

# 绿色化学

第一届国际绿色化学高级研讨会文集

主编 朱清时

中国科学技术大学出版社

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合肥·1998

# **GREEN CHEMISTRY**

## **Proceedings of First International Workshop on Green Chemistry in China**

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# **First International Workshop on Green Chemistry in China ( 1st IWGC )**

## **Sponsored by**

National Committee of Science and Technology of China

National Foundation Committee of Natural Science of China

Education Department of China

Chinese Academy of Sciences

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Massachusetts Institute of Technology, MA, U.S.A.

## PREFACE

The First International Workshop on Green Chemistry (1<sup>st</sup> IWGC) was held in Hefei/Jiuhua Mountain, China, from May 5 to May 10 1998. The Workshop was sponsored by the National Committee of Science and Technology of China, National Foundation Committee of Natural Sciences of China, National Education Committee of China, Chinese Academy of Sciences, and the University of Science and Technology of China. About 80 participants from the United States, the United Kingdom, Russia and the People's Republic of China attended this workshop.

More than 80 talks were given in this workshop including 10 invited lectures and more than 70 contributed papers. The contents were extensive and the topics included alternative reaction conditions, environment-friendly materials, zero emission and alternative reaction path. They covered recent developments in the most research field of green chemistry. We feel it a pity that some excellent invited talks could not be included in this proceedings for some reasons, such as the excellent talks given by Dr. Paul Anastas 'An Overview of Green Chemistry in The United States', Prof. Shengming Ma 'Green Chemistry and Organic Synthesis' and Prof. Yizheng Zhang 'Green Chemistry in High Efficient Utilization of Resources'.

We gratefully acknowledge the support of K. C. Wong Education Foundation, Hong Kong.



## OPENING SPEECH

Ladies and Gentlemen:

The First International Workshop on Green Chemistry now begins. On behalf of the University of Science and Technology of China (USTC), I would like to take this opportunity to extend my warmest welcome to the experts from overseas and from domestic universities, and the research institutes of the Chinese Academy of Sciences.

We are greatly honored to have Mr. Ji Kunsheng, the Vice-chairman of the Standing Committee of Anhui Provincial Congress, and Mr. Jiang Zuojun, the Vice-governor of Anhui Province, with us for the opening ceremony. They will make wonderful speeches in a moment. As one of the co-chairman, Mr. Jin Duo, the Director of the Basic Research Bureau of the Chinese Academy of Sciences is with us for the opening ceremony too. We also have the presence at the ceremony of the other USTC leaders and some academicians of the Chinese Academy of Sciences.

We will enter the 21<sup>st</sup> century in a year and seven months. Every person who loves chemistry is considering such a question: what will the chemistry be like in the 21<sup>st</sup> century? Different people have different answers to the question, but all the answers will have one thing in common: the chemistry in the 21<sup>st</sup> century must be greened. Namely, it will not cause any more pollution to environment; instead it will develop harmoniously with environment. We have only one earth. Every single one of us should value it.

It's a great honor for USTC to sponsor the First International Workshop on Green Chemistry in China. In addition to 10 invited lectures, there are also over seventy speeches on special topics. This reflects that emphasis has been laid on green chemistry in China, and with research fundamentals to a certain extent.

The American Society of Chemistry has laid much emphasis on this workshop. Dr. Paul H. L. Walter, the Chairman of the Society, has sent a congratulation letter to the workshop. Dr. P. Anastas of the US Agency of Environmental Protection has come to join us for the meeting. I fully believe that this workshop will play an active role in strengthening the international cooperation on the research of green chemistry in addition to the exchange of the newest research achievements in this respect.

May the First International Workshop on Green Chemistry be a great success! Best wishes to the health of all the experts and representatives for the workshop! Wish you a good time in Hefei and Chizhou!

Zhu Qingshi  
President of USTC

## GREETING TALK

By *Ji Kunsheng*

Distinguished experts, Professors, comrades and friends,

It is a great, new and very important event that the First International Workshop on Green Chemistry is convened at the University of Science and Technology of China. On behalf of the Standing Committee of Anhui Provincial People's Congress, I wish to convey my hearty congratulations on the opening of this conference, extend a warm welcome to the presence of the experts and professor from home and abroad, and congratulate beforehand on a complete success of this grand conference.

