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Editorial (Special Issue on Celebrating the 70th Anniversary of Dalian Institute of Chemical Physics, CAS)

An odyssey: the way Chinese catalysis towards the world

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ARTICLE INFO

Article history:

Received 17 August 2019

Accepted 25 August 2019

Published 5 November 2019

Keywords:

Chinese catalysis

The 16th International Catalysis Congress

The international catalytic academic exchange platform
Influence

ABSTRACT

The 16th International Catalysis Congress (16th ICC) was successfully held in China in July 2016. This paper reviewed the development of catalytic science and technology of China from scratch to small then to large under the efforts of several generations. In 1950s, catalysis discipline was first set up to train early catalytic professionals in Jilin University, Peking University and Xiamen University. Subsequently, a large research team was formed in colleges and universities, the Academy of Sciences, the Enterprise Research Institute to carry out a large number of catalytic researches. Along with the Chinese reform and opening-up, the spring of science came, and the state started to emphasize and strongly support scientific research. Chinese catalytic researchers began to enter the international catalytic academic exchange platform. Famous foreign scientists are invited to visit China and a large number of visiting scholars and foreign students have been sent to the United States, Europe and Japan, many of them have become well-known professors, and grown into catalytic academic elites. The first China-Japan-USA Symposium on Catalysis was held in Dalian in 1982, and it was expanded to become the Asian-Pacific Congress on Catalysis (APCAT), one of the three regional catalytic conferences in the world. After several generations of bidding for the organization of the International Catalytic Congress three times, China won the right to host the 16th ICC. It has effectively promoted the Chinese catalytic academic circles to the international academic ones and improved the influence of catalysis communities in China significantly. The great development in catalytic research and technology has condensed the efforts of several generations of catalysts. To make China a catalytically strong country, there is still a long way to go. We hope that the contemporary scientists can accomplish this historical task.

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1. Successful holding of the 16th International Catalytic Congress

As Olympic Games in sports circles, the International Congress on Catalysis (ICC) is the grand event in the catalytic community. July 2016, with the careful planning and arrangements by the Chinese catalytic elites represented by Li Can, Bao Xinhe, Zhang Tao, Shen Wenjie and their teams, the quadrennial grand event in the international catalytic world, the 16th ICC, was successively held in Beijing.

The scientists taking part in this event were the catalytic elites and leading authorities from countries all over the world; the topics and the distribution of the plenary lectures, keynote lectures and oral presentations indicated the frontiers of the catalytic science and the magnanimity of the organizers; the utilities and service of the congress, especially the volunteers, were of the world class. In addition to following the tradition of the ICC, also shown was a brief video-review on the previous ICCs and the expectations and wishes from various catalysis masters with international fames, among whom I could see a

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Fig. 1. The opening ceremony of the 16th ICC held in Beijing, China in July 2016.

lot of familiar faces. We could see some adequate Chinese elements within the congress as well, so that the participants could enjoy a warm scene mingled with the science and humanities. I dare say, therefore, that the Beijing Congress was a magnificent achievement. See Figs. 1–3.

This was also the consensus of the old friends I met at the congress, they were: Professors Michel Che and J. Vadrine from France; Professors A. T. Bell, B. C. Gates and G. L. Hall from the United States; Professors K. Domen and S. T. Oyama from Japan; Professor V. N. Parmon from Russia; Professor C. C. Vicente from Spain; Professor L. A. Petlov from Bulgaria; Professors Xu Ruren, Xie Youchang, Li xuanwen, Huang Zhongtao, Liu Huazhang, Chen Songying, Chen Qingling, He Mingyuan from mainland China; Professor Wu Qinghui from Hong Kong of China; Professor Liu Shangbin from Taiwan, China.

The principle author could not help my thoughts flying during the meeting. It was the dream of generations of Chinese catalytic professionals, and it was a new starting point for China to go forward to be a catalytically strong power. And this contemporary event was crystalized by the efforts of generations of Chinese catalytical scientists.

2. Establishment of catalytic team and scientific and technological exchange in china

The scenes stirred up my feelings. Looking back the history, it started more than half century ago. The author graduated

Fig. 2. Group photo after the 16th ICC banquet performances.

