Nikolay Pavlovich Yushkin
May 20, 1936 – September 17, 2012

Nikolay Pavlovich Yushkin
(1936–2012)

Nikolay Pavlovich Yushkin died September 17, 2012, at the age of 77. Yushkin was an Academician of the Russian Academy of Sciences (1991), Councillor to the Russian Academy of Sceinces (2008), and the recipient of numerous state and non-government awards. He was a director of the Institute of Geology, Komi Science Centre, Uralian Branch, Russian Academy of Sciences (1985-2008) (Syktyvkar, Komi Republic). He was vice-president of the International Mineralogical Association (IMA) and vice-president of the Russian Mineralogical Society (RMS), and he was the chairman and member of many commissions, committees, and scientific councils. He was awarded by state organizations to many ranks, among them "*Honored Scientist of the Russian Federation*", "*Honored Scientist of the Komi Republic*", *"Honorable Explorer"*, and *"Honorable Citizen of Syktyvkar city"*.

He became a professor in 1981 and was an invited professor at several Russian and foreign universities, a supervisor of 9 doctoral (including one academician of the Russian Academy of Sciences and 2 directors of the research institutes of the Russian Academy of Sciences) and 35 PhD dissertations. He was a founder and the Chair of Geology at Syktyvkar State University, with more than 200 graduates during 15 years. Yushkin is an author of 700 scientific publications, including more than 30 monographs and 360 popular science books and articles. He was an editor of 190 monographs, collective works and other publications. He is one of authors of the scientific discovery on "*Regularities of time-space changes in morphology of mineral individuals during natural crystal formation*" and 6 inventions.

Time gradually heals the sadness of this loss. However, there is a feeling of emptiness, which cannot be filled. Nikolay P. Yushkin had an extraordinary creative mind, who opened new horizons in mineralogy.

I met him at the *Fedorov Symposium* in 1981–82, when I was a student at the Leningrad Mining Institute. Nikolay Pavlovich was then already a doctor of science and a famous young professor. His talks attracts a lot of attention. Externally, he had no loud voice but had inexplicit intonations, sometimes not with very ordered sentencing, perhaps because of improvisations in the course of lecture in the old Russian Mineralogical Society library. There was a strong logic in his talks, with historical references, analyses on personal and collegues's results, and, finally, with conclusions that usually broadened the mineralogical horizons. He called them boundaries of the mineral world. I had a chance to know him better in August-September 1992 at the 29th International Geological Congress in Kyoto, Japan. I was strolling through the halls with poster presentations and found Yushkin near the poster with his hypothesis of the origin of life at the final stage of the mineral formation. He was a director of the institute standing near his poster as was requested by the programme. It was a great surpise! Not wasting much time, he immediately explained to me his presentation. Moreover, he found me the next day at my poster and listened to my mathematical interpretation of petrographic structures. In 1995, he agreed to become the advisor for my doctoral thesis, in which I developed this idea.

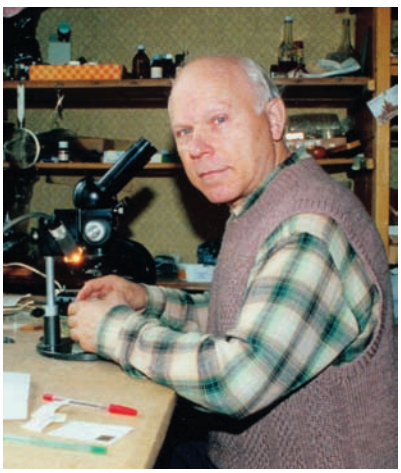
Nikolay P. Yushkin received a classic geological education and agreed with the onthogenic paradigm of Professor Grigoriev and Professor Shafranovskiy. He worked productively in many branches of theoretical and applicable mineralogy, such as general and genetic mineralogy, genetic and informational mineralogy, evolutionary mineralogy and crystal morphology, topomineralogy of ore districts, vitamineralogy, mineralogical diatropics, mineral organobiosis, biomineral co-evolution, archeomineralogy, nanomineralogy, and more. He had the widest knowledge and vision of mineralogy in all meanings of this word. This is a typical characteristics of genuine scientist. Yushkin was able to link mineralogy with other sciences and from my point of view, he was talented at that. Just like in good water colour painting or nature, there are many faces which are not separable.

