IAF SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations - IAF SPACE PROPULSION SYMPOSIUM (IP)

Author: Dr. Yingwen YAN
Nanjing University of Aeronautics and Astronautics, China, yanyw@Nuaa.edu.cn

A SIMPLIFIED CHEMICAL REACTION MECHANISM FOR TWO-COMPONENT RP-3 KEROSENE SURROGATE FUEL AND ITS VERIFICATION

Abstract

The simplification of the dynamic model of aviation kerosene oxidation is one of the important problems in numerical simulation of combustion chamber. It plays a decisive role in CFD numerical calculation and for reducing the stiffness of convergence, as well as for introducing chemical reactions to more complex turbulent combustion problems. This paper presents a two-component surrogate fuel model for chemical reactions. Furthermore, the simplified mechanism of the optimization of the ignition delay time and experimental value is adopted by using the direct relation graph method (DRG).The simplified mechanism was introduced into FLUENT to simulate the precast evaporation flame of the Bunsen burner, which is the RP-3 fuel. Numerical results are in good agreement with the experimental results. The established simplified mechanism for the bicomponent RP-3 aviation kerosene alternative fuel can be applied to practical engineering problems of numerical forecast.