
CHRONICLE

In Memory of Yuri Mikhailovich Polukarov (1927–2010)

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Outstanding scientist in the sphere of physical chemistry and electrochemistry, Corresponding Member of the Russian Academy of Sciences Yuri Mikhailovich Polukarov has passed away.

Polukarov was born in Perm into the family of professor of Perm University M.N. Polukarov. In 1949 after graduation from the university, he entered the candidate of sciences program of USSR Academy of Sciences' Institute of Physical Chemistry. At the institute, he conducted his first scientific surveys under the guidance of professor K.M. Gorbunova, defended his candidate's dissertation, and obtained the scientific rank of senior research associate.

Polukarov published more than 300 papers within 60 years of work at the institute. He managed the laboratory of structure of surface layers for more than 30 years, occupied the position of deputy research director for nearly 10 years, and from 1988 to 2002 served as director of the institute. During difficult years for the Russian science, he was able to ensure the stable work of all departments at the Institute of Physical Chemistry and maintain the key corps of highly experienced scientific personnel. Polukarov was the editor-in-chief of the journals *Elektrokhimiya* [*Russian Journal of Electrochemistry*] and *Fizikokhimiya Poverkhnosti i Zashchita Materialov* [*Protection of Metals and Physical Chemistry of Surfaces*]; for many years, he was the

editor of the information publication *Results of Science and Engineering. Electrochemistry Series*, in which he published some review works on electrochemistry of metals and alloys. Polukarov was an Associate of the International Electrochemical Society, chairman of the Moscow Branch of the Mendeleev Chemical Society, managed the interinstitutional seminar "Nanoparticles and Self-Organization Processes," engaged in teaching at the Chair of Technology of Electrochemical Productions of the Mendeleev University of Chemical Technology.

Polukarov paid significant attention to experimental method and technique from the very beginning of his scientific activity, to development of an instrumental basis for scientific research. His name is connected to the development of X-ray diffractometry as applied to electrochemical objects. His active interest in different electron microscopy methods at the institute, including scanning tunneling electron microscopy, led to its establishment. He developed methods for studying crystallization pressure, hydrogenation of metals, and the magnetic and many other physical properties of electrochemical facings. His interest in new scientific ideas and technologies was continuously profound.

In addition to his pioneering experimental works in the sphere of electron microscopy, even at the begin-

ning of his creative activity, Polukarov carried out significant theoretical and experimental research into processes of electrodeposition of alloys, which are still valuable today. Namely, at that time, the bases of this approach to these complex electrochemical processes were laid, which later made it possible to obtain a large number of new metal systems, including those that did not correspond to stable state diagrams. Some unique results were also obtained on the magnetic properties of electrochemically obtained alloys, defining development of this branch of science and engineering for many years.

Another sphere is closely connected to this: studying the formation of metastable and defect structures during electrochemical crystallization. Complex studies of imperfections in the crystal lattice in electrochemically deposited metals using various structurally sensitive methods were performed in this branch under his guidance. This series of works in led Polukarov to create the general concept of such structure formations, and in 1966 he defended his doctoral dissertation on this topic. For a long time, Polukarov also managed research under contracts with different enterprises of the electronics industry, machine-building industry, and other branches of engineering; many times, he gave reports at seminars and conferences devoted both to strictly theoretical and applied problems.

Recently, Polukarov successfully dealt with topics in the electrochemistry of nanodimensional systems, physicochemistry of mono- and multilayer metal compounds, metal glasses, and galvanic formation of alloys and composite materials.

In addition to original articles and illustrious reports at conferences, Polukarov published several fundamental review papers, stimulating research of the kinetics and mechanism of electrochemical crystal nucleation, coating structures, and the electrochemis-

try of nanodimensional systems at many Russian laboratories.

In addition to the breadth of his views and ability to see the general in the specific, Polukarov was always distinguished by the desire and ability to penetrate the essence and detail of phenomena; his curiosity has generated the definition of problems; and his rich experience has made it possible to find ways to solve this. His review in *Rezultaty Nauki* [Results in Science] (1979) on the initial stages of electrochemical crystallization of metals instigated studies into the kinetics and mechanism of electrochemical nucleation at many Russian laboratories. A present this direction is an important component of the electrochemistry of nanodimensional systems and the study of nanoclusters, adatom monolayers, and mechanisms of their formation at the atomic level.

Polukarov's outstanding human qualities—his benevolence, fidelity to principle and democracy, keen sense of humor, ability to see both advantages and disadvantages and understand other points of view while keeping his own, respect toward friends and employees—won him the solid respect and love of his students, colleagues, and friends. He always found time to train and teach young people. He could arouse in a person the desire to work, to believe in own strengths, and to achieve significant results.

The image of this wonderful person will be always remain in the memory of his students and colleagues.

The collective body of the Institute of Physical Chemistry and Electrochemistry and the editorial board of journal *Fizikokhimiya Poverkhnosti i Zashchita Materialov* express their deepest condolences to his family and relatives.

Yu.D. Gamburg and A.I. Danilov
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