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In memory of the Master

On the occasion of the 90th birthday of Leonid Antonovich Serafimov

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The article is dedicated to the 90th birthday of Leonid Antonovich Serafimov, an outstanding scientist, Doctor of Engineering Sciences, professor at the M.V. Lomonosov Moscow State University of Fine Chemical Technologies. Serafimov made an invaluable contribution to the development of the theoretical foundations of chemical technology. The article briefly describes the research conducted by the scientific school "Theoretical Foundations and Technological Principles of Mass-Transfer and Combined Processes of Organic Synthesis" founded and led by him. Special attention is given to the ideological component of his scientific and pedagogical activity; and his active civil position, encyclopedic knowledge and remarkable personal qualities are also duly noted.

Keywords: *Leonid A. Serafimov, scientific school, theory of combined reaction-mass transfer processes, thermodynamic-topological analysis of phase diagrams.*

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Памяти Учителя

К 90-летию со дня рождения Леонида Антоновича Серафимова

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Статья посвящена 90-летию со дня рождения выдающегося ученого, доктора технических наук, профессора МИТХТ им. М.В. Ломоносова Леонида Антоновича Серафимова, внесшего неоценимый вклад в развитие теоретических основ химической технологии. Кратко описаны исследования, проводимые научной школой «Теоретические основы и технологические принципы массообменных и совмещенных процессов органического синтеза», основанной и возглавляемой им; обращено внимание на мировоззренческую составляющую в его научно-педагогической деятельности; отмечены его активная гражданская позиция, энциклопедические знания и замечательные личностные качества.

Ключевые слова: *Серафимов Л.А., научная школа, теория совмещенных реакционно-массообменных процессов, термодинамико-топологический анализ фазовых диаграмм.*

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On September 29, 2019, Leonid Antonovich Serafimov, Doctor of Technical Engineering Sciences, professor, and world-famous scientist would have turned 90 years old. His entire life was associated with the M.V. Lomonosov Moscow State University of Fine Chemical Technologies, where he rose from a student, Stalin scholarship holder to a professor and head of a department. L.A. Serafimov worked for 13 years in the Ministry of Higher and Specialized Secondary Education of the Russian Soviet Federative Socialist Republic. He headed the General Directorate of Universities, Economic and Law Institutes and was a member of the ministry collegiate organ.

L.A. Serafimov was the founder of the scientific school "Theoretical Foundations and Technological Principles of Mass Transfer and Combined Processes of Organic Synthesis." He discovered the fundamental laws of heterogeneous equilibria and used these laws as a basis for an original thermodynamic-topological analysis of phase diagrams and dynamic rectification systems. This analysis is a stem for developing resource-saving schemes for the separation of complex mixtures in basic organic and petrochemical synthesis.

Professor L.A. Serafimov created the theory of combined reaction and mass-transfer processes and the theory of transformation of the structures of phase equilibrium diagrams based on boundary and internal tangential azeotropy. He actively developed the physicochemical fundamentals in the functioning of energy-efficient complexes for azeotropic mixture separation.

The studies of the scientific school headed by him were 15–20 years ahead of the work of foreign scientists, ensuring the stable priority of Russian science in the aforementioned field. Professor Serafimov placed great emphasis in his works on introducing various mathematical methods in studies on heterogeneous systems thermodynamics. His scientific results were used abroad to create modern program-oriented modeling systems for computers.

It is worth mentioning separately the worldview component in the scientific and pedagogical activity of L.A. Serafimov. He considered it absolutely necessary to include philosophical issues in lecture courses, to illustrate the relationship between natural science laws and philosophical ones and thought a lot about the impact of technology on society. His scientific works on the development of theoretical foundations for chemical technology applied to technological problems reveal the concepts of research intensity, ideality, infinity, homology and isomerism, invariants of phase diagram structures, mathematical modeling as a method of scientific knowledge, etc.

Professor Serafimov had a phenomenal capacity for work. As a professor at the Department of Chemistry and Technology of Basic Organic Synthesis he gave original lecture courses created by him, which have no analogues in the world. He was engaged in scientific work, wrote articles and left scientific notes for his students until the very end of his life. He possessed an amazing ability to gather young promising scientists around him and captivate them with his scientific ideas, to set specific tasks for them and helped to realize themselves in the form of defenses of qualification works of different levels.

L.A. Serafimov prepared 14 doctors and 75 candidates of sciences, as well as more than 30 masters. L.A. Serafimov is the author of more than 800 scientific papers. Among them are 6 scientific monographs, 44 copyright certificates and patents, and 520 scientific articles, the majority of which were published in leading journals in Russia and abroad.

For many years, Leonid Antonovich was the scientific director of the Laboratory of Problems of the Higher School of MITHT, which on the basis of original methodological works allowed the university to take its rightful place in modern higher education. He published about 40 articles on the modernization of higher education in Russia. The merits of Professor L.A. Serafimov were recognized by the scientific community: he was a two-time winner of the prize of the International Academic Publishing Company "Science" for a series of publications in the journal "Theoretical Foundations of Chemical Technology" published by the Russian Academy of Sciences; he was also Academician of the Russian and International Engineering Academies; Honored Worker of Science and Technology of the RSFSR; Honored Worker in Higher Professional Education of Russia; Honored Inventor of the USSR; Honorary Professor of MITHT named after M.V. Lomonosov; Honorary Doctor of the Association of the Russian Federation "Basic Processes and Technique of Industrial Technologies." He was also awarded orders and medals.

L.A. Serafimov was an excellent lecturer and a brilliant speaker. He was repeatedly invited to lecture at foreign universities and firms (Rostock and Dortmund Universities, Germany; University of Rennes, France; Prof. Asen Zlatarov University, Bulgaria; BASF, Stuttgart). He held master classes for students, postgraduates and colleagues from different universities. The Moscow scientific workshop on phase equilibria was created at his initiative.

L.A. Serafimov carried out a lot of scientific and organizational work. For a long time he was a member of the European Engineering and Chemical Working Group on Distillation, Absorption and Extraction, a member of the Expert Council of the Higher Attestation Commission, a member of three dissertation councils, an expert of the Russian Foundation for Basic Research, a member of the RAS Council for the Scientific Fundamentals of Chemical Technology, a member of the organizing committees of international conferences "Chemical Thermodynamics in Russia," "Science-Intensive Chemical Technologies," etc.

He worked as a member of the editorial boards of the journals "Theoretical Foundations of Chemical Technology" and "Fine Chemical Technologies" ("Vestnik MITHT"). Leonid Antonovich Serafimov was a demanding and at the same time benevolent reviewer: he always supported extraordinary publications made by talented scientists; he gave reasoned critical reviews; he published his fundamental results making a significant contribution to the formation of a positive reputation of magazines.

The scientific authority of Professor L.A. Serafimov was indisputable. He was respected both as a scientist and as a teacher by his colleagues, disciples, and students.

Leonid Antonovich's professional path as a scientist and professor is a great example of serving his work! This is the work of an active creator of the achievements of MITHT and higher education in Russia. He made a significant contribution to the history of our institute, academy, and university. An ardent admirer of his Alma Mater, he was always proud of our regalia: the name of Mikhail Vasilyevich Lomonosov and the Order of the Red Banner of Labor, which at various times marked the merits of the staff of the Moscow Institute of Fine Chemical Technologies.

Leonid Antonovich's active role in civil society, encyclopedic knowledge, and personal qualities attracted people of all ages and positions to him. His fidelity to principle and his responsibility always served the interests of MITHT named after M.V. Lomonosov.

We are proud that we lived and worked side by side with this man.

We will always remember him.

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