Anton Nikoforovich Sevhenko (on his seventieth birthday)

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The noted Soviet scientist Anton Nikiforovich Sevchenko, one of the foremost specialists in the field of luminescence and a member of the Belorussian Academy of Sciences, celebrates his 70th birthday on February 22, 1973.

Sevchenko was born into a peasant family in the village of Deniskovichi in Gomel' Oblast'. On graduating from Rogachevo Pedagogical Institute in 1926, he worked for some time as a school principal, and then entered the Belorussian State University in 1929.

His scientific activity began in 1932 under the tutelage of Academician S. I. Vavilov at the State Optical Institute. Here he produced a number of papers of fundamental scientific importance. The luminescence of organic and inorganic substances became his principal field of research. Vavilov himself held Sevchenko's work in high esteem, citing it frequently in his own papers and using Shevchenko's experimental data in his theoretical treatment of the microstructure of light.

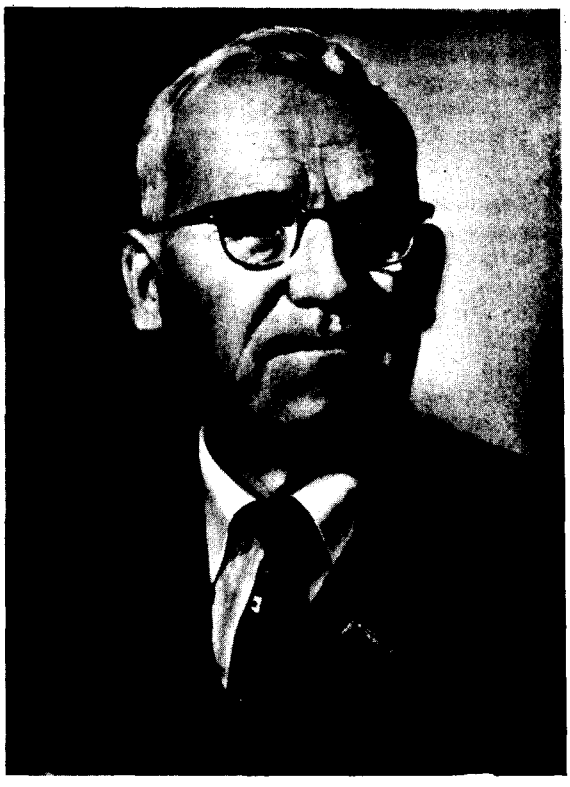
During the Second World War, Sevchenko busied himself with defense work with all of his characteristic energy. He developed and introduced luminescence techniques for use in blackouts and a number of other military applications of physical optics.

Even before the war, Sevchenko had begun a systematic study of the luminescence of rare-earth and uranium compounds. His doctorate thesis (1952) was the fruit of a decade of research on the luminescence of uranyl compounds.

In 1953, Sevchenko was elected an Academician of the Belorussian Academy of Sciences and moved to Minsk to work. He had soon organized the Institute of Physics and Mathematics of the Academy, which he served as Director for two years. In 1957, he was named Rector of the V. I. Lenin Belorussian State University.

Sevchenko's removal to Minsk marked the beginning of a new phase of his scientific career. The Luminescence Laboratory that he founded and still directs remains one of the foremost scientific subdivisions of the Physics Institute at the Belorussian Academy. It conducts research on the luminescence of organic compounds, organic complexes of the rare-earth elements, and chlorophyll-like molecules, as well as in quantum electronics. At the Belorussian University, Sevchenko supervises work on the luminescence of uranyl compounds, semiconductor optics, the infrared spectroscopy of peroxide compounds, and the luminescence of organic substances. Results of fundamental importance in all of these areas can be credited to Sevchenko's typically profound understanding of the essence of the physical problem, his extraordinary intuition as an investigator, and his skill as a physical experimentor

The studies of the uranyl compounds, which form a highly important class of substances, have led to solution of a number of key problems, making possible better understanding of the mechanism of chemical-



bond formation in uranyl compounds and a reliable interpretation of their electronic vibrational spectra. The key that decodes the vibrational structure of the electronic spectra was Sevchenko's discovery that all constituents of the complex participate in forming the luminescence spectrum of the uranyl compound. The interpretation of the spectra makes it possible to obtain experimentally the many parameters needed for theoretical analysis of the nature of the chemical bonds formed by the uranyl ion.

In a polarization study of the luminescence of uranyl glasses, Sevchenko discovered and investigated a new physical phenomenon: the depolarization that accompanies extinction.

Sevchenko has been engaged in study of chlorophyll-like molecules of the porphyrin type since 1956. The object of this effort is to ascertain the nature of primary processes of photosynthesis.

Prior to Sevchenko's work, there were no reliable experimental data on the symmetry of porphyrin molecules or the anisotropy of absorption and emission of light in these systems—data that were necessary for interpretation of the electronic spectra. A coordinated quantitative investigation of a broad range of luminescence-spectral properties of porphyrins and metalporphyrins enabled Sevchenko to obtain valuable information on the mechanisms of primary photosynthetic processes and certain photochemical reactions in solutions of chlorophyll and its analogs. Here we should

take note of papers on the polarization of the luminescence and quasi-line spectra and measurements of the quantum yield of intercombination conversion. The results of the research were codified in the monograph "The Spectroscopy of Chlorophyll and Related Compounds," which Sevchenko published in 1968 (in collaboration with G. P. Gurinovich and K. N. Solov'ev).

