

Experimental Study of Complex Combustion Processes in Higher Education

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Abstract. Institution of higher education - is an educational institution, where in addition to training highly qualified personnel in the field, carried out research in various fields of science and technology. The deterioration of the environment, particularly atmospheric pollution of cities by industrial and transport vehicles, aims to detailed study of combustion processes in the industrial sectors. Within the walls of the university, during the educational process and as final papers, students conduct research on the burning processes of various fuels. The obtained results allow determining the optimal parameters of combustion, to offer technological and constructive solutions, which in turn can solve partially or completely the problem of minimizing harmful emissions and efficient combustion of hydrocarbon fuel.

Introduction

In order to prepare qualified engineers in the field of thermal physics students learn the course of a numerical method of thermal physics, which is widely covered by the combustion process. Numerical modeling of the combustion of different fuels is a complex task [1-4], as it requires large amounts of complex accounting related processes and phenomena: chemical multistage chain reaction transfer of momentum, heat and mass by convection, molecular transport, emission, turbulence, evaporation of liquid droplets, etc. [5]. Therefore, computer modeling is becoming an increasingly important element in the study of combustion processes and the design of various devices that use the combustion process [6-9]. You can expect that his role will increase in the future. At the same time talk about the complete replacement of experimental research by numerical calculations would be wrong—it is about design approaches, which should complement each other [10-12].

The State of the Art

Combustion is a self-sustaining and self-propagating physic-chemical process of converting fuel and oxidant molecules into reaction product molecules. Depending on the state in which the fuel and oxidant are in the aggregate state, two types of combustion are divided: homogeneous combustion - combustion of gases; heterogeneous - combustion of liquid and solid fuels. In homogeneous combustion, the chemical reaction proceeds in a volume where there is fuel and an oxidizer, with such combustion, a physical or chemical process can play a big role. In heterogeneous combustion chemical reaction occurs at the interface, a major role is played by physical processes: diffusion and convection. In this paper, the process of homogeneous combustion of a sputtered fuel is investigated.