Professor Alexander Ivanovitch Konovalov

A Tribute

Dedicated to Prof. Konovalov on the occasion of his 70th birthday

Alexander Ivanovitch Konovalov, a full Member of the Russian Academy of Sciences, celebrated his seventieth anniversary on January 30, 2004. He is well known to the scientific community for his work in the field of physical organic and supramolecular chemistry.

His interests include reactivity and the mechanism of reactions of organic, organometallic and natural product compounds, the thermodynamics of solvation and intermolecular interactions and the design of receptor molecules, especially the rules governing the complexation and molecular recognition features of calixarenes. He is the author of more than 800 papers including more than 30 inventor's certificates and patents, some of them currently being applied in industry.

Academician A.I. Konovalov made fundamental contributions to the establishment of the factors determining the reactivity of addends in the reactions of 2+2, 3+2, and 4+2 cycloadditions. He carried out complicated kinetic, thermochemical, spectrophotometric and stereochemical investigations. These investigations helped to characterize about 1000 cycloaddition reactions, to determine the enthalpies of more than 200 reactions, and to study charge transfer complexes in dozens of reactions.

Professor A.I. Konovalov and coworkers were the first to apply the donor-acceptor characteristics of addends, such as ionization potentials and electron affinities along with other (thermochemical, stereochemical) characteristics, to the investigation of addend reactivity. This established a correlation dependence, describing the variation of rate constants over a wide range

of reactivity (20 orders of magnitude). A "neutral" type of the Diels-Alder reaction was discovered that resulted in the classification of these reactions on a donor-acceptor basis.

In 1987 A.I. Konovalov was awarded the USSR State Prize in the field of Science and Technology for work on the thermodynamics of solvation of organic compounds in non-aqueous solvents. Quantitative regularities were established that allowed the prediction values of solvation enthalpies in non-aqueous solvents, the determination of vaporization enthalpies of complicated organic compounds from solvation thermochemical parameters and the calculation of energies of various intermolecular interactions in solution.

Professor Konovalov et.al. also developed an important universal model for solvent-separated ion pairs in media with different solvation characteristics as well as the cryptate-method for determining the acidity of organic compounds using [2.1.1] cryptates of organolithium compounds. A universal scale for the cryptate ion-pair acidity of organic compounds was developed for a range of pK_a from 6 to 42, free from association, aggregation and solvation effects. On the basis of these data the dependence of the relative values of ion acidity in gas phase and in solution on $1/\varepsilon$ was established for the first time.

The works of A.I. Konovalov in the field of supramolecular chemistry should be especially noted. These investigations, which started in 1995, resulted in the establishment of the supramolecular chemistry school in Kazan, which has achieved world recognition. One of the most important domains of investigation is the creation of new macrocyclic receptors on the basis of calixarenes and their application in selective binding, extraction and transport of both organic and inorganic substrates including biologically active compounds and radionucleides.

Professor Konovalov was the Head of the Department of Organic Chemistry at Kazan State University (1974-1999), the Rector of Kazan State University (1979-1990), a member of the Administrative Board of the Universities International Association (1985-1995), the Director of the A.E. Arbuzov Institute of Organic and Physical Chemistry of the Kazan Scientific Center of RAS (1990-2001), the USSR people's deputy, and a member of the Commission on Science and Education at the Supreme Council of the USSR. He was awarded the USSR State prize and the Mendeleev Golden Medal as well as many other state prizes.

At the present time Professor A.I. Konovalov is the head of the Kazan chemical school, called by historians "a cradle of Russian organic chemistry". There are more than 50 Candidates and Doctors of Science among his disciples. He was the first to organize the international conferences on supramolecular chemistry in Russia (Kazan, 2000, and Kazan, 2002) as well as the Science-and-Educational Center "Materials and Technologies of the XXI Century" attached to Kazan State University. This Center was established within the framework of the joint Russian and American Program "Basic science and higher education", which is headed by Professor Konovalov at the moment.

Professor Konovalov is a member of the Presidium of RAS, the Chairman of the Presidium of the Kazan Science Center of RAS, Vice-President of the Academy of Science of the Republic of Tatarstan, Vice-President of the D.I. Mendeleev Russian Chemical Society, Chairman of the

Scientific Board on Organic and Organoelemental Chemistry of RAS and a member of the International Council on Heteroatom Chemistry.

He is also a member of the State Prize Reward Committees of the Russian Federation and of the Republic of Tatarstan, of the International Arbuzov Prize Reward Committee (Deputy Chairman), and of the Butlerov Prize Committee (Chairman), among others.

A.I. Konovalov is the Deputy Editor-in-Chief of the Journal "*Russian Chemical Bulletin"*, a member of the Editorial Boards of a number of Russian and International Journals including *"Russian Chemical Reviews"*, *"Russian Journal of General Chemistry"*, *"Russian Journal of Organic Chemistry*", "*Phosphorus, Sulfur, Silicon and other elements*". In addition, A.I. Konovalov is a member of the Arkivoc Editorial Board of Referees

Curriculum Vitae

Name: Alexander I. Konovalov
Date of birth: January 30, 1934
Education: 1974 - Second Degree (Doctor of Chemistry) (Kazan State University); 1963 - Ph.D. in Chemistry (Candidate of Chemistry) (Kazan State University); 1956 - M.S. in Chemistry (graduated from the Kazan State University).
Positions: 1995 - up to date - Chairman of the Presidium of the Kazan Scientific Center of Russian Academy of Sciences; 1990-2000 - Director of the Arbuzov Institute of Organic and Physical Chemistry of the Kazan Scientific Center of Russian Academy of Sciences; 1999-up to date - Professor of the Organic Chemistry Department of Kazan State University; 1974-1999 - Head of the Organic Chemistry Department of Kazan State University; 1968-1972 - Dean of the Chemical Faculty of Kazan State University; 1979-1990 – Rector of Kazan State University; 1966-1974 - Associate Professor of the Organic Chemistry Department of Kazan State University; 1964-1966 **–** Assistant of the Organic Chemistry Department of Kazan State University.
Other activities: Vice-President of the Tatarstan Academy of Sciences; Vice-President of the Mendeleev Russian Chemical Society, Chairman of the Scientific Board on Organic and Organoelemental Chemistry of RAS; a member of Editorial Boards of Russian and International scientific journals: Russian Chemical Bulletin, Russian Journal of General Chemistry, Russian Journal of Organic Chemistry, Phosphorus, Sulfur, Silicon, and other elements; a member of the Arkivoc Editorial board of Referees Member of the International Union on Heteroatom Chemistry; Chairman of the Butlerov Prize Committee of RAS.
Awards and Recognitions: 1990 - Correspondent Member of the Russian Academy of Sciences; 1992 – Academician of the Russian Academy of Sciences; 1991 - Academician of the Academy of Sciences of the Republic of Tatarstan; 1987 - State Prize Winner (USSR) in the Field of Science and Technology for the "Development of the Theoretical Background of Nonaqueous

Solution Chemistry and its Practical Applications"; 2003 - the Mendeleev Golden Medal of Russian Academy of Sciences.

Research interests. Reactivity and Mechanisms of Organic and Organoelemental Compounds; Thermodynamics of Solvation and Intermolecular Interactions, Organophosphorus Chemistry, Supramolecular Chemistry, Chemistry of Macrocyclic Compounds and their Host-Guest Complexes.

Publications. more than 800 articles, abstracts and patents.

List of selected publications

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2. Konovalov, A. I.; Solomonov, B. N. *Dokl.Akad.Nauk SSSR (Russian Edition)* **1973**, *211*, 1115.
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