



The Editorial Preface

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Published online: 12 September 2020

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With this Special Issue of *Applied Magnetic Resonance* in memory of late Prof. Yakov Lebedev on the occasion of his 85th birthday, the journal is continuing its long-standing academic tradition of honoring scientists who had a major impact in the field of magnetic resonance. The Special Issue contains 25 papers written by Prof. Lebedev's former collaborators, colleagues, students, and friends, as well as by scientists all over the world, who appreciate his human personality and scientific accomplishments. The papers from well-known research groups provide typical examples of applications and methodological developments in physical chemistry where Yakov Lebedev has left so many distinctive footsteps. Over the years, Prof. Lebedev has mentored numerous graduate students and postdocs, many of whom are now actively working as professional scientists, be it at universities, research laboratories, industries or research institutions.

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Yakov Lebedev was born on April 22, 1935. He got his master's degree from the Moscow Institute of Physics and Technology (MIPT). He was one of the first students who graduated from the freshly established MIPT. His scientific career began as a research associate at the Semenov Institute of Chemical Physics, Moscow, in 1959 under the supervision of Academician Vladislav V. Voevodskij. In 1962, Yakov Lebedev received his PhD in Physical Chemistry, and in 1966, he was appointed Head of the Laboratory of Chemical Radio-Spectroscopy, which was later named after V.V. Voevodskij. At the same time, Yakov Lebedev got a joint appointment at his *alma mater*, the Moscow Institute of Physics and Technology, where he became a Professor of Chemical Physics in 1974. For many years, Prof. Lebedev has directed the work on chemical radio-spectroscopy in the USSR Academy of Sciences. In 1989, Prof. Lebedev was elected the Head of the Department of Kinetics and Catalysis of the Semenov Institute. He was leading this Department up until his far too early death on September 25, 1996, after several years of a valiant fight against cancer.

Yakov Lebedev focused most of his work in two directions: elementary chemical processes in the condensed phase and new methods in EPR spectroscopy. In both of these branches, his contributions have been recognized as exceptional. His discoveries in stepwise multiple kinetics of solid-phase reactions have now become part of the basic knowledge in physical chemistry. His work on radical pairs and "cage effects" in solid-state materials, including the first experimental proof of the tunneling mechanism of hydrogen-atom transfer at low temperature, has met with great interest and expanded the boundaries of our knowledge. The advanced methods of the interpretation of complex EPR spectra, as were proposed by Prof. Lebedev, have been recognized worldwide, and continue to be employed today.

In the 1970s, Prof. Lebedev started to develop the theoretical basis for completely new methods of chemical EPR spectroscopy, with special emphasis on EPR at high magnetic fields, EPR tomography and Fourier EPR spectroscopy. The high-field EPR instrumentation, built at that time under Prof. Lebedev's leadership at the Semenov Institute of Chemical Physics in Moscow, had no qualitative equivalent in terms of spectral sensitivity and resolution outside the USSR until the early 1980s. The theoretical foundation he laid for high-resolution EPR spectroscopy allowed his team to continuously expand chemical EPR spectroscopy and to collect new scientific results in radiation chemistry, photochemistry and photobiology. To this day, Prof. Lebedev's contributions continue to be widely used to solve relevant challenges in physical chemistry.

Yakov Lebedev published three monographs, two textbooks and over 320 papers in scientific journals. Although his numerous contributions to science, his innovations and extraordinary results speak for themselves—and have been recognized by many official awards including the USSR State Prize in Science and Technology (1988) and the International Zavoisky Prize (1994)—it is above all his exemplary character of human affection and sincerity, combined with his high work ethics, that led him on this continuing path of success. His *leitmotif* was always "let's not rush things" and "scientific quality first", rather than to set arbitrary deadlines or chase after them. This style of leadership has helped him a lot over the good and bad

periods of his academic life. In his extensive published work, not a single work had to be corrected later owing to inaccuracies or errors.

Prof. Lebedev was known for focusing his research on carefully thought-through experiments and constant critical checking of the results obtained. This has led to a general respect and trust in his work, attractive for national and international cooperation partners. Collaborating and interacting with him has been a privilege, allowing for enjoyable discussions on issues of science, society and humanities. It was a lasting experience to share his high standards of scientific rigor and his attention to the details of the issues when it comes to publication of the work.

Professionalism was another key feature of his personality. As a reliable manager for research and development programs, as a scholar of great merit, and as a highly respected personality, Prof. Lebedev has made outstanding contributions in his field during his distinguished academic career.

We want to thank the authors of this Special Issue who accepted the invitation and submitted their manuscripts in time, and the referees who helped to improve the manuscripts submitted. We also want to express our gratitude to the Editor-in-Chief, Prof. Kev M. Salikhov, and the Assistant Editor, Dr. Laila V. Mosina, of *Applied Magnetic Resonance* for their support and encouragement, which enabled the timely publication of this Special Issue, even under the aggravated conditions of the still ongoing Corona pandemic.

We decided to divide the 25 accepted papers by five Topics according to the main directions of Yakov Lebedev's scientific interests ordering them as follows:

1. Biology and Medical Applications.
2. Chemistry and Catalysis.
3. Material Sciences.
4. Instrumentation and Methods.
5. Theory.

Inside each Topic, the articles are ordered according to the collective decision of the Invited Editors.

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