Paper ID: 20864
poster
student

SPACE PROPULSION SYMPOSIUM (C4)
Poster Session (P)

Author: Mr. XING Baoyu
National University of Defense Technology, China, xingbaoyu1984@yahoo.com.cn

FLUID-SOLID COUPLED HEAT TRANSFER AND FLOW SIMULATION OF PLATELET HEAT EXCHANGER IN SOLAR THERMAL THRUSTER

Abstract

Thermal propulsion system includes solar thermal propulsion and nuclear thermal propulsion, and it is a significant issue to improve the heat transfer efficiency of the solar thermal thruster. This paper proposes a platelet configuration to be used in the heat exchanger core, which is the most important component of solar thermal system. The platelet passage can enhance the heat transfer between the propellant and the hot core heated by the concentrated sunlight. Based on fluid-solid coupled heat transfer, the paper utilized the platelet heat transfer characteristic to simulate the heat transfer and flow field of the platelet passage. A coupled system includes the coupled flow and heat transfer between the fluid region and solid region.The simulation result shows that the propellant can be heated to the design temperature of 2300K in platelet passage of the thermal propulsion system, and the fluid-solid coupled method can solve the heat transfer in the platelet structure more precisely.