



DEVELOPMENT OF ALGORITHMS FOR SIMULATION OF IRON ROD COMBUSTION IN OXYGEN WITH THE DETACHMENT OF THE DROP

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ABSTRACT

The present work is a part of a research program to study the combustion of steel in oxygen at high pressure. A fundamental understanding of iron and steel combustion in oxygen is important to the safe selection and specification of these materials for oxygen service. The problem is studied for a long time, but the actual working models for the simulation of the combustion process a little.

In the paper standard upward-burning promoted ignition tests were considered on cylindrical iron rods in oxygen. There were presented combustion model with the separation drops to investigate influence different factors on the combustion process. The model results were compared with the NASA experiments to clarify the values that were introduced parametrically. The present model allow us to calculate and visualize the combustion parameters such as the speed of the reaction front (front of burning) along the rod, the rate of the mass increasing of the drop and its separation, reaction time, heat distribution along the rod, etc. For simulation there were used The Wolfram Mathematica 7 program.

Keywords: iron, metal combustion, heat conduction, burn criteria, flammability