



PREFACE

**110 years of Physical Chemistry at the University of Belgrade**



This issue of the *Journal of the Serbian Chemical Society* is dedicated to the celebration of the 110 years of Physical Chemistry at the University of Belgrade. To commemorate this special occasion, we have asked some of our distinguished colleagues to contribute to this issue in their respective subfields of Physical Chemistry. We attempted to ensure that these contributions spanned a range of different institutions, most of which are situated outside of Serbia. The contributions were submitted by former students of the University of Belgrade. A portion of the space in this issue was reserved for contributions from several young authors from the Faculty of Physical Chemistry. I take this opportunity to thank sincerely all the contributors on behalf of the Faculty of Physical Chemistry.

As a discipline, Physical Chemistry started to mature in the second half of the 19<sup>th</sup> century. In fact, Physical Chemistry was first mentioned in 1752 in Lomonosov's lectures to the students of St. Petersburg University entitled "A Course in True Physical Chemistry" («Курс истинной физической химии» in Russian), but its modern concepts date back to the second half of the 19<sup>th</sup> century, when the first articles on chemical kinetics and thermodynamics commenced appearing in scientific journals. Around the same time, some of the classical terms in Physical Chemistry, such as chemical potential and phase rule, were introduced. Key researchers in the area at that time were J. W Gibbs, K. K. Onnes, S. A. Arrhenius, J. H van't Hoff and W. Ostwald. In 1887, Ostwald founded the first scientific journal in the area of Physical Chemistry, *Zeitschrift für physikalische Chemie*. This early history of Physical Chemistry should also include the studies that contributed to the discovery of radioactivity – initiated in France by H. Becquerel in 1896 and later followed by Pierre and Marie Curie. Some authors would argue that these contributions would better fit into the history of nuclear chemistry, but at the University of Belgrade, nuclear chemistry

was traditionally considered a part of Physical Chemistry – in fact, as its most important component during several decades.

Physical Chemistry is a science whose unique conception combines knowledge of chemistry, physics, and mathematics, with the overarching goal of answering some of the very basic questions of chemistry: how and why do chemical reactions occur, or what is the structure of matter.

Belgrade's Great School, as the University of Belgrade was called until 1905, included enough visionaries to realize the importance of this young scientific discipline, and Physical Chemistry was included in the *Curriculum* as early as 1903. In 1903, Dr. Miloje Stojiljković, who obtained his doctorate at the University of Geneva, was elected as a Docent of Physical Chemistry in the Section for Natural Sciences and Mathematics of the Faculty of Philosophy at Belgrade's Great School. Since then, instruction and research in Physical Chemistry have continued uninterrupted to the present day. Initially, the home for physical chemists was the Faculty of Philosophy, then the Faculty of Natural Sciences and Mathematics, and finally, since 1990, the Faculty of Physical Chemistry as the home institution. During the academic year 1925/26, the Section for Technology of the Technical Faculty (today the Faculty of Technology and Metallurgy) elected Panta S. Tutundžić to be a Docent of Physical Chemistry and Electrochemistry. In 1926, he founded the Laboratory of Physical Chemistry and Electrochemistry, which still exists today. A significant contribution to the instruction in Physical Chemistry has also been provided by the Faculty of Pharmacy. Since 1939, Pavle Savić taught physical chemistry at what was then the Section of Pharmacy of the Faculty of Medicine. The University of Belgrade also constituted a nucleus for the development of physical chemistry at other universities in Serbia and Yugoslavia.



Prof. Miloje Stojiljković



Academician Pavle Savić



Academician Panta Tutundžić

Many of us best know Mihajlo Pupin for his invention of the so-called Pupin solenoid, which allowed improved transmission of telephone signals. Much less known is the fact that he was the first physical chemist from the Balkans; in 1889, he defended his doctoral dissertation in Physical Chemistry on the topic of osmotic pressure in Berlin under the supervision of Herman von Helmholtz.

