Professor Boris A. Trofimov

A Tribute



This Special Issue of Arkivoc is to celebrate the 65th birthday of Boris Aleksandrovich Trofimov, known throughout the world of science as a distinguished specialist in organic, physical-organic and element-organic chemistry.

Boris A. Trofimov was born on 2 October 1938 in the town of Chita. In 1955, after graduation from the Irkutsk secondary school with a Gold Medal, he entered the Chemical Department of the Irkutsk State University. As a University student he learned with enthusiasm and persistence. It was during these young years that the main features of his creative and versatile personality such as an inexhaustible thirst for knowledge and great capacity for work, clearly manifested themselves. His love of organic chemistry developed when he was taking his first steps in chemistry and remains with him to this day.

In 1961 he graduated from the University (Honors Diploma) under Professor Anastasiya Kalabina and set to work at the Irkutsk Institute of Organic Chemistry, Siberian Branch of the USSR Academy of Sciences (at present the A.E. Favorsky Institute of Chemistry, Siberian Branch of the Russian Academy of Sciences, IrICh RAS) under Professor Mikhail Shostakovsky, a close disciple of Academician Alexey Favorsky, head of the renowned classical school of Russian chemistry. In the institute he worked his way up from laboratory assistant (1961) to D.Sc., Professor, Academician RAS, and Director of the Institute. Here are the dates: Junior

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scientist (1962); Candidate of chemical sciences (Ph.D. equivalent) (1965); Scientific secretary (1966); Doctor of chemical sciences (D. Sc.) and Head of the Laboratory of unsaturated heteroatomic compounds (1970); Professor (1974); Deputy Director (1990); Director (1994 till present); Active Full Member of the Russian Academy of Sciences (2000).

Boris Trofimov is the author and co-author of over 850 research papers, 49 reviews, more than 500 inventions**,** 9 monographs, some of which were published abroad (the complete list of his publications exceeds 2000).

Taking charge of the Institute in 1994, he was able to provide the guidance necessary for survival in a time of a dramatic reduction in financial support for research. In very difficult circumstances he produced admirable work in maintaining his scientific staff and developing principal scientific directions which created a sound position for IrICh in world science. Being director and scientist, he does his best to balance his administrative and research activities and fill the working day at the expense of his leisure time lest science suffers. It is surprising that this heavy administrative burden seems to have little affect on his creative potential.

During the last 5 years he has published 200 scientific articles in leading Russian and international journals, a chapter in a monograph and 13 reviews.

Research Interests

The principal direction in his research was and remains organic synthesis based on acetylene, the chemistry of unsaturated chalcogenides, organophosphorus and heterocyclic compounds, mechanisms of the reactions of addition to double and triple bonds adjacent to heteroatoms and functional groups, and prototropic or sigmatropic rearrangements of unsaturated heteroatomic systems.

He and his disciples were the first to systematically introduce super base catalysts and reagents into the chemistry of acetylene and acetylene derivatives, which allowed the development of a series of new reactions and approaches now widely accepted in fine organic synthesis and industrial production. Under his supervision and with his personal participation, new effective syntheses of vinyl and acetylene ethers, -sulfides, -selenides and -tellurides, *O*-vinyloximes, pyrroles, *N*-vinyl-, *N*-ethynyl and *N*-allenylazoles, iminohydrofurans, hydroxyacetylenic acids, vinyloxyallenes, vinyloxy-1,3-butadienes, vinylacrylamides, *etc*., have been developed on the basis of theoretical and experimental studies of direct vinylation and ethynylation using acetylene.

The general reaction of ketoximes with acetylene leading to pyrroles and *N*-vinylpyrroles appears under his name in monographs and textbooks. Recently the Trofimov reaction was shown to be effective for the modification of steroids with pyrrole moieties. Also, the discovery and development of the vinylation of elemental sulfur, selenium, tellurium and phosphorus belongs to him and his school. Progress in this field is mostly related to the systematic

application of highly basic catalytic systems or reagents anchored to non-hydroxylic dipolar solvents (super base systems).

In recent years, together with his research team, Boris Trofimov has developed a new area - the chemistry of phosphide- and phosphinite ions generated from elemental phosphorus in super base systems. This involves *in situ* reactions with electrophiles to form primary, secondary and tertiary phosphines and phosphinoxides. He has also discovered that these ions are prone to add readily to electrophilic alkenes.

The above fundamental investigations led to the development of novel, commercially feasible syntheses of intermediates, building blocks, polyfunctional monomers, sulfur polymers, proton-exchanging membranes, epoxy resins, specialty solvents, cross-linking agents, ion-exchangers, extragents, sorbents, surfactants, corrosion inhibitors, fuel additives, conducting, redox and photosensitive polymers, components for optoelectronic devices and Li-batteries, organic electrolytes, pharmaceuticals, flavors, fragrances and pesticides.

Boris A. Trofimov was awarded the following diplomas, medals and orders: Prizes of Siberian Branch of USSR Academy of Sciences for Basic and Applied Research In Chemistry (1984, 1985, 1990); Gold (1979), Silver (1987) and two Bronze (1972, 1978) Medals for invention activity (from Exhibition of the USSR Achievements in National Economy); Government Medal “For Dedicated Working Activity” (1971); Government Decorations “Sign of Honor” (1986) and “Order of Friendship” (1999). In 1997 he was the recipient of the A. M. Butlerov Award.

His scientific and science-organizational activities have gained worldwide recognition. He is a member of the Asia-Pacific Academy of Advanced Materials; a Honorary Fellow of the Florida Center of Heterocyclic Chemistry, a member of the Editorial Board of journals "Sulfur Reports", "Sulfur Letters", "Journal of Organic Chemistry" (Russia), "Arkivoc" (USA); a member of the United Scientific Council on Chemical Sciences, Siberian Branch, Russian Academy of Sciences; Presidium of Irkutsk Scientific Center, Russian Academy of Sciences; Presidium, East Siberian Scientific Center, Russian Academy of Medical Sciences; Council of Experts of the Supreme Commission on Scientific Qualification; National Committee of Russian Chemists; Bureau of Scientific Council on Organic and Element-Organic Chemistry, Russian Academy of Sciences; Council of the section “Organic Chemistry” of D. I. Mendeleev Russian Chemical Society; Interdepartmental Scientific Council on Chemical and Biological Weapon Convention at the Russian Academy of Sciences and Russian Agency of Ammunition; leader and coordinator of a number of research programs.

The question "What is your hobby?" is always answered by "Organic chemistry". One can meet him in the laboratory more often than in office. He considers spoiled the rare days when he has not time enough to go round all the rooms in his lab, to "peep in each flask", to have a look at spectra and chromatograms. Research work is and remains the matter of priority. He is always accessible and ready to share generously all his knowledge and ideas with his colleagues.

Boris Trofimov is a lecturer and teacher. He guided 62 of his research students to the Ph.D. degree and 18 to doctorate (habilitations). I, as one of them, have been lucky in having him first as a supervisor during my PhD studies, then later becoming one of his coworkers and colleagues. The result has been a fruitful collaboration for four decades.

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