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Chairman's Address

Yoshihiko MORO-OKA

On the behalf of the Organizing Committee, it is a great pleasure for me to welcome all of you to the first Tokyo Conference on Advanced Catalytic Science and Technology, TOCAT-1.

We are very glad that nearly five hundred participants including 100 scientists from 19 different countries outside Japan are taking part in this conference. As you can see in the program, 43 oral presentations and 88 poster presentations in the general session and 34 presentations in the industrial session will be given during the conference.

This year is situated just midway between the 9th International Conference on Catalysis in Calgary and the 10th ICC in Budapest. I know that fairly many international meetings on catalysis are being held or planned throughout the world. However, I feel that most of them including the ICC are more inclined toward academic investigations. We, the Organizing Committee of this conference, felt the need for a new type of meeting involving more industrial researchers and topics.

A great stream of research on heterogeneous catalysis started with the epoch-making success of ammonia synthesis early in this century. At approximately the same time catalytic hydrogenation by transition metals was also discovered and established. At that time, fundamental investigations were more closely connected with new industry than is the case now. With the passage of time, however, academic investigations and industrial applications went their separate ways and in recent years have become nearly independent of each other. It seems that exchanges between the two areas have decreased year by year.

I do not believe this is good for either side. The importance of catalysis increases more and more in modern science and technology, especially with regard to preserving the environment, improving chemical industry, and using our limited natural resources more efficiently. I believe that a catalyst is a real catalyst only when it catalyzes a useful reaction. Without useful reactions, catalytic materials lose their meaning. This is a very simple but sometimes forgotten fact.

We have organized this conference to fill in the gap between basic science and application technology. I think that one of the important characteristics of this conference may be found in the industrial session. I am very happy that many industrial companies not only in Japan but also in other parts of the world support our proposal. I sincerely hope that the conference will stimulate closer cooperation

between technology and basic science and promote new concepts and methods for the development of useful catalytic systems.

This conference is sponsored by the Catalysis Society of Japan and I wish here to express our appreciation. I also thank the Association for the Progress of New Chemistry, *Sin-Kagaku Hatten-Kyokai*, for its financial support.

Last but not least, thanks to all the international and academic advisory boards for their collaboration and encouragement.

Again I thank all of you in this room for attending the conference. I hope that you will enjoy the lectures and discussions over the next four days and that this meeting will be productive and memorable for all.

Thank you.

Address from International Advisory Board

B. DELMON

Probably the worst way to start speaking before an audience of catalysis specialists is to underline that catalysis is multidisciplinary. This is commonplace. The problem is that, fortunately, this is true. Because of that multidisciplinary, perhaps, or because of the exceptional importance it has gained, catalysis cannot be split between fundamental and applied, or academic and industrial.

It is therefore a special pleasure for the catalysis community that the Organizers of a Conference announce that they will bring together engineers and scientists, and will create all favourable conditions for making easy communication between basic research and application technology possible. There is no doubt that for this reason, the colleagues in whose names Professor Y. Moro-oka asked me to speak were extremely happy to be included in the International Advisory Board of TOCAT-1.

In March 1988, I had been fortunate enough to participate in a Meeting of the Catalysis Society of Japan. This is a powerful Society (1400 members at that time; this is probably the largest catalysis society in the world). It is quite venerable. Actually, the word is not adequate, because, in my Dictionary of Synonyms I found next to venerable : old, aged, patriarchal. Let us say simply that that Meeting in 1988 celebrated the 30th anniversary of creation of the Society. The founders were pioneers : this was the first Catalysis Society in the world, a respectable young pioneer now.

The Catalysis Society of Japan has achieved, throughout its life, an excellent balance between applications and fundamental science, as shown by the attendance to the meetings. In 1988, at the 61st Discussion Meeting, I was impressed by the participation of industrial scientists, many young students, mature investigators, respected heads of divisions in industry, and professors, all of them together. The Catalysis Society of Japan not only was and is a pioneer, it is also a very efficient organizer of two very busy meetings each year.

