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*Pro memoriam*

# The anniversary of Professor Romanas VIŠOMIRSKIS

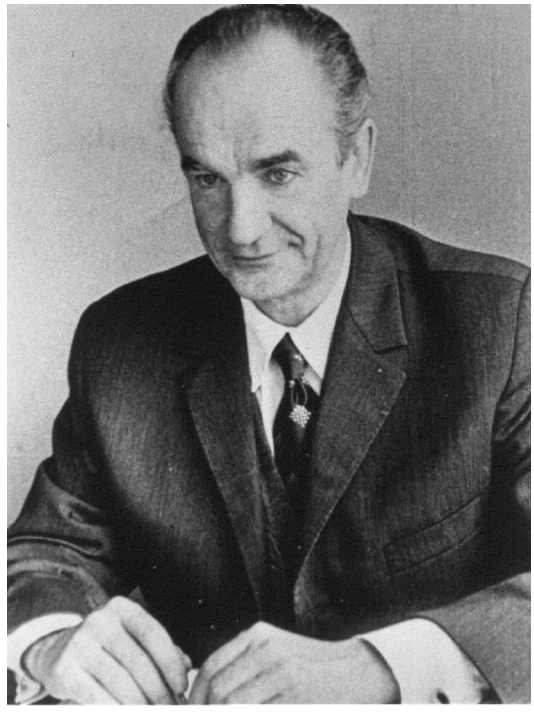
Professor R. Višomirskis was one of the most outstanding electrochemists in Lithuania. In his motherland and abroad he was famous for his deep knowledge of the theoretical, experimental and applied aspects of electrochemistry, high standards for experimental work, active teaching and successful scientific organizational and administrative activity.

In view of Professor's highly significant contribution to these activities, we consider it reasonable to remember him on the occasion of his 80th anniversary and to describe his biography in brief. While doing this, we would like to note that Professor's biography and main achievements in his versatile activities have already been described in greater detail in literature. Such material is available in the following publications or research papers: (i) Romanas Višomirskis, *Bibliographical Index,* R. Jankauskienė and D. Kimtienė (eds.), Library of the Lithuanian Academy of Sciences, Institute of Chemistry, Vilnius (1998); (ii) *Romanas Višomirškis (February 17, 1928–July 8, 1995)*, in *Chemija,* **2**, 5 (1996); (iii) *Professor Romanas Višomirskis* (*1928–1995*), in *Chemija*, **14**(1), 59 (2003).

Romanas Višomirskis was born in February 17, 1928, in Vilnius, Lithuania. In 1946 he began studying chemistry at Vilnius University, from which he graduated in 1951. He started his scientific career at the Institute of Chemistry and Chemical Technology (presently the Institute of Chemistry) under the supervision of Professor Juozas Matulis, whom he always held in respect. In 1954 having defended his Ph. D. on the subject of overvoltage of hydrogen evolution at chromium, R. Višomirskis continued his own scientific work in the area of electrochemistry. He remained faithful to the Institute of Chemistry and to electrochemistry until the last days of his life.

Two important aspects that were to become significant throughout his scientific research activity were apparent from the very beginning. The first one, taking into account the demands of the time, was the area of kinetics and the mechanisms of electrode reactions occurring at the discharge and ionisation of metals in solutions of complex salts and the electrochemical behaviour of numerous inorganic and organic substances commonly used in electroplating, as well as the interaction of these substances with metal ions and metal substrates. Secondly, R. Višomirskis, like Professor J. Matulis, saw real possibilities to use in the industry the results of fundamental and applied investigations not only in Lithuania or the former Soviet Union, but also in other countries.

The first ones of them can be illustrated by numerous investigations performed by R. Višomirskis and his co-workers on the electrochemical behaviour and deposition of Cu, Zn, Cd, Au, Ag, In, Fe, Ni, Pd, Ge and Ga layers. When generalizing the features



of the kinetics of metal ion discharge specifically in complex or alkaline solutions, R. Višomirskis stressed the importance of the state of a metal surface and surface phenomena. He formulated a concept that phase films of slightly soluble compounds form on a metal electrode surface as a result of the chemical interaction of metal with a solution or in the course of the electrode reaction. Different properties were attributed to such surface films; however, the chemical composition and thickness of these films were not precisely determined. According to this concept, deviations of the kinetic parameters from the theoretically expected ones were explained by the hampering effects, which were shown by the surface films on the electrode. It should be noted that there have been repeated attempts made in order to verify the validity of this concept quantitatively.

The second important aspect was that Professor actively worked on many problems of electroplating and made a substantial contribution toward this area, including the works of applied type and original technologies for electrodeposition of Cu, Cd, Zn, Au, Ag and Pd and some of their alloys. At that time, due to the results obtained by the groups under the supervision of Professor J. Matulis and Professor R. Višomirskis, the Institute quickly gained a top position in the field of metal plating in the former Soviet Union and in the countries of the former Council

of Mutual Economic Assistance. At that time the leading position ensured a significant additional financial support.