Another feature of his scientific views is an historical approach (*sub specie aeternitatis*) to the evolution of ideas. For many years he was the chairman of the commission on the history of the Russian Mineralogical Society (RMS). He is an author of remarkable Essay on the evolution of mineralogical ideas, revived Naumann's law of aggregation of mineral individuals, and published the final volume of "*History of Crystallography"* by Professor Shafranovskiy and his scientific letters to/from Professor. It seemed that as Russian Mineralogical Society Vice President, Yushkin could chair a "*more serious*" commission. But no! I think he had the rare skill of being able to separate the fate of scientific ideas from the fate of their creators to understand both. As to the historian of science, an historical section of the 10th All-Russian Fersman Scientific Session will be dedicated to Nikolay Pavlovich Yushkin in Apatity in April 2013.

Yushkin was a gifted Teacher. I mentioned earlier the number of his pupils who completed doctoral and PhD dissertations, as well as the number of his students. He trusted in young generations, who will have to continue the traditions.

Big things are visible from a distance. Becoming part of history, Nikolay Pavlovich Yushkin left us with the problem of understanding the phenomenon of Yushkin. During his life, it was not appropriate and would have been impossible. We were always in a rush to follow him on the periphery of the mineral world from one boundary to another, from one conference to another. However, what can we link with his name? Of course, it is his rare historical and global view of the world with a solid methodological basis. Undoubtedly, it is a brave broadening of the scope of mineralogy with simultaneous deepening into its classic problems. And also, it is his love of life "*in all meanings of this word*".

Yury L. Voitekhovskiy, Director of the Geological Institute, Kola Science Centre



Alexander Petrovich Khomyakov
April 2, 1933 — October 12, 2012

Alexander Petrovich Khomyakov
(1933–2012)

The outstanding Russian mineralogist Alexander Petrovich Khomyakov (2 April 1933 – 12 October 2012) made a great contribution to understanding the mineral world. He is an author and co-author of more than 500 published works on a wide range of scientific problems. His achievements will be remembered as long as mineralogy exists as a science. Alexander P. Khomyakov discovered or participated in the discovery of 101 mineral species, being the first author in 80 discoveries. The latter number is an absolute world record. Although in the total number of new minerals he yields to several of his colleagues, he is ahead of everyone in the number of discoveries as first author.

The scientific contributions by Khomyakov are recognized worldwide. In 1999, an international group of mineralogists and crystallographers, comprising R.A. Gault, J.D. Grice, and T.S. Ercit (all from Canada) as well as O. Johnsen (Denmark), named after him a compositionally outstanding and very beautiful mineral, which they discovered in the ultra-alkaline rocks of St-Hilaire in Canada. Khomyakovite and its manganese analogue manganokhomyakovite, discovered a little bit later, are geochemically unique tungsten-bearing members of the eudialyte group, which was a favorite of Alexander Petrovich during the last two decades.

Upon graduation from the Moscow Geological Exploration Institute (MGRI) in 1957, Khomyakov started to work at the Institute of Mineralogy, Geochemistry and Crystal Chemistry (IMGRE) in Moscow, where he continued to work until his last days, progressing from senior laborer to leading scientist. During the first decades, he specialized in studying the rare metal deposits of Siberia under the leadership of well-known mineralogist Eugene I. Semenov. His works of this period are very interesting. They are dedicated to the crystal chemical mechanisms of the distribution of rare earth elements between minerals. In the late 1960s, he was interested in the high-alkaline rocks of the Khibiny and Lovozero massifs in the Kola Peninsula. They remained a main object of his work for more than 40 years. Here, he made his most important discoveries and conclusions, which made him famous worldwide. In total, he took part in 53 field trips, of which 41 were in the Khibiny-Lovozero Complex and 12 at various alkaline-rare metal occurrences in other regions such as Karasug, Kiya, Belaya Zima, Tatarka, and Burpala in Siberia, Vishnevye Gory in the Urals, carbonatite deposits of Ukraine, and other locations.

