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## Editorial

# Preface to Special Issue of Chinese Journal of Catalysis in Memory of Professor Qin Xin



This special issue is dedicated to Professor Qin Xin on the occasion of one year of his passing away. This is in recognition of his unique and remarkable contributions to the application of *in-situ* molecular spectroscopy for catalysis study, the exploration of nitrides, carbides and HDS (hydrodesulfurization), HDN (hydrodenitrogenation) catalysts, and the development of efficient electrocatalysts for direct alcohol fuel cells.

Professor Xin was born in Harbin in April 1939. After graduating from the Department of Chemistry, Jilin University in 1962, he worked in Dalian Institute of Chemical Physics (DICP), Chinese Academy of Sciences (CAS) as an assistant, associate, senior, distinguished, and emeritus researcher, until he suddenly passed away in June 2020.

As the meaning of his name, Professor Xin worked diligently in scientific research and advising graduate students for 58 years. Since 1962, he had spent more than 30 years on the development of an *in-situ* Molecular Spectroscopy Laboratory, which then served as a base for the foundation of the State Key Laboratory of Catalysis (SKLC) at DICP. He also had gradually developed a series of *in-situ* characterization methods, for the catalytic studies, such as dual molecular probes, and acquired new insights into catalytic reactions. These methods have been adopted by more than 60 laboratories around the world. His main research activities and accomplishment included: pioneered *in-situ* molecular spectroscopy in catalytic studies; explored novel transition-metal nitrides and carbides; *in-situ* characterized oxo-species in mixed oxide catalysts; and deep investigated HDS and HDN catalysts.

In late 1998, Prof. Xin initiated his collaboration with Prof. Baolian Yi, to pioneer the direct methanol fuel cell research, and they founded the direct alcohol fuel cell (DAFC) lab at DICP. Later, Prof. Xin and Prof. Gongqun Sun led a research team to explore novel electrocatalysts and electrodes for both cathode oxygen reduction reaction and anode alcohol oxidation and to develop direct methanol fuel cell systems. His main contributions to this field are: 1) discovered that multi-walled carbon nanotubes are a better support than conventional

carbon black for fuel cell electrocatalysts, 2) found PtSn is the best bimetallic catalysts for ethanol oxidation in acid electrolytes. A number of publications from his group strongly impacted the field and were heavily cited. Prof. Xin made significant contribution to the catalyst development of direct methanol fuel cell systems, and the DMFC team finally won the Second Prize of National Natural Science Award in 2015.

Professor Xin had been devoted his whole academic career in scientific adventure, mentoring a considerable number of students who are now active in research, teaching and advising teaching and research. He made prominent contributions to basic research on *in-situ* spectroscopic characterization of catalytic reactions, new catalytic/electrocatalytic materials, direct alcohol fuel cell catalysis, and promoted the level of Chinese catalysis research to the same level as those in advanced countries around the world.

Professor Xin won numerous honors and awards. These include: Outstanding Achievement Award in Science and Technology, Chinese Academy of Sciences, 2016; Second Prize of National Natural Science Award on “Fundamental Research in Electrocatalysts for Direct Alcohol Fuel Cells”, 2015; The Second prize of National Invention Award on “the Development of UV-Raman spectroscopy for study of heterogeneous catalysis”, 1999; and Golden Bull Award for his contributions to “Fundamental Catalysis Research”, 1994.

Professor Xin also held a number of academic positions and actively promoted academic activities and exchanges. He served as the secretary of the Catalysis Society of China, the Editorial Board member for *Chinese Journal of Catalysis*, *Spectroscopy and Spectral Analysis*, *Journal of Molecular Catalysis*, *Functional Materials*, *Journal of Industrial Catalysis*; Guest Editors for *Chinese Journal of Catalysis*, *Electrochimica Acta*. He was also an affiliated professor for University of Chinese Academy of Sciences, Jilin University, Liaoning Normal University, Liaoning Shihua University, Qingdao University of Science and Technology.

Professor Xin always gave his advice “conducting research steady and sure” to his graduate students and postdoctor

researchers. He certainly put these words into practice in his own life and made remarkable contributions to promote heterogeneous catalysis and electrocatalysis research in China.

Professor Xin realized the importance of the international academic exchange and cooperation at the earliest time. He had presided over five international cooperation programs, such as that between Louvain-la-Neuve Catholic University (Belgium) and the DICP, CAS. He also encouraged his colleagues and graduate students to collaborate with researchers around the world, and he built research connections with researchers from Belgium, Spain, Greek, Japan, and South Korea. He devoted himself to promote the Chinese catalytic academic circles to the international academic ones, improve the influence of catalysis communities in China significantly, and boost China among the catalytic big countries.

In the time of one year Professor Xin passed away, this special issue in memory and honor of his significant contributions to Chinese catalysis research, and carrying forward his spirit of “conducting research steady and sure”, includes 24 invited articles contributed by his former graduate students, collaborators, colleagues, and friends. These articles reflect his research interests and fields, and demonstrate the recent progresses made *in-situ* dynamic characterization, new catalytic materials, and electrocatalysis.

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