Experimental data obtained by the Professor himself and in co-operation with his associates were summarized in his doctoral (now habil. dr.) thesis entitled "Studies on the kinetics of electrolytic deposition of metals from complex electrolytes" (1966), his monograph "Kinetics of electrolytic deposition of metals from complex electrolytes" (1969) and in the fifth chapter of multi-authored book "Bright electrodeposits" (ed. J. Matulis, 1969). His publications (there were more than 250 of them) well illustrate the impressive results of research works performed by his group. Many of these publications will certainly be a guiding reference for the future generations of electrochemists.

Professor R. Višomirskis was known for being a successful teacher. He personally supervised twelve, and together with his colleagues twenty four, Ph. D. theses.

During his career, Professor combined scientific and applied investigations with fruitful administrative work. In 1956, two years after his Ph. D., he was appointed Head of the Department of Electrochemical Investigations and stayed in this position until his last days. In 1958, at the age of only 30, R. Višomirskis became a deputy Director of the Institute, and in 1976, as a successor of Professor J. Matulis, he became the Director of the Institute. He held this position till 1992.

In 1968 R. Višomirskis was conferred the scientific title of Professor, in 1972 he was elected a Corresponding Member and some years later, in 1976, a member of the Lithuanian Academy of Sciences. Professor was awarded many distinguished honours and medals for his prominent contributions to the science and scientific administrative activity. He was internationally recognized as an authority in electrochemistry and electrochemical engineering – he was a member of ISE, a member of editorial boards of a number of electrochemical journals.

On the occasion of the 80th anniversary of Professor R. Višomirskis, in order to pay a tribute to him due to his significant scientific work and teaching activities, we believe, it should be both interesting and useful to discuss whether Professor's concept of the role of phase films has found its further explication in investigations that have been recently carried out at the Institute, and to convey the memories of him that are kept in the minds of his students, co-workers and colleagues after his death more than ten years ago.

Thus, returning to the above-mentioned concept, it is thought that, in spite of the fact that the persistent nature and role of surface phase films in the kinetics of electrode reactions, in our opinion, has not been resolved yet, this concept provides a strong motivation for further studies. It is well known that the formation of submono-, mono- or slightly thicker layers on various substrates occurring either during electrode reactions or due to the use of special methods of electrode modification is the subject of interfacial electrochemistry. This subject is now a matter of considerable significance increasingly attracting the interest of scientists and engineers due to such areas as clean energy technology, electrocatalysis, electronics, optoelectronics, deposition of metal layers of desirable properties, etc. At the Institute of Chemistry, research works of such kind are carried out rather intensively. For instance, using certain electrochemical techniques, surface layers containing oxygen, sulphur or selenium and layers of other kinds of different thickness and structure, form on copper, nickel, zinc, cadmium, tin and their alloys and on noble metals and some carbon materials. Thread-shaped and tube-shaped crystals and their derivatives of nanometric sizes and continuous nanometric layers are formed using anodically treated aluminium and titanium samples. Selenium-modified polycrystalline platinum and glassy carbon electrodes are used for the investigation of the very first stages of copper electrocrystallization and for gaining a deeper insight into the phenomenon of acceleration of the discharge of copper ions under the impact of small amounts of selenium compounds.

Professor R. Višomirskis observed high standards for experimental work. He was known for encouraging the creativity of his students and co-workers and for giving them considerable freedom in performing research works and choosing experimental techniques. At the same time, he insisted that his students should base their publications on precise, thoroughly verified and rigorously analysed data. Professor liked calculations related to the evaluation of the theoretically expected kinetic parameters and suggested for his students and co-workers to use such calculations. As a rule, the experimental material prepared by his group presented in the scientific papers and intended for publication was obtained employing different methods, including electrochemical, structural, elipsometric ones and methods of spectroscopic analysis, radioactive tracer, etc. Being a very good expert in the fundamental aspects of electrochemistry and having a clear analytical mind, R. Višomirskis was always a strong supporter of professional liability and scientific ethics. In our opinion, it is also interesting to note, that a certain dualism existed in the relationship between Professor and his co-workers. Professor had a very strong opinion about the determining role of surface phase films. Since he was a bright debater, it was very difficult for others to find persuasive arguments against his concept. On the other hand, Professor appreciated good arguments, and when his co-workers or students, in spite of his persuasion, opposed to his concept, he encouraged them to accept the challenge to prepare and publish a paper without him.

Professor R. Višomirskis had some likings and hobbies. While being a student, he was captivated by chess and was the winner of many prestigious competitions. Later, he became an excellent and successful bridge player. Having an expressive look and clear speech, being correct in manner and both direct and diplomatic in speaking, he was an attractive and elegant person. He had a subtle sense of humour and self-irony. Although Professor was known at the Institute to be a rather reserved person, he liked to have a rest with some of his closest friends outside the town. Being with them, he enjoyed himself with some drops of high quality cognac or whisky, at the same time openly discussing actual political events. Professor R. Višomirskis was a man of word and a person full of vitality and patience.

Professor admitted that there was a need for a considerable change in the administration of science in Lithuania after the restoration of its independence. He strongly disagreed with the way it was administered, especially with the attempts to separate fundamental electrochemistry from applied electrochemistry as well as to attribute different importance to these two areas. He fought hard, but at that time his arguments had little or no effect on the dominant opinion. His mind did not allow him to put up

with such situation, which became an additional source of sadness and low spirit during his last years.