It was exhausting work, without weekends, Khomyakov was requested to create not only a home mineralogical laboratory, but also a specialized portable laboratory for research in the field. This included big and small core splitters, binoculars, heavy liquids for the

separation of minerals, a set of portable ultra-violet lamps to study luminescence and, of course, polarizing microscopes with a set of immersion liquids. The latter device should be mentioned particularly. Alexander Petrovich was undoubtedly the best Russian specialist in the optical microscopy of transparent minerals during the last decades. He was an actively practicing specialist. He always would start the initial instrumental diagnostics of unknown or suspicious crystals by defining their optical properties. This method, widely used in the past and presently being in the background due to the development of the microprobe and X-ray equipment, provides very effective results in the hands of a virtuoso. Alexander himself noted quite often that this method helped him to "catch" the most interesting new minerals, most of all, colorless ones.

Khomyakov is known worldwide as a most significant specialist in fundamental mineralogy, and the discoverer of a fantastic number of minerals, discovered by one person. All these minerals belong to alkaline formations, with almost all of them being in the high-alkaline branch. In fact, Khomyakov is a founder of ultra-alkaline mineralogy of hyperagpaitic rocks, comprising not only unusually abundant new minerals, but also large deposits of rare metals and natural soda of endogenic origin. He also worked on the resolution of practical problems. The minerals of this new formation were fragmentarily studied earlier, beginning at the end of the 19th century in Greenland and since the 1920s in the Kola Peninsula. However, they formed a new branch in mineralogy only in the 1970s–80s due to the studies by Khomyakov, who created not only the basic mineralogical part, but also formulated its geological-geochemical, crystal chemical, and genetic aspects. This was part of his Doctor of Science dissertation presented in 1986. "*Mineralogy of Ultra-Agpaitic Alkaline Rocks*", the major monograph by Khomyakov, was published in Russian in 1990. In 1995 an updated edition of this monograph ("*Mineralogy of Hyperagpaitic Alkaline Rocks*") was published by Oxford Press in English, becoming a "*bible*" for alkaline mineralogists.

Other scientific achievements of Khomyakov include serious studies on the theory of structural inheritance in crystal genesis, including the introduction of the concept of transformation of mineral species, most of all transformations of unstable dry ultra-alkaline silicates (the keldyshite and lovozerite groups) and phosphorous silicates (the epistolite-lomonosovite group). Finally, it is worth mentioning his discovery, made in cooperation with crystal chemists, of super-complex structures in minerals. I It was first recognized for mineevite-(Y), comprising simultaneously the carbonate, hydrocarbonate, sulphate, fluoride and chloride anions. Then, it was discovered in multilayered zirconium and titanium silicates of the eudialyte group. These discoveries were considered by Khomyakov as an opening in the knowledge of polymer-like structure, preserved in the mineral world.

More than 20 years ago Khomyakov concluded bravely, that the total number of mineral species exceeds 4,000–5,000 in contradiction to the dominant understanding at the time. In his opinion, this number is unlimited in principle, e.g., after the discovery of *n* mineral, there will be always a discovery of *n+1* mineral and so on, as long as the mineralogical society continuous to function. This forecast is fully confirmed by the dynamic discovery of today.

Khomyakov was a happy person. His wife Elena and son Pavel always provided their support and shared his views. His wife was with him in expeditions and helped in his mineralogical work. His son was his interpreter and assisted with computers. Alexander Petrovich Khomyakov was actively working until his last breath.

He will remain in our memories as a tireless and active researcher and very interesting person in all aspects.

Georgii N. Nechelyustov, Nina V. Skorobogatova, Igor V. Pekov, Boris S. Gorobets

Alexander Efimovich Zadov
December 8, 1958 – December 8, 2012

Alexander Efimovich Zadov (1958–2012)

On December 8, 2012, on his birthday, a talented mineralogist and passionate collector, Alexander Efimovich Zadov, passed away after a long battle with a serious illness. He was only 54 years old.

