Ecologically Safe and Resource-Sparing Technologies and Materials: Problems and Perspectives

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On July 27–30, 2002, in Ulan-Ude and at the International Ecological Education Centre «Istomino» (Lake Baikal), memorial scientific readings dedicated to the outstanding scientist, pedagog and science organizer, Corresponding Member of the Russian Academy of Sciences Marx Vasilievich Mokhosoev and to the development of those trends in science in whose studies he was engaging for 30 years, were held. Among his versatile scientific interests there were physicochemical studies of phase equilibria in multicomponent systems, chemistry of complex oxide compounds and synthesis of materials on their basis, creation of foundations of processing the mineral raw materials of Buryatia, problems of conservation of Lake Baikal and the Baikal territory from the positions of chemistry of environment.

Marx Vasilievich attributed a great importance to the solution of problems of inorganic material studies. Under his guidance, more than 500 new phases have been obtained, a new class of inorganic compounds (triple molybdates of inequivalent elements) has been discovered, the perspectives of creating, on their basis, segneto- and piezoelectrics, pyroelectric detectors, luminophores, laser materials, solid electrolytes, thermoindicators have been demonstrated.

Under his guidance, a new direction in the technology of processing poor and difficult-to-enrich molybdenum and tungsten ores – chemometallurgical enrichment has been formed. The works in this direction have made it possible to create original methods of comprehensive processing of difficult-to-enrich polymetallic, molybdenum-, tungsten-, and gold-containing ores, synnyrites, to solve some problems of rational management of natural resources and environment protection.

In 1975–1986, M. V. Mokhosoev headed the Buryat Science Centre of the Siberian Branch of the Russian Academy of Sciences. Apart from basic problems, its scientists were engaging in some applied tasks, including those of development of natural resources of the BAM zone. Within the framework of the program "Siberia", recommendations have been developed for concretization of geological prospective works in the region of the Kholodninsk polymetal deposit, in the Tya vein of iron quartzites and of the North Pribaikalia deposits rich in valuable metals. Solving the tasks of national economy, the Presidium of the Buryat Science Centre and its institutes, with the support from the Siberian Branch of the Russian Academy of Sciences, began to actively raise the problems of nature conservation in the basin of Lake Baikal. On the M. V. Mokhosoev`s initiative, a delegation of government members and scientists of Buryatia visited mining chemistry enterprises of the Kola Peninsula and got personally convinced in the perilous consequences of extensive exploitation of apatite deposits. A result of this expedition was the cessation of construction of the Transbaikalian apatite mill (the Oshurkov deposit).

M. V. Mokhosoev was one of the first Buryatian scientists who raised alarm about the continuously growing man-caused load on Lake Baikal and its water area. Being a member and the President of the Supreme Soviet of the Buryat ASSR, he took advantage of this tribune to draw the attention of the Government and ofthe society to nature conservation problems, appeared in the press and television with proposals to introduce waste-free technologies at industrial enterprises of the republic.

The scientists actively participated in the solution of the problem of reprofiling the Baikal Paper and Pulp Mill and purifying its sewage waters.

At the peak of his scientific and social activities, on June 30, 1990, while running an international seminar, Marx Vasilievich died. The heart of the great scientist, leader and man of society, man of a high sense of citizenship duty, stopped beating.

Marx Vasilievich has created the school of "molybdatists and tungstenatists" which continues to work successfully at the Buryat Science Centre (the Baikal Institute of Natural Management, Siberian Branch of the Russian Academy of Sciences), at the Donetsk National University (Ukraine), and in various other cities of Russia. His colleagues and disciples are successfully carrying on his cause, deeming his memory.

The scientific readings of 2002 are a continuation of M. V. Mokhosoev memorial seminars that were held in Ulan-Ude (1991, 1993) and Irkutsk (1996) under the guidance of Academician F. A. Kuznetsov, M. V. Mokhosoev's friend and colleague. The scientific readings were held under the financial support from the Russian Foundation of Basic Research, the Government of the Buryat Republic and the Russian Academy of Sciences (the Scientific Council of the Russian Academy of Sciences for the problem «Physicochemical Basis of Semiconductor Material Science»), the Institute of Inorganic Chemistry, SB RAS, the Buryat Science Centre, the Ministry of Science and Education of the Buryat Republic, and the Buryat State University.

The program of readings encompassed a wide range of basic and applied scientific problems in the following directions:

– phase equilibria in multicomponent systems;

– complex oxide compounds and materials based on them;

– new information technologies and computerized construction of materials;

– ecologically safe and resource-sparing technologies and materials.

A collective monograph of documents and reminiscences of M. V. Mokhosoev "We remember him as this..." was presented to the participants of the Conference and the public of Ulan-Ude.

Within the framework of the Conference, the representative of the European branch of the Shimatsu Company, Bert Steinhof (Duisburg, Germany), carried out a presentation of production of this company.

Representatives of 49 organizations of Russia, Ukraine, Mongolia, Germany and Japan took part in the work of the meeting. The majority of participants were scientists of the Russian Academy of Sciences and of the Ministry of Education of the Russian Federation.

The Russian Academy of Sciences was represented by Kurnakov Institute of General and Inorganic Chemistry, Institute of Spectroscopy, Institute of Metal Physics of the Ural Branch of the RAS, Institute of Solid Chemistry, UrB RAS, many institutes of the Siberian Branch (Novosibirsk, Buryat, Irkutsk, Krasnoyarsk, Yakut Science Centers), Institute of Material Science of the Khabarovsk Science Centre of the Far East Branch, Tananaev Institute of Chemistry and Technology of Rare Elements and Mineral Raw Materials of the Kola Science Centre (Apatity City) *etc.*

In the work of the Conference an active part was taken by the scientists of the Lomonosov Moscow State University, the Russian University of Peoples' Friendship, the Moscow State University of Radiotechnics, Electronics and Automation, the Moscow State Academy of Fine Chemical Technology, the East Siberian State Technological University, the Buryat, Voronezh, Irkutsk, Krasnoyarsk, Kabardino-Balkaria, Rostov, Samara, Tyumen, Ural State Universities and other high schools of Russia.

Besides, there were presented the works of foreign authors from the Donetsk National University and the Ukraine Institute of Mate-

rial Science Problems (Kiev), the Institute of Chemistry and Chemical Technology of the Mongolian Academy of Sciences, the National University of Mongolia, the Centre for Chemistry and Technology of New Materials at the National University of Mongolia, the Ulan-Baatar University, the Mongolian State Pedagogical University *etc*.

The program of readings embraced 160 contributions, including 8 plenary reports, 45 oral section presentations, and 107 posters.

Two parallel sections were working:

– complex oxide compounds and materials based on them;

– ecologically safe and resource-sparing technologies and materials.

Within the framework of the Conference, a competition of works of young scientists and post-graduate students was organized. The participants of the Conference have ascertained with satisfaction an undoubted progress in the science fields under consideration. Despite such a hindering factor as sequestration offinancial support of research, the scientific school created by M. V. Mokhosoev at the Buryat Science Centre has not only survived under the hard modern conditions, but has even increased its potential.

Colleagues have appreciated very highly the contribution made by Buryat chemists to the solution of the problems of inorganic material science and environment protection by means of developing a series of technological processes of comprehensive treatment of natural and secondary raw materials, developing physicochemical and biological methods of purification of industrial and sewage waters, creating ecologically clean materials.