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Abstract Book

Editors:
Prof. Dr. Gulzar IBRAHIMOVA
Merve KIDIRYÜZ

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ABSTRACT BOOK

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INVESTIGATION OF HEAT AND MASS TRANSFER PROCESSES AT HIGH-TEMPERATURE MEDIA

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Abstract

Solid fuel combustion is a complex physical and chemical phenomenon, which occurs at high temperatures with rapid and complete oxidation of combustible matter (carbon) by atmospheric oxygen and accompanied by a large amount of heat release. Due to the low quality of main Kazakh coal deposits their exploitation at industry has increased scientific and applied relevance. Conducting of deep research on coal combustion in the real conditions can ensure the efficient technological process at all. Heightened interest observed in particular to the study of heat and mass transfer processes at combustion of pulverized Kazakh coal with high ash content. As it known combustion processes take place under conditions of strong turbulence and non-isothermal flow, multiphase medium with a significant impact of nonlinear effects of thermal radiation, interfacial interaction and multistage proceeding with chemical reactions. Such phenomena have an important role in studying of the natural phenomenon of low-grade coal combustion. So investigations of turbulent chemically reacting media are extremely important to deepen knowledge of physical and chemical properties, for application possibilities.

The paper will devoted to the complex research processes of heat and mass transfer occurring in the real conditions of solid fuel (coal) combustion. Development of technological processes with economic and ecological advantages are the main purpose for many researches in thermal physics and technical physics. The complex processes of heat and mass transfer in the presence of combustion are non-stationary, strongly non-isothermal with a constant change in the physical and chemical state of the environment. It greatly complicates their experimental study. In this case, studying of heat and mass transfer in high-reacting media with simulation of physical and chemical processes occur during combustion of pulverized coal is important for the solution of modern power engineering industry and ecology problems. In this regard, a comprehensive study of heat and mass transfer processes at high-temperature media observed. Investigations based on the achievements of modern physics by using numerical methods for 3D modeling. Numerical experiments are conducted to describe and study aerodynamic characteristics, heat and mass transfer processes during the burning of pulverized Kazakhstan low-grade coal.

Keywords: Aerodynamic, Combustion, Heat Exchange, Chemical Reaction, Numerical Experiment