Back in 1940, Sevchenko had collaborated with Vavilov in an interesting study of the extinction curves of the luminescence of rare-earth ions. Since that time, the luminescence of the rare earths has been one of Sevchenko's abiding interests. In 1950, he began research on organic chelate compounds of the rare earths, in which he demonstrated the occurrence of intramolecular migration of electronic excitation energy from the organic part of the chelate to the rare-earth ion.

The conditions, pathways, and mechanisms of energy transfer in complex organic systems with rare-earth elements were determined as a result of analysis of a large body of experimental material, and the transition probabilities were established quantitatively. The phenomenon of secondary luminescence sensitization of rare-earth ions was observed in multicomponent crystals of the complexes.

The classical objects of luminescence research—dyes, phthalimide derivatives, and other so-called complex molecules—received Sevchenko's attention in two aspects: luminescence polarization and the nature of luminescence on anti-Stokes excitation. He has recently produced a series of papers on lasing in organic compounds in connection with the development of quantum electronics.

Sevchenko and his students discovered and investigated the dependence of the fluorescence polarization of complex molecules on the wavelength of the radiation. He proposed a polarization method for determination of the volumes of the solvate envelopes of fluorescing molecules in solutions. Systematic investigation of the luminescence spectra and quantum yields of molecules of various classes with longwave excitation indicated that the anti-Stokes excitation is not specific. Lasing was obtained in a class of luminescing compounds that was new to quantum electronics—the phthalimides—with single-pulse excitation. The vector characteristics of the generated radiation were studied for various classes of compounds. The year 1971 saw the publication of Sevchenko's monograph (with A. M. Sarzhevskiĭ as coauthor) "The Anisotropy of the Absorption and Emission of Light by Molecules," which reflects Sevchenko's work on polarization luminescence and lasing.

Sevchenko is in charge of infrared-spectroscopy studies of free-radical reactions in the liquid phase. Valuable information has been obtained here on the structure of organic peroxides and the mechanism of their initiating effect in polymerization reactions, and on the structure of the resulting polymers.

Since 1962, Sevchenko has paid considerable attention to the optical properties of semiconductor (silicon, germanium, gallium arsenide) single crystals. Use of optical research methods has made possible detailed study of the energy spectra and of the formation and nature of the defects that form when semiconductors are irradiated with fast electrons, neutrons, protons, and γ rays.

Sevchenko has always stressed the practical utilization of scientific results. He is credited with a number of practical developments. Highly sensitive methods of determining sexavalent uranium and a number of rare-earth elements have been based on the fundamental luminescence research of Sevchanko and his students. Studies of the IR spectra of peroxide compounds have made possible rational selection of initiating systems for industrial polymer production processes. Studies of the optical properties of semiconductors with radiation-induced defects led to the elaboration of practical recommendations and technological expedients.

The results of Sevchenko's research are widely familiar to the country's scientific community, and have been reported on various occasions to All-Union and international conferences.

Sevchenko skillfully combines creative scientific research with a great deal of scientific-administrative and teaching activity. As rector of the Belorussian State University, he did much to make the Institution one of the most advanced in the country. In 1967, the V. I. Lenin Belorussian State University was awarded the Order of the Red Banner of Labor—an event that did no small honor to its Rector, Prof. A. N. Sevchenko. Recently, Sevchenko has been devoting much energy to the organization of a new institute at BSU—the Scientific Research Institute of Applied Physical Problems, which shows promise of becoming a first-class scientific-research agency with a broad physical profile. Sevchenko was appointed Director of this institute in 1972.

Much credit is due Sevchenko for the schooling of highly qualified scientific staff. Six persons have won the degree of Doctor of Physico-Mathematical Sciences under his guidance (two are now Corresponding Members of the Belorussian Academy), and over 30 of his students have defended their candidate's dissertations.

The workers of the Belorussian SSR have repeatedly shown high confidence in A. N. Sevchenko by electing him Deputy to the Supreme Soviets of the USSR and BSSR. He was reelected to the Central Committee of the Belorussian Communist Party at its last congress. Sevchenko has participated as a delegate from the BSSR in the work of United Nations international organizations, and in particular in the work of the Agency for the Peaceful Uses of Atomic Energy. Sevchenko is a citizen-scientist who has served the Soviet nation with devotion.

Sevchenko's many years of productive activity in science and higher education have been duly recognized by the Soviet government, which conferred upon him the lofty title of Hero of Socialist Labor and two Orders of the Badge of Honor, and five medals.

This anniversary find Anton Sevchenko full of vigor and energy, new plans and creative ideas. His friends, colleagues, and many students cordially congratulate him on his 70th birthday, and wish him good health, great happiness, and new creative successes.

Translated by R. W. Bowers