

SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations (IP)

Author: Mr. XINQUAN QIAO
Institute of Spacecraft System Engineering, China Academy of Space Technology (CAST), China,
hitqiaoxinquan@163.com

Mrs. NINGLI ZHANG
China, hitqiaoxinquan@163.com

Mr. HAI GENG
China, hitqiaoxinquan@163.com

Dr. QIWEI ZHAO
China, hitqiaoxinquan@163.com

Dr. JUE WANG
China, hitqiaoxinquan@163.com

Dr. DAPENG WANG
China Academy of Space Technology (CAST), China, wangdapeng@cast.cn

THERMAL TEST ON AN ION THRUSTER

Abstract

Electric propulsion (EP) has been widely used on the spacecrafts of NASA, RKA and ESA, because of its special advantages, compared to chemical propulsion. A thermal test validation on an ion thruster (key part of EP) is investigated in the vacuum chamber for the first time in China. The ion thruster in our test is one type of Kauffman thrusters, which has a good potential to be used in the propulsion systems on the GEO orbit to keep spacecrafts' location. Temperature of the ion thruster (on operation in the test) is derived in this thesis. The working conditions we set in the test are equivalent to the conditions on orbit. Two thrusters are fixed on the bracket in the test, and one of them is on operation in the working condition. The whole test system is located in a vacuum chamber. Temperature of ion thruster and fitted curves are given in this thesis. Just as the test results show in this paper, the highest temperature of the magnet parts in the ion thruster is about 230 degrees centigrade, which is lower than the upper limitation of magnet working temperature range. The ion thruster can work well when it is on operation in a rigorous high temperature environment, which proves that the thermal designs and measures to cool the ion thruster (on operation) are in reason.