

In memoriam of Academician Andrei ANDRIESH, the Founder of Noncrystalline Semiconductor School in the Republic of Moldova

24.10.1933-7.04.2012



Academician Andrei ANDRIESH, the third president of the Academy of Sciences of Moldova (1989-2004), Doctor habilitate in physics and mathematics, twice Laureate of the State Award in Science and Production died on April 7, 2012. The scientific community in Moldova and abroad has lost a valuable scientist, a man of great humanity, and a citizen with love to this country, the founder of the scientific school on noncrystalline semiconductors.

Academician Andrei Andriesh was born on October 24, 1933 in Chisinau. He graduated from the Physics and Mathematics Faculty at the Moldova State University of Chisinau (1956) and PhD in the Ioffe Physical Technical Institute in St. Petersburg (1962). Internationally renowned scientist in the fields of optoelectronics and noncrystalline semiconductor, personality of a vast erudition and culture, academician Andrei Andriesh devoted its entire life to the Academy of Sciences of Moldova. His scientific carrier began with different positions of researcher at the Institute of Mathematics and Physics (1962-1964), Scientific Secretary (1964-1971), head of laboratory (1971-1993) and director of the Center for Optoelectronics of the

Institute of Applied Physics of the Academy of Sciences (since 1994). He held the most important administrative positions in the Academy of Sciences: General Scientific Secretary (1984-1989) and president of the Academy of Sciences (1989-2004). In 2004 he was elected honorary president of the Academy of Sciences of Moldova.

Academician Andrei Andriesh was the founder of scientific school in physics of noncrystalline semiconductors. The noncrystalline semiconductors present a new group of materials with physical properties different from crystalline semiconductors due to the disordered structure of atomic network in these materials. This group includes chalcogenide glasses, which are transparent in the infrared region and are promising for different applications in photonics and optoelectronics.

Academician Andrei Andriesh had the honor to work under leadership of Prof. B.T. Kololmiets, Academician R. Grigorovici, Prof. S. Ovshischy, and Prof. N. Mott—Nobel Laureate in the field of noncrystalline semiconductors. Academician Andrei Andriesh was an initiator of systematic investigations of photoelectric and optical properties of chalcogenide glasses, the light propagation in optical waveguides, the photoinduced optical phenomena, including nonlinear effects, in the R. Moldova. Due to the significant scientific results obtained in this field with his coauthors, in 2001 for the second time, he became the Laureate of the State Prize of the R. Moldova in science, techniques, and production, and the winner of the “Stanford R.Ovshinsky” Award of Excellence in the field of chalcogenides in 2005.

In the Center of Optoelectronics, the basic physical properties of chalcogenide glasses have been being studied. It was demonstrated that the spectrum of localized states and energy distribution can be modified through varying the chalcogenide glass composition, temperature and light irradiation. For the first time, there was carried out a complex experimental study of the transient processes of the dispersive transport, photoconductivity and photoinduced optical absorption, the specific features of which are determined by the non-equilibrium carriers and the spectrum of the localized states. In the case of dispersive transport, a theoretical model of multiple trapping of charge carriers was developed, which allowed explaining the experimental results and features of the drift in chalcogenide glasses, photoinduced absorption, photoconductivity, and non-linear phenomena.

Under the supervision of Academician Andrei Andriesh, in the Center of Optoelectronics, the search for and development of novel methods of recording the optical and holographic information, as well as effective media for optical registration, were carried out. At present, the holograms of various types (rainbow holograms, focused image holograms, Fourier holograms, volume holograms) are formed with high diffraction efficiency, large scene depth, and dimensions of 0.5 mm² to 140 cm². A technology process for preparing a metal matrix for multiplication of patterns from a hologram origin was developed. The study of the structural transformations in thin films of vitreous semiconductors stimulated by low-energy electron irradiation presents interest from the practical point of view for the formation of phase and relief diffraction elements with submicron period for various optoelectronic applications.

In the last years of activities, academician Andrei Andriesh initiated the development and investigation of the new organic/inorganic nanostructured composite materials. Nanostructured composite materials are very attractive for the future implementation of new photonic and optoelectronic devices. Actually, the definition of nanocomposite materials has significantly broadened; it includes a large variety of systems and structures, such as one-dimensional, two-dimensional (metal oxides, metal phosphates, chalcogenides), three-dimensional, and amorphous materials. The main efforts were focused on the ability to control nanoscale structures with the

required physical and optical characteristics through innovational synthesizing approaches. The luminescent composites based on lanthanide complexes have attracted much attention due to scientific interest as well as for the wide variety of application in photonics and optoelectronics: planar optical amplifiers, solar cells, light emitting diodes, gas selective sensors, photonic devices, etc. Academician Andrei Andriesh was an author and coauthor of about 500 scientific papers and 30 patents. They include “Vitreous Arsenic Sulfide and it’s alloys” (1981), “Nonstationary Currents in Disordered Solids” (1983), “The Vitreous Semiconductors in the Photoelectric Systems of Recording of Optical Information” (1988), “Physics of Chalcogenide Glasses” (1996), etc. He contributed to training of highly skilled scientists, including 17 doctors and 8 doctors habilitate.

Academician Andrei Andriesh was a Member of the Engineering Academy of the Russian Federation, Corresponding Member of the Austrian Society Albert Schweitzer-Gesellschaft Modling, Member of the European Academy of Arts, Honorable Member of the Romanian Academy of Sciences, President SPIE-Moldova Society, Honorable Member of the American-Romanian Academy, and Doctor Honoris Causa of the Polytechnic University from Bucharest.

Academician Andrei Andriesh essentially contributed to the elaboration and development of the Informational Infrastructure Strategy and the implementation of Academic network development projects in Moldova by RENAM (Research and Education Networking Association in Moldova) with support of the NATO Science Committee and European Commission.

Academician Andrei Andriesh was awarded with the title „Om Emerit”, he was the winner of the Award „C. Miculescu” of the Romanian Academy of Sciences, the Medal „Insigna de Onoare”, „Ordinul Republicii”, „Academician S. I. Vavilov”, etc. His productive research activities in the field of noncrystalline semiconductors, creativity, and directed actions are an example for young researchers and encourage them to discoveries of new materials, photonic and optoelectronic devices.