Finally, we would like to thank all those who worked with Professor Romanas Višomirskis and whose warm words have been used here. Special thanks to his closest friends Petras and Gražina Narbutas, whose warm relationship with him and attention to him frequently allowed him behaving without restraint, and also to his first disciple Dr. Lev Deresh, who presented his interesting recollection about the Professor. We are fully confident that the name of Romanas Višomirskis and his work will be associated with the Lithuanian electrochemists for the generations to come.

Dr. A. STEPONAVIČIUS
Habil. Dr. K. JUODKAZIS
Prof. E. JUZELIŪNAS

## SCIENTIFIC SCHOOL OF PROF. R. VIŠOMIRSKIS (1928–1995)

**Direct scientific supervision:**

1. A. Steponavičius, *Investigation of copper electrodeposition process from cyanide solution* (1963).
2. J. Šivickis, *Investigation of cadmium electrodeposition process from cyanide solutions* (1966).
3. J. Morgenštern, *Investigation of palladium electrodeposition process from alkaline solutions* (1967).
4. K. Juodkazis, *Electrochemical investigation of mass transport to the surface of laminar sound-flowed plate* (1968).
5. L. Dereš, *Investigation on kinetics of zinc electrodeposition from cyanide solutions* (1969).
6. G. Garmutė, *Investigation of indium electrodeposition process from sulphate solutions* (1971).
7. S. Dzetaveckienė, *Investigation of gold electrodeposition process from cyanide solutions* (1971).
8. S. Survilienė, *Investigation on kinetics of cathode process in gallium salt solution* (1977).
9. O. Molčadskytė, *Kinetics of gold electrodeposition from acidic solutions* (1979).
10. K. Leinartas, *The role of phase layers in kinetics of copper electrodeposition from ethylenediamine solutions* (1987).
11. V. Reipa, *Au surface state during electrolysis process of dicyanoaurate and tetrachloroaurate solutions* (1987).
12. L. Gudavičiūtė, *The role of cathode surface state in kinetics of copper electrodeposition from sulphate solutions* (1990).
13. H. Samas, *Influence of cathode surface state on kinetics of zinc discharge from acidic solutions* (1992).

**Collegial scientific supervision:**

14. S. Pilytė, *Investigation of palladium electrodeposition process from acidic and neutral solutions* (1967).
15. B. Radžiūnienė, *Changes of cathode active surface during copper deposition from cyanide solutions* (1971).
16. T. P. Vengris, *Some regularities of secondary processes during electrodeposition of iron from sulphate solutions* (1973).
17. E. Davidavičius, *Consideration of an influence of mass transport in the use of some non-steady methods of investigation of electrode processes* (1974).
18. V. P. Kapočius, *Changes of cathode active surface during copper electrodeposition from pyrophosphate solutions* (1974).
19. V. Šukienė, *Investigation of indium electrodeposition process from alkaline tartrate solutions* (1975).
20. V. M. Karpavičienė, *Investigation of regularities of copper electrodeposition process from alkaline ethanolamine solutions* (1976).
21. A. A. Lukinskas, *Investigation of cadmium electrodeposition process from sulphamate solutions* (1976).
22. A. Dikčius, *Investigation of mechanism of copper electrodeposition from cyanide solutions* (1977).
23. A. J. Juozėnas, *Investigation of mechanism of copper electrodeposition from alkaline mono- and triethanolamine solutions* (1978).
24. T. Juodienė, *Kinetics of processes taking place at indium electrode in alkaline ethylenediaminetetraacetate solution* (1983).
25. M. Samulevičienė, *Investigation of kinetics of cadmium electrodeposition from cyanide solutions* (1983).
26. V. Rėzaitė, *Kinetics of cathode process in tetrahydrooxyzincate solutions* (1984).
27. A. Krotkus, *Faradaic impedance under condition of convective diffusion* (1985).
28. E. Matulionis, *Formation of structure of gold coatings deposited from dicyanoaurate solutions* (1985).
29. S. Lichušina, *Copper electrodeposition process from alkaline ethylenediaminetetraacetate solutions* (1988).
30. R. Juškėnas, *Formation of structure of zinc coatings deposited from alkaline solutions* (1990).
31. A. Selskis, *Regularities of nickel electrocrystallization and formation of internal structure of deposits in sulphate-chloride solutions* (1990).
32. N. Leonavičiūtė-Baltrūnienė, *Influence of cathode surface state on kinetics of silver deposition from cyanide solutions* (1992).
33. E. Vaitkevičius, *Kinetics of cadmium electrodeposition from ethylenediaminetetraacetate solutions* (1992).
34. G. Statulevičius, *Influence of halogene on cadmium electrodeposition process from sulphate solution* (1992).
35. B. Šebeka, *The role of cathode surface state in kinetics of indium electrodeposition from sulphate solutions* (1992).
36. E. Juzėnienė, *Kinetics of gold and its alloys with copper and cadmium electrodeposition from cyanide solutions* (1994).