In our request for subsidies, we, in Academia, always argue that our basic research is useful for the development of an innovative chemical industry. The contracts we obtain from Industry and help us make our laboratories run, let us think so, not too wrongly, I hope. But I am stricken by the role that industrial catalysis plays in stimulating new lines of research in Academia. The first circular of TOCAT-1 was

in this line : "It is hoped that this conference will stimulate closer cooperation between technology and basic science and promote new concepts for the development of useful catalytic systems". Not only are the members of the Catalysis Society of Japan very efficient organizers : they certainly exert, via National Meetings and International Conferences, a strong stimulating action. It is not mere chance, I suppose, if two Organizers of the present Conference (one from Industry, one from Academia) have recently completed a Review Paper, now in press, entitled "Recent progress in catalytic technology in Japan".

Incidentally, this title, and the impressive content of the paper also demonstrate that the innovative and dynamic environment of the Catalysis Society of Japan, namely the technical advances achieved by the various Industrial Companies, creates a very healthy stimulation.

The perfectly organized Seventh International Congress of Catalysis, co-sponsored by the Chemical Society of Japan and IUPAC, was the work of the Catalysis Society.

I do not remember how many satellite symposia were organized then. TOCAT-1 also takes place amidst a constellation of symposia, pre-symposia, post-congress meetings, satellite meetings, workshops, etc... and much credit must be given to our Japanese colleagues for all these efforts. It took 16 years for the USA to have another International Congress of Catalysis. Now, many countries are active in catalysis. After the Worldwide Catalysis Seminars of 1988, and several specialised meetings held in the last 2 years, it was clear that our Japanese colleagues felt unable to wait for the second International Congress of Catalysis to be organized in Japan. They were eager to organize something of their own soon, very soon. Our Japanese friends look so calm and have so much control that I could not suspect how impatient they could be. (But again, my Dictionary of Synonyms tells me that the word is improper : let us say that are incredibly dynamic.) The conclusion is clear : the Catalysis Society of Japan in addition of being venerable, efficient, stimulating, is *impatient*-sorry : terribly dynamic !

An organization is the synergetic addition of its members. The members of the Catalysis Society of Japan are remarkably efficient and dynamic. It is a pleasure for the International Advisory Board to be associated with their achievements, and the synergy seems excellent. Congratulations to the Organizers. And many warm thanks for the enormous amount of work they have dedicated to the organization of TOCAT-1.

The participants will enjoy the special structure of the programme, especially the combination of industrial and more conventionally scientific sessions.

And they will await impatiently the announcement of the date of TOCAT-2. In a very near future, I guess. How many of them will take place before the International Congresses on Catalysis return Japan ?

Preface

Applied catalysis is a rapidly growing field. Catalysis is used in the production process of many kinds of chemicals and also to reduce pollutants. The technology of catalysis partly reflects recent developments in catalytic science. However, the gap between basic research and application technology still remains too large to meet increasing demand. On this occasion, the Catalysis Society of Japan has embarked on a new series of international conferences on catalysis to stimulate closer cooperation between technology and basic science and promote new concepts of the development of useful catalytic systems. To realize this objective the organizing committee decided to hold one full-day special session for the industrial application of catalysis, in which 33 interesting works from eight nations were presented. Furthermore, four of six plenary lectures were presented by industrial researchers.

Fortunately, our efforts attracted much attention and the conference had about 500 attendants from 19 nations with 148 papers presented.

This volume comprises the proceedings of the conference. All papers presented orally are included but some from the poster session are not, partly because of limited space and partly because some authors did not desire publication. The contributed papers have been grouped into four categories : plenary lectures, papers presented orally, papers presented in the industrial and general poster sessions.

We believe that these proceedings are an excellent guide to the recent developments in catalytic science and technology.

The editors express their thanks to Drs. Masahide Shimokawabe of Hokkaido University and Tsunehiro Tanaka of Kyoto University and Mr. Ippei Ohta of Kodansha Scientific for their invaluable assistance in the editing of this volume.

Satohiro YOSHIDA
Nobutsune TAKEZAWA
Tetsuji ONO

October 1990

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