In Memoriam
Kirill Ilyich Zamaraev (1939–1996)

Professor Kirill Ilyich Zamaraev, IUPAC Past-President, R&D Director of the Boreskov Institute of Catalysis, died on June 26, 1996. Russia and the world have lost a wonderful person, a great scientist and an eminent statesman.

Kirill I. Zamaraev was born in Moscow, Russia, on May 20, 1939 in the family of a famous soviet chemical engineer. He began his professional education at the Moscow Mendeleev Institute of Fine Chemical Technology, then moved to the Moscow Physical-Technical Institute (MPhTI) in order to improve his knowledge of chemical physics. In both these universities his rank as a student was number one.

He received a BSc degree from the MPhTI in 1963 and was awarded a PhD in chemical physics in 1966 and a DSc in physical chemistry in 1972 by the N. Semenov Institute of Chemical Physics (ICP) in Moscow (title of his doctoral thesis was ''ESR study of transition metal complexes structure and reactivity''). In 1966–1976 he made his research as a junior research fellow, a senior research fellow and then the head of a laboratory at ICP where he performed a wide set of important basic research in the fields of elementary kinetics of electron spin exchange and tunneling electron transfer on large distances, as well as of ESR and NMR application to the studies of metallocomplex catalysts. At the same time he worked as an assistant professor at MPhTI. Since the beginning of the seventies K. Zamaraev was drawn by academician N. Semenov into the studies on photocatalytic conversion of solar energy. In 1974–1975 he was the first soviet long-term visiting researcher to the Cornel and Stanford Universities as well as the University of Chicago under a Program of scientific exchange in chemistry between the USSR and the USA.

In 1976 Professor Zamaraev was elected as the corresponding member of the Academy of Sciences of the USSR and invited by academician G.K. Boreskov to join the Institute of Catalysis, Novosibirsk, as a Deputy Director. Kirill Ilyich came to Novosibirsk at early 1977 together with a large team of young chemical physicists, thus largely widening the studies of elementary catalytic reactions on molecular–atomic level through application of modern physical and kinetic instrumental methods of investigation.

In 1984 Professor Zamaraev became the Director of the Boreskov Institute of Catalysis, and since that time he was the real leader of all research and development activity of this huge (more than 1000 people in staff) institute.

From 1986 till 1992 Professor Zamaraev held the position of General Director of the large R&D association known as ''MNTK ''Katalyzator'' Group''. Since 1985 he was the Chairman of the Scientific Council on Catalysis

and its Industrial Applications of the USSR (now of the Russian Federation), being the leader of the community of specialists in catalysis of the Russian Academy of Sciences. Since 1977 he was a Full Professor of the Novosibirsk State University having the chair in physical chemistry.

During the last changes in the former Soviet Union Professor Zamaraev was in charge of serious transformations of Russian science on the way of its adaptation to a society with market economy. He participated as a leading person at the formation of a large set of Federal Research Centers of Russia, which contain now, together with the Russian Academy of Sciences, the main scientific potential of Russia.

In 1994 the status of Federal Research Center was obtained also by the Boreskov Institute of Catalysis. In 1995, according to his own will, Kirill Zamaraev left the position of the Director of the Boreskov Institute of Catalysis, remaining the R&D Director of the Institute. The background of this decision was his sincere desire to spend more time on doing deep fundamental science.

Professor Zamaraev has been honored by the Russian Academy of Sciences and international community of chemists on several occasions. In 1987 he was elected a Full Member of the Academy of Sciences of the USSR (now Russia), in 1990 a Member of the Academia Europea and a Foreign Fellow of the Indian National Science Academy, in 1995 a Foreign Fellow of the Korean Academy of Science and Technology. In 1994 he was awarded the Silver Medal of the Royal Chemical Society of Great Britain as a centenary lecturer, in 1994 the Karpinsky medal of the Chemical Society of Germany.

Since the sixties Professor Zamaraev was a member of the International Union of Pure and Applied Chemistry. In 1987–1989 he was the President of the IUPAC Physical Chemistry Division, in 1990–1993 he organized the work of Editorial Advisory Board for Monographs on Chemistry for 21st Century, was a member of the IUPAC Executive Committee and Bureau. In 1994–1995 he held the position of President of the IUPAC. In January 1996 he became the IUPAC Past-President.

Professor Zamaraev participated in the work of numerous scientific journals – Russian as well as international. He was the Editor-in-Chief of the *Reaction Kinetics and Catalysis Letters*, Regional Editor of the *Journal of Molecular Catalysis*, Member of the Editorial Boards of the journals *Catalysis Reviews*, *Catalysis Today*, *Catalysis Letters*, *Topics in Catalysis*, *Chemistry – A European Journal*, *Mendeleev Communications, Chemistry for Sustainable Development* and some other journals.

Professor Zamaraev is known for his mechanistic studies of catalysis at the molecular–atomic scale, and in particular for in situ characterization with the use of radiospectroscopy methods, i.e., electron spin resonance (ESR) and nuclear magnetic resonance (NMR). At the initial stage of his work Professor Zamaraev studied by ESR the structure of the transition metal complexes in solution and made a considerable contribution to the strategy of interpretation of complex EPR spectra of powder samples and reliable determination of EPR parameters.

He had discovered and kinetically characterized numerous electron tunneling reactions on large distances. He has performed pioneering experimental studies of reactions of electron tunneling between donor–acceptor pairs frozen in neutral matrices. He has demonstrated the possibility of electron tunneling on the distances of 15–30 Å and explored in detail the kinetics of this phenomenon in the time range from 10^{-6} to 10^{5} s. His fundamental studies of electron spin exchange in solution are also well known.

He was one of the pioneers who used the modern multinuclear solid state NMR technique for studies of the structure and the active sites on catalyst surfaces and intermediates of catalytic reactions in solutions and on solid surfaces.

He paid great attention to the study of chemistry in the second coordination sphere of metal complexes and the role of interfering interactions in the mechanisms of catalytic reactions. He was among the first to study catalytic reactions in the gas phase by ion cyclotron resonance (ICR).

The works of Professor Zamaraev in photocatalysis and design of catalytic converters of solar energy utilization, as well as on the role of photocatalytic phenomena in the global chemistry of atmosphere, are the contribution to the XXI century science and technology. The approaches developed by Professor Zamaraev towards catalysis research helped to obtain unique results that were important for catalysis fundamentals and applications.

He published three monographs and over 300 works in Russian and foreign journals.

Kirill Ilyich was a man of great heartfelt generosity, honesty, decency and kindness. He was a perceptive connoisseur of music and poetry. He really enjoyed the rare moments of contact with nature and he even celebrated his 50th anniversary with his friends climbing and hiking at the mountains.

It is not only Russian science which has missed one of their front figures but this is a tremendous loss to the international catalysis and chemistry community. He left us unfairly early. He will be missed by his many friends and colleagues.

Professor V.N. Parmon
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