

## Preface

“Creativity is the soul of a nation and an inexhaustible source of a country’s prosperity.” Original innovation, as the major source of new technologies, will not only bring about technological breakthroughs, but give rise to new industries and new economic structures, offering unlimited opportunities for later starters to overtake the frontrunners. “Innovation in Chemistry” is the specific theme for the 40<sup>th</sup> International Union of Pure and Applied Chemistry (IUPAC) Congress, which was held on 14–19 August 2005 in Beijing, China. The Congress provided an excellent forum for presenting the latest innovative achievements in the chemical sciences and in the practice of chemistry.

A total of 1083 participants from 64 countries attended the Congress. With 412 of the participants from mainland China and 556 from other countries and regions, the Congress helped to build a bridge between Chinese chemists and the world, encouraging cooperation and excellence in fundamental research and industrializations.

The high-scientific value of the Congress was evident in the plenary lectures, which were delivered by eight distinguished chemists, including three Nobel Laureates and one Einstein Award Winner. A total of 1145 papers and 622 posters were presented in the eight sessions of the Congress: (1) Environmental Chemistry and Green Chemistry; (2) Chemistry in the Life Sciences and Chemical Biology; (3) Materials Chemistry, Supramolecular Chemistry, and Nanochemistry; (4) Information Technology in Chemistry and Computational Chemistry; (5) Innovation in Physical Chemistry and Biophysical Chemistry: Research Methods and Techniques; (6) Innovation in Methodology, Technique, and Instrumentation and Analytical Chemistry; (7) Innovation in Chemical Education and Teaching Methods; (8) Innovation in the Chemical and Petrochemical Industries and “Responsible Care” for Society.

Fourteen papers selected from the plenary and invited lectures from the 40<sup>th</sup> IUPAC Congress are published in this special issue of *Pure and Applied Chemistry (PAC)*, which cover a spectrum from theoretical chemistry to chemical engineering, from micro/nanoscale studies to industrial-scale process/equipment evaluations. The review on the study of single molecules and their assembly provides a comprehensive, up-to-date summary of the field based on the fundamental research; much of the information presented falls within the special expertise of the group. The paper on the superheavy element describes the latest developments in a field that has shown higher activity in recent years as the predicted “island of stability” comes within the reach of the available hardware. This area is always of special interest to international scientists owing to the special synthesis techniques for superheavy elements employed by the Dubna group. Green chemistry is becoming a characteristic area in China that plays a significant role in motivating the development of new synthetic techniques, such as cross-dehydrogenative coupling. Other papers in this issue address a variety of topics from novel instrumentation for electrochemical impedance spectroscopy to synthesis of oxide nanomaterials; from catalysts to waste water treatment. These papers give a snapshot of the research reported at the 40<sup>th</sup> IUPAC Congress. I sincerely hope that this special issue of *PAC* brings some fresh ideas, novel concepts, and useful data to the readers.

The International Organizing Committee contributed to the shaping of an important area of emerging science and technology. Thanks and appreciations are due to the Local Organizing Committee for the efficiency and excellence of the local arrangements and for the gracious hospitality. I am grateful to those who contributed their latest research work to this issue, and the support from Dr. John W. Jost, IUPAC Executive Director.

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President of the Chinese Chemical Society,  
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