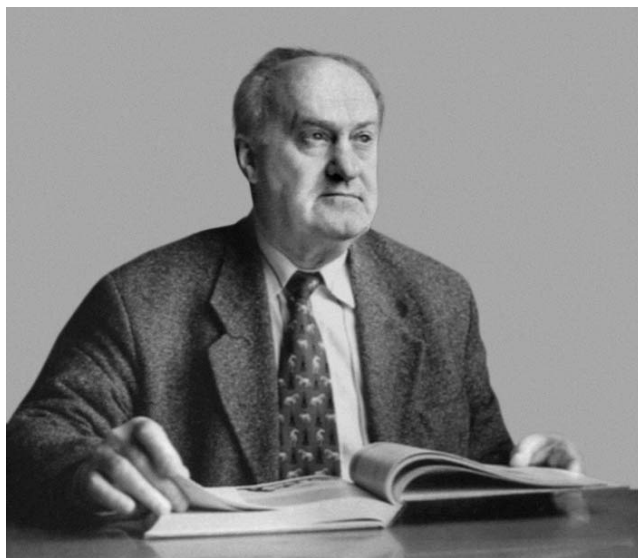

OBITUARY

Povilas Algirdas Vaškelis¹
(January 19, 1937–February 5, 2009)
Pro memoria

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With great sadness we report that Professor Povilas Algirdas Vaškelis passed away on February 5th, 2009 in Vilnius, Lithuania. Prof. A. Vaškelis, Academician of Lithuanian Academy of Sciences, a member of Advisory Board of the journals “*Elektrokhimiya*” and “*Russian Journal of Electrochemistry*”, Honorary Editor-in-Chief of the main Lithuanian chemical journal “*Chemija*” was one of the most reputed and eminent chemists in Lithuania.

Still studying at the Chemistry Department of Vilnius University, A. Vaškelis began to work as a senior laboratory assistant at the Institute of Chemistry and Chemical Technology of the Lithuanian Academy of Science (nowadays—Institute of Chemistry), where he started his scientific carrier after the graduation. Shortly after, in 1963, he defended his doctoral thesis and using the advantages of the new (by that time) method—polarography, continued the studies of peroxo-compounds, investigated the equilibria of metal ion complex formation. It may be mentioned, that the Academician Vaškelis did not forget polarography in his further research: he used this method for studies of formation equilibria of transition metal ions complexes in alkaline and strongly alkaline aqueous solutions,

where other methods appeared to be considerably less informative. During the period 1962–2001 more than 40 scientific papers related to polarography were published.

A significant (if not the major) part of scientific work of A. Vaškelis was devoted to systematic studies of the kinetics and the mechanism of electroless deposition of metals and their alloys, as well as with the related processes proceeding in the solution (already mentioned equilibria, stability of electroless plating solutions, formation and properties of colloidal metal nano-particles) and on the surface (heterogeneous catalysis and electrocatalysis, activation of surfaces, determination of the real surface area, etc.). It should be mentioned that with these major scientific contributions A. Vaškelis became a worldwide recognized expert in the field. This was achieved by successfully combining fundamental and practical—complementing each other—aspects of the scientific research.

In 1967, independently of M. Saito (1965, Japan) and M. Paunovic (1968, USA), A. Vaškelis proposed a pioneering interpretation of electroless metal ions reduction mechanism on the basis of mixed-potential theory, which had been earlier used to describe corrosion processes. This made it possible to figure out that

¹ The article was translated by the authors.

the so-called electroless (or “chemical”) metal deposition is just a coupling of two (sometimes even more) partial processes simultaneously occurring on the surface at equal rates, transferring electrons via the depositing metal. This interpretation stimulated the use of electrochemical methods for studies of the processes in the whole world, supporting its validity and correctness.

However, in due course it became evident that solely electrochemical methods of measurement are not sufficient for investigation of such complex processes inasmuch as the current measured by varying the electrode potential represent the overall contribution of several electrochemical reactions, whereas the individual contributions remain unknown. All this stimulated development and utilization of novel combined investigation methods making it possible to determine the contribution of the individual reactions to the overall process. It should be mentioned, that a new on-line electrochemical mass spectrometry method intended for direct analysis of gaseous reaction products was applied for the first time for studies of the mechanism and kinetics of chemical metallization using isotope labeling. Along with this method, for in-situ studies of partial reactions of chemical metallization A. Vaškelis et al. were among the first who applied quartz crystal microbalance technique, which enables to determine the variations in electrode mass (with a sensitivity of 10^{-9} g) during metal deposition. The development and application of these techniques made it possible to investigate important peculiarities of the mechanism and kinetics of metal deposition, enabled to determine the interaction of partial electrochemical reactions of the process, otherwise not possible to investigate by using conventional electrochemical methods.