Zadov was born and grew up in Moscow. After graduating from school and serving in the army, he studied at the Moscow Institute of Steel and Alloys, where he graduated in 1984 with a degree in "casting production of ferrous and nonferrous metals." In 1991, he earned his Candidate of Technical Sciences degree, defending a dissertation on the topic "Binding Compositions Based on Liquid Glass and Ethylene Glycol Acetates." He worked as a technician in the Scientific Industrial Company "Regenerator" and was a very knowledgeable and valuable expert in binding and refractory materials.

But how is that related to mineralogy?

Zadov became passionate about minerals in high school, first as an amateur collector. Unlike many other collectors, he was not only interested in pretty specimens and crystals, but was also attracted to rare and strange minerals, which were sometimes not so good-looking from an aesthetic point of view. He took many trips to various mineral localities, and eventually his eagerness to understand the origin of the minerals he collected brought him to the community of professional mineralogists and crystal chemists. Having a background in silica materials, he quickly became a high-class mineralogist-explorer, particularly known and respected as a specialist in calcium silicates.

It should be noted that calcium silicates, especially hydrous varieties, are one of the most difficult and unrewarding objects for mineralogical studies. When dealing with these minerals, with their phases being so difficult to identify even in aggregates, many well qualified experts tend to give up. However, it was the area that he chose as his focus and where he made the most significant contributions as a scientist. A person with amazing scientific intuition, he was capable of seeing extraordinary things where others did not notice anything special. He made a great contribution to the mineralogy and crystal chemistry of the most complicated tobermorite group, thoroughly investigated calcio-olivine and returned it to the mineralogical classification. He discovered aklimaite, he was a co-author of discoveries of almost ten new natural calcium silicates, and he published very interesting data on rosenhahnite, fukalite, and afwillite. Essentially, it was he who opened to mineralogists the wonderful carbonaceous skarns of Lakarga Mountain, North Caucasus, where almost twenty new minerals were found within the period of less than ten years. Why such high interest in this specific area of science? It successfully combined his life-long occupation with cements and his especially high interest in the mineralogy of rhodingites of the Bazhenovskoe chrysotile-asbestos deposit in the Urals – his favorite object – where he started to collect attractive specimens and later went on studying the systematization of calcium hydrosilicates, which are so abundant in that area. Being an emotional personality, Zadov always talked about these modest-looking minerals and their crystal structures with passion and, even, it would not be an exaggeration to say, poetically.

He was also famous as a brilliant expert in optical microscopy. Having a limited access to laboratory equipment, he turned his own room into a laboratory and mastered the skill of determining the optical properties and density of minerals. Furthermore, he theoretically developed and later created sets of immersion liquids that allowed researchers to breathe freely, literally speaking. One would agree that when measuring optical constants, it is much more pleasant to inhale aromatic oils instead of toxic iodine methylene from standard reagent sets. As an optical specialist (and not only), Zadov participated in studies of minerals very different in composition and genesis, originating from dozens of various deposits around the world; he also completed important generalizations on properties of zeolites and minerals of the labuntsovite group. With his participation, more than 90 (!) new minerals have been discovered. In three of those discoveries, he was the main author. For the period from 2000 to 2010 Alexander Efimovich Zadov is officially recognized as third in the world in the number of discoveries of new minerals.

When talking to Alexander, one would be always impressed by his enthusiasm, genuine interest, curiosity, personal modesty, and absolute altruism. His interest as a researcher was always above his personal ambitions. He always agreed to help people and offered help himself, and he was happy to give his mineral specimens to museums and colleague collectors. Museums of the Russian Academy of Sciences alone received more than a hundred of his specimens. He was a brave and strong person. Knowing that his chances of overcoming his illness were slim, he took care about transferring the main part of his collection to the Fersman Mineralogical Museum of Russian Academy of Sciences.

Let the memory of this open, kind, and bright person be kept in our hearts.

Dmitrii I. Belakovskii, Igor V. Pekov, Nikolay N. Pertsev, and Nikita V. Chukanov