Introduction

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This year, the Joint Institute for High Temperatures of the Russian Academy of Sciences (JIHT RAS) celebrates its 50th anniversary.

The institute counts its beginning from July 11, 1960, when a decree of the Presidium of the USSR Academy of Sciences founded the Laboratory for High Temperatures, USSR Academy of Sciences. Corresponding Member V.A. Kirillin was appointed director. Some time after, at the beginning of 1961, he was replaced by Dr. (Eng.) A.E. Sheindlin; in 1962, on the basis of an order from the USSR government, the Scientific-Research Institute for High Temperatures at the Moscow Energy Institute (MEI) was organized, based on the MEI Problem Laboratory of the Chair of Engineering Thermophysics and USSR Academy of Sciences Institute for High Temperatures.

Within the past 50 years, the institute changed from the relatively small MEI science laboratory into the very large enterprise the Division of Energetics, Machine Manufacture, Mechanics, and Control Processes, RAS, the country's leading scientific center in energetics and thermophysics.

Works on a whole series of completely new directions were developed at the institute for the needs of future energetics, calculation of processes and constructions of energetics setups, and aviation and rocket engineering. For high-temperature nuclear reactors, new construction materials capable of working under high temperatures were required; therefore, the institute began experimental studies in thermophysical transport properties and optical characteristics of such refractory materials as tungsten; molybdenum; niobium; tantalum; vanadium; graphite; aluminum oxides; zirconium; tantalum, hafnium, and zirconium carbides; and metal borides.

A massive cycle of works were carried out in the thermophysical properties of rare-earth metals in connection with their use in nuclear energy installations on fast neutrons, in installations with direct energy conversion, and in new types of rocket engines.

In parallel, large-scale installations were created to study heat exchange under liquid metal flow and heat transfer agents undergoing chemical conversions under high parameters. Beginning in the 1960s, the institute began studies and developments in the field of

low-temperature plasma and the MHD method of heat energy conversion to electric energy. All of the above-listed studies had a fundamental character, which was the basis for the 1967 transfer of the MEI Institute for High Temperatures to the USSR Academy of Sciences. Corresponding Member Sheindlin was selected as director. The Institute for High Temperatures was becoming a large scientific center in the USSR with test areas, branch offices, and divisions for new directions in energetics.

Low-temperature plasma studies were closely related to problems of MHD energy transformation and questions on rocket engineering. The institute embarked on an entire complex of studies of the thermophysical, electrophysical, and optical properties of low-temperature plasma, which have always and to this day remain some of the most important directions in which the institute enjoys a leading role. These are various types of gas discharges (electric arc, microwave discharge, pulse corona, pulsed-periodic discharges, lasers on metal vapors, cryogenic discharges, technological plasmotrons, etc.), theoretical and experimental studies of the behavioral features of a nonideal plasma, and many effects studied with the use of modern supercomputers. At the time, the institute was becoming a unique scientific center with interunion and international ties.

Soon after creation of the institute, its leadership took the decision to create an academic journal, and in 1963, the first issue of *Teplofizika vysokokikh temperatur* (*High Temperature*) was published.

The journal began to publish the most important directions in the thermophysics of high-temperature and energetics, devoted to the thermophysical properties of substances in solid, liquid, and gaseous states; problems of heat exchange in energy devices; plasma studies; etc.

This issue is dedicated to the 50th jubilee of JIHT RAS; it presents certain directions being developed at the institute, as well as in cooperation with other RAS institutes, universities, and organizations.

The editorial board of the journal sincerely congratulates JIHT RAS on its jubilee and wishes further success in contemporary directions of science and technologies.