and biocompatible materials from microbial origin for biomedical application, e.g. chemically or enzymatically modify poly-[(R)-3-hydroxybutyrate] (PHB) and poly-[(R)-3-hydroxyoctanoate] (PHO) as thermoplastic elastic block co-polymers.

#### **Application of International Association of Catalysis Societies (IACS) Membership**

Singapore is doing cutting-edge research in catalysis in both academia and industry. It represents one of leading countries in catalysis research in the Southeast Asia. To achieve the mission of SCS, it is essential that SCS links up to other catalysis societies in the world by becoming a member of the International Association of Catalysis Societies (IACS). We foresee several benefits for SCS to join IACS. Firstly, it helps promoting the vibrant catalysis research in Singapore. Secondly, it raises the international profile of Singapore, which will fulfil the long-term goal of becoming a world-class chemical hub. Thirdly, it provides the best opportunity for us to network, deepen relations, and facilitate future collaborations with our global counterparts. Finally, the IACS membership will enable us to host major international meetings. Singapore is the Asia's top convention city for 10 straight years, according to the global rankings by the International Congress and Convention Association. Perhaps, this will give SCS a good opportunity to host one of the International Congress on Catalysis in the future, which will certainly place us firmly on the world map of catalysis.

I trust that our application will meet your kind consideration.

With best regards

A handwritten signature in blue ink, appearing to read "Richard".

Richard



June 22, 2012

To the executive board members of the International Association of Catalysis Societies:

The Catalysis Society of Turkey would like to be a member of the International Association of Catalysis Societies. The society was officially established on November 26, 2006. Since then the following major activities were organized:

1. Anatolian School of Catalysis in Collaboration with NIOK September 25-October 6, 2006.
2. First National Catalysis Conference (NCC-1) January 17-20, 2007.
3. DeNOX workshop May 16, 2007.
4. Energy and Catalysis Workshop, July 2, 2007.
5. Second National Catalysis Conference (NCC-2) June 18-21, 2008.
6. Francois Gault Lecture, Prof. Robbie Burch February 26-27, 2009.
7. Fuel Cell Catalysis Workshop, March 6, 2009.
8. Third National Catalysis Conference (NCC-3) April 28-May 1, 2010.
9. EFCATS Summer School, September 13-17, 2010.
10. Fourth National Catalysis Conference (NCC-4) March 21-24, 2012.
11. Second Anatolian School of Catalysis, Planned for 2013.
12. A bid is prepared for the EUROPACAT conference for 2015.
13. Two special issues were prepared from the conference proceedings:
  - a. Turkish Journal of Chemistry Volume 31 issue 5, 2007 (Guest edited by Prof.Z. I. Onsan)
  - b. International Journal of Chemical Reactor Engineering 2011 (Guest edited by Prof. T. Dogu and G. Dogu)

The constituency of the society is as follows:

- 60 voting academic members
- 200 non-voting (student) members
- 5 major industrial corporations support the activities as corporate members. They are the key players of refineries (TUPRAS) and petrochemical industries (SOCAR-PETKIM), commodity chemicals, AKKIM, world's leading fiber manufacturer AKSA and AKSA-CA.

The fact that Turkey is in the energy corridor to the west and is strongly becoming a key player of chemical manufacture in the Mediterranean region reflects itself in the dynamic structure of the Catalysis Society of Turkey.

With this letter, we declare our candidacy for membership of the International Association of Catalysis Societies.

Kind regards;



Prof. Deniz Uner  
Past President and Executive Committee Member  
Catalysis Society of Turkey



Prof. Z. Ilse Onsan  
President  
Catalysis Society of Turkey