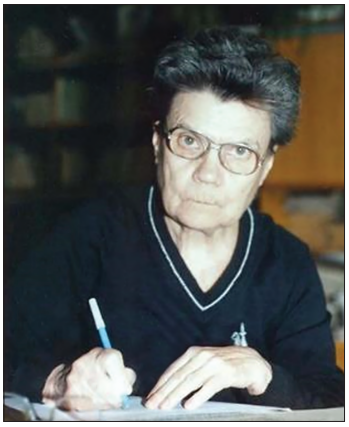
TO COMMEMORATE THE 95th ANNIVERSARY OF BIRTHDAY OF PROFESSOR Z.A. MATYSINA



September 2, 2022 is the 95th anniversary of Professor Zinaida Alfredovna Matysina, leading staff research scientist at the I.M. Frantsevych Institute for Problems of Materials Science of the National Academy of Sciences of Ukraine, Honoured Professor of the Oles Honchar Dnipro National University, Doctor of Physical and Mathematical Sciences.

Stages of Life. She was born on September 2, 1927. She studied at school No. 2 with advanced study of German; after the school was reformed, she studied at schools Nos. 100 and 80, having received an education for 8 classes. Having independently studied all the subjects of the senior classes externally with excellent marks (grades), she passed the exams for the school-leaving (matriculation) certificate and was accepted in 1946 as a student at the Faculty of Physics and Mathematics of Dnepropetrovsk State University, from which she graduated with honours in 1951 with a degree of 'Physicist, Teacher of Physics'. One year she worked as a senior lecturer at the Department of Physics of the Dnepropetrovsk Metallurgical Institute, where she read all sections of the general course of physics (students ran, peeped and laughed: 'Look, the girl is lecturing!?'). The head of the department, Ivan V. Radchenko, thanked for the work and, in appreciation, presented her his monograph 'Molecular Physics', for which he received the degree of Doctor of Pedagogical Sciences.

From 1952 to 1955, she studied at the graduate school at the Institute for Metal Physics of the Academy of Sciences of Ukrainian S.S.R. in the Theoretical Department under the leadership of Corresponding Member of the A.S. of Ukr.S.S.R. Adrian A. Smirnov.

In 1955, she defended her Ph.D. thesis entitled 'On the Theory of the Electrical Resistance of Alloys'. At that time, there was an order from the Presidium of the Academy of Sciences to defend dissertations strictly during the years of study. Therefore, it was jokingly noted at the council that Zinaida Alfredovna Matysina did not complete the dissertation on time: the defence took place on October 25, 1955, while the term of postgraduate studies ended on October 17.

After finishing the postgraduate study, she worked as a junior researcher under the guidance of Academician A.A. Smirnov. From 1961 to 1964, she was associate professor of the Physics Department of the Civil Air Fleet Institute. From 1964 to 2015, she worked initially as associate professor, then as head of the General Physics Department, and, after defending her doctoral dissertation, as professor of the Experimental Physics Department of the Dnipro National University.

Currently, Zinaida A. Matysina is a leading researcher at the Department of Hydrogen Materials Science and Carbon Nanostructures in the I.M. Frantsevych Institute for Problems of Materials Science of the National Academy of Sciences of Ukraine.

Scientific Work. In the student years, Zinaida was engaged in the study of the Fe-based alloys' spectra, performed 3 works on the development of the express analyses of Siemens–Martin steel for the quantitative content of P, Si, and other impurities in the smelting process. One of these works became a diploma; for the other two, she received the letters of commendations.

At the Metallurgical Institute, she studied the scattering of light by colloidal solutions in order to determine the size of suspended particles. The results were presented at the Academic Council during the defence of the S. Chernyavskaya's dissertation. One of the opponents invited Zinaida to Kyiv to enter the graduate school. Thus, she became a postgraduate student at the Theoretical Department of the Institute for Metal Physics of the Acad emy of Sciences of Ukrainian S.S.R. under the direction of A.A. Smirnov as her scientific adviser.

She developed a quantum-mechanical theory of the electrical resistance of the ordered alloys of transition metals with non-transition ones, applying the band and many-electron approximation of density matrix, which became the topic of her Ph.D. thesis.

