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The Preface
Tribute to Professor Hong-Yuan Chen

This year is the 80th birthday of Professor Hong-Yuan Chen, Academician of Chinese Academy of Science (CAS). This special issue in the ***Journal of Electroanalytical Chemistry*** is therefore dedicated to Professor Chen in honor of his significant achievements and great contributions to electrochemistry and analytical science as well as in celebration of his 80th birthday. The authors of this special issue include Professor Chen's students and collaborators all over the world from Canada, China, France, Germany, Japan, Sweden, United States and etc. As electroanalytical chemists, we would like to express our deepest appreciation and heartfelt thanks to Professor Chen for his creative accomplishments and earnest instructions. During all the past years, Professor Chen has devoted himself to exploreing new areas in electrochemistry, and to cultivating young talents in electrochemical research.

Professor Chen graduated from the Department of Chemistry at Nanjing University in 1961. From 1981 to 1984, he worked as a visiting scholar at the University of Mainz in West Germany, and achieved several German research foundations including Deutsche Forschungsgemeinschaft (DFG), Deutscher Akademischer Austauschdienst (DAAD), VW-Stiftung and etc. During 1991 to 1994, he was selected and acted as a committee member of the International Union of Pure and Applied Chemistry (IUPAC). He has been the Editor of *Journal of Analytical Science* and the *Associate Editor of Science China Chemistry*, *Chemical Journal of Chinese Universities* and other notable journals. He has been the advisory board member for *Analytical Chemistry* and *ACS Sensors*. He won the National Scientific Conference Award (1978), the Prize of National Natural Science Awards (3rd class in 1982), the Prize of the Ministry of Education Natural Science Award (1st class in 2001 and 2006) and the Prize of National Natural Science Awards (2nd class in 2007). For his outstanding contributions, Professor Chen was elected as an Academician of Chinese Academy of Science (CAS) in 2001. In the year of 2015, Professor Chen is one of the two recipients of Nature Lifetime achievement awards and other notable journals. Nature publishing group launched its annual awards for outstanding scientific mentorship and focused on a specific country or countries each year. Currently, Professor Chen is both the Director of Institute of Analytical Science and the Institute of Chemical Biology at Nanjing University. To date, he has authored and co-authored over 810 papers (177 published in Chinese journals) with citations of over 22000 times with an H-index of 75, 15 patents and 8 books.

Prof. Chen's research interests include a wide scope of electrochemical biosensing, bioelectrochemistry, ultramicroelectrodes, biomolecular-electronic devices, mass spectrometry, and the single cell/particle/molecule analysis. As the founder for one of the earliest nanoanalytical research groups in China, he has introduced nanotechnology and biotechnology into the electrochemistry field and has conducted substantial experimental and theoretical studies toward various life-related issues. He is always making the effort to develop advanced analytical techniques with new strategies for novel applications. Professor Chen is

a pioneer in the field of analytical chemistry for life science in China, and established the State Key Laboratory of Analytical Chemistry for Life Science in Nanjing University, which is the first institute named after the concept of "Analytical Chemistry for Life Science" in the world.

This special issue is especially dedicated to Professor Chen in celebration of his 80th birthday as well as in honor of his remarkable achievements. With excellent contributions from his collaborators, his colleagues and his previously supervised students, this issue will introduce readers the most cutting-edge developments on electroanalytical chemistry.

More details will be found in the following foreword short interview with Professor Hong-Yuan Chen as well as his publication list.

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1. An Interview with Professor Hong-Yuan Chen By Wei-Wei Zhao / Jing-Juan Xu / Dan-Ke Xu

1.1. Please talk a little bit about your early research experience?

In 1960s, I graduated from Nanjing University and started my career as a young teacher in the division of analytical chemistry. My supervisor, Professor Hong Gao, told me that an analytical chemist should have solid knowledge of mathematics, physics and applied electronics. He assigned me to do the full-time study of mathematical physics, radio electronics, pulse technology and some other courses. Such experiences helped me to build solid technical basis that benefited a lot in my thinking way and research work. In 1963, I published my first paper "Catalytic current theory of AC polarography" in the Journal of Nanjing University by the strong recommendation of Professor An-Bang Dai. Then, due to the shortage of funding, I had to develop the indispensable instruments by myself to meet the needs of electrochemical researches. As a result, my developed two quality products, i.e., "linear sweeping oscillopolarography" and "bidirectional rectifier vibration square wave polarography" which were also selected for the "Exhibition of Scientific Research Achievements of Key Universities" organized by the Ministry of Education of China in 1965.

In 1978, Professor Gao and I got the "National Science Conference Award of China" because of our achievements in the modern polarography theory. In early 1980s, I was sponsored by the government to study abroad in West Germany under the guidance of Professor Rolf Neeb, one distinguished electroanalytical chemist in the world. In his group, based on my own experimental results, I deduced a general theoretical formula on the temperature effect of various polarographic processes. He appreciated my work very much and called the formula as "Chen's equation". In January 1984, I finished the study in Germany and returned to China. In my independent research in Nanjing University, I focused on the fundamental investigation on the microelectrode and its application for the electrochemical detection of biological substances. These efforts had laid the foundation for the early development of "Analytical Chemistry for Life Science" in Nanjing University in the later years.