One of the key figures in the development of Physical Chemistry, especially in the period after World War II, was certainly Prof. Pavle Savić. In the 1930s, working in Paris with Irène Joliot-Curie, who by then was already a Nobel Laureate, he made a key contribution to one of the most significant scientific discoveries in history – nuclear fission. He taught Physical Chemistry (at the Faculty of Medicine before World War II, and at the Faculty of Natural Sciences and Mathematics after it), he founded the Vinča Institute of Nuclear Sciences, and acted as the president of the Serbian Academy of Sciences and Arts (SASA) between 1971 and 1981. As Physical Chemistry was traditionally oriented towards fundamental research, a number of physical chemists were always members of SASA at any given time in its history. In addition to Pavle Savić, whose focus in teaching and research was nuclear chemistry, Professors Milenko Šušić (electrochemistry and general physical chemistry) and Slobodan Ribnikar (chemistry of isotopes and spectrochemistry) from the Faculty of Physical Chemistry were also Academy members. Furthermore, Professors Panta Tutundžić, Aleksandar Despić and Dragutin Dražić, all from the Faculty of Technology and Metallurgy, also worked on and made significant contributions to Physical Chemistry, with particular focus on electrochemistry. Professor Aleksandar Despić was also the president of SASA between 1994 and 1998. The establishment and development of individual subfields of physical chemistry owes much also to Professors Slobodan Ristić (spectrochemistry) and Slobodanka Veljković (chemical kinetics



Academician Milenko  
Šušić



Academician Aleksandar  
Despić



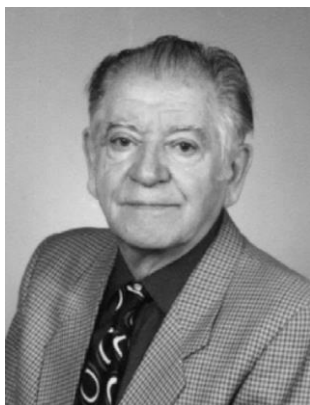
Academician Slobodan  
Ribnikar

and reaction mechanisms). Outstanding contributions are also made by Professor Ivan Draganić, whose work in the field of radiation chemistry at the Vinča Institute of Nuclear Sciences resulted in very significant contributions to the radiation chemistry of water.

During the past decades, Physical Chemistry at the University of Belgrade has developed in parallel under the auspices of several institutions. The Faculty of Physical Chemistry is the main teaching venue and is active in research spanning the fields of electrochemistry, nuclear chemistry, quantum chemistry, chemical kinetics, thermodynamics, spectrochemistry, biophysical chemistry, environmental physical chemistry, *etc.* The traditional strengths of the Faculty of Technology and Metallurgy are the fields of electrochemistry and the physical chemistry of materials (especially macromolecules). For more than six decades, the Vinča Institute of Nuclear Sciences has been developing physical chemistry through research in the fields of isotope chemistry, spectrochemistry, mass spectrometry, radiochemistry, radiation chemistry, chemistry and analysis of nuclear materials, surface chemistry, energy conversion, *etc.* Significant contributions to the teaching and science of Physical Chemistry are also being made at the Faculty of Pharmacy, mainly in the areas of interest to pharmaceutical studies, and most directly through the work at the Center for Physical Chemistry and Instrumental Methods.

The mission of the Faculty of Physical Chemistry, University of Belgrade, is to provide the highest possible quality of instruction for its students at BSc, MSc and PhD levels, including training in the specialized areas of forensic science, radioecology, instrumental analysis, biosystems and radiation. Our goal is to create graduates whose quality is globally recognized. We are delighted to see the success of this strategy as graduates from the Faculty of Physical Chemistry, University of Belgrade, can be found in the most established world laboratories at the Universities of Oxford, Bonn, Heidelberg, Berlin, Eindhoven, Moscow State University, UC Berkeley, UC Santa Barbara, Argonne National Laboratory, University of Dnjepropetrovsk, CWRU Cleveland, Brookhaven National Laboratory, Mayo Clinic, Karolinska Institute, École Central Paris, as well as numerous other institutions in the USA, Germany, France, Russia, Spain, Portugal, Brazil, and around the world.

What is our vision for the future? To ensure that the instruction in Physical Chemistry follows the modern trends of increased use of new technologies in the analyses of processes, chemical composition, and the structure of matter. Furthermore, there is also a tendency to combine several disciplines – chemistry, physics, mathematics, geology, biology, astronomy, hydrology – in an attempt to provide the best possible understanding of natural phenomena. Quick adoption and development of new knowledge is facilitated by new information technologies. In the future, Faculty of Physical Chemistry must follow and contribute to these tendencies, while keeping their importance in context – as new graduates



Prof. Ivan Draganić



Prof. Slobodan Ristić



Prof. Slobodanka Veljković



Academician Dragutin Dražić

should be able to not only adopt and apply modern technological discoveries, but also to develop them within our own local environment. The planning of teaching curricula will continue to learn from positive experiences in other countries, and following these worldwide trends will be facilitated by nurturing the contacts established with numerous physical chemists around the world. Their contributions to this issue of JSCS are an excellent illustration of this practice.

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