



“Researchers in chemistry have already accumulated so enormous amount of information that they might potentially find there answers to the majority of questions of interest without carrying out scientific experiments”

V. A. Koptug

In 2021, it was the 90th anniversary of Valentin Afanasyevich Koptug, Member of the Academy of Sciences of the USSR, President of the International Union for Pure and Applied (IUPAC), President of the Siberian Branch of the USSR Academy of Sciences, Rector of the Novosibirsk State University, Director of the Novosibirsk Institute of Organic Chemistry SB RAS, Honorary Citizen of Novosibirsk.

One of the determinative events in the life of V. A. Koptug, a young Candidate of Sciences, a graduate of the Mendeleev Institute of Chemical Technology in Moscow, was the proposal made by

his Teacher, Professor N. N. Vorozhtsov-Jr., to become Head of the Laboratory of Studying Mechanisms of Organic Reactions in the newly organized Novosibirsk Institute of Organic Chemistry (NIOCh) in the Academy Town under construction near Novosibirsk. V. A. Koptug accepted this invitation.* In Novosibirsk, V. A. Koptug continued working on the problem of isomerization of aromatic compounds, in particular with the help of labeled atom method. This is how the problems of physical organic chemistry became at the focus of V. A. Koptug's attention. The labeled atom method allowed interpreting the

* The explicit biography of V. A. Koptug may be found in specialized issues, for example: Academician Valentin Afanasyevich Koptug. Novosibirsk, Infolio-press, 1997.

mechanism of isomeric transformations of benzene homologues. N. N. Vorozhtsov and V. A. Koptug made enormous efforts to equip the NIOCh with advanced instruments. As early as in 1961, the Group of Molecular Spectroscopy had been organized within the Laboratory, and in 1964 the Group of Mass Spectrometry was organized. The first data on the structure of complexes formed by aromatic hydrocarbons with metal halides and hydrogen halides had been obtained by means of proton magnetic resonance. New, highly informative investigation methods appear in the toolkit of chemistry, and the epoch of avalanche-like accumulation of scientific information starts.

Elected a Corresponding Member of the Academy of Sciences of the USSR, V. A. Koptug takes steps to create a specialized library of spectral information at the NIOCh and puts forward the idea to organize the Scientific and Informational Centre of Molecular Spectroscopy (1971). The problem of computer application in chemistry is under broad discussion; both the methods of information search system arrangement and the algorithms of information search over the infrared spectral databases are theoretically substantiated. These works had been crowned by the successful development of an original device to input the graphical and text information, Graf, patented in the GDR, USA, Great Britain, Austria. In 1975, V. A. Koptug was elected Member of the Commission on Molecular Spectroscopy and Structure at IUPAC.

In 1985, Academician V. A. Koptug was elected Vice-President, and in 1987 – President of IUPAC. In his presidential report at the 35th General Assembly of IUPAC, V. A. Koptug focused on the changing requirements to chemistry from the world community and on increasing attention to environmental problems. At the eminent position of President of the Siberian Branch of the Academy of Sciences of the USSR, Academician V. A. Koptug takes active part in studying the problem of rational management of unique natural objects and resources of Siberia – the Altai and Lake Baikal. The International Centres on Ecological Studies, the United Scientific Council of RAS on ecological problems, a network of analytical and test centres, basic ecological research laboratories, a system of informational provision of ecological studies had been organized with his direct participation. Academician V. A. Koptug was member of the preparative committee and

participant of the United Nations Conference on Environment and Development (Rio de Janeiro, 1992), a fervent advocate of the idea of sustainable development based on the balance of economic prosperity, ecological safety and social justice. In 1993, on the initiative of Academician V. A. Koptug, thematical scientific journal “Chemistry for Sustainable Development” was founded. The special issue of this journal is now before you.**

The current issue presents the works originating, in one form or another, from the ideas of Academician V. A. Koptug, a man of distinction, organizer and scientist. Investigation of reaction mechanisms using physicochemical methods is the subject of works by G. E. Salnikov with co-authors, as well as by E. V. Panteleeva and R. Yu. Peshkov. The article by E. V. Karpova with co-authors is an example of the integrated investigation of historical artifacts with the application of a broad toolkit of physicochemical methods. The enormous applied significance of chromatographic methods is depicted by the research work by N. V. Basov with co-authors, dealing with the quantitative identification of blood plasma metabolites, and by the research article by S. V. Morozov with co-authors, aimed at the studies of concentrations and distribution of persistent organic pollutants. V. D. Tikhova and co-authors have presented the recent advances in the area of analytical determination of fluorine. The ideas of sustainable development, in particular the principles of Green Chemistry, implying active involvement of renewable plant raw materials, development of catalytic processes in organic synthesis are depicted in the articles by S. A. Borison, E. S. Mozhaytsev, A. A. Munkuev. The experimental investigation into the effect of the extracts of carthamoid rhapontic (*Rhaponticum carthamoides*) and cranberry (*Vaccinium oxycoccus*) meal on the physical productivity is discussed in the work by D. A. Khalikova with co-workers. The special issue is completed by the articles by S. A. Cherkasov with co-authors and I. K. Shundrina with co-workers, dealing with the synthesis and characterization of the properties of new functional polymer materials.

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** In 2011, to mark the 80th anniversary of V. A. Koptug, a special issue of the journal SCIENCE First Hand, Vol 38, No. 2 (<https://scfh.ru/journal/2011/bez-straha-i-upreka/>) was prepared by the Siberian Branch of RAS.