1.2. You have firstly present the concept of "Analytical Chemistry for Life Science" in China, what is the connotation of "Analytical Chemistry for Life Science"?

As you know, "Analytical Chemistry" studies the materials component, structure, content as well as their distribution in different states and under the processes of evolution. This newly presented concept, "Analytical Chemistry for Life Science", is the advancement of the "bioanalytical chemistry", and it is the result of interdisciplinary combinations. However, its research objects, targets and methodologies are distinguished from the latter, with its emphasis more on the transit and dynamic interaction in the life systems. It demands sensitive, selective, accurate, fast monitoring of molecular recognition events and thereby the acquirement of important information in the life activities. We have first established the "State Key Lab of Analytical Chemistry for Life Science" in Nanjing University. Now, this concept has been well-received by the analytical community, and many related labs that named after this concept have been established in China. By the way, this concept is still in developing, and its connotation is also evolving continuously.

1.3. What are your current research interest?

My current research interest focuses on the development of innovative bioanalytical techniques based on the ideal fusion of electron transfer, energy conversion, as well as other intrinsic properties of matters, aiming for the single-cell, single-particle and single-molecule analysis with high spatio-temporal resolution.

1.4. What is the most impressive piece of your work?

In the fundamental research, my group have made some innovation. For example, we have introduced the concepts of "shielding effect" of the diffusion layer on microelectrode array, and a corresponding formula to calculate the shielding factor was also developed (J. Electroanal. Chem., 1992, 341, 35-46). This result has been included to the official IUPAC technical report entitled "Microelectrodes: definitions, characterization and applications" (Pure Appl. Chem., 2000, 72, 1483-1492). Besides, we proposed the concept of "steady reaction-diffusion layer" (J. Electroanal. Chem., 1993, 346, 29-51), which has provided a perfect solution to describe the chemical homogenous coupling reactions on microelectrode and the steady current in complex multistep processes on electrode. This result had been included in the classic text book of "Electrochemical Methods: Fundamentals and Applications" (By Allen J Bard & Larry R. Faulkner). In short, many of my basic studies have been applied for the studies of analytical chemistry for life sciences in past years.

1.5. What is your experience in mentoring and fostering scientific creativity?

In my opinion, simply teaching the students with knowledge is not enough. A supervisor should also train them in way of scientific, logic and also instinctive thinking, and even reverse thinking. In addition, everyone should have his/her own mind, and I encourage them to find opportunity and solve problem independently. A responsible director has to respect his peers and students as well as inspire them to do research creatively. Besides, a good supervisor should be people oriented. Each student has different background and ability; therefore it is necessary to make different guidance. For students who just started to do research, we need to give them more detailed instructions to help them get used to the research environment gradually. Regarding the fellows who have solid knowledge base, strong independence and creativity, I choose to let them think and practice in their own ways, and give them some suggestions at key points. My mentoring goal is to enable the students to show their talents not only in my lab, but also in their future careers.

Publication List of Professor Hong-Yuan Chen

[1] H.Y. Chen, R. Neeb, Bestimmung des cobalts neben nickel und anderer metallen durch differentielle pulse-polarographie in citrathaltigen dimethylglyoximlosungen, Fresenius Z Anal. Chem. 314 (1983) 657–659.

[2] H.Y. Chen, R. Neeb, Zur temperaturabhangigkeit polarographischer strome, Fresenius Z Anal. Chem. 319 (1984) 240–247.

[3] H.Y. Chen, R. Neeb, Untersuchungen zum polarographischen verhalten des rheniums in perchlorsauren losungen, Fresenius Z Anal. Chem. 320 (1985) 247–251.

[4] G.W. Zou, R.R. Shi, X.M. Xie, H.Y. Chen, Determination of hydroquinone and metol in photographic developer by by reversed phase ion-pair chromatography with amperometric detection, Anal. Chim. Acta 208 (1988) 337–342.

[5] H.Y. Chen, H.Q. Fang, H.X. Ju, H.B. Li, R. Neeb, Study on the determination of trace rhenium(VII) by the adsorption differential pulse polarography, Acta Chim. Sin. 5 (1989) 412–421.

[6] H.Y. Chen, J.L. Han, H. Gao, Study of alternating current adsorptive stripping voltammetry in flowing system for determination of ultratrace amount of folic acid, Fresenius Z Anal. Chem. 334 (7) (1989) 621.

[7] J.L. Han, H.Y. Chen, H. Gao, Alternating current adsorptive stripping voltammetry in a flow system for the determination of ultratrace amounts of folic acid, Acta Chim. Sin. 252 (1991) 47–52.

[8] X.M. Shen, H.Y. Chen, H. Gao, Investigation on i_f -E curve in cyclic derivative chronopotentiometry V. Theoretical equation of i_f -E curves in the case of quasi-reversible and irreversible electrode reaction, Chem. Res. Chinese. U. 8 (2) (1992) 71.

[9] X.M. Shen, H.Y. Chen, H. Gao, Investigation on i_f -E curve in cyclic derivative chronopotentiometry VI. A microcomputer-based date acquisition system for i_f -E curve measurements, Chin. Chem. Lett. 3 (2) (1992) 158.

[10] Q.K. Zhuang, H.Y. Chen, The application of microelectrode to the study of multistep electrode processes under steady state conditions part I. EE mechanism, Chin. Chem. Lett. 3 (3) (1992) 217–218.