At the same time, she was engaged in the development of theory of the atomic ordering and decomposition of binary and ternary alloys, their physical properties, and phase transformations with and without the correlation effect.

At the Institute of the Civil Air Fleet, working as associate professor, she wrote and published three books: two reference books on the SI system of units introduced in 1963 (international system) and a manual on laboratory work.

At the Dnepropetrovsk State University, she continued to develop both quantum-mechanical and statistical-thermodynamic theories of different ordered alloys based on the cubic and hexagonal structures. The diffusion, solubility, electrical resistance, the influence of bulk effects, pressure, and the presence of vacancies on the physical characteristics of alloys were studied. Studies of ordering alloys of different structures have also been carried out using the pseudopotential method, which has just begun to be developed. The problem of the scattering of different-type waves (slow neutrons, x-rays, conduction electrons in alloys) by the crystal lattice of solid solutions was solved. A general formula for the scattering intensity for multicomponent alloys was derived taking into account the long-range order and interatomic correlations in all the coordination spheres. The results were formalized in her doctoral dissertation.

After defence of the doctoral dissertation, she studied other types of ordering in solids: magnetic, dipole, charge, spin, and deformation ones.

Publications and Participation in Conferences. There are more than 600 publications, including 23 books: 14 monographs, 2 textbooks, 2 reference books, 5 tutorials. Articles are published in many international journals: *Phys. Stat. Solidi*, *J. Phys. Chem. Solids*, *Int. J. Hydrogen Energy*, *Carbon*, *J. Alloys Compd.*, *Int. Sci. J. Alternative Energy and Ecology* and others. The 24th monographic book 'Hydrogen in Crystals' has been submitted to the printing house of the KIM publishing house.

Z.A. Matysina took part in conferences, meetings, seminars, assemblies, sessions, conferences, symposiums, and congresses in numerous cities of the world (Kyiv, Minsk, Alma-Ata, Ashgabat, Baku, Dushanbe, Riga, Tbilisi, Tashkent, Yerevan, Irkutsk, Novgorod, Yaroslavl, Kuibyshev, Donetsk, Lviv, Kharkiv, Odesa, Dnipro, Moscow, Leningrad and others).

Scientific works in collaboration with scientists of the I.M. Frantsevych Institute for Problems of Materials Science of the National Academy of Sciences of Ukraine were reported in 25 countries of the world, including United States, England, France, Germany, Italy, Canada, Argentina, Japan, Belgium, Norway, Austria, China, Turkey, Australia, Poland, Hungary, Bulgaria, Switzerland, and Czech Republic.

Public (Social) Activities. Zinaida A. Matysina presented lectures in the public interests. She read lectures in workshops and dormitories of factories, plants and schools. During the student years, she presented lectures weekly, in total more than 300. Topics of lectures were as follow: 'Evolution of the Universe (galaxies, nebulae, black holes, stars, planets, comets, quasars, pulsars)', 'Volcanoes and earthquakes', 'The origin of life on Earth', 'Search for extra-terrestrial civilizations', *etc*. Zinaida Matysina was a lecturer and chair of the section of the 'Knowledge' society at the Faculty of Physics of the Oles Honchar Dnipro National University.

Sports Activity. Zinaida took a great interest to the rowing (1st place in the competition for graduate students), ping-pong (2nd place in the Academy of Sciences), equestrian sport (received the title of 'Voroshilovsky rider'), skiing, skating, swimming, tourism. She visited the mountains of the Caucasus, climbed up the Hoverla in Carpathians and mountains in Crimea, visited caves, canyons, multi-cascade waterfalls, Baikal Lake and caves in Czech Republic with boating through the underground water labyrinths.

Colleagues and friends, as well as the whole team of the G.V. Kurdyumov Institute for Metal Physics of the N.A.S. of Ukraine, cordially congratulate Zinaida Alfredovna on the 95th anniversary and wish her good health, creative inspiration and longevity, further success in work in favour of Ukraine and world science, as well as ordinary human happiness.