A new fundamental knowledge gained made it possible to upgrade electroless metal deposition processes, as well as to predict and discover the novel processes, not known yet and used in practice.

For instance, thorough studies of thermodynamic parameters of electroless metal ion reduction and their generalization allowed to predict new processes of chemical metallization on the basis of the mentioned above mixed potential theory, namely, these were chemical reduction of metal ions (silver, copper) by divalent cobalt amino-complexes. Importantly, this discovery of novel processes suitable for practical application was made on the basis of deep insight into the complex reaction networks, which enabled to theoretically foresee new opportunities and put them into practice.

Along with apparent scientific novelty, these electroless plating processes are distinguished for their technological novelty, as well (possibility to electrochemically regenerate consumed reducing agent, by reducing trivalent cobalt ions back to divalent), allowing formation of metal coatings with high technological characteristics on the dielectric surfaces, permitting to avoid the use of toxic chemicals (formaldehyde).

Therefore the new electroless metallization processes, proposed by A. Vaškelis et al., had attracted attention from the international companies, dealing with electroless plating of metals and their alloys. The results of the theoretical studies of Academician A. Vaškelis were and still are widely used to originate new technologies. He successfully guided the contracts for experimental development sponsored by Japanese companies “Toyota Motors Corporation”, “Ebara-Udilyte”, and “LAM Corporation” from the USA (the latter is located in a widely known Silicon Valley).

To summarize the scientific path and the achievements of A. Vaškelis it can be asserted without doubts, that he was a researcher of the superior level. A scientist, capable of seeing new reasonings between seemingly unrelated phenomena, to correlate and interpret them correctly, using this as the background, for the formulation of generalized conclusions, further expanding their validity in a much wider context, as well as to successfully employ the practical aspects, being in total an eminent example for the outstanding research and development efforts.

It is worth noting, that the scientific community assessing the credits of A. Vaškelis, benevolently responded to the initiative to publish a special issue of “Journal of Solid State Electrochemistry” dedicated to his 70th birthday in 2007. This worldwide response (not that common) by the scientific community clearly shows the importance of A. Vaškelis' works, the assessment of his scientific path as well as a great personal respect.

As it was already mentioned, the work of A. Vaškelis have brought him a wide recognition both in his mother country and abroad. He was an awardee of two National Prizes in Science of Lithuania (in 1989 and 2000). In 1996 he was awarded with J. Matulis prize of Lithuanian Academy of Sciences, the same year a paper of A. Vaškelis et al. “New methods of electroless metallization and direct plastics coating” at the International Conference “Interfinish 96 World Congress” was awarded as the best scientific work. In the year 2000 A. Vaškelis et al., for the article “Electroless copper plating using cobalt(II) complex compounds as a reducing agents. Thermodynamic aspects and kinetic studies”, published in the journal “Galvanotechnik” in Germany, was awarded with a nominal Heinz Leuze prize of German Electroplating and Surface Treatment Technical Society. The scientific activities of A. Vaškelis were closely interlaced with pedagogical ones. He taught a course of “Chemical thermodynamics” for the students of Vilnius Pedagogical University, was teaching “Catalysis” course for the PhD students of the Institute of Chemistry and Vilnius University, as well as for post-graduate students of Vilnius University and Vilnius Pedagogical University. Fifteen doctoral theses were prepared and defended under his guidance and supervision, and two of the fifteen doctors became later habilitated doctors.

Therefore, it is valid to note, that A. Vaškeľis had established his own scientific school, as far as seven disciples of his former disciples (scientific “grandchildren”) already defended their doctoral thesises. An erudite and broad-minded chemist was a tutor for everyone who was seeking for his advice.

It should be emphasized, that the scientific degrees and ranks were gained on the basis of original way of thinking, an outstanding ability of scientific prediction, hard-working and precision in the research, national and international awards and assessments, numerous team of disciples—this was one (undoubtedly, the main) part of the activity of Academician. Social, educative activities and his work as an expert was another, a very important field. He was the Editor-in-Chief of the main Lithuanian chemical journal “Chemija”, the vice-President of Lithuanian Chemical Society, the

Chairman of the Board of Theodor Grotthuss Foundation, a reviewer of numerous international chemical journals, an opponent to the dissertations defended in various fields of chemistry, an author of the articles of Lithuanian Encyclopedia.

We will largely miss an outstanding Colleague, erudite and chemist of the widest area of interests. Retains his considerate advertence to co-workers, great tolerance, valuable advices and unselfish assistance of leader-teacher, co-worker and colleague. He will be long remembered by the scientific community as a bright scientist and a charming person.

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