Fig. 3. The working volunteers in 16th ICC.

from Jilin University as a catalytic professional in 1962, when there were only Jilin University, Xiamen University, Peking University where Chinese students could learn catalysis, among which specialists from Soviet Union (USSR) Zaharov et al gave lectures in Beijing and Jilin respectively. The author could still remember, that during late 1950s there were two catalytic seminars held in Xiamen and Jilin Universities respectively, to cultivate groups of professionals working in catalysis. A number of people won their licentiate as a joint programme by the Institute of Petroleum, Chinese Academy of Sciences (currently Dalian Institute of Chemical Physics, Chinese Academy of Sciences, DICP) and Soviet specialists. In early 1960s, several licentiate coming back from the USSR to the DICP, their knowledge learnt covered all six theories of catalytic science. Because China's state policies then skewed towards the USSR, the contents of catalysis lectures in China were almost all those of Soviets' works: multiplet theory, semiconductor electrons theory, surface active groups theory, and so on. At that time, all what we knew about catalysis were those of USSR's, as if there was no other half of the world.

Later on, the older scientists often talked, during discussions, about how the Japanese scientists had been trained: quite a few famous professors of the first generation Japanese catalytic masters, Keii Tominaga, Yoneda Yukio, Kan Takao, Horiuti Toshiro, Tarama Kimio, Mulikawa taught a group of scientists like Kenzi Tamaru, Kozo Tanabe who got thorough knowledge of both the west and Japan, and brought up in turn a lot of even younger elites for Japanese catalysis. That means, inheritance is necessary in science.

Before 1980, we did not know much about the outer world, and the outer world did not know much about us. However, from the 3–5 original western journals and limited number of photocopied ones, we found that there was a big field we had little touched.

Along with the Chinese reform and opening-up, the spring of science came, and the state started to emphasize and strongly support scientific research. Thereby the scientists brought the issue of international communication into agenda. In order to know the international catalytic community and to introduce China to the world, the government sent a delegation to take part in the 7th ICC in Tokyo for the first time in 1980. The dele-

Fig. 4. Catalytic professionals graduated from Beijing, Jilin and Xiamen Universities.

gation members were Min Enze, Tsai Khirui, Guo Xiexian, Lin Liwu and others, which was the result of the coordination between Chinese Academy of Sciences, universities and the industrial research institutions. By invitation, Guo Xiexian gave a lecture at the “Post Symposium” of the congress, on “China’s Current Catalytic Researches”, which introduced the history, current circumstances, researcher teams, research fields, and equipment etc, of the Chinese catalytic research. See Figs. 4–11. From then on, a new stage for Chinese catalytic professionals to go to the international academic communication platform

Fig. 5. Catalytic Seminar participants at Xiamen University in 1963.

Fig. 6. September 1958, 4 on-the-job graduate students of USSR specialist KaLiqici, Lu Peizhang, Ye Zuheng, Zhang Yanqing and Xi Zuwei, having successfully defended their theses equivalent to licentiate at the DICP. This is a group photo of all the people attending the oral examination (from left): Front: Wu Chi, Fu Ying, Zhang Zhicheng, KaLiqici, Zhang Dayu, Eflos, Zhu Yajie, Jiang Mingqian. Middle: Zhang Guoshi, Zhu Baolin, Lou Nanquan, Guo Hefu, Gu Yijian, Ye Zuheng, Xi Zuwei, Lu Peizhang, Bai Jiefu. Back: Guo xiexian, Yu Jianxin, Lin Junyong, Diao Qinghe, Chen Qingdao, Zhang Yanqing, Gu qun.

started.

3. Understanding and learning stage

To this end, the Chinese government started to send a great number of visiting scholars and abroad students to the United States, Europe and Japan, and invited famous foreign scientists to visit China. The DICP has sent about 100 visiting scholars and abroad students in 1980s. A part of these people stayed abroad, some become famous professors or do well in their fields. While most of them returned to homeland after finished their studies, and many have become elites in Chinese catalytic circle.

Fig. 7. Professor Zhang Dayu (left) holding a discussion with a specialist from the USSR (right).

Fig. 8. A specialist from the USSR (left) teaching Li Xuanwen (right) to do research at Peking University.

Fig. 9. Professor Zhang Dayu giving a lecture on fuel cells at the DICP (1960).

