

## **My way - Curriculum Vitae during 80 years**

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In the first part of his life any scientist is working for his reputation, in the second part his reputation is working for him. Don't be afraid to do what you can't do. Remember, Noah's Ark was built by amateurs and the Titanic was built by professionals. The only person you have to compare yourself with is you were in the past. The only person you have to be better than are you who you are now. In a character of any person there are three golden qualities: patience, sense of measure, and the ability to remain silent. Sometimes they help in life more than intellect, talent and beauty. Everyone would like to live longer, but none would like to be old. The more we go on living the older we become, that is the price for a long life. Whose fault is it that we pay so much? We all know the words one Russian song "Only once in your life you can be 18 and it is youth". As well as 80 (that is far from being young) also can be once. One folk's proverb says "The only one, who does not do anything, does not make a single mistake". I have been working for all my life and I am still working actively and it means I made mistakes. So, I decided to remember the years I lived through and estimate my successes and failures. Well, it really was Old Man Winter in 2013 and 2014. It was very cold outside and nice and warm inside. I was sitting in my chair in front of a fireplace and thinking about life. Time is flying. Just recently, on January 7, 2014, it was my 79<sup>th</sup> birthday. That day Prof. Vladimir A. Babkin from Volgograd-city (Russia) called me and reminded me that the numeric value 79 is the number of the element GOLD (AURUM) in the D.I. Mendeleev Periodic Table of Elements. By the way, the number 80 is the number of element MERCURY (HYDRARGIUM) in the same table. Well, Mercury is a very valuable metal, because Mercury is movement. A well-known Russian poetess Larisa Rubalskaya wrote about that age: "Only one thing consoles me. I am worse than I was, but I am better than I will be". Hardly anyone in gerontology will doubt this thought. So I decided to prepare this volume about my life, my activity in science and my work for many years at the Institute of Chemical

Physics of Academy of Sciences of the USSR (Institute of Biochemical Physics of Russian Academy of Sciences), Moscow State University of Fine Chemical Technology, Kazan National Research Technological University and at Volzhsk Polytechnic Institute. In recent years I have been working together with more than 150 scientists from Russia and colleagues from the USA, the UK, Portugal, Spain, Italy, France, Germany, Poland, Slovakia, the Czech Republic, Romania, Bulgaria, Turkey, Iran, Thailand, Ukraine, Belarus, Uzbekistan and Kirgizia. I asked some of them to write scientific chapters in this volume. I was born on January 7, 1935 in Omsk-city on the banks of the river Irtysh (Siberia). My father Zaikov Efrem Ksenofontovich (1902-1987) was a land-surveyor and, before his retirement, was a teacher of mathematics in high school in Omsk. My mother Zaikova (maiden name Mironova) Matrena Trofimovna (1907-1972) taught general and inorganic chemistry at Omsk Medical Institute. My elder sister Zinaida (1927-2008) was a teacher of physics in high school in Omsk. I had two more sisters Inna and Clara, but they passed away very young. I studied at School No. 4 (elementary school) and No. 19 (middle and high school) and I would like to say that there were many very good and qualified teachers. I still remember many of them. Vera Tarasova (chemistry), Evgeny Klevakin (algebra), Pavel Goncharik (physics), Roza Hatskilevich (geometry and trigonometry), Ferdinand Kremer (geography), Vera Rubinshtein (French), Wilhelm Scpet (violin) and Jadwiga Szczepanovska (pianoforte). When I finished school I had two options: to become a professional violinist (at this time I finished music school for violin and pianoforte) or go to university. My violin teacher Wilhelm Scpet explained to my parents that I could not become a good violinist because my fingers were short (not Niccolò Paganini fingers). In June of 1952 I finished high school and in July of the same year I passed the competitive examinations for the Chemical Faculty Department of the M.V. Lomonosov Moscow State University. The competition was very high (10 applicants for 1 placement). I studied at the University very well. We had excellent professors at the university: Lev Abramovich Tumarkin (mathematics), Victor Ivanovich Spitsyn (inorganic chemistry), Alexander Nikolaevich Nesmeyanov - President of Academy of Sciences of the USSR (organic chemistry), Nikolai Konstantinovich Kochetkov (chemistry of natural compounds), Valentin Alekseevich Kargin (chemistry of high-molecular compounds), Piotr Alexandrovich Rebinder (colloid chemistry) and many others. After my third year at the university I was transferred to a special group. The main task of this group was to separate isotopes for nuclear industry. In this group we separated lithium 6 from lithium 7. We tried many ways and found a very good one. This work lasted for 2.5 years. On the basis of this data I defended my diploma (December 25, 1957). I never worked in this field again. On