Human society is faced with four serious problems of population, food, environment and energy. Over a long period of time, we have achieved economic profits through the way of economic growth with the conquest of nature. The ecological background which human economic development can not be separated from is ignored. It resulted in the excessive consumption of the resources and the serious pollution of the environment. As a result, human being falls into the predicament that it is difficult to ensure a sustained development. The increasingly serious problem of environmental pollution impelled human being to come up with the idea of sustained development. In July of 1992, the United Nations put forward the strategy of sustained development on "Environment and Development Conference" held in Rio de Janeiro, Brazil. On the conference, the heads of governments of more than 100 countries unanimously undertook to take the strategy of sustained development as a long-term and common strategy of development. Sustained development has become the tendency of the day and the general trend of world development. Our nation put forward the two strategies of rejuvenation of China through science and education and sustained development on the Fifth Plenary Session of the 14<sup>th</sup> Central Committee of the Chinese Communist Party. In July 1995, on the 6<sup>th</sup> conference of the Communist Party Anhui Province put forward the three grand strategies of development of Anhui Province through science and education, promotion of the work as a whole through export-oriented economy and sustained development. In my opinion, the convening of the first international workshop on green chemistry in Anhui Province, China, is a strong action to respond to the Rio declaration. It's the specific embodiment of implementing global sustained development strategy. And it is a concrete step to carry out the spirit of the 5<sup>th</sup> plenary session of the 14<sup>th</sup> central committee of the Chinese Communist Party and China's 21<sup>st</sup> century agenda. I believe that the achievements on this conference is

to exert an active and profound influence on the development of green chemistry of our province, our country and even the world for the realization of sustained development.

One month ago, I was still in charge of Chizhou Prefecture, Anhui Province. The prefecture is taken as the other site of this conference. It's the first national demonstration region of eco-economy and an area among 16 regions for implementing a pilot project under China's 21<sup>st</sup> Century agenda. In 1988 when Chizhou prefecture was just formed, only 28.6 percent of its area was covered by forests. To the end of 1997, the forest coverage was 54.1 percent. It registered an increase of 25.5 percent in 9 years, an average increase of 2.83 percent every year. The rapid economic development has not destroyed the ecological environment. Instead, the economic structure has been optimized. Not long ago, member of the Political Bureau of Chinese Communist Party's Central Committee, Vice Chairman of the Standing Committee of the Nation People's Congress, Mr. Jiang Chunyun spoke highly of it and regarded it as a miracle during his work inspection in Chizhou. For many years, after constantly deepening understanding of the situation in Chizhou, constantly making a thorough investigation and study of the circumstances and tendency at home and abroad, and constantly thinking deeply and investigating the way of development in Chizhou, we have made the significant decision to develop eco-economy and take the road of sustained development. Chizhou prefecture was approved by the nations as China's first national demonstration region of eco-economy, and then as an area for implementing a pilot project under China's 21<sup>st</sup> century agenda. It's advancing orientation of Development direction of Chizhou prefecture that Chizhou prefecture is a pilot area for implementing China's 21<sup>st</sup> century agenda and a national demonstration region for developing eco-economy. It is also a leap in the process of cognition which can bring new opportunities for developing Chizhou prefecture. Here, I would like to express my particular gratitude to Professor J.I. Steinfeld from Massachusetts Institute of Technology, and Professor Zhu Qingshi, academician of Chinese Academy of Sciences. In July 1995, Professor Zhu Qingshi accompanied Prof. J. I. Steinfeld to make an investigation of Jiuhua Mountain, Chizhou prefecture. When talking over ecological environment protection, I put forward the idea of developing the whole area of Chizhou prefecture into a macro industrial development zone for environmental protection. The two professors fully affirmed my idea and expressed support. Their support has heightened our confidence and resolution. The objective, direction and essence are consistent in implementing China's 21<sup>st</sup> century agenda and in constructing the national demonstration of eco-economy. Both key ideas are sustained development. Through developing highly effective eco-agriculture (mainly organic food industry), eco-tour, feature tour, clean production, environmental protection industry, after many years systematic development, we will gradually construct Chizhou prefecture into a developed region with beautiful environment in which agriculture, industry and commerce

are closely integrated and tourism is thriving. That is blue sky and water, clean earth, fresh air and developed economy as long as Chizhou Prefecture continues to take this way. We can say that it is sure to promote sustained development of China and even the world. For this reason, I sincerely wish that all of you give your attention, support and assistance to the development of Chizhou.

As long as we make scientific use of resources, protect and optimize ecological environment, we have all the reasons to believe that human society can be assured sustained development. It's because the earth ecological system has the capacity of rejuvenation to continuously form and maintain the dissipation structure of human economy system. The new idea of sustained development put forward in the Environment and Development Conference held in Rio de Janeiro embodies the global common understanding about the cooperation in the field of environment and development and reflects the summit political promises. Human destiny brings every nation in the world closely together. The era is calling sincere cooperation all over the world. The famous British writer, Bernard Shaw spoke a paragraph of wonderful words about human idea communication. He said, "Human's communication of ideas is different from exchange of apples. After two people exchanged apples, each one still got one apple on his hand. But after communication of ideas between two persons, each person's brain has two ideas". This conference is a very good communication of ideas. As long as the people all over the world hand in hand meet the challenge human being is faced with, I think we are bound to create the glory of human future.

Thank you.

Ji Kunsheng  
Vice-Chairman of the Standing Committee  
of Anhui Provincial Congress

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