How the State Key Laboratory on Catalysis (SKLC), Dalian Institute of Chemical Physics, Chinese Academy of Sciences and the Chinese catalytic community could go to the communication stage of the international catalytic community, that was a question the Chinese catalysis people were considering. Given the conditions and situation then, Professor Guo Xiexian and others planned a few key collaborations with foreign colleagues. The collaborators in America were Professor A. T. Bell (head of the Department of Chemical Engineering of University of California, Berkeley, Chairman of the International Catalysis Council) and others. In Japan, they were Professor Kenzi Tamaru of University of Tokyo (Deputy President of the university, Chairman of the International Catalysis Council) and Professor Kozo Tanabe (President of University of Sapporo) and others. In Europe, they were Professor B. Delmon of University of New Leuven, Belgium, Professor Michel Che of the Sixth University of Paris, France and others. The ways of collaboration included hosting and taking part in international academic conferences (successively we hosted China-Japan Conference on Precious Metal Catalysis, China-Japan-USA Symposium on Catalysis, the 4th International Conference on Spillover (the first international conference hosted by Chinese catalytic community, which attracted scientists from 15 countries), the 5th International Conference on Inorganic Membranes, 3rd World Petroleum Congress hosted by Sinopec, and China-Japan C1-Chemistry Conference etc.) and signing agreements for major international

Fig. 10. Left (from right) Su Weihan, He Xuelun, Zhang Dayu, Lou Nanquan, Fu Daoyun, Zhang Zhaolan, Unknown person visited the USSR. Right: Prof. Guo Xiexian visited USSR.

Fig. 11. Professor Zhang Dayu (left four) and others visited North Korea.

academic cooperation (via this route, the DICP has sent more than 100 graduate students and visiting scholars abroad). Professor Guo Xiexian was particularly taking pains to organize and prepare for the China-Japan-USA Symposium on Catalysis. The first of these was held in Dalian, which was very successful and was a wonderful beginning for the catalytic elites of the three countries to meet each other. That was followed by 5 later conferences in Sapporo, Xiamen, Chicago, Sapporo, and Beijing. Eventually, this conference series was extended to be Asian-Pacific Congress on Catalysis (APCAT), with a Standing Secretariat set in Dalian and Professor Xiao Fengshou as the Secretary General. This step was decided by the relevant scientists during the 12th ICC in Granada, Spain, 2000. Hereafter, the series conference, APCAT, was carried on 13 times successively, held in South Korea, Japan, Mainland China, Australia, Singapore, Taipei China, and India. The APCAT has, together with North American Catalysis Conference and European Catalysis Conference, become one the three regional series conferences on catalysis, only second to the quadrennial ICC. All these conferences are meetings for renowned catalytic scientists from all over the world, indicating that Chinese catalytic community had certain influence on the international catalytic community.

The frequent personal exchanges and academic communications within the international catalytic community, boosted by a series of measures of the reform and opening-up, had not only strengthened the ties between ourselves and the international colleagues and let us intermingle with the catalytic world, but also won the academic reputation for us, and increased our voice in the academic communication. See Figs. 12–14.

Before 7th ICC, people could rarely see any Chinese scientists at the congress; since 9th ICC, the number of Chinese representatives had gradually increased, reached several dozens to about a hundred. I can still recall, that when I first went abroad, people would first ask if I came from Japan, then if from Taiwan, and last if from mainland China. But now, none will ask like that. It is a good indication that the influence of China is getting bigger and stronger.

Fig. 12. The slides used by Guo Xiexian at the 7th ICC held in Tokyo in 1980 (made by Xin Qin).

Fig. 13. A part of the contents introduced at the 7th ICC held in Tokyo in 1980.

Fig. 14. In 1980, we only have chromatographs, spectrometers and infrared as the big pieces of equipment.

4. The course of bidding for the International Catalytic Congress

Professors Tsai Khirui and Guo Xiexian were elected as directors of the International Catalysis Council in 1984, they were replaced later by Guo Xiexian and Chen Yi, then Li Can and He Mingyuan, now Bao Xinhe and Wang Ye. Thereupon China started to get involved in the affairs of the International Catalysis Council.

In the meantime, Guo Xiexian and other older scientists started to consider bidding for hosting the ICC. As what I can recollect, once he let me go to Beijing to talk to Fang Zhi and Qiu Xibai of the Chemical Society Office, asking about the procedure, conditions, requirements for hosting such a congress.

