A.V. Luikov Heat and Mass Transfer Institute
National Academy of Sciences of Belarus

For the years of its existence A.V. Luikov Heat and Mass Transfer Institute (HMTI) of the National Academy of Sciences of Belarus has become a large scientific complex, which is well recognized in various important fields of science and technology. Presently, HMTI is conducting research dealing with problems of heat and mass transfer in capillary-porous bodies, disperse systems, rheological and non-equilibrium media, turbulent non-uniform flows, aerothermo-optical devices and low-temperature generators, laser technologies, power engineering, nanomaterials and nanotechnologies, plasma and wastes treatment, energy and resources saving. This scope of studies comprises the trends of fundamental and applied studies, which is manifested in research and a description of the mechanism of phenomena and processes of energy and substance transfer, as well as in creating the scientific fundamental principles of technological processes and equipment.

The applied aspect of investigations is associated with:

- developing fundamentals of heat and mass transfer energy-saving technology and techniques (general principles of developing, controlling and enhancing the processes of heat and mass transfer and flow);
- elaborating equipment for drying, heat treatment and granulation of materials physical and chemical composition;
- working out heat/mass transfer and energy equipment (heat pipes, heat exchangers, fluidized bed furnaces for low-grade solid fuel combustion, radiation gas heaters equipped with disperse heat carrier) methods of diagnostics of thermal processes (temperature fields, structure, velocity and concentration fields in gas and liquid flows);
- designing control devices of powerful radiant flows propagating in atmosphere, laser gas dynamic and gas discharge systems;
- developing plasma technique and technology of plasma processing of disperse materials (for direct production of steel from iron ore, plasma synthesis of substance, etc.), methods and means of control thermal protection from intensive gas dynamic heating, ecologically clean waste treatment plasma technologies,;
- studying membrane mass transfer (for purification of sewage and polluted water);
- using disperse media for developing ecologically pure technologies (e. g., in coloring processes), etc.

HMTI includes numerous laboratories with up-to-date equipment and possesses highly qualified staff. By using modern experimental and technical base, the Institute is able to confidently solve different scientific and practical problems, thus acquiring new knowledge and developing new technological processes, methods, devices, measuring and experimental facilities. HMTI is a scientific institution with about 500 employees, including 4 academicians, 4 correspondent members, 34 Doctors of Sciences and 97 PhD's.

The novelty and originality of the developments of HMTI are highly appreciated (above 2500 authors' certificates and patents multiple exhibition certificates).

Cooperation in the sphere of science on heat and mass transfer is diverse. It involves exchange of information on the results of conducted studies and, of course, mutually beneficial research and developments under joint programs and contracts. On multilateral or bilateral basis, HMTI fruitfully collaborates with research organizations of the USA (GE), France (CNRS, Air Liquide S.A.), Great Britain (University of Edinburgh), the People's Republic of China (Institute of Thermophysics of CAS, Chinese Academy of Space Technology), Poland (Institute of Flow Machines of PAS). These are only a few examples of institutions of the list, which can be continued by naming Sweden, Italy, Taiwan, India, Ukraine, Russia, Moldova, Lithuania, Germany, etc.

For many years HMTI has been the leading organization in the multilateral academic cooperation on physical and engineering problems of power engineering in heat and mass transfer research.

HMTI possesses a lot of completed developments of advanced energy-saving technological processes, facilities, devices, instrumentation, many of which have been successfully tested, incorporated at separate enterprises or a group of relevant plants, may be brought to a commercial level or are already stock-produced. First of all, this refers to the equipment for drying and thermal treatment of workpieces, heat recovery of second energy resources, use of energy of unconventional sources (fuel cells, hydrogen, solar and biomass power engineering), heat, chemical and thermal treatment of materials by using a disperse heat carrier, processes employing the methods of self-propagating high-temperature synthesis, thermal diagnostics and control systems, different wastes treatment technologies, etc.

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