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Academician of the National Academy of Sciences of Ukraine Volodymyr Semynozhenko Turns 75

On June 9, Volodymyr Semynozhenko — a prominent Ukrainian scientist, Academician of the National Academy of Sciences of Ukraine, and Director General of the Science and Technology Complex "Institute for Single Crystals" of the NAS of Ukraine — celebrates his 75th birthday.

The areas he studies include modern solid-state physics, materials science, single-crystal growth technologies, and the development of biomedical materials.

Volodymyr Semynozhenko's research is closely connected with high-temperature superconductors (HTS): developed original models explaining their formation mechanisms, grew the first twin-free single crystals of yttrium-based compounds, and obtained HTS films with high uniformity, and also, investigated the kinetics of nonequilibrium processes in strong fields and predicted a number of new physical phenomena in complex systems.

Under his scientific leadership, new physical concepts continue to evolve, particularly those explaining the exceptionally high quasi-isomorphic capacity of crystalline substances based on rare-earth oxides. These studies are grounded in the model of anharmonic adiabatic potential. For the first time, the mechanisms of tunneling transitions of impurity centers in complex oxide crystal structures with low symmetry were systematically interpreted. He also actively contributes to the study of molecular and supramolecular organization of organic scintillating media, smectic liquid crystalline systems with ferroelectric and antiferroelectric properties, and the phenomenon of sound wave generation in nematic liquid crystals. In recent years, his team has begun investigating excitonic processes in low-dimensional molecular systems.

Volodymyr Semynozhenko has made a significant contribution to the advancement of instrumentation for radiation research and the development of non-destructive testing methods. His re-

search includes rare-earth oxide systems, anharmonic potential models, tunneling mechanisms in complex crystals, liquid crystal and scintillation systems, excitonic dynamics in low-dimensional structures, and luminescence and bioactivity of nanoparticles for nanobiomedicine.

A new scientific field has emerged under Volodymyr Semynozhenko leadership — the study of luminescence and bioactivity of inorganic nanoparticles with pro- and antioxidant properties, laying the groundwork for the development of nanobiomedical technologies. He is also a key advocate for the development of high-tech sectors and advanced medical solutions in Ukraine, including the production of test systems for diagnosing critical diseases such as AIDS, hepatitis, TORCH infections, and tuberculosis.

Volodymyr Semynozhenko is the author of over 460 scientific publications and more than 100 patents, and he has supervised 7 Doctors of Science and 11 PhD holders. He holds honorary doctorates and professorships from 34 universities. He serves as Editor-in-Chief of the journals *Functional Materials* and *Science and Innovation*, and hosts the program "*About Science. Expertly"* on the NAS of Ukraine's YouTube channel.

On his initiative, several national science and technology programs were adopted, including the program *Development of Advanced Technologies for the Creation of Domestic Medicinal Products to Support Public and Veterinary Health for 2011–2015*. As part of this initiative, innovative Ukrainian-made medicines were developed during 2012–2013.

Among honors of Volodymyr Semynozhenko are two State Prizes of Ukraine in Science and Technology (1992 and 2000), the International Prize in Nuclear Physics (1999), the title of Honored Scientist and Engineer of Ukraine (2008), the V.I. Trefilov Prize of the NAS of Ukraine, and the Cabinet of Ministers of Ukraine Award for Innovative Technologies (2017). He has been awarded the Orders of Merit I, II, and III Class, the Order of Prince Volodymyr the Great IV Class, the Order of Prince Yaroslav the Wise V Class, as well as Honorary Diplomas of the Verkhovna Rada and Cabinet of Ministers of Ukraine, the Gold Medal (2010) and the Grand Gold Medal (2021) of the National Academy of Arts of Ukraine, and the award of the Commander-in-Chief of the Armed Forces of Ukraine *For Assistance to the Army* (2023).