February 13, 1957 I started working at the Institute of Chemical Physics Academy of Sciences of the USSR. My friends from the university Lev Andronov and Lamara Privalova (maiden name Kokaya) helped me to find this position because they had already worked at this Institute half a year. I had a chance to begin my career in the laboratory of Prof. Nikolai Markovich Emanuel, a well-known scientist in the field of chemical kinetics. However before meeting Prof. Emanuel I had an interview with his deputies Dr. Erna A. Blumberg and Dr. Zinaida K. Maizus. They gave a positive conclusion and I met Prof. Emanuel. At our first meeting Emanuel asked me what I could do. I said I know chemical kinetics, was able to separate isotopes and I also played the saxophone (I played the saxophone in dance-club). Emanuel joked: "This is very important because none of my co-workers can play the saxophone". And he invited me as a researcher to his laboratory. He was very fond of American jazz and asked me to organize a jazz-band. I did that and every weekend we had dances in our department. Many scientists came over to dance to jazz, that is how I got to know many of them. The Director of the Institute of Chemical Physics was the winner of the Nobel Prize - academic Nikolai N. Semenov. He received the Nobel Prize for research in the field of chain branch reactions in 1956 together with the British scientist Sir Cyril Hinshelwood. On January 4, 1964 I defended my PhD thesis "The comparison of processes of butane oxidation in liquid and gas phases". As a whole, the process of butane oxidation was developed by Emanuel and his co-workers earlier. On the base of these results (including mine), there was constructed a workshop to produce butane oxidation to acetic acid and metylethylketone, in the capacity of 10 thousand tons of acetic acid, at a Moscow oil-processing plant. N. M. Emanuel's co-workers M. G. Bulygin, E. B. Chizhov, and L.I. Korablev worked very hard to build this shop. My Doctor of Science thesis "Role of Media in the Radical Chain Reactions of Oxidation" was defended on April 16, 1968. And on May 20, 1968 I went to Canada (National Research Council of Canada, Ottawa) to work with Prof. Keith Usherwood Ingold for my second training. I worked there for about half a year. I am very grateful to Prof. Keith Ingold (he is still working in the field of biochemical kinetics), not only as he is a great scientist in the field of chemical kinetics, but also because he is a great teacher of life in the West. Now we are friends. After that I worked in the USA, the UK, Japan, and Germany for some time. (In reference to Canada being the 2<sup>nd</sup> training) my first training was in Poland in 1965 at the Institute of Physical Chemistry of Polish Academy of Sciences, Warsaw (Prof. Wojtech Zelenkevich). I learned Polish before my visit to Poland. But when I came to Warsaw I realized that the majority of Polish scientists spoke Russian much better than I spoke Polish. So, it was easy to communicate with them. This training was

very fruitful for me as well. In 1970 I became a Full Professor of Chemistry. My first book with the co-authors N. M. Emanuel and Z. K. Maizus was published in 1973 on the basis of the same research as my Doctor of Science thesis, at Nauka (Science) Publishers (Moscow). Then this book was translated into English and published in Pergamon Press Publishers (Oxford, the UK). At present I (with many co-authors) have already published more than 400 monographs and volumes (about 300 in English and about 100 in Russian) and about 4000 original articles in Russian and in English.. All of them are devoted to Chemical Physics, Chemical Kinetics, Biochemical Kinetics, Biochemical Physics, Polymer Material Science, Composites and Nanocomposites. In 1966 I started doing research in the field of Degradation and Stabilization of Polymers as a part of a general problem in the realm of Polymer Material Science. I am still working in this field today. And a big researching group is working together with me in this area up to the present. I met many great scientists and nice people in my life. Among them: Herman Mark, Charles Overbergers, Eli M. Pearce, Menachem Lewin, Gerald Kirshenbaum from Brooklyn Polytechnic University (NYC, USA), Norman Grassie (University of Glasgow, Scotland, UK), Georges Geuskens from Universite de Libr de Brussel (Belgium), Rainer Wolf (Sandoz Co. Hunige, France), Victor de Manuel de Matos Lobo (Coimbra University, Coimbra, Portugal), Wolfgang Fritsche (German Chemical Society, Frankfurt am Main, Germany), Charles Wright and Antonio Ballada (Himont Company, Wilmington, DE, USA), Paul Edwin Stott (Crompton Co, Middlebury, CT, USA), William Herbert Starnes, Jr. (College of William and Mary, Williamsburg, VA, USA), Alberto D'Amore (The Second University of Naples, Italy), Alfonso Jimenez (University of Alicante, Spain), Ryszard Kozlovski (ESCORENA, UN, Poland), Devrim Balkose (Polytechnik University, Izmir, Turkey), Walter Focke (University of Pretoria, South Africa), Jan Rejer Theodor Frank Groesbeek (VSP International Publisher, Zeist, The Netherlands), Frank Columbus (Nova Science Publishers, New York, USA) and many others. Of course, I would like to mention more names but the size of this volume doesn't allow me to do that. My family helps me both in life and in work: my wife Marina, my son Vadim, my daughter-in law Olga, my grandchildren Alexandra and Denis. Life has changed a lot for the past 20-25 years. Vadim with his family lives in Ohio in the USA, my granddaughter Alexandra is a master's level graduate student in Chicago, Illinois, my grandson Denis is a high school student in Perry, Ohio. My wife Marina Artsis and I are still working at the Institute of Biochemical Physics (part of the Institute of Chemical Physics) Russian Academy of Science in Moscow. I met Marina at the Institute and we have been working together all our life. And Marina always has a "to-do list" to keep me busy. I have already been working at this Institute

for 57 years. I have defined the coming of old age as “when one spends on healthcare and medicine the same part of his budget as on food, clothes and pleasure” - then it means that old age has come. Of course, modern medicine gives us a chance to live longer and have a good life in old age. In any case, in answering Hamlet's question (a hero of William Shakespeare) “to be or not to be?” - We definitely say TO BE.