However, a conference like this could only be hosted by the Chemical Society then, and the circumstances in China were too

shabby as well. We felt it too hard to cope with the transportation, accommodation, conference facilities, and, especially, the funds needed. That was why the Chinese representatives at the 9th ICC only spoke the wishes, without any concrete movement whatsoever.

It was at the 12th ICC, Granada, Spain, that China first officially bade for hosting the ICC. However, French colleagues suggested to host it in Paris, with the reason that several of the famous professors and directors in European catalytic community were facing retirement, and they were keen to realize their dream once more. China did not gain many votes, and we did not prepare well enough either.

At the 13th ICC in Paris, China's strength in catalysis was much stronger than before, as there were more than 100 representatives at the event, and the research level on catalysis was much higher too. We now had sufficient preparation, and we resolved to hit the goal.

This time our main rival was South Korea. It seems like yesterday, that when I saw Professors Chen Yi (the keynote speaker) and Li Can to the Council meeting hall, there were only we three Chinese, while a big team from South Korea standing in line there, each with a bouquet of flowers in hand to give to the meeting directors. This scene let me feel somewhat ominous: why we could not organize such a team? This time we failed once again.

Fig. 15. The 1st China-Japan-USA Symposium on Catalysis held in Dalian in 1982.

Fig. 16. Presidium members of 4th China-Japan-USA Symposium on Catalysis held in Sapporo, Japan in July 1989. From right: Academician Guo Xiexian, Professors Kenzi Tamaru, Kozo Tanabe, A. T. Bell, Chen Yi.

Fig. 17. The 4th International Conference on Spillover held in Dalian, China in 1997.

Fig. 18. APCAT held in Dalian, 2003. From left: Professors Iwamaotom, J. Verine, Michel Che, Chen Yi, Xin Qin.

Fig. 19. The Opening Ceremony of 9th ICC held in Calgary, Canada on 26th June, 1988. Central position: Academician Guo Xiexian and Professor Chen Yi.

Fig. 20. Meeting of the International Catalysis Council at the 10th ICC held in Budapest, Hungary on 19th July, 1992. Back to the camera from left: 1. Professor Chen Yi, 2. Academician Guo Xiexian.

Although the bidding was not successful, Li Can won the ICC award, and was elected as the vice-chairman of the council, which gave us certain comfort. According to the rules of the Council, the vice-chairman will automatically be promoted to be the chairman next term, that meant, Chinese people had entered the central hierarchy of the international catalytic community. After the closing ceremony, the presidium took a group photo with the Chinese representatives, which was the first time ever I experienced for a few congresses I attended. This also meant an increased Chinese influence at the ICC, which was a solid foundation for the future success.

At last, it was the 15th ICC in Munich, Germany, the Chinese bidding group, formed by Bao Xinhe, Li Can, Zhang Tao, Wang Ye, and Shen Wenjie, successfully bade the hosting for the 16th ICC, after Professor Bao's speaking and Professor Zhang's supplement speaking. Our bidding was granted without any suspense. It seemed that, after a few generations' continuous efforts, hosting the congress was just so natural. See Figs. 15–25.

5. The contributions of old Chinese scientists and international friends

While Chinese catalytic community successfully hosted the 16th ICC and entered the international academic stage with considerable achievements, there are many people and things we cannot forget as follows.

Full supports from foreign friends, inclusive but not limited: Professor A. T. Bell from America; Professors Kenzi Tamaru and Kozo Tanabe from Japan; Belgian Professor B. Delmon, French Professor Michel Che, and Bulgarian Professor P. A. Petlov from Europe and so on. See Figs. 26–41. Professor B. Delmon is a renowned scientist in the international catalytic

Fig. 21. Group photo of a part of the Chinese representatives attending the 12th ICC held in Spain in 2000.

Fig. 22. The candidature file for bidding hosting ICC.

Fig. 23. Li Can won the International Catalysis Award at the 13th ICC held in Paris in 2004 and was elected as the vice-chairman of the council.

Fig. 24. Group photo of the presidium with the Chinese delegation after 13th ICC closing ceremony.

community, academican of both the Belgian Royal Academy of Sciences and the Academy of Engineering, once the Chairman of catalysis councils of nearly 10 European countries. He has made quite some contributions to help Chinese catalytic community enter the world stage, such as cultivating a number of doctorates, post-doctorates, visiting scholars; actively introducing the achievements of Chinese catalysis, recommending

China to host international academic conferences; supporting Chinese scientists to act as the editors of international academic journals and so on. He has made collaborations with DICP, Lanzhou Institute of Chemical Physics, Shanxi Institute of Coal Chemistry, Tianjin Institute of Chemical Engineering, Xiamen University, East China University of Science and Technology and so on, is a familiar old friend and collaborator of ours. Additionally, he enjoys very high authority in the international catalytic community, has co-edited, with Professor J. T. Yates, *The Studies in Surface Science and Catalysis*, the series books so far with 177 volumes (including 4 by Chinese catalytic scientists, 112, 147, 165, and 170), which is the most comprehensive

Fig. 25. China successfully bidding for the 16th ICC. The presidium took group photo with Chinese delegation at the 15th ICC held in Munich Germany in 2012.

Fig. 26. Professor Xin Qin visited Professor B. Delmon's laboratory in 1986.

Fig. 27. Professor B. Delmon visited SKLC in 1994.

Fig. 28. Professor B. Delmon visited SKLC in 2004. From right: B. Delmon, Li Yongwang, Xin Qin, Wei Zhaobin, unknown person, Li Can.

Fig. 29. 3rd China-Japan-USA Symposium on Catalysis held in Xiamen in August 1987. From left: Professors Xie Youchang, Shen Shikong, Li Jinlu, Academician Guo Xiexian, Professors Liu Dianqiu, A. T. Bell, Academician Tsai Khirui, Professor Zhu Qiming.

Fig. 30. Professors Xie Youchang (Beijing), A. T. Bell, Gao Zi (Fudan University), Yan Qijie (Nanjing) at 3rd China-Japan-USA Symposium on Catalysis held in Xiamen in August 1987.

Fig. 31. Professor A. T. Bell has visited DICP many times.

Fig. 32. At ICC16th held in Beijing, China in 2016. From right: Xu Ruren, Xiong Guoxing, A. T. Bell, Mrs Bell, Xin Qin.

set of books globally.

Given all these, Academician Min Enze and others recommended him to be a foreign academician of the Chinese Academy of Sciences (Xin Qin provided all the supporting documents). At the same time, Academician Tsai Khirui recommended Professor Tamaru of the Tokyo University of Japan. However, there could only be one foreign academician for the Physical Chemistry Group in the Chemistry Department, and at the last step neither succeeded. Professor Min was very sorry for this, thinking it would be better to recommend one each time. He was then a standing member of the presidium, holding some voice. Once he told me that he had considered too much about balance. Nonetheless, we could never forget Delmon's boosting function in helping Chinese catalytic community to-

Fig. 33. Academic exchanges with Professor M. Boudart from University of Princeton, Professors J. C. Dumisc and G. W. Hube from University of Wisconsin.

Fig. 34. Delegation of Chinese Academy of Sciences visited the University of California, and Exchanges with Professor G. L. Hall, former editor of *Journal of Catalysis* at international academic conferences.

Fig. 35. Professors G. L. Hall and Xin Qin at the 18th Chinese National Congress on Catalysis held in Tianjin in 2017.

Fig. 36. Professor J. Vedrine is an old friend of the author.

Fig. 37. Academician Guo Xiexian and Professor Kenzi Tamaru talked at the 5th China-Japan-USA Symposium on Catalysis held in Evanston, America in June 1991.

Fig. 38. Professors Gao Zi and Kenzi Tamaru put on performance at the closing ceremony of the China-Japan-USA Symposium on Catalysis.

Fig. 39. Professor Kenzi Tamaru visited SKLC. From left: Yan Yushan, Xinqin, Guo Xiexian, Kenzi Tamaru.

wards the international communication stage.

Professor A. T. Bell is the head of Chemical Engineering Department of University of California, Berkeley. He visited Dalian as early as 1982 to prepare for the 1st CHINA-JAPAN-USA

Fig. 40. Prof. H. Bourda (left 1) and Prof. Kenzi Tamaru (left 3) visited Fudan University.

Fig. 41. Many Japanese catalytic elites, such as Ohnishi Kohji, Misono Makoto, Hatton Hideshi, M. Ichikawa, K. Tanaka, S. Moloka, K. Fujimoto and T. Inui etc., have visited the SKLC.

SYMPOSIUM ON CATALYSIS, and took part in the conference as the head of American Delegation with ten-odd famous professors. He has visited mainland China for a couple of dozen times and trained quite a few high rank Chinese catalytic professionals.

Professor Michel Che visited the DICP as early as the 1970s, together with Professor C. Naccache, a French old authority on molecular sieves. Che has held a long-standing friendship with Chinese scientists. He and Professors J. Viedrine and M. Breyse organized and set up a Sino-French joint laboratory on Catalysis, contributed a lot on boosting scientific research collaborations between China and France, supporting and recommending Chinese scientists to enter the international communicating platform. Hence, he was awarded the China International Science and Technology Cooperation Award in 2009.

Professor Kenzi Tamaru, deputy president of University of Tokyo, chairman of the International Catalysis Council and Professor Kozo Tanabe, president of University of Sapporo, took part in the 1st CHINA-JAPAN-USA SYMPOSIUM ON CATALYSIS as the heads of the Japanese Delegation. Since then on, with a lot of exchange visits, and with collaboration researches carried out through abroad students and visiting scholars, both Tamaru and Tanabe, and their students Ohnishi

Fig. 42. Older generation scientists met at the Chinese National Congress on Catalysis, Nanjing, recalled the anecdotes of the past.

Fig. 43. Professor Li Xuanwen of Peking University was awarded a Century Award by the French Chemical Society. Top Science and Technology Award laureate.

Fig. 44. Academician Min Enze discussing with others on the publication of *Chinese Catalysis Masters* and *The History of Chinese Catalysis*.

Kohji, Misono Makoto, Hatton Hideshi, M. Ichikawa, K. Tanaka, S. Moloka, K. Fujimoto and T. Inui have become our familiar old friends.

6. The outstanding contributions from the older generation of Chinese scientists

Besides above-mentioned main role Professor Guo Xiexian acted for the Chinese catalytic community, Tsai Khirui, Peng

Fig. 45. Some of the older generation catalytic professionals reuniting happily at the 14th Chinese National Conference on Catalysis held in Nanjing.

Fig. 46. The Chinese elites, such as Min Enze, He Mingyuan, Xu Ruren, Gaozi, Xu Xinhua, Pang Wenqin, Li Hexuan, et al have made contributions to the scientific development of molecular sieves in China.

Shaoyi, Min Enze and other older masters exerted important influence. In particular, there were a few things impressed the author the most. See Fig. 42–47.

Sinopec hosted the 3rd World Petroleum Congress before the 13th ICC. A part of the members of the Catalysis Committee held a special meeting at the Research Institute of Petroleum Processing, Beijing, where Academicians Min Enze and Li Dadong mentioned their bidding experience in details. Professor Min talked about many ideas and told many things we should pay attention to. When we were preparing for the candidature file, Professors Chen Yi and Gao Zi came to Dalian to deliberate the statement word by word. Chen Yi was the acting president of Nanjing University, Gao Zi was a senior professor, but they took a meticulous attitude, like primary school pupils doing homework. It was Finally decided that Chen Yi would be the keynote speaker. Chen's English is excellent, nevertheless he was carefully rehearsing the presentation, listening to other people's comments. We discussed the congress' emblem, and in the length the Great Wall was chosen, as it could well embody China's long history and grandness. Next we selected one image

Fig. 47. Left: Zhou Bing (middle) and others won the Green Chemistry (right). Presidential Prize, 2007. Middle: Zhou Bind (left 3) at the University of Louvain. Right: Zhou Bing (right) at the SKLC.

Fig. 48. To make China a catalytically strong country, there is still a long way to go.

from many candidates, which could show the extensiveness and profoundness of our nation (The Great Wall was once more chosen as the emblem for the 16th ICC as the main Chinese cultural element). These were already things of the past, but they were still impressive.

Professor Li Xuanwen of Peking University went to France as an abroad student in his early years, who is excellent in French and very familiar with French catalytic community. He has made a major contribution for the collaboration between China and France, and was awarded a Century Award by the French Chemical Society.

7. Overseas Chinese catalytic elites keeping the development of motherland in mind

In the beginning of reform and opening-up, a big number of Chinese catalytic elites went studying abroad, some of them now do very well in their respective fields with considerable voice. Most of them care very much with their homeland's progress, hoping China to gain even greater achievements. Through my contacting with them, I can feel their willingness to exert their power for the benefit of China. Sometimes I call them the "Legionnaire", Zhou Bing, Xiao Jianliang, Chen Jinguang, Su Baolian, Yan Yushan, Song Chunshan...are just a few examples. At the time that Chinese catalytic community is going to the world, we shouldn't forget their functions.

Zhou Bing, for instance, graduated from Jilin University,

studied at University of Louvain, Belgium with Professor B. Delmon. The year I went to Delmon's laboratory, as a visiting professor to carry out collaboration, coincided his last year of PhD study. Professor Delmon valued him very high. I urged him to do post-doctorate research in the SKLC, and Professor Guo Xiexian appreciated him very much, appointed him a deputy director for the laboratory. Zhou Bing could speak very good French, but he thought there was room of improvement for his English, and wanted to go to an English-speaking country, so that he could better use his ability. Later he went to Canada and then America, and did some outstanding work there, invented platinum nanowire catalyst to synthesize hydrogen peroxide and industrialized the process, which won him an (American) Green Chemistry Presidential Prize (Doctors Zhou Zhenhua and Wu Zhihua of ours involved in this work). He was elected as Chairman of Regional Chemical Society in New Jersey, due to his academic authority, and co-authored a few treatises with Professor G. A. Somorjai of University of California, Berkeley. When we were bidding for hosting ICC at the 13th ICC, he paid for a dinner, inviting members of the International Catalysis Council, including Zhang Tao and Bao Xinhe, so that they could increase the mutual understanding. Afterwards he did quite some co-operations with us on the direct alcohol fuel cell catalyst, made a big contribution for the improvement of our laboratory.

8. There's still a long way to go

Graphical Abstract

Chin. J. Catal., 2019, 40: 1615–1626 doi: S1872-2067(19)63482-0

An odyssey: The Way Chinese catalysis towards the world

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With the careful planning and arrangements by the Chinese catalytic elites, the quadrennial grand event in the international catalytic world—the 16th International Congress on Catalysis (ICC) was successively held in Beijing presentations indicating the frontiers of the catalytic science and the magnanimity of the organizers. This paper reviewed the development of catalytic science and technology of China from scratch to small then to large under the efforts of several generations.

With nearly a century's efforts, the colleagues of Chinese catalytic community have made Chinese catalytic science and technology, growing out of nothing, from small to large, a concrete big power. There is, nevertheless, still a long way to go to make us a catalytically strong power. We hope that the contemporary scientists can accomplish this historical task. See Figs. 48.

Now that at the time China is among the catalytic big coun-

tries, we must still remember the wise saying of Professor Min Enze:

"To make China a catalytically strong country, there is still a long way to go."

Where is the way?

It is under foot!

Make concerted effort, lay a solid foundation, increase original creativity.

中国催化界走向国际学术舞台的艰辛历程

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摘要: 2016年7月中国成功举办了十六届国际催化大会。本文回顾了中国催化界几代人通过不断努力将中国催化科学技术从无到有, 从小到大发展成催化大国的艰辛历程。上世纪五十年代由吉林大学, 北京大学, 厦门大学首先设立催化学科培养了早期催化专业人才。随后在高等院校, 科学院和企业研究院所形成了庞大的研究团队, 开展了大量的催化研究。随着中国改革开放, 科学的春天来临, 国家对科学的重视和支持加强, 中国催化界同仁走向国际催化学术交流平台进入新阶段。邀请国外知名科学家访问中国, 同时, 向美国, 欧洲, 日本派出大批访问学者, 留学生, 许多人已成为知名教授, 现已成长为栋梁之才和催化学术界的精英。1982年开始, 我国举办国际会议中日美催化会议, 现该会议发展成亚系列亚太会议, 成为世界三大地区催化会议之一。经过几代人三次申办最终获得国际催化大会的主办权, 有力地推进了中国催化学术界走向国际学术界并提高了中国在国际催化界的影响力。催化大国发展历程凝聚了几代催化人的努力, 我们还要向催化强国努力, 这仍有很长的路需要年轻人去奋进。

关键词: 中国催化; 十六届国际催化大会; 国际催化学术交流平台; 影响力

收稿日期: 2019-08-17. 接受日期: 2019-08-25. 出版日期: 2019-11-05.

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本文的电子版全文由Elsevier出版社在ScienceDirect上出版(<http://www.sciencedirect.com/science/journal/18722067>).