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Vasyl Stefanyk Precarpathian National University

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In memory of Professor Yuriy Rud'
(1939 - 2020)

Professor Yuriy Rud'

A famous scientist, author of more than 600 scientific publications in the field of semiconductor materials science, professor ***Yuriy Vasilyevich Rud'*** died on September 13, 2020.

A native of Kryvyi Rih, he lived, until entering the institute, in the village of Penyaki, Brody district, Lviv region, where his father worked as an agronomist. Yuriy Rud' graduated from the Kyiv Pedagogical Institute and on the recommendation of the Department of Physics of this institute entered the graduate school of the Ioffe Physical-Technical Institute (St. Petersburg), where his teachers were world-famous scientists N.A. Goryunova and D.N. Nasledov. Although all Yuriy Vasyliovych's scientific activity was connected with this institute, he never lost contacts with Ukraine - he participated in the scientific conferences and seminars held in Ukraine, reviewed scientific projects of Ukrainian researchers, was an official opponent in the defenses of their doctoral dissertations and always dreamed of returning to Ukraine but not destined.

Experts in the field are well aware of the contribution of Y.V. Rud' to the complex study of the phenomena of charge carrier transfer, the study of optical, photoelectric and luminescent properties of multicomponent semiconductors and the development of structures important for the practical applications. He proposed and developed new principles for growing single crystals of these materials from nonstoichiometric melt solutions by directed crystallization of nearly stoichiometric melts of the obtained phases under conditions of low temperature gradients and crystallization front velocities, as well as software control of partial pressures of volatile components. In particular, single crystals of a number of three-component semiconductors with chalcopyrite lattices were obtained for the first time, which opened up wide experimental studies of the physical properties of these new materials, including studies of crystal lattice defects of various types and their role in formation of the physical properties of such materials. This made it possible to determine conditions for the conversion of the type of conductivity important for practical applications. He first pointed out the need to control the parameters of the vapor phase in all technological processes associated with the formation of defects, which allowed to grow crystals with controlled parameters. An important achievement was the discovery of the anisotropy of optoelectronic phenomena in crystals of three-component semiconductors and its relationships with the effects of atomic ordering, which made it possible to develop a number of new-generation optoelectronic devices. Due to the improvement of the perfection of crystals of three-component compounds, it became possible to obtain materials with high mobility of charge carriers and improved optical quality, which were used in the creation of highly efficient radiation converters.

An important result of Y.V. Rud's research was the discovery of a new photoelectric phenomenon - induced photopleochroism, which allowed to offer the use of isotropic binary and elementary semiconductors in new functions and to realize this phenomenon as a new method of quality control of semiconductor photoconverters.

Y.V. Rud' was an enthusiast of studying the new-generation semiconductors, which are able not only to expand the range of physical properties of the main materials of modern semiconductor electronics, those are the elementary and binary semiconductors, but even able to overcome the competition with these "traditional" materials in many applications. The phenomena discovered by him that provide this ability include, first of all, the high nonlinear polarization of three-component compounds, the presence of a limiting degree of polarization of recombination radiation and spin orientation of emitted electrons, the ability to obtain materials with a band gap width required to create ultraviolet lasers, the ability to create highly efficient solar cells with record radiation resistance, etc.

Despite the wide range of co-authors, the scientific leadership of Y.V. Rud' was indisputable at all stages of conducting the majority of research - in the development of ideas, staging experiments, processing results and writing articles. Universities in the United States and Germany have repeatedly invited him as a lecturer as well as an expert on scientific programs of Windows in Sciences and Woorkshops on UFO Materials, he was the head of some INTAS programs and CRDF projects.

The death of professor Yuriy Rud' is an irreparable loss for his colleagues and pupils.

Prof. G.S. Pekar
Head of the Department of Growth Technologies of Semiconductor Materials and Structures,
V.E. Lashkaryov Institute of Semiconductor Physics of the National Academy